



ALPHABETICAL PRODUCT INDEX

A

ABSORBENT PAD / BOOM (OIL).....785
 ACCESSORY PANEL (ELECTRICAL).....572-575
 ACTUATORS (CLUTCH).322-331, 351-353, 356, 357
 AIR CONTROLS.....310-353
 AIR HORNS/ WHISTLES.....734-737
 AIR OPERATED TOILETS.....521
 AIR STARTERS.....509-510
 ALARMS PANELS & SYSTEMS.....*****
 BILGE.....501-504
 FIRE PROTECTION CONTROL.....760-775
 LIQUID LEVEL.....501-504
 MULTIFUNCTION.....501-504
 SHIP'S GENERAL ALARM.....665
 ALUMINIZED EXHAUST SILENCERS.....418-429
 ALUMINUM HATCHES / DOORS....82, 83, 109-114
 AMMETERS.....558
 ANCHORS.....786
 ANCHOR LIGHTS.....612, 614, 615, 617-622, 673
 ANODES (SACRIFICIAL).....778, 779
 ANTENNA.....776
 ANTI-SLIP TREADS.....781
 AUTOMATIC FOG SIGNAL TIMER.....740
 AXE.....741

B

BALL JOINT (CONTROL CABLE).....400, 401
 BARGE
 CORNER PLATES.....69
 EXPANSION JOINTS.....69
 HOSE CRANE.....70, 73
 INTERLOCKING DEVICE.....65
 LIGHTS.....670, 671
 BARGE PULLEY.....799
 BARRICADE LIGHTS.....666
 BASKET STRAINERS.....514-520
 BASKETS (PERSONNEL).....742
 BATTERY
 BOXES.....592, 593
 CHARGERS.....588, 589
 ISOLATORS.....570
 SWITCHES.....590,591
 BEARINGS FLANG
 ED.....268-271
 RUDDER.....273
 SLEEVE.....264-268
 STAVE.....274-275
 NON-METALIC.....264, 266, 273
 BELL MOUTH (SUCTION).....64
 BELL
 FOG.....738, 739
 ELECTRIC.....768
 BELT POUCH.....684
 BILGE
 PLATES.....68
 PUMPS.....530, 531
 SWITCH.....465, 466, 529
 BIO CULTURE MSD ENHANCER.....525, 526
 BITTS (SINGLE & DOUBLE).....33-39
 BLADE (WIPER).....759

BLOCKS & SHEAVES.....149-152
 BOLT ON BUMPERS.....292
 BOOKS.....787
 BOOMS (OIL SPILL).....785
 BOAT CHAIR.....754, 755
 BOX (STUFFING).....278-281
 BRACKETS (MOUNTING FIRE AXE, RING BUOY &
 LIGHTS).....693, 708, 721
 BRAKE SHOES (WINCH).....209, 238, 246
 BREAKER (CIRCUIT).....578
 BUOYS
 RING.....693, 708
 MARKER.....726
 REGULATORY.....722,725,726
 MOUNTING HARDWARE.....721, 748
 BULBS.....613, 634
 BUMPERS.....290-294, 307
 BUOYANT APPARATUS.....728
 BUTTON CHOCKS.....46, 48-53
 BUTTON ROLLER.....56,57

C

CABLE
 CUTTERS.....250-253
 HARDWARE.....400, 403
 PUSH-PULL CONTROL.....396-399
 SHIPBOARD ELECTRIC.....542-546
 VERNIER CONTROL.....399
 CABIN LIGHTS.....648-652
 CAPSTAN.....142, 143, 213, 214
 CARGO (LIQUID GUAGE).....59, 792, 793
 CARGO VALVE POSITION INDICATOR.....794
 CHAIRS (PILOT HOUSE).....754, 755
 CHANNEL MARKER BUOYS.....726
 CHARGERS (BATTERY).....558-564
 CHECK VALVE.....334, 346
 CHOCKING COMPOUNDS.....284-286, 289
 CHOCKS
 BUTTON.....46, 48-53
 CLOSED.....41
 KEVEL.....29-30
 OPEN.....40, 47
 PANAMA.....43-45
 ROLLER.....54-58, 153
 CHLORINE TABLETS.....525, 526
 CIRCUIT BREAKERS.....578
 COATINGS.....286, 287
 CLEANERS - TANK.....527
 CLEAN OUT HATCHES.....20-27, 101, 102
 CLEATS.....29
 CLEVIS (CONTROL CABLE).....401
 CLUTCH ACTUATORS.....331-324, 351
 COMPASSES.....733
 CONTROLS
 ELECTRONIC.....354-370
 MECHANICAL ENGINE/TRANSMISSION...371-376
 PNEUMATIC ENGINE/TRANSMISSION....310-353
 CONTROL PANELS
 ENGINE.....479-482, 497-500
 GENERATOR.....497, 498, 557
 CONVERTERS (VOLTAGE).....565
 COOLANT LEVEL SIGHT GLASS.....455-458

COOLANT LEVEL SWITCH.....455-458, 461
 COOLERS (ENGINE/TRANSMISSION).....511, 512
 CORNER PLATES.....69
 COVERALLS (FLOATATION).....692,711
 CRANKCASE VENTILATION FILTERS.....430
 CRANE
 BARGE.....70-73
 DAVIT.....74-79
 CUTTERS (WIRE ROPE).....250,253
 CRAWLER (DECK).....780, 781

D

D-RINGS.....32
 DC-DC CONVERTER.....565, 576
 DASH SWITCH.....***
 DAVIT CRANES.....74-79
 DAY MARK SIGNALS.....727
 DECK
 CRAWLER (PAINT REMOVAL).....780
 HORNS.....587
 BOX.....800
 DRAIN.....801
 PLUGS.....801
 DECK FITTINGS.....SECTION 1
 DECK HAND MANUAL.....787
 DEMOUNTABLE STAVE BEARINGS.....274, 275
 DESTROYER WHEEL.....758
 DIESEL FUEL FILTER.....431-440
 DIGITAL TACHOMETER.....469-472
 DIPSTIC LEVEL GAUGE.....792, 793
 DISINFECTANT TABLETS.....525, 526
 DISHED HEADS.....66,67
 DOCK
 LIGHTS.....672, 669
 FENDERING.....293-307
 WINCHES.....215-219
 DOG HANDLES.....28
 DOME (EXPANSION).....60-62
 DOME LIGHTS.....648, 649
 DOORS
 JOINER.....80, 81
 WEATHERTIGHT.....82
 WATERTIGHT.....85-89
 DOUBLE BITTS.....33-35
 DRAIN (DECK).....801
 DREDGE LIGHTS.....683
 DRY BAGS.....587
 DRY SUIT.....713-718
 DUPLEX STRAINERS.....516, 517

E

E.P.I.R.B.....AVAILABLE, NOT SHOWN
 ELECTRIC
 ENGINE CONTROLS.....354-370
 GAUGE.....484
 HORN.....505
 PUMP.....529-533
 TOILET.....521-524
 WINCH.....120-131, 140, 141, 186-208,
 211-212, 215-221, 230-249



ALPHABETICAL PRODUCT INDEX

ELECTRICAL
 ACCESSORIES.....580-583, 585-587
 CABLE.....542-546
 PANEL.....572-575, 578
ELECTROLYSIS ELIMINATORS.....778, 779
ELECTRONIC STEERING CONTROLS.....382-389
EMERGENCY LIGHTS.....731
ENGINE
 ALARMS.....479-482, 497,498, 501-504
 COOLING.....511, 512
 CONTROL.....486-490, 497-500
EPOXY CHOCKING COMPOUND.....284
EXHAUST
 BLANKETS.....408
 FLEXIBLE CONNECTIONS.....404-407
 SILENCERS.....410-429
EXPANSION PLATES.....69
EXPANSION TRUNKS.....60-62
EXTINGUISHERS (FIRE)...AVAILABLE, NOT SHOWN
EXTRUDED FENDERING.....293
EYE BOLT.....28

F
FABRICATED WIRE ROPE CHOCK.....46-47
FAIRLEAD.....151
FENDERING (RUBBER).....290-307
FIDS.....786
FILTERS.....430-440
FIRE
 ALARM SYSTEMS.....760-775
 AXE /BRACKET.....741
 EXTINGUISHERS.....AVAILABLE, NOT SHOWN
 HOSE.....750
 NOZZLES.....749, 750
 HOSE REELS / RACKS.....744-747, 750
FIRST AID.....AVAILABLE, NOT SHOWN
FITTINGS (DECK).....SECTION 1
FLAME SCREENS.....796
FLANGED BEARINGS.....268-271
FLANGED DISHED HEADS.....66, 67
FLAX PACKING.....276, 277
FLEX TREAD.....781
FLEX EXHAUST CONNECTION.....404-407
FLEXIBLE LADDER.....750
FOAM DAMMING MATERIAL.....285
FOG BELLS.....738, 739
FOG SIGNAL TIMER.....740
FLOATS.....728
FLOAT COATS.....691, 692, 707, 710, 712
FLOAT FREE LINK (ROPE).....727
FLOATATION VESTS...684-690, 697, 702, 705-708
FLOOD LIGHTS.....667-669, 677-682
FLUORESCENT LIGHTS.....650-652
FLUSH HATCHES.....2, 3, 6, 22, 27, 109-115
FREQUENCY METERS.....557
FUEL FILTERS.....431-440
FUEL LEVEL GAUGES.....59, 792-793
FUEL OIL TANKS.....59

G
GASKET
 DOOR.....84, 276, 784

HATCH.....84, 276, 784
GAUGES
 AMMETER.....558
 AMPERAGE.....484
 COMPOUND P/V.....795
 ELECTRIC.....484
 FUEL.....484
 HOURMETER.....467, 472, 491, 492
 OIL PRESSURE.....441, 446
 OIL TEMPERATURE.....449-452, 483
 TACHOMETER.....467-472
 TEMPERATURE.....449, 452-454
 VOLTMETER.....484, 557, 577
GAUGING (TANK BARGE).....***
 GAUGE TREES.....798
 RAISING STICK GAUGES.....792, 793
 SIGHT GLASSES.....788, 789
GENERATORS.....548-554
 CONTROL INSTRUMENTS.....557
 VOLTAGE REGULATORS.....555-557
GRIDCOOLERS.....511, 512
GRINDING MACHINES.....780, 781

H
HAILERS.....501
HANGERS (SHAFT).....AVAILABLE, NOT SHOWN
HAND FID.....786
HAND HELD RADIO.....AVAILABLE, NOT SHOWN
HANDWHEELS (VALVE).....794
HAND WINCHES / PARTS.....118-119, 132-137, 154-184, 222-229
HARD COATED SHAFT SLEEVES.....282, 283
HATCH
 ALUMINUM.....109-114
 BOLTED CLEAN OUT.....20-27, 101, 102
 FLUSH.....2, 3, 6, 22, 27, 109-115
 PACKING.....84, 276, 277
 RAISED...4, 5, 7-15, 19-21, 23-26, 90, 91, 93, 94, 96-100
 RAISED WATERTIGHT...4, 5, 7-15, 19-21, 23-26, 90, 91, 93, 94, 96-100
 QUICK ACTING.....91, 92, 96, 98-100, 109-115
 SPRING BALANCED.....91, 93, 95-98
 ULLAGE.....17, 18, 97
HELI-SEP OIL WATER SEPARATOR.....528
HELM PUMP.....390-393
HERTZ METER.....557
HORN
 AIR.....734-737
 ELECTRIC.....505
 SWITCH.....737
HOSE (FIRE).....750
HOSE CRANE.....70-73
HOSE TYPE STUFFING BOX.....280, 281
HOURMETER.....467-472, 491, 492
HULL ANODE.....778, 779
HULL FENDERS.....290-294, 307
HYDRA ELECTRIC WINCHES / PARTS.....196-210
HYDRAULIC STEERING.....390-395
HYDROSTATIC LEVEL SWITCH.....465, 466

I
IDENTIFICATION / INFO PLACARDS.....782, 783
IGNITION SWITCH.....***
IMMERSION SUITS....694,696, 711, 717, 718-720
INCANDESCENT SEARCHLIGHT.....625-647
INDICATOR (RUDER ANGLE).....381
INFLATABLE PFD'S.....690, 701, 702, 704
INSTRUMENT PANELS.....***
INTAKE WATER STRAINERS.....518-520
INTERLOCKING DEVICE (BARGE).....65
INVERTER.....562, 563
INVERTED CHECK VALVE.....790, 791
INSULATION BLANKETS.....408
ISOLATOR INTEGRATOR.....570

J
JACKETS (FLOATATION)...691, 692, 709, 710, 712
JIFFY MIXER.....285
JOG LEVER.....382, 383
JOY STICK.....384

K
KEEL COOLERS.....511, 512
KEVELS.....29-31

L
LADDERS.....750
LAMPS/ BULBS.....624, 634, 635
LAMP SOCKETS].....634, 635
LEAVING LINE.....696, 786
LENSES.....624
LEVEL GAUGES.....484, 493-496, 792
LEVEL SWITCHES.....461-466, 484, 493-496
LIFE
 BUOYS.....693,708, 723
 FLOAT.....728
 JACKET.....684-690, 697-702
 RING.....683, 708, 723
 VEST.....684-690, 697-723
LIGHTS.....***
 ANCHOR.....673
 BARGE.....670,671
 BULBS.....613
 BULKHEAD.....660-664
 BUOY.....674, 729, 730
 DECK.....660-664
 DOME.....648, 649,648, 649
 FLOOD.....667-669, 677-682
 FLUORESCENT.....650-652
 L.E.D.....667-673, 675-682
 MAN OVERBOARD.....695, 721, 732
 NAVIGATION.....612-624, 670, 671, 675, 676
 PEEP.....***
 PFD.....695, 731
 SEARCHLIGHTS.....598-611, 625-617
 SOLAR POWERED.....670-672
 STROBE.....695, 721, 731, 732



ALPHABETICAL PRODUCT INDEX

WATER.....695, 718, 720
 LINE (THROW BAG).....696
 LIQUID LEVEL SWITCHES.....461-466, 455-458
 LOCK LINE.....786
 LOW PRESSURE SENSOR.....447, 448
 LOUD HAILER.....587

M

MACERATOR PUMPS.....AVAILABLE, NOT SHOWN
 MAGNESIUM ANODES.....778, 779
 MAGNETIC PICK UP.....470
 MAN OVERBOARD LIGHTS.....695, 721, 732
 MANHOLE HATCH.....2, 3, 6, 22, 27, 109-115
 MANUAL WINCHES.....118-119, 132-137,
 154-184, 222-229
 MARINE BEARINGS.....262-275
 MARINE VHF RADIOS.....AVAILABLE, NOT SHOWN
 MARKER BUOYS.....726
 MOORING
 BUOYS.....723, 724
 RINGS.....42, 63
 MUFFLER (EXHAUST).....410-429
 MURPHY GAUGES.....441-504

N

NAVIGATION LIGHTS..612-624, 670, 671, 675, 676
 NAVIGATION RULES BOOK.....787
 NAVY SPECIAL LIGHT.....731
 NUMBERS/ LETTERS/ SIGNS.....782, 783
 NON SKID TREADS.....781
 NON-METALIC BEARINGS.....264, 266, 273
 NOZZLE (FIRE HOSE).....749, 750

O

OARS / OARLOCKS.....786
 OIL ABSORBENT
 BOOMS.....785
 PADS.....785
 SPILL KIT DRUMS.....785
 OIL POLLUTION SIGN.....782, 783
 OIL PRESSURE GAUGES/ SENDERS.....441-446,
 483, 484
 OIL PRESSURE SWITCH.....447, 448
 OIL / WATER SEPARATOR.....528
 OPEN CHOCK.....40
 OVERPACK (POLLUTION CONTROL DRUM).....785

P

PACKING PULLERS.....276, 277, 784
 PAAD (OIL ABSORBING).....785
 PADDLES (OARS).....786
 PANELS.....482-485
 PANEL METERS.....557, 577
 PERSONNEL BASKET.....742
 PFD'S.....684-690, 697-702, 705
 PFD LIGHT.....695, 731

PIKE POLES.....786
 PILOTHOUSE CHAIR.....754, 755
 PLACARDS.....782, 783
 PLATFORM LIGHTS.....***
 PNEUMATIC CONTROLS.....310-353
 PNEUMATIC DECK SCALER.....780, 781
 PNEUMATIC SWITCH.....737
 POLLUTION CONTROL
 BOOMS.....785
 PAD.....785
 MARINE SANITATION DEVICES.....521-524
 OIL / WATER SEPARATORS.....528
 OVERPACK DRUM KIT.....785
 SIGNS / PLACARDS.....782, 783
 POUCHES (BELT / BACK).....684
 PORT LIGHTS.....103-108
 POWER SUPPLIES.....566-569, 571
 PRESSURE GAUGES.....441-446
 PRESSURE SWITCHES.....447, 448
 PRESSURE VACUUM GAUGE.....795
 PROPELLERS.....256-261
 PUMPS
 HELM.....390-393
 WATER.....529-538
 PULLER (PACKING).....276
 PULLEY (90° ELBOW).....799
 PUMP STRAINERS.....514-520
 PUSHNEE BUMPERS.....290-307
 PUSH PULL CONTROL CABLES.....396-399
 PV VALVES.....795, 797

Q

QUICK ACTING W.T. DOORS / HATCHES...91, 92,
96, 98-100, 109-115

R

RADIOS (VHF MARINE)....AVAILABLE, NOT SHOWN
 RATCHETS.....116
 RATCHET STRAP.....63
 RAIN CAPS (EXHAUST).....407
 RAISED WATERTIGHT HATCHES.....4, 5, 7-15,
19-21, 23-26, 90, 91, 93, 94, 96-100
 REACH RODS.....794
 REFLECTIVE TAPE.....693
 REGULATOR (VOLTAGE).....555-557
 RELAY AIR VALVE.....318-321, 349, 350
 RELEASE AGENT.....285
 RESCUE EQUIPMENT.....693-696, 703, 704
 RING BUOYS/BRACKETS.....639, 708, 721, 723, 748
 RISING STICK GAUGE.....792, 793
 ROLLER BUTTONS.....56, 57
 ROLLER CHOCKS.....54-58, 153
 ROPE.....696, 786
 RUDDER BEARINGS.....273
 RUDDER ANGLE INDICATORS.....381
 RUDDER FEEDBACK UNIT.....377-380
 RULES (NAVIGATION).....787

S

SANITATION SYSTEMS.....521-524
 SCALER (DECK).....780
 SCUPPER PLUGS.....801
 SCUTTLE (WATERTIGHT).....91, 92, 96, 98-100,
109-115
 SEARCHLIGHTS
 INCANDESCENT.....625-647
 XENON.....598-611
 SEAT - PILOT HOUSE.....754, 755
 SELF ALIGNING ROLLER CHOCKS.....54
 SELF PRIMING PUMP.....530-538
 SENDERS
 OIL PRESSURE GAUGE.....449-452, 483, 484
 TACHOMETER.....467-472
 WATER TEMPERATURE GAUGE.....449-452, 483, 484
 SHADES (WINDOW).....757
 SHAFT
 BEARINGS.....268-271
 SLEEVES.....264-268
 SHEAVES / BLOCKS.....149-152
 SHIP BELLS.....738, 739
 SHIPBOARD CABLE.....542-546
 SHUT DOWN DEVICES.....799
 SHUTDOWN SYSTEM PULLEY.....799
 SIGHT GLASSES.....459, 460, 788, 789
 SIGNS.....751
 SIGNALS (DAY MARK).....727
 SILENCERS.....410-429
 SINGLE BITTS.....36-39
 SLEEVE BEARINGS.....262-268
 SLIDING WINDOW.....756
 SOCKET (LAMP).....634, 635
 SOLAR POWERED LIGHTS.....670, 671, 672
 SOLAR WINDOW SHADES.....757
 SOLENOID AIR VALVE.....737
 SPIKE POLES.....786
 SPILL RESPONSE KITS.....785
 SPOTLIGHTS.....625
 STARTERS (AIR).....509, 510
 STAVE BEARINGS.....274, 275
 STEERING - HYDRAULIC.....390-395
 STEERING LEVERS.....385, 387
 STEERING WHEELS.....758
 STICK GAUGE.....792, 793
 STRAINERS.....514-520
 STRETCHERS.....742, 743
 STROBE LIGHTS.....507, 508, 695, 721, 731, 732
 STUFFING GLAND (REACH ROD).....794
 STUFFING BOXES (PROPELLER SHAFT)....278-281
 SUCTION BELLMOUTH.....64
 SURVIVAL SUITS (COLD WATER)....694, 696, 711,
719, 720
 SWITCH
 AC SELECTOR.....579, 580
 BATTERY.....590, 591, 594
 BILGE LEVEL.....461-466
 FLOAT.....529
 IGNITION.....594
 PANEL.....594
 PUSH BUTTON.....594
 SWITCHGAUGE.....441-444, 449-452, 455-458,
479-481, 493-496



ALPHABETICAL PRODUCT INDEX

T

| | |
|------------------------------|------------------------|
| TACHOMETERS..... | 467-472 |
| TAILSHFT SLEEVES..... | 282, 283 |
| TANK CLEANERS..... | 527 |
| TANK LEVEL GAUGES..... | 59, 455, 458, 792, 793 |
| TANK VENTS..... | 790, 791, 795 |
| TAPE – REFLECTIVE..... | 693 |
| TATTLETALE RELAYS..... | 473-478 |
| TEMPERATURE GAUGES..... | 449-452 |
| TEMPERATURE SWITCH..... | 453-454 |
| THERMOMETERS..... | 795 |
| THROTTLE ACUATORS..... | 322, 323, 352, 353 |
| THROTTLE CONTROL CABLES..... | 396-404 |
| THROW BAGS (ROPE)..... | 696 |
| TOILETS..... | 521-524 |
| TOW KNEE PADS..... | 290-292 |
| TOWING LIGHTS..... | *** |
| TUBE TYPE SIGHT GLASS..... | 459, 460 |
| TUMBLEBOLTS..... | 28 |
| TWIST LOCK HATCH..... | 6 |

U

| | |
|-------------------|------------|
| ULLAGE HATCH..... | 17, 18, 97 |
|-------------------|------------|

V

| | |
|-------------------------------|---------------------------|
| VACUUM GAUGE..... | 795 |
| VALVES – SOLENOID..... | 737 |
| VALVE POSITION INDICATOR..... | 794 |
| VENT CHECK VALVES..... | 790, 791 |
| VEST (FLOATATION)..... | 684-690, 697-702, 705-708 |
| VHF MARINE RADIOS..... | *** |
| VOLTAGE REGULATORS..... | 555-557 |
| VOLT METERS..... | 484, 494-496, 557, 576 |

W

| | |
|--|--|
| WATERTIGHT DOORS..... | 85-89 |
| WATERTIGHT HATCHES..... | 2-27, 90-102, 109-115 |
| WATER LIGHTS..... | 721, 732 |
| WATER / OIL SEPARATOR..... | 528 |
| WATER PUMPS..... | 529-538 |
| WATER STRAINER..... | 518-520 |
| WATER TEMPERATURE GAUGES /SENDERS..... | 449, 452, 483 |
| WELD ON BUMPERS..... | 290-307 |
| WHEELS | |
| PROPELLER..... | 256-261 |
| STEERING..... | 758 |
| VALVE..... | 794 |
| WHISTLE (AIR / STEAM)..... | 737 |
| WINCHES | |
| AIR..... | 138, 139 |
| ANCHOR..... | 220,221 |
| BARGE POSITIONING..... | 215-219 |
| ELECTRIC..... | 120-131, 140, 141, 186-208, 211, 212, 215-221, 230-249 |
| MANUAL..... | 154-184, 222-229 |
| SPUR GEAR..... | 118, 119, 132-137 |

| | |
|----------------------------|------------------------|
| WINDOW SHADES..... | 757 |
| WINDSHIELD WIPERS..... | 759 |
| WINDSHIELDS / WINDOWS..... | 756 |
| WIRE (ELECTRICAL)..... | 542-546 |
| WIRE ROPE BUTTON..... | 46-53 |
| WIRE ROPE CUTTER..... | 250,253 |
| WORK VESTS..... | 648-690, 697, 706, 707 |

X

| | |
|-------------------------|---------|
| XENON SEARCHLIGHTS..... | 598-611 |
|-------------------------|---------|

Y

| | |
|-----------------------------|-----|
| YOKES (VALVE COUPLING)..... | 794 |
|-----------------------------|-----|

Z

| | |
|------------------|----------|
| ZINC ANODES..... | 778, 779 |
|------------------|----------|



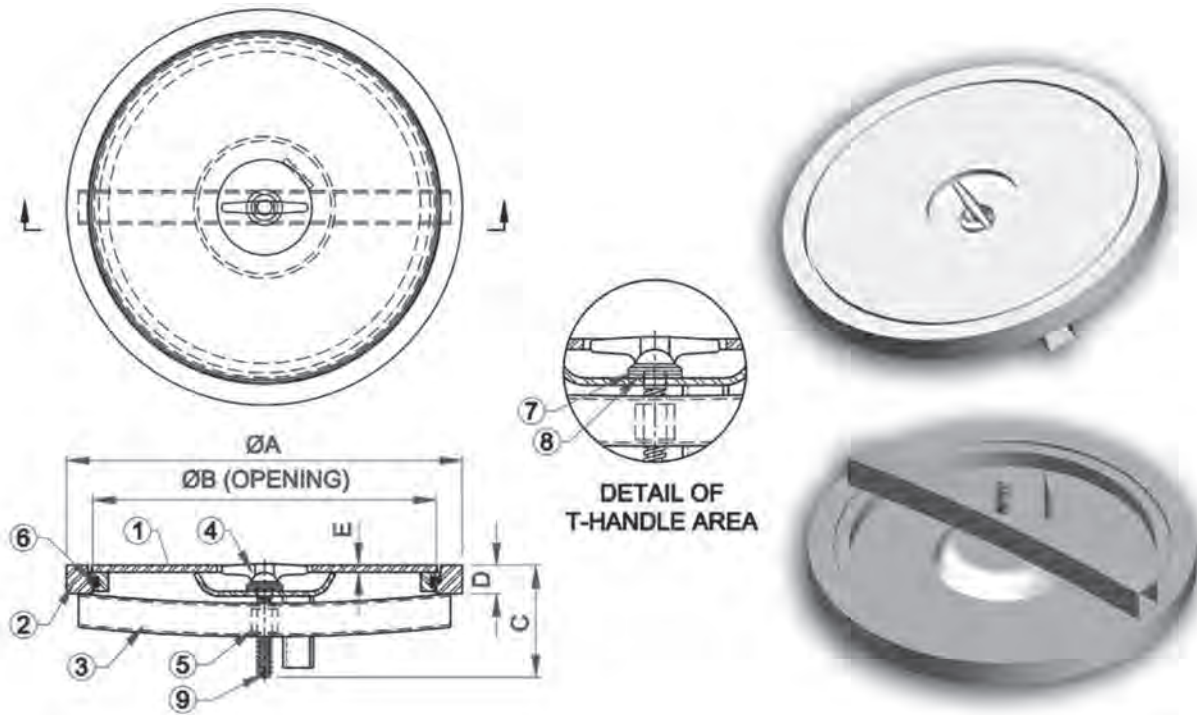
TABLE OF CONTENTS

| | | |
|---|----------------|-------------------|
| DECK HARDWARE FLUSH / RAISED WATER TIGHT HATCHES • KEVELS • KEVEL CHOCKS • ROLLER CHOCKS • BUTTON CHOCKS SINGLE / DOUBLE BITTS • HOSE CRANES • DAVITS • WATER TIGHT DOORS • PANAMA CHOCKS • FUEL TANKS • SUCTION BUTTONS | 2-117 | SECTION 1 |
| WINCHES THERN WINCHES • WINTECH WINCHES • JEAMAR WINCHES & SHEAVES • NABRICO WINCHES BARGE MOVING WINCHES • CONNECTORS • WINCH HOISTS • WIRE ROPE CUTTERS | 118-255 | SECTION 2 |
| PROPULSION / TAILSHAFT EQUIPMENT PROPELLERS • SLEEVE / FLANGED RUDDER & STAVE BEARINGS • PACKING • STUFFING BOXES NICKEL – CHROME – BORON HARD COATED SHAFT SLEEVES • CHOCKING COMPOUNDS | 256-288 | SECTION 3 |
| BUMPERS / FENDERING CURVED / FLAT WELD ON BUMPERS • BOLT ON BUMPERS • EXTRUDED FENDERS • MODULAR BUMPERS LAMINATED SLICED TIRE FENDERS • DOCK FENDERS • BOAT DOCKING FENDERS | 289-308 | SECTION 4 |
| CONTROLS / ENGINE ROOM ENGINE / TRANSMISSION CONTROLS • ACTUATORS • MIGHTY MARINER • PUSH PULL CABLES RUDDER ANGLE INDICATORS • ENGINE COOLERS • FLEXIBLE EXHAUST SILENCERS • FILTERS MURPHY GAUGES • ALARMS • PANELS • AIR STARTERS • ANNUNCIATORS | 309-513 | SECTION 5 |
| PUMPS / SANITATION / POLLUTION CONTROL STRAINERS • WATER SYSTEM PUMPS • BILGE PUMPS • HAND PUMPS • IMPELLERS • BILGE SWITCHES MACERATOR PUMPS • MSD'S • OIL / WATER SEPARATORS | 514-540 | SECTION 6 |
| ELECTRICAL ELECTRIC CABLE • GENERATORS • VOLTAGE REGULATORS • BATTERY CHARGERS • AM/VM/FM METERS POWER SUPPLIES • INVERTERS • CONVERTERS • ELECTRICAL PANELS/INSTRUMENTS • NEWMAR ACCESSORIES BATTERY BOXES • SWITCHES | 541-596 | SECTION 7 |
| LIGHTS SEARCHLIGHTS • NAVIGATION LIGHTS • LAMPS • SOCKETS • BARGE LIGHTS • DOCKING LIGHTS FLOOD LIGHTS • DOME LIGHTS • HEAVY DUTY LIGHTS • SAFETY LIGHTS • BARRIER LIGHTS SOLAR POWERED LIGHTS • PFD LIGHTS • LED | 597-684 | SECTION 8 |
| SAFETY FLOTATION VESTS & CUSHIONS • FLOAT COATS & BIBS • WETSUITS • RAINCOATS • WORK VESTS • SURVIVAL SUITS WORK SUITS • WATER LIGHTS • RING BUOYS • DAY MARKS • BUOYANT APPARATUS • SEA ANCHORS FOG SIGNAL TIMER • EPIRB'S • COMPASSES • AIR HORNS • FOG BELLS • FIRE EQUIPMENT • STRETCHERS | 685-754 | SECTION 9 |
| PILOTHOUSE PILOT HOUSE CHAIRS • WINDOWS • WINDOW SHADES • WINDSHIELD WIPERS • STEERING WHEELS | 755-778 | SECTION 10 |
| MISCELLANEOUS EQUIPMENT ANODES • DOORS • RUST & PAINT REMOVER • NON SKID • SIGNS • PACKING • OIL ABSORBENT MATERIAL OARS • ANCHORS • KNIVES • ROPE • FUEL, WATER & WASTE TANKS • BOOKS • SIGHT GLASSES • GAUGE TREE STICK GAUGE • GAUGES • PLUMB BOBS • PV VALVES • SPILL KIT | 779-805 | SECTION 11 |
| ALPHABETICAL PRODUCT INDEX | 806-809 | |



FLUSH WATERTIGHT T-HANDLE HATCH

1



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | WT. (lbs.) |
|------------|----------|------|---------|-----|--------|--------|------|------------|
| DF-430-18D | 6297 | 18" | 20 3/4" | 18" | 5 7/8" | 1 1/2" | 3/8" | 70 |
| DF-430-24D | 6270 | 24" | 26 3/4" | 24" | 5 7/8" | 1 1/2" | 3/8" | 120 |

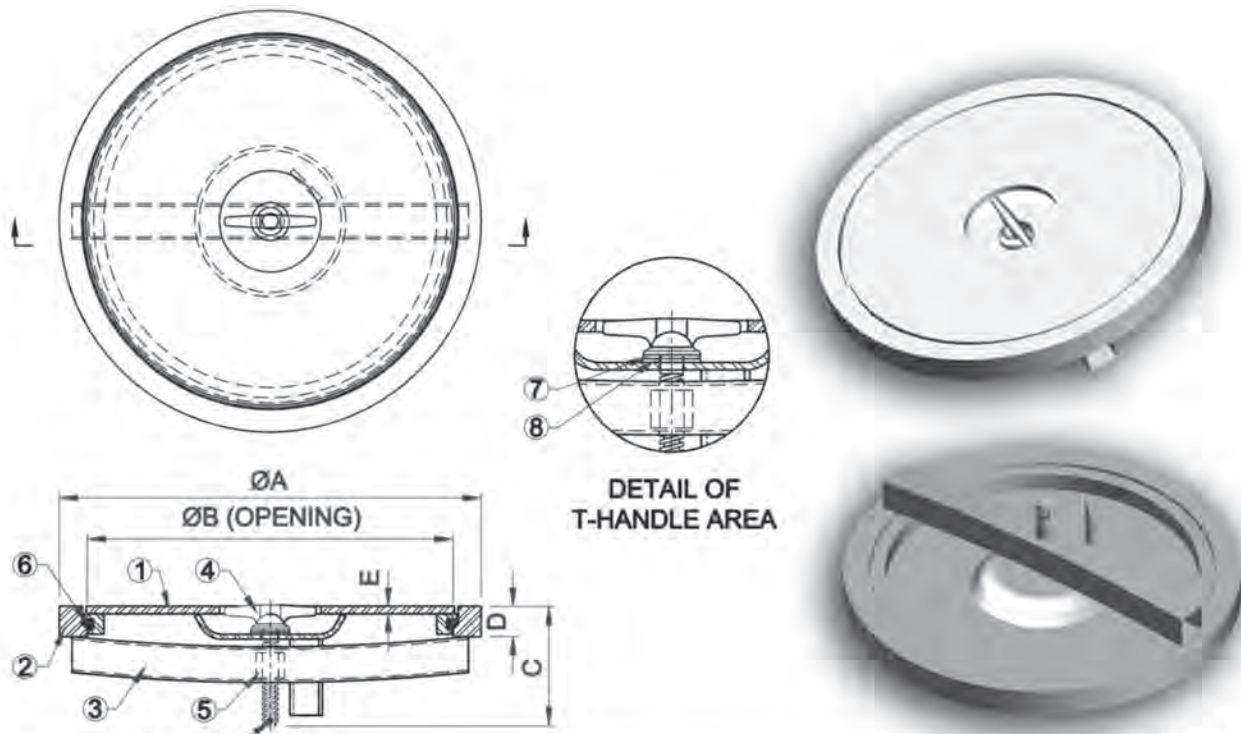
| PIECE No. | DESCRIPTION | PART No. | | MATERIAL |
|-----------|----------------------|------------|------------|------------------|
| | | DF-430-18D | DF-430-24D | |
| 1 | HATCH COVER ASSEMBLY | 6769 | 15342 | STEEL |
| 2 | DECK RING | 6750 | 15334 | STEEL |
| 3 | STRONGBACK | 6300 | 13870 | GALVANIZED STEEL |
| 4 | T-HANDLE | 16993 | | STAINLESS |
| 5 | ACME THREADED NUT | 507 | | BRASS |
| 6 | HATCH GASKET | 17256 | 6548 | NEOPRENE |
| 7 | WASHER | 604 | | BRASS |
| 8 | WASHER GASKET | 6556 | | NEOPRENE |
| 9 | COTTER PIN | 21639 | | STAINLESS |

1- HATCH ALSO AVAILABLE IN STAINLESS STEEL. PART NO. 6296

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FLUSH GALVANIZED WATERTIGHT T-HANDLE HATCH



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | WT. (lbs.) |
|------------|----------|------|---------|-----|--------|--------|------|------------|
| DF-430-18D | 6335 | 18" | 20 3/4" | 18" | 5 7/8" | 1 1/2" | 3/8" | 70 |
| DF-430-24D | 6289 | 24" | 26 3/4" | 24" | 5 7/8" | 1 1/2" | 3/8" | 120 |

| PIECE No. | DESCRIPTION | PART No. | | MATERIAL |
|-----------|----------------------|------------|------------|------------------|
| | | DF-430-18D | DF-430-24D | |
| 1 | HATCH COVER ASSEMBLY | 20391 | 15343 | GALVANIZED STEEL |
| 2 | DECK RING | 6751 | 15335 | GALVANIZED STEEL |
| 3 | STRONGBACK | 6300 | 13870 | GALVANIZED STEEL |
| 4 | T-HANDLE | | 16993 | STAINLESS |
| 5 | ACME THREADED NUT | | 507 | BRASS |
| 6 | HATCH GASKET | 17256 | 6548 | NEOPRENE |
| 7 | WASHER | | 604 | BRASS |
| 8 | WASHER GASKET | | 6556 | NEOPRENE |
| 9 | COTTER PIN | | 21639 | STAINLESS |

1- OPTIONAL T-HANDLE AVAILABLE FOR ACCESS FROM BELOW.

2- OTHER GASKET MATERIALS AVAILABLE.

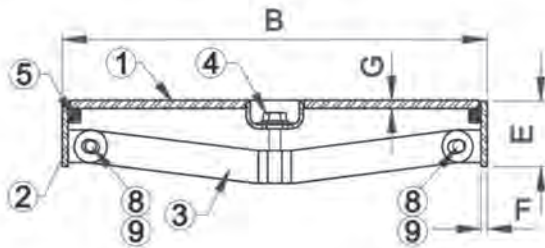
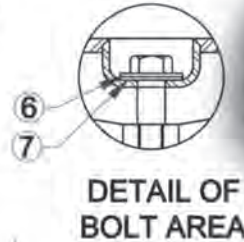
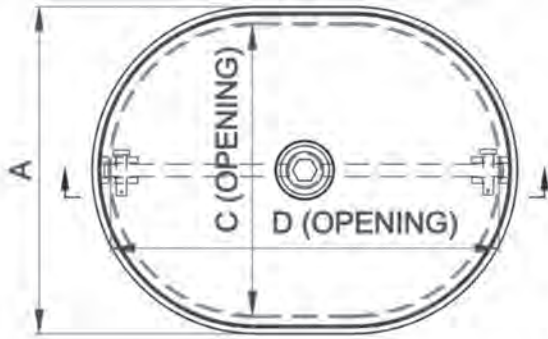
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RAISED WATERTIGHT SINGLE BOLT OVAL HATCH

1



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | WT. (lbs.) |
|-------------|----------|-------|---------|---------|-----|-----|----|------|------|------------|
| DF-540-1824 | 93001 | 18x24 | 20 1/4" | 26 1/4" | 18" | 24" | 4" | 3/8" | 1/2" | 180 |

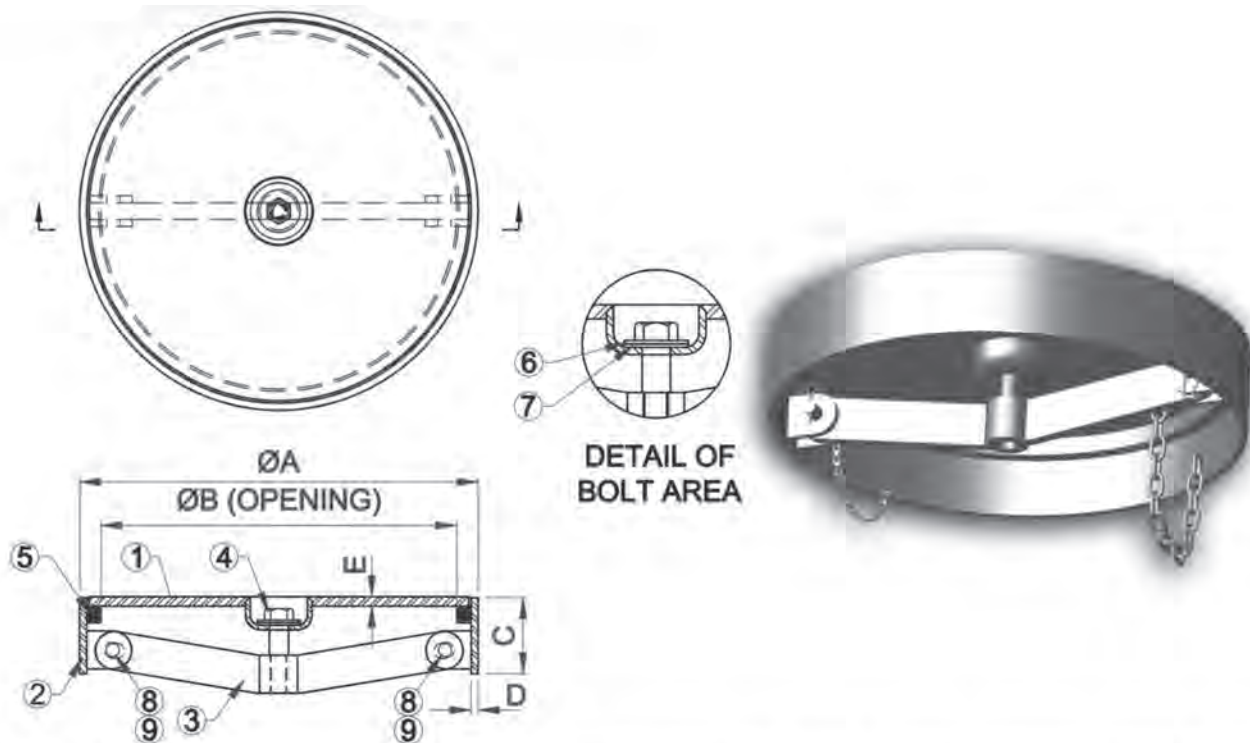
| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|----------------------|----------|------------------|
| 1 | HATCH COVER ASSEMBLY | 93039 | STEEL |
| 2 | COAMING ASSEMBLY | 93043 | STEEL |
| 3 | STRONGBACK ASSEMBLY | 93045 | STEEL |
| 4 | HEX HEAD BOLT | 92746 | STAINLESS |
| 5 | HATCH GASKET | 93050 | NEOPRENE |
| 6 | WASHER | 92908 | BRASS |
| 7 | WASHER GASKET | 92711 | NEOPRENE |
| 8 | CLEVIS PIN | 92770 | GALVANIZED STEEL |
| 9 | COTTER PIN | 92789 | STAINLESS |

- 1- COAMING ASSEMBLY INCLUDES HATCH GASKET.
- 2- HATCH ALSO AVAILABLE IN GALVANIZED AND STAINLESS STEEL.
- 3- OTHER GASKET MATERIALS AVAILABLE.

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RAISED WATERTIGHT SINGLE BOLT ROUND HATCH



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | WT. (lbs.) |
|-------------|----------|---------|-----|---------|----|------|------|------------|
| DF-540-1775 | 89915 | 17 3/4" | 20" | 17 3/4" | 4" | 3/8" | 1/2" | 90 |
| DF-540-1975 | 93017 | 19 3/4" | 22" | 19 3/4" | 4" | 3/8" | 1/2" | 100 |
| DF-540-2175 | 93025 | 21 3/4" | 24" | 21 3/4" | 4" | 3/8" | 1/2" | 115 |

| PIECE No. | DESCRIPTION | PART No. | | | MATERIAL |
|-----------|----------------------|-------------|-------------|-------------|------------------|
| | | DF-540-1775 | DF-540-1975 | DF-540-2175 | |
| 1 | HATCH COVER ASSEMBLY | 92673 | 92924 | 92932 | STEEL |
| 2 | COAMING ASSEMBLY | 92681 | 92959 | 92967 | STEEL |
| 3 | STRONGBACK ASSEMBLY | 92762 | 93041 | 93068 | STEEL |
| 4 | HEX HEAD BOLT | | 92746 | | STAINLESS |
| 5 | HATCH GASKET | 92703 | 92983 | 92991 | NEOPRENE |
| 6 | WASHER | | 92908 | | BRASS |
| 7 | WASHER GASKET | | 92711 | | NEOPRENE |
| 8 | CLEVIS PIN | | 92770 | | GALVANIZED STEEL |
| 9 | COTTER PIN | | 92789 | | STAINLESS |

- 1- COAMING ASSEMBLY INCLUDES HATCH GASKET.
 2- HATCH ALSO AVAILABLE IN GALVANIZED AND STAINLESS STEEL.
 3- OTHER GASKET MATERIALS AVAILABLE.

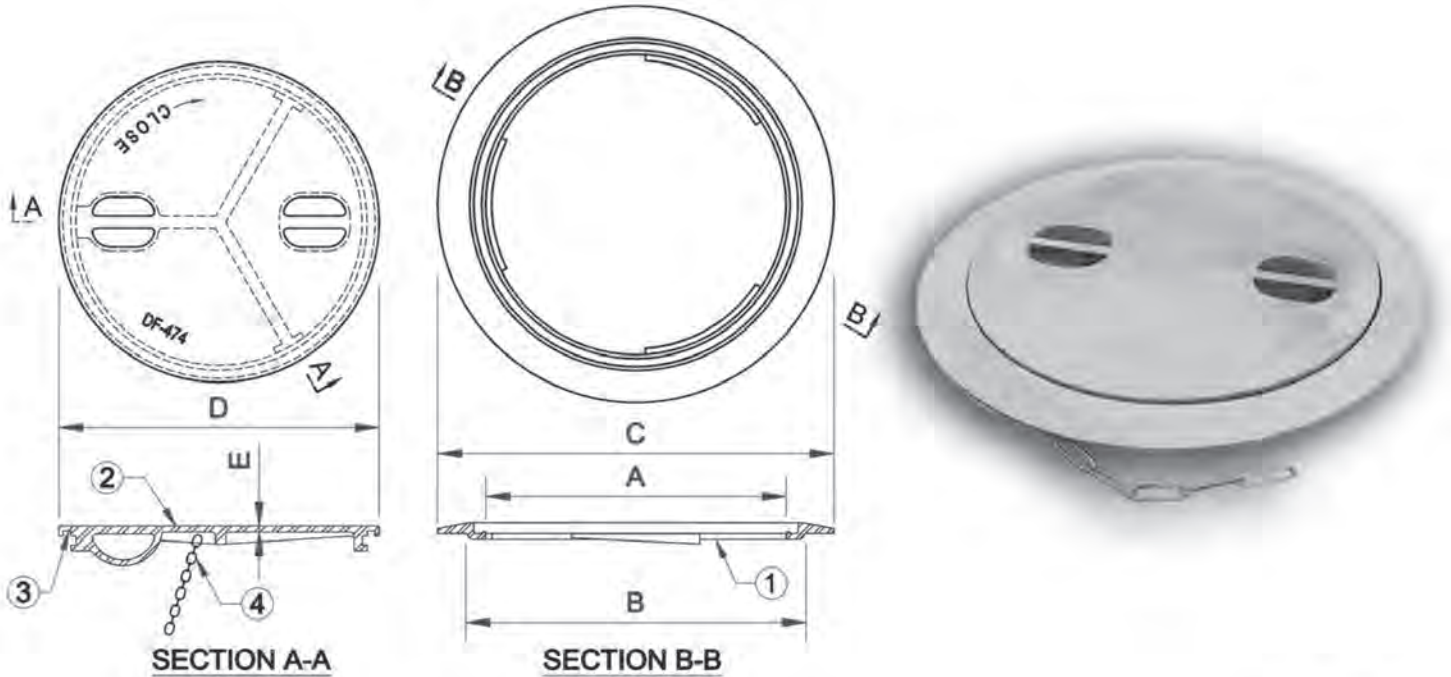
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TWIST LOCK HATCH

1



| MODEL No. | PART No. | SIZE | A | B | C | D | E | WT. (lbs.) |
|-----------|----------|------|---------|---------|---------|-----|------|------------|
| DF-474 | 82317 | 18" | 18 3/4" | 21 1/4" | 24 3/4" | 20" | 3/8" | 85 |

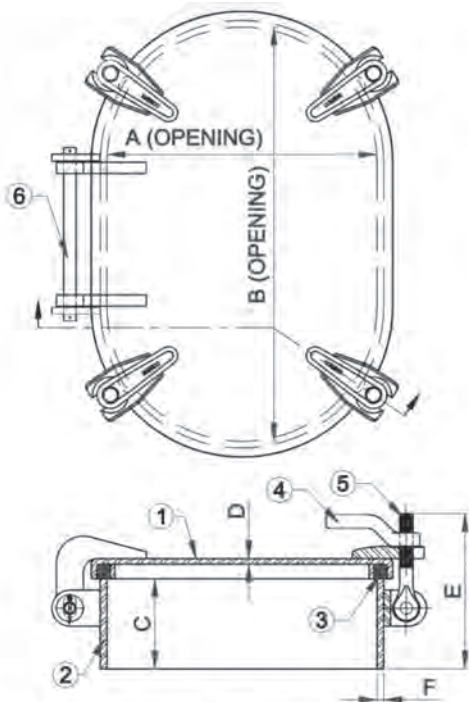
| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|-------------|----------|------------|
| 1 | DECK RING | 82325 | CAST STEEL |
| 2 | COVER | 82333 | CAST STEEL |
| 3 | GASKET | 82341 | NEOPRENE |
| 4 | CHAIN | 82368 | STEEL |

1- OTHER GASKET MATERIAL AVAILABLE.

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4 DOG RAISED WATERTIGHT HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | WT. (lbs.) |
|-------------|----------|--|---------|---------|----|-------|--------|------|------------|
| DF-174-5 | 72451 | 15x23 | 15" | 23" | 5" | 5/16" | 8 5/8" | 3/8" | 95 |
| DF-174-5-SS | 72454 | STAINLESS STEEL VERSION OF PART NUMBER ABOVE | | | | | | | |
| DF-464-5 | 78514 | 18x24 | 18 1/4" | 24 1/4" | 5" | 5/16" | 8 5/8" | 3/8" | 105 |
| DF-465-5-SS | 78526 | STAINLESS STEEL VERSION OF PART NUMBER ABOVE | | | | | | | |

| PIECE No. | DESCRIPTION | PART No. | | MATERIAL |
|-----------|--------------------|----------|-------|-----------|
| 1 | COVER ASSEMBLY | 77887 | 78484 | STEEL |
| 2 | COAMING ASSEMBLY | 74897 | 19551 | STEEL |
| 3 | GASKET | 74497 | 78530 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | | IRON |
| 5 | TUMBLE BOLT | 10774 | | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 73999 | 75077 | STAINLESS |

- 1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

- 3- TUMBLE BOLTS ALSO AVAILABLE IN STAINLESS.
4- DOG HANDLE ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, FLAME SCREENS, AND CUSTOM COAMING HEIGHTS.

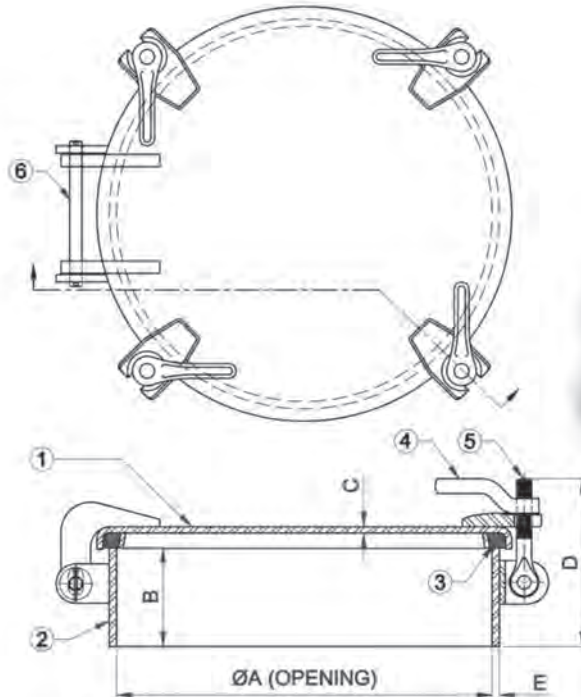
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4 DOG RAISED WATERTIGHT HATCH

1



| MODEL No. | PART No. | SIZE | ØA | B | C | D | E | WT. (lbs.) |
|-------------|----------|--|-----|----|-------|--------|------|------------|
| DF-343-5 | 74950 | 19" | 19" | 5" | 5/16" | 8 5/8" | 3/8" | 90 |
| DF-343-5-SS | 74964 | STAINLESS STEEL VERSION OF PART NUMBER ABOVE | | | | | | |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|-----------|
| 1 | COVER ASSEMBLY | 77895 | STEEL |
| 2 | COAMING ASSEMBLY | 75026 | STEEL |
| 3 | GASKET | 74497 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 75077 | STAINLESS |

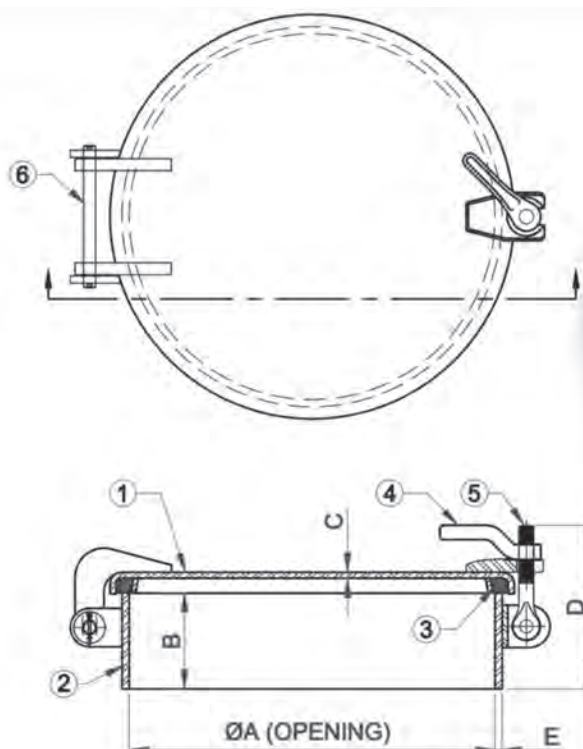
1- GASKET INCLUDED WITH COVER ASSEMBLY.
 2- OTHER GASKET MATERIALS AVAILABLE.

3- TUMBLE BOLTS ALSO AVAILABLE IN STAINLESS.
 4- DOG HANDLES ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, AND CUSTOM COAMING HEIGHTS.

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SINGLE DOG RAISED WATERTIGHT HATCH



| MODEL No. | PART No. | SIZE | ØA | B | C | D | E | WT. (lbs.) |
|-----------|----------|------|-----|----|-------|--------|------|------------|
| DF-543-5 | 21598 | 19" | 19" | 5" | 5/16" | 8 5/8" | 3/8" | 80 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|-----------|
| 1 | COVER ASSEMBLY | 75019 | STEEL |
| 2 | COAMING ASSEMBLY | 75027 | STEEL |
| 3 | GASKET | 74497 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 75077 | STAINLESS |

- 1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

- 3- TUMBLE BOLT ALSO AVAILABLE AS STAINLESS.
4- DOG HANDLE ALSO AVAILABLE AS SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, AND CUSTOM COAMING HEIGHTS.

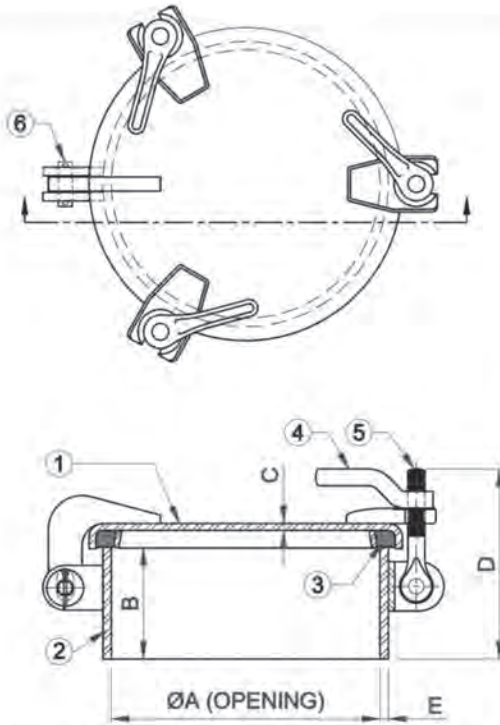
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3 DOG RAISED WATERTIGHT HATCH

1



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | WT. (lbs.) |
|-----------|----------|------|-----|----|-------|--------|------|------------|
| DF-456-5 | 75965 | 12" | 12" | 5" | 5/16" | 8 5/8" | 3/8" | 55 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|-----------|
| 1 | COVER ASSEMBLY | 77909 | STEEL |
| 2 | COAMING ASSEMBLY | 76156 | STEEL |
| 3 | GASKET | 75981 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 76067 | STAINLESS |

1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

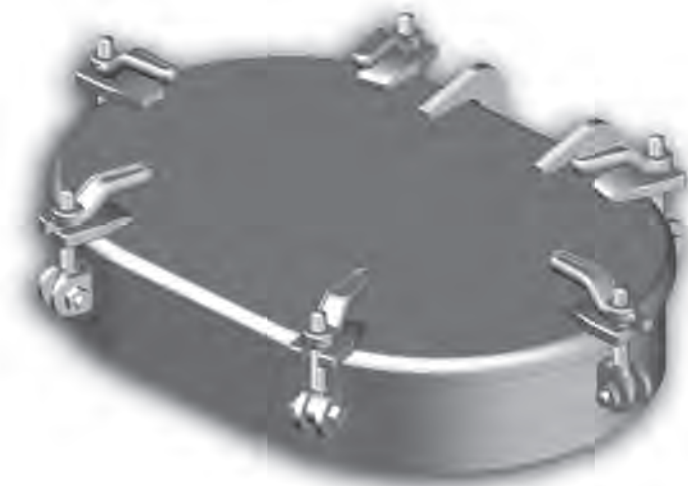
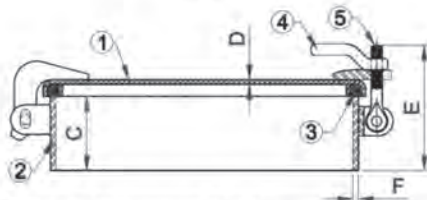
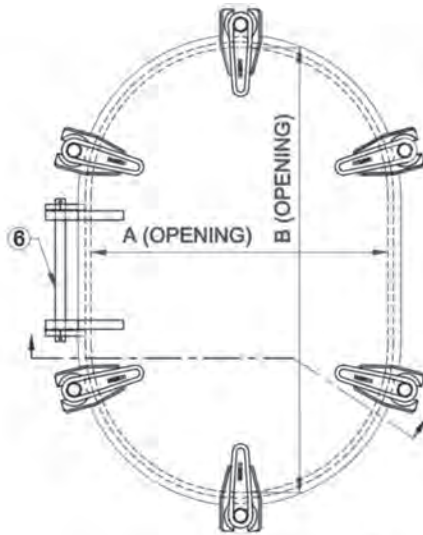
3- TUMBLE BOLTS ALSO AVAILABLE IN STAINLESS.
4- DOG HANDLES ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, FLAME SCREENS, AND CUSTOM COAMING HEIGHTS

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6 DOG RAISED WATERTIGHT HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | WT. (lbs.) |
|-----------|----------|-------|-----|-----|----|-------|--------|------|------------|
| DF-686-5 | 78480 | 20x30 | 20" | 30" | 5" | 5/16" | 8 5/8" | 3/8" | 115 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|-----------|
| 1 | COVER ASSEMBLY | 78478 | STEEL |
| 2 | COAMING ASSEMBLY | 78476 | STEEL |
| 3 | GASKET | 78479 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 75077 | STAINLESS |

1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

3- TUMBLE BOLTS ALSO AVAILABLE IN STAINLESS.
4- DOG HANDLES ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, FLAME SCREENS, AND CUSTOM COAMING HEIGHTS.

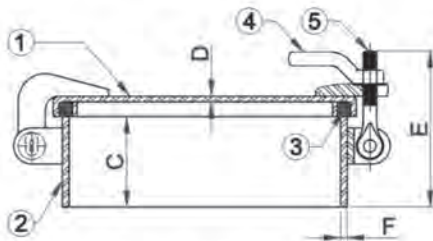
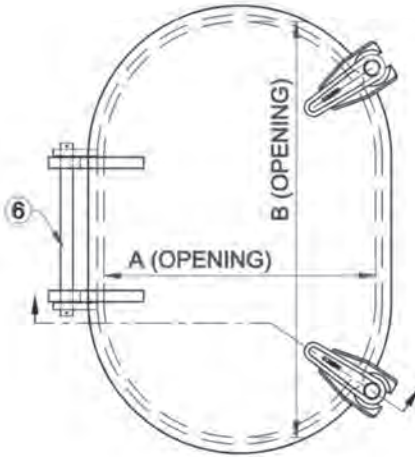
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2 DOG RAISED WATERTIGHT HATCH

1



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | WT. (lbs.) |
|-----------|----------|-------|-----|-----|----|-------|--------|------|------------|
| DF-274-5 | 89559 | 15x23 | 15" | 23" | 5" | 5/16" | 8 5/8" | 3/8" | 90 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|-----------|
| 1 | COVER ASSEMBLY | 89550 | STEEL |
| 2 | COAMING ASSEMBLY | 74099 | STEEL |
| 3 | GASKET | 74497 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 73998 | STAINLESS |

1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

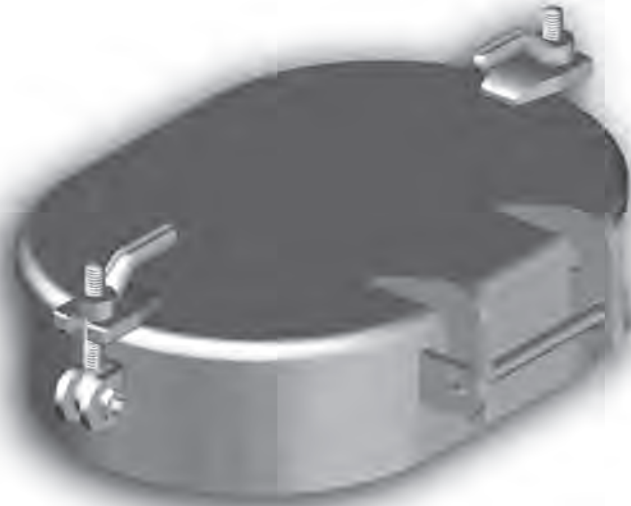
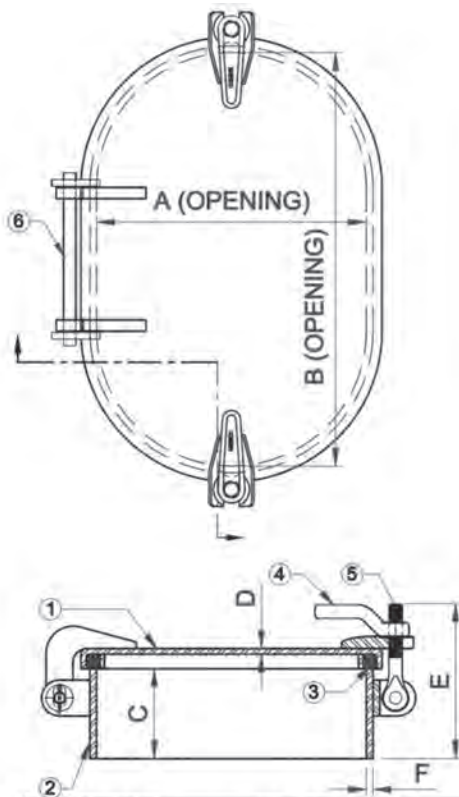
3- TUMBLE BOLTS ALSO AVAILABLE IN STAINLESS.
4- DOG HANDLES ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, FLAME SCREENS, AND CUSTOM COAMING HEIGHTS.

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2 DOG RAISED WATERTIGHT HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | WT. (lbs.) |
|-----------|----------|-------|-----|-----|----|-------|--------|------|------------|
| DF-774-5 | 72481 | 15x23 | 15" | 23" | 5" | 5/16" | 8 5/8" | 3/8" | 90 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|-----------|
| 1 | COVER ASSEMBLY | 73148 | STEEL |
| 2 | COAMING ASSEMBLY | 74100 | STEEL |
| 3 | GASKET | 74497 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | HINGE PIN ASSEMBLY | 73998 | STAINLESS |

- 1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

- 3- TUMBLE BOLT ALSO AVAILABLE IN STAINLESS.
4- DOG HANDLE ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, FLAME SCREENS, AND CUSTOM COAMING HEIGHTS.

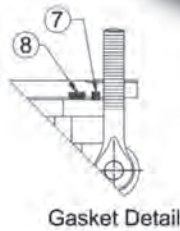
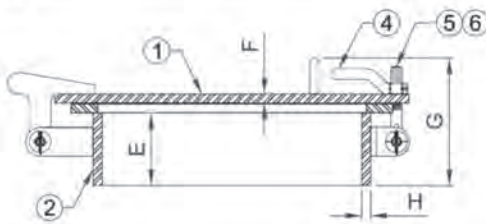
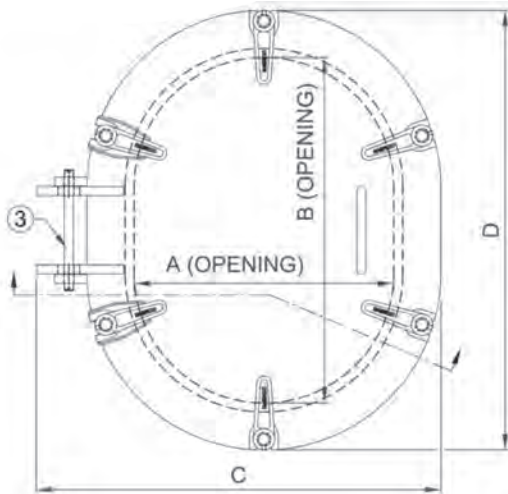
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6 DOG RAISED (6 PSI) OVAL HATCH

1



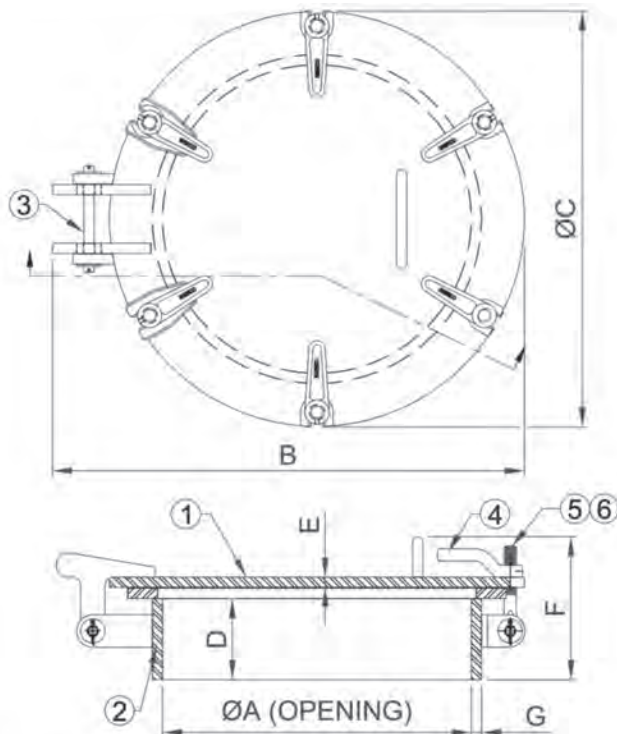
| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|-----|-----|-----|---------|----|------|----------|------|------------|
| DF-466-5 | 21157 | 18x24 | 18" | 24" | 28" | 30 1/2" | 5" | 5/8" | 8 13/16" | 5/8" | 250 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|-------------------------------|----------|------------|
| 1 | COVER ASSEMBLY | 21213 | STAINLESS |
| 2 | COAMING ASSEMBLY | 21214 | STAINLESS |
| 3 | HINGE PIN ASSEMBLY | 21218 | STAINLESS |
| 4 | DOG HANDLE W / GREASE FITTING | 74838 | GALVANIZED |
| 5 | TUMBLE BOLT (QTY-4) | 87939 | STAINLESS |
| 6 | TUMBLE BOLT (QTY-2) | 87938 | STAINLESS |
| 7 | OUTER GASKET | 21810 | VITON |
| 8 | INNER GASKET | 21811 | TEFLON |

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6 DOG RAISED (6 PSI) ROUND HATCH



Gasket Detail

| MODEL No. | PART No. | SIZE | ØA | B | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|-----|---------|----|------|----------|------|------------|
| DF-346-5 | 21158 | 19" | 19" | 29" | 25 5/8" | 5" | 5/8" | 8 13/16" | 5/8" | 200 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|-------------------------------|----------|------------|
| 1 | COVER ASSEMBLY | 21211 | STAINLESS |
| 2 | COAMING ASSEMBLY | 21212 | STAINLESS |
| 3 | HINGE PIN ASSEMBLY | 21215 | STAINLESS |
| 4 | DOG HANDLE W / GREASE FITTING | 74838 | GALVANIZED |
| 5 | TUMBLE BOLT (QTY-4) | 87939 | STAINLESS |
| 6 | TUMBLE BOLT (QTY-2) | 87938 | STAINLESS |
| 7 | OUTER GASKET | 21808 | VITON |
| 8 | INNER GASKET | 21809 | TEFLON |

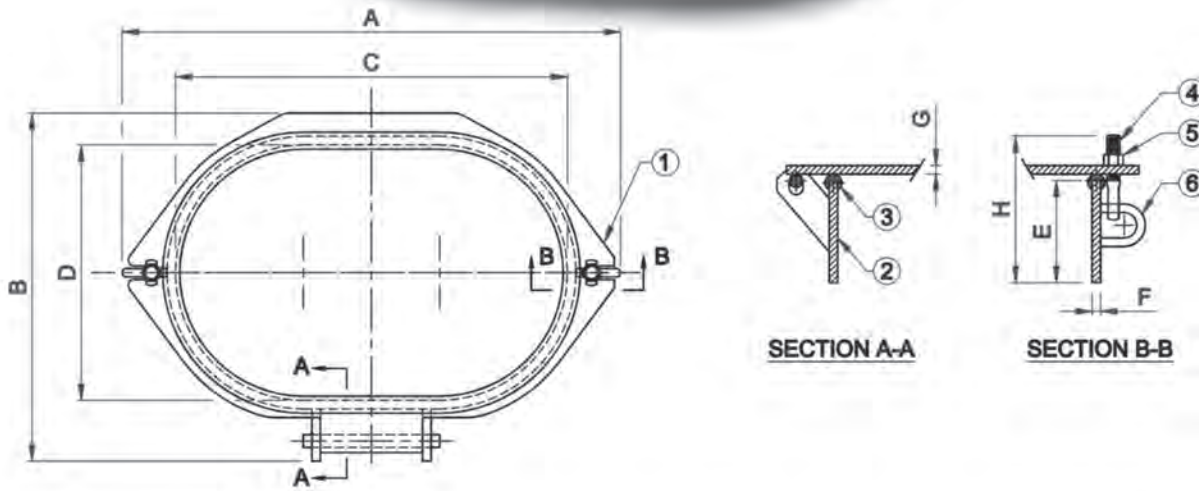
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TWO BOLT MANHOLE

1



| MODEL No. | PART No. | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|---------|---------|-----|-----|----|------|------|---------|------------|
| DF-547-6 | 93289 | 26 5/8" | 20 7/16 | 23" | 15" | 6" | 1/2" | 1/2" | 10 1/2" | 120 |

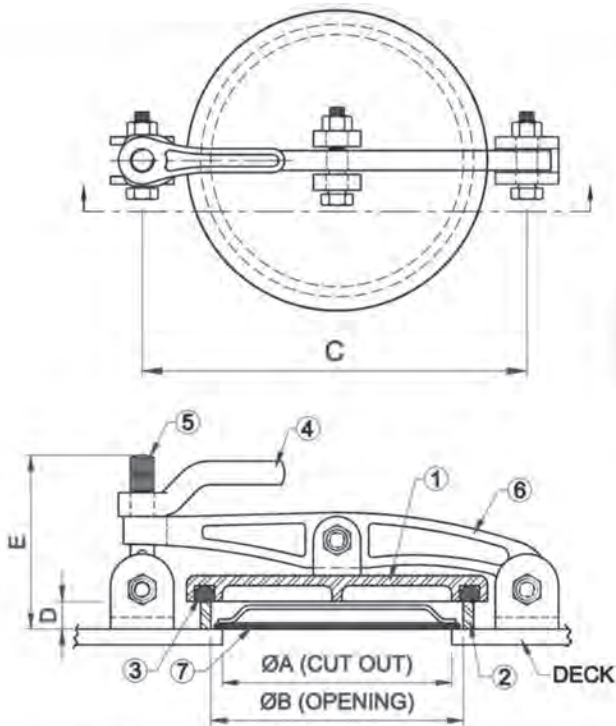
| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|------------------|----------|-----------------|
| 1 | COVER ASSEMBLY | 93394 | STEEL |
| 2 | COAMING ASSEMBLY | 93432 | STEEL |
| 3 | GASKET | 93440 | NEOPRENE |
| 4 | TUMBLE BOLT | 10774 | BRONZE |
| 5 | NUT | 93386 | STEEL |
| 6 | STAPLE | 93459 | STAINLESS STEEL |

1- OTHER GASKET MATERIAL AVAILABLE.

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SINGLE DOG ULLAGE HATCH



1

| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | WT. (lbs.) |
|-----------|----------|------|--------|---------|---------|------|--------|------------|
| DF-112 | 6646 | 6" | 5 1/2" | 6 1/16" | 12 1/4" | 7/8" | 6 1/2" | 18 |
| DF-144 | 6645 | 8" | 7 1/2" | 8 1/16" | 12 1/4" | 7/8" | 6 1/2" | 22 |

| PIECE No. | DESCRIPTION | PART No. | | MATERIAL |
|-----------|----------------|----------|--------|-----------|
| | | DF-112 | DF-144 | |
| 1 | COVER ASSEMBLY | 6636 | 6637 | CAST IRON |
| 2 | COAMING RING | 75665 | 75671 | STEEL |
| 3 | GASKET | 17169 | 17167 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | | IRON |
| 5 | TUMBLE BOLT | 10774 | | BRONZE |
| 6 | ULLAGE ARM | 6831 | | CAST IRON |
| 7 | FLAME SCREEN | 6628 | 6629 | STAINLESS |

1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

3- TUMBLE BOLT ALSO AVAILABLE AS STAINLESS.
4- DOG HANDLE ALSO AVAILABLE AS SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, AND CUSTOM COAMING HEIGHTS

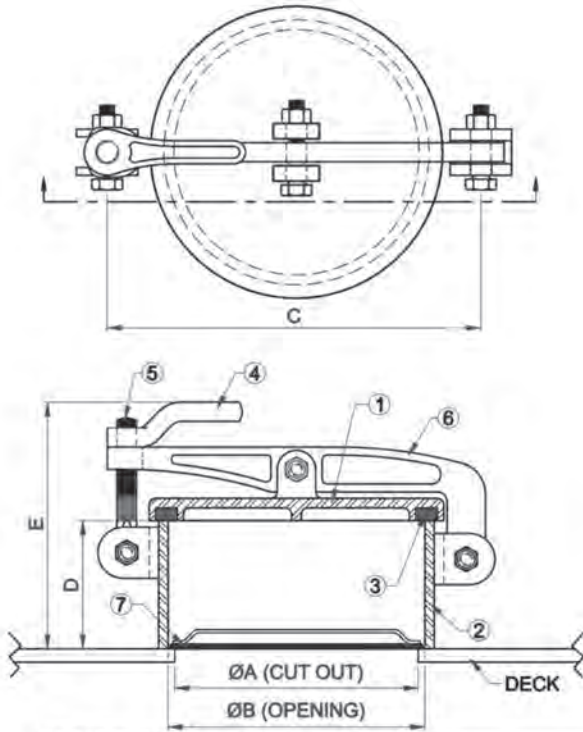
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SINGLE DOG ULLAGE HATCH

1



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | WT. (lbs.) |
|-----------|----------|--|--------|----------|---------|----|--------|------------|
| DF-569-5 | 83097 | 10" | 9 1/2" | 10 1/32" | 13 1/4" | 5" | 9 5/8" | 42 |
| DF-569-SS | 83096 | STAINLESS STEEL VERSION OF PART NUMBER ABOVE | | | | | | |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|----------------|----------|-----------------|
| 1 | COVER ASSEMBLY | 83062 | CAST IRON |
| 2 | COAMING RING | 19526 | STEEL |
| 3 | GASKET | 82449 | NEOPRENE |
| 4 | DOG HANDLE | 74837 | IRON |
| 5 | TUMBLE BOLT | 10774 | BRONZE |
| 6 | ULLAGE ARM | 19461 | CAST IRON |
| 7 | FLAME SCREEN | 19496 | STAINLESS |
| 8 | HEX HEAD BOLT | 20842 | BRONZE |
| 9 | HEX HEAD BOLT | 20850 | BRONZE |
| 10 | ESNA NUT | 20869 | STAINLESS STEEL |

1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

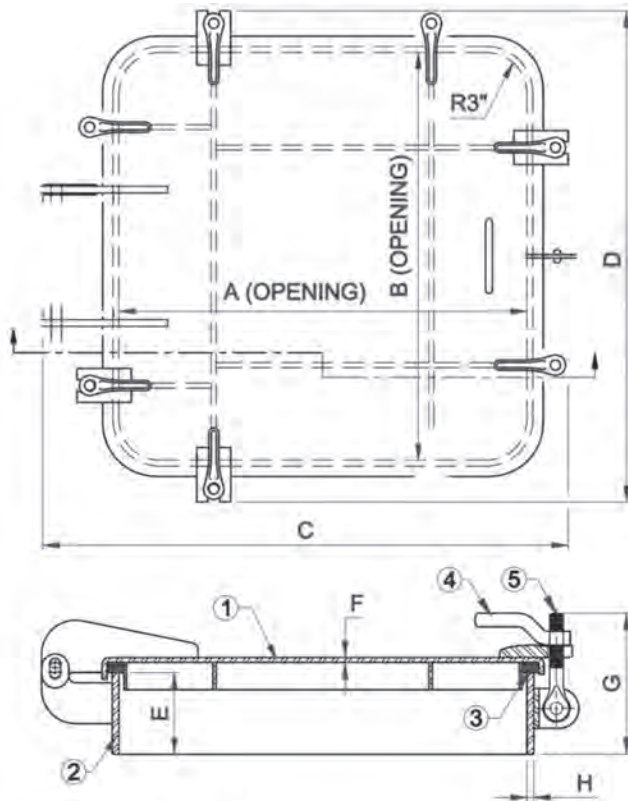
3- TUMBLE BOLT ALSO AVAILABLE AS STAINLESS.
4- DOG HANDLE ALSO AVAILABLE AS SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, AND CUSTOM COAMING HEIGHTS

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8 DOG RAISED WATERTIGHT HATCH



1

| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|-----|-----|---------|---------|----|------|--------|-------|------------|
| DF-475-5 | 87742 | 30x30 | 30" | 30" | 38 3/4" | 36 1/8" | 5" | 1/4" | 8 1/4" | 7/16" | 220 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|------------------|----------|----------|
| 1 | COVER ASSEMBLY | 73974 | STEEL |
| 2 | COAMING ASSEMBLY | 73976 | STEEL |
| 3 | GASKET | 87760 | NEOPRENE |
| 4 | DOG HANDLE | 17744 | BRASS |
| 5 | TUMBLE BOLT | 10774 | BRONZE |

1- GASKET INCLUDED WITH COVER ASSEMBLY.
2- OTHER GASKET MATERIALS AVAILABLE.

3- TUMBLE BOLTS ALSO AVAILABLE IN STAINLESS.
4- DOG HANDLES ALSO AVAILABLE IN SS, GALV'D OR BRONZE.

OTHER OPTIONAL EXTRAS INCLUDE: HOT DIPPED GALVANIZED, STAINLESS STEEL CONSTRUCTION, AND CUSTOM COAMING HEIGHTS.

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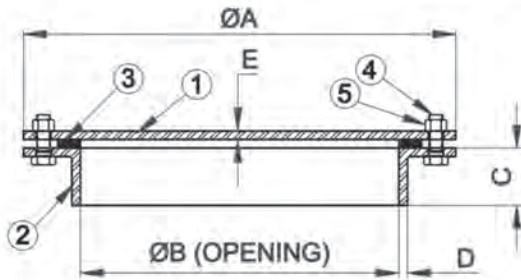
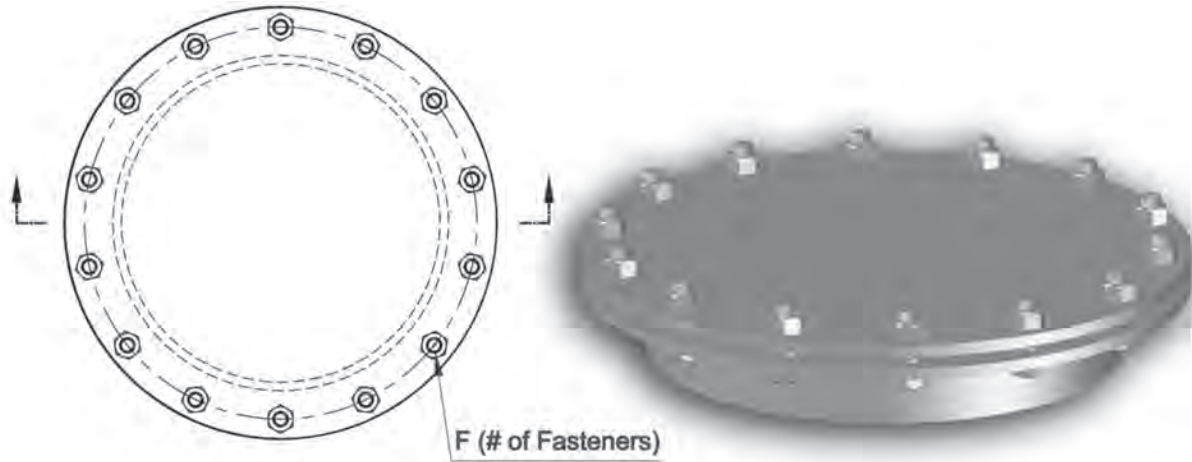
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RAISED MULTI-BOLT CLEAN OUT HATCH

1



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | F | WT. (lbs.) |
|-----------|----------|------|-----|-----|--------|------|------|----|------------|
| DF-154-14 | 15407 | 14" | 19" | 14" | 2 1/2" | 3/8" | 3/8" | 12 | 60 |
| DF-154-18 | 77240 | 18" | 23" | 18" | 2 1/2" | 3/8" | 3/8" | 16 | 78 |

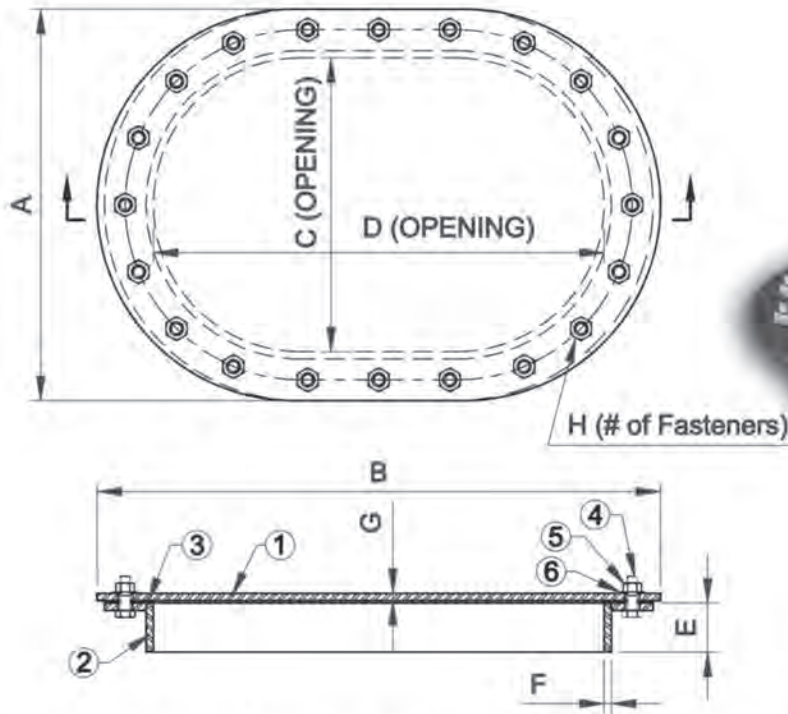
| PIECE No. | DESCRIPTION | PART NUMBER | | MATERIAL |
|-----------|---------------|-------------|-----------|----------|
| | | DF-154-14 | DF-154-18 | |
| 1 | COVER PLATE | 76767 | 77216 | STEEL |
| 2 | COAMING | 76783 | 77232 | STEEL |
| 3 | GASKET | 76775 | 77224 | NEOPRENE |
| 4 | HEX HEAD BOLT | 14613 | | STEEL |
| 5 | HEX NUT | 16179 | | BRASS |

- 1- ADDITIONAL COAMING HEIGHTS AVAILABLE.
- 2- OTHER BOLT, NUT AND WASHER COMBINATIONS AVAILABLE.
- 3- OTHER GASKET MATERIALS AVAILABLE.

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RAISED MULTI-BOLT OVAL HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|-----|---------|-----|-----|--------|------|------|----|------------|
| DF-501 | 21091 | 15x23 | 20" | 28 3/4" | 15" | 23" | 2 1/2" | 3/8" | 3/8" | 20 | 85 |
| DF-502 | 21105 | 18x24 | 23" | 29 3/4" | 18" | 24" | 2 1/2" | 3/8" | 3/8" | 24 | 106 |

| PIECE No. | DESCRIPTION | PART NUMBER | | MATERIAL |
|-----------|---------------|-------------|--------|-----------|
| | | DF-501 | DF-502 | |
| 1 | COVER PLATE | 21342 | 21350 | STEEL |
| 2 | COAMING | 21369 | 21377 | STEEL |
| 3 | GASKET | 21385 | 21393 | NEOPRENE |
| 4 | HEX HEAD BOLT | 14605 | | STEEL |
| 5 | HEX NUT | 21245 | | STAINLESS |
| 6 | WASHER | 21237 | | BRASS |

- 1- ADDITIONAL COAMING HEIGHTS AVAILABLE.
- 2- OTHER BOLT, WASHER AND NUT COMBINATIONS AVAILABLE.
- 3- OTHER GASKET MATERIALS AVAILABLE.

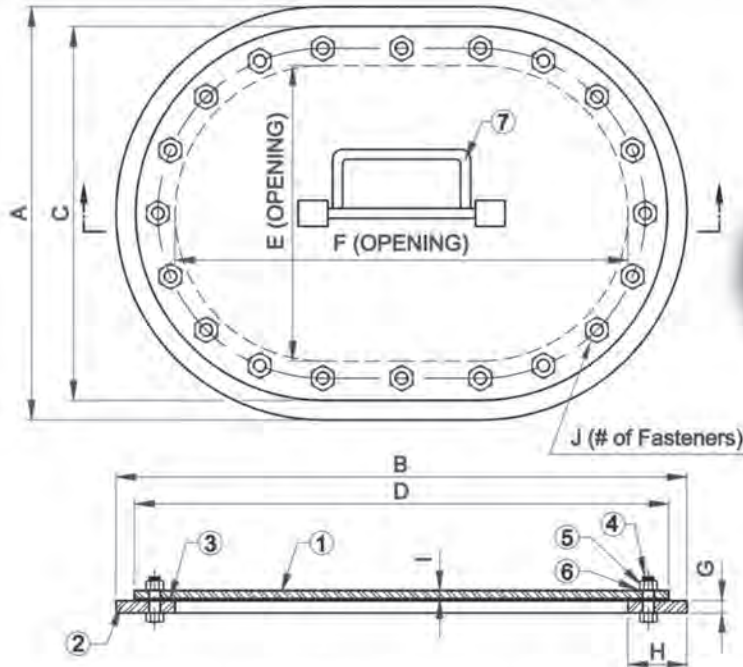
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FLUSH MULTI-BOLT OVAL HATCH

1



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | I | J | WT. (lbs.) |
|-----------|----------|-------|-----|-----|---------|---------|-----|-----|------|----|------|----|------------|
| DF-503 | 21113 | 15x23 | 21" | 29" | 18 1/2" | 26 1/2" | 15" | 23" | 3/4" | 3" | 3/8" | 20 | 95 |
| DF-504 | 21121 | 18x24 | 24" | 30" | 21 1/2" | 27 1/2" | 18" | 24" | 3/4" | 3" | 3/8" | 24 | 112 |

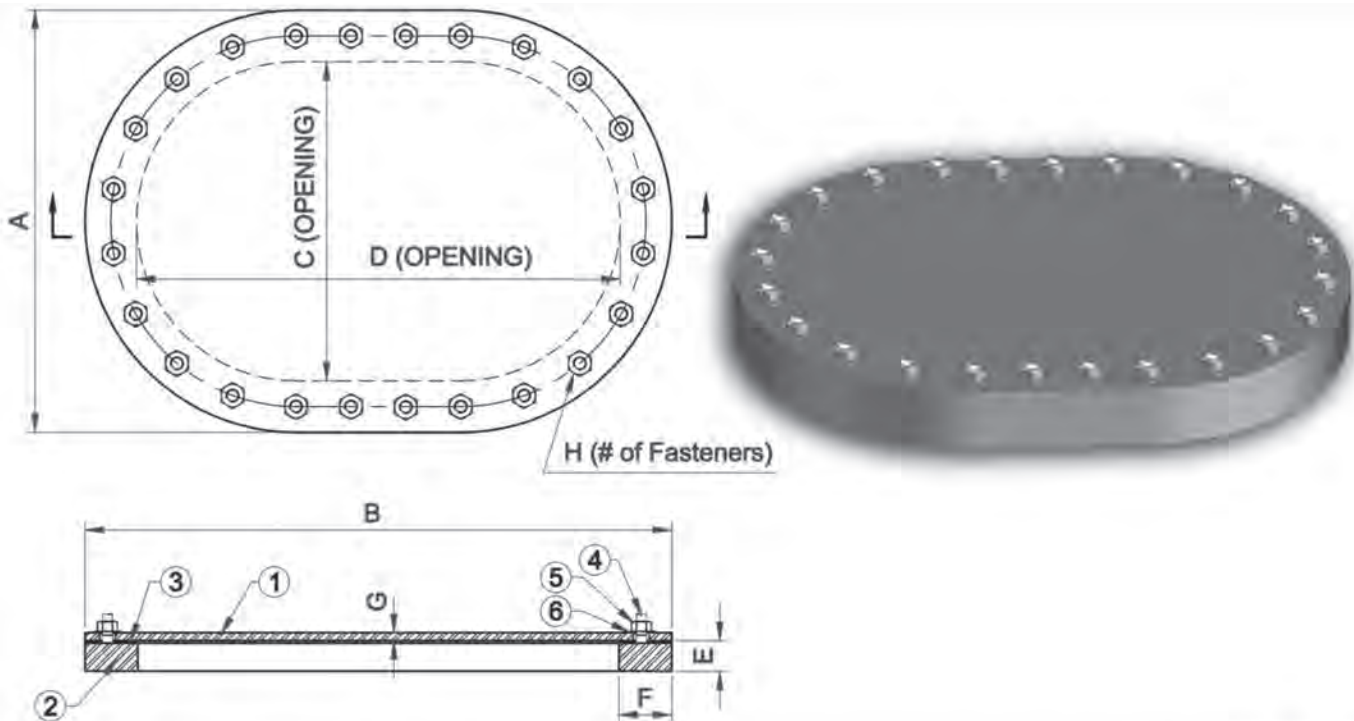
| PIECE No. | DESCRIPTION | PART NUMBER | | MATERIAL |
|-----------|-----------------|-------------|--------|-----------|
| | | DF-503 | DF-504 | |
| 1 | COVER PLATE | 21229 | 21318 | STEEL |
| 2 | DECK RING | 21253 | 21326 | STEEL |
| 3 | GASKET | 21296 | 21334 | NEOPRENE |
| 4 | HEX HEAD BOLT | | 14613 | STEEL |
| 5 | HEX NUT | | 21245 | STAINLESS |
| 6 | WASHER | | 21237 | BRASS |
| 7 | HANDLE | | 21261 | STEEL |
| 8 | HANDLE RETAINER | | 21288 | STEEL |

- 1- OTHER BOLT, NUT AND WASHER COMBINATIONS AVAILABLE.
- 2- OTHER GASKET MATERIALS AVAILABLE.

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RAISED MULTI-STUD OVAL HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-------------|----------|-------|---------|---------|---------|---------|----|--------|------|----|------------|
| DF-548-1523 | 93149 | 15x23 | 20 1/2" | 28 1/2" | 15 1/2" | 23 1/2" | 2" | 2 1/2" | 3/4" | 24 | 111 |
| DF-548-2230 | 93297 | 22x30 | 27 1/2" | 35 1/2" | 22 1/2" | 30 1/2" | 2" | 2 1/2" | 3/4" | 32 | 153 |

| PIECE No. | DESCRIPTION | PART No. | | MATERIAL |
|-----------|---------------|-------------|-------------|-----------|
| | | DF-548-1523 | DF-548-2230 | |
| 1 | COVER PLATE | 93203 | 93300 | STEEL |
| 2 | COAMING RING | 93211 | 93319 | STEEL |
| 3 | GASKET | 93238 | 93327 | NEOPRENE |
| 4 | THREADED STUD | 93246 | | STAINLESS |
| 5 | HEX | 16179 | | BRASS |
| 6 | WASHER | 453 | | STAINLESS |

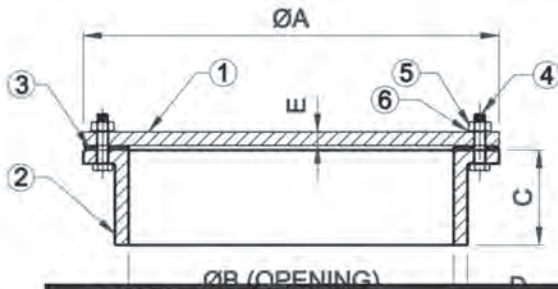
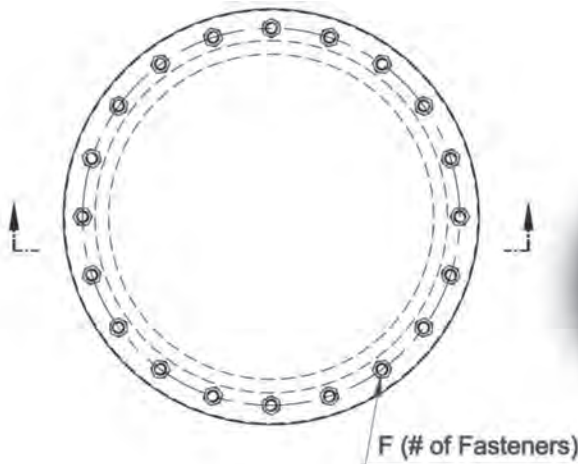
1- OTHER GASKET MATERIALS AVAILABLE.

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RAISED (6 PSI) MULTI-BOLT ROUND HATCH



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | F | WT. (lbs.) |
|-----------|----------|------|-----|-----|----|------|------|----|------------|
| DF-157-18 | 77227 | 18" | 23" | 18" | 5" | 3/8" | 3/4" | 20 | 186 |

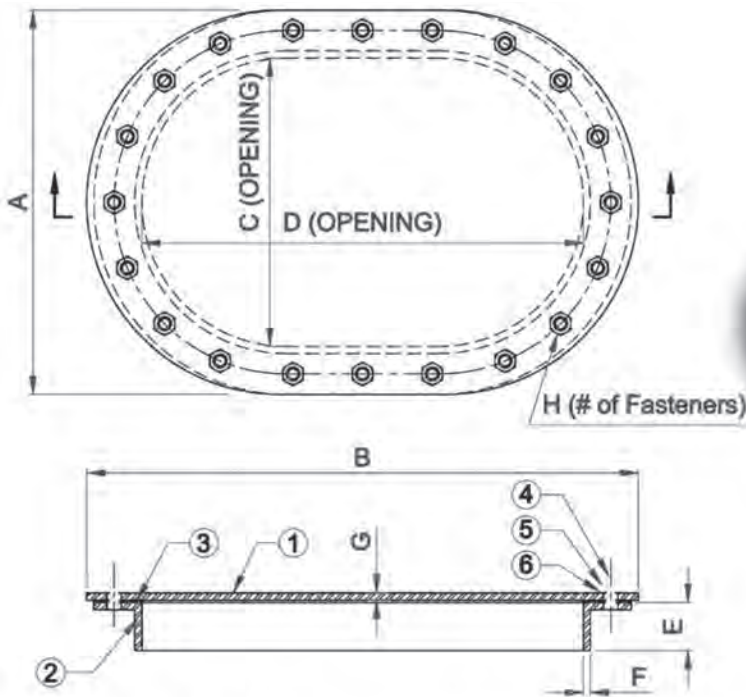
| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|------------------|----------|-----------|
| 1 | COVER PLATE | 77228 | STAINLESS |
| 2 | COAMING ASSEMBLY | 77232 | STAINLESS |
| 3 | GASKET | 77231 | GARLOCK |
| 4 | HEX HEAD BOLT | 451 | STAINLESS |
| 5 | HEX NUT | 452 | STAINLESS |
| 6 | WASHER | 453 | STAINLESS |

- 1- OTHER BOLT, NUT AND WASHER COMBINATIONS AVAILABLE.
- 2- OTHER GASKET MATERIALS AVAILABLE.

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RAISED (6 PSI) MULTI-BOLT OVAL HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|-----|----------|-----|---------|--------|------|------|----|------------|
| DF-506 | 21152 | 18x24 | 23" | 29 7/16" | 18" | 24 3/8" | 5 1/4" | 3/8" | 3/4" | 24 | 252 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|---------------|----------|-----------|
| 1 | COVER PLATE | 21153 | STAINLESS |
| 2 | COAMING | 21171 | STAINLESS |
| 3 | GASKET | 21156 | GARLOCK |
| 4 | HEX HEAD BOLT | 451 | STAINLESS |
| 5 | HEX NUT | 452 | STAINLESS |
| 6 | WASHER | 453 | STAINLESS |

- 1- OTHER BOLT, NUT AND WASHER COMBINATIONS AVAILABLE.
 2- OTHER GASKET MATERIALS AVAILABLE.

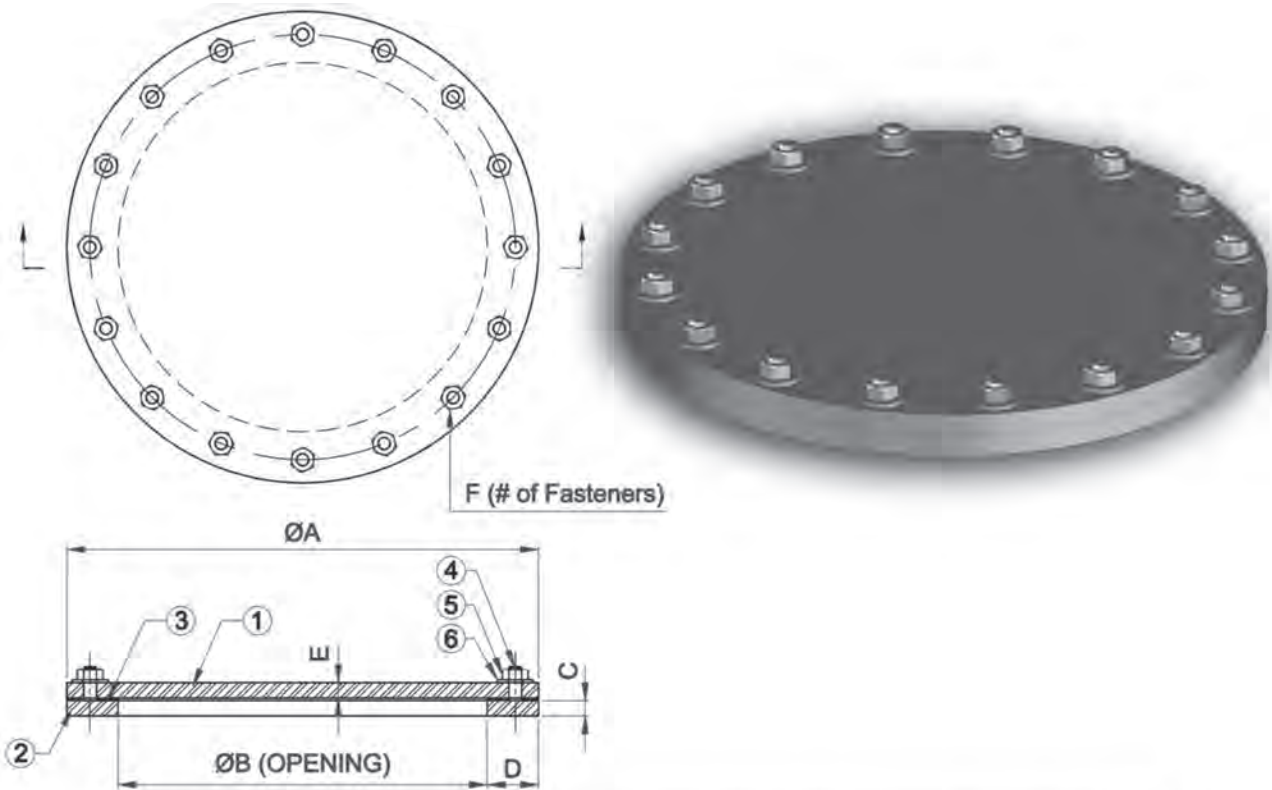
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RAISED MULTI-STUD ROUND HATCH

1



| MODEL No. | PART No. | SIZE | ØA | ØB | C | D | E | F | WT. (lbs.) |
|-----------|----------|------|---------|---------|----|--------|------|----|------------|
| DF-549-18 | 30608 | 18" | 23 1/2" | 18 1/2" | 2" | 2 1/2" | 3/4" | 16 | 100 |
| DF-549-20 | 30610 | 20" | 25 1/2" | 20 1/2" | 2" | 2 1/2" | 3/4" | 18 | 115 |

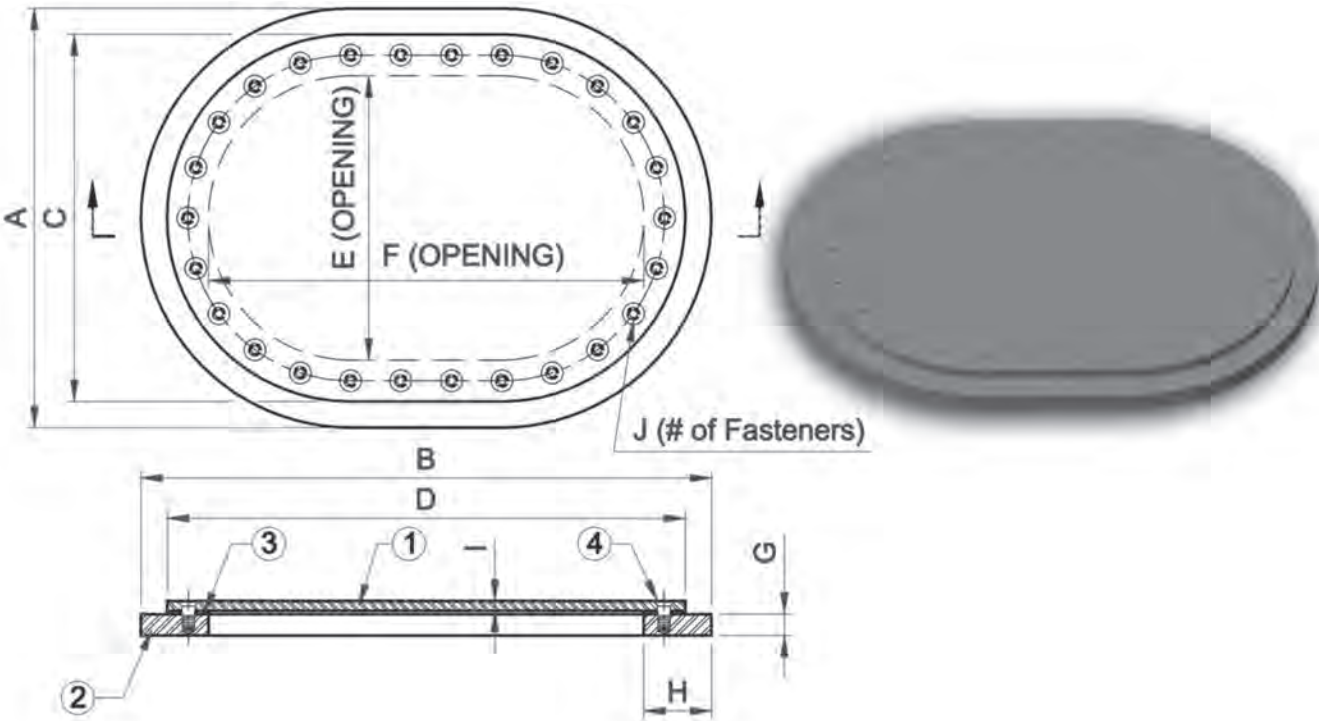
| PIECE No. | DESCRIPTION | MATERIAL |
|-----------|---------------|-----------|
| 1 | COVER PLATE | STEEL |
| 2 | COAMING RING | STEEL |
| 3 | GASKET | NEOPRENE |
| 4 | THREADED STUD | STAINLESS |
| 5 | HEX NUT | BRASS |
| 6 | WASHER | STAINLESS |

1- OTHER GASKET MATERIALS AVAILABLE.

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FLUSH MULTI-SCREW OVAL HATCH



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | I | J | WT. (lbs.) |
|-----------|----------|-------|---------|---------|---------|---------|-----|-----|--------|---------|------|----|------------|
| DF-505 | 21148 | 15x23 | 22 1/8" | 30 1/8" | 19 3/8" | 27 3/8" | 15" | 23" | 1 1/8" | 3 9/16" | 1/2" | 26 | 160 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|------------------------|----------|-----------|
| 1 | COVER PLATE | 21181 | STEEL |
| 2 | DECK RING | 21210 | STEEL |
| 3 | GASKET | 21202 | NEOPRENE |
| 4 | FLAT HEAD SOCKET SCREW | 21199 | STAINLESS |

1- OTHER GASKET MATERIALS AVAILABLE.

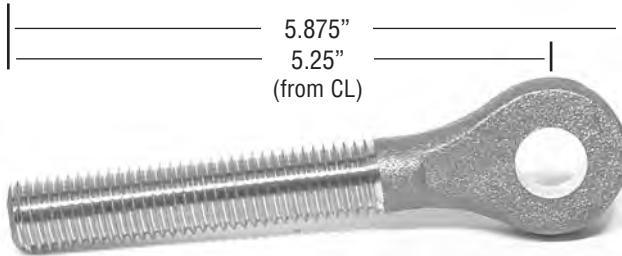
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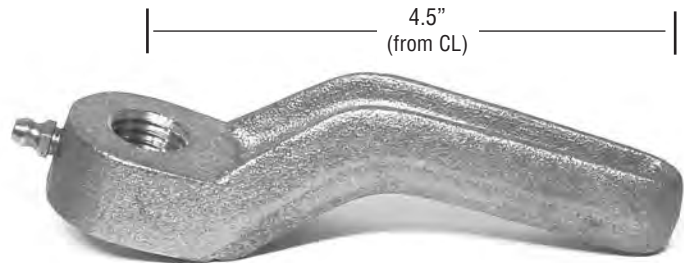
HARDWARE

1



TUMBLE BOLT

| PART NO. | MATERIAL |
|----------|-----------------|
| 10774 | BRASS |
| 87939 | STAINLESS STEEL |



SINGLE WING DOG HANDLE

| PART NO. | MATERIAL |
|----------|-------------------------------|
| 74837 | MALLEABLE IRON |
| 74838 | GALVANIZED (w/Grease Fitting) |
| 85235 | STAINLESS STEEL |
| 17744 | BRASS |



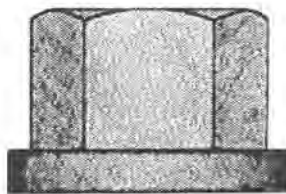
WING NUT

| PART NO. | WING SPAN | HUB.DIA. | MAX TRAP |
|----------|-----------|----------|----------|
| WN375 | 3-1/4" | 1-1/16" | 3/8" |
| WN625 | 3-3/4" | 1-1/8" | 5/8" |
| WN500 | 5" | 1" | 1/2" |



DOUBLE WING DOG HANDLE

| PART NO. | MATERIAL |
|----------|----------|
| 17876 | BRASS |



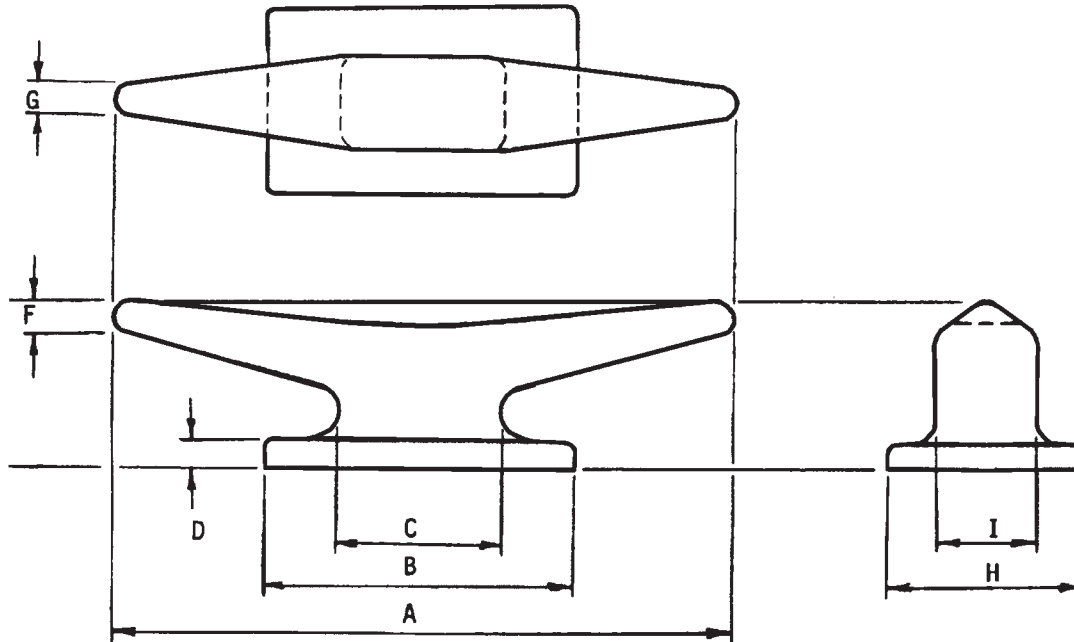
FLANGED NUT

| FLANGED NUT, FS-3000 SERIES | | | |
|-------------------------------------|----------|-------------|----------|
| MATERIAL: BRONZE OR STAINLESS STEEL | | | |
| PART NO. | Hex Size | Flange Dia. | Max Trap |
| FN-3010 | 1-1/4" | 1-1/2" | 3/4" |
| FN-3020 | 1-5/8" | 2" | 1" |
| FN-3030 | 2" | 2-1/2" | 1" |
| FN-3040 | 2-3/8" | 2-5/8" | 1-1/4" |

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CAST STEEL KEVEL



| MODEL NO. | PART NO. | SIZE | A | B | C | D | E | F | G | H | I | WT. (lbs.) |
|-----------|----------|------|-----|----|--------|------|----|----|----|--------|--------|------------|
| DF-518 | 87920 | 18" | 18" | 9" | 4-3/4" | 7/8" | 5" | 1" | 1" | 5-1/2" | 2-7/8" | 34 |

PLAIN ALUMINUM OPEN BASE CLEAT



FIG. 530

PERKO

| ORDERING INFORMATION | | | | | |
|----------------------|----------------|-----------------|----------------|------------|---------------|
| PART NO. | OVERALL LENGTH | BASE DIMENSIONS | MAX. ROPE SIZE | SCREW SIZE | WEIGHT (lbs.) |
| 530 008 ALU | 8" | 4" X 2-1/4" | 3/4" | 1/2" | 1-1/8 |
| 530 010 ALU | 10" | 4-1/2" X 3" | 7/8" | 1/2" | 1-3/4 |
| 530 012 ALU | 12" | 6-1/2" X 2-7/8" | 1" | 5/8" | 3-1/2 |
| 530 015 ALU | 15" | 7" X 3-1/4" | 1-1/2" | 3/4" | 4-7/8 |

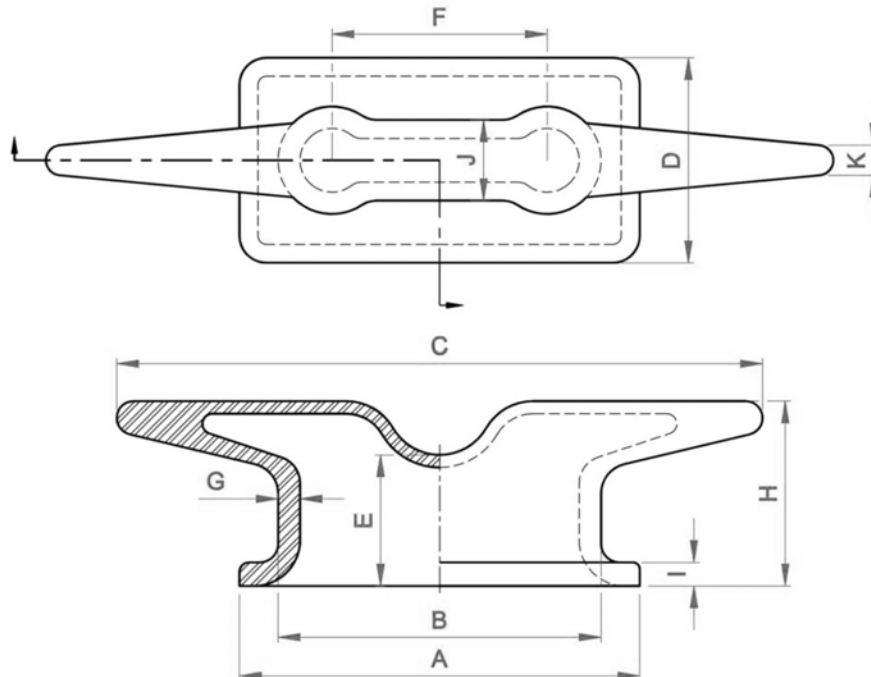
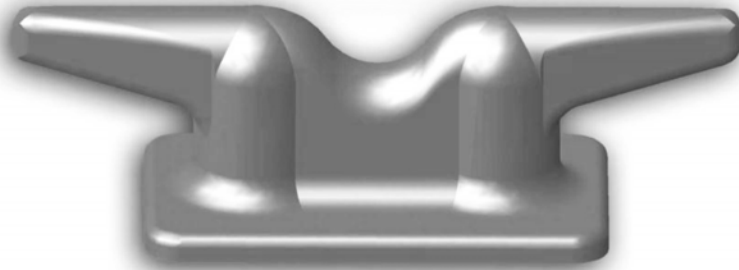
Standard Pack: 1 piece

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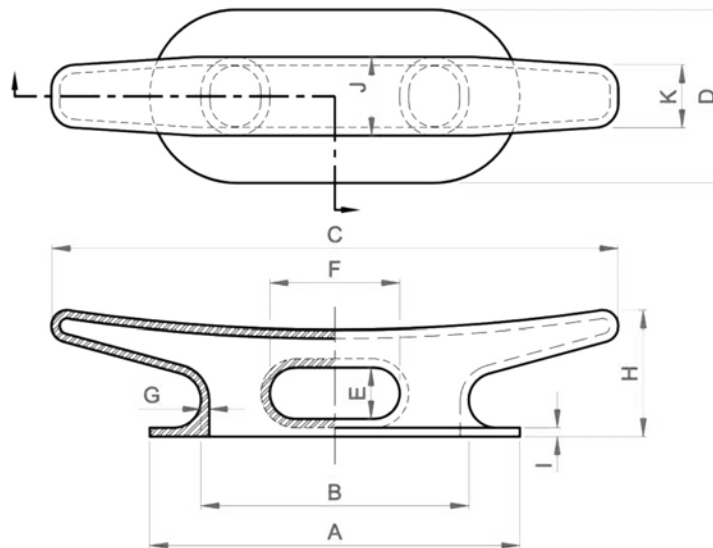
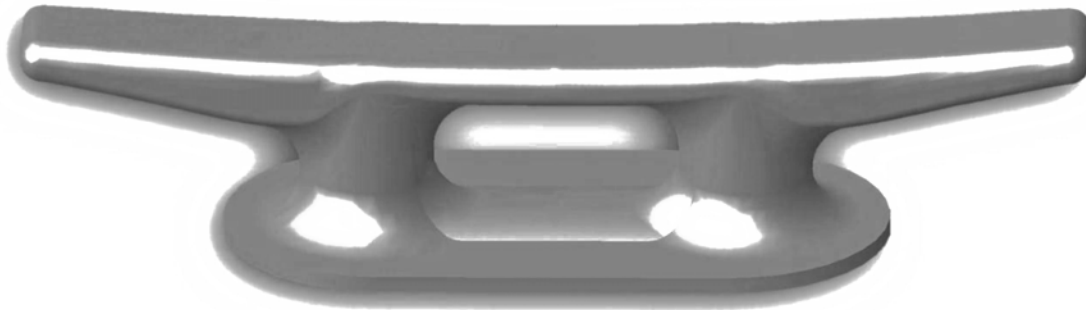
CAST STEEL HEAVY KEVEL



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | I | J | K | WT. (lbs.) |
|-----------|----------|------|---------|-----|-----|---------|--------|-----|--------|---------|--------|--------|--------|------------|
| DF-488 | 89338 | 30" | 19" | 15" | 30" | 11 1/4" | 6 3/8" | 10" | 1 1/4" | 8 7/8" | 1 3/8" | 3 3/4" | 1 3/4" | 180 |
| DFSK-HC48 | 89340 | 48" | 29 3/4" | 24" | 48" | 15 1/4" | 9 3/4" | 16" | 1 5/8" | 13 3/4" | 1 3/4" | 6" | 2 1/4" | 440 |

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CAST STEEL KEVEL CHOCK



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | I | J | K | WT. (lbs.) |
|-----------|----------|------|---------|-----|-----|---------|--------|--------|-------|--------|-------|----|--------|------------|
| DF-30 | 18562 | 24" | 10 1/2" | 9" | 24" | 7 1/2" | 2 1/4" | 3 1/4" | 1/2" | 5 5/8" | 1/2" | 4" | 3" | 50 |
| DF-482 | 20265 | 36" | 23 1/2" | 17" | 36" | 11" | 3 1/4" | 8 1/4" | 9/16" | 8" | 9/16" | 5" | 4" | 100 |
| DF-483 | 20273 | 42" | 26 3/4" | 20" | 42" | 12 1/2" | 4 1/8" | 9 5/8" | 5/8" | 9" | 5/8" | 6" | 4 3/4" | 160 |
| DF-484 | 20257 | 48" | 30" | 23" | 48" | 14" | 5" | 11" | 3/4" | 10" | 3/4" | 7" | 5 1/2" | 220 |

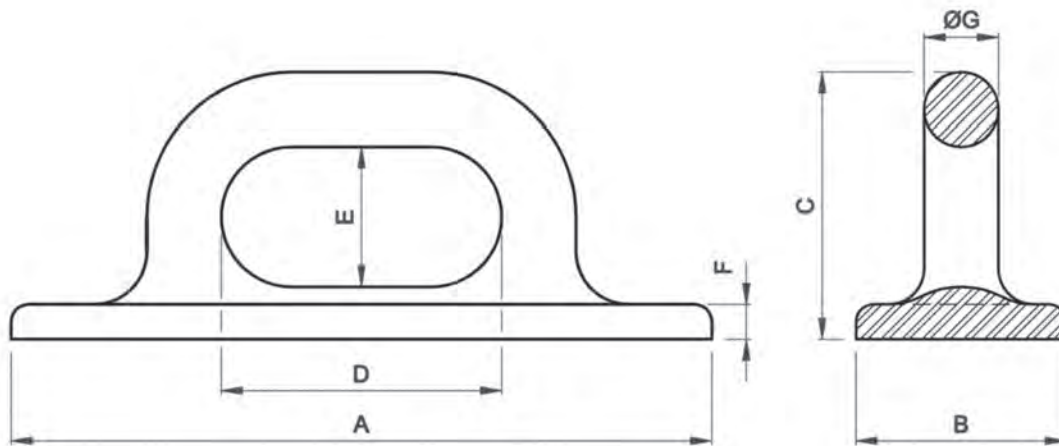
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CAST STEEL D-RING

1

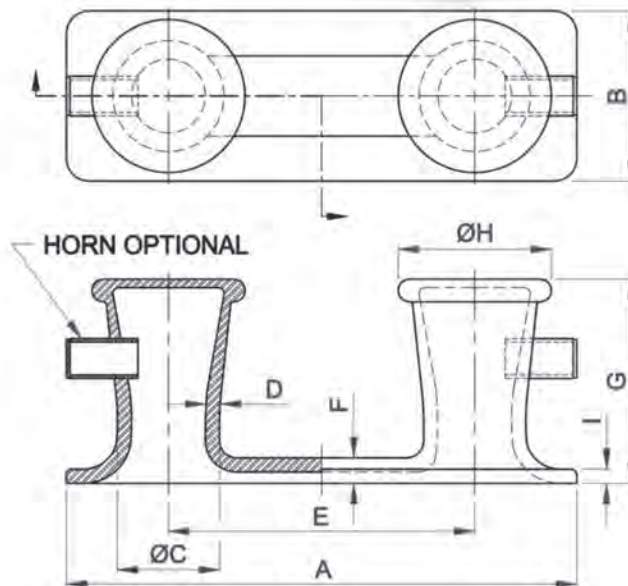


| MODEL No. | PART No. | A | B | C | D | E | F | ØG | WT. (lbs.) |
|-----------|----------|-----|----|--------|----|----|----|--------|------------|
| DF-196 | 16713 | 20" | 6" | 7 5/8" | 8" | 4" | 1" | 2 1/8" | 55 |

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CAST STEEL DOUBLE BITT



| MODEL No. | PART No. | SIZE | A | B | ØC | D | E | F | G | ØH | I | WT. (lbs.) |
|-----------|----------|-------------|-----|-----|----|--------|-----|--------|-----|---------|--------|------------|
| DF- 2 | 7005 | 8" | 40" | 14" | 7" | 1" | 24" | 2" | 16" | 11" | 1 1/4" | 375 |
| DF- 2A | 20281 | 8" W/Horns | 40" | 14" | 7" | 1" | 24" | 2" | 16" | 11" | 1 1/4" | 385 |
| DF- 40 | 6858 | 10" | 45" | 15" | 9" | 1 1/4" | 27" | 2 1/4" | 18" | 13 1/2" | 1 1/4" | 545 |
| DF- 40A | 77054 | 10" W/Horns | 45" | 15" | 9" | 1 1/4" | 27" | 2 1/4" | 18" | 13 1/2" | 1 1/4" | 560 |

1- HORNS NOT SHOWN ON DOUBLE BITT MODEL.

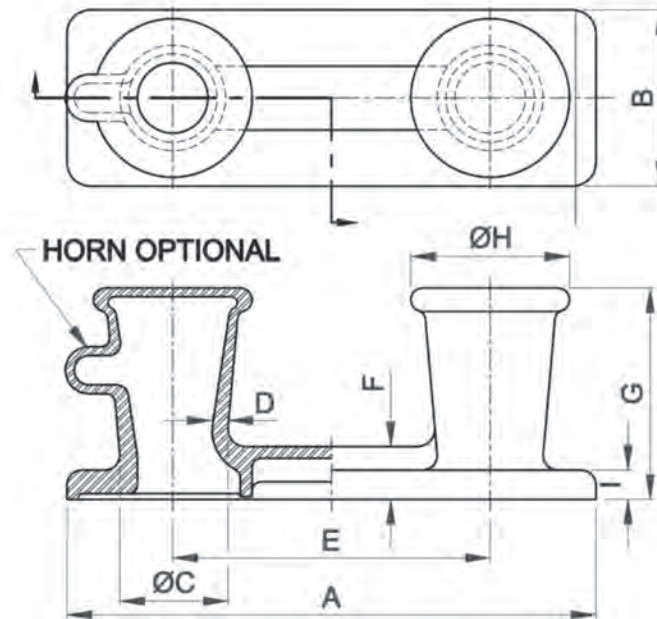
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CAST STEEL HEAVY DOUBLE BITT

1



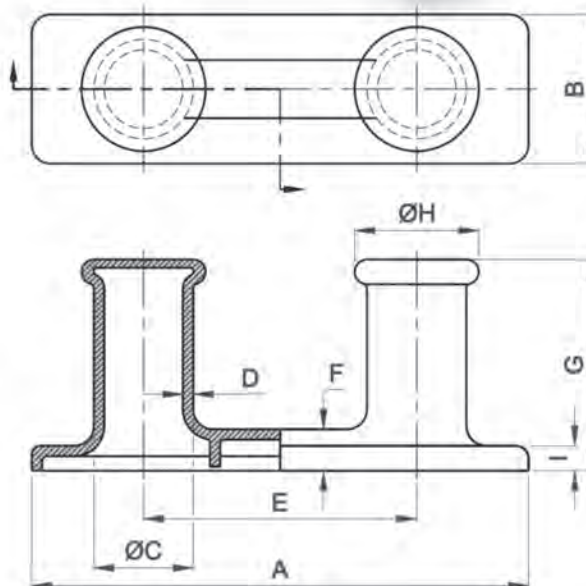
| MODEL No. | PART No. | SIZE | A | B | ØC | D | E | F | G | ØH | I | WT. (lbs.) |
|-----------|----------|-------------|-----|-----|----|--------|-----|--------|-----|---------|--------|------------|
| DF-537 | 89648 | 10" | 45" | 15" | 9" | 1 1/2" | 27" | 4 1/2" | 18" | 13 1/2" | 2 1/2" | 625 |
| DF-537A | 90034 | 10" W/HORN | 45" | 15" | 9" | 1 1/2" | 27" | 4 1/2" | 18" | 13 1/2" | 2 1/2" | 635 |
| DF-537AA | 90036 | 10" W/HORNS | 45" | 15" | 9" | 1 1/2" | 27" | 4 1/2" | 18" | 13 1/2" | 2 1/2" | 645 |

1- HORN NOT SHOWN ON DOUBLE BITT MODEL.

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CAST STEEL HEAVY DOUBLE BITT



| MODEL No. | PART No. | SIZE | A | B | $\varnothing C$ | D | E | F | G | $\varnothing H$ | I | WT. (lbs.) |
|-----------|----------|------|-----|-----|-----------------|--------|-----|---------|---------|-----------------|--------|------------|
| DF-491 | 89362 | 12" | 60" | 18" | 12" | 1 1/4" | 33" | 5" | 25 1/2" | 15" | 3" | 990 |
| DF-498 | 21164 | 14" | 66" | 21" | 14" | 1 1/2" | 40" | 5 1/2" | 29 3/4" | 17 1/2" | 3 1/2" | 1780 |
| DF-499 | 21168 | 16" | 76" | 24" | 16" | 1 3/4" | 46" | 7 3/16" | 34" | 20" | 4" | 2500 |

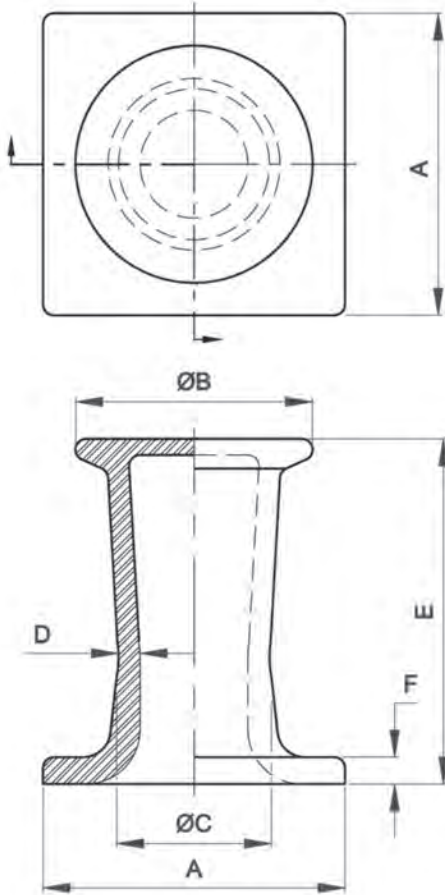
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CAST STEEL SINGLE BITT

1

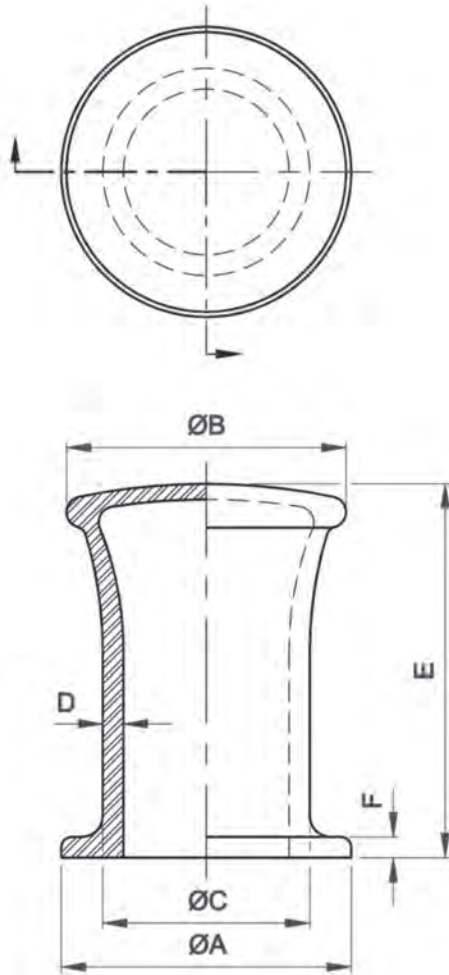


| MODEL No. | PART No. | SIZE | A | ØB | ØC | D | E | F | WT. (lbs.) |
|-----------|----------|------|-----|-----|----|----|-----|--------|------------|
| DF-SB8 | 87971 | 8" | 14" | 11" | 7" | 1" | 16" | 1 1/4" | 160 |

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CAST STEEL SINGLE BITT



| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | WT. (lbs.) |
|-----------|----------|------|-----|---------|-----|----|-----|----|------------|
| DF-SB10 | 20230 | 10" | 14" | 13 1/2" | 10" | 1" | 18" | 1" | 190 |

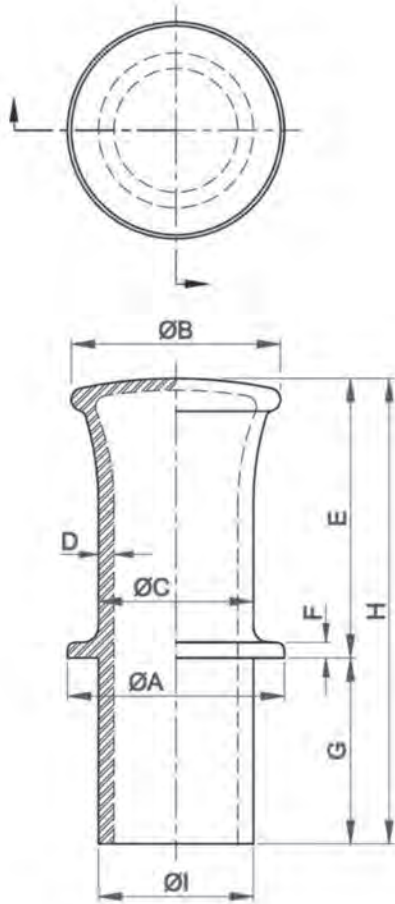
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CAST STEEL THRU DECK SINGLE BITT

1

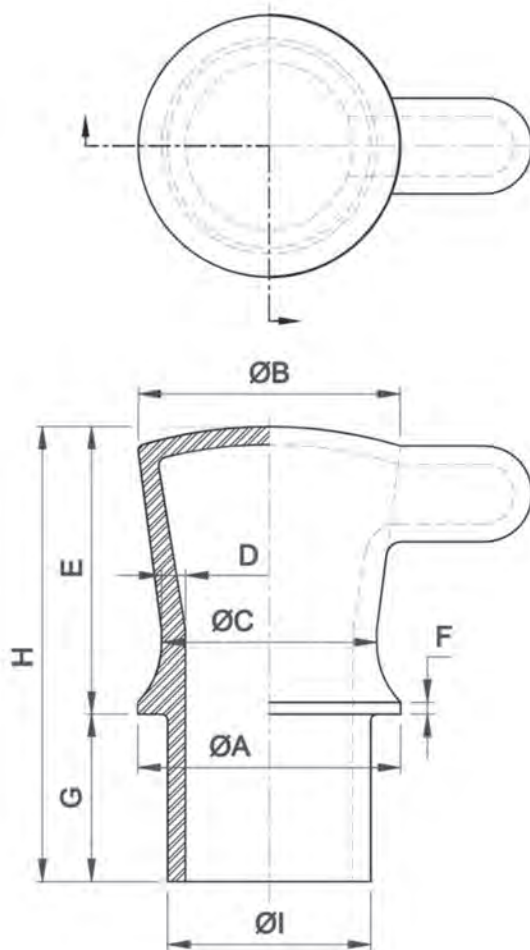


| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | H | ØI | WT. (lbs.) |
|-----------|----------|------|-----|---------|-----|----|-----|----|-----|-----|---------|------------|
| DF-530 | 21555 | 8 | 14" | 12" | 8" | 1" | 16" | 1" | 11" | 27" | 10 1/4" | 260 |
| DF-530-10 | 20231 | 10" | 14" | 13 1/2" | 10" | 1" | 18" | 1" | 12" | 30" | 10" | 300 |

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CAST STEEL THRU DECK SINGLE BITT



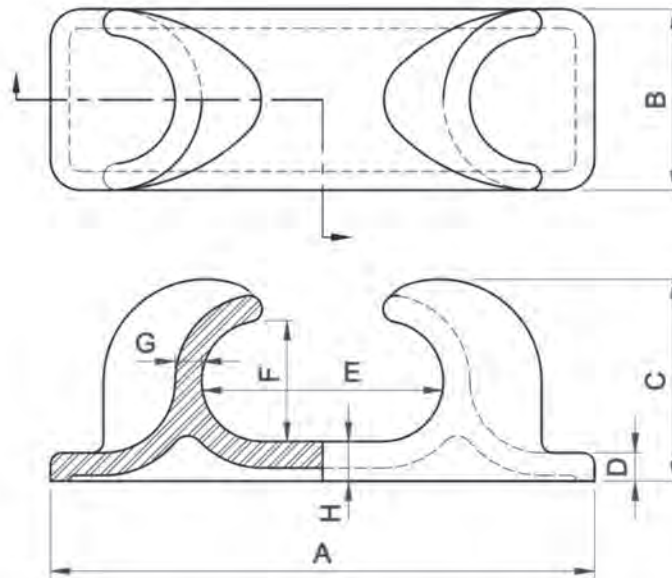
| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | H | ØI | WT. (lbs.) |
|-----------|----------|------|-----|-----|----|------|-----|------|----|-----|--------|------------|
| DF-532 | 21660 | 9" | 11" | 11" | 9" | 3/4" | 12" | 1/2" | 7" | 19" | 8 1/2" | 155 |

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CAST STEEL OPEN CHOCK

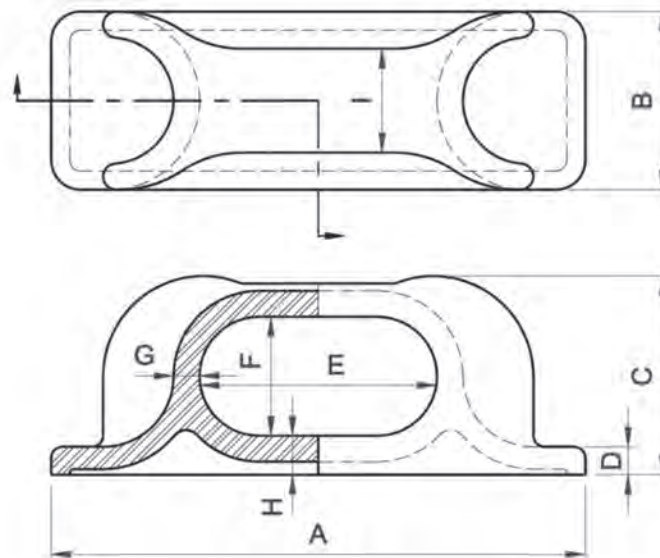


| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|------|---------|-----|---------|---------|---------|--------|--------|----------|------------|
| DF-496 | 89451 | 4x8 | 19 3/4" | 6" | 6 3/4" | 1 1/8" | 8" | 4" | 1" | 1 3/8" | 75 |
| DF-495 | 89443 | 5x11 | 25 1/4" | 8" | 9" | 1 5/16" | 10 3/4" | 5 3/8" | 1 1/4" | 1 13/16" | 132 |
| DF-485 | 20362 | 6x12 | 27 3/4" | 9" | 10 1/8" | 1 1/2" | 12" | 6" | 1 3/8" | 2 1/16" | 175 |
| DF-489 | 89346 | 8x16 | 36" | 12" | 13 3/8" | 1 7/8" | 16" | 8" | 1 3/4" | 2 5/8" | 435 |

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CAST STEEL CLOSED CHOCK



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | I | WT. (lbs.) |
|-----------|----------|------|---------|-----|---------|--------|-----|----|--------|---------|--------|------------|
| DF-497 | 89478 | 4x8 | 19 3/4" | 6" | 6 3/4" | 1 1/8" | 8" | 4" | 1" | 1 3/8" | 3 1/2" | 84 |
| DF-480 | 89397 | 6x12 | 27 3/4" | 9" | 10 1/8" | 1 1/2" | 12" | 6" | 1 3/8" | 2 1/16" | 5 1/4" | 191 |
| DF-490 | 89354 | 8x16 | 36" | 12" | 13 3/8" | 1 7/8" | 16" | 8" | 1 3/4" | 2 5/8" | 7" | 455 |

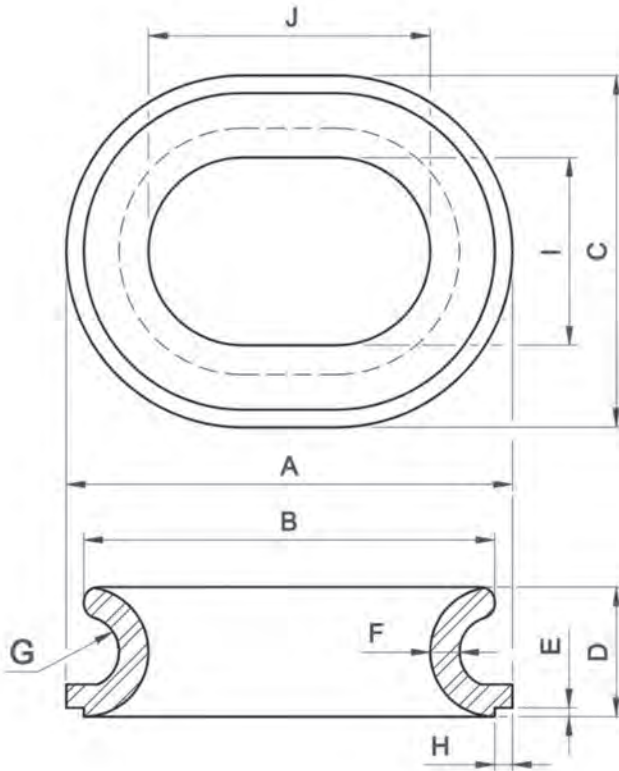
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CAST STEEL MOORING RING

1

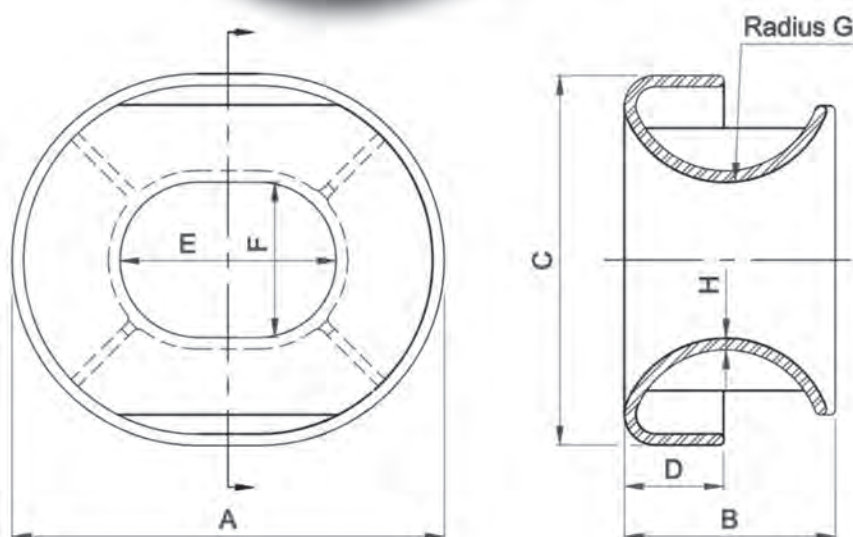


| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | I | J | WT. (lbs.) |
|-----------|----------|------|-----|---------|-----|--------|------|--------|--------|------|----|-----|------------|
| DF-528 | 21512 | 8x12 | 19" | 17 1/2" | 15" | 5 1/2" | 3/8" | 1 1/4" | 1 1/2" | 3/4" | 8" | 12" | 130 |

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CAST STEEL PANAMA CANAL CHOCK (BULWARK)



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|---------|---------|---------|--------|-----|-----|----|------|------------|
| DF-531 | 21551 | 12x10 | 25 1/2" | 13 1/2" | 23 1/2" | 6 1/2" | 12" | 10" | 7" | 3/4" | 256 |
| DF-531 | 21550 | 14x10 | 27 1/2" | 13 1/2" | 23 1/2" | 6 1/2" | 14" | 10" | 7" | 3/4" | 410 |

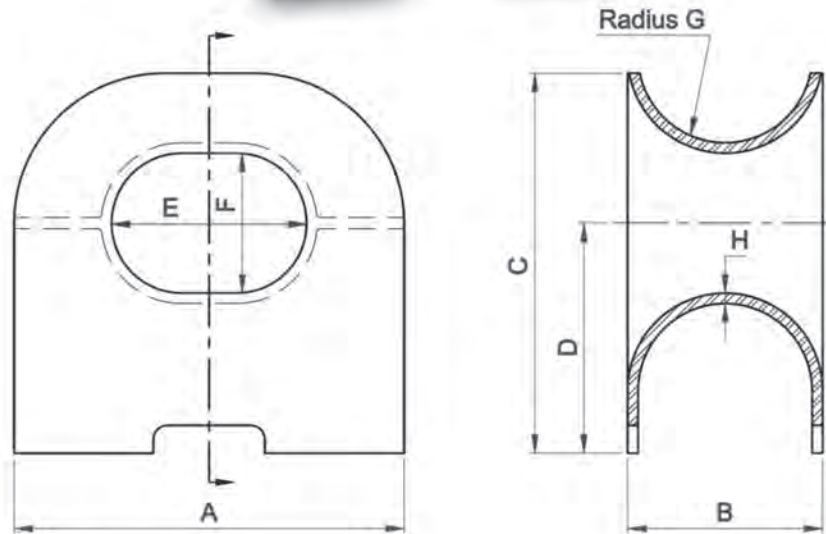
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CAST STEEL PANAMA CANAL CHOCK

1

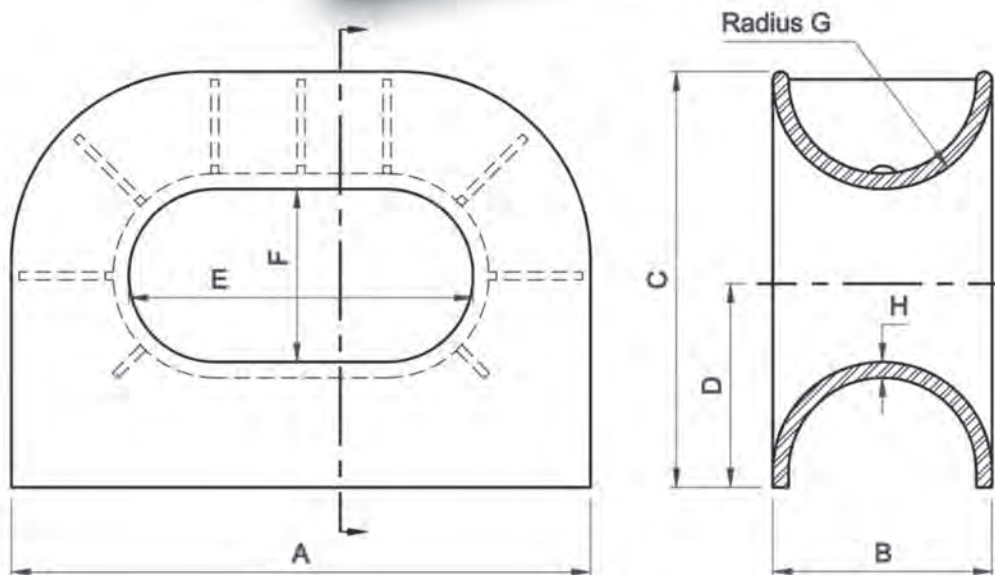


| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|-----|-----|---------|---------|-----|-----|--------|------|------------|
| DF-531 | 21602 | 12x10 | 26" | 14" | 22" | 12" | 12" | 10" | 6 5/8" | 3/4" | 305 |
| DF-531 | 21601 | 14x10 | 28" | 14" | 27 1/4" | 16 1/2" | 14" | 10" | 6 1/4" | 3/4" | 365 |

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CAST STEEL PANAMA CANAL CHOCK



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|-------|-----|-----|---------|---------|-----|-----|----|--------|------------|
| DF-531 | 21554 | 22x11 | 37" | 14" | 26 1/2" | 13 1/2" | 22" | 11" | 7" | 1" | 790 |
| DF-531 | 21607 | 18x12 | 33" | 14" | 31 1/2" | 18" | 18" | 12" | 7" | 1 1/8" | 1140 |
| DF-531 | 21609 | 24x12 | 41" | 16" | 34 1/2" | 20" | 24" | 12" | 8" | 1 1/8" | 1200 |

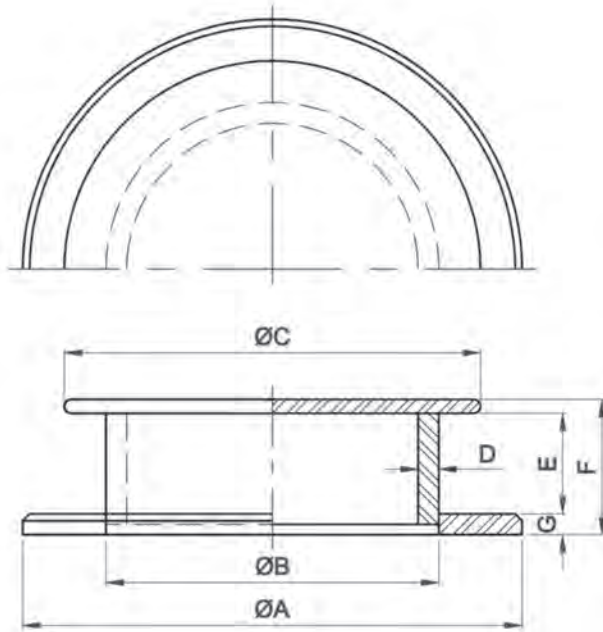
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FABRICATED STEEL BUTTON CHOCK

1

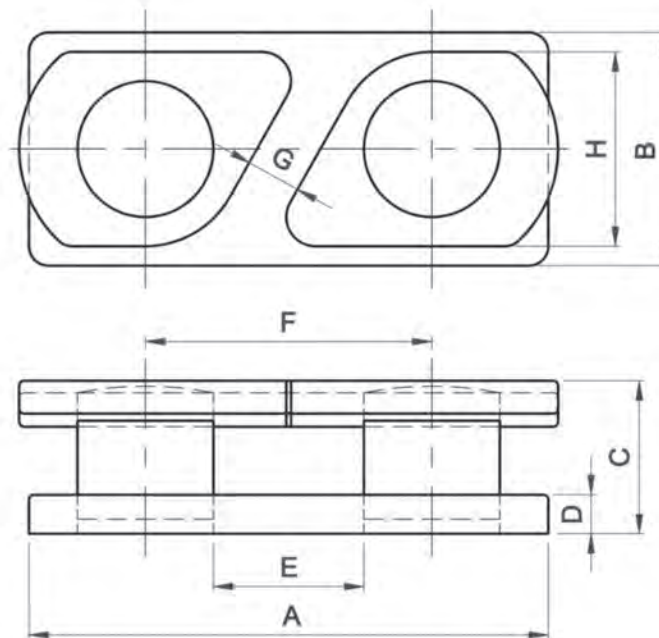


| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|--------|---------|--------|---------|------|--------|--------|------|------------|
| DF-148 | 6610 | 3 1/2" | 8" | 3 1/2" | 7" | N/A | 1 3/4" | 3 1/4" | 1" | 25 |
| DF-129 | 6688 | 8 1/2" | 14 5/8" | 8 5/8" | 11 5/8" | 7/8" | 1 3/4" | 3" | 3/4" | 52 |
| DF-158 | 6505 | 8 1/2" | 14 5/8" | 8 5/8" | 11 5/8" | 7/8" | 3" | 4 1/4" | 3/4" | 62 |
| DF-129A | 6661 | 11" | 17" | 11" | 14" | 1" | 1 3/4" | 3" | 3/4" | 70 |
| DF-158A | 6491 | 12" | 18" | 12" | 15" | 3/4" | 3 5/8" | 4 7/8" | 3/4" | 95 |

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FABRICATED STEEL OPEN CHOCK



| MODEL No. | PART No. | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|---------|----|----|----|--------|--------|--------|----|------------|
| DF-149 | 6602 | 13 3/8" | 6" | 4" | 1" | 3 7/8" | 7 3/8" | 1 3/8" | 5" | 47 |

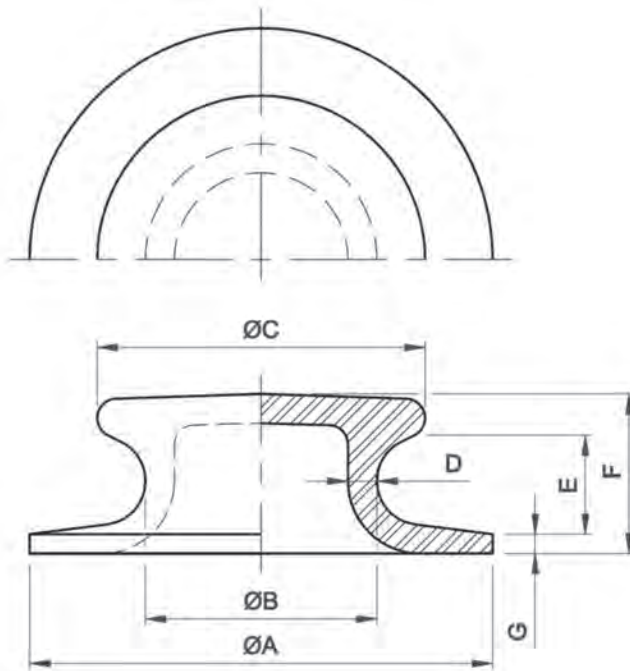
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CAST STEEL 6" BUTTON CHOCK

1

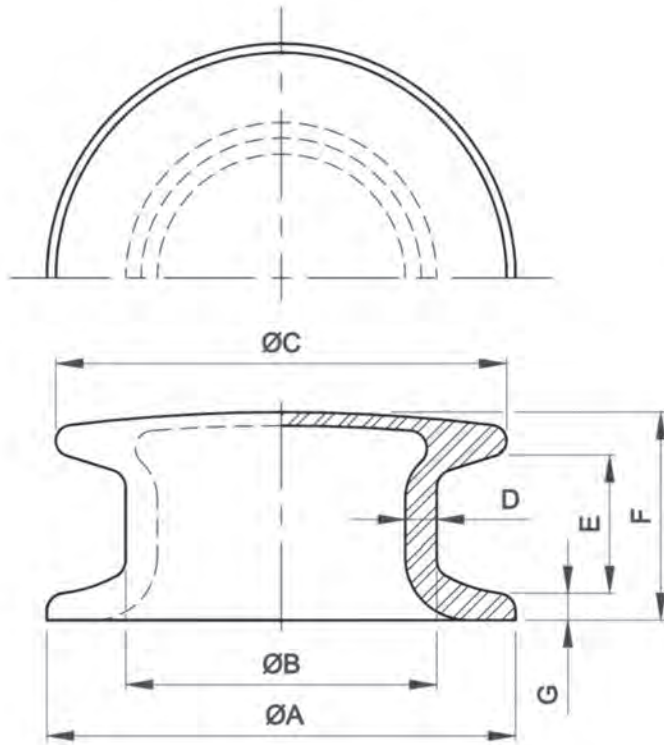


| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|----|--------|------|---------|--------|------|------------|
| DF-192 | 6408 | 6" | 12" | 6" | 8 1/2" | 3/4" | 2 9/16" | 4 1/8" | 1/2" | 40 |

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CAST STEEL 8" BUTTON CHOCK



| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|--------|---------|------|--------|--------|------|------------|
| DF-473C | 77461 | 8" | 13" | 8 5/8" | 12 1/2" | 5/8" | 3 3/4" | 5 3/4" | 3/4" | 75 |

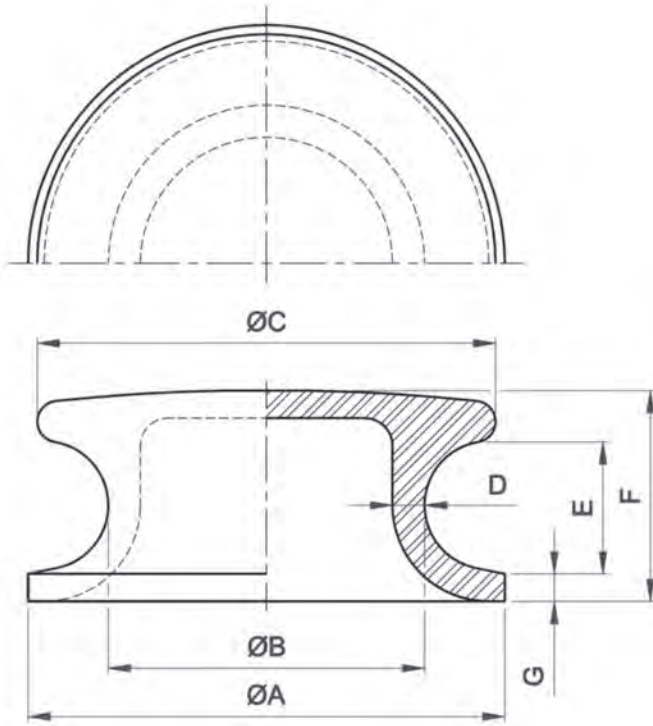
TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.

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CAST STEEL 8" BUTTON CHOCK

1

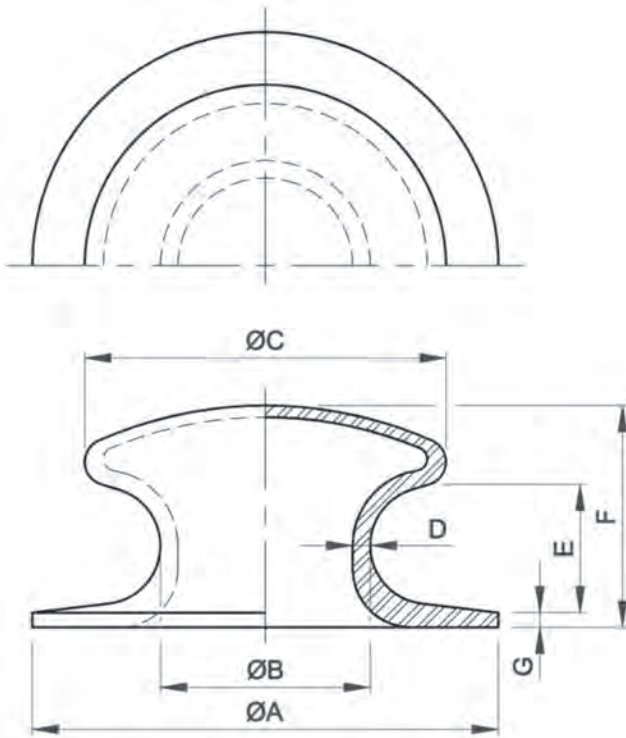


| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|--------|---------|------|--------|--------|------|------------|
| DF-542 | 89990 | 8" | 13" | 8 5/8" | 12 1/2" | 7/8" | 3 5/8" | 5 3/4" | 3/4" | 75 |

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CAST STEEL 9" BUTTON CHOCK



1

| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|----|---------|------|--------|--------|------|------------|
| DF-194 | 16128 | 9" | 20" | 9" | 15 1/2" | 3/4" | 5 1/2" | 9 1/2" | 5/8" | 158 |

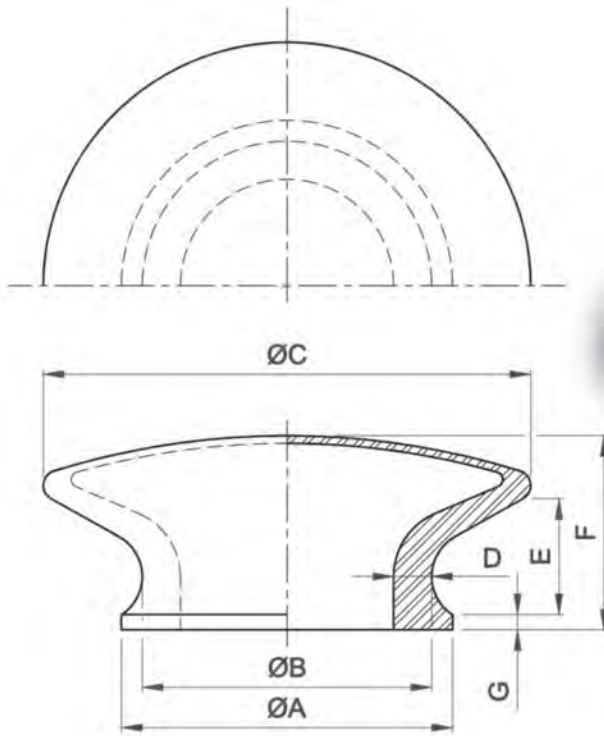
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CAST STEEL 9 1/2" BUTTON CHOCK

1

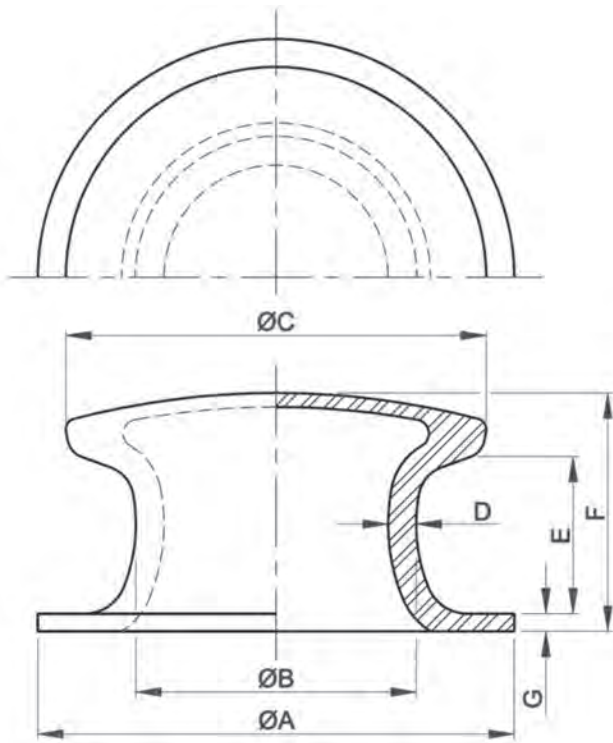


| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|--------|---------|--------|-----|--------|--------|--------|------|------------|
| DF-176 | 13838 | 9 1/2" | 10 7/8" | 9 1/2" | 16" | 1 1/4" | 3 3/4" | 6 3/8" | 1/2" | 84 |

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CAST STEEL 10" BUTTON CHOCK



1

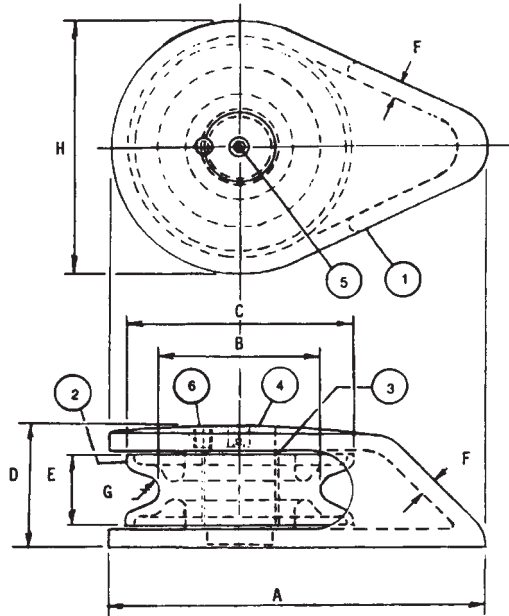
| MODEL No. | PART No. | SIZE | ØA | ØB | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|-----|-----|----|--------|--------|------|------------|
| DF-185 | 14567 | 10" | 17" | 10" | 15" | 1" | 5 3/4" | 8 1/2" | 5/8" | 145 |

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SINGLE ROLLER CHOCK



| MODEL NO. | PART NO. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|-----------|----------|------|-----|----------|--------|--------|---------|------|--------|----|------------|
| DF-927 | 89265 | 8" | 13" | 5-11/16" | 7-7/8" | 4-1/4" | 2-7/16" | 5/8" | 17/32" | 9" | 55 |

| PIECE NO. | DESCRIPTION | PART NO. | MATERIAL |
|-----------|----------------|----------|------------|
| 1 | BASE | 89273 | CAST STEEL |
| 2 | ROLLER | 89281 | CAST STEEL |
| 3 | BUSHING | 89303 | BRASS |
| 4 | PIN | 89311 | STEEL |
| 5 | GREASE FITTING | 70505 | STEEL |
| 6 | SET SCREW | 70599 | STEEL |

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SELF-ALIGNING ROLLER CHOCKS



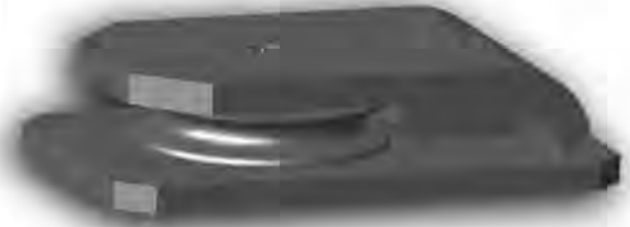
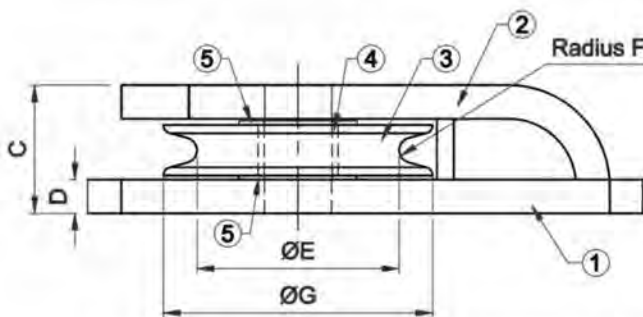
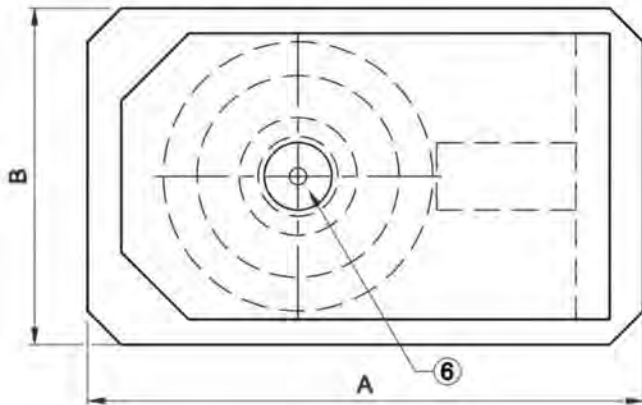
| MODEL | SHEAVE DIA. | CAP. (TONS) |
|---------|-------------|-------------|
| RC8-20 | 8" | 20 |
| RC10-40 | 10" | 40 |
| RC12-65 | 12" | 65 |

The Wintech Roller Chock is a self-aligning chock, which pivots up and down to automatically accommodate empty or loaded barges. Improved sheave alignment reduces premature cable and sheave wear. The Roller Chock is offered in three sizes up to 1 1/8" wire.

*see page 153 for pivoting roller chock

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SINGLE ROLLER CHOCK



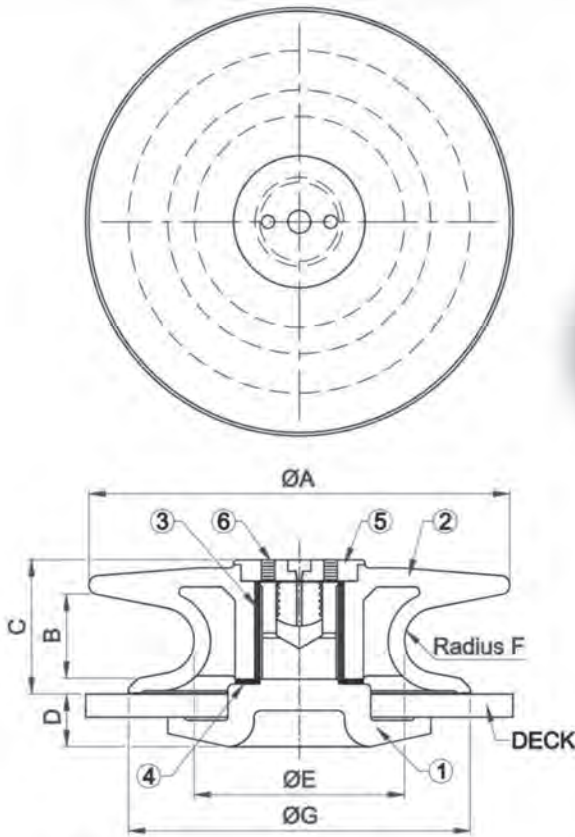
| MODEL No. | PART No. | SIZE | A | B | C | D | ØE | F | ØG | WT. (lbs.) |
|-----------|----------|------|---------|-----|----------|----|----|------|----|------------|
| DF-361 | 13862 | 8" | 16 1/2" | 10" | 3 13/16" | 1" | 6" | 3/8" | 8" | 123 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--------------------|----------|----------|
| 1 | ROLLER BODY BOTTOM | 76988 | STEEL |
| 2 | ROLLER BODY TOP | 76996 | STEEL |
| 3 | ROLLER SHEAVE | 77003 | STEEL |
| 4 | BUSHING | 77410 | BRASS |
| 5 | WASHER | 77046 | BRASS |
| 6 | ROLLER PIN | 77038 | STEEL |



THRU DECK SINGLE ROLLER BUTTON CHOCK

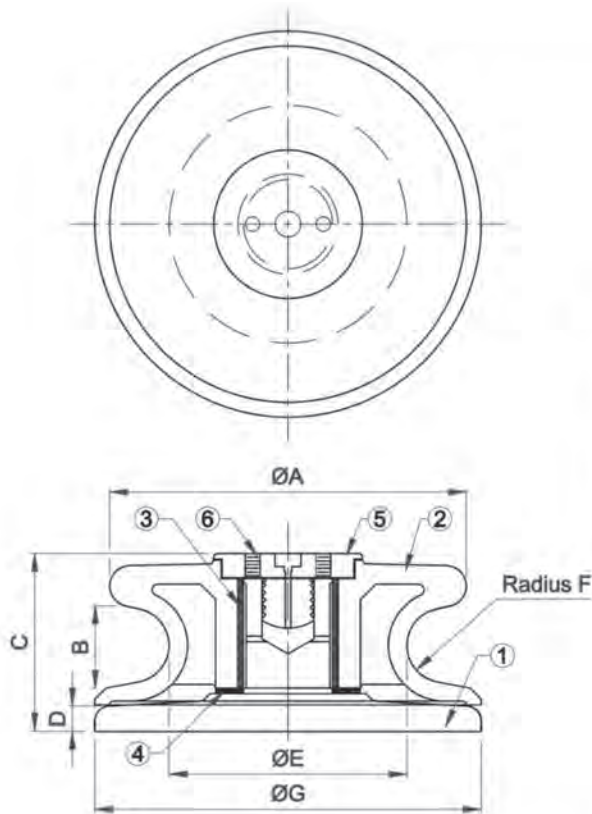
1



| MODEL No. | PART No. | SIZE | A | B | C | D | ØE | F | ØG | WT. (lbs.) |
|-----------|----------|------|-----|---------|---------|----|----|--------|-----|------------|
| DF-11 | 6998 | 16" | 16" | 3 3/16" | 5 1/16" | 2" | 8" | 1 1/4" | 13" | 126 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|---------------|----------|------------|
| 1 | ROLLER BASE | 6971 | CAST STEEL |
| 2 | ROLLER SHEAVE | 6947 | CAST STEEL |
| 3 | BUSHING | 6920 | BRONZE |
| 4 | WASHER | 6912 | BRASS |
| 5 | ROLLER CAP | 6939 | BRASS |
| 6 | SET SCREW | 74918 | STAINLESS |

SINGLE ROLLER BUTTON CHOCK



1

| MODEL No. | PART No. | SIZE | ØA | B | C | D | ØE | F | ØG | WT. (lbs.) |
|-----------|----------|------|-----|---------|----|------|----|--------|-----|------------|
| DF-512 | 89222 | 12" | 12" | 2 3/4" | 6" | 7/8" | 8" | 1 1/4" | 13" | 125 |
| DF-511 | 89249 | 16" | 16" | 3 3/16" | 6" | 7/8" | 8" | 1 1/4" | 13" | 140 |

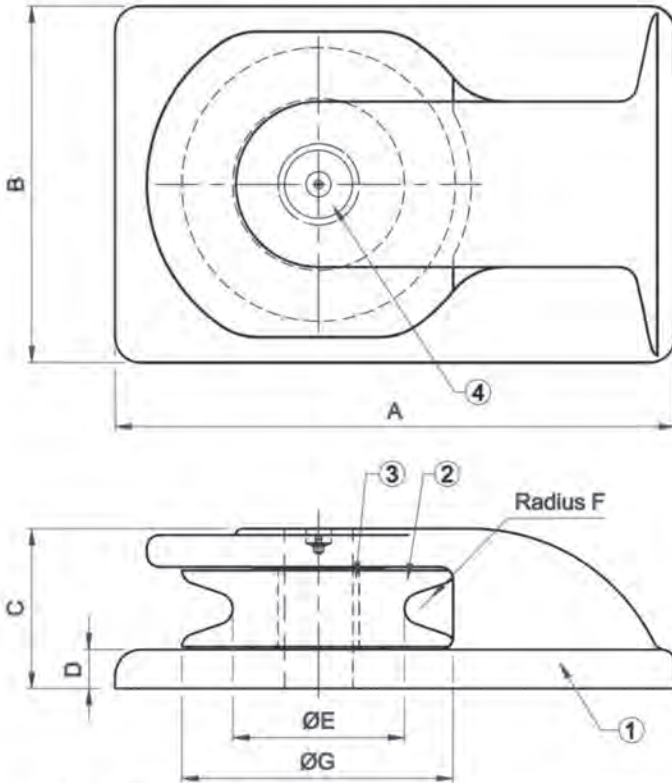
| PIECE No. | DESCRIPTION | PART NUMBER | | MATERIAL |
|-----------|---------------|-------------|--------|------------|
| | | DF-512 | DF-511 | |
| 1 | ROLLER BASE | 89257 | | CAST STEEL |
| 2 | ROLLER SHEAVE | 89230 | 6947 | CAST STEEL |
| 3 | BUSHING | 6920 | | BRASS |
| 4 | WASHER | 6912 | | BRASS |
| 5 | ROLLER CAP | 6939 | | BRASS |
| 6 | SET SCREW | 74918 | | STAINLESS |

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SINGLE ROLLER CHOCK

1



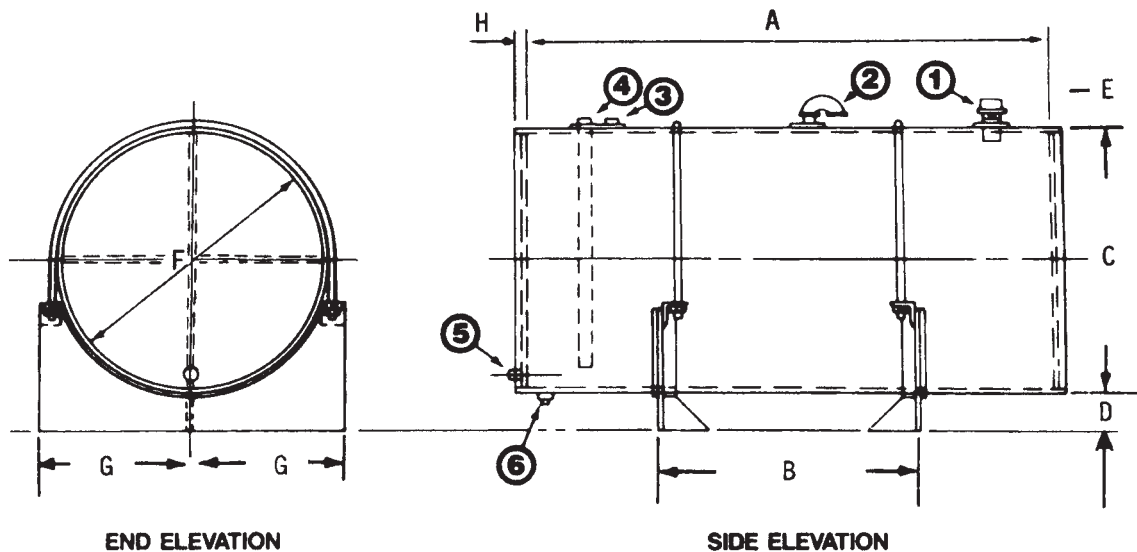
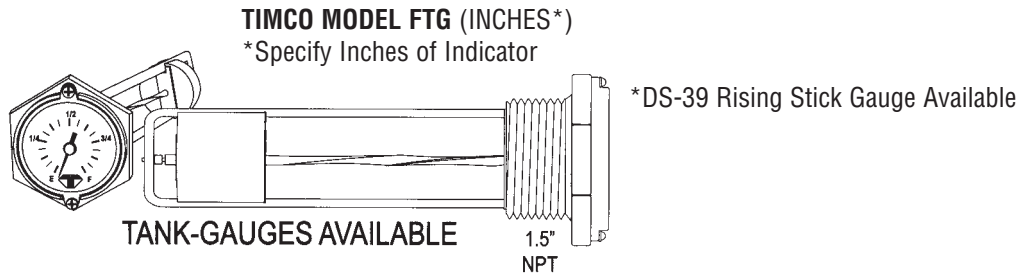
| MODEL No. | PART No. | SIZE | A | B | C | D | ØE | F | ØG | WT. (lbs.) |
|-----------|----------|------|-----|-----|--------|--------|--------|------|---------|------------|
| DF-164 | 6475 | 11" | 22" | 14" | 6 1/4" | 1 1/2" | 6 3/4" | 5/8" | 10 3/4" | 296 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|----------------|----------|------------|
| 1 | HOUSING | 6467 | CAST STEEL |
| 2 | ROLLER SHEAVE | 6734 | CAST STEEL |
| 3 | BUSHING | 6726 | BRONZE |
| 4 | ROLLER PIN | 76198 | STEEL |
| 5 | GREASE FITTING | 9865 | STEEL |

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FUEL OIL TANK



| MODEL NO. | PART NO. | SIZE | A | B | C | D | E | F | G | H | WT. (lbs.) |
|------------|----------|----------|-----|-----|---------|----|------|-----|-----|------|------------|
| DF-448 | 6246 | 300 Gal. | 72" | 35" | 36-3/8" | 6" | 7" | 36" | 20" | 1/2" | 714 |
| DF-448-500 | 6246-500 | 500 Gal. | 86" | 40" | 42" | 6" | 9.5" | 42" | 23" | 1/2" | 1150 |

| PIECE NO. | DESCRIPTION |
|-----------|--|
| 1 | 2" dia. FILL W/ BRASS CAP AND CHAIN |
| 2 | 2-1/2" dia. VENT W/ STAINLESS STEEL FLAME SCREEN /OPTIONAL P/V VALVE |
| 3 | 1" dia. RETURN CONNECTION |
| 4 | 1" dia. SUCTION CONNECTION |
| 5 | 1" dia. OPTIONAL SUCTION OR DRAIN W/ PLUG |
| 6 | 1-1/2" dia. DRAIN W/ PLUG |

MATERIAL: STEEL

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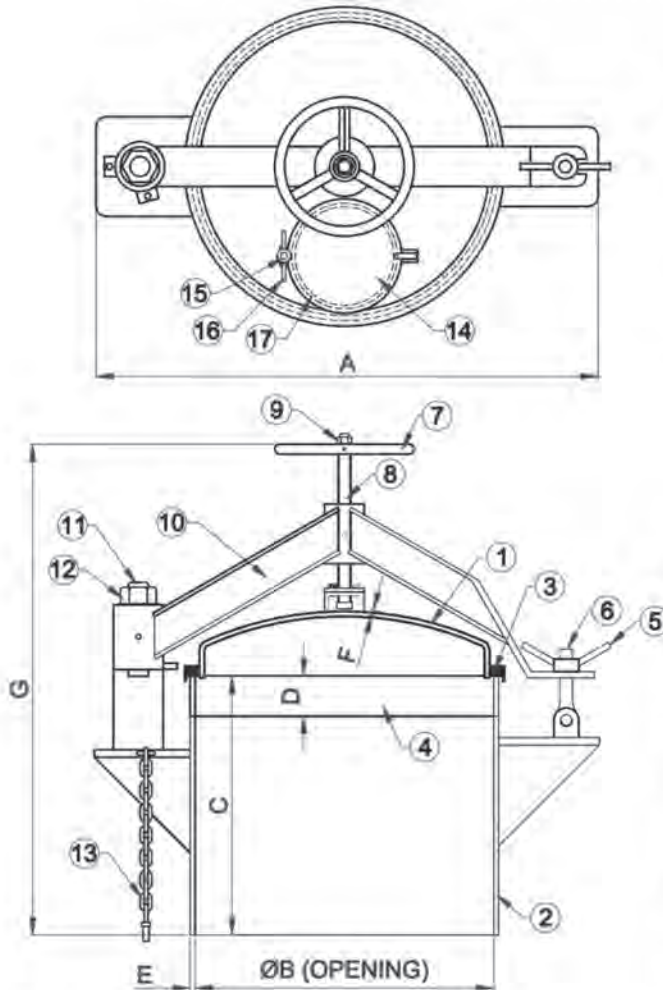
TANK TESTED TO 5 P.S.I. & BUILT IN ACCORDANCE WITH U.S. COAST GUARD SPECIFICATIONS FOR RIVER SERVICE. **OTHER SIZE FUEL OIL STORAGE TANKS QUOTED ON REQUEST.**

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RAISED WATERTIGHT EXPANSION DOME

1



| No. | DESCRIPTION | MATERIAL |
|-----|---------------------------|------------|
| 1 | HATCH COVER ASSEMBLY | STEEL |
| 2 | COAMING ASSEMBLY | STEEL |
| 3 | HATCH GASKET | NEOPRENE |
| 4 | UPPER COAMING RING | STAINLESS |
| 5 | WING NUT | BRASS |
| 6 | DROP BOLT | STAINLESS |
| 7 | HANDWHEEL ASSEMBLY | STEEL |
| 8 | CENTER SHAFT | STAINLESS |
| 9 | HEX NUT | STAINLESS |
| 10 | I-BEAM SWIVEL ARM | STEEL |
| 11 | HINGE PIN ASSEMBLY | STAINLESS |
| 12 | HEX NUT | STAINLESS |
| 13 | KEEPER PIN & CHAIN | GALVANIZED |
| 14 | 10" ULLAGE HATCH ASSEMBLY | STEEL |
| 15 | ULLAGE HATCH DROP BOLT | STAINLESS |
| 16 | ULLAGE HATCH WING NUT | BRASS |
| 17 | ULLAGE HATCH GASKET | NEOPRENE |

The expansion dome is shown with a 10" ullage hatch installed in the hatch cover assembly. This add-on feature has the option to be Stainless Steel or removed entirely from the hatch assembly. Additional add-on features available are a Stainless Steel sight glass with cover, blind flange, or any custom sized ullage.

The dome is also equipped with a stainless steel coaming ring which can be left off or custom sized for specific needs.

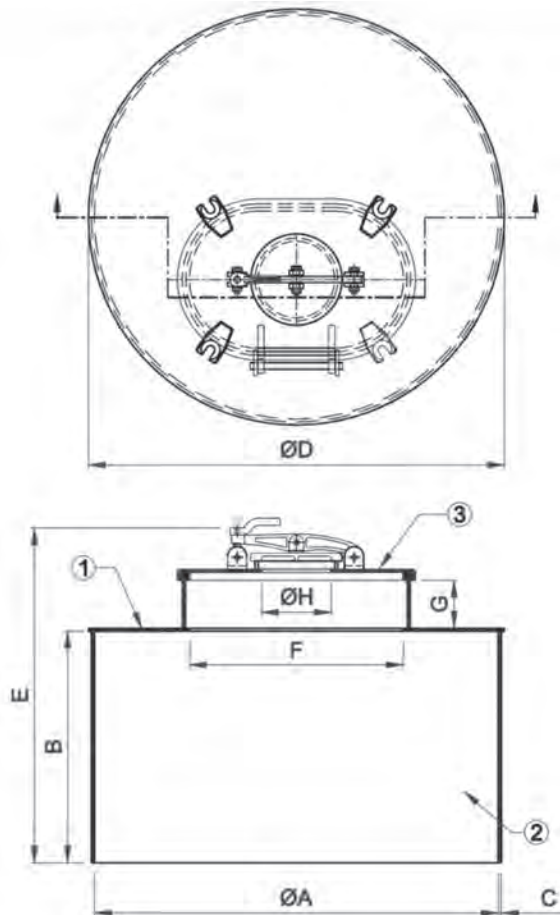
| MODEL No. | PART No. | SIZE | A | ØB | C | D | E | F | G | WT. (lbs.) |
|-------------|----------|------|-----|-----|-----|----|------|------|-----|------------|
| DF-450-3026 | 21010 | 30" | 51" | 30" | 26" | 4" | 1/2" | 1/2" | 50" | 750 |
| DF-450-4224 | 21033 | 42" | 63" | 42" | 24" | 4" | 1/2" | 1/2" | 49" | 950 |

- 1- ADDITIONAL COAMING HEIGHTS AVAILABLE.
- 2- ADDITIONAL OPENING DIAMETERS AVAILABLE.
- 3- OTHER GASKET MATERIALS AVAILABLE.
- 4- AVAILABLE IN LEFT HAND AND RIGHT HAND MODELS.

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EXPANSION TRUNK



1

| MODEL No. | PART No. | SIZE | $\varnothing A$ | B | C | $\varnothing D$ | E | F | G | $\varnothing H$ | WT. (lbs.) |
|-----------|----------|-------|-----------------|-----|-------|-----------------|---------|-----------------|----|-----------------|------------|
| DF-449 | 6238 | 42x24 | 42" | 24" | 5/16" | 43 1/4" | 34 3/4" | 22 1/4"x13 1/4" | 5" | 7 1/4" | 520 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--|----------|----------|
| 1 | COVER PLATE | 76163 | STEEL |
| 2 | COAMING ASSEMBLY | 76171 | STEEL |
| 3 | DF-174 HATCH W/ DF-144 ULLAGE HATCH | 8214 | STEEL |

1. AVAILABLE IN A VARIETY OF SIZES AND MATERIALS.

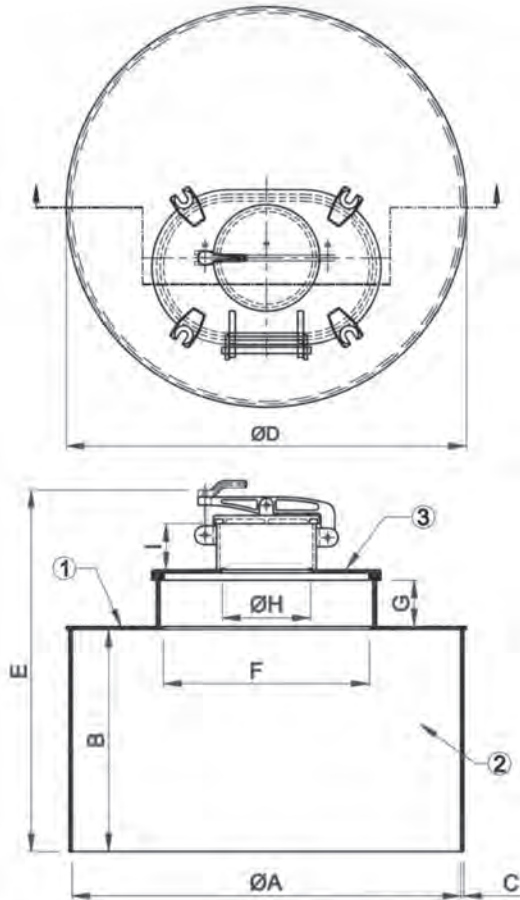
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EXPANSION TRUNK

1



| MODEL No. | PART No. | SIZE | ØA | B | C | ØD | E | F | G | ØH | I | WT. (lbs.) |
|-----------|----------|-------|-----|-----|-------|---------|----------|-----------------|----|--------|----|------------|
| DF-470 | 85308 | 42x24 | 42" | 24" | 5/16" | 43 1/4" | 39 1/16" | 22 1/4"x13 1/4" | 5" | 9 1/4" | 5" | 540 |

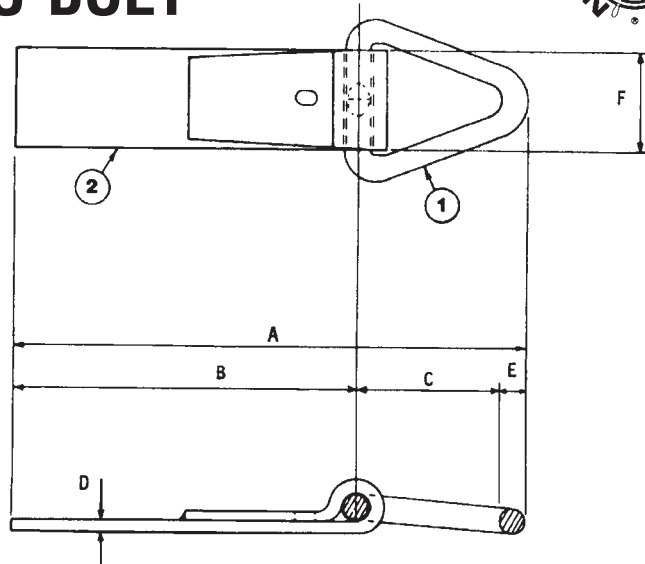
| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|--|----------|----------|
| 1 | COVER PLATE | 76163 | STEEL |
| 2 | COAMING ASSEMBLY | 76171 | STEEL |
| 3 | DF-174 HATCH W/ DF-569-5 ULLAGE HATCH | 85316 | STEEL |

1. AVAILABLE IN A VARIETY OF SIZES AND MATERIALS.

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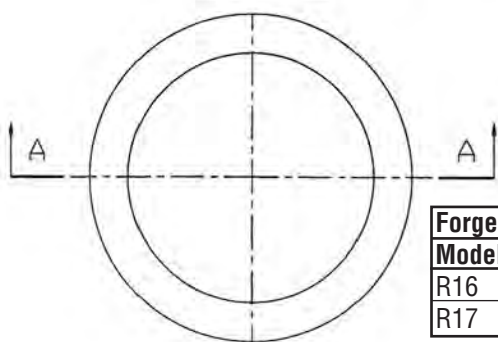
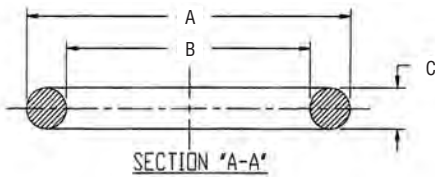
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RATCHET STRAP & MOORING RING/U-BOLT

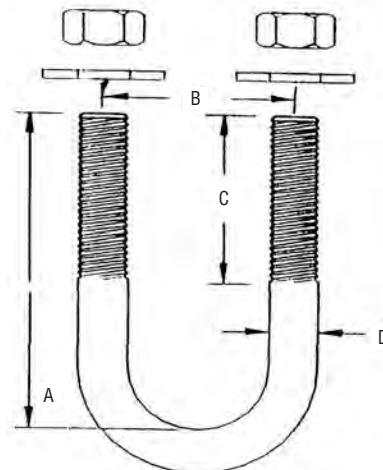


| MODEL NO. | PART NO. | A | B | C | D | E | F | WT. (lbs.) |
|-----------|----------|---------|-----|--------|------|--------|----|------------|
| DF-80 | 6807 | 35-5/8" | 24" | 9-7/8" | 3/4" | 1-3/4" | 7" | 83 |

| PIECE NO | DESCRIPTION | PART NO. | MATERIAL |
|----------|---------------------|----------|------------|
| 1 | RATCHET STRAP RING | 75736 | MILD STEEL |
| 2 | RATCHET STRAP PLATE | 75744 | MILD STEEL |



| Forged Ring | | | |
|-------------|-----|-----|------|
| Model | A | B | C |
| R16 | 16" | 12" | 2" |
| R17 | 17" | 12" | 2.5" |



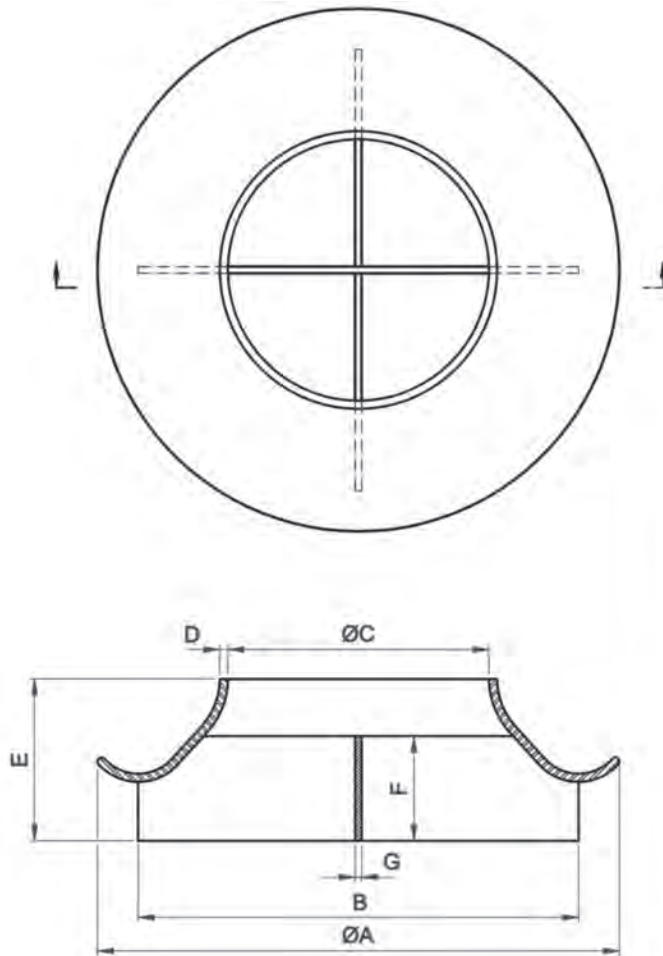
| Model | A | B | C | D |
|--------|----|----|------|------|
| MUB2.5 | 9" | 8" | 7.5" | 2.5" |

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STEEL SUCTION BELLMOUTH

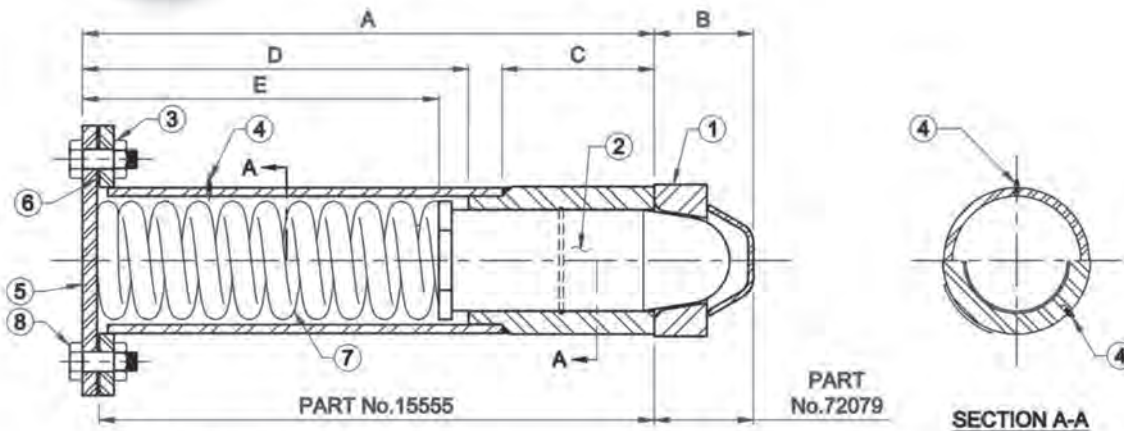


| MODEL No. | PART No. | SIZE | ØA | B | ØC | D | E | F | G | WT. (lbs.) |
|-----------|----------|------|-----|---------|---------|-------|----------|--------|------|------------|
| DF-82-6 | 6793 | 6" | 20" | 16 7/8" | 6 1/16" | 5/16" | 4 13/16" | 2 1/2" | 1/4" | 34 |
| DF-82-8 | 13749 | 8" | 20" | 16 7/8" | 8 1/16" | 5/16" | 5 3/8" | 3" | 1/4" | 34 |
| DF-82-10 | 17191 | 10" | 20" | 16 7/8" | 10" | 5/16" | 6 3/16" | 4" | 1/4" | 34 |
| DF-82-12 | 17192 | 12" | 20" | 16 7/8" | 12" | 1/2" | 7" | 5" | 1/2" | 65 |
| DF-82-14 | 17199 | 14" | 20" | 16 7/8" | 13 1/4" | 3/8" | 8" | 6" | 1/2" | 75 |

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INTERLOCKING PIN



| MODEL No. | PART No. | A | B | C | D | E | WT. (lbs.) |
|-----------|----------|---------|--------|----|---------|---------|------------|
| DF-134 | 15555 | 33 7/8" | 5 7/8" | 9" | 22 7/8" | 21 1/8" | 470 |

| PIECE No. | DESCRIPTION | PART No. | MATERIAL |
|-----------|-------------------------------------|----------|-----------------|
| 1 | LOCKING PIN SOCKET ASSEMBLY | 72079 | STEEL |
| 2 | LOCKING PIN ASSEMBLY | 72109 | STEEL |
| 3 | 1 1/8" DIA. HEAVY HEX NUT | 15989 | STEEL |
| 4 | GREASE FITTING | 9873 | STAINLESS STEEL |
| 5 | SPRING KEEPER PLATE | 72176 | STEEL |
| 6 | GASKET | 75140 | NEOPRENE |
| 7 | INTERLOCKING SPRING | 7064 | STEEL |
| 8 | 1 1/8" DIA. X 3 1/4" HEAVY HEX BOLT | 72222 | STEEL |

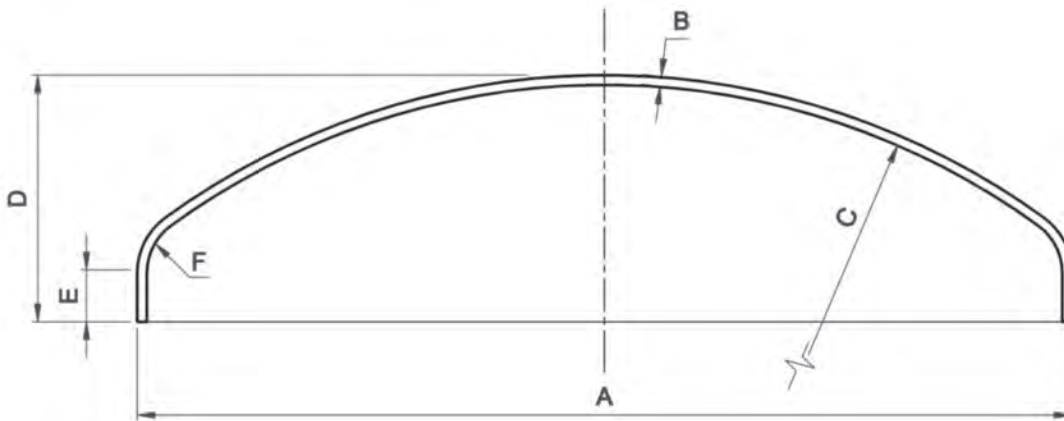
DF-134 PIN ASSEMBLY #15555 AND SOCKET ASSEMBLY #72079 ARE ORDERED SEPARATELY

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FLANGED AND DISHED HEAD

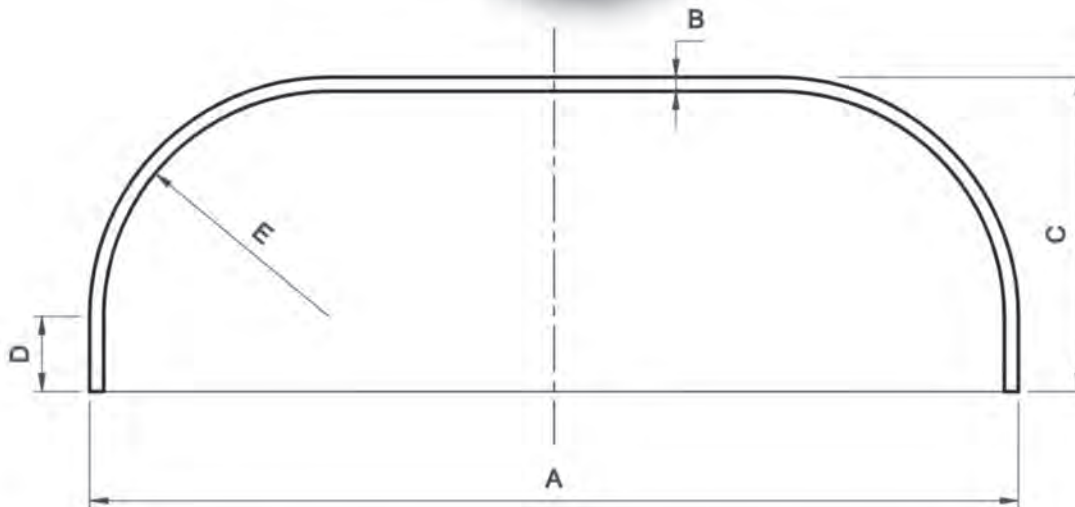


| MODEL No. | PART No. | A | B | C | D | E | F | WT. (lbs.) |
|-----------|----------|-----|------|-------|--------|----|--------|------------|
| SE-31 | 90046 | 36" | 3/8" | 28.8" | 9 1/2" | 2" | 2 1/4" | 155 |

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FLANGED HEAD



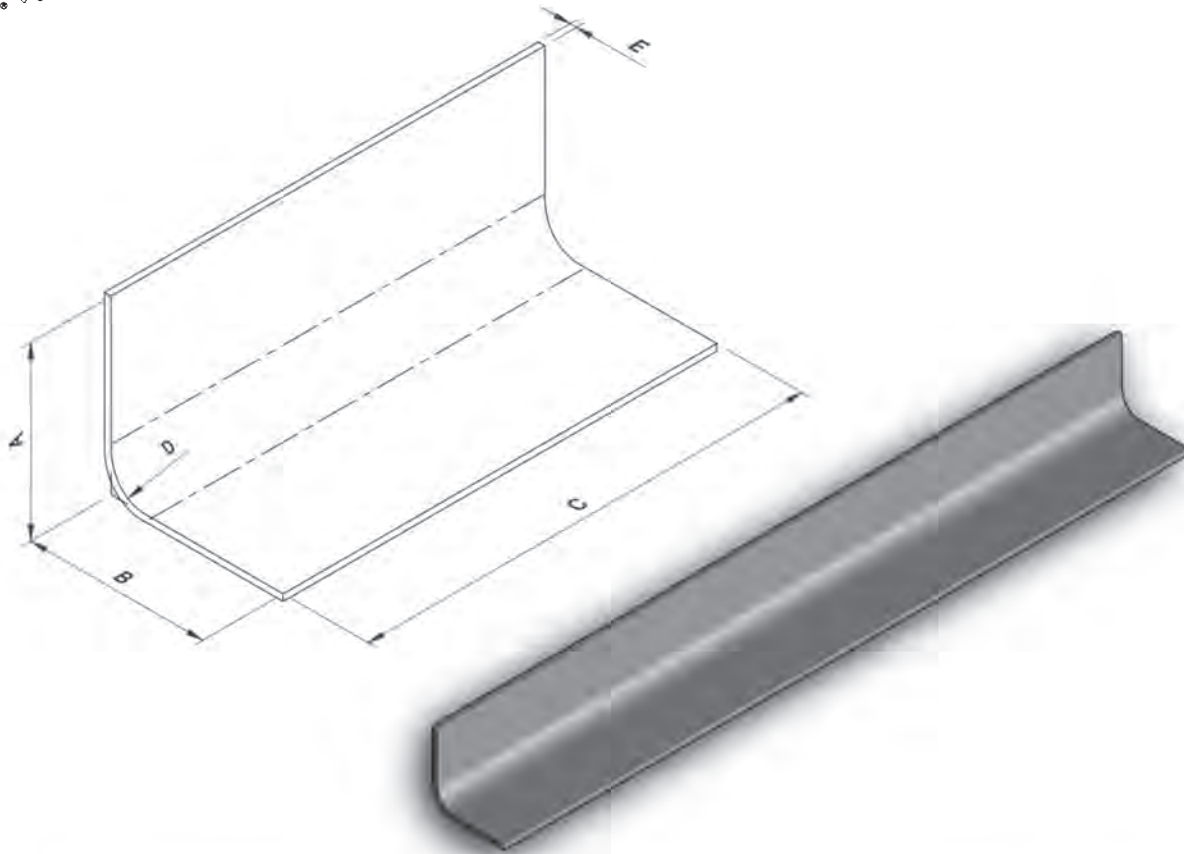
| MODEL NO. | PART NO. | A | B | C | D | E | WT (LBS.) |
|-----------|----------|---------|------|--------|--------|--------|-----------|
| SE-22 | 90042 | 24 3/4" | 3/8" | 8 3/8" | 2" | 6" | 95 |
| SE-29 | 89923 | 25 1/2" | 3/4" | 6 3/4" | 0" | 6" | 160 |
| SE-33 | 90051 | 36" | 3/8" | 3" | 1 1/2" | 1 1/8" | 140 |

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BILGE PLATES

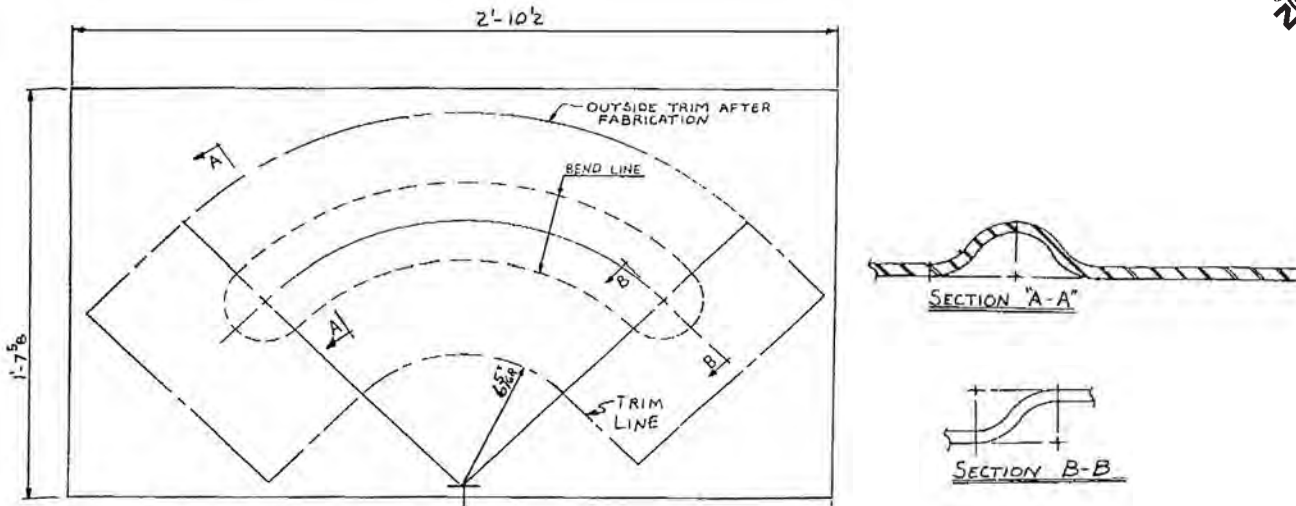


| MODEL No. | SIZE | A | B | C | D | E | WT. (lbs.) |
|--------------|-----------------|-------|-------|--------|-----|------|------------|
| BP123/440-44 | PL 96x3/4x40'-0 | 4'-2" | 4'-2" | 40'-0" | 12" | 3/4" | 9801 |
| BP63/440-44 | PL 96x3/4x40'-0 | 4'-1" | 4'-1" | 40'-0" | 6" | 3/4" | 9801 |
| BP121/240-44 | PL 96x1/2x40'-0 | 4'-2" | 4'-2" | 40'-0" | 12" | 1/2" | 6534 |
| BP61/240-44 | PL 96x1/2x40'-0 | 4'-1" | 4'-1" | 40'-0" | 6" | 1/2" | 6534 |
| BP123/440-62 | PL 96x3/4x40'-0 | 6'-2" | 2'-2" | 40'-0" | 12" | 3/4" | 9801 |
| BP63/440-62 | PL 96x3/4x40'-0 | 6'-1" | 2'-1" | 40'-0" | 6" | 3/4" | 9801 |
| BP121/240-62 | PL 96x1/2x40'-0 | 6'-2" | 2'-2" | 40'-0" | 12" | 1/2" | 6534 |
| BP61/240-62 | PL 96x1/2x40'-0 | 6'-1" | 2'-1" | 40'-0" | 6" | 1/2" | 6534 |

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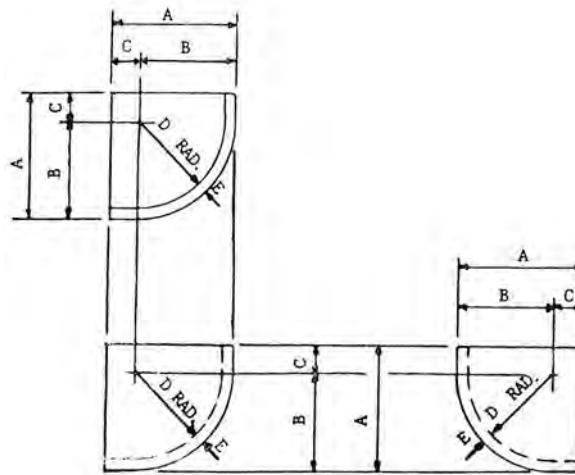
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EXPANSION JOINT



| MODEL NO. | PART NO. | SIZE | MATERIAL | WT. (lbs.) |
|-----------|----------|------------------------|------------|------------|
| DF-443-6 | 87904 | 2'X10-1/2" X 1'X7-5/8" | MILD STEEL | 48 |
| DF-443-3 | 87890 | | MILD STEEL | 40 |

STEEL CORNER PLATES



| MODEL NO. | PART NO. | SIZE | A | B | C | D | E | WT. (lbs.) |
|-----------|----------|------|---------|---------|----|-----|------|------------|
| DF-486-6 | 87998 | 6" | 8-3/4" | 6-3/4" | 2" | 6" | 3/4" | 54 |
| DF-487-12 | 88005 | 12" | 14-3/4" | 12-3/4" | 2" | 12" | 3/4" | 167 |

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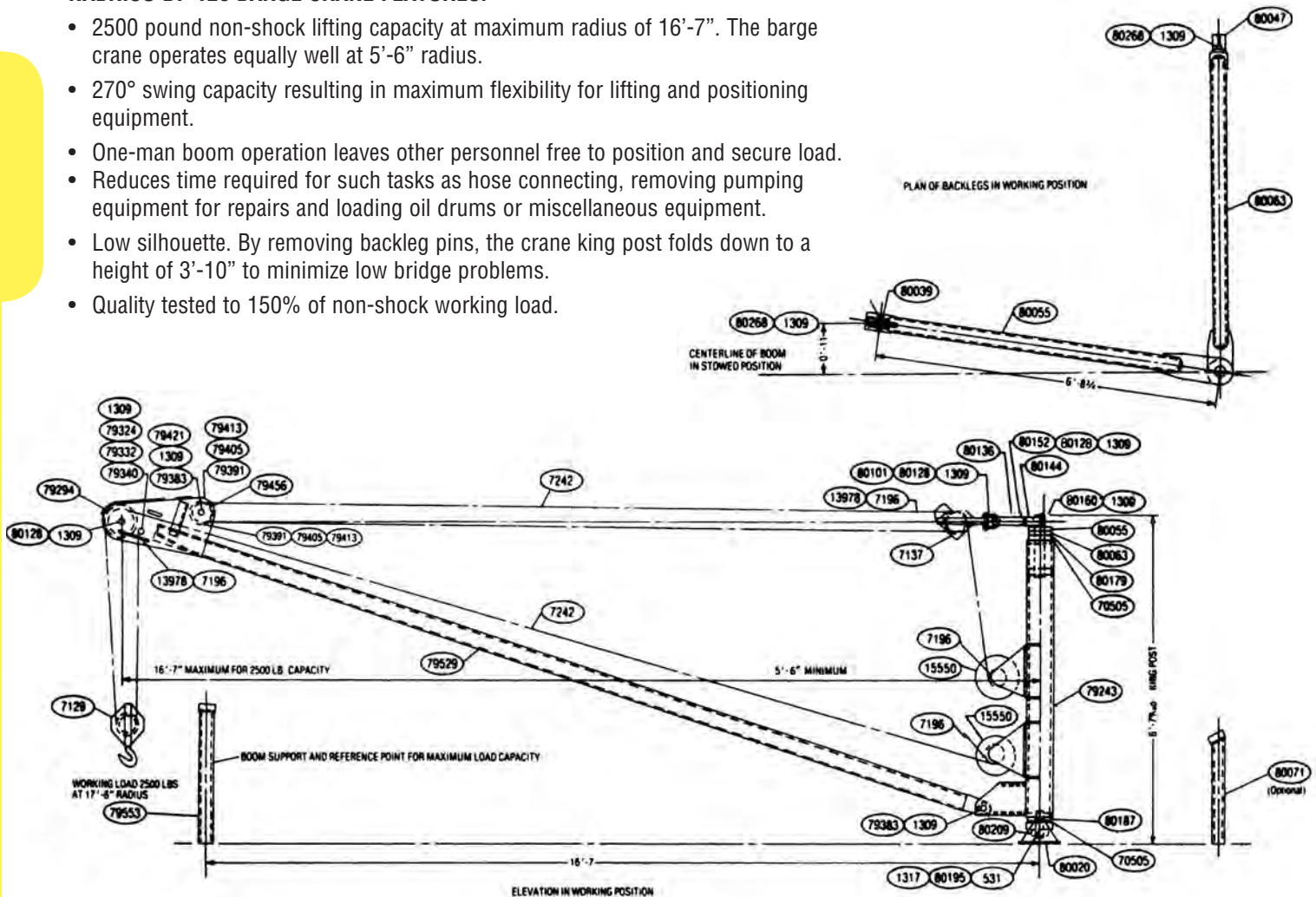
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DF-126 BARGE CRANE (PRE 2011)

NABRICO DF-126 BARGE CRANE FEATURES:

- 2500 pound non-shock lifting capacity at maximum radius of 16'-7". The barge crane operates equally well at 5'-6" radius.
- 270° swing capacity resulting in maximum flexibility for lifting and positioning equipment.
- One-man boom operation leaves other personnel free to position and secure load.
- Reduces time required for such tasks as hose connecting, removing pumping equipment for repairs and loading oil drums or miscellaneous equipment.
- Low silhouette. By removing backleg pins, the crane king post folds down to a height of 3'-10" to minimize low bridge problems.
- Quality tested to 150% of non-shock working load.



| SPECIFICATIONS | |
|-----------------------------------|--|
| Boom And King Post Assembly Plate | ASTM A 36 |
| Square Tubing | ASTM A 36 |
| Sheaves | Cast Iron, Graphite Impregnated Bronze Bushing |
| Pins | Cold Rolled Steel |
| Pipe | ASTM A 53 |

WINCHES

- Hand-Operated With Adjustable Handle
- 4:1 Gear Ratio for Fast Take Up
- 22:1 Gear Ratio for Winching
- Cam-Actuated Brake with Dual Adjustment
- Spring-Loaded Holding Dog
- Oil-Impregnated Bronze Bearings

TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.

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DF-126 BARGE CRANE PARTS LIST



| PART NO. | QUANTITY | LIST OF MATERIALS | DWG. NO. |
|----------|----------|--|----------|
| 329 | 8 | 1/2" X 1-3/4" Lg. Hex Bolt | |
| 531 | 1 | 5/8" St. Hex Nut | 531 |
| 558 | 8 | 1/2" Hex Nut | |
| 1309 | 18 | Cotter Key 1/4" x 1-3/4" Lg. Cadmium Plated Stl. | |
| 1317 | 1 | Cotter Key 1/8" x 1-1/2" Lg. Cadmium Plated Stl. | |
| 7129 | 1 | 6" Sgl. Sheave Stl. Block W/Swivel Hook | |
| 7137 | 1 | 6" Dbl. Sheave Stl. Block W/Shackle & Becket | |
| 7196 | 8 | 1/4" Galv. Wire Rope Clamps (2 Clamps for Winches) | |
| 7242-80 | 1 | 80 Lin. Ft. 1/4" Galv. 7x19 Wire Rope | |
| 7242-110 | 1 | 110 Lin. Ft. 1/4" Galv. 7x19 Wire Rope | |
| 13978 | 2 | 5/16" Wire Rope Thimble | |
| 15550 | 2 | 4000 Lb. Nabrico Hand Winch or LM6 | |
| 70505 | 2 | 1/4"-28 Alemite 1652B Fitting | 70505 |
| 70548 | 8 | 1/2" Lockwasher | |
| 79243 | 1 | King Post | 79243 |
| 79294 | 1 | 6" O.D. Sheave, Western or Eq. | |
| 79324 | 2 | 1-1/4" Pipe Spacer | 79324 |
| 79332 | 1 | 3/4" Pipe Spacer | 79332 |
| 79340 | 1 | 13/16" O.D. Pivot Pin | 79340 |
| 79383 | 1 | 1-1/4" O.D. Pivot Pin | 79383 |
| 79391 | 2 | 3/8" Hex Nut | |
| 79405 | 2 | 3/8" x 5 1/2" Lg. Hex Head Bolt | |
| 79413 | 1 | 3/8" Pipe Spacer | 79413 |
| 79421 | 1 | Washer | 79421 |
| 79456 | 2 | 4-7/8" O.D. Sheave, McKissik or Eq. | |
| 79529 | 1 | Boom | 79529 |
| 79553 | 1 | Rest for Boom | 79553 |
| 80020 | 1 | Pivot for King Post | 80020 |
| 80039 | 1 | Pivot for Backleg | 80039 |
| 80047 | 1 | Pivot for Backleg | 80047 |
| 80055 | 1 | Backleg for King Post | 80055 |
| 80063 | 1 | Backleg for King Post | 80063 |
| 80071 | 1 | Rest for King Post | 80071 |
| 80101 | 1 | Pipe Spacer | 80101 |
| 80128 | 3 | Bar Strap Pin | 80128 |
| 80136 | 2 | Bar Strap | 80136 |
| 80144 | 2 | Bar Strap | 80144 |
| 80152 | 1 | Washer (Stl.) | 80152 |
| 80160 | 1 | Upper King Post Pin | 80160 |
| 80179 | 1 | Brass Washer | 80179 |
| 80187 | 1 | Brass Washer | 80187 |
| 80195 | 1 | 5/8" x 5" Lg. Hex Head Stl. Bolt (Drill for 1/8" CK) | 80195 |
| 80209 | 1 | Retaining Collar | 80209 |
| 80268 | 2 | Pivot Pin | |

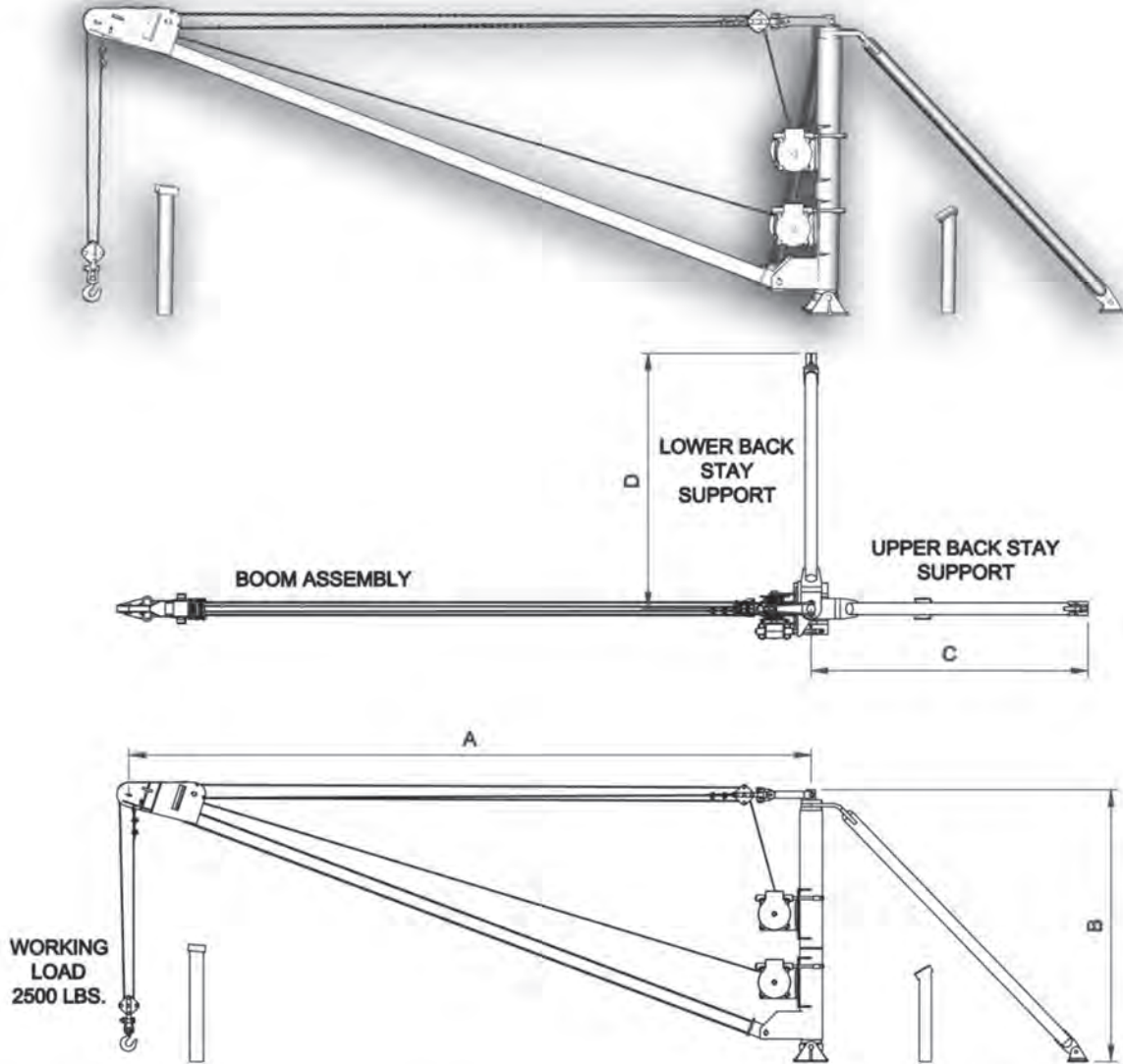
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DF-126 BARGE CRANE

1



| MODEL No. | PART No. | A | B | C | D | WT. (lbs.) |
|-----------|----------|--------------------------|------------|-----------|-----------|------------|
| DF-126 | 79650 | 16' 7" (MAX) 5' 6" (MIN) | 6' 7 5/16" | 6' 8 3/4" | 6' 2 1/2" | 1100 |

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DF-126 BARGE CRANE PARTS LIST



| DF-126 Barge Crane Parts List | | | |
|--|--|----------|-------------|
| Item No. | Part Description | Quantity | Part No. |
| 1 | Single Sheave Block Assembly (6") w/ Swivel Hook | 1 | 7129 |
| 2 | Double Sheave Block Assembly (6") | 1 | 7137 |
| 3 | Galvanized Wire Rope 3/8" 7x19 @ 80' (Luffing) | 1 | 7452 |
| 4 | Galvanized Wire Rope 3/8" 7x19 @ 110' (Hoisting) | 1 | 7453 |
| 5 | DF-7 Manual Worm Gear Winch (2 Ton) | 2 | 15557 |
| 6 | Bracket Assembly | 1 | 79242 |
| 7 | King Post Assembly | 1 | 79243 |
| 8 | Wire Rope Sheave (6" Diameter) | 1 | 79294 |
| 9 | Pivot Pin | 2 | 79383 |
| 10 | Wire Rope Sheave (4-7/8" Diameter) | 2 | 79456 |
| 11 | Boom Assembly | 1 | 79529 |
| 12 | King Post Rest Assembly | 1 | 79553 |
| 13 | Mounting Pin for 4-7/8" Dia. Wire Rope Sheave | 1 | 79987 |
| 14 | Mounting Pin for 6" Dia. Wire Rope Sheave | 1 | 79995 |
| 15 | King Post Foundation Assembly | 1 | 80020 |
| 16 | Back Leg Support Assembly (Long) | 1 | 80055 |
| 17 | Back Leg Support Assembly (Short) | 1 | 80063 |
| 18 | Boom Rest Assembly | 1 | 80071 |
| 19 | Connector Pin (Double Sheave Block to Bracket) | 1 | 80125 |
| 20 | Connector Pin (Bracket to King Post) | 1 | 80165 |
| 21 | Brass Washer (King Post Top) | 1 | 80179 |
| 22 | Brass Washer (King Post Bottom) | 1 | 80187 |
| DF-126 Barge Crane Cable Kit (includes the following) | | | 7246 |
| | Galvanized Wire Rope 3/8" 7x19 @ 80' (Luffing) | 1 | |
| | Galvanized Wire Rope 3/8" 7x19 @ 110' (Hoisting) | 1 | |
| | Cable Clamp (3/8" wire rope size) | 8 | |
| | Wire Rope Thimble | 2 | |
| | Hex Head Bolt 1/2" (SS) used for winch mounting | 8 | |
| | Hex Nut 1/2" (SS) used for winch mounting | 8 | |
| | Lockwasher 1/2" (SS) used for winch mounting | 8 | |

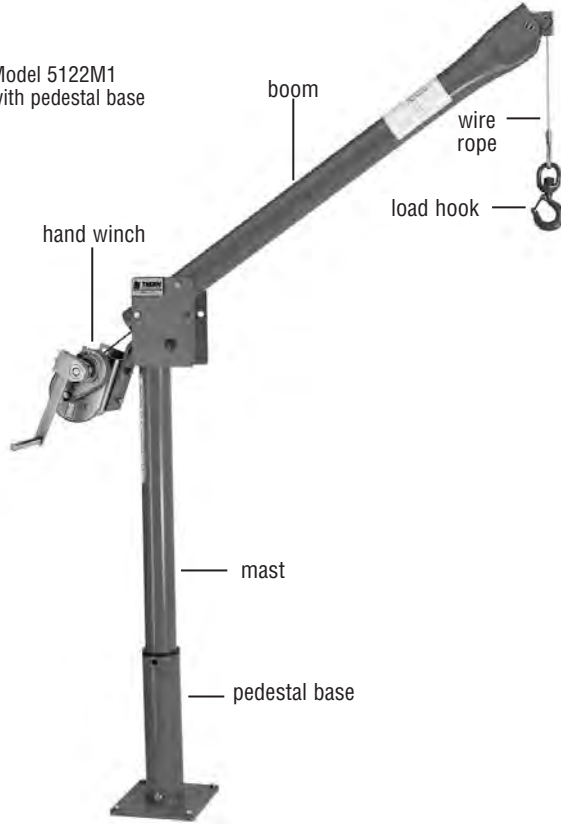
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PORTABLE DAVIT CRANES

Model 5122M1
with pedestal base



Series 5122

Up to 500 lb. capacity

Hand Winch Operation

- **Wheel Base** sold separately for floor crane operation. Base includes steel front wheels and rear caster wheels for 360° maneuverability. See Model 514.
- **Hand Winch Operation** with spur gear hand winch equipped with automatic disc brake for load control.
- **Quick Disconnect Anchor** for quickly attaching or removing the wire rope from the winch drum.
- **Corrosion Resistant Finish** with electrostatic powder coating and corrosion resistant fasteners. Galvanized finish also available, see models ending in GAL.
- **Stainless Steel** models for long service life in corrosive environments, with zinc and iridescent dichromate-plated hand winch or stainless steel hand winch.
- **Adjustable Boom** with 2 different positions for operation, and folds down for storage or transport.
- **Crane Rotates 360°** in a sleeve bearing in the base.
- **Bases** sold separately in pedestal, socket, or wall mount style. See models starting with 522.
- **Wire Rope Assemblies** sold separately.

CRANE CONFIGURATIONS, BASES, AND OPTIONS

| MODEL NO. | DESCRIPTION | APPROX. SHIP. WT. (LBS.) |
|----------------|--|--------------------------|
| Cranes | | |
| 5122M1 | Up To 500 Lb. - With M4021PB-K Spur Gear Hand Winch* | 68 |
| 5122M1GAL | Up To 500 Lb. - With M4021PB-K Spur Gear Hand Winch - Galvanized Finish (on crane only)* | 68 |
| 5122M1SSA | Up To 500 Lb. - With M4041PBSS-K Spur Gear Hand Winch - Stainless Steel (crane and winch)* | 71 |
| 5122M1SSB | Up To 500 Lb. - With M4021PB-K Spur Gear Hand Winch - Stainless Steel (crane only)* | 69 |
| Bases | | |
| 514 | Wheel Base - Electrostatic Powder Coated Finish | 61 |
| 522 | Pedestal/Socket Base (upright or flush mount) | 18 |
| 522GAL | Pedestal/Socket Base (upright or flush mount) - Galvanized Finish | 18 |
| 522SS | Pedestal Base (upright mount) - Stainless Steel | 18 |
| 522SSF | Socket Base (flush mount) - Stainless Steel | 18 |
| 522W | Wall Mount Base | 20 |
| 522WGAL | Wall Mount Base - Galvanized Finish | 20 |
| 522SSW | Wall Mount Base - Stainless Steel | 20 |
| Options | | |
| | Wire Rope Assemblies, Base Covers, Wire Rope Keepers | |

*Other configurations available, please contact Timco.

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PORTABLE DAVIT CRANES



Series 5122 Bases, Wire Rope Assemblies and Accessories

INDEPENDENT BASES – sold separately

- Pedestal, Socket, or Wall mount style.
- Wheel Base for floor crane operation. Base includes steel front wheels and rear caster wheels for 360° maneuverability. See Model 514.
- Important: Base installation is purchaser's responsibility. Thern recommends consulting a civil engineer or other qualified professional. Contact factory for installation guidelines.

Independent Bases

| BASE | DESCRIPTION | APPROX. SHIP WT. |
|---------|--|------------------|
| 522 | pedestal/socket base – powder coat finish (upright or flush mount) | 18 lb. |
| 522GAL | pedestal/socket base – galvanized finish (upright or flush mount) | 18 lb. |
| 522SS | pedestal/socket base – stainless steel (upright or flush mount) | 18 lb. |
| 522W | wall mount base – powder coat finish | 21 lb. |
| 522WGAL | wall mount base – galvanized finish | 21 lb. |
| 522SSW | wall mount base – stainless steel | 21 lb. |
| 514 | wheel base – enamel finish | 80 lb. |

WIRE ROPE ASSEMBLIES – sold separately

- Galvanized or Stainless Steel wire rope assemblies with swaged ball fitting to work with the quick disconnect anchor on the winch.

Wire Rope Assemblies

| MODEL NUMBER | WIRE ROPE DIAMETER AND LENGTH | APPROX. SHIP WEIGHT |
|---|-------------------------------|---------------------|
| galvanized aircraft cable with swivel hook and swaged ball fitting | | |
| WA19-20NS | 3/16 in. x 20 ft. | 3 lb. |
| WA19-28NS | 3/16 in. x 28 ft. | 4 lb. |
| WA19-36NS | 3/16 in. x 36 ft. | 4 lb. |
| WA19-45NS | 3/16 in. x 45 ft. | 5 lb. |
| 304 stainless steel wire rope with SS oval hook and swaged ball fitting - swivel hook also available please contact factory | | |
| WS19-20NO | 3/16 in. x 20 ft. | 3 lb. |
| WS19-28NO | 3/16 in. x 28 ft. | 3 lb. |
| WS19-36NO | 3/16 in. x 36 ft. | 3 lb. |
| WS19-45NO | 3/16 in. x 45 ft. | 4 lb. |
| WS19-60NO | 3/16 in. x 60 ft. | 9 lb. |
| WS19-75NO | 3/16 in. x 75 ft. | 11 lb. |

ACCESSORIES

Base Cover – plastic cover fits in the mast hole in the base to help keep water from collecting inside the base when the crane is removed.

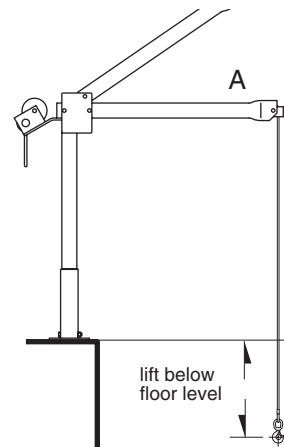
TK2P

Cable Spool – spring loaded reel winds up wire rope when detached from crane.

RW50 12 lb

Wire Rope Keeper – metal bracket attaches to base or other structure to hold free end of the wire rope when detached from crane.

B1766



Series 5122 Performance Characteristics

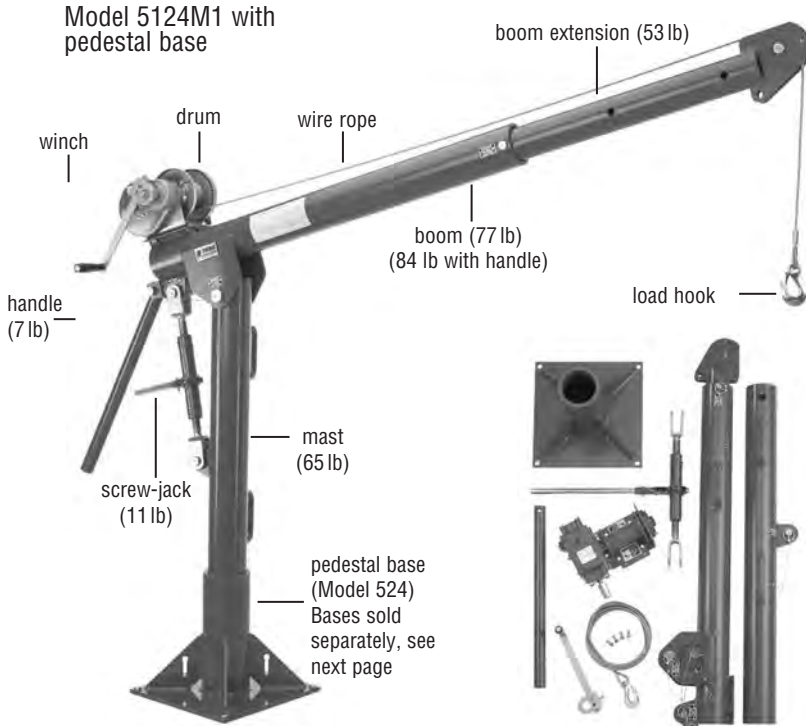
| WIRE ROPE DIA. | WIRE ROPE LENGTH | 5122 SERIES WITH M1 WINCH | | 5122 SERIES WITH M3 WINCH | | LIFT BELOW FLOOR LEVEL (MIN – MAX) ¹ |
|----------------|------------------|---------------------------|------------------------|---------------------------|------------------------|---|
| | | LOAD RATING POSITION A | LOAD RATING POSITION B | LOAD RATING POSITION A | LOAD RATING POSITION B | |
| 3/16 in. | 20 ft. | 500 lb. | 500 lb. | 500 lb. | 500 lb. | 9 – 10 ft. |
| 3/16 in. | 28 ft. | 500 lb. | 500 lb. | 500 lb. | 500 lb. | 17 – 18 ft. |
| 3/16 in. | 36 ft. | 500 lb. | 500 lb. | 500 lb. | 500 lb. | 25 – 26 ft. |
| 3/16 in. | 45 ft. | 500 lb. | 500 lb. | 500 lb. | 500 lb. | 34 – 35 ft. |
| 3/16 in. | 60 ft. | – | – | 500 lb. | 500 lb. | 49 – 50 ft. |
| 3/16 in. | 75 ft. | – | – | 500 lb. | 500 lb. | 64 – 65 ft. |

¹ Lift below floor level varies depending on boom position and base configuration. For longer lifts, please contact factory.

Important: It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable



PORTABLE DAVIT CRANES



Series 5124

Hand or Power Winch Operation
Up to 2000 lb capacity

Select the option that best suits your needs for each item.

Order your Base, Wire Rope Assembly and Optional Accessories separately. See next page.

- Two-year Limited Warranty

Optional Finishes

- Galvanized Finish provides extra protection against corrosion.
- Stainless Steel Models are constructed from all stainless steel with an electro-polished finish for superior corrosion resistance.

Crane breaks down for transport

Crane Model

- Crane Rotates 360° on a pin and sleeve bearing in the base. Handle on the boom makes rotation easy.
- Adjustable Boom telescopes to 4 different lengths, and adjusts in height while under load with ratchet style screw-jack.
- Crane Breaks Down for storage or transport.

Winch Models

- Hand Winch Operated Models include spur gear or worm gear hand winch with brake for load control. Model M2 winch can be drill driven, 400 rpm max.
- Power Winch Operated Models include electric winch with pendant control and brake. Other power options available, please contact factory.
- Quick Disconnect Anchor for quickly attaching or removing wire rope equipped with a swaged ball fitting.

Winch Options

| WINCH | DESCRIPTION | APPROX. SHIP WT. |
|-------------------|---|------------------|
| M1 | M4312PB-K – zinc plated spur gear hand winch | 28 lbs. |
| M2 ² | 4WM2-K – worm gear hand winch | 42 lbs. |
| M3 | M4312PBSS-K – stainless steel spur gear hand winch | 28 lbs. |
| E2 ³ | 4WP2-K electric winch – 115/1/60 VAC with 6 ft pendant control | 85 lbs. |
| E4 ³ | 4777-K electric winch – 115/1/60 VAC with 6 ft pendant control | 110 lbs. |
| E4DC ³ | 4777DC-K electric winch – 12 volt DC with 10 ft pendant control | 105 lbs. |

² Winch finish is powder coated, for epoxy finish contact factory.

³ Winch finish is enamel, for epoxy finish contact factory.

Optional Finish (crane only)

| FINISH | DESCRIPTION |
|--------|---|
| GAL | galvanized finish – crane only |
| SS | stainless steel construction – crane only |

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PORTABLE DAVIT CRANES



Series 5124 Bases, Wire Rope Assemblies and Accessories

INDEPENDENT BASES – sold separately

- Pedestal, Socket, or Wall mount style.
- Wheel Base for floor crane operation. Base legs adjust in length and width. See Model 524R.
- Important: Base installation is purchaser's responsibility.


Thern recommends consulting a civil engineer or other qualified professional.

Contact factory for installation guidelines.


Independent Bases

| BASE | DESCRIPTION | APPROX. SHIP WT. |
|---------|--|------------------|
| 524 | pedestal base – powder coat finish (upright mount) | 69 lb. |
| 524GAL | pedestal base – galvanized finish (upright mount) | 69 lb. |
| 524SS | pedestal base – stainless steel (upright mount) | 69 lb. |
| 524F | socket base – powder coat finish (flush mount) | 58 lb. |
| 524FGAL | socket base – galvanized finish (flush mount) | 58 lb. |
| 524SSF | socket base – stainless steel (flush mount) | 58 lb. |
| 524W | wall mount base – powder coat finish | 85 lb. |
| 524WGAL | wall mount base – galvanized finish | 85 lb. |
| 524SSW | wall mount base – stainless steel | 85 lb. |
| 524R | wheel base – enamel finish | 445 lb. |

ACCESSORIES



Base Cover
– plastic cover fits in the mast hole in the base to help keep water from collecting inside the base when the crane is removed.
TK4P



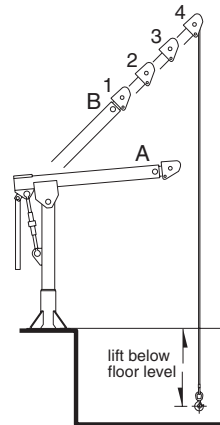
Drill-Motor Drive
– 7 amp, 400 rpm drill- motor to power drive the hand winch.
Only available for cranes configured with the M2 winch option. 120 VAC drill-motor includes 1-1/8" hex socket drive.

WIRE ROPE ASSEMBLIES – sold separately

- Galvanized or Stainless Steel wire rope assemblies with swaged ball fitting to work with the quick disconnect anchor on the winch.

Wire Rope Assemblies

| MODEL NUMBER | WIRE ROPE DIAMETER AND LENGTH | APPROX. SHIP WEIGHT |
|--|-------------------------------|---------------------|
| Galvanized aircraft cable with swivel hook and swaged ball fitting | | |
| WA25-20NS | 1/4 in. x 20 ft. | 4 lb. |
| WA25-28NS | 1/4 in. x 28 ft. | 5 lb. |
| WA25-36NS | 1/4 in. x 36 ft. | 6 lb. |
| WA25-45NS | 1/4 in. x 45 ft. | 7 lb. |
| WA25-60NS | 1/4 in. x 60 ft. | 9 lb. |
| WA25-75NS | 1/4 in. x 75 ft. | 10 lb. |
| 304 stainless steel wire rope with SS eye hook and swaged ball fitting - swivel hook also available please contact factory | | |
| WS25-20NE | 1/4 in. x 20 ft. | 4 lb. |
| WS25-28NE | 1/4 in. x 28 ft. | 5 lb. |
| WS25-36NE | 1/4 in. x 36 ft. | 6 lb. |
| WS25-45NE | 1/4 in. x 45 ft. | 7 lb. |
| WS25-60NE | 1/4 in. x 60 ft. | 8 lb. |
| WS25-75NE | 1/4 in. x 75 ft. | 10 lb. |



Important:

It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals, and regulations. Be sure to read the Owner's

Series 5124 Performance Characteristics

| WIRE ROPE WIRE ROPE DIA. LENGTH | LOAD RATING FOR 5124M1 AND M3 | | | | LOAD RATING FOR 5124M2, E2, E4 AND E4DC | | | | LIFT BELOW FLOOR LEVEL (MIN – MAX) ¹ |
|---------------------------------|-------------------------------|------------|------------|------------|---|------------|------------|------------|---|
| | POSITION 1 | POSITION 2 | POSITION 3 | POSITION 4 | POSITION 1 | POSITION 2 | POSITION 3 | POSITION 4 | |
| 1/4 in. 20 ft. | 2000 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 2000 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 0 – 4 ft. |
| 1/4 in. 28 ft. | 1800 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 1700 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 8 – 12 ft. |
| 1/4 in. 36 ft. | 1600 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 1600 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 16 – 20 ft. |
| 1/4 in. 45 ft. | 1600 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 1500 lbs. | 1500 lbs. | 1300 lbs. | 1000 lbs. | 25 – 29 ft. |
| 1/4 in. 60 ft. | 1300 lbs. | 1300 lbs. | 1300 lbs. | 1000 lbs. | 1300 lbs. | 1300 lbs. | 1300 lbs. | 1000 lbs. | 40 – 44 ft. |
| 1/4 in. 75 ft. | – | – | – | – | 1200 lbs. | 1200 lbs. | 1200 lbs. | 1000 lbs. | 55 – 59 ft. |
| 5/16 in. 20 ft. | 2000 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 2000 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 0 – 4 ft. |
| 5/16 in. 28 ft. | 1700 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 1600 lbs. | 1600 lbs. | 1300 lbs. | 1000 lbs. | 8 – 12 ft. |
| 5/16 in. 36 ft. | 1500 lbs. | 1500 lbs. | 1300 lbs. | 1000 lbs. | 1400 lbs. | 1400 lbs. | 1300 lbs. | 1000 lbs. | 16 – 20 ft. |
| 5/16 in. 45 ft. | 1400 lbs. | 1400 lbs. | 1300 lbs. | 1000 lbs. | 1400 lbs. | 1400 lbs. | 1300 lbs. | 1000 lbs. | 25 – 29 ft. |

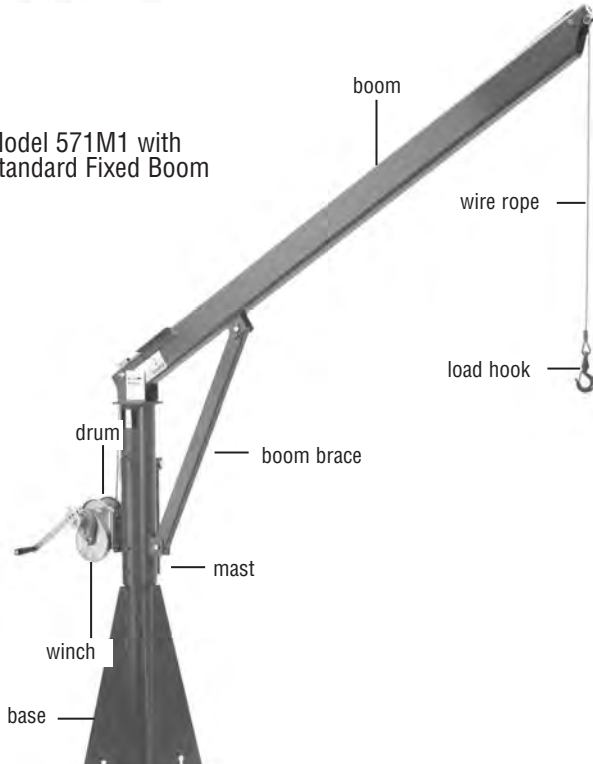
¹ Lift below floor level varies depending on boom position and base configuration. For longer lifts please contact factory.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



PORTABLE DAVIT CRANES

Model 571M1 with Standard Fixed Boom



Series 571 and 572 Fre Rol Davit Cranes

Hand or Power Winch Operation
Up to 2200 lb capacity

- Hand Winch Operated Models include spur gear or worm gear hand winch with brake for load control. Model 571M2 can be drill driven, 400 rpm max.
- Power Winch Operated Models include 115 volt 1 phase AC electric winch with pendant control and brake. Other power options available, please contact factory.
- Fixed Boom – Boom Position C
- Adjustable Boom Option – adjusts between Boom Position A and D – with hand operated ratchet style screw-jack, used to adjust height and reach.
- Mast and Boom Rotate on tapered roller bearings for smooth 360° load movement. Mast locks in one of four positions with hand tightened lock bolt. Handle on the mast makes rotation easy.
- Gusset Style Base for permanent installation and stability under load.
- Epoxy Finish available for improved protection against corrosion.
- Wire Rope Assemblies sold separately. Contact Timco.
- Two-year Limited Warranty



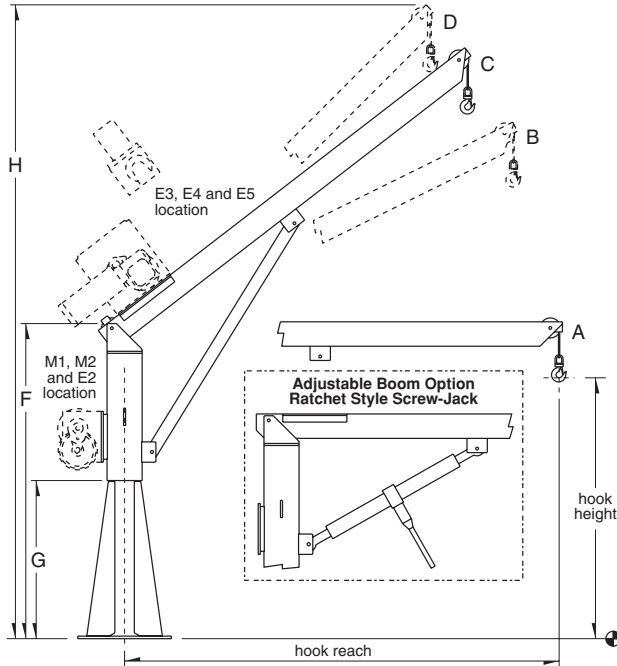
Model 571M2 with Adjustable Boom Option

Series 571 and 572 – Crane Configurations, Bases, and Options

| MODEL | DESCRIPTION | APPROX. SHIP WT. |
|-------|--|------------------|
| 571M1 | up to 1500 lb. – with M4312PB-K spur gear hand winch | 425 lb. |
| 571M2 | up to 1500 lb. – with 4WM2V-K worm gear hand winch | 450 lb. |
| 571E2 | up to 1500 lb. – with 4WP2-K electric winch – 115 VAC, 1 phase, 6 ft pendant control | 475 lb. |
| 571E4 | up to 1500 lb. – with 4777-K electric winch – 115 VAC, 1 phase, 6 ft pendant control | 489 lb. |
| 572M1 | up to 2200 lb. – with M452B-K spur gear hand winch | 720 lb. |
| 572E3 | up to 2000 lb. – with 4771-K electric winch – 115 VAC, 1 phase, 6 ft pendant control | 750 lb. |
| 572E5 | up to 2200 lb. – with 4WS3M6-K electric winch – 115 VAC, 1 phase, 6 ft pendant control (other configurations available, please contact factory) | 750 lb. |
| SJ1 | ratchet style screw-jack for Series 571 (replaces standard boom brace) | 37 lb. |
| SJ2 | ratchet style screw-jack for Series 572 (replaces standard boom brace) | 97 lb. |

Please contact TIMCO for price and delivery.

PORTABLE DAVIT CRANES



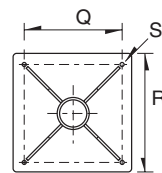
Series 571 and 572 Crane Dimensions

| | Series 571 | Series 572 |
|---------------|------------|------------|
| F | 67.19 in. | 77.41 in. |
| G | 32.88 in. | 38.62 in. |
| H | 131.19 in. | 155.75 in. |
| Q | 16.00 in. | 20.00 in. |
| R | 18.00 in. | 23.00 in. |
| S (hole dia.) | .56 in. | .81 in. |

Dimensions are for reference only and subject to change without notice.

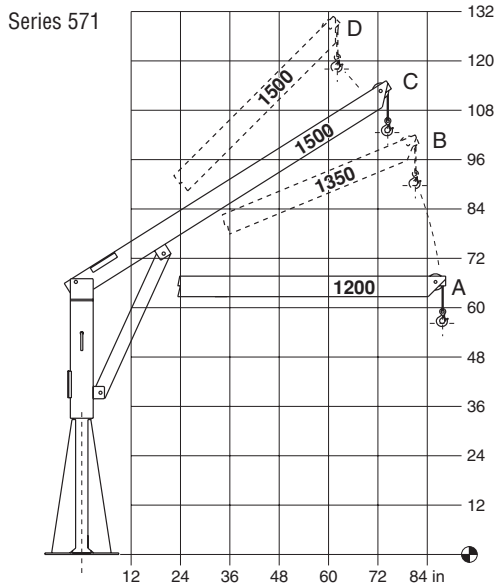
Important:

Load rating will vary with wire rope length and boom position.

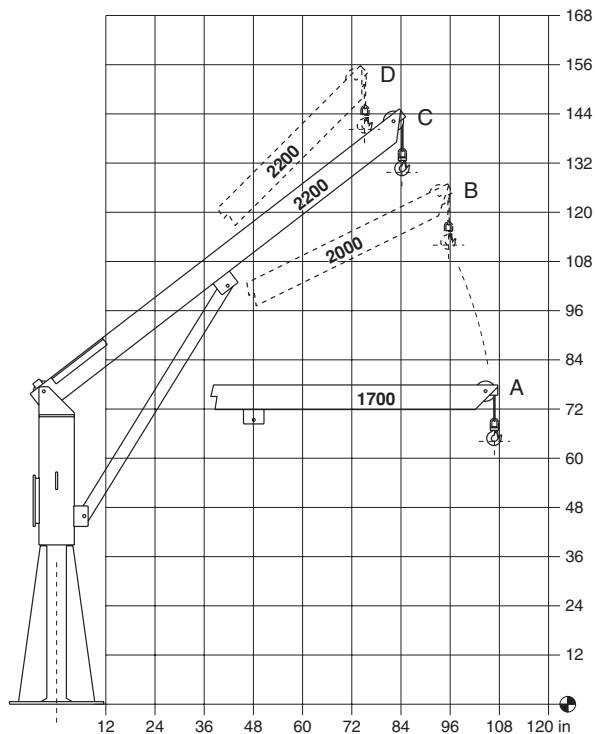


Important:

It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals, and regulations. Be sure to read the Owner's Manual supplied with the equipment before



Series 572



Series 571 and 572 – Height and Reach

| SERIES | BOOM POSITION | HOOK REACH | HOOK HEIGHT |
|--------|---------------|------------|-------------|
| 571 | A | 87.88 in. | 56.00 in. |
| | B | 81.25 in. | 90.00 in. |
| | C (fixed) | 74.56 in. | 102.00 in. |
| | D | 62.25 in. | 118.00 in. |
| 572 | A | 106.75 in. | 64.00 in. |
| | B | 95.50 in. | 112.00 in. |
| | C (fixed) | 84.25 in. | 130.00 in. |
| | D | 75.00 in. | 140.00 in. |

Dimensions are for reference only and subject to change without notice.

Important:

Base installation is purchaser's responsibility. Thern recommends consulting a civil engineer or other qualified professional.

STEEL DOORS

STEELCRAFT®

SIZES AND PERFORMANCE:

All doors are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8-1998 (commonly referred to as SDI-100). Special size products are available to meet the unique construction, performance and aesthetic requirements of the architectural community. Contact Steelcraft for those requirements.

USAGE AND APPLICATION:

To help simplify the use, selection and specification of Steelcraft door products, the following guidelines for base material selection can be used:

Material gage - the following base material thicknesses are available:

- **20 gage (.8 mm)** - for Light Commercial applications with minimal use and abuse.
- **18 gage (1 mm)** - for Heavy Commercial and Institutional applications with high use.

- **16 gage (1.3 mm)** - for Extra-Heavy Commercial and

Institutional applications with potential of very high use.

- **14 gage (1.7 mm)** - for Extra-Heavy Commercial and Institutional applications with extremely high use.

Material selection - in addition to the thickness of base material, the following base material types of metal are available:

- Cold Rolled Steel (commonly referred to as CRS) is used mainly on interior openings
- Galvanized is recommended for use on exterior openings or for interior locations with high humidity present.

INSTALLATION:

Installation of all Steelcraft frames and doors shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames, and ANSI/DHI A115-IG Installation Guide for Doors and Hardware. All fire rated frames must be installed in accordance with NFPA Pamphlet 80, and/or the local Authority Having Jurisdiction.

NOMENCLATURE:

Steelcraft doors are described and marked with easy to follow product identification nomenclature. The markings identify the doors by door series, gage, fire rating, door thickness, width, height, glass design, hand and lock.

The following is a brief guide to the nomenclature used by Steelcraft:

Locking (some examples):

- 161** (Cylindrical) Bored lock prep
- 61L** Bored lock with lever handles
- 86** Mortise lock
- 86ED** Mortise lock edge only
- RPD** Rim panic device
- SPL** Special lock application

Hand:

- R** Right hand
- L** Left hand
- RHR** Right hand reverse
- LHR** Left hand reverse

Glass type (designs):

- F** Flush Door - No Lite
- G** Half Glass Lite
- V** Vision Lite
- N** Narrow Lite
- L** Louver
- D** Dutch Lite

Door Thickness:

- 4** 1-3/4" (45 mm) door

Fire Rating:

- UL** Frame listed by Underwriters' Laboratories Inc.
- WH** Frame listed by Warnock Hersey (ITS Laboratories)

Gage:

(thickness of metal face panel)

- 20** 20 gage (.8 mm)
- 18** 18 gage (1 mm)
- 16** 16 gage (1.3 mm)
- 14** 14 gage (1.7 mm)

Frame Series:

- L** Laminated door construction with edge seams
- B** Steel Stiffened door construction with edge seams
- LF/BF** L- or B-Series with filled edge
- LW/BW** L- or B-Series with welded edge
- CE** Embossed door construction
- T** Temperature Rise Rated door construction with edge seams

A Stile and Rail door construction

AN Narrow Stile and Rail door construction

NOTE: The nomenclature designation shown here is for education, example and reference only. Refer to the individual Spec Sheets to develop options related to the specific door series.

Nominal Door Opening -

- Height - Designated in feet and inches
- 70** 7'0" (2134 mm) Nominal Door Opening - Width Designated in feet and inches
- 30** 3'0" (914 mm)

STEELCRAFT®

STEEL DOORS

GENERAL DOOR INFORMATION

Steelcraft doors are designed for virtually all construction requirements in commercial building applications. Their construction, durability and flexibility have been proven throughout the world in both operation and physical testing of all types.



A brief summary of the door products covered in this catalog follows:

Laminated (L-Series):

These honeycomb core doors are designed for installation in all building constructions and installed in all interior and exterior applications. The continuously bonded cores and full height mechanically locked edge seams provide attractive, flat and very durable doors to the commercial construction industry. Many options are available in this product series including edge construction, GrainTech®, core variations and finishes.

| SPECIFICATIONS | | |
|-------------------------|---|---------------------|
| Door Thickness | 1-3/4" | (45 mm) |
| Standard Heights | 6'8" to 7'0" | (2032 mm - 2134 mm) |
| | 7'2" to 7'10" | (2184 mm - 2388 mm) |
| | 8'0" to 10'0" | (2438 mm - 3048 mm) |
| Standard Widths | Increments of 2" (50 mm) from 1'6"(457 mm) to 4'0"(1219 mm) | |

Steel Stiffened (B-Series):

These internal steel stiffened core doors are designed for installation in all building constructions and installed in all interior and exterior applications. The internal steel stiffeners are welded to the face sheets. The full height mechanically locked edge seams provide attractive and very durable doors to the commercial construction industry. Edge construction options are available.

EmCraft® Embossed (CE-Series):

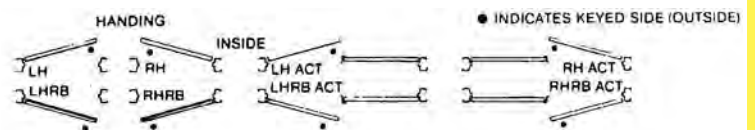
These embossed doors with honeycomb/polystyrene core are designed for installation in all building constructions and installed in all interior and exterior applications. Their deeply embossed panels create the appearance of hand carved doors. The continuously bonded cores and full height mechanically locked edge seams provide attractive, flat and very durable doors to the commercial construction industry.

Temperature Rise (T-Series):

These doors are designed for use in locations requiring a temperature rise rating. This door and its temperature rise rating are usually dictated by the local building code. The Steelcraft T-Series doors carry a 250° F temperature rise in 30 minutes of fire exposure. Edge construction options are available.

Stile and Rail (A & AN-Series):

These doors are specifically designed for entrances and applications requiring full glass designs. They are an attractive and very durable alternative to both aluminum entrance doors and the full flush steel doors prepared for large installed lights.



WEATHER TIGHT "READY" DOORS

QUICK AVAILABILITY

For current list of in-stock doors, see:
www.freemanmarine.com/stock/weather-tight-ready.htm

FREEMAN MARINE'S Weather Tight "Ready" doors are double-skin, .080" mill finished aluminum door skins bonded to an extruded aluminum panel frame. Doors include flush exterior windows, marine grade lever handle locksets, adjustable stainless steel hinges and two (2) individual dog handles. Rigid foam core provides excellent thermal and acoustic properties as well as contributing to door rigidity.

Standard duty, Weather Tight "Ready" doors are suitable for the following typical high traffic access installations:

- Pilothouse • Galley • Engine Room
- Salon • Main Deck • Storage



WEATHER TIGHT "READY" DOORS

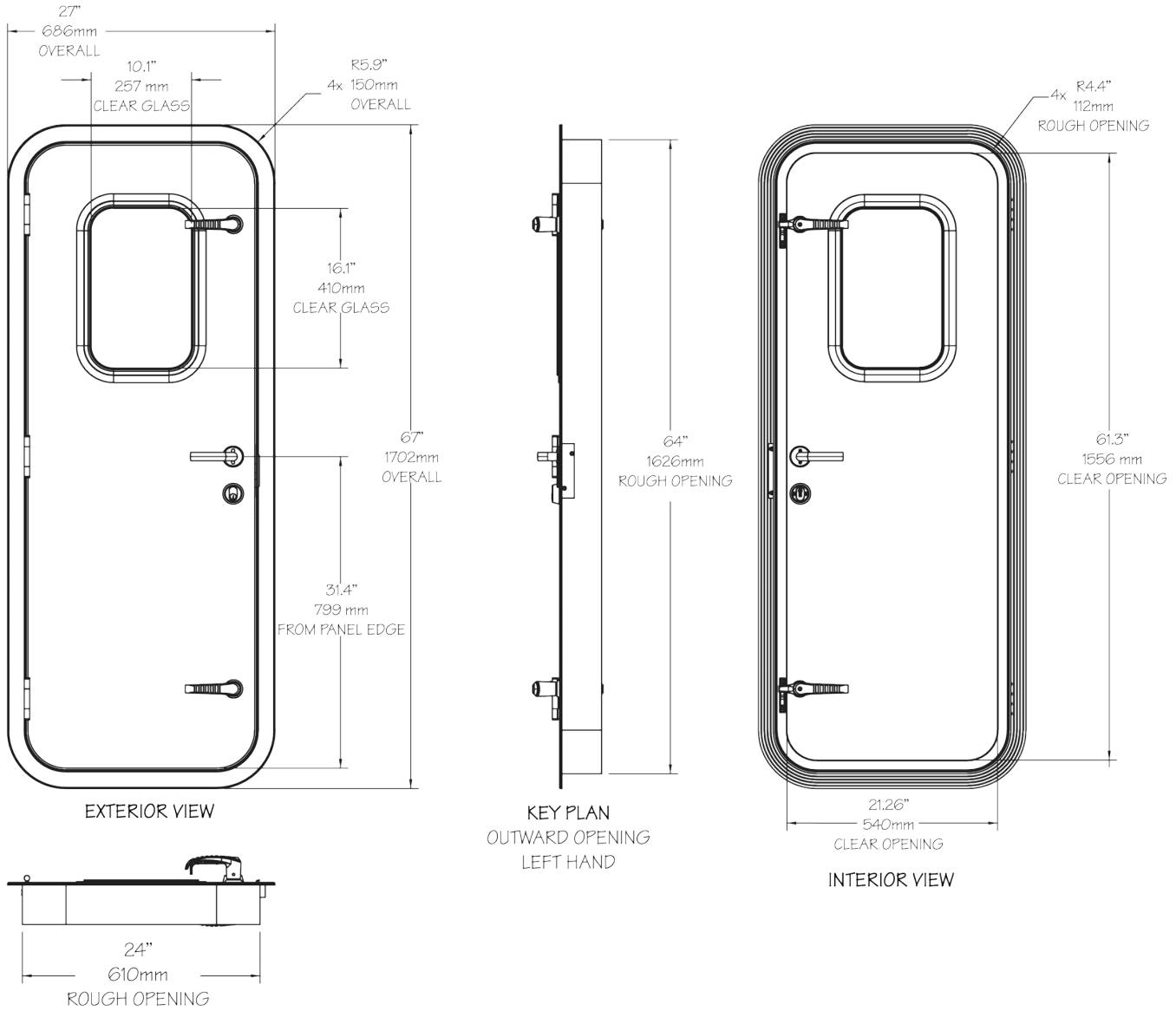
- Marine Grade Bonded .080" Aluminum Panel Skins Mill Finish
- Welded Aluminum Frame, Radius Corners
- Welded Panel Frame for Strength
- Gasket on Door Panel for Long Life and Positive Sealing
- Bolt-in or Weld-in Frames
- (2) Individual Dogs
- Rigid Foam Core Insulation
- Stainless Steel Hinges, Adjustable
- Stainless Steel Fasteners
- Clamp-Grip Window 1/4" Clear Tempered Glass

Freeman Guarantees that any door listed below that is NOT IN-STOCK will be ready to ship within (3) weeks or Freeman will pay for shipping*

*Free shipping in continental US only via "GROUND COMMON CARRIER"

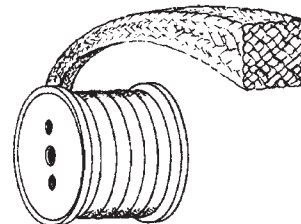
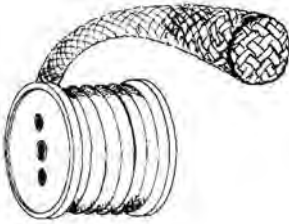
| PART# | DOOR SIZE (Rough Opening) | HANDING | VIEWING GLASS |
|------------|------------------------------|---------|------------------|
| 1111-2464L | 24" x 64" | LEFT | 10" x 16" |
| 1111-2464R | 24" x 64" | RIGHT | 10" x 16" |
| 1111-2664L | 26" x 64" | LEFT | 10" x 16" |
| 1111-2664R | 26" x 64" | RIGHT | 10" x 16" |
| 1111-2466L | 24" x 66" | LEFT | 10" x 16" |
| 1111-2466R | 24" x 66" | RIGHT | 10" x 16" |
| 1111-2666L | 26" x 66" | LEFT | 10" x 16" |
| 1111-2666R | 26" x 66" | RIGHT | 10" x 16" |
| 1111-3066L | 30" x 66" | LEFT | 15" x 20" |
| 1111-3066R | 30" x 66" | RIGHT | 15" x 20" |
| 1111-3666L | 36" x 66" | LEFT | 15" x 20" |
| 1111-3666R | 36" x 66" | RIGHT | 15" x 20" |
| 1111-2472L | 24" x 72" | LEFT | 10" x 16" |
| 1111-2472R | 24" x 72" | RIGHT | 10" x 16" |
| 1111-2672L | 26" x 72" | LEFT | 10" x 16" |
| 1111-2672R | 26" x 72" | RIGHT | 10" x 16" |
| 1111-3072L | 30" x 72" | LEFT | 15" x 20" |
| 1111-3072R | 30" x 72" | RIGHT | 15" x 20" |
| 1111-3672L | 36" x 72" | LEFT | 15" x 20" |
| 1111-3672R | 36" x 72" | RIGHT | 15" x 20" |
| 1111-2678L | 26" x 78" | LEFT | 10" x 16" |
| 1111-2678R | 26" x 78" | RIGHT | 10" x 16" |
| 1111-3078L | 30" x 78" | LEFT | 15" x 20" |
| 1111-3078R | 30" x 78" | RIGHT | 15" x 20" |
| 1111-3678L | 36" x 78" | LEFT | 15" x 20" |
| 1111-3678R | 36" x 78" | RIGHT | 15" x 20" |

WEATHER TIGHT "READY" DOORS



1

DOOR/HATCH COVER GASKETS



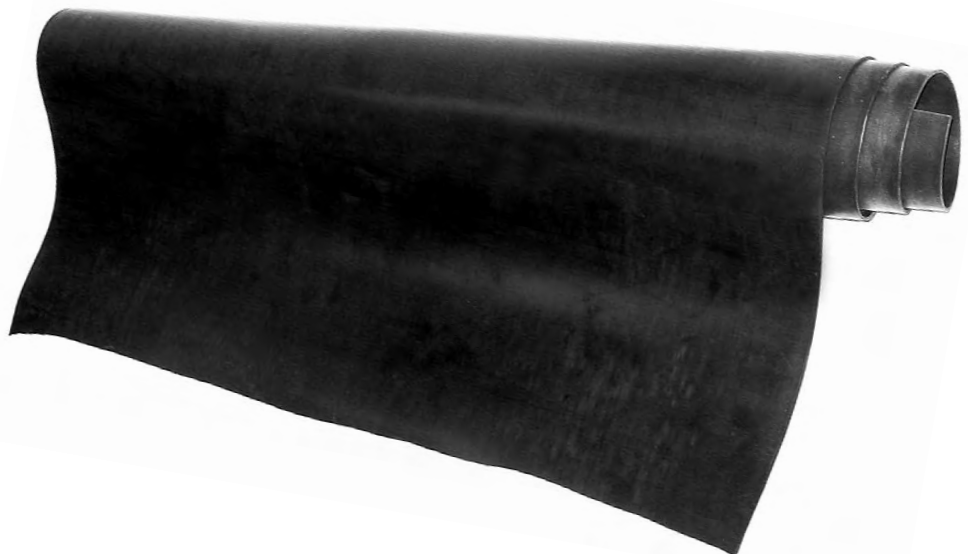
ROUND & SQUARE STYLES AVAILABLE IN NEOPRENE, VITON, BUTYL, BUNA-N AND TEFLON HATCHPAK

| ROUND | ORDERING INFORMATION CHART | | | | | |
|----------|----------------------------|-------|--------|-------|--------|--------|
| MATERIAL | .375" | .50" | .625" | .75" | .875" | 1.00" |
| NEOPRENE | N375R | N50R | N625R | N75R | N875R | N100R |
| VITON | V375R | V50R | V625R | V75R | V875R | V100R |
| BUTYL | B375R | B50R | B625R | B75R | B875R | B100R |
| BUNA-N | BN375R | BN50R | BN625R | BN75R | BN875R | BN100R |
| HATCHPAK | H375R | H50R | H625R | H75R | H875R | H100R |

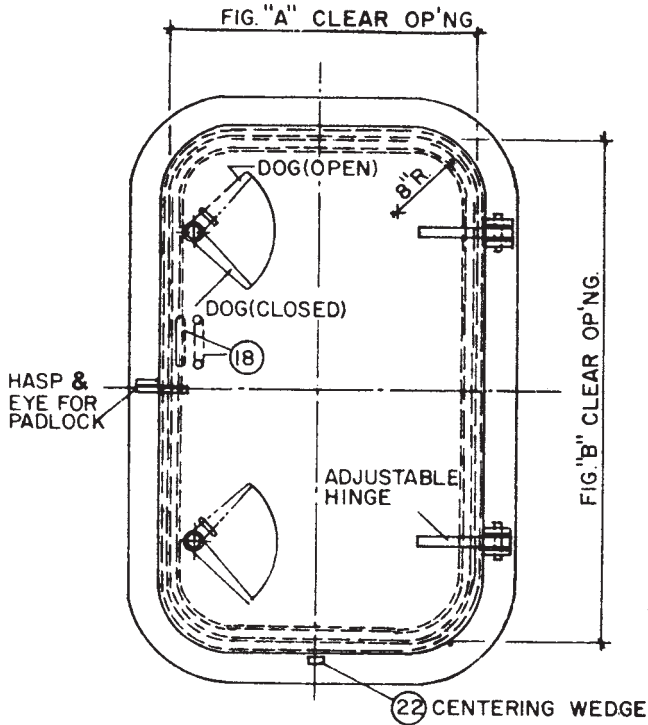
| SQUARE | ORDERING INFORMATION CHART | | | | | |
|----------|----------------------------|------|-------|------|-------|-------|
| MATERIAL | .375" | .50" | .625" | .75" | .875" | 1.00" |
| NEOPRENE | N375 | N50 | N625 | N75 | N875 | N100 |
| VITON | V375 | V50 | V625 | V75 | V875 | V100 |
| BUTYL | B375 | B50 | B625 | B75 | B875 | B100 |
| BUNA-N | BN375 | BN50 | BN625 | BN75 | BN875 | BN100 |
| HATCHPAK | H375 | H50 | H625 | H75 | H875 | H100 |

GASKET MATERIAL

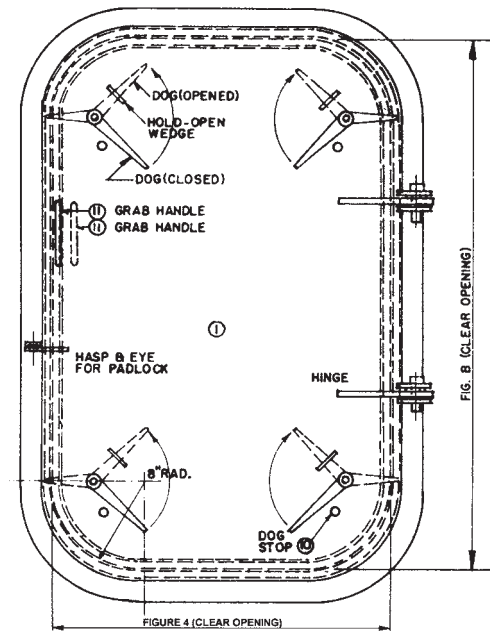
Specify material type and thickness when ordering.



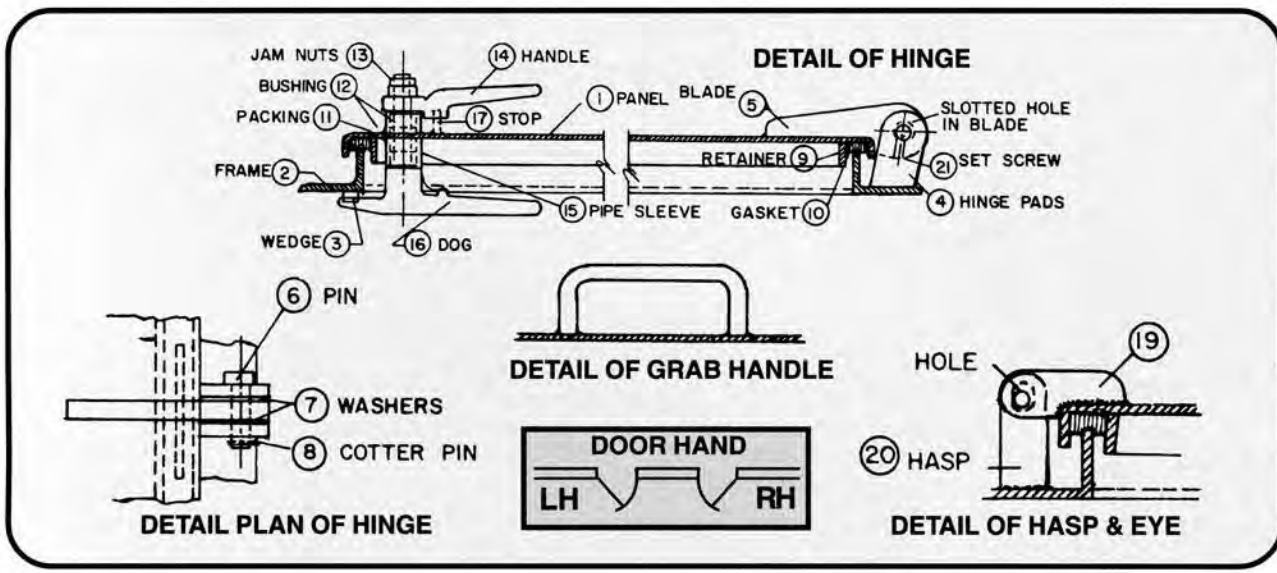
MODEL T-100 2 DOG WATERTIGHT/GASTIGHT DOOR



MODEL T-101 4 DOG WATERTIGHT DOOR

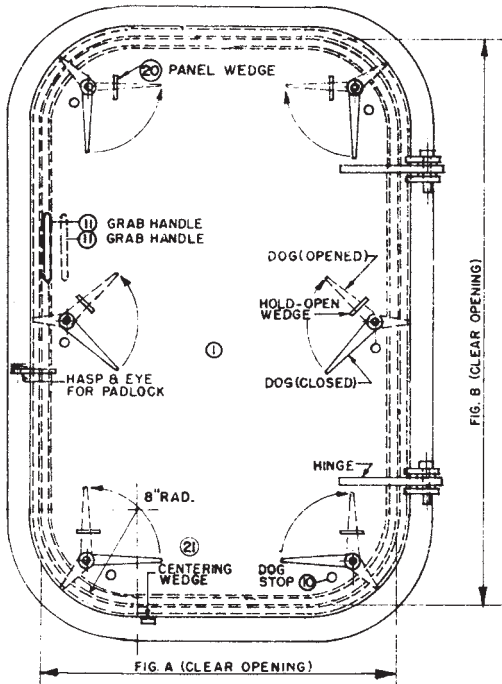


- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS AND LEFT HAND OR RIGHT HAND WHEN ORDERING

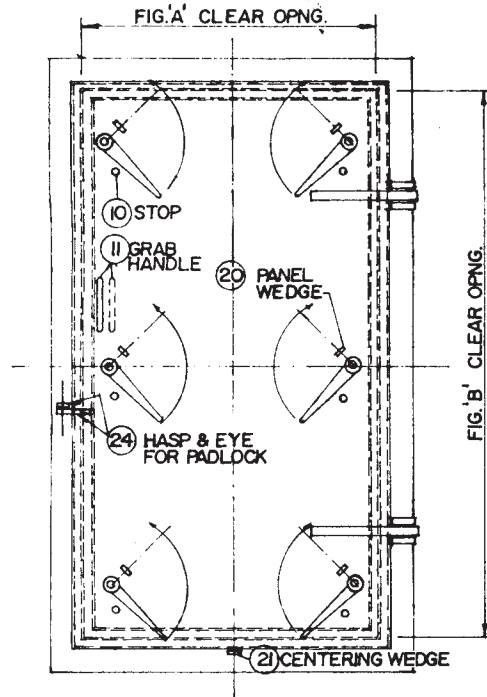


1

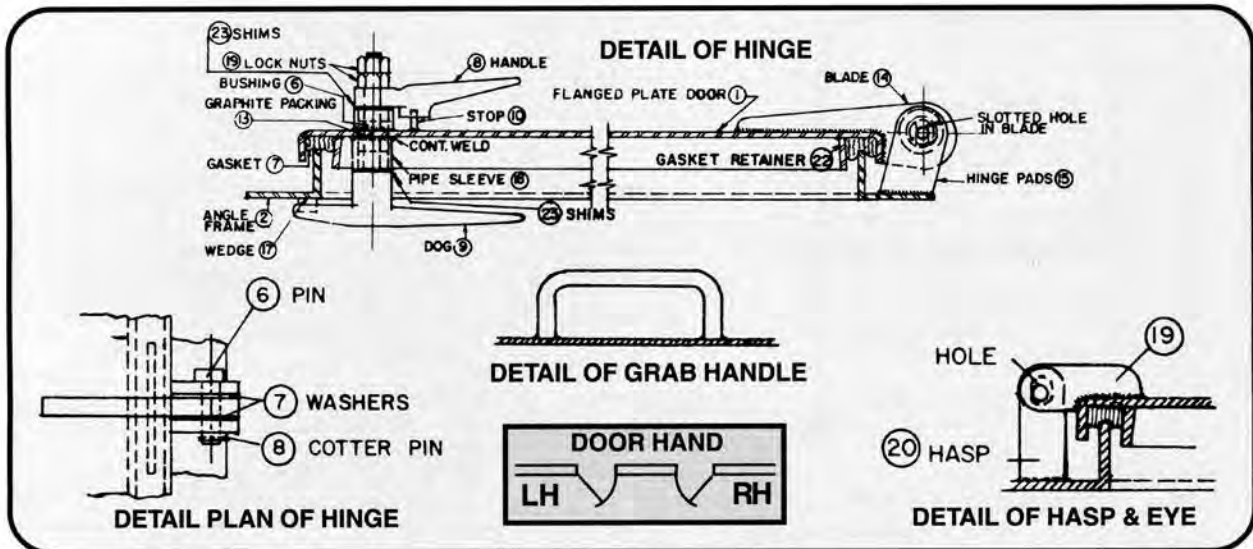
MODEL T-102 6 DOG WATERTIGHT DOOR

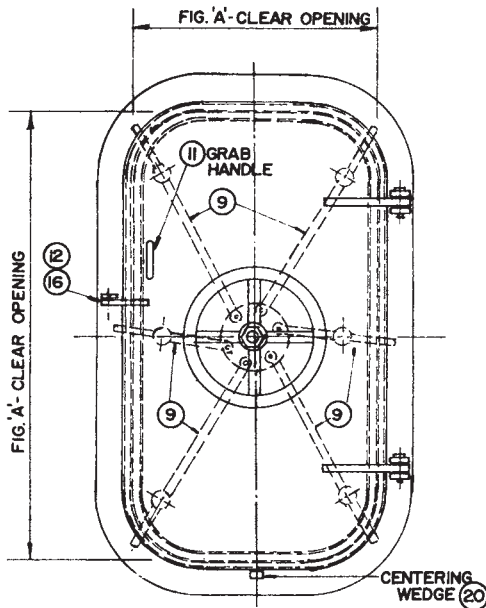


MODEL T-103 6 DOG WATERTIGHT/GASTIGHT DOOR



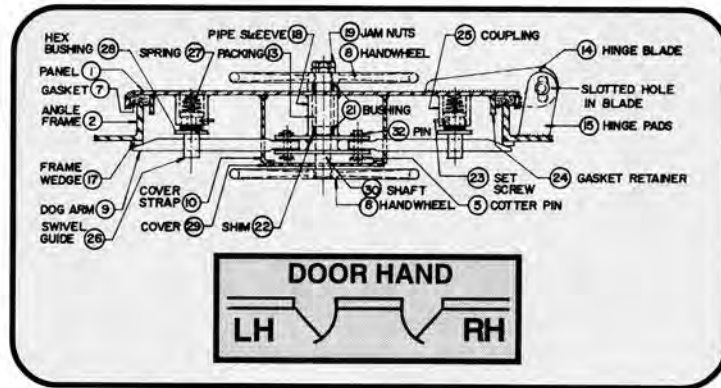
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS AND LEFT HAND OR RIGHT HAND WHEN ORDERING



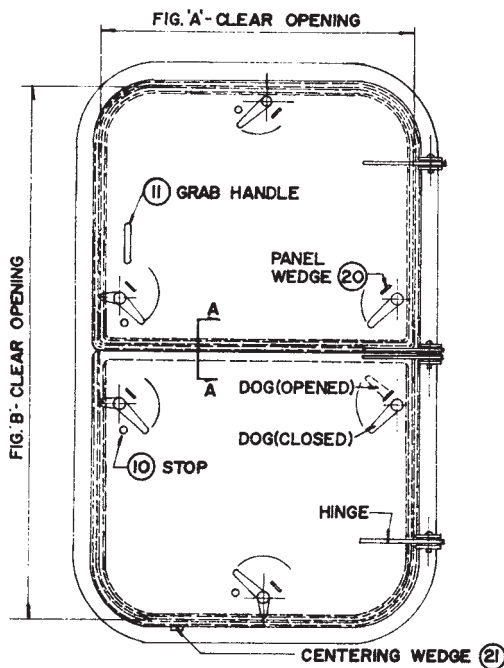


MODEL T-104

6 DOG, QUICK-ACTING WATERTIGHT DOOR

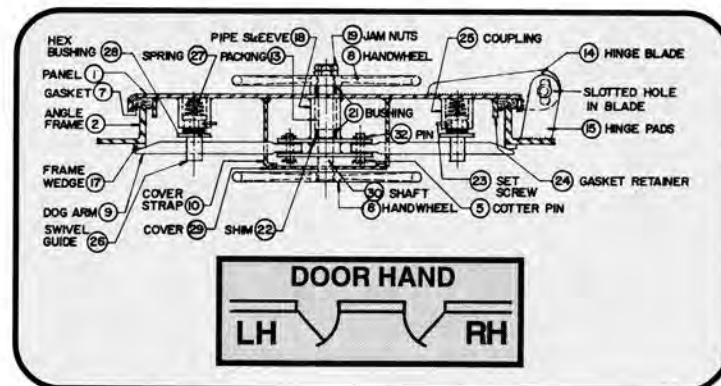


- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS AND LEFT HAND OR RIGHT HAND WHEN ORDERING

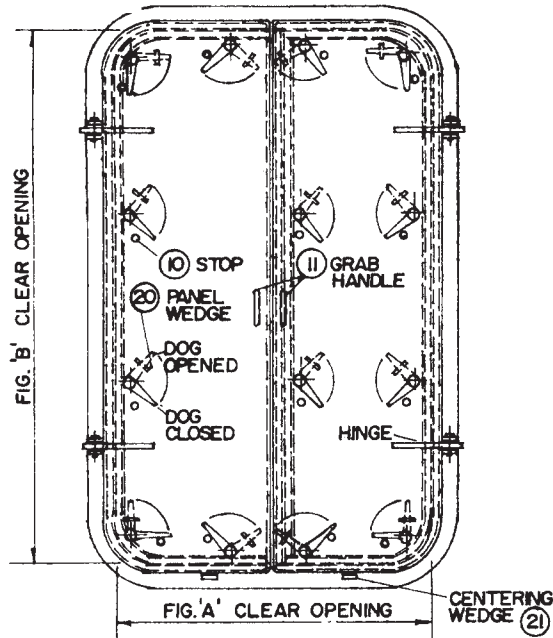


MODEL T-105

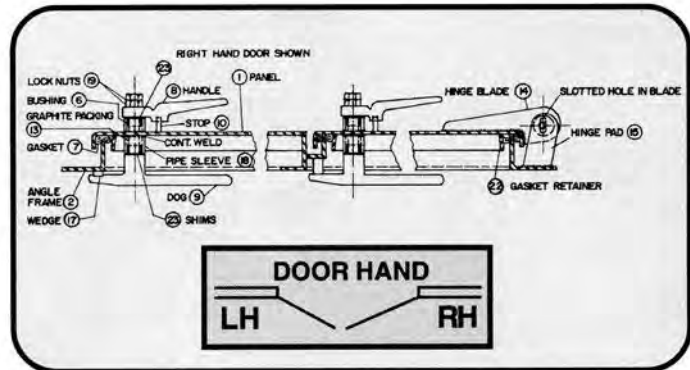
6 DOG WATERTIGHT DUTCH DOOR



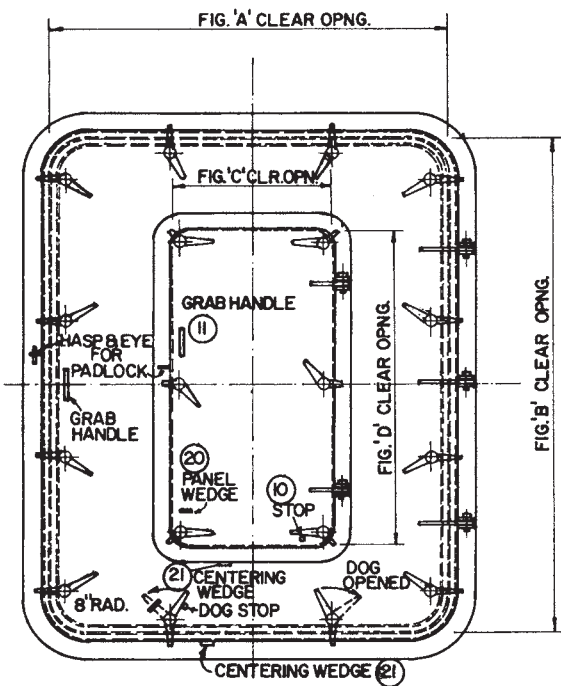
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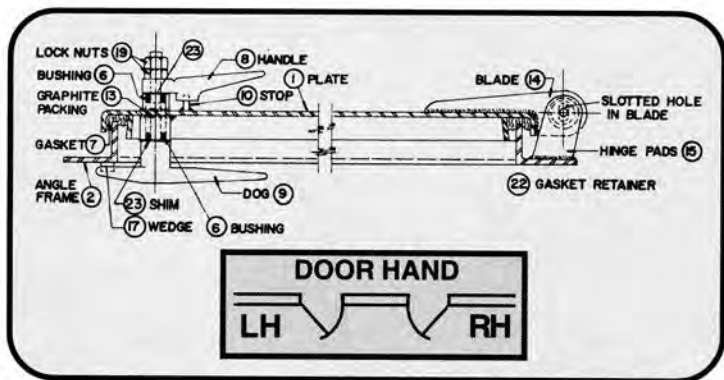
MODEL T-106 WATERTIGHT DOUBLE DOOR

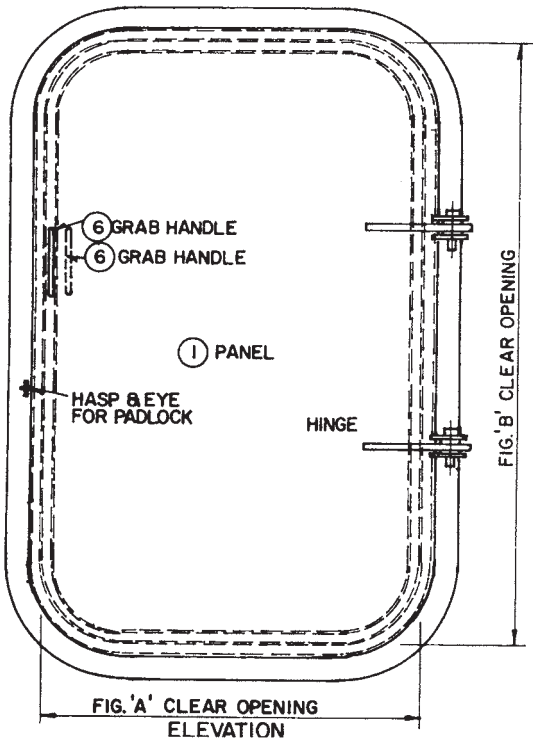


- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS AND LEFT HAND OR RIGHT HAND WHEN ORDERING

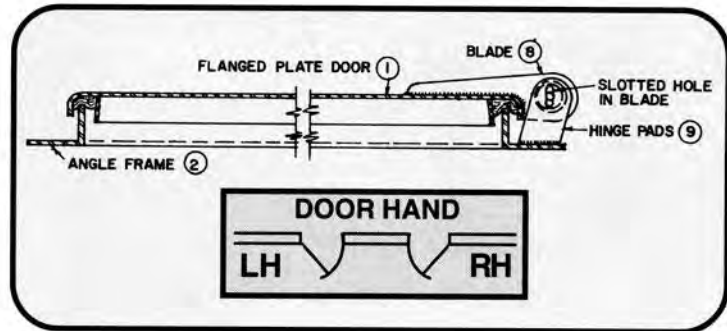


MODEL T-107 WATERTIGHT DOOR: PERSONNEL & EQUIPMENT

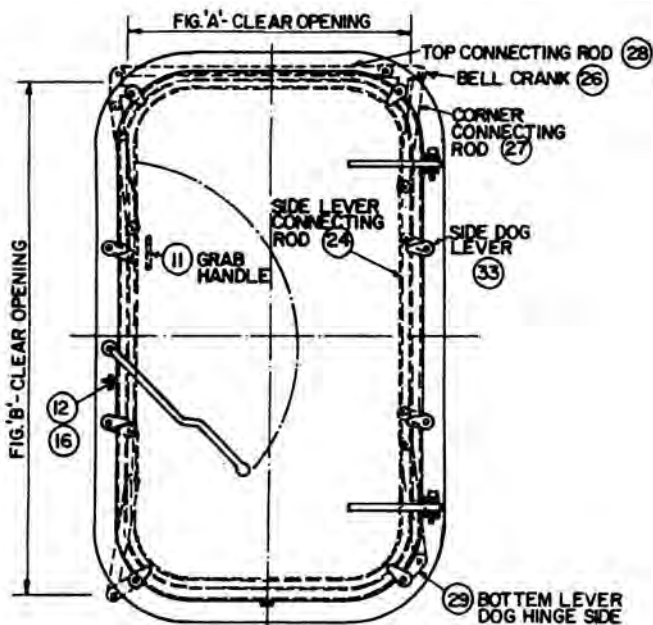




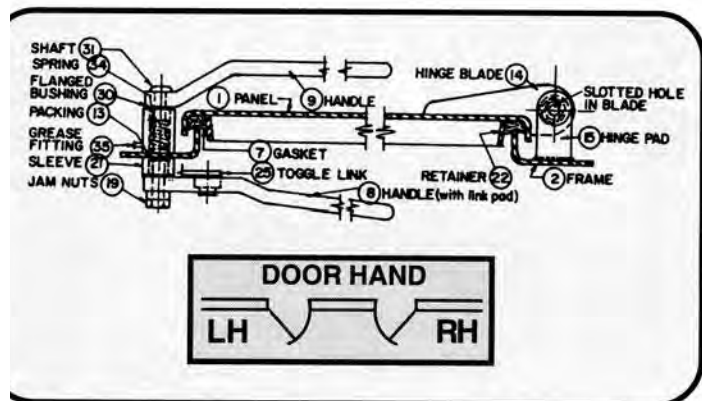
MODEL T-108 NON-TIGHT DOOR



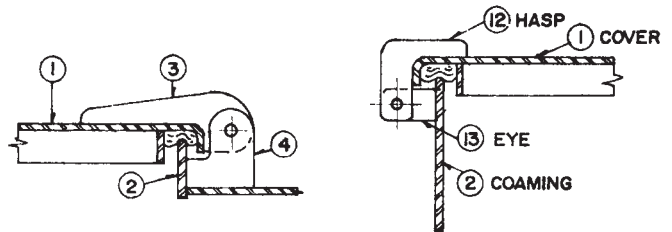
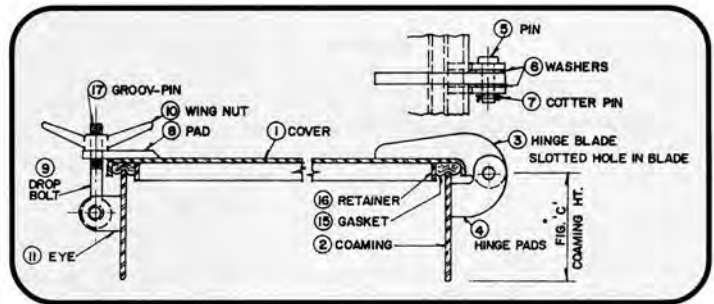
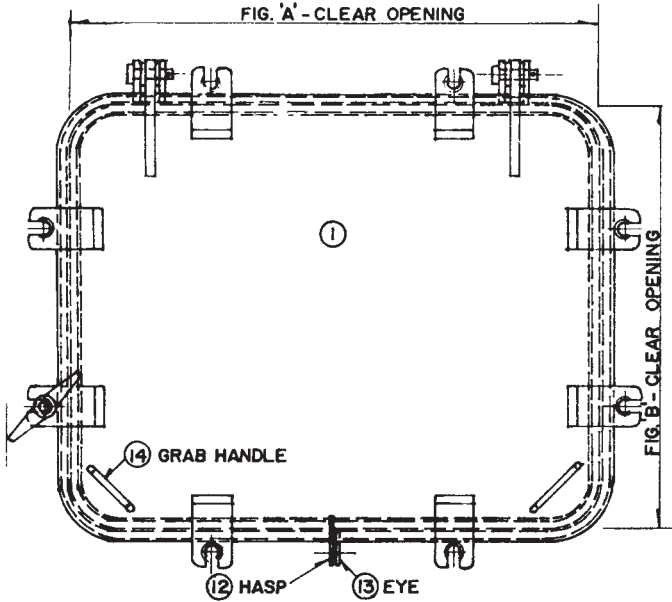
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS AND LEFT HAND OR RIGHT HAND WHEN ORDERING



MODEL T-109 QUICK-ACTING, LEVER-OPERATED WATERTIGHT DOOR

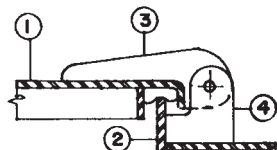
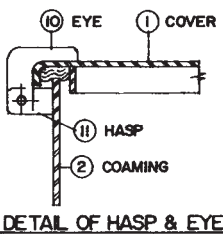
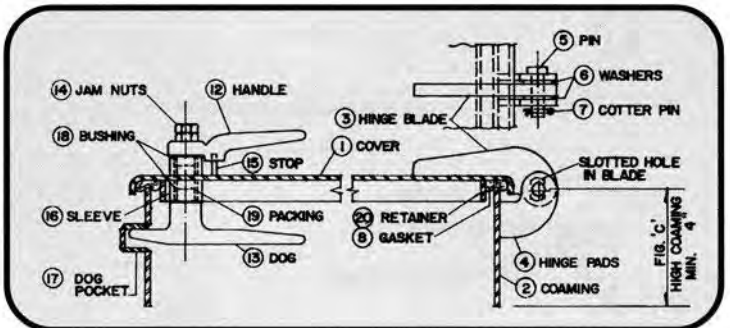
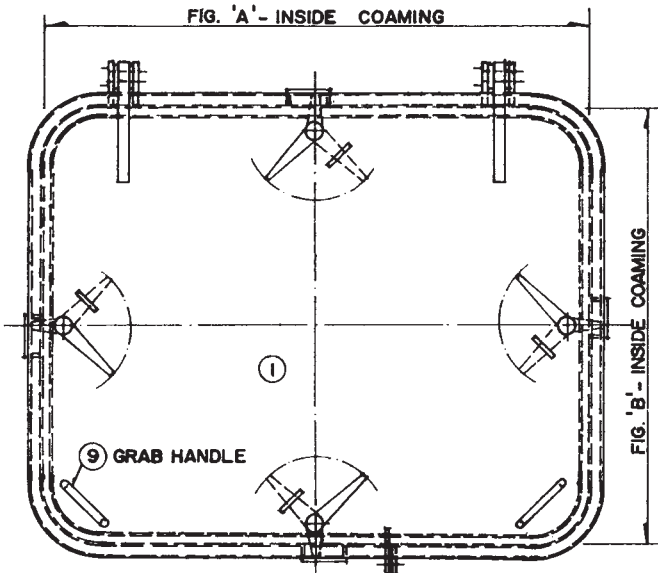


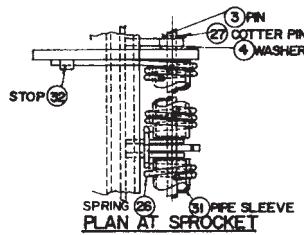
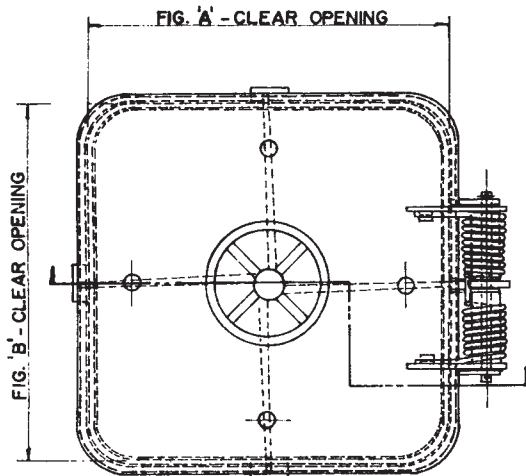
HATCH T-200 WATERTIGHT HATCH WITH DROP BOLTS



- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING

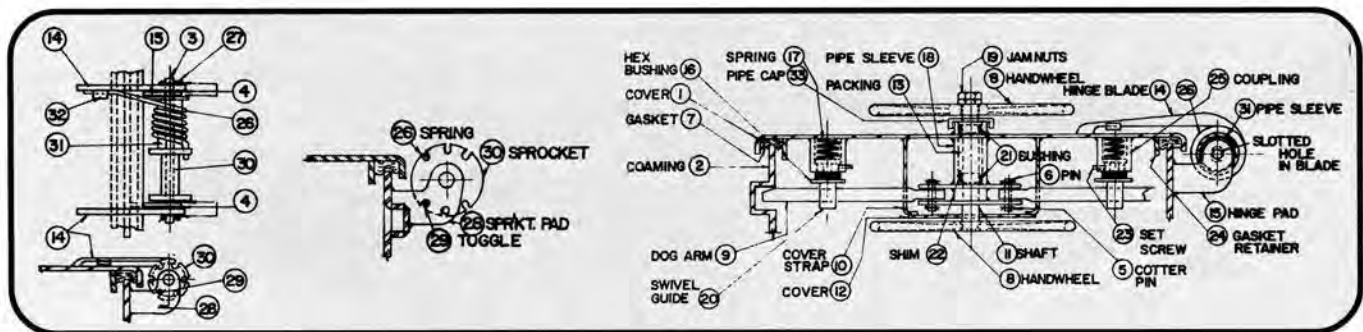
HATCH T-201 WATERTIGHT HATCH



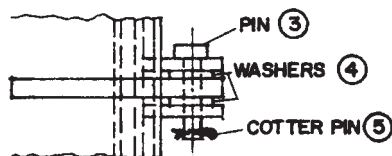
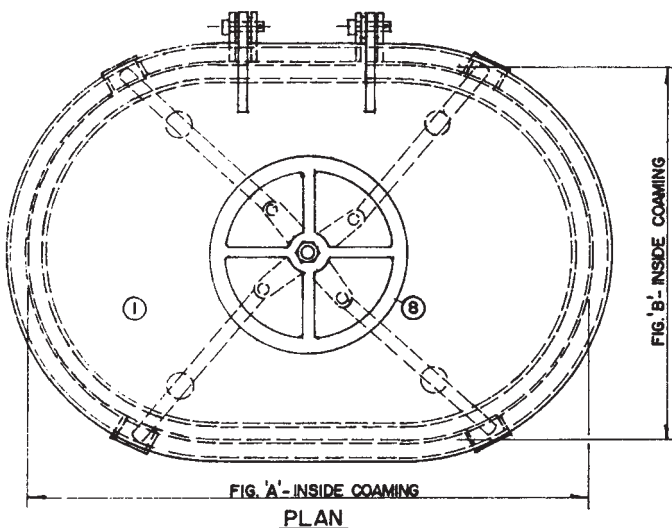


HATCH T-202

SPRING-BALANCED QUICK-ACTING
WATERTIGHT HATCH

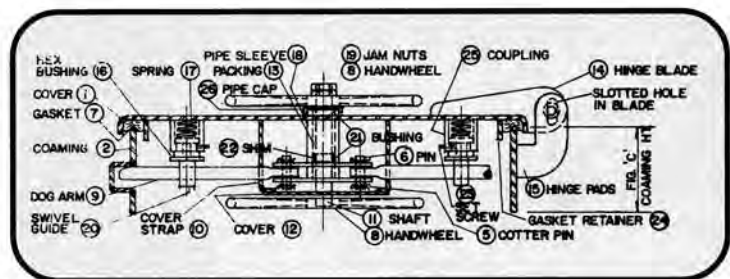


- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



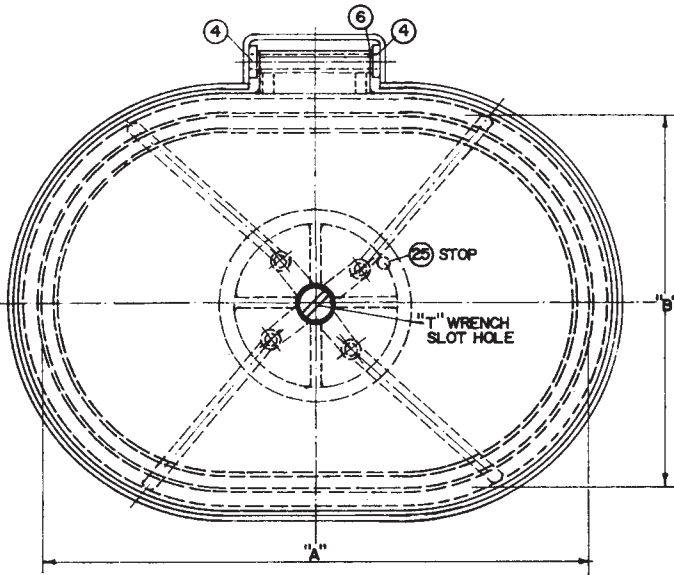
HATCH T-203

QUICK-ACTING OVAL WATERTIGHT HATCH

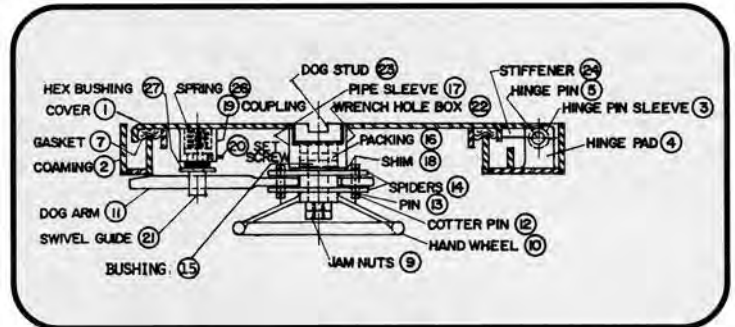


1

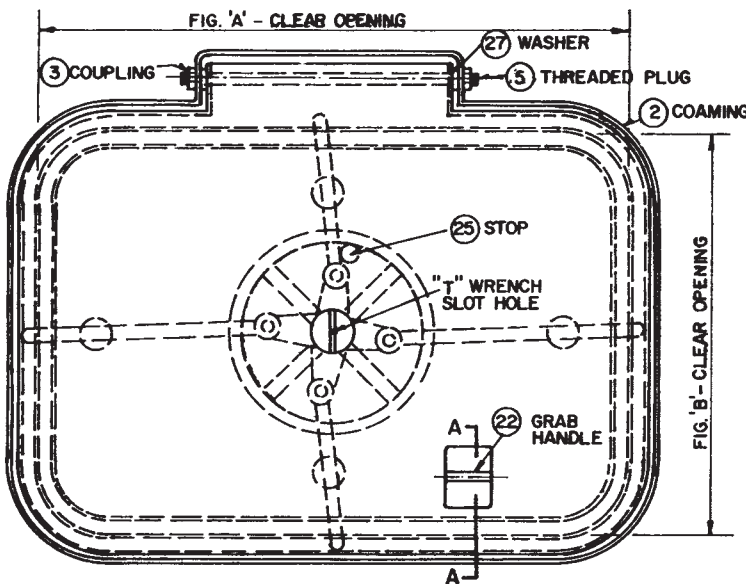
1



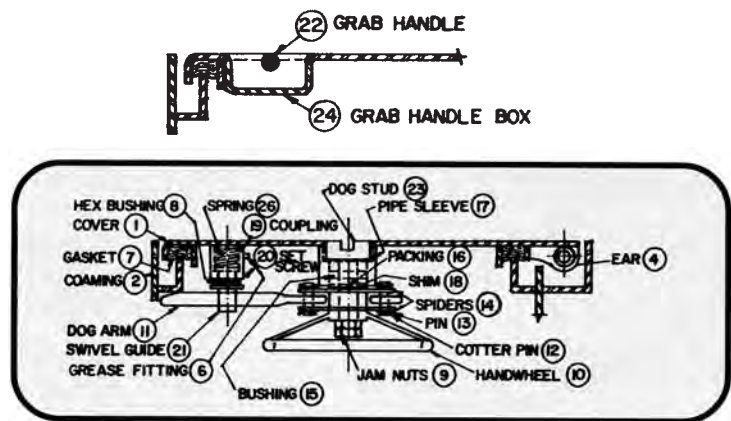
HATCH T-204 QUICK-ACTING FLUSH OVAL WATERTIGHT HATCH

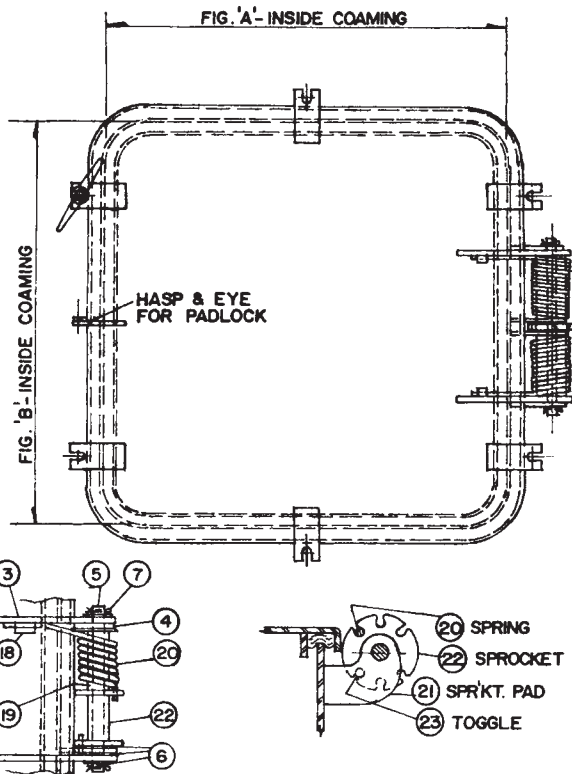


- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



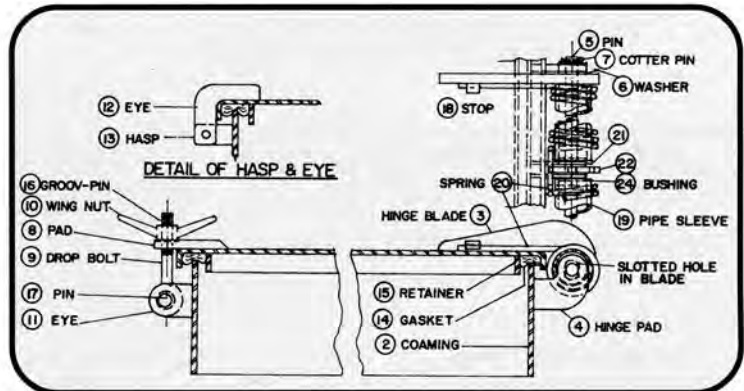
HATCH T-205 QUICK-ACTING WATERTIGHT FLUSH HATCH



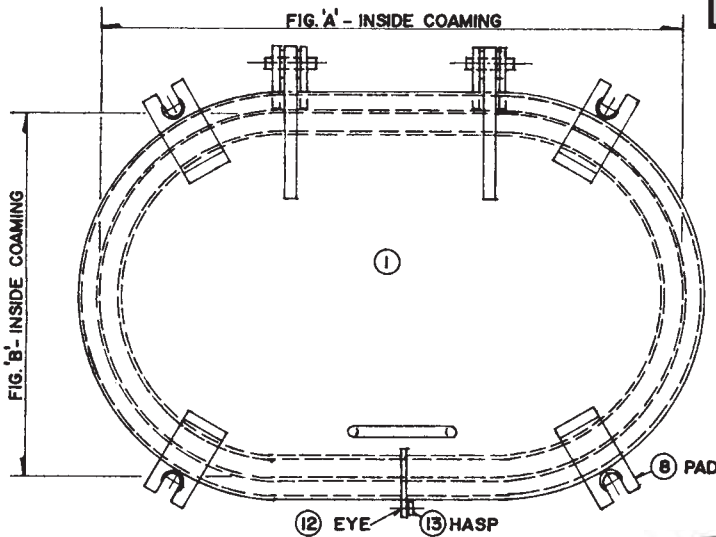


HATCH T-207

SPRING-BALANCED RECTANGULAR OR SQUARE DOG HATCH

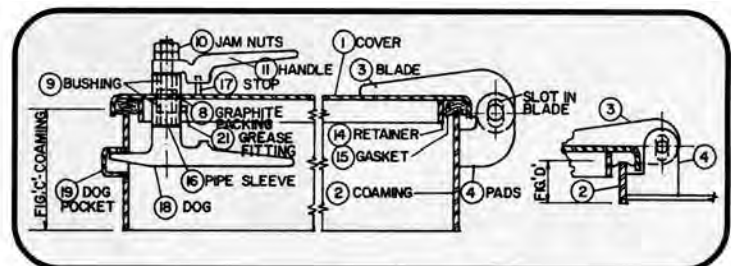
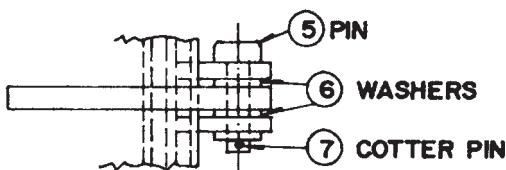


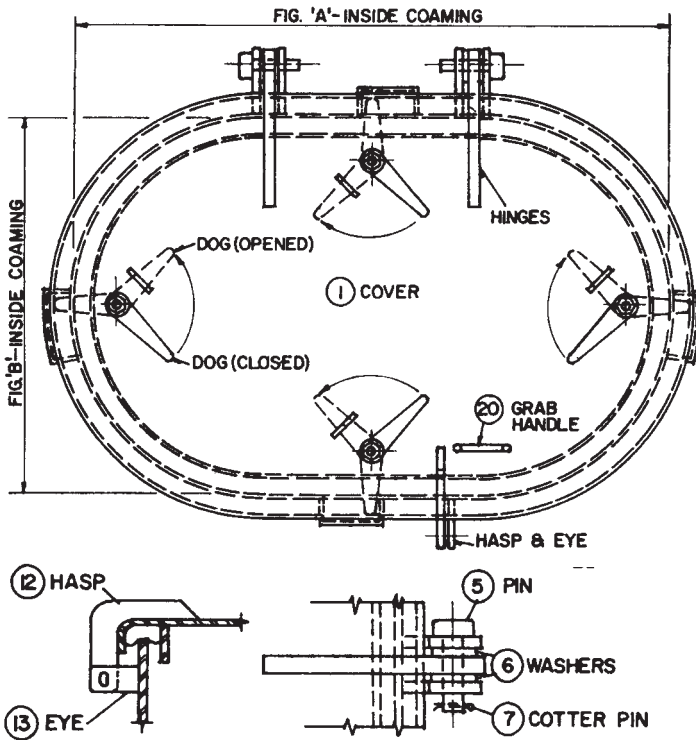
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



HATCH T-208

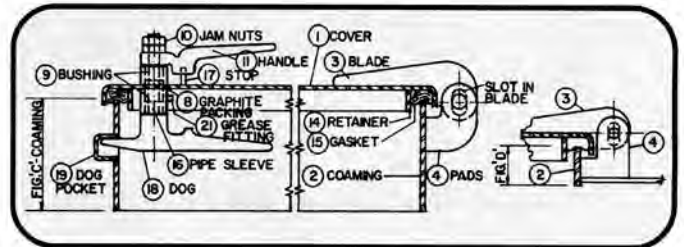
OVAL WATERTIGHT HATCH WITH DROP BOLTS



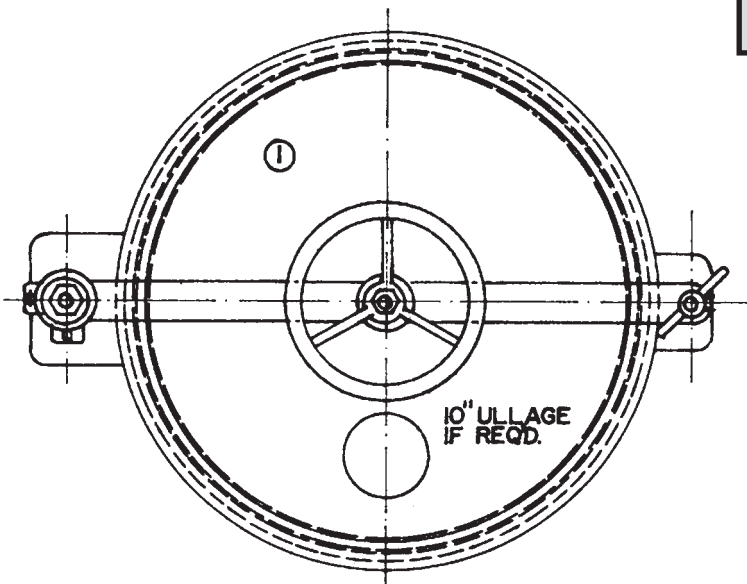


HATCH T-209

OVAL WATERTIGHT HATCH WITH DOGS



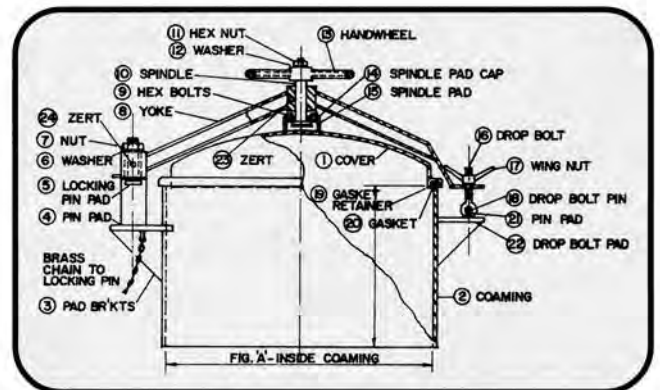
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING

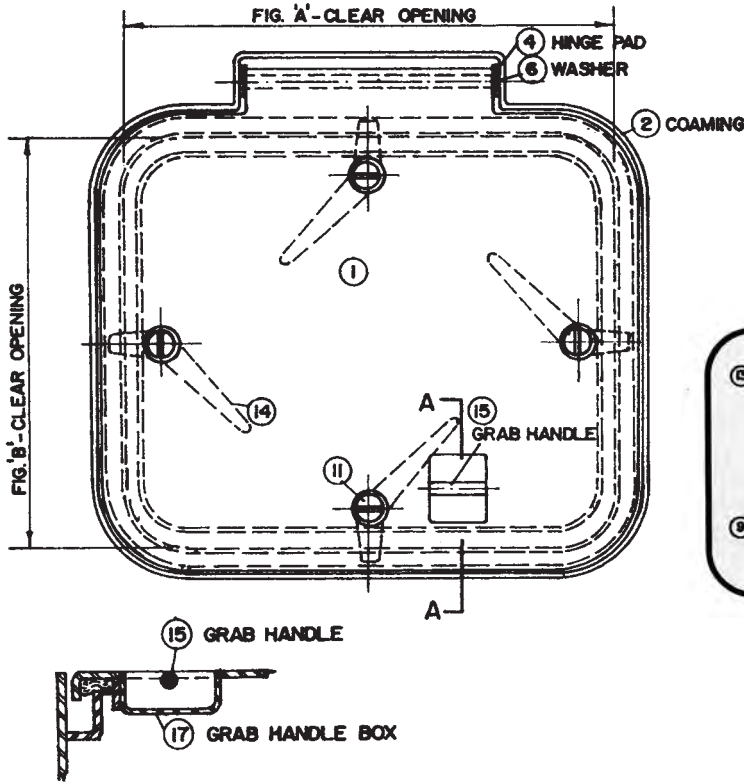


- SPECIFY DIAMETER, COAMING HEIGHT AND GASKET MATERIAL WHEN ORDERING

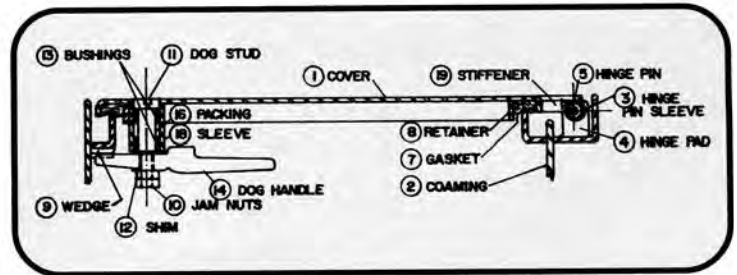
HATCH T-210

OIL CARGO HATCH

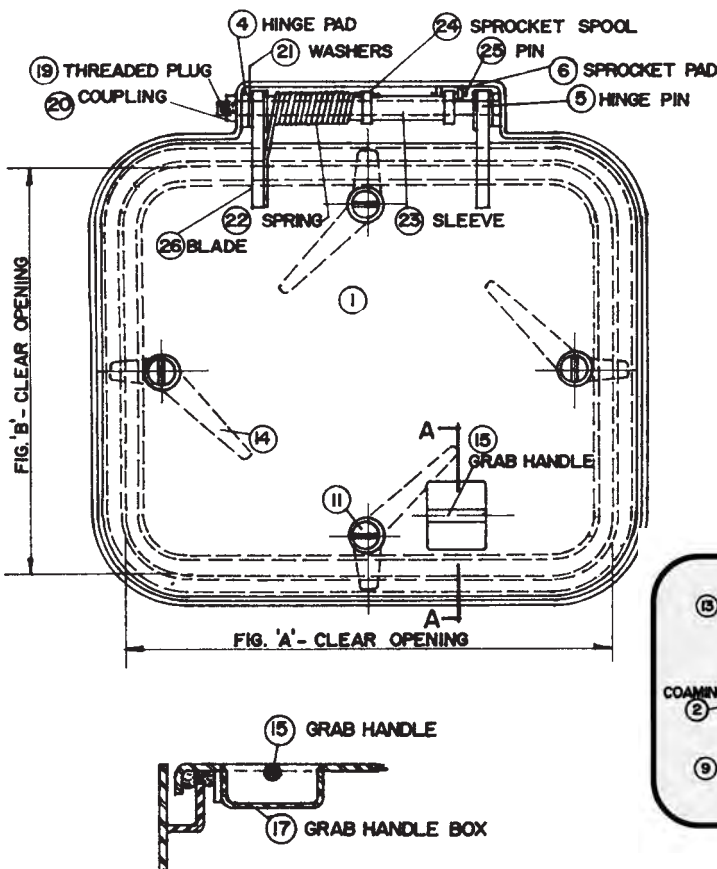




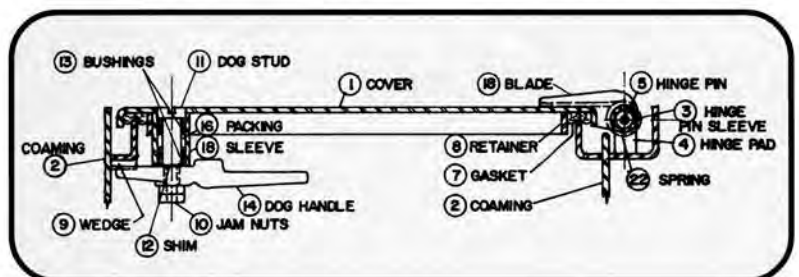
HATCH T-211 WATERTIGHT FLUSH HATCH



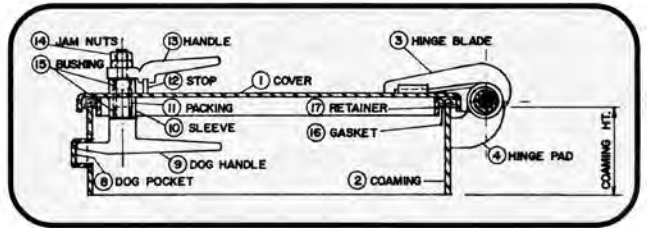
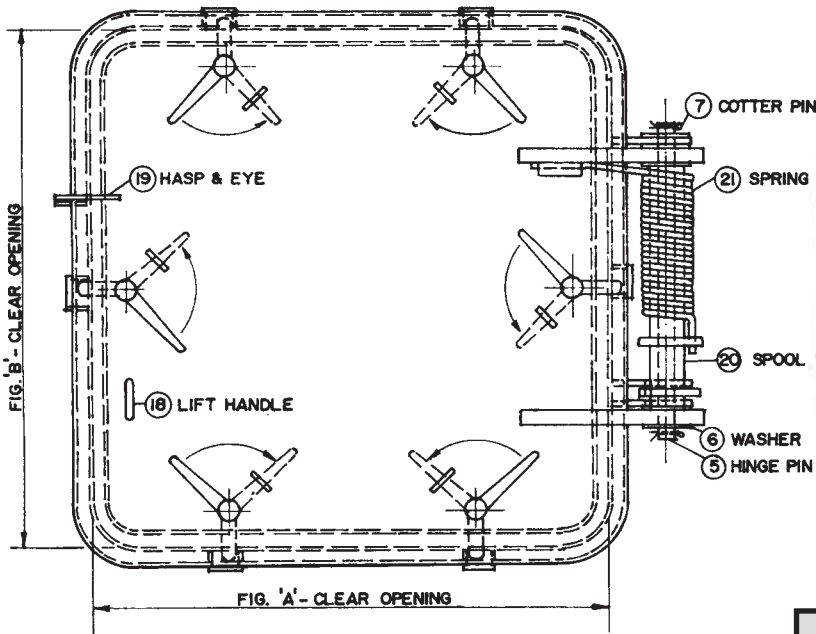
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



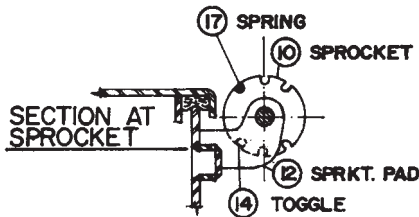
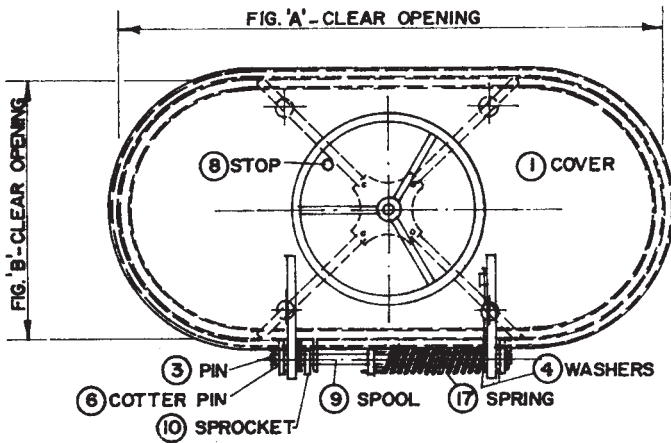
HATCH T-213 WATERTIGHT FLUSH HATCH WITH SPRING-BALANCED COVER



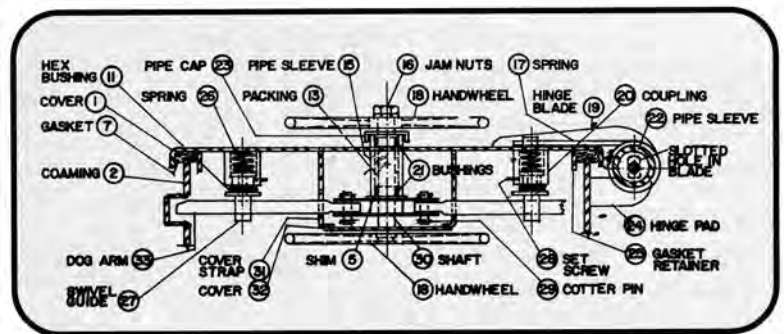
HATCH T-214 WATERTIGHT HATCH WITH SPRING-BALANCED COVER

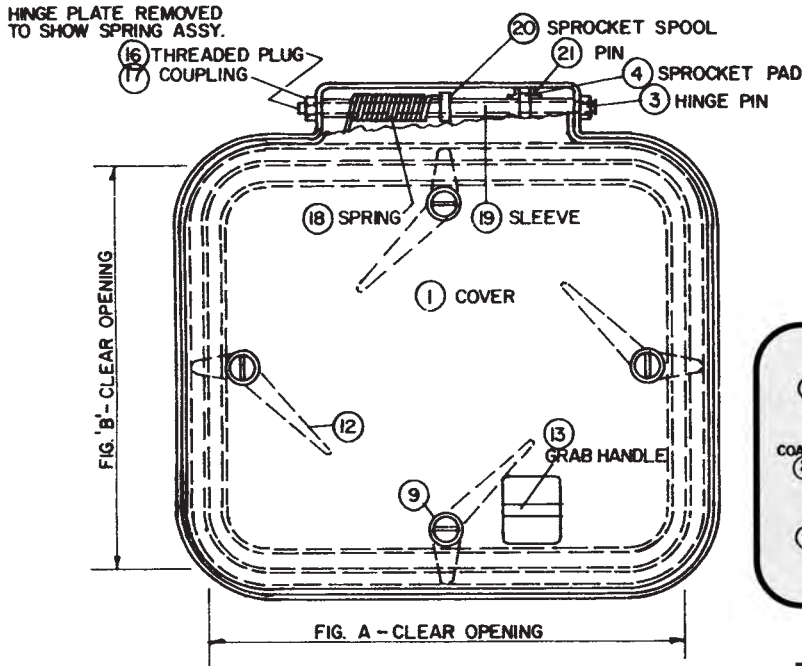


- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



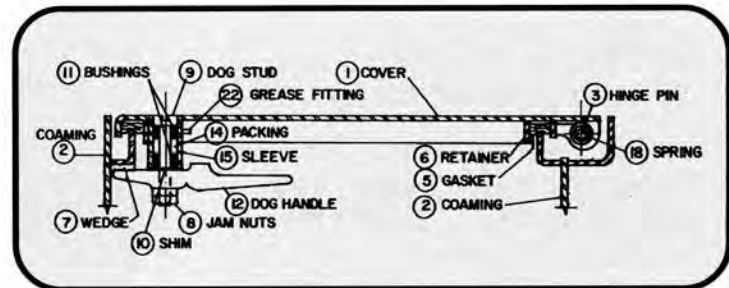
HATCH T-215 SPRING-BALANCED QUICK-ACTING WATERTIGHT OVAL HATCH



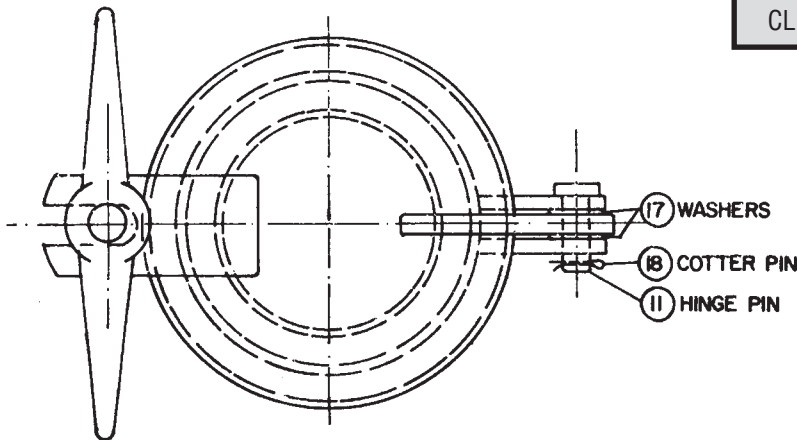


HATCH T-217

WATERTIGHT FLUSH HATCH
WITH SPRING-BALANCED COVER
AND RECESSED SPRING

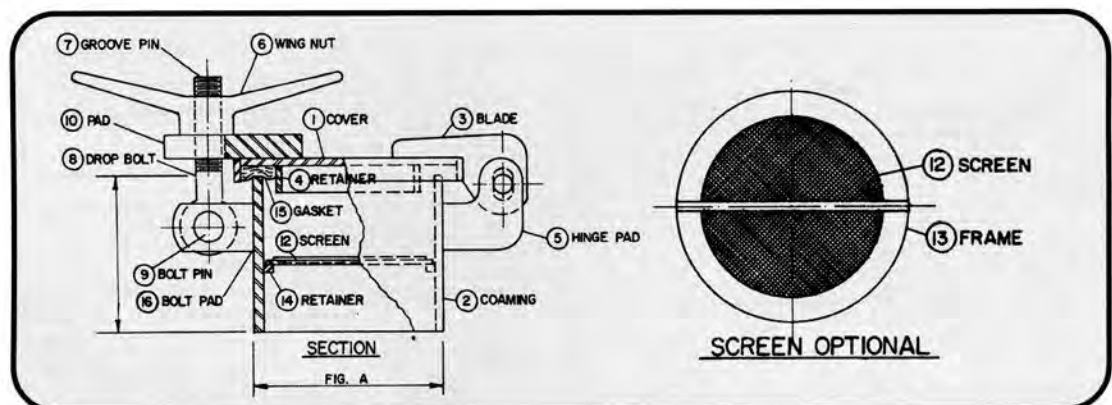


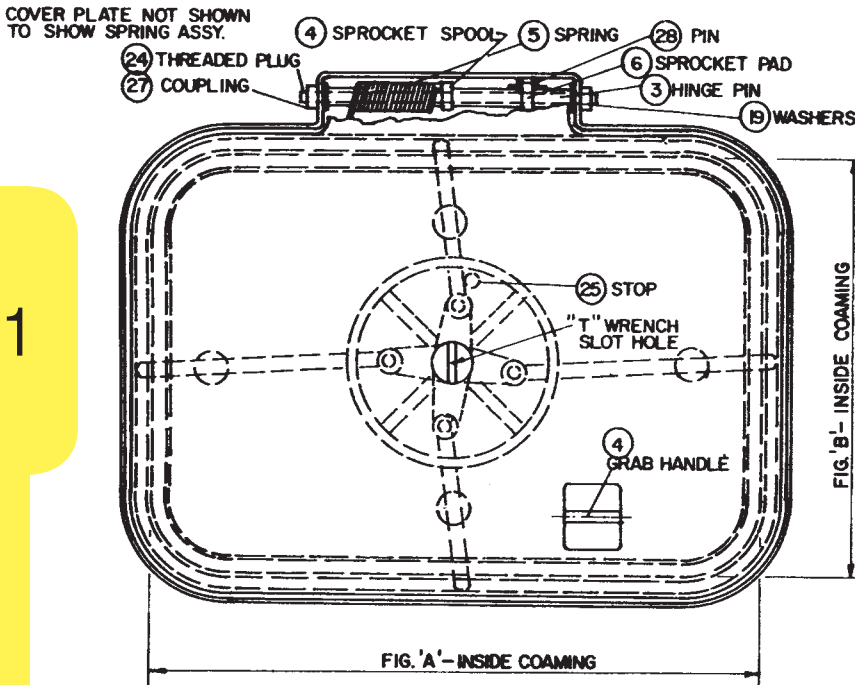
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



HATCH T-218

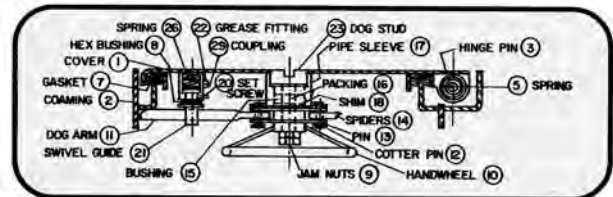
ULLAGE HATCH



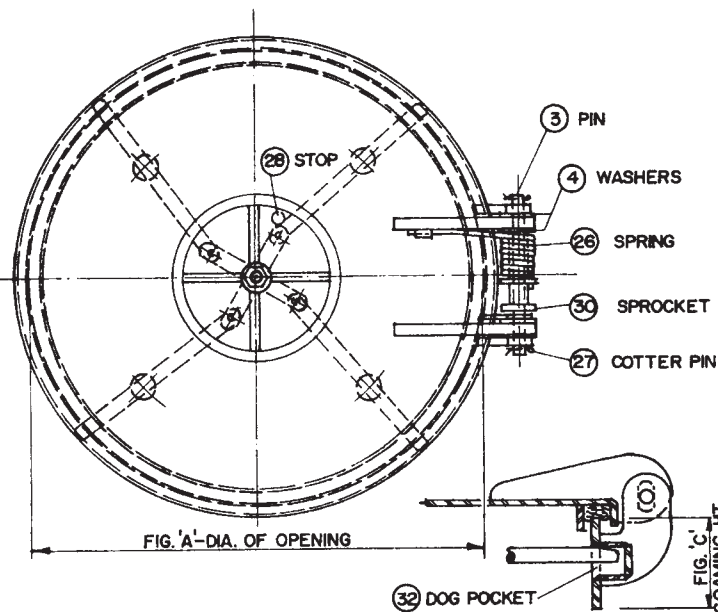


HATCH T-219

QUICK-ACTING WATERTIGHT
FLUSH HATCH WITH
SPRING-BALANCED COVER
AND RECESSED SPRING

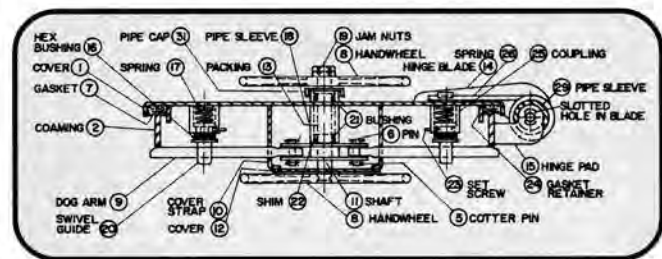


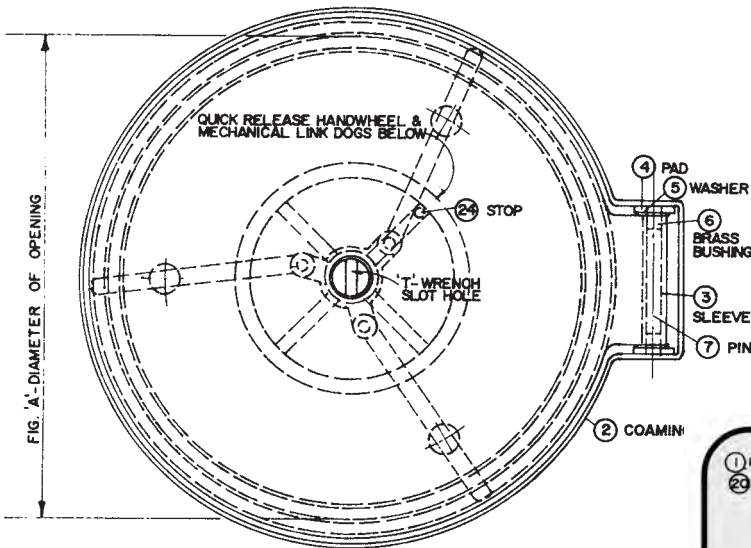
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



HATCH T-400

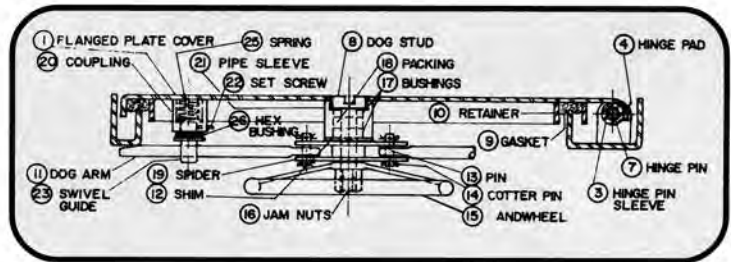
QUICK-ACTING WATERTIGHT ROUND
SCUTTLE WITH SPRING-BALANCED COVER



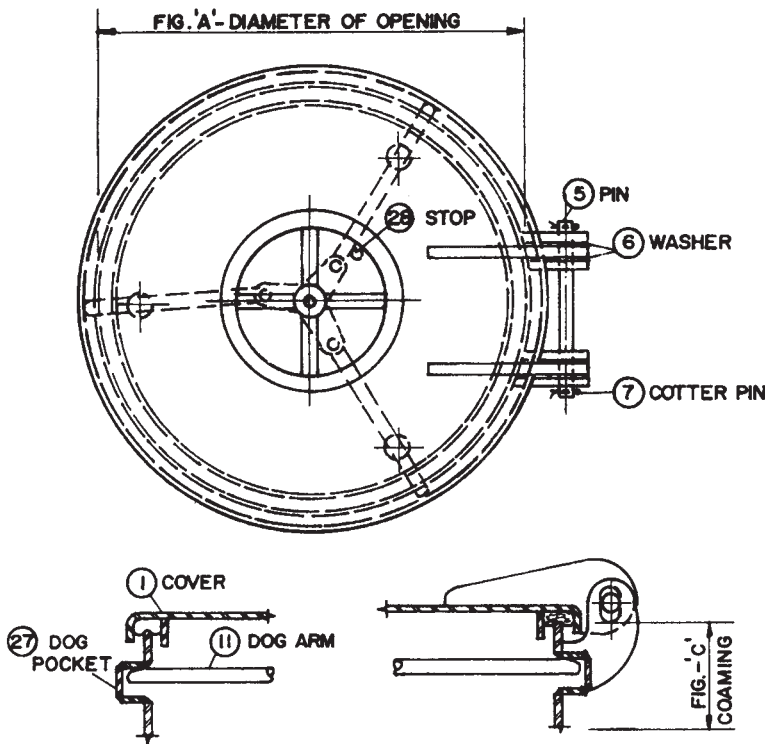


HATCH T-401

QUICK-ACTING WATERTIGHT FLUSH ROUND SCUTTLE

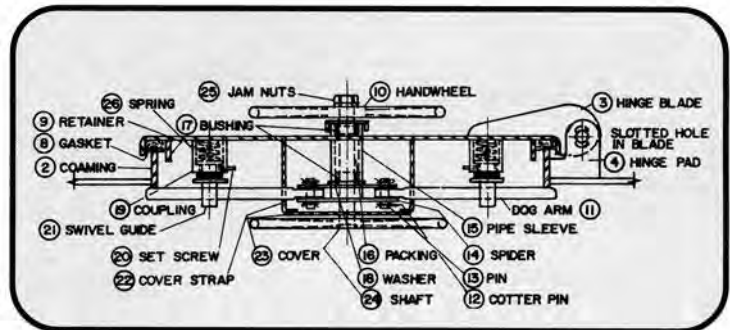


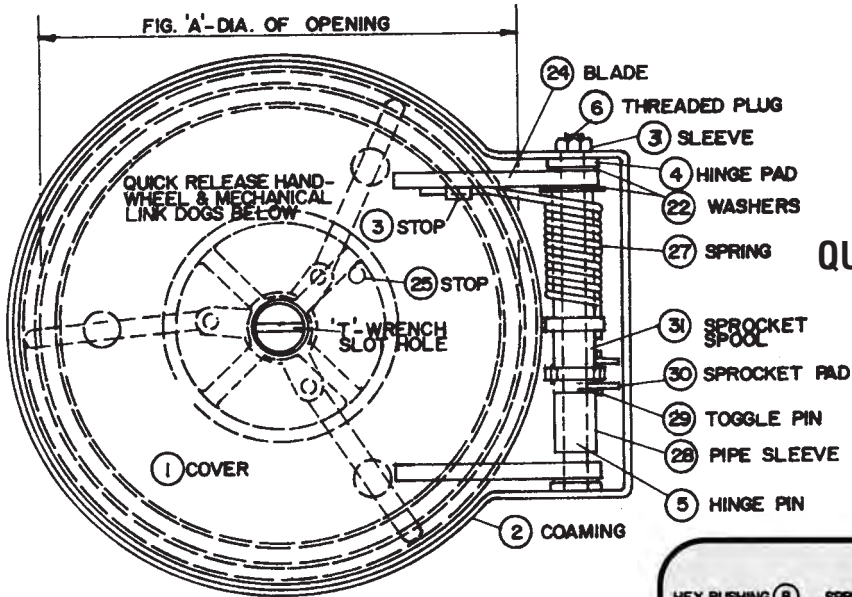
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



HATCH T-402

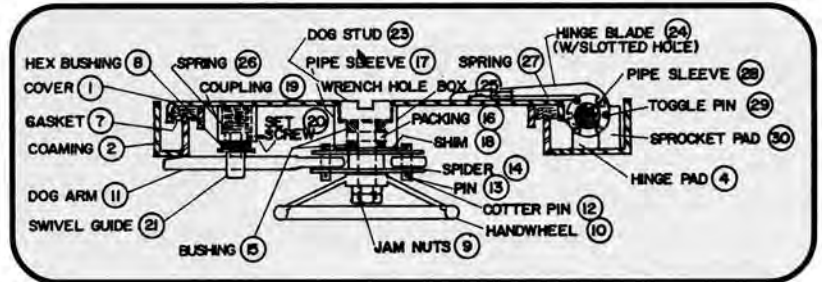
QUICK-ACTING WATERTIGHT ROUND SCUTTLE WITH 3 DOGS



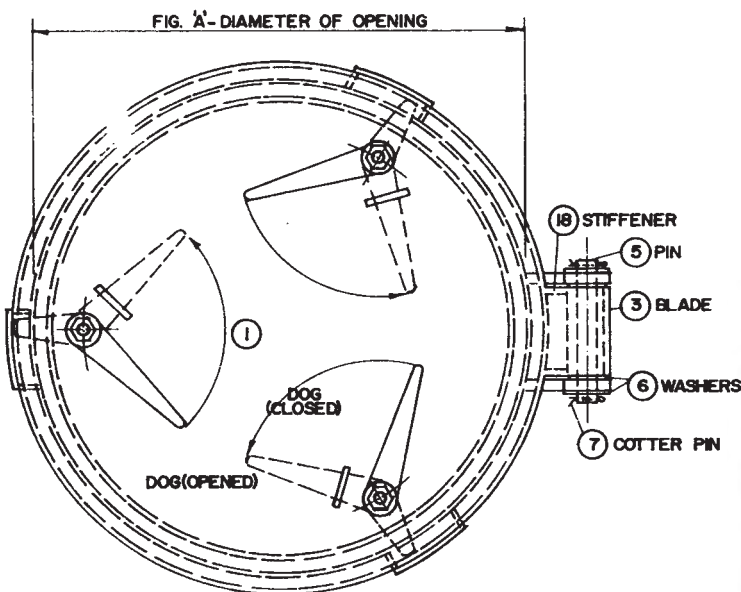


HATCH T-403

QUICK-ACTING FLUSH WATERTIGHT SPRING-BALANCED SCUTTLE

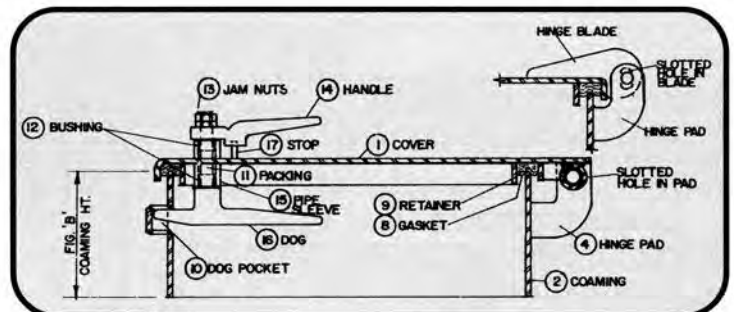


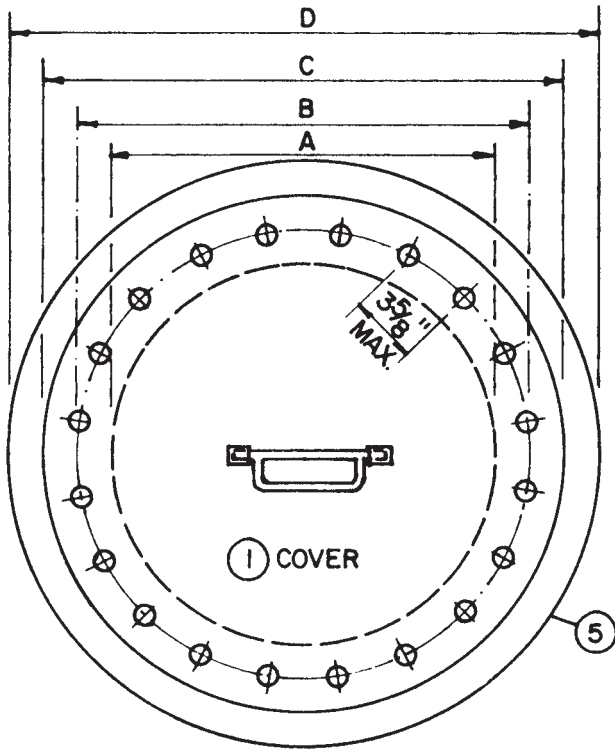
- MILD STEEL CONSTRUCTION WITH NEOPRENE GASKET
- SPECIFY STANDARD OR ABS CONSTRUCTION GRADE, CLEAR OPENING DIMENSIONS WHEN ORDERING



HATCH T-405

WATERTIGHT SCUTTLE WITH 3 DOGS



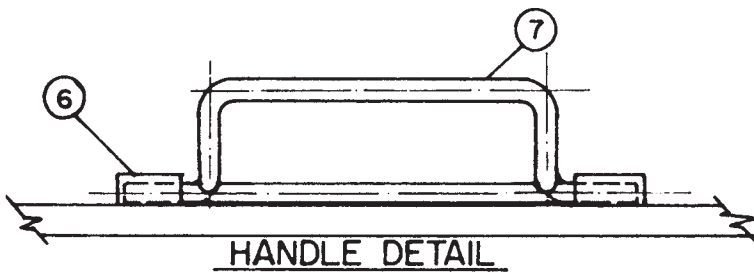
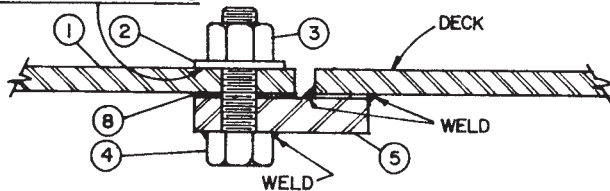


T306 WATERTIGHT MANHOLE COVER

1

| DIMENSION SCHEDULE | | | | |
|--------------------|-----|---------|-----|-----|
| CLEAR OPENING | A | B | C | D |
| 18" | 18" | 19-3/4" | 22" | 24" |
| 20" | 20" | 21-3/4" | 24" | 26" |
| 22" | 22" | 23-3/4" | 26" | 28" |
| 24" | 24" | 25-3/4" | 28" | 30" |
| 26" | 26" | 27-3/4" | 30" | 32" |

LAMPWICK GROMMET
FURNISHED BY SHIPYARD



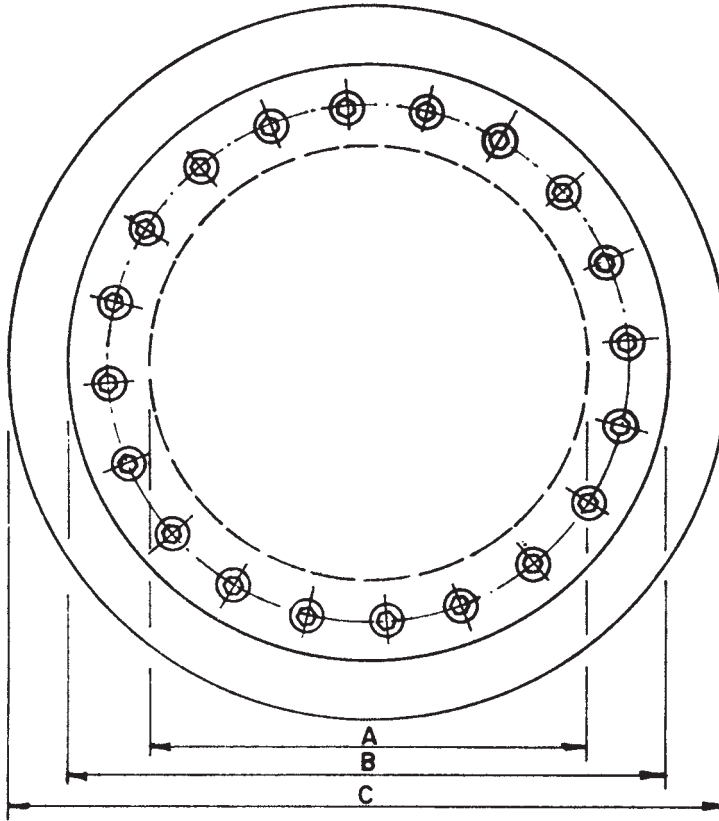
SCHEDULE OF MATERIALS

| PIECE NO. | MATERIAL |
|-----------|----------|
| 1 | STEEL |
| 2 | PLATED |
| 3 | BRASS |
| 4 | STEEL |
| 5 | STEEL |
| 6 | STEEL |
| 7 | STEEL |
| 8 | NEOPRENE |

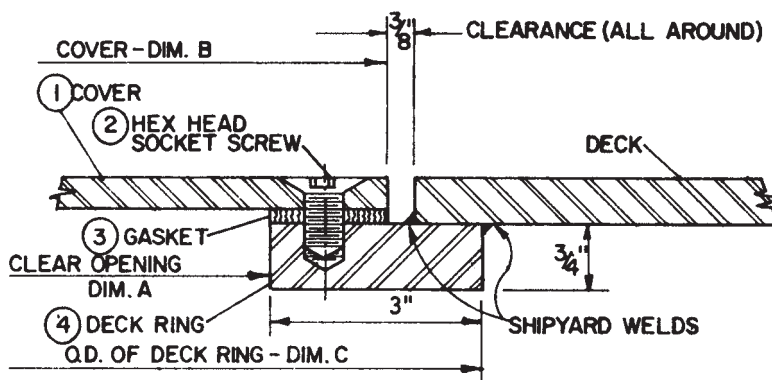


T-310 FLUSH BOLTED PLATE MANHOLE

1

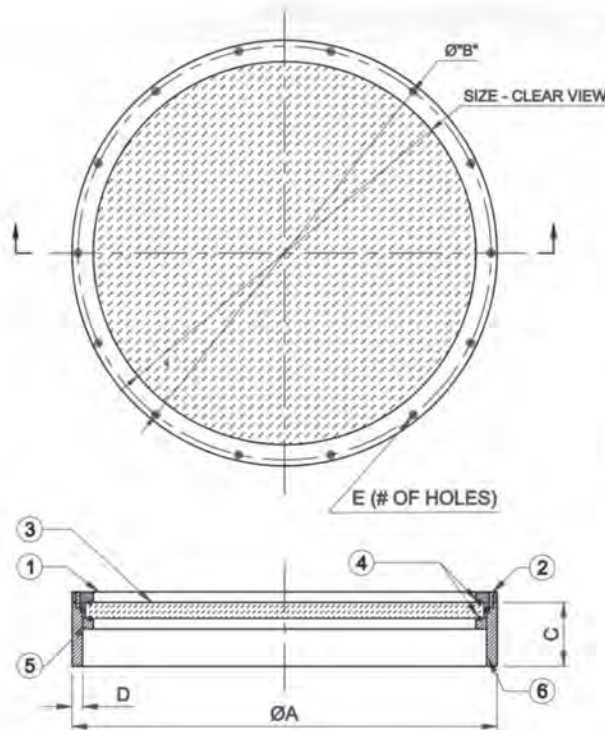


| DIMENSION SCHEDULE | | | |
|--------------------|-----|-----|-----|
| CLEAR OPENING | A | B | C |
| 18" | 18" | 21" | 24" |
| 20" | 20" | 24" | 26" |
| 22" | 22" | 26" | 28" |
| 24" | 24" | 28" | 30" |



| SCHEDULE OF MATERIALS | |
|-----------------------|-----------|
| PIECE NO. | MATERIAL |
| 1 | STEEL |
| 2 | STAINLESS |
| 3 | NEOPRENE |
| 4 | STEEL |

WELD IN FIXED LIGHT



| MODEL No. | SIZE | ØA | ØB | C | B | E | WT. (lbs.) |
|-----------|------|-----|----------|----|------|----|------------|
| 400 | 8" | 10" | 9 7/16" | 3" | 1/2" | 10 | 24 |
| 400 | 10" | 12" | 11 7/16" | 3" | 1/2" | 10 | 30 |
| 400 | 12" | 14" | 13 7/16" | 3" | 1/2" | 12 | 37 |
| 400 | 14" | 16" | 15 7/16" | 3" | 1/2" | 12 | 44 |
| 400 | 16" | 18" | 17 7/16" | 3" | 1/2" | 12 | 52 |
| 400 | 18" | 20" | 19 7/16" | 3" | 1/2" | 14 | 60 |

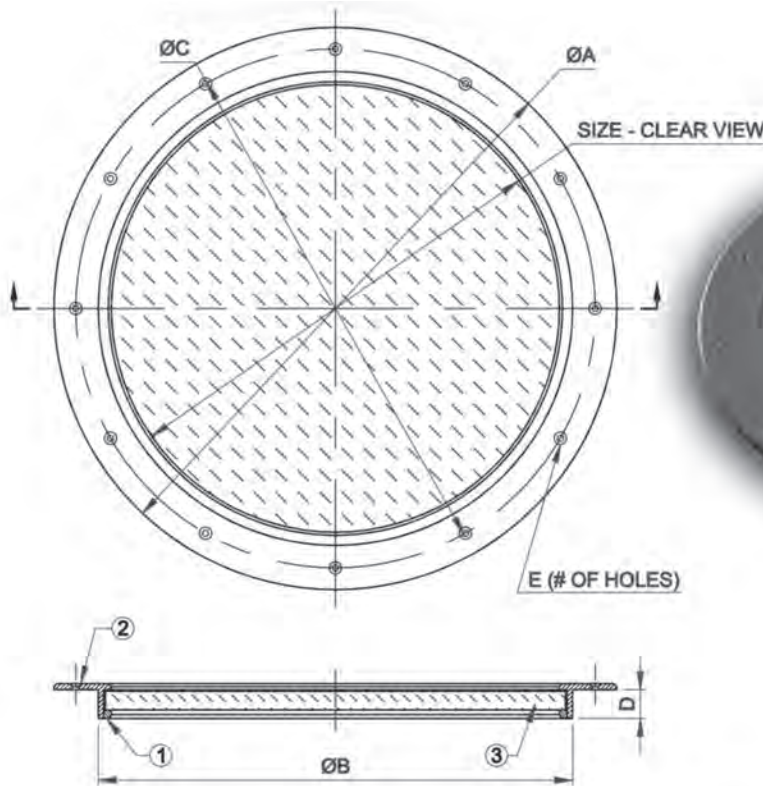
| PIECE No. | DESCRIPTION | BRASS LIGHT | STEEL LIGHT | ALUMINUM LIGHT |
|-----------|----------------|-------------|-------------|----------------|
| 1 | RETAINING RING | BRASS | BRASS | ALUMINUM |
| 2 | SCREW | | STAINLESS | |
| 3 | GLASS | | GLASS | |
| 4 | GASKET | | NEOPRENE | |
| 5 | GLASS TOP | BRASS | STEEL | ALUMINUM |
| 6 | COAMING | BRASS | STEEL | ALUMINUM |

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BOLT-ON FIXED LIGHT



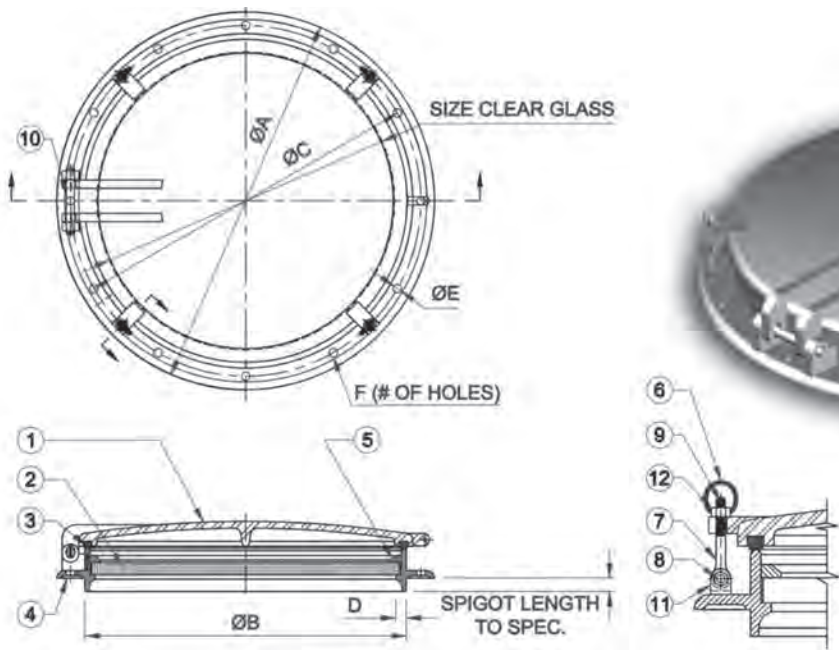
| MODEL No. | SIZE | ØA | ØB | ØC | D | E | WT. (lbs.) |
|-----------|------|---------|----------|---------|--------|----|------------|
| 500 | 4" | 6 5/8" | 4 13/16" | 5 7/8" | 11/16" | 6 | 3 |
| 500 | 6" | 8 1/2" | 6 13/16" | 7 1/2" | 13/16" | 6 | 5 |
| 500 | 7" | 9 3/4" | 7 13/16" | 8 7/8" | 13/16" | 6 | 6 |
| 500 | 8" | 11" | 9 1/16" | 10 3/8" | 7/8" | 8 | 8 |
| 500 | 10" | 13 1/4" | 11 1/16" | 12 1/4" | 1" | 8 | 12 |
| 500 | 12" | 15 1/4" | 13 1/16" | 14 1/4" | 1 1/8" | 12 | 17 |
| 500 | 14" | 18 1/4" | 15 1/16" | 17" | 1 1/8" | 12 | 24 |
| 500 | 16" | 20 5/8" | 17 1/16" | 18 7/8" | 1 1/8" | 12 | 30 |
| 500 | 18" | 22 5/8" | 19 1/16" | 20 7/8" | 1 1/8" | 12 | 35 |

| PIECE No. | DESCRIPTION | BRASS LIGHT | STEEL LIGHT | ALUMINUM LIGHT |
|-----------|----------------|-------------|-------------|----------------|
| 1 | FRAME | BRASS | STEEL | ALUMINUM |
| 2 | RETAINING RING | BRASS | BRASS | ALUMINUM |
| 3 | GLASS | | GLASS | |

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BOLT-ON FIXED LIGHT W/COVER



| MODEL No. | SIZE | ØA | ØB | ØC | D | ØE | F | WT. (lbs.) |
|-----------|------|---------|---------|---------|------|--------|----|------------|
| 600 | 8" | 11 3/8" | 9" | 10 1/4" | 5/8" | 25/64" | 8 | 25 |
| 600 | 10" | 13 5/8" | 11" | 12 3/8" | 5/8" | 33/64" | 8 | 32 |
| 600 | 12" | 15 7/8" | 13 1/8" | 14 5/8" | 5/8" | 33/64" | 12 | 40 |
| 600 | 14" | 18 7/8" | 15 1/4" | 16 5/8" | 5/8" | 33/64" | 12 | 48 |
| 600 | 16" | 20 5/8" | 17 1/4" | 18 7/8" | 5/8" | 33/64" | 12 | 57 |
| 600 | 18" | 22 5/8" | 19 1/4" | 21" | 5/8" | 33/64" | 12 | 67 |

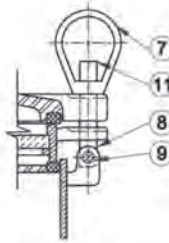
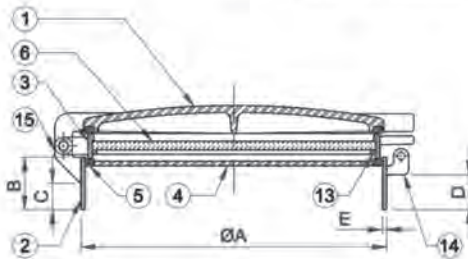
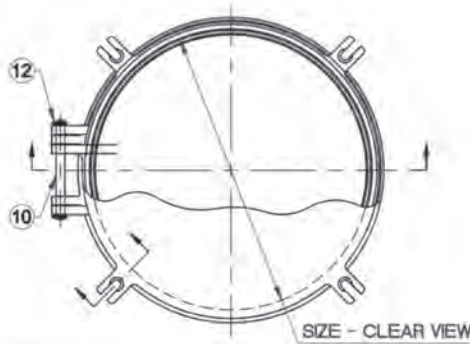
| PIECE No. | DESCRIPTION | BRASS LIGHT | STEEL LIGHT | ALUMINUM LIGHT |
|-----------|----------------|-------------|-------------|----------------|
| 1 | COVER | | ALUMINUM | |
| 2 | GLASS | | GLASS | |
| 3 | GASKET | | NEOPRENE | |
| 4 | FRAME | BRASS | STEEL | ALUMINUM |
| 5 | RETAINING RING | BRASS | STEEL | ALUMINUM |
| 6 | BELL NUT | | BRASS | |
| 7 | DROP BOLT | BRASS | STEEL | ALUMINUM |
| 8 | BOLT | | STAINLESS | |
| 9 | COTTER PIN | | STAINLESS | |
| 10 | HINGE PIN | | STAINLESS | |
| 11 | DROP BOLT LUG | | STAINLESS | |
| 12 | HEX NUT | | STAINLESS | |

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WELD IN PORTLIGHT



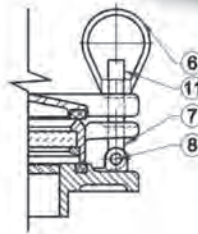
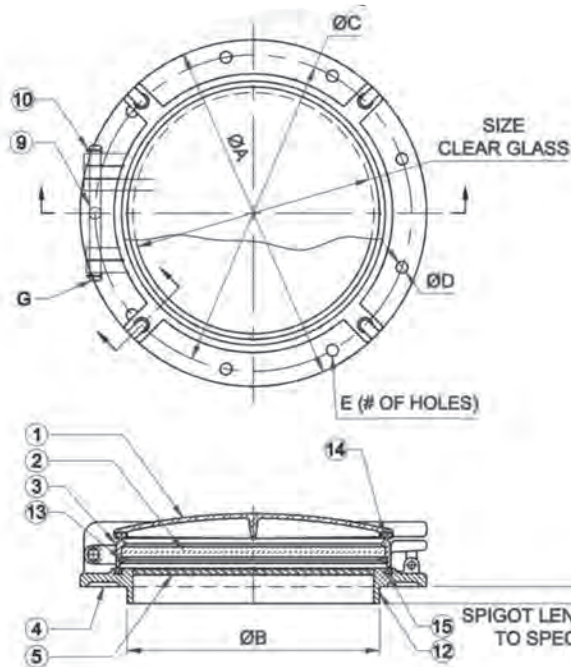
| MODEL No. | SIZE | ØA | B | C | D | E | WT. (lbs.) |
|-----------|------|---------|----|--------|----|------|------------|
| 700 | 8" | 9 1/2" | 3" | 1 1/2" | 2" | 1/4" | 28 |
| 700 | 10" | 11 1/2" | 3" | 1 1/2" | 2" | 1/4" | 35 |
| 700 | 12" | 13 1/2" | 3" | 1 1/2" | 2" | 1/4" | 44 |
| 700 | 14" | 15 1/2" | 3" | 1 1/2" | 2" | 1/4" | 54 |
| 700 | 16" | 17 1/2" | 3" | 1 1/2" | 2" | 1/4" | 63 |
| 700 | 18" | 19 1/2" | 3" | 1 1/2" | 2" | 1/4" | 73 |

| PIECE No. | DESCRIPTION | BRASS LIGHT | STEEL LIGHT | ALUMINUM LIGHT |
|-----------|------------------|-------------|-------------|----------------|
| 1 | COVER | | ALUMINUM | |
| 2 | SPIGOT FRAME | BRASS | STEEL | ALUMINUM |
| 3 | GLASS FRAME | BRASS | STEEL | ALUMINUM |
| 4 | REMOVABLE SCREEN | | BRASS | |
| 5 | GASKET | | NEOPRENE | |
| 6 | GLASS | | GLASS | |
| 7 | BELL NUT | | BRASS | |
| 8 | SCREW | | STAINLESS | |
| 9 | GROOVE PIN | | STAINLESS | |
| 10 | HINGE PIN | | STAINLESS | |
| 11 | DROP BOLT | | STAINLESS | |
| 12 | COTTER PIN | | STAINLESS | |
| 13 | RETAINING RING | BRASS | BRASS | ALUMINUM |
| 14 | DROP BOLT LUG | BRASS | STEEL | ALUMINUM |
| 15 | HINGE PAD | BRASS | STEEL | ALUMINUM |

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BOLT ON PORTLIGHT



| MODEL No. | SIZE | ØA | ØB | ØC | ØD | E | WT. (lbs.) |
|-----------|------|-------------|-------------|-------------|-------------|----|------------|
| 800 | 8" | 11 1/2" | 8 3/8" | 10 1/2" | 25/64" | 9 | 18 |
| 800 | 10" | 14 1/4" | 10 3/8" | 12 3/4" | 33/64" | 12 | 24 |
| 800 | 12" | 16" | 12 3/8" | 14 3/4" | 33/64" | 12 | 31 |
| 800 | 14" | 18" | 14 3/8" | 17" | 33/64" | 12 | 38 |
| 800 | 16" | 20 3/8" | 16 1/2" | 18 7/8" | 33/64" | 12 | 45 |
| 800 | 18" | 22 3/4" | 18 1/2" | 21 1/8" | 33/64" | 12 | 52 |

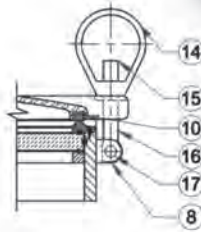
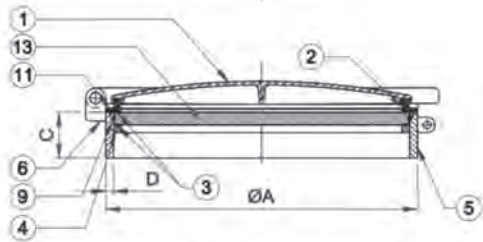
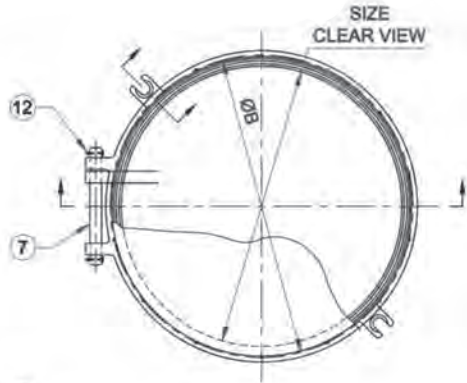
| PIECE No. | DESCRIPTION | BRASS LIGHT | STEEL LIGHT | ALUMINUM LIGHT |
|-----------|--------------|-------------|-------------|----------------|
| 1 | COVER | | ALUMINUM | |
| 2 | GLASS | | GLASS | |
| 3 | GLASS FRAME | BRASS | STEEL | ALUMINUM |
| 4 | SPIGOT FRAME | BRASS | STEEL | ALUMINUM |
| 5 | WIRE SCREEN | | BRASS | |
| 6 | BELL NUT | BRASS | STEEL | ALUMINUM |
| 7 | SCREW | BRASS | STEEL | ALUMINUM |
| 8 | ROLL PIN | | STAINLESS | |
| 9 | HINGE PIN | | STAINLESS | |
| 10 | COTTER PIN | | STAINLESS | |
| 11 | DROP BOLT | BRASS | STEEL | STAINLESS |
| 12 | SCREEN FRAME | BRASS | STAINLESS | STAINLESS |
| 13 | BEZEL RING | BRASS | STEEL | ALUMINUM |
| 14 | GASKET | | NEOPRENE | |
| 15 | GASKET | | NEOPRENE | |

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WELD-IN FIXED LIGHT W/COVER



| MODEL No. | SIZE | ØA | ØB | C | D | WT. (lbs.) |
|-----------|------|-----|----------|----|------|------------|
| 900 | 8" | 10" | 9 7/16" | 3" | 1/2" | 28 |
| 900 | 10" | 12" | 11 7/16" | 3" | 1/2" | 35 |
| 900 | 12" | 14" | 13 7/16" | 3" | 1/2" | 43 |
| 900 | 14" | 16" | 15 7/16" | 3" | 1/2" | 51 |
| 900 | 16" | 18" | 17 7/16" | 3" | 1/2" | 59 |
| 900 | 18" | 20" | 19 7/16" | 3" | 1/2" | 68 |

| PIECE No. | DESCRIPTION | BRASS LIGHT | STEEL LIGHT | ALUMINUM LIGHT |
|-----------|----------------|-------------|-------------|----------------|
| 1 | COVER | | ALUMINUM | |
| 2 | RETAINING RING | | BRASS | |
| 3 | GASKET | | NEOPRENE | |
| 4 | GLASS TOP | BRASS | STEEL | ALUMINUM |
| 5 | COAMING | BRASS | STEEL | ALUMINUM |
| 6 | HINGE PAD | BRASS | STEEL | ALUMINUM |
| 7 | HINGE PIN | | STAINLESS | |
| 8 | DROP BOLT LUG | | STEEL | |
| 9 | GASKET | | NEOPRENE | |
| 10 | GASKET | | NEOPRENE | |
| 11 | SCREW | | STAINLESS | |
| 12 | COTTER PIN | | STAINLESS | |
| 13 | GLASS | | GLASS | |
| 14 | BELL NUT | | BRASS | |
| 15 | DROP BOLT | | STAINLESS | |
| 16 | SCREW | | STAINLESS | |
| 17 | GROOVE PIN | | STAINLESS | |

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CAST HATCHES

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE HAS MORE QUICK-ACTING FLUSH HATCH EXPERIENCE, MODELS AND FEATURES THAN ANY MANUFACTURER

Freeman hatches are used on a wide variety of fishing boats, tugs, barges, research vessels, offshore tenders, rescue craft and other workboats. The FREEMAN hatch is designed for new boats, for replacing other hatches in standard openings, or for improving existing craft.

The hatches are fast acting and easy to use. Simply grasp the handle and pull, the shaft slides into place, and with less than a quarter turn, completely disengages the locking mechanism. The dogs and linked handle do the work smoothly in just a second.

Our easy lift system allows simple removal. With the locking mechanism disengaged, the hatch is resting on the deck ring and can be lifted out with one hand.

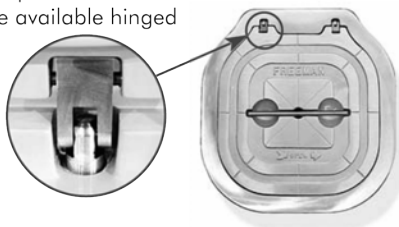
- TOP VALUE
- FAST ACTING
- EASY LIFT
- VERSATILE
- RELIABLE
- LOW MAINTENANCE

✓ Buy America Act Compliant (52.225-1)



HINGED HATCHES

For hinged models the unique hinging device allows the hatch to be opened more than 180° and "floats" when the hatch is closed to facilitate a tighter seal. Round hatches 18" and larger, and all oval and square hatches with aluminum covers are available hinged from the factory.



Close-up view of standard Freeman "floating" hinge installed on hatch assembly.

• APPROVALS

Lloyd's Register - type approval certificate no. 09/60003(E1).
U.S. Coast Guard, CE, ISO-12216 compliant.
ABS, Bureau Veritas and Germanischer Lloyd's approvals have been awarded and may be obtained for specific intended uses.
FREEMAN Cast Hatches are currently in use on Coast Guard vessels and U.S. Naval craft of all types.



• LIFT OUT



• SURFACE HINGES



• CONCEALED YOKE HINGE
(optional, selected models)

- Evenly spaced dogging arms exert uniform pull on the cover plate.
- Handle position shows when dogging arms are engaged or disengaged.
- Handle is always attached. Hatch and handle fit flush with the deck with the handle in a recessed locked position.
- Watertight hatches are designed to seal up to 30 foot intermittent head, the double-sealing gasket seals tighter under pressure.
- Versatile installation, hatches can be installed in steel, aluminum, wood, or fiberglass decks.
- Complete units include aluminum or steel mounting rings for bolt-in or weld-in installations.
- Dogging mechanism assures smooth consistent action; no binding or jamming.
- Quick-acting dogging eliminates over or under tightening; hatch operates the same each time.

FREEMAN
MARINE EQUIPMENT, INC.

CAST HATCHES - ROUND



30" Round lift-out,
Aluminum ring



8" Round lift-out, Aluminum ring



18" Round lift-out,
Steel ring



22" Round hinged,
Aluminum ring

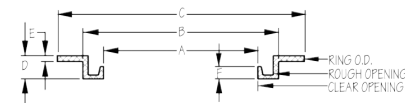
1

| PART NO | SIZE | SHAPE | STYLE | RING | DIMENSIONS | | | | | | | | | | | | MECHANISM | ASSEMBLY WEIGHT | | | |
|-----------|------|-------|----------|------|---------------|--------|----------------|--------|---------|--------|-----|------|-----|-----------|--------|------|-----------|-----------------|----------|-----|------|
| | | | | | CLEAR OPENING | | ROUGH OPENING* | | OVERALL | | | | | | | | | STD MATERIAL | CUBIC FT | LBS | KGS |
| | | | | | A (in) | A (mm) | B (in) | B (mm) | C (in) | C (mm) | D | E | F | MTRL | THKNSS | in | | | | | |
| 2401-0002 | 8" | ROUND | LIFT-OUT | A-C | 7.9 | 201 | 10.3 | 262 | 12.0 | 305 | 1 | 0.31 | | ALUM | 0.23 | 9.8 | 249 | ALUM ALLOY | 3 | 8 | 3.6 |
| 2402-0002 | 12" | ROUND | LIFT-OUT | A-C | 11.9 | 302 | 14.8 | 376 | 17.4 | 442 | 1.3 | 0.31 | | ALUM | 0.19 | 13.9 | 353 | ALUM ALLOY | 3 | 13 | 5.9 |
| 2402-0003 | 12" | ROUND | LIFT-OUT | S-C | 11.9 | 302 | 14.5 | 368 | | | 1.3 | 0.25 | | ALUM | 0.19 | 13.9 | 353 | ALUM ALLOY | 3 | 16 | 7.3 |
| 2403-0002 | 15" | ROUND | LIFT-OUT | A-C | 15 | 381 | 17.8 | 452 | 21.5 | 546 | 1.3 | 0.31 | | ALUM | 0.29 | 17 | 432 | ALUM ALLOY | 3 | 23 | 10.4 |
| 2403-0003 | 15" | ROUND | LIFT-OUT | S-C | 15 | 381 | 17.6 | 447 | | | 1.3 | 0.25 | | ALUM | 0.29 | 17 | 432 | ALUM ALLOY | 3 | 26 | 11.8 |
| 2404-0002 | 18" | ROUND | LIFT-OUT | A-C | 18 | 457 | 20.9 | 530 | 24.5 | 622 | 1.4 | 0.31 | | ALUM | 0.26 | 20 | 508 | ALUM ALLOY | 3 | 30 | 13.6 |
| 2404-0003 | 18" | ROUND | LIFT-OUT | S-C | 18 | 457 | 20.5 | 521 | | | 1.3 | 0.25 | | ALUM | 0.26 | 20 | 508 | ALUM ALLOY | 3 | 32 | 14.5 |
| 2405-0002 | 18" | ROUND | LIFT-OUT | A-K | 18 | 457 | 20 | 508 | 24 | 607 | 1.5 | 0.38 | 0.8 | ALUM | 0.24 | | | ALUM ALLOY | 3 | 38 | 17.2 |
| 2405-0003 | 18" | ROUND | LIFT-OUT | S-K | 18 | 457 | 20.6 | 523 | | | 2.5 | 0.31 | 1.0 | ALUM | 0.24 | | | ALUM ALLOY | 3 | 36 | 16.3 |
| 2441-0002 | 18" | ROUND | HINGED | A-C | 18 | 457 | 20.9 | 530 | 24.5 | 622 | 1.6 | 0.27 | | ALUM | 0.38 | 20 | 508 | ALUM ALLOY | 3 | 35 | 15.9 |
| 2441-0003 | 18" | ROUND | HINGED | S-C | 18 | 457 | 20.8 | 528 | | | 1.3 | 0.25 | | ALUM | 0.38 | 20 | 508 | ALUM ALLOY | 3 | 38 | 17.2 |
| 2442-0002 | 18" | ROUND | HINGED | A-K | 18 | 457 | 20 | 508 | 24 | 607 | 1.5 | .38 | 0.8 | ALUM | 0.24 | | | ALUM ALLOY | 3 | 39 | 17.7 |
| 2442-0003 | 18" | ROUND | HINGED | S-K | 18 | 457 | 20.6 | 523 | | | 2.5 | .31 | 1.0 | ALUM | 0.24 | | | ALUM ALLOY | 3 | 42 | 19.1 |
| 2481-0107 | 18" | ROUND | LIFT-OUT | S-C | 18 | 457 | 20.5 | 521 | | | 1.5 | .25 | | DUCT IRON | 0.41 | 19.9 | 505 | STAIN STEEL | 3 | 75 | 34 |
| 2406-0002 | 20" | ROUND | LIFT-OUT | A-C | 19.8 | 503 | 22.8 | 579 | 26.5 | 673 | 1.3 | .31 | | ALUM | 0.26 | 21.9 | 556 | ALUM ALLOY | 4 | 36 | 16.3 |
| 2406-0003 | 20" | ROUND | LIFT-OUT | S-C | 19.8 | 503 | 22.4 | 569 | | | 1.3 | 0.25 | | ALUM | 0.26 | 21.9 | 556 | ALUM ALLOY | 4 | 37 | 16.8 |
| 2407-0002 | 20" | ROUND | LIFT-OUT | A-K | 20 | 508 | 22 | 559 | 26 | 660 | 1.4 | 0.38 | 0.7 | ALUM | 0.35 | | | ALUM ALLOY | 4 | 44 | 20 |
| 2407-0003 | 20" | ROUND | LIFT-OUT | S-K | 20 | 508 | 22.6 | 574 | | | 2.5 | 0.31 | 1.0 | ALUM | 0.35 | | | ALUM ALLOY | 4 | 41 | 18.6 |
| 2443-0002 | 20" | ROUND | HINGED | A-C | 19.6 | 498 | 22.8 | 579 | 26.5 | 673 | 1.7 | 0.40 | | ALUM | 0.29 | 21.9 | 556 | ALUM ALLOY | 4 | 44 | 20 |
| 2443-0003 | 20" | ROUND | HINGED | S-C | 19.6 | 498 | 22.4 | 569 | | | 1.3 | 0.25 | | ALUM | 0.29 | 21.9 | 556 | ALUM ALLOY | 4 | 47 | 21.3 |
| 2444-0002 | 20" | ROUND | HINGED | A-K | 20 | 508 | 22 | 559 | 26 | 660 | 1.4 | 0.38 | 0.7 | ALUM | 0.35 | | | ALUM ALLOY | 4 | 45 | 20.4 |
| 2444-0003 | 20" | ROUND | HINGED | S-K | 20 | 508 | 22.6 | 579 | | | 2.5 | 0.31 | 1.0 | ALUM | 0.35 | | | ALUM ALLOY | 4 | 48 | 21.8 |

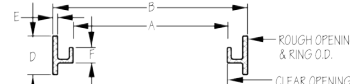
*DOES NOT INCLUDE HINGE POCKETS

CAST HATCHES - ROUND

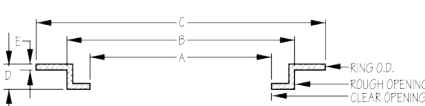
FREEMAN
MARINE EQUIPMENT, INC.



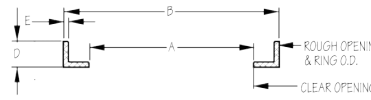
Aluminum Deck Ring, Knife Edge Seal



Steel Deck Ring, Knife Edge Seal



Aluminum Deck Ring, Compression Seal



Steel Deck Ring, Compression Seal



| PART NO | SIZE | SHAPE | STYLE | RING | DIMENSIONS | | | | | | | | COVER | | | | MECHANISM | | | ASSEMBLY WEIGHT | |
|-----------|------|-------|----------|------|---------------|--------|----------------|--------|---------|--------|-----|------|---------|-----------|--------------|---------|-----------|-------------|---------|-----------------|------|
| | | | | | CLEAR OPENING | | ROUGH OPENING* | | OVERALL | | | | OVERALL | | STD MATERIAL | DOQ Qty | LBS | KGS | | | |
| | | | | | A (in) | A (mm) | B (in) | B (mm) | C (in) | C (mm) | D | E | F | MTRL | | | | | THKNESS | in | mm |
| 2408-0002 | 22" | ROUND | LIFT-OUT | A-C | 22 | 559 | 24.8 | 630 | 28.5 | 724 | 1.6 | 0.31 | | ALUM | 0.31 | 24 | 610 | ALUM ALLOY | 4 | 39 | 17.7 |
| 2408-0003 | 22" | ROUND | LIFT-OUT | S-C | 22 | 559 | 24.6 | 625 | | | 1.5 | 0.25 | | ALUM | 0.31 | 24 | 610 | ALUM ALLOY | 4 | 40 | 18.1 |
| 2411-0002 | 24" | ROUND | LIFT-OUT | A-C | 23.3 | 592 | 26.6 | 676 | 30.5 | 775 | 1.4 | 0.31 | | ALUM | 0.37 | 25.8 | 665 | ALUM ALLOY | 4 | 52 | 23.6 |
| 2411-0003 | 24" | ROUND | LIFT-OUT | S-C | 23.3 | 592 | 26.5 | 673 | | | 1.5 | 0.25 | | ALUM | 0.37 | 25.8 | 665 | ALUM ALLOY | 4 | 54 | 24.5 |
| 2412-0002 | 24" | ROUND | LIFT-OUT | A-K | 24.1 | 612 | 26.1 | 663 | 30.6 | 777 | 1.6 | 0.38 | 0.6 | ALUM | 0.42 | | | ALUM ALLOY | 4 | 65 | 29.5 |
| 2412-0003 | 24" | ROUND | LIFT-OUT | S-K | 24.1 | 612 | 26.7 | 678 | | | 2.5 | 0.31 | 1.0 | ALUM | 0.42 | | | ALUM ALLOY | 4 | 59 | 28.8 |
| 2447-0002 | 24" | ROUND | HINGED | A-C | 23.4 | 594 | 26.4 | 671 | 30.5 | 775 | 1.7 | 0.4 | | ALUM | 0.41 | 25.8 | 665 | ALUM ALLOY | 4 | 59 | 28.8 |
| 2447-0003 | 24" | ROUND | HINGED | S-C | 23.4 | 594 | 26.5 | 673 | | | 1.5 | 0.25 | | ALUM | 0.41 | 25.8 | 665 | ALUM ALLOY | 4 | 62 | 28.1 |
| 2448-0002 | 24" | ROUND | HINGED | A-K | 24.1 | 612 | 26.1 | 663 | 30.6 | 777 | 1.6 | 0.38 | 0.6 | ALUM | 0.42 | | | ALUM ALLOY | 4 | 66 | 29.9 |
| 2448-0003 | 24" | ROUND | HINGED | S-K | 24.1 | 612 | 26.7 | 678 | | | 2.5 | 0.31 | 1.0 | ALUM | 0.42 | | | ALUM ALLOY | 4 | 65 | 29.5 |
| 2482-0107 | 24" | ROUND | LIFT-OUT | S-C | 23.3 | 592 | 26.5 | 673 | | | 1.5 | 0.25 | | DUCT IRON | 0.36 | 25.8 | 655 | STAIN STEEL | 4 | 110 | 49.9 |
| 2415-0006 | 30" | ROUND | LIFT-OUT | A-C | 30 | 762 | 33.5 | 851 | 37.3 | 947 | 1.4 | 0.31 | | ALUM | 0.41 | 32.5 | 826 | STAIN STEEL | 4 | 81 | 36.7 |
| 2415-0007 | 30" | ROUND | LIFT-OUT | S-C | 30 | 762 | 33.3 | 846 | | | 1.3 | 0.25 | | ALUM | 0.39 | 32.5 | 826 | STAIN STEEL | 4 | 87 | 39.5 |
| 2452-0006 | 30" | ROUND | HINGED | A-C | 30 | 762 | 33.5 | 851 | 37.3 | 947 | 1.7 | 0.4 | | ALUM | 0.46 | 32.5 | 826 | STAIN STEEL | 4 | 82 | 37.2 |
| 2452-0007 | 30" | ROUND | HINGED | S-C | 30 | 762 | 33.3 | 846 | | | 1.5 | 0.25 | | ALUM | 0.49 | 32.5 | 826 | STAIN STEEL | 4 | 118 | 53.5 |
| 2444-0003 | 20" | ROUND | HINGED | S-K | 20 | 508 | 22.6 | 579 | | | 2.5 | 0.31 | 1.0 | ALUM | 0.35 | | | ALUM ALLOY | 4 | 48 | 21.8 |

*DOES NOT INCLUDE HINGE POCKETS

1

FREEMAN
MARINE EQUIPMENT, INC.

CAST HATCHES - OVAL



15" x 24" Oval lift-out,
Aluminum ring



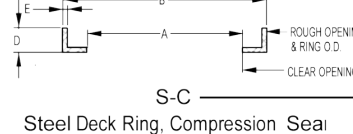
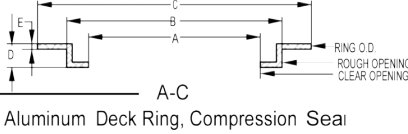
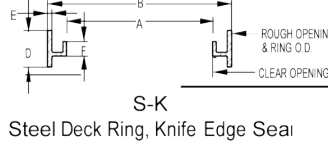
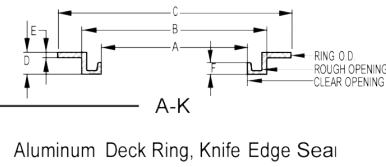
15" x 24" Oval hinged,
Steel ring, Inside view



15" x 24" Oval lift-out,
Steel ring



15" x 24" Oval hinged,
Steel ring



| PART NO | SIZE | SHAPE | STYLE | RING | DIMENSIONS | | | | | | | | | | MECHANISM | ASSEMBLY WEIGHT | | | | | |
|-----------|---------|-------|----------|------|---------------|---------|----------------|---------|-----------|---------|-----|------|-------|-----------|-----------|-----------------|---------|-------------|-----|------|------|
| | | | | | CLEAR OPENING | | ROUGH OPENING* | | OVERALL | | | | COVER | OVERALL | | STD MATERIAL | Qty | LBS | KGS | | |
| | | | | | A (in) | A (mm) | B (in) | B (mm) | C (in) | C (mm) | D | E | F | THICKNESS | | | | | | (in) | (mm) |
| 2431-0002 | 12"x18" | OVAL | LIFT-OUT | A-C | 12x18 | 305x457 | 15x21 | 381x533 | 18.8x24.8 | 478x630 | 1.5 | .31 | | ALUM | 0.28 | 14.1x20.3 | 358x516 | ALUM ALLOY | 4 | 29 | 13.2 |
| 2431-0003 | 12"x18" | OVAL | LIFT-OUT | S-C | 12x18 | 305x457 | 14.8x19.8 | 376x503 | | | 1.3 | 0.25 | | ALUM | 0.29 | 14.1x20.3 | 358x516 | ALUM ALLOY | 4 | 30 | 13.6 |
| 2471-0002 | 12"x18" | OVAL | HINGED | A-C | 12x18 | 305x457 | 15x21 | 381x533 | 18.8x24.8 | 478x630 | 1.5 | 0.31 | | ALUM | 0.28 | 14.1x20.3 | 358x516 | ALUM ALLOY | 4 | 31 | 14.1 |
| 2471-0003 | 2"x18" | OVAL | HINGED | S-C | 12x18 | 305x457 | 14.8x20.6 | 376x503 | | | 1.3 | 0.25 | | ALUM | 0.29 | 14.1x20.3 | 358x516 | ALUM ALLOY | 4 | 31 | 14.1 |
| 2433-0002 | 15"x24" | OVAL | LIFT-OUT | A-C | 14.6x23.4 | 37x594 | 17.6x26.6 | 447x676 | 21.3x30.3 | 541x770 | 1.5 | 0.25 | | ALUM | 0.22 | 16.3x25.9 | 414x658 | ALUM ALLOY | 4 | 35 | 15.9 |
| 2433-0003 | 15"x24" | OVAL | LIFT-OUT | S-C | 14.6x23.4 | 37x594 | 17.6x26.6 | 447x676 | | | 1.3 | 0.25 | | ALUM | 0.22 | 16.3x25.9 | 414x658 | ALUM ALLOY | 4 | 37 | 16.8 |
| 2434-0002 | 15"x24" | OVAL | LIFT-OUT | A-K | 15.2x24.2 | 386x615 | 17.2x26.5 | 437x673 | 21x30 | 533x762 | 1.6 | 0.31 | 0.6 | ALUM | 0.21 | | | ALUM ALLOY | 4 | 35 | 15.9 |
| 2434-0003 | 15"x24" | OVAL | LIFT-OUT | S-K | 15.2x24.2 | 386x615 | 17.7x26.7 | 450x678 | | | 2.5 | 0.31 | 0.25 | ALUM | 0.21 | | | ALUM ALLOY | 4 | 54 | 24.5 |
| 2473-0002 | 15"x24" | OVAL | HINGED | A-C | 14.6x23.5 | 371x597 | 17.6x26.5 | 447x673 | 21.6x30.5 | 549x775 | 1.5 | 0.31 | | ALUM | 0.20 | 16.3x25.9 | 414x658 | ALUM ALLOY | 4 | 37 | 16.8 |
| 2473-0003 | 15"x24" | OVAL | HINGED | S-C | 14.6x23.5 | 371x597 | 17.6x26.5 | 447x673 | | | 1.3 | 0.25 | | ALUM | 0.20 | 16.3x25.9 | 414x658 | ALUM ALLOY | 4 | 38 | 17.2 |
| 2474-0002 | 15"x24" | OVAL | HINGED | A-K | 15.2x24.2 | 388x615 | 17.2x26.2 | 437x665 | 21x30 | 533x762 | 1.6 | 0.31 | 0.6 | ALUM | 0.21 | | | ALUM ALLOY | 4 | 35 | 15.9 |
| 2474-0003 | 15"x24" | OVAL | HINGED | S-K | 15.2x24.2 | 388x615 | 17.7x26.7 | 450x678 | | | 2.5 | 0.31 | 0.25 | ALUM | 0.21 | | | ALUM ALLOY | 4 | 60 | 27.2 |
| 2483-0107 | 15"x24" | OVAL | LIFT-OUT | S-C | 14.8x23.8 | 445x673 | 17.5x26.5 | 445x673 | | | 1.5 | 0.25 | | Duct Iron | 0.38 | 16.9x25.6 | 429x650 | STAIN STEEL | 4 | 85 | 28.6 |
| 2435-0002 | 19"x26" | OVAL | LIFT-OUT | A-K | 19.2x26.2 | 488x665 | 21.2x28.2 | 538x716 | 25x32 | 635x813 | 1.6 | 0.31 | 0.6 | ALUM | 0.29 | | | ALUM ALLOY | 4 | 43 | 19.5 |
| 2435-0003 | 19"x26" | OVAL | LIFT-OUT | S-K | 19.2x26.2 | 488x665 | 21.7x28.7 | 551x729 | | | 2.5 | 0.31 | 0.6 | ALUM | 0.29 | | | ALUM ALLOY | 4 | 61 | 27.7 |
| 2475-0002 | 19"x26" | OVAL | HINGED | A-K | 19.2x26.2 | 488x665 | 21.2x28.2 | 538x716 | 25x32 | 635x813 | 1.6 | 0.31 | 0.6 | ALUM | 0.29 | | | ALUM ALLOY | 4 | 44 | 20 |
| 2475-0003 | 19"x26" | OVAL | HINGED | S-K | 19.2x26.2 | 488x665 | 21.7x28.7 | 551x729 | | | 2.5 | 0.31 | 2.5 | ALUM | 0.29 | | | ALUM ALLOY | 4 | 67 | 30 |

*DOES NOT INCLUDE HINGE POCKETS

CAST HATCHES SQUARE/RECTANGULAR

FREEMAN
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22" Square hinged, Inside view



22" Square hinged,
Steel ring



18" x 24" Rectangular
Hinged, Aluminum ring

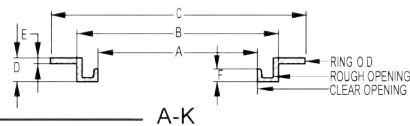


22" Square hinged,
Aluminum ring

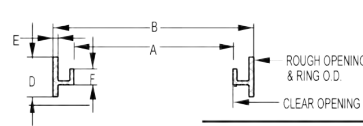


Knife Edge Seal w/
Aluminum Deck Ring

A-K



Aluminum Deck Ring, Knife Edge Seal



Steel Deck Ring, Knife Edge Seal



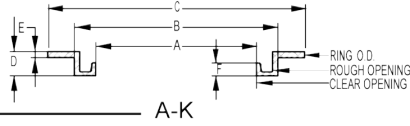
Knife Edge Seal w/
Steel Deck Ring

S-K

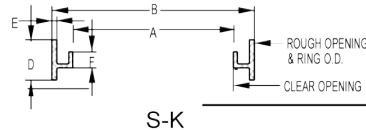
| PART NO | SIZE | SHAPE | STYLE | RING | DIMENSIONS | | | | | | | | | | MECHANISM | | ASSEMBLY WEIGHT | | |
|-----------|---------|--------|----------|------|---------------|---------|----------------|----------|-----------|---------|-----|------|-------|------|--------------|-------------|-----------------|-----|---------|
| | | | | | CLEAR OPENING | | ROUGH OPENING* | | OVERALL | | | | COVER | | STD MATERIAL | DOQ Qty | LBS | KGS | |
| | | | | | A (in) | A (mm) | B (in) | B (mm) | C (in) | C (mm) | D | E | F | MTRL | | | | | THKNESS |
| 2421-0002 | 18"x24" | RCTNGL | LIFT-OUT | A-K | 18x24 | 457x610 | 20.5x26.5 | 521x673 | 24.5x30.5 | 622x775 | 1.6 | .38 | 0.7 | ALUM | 0.22 | ALUM ALLOY | 4 | 36 | 16.3 |
| 2422-0003 | 18"x24" | RCTNGL | LIFT-OUT | S-K | 18x24 | 457x610 | 20.5x26.5 | 2521x673 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.22 | ALUM ALLOY | 4 | 61 | 27.7 |
| 2461-0002 | 18"x24" | RCTNGL | HINGED | A-K | 18x24 | 457x610 | 20.5x26.5 | 2521x673 | 24.5x30.5 | 622x775 | 1.6 | 0.38 | 0.7 | ALUM | 0.22 | ALUM ALLOY | 4 | 36 | 16.3 |
| 2403-0002 | 20"x20" | SQUARE | LIFT-OUT | A-K | 20.3x20.3 | 517x517 | 22.8x22.8 | 579x579 | 26.8x26.8 | 681x681 | 1.6 | 0.38 | 0.7 | ALUM | | ALUM ALLOY | 4 | 43 | 19.5 |
| 2422-0003 | 20"x20" | SQUARE | LIFT-OUT | S-K | 20.3x20.3 | 517x517 | 22.8x22.8 | 579x579 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.20 | ALUM ALLOY | 4 | 74 | 33.6 |
| 2462-0002 | 20"x20" | SQUARE | HINGED | A-K | 20.3x20.3 | 517x517 | 22.8x22.8 | 579x579 | 26.8x26.8 | 681x681 | 1.6 | 0.38 | 0.7 | ALUM | 0.20 | ALUM ALLOY | 4 | 45 | 20.4 |
| 2462-0003 | 20"x20" | SQUARE | HINGED | S-K | 20.3x20.3 | 517x517 | 22.8x22.8 | 579x579 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.20 | ALUM ALLOY | 4 | 76 | 34.5 |
| 2463-0002 | 22"x22" | SQUARE | HINGED | A-K | 22x22 | 559x559 | 24.5x24.5 | 622x622 | 28.5x28.5 | 724x724 | 1.6 | 0.38 | 0.7 | ALUM | 0.20 | ALUM ALLOY | 4 | 46 | 20.9 |
| 2423-0002 | 22"x22" | SQUARE | LIFT-OUT | A-K | 22x22 | 559x559 | 24.5x24.5 | 622x622 | 28.5x28.5 | 724x724 | 1.6 | 0.38 | 0.7 | ALUM | 0.20 | ALUM ALLOY | 4 | 45 | 20.4 |
| 2423-0003 | 22"x22" | SQUARE | LIFT-OUT | S-K | 22x22 | 559x559 | 24.5x24.5 | 622x622 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.20 | ALUM ALLOY | 4 | 92 | 41.7 |
| 2463-0003 | 22"x22" | SQUARE | HINGED | S-K | 22x22 | 559x559 | 24.5x24.5 | 622x622 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.20 | ALUM ALLOY | 4 | 92 | 41.7 |
| 2424-0002 | 24"x24" | SQUARE | LIFT-OUT | A-K | 24.5x24.5 | 622x622 | 27x27 | 686x686 | 31x31 | 787x787 | 1.6 | 0.38 | 0.7 | ALUM | 0.26 | ALUM ALLOY | 4 | 57 | 25.9 |
| 2424-0003 | 24"x24" | SQUARE | LIFT-OUT | S-K | 24.5x24.5 | 622x622 | 27x27 | 686x686 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.28 | ALUM ALLOY | 4 | 96 | 43.5 |
| 2464-0002 | 24"x24" | SQUARE | HINGED | A-K | 24.5x24.5 | 622x622 | 27x27 | 686x686 | 31x31 | 787x787 | 1.6 | 0.38 | 0.7 | ALUM | 0.28 | ALUM ALLOY | 4 | 58 | 26.3 |
| 2464-0003 | 24"x24" | SQUARE | HINGED | S-K | 24.5x24.5 | 622x622 | 27x27 | 686x686 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.28 | ALUM ALLOY | 4 | 97 | 44 |
| 2427-0002 | 27"x27" | SQUARE | LIFT-OUT | A-K | 27.2x27.2 | 690x690 | 29.6x29.6 | 752x752 | 33.6x33.6 | 854x854 | 1.6 | 0.32 | 0.8 | ALUM | 0.35 | ALUM ALLOY | 4 | 63 | 28.6 |
| 2427-0003 | 27"x27" | SQUARE | LIFT-OUT | S-K | 27.2x27.2 | 690x690 | 29.6x29.6 | 752x752 | | | 2.5 | 0.31 | 1.9 | ALUM | 0.35 | ALUM ALLOY | 4 | 85 | 38.6 |
| 2426-0006 | 30"x30" | SQUARE | LIFT-OUT | A-K | 30x30 | 762x762 | 32.5x32.5 | 826x826 | 36.5x36.5 | 927x927 | 1.6 | 0.25 | 0.7 | ALUM | 0.25 | STAIN STEEL | 4 | 75 | 31 |
| 2426-0007 | 30"x30" | SQUARE | LIFT-OUT | S-K | 30x30 | 762x762 | 32.5x32.5 | 826x826 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.25 | STAIN STEEL | 4 | 113 | 51.3 |

FREEMAN
MARINE EQUIPMENT, INC.

CAST HATCHES SQUARE/RECTANGULAR



A-K Aluminum Deck Ring, Knife Edge Seal



S-K Steel Deck Ring, Knife Edge Seal



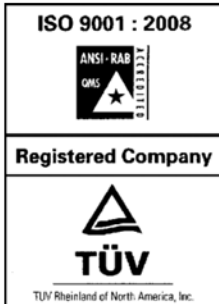
S-K

| PART NO | SIZE | SHAPE | STYLE | RING | DIMENSIONS | | | | | | | | | | COVER | | MECHANISM | | ASSEMBLY WEIGHT | | | | |
|---------------------|---------|--------|----------|------|---------------|---------|----------------|---------|-----------|-----------|-----|------|-----------|--------------|-------|-------------|-----------|------|-----------------|-------------|---|-----|------|
| | | | | | CLEAR OPENING | | ROUGH OPENING* | | OVERALL | | | | THICKNESS | STD MATERIAL | DOGS | LBS | KGS | | | | | | |
| | | | | | A (in) | A (mm) | B (in) | B (mm) | C (in) | C (mm) | D | E | | | | | | F | | | | | |
| 2466-0007 | 30"x30" | SQUARE | HINGED | S-K | 30x30 | 762x762 | 32.5x32.5 | 826x826 | | | | | | | 2.5 | 0.31 | 0.9 | ALUM | 0.25 | STAIN STEEL | 4 | 114 | 51.7 |
| 2429-0002 0001** | 30"x36" | RCTNGL | LIFT-OUT | A-K | 30.5x36.5 | 775x927 | 32.8x38.8 | 834x987 | 36.3x42.3 | 923x1075 | 2.5 | 0.31 | 0.9 | ALUM | 0.30 | ALUM | ALLOY | 8 | 102 | 46.3 | | | |
| 2429-0003 0001** | 30"x36" | RCTNGL | LIFT-OUT | S-K | 30.5x36.5 | 775x927 | 32.8x38.8 | 834x987 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.30 | ALUM | ALLOY | 8 | 119 | 54.0 | | | |
| 2428-0002 | 36"x36" | SQUARE | LIFT-OUT | A-K | 36x36 | 914x914 | 39.3x39.3 | 998x998 | 42x42 | 1067x1067 | 2.5 | 0.31 | 0.9 | ALUM | 0.38 | ALUM | ALLOY | 8 | 104 | 48.0 | | | |
| 2428-0003 | 36"x36" | SQUARE | LIFT-OUT | S-K | 36x36 | 914x914 | 39.3x39.3 | 998x998 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.38 | ALUM | ALLOY | 8 | 134 | 60.8 | | | |
| 2468-0002 | 36"x36" | SQUARE | HINGED | A-K | 36x36 | 914x914 | 39.3x39.3 | 998x998 | 42x42 | 1067x1067 | 2.5 | 0.31 | 0.9 | ALUM | 0.38 | ALUM | ALLOY | 8 | 119 | 54.0 | | | |
| 2468-0003 | 36"x36" | SQUARE | HINGED | S-K | 36x36 | 914x914 | 39.3x39.3 | 998x998 | | | 2.5 | 0.31 | 0.9 | ALUM | 0.38 | ALUM | ALLOY | 8 | 149 | 67.6 | | | |
| 2466-0006 | 30"x30" | SQUARE | HINGED | A-K | 30x30 | 762x762 | 32.5x32.5 | 826x826 | 36.5x36.5 | 927x927 | 1.6 | 0.25 | 0.7 | ALUM | 0.25 | STAIN STEEL | 4 | 78 | 35.4 | | | | |

*DOES NOT INCLUDE HINGE POCKETS
**REQUIRES ESCAPE HANDLE AS STANDARD

Freeman

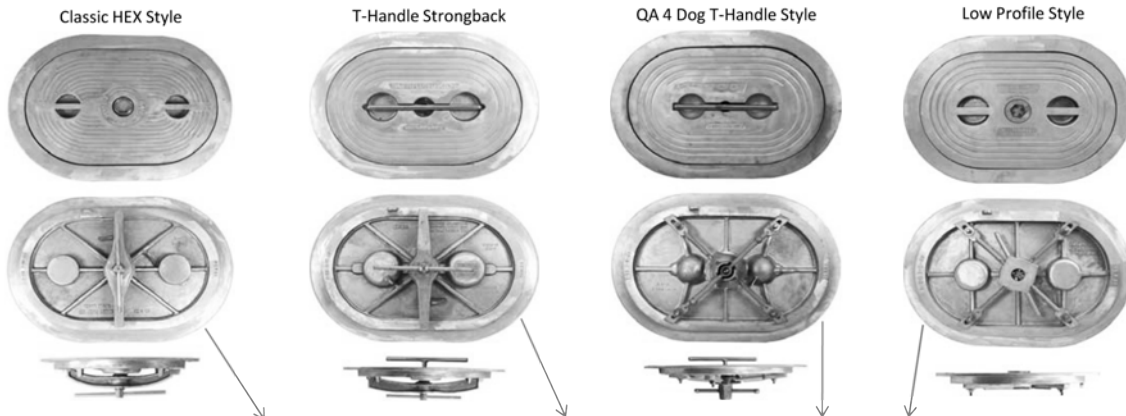
QUALITY & CAPABILITIES



Compliance with ISO 9001:2008
Certified by TÜV Rheinland
Of North America, Inc.

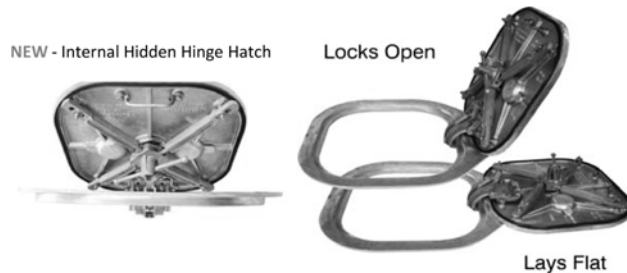
- Serving Commercial, Fishing, Passenger, Supply, Military, and Mega-Yacht Projects
- Comprehensive In-house Capabilities — Design, Engineering, Tooling, Foundry, Machining, Fabrication, Assembly, Paint, Testing, Service, Parts
- Privileged to be Specified by Leading Naval Architects and Builders Worldwide
- International Standards — Recognized by Leading Agencies and Societies

FLUSH HATCH PRODUCT MATRIX



| CLEAR OPENING DIMENSION | LIFT-OUT | HINGED | CENTERBOLT STYLE | | BUILT-IN T-HANDLE STYLE | | | LOW-PROFILE STYLE | DECK RING OPTIONS | | | |
|-------------------------------|----------|-----------------|---------------------|-------------|----------------------------|----|---------------|--------------------------------------|----------------------|----------|-----|--|
| | | | CLASSIC HEX | | STRONGBACK | | QA 4-DOG | | | MATERIAL | | |
| | | | AL | ST | AL | ST | AL | AL | /A | /S | /SS | |
| OVALS | | | | | | | | | | | | |
| 15 X 24 | L-O | | BFHO15X24A | BFHO15X24S | BFHOTH15X24A | | BFHQTH15X24A | BFHLP15X24A | /A | /S | /SS | |
| 15 X 24 | | HNGD | BFHHO15X24A | BFHHO15X24S | BFHHOTH15X24A | | | | /A | /S | /SS | |
| 15 X 24 | | HIDDEN HINGE | | | | | BFHHQTH15X24A | < NEW! | /A | /S | | |
| ROUNDS | | | | | | | | | | | | |
| 8 | L-O | | | | BFHRTH8A | | | | /A | /S | /SS | |
| 14 | L-O | | BFHR14A | BFHR14S | | | | | /A | /S | /SS | |
| 16 | L-O | | BFHR16A | BFHR16S | | | | | /A | /S | /SS | |
| 18 | L-O | | BFHR18A | BFHR18S | | | | | /A | /S | /SS | |
| 20 | L-O | | BFHR20A | BFHR20S | BFHRTH20A | | BFHQTH20A | BFHLP20A <small>(PLANNED)</small> | /A | /S | /SS | |
| 20 | | HIDDEN HINGE | | | | | BFHHQTH20A | < NEW! | /A | /S | | |
| 22 | | HNGD | BFHHR22A | BFHHR22S | | | | | /A | /S | | |
| 24 | L-O | | BFHR24A | BFHR24S | | | | | /A | /S | /SS | |
| SQUARES | | | | | | | | | | | | |
| 24 X 24 | L-O | | | | BFHSQ24X24A | | | | /A | /S | /SS | |
| 24 X 24 | L-O | | | | | | BFHQTH24X24A | < NEW! 4-DOG | /A | /S | /SS | |
| 24 X 24 | | HNGD | | | BFHHSQ24X24A | | | | /A | /S | | |
| 24 X 24 | | HIDDEN HINGE | | | | | BFHHQTH24X24A | < NEW! | /A | /S | | |

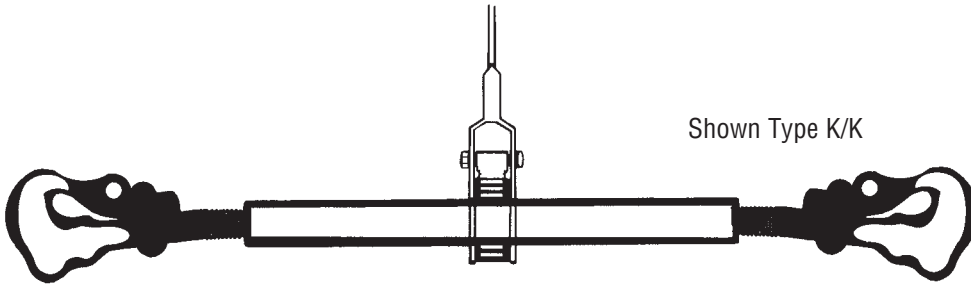
COAMINGS available standard heights: 6" 12" 18" 24"



1

RATCHETS

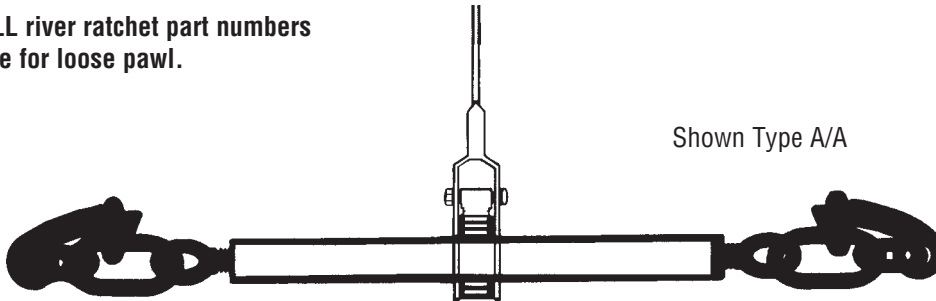
1



Shown Type K/K

| SCREW DIAMETER | STOCK NUMBERS | | |
|----------------|---------------|-------|-------|
| | BARREL LENGTH | | |
| | 24" | 30" | 36" |
| 1-3/8" | T8557 | T8567 | T8577 |
| 1-3/4" | T8657 | T8667 | |

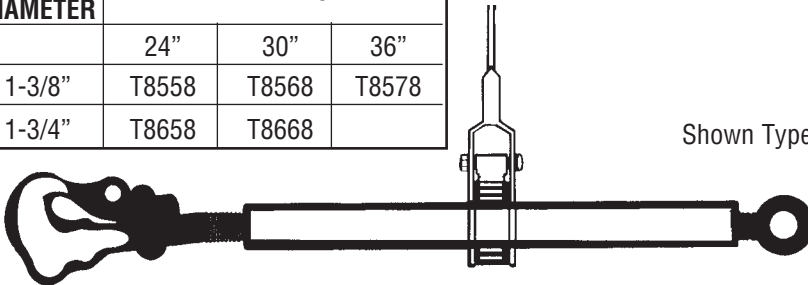
ALL river ratchet part numbers are for loose pawl.



Shown Type A/A

| SCREW DIAMETER | STOCK NUMBERS | | |
|----------------|---------------|-------|-------|
| | BARREL LENGTH | | |
| | 24" | 30" | 36" |
| 1-3/8" | T8550 | T8560 | T8570 |
| 1-3/4" | T8650 | T8660 | T8670 |
| 2" | T8850 | T8860 | T8870 |

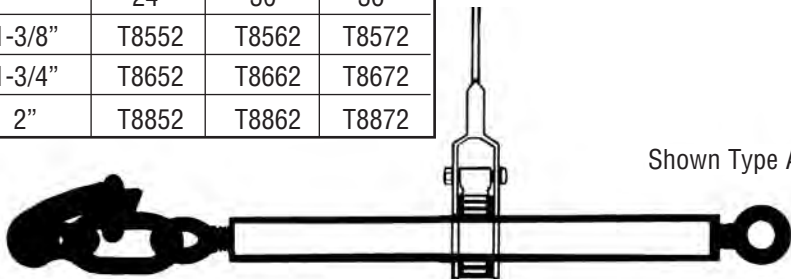
| SCREW DIAMETER | STOCK NUMBERS | | |
|----------------|---------------|-------|-------|
| | BARREL LENGTH | | |
| | 24" | 30" | 36" |
| 1-3/8" | T8558 | T8568 | T8578 |
| 1-3/4" | T8658 | T8668 | |



Shown Type K/F

| SCREW DIAMETER | STOCK NUMBERS | | |
|----------------|---------------|-------|-------|
| | BARREL LENGTH | | |
| | 24" | 30" | 36" |
| 1-3/8" | T7710 | T7714 | T7715 |
| 1-3/4" | T7808 | T7809 | T7810 |

| SCREW DIAMETER | STOCK NUMBERS | | |
|----------------|---------------|-------|-------|
| | BARREL LENGTH | | |
| | 24" | 30" | 36" |
| 1-3/8" | T8552 | T8562 | T8572 |
| 1-3/4" | T8652 | T8662 | T8672 |
| 2" | T8852 | T8862 | T8872 |



Shown Type A/F

| SCREW DIAMETER | STOCK NUMBERS | | |
|----------------|---------------|-------|-------|
| | BARREL LENGTH | | |
| | 24" | 30" | 36" |
| 1-3/8" | T7716 | T7717 | T7718 |
| 1-3/4" | T7811 | T7812 | T7813 |
| 2" | T7902 | T7903 | T7904 |

Other Length/Size Combinations Available Upon Request



SPUR GEAR HAND WINCHES

Model M4042PBSS



Wire rope assemblies sold separately

Model M4312



Up to 2000 lb. capacity

- **Machine Cut Spur Gears** for accurate and long lasting service.
- **Automatic Brake Models** provide positive load control for lifting and lowering operations. Brake models have PB suffix.
- **Corrosion Resistant** zinc and iridescent dichromate plated finish protects against corrosion in harsh environments.
- **Quick Disconnect Anchor** for quickly attaching or removing wire rope equipped with a swaged ball fitting.
- **Bronze and Radial Ball Bearings** provide smooth and efficient operation.
- **Large Diameter Drums** minimize wear to extend wire rope life.
- **Gear Covers** protect gears and help prevent injuries.
- **Stainless Steel Models Available** for harsh environments, see models with SS suffix. Stainless steel models are electro-polished for added corrosion resistance.
- **Two-year Limited Warranty**

Spur Gear Hand Winches – Configurations and Performance Characteristics

| MODEL NUMBER | DESCRIPTION | LOAD RATING (LB.) | | | WIRE ROPE DIA. (IN) | DRUM CAPACITY (FT) ¹ | | | SINGLE GEAR RATIO | DOUBLE GEAR RATIO | FORCE ² TO LIFT 1000 LB. | APPROX. SHIP WT. (LB.) |
|--------------|---|-------------------|----------|-----------|--------------------------|---------------------------------|-----------------|------------------|-------------------|-------------------|-------------------------------------|------------------------|
| | | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | MID DRUM | FULL DRUM | | | | |
| M401 | 500 lb. – marine duty (for pulling only) | 500 | 400 | 300 | 1/8 3/16 | 7 4 | 60 27 | 130 60 | — | — | — | 8 |
| M4022 | 1000 lb. – marine duty (for pulling only) | 1000 | 700 | 500 | 1/8 3/16 | 4 3 | 52 26 | 130 57 | 2.85:1 | — | 40 lb. | 12 |
| M4022PB | 1000 lb. – marine duty with brake (for lifting) | 1000 | 700 | 500 | 1/8 3/16 | 4 3 | 52 26 | 130 57 | 2.85:1 | — | 41 lb. | 17 |
| M4032 | 1000 lb. – marine duty (for pulling only) | 1000 | 700 | 500 | 1/8 3/16 | 11 7 | 110 51 | 250 110 | 2.85:1 | — | 40 lb. | 14 |
| M4032PB | 1000 lb. – marine duty with brake (for lifting) | 1000 | 700 | 500 | 1/8 3/16 | 11 7 | 110 51 | 250 110 | 2.85:1 | — | 41 lb. | 18 |
| M4042PBSS | 1000 lb. – stainless steel with brake (for lifting) | 1000 | 800 | 600 | 1/8 3/16 1/4 | 12 8 5 | 110 48 27 | 240 110 59 | 3.83:1 | — | 46 lb. (single gear) | 24 |
| M4312 | 2000 lb. – marine duty (for pulling only) | 2000 | 1600 | 1200 | 3/16 1/4 5/16 4 | 8 5 17 | 48 27 39 | 110 59 | 3.83:1 | 14.7:1 | 20 lb. (double gear) | 23 |
| M4312PB | 2000 lb. – marine duty with brake (for lifting) | 2000 | 1600 | 1200 | 3/16 1/4 5/16 4 | 8 5 17 | 48 27 39 | 110 59 | — | 14.7:1 | 17 lb. (double gear) | 28 |
| M4312PBSS | 2000 lb. – stainless steel with brake (for lifting) | 2000 | 1600 | 1200 | 3/16 1/4 5/16 4 | 8 5 17 | 48 27 39 | 110 59 | — | 14.7:1 | 17 lb. (double gear) | 28 |
| M4412 | 2000 lb. – marine duty (for pulling only) | 2000 | 1600 | 1200 | 3/16 1/4 5/16 | 18 14 11 | 97 52 35 | 210 120 77 | 3.83:1 | 14.7:1 | 20 lb. (double gear) | 25 |
| M4412PB | 2000 lb. – marine duty with brake (for lifting) | 2000 | 1600 | 1200 | 3/16 1/4 5/16 | 18 14 11 | 97 52 35 | 210 120 77 | — | 14.7:1 | 17 lb. (double gear) | 30 |

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Approximate handle force required to lift 1000 lb. with an empty drum, and maximum handle length.

³ Please contact Timco for firm fixed price and delivery.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SPUR GEAR HAND WINCHES DOUBLE REDUCTION

Model M492



Model M452B shown with Disc Brake and Wire Rope



Up to 10,000 lb. capacity

- **Machine Cut Spur Gears** for accurate and long lasting service.
- **Automatic Brake Models** provide positive load control for lifting and lowering operations. Brake models have B suffix
- **Corrosion Resistant** durable paint finish combined with zinc and iridescent dichromate plating protects against corrosion.
- **Bronze and Radial Ball Bearings** provide smooth and efficient operation.
- **Large Diameter Drums** minimize wear to extend wire rope life.
- **Spring Loaded Ratchets** for positive engagement with gear.
- **Steel Gear Covers** protect gears and help prevent injuries.
- **Handles Adjust** in length to change force required to move load.
- **Two-year Limited Warranty**

Spur Gear Hand Winches – Configurations and Performance Characteristics

| MODEL NUMBER | DESCRIPTION | LOAD RATING (LB.) | | | WIRE ROPE DIA. (IN) | DRUM CAPACITY (FT) ¹ | | | SINGLE GEAR RATIO | DOUBLE GEAR RATIO | FORCE ² TO LIFT 1000 LB. | APPROX. SHIP WT. (LB.) |
|--------------|--|-------------------|----------|-----------|---------------------|---------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------------------------|------------------------|
| | | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | MID DRUM | FULL DRUM | | | | |
| M452 | 4000 lb. – marine duty (for pulling only) | 4000 | 3300 | 2500 | 1/4 5/16 3/8 | 23 18 14 | 130 89 64 | 300 200 140 | 4.42:1 | 19.54:1 | 10 lb. (double gear) | 83 |
| M452B | 4000 lb. – marine duty with brake (for lifting) | 4000 | 3300 | 2500 | 1/4 5/16 3/8 | 23 18 14 | 130 89 64 | 300 200 140 | — | 19.54:1 | 10 lb. (double gear) | 91 |
| M452B-A | 4000 lb. – marine duty with brake (for lifting) 4 inch drum width | 4000 | 3300 | 2500 | 1/4 5/16 3/8 | 13 9 7 | 83 56 40 | 190 120 89 | — | 19.54:1 | 10 lb. (double gear) | 83 |
| M492 | 10,000 lb. – marine duty (for pulling only) | 10,000 | 7400 | 5400 | 5/16 3/8 1/2 | 27 21 15 | 240 170 100 | 540 390 230 | 5.00:1 | 25.00:1 | 8 lb. (double gear) | 166 |
| M492B | 10,000 lb. – marine duty with brake (for lifting) | 10,000 | 7400 | 5400 | 5/16 3/8 1/2 | 27 21 15 | 240 170 100 | 540 390 230 | — | 25.00:1 | 8 lb. (double gear) | 173 |
| M492-12 | 10,000 lb. – marine duty (for pulling only) 12 inch drum width | 10,000 | 7400 | 5400 | 5/16 3/8 1/2 | 46 37 27 | 380 270 160 | 850 610 360 | 5.00:1 | 25.00:1 | 8 lb. (double gear) | 175 |
| M492B-12 | 10,000 lb. – marine duty with brake (for lifting) 12 inch drum width | 10,000 | 7400 | 5400 | 5/16 3/8 1/2 | 46 37 27 | 380 270 160 | 850 610 360 | — | 25.00:1 | 8 lb. (double gear) | 190 |
| MB451 | disc brake only for M452 (for lifting) | | | | | | | | | | | 13 |
| MB491 | disc brake only for M492 and M492-12 (for lifting) | | | | | | | | | | | 15 |
| HW452 | hand wheel only for M452 (for pulling only) | | | | | | | | | | | 19 |
| HW492 | hand wheel only for M492 and M492-12 (for pulling only) | | | | | | | | | | | 20 |

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Approximate handle force required to lift 1000 lb. with an empty drum, and maximum handle length.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



WORM GEAR POWER WINCHES

Up to 2000 lb. capacity

- **115 Volt Single Phase Electric Motor** includes power cord with grounded plug and a momentary contact-type push button pendant control on a control cord.
- **Machine Cut Worm Gears** provide accurate operation and long lasting service.
- **Enclosed Oil Bath** provides continuous lubrication of gears to minimize wear. Oil seals keep oil in and dirt out.
- **Internal Mechanical Brake** provides positive load control for lifting and lowering operations.
- **Ball Bearings** and self-aligning bronze bearings provide smooth and efficient operation.
- **Pressure Plate** on series 4WP2T8 only, applies pressure to drum and wire rope to help maintain uniform winding.
- **Dual Function Cable Anchor** for quick disconnect of wire rope with swaged ball fitting, or recessed cable anchor with set screw for wire rope with unfinished end.
- **Mounting Options** include floor, wall, or ceiling.
- **Two-year Limited Warranty**



Model 4WP2T8-2000-8

Wire rope assemblies sold separately

- **Cast Aluminum** construction, for lightweight strength.
- **Corrosion Resistant** durable paint finish protects against corrosion in harsh environments.
- **Large Diameter Drums** minimize wear to the wire rope and help extend its life.
- **Clutch Model** allows operator to manually disengage the drum to rapidly unwind wire rope. **Clutch models do not include pressure plates.**

Series 4WP2 and 4WP2T8 – Performance Characteristics

| SERIES | DESCRIPTION | MOTOR HP | AMPS FULL LOAD | LOAD RATING (LB) | | | WIRE ROPE DIA. (IN) | LINE SPEED (FPM) | | DRUM CAPACITY (FT) ¹ | | | APPROX. SHIP WT. (LB.) |
|----------------------------|---|----------|----------------|------------------|----------|-----------|---------------------|------------------|-----------|---------------------------------|----------|-----------|------------------------|
| | | | | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | FULL DRUM | 1ST LAYER | MID DRUM | FULL DRUM | |
| 4WP2 ² | includes controls | 1.3 | 16 | 2000 | 1500 | 1200 | 1/4 | 8 | 13 | 11 | 35 | 77 | 85 |
| 4WP2T8-2000-8 ⁴ | includes controls | 1.3 | 16 | 2000 | 1200 | 800 | 1/4 | 8 | 19 | 19 | 130 | 280 | 101 |
| | ATLAS winch – 8" drum – for pulling or lifting | | | | | | 5/16 | 8 | 19 | 15 | 85 | 190 | |
| 4WP2TC-2000-8 ⁴ | includes controls clutch model – 5.5" drum – for horizontal pulling only | 1.3 | 16 | 2000 | 1200 | 800 | 1/4 | 8 | 19 | 12 | 87 | 190 | 106 |

Motor Options – standard motor is 115/1/60 VAC TEFC, for other configurations add motor code to model number when ordering.

Example: 4WP2T8-2000-8-PN (pneumatic winch)

- A⁵ 115 volt 1 phase – no controls or power cord – TENV
- B⁵ 230 volt 1 phase – no controls or power cord – TEFC
- D⁵ 230 volt 3 phase – no controls or power cord – TEFC
- E⁵ 460 volt 3 phase – no controls or power cord – TEFC
- F all other voltages or hertz
- PN 8-vane air motor w/controls (mounted)

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Tension in wire rope will also affect drum capacity.

² Model 4WP2, 115 VAC motor includes 8 ft power cord with grounded plug, and push button pendant control on 6 ft cord.

³ Please contact TIMCO for firm fixed price and delivery.

⁴ For 4WP2T8 & 4WP2TC, 115 VAC motor includes 16 ft power cord with grounded plug, and push button pendant control on 16 ft cord.

⁵ Controls are sold separately for all non-standard electric motors (A, B, D, and E).

Options and Accessories

| MODEL | DESCRIPTION | APPROX. SHIP WT. |
|---------------------|--|------------------|
| EL1CS ⁷ | NEMA 1 control switch – mounted and wired | 3 lb. |
| EL1CSW ⁷ | NEMA 4 watertight control switch – mounted and wired | 7 lb. |
| TPL-4WP2 | Two Part Line Kit – not available for 4WP2 Series | 4 lb. |

⁶ Please contact TIMCO for firm fixed price and delivery.

⁷ Controls for 115 volt, single phase, 60 cycle include an 8 ft power cord with grounded plug.

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WORM GEAR POWER WINCHES



Options and Accessories

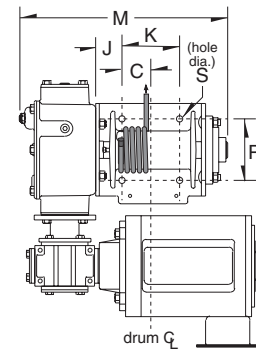
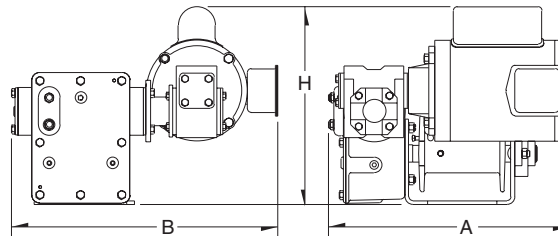
- **Emergency Hand Crank** for manual operation in case of power failure. Does not include handle.
- **Two Part Line Kit** to convert to double line rigging. **Not available for 4WP2 Series.**
- **Rotary Limit Switches** for secondary shut-off to limit load travel in one or two directions. **Not available on clutch models.**
- **Special Motors and Controls** including severe duty and explosion proof.
- **Special Finishes** for hazardous environments.
- **Torque Limiters** as part of the motor controls on electric models.

Important:

It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals and regulations. Be sure to read the Owner's Manual supplied with the equipment before operating it.

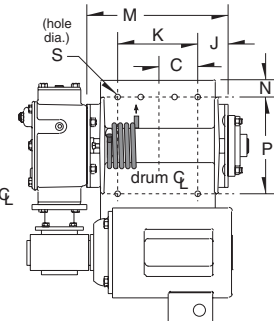
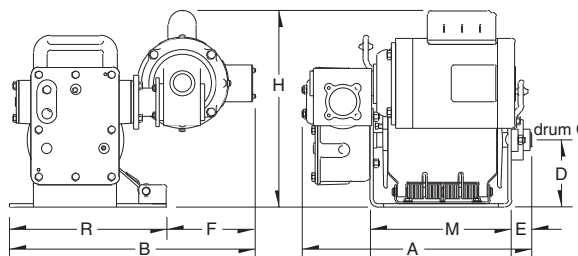
Series 4WP2

Install wire rope correctly as shown, or brake will not operate properly.



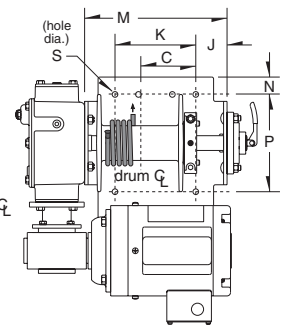
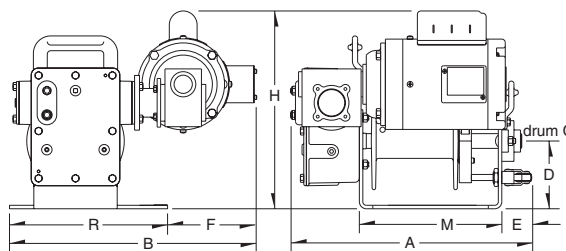
Series 4WP2T8

Install wire rope correctly as shown, or brake will not operate properly.



Series 4WP2TC clutch models

Install wire rope correctly as shown, or brake will not operate properly.

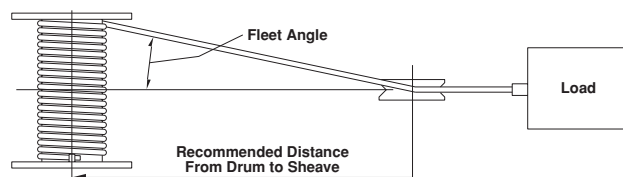


Series 4WP2 and 4WP2T8 – Dimensions (in)

| MODEL NUMBER | A ¹ | B ¹ | C | D | E | F | H ¹ | J | K | M | N | P | R | S (HOLE DIA.) |
|---------------|----------------|----------------|------|------|------|------|----------------|------|------|-------|------|------|-------|---------------|
| 4WP2 | 15.63 | 17.28 | 1.72 | – | – | – | 12.84 | 1.72 | 3.75 | 13.50 | – | 4.00 | – | .41 |
| 4WP2T8-2000-8 | 16.62 | 17.80 | 2.75 | 4.88 | 1.44 | 6.43 | 14.25 | 2.25 | 5.81 | 10.25 | 1.25 | 7.00 | 11.38 | .41 |
| 4WP2TC-2000-8 | 17.34 | 17.80 | 4.02 | 4.88 | 2.16 | 6.43 | 14.25 | 2.25 | 5.81 | 10.25 | 1.25 | 7.00 | 11.38 | .41 |

Dimensions are for reference only and subject to change without notice.

¹ Dimensions A, B and H may vary with motor selection.



Series 4WP – Drum Dimensions

| MODEL EXTENSION | DRUM DIAMETER | FLANGE DIAMETER | DRUM WIDTH | FLEET ANGLE DISTANCE ⁴ |
|-----------------|---------------|-----------------|------------|-----------------------------------|
| 4WP2 | 2.50 in. | 5.00 in. | 5.00 in. | 8 ft. |
| 4WP2T8-2000-8 | 2.50 in. | 7.00 in. | 8.00 in. | 13 ft. |
| 4WP2TC-2000-8 | 2.50 in. | 7.00 in. | 5.50 in. | 9 ft. |

Dimensions are for reference only and subject to change without notice.

⁴ Recommended minimum distance between drum and lead sheave for smooth drum.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



HIGH SPEED WORM GEAR POWER WINCHES

Up to 1500 lb. capacity

- **Direct Drive Design** delivers high speed operation in both directions, even under full load.
- **Machine Cut Bronze Worm Gears** provide accurate operation and long lasting service.
- **Enclosed Oil Bath** provides continuous lubrication of gears to minimize wear. Oil seals keep oil in and dirt out.
- **Internal Mechanical Brake** provides positive load control for lifting and lowering operations.
- **Ball Bearings** and self-aligning bronze bearings provide smooth and efficient operation.
- **Pressure Plate** applies pressure to drum and wire rope to help maintain uniform winding. Not available on clutch models.
- **Dual Function Cable Anchor** for quick disconnect of wire rope with swaged ball fitting, or recessed cable anchor with set screw for wire rope with unfinished end.
- **Mounting Options** include floor, wall or ceiling.
- **Two-year Limited Warranty**
- **Cast Aluminum** construction, for lightweight strength.
- **Corrosion Resistant** durable paint finish protects against corrosion in harsh environments.



Model 4WP2D8-1500-40

Wire rope assemblies and controls sold separately

- **Large Diameter Drums** minimize wear to the wire rope and help extend its life.
- **Clutch Model** allows operator to manually disengage the drum to rapidly unwind wire rope. **Clutch models do not include pressure plates.**

Series 4WP2D – Performance Characteristic

When ordering, please indicate Model Number and Extensions
 Examples: 4WP2D8-800-26-A (without clutch); 4WP2DC-800-40-A (with clutch)

| MODEL NUMBER | MODEL NUMBER EXTENSIONS | | | MOTOR HP | LOAD RATING(LB.) | | | WIRE ROPE DIA.(IN.) | LINE SPEED (FPM) | | DRUM CAPACITY(FT.) ¹ APPROX. ² | | | |
|---|-------------------------|------------|-------------|----------|------------------|----------|-----------|---------------------|------------------|-----------|--|----------|-----------|---------------|
| | LOAD RATING | LINE SPEED | MOTOR CODES | | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | FULL DRUM | 1ST LAYER | MID DRUM | FULL DRUM | SHIP WT.(LB.) |
| High Speed Atlas winches for lifting or pulling | | | | | | | | | | | | | | |
| 4WP2D8 | 800 | 26 | A,B,D,E | 1 | 800 | 460 | 330 | 1/4 | 26 | 65 | 19 | 130 | 280 | 100 |
| 4WP2D8 | 800 | 40 | D,E | 1.5 | 800 | 460 | 330 | 1/4 | 40 | 97 | 19 | 130 | 280 | 100 |
| 4WP2D8 | 1500 | 26 | D,E | 2 | 1500 | 900 | 600 | 1/4 | 26 | 65 | 19 | 130 | 280 | 100 |
| 4WP2D8 | 1500 | 40 | D,E | 3 | 1500 | 900 | 600 | 1/4 | 40 | 97 | 19 | 130 | 280 | 100 |
| High Speed Clutch Models for HORIZONTAL PULLING ONLY | | | | | | | | | | | | | | |
| 4WP2DC | 800 | 26 | A,B,D,E | 1 | 800 | 460 | 300 | 1/4 | 26 | 65 | 12 | 87 | 190 | 100 |
| 4WP2DC | 800 | 40 | D,E | 1.5 | 800 | 460 | 300 | 1/4 | 40 | 97 | 12 | 87 | 190 | 100 |
| 4WP2DC | 1500 | 26 | D,E | 2 | 1500 | 900 | 600 | 1/4 | 26 | 65 | 12 | 87 | 190 | 100 |
| 4WP2DC | 1500 | 40 | D,E | 3 | 1500 | 900 | 600 | 1/4 | 40 | 97 | 12 | 87 | 190 | 100 |

¹ Actual drum capacities 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Weight may vary with motor.

Options and Accessories

| MODEL | DESCRIPTION | 115/1/60 ⁵ | 230/1/60 | 230/3/60 | 460/3/60 |
|----------|---------------------|-----------------------|----------|----------|-----------|
| EL1CS | NEMA 1 | to 1.5 hp | to 2 hp | to 3 hp | to 3 hp |
| EL2CS | NEMA 1 | to 1.5 hp | to 3 hp | to 5 hp | to 7.5 hp |
| EL1CSW | NEMA 4 – watertight | to 1.5 hp | to 2 hp | to 3 hp | to 3 hp |
| EL2CSW | NEMA 4 – watertight | to 1.5 hp | to 3 hp | to 5 hp | to 7.5 hp |
| TPL-4WP2 | Two Part Line Kit | | | | |

⁵ Controls for 115V single phase motors up to 1 hp, include an 8 ft power cord with grounded plug.

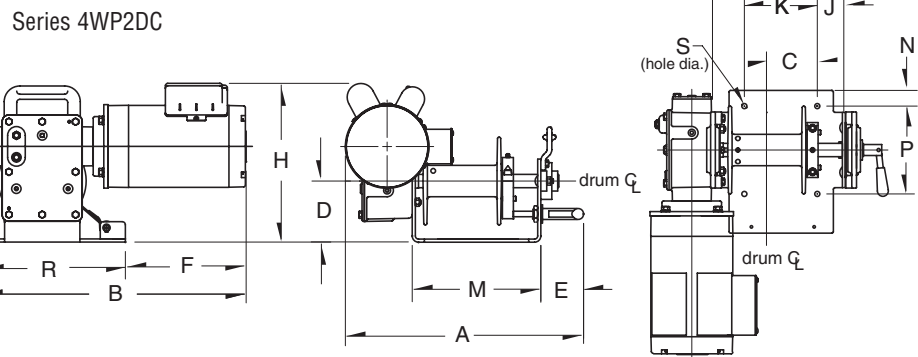
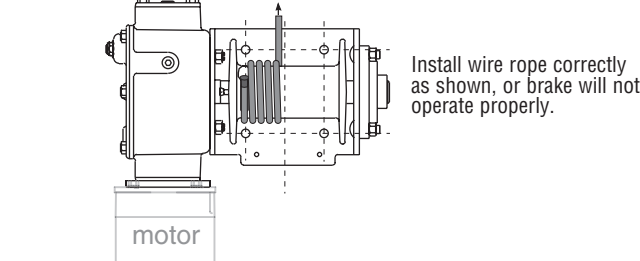
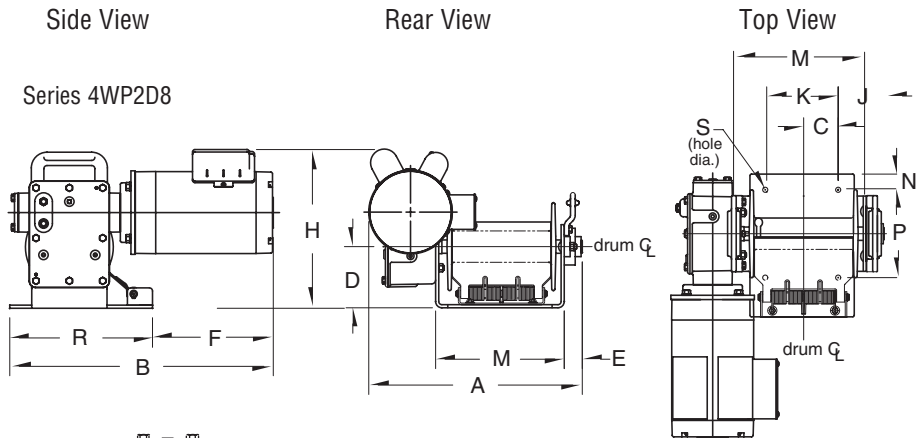
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HIGH SPEED WORM GEAR POWER WINCHES

Options and Accessories

- **Emergency Hand Crank** for manual operation in case of power failure. Does not include handle.
- **Two Part Line Kit** to convert to double line rigging.
- **Rotary Limit Switches** for secondary shut-off to limit load travel in one or two directions. **Not available on clutch models.**
- **Special Motors and Controls** including severe duty and explosion proof.
- **Special Finishes** for hazardous environments.
- **Torque Limiters** as part of the motor controls on electric models.

Important:
It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals and regulations. Be sure to read the Owner's Manual supplied with the equipment before operating it.

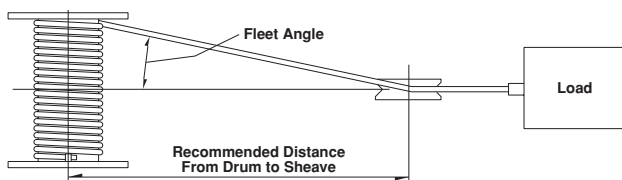


Series 4WP2D – Dimensions (in)

| SERIES | A ¹ | B ¹ | C | D | E | F | H ¹ | J | K | M | N | P | R | S (HOLE DIA.) |
|--------|----------------|----------------|------|------|------|------|----------------|------|------|-------|------|------|-------|---------------|
| 4WP2D8 | 17.50 | 21.00 | 2.75 | 5.00 | 1.50 | 9.50 | 12.75 | 2.25 | 5.81 | 10.25 | 1.25 | 7.00 | 11.50 | .41 |
| 4WP2DC | 19.00 | 21.00 | 4.00 | 5.00 | 3.50 | 9.50 | 12.75 | 2.25 | 5.81 | 10.25 | 1.25 | 7.00 | 11.50 | .41 |

Dimensions are for reference only and subject to change without notice.

¹ Dimensions A, B and H may vary with motor selection.



Series 4WP2D – Drum Dimensions

| MODEL | DRUM DIAMETER | FLANGE DIAMETER | DRUM WIDTH | FLEET ANGLE DISTANCE ⁴ |
|-------|---------------|-----------------|------------|-----------------------------------|
| 4WPD8 | 2.50 in. | 7.00 in. | 8.00 in. | 13 ft. |
| 4WPD8 | 2.50 in. | 7.00 in. | 5.50 in. | 9 ft. |

Dimensions are for reference only and subject to change without notice.

⁴ Recommended minimum distance between drum and lead sheave for smooth drum.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HELICAL/WORM GEAR POWER WINCHES

Series 477

Up to 2000 lb. capacity

- **Machine Cut Gears** for accurate and long lasting service.
- **Enclosed Oil Bath** provides continuous lubrication of gears to minimize wear. Oil seals keep oil in and dirt out.
- **Internal Mechanical Brake** for positive load control.
- **Cast Aluminum** construction for lightweight strength, with durable paint finish to resist corrosion.
- **Ball Bearings** ensure smooth and efficient operation.
- **Series 4777** is designed with a 4 inch wide drum for tight fleet angle installations.
- **Accessory Options** include limit switches, cable pressure plates, torque limiting controls and manual overrides.
- **Large Diameter Drums** minimize wear to the wire rope and help extend its life.
- **Mounting Options** include floor, wall or ceiling.
- **Two-year Limited Warranty**

Model 4771 shown with wire rope



2

Series 477 – Configurations and Performance Characteristics

| MODEL NUMBER | MOTOR DESCRIPTION | AMPS | | LOAD RATING (LB.) | | | WIRE ROPE DIA. (IN) | LINE SPEED (FPM) | | DRUM CAPACITY (FT) ¹ | | | APPROX. SHIP WT. (LB.) |
|-------------------------|----------------------------------|----------|-----------|-------------------|----------|-----------|---------------------|------------------|-----------|---------------------------------|----------|-----------|------------------------|
| | | MOTOR HP | FULL LOAD | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | FULL DRUM | 1ST LAYER | MID DRUM | FULL DRUM | |
| 4771 ² | 115/1/60 VAC – 6 ft pendant | 1.2 | 16 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 88 |
| 4771AC-1PH | 115/1/60 VAC – less controls | 1.2 | 16 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 87 |
| 4771AC-1PH2 | 115/230/1/60 VAC – less controls | 1.5 | 16/8 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 115 |
| 4771AC-3PH ⁴ | 230/460/3/60 VAC – less controls | 1.5 | 5/2.5 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 111 |
| 4771DC ⁵ | 12 VDC – with 10 ft pendant | 1.0 | 100 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 105 |
| 4771PN ^{5,6} | pneumatic – less controls | 1.2 | | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 70 |
| 4771HY ^{5,6} | hydraulic – less controls | 2.3 | | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 13 | 40 | 90 | 72 |
| 4777 ² | 115/1/60 VAC – 6 ft pendant | 1.2 | 16 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 7 | 27 | 60 | 93 |
| 4777DC ⁶ | 12 VDC – with 10 ft pendant | 1.0 | 100 | 2000 | 1500 | 1200 | 5/16 | 13 | 22 | 7 | 27 | 60 | 105 |

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Tension in wire rope will also affect drum capacity.

² Motor includes an 8 ft. power cord with grounded plug, and a push button pendant control on 6 ft. cord.

³ Please contact Timco for firm fixed price and delivery.

⁴ For Model 4771AC-3PH, please specify voltage when ordering.

⁵ For pneumatic, hydraulic, and DC models, line speed is based on rated load, actual line speed varies with load weight and power supply.

⁶ For Model 4771PN, ratings are for 80 cfm at 100 psi. For Model 4771HY, ratings are for 4 gpm at 1000 psi.

Notes: Custom controls are available including wireless remote control, variable speed control, electronic overload and enclosures for special environments.

Series 477 – Controls

| MODEL | DESCRIPTION | APPROX. SHIP WT. |
|---------------------|--|------------------|
| EL1CS ⁸ | NEMA 1 control switch – mounted and wired | 3 lb. |
| EL1CSW ⁸ | NEMA 4 watertight control switch – mounted and wired | 7 lb. |
| 477PN-CNTRL | pneumatic control valve (not mounted or plumbed, no hoses) | 6 lb. |
| 477PN-HS6 | 6 ft hoses for pneumatic controls (not plumbed) | 4 lb. |
| 477HY-CNTRL | hydraulic control valve (not mounted or plumbed, no hoses) | 5 lb. |
| 477HY-HS6 | 6 ft hoses for hydraulic controls (not plumbed) | 4 lb. |

⁷ Please contact Timco for firm fixed price and delivery.

⁸ Controls for 115 volt, single phase, 60 cycle include an 8 ft. power cord with grounded plug.

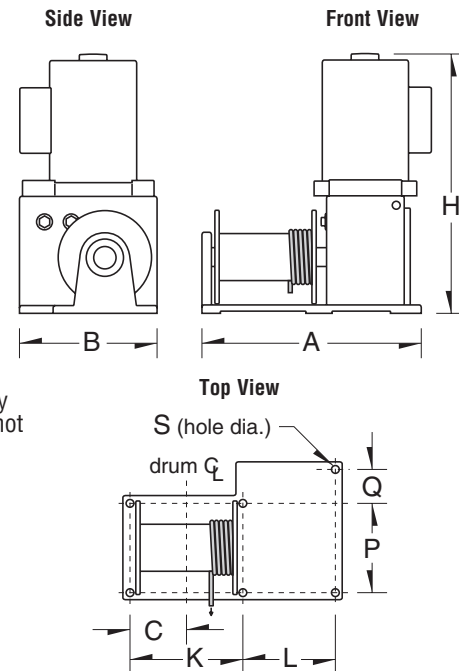
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HELICAL/WORM GEAR POWER WINCHES

Options and Accessories

- **Emergency Hand Crank** for manual operation in case of power failure. Does not include handle.
- **Rotary Limit Switches** for secondary shut-off to limit load travel in one or two directions.
- **Special Motors and Controls** including severe duty and explosion proof.
- **Special Finishes** for hazardous environments.
- **Torque Limiters** as part of the motor controls on electric models.

Install wire rope correctly as shown, or brake will not operate properly.



Important:

It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals, and regulations. Be sure to read the Owner's Manual supplied with the equipment before operating it.

Series 477 – Winch Dimensions (in)

| MODEL NUMBER | A | B | C | H | K | L | P | Q | S (HOLE DIA.) |
|--------------|-------|------|------|-------|------|------|------|------|---------------|
| 4771 | 14.38 | 8.86 | 3.55 | 17.45 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4771AC-1PH | 14.38 | 8.86 | 3.55 | 22.00 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4771AC-1PH2 | 14.38 | 8.86 | 3.55 | 21.00 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4771AC-3PH | 14.38 | 8.86 | 3.55 | 19.00 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4771DC | 14.38 | 8.86 | 3.55 | 18.69 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4771PN | 14.38 | 8.86 | 3.55 | 14.94 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4771HY | 14.38 | 8.86 | 3.55 | 11.84 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4777 | 14.38 | 8.86 | 3.49 | 17.45 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |
| 4777DC | 14.38 | 8.86 | 3.49 | 18.69 | 6.75 | 6.31 | 5.70 | 2.16 | .34 |

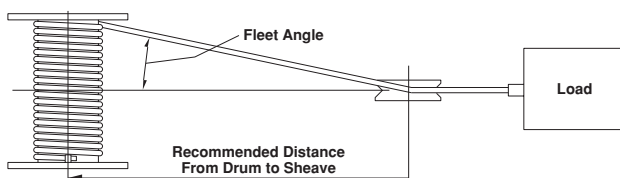
Dimensions are for reference only and subject to change without notice.

Series 4WP2D – Drum Dimensions

| MODEL EXTENSION | DRUM DIAMETER | FLANGE DIAMETER | DRUM WIDTH | FLEET ANGLE DISTANCE ⁴ |
|-----------------|---------------|-----------------|------------|-----------------------------------|
| 4771 | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4771AC-1PH | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4771AC-1PH2 | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4771AC-3PH | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4771DC | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4771PN | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4771HY | 3.00 in. | 6.00 in. | 6.00 in. | 10 ft |
| 4777 | 3.00 in. | 6.00 in. | 4.00 in. | 7 ft |
| 4777DC | 3.00 in. | 6.00 in. | 4.00 in. | 7 ft |

Dimensions are for reference only and subject to change without notice.

⁴ Recommended minimum distance between drum and lead sheave for smooth drum.



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WORM/SPUR GEAR POWER WINCHES



Series 4WS3M10 shown with clutch

Up to 6000 lb. capacity

- **Modular Design** allows us to make-to-order each winch to meet your exact needs.
- **Standard Features** include TEFC brake motors, enclosed machine cut gearing and flange style ball bearings.
- **Custom Modifications** available include grooved drums, special drum lengths and diameters, limit switches, roller pressure bars, and special finishes. Pneumatic, hydraulic and alternate motor voltages are also available.
- **Two-year Limited Warranty**

Wire rope assemblies and controls sold separately

Series 4WS Electric – Configurations and Performance Characteristics

| MODEL NUMBER | MODEL NUMBER EXTENSIONS | | | | MOTOR HP | LOAD RATING(LB.) | | | WIRE ROPE DIA.(IN) | LINE SPEED (FPM) | | DRUM CAPACITY(FT) ¹ | | | SHIP WT.(LB.) | APPROX. ² |
|---|-------------------------|------------|---------------|---------------|----------|------------------|----------|-----------|--------------------|------------------|-----------|--------------------------------|----------|-----------|---------------|----------------------|
| | LOAD RATING | LINE SPEED | MOTOR CODES | CLUTCH OPTION | | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | FULL DRUM | 1ST LAYER | MID DRUM | FULL DRUM | | |
| 4WS1M6 | 800 | 15 | A, B, D, E, F | C | .5 | 800 | 550 | 420 | 3/16 | 17 | 33 | 21 | 110 | 260 | 155 | |
| 4WS1M6 | 800 | 30 | A, B, D, E, F | C | .75 | 800 | 550 | 420 | 3/16 | 29 | 55 | 21 | 110 | 260 | 165 | |
| 4WS1M6 | 800 | 40 | A, B, D, E, F | C | 1 | 800 | 550 | 420 | 3/16 | 43 | 82 | 21 | 110 | 260 | 175 | |
| 4WS1M6 | 1100 | 20 | A, B, D, E, F | C | .75 | 1100 | 800 | 600 | 1/4 | 18 | 32 | 16 | 62 | 140 | 165 | |
| 4WS1M6 | 1100 | 30 | A, B, D, E, F | C | 1 | 1100 | 800 | 600 | 1/4 | 30 | 54 | 16 | 62 | 140 | 175 | |
| 4WS1M6 | 1100 | 40 | D, E, F | C | 1.5 | 1100 | 800 | 600 | 1/4 | 44 | 81 | 16 | 62 | 140 | 170 | |
| 4WS1M6 | 1500 | 20 | A, B, D, E, F | C | 1 | 1500 | 1000 | 800 | 1/4 | 18 | 32 | 16 | 62 | 140 | 175 | |
| 4WS1M6 | 1500 | 30 | D, E, F | C | 1.5 | 1500 | 1100 | 800 | 1/4 | 30 | 54 | 16 | 62 | 140 | 170 | |
| 4WS1M6 | 1500 | 40 | B, D, E, F | C | 2 | 1500 | 1100 | 800 | 1/4 | 44 | 81 | 16 | 62 | 140 | 180 | |
| clutch option for 4WS1M6 (for horizontal pulling only) | | | | | | | | | | | | add: | 5 | 770 | 770 | |
| 4WS3M10 | 2000 | 15 | A, B, D, E, F | C | 1 | 2000 | 1300 | 1000 | 5/16 | 14 | 29 | 34 | 220 | 500 | 310 | |
| 4WS3M10 | 2000 | 20 | D, E, F | C | 1.5 | 2200 | 1400 | 1000 | 5/16 | 18 | 39 | 34 | 220 | 500 | 305 | |
| 4WS3M10 | 2500 | 20 | B, D, E, F | C | 2 | 2500 | 1600 | 1200 | 3/8 | 22 | 46 | 27 | 160 | 360 | 320 | |
| 4WS3M10 | 3000 | 15 | D, E, F | C | 1.5 | 3000 | 2000 | 1500 | 3/8 | 14 | 29 | 27 | 160 | 360 | 305 | |
| 4WS3M10 | 3000 | 20 | B, D, E, F | C | 2 | 3000 | 2000 | 1500 | 3/8 | 19 | 39 | 27 | 160 | 360 | 320 | |
| 4WS3M10 | 3500 | 7 | A, B, D, E, F | C | 1 | 3500 | 2300 | 1700 | 7/16 | 8 | 15 | 23 | 120 | 270 | 330 | |
| 4WS3M10 | 3500 | 15 | B, D, E, F | C | 2 | 3700 | 2500 | 1800 | 7/16 | 14 | 29 | 23 | 120 | 270 | 320 | |
| 4WS3M10 | 3500 | 20 | D, E, F | C | 3 | 3700 | 2500 | 1800 | 7/16 | 23 | 46 | 23 | 120 | 270 | 330 | |
| clutch option for 4WS3M10 (for horizontal pulling only) | | | | | | | | | | | | add: | 8 | 790 | | |
| 4WS6M12 | 3000 | 10 | D, E, F | C | 1.5 | 3400 | 2200 | 1600 | 3/8 | 12 | 25 | 40 | 300 | 660 | 515 | |
| 4WS6M12 | 3000 | 20 | B, D, E, F | C | 2 | 3100 | 2000 | 1500 | 3/8 | 20 | 42 | 40 | 300 | 660 | 530 | |
| 4WS6M12 | 4000 | 10 | B, D, E, F | C | 2 | 4500 | 2900 | 2100 | 7/16 | 12 | 25 | 34 | 220 | 500 | 530 | |
| 4WS6M12 | 4000 | 20 | D, E, F | C | 3 | 4000 | 2500 | 1900 | 7/16 | 24 | 50 | 34 | 220 | 500 | 540 | |
| 4WS6M12 | 6000 | 4 | A, B, D, E, F | C | 1 | 6200 | 4000 | 3000 | 1/2 | 4 | 8 | 30 | 170 | 390 | 535 | |
| 4WS6M12 | 6000 | 10 | D, E, F | C | 3 | 6400 | 4200 | 3100 | 9/16 | 12 | 25 | 26 | 140 | 310 | 540 | |
| 4WS6M12 | 6000 | 20 | D, E, F | C | 5 | 6400 | 4200 | 3100 | 9/16 | 24 | 50 | 26 | 140 | 310 | 585 | |
| clutch option for 4WS6M12 (for horizontal pulling only) | | | | | | | | | | | | add: | 12 | 980 | | |

Motor Codes

| | | |
|----------|--|---------|
| A | 115 volt | 1 phase |
| B | 230 volt | 1 phase |
| D | 230 volt | 3 phase |
| E | 460 volt | 3 phase |
| F | All other voltages – please contact factory. | |

NOTE: Custom controls are available including wireless remote control, variable speed control, electronic overload, and enclosures for special environments.

¹ Actual drum capacities 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Weight may vary with motor.

³ Please contact Timco for firm fixed price and delivery.

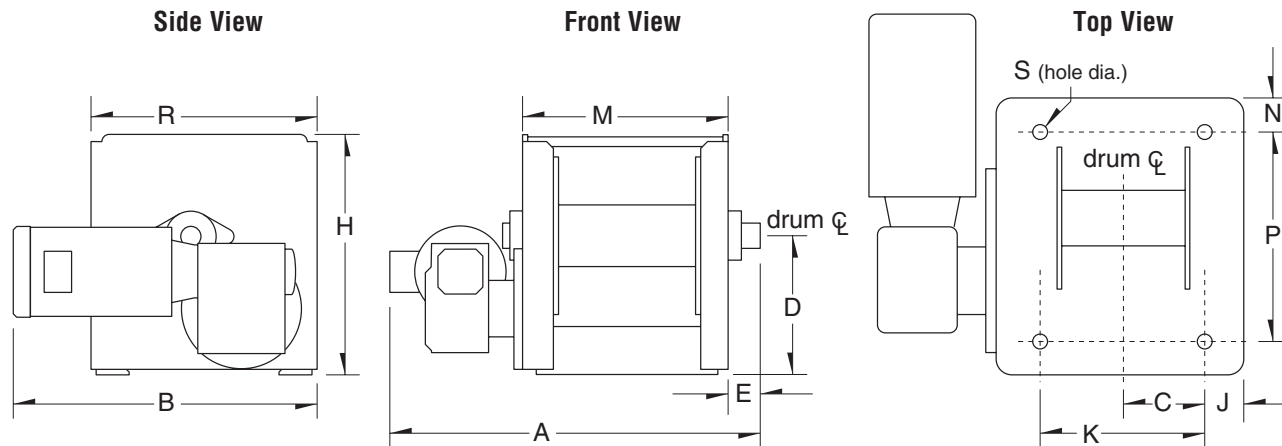
Electric Drum Control Switches – Order Separately

| MODEL | DESCRIPTION | 115/1/60 ⁵ | 230/1/60 | 230/3/60 | 460/3/60 |
|--------|----------------------|-----------------------|----------|----------|-----------|
| EL1CS | NEMA 1 | to 1.5 hp | to 2 hp | to 3 hp | to 3 hp |
| EL2CS | NEMA 1 | to 1.5 hp | to 3 hp | to 5 hp | to 7.5 hp |
| EL1CSW | NEMA 4 – watertight | to 1.5 hp | to 2 hp | to 3 hp | to 3 hp |
| EL2CSW | NEMA 4 – watertight | — | to 3 hp | to 5 hp | to 7.5 hp |
| EL1PD | 6 ft pendant control | to 1 hp | — | — | — |

⁵ Controls for 115V single phase motors up to 1 hp, include an 8 ft power cord with grounded plug.

⁶ Please contact Timco for firm fixed price and delivery.

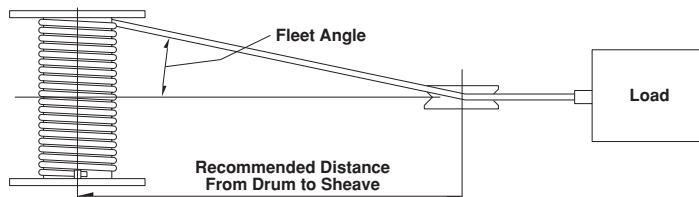
WORM/SPUR GEAR POWER WINCHES



Series 4WS – Winch Dimensions (in)

| MODEL EXTENSION | A | B | C | D | E | H | J | K | M | N | P | R | S (HOLE DIA.) |
|-----------------|-------|-------|------|-------|------|-------|------|-------|-------|------|-------|-------|---------------|
| 4WS1M6-800-15 | 21.00 | 21.62 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-800-30 | 21.00 | 22.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-800-40 | 21.75 | 23.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-1100-20 | 21.00 | 22.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-1100-30 | 21.75 | 23.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-1100-40 | 21.75 | 22.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-1500-20 | 21.75 | 23.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-1500-30 | 21.75 | 22.38 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS1M6-1500-40 | 21.75 | 25.00 | 3.00 | 6.75 | 2.25 | 11.75 | 1.75 | 6.00 | 9.75 | 1.25 | 8.50 | 11.00 | .44 |
| 4WS3M10-2000-15 | 27.75 | 26.75 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-2000-20 | 27.75 | 25.75 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-2500-20 | 27.75 | 28.25 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-3000-15 | 27.75 | 25.75 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-3000-20 | 27.75 | 28.25 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-3500-7 | 27.75 | 32.00 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-3500-15 | 27.75 | 28.25 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS3M10-3500-20 | 28.81 | 33.00 | 5.00 | 10.12 | 2.38 | 17.50 | 2.38 | 10.00 | 15.00 | 1.88 | 12.75 | 16.50 | .59 |
| 4WS6M12-3000-10 | 33.00 | 26.75 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |
| 4WS6M12-3000-20 | 33.00 | 29.50 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |
| 4WS6M12-4000-10 | 33.00 | 29.50 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |
| 4WS6M12-4000-20 | 34.00 | 29.25 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |
| 4WS6M12-6000-4 | 33.00 | 27.75 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |
| 4WS6M12-6000-10 | 34.00 | 29.25 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |
| 4WS6M12-6000-20 | 34.00 | 31.00 | 5.62 | 12.88 | 2.50 | 22.50 | 3.25 | 12.00 | 19.00 | 1.88 | 18.25 | 22.00 | .88 |

Dimensions are for reference only and subject to change without notice.



Important:

It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals, and regulations. Be sure to read the Owner's Manual supplied with the equipment before operating it.

Series 4WS – Drum Dimensions

| MODEL EXTENSION | DRUM DIAMETER | FLANGE DIAMETER | DRUM WIDTH | FLEET ANGLE DISTANCE ⁴ |
|-----------------|---------------|-----------------|------------|-----------------------------------|
| 4WS1M6 | 2.88 in | 7.00 in | 6.00 in | 10 ft |
| 4WS3M10 | 4.50 in | 11.50 in | 10.00 in | 16 ft |
| 4WS6M12 | 5.50 in | 14.00 in | 12.00 in | 20 ft |

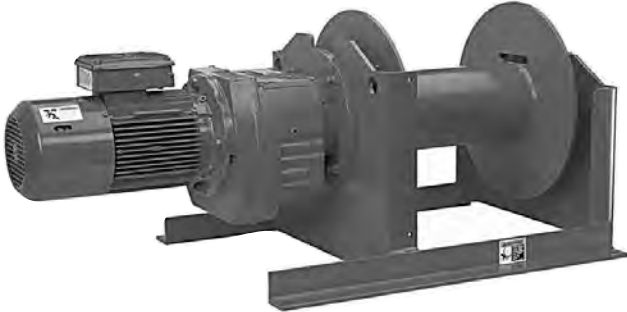
Dimensions are for reference only and subject to change without notice.

⁴ Recommended minimum distance between drum and lead sheave for smooth drum.



HELICAL / PARALLEL GEAR POWER WINCHES

Series 4HPF - Up to 26000 lb. capacity
Wire rope assemblies and controls sold separately



- **Helical/Parallel Gearing** provides efficiency required for applications involving quick line speeds or long travel distances.
- **Standard Features** include TEFC severe duty brake motors, enclosed gearing and flange style roller bearings.
- **Custom Modifications** including grooved drums, special drum lengths and diameters, limit switches, roller pressure bars, and special finishes are available, please contact factory. Pneumatic, hydraulic and alternate motor voltages are also available.
- **Clutch Models** are available, contact Timco.
- **Two-year Limited Warranty**

Series 4HPF Electric – Configurations and Performance Characteristics

When ordering, please indicate Model Number and Extensions - Examples: 4HPF9M-9000-20-D; 4HPF9M-9000-40-E

| MODEL NUMBER | MODEL NUMBER EXTENSIONS | | | MOTOR HP | LOAD RATING (LB.) | | | WIRE ROPE DIA. (IN.) | LINE SPEED (FPM) | | DRUM CAPACITY (FT.) ¹ | | | APPROX. SHIP WT. (LB.) |
|--------------|-------------------------|------------|-------------|----------|-------------------|----------|-----------|----------------------|------------------|-----------|----------------------------------|----------|-----------|------------------------|
| | LOAD RATING | LINE SPEED | MOTOR CODES | | 1ST LAYER | MID DRUM | FULL DRUM | | 1ST LAYER | FULL DRUM | 1ST LAYER | MID DRUM | FULL DRUM | |
| 4HPF2M | 2000 | 20 | D, E, F | 1 | 2100 | 1300 | 1000 | 5/16 | 17 | 38 | 34 | 250 | 560 | 170 |
| 4HPF2M | 2000 | 35 | D, E, F | 2 | 2100 | 1300 | 1000 | 5/16 | 34 | 76 | 34 | 250 | 560 | 200 |
| 4HPF3M | 3000 | 20 | D, E, F | 1.5 | 3000 | 2100 | 1600 | 3/8 | 19 | 33 | 33 | 160 | 360 | 250 |
| 4HPF3M | 3000 | 35 | D, E, F | 3 | 3300 | 2300 | 1800 | 3/8 | 33 | 59 | 33 | 160 | 360 | 260 |
| 4HPF5M | 5000 | 20 | D, E, F | 3 | 5000 | 3100 | 2300 | 1/2 | 22 | 49 | 52 | 400 | 890 | 495 |
| 4HPF5M | 5000 | 35 | D, E, F | 5 | 5000 | 3100 | 2300 | 1/2 | 37 | 81 | 52 | 400 | 890 | 495 |
| 4HPF7M | 7000 | 25 | D, E, F | 5 | 7300 | 5400 | 4300 | 5/8 | 24 | 40 | 51 | 230 | 510 | 645 |
| 4HPF7M | 7000 | 40 | D, E, F | 7.5 | 7300 | 5400 | 4300 | 5/8 | 38 | 64 | 51 | 230 | 510 | 760 |
| 4HPF9M | 9000 | 20 | D, E, F | 5 | 9000 | 6500 | 5100 | 3/4 | 21 | 37 | 65 | 310 | 700 | 1000 |
| 4HPF9M | 9000 | 40 | D, E, F | 10 | 9000 | 6500 | 5100 | 3/4 | 41 | 73 | 65 | 310 | 700 | 1115 |
| 4HPF15M | 15000 | 25 | D, E, F | 10 | 14,300 | 10,900 | 8800 | 7/8 | 26 | 41 | 57 | 210 | 480 | 1340 |
| 4HPF15M | 15000 | 35 | D, E, F | 15 | 15,100 | 11,500 | 9300 | 7/8 | 36 | 59 | 57 | 210 | 480 | 1370 |
| 4HPF20M | 20000 | 20 | D, E, F | 10 | 20,100 | 14,100 | 10,800 | 1 | 17 | 31 | 97 | 520 | 1160 | 2395 |
| 4HPF20M | 20000 | 40 | D, E, F | 25 | 20,100 | 14,000 | 10,800 | 1 | 43 | 81 | 97 | 520 | 1160 | 2620 |
| 4HPF25M | 25000 | 20 | D, E, F | 15 | 25,200 | 19,200 | 15,500 | 1-1/8 | 20 | 32 | 96 | 380 | 840 | 3185 |
| 4HPF25M | 25000 | 40 | D, E, F | 30 | 25,000 | 19,000 | 15,400 | 1-1/8 | 42 | 68 | 96 | 380 | 840 | 3440 |

Motor Codes

| | | |
|----------|--|---------|
| D | 230 volt | 3 phase |
| E | 460 volt | 3 phase |
| F | All other voltages – please contact factory. | |

¹ Actual drum capacities 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Please contact Timco for firm fixed price and delivery.

Electric Motor Controls – Please Order Separately

| MODEL | DESCRIPTION | APPROX. SHIP WT. |
|--------|--|------------------|
| EL4020 | electric motor controls 230/3/60 to 3 hp | 25 lb. |
| EL4029 | electric motor controls 230/3/60 to 7.5 hp | 25 lb. |
| EL4030 | electric motor controls 230/3/60 to 10 hp | 28 lb. |
| EL4031 | electric motor controls 230/3/60 to 20 hp | 28 lb. |
| EL4052 | electric motor controls 230/3/60 to 30 hp | 60 lb. |
| EL4021 | electric motor controls 460/3/60 to 7.5 hp | 25 lb. |
| EL4032 | electric motor controls 460/3/60 to 15 hp | 25 lb. |
| EL4033 | electric motor controls 460/3/60 to 20 hp | 28 lb. |
| EL4053 | electric motor controls 460/3/60 to 40 hp | 60 lb. |

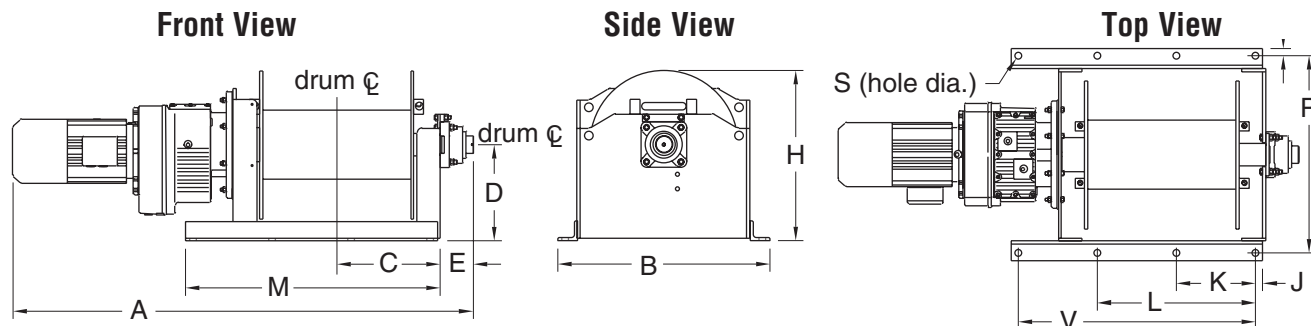
Controls include NEMA 4 rated enclosure, and NEMA 4x rated pendant control on 50 foot cord.

³ Please contact Timco for firm fixed price and delivery. All prices include mounting and wiring to motor.

Notes:

- Custom controls are available including wireless remote control, variable speed control, electronic overload, and enclosures for special environments.

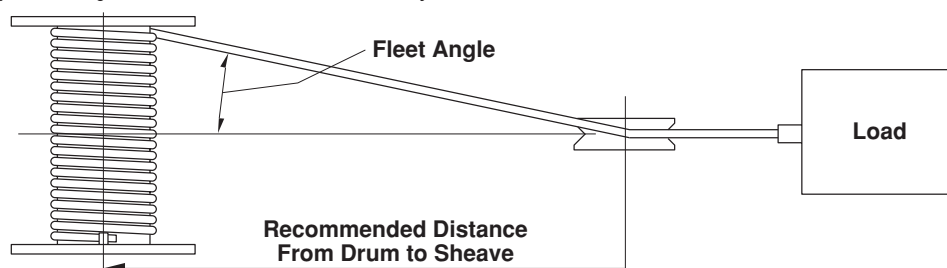
HELICAL / PARALLEL GEAR POWER WINCHES



Series 4HPF – Winch Dimensions (in)

| MODEL EXTENSION | A | B | C | D | E | H | J | K | L | M | N | P | S (HOLE DIA.) | V |
|------------------|-------|-------|-------|-------|------|-------|------|-------|-------|-------|------|-------|---------------|-------|
| 4HPF2M-2000-20 | 37.50 | 17.00 | 7.56 | 8.00 | 2.38 | 14.28 | 1.00 | 10.00 | 20.00 | 22.56 | .62 | 15.75 | .59 | - |
| 4HPF2M-2000-35 | 39.00 | 17.00 | 7.56 | 8.00 | 2.38 | 14.28 | 1.00 | 10.00 | 20.00 | 22.56 | .62 | 15.75 | .59 | - |
| 4HPF3M-3000-20 | 42.00 | 17.00 | 7.56 | 8.00 | 2.38 | 14.00 | 1.00 | 10.00 | 20.00 | 22.56 | .62 | 15.75 | .59 | - |
| 4HPF3M-3000-35 | 42.00 | 17.00 | 7.56 | 8.00 | 2.38 | 14.00 | 1.00 | 10.00 | 20.00 | 22.56 | .62 | 15.75 | .59 | - |
| 4HPF5M-5000-20 | 54.25 | 26.00 | 11.50 | 12.00 | 5.12 | 21.00 | 1.00 | 15.25 | 30.50 | 33.38 | 1.00 | 24.00 | .88 | - |
| 4HPF5M-5000-35 | 54.25 | 26.00 | 11.50 | 12.00 | 5.12 | 21.00 | 1.00 | 15.25 | 30.50 | 33.38 | 1.00 | 24.00 | .88 | - |
| 4HPF7M-7000-25 | 56.00 | 26.00 | 11.50 | 12.00 | 5.12 | 21.00 | 1.00 | 15.25 | 30.50 | 33.38 | 1.00 | 24.00 | .88 | - |
| 4HPF7M-7000-40 | 59.00 | 26.00 | 11.50 | 12.00 | 5.12 | 21.00 | 1.00 | 15.25 | 30.50 | 33.38 | 1.00 | 24.00 | .88 | - |
| 4HPF9M-9000-20 | 64.25 | 31.00 | 14.50 | 14.50 | 6.25 | 25.50 | 1.25 | 13.25 | 26.50 | 43.50 | 1.12 | 28.75 | 1.12 | 39.75 |
| 4HPF9M-9000-40 | 69.25 | 31.00 | 14.50 | 14.50 | 6.25 | 25.50 | 1.25 | 13.25 | 26.50 | 43.50 | 1.12 | 28.75 | 1.12 | 39.75 |
| 4HPF15M-15000-25 | 71.50 | 31.00 | 14.50 | 14.50 | 6.25 | 25.50 | 1.25 | 13.25 | 26.50 | 43.50 | 1.12 | 28.75 | 1.12 | 39.75 |
| 4HPF15M-15000-35 | 74.00 | 31.00 | 14.50 | 14.50 | 6.25 | 25.50 | 1.25 | 13.25 | 26.50 | 43.50 | 1.12 | 28.75 | 1.12 | 39.75 |
| 4HPF20M-20000-20 | 90.00 | 43.00 | 21.00 | 19.50 | 6.75 | 34.50 | 1.50 | 16.00 | 32.00 | 51.62 | 1.50 | 40.00 | 1.38 | 48.00 |
| 4HPF20M-20000-40 | 96.50 | 43.00 | 21.00 | 19.50 | 6.75 | 34.50 | 1.50 | 16.00 | 32.00 | 51.62 | 1.50 | 40.00 | 1.38 | 48.00 |
| 4HPF25M-25000-20 | 93.25 | 43.00 | 21.00 | 19.50 | 6.75 | 34.50 | 1.50 | 16.00 | 32.00 | 51.62 | 1.50 | 40.00 | 1.38 | 48.00 |
| 4HPF25M-25000-40 | 99.75 | 43.00 | 21.00 | 19.50 | 6.75 | 34.50 | 1.50 | 16.00 | 32.00 | 51.62 | 1.50 | 40.00 | 1.38 | 48.00 |

Dimensions are for reference only and subject to change without notice. Please contact factory for exact dimensions.



Series 4HPF – Drum Dimensions

| SERIES | DRUM DIAMETER | FLANGE DIAMETER | DRUM WIDTH | FLEET ANGLE DISTANCE ⁴ |
|---------|---------------|-----------------|------------|-----------------------------------|
| 4HPF2M | 4.50 in. | 12.00 in. | 10.00 in. | 16 ft. |
| 4HPF3M | 5.50 in. | 12.00 in. | 10.00 in. | 16 ft. |
| 4HPF5M | 7.00 in. | 18.00 in. | 16.00 in. | 26 ft. |
| 4HPF7M | 9.00 in. | 18.00 in. | 16.00 in. | 26 ft. |
| 4HPF9M | 10.75 in. | 22.00 in. | 20.00 in. | 32 ft. |
| 4HPF15M | 11.50 in. | 22.00 in. | 20.00 in. | 32 ft. |
| 4HPF20M | 14.00 in. | 30.00 in. | 30.00 in. | 48 ft. |
| 4HPF25M | 16.00 in. | 30.00 in. | 30.00 in. | 48 ft. |

Dimensions are for reference only and subject to change without notice. Please contact factory for exact dimensions.

⁴ Recommended minimum distance between drum and lead sheave for smooth drum.

Important:

It is the owner's or operator's responsibility to determine the suitability of the equipment to its intended use. Study all applicable codes, manuals, and regulations. Be sure to read the Owner's Manual supplied with the equipment before operating it.

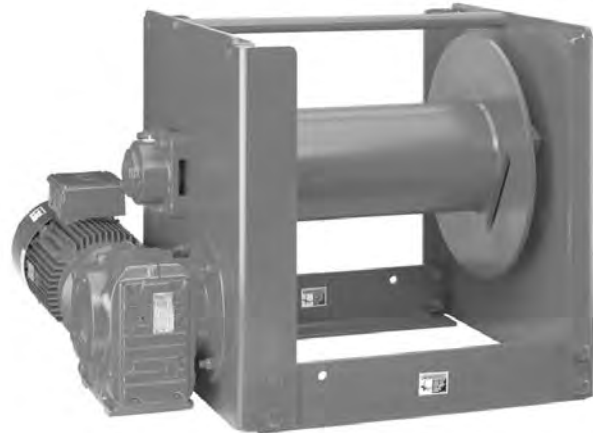


HELICAL / WORM GEAR POWER WINCHES

Series 4WS
Up to 26,000 lb. capacity

Modular Design allows us to make-to-order each winch to meet your exact needs.

- **Standard Features** include TEFC brake motors, enclosed gearing, and flange style roller bearings.
- **Custom Modifications** including grooved drums, special drum lengths and diameters, limit switches, roller pressure bars, and special finishes are available, please contact factory. Pneumatic, hydraulic and alternate motor voltages are also available.
- **Two-Year Limited Warranty**



Series 4WS Electric – Configurations and Performance Characteristics

When ordering, please indicate Model Number and Extensions. Examples: 4WS9M18-9000-15-D; 4WS9M18-9000-20-E

| model number | model number extensions | | | motor hp | load rating (lb.) | | | wire rope dia. (in.) | line speed (fpm) | | drum capacity (ft.) ¹ | | | approx. ship wt. (lb.) |
|--------------|-------------------------|------------|-------------|----------|-------------------|----------|-----------|----------------------|------------------|-----------|----------------------------------|----------|-----------|------------------------|
| | load rating | line speed | motor codes | | 1st layer | mid drum | full drum | | 1st layer | full drum | 1st layer | mid drum | full drum | |
| 4WS9M18 | 7000 | 20 | D, E, F | 5 | 7300 | 5000 | 3800 | 5/8 | 21 | 41 | 59 | 340 | 760 | 1098 |
| 4WS9M18 | 7000 | 30 | D, E, F | 7.5 | 7500 | 5200 | 4000 | 5/8 | 32 | 61 | 59 | 340 | 760 | 1095 |
| 4WS9M18 | 10000 | 10 | D, E, F | 5 | 10,000 | 6900 | 5300 | 5/8 | 13 | 24 | 59 | 340 | 760 | 1098 |
| 4WS9M18 | 10000 | 20 | D, E, F | 7.5 | 10,000 | 6900 | 5300 | 5/8 | 21 | 41 | 59 | 340 | 760 | 1095 |
| 4WS9M18 | 10000 | 30 | D, E, F | 10 | 10,000 | 6900 | 5200 | 5/8 | 32 | 61 | 59 | 340 | 760 | 1151 |
| 4WS16M20 | 13000 | 15 | D, E, F | 7.5 | 13,000 | 8800 | 6700 | 3/4 | 14 | 26 | 65 | 400 | 880 | 1550 |
| 4WS16M20 | 13000 | 20 | D, E, F | 10 | 13,300 | 9100 | 6900 | 3/4 | 18 | 35 | 65 | 400 | 880 | 1610 |
| 4WS16M20 | 13000 | 35 | D, E, F | 15 | 13,000 | 8900 | 6700 | 3/4 | 35 | 68 | 65 | 400 | 880 | 1650 |
| 4WS16M20 | 16000 | 15 | D, E, F | 7.5 | 16,000 | 11,100 | 8500 | 7/8 | 12 | 24 | 54 | 290 | 640 | 1550 |
| 4WS16M20 | 16000 | 20 | D, E, F | 10 | 16,000 | 11,100 | 8500 | 7/8 | 16 | 31 | 54 | 290 | 640 | 1610 |
| 4WS26M26 | 22000 | 20 | D, E, F | 15 | 22,800 | 16,700 | 13,200 | 1 | 18 | 31 | 82 | 370 | 830 | 3110 |
| 4WS26M26 | 22000 | 25 | D, E, F | 20 | 22,600 | 16,500 | 13,100 | 1 | 25 | 43 | 82 | 370 | 830 | 3290 |
| 4WS26M26 | 22000 | 35 | D, E, F | 25 | 22,200 | 16,300 | 12,900 | 1 | 36 | 63 | 82 | 370 | 830 | 3350 |
| 4WS26M26 | 26000 | 10 | D, E, F | 10 | 26,200 | 19,400 | 15,400 | 1-1/8 | 10 | 17 | 71 | 300 | 660 | 3070 |
| 4WS26M26 | 26000 | 15 | D, E, F | 15 | 26,000 | 20,200 | 16,500 | 1-1/8 | 16 | 27 | 71 | 300 | 660 | 3110 |

Motor Codes

| | | |
|----------|--|---------|
| D | 230 volt | 3 phase |
| E | 460 volt | 3 phase |
| F | All other voltages – please contact factory. | |

Notes:

• Custom controls are available including wireless remote control, variable speed control, electronic overload, and enclosures for special environments.

¹

Actual drum capacities 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

²

Please contact Timco for firm fixed price and delivery.

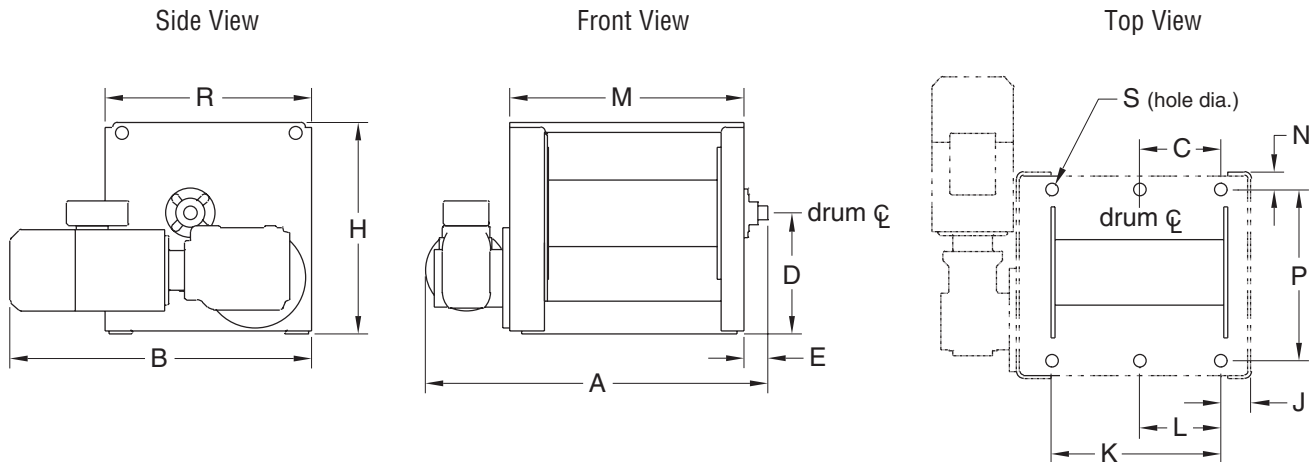
Electric Motor Controls – Please Order Separately

| model | description | approx. ship wt. |
|--------|--|------------------|
| EL4020 | electric motor controls 230/3/60 to 3 hp | 25 lb. |
| EL4029 | electric motor controls 230/3/60 to 7.5 hp | 25 lb. |
| EL4030 | electric motor controls 230/3/60 to 10 hp | 28 lb. |
| EL4031 | electric motor controls 230/3/60 to 20 hp | 28 lb. |
| EL4052 | electric motor controls 230/3/60 to 30 hp | 60 lb. |
| EL4021 | electric motor controls 460/3/60 to 7.5 hp | 25 lb. |
| EL4032 | electric motor controls 460/3/60 to 15 hp | 25 lb. |
| EL4033 | electric motor controls 460/3/60 to 20 hp | 28 lb. |
| EL4053 | electric motor controls 460/3/60 to 40 hp | 60 lb. |

Controls include NEMA 4 rated enclosure, and NEMA 4x rated pendant control on 50 foot cord.

³ Please contact Timco for firm fixed price and delivery. All prices include mounting and wiring to motor.

HELICAL / WORM GEAR POWER WINCHES



Series 4WS – Winch Dimensions (in)

| model extension | A | B | C | D | E | H | J | K | L | M | N | P | R | S (hole dia.) |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| 4WS9M18-7000-20 | 44.00 | 33.62 | 8.50 | 17.75 | 5.12 | 31.00 | 4.00 | 18.00 | – | 26.00 | 2.75 | 22.00 | 27.50 | 1.19 |
| 4WS9M18-7000-30 | 45.25 | 38.50 | 8.50 | 17.75 | 5.12 | 31.00 | 4.00 | 18.00 | – | 26.00 | 2.75 | 22.00 | 27.50 | 1.19 |
| 4WS9M18-10000-10 | 44.00 | 33.62 | 8.50 | 17.75 | 5.12 | 31.00 | 4.00 | 18.00 | – | 26.00 | 2.75 | 22.00 | 27.50 | 1.19 |
| 4WS9M18-10000-20 | 45.25 | 38.50 | 8.50 | 17.75 | 5.12 | 31.00 | 4.00 | 18.00 | – | 26.00 | 2.75 | 22.00 | 27.50 | 1.19 |
| 4WS9M18-10000-30 | 45.25 | 40.00 | 8.50 | 17.75 | 5.12 | 31.00 | 4.00 | 18.00 | – | 26.00 | 2.75 | 22.00 | 27.50 | 1.19 |
| 4WS16M20-13000-1547.75 | 34.75 | 9.50 | 20.00 | 6.25 | 34.00 | 4.00 | 20.00 | 10.00 | 29.00 | 2.75 | 27.50 | 33.00 | 1.19 | |
| 4WS16M20-13000-2047.75 | 36.75 | 9.50 | 20.00 | 6.25 | 34.00 | 4.00 | 20.00 | 10.00 | 29.00 | 2.75 | 27.50 | 33.00 | 1.19 | |
| 4WS16M20-13000-3547.75 | 39.25 | 9.50 | 20.00 | 6.25 | 34.00 | 4.00 | 20.00 | 10.00 | 29.00 | 2.75 | 27.50 | 33.00 | 1.19 | |
| 4WS16M20-16000-1547.75 | 34.75 | 9.50 | 20.00 | 6.25 | 34.00 | 4.00 | 20.00 | 10.00 | 29.00 | 2.75 | 27.50 | 33.00 | 1.19 | |
| 4WS16M20-16000-2047.75 | 36.75 | 9.50 | 20.00 | 6.25 | 34.00 | 4.00 | 20.00 | 10.00 | 29.00 | 2.75 | 27.50 | 33.00 | 1.19 | |
| 4WS26M26-22000-2060.50 | 43.25 | 12.50 | 25.38 | 8.25 | 44.50 | 5.88 | 26.00 | 13.00 | 38.00 | 3.00 | 36.00 | 42.00 | 1.38 | |
| 4WS26M26-22000-2560.50 | 47.00 | 12.50 | 25.38 | 8.25 | 44.50 | 5.88 | 26.00 | 13.00 | 38.00 | 3.00 | 36.00 | 42.00 | 1.38 | |
| 4WS26M26-22000-3560.50 | 49.75 | 12.50 | 25.38 | 8.25 | 44.50 | 5.88 | 26.00 | 13.00 | 38.00 | 3.00 | 36.00 | 42.00 | 1.38 | |
| 4WS26M26-26000-1060.50 | 42.00 | 12.50 | 25.38 | 8.25 | 44.50 | 5.88 | 26.00 | 13.00 | 38.00 | 3.00 | 36.00 | 42.00 | 1.38 | |
| 4WS26M26-26000-1560.50 | 43.25 | 12.50 | 25.38 | 8.25 | 44.50 | 5.88 | 26.00 | 13.00 | 38.00 | 3.00 | 36.00 | 42.00 | 1.38 | |

Dimensions are for reference only and subject to change without notice. Please contact factory for exact dimensions.

Series 4WS – Drum Dimensions

| series | drum diameter | flange diameter | drum width | fleet angle distance ⁴ |
|----------|---------------|-----------------|------------|-----------------------------------|
| 4WS9M18 | 9.00 in. | 20.00 in. | 18.00 in. | 29 ft. |
| 4WS16M20 | 10.75 in. | 24.00 in. | 20.00 in. | 32 ft. |
| 4WS26M26 | 14.00 in. | 28.00 in. | 26.00 in. | 42 ft. |

Dimensions are for reference only and subject to change without notice. Please contact factory for exact dimensions.

⁴ Recommended minimum distance between drum and lead sheave for smooth drum.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



SPUR-GEAR 'HANDI-WINCH'® SERIES

1/2 and 1 US Ton Winching Capacity

AM & BM Spur Gear 'Handi-Winch'® Series are designed to offer a portable hand winch for light lifting, lowering, holding, moving or securing rated loads.*

Optional disc brake handle incorporates a "Weston" style load brake to automatically hold the rated load in lifting applications.

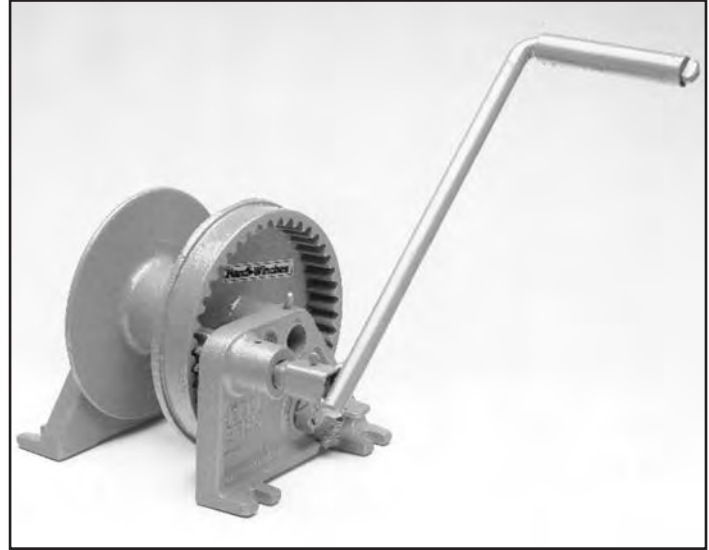
Standard features:

- Cast steel drum
- Ductile iron frame
- Cast bronze spur gear pinion
- Spring-operated load holding dogs
- Two-way operation on models without brakes
- Single direction on models equipped with lowering brakes
- Two drum widths: 3 inches and 6 inches
- Suitable for marine environment

Options:

- Gear cover:
P/N 6190 for A Series 1/2 Ton
P/N 6190 for B Series 1 Ton
- Hand-actuated band style lowering brake
(Add suffix "B" to model code)
- Disc brake handle:
P/N 3893 for both A & B Series
- Marine 812 polyurethane finish
- Drum divider flange

**Not recommended for power applications.*



1/2 TON AM3 SPUR GEAR HAND WINCH

Warning: Before installation see maintenance and operations manual for additional warnings and precautions. This equipment is not to be used for lifting, supporting or transporting people, or lifting or supporting loads over people.

SPUR GEAR SERIES 1/2 TON AND 1 TON SPECIFICATIONS

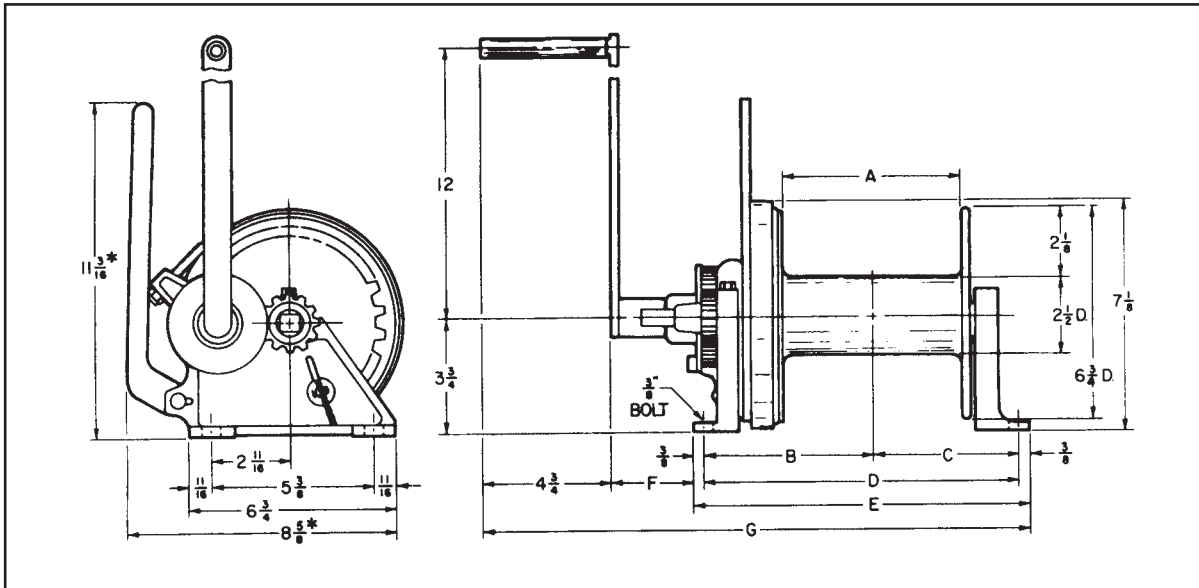
| MODEL NO. | | CAPACITY 1st Layer (US Tons*) | GEAR RATIO | DRUM CAPACITIES | | | | SHIPPING WT. (lbs.) | |
|-----------|---------|-------------------------------------|---------------|-----------------|-------|------|-------|---------------------|---------|
| WO/Brake | W/Brake | | | 1/8" | 3/16" | 1/4" | 5/16" | WO/Brake | W/Brake |
| AM3 | AM3B | 1/2 | 5.25:1 | 367' | 151' | 89' | 54' | 20 | 23 |
| AM6 | AM6B | 1/2 | 5.25:1 | 735' | 303' | 178' | 109' | 23 | 25 |
| BM3 | BM3B | 1 | 5.25:1/10.5:1 | 367' | 151' | 89' | 54' | 23 | 25 |
| BM6 | BM6B | 1 | 5.25:1/10.5:1 | 735' | 303' | 178' | 109' | 24 | 27 |

*Winching capacity rated on first layer.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SPUR-GEAR 'HANDI-WINCH®' SERIES

1/2 and 1 US Ton Winching Capacity



*For models with lowering brakes

2

SPUR GEAR SERIES 1/2 TON AND 1 TON SPECIFICATIONS

| MODEL NO. | | A | B | C | D | E | F | G |
|-----------|---------|----|----------|----------|---------|---------|--------|---------|
| WO/Brake | W/Brake | | | | | | | |
| AM3 | AM3B | 3" | 4-7/32" | 3-9/32" | 7-1/2" | 8-1/4" | 2-1/8" | 15-1/8" |
| AM6 | AM6B | 6" | 5-23/32" | 4-25/32" | 10-1/2" | 11-1/4" | 2-1/8" | 18-1/8" |
| BM3 | BM3B | 3" | 4-7/32" | 3-9/32" | 7-1/2" | 8-1/4" | 3" | 16" |
| BM6 | BM6B | 6" | 5-23/32" | 4-25/32" | 10-1/2" | 11-1/4" | 3" | 19" |

NOTE: Dimensions are subject to change. Please contact factory for certified prints.

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SPUR-GEAR SERIES

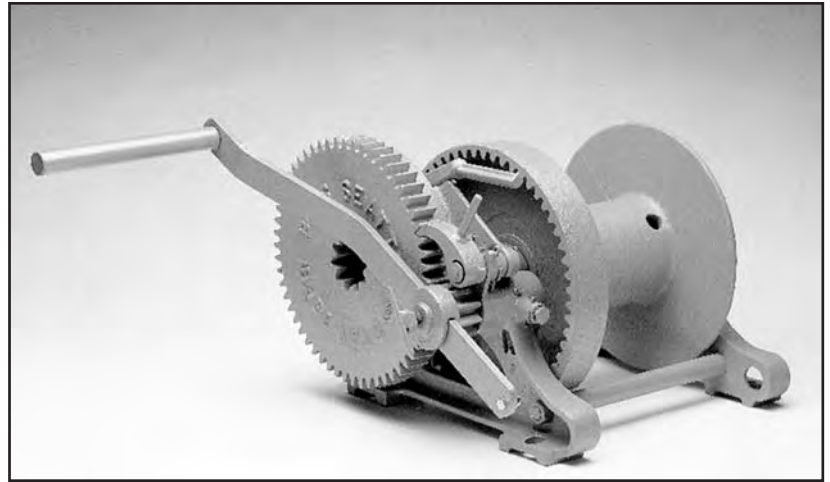
2 and 5 US Ton Winching Capacity

The LM & HM Series “All Steel” hand winches* are designed for marine duty and industrial use.

Optional disc brake handle incorporates a “Weston” style load brake to automatically hold the rated load in lifting operations.

Standard Features:

- Cast steel drums and ring gear
- Steel load-bearing components, cast steel frames
- Replaceable bronze bushings
- One-piece, fully adjustable 14”-long steel operating handle with pinion
- Spring-loaded holding dog with release handle
- Hand-operated, adjustable holding brake
- Easy free spooling
- Two-speed gear change offers fast cable take up and easier winching



5 TON HM 12

*NOTE: Not recommended for power winching operation.

| OPTIONS & ACCESSORIES | | |
|---|--------|--------|
| DESCRIPTION | LM | HM |
| 28” Diameter Handwheel | 1580-2 | 1580-1 |
| Hand Wheel for Units with Disc Brake Handle (SBH) | 3628 | 3628 |
| Extended Shaft Pinion (1-7/16” x 12”) | 2833 | 991 |
| Power Drive Pinion** | 1942 | 1948 |
| Gear Covers | 250-B | 249 |
| Disc Brake Handle | 3679 | 3677 |
| Marine 812 Top Coat | | |
| Reverse Dog Assembly | | |
| Drum Divider Flange | | |

** **WARNING:** Accessory drive pinion is intended only for faster cable take-up by power with no load, and should never be used for power-driven winch or hoist operation.

| SPUR GEAR SERIES 2 TON AND 5 TON SPECIFICATIONS | | | | | | | | | |
|---|------------------------------|------------|-----------------|-------|-------|-------|------|------|-----------------|
| MODEL NO. † | CAPACITY 1st Layer (US Tons) | GEAR RATIO | DRUM CAPACITIES | | | | | | SHIP WT. (lbs.) |
| | | | 1/4” | 5/16” | 3/8” | 7/16” | 1/2” | 5/8” | |
| LM6 | 2 | 4:1/22:1 | 278’ | 180’ | 133’ | 97’ | 66’ | – | 63 |
| LM6W | | | | | | | | | 69 |
| LM10 | 2 | 4:1/22:1 | 464’ | 300’ | 222’ | 161’ | 111’ | – | 77 |
| LM10W | | | | | | | | | 88 |
| LM16 | 2 | 4:1/22:1 | 742’ | 480’ | 355’ | 257’ | 177’ | – | 93 |
| LM16W | | | | | | | | | 104 |
| HM8 | 5 | 4:1/24:1 | – | – | 358’ | 284’ | 220’ | 123’ | 123 |
| HM8W | | | | | | | | | 135 |
| HM12 | 5 | 4:1/24:1 | – | – | 537’ | 425’ | 330’ | 185’ | 131 |
| HM12W | | | | | | | | | 151 |
| HM16 | 5 | 4:1/24:1 | – | – | 716’ | 566’ | 440’ | 247’ | 142 |
| HM16W | | | | | | | | | 166 |
| HM24 | 5 | 4:1/24:1 | – | – | 1075’ | 850’ | 660’ | 371’ | 163 |
| HM24W | | | | | | | | | 174 |

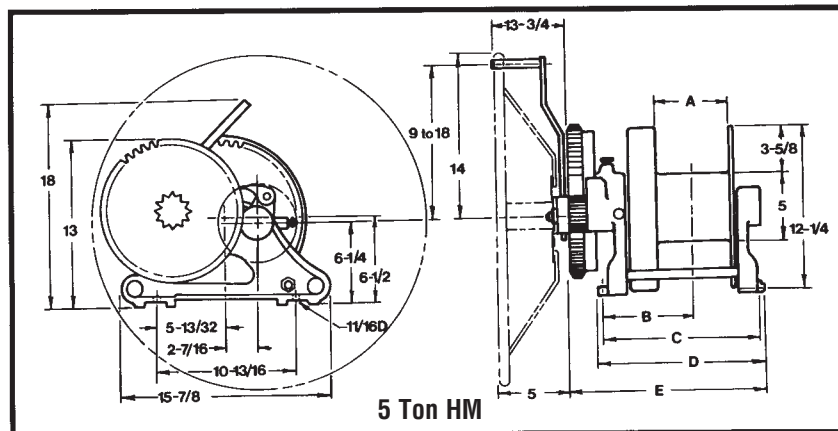
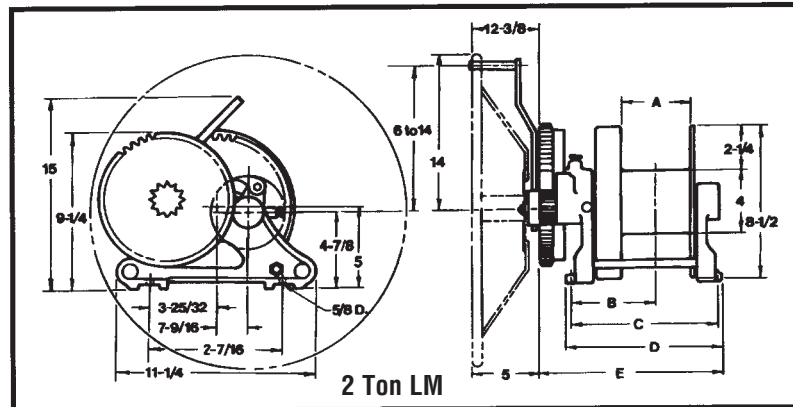
†“W” at the end of the model no. indicates unit is equipped with a handwheel. Allow 19 additional lbs. for handwheel.

WARNING: Before installation, see maintenance and operations manual for additional warnings and precautions. This equipment is not to be used for lifting, supporting or transporting people, or lifting or supporting loads over people.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SPUR-GEAR SERIES

2 and 5 US Ton Winching Capacity



SPUR GEAR SERIES 2 AND 5 TON SPECIFICATIONS

| MODEL NO. | A | B | C | D | E |
|---------------|-----|---------|---------|---------|---------|
| LM6 LM6W | 6" | 5-7/8" | 10-3/4" | 12-1/4" | 14" |
| LM10 LM10W | 10" | 7-3/4" | 14-5/8" | 16-1/4" | 18" |
| LM16 LM16W | 16" | 10-3/4" | 20-5/8" | 22-1/4" | 24" |
| HM8 HM8W | 8" | 7-7/8" | 13-7/8" | 15-3/8" | 17-3/4" |
| HM12 HM12W | 12" | 9-1/4" | 17-3/4" | 19-1/4" | 21-1/4" |
| HM16 HM16W | 16" | 11-1/2" | 22-1/4" | 23-3/4" | 25-3/4" |
| HM24 HM24W | 24" | 16-3/4" | 30-1/4" | 31-7/8" | 33-3/4" |

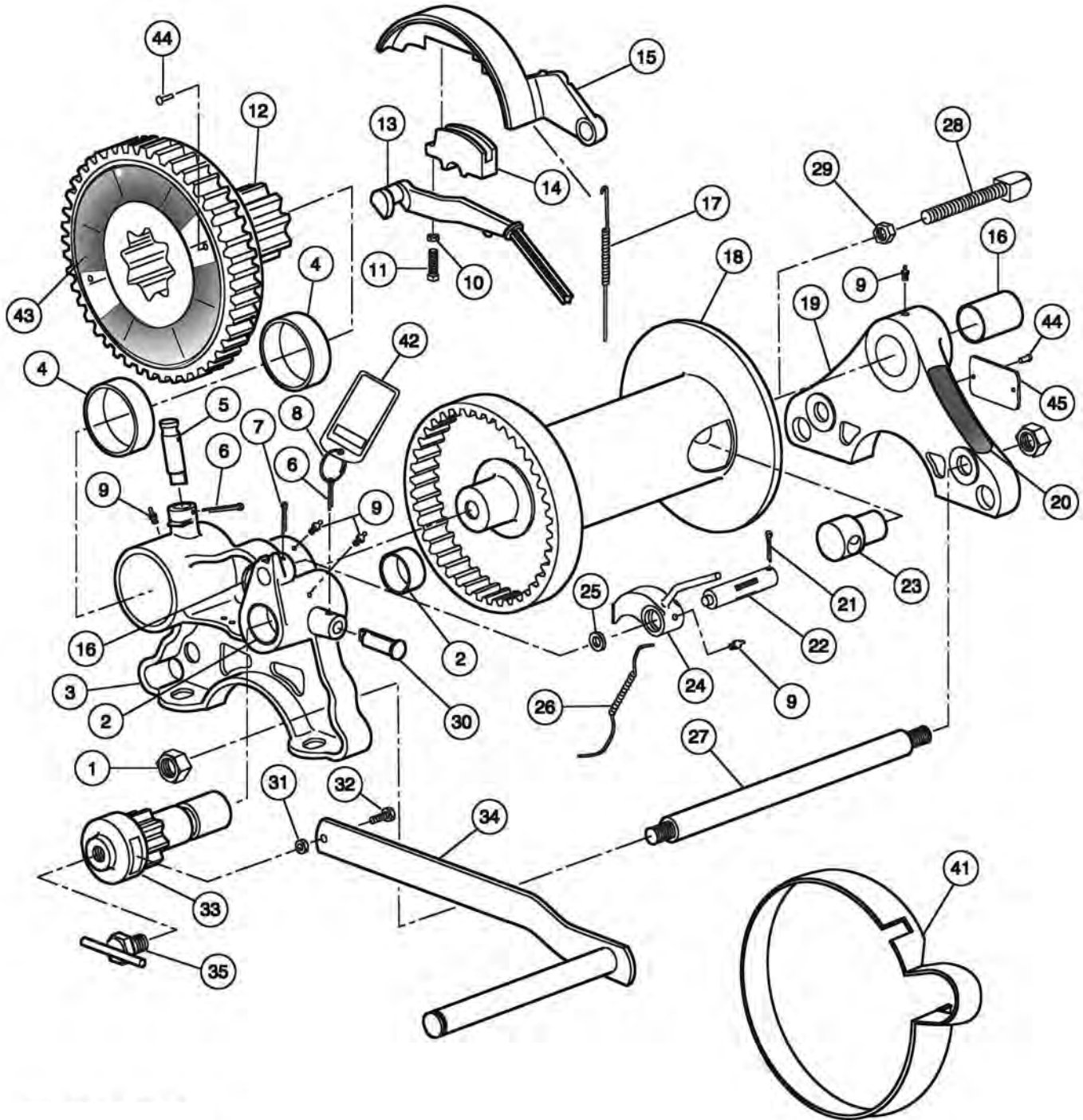
NOTE: Dimensions are subject to change. Please contact factory for certified prints.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



SPUR-GEAR SERIES 2 and 5 US Ton Winching Capacity

2



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SPUR-GEAR SERIES

2 and 5 US Ton Winching Capacity

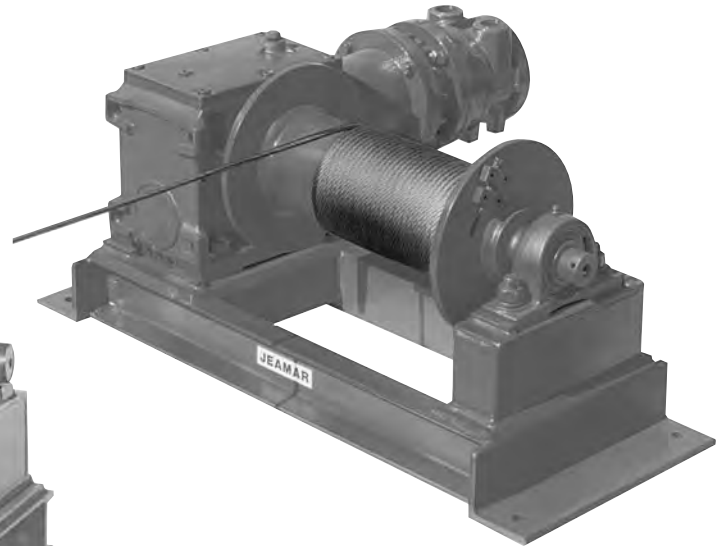
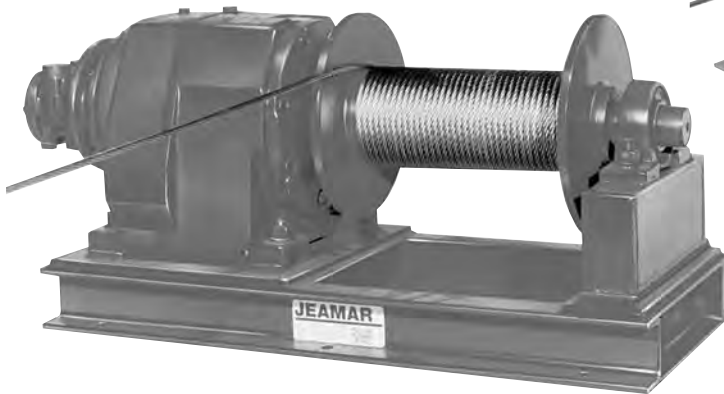


| ITEM NO. | DESCRIPTION OF PART | QTY | TOTAL PART NUMBER | |
|----------|--|-----|---|--------------------|
| | | | LM (2 Ton) | HM (5 Ton) |
| 1 | Spacer Nut | 4 | 52848 | |
| 2 | Pinion Bushing | 2 | 1288-1 | 1288-4 |
| 3 | Large Frame | 1 | Not Sold Separately | |
| 4 | Gear Bushing | 2 | 1288-3 | 1288-6 |
| 5 | Dowel | 1 | 290 | |
| 6 | Cotter Pin | 1 | 54725 | |
| 7 | Cotter Pin | 2 | 51021 | |
| 8 | Label Ring | 1 | 50040 (Refer to Kit Part Number 23223) | |
| 9 | Grease Fitting | 5 | 53839 | |
| 10 | Jam Nut | 1 | 50161 | |
| 11 | Setscrew154691 | | | |
| 12 | Gear | 1 | 462-2 | 158-2 |
| 13 | Brake Lever | 1 | 1307 | |
| 14 | Brake Shoe Block | 1 | 937 | |
| 15 | Brake Shoe | 1 | 2204 | 2203 |
| 16 | Drum Bushing | 2 | 1288-2 | 1288-5 |
| 17 | Brake Spring | 1 | 1352 | |
| 18 | Drum (All models and lengths) | 1 | 172-1 | 258-2 |
| 19 | Small Frame | 1 | 1306-A | 1302-A |
| 20 | IR-Logo Label | 1 | 71106231 (Refer to Kit Part Number 23223) | |
| 21 | Cotter Pin | 1 | 54447 | 54165 |
| 22 | Dog Pin | 1 | 3839 | |
| 23 | Wire Rope Clamp (Incl's items 28 & 29) | 1 | 407-B | 307-B |
| 24 | Dog | 1 | Order Dog Assy 774 | Order Dog Assy 795 |
| 25 | Washer (without reversing dog) | 1 | 50918 | |
| | Washer (with reversing dog) | 2 | | |
| 26 | Dog Spring (without reversing dog) | 1 | 1353 | |
| | Dog Spring (with reversing dog) | 2 | | |
| 27 | Spacer (6 in. long drum) | | 279-1 | --- |
| | Spacer (10 in. long drum) | | 279-2 | --- |
| | Spacer (8 in. long drum) | 2 | --- | 281-2 |
| | Spacer (12 in. long drum) | | --- | 281-3 |
| | Spacer (16 in. long drum) | | --- | 281-4 |
| | Spacer (24 in. long drum) | | --- | 281-5 |
| 28 | Wire Rope Clamp Setscrew | 1 | (71063796) Order item 23 | |
| 29 | Wire Rope Clamp Locknut | 1 | (50914) Order item 23 | |
| 30 | Spring Loaded Lock Dowel | 1 | 303 | |
| 31 | Locknut | 1 | 50852 | |
| 32 | Handle Retainer | 1 | 52856 | |
| 33 | Pinion | 1 | 164 | 165B |
| 34 | Handle Assembly (Standard) | 1 | 278 | 286 |
| 35 | Lockscrew | 1 | 239 | |
| 41 | Gear Cover (Optional) | 1 | 250-B | 249 |
| 42 | Warning Tag | 1 | 71056410 (Refer to Kit Part Number 23223) | |
| 43 | Warning Label | 1 | 71064125 (Refer to Kit Part Number 23223) | |
| 44 | Drive Screw | 6 | 50915 (Refer to Kit Part Number 23223) | |
| 45 | Nameplate | 1 | 71064208-R (NOT SOLD) | |
| *130 | Reversing Dog | 1 | 308367 | |
| | **Recommended spare. | | *Not shown on drawing. | |

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

AIR WINCHES

Air Tugger Winch



Air Lifting Winch

Winch Drums

Drums are steel fabricated and designed to specific loading capacity. Drums are sized according to ASME B30.7.94 to provide a minimum pitch diameter of 15 times the nominal rope diameter on Air Tuggers and 18 times on our Air Lifting Winches.

Direct Drive

A simple, direct-drive design increases the efficiency of the winch and eliminates drive chains or bull gears to maximize power output.

Any Position

An open-base design permits mounting in horizontal or vertical positions. Loads can be pulled through the base itself, which is particularly useful in limited-space installations.

Ball & Roller Bearings Throughout

Friction load loss is reduced to a minimum through the use of ball and roller bearings. No bushings means higher efficiency and more power for pulling.

Power In — Power Out

For added safety, all winches are fully reversible. This gives the operator complete control of the winch load in both directions at all times.

High Service Factors

Jeamar winches are designed and manufactured for continuous, heavy-duty operation with a minimum service factor of 1 (one).

Gear Reducers

All Jeamar air winches have high-efficiency helical reducers plus high-capacity, anti-friction bearings for long life, low noise and high output torque. Totally enclosed reducers make them weatherproof.

Air Motors

Jeamar air motors are fully reversible vane type. Positive starting and precise control are central features of the motors, which have been designed for long life and low-cost operation. They can be stalled indefinitely under load without harm to the motor.

Control Valve

Control valves feature proportional flow with spring return to neutral for "deadman" operation. Valves control the winch speed by varying air flow to the motor. With the control released, air flow is cut off, stopping the winch. Controls are supplied loose to allow for mounting that is appropriate to the application.

Air Brake

Standard on all heavy duty lifting winches, the air brake is a disc type that is activated automatically in the event of a power interruption. The brake will stop the winch and hold the load securely. When the Air Tugger is used to move loads on an incline, it is essential that a brake be used.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

AIR WINCHES



Air Tugger Winch Specifications

| Model Number | | NHA 550 | NHA 1100 | NHA 1900 | NHA 2800 | NHA 4000 | NHA 5800 | NHA 7500 |
|-----------------------------------|-------|---------|----------|----------|----------|----------|----------|----------|
| Working Load Limit (1st Layer) | lb | 550 | 1100 | 1900 | 2800 | 4000 | 5800 | 7500 |
| | kg | 249 | 499 | 862 | 1270 | 1814 | 2630 | 3401 |
| Working Load Limit (4th Layer) | lb | 412 | 785 | 1355 | 2015 | 2900 | 4230 | 5280 |
| | kg | 187 | 356 | 615 | 914 | 1315 | 1918 | 2395 |
| Line Speed (1st Layer) | fpm | 25 | 28 | 27 | 21 | 22 | 26 | 23 |
| | m/min | 7.6 | 8.5 | 8.2 | 6.4 | 6.7 | 7.9 | 7.0 |
| Line Speed (4th Layer) | fpm | 33 | 39 | 38 | 29 | 30 | 35 | 32 |
| | m/min | 10.1 | 11.9 | 11.6 | 8.8 | 9.1 | 10.7 | 9.8 |
| Rope Diameter | in | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 |
| | mm | 3 | 5 | 6 | 8 | 10 | 11 | 13 |
| Rope Capacity (4th Layer) | ft | 125 | 160 | 215 | 215 | 275 | 290 | 250 |
| | m | 38 | 49 | 66 | 66 | 84 | 88 | 76 |
| Motor Power (at rated line speed) | Hp | 0.42 | 0.96 | 1.58 | 2.40 | 2.70 | 4.60 | 5.40 |
| | kw | 0.3 | 0.7 | 1.2 | 1.8 | 2.0 | 3.4 | 4.0 |
| Air Consumption | cfm | 58 | 110 | 110 | 160 | 160 | 260 | 260 |
| | l/s | 26 | 50 | 50 | 75 | 75 | 118 | 118 |
| Weight | lb | 92 | 130 | 190 | 415 | 438 | 645 | 808 |
| | kg | 42 | 59 | 86 | 189 | 199 | 293 | 367 |

Note: All performance data are based on 90psi (6 Bar) air supply

Air Lifting Winch Specifications

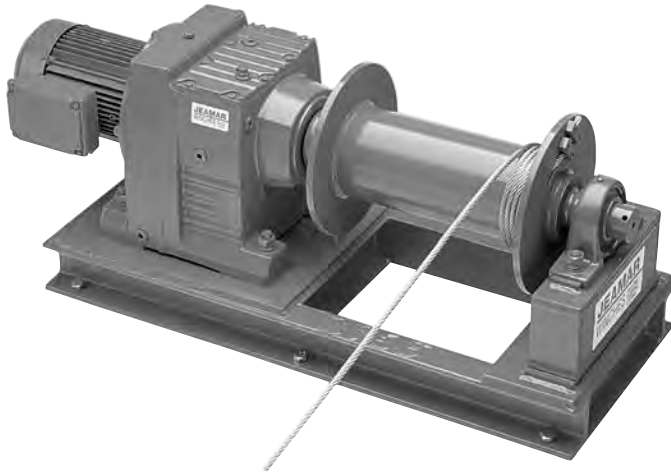
| Model Number | | NLA 400 | NLA 900 | NLA 1400 | NLA 2000 | NLA 2800 | NLA 3800 | NLA 5000 |
|-----------------------------------|-------|---------|---------|----------|----------|----------|----------|----------|
| Working Load Limit (1st Layer) | lb | 400 | 900 | 1400 | 2000 | 2800 | 3800 | 5000 |
| | kg | 181 | 408 | 635 | 907 | 1270 | 1723 | 2268 |
| Working Load Limit (4th Layer) | lb | 300 | 675 | 1060 | 1515 | 2120 | 2940 | 3750 |
| | kg | 136 | 306 | 481 | 687 | 961 | 1333 | 1701 |
| Line Speed (1st Layer) | fpm | 24 | 24 | 24 | 23 | 25 | 23 | 20 |
| | m/min | 7.3 | 7.3 | 7.3 | 7.0 | 7.6 | 7.0 | 6.1 |
| Line Speed (4th Layer) | fpm | 32 | 32 | 32 | 30 | 33 | 30 | 27 |
| | m/min | 9.8 | 9.8 | 9.8 | 9.1 | 10.1 | 9.1 | 8.2 |
| Rope Diameter | in | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 |
| | mm | 3 | 5 | 6 | 8 | 10 | 11 | 13 |
| Rope Capacity (4th Layer) | ft | 125 | 187 | 250 | 300 | 300 | 350 | 300 |
| | m | 38 | 57 | 76 | 91 | 91 | 107 | 91 |
| Motor Power (at rated line speed) | Hp | 0.40 | 1.00 | 1.48 | 2.00 | 2.90 | 3.80 | 4.30 |
| | kw | 0.3 | 0.7 | 1.1 | 1.5 | 2.2 | 2.8 | 3.2 |
| Air Consumption | cfm | 58 | 110 | 110 | 160 | 160 | 260 | 260 |
| | l/s | 26 | 50 | 50 | 75 | 75 | 118 | 118 |
| Weight | lb | 128 | 196 | 289 | 350 | 378 | 445 | 719 |
| | kg | 58 | 89 | 131 | 159 | 172 | 202 | 327 |

Note: All performance data are based on 90psi (6 Bar) air supply

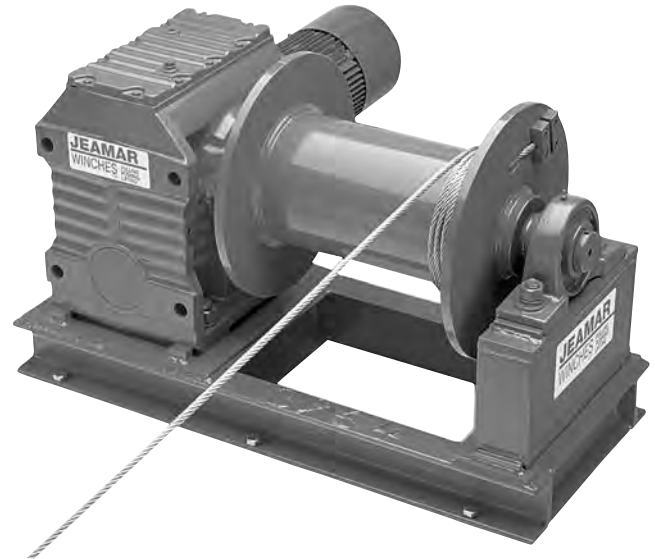
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ELECTRIC WINCHES

Electric Hauling Winch



Electric Lifting Winch



Winch Drums

Drums are steel fabricated and designed to specific loading capacity. Drums are sized according to ASME B30.7.94 to provide a minimum pitch diameter of 15 times the nominal rope diameter on Hauling Winches and 18 times on Lifting Winches.

Direct Drive

A simple, direct-drive design increases the efficiency of the winch for maximum power output.

Any Position

An open-base design permits mounting in horizontal or vertical positions.

Ball & Roller Bearings

Friction load loss is reduced to a minimum through the use of ball and roller bearings.

Power In — Power Out

For added safety, all winches are fully reversible.

High Service Factors

Jeamar winches are designed and manufactured for continuous, heavy-duty operation with a minimum service factor of 1 (one).

Gear Reducers

All Jeamar hauling winches have high-efficiency helical gear re-

ducers plus high-capacity, anti-friction bearings for long life, low noise and high output torque. Jeamar Lifting Winches utilize high efficiency helical worm or worm reducers.

Electric Motors

The full range of Jeamar's heavy duty electric winches is available with 3-phase motors in any standard voltage at 50 or 60 Hz, with a selection of single phase in any standard voltage at 50 or 60 Hz. All motors are TEFC flange mounted and conform to NEMA, EEMAC or IEC specifications.

Braking Systems

Standard on all heavy duty lifting winches, the electromagnetic brake is a disc type that is activated automatically in the event of a power interruption. The brake will stop the winch and hold the load securely. Due to the high ratio of the worm gear, it has the effect of a secondary braking system in accordance with the requirements of OSHA. When a Hauling Winch is used to move loads on an incline, it is essential that a brake be used.

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ELECTRIC WINCHES

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

Specifications

Single Phase Hauling Winches

| Model Number | | NHS 550 | NHS 1100 | NHS 1900 |
|--------------------------------|--------|---------|----------|----------|
| Working Load Limit (1st Layer) | lb | 550 | 1100 | 1900 |
| | kg | 249 | 499 | 862 |
| Working Load Limit (4th Layer) | lb | 412 | 785 | 1355 |
| | kg | 187 | 356 | 615 |
| Line Speed (1st Layer) | ft/min | 25 | 28 | 24 |
| | m/min | 7.6 | 8.5 | 7.3 |
| Line Speed (4th Layer) | ft/min | 33 | 39 | 34 |
| | m/min | 10.1 | 11.9 | 10.4 |
| Rope Diameter | in | 1/8 | 3/16 | 1/4 |
| | mm | 3 | 5 | 6 |
| Rope Capacity (4th Layer) | ft | 105 | 160 | 215 |
| | m | 32 | 49 | 66 |
| Motor | Hp | 1/2 | 1 | 1-1/2 |
| | kW | 0.4 | 0.7 | 1.1 |
| Weight | lb | 90 | 140 | 232 |
| | kg | 41 | 63 | 105 |

Single Phase Lifting Winches

| Model Number | | NLS 400 | NLS 900 | NLS 1400 | NLS 2000 |
|--------------------------------|--------|---------|---------|----------|----------|
| Working Load Limit (1st Layer) | lb | 400 | 900 | 1400 | 2000 |
| | kg | 181 | 408 | 635 | 907 |
| Working Load Limit (4th Layer) | lb | 300 | 675 | 1060 | 1515 |
| | kg | 136 | 306 | 481 | 687 |
| Line Speed (1st Layer) | ft/min | 24 | 24 | 25 | 23 |
| | m/min | 7.3 | 7.3 | 7.6 | 7.0 |
| Line Speed (4th Layer) | ft/min | 32 | 32 | 33 | 30 |
| | m/min | 9.8 | 9.8 | 10.1 | 9.1 |
| Rope Diameter | in | 1/8 | 3/16 | 1/4 | 5/16 |
| | mm | 3 | 5 | 6 | 8 |
| Rope Capacity (4th Layer) | ft | 125 | 187 | 250 | 300 |
| | m | 38 | 57 | 76 | 91 |
| Motor | Hp | 1/2 | 1 | 1-1/2 | 2 |
| | kW | 0.4 | 0.7 | 1.1 | 1.5 |
| Weight | lb | 130 | 212 | 322 | 420 |
| | kg | 59 | 96 | 146 | 190 |

2

Three Phase Hauling Winches

| Model Number | | NHT 550 | NHT 1100 | NHT 1900 | NHT 2800 | NHT 4000 | NHT 5800 | NHT 7500 | NHT 9000 | NHT 11000 | NHT 15000 | NHT 17000 |
|--------------------------------|--------|---------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| Working Load Limit (1st Layer) | lb | 550 | 1100 | 1900 | 2800 | 4000 | 5800 | 7500 | 9000 | 11000 | 15000 | 17000 |
| | kg | 249 | 499 | 862 | 1270 | 1814 | 2630 | 3401 | 4082 | 4989 | 6803 | 7710 |
| Working Load Limit (4th Layer) | lb | 390 | 785 | 1357 | 2015 | 2900 | 4230 | 5280 | 6615 | 7850 | 10770 | 12230 |
| | kg | 177 | 356 | 615 | 914 | 1315 | 1918 | 2395 | 3000 | 3560 | 4884 | 5546 |
| Line Speed (1st Layer) | ft/min | 27 | 28 | 31 | 31 | 25 | 26 | 29 | 25 | 28 | 21 | 28 |
| | m/min | 8.2 | 8.5 | 9.5 | 9.5 | 7.6 | 7.9 | 8.8 | 7.6 | 8.5 | 6.4 | 8.5 |
| Line Speed (4th Layer) | ft/min | 38 | 39 | 43 | 43 | 34 | 35 | 41 | 34 | 39 | 30 | 39 |
| | m/min | 11.6 | 11.9 | 13.1 | 13.1 | 10.4 | 10.7 | 12.5 | 10.4 | 11.9 | 9.1 | 11.9 |
| Rope Diameter | in | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 9/16 | 5/8 | 3/4 | 3/4 |
| | mm | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 14 | 16 | 19 | 19 |
| Rope Capacity (4th Layer) | ft | 113 | 117 | 226 | 215 | 275 | 290 | 250 | 350 | 315 | 375 | 375 |
| | m | 34 | 36 | 69 | 66 | 84 | 88 | 76 | 107 | 96 | 114 | 114 |
| Motor | Hp | 1/2 | 1 | 2 | 3 | 3 | 5 | 7 1/2 | 7 1/2 | 10 | 10 | 12 1/2 |
| | kW | 0.4 | 0.7 | 1.5 | 2.2 | 2.2 | 3.7 | 5.6 | 5.6 | 7.5 | 7.5 | 9.3 |
| Weight | lb | 94 | 146 | 229 | 450 | 500 | 700 | 950 | 1230 | 1500 | 1900 | 2100 |
| | kg | 43 | 66 | 104 | 204 | 227 | 317 | 431 | 558 | 680 | 840 | 952 |

Three Phase Lifting Winches

| Model Number | | NLT 400 | NLT 800 | NLT 1400 | NLT 1900 | NLT 2800 | NLT 3800 | NLT 5000 | NLT 6500 | NLT 8000 | NLT 11000 | NLT 16000 |
|--------------------------------|--------|---------|---------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| Working Load Limit (1st Layer) | lb | 400 | 800 | 1400 | 1900 | 2800 | 3800 | 5000 | 6500 | 8000 | 11000 | 16000 |
| | kg | 181 | 363 | 635 | 862 | 1270 | 1723 | 2268 | 2948 | 3628 | 4989 | 7256 |
| Working Load Limit (4th Layer) | lb | 325 | 675 | 1060 | 1380 | 2120 | 2945 | 3750 | 4840 | 6015 | 8270 | 12210 |
| | kg | 147 | 306 | 481 | 626 | 961 | 1336 | 1701 | 2195 | 2728 | 3751 | 5537 |
| Line Speed (1st Layer) | ft/min | 22 | 22 | 24 | 24 | 23 | 28 | 22 | 27 | 25 | 21 | 22 |
| | m/min | 6.7 | 6.7 | 7.3 | 7.3 | 7.0 | 8.5 | 6.7 | 8.2 | 7.6 | 6.4 | 6.7 |
| Line Speed (4th Layer) | ft/min | 27 | 26 | 32 | 33 | 30 | 36 | 29 | 36 | 33 | 28 | 29 |
| | m/min | 8.2 | 7.9 | 9.8 | 10.1 | 9.1 | 11.0 | 8.8 | 11.0 | 10.1 | 8.5 | 8.8 |
| Rope Diameter | in | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 9/16 | 5/8 | 3/4 | 7/8 |
| | mm | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 14 | 16 | 19 | 22 |
| Rope Capacity (4th Layer) | ft | 175 | 220 | 250 | 300 | 300 | 350 | 300 | 300 | 300 | 400 | 425 |
| | m | 53 | 67 | 76 | 91 | 91 | 107 | 91 | 91 | 91 | 122 | 130 |
| Motor | Hp | 1/2 | 1 | 1.5 | 2 | 3 | 5 | 5 | 7.5 | 10 | 10 | 15 |
| | kW | 0.4 | 0.7 | 1.1 | 1.5 | 2.2 | 3.7 | 3.7 | 5.5 | 7.5 | 7.5 | 11.2 |
| Weight | lb | 130 | 212 | 322 | 420 | 440 | 500 | 774 | 920 | 1390 | 2060 | 3060 |
| | kg | 59 | 96 | 146 | 190 | 200 | 227 | 351 | 417 | 630 | 934 | 1388 |

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CAPSTAN WINCHES

2



Direct Drive

A direct-drive design increases the efficiency of the capstan winch and eliminates drive chains or bull gears to maximize power output.

Any Angle

The rope can leave the drum at any angle, enabling the operator to stand in the most appropriate, out-of-line-of-sight location. For safety, the load line shall be the bottom wrap on the drum, and the lead line going to the operator will be the top wrap on the drum.

Gear Reducers

All Jeamar capstan winches utilize high-efficiency worm, helical, helical-worm or helical-bevel reducers plus high-capacity, anti-friction bearings designed for long life, low noise and higher output torque.

High Starting Loads

High-starting-torque, 3-phase motors are available in all standard voltages at 50 and 60 Hz. These motors are suited to railcar pulling where momentary overloads occur when a railcar is started in motion. Single phase motors at 115/230 volts at 50 or 60 Hz are available as an option on some models.

Load Calculations

For detail on pulling railcars up grades, send for our free railcar pulling brochure.

Controls

Capstans can be supplied with start/stop, foot-operated controls of the "deadman" variety. If the operator's foot moves off the switch, the capstan will stop. This type of control allows the operator to use two hands on the rope, for optimum control.

Hydraulic and Air-Driven Motors

Capstan winches can be supplied with either hydraulic or air motors.

Explosion Proof

Fully explosion-proof motors and controls are available for applications in hostile or volatile environments.

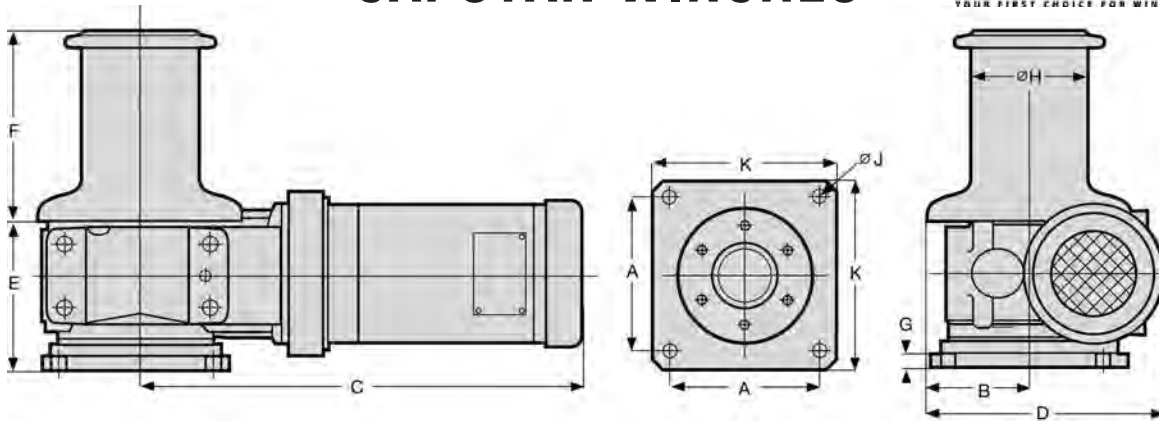
torque limitation

Capstans can be supplied with a variable frequency drive (VFD) package. The VFD controls the amount of current that the motor can draw, limiting the amount of torque that the electric motor can produce.

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CAPSTAN WINCHES

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS



2

| Model Number | | VC 2000-26 | VC 5000-30 | VC 5000-45 | VC 8000-13 | VC 8000-30 | VC 12000-17 | VC 15000-13 | VC 18000-17 | VC 22000-17 | |
|--------------------------------|--------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------|
| Working Load Limit Starting | lb | 2000 | 5000 | 5000 | 8000 | 8000 | 12000 | 15000 | 18000 | 22000 | |
| | kg | 907 | 2268 | 2268 | 3628 | 3628 | 5442 | 6803 | 8163 | 9977 | |
| Working Load Limit Running | lb | 1000 | 2500 | 2500 | 4000 | 4000 | 6000 | 7500 | 9000 | 11000 | |
| | kg | 454 | 1134 | 1134 | 1814 | 1814 | 2721 | 3401 | 4082 | 4989 | |
| Rope Speed | ft/min | 26 | 30 | 45 | 13 | 30 | 17 | 13 | 17 | 17 | |
| | m/min | 8 | 9 | 14 | 4 | 9 | 5 | 4 | 5 | 5 | |
| Rope Diameter* (Polypropylene) | in | 5/8 | 1-1/8 | 1-1/8 | 1-1/2 | 1-1/2 | 1-3/4 | 2 | - | - | |
| | mm | 16 | 29 | 29 | 38 | 38 | 44 | 50 | - | - | |
| Rope Diameter* (Spect-Set) | in | 5/8 | 5/8 | 5/8 | 3/4 | 3/4 | 7/8 | 1 | 1-1/4 | 1-1/4 | |
| | mm | 16 | 16 | 16 | 20 | 20 | 22 | 25 | 32 | 32 | |
| Motor | Hp | 1.5 | 3 | 5 | 3 | 5 | 5 | 5 | 7.5 | 7.5 | |
| | kW | 1.1 | 2.3 | 3.8 | 2.3 | 3.8 | 3.8 | 3.8 | 5.7 | 5.7 | |
| Weight | lb | 202 | 330 | 355 | 452 | 474 | 660 | 1124 | 1162 | 1379 | |
| | kg | 92 | 150 | 161 | 205 | 215 | 299 | 510 | 527 | 625 | |
| DIMENSIONS | A | in | 9.00 | 9.00 | 9.00 | 14.50 | 14.50 | 14.50 | 17.00 | 17.00 | 17.00 |
| | | mm | 229 | 229 | 229 | 368 | 368 | 368 | 432 | 432 | 432 |
| | B | in | 5.58 | 6.00 | 6.00 | 8.75 | 8.75 | 8.75 | 10.50 | 10.50 | 12.40 |
| | | mm | 142 | 152 | 152 | 222 | 222 | 222 | 267 | 267 | 315 |
| | C | in | 14.66 | 26.39 | 26.39 | 27.62 | 27.62 | 30.00 | 32.00 | 32.66 | 51.66 |
| | | mm | 372 | 670 | 670 | 702 | 702 | 762 | 813 | 830 | 1312 |
| | D | in | 11.83 | 14.00 | 14.00 | 18.00 | 18.00 | 19.77 | 23.69 | 23.69 | 22.90 |
| | | mm | 300 | 356 | 356 | 457 | 457 | 502 | 602 | 602 | 582 |
| | E | in | 8.95 | 10.05 | 10.05 | 11.81 | 11.81 | 13.75 | 16.09 | 16.09 | 11.88 |
| | | mm | 227 | 255 | 255 | 300 | 300 | 349 | 409 | 409 | 302 |
| | F | in | 5.25 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 |
| | | mm | 133 | 292 | 292 | 292 | 292 | 292 | 292 | 292 | 292 |
| | G | in | 0.75 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.25 | 1.25 | 1.25 |
| | | mm | 19 | 19 | 19 | 25 | 25 | 25 | 32 | 32 | 32 |
| | H | in | 4.00 | 7.00 | 7.00 | 7.00 | 7.00 | 9.00 | 11.00 | 11.00 | 11.00 |
| | | mm | 102 | 178 | 178 | 178 | 178 | 229 | 279 | 279 | 279 |
| | J | in | 0.81 | 0.81 | 0.81 | 1.06 | 1.06 | 1.06 | 1.31 | 1.31 | 1.31 |
| | | mm | 21 | 21 | 21 | 27 | 27 | 27 | 33 | 33 | 33 |
| K | in | 11.00 | 11.00 | 11.00 | 17.50 | 17.50 | 17.50 | 21.00 | 21.00 | 21.00 | |
| | mm | 279 | 279 | 279 | 445 | 445 | 445 | 533 | 533 | 533 | |

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ELECTRIC MOTOR CONTROLS

2



Single Speed Reversing Magnetic Controls for 1- and 3-phase motors up to 40 HP.

UL, IEC or CSA Recognized Components Throughout.

- **Steel Enclosure** NEMA 4 rated (watertight) keeps dirt and water out. Approved for most outdoor applications.
- **Pendant Control Switch** NEMA 4X rated (watertight), on 50-foot cord, allows operator to stand away from winch during operation. Pendant control is operated with momentary contact-type push buttons. Cord lengths of less than 50 feet are available, please specify when ordering.
- **Reversing Contactor** is electrically and mechanically interlocked to deliver smooth reversing control.
- **Thermal Overload Relay** trips power OFF to protect motor from overheating. Switch is manually reset.
- **Fused Control Circuit** powers pendant with 115 volt, 2 amp current to help protect against high voltage shocks.
- **Wiring Diagram** is supplied inside enclosure.
- **Steel Mounting Bracket** secures control box to winch.

EL SERIES - ELECTRIC MOTOR CONTROLS - HORSEPOWER RATINGS

| Model No. | Maximum Rated Motor Horsepower For Power Supply Current | | | | | Approx. Ship. Wt. (Lbs.) |
|-----------|---|----------|-----------|-----------|-----------|--------------------------|
| | 115/1/60 | 230/1/60 | 208/3/60 | 230/3/60 | 460/3/60 | |
| EL 4017 | To 1 HP | - | - | - | - | 25 |
| EL 4023 | To 1.5 HP | - | - | - | - | 25 |
| EL 4018 | - | To 2 HP | - | - | - | 25 |
| EL 4024 | - | To 3 HP | - | - | - | 25 |
| EL 4019 | - | - | To 3 HP | - | - | 25 |
| EL 4026 | - | - | To 7.5 HP | - | - | 25 |
| EL 4027 | - | - | To 10 HP | - | - | 28 |
| EL 4028 | - | - | To 20 HP | - | - | 28 |
| EL 4020 | - | - | - | To 3 HP | - | 25 |
| EL 4029 | - | - | - | To 7.5 HP | - | 25 |
| EL 4030 | - | - | - | To 10 HP | - | 28 |
| EL 4031 | - | - | - | To 20 HP | - | 28 |
| EL 4052 | - | - | - | To 30 HP | - | 60 |
| EL 4021 | - | - | - | - | To 7.5 HP | 25 |
| EL 4032 | - | - | - | - | To 15 HP | 25 |
| EL 4033 | - | - | - | - | To 20 HP | 28 |
| EL 4053 | - | - | - | - | To 40 HP | 60 |
| EL 4054 | - | - | - | - | To 60 HP | 60 |

Controls include NEMA 4 enclosure and NEMA 4X push button pendant control on 50-foot cord.

Options:

- Special current or horsepower ratings
- Special-rated enclosures for explosive or harsh environments
- Soft start or soft stop controls
- Variable speed or multi-speed controls
- Torque limiting controls
- Selector switches
- Power cord disconnects
- Various panel mounted controls or pilot lights

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GW SERIES WALL MOUNT

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

Seven Rugged Sizes

Linepulls from 550 lbs. (250 kg) to 11,000 lbs. (5,000 kg).

Two Speeds

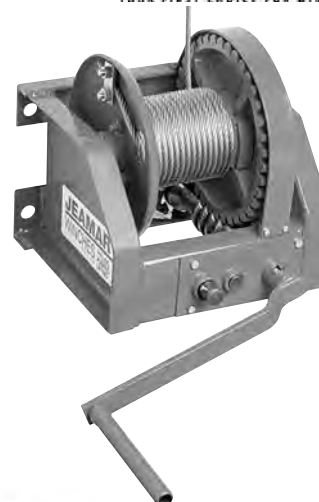
Higher-capacity models are equipped with two-speed gearing for ease in handling heavy loads.

Brakes are standard/Removable Handle

Load activated braking and a removable handle prevent tampering if the operator must leave the winch under load.

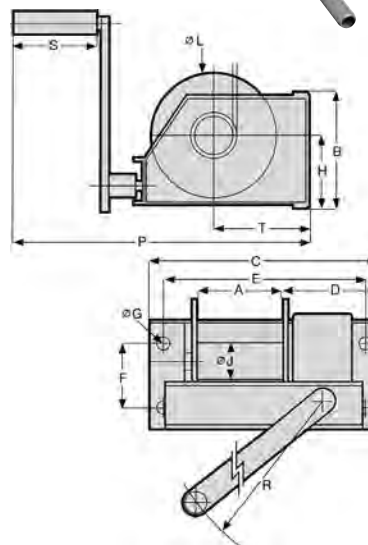
Bearings

Effective use of needle roller bearings and bushings minimizes friction, ensures ease of operation, smooth running, increased life and minimum cranking effort.



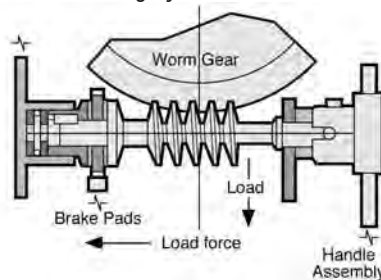
2

| Model Number | GW 550 | GW 1100 | GW 2200 | GW 3300 | GW 4400 | GW 6600 | GW 11000 | | |
|--------------------------------------|--------|---------|---------|---------|---------|---------|----------|-------|-------|
| Working Load Limit (1st Layer) | lb | 550 | 1100 | 2200 | 3300 | 4400 | 6600 | 11000 | |
| | kg | 250 | 500 | 1000 | 1500 | 2000 | 3000 | 5000 | |
| Rope Diameter | in | 3/16 | 1/4 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | |
| | mm | 5 | 6 | 9 | 10 | 13 | 16 | 20 | |
| Rope Storage Capacity | ft | 222 | 222 | 190 | 165 | 158 | 140 | 140 | |
| | m | 68 | 68 | 58 | 50 | 48 | 43 | 43 | |
| Lift Per Crank Rotation (High Speed) | in | 1.7 | 1.7 | 1.0 | 0.9 | 0.8 | 0.6 | 0.7 | |
| | mm | 44 | 42 | 25 | 24 | 21 | 16 | 18 | |
| Lift Per Crank Rotation (Low Speed) | in | - | - | - | - | 0.4 | 0.3 | 0.4 | |
| | mm | - | - | - | - | 11 | 8 | 9 | |
| Hand Force Required | lb | 11 | 20 | 31 | 46 | 26 | 37 | 77 | |
| | N | 49 | 88 | 137 | 206 | 118 | 167 | 343 | |
| Weight | lb | 29 | 35 | 57 | 62 | 132 | 172 | 253 | |
| | kg | 13 | 16 | 26 | 28 | 60 | 78 | 115 | |
| DIMENSIONS | A | in | 4.21 | 5.08 | 6.30 | 7.28 | 7.09 | 8.07 | 7.87 |
| | | mm | 107 | 129 | 160 | 185 | 180 | 205 | 200 |
| | B | in | 6.69 | 7.48 | 10.24 | 10.35 | 16.50 | 21.65 | 24.13 |
| | | mm | 170 | 190 | 260 | 263 | 419 | 550 | 613 |
| | C | in | 11.54 | 12.32 | 13.70 | 14.88 | 16.14 | 17.17 | 17.17 |
| | | mm | 293 | 313 | 348 | 378 | 410 | 436 | 436 |
| | D | in | 4.84 | 4.92 | 5.00 | 5.00 | 5.39 | 5.39 | 5.43 |
| | | mm | 123 | 125 | 127 | 127 | 137 | 137 | 138 |
| | E | in | 10.28 | 11.06 | 12.44 | 13.62 | 14.17 | 15.20 | 15.20 |
| | | mm | 261 | 281 | 316 | 346 | 360 | 386 | 386 |
| | F | in | 3.21 | 4.17 | 5.55 | 7.01 | 7.72 | 9.88 | 12.44 |
| | | mm | 81.5 | 106 | 141 | 178 | 196 | 251 | 316 |
| | G | in | 7/16 | 7/16 | 7/16 | 7/16 | 1 | 1 | 1 |
| | | mm | 17 | 17 | 17 | 17 | 25 | 25 | 25 |
| | H | in | 3.45 | 3.78 | 5.51 | 5.59 | 9.80 | 12.13 | 13.19 |
| | | mm | 87.7 | 96 | 140 | 142 | 249 | 308 | 335 |
| | J | in | 1.90 | 2.76 | 4.00 | 4.00 | 5.24 | 6.50 | 8.63 |
| | | mm | 48.3 | 70 | 101.6 | 101.6 | 133 | 165.1 | 219.1 |
| | L | in | 6.30 | 7.48 | 9.45 | 9.45 | 12.28 | 14.80 | 17.20 |
| | | mm | 160 | 190 | 240 | 240 | 312 | 376 | 437 |
| P | in | 16.14 | 17.32 | 19.29 | 19.29 | 29.13 | 32.48 | 34.06 | |
| | mm | 410 | 440 | 490 | 490 | 740 | 825 | 865 | |
| R | in | 13.78 | 13.78 | 13.78 | 13.78 | 14.96 | 14.96 | 14.96 | |
| | mm | 350 | 350 | 350 | 350 | 380 | 380 | 380 | |
| S | in | 5.51 | 5.51 | 5.51 | 5.51 | 9.84 | 9.84 | 9.84 | |
| | mm | 140 | 140 | 140 | 140 | 250 | 250 | 250 | |
| T | in | 4.76 | 5.43 | 6.46 | 6.46 | 8.19 | 10.24 | 11.73 | |
| | mm | 121 | 138 | 164 | 164 | 208 | 260 | 298 | |



Automatic Brakes are Standard

Brakes respond automatically when the handle is released. Recoil is prevented and the load is held securely in any position. Ask for your copy of the technical bulletin on this Jeamar braking system.



Jeamar manufactures heavy duty winches for virtually any application. Thirteen different models are available in a wide range of sizes. Load activated brakes are standard on all models and sizes.

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

CMA SERIES SEAWORTHY

Aluminum

Seaworthy Aluminum

Corrosion resistant and ideal for deck machinery or dockside applications.

Cranking Flexibility

Can be operated from either end, providing flexibility where space is limited.

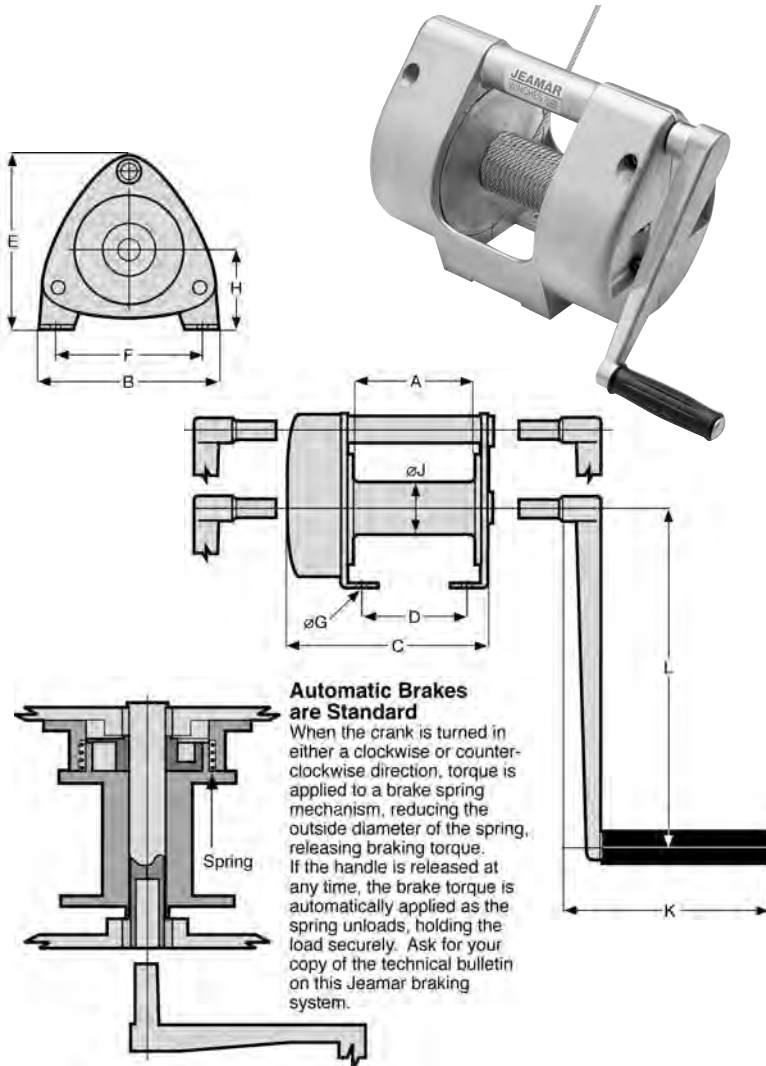
Two Speeds

Higher-capacity models are equipped with two-speed gearing for ease in handling heavy loads.

Rope off at any angle

Mount in any position; rope comes off where you want it.

2



| Model Number | | | CMA 440 | CMA 1100 | CMA 1760 |
|-------------------------|------------------------------|------|---------|----------|----------|
| Working Load Limit | Low Speed Drive (1st Layer) | lb | 440 | 1100 | 1760 |
| | | kg | 200 | 500 | 800 |
| | High Speed Drive (1st Layer) | lb | * | 198 | 429 |
| | | kg | * | 90 | 195 |
| Rope Diameter | | in | 3/16 | 1/4 | 5/16 |
| | | mm | 5 | 6 | 7 |
| Rope Storage Capacity | | ft | 131 | 164 | 256 |
| | | m | 40 | 50 | 78 |
| Lift Per Crank Rotation | Low Speed Drive | in | 6.7 | 2.4 | 1.4 |
| | | mm | 170 | 60 | 36 |
| | High Speed Drive | in | * | 8.2 | 9.7 |
| | | mm | * | 208 | 246 |
| Hand Force Required | | lb | 43 | 27 | 40 |
| | | N | 190 | 120 | 180 |
| Weight | | lb | 17.6 | 30.8 | 35.2 |
| | | kg | 8 | 14 | 16 |
| DIMENSIONS | A | in | 4.72 | 4.72 | 7.87 |
| | | mm | 120 | 120 | 200 |
| | B | in | 6.30 | 6.30 | 12.83 |
| | | mm | 160 | 160 | 326 |
| | C | in | 7.56 | 12.99 | 12.99 |
| | | mm | 192 | 330 | 330 |
| | D | in | 5.51 | 3.94 | 7.09 |
| | | mm | 140 | 100 | 180 |
| | E | in | 6.50 | 10.51 | 12.87 |
| | | mm | 165 | 267 | 327 |
| | F | in | 5.31 | 4.92 | 9.84 |
| | | mm | 135 | 125 | 250 |
| | G | in | 0.37 | 0.43 | 0.55 |
| | | mm | 9.5 | 11 | 14 |
| | H | in | 2.95 | 4.53 | 5.75 |
| | | mm | 75 | 115 | 146 |
| J | in | 1.97 | 2.36 | 2.76 | |
| | mm | 50 | 60 | 70 | |
| K | in | 7.72 | 6.5 | 7.72 | |
| | mm | 196 | 165 | 196 | |
| L | in | 12.6 | 9.84 | 12.6 | |
| | mm | 320 | 250 | 320 | |

*Note: Model CMA 440 - crank drives drum directly only

Jeamar manufactures heavy duty winches for virtually any application.

Thirteen different models are available in a wide range of sizes. Load activated brakes are standard on all models and sizes.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

CMS SERIES

Stainless Steel Console Mount

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

| Model Number | | CMS 1450 | CMS 2200 | |
|--------------------------------|----|----------|----------|-------|
| Working Load Limit (1st Layer) | lb | 1450 | 2200 | |
| | kg | 659 | 1000 | |
| Rope Diameter | in | 1/4 | 5/16 | |
| | mm | 6 | 7 | |
| Rope Storage Capacity | ft | 66 | 85 | |
| | m | 20 | 26 | |
| Lift Per Crank Rotation | in | 2.2 | 1.8 | |
| | mm | 55 | 45 | |
| Hand Force Required | lb | 50 | 54 | |
| | N | 220 | 240 | |
| Weight | lb | 16.72 | 26.62 | |
| | kg | 7.6 | 12.1 | |
| DIMENSIONS | A | in | 1.97 | 1.97 |
| | | mm | 50 | 50 |
| | B | in | 6.69 | 9.45 |
| | | mm | 170 | 240 |
| | C | in | 3.74 | 3.74 |
| | | mm | 95 | 95 |
| | D | in | 9.13 | 10.75 |
| | | mm | 232 | 273 |
| | E | in | 7.56 | 10.47 |
| | | mm | 192 | 266 |
| | F | in | - | 6.73 |
| | | mm | - | 171 |
| | G | in | 0.41 | 0.41 |
| | | mm | 10.5 | 10.5 |
| | H | in | 3.94 | 5.43 |
| | | mm | 100 | 138 |
| | J | in | 2.50 | 2.50 |
| | | mm | 63.5 | 63.5 |
| | K | in | 2.28 | 2.95 |
| | | mm | 58 | 75 |
| L | in | 7.20 | 10.04 | |
| | mm | 183 | 255 | |
| M | in | 3.94 | 3.07 | |
| | mm | 100 | 78 | |
| N | in | 0.98 | 1.38 | |
| | mm | 25 | 35 | |
| P | in | 11.46 | 11.46 | |
| | mm | 291 | 291 | |
| R | in | 9.84 | 9.84 | |
| | mm | 250 | 250 | |
| S | in | 4.21 | 4.21 | |
| | mm | 107 | 107 | |
| T | in | 2.17 | 2.17 | |
| | mm | 55 | 55 | |
| U | in | 1.5 | 1.2 | |
| | mm | 38 | 30 | |

Stainless Steel

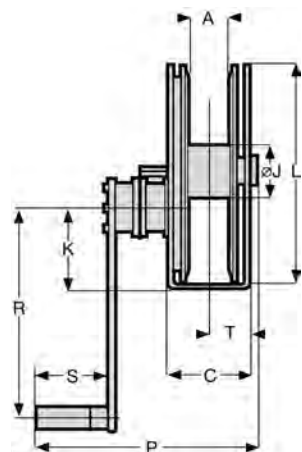
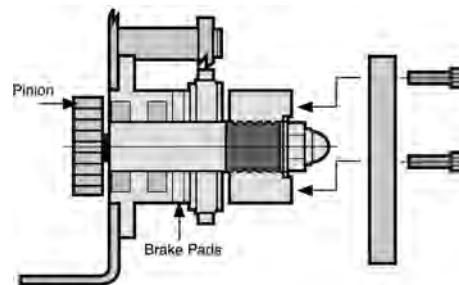
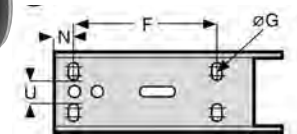
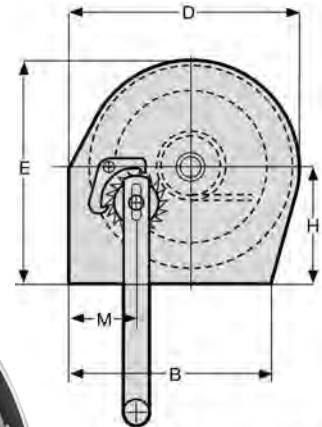
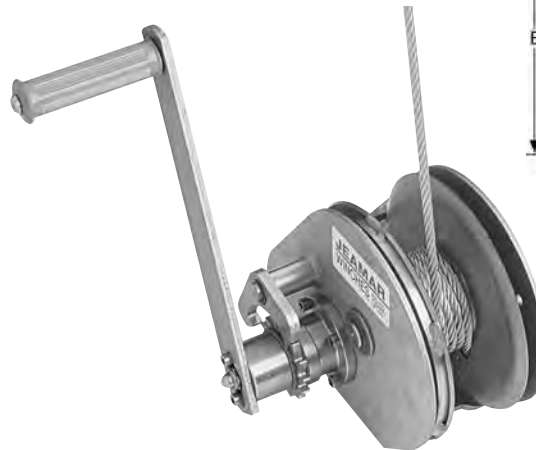
Corrosion resistant in hostile environments and ideal in hygienic applications such as food processing and pharmaceutical manufacturing.

Lightweight

For easy handling and installation.

High Efficiency

Leading-edge design reduces cranking effort.



Automatic Brakes are Standard

The winch is supplied with a detachable handle. The braking system is applied automatically when the operator stops turning the crank and the load is held securely. Ask for your copy of the technical bulletin on this Jeamar braking system.

Jeamar manufactures heavy duty winches for virtually any application. Thirteen different models are available in a wide range of sizes. Load activated brakes are standard on all models and sizes.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

CFF SERIES CONTROLLED

Free Fall

Controlled Free Fall

By simply pushing the handle back in the reverse direction, the winch will pay out at a controlled speed. The pay out speed is variable up to a predetermined maximum and is under the full control of the operator at all times. When the handle is released, the holding brake automatically goes on and the load is held.

Standard Double Braking System

A centrifugal dynamic brake is incorporated to govern maximum speed and to prevent overspeeding of the load. In addition, a load-activated brake is incorporated, allowing the operator to stop and hold the load securely in any position. This unique braking system also prevents the winch handle from recoiling.

High Rope-to-Drum Ratio

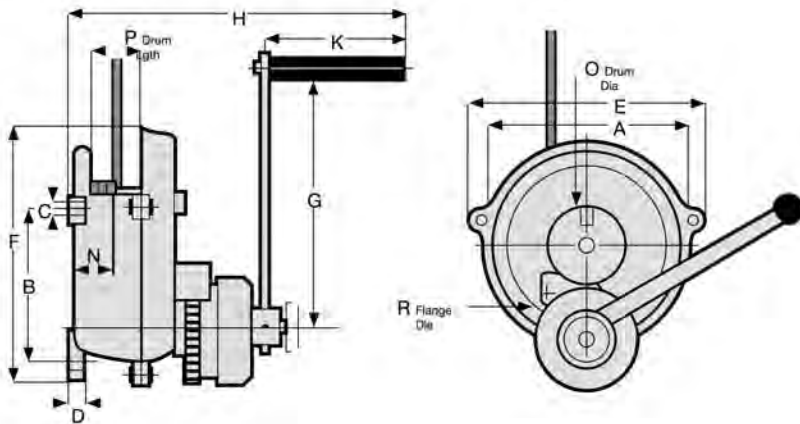
Rope life is substantially increased with drum diameters a minimum of 20 times the diameter of the rope.

Fully Enclosed Gears

All gears are fully enclosed, increasing operational protection and making the winch ideal for use in adverse conditions.

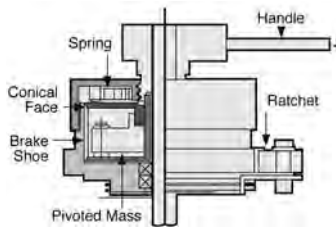


2



Automatic Brakes are Standard

The brake mechanism uses a split-shoe brake acting against a cylindrical drum. Counterclockwise rotation of the handle releases the brake by removing the axial pressure at the conical faces. The load begins to fall and the pivoted masses swing out under centripetal acceleration and reapply the brake. Releasing the handle applies the brake for positive holding of the load. Ask for your copy of the technical bulletin on this Jeamar braking system.



| Model Number | | CFF 660 | CFF 1100 | CFF 2200 | CFF 3300 |
|-------------------------------------|--------|---------|----------|----------|----------|
| Working Load Limit | lb | 660 | 1100 | 2200 | 3300 |
| | kg | 300 | 500 | 1000 | 1500 |
| Rope Diameter | in | 3/16 | 1/4 | 3/8 | 7/16 |
| | mm | 5 | 6 | 9 | 11 |
| Rope Storage Capacity | ft | 85 | 67 | 50 | 45 |
| | m | 26 | 20 | 15 | 14 |
| Lift Per Crank Rotation | in | 3.0 | 2.72 | 1.42 | 1.18 |
| | mm | 76 | 69 | 36 | 30 |
| Hand Force Required At Maximum Load | lb | 22.7 | 33.9 | 36.1 | 44.7 |
| | N | 101 | 151 | 161 | 199 |
| Maximum Lowering Speed | ft/min | 118 | 118 | 59 | 59 |
| | m/min | 36 | 36 | 18 | 18 |
| Weight | lb | 75 | 110 | 191 | 242 |
| | kg | 34 | 50 | 87 | 110 |
| A | in | 10.43 | 13.19 | 13.58 | 14.76 |
| | mm | 265 | 335 | 345 | 375 |
| B | in | 8.74 | 10.63 | 18.78 | 20.98 |
| | mm | 222 | 270 | 477 | 533 |
| C | in | 0.59 | 0.75 | 0.79 | 0.79 |
| | mm | 15 | 19 | 20 | 20 |
| D | in | 0.95 | 0.98 | 1.18 | 1.18 |
| | mm | 24 | 25 | 30 | 30 |
| E | in | 12.17 | 15.63 | 15.75 | 17.56 |
| | mm | 309 | 397 | 400 | 446 |
| F | in | 13.70 | 17.13 | 24.8 | 27.36 |
| | mm | 348 | 435 | 630 | 695 |
| G | in | 17.32 | 17.32 | 17.32 | 17.32 |
| | mm | 440 | 440 | 440 | 440 |
| H | in | 21.97 | 22.95 | 23.74 | 24.72 |
| | mm | 558 | 583 | 603 | 628 |
| K | in | 9.37 | 9.37 | 9.37 | 9.37 |
| | mm | 238 | 238 | 238 | 238 |
| N | in | 2.48 | 2.95 | 3.74 | 4.13 |
| | mm | 63 | 75 | 95 | 105 |
| O | in | 4.72 | 5.90 | 7.87 | 8.07 |
| | mm | 120 | 150 | 200 | 205 |
| P | in | 3.11 | 3.39 | 4.61 | 4.92 |
| | mm | 79 | 86 | 117 | 125 |
| R | in | 7.68 | 10.24 | 10.83 | 11.42 |
| | mm | 195 | 260 | 275 | 290 |

Jeamar manufactures heavy duty winches for virtually any application. Thirteen different models are available in a wide range of sizes. Load activated brakes are standard on all models and sizes.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Premium Steel Sheaves with Ball Bearings

Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

High Quality

Jeamar steel sheaves are manufactured from the highest-quality, fine-grain steel, ensuring uniformity of material, consistent high quality and greater strength. The innovative, cold-rolled forming process ensures an ideal groove profile. The inherent elasticity and resilience of steel makes for a tougher sheave to meet the most demanding applications.

Work Hardened

Work hardening of the rope groove takes place during the forming process, which substantially increases the life of the sheave. The high-quality finish of the rope groove ensures minimum wear and abrasion between the rope and sheave, adding considerably to the rope life.

High Strength And Low Weight

The strength of the steel used considerably exceeds that of cast iron. Steel also has a weight-saving advantage of up to 50 percent over cast iron, resulting in easier handling and installation.

Exceptional Arc of Support

Jeamar steel sheaves are designed with a minimum arc of support for the rope of 125 degrees, ensuring that the rope cross sectional shape is maintained under normal load conditions. In turn, this increases rope life by minimizing internal rope flexing and increases sheave life by reducing gouging. Note: It is essential that the correct size of sheave be used for the rope. For instance, a 1/2 in. diameter rope should be used with a sheave that has a 1/2 in. groove radius, to achieve optimum conditions.

High Sheave-to-Rope Ratio

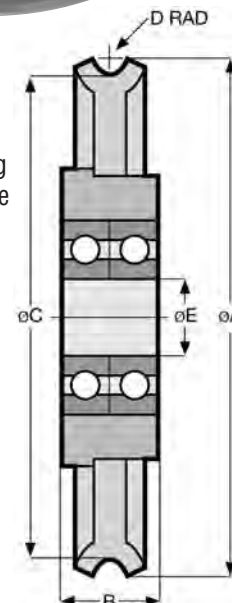
Jeamar sheaves have a minimum sheave-to-rope ratio of 15:1. This ensures a large radius for the rope to bend around, which in turn decreases flexing of the rope and substantially increases rope life.

High Efficiency Ball or Roller Bearings

Jeamar steel sheaves incorporate either ball or taper roller bearings for maximum efficiency, reduced friction, smooth motion, long life and high speed.

Lifetime Lubrication

The ball and roller bearings are sealed and lifetime lubricated for long life and minimum maintenance costs.



2

| Model Number | | S 1000 | S 3500 | S 7000 | S 10500 | S 16000 | S 23000 | S 31000 | S 41000 | S 52000 | S 68000 | S 83000 |
|--------------------|----|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| Working Load Limit | lb | 1000 | 3500 | 7000 | 10500 | 16000 | 23000 | 31000 | 41000 | 52000 | 68000 | 83000 |
| | kg | 455 | 1587 | 3175 | 4772 | 7272 | 10455 | 14090 | 18636 | 23583 | 30839 | 37642 |
| Sheave Diameter | in | 2.25 | 4.25 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 21.54 | 23.54 | 26.34 |
| | mm | 57 | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| Rope Size | in | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 |
| | mm | 3 | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 | 32 | 35 |
| Weight | lb | 3 | 3.5 | 6 | 10 | 16 | 24 | 38 | 56 | 114 | 182 | 300 |
| | kg | 1.3 | 1.6 | 2.7 | 4.5 | 7.3 | 10.9 | 17.2 | 25.4 | 52 | 83 | 136 |
| DIMENSIONS (mm) | A | 57 | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| | B | 20 | 30 | 38 | 42 | 50 | 58 | 66 | 74 | 67 | 67 | 80 |
| | C | 51 | 95 | 136 | 179 | 222 | 265 | 313 | 362 | 457 | 508 | 559 |
| | D | 2 | 3.5 | 5.5 | 6.5 | 9.5 | 11.5 | 11.5 | 13.5 | 16 | 17 | 19 |
| | E | 12 | 20 | 30 | 35 | 45 | 55 | 65 | 75 | 90 | 100 | 110 |

The S 52000, S 68000 and S 83000 are supplied with double row cylindrical roller bearings.

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SHEAVES & BLOCKS

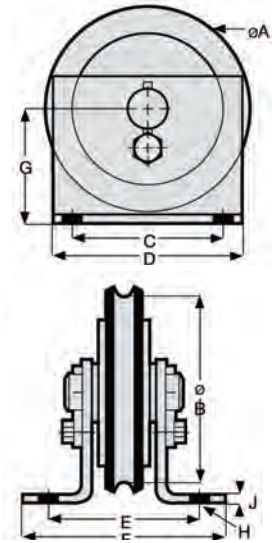


Vertical Directional Blocks



The S 52000, S 68000 and S 83000 are supplied with double row cylindrical roller bearings.

| Model Number | | VB 1000 | VB 3500 | VB 7000 | VB 10500 | VB 16000 | VB 23000 | VB 31000 | VB 41000 | VB 52000 | VB 68000 | VB 83000 |
|--------------------|----|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| Working Load Limit | lb | 1000 | 3500 | 7000 | 10500 | 16000 | 23000 | 31000 | 41000 | 52000 | 68000 | 83000 |
| | kg | 455 | 1587 | 3175 | 4772 | 7272 | 10455 | 14090 | 18636 | 23583 | 30839 | 37642 |
| Sheave Diameter | in | 2.25 | 4.25 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 21.54 | 23.54 | 26.34 |
| | mm | 57 | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| Rope Size | in | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 |
| | mm | 3 | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 | 32 | 35 |
| Weight | lb | 2 | 6 | 16 | 27 | 54 | 80 | 128 | 229 | 375 | 595 | 950 |
| | kg | 0.9 | 2.7 | 7.25 | 8.2 | 24.5 | 36.3 | 58 | 104 | 170 | 270 | 431 |
| DIMENSIONS (mm) | A | 57 | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| | B | 51 | 95 | 136 | 179 | 222 | 265 | 313 | 362 | 457 | 508 | 559 |
| | C | 32 | 60 | 83 | 114 | 153 | 216 | 267 | 292 | 406 | 444 | 497 |
| | D | 51 | 89 | 127 | 165 | 203 | 280 | 330 | 368 | 497 | 543 | 608 |
| | E | 70 | 87 | 122 | 151 | 185 | 219 | 253 | 286 | 283 | 309 | 346 |
| | F | 89 | 125 | 167 | 202 | 236 | 283 | 317 | 362 | 359 | 392 | 439 |
| | G | 35 | 61 | 86 | 112 | 143 | 165 | 194 | 223 | 283 | 309 | 346 |
| | H | 8.75 | 10.3 | 13.5 | 17.5 | 21 | 27 | 27 | 33 | 33 | 35 | 40 |
| | J | 4.75 | 6.4 | 9.6 | 13 | 16 | 19 | 22 | 26 | 26 | 29 | 32 |



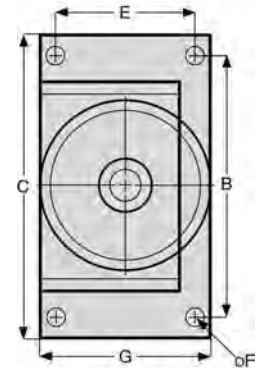
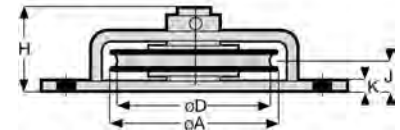
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Horizontal Directional Blocks



The S 52000, S 68000 and S 83000 are supplied with double row cylindrical roller bearings.

| Model Number | | HB 1000 | HB 3500 | HB 7000 | HB 10500 | HB 16000 | HB 23000 | HB 31000 | HB 41000 | HB 52000 | HB 68000 | HB 83000 |
|--------------------|----|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| Working Load Limit | lb | 1000 | 3500 | 7000 | 10500 | 16000 | 23000 | 31000 | 41000 | 52000 | 68000 | 83000 |
| | kg | 455 | 1587 | 3175 | 4772 | 7272 | 10455 | 14090 | 18636 | 23583 | 30839 | 37642 |
| Sheave Diameter | in | 2.25 | 4.25 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 21.54 | 23.54 | 26.34 |
| | mm | 57 | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| Rope Size | in | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 |
| | mm | 3 | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 | 32 | 35 |
| Weight | lb | 5.4 | 8.3 | 19 | 25 | 66 | 100 | 170 | 316 | 488 | 774 | 1235 |
| | kg | 2.45 | 3.8 | 8.6 | 11.4 | 30 | 45.4 | 77 | 144 | 221 | 351 | 560 |
| DIMENSIONS (mm) | A | 57 | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| | B | 101.6 | 160 | 222 | 286 | 362 | 445 | 514 | 597 | 744 | 813 | 910 |
| | C | 121 | 184 | 248 | 324 | 413 | 508 | 590 | 660 | 844 | 922 | 1032 |
| | D | 51 | 95 | 136 | 179 | 222 | 265 | 313 | 362 | 457 | 508 | 559 |
| | E | 38 | 76 | 114 | 146 | 178 | 216 | 242 | 305 | 447 | 489 | 547 |
| | F | 8.75 | 9 | 13 | 17 | 20 | 27 | 33 | 40 | 40 | 44 | 49 |
| | G | 57 | 102 | 140 | 184 | 229 | 279 | 318 | 368 | 547 | 598 | 669 |
| | H | 44.5 | 70 | 102 | 121 | 146 | 165 | 203 | 223 | 168 | 184 | 206 |
| | J | 16 | 25 | 33 | 38 | 45 | 52 | 60 | 67 | 65 | 71 | 80 |
| | K | 4.75 | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 25 | 29 | 32 |



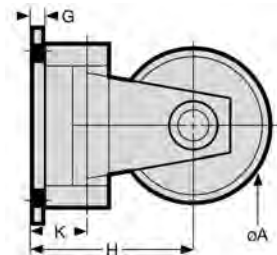
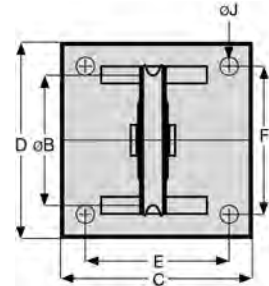
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Jeamar Winches
YOUR FIRST CHOICE FOR WINCHING SOLUTIONS

Single Swivel Directional Blocks



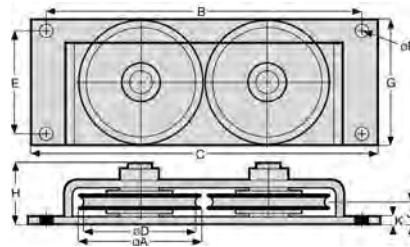
SHEAVES & BLOCKS



The S 52000, S 68000 and S 83000 are supplied with double row cylindrical roller bearings.

| Model Number | SS 3500 | SS 7000 | SS 10500 | SS 16000 | SS 23000 | SS 31000 | SS 41000 | SS 52000 | SS 68000 | SS 83000 | |
|--------------------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|-------|
| Working Load Limit | lb | 3500 | 7000 | 10500 | 16000 | 23000 | 31000 | 41000 | 52000 | 68000 | 83000 |
| | kg | 1587 | 3175 | 4772 | 7272 | 10455 | 14090 | 18636 | 23583 | 30839 | 37642 |
| Sheave Diameter | in | 4.25 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 21.54 | 23.54 | 26.34 |
| | mm | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| Rope Size | in | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 |
| | mm | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 | 32 | 35 |
| Weight | lb | 10 | 25 | 40 | 121 | 180 | 290 | 450 | 645 | 1104 | 1768 |
| | kg | 4.5 | 11.3 | 18.1 | 55 | 82 | 132 | 204 | 293 | 501 | 802 |
| DIMENSIONS (m m) | A | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| | B | 95 | 136 | 179 | 222 | 265 | 313 | 362 | 457 | 508 | 559 |
| | C | 120 | 183 | 243 | 305 | 360 | 420 | 480 | 483 | 515 | 582 |
| | D | 135 | 246 | 269 | 330 | 395 | 450 | 520 | 649 | 709 | 792 |
| | E | 90 | 150 | 180 | 225 | 270 | 320 | 360 | 406 | 432 | 489 |
| | F | 100 | 215 | 200 | 250 | 300 | 350 | 400 | 572 | 622 | 699 |
| | G | 6 | 10 | 12 | 16 | 20 | 20 | 25 | 25 | 29 | 32 |
| | H | 115 | 185 | 214 | 268 | 320 | 376 | 428 | 483 | 533 | 592 |
| | J | 12 | 14 | 14 | 16 | 20 | 26 | 33 | 33 | 36 | 40 |
| | K | 36 | 54 | 72 | 75 | 104 | 130 | 144 | 144 | 157 | 176 |

Fairlead Assemblies



| Model Number | FA 3500 | FA 7000 | FA 10500 | FA 16000 | FA 23000 | FA 31000 | FA 41000 | FA 52000 | FA 68000 | FA 83000 | |
|--------------------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|-------|
| Working Load Limit | lb | 3500 | 7000 | 10500 | 16000 | 23000 | 31000 | 41000 | 52000 | 68000 | 83000 |
| | kg | 1587 | 3175 | 4772 | 7272 | 10455 | 14090 | 18636 | 23583 | 30839 | 37642 |
| Sheave Diameter | in | 4.25 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 21.54 | 23.54 | 26.34 |
| | mm | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| Rope Size | in | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 |
| | mm | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 | 32 | 35 |
| Weight | lb | 14.8 | 26.5 | 44 | 117 | 177 | 300 | 560 | 645 | 1104 | 1768 |
| | kg | 6.7 | 12 | 20 | 53 | 80 | 136 | 254 | 293 | 501 | 802 |
| DIMENSIONS (m m) | A | 109 | 152 | 203 | 254 | 305 | 357 | 406 | 547 | 598 | 669 |
| | B | 272 | 380 | 496 | 625 | 760 | 880 | 1016 | 1304 | 1424 | 1592 |
| | C | 296 | 406 | 534 | 678 | 825 | 956 | 1096 | 1404 | 1533 | 1714 |
| | D | 95 | 136 | 179 | 222 | 265 | 313 | 362 | 457 | 508 | 559 |
| | E | 76 | 114 | 146 | 178 | 216 | 242 | 305 | 447 | 489 | 547 |
| | F | 9 | 13 | 17 | 20 | 27 | 33 | 40 | 40 | 44 | 49 |
| | G | 102 | 140 | 184 | 229 | 279 | 318 | 368 | 547 | 598 | 669 |
| | H | 70 | 102 | 121 | 146 | 165 | 203 | 223 | 168 | 184 | 206 |
| | J | 25 | 33 | 38 | 45 | 52 | 60 | 67 | 65 | 71 | 80 |
| | K | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 25 | 29 | 32 |

The S 52000, S 68000 and S 83000 are supplied with double row cylindrical roller bearings.

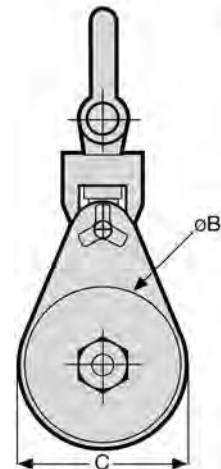
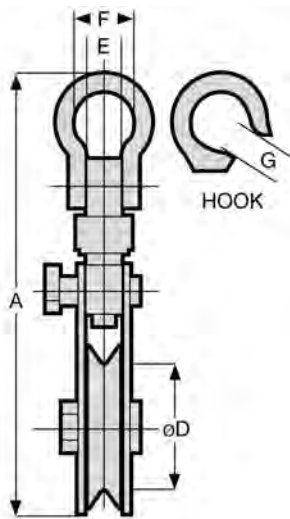
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SHEAVES & BLOCKS



Snatch Blocks

2



Taper Roller Bearings

Taper roller bearings with a high side load capacity are standard in Jeamar snatch blocks. These bearings overcome the side loads imposed during the initial tensioning of the wire rope, extending the life and increasing the efficiency of the snatch block.

Easy Installation

The drop side is secured by a simple non-removable attachment with an additional 'secure pin'. The design allows the rope to be installed and removed quickly and easily.

Block loading

Jeamar blocks are rated for the full working load limit at 0° rope angle.

High Quality

Jeamar steel sheaves are precision made from the highest quality fine-grain steel. They're tough, hassle free and they last longer.

High Strength and Low Weight

The strength of the steel used by Jeamar considerably exceeds that of cast iron. Steel also has a weight-saving advantage of up to 50 percent over cast iron, resulting in easier handling and installation.

Exceptional Arc of Support

Jeamar steel sheaves ensure that the shape of your rope is maintained under normal load conditions.

High Sheave-to-Rope Ratio

With a minimum sheave-to-rope ratio of 15:1, the rope's bending stress is reduced for longer life.

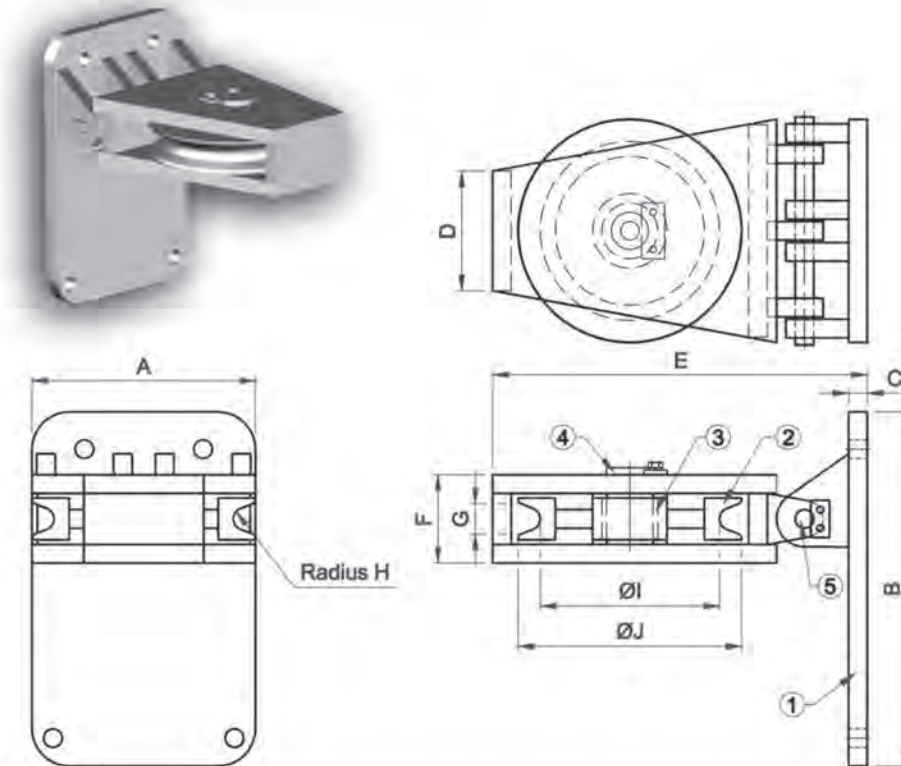
Work Hardened

Rope grooves are hardened during forming, increasing the life of sheave and rope.

| Model Number | | SB 3500 | SB 7000 | SB 10500 | SB 16000 | SB 23000 | SB 31000 | SB 41000 |
|--------------------|----|---------|---------|----------|----------|----------|----------|----------|
| Working Load Limit | lb | 3500 | 7000 | 10500 | 16000 | 23000 | 31000 | 41000 |
| | kg | 1587 | 3175 | 4772 | 7272 | 10455 | 14090 | 18636 |
| Sheave Diameter | in | 4.5 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 |
| | mm | 114 | 152 | 203 | 254 | 305 | 356 | 406 |
| Rope Size | in | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 |
| | mm | 6 | 10 | 13 | 16 | 19 | 22 | 25 |
| Weight | lb | 10 | 15 | 20 | 40 | 75 | 88 | 107 |
| | kg | 4.5 | 6.8 | 8.6 | 18 | 34 | 40 | 48.5 |
| DIMENSIONS (mm) | A | 330 | 372 | 423 | 584 | 635 | 788 | 854 |
| | B | 114 | 152 | 203 | 254 | 305 | 356 | 407 |
| | C | 121 | 159 | 210 | 261 | 311 | 365 | 416 |
| | D | 103 | 136 | 179 | 222 | 285 | 313 | 362 |
| | E | 27 | 27 | 27 | 44 | 59 | 59 | 59 |
| | F | 42 | 42 | 42 | 68.5 | 89 | 89 | 89 |
| | G | 37 | 37 | 36 | 48 | 53 | 53 | 53 |

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PIVOTING ROLLER CHOCK



| MODEL No. | PART No. | SIZE | A | B | C | D | E | F | G | H | ØI | J | WT. (lbs.) |
|-----------|----------|------|-----|-----|----|--------|---------|--------|--------|-------|--------|-----|------------|
| DF-710 | 6478 | 10" | 12" | 19" | 1" | 6 1/2" | 18 3/4" | 4 3/4" | 1 7/8" | 1/2" | 7 1/2" | 10" | 210 |
| DF-712 | 6479 | 12" | 12" | 19" | 1" | 6 1/2" | 20 1/4" | 4 3/4" | 2" | 9/16" | 9 1/2" | 12" | 240 |

| PIECE No. | DESCRIPTION | PART No. | | MATERIAL |
|-----------|----------------|----------|--------|-----------|
| | | DF-710 | DF-712 | |
| 1 | MOUNTING PLATE | 6735 | | STEEL |
| 2 | ROLLER SHEAVE | 6736 | 6738 | STAINLESS |
| 3 | BUSHING | 6740 | | BRONZE |
| 4 | ROLLER PIN | 6737 | | STAINLESS |
| 5 | HINGE PIN | 6739 | | STAINLESS |

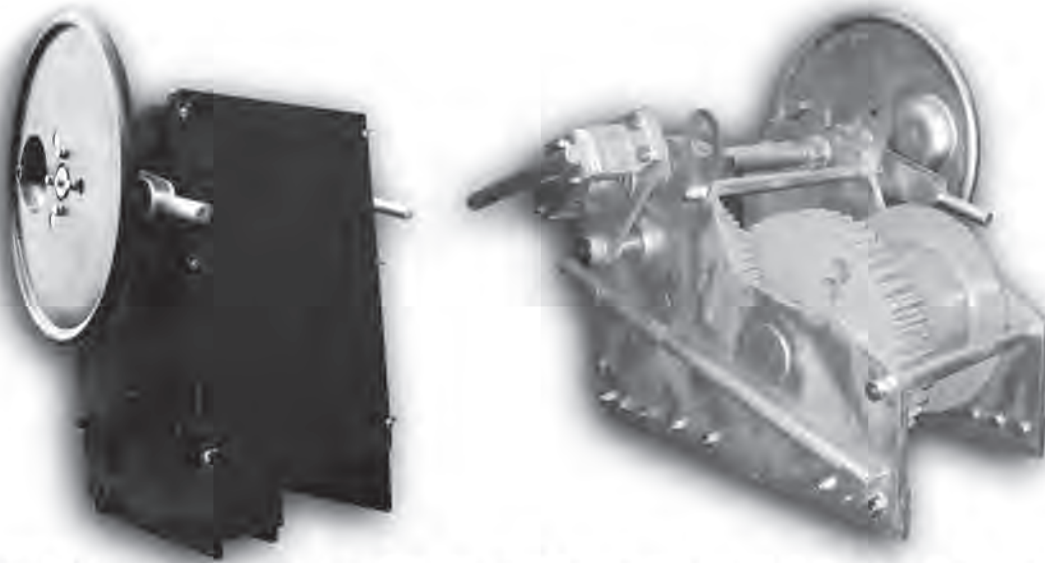
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MANUAL WINCHES

2



NABRICO provides the extra hands you need for fast and sure tow make-up and breakdown with a complete line of hand winches in both left and right hand models (except 2/5 ton winches). Our DF-3 winch features the same trusted parts as our DF-156 winch in a more compact design. NABRICO manual winches are available in 2, 5, 10, 20, 30, 40, and 60 ton holding capacities. NABRICO has a hand winch to meet the particular needs of your job or installation.

Match a NABRICO hand winch to your needs and available space and you're ready to go to work. For installation purposes, all dimensions should be verified.

NABRICO warrants that all deck fittings shall be free from defects in material and workmanship at the time of shipment. If, within six (6) months on all winches and three (3) months on all fabricated by NABRICO after date of shipment (under normal conditions of use and service), defects shall be discovered which are not due to normal wear and tear or misuse, NABRICO shall correct such defects at its expense. NABRICO's obligation under this warranty is limited to its repair or replacement of its equipment or parts which, upon examination, NABRICO shall determine to have been defective. If defects occur in the equipment purchased by NABRICO from others, NABRICO shall not be liable directly or indirectly in contract, tort or otherwise, to the Buyer or anyone in privity with the Buyer for any loss or damage to any vessel or its equipment, or its equipment, stores, cargo or other property, for any personal injury or death or for consequential damages resulting from any of the foregoing arising out of any such defect or occurring after the expiration of the warranty period. This warranty is void when any deck fitting has been altered, repaired or misused by anyone other than NABRICO or its personnel.

Winches portrayed in drawings photographs and copies are not designed for lifting or lowering persons or equipment.

Winches portrayed in drawings, photographs and copy are not designed for lifting or lowering persons or or equipment

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2 AND 5 TON MANUAL WINCH



2

| MODEL No. | LINE PULL SLOW SPEED | LINE PULL FAST SPEED | SHOCK LOAD | HAND BRAKE HOLDING OR DOG |
|-----------|----------------------|----------------------|--------------------|---------------------------|
| 2 Ton | 4025 | 3500 | 3800 (3 foot drop) | 6000 |
| 5 Ton | 10000 | 8500 | 8250 (3 foot drop) | 14000 |

ALL ABOVE NUMBERS ARE POUNDS

| CABLE CAPACITY (FULL DRUM) | | | | | | | |
|----------------------------|------------|-----|------|-----|------|-----|--------|
| MODEL No. | DRUM WIDTH | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | WEIGHT |
| 2 Ton | 6" | 275 | 200 | 105 | 100 | 60 | 65 |
| 5 Ton | 6" | | | 300 | 200 | 170 | 116 |

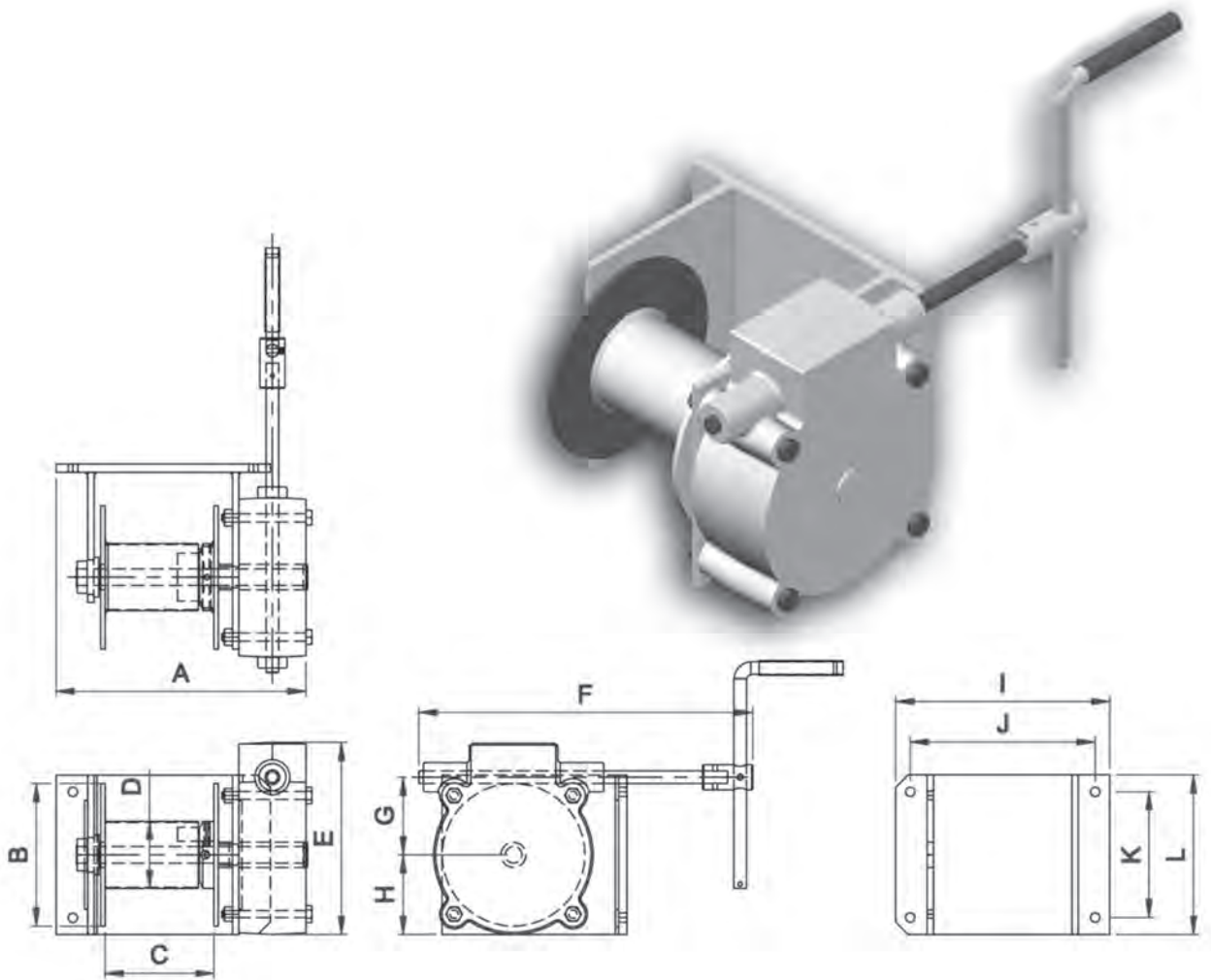
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2 TON MANUAL WINCH ASSY.

2

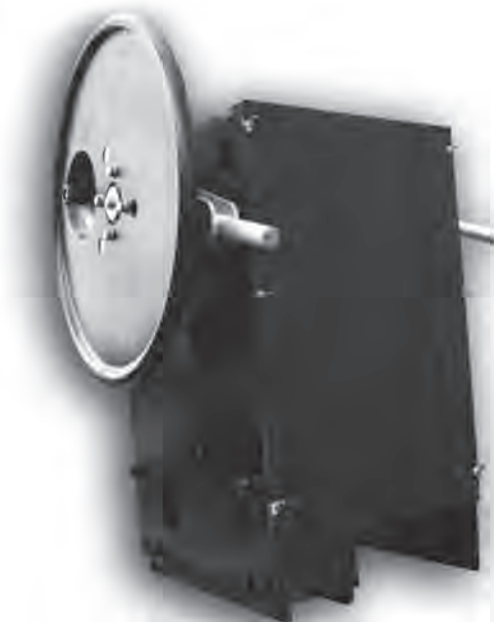


| MODEL No. | PART No. | A | B | C | D | E | F | G | H | I | J | K | L | WT. (lbs.) |
|-----------|----------|-----|--------|--------|----|---------|---------|--------|--------|---------|-----|--------|--------|------------|
| DF-7 | 15557 | 15" | 8 1/2" | 6 1/2" | 4" | 11 1/2" | 19 7/8" | 4 1/2" | 4 3/4" | 12 3/4" | 11" | 7 1/2" | 9 1/2" | 120 |

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DF-3 MANUAL WINCH



- REVOLUTIONARY NEW HIGH LOAD RELEASE DOG SYSTEM.
- HIGH LOAD RELEASE BRAKE WITH SECONDARY ANTI-BACKLASH DRAG BRAKE THAT IS ACTIVATED AUTOMATICALLY WITH THE RELEASE OF THE DOG.
- HIGH LOAD RELEASE BRAKE IS A MULTI-DISC SYSTEM THAT INCORPORATES ALL STAINLESS STEEL PARTS.
- FASTEST ACTING AND MOST POWERFUL BRAKE AVAILABLE.
- 4 BOLT LUG REMOVABLE HANDWHEEL.
- NEW SIMPLER HEAVY DUTY RATCHET ASSEMBLY WITH NO SPRINGS OR LEVERS.

- MINIMAL MAINTENANCE.
- EASY TO REPAIR.
- ALL STAINLESS STEEL AND SILICON BRONZE FASTENERS INCLUDING SEPARATOR RODS.
- 3-PLY CONVEYOR BELT COVERS (DAMAGE AND CORROSION RESISTANT).
- GALVANIZED COATING AVAILABLE.
- SALTWATER PACKAGE STANDARD WITH 3-STOP PAINT SYSTEM.
- HEAVIEST WINCH IN ITS CLASS.
- TRUE RIGHT AND LEFT HAND MODELS FOR USE IN PAIRS.
- TOTALLY ENCLOSED DRIVE TRAIN WITH THE SMALLEST DECK FOOTPRINT IN THE INDUSTRY.

| MODEL No. | HOLDING-DOG &/OR BRAKE | LINE PULL @ FIRST LAYER WITH ONE MAN | | DRUM CAPACITIES (FT) | | | | WEIGHT LBS | DIMENSIONAL DATA | | |
|-----------|------------------------|--------------------------------------|---------------------|----------------------|------|------|----|------------|------------------|---------|---------|
| | | HAND WHEEL | RATCHET W/STD. EXT. | 5/8" | 3/4" | 7/8" | 1" | | W | L | H |
| DF-3-30 | 30 TONS | 14000 | 22000 | 233 | 141 | 123 | 67 | 1109 | 19 3/8" | 22" | 35 1/2" |
| DF-3-40 | 40 TONS | 14000 | 18000 | 285 | 173 | 150 | 83 | 1567 | 20 1/8" | 23 1/4" | 43 1/2" |

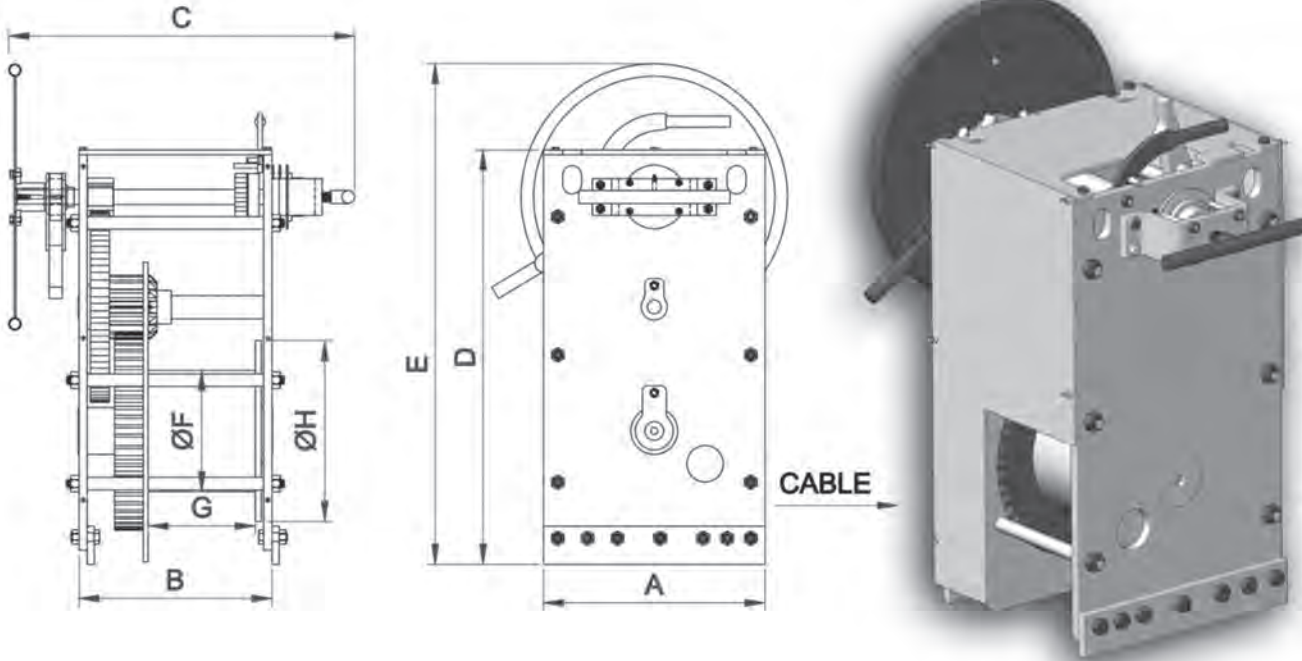
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30 TON UPRIGHT MANUAL WINCH

2



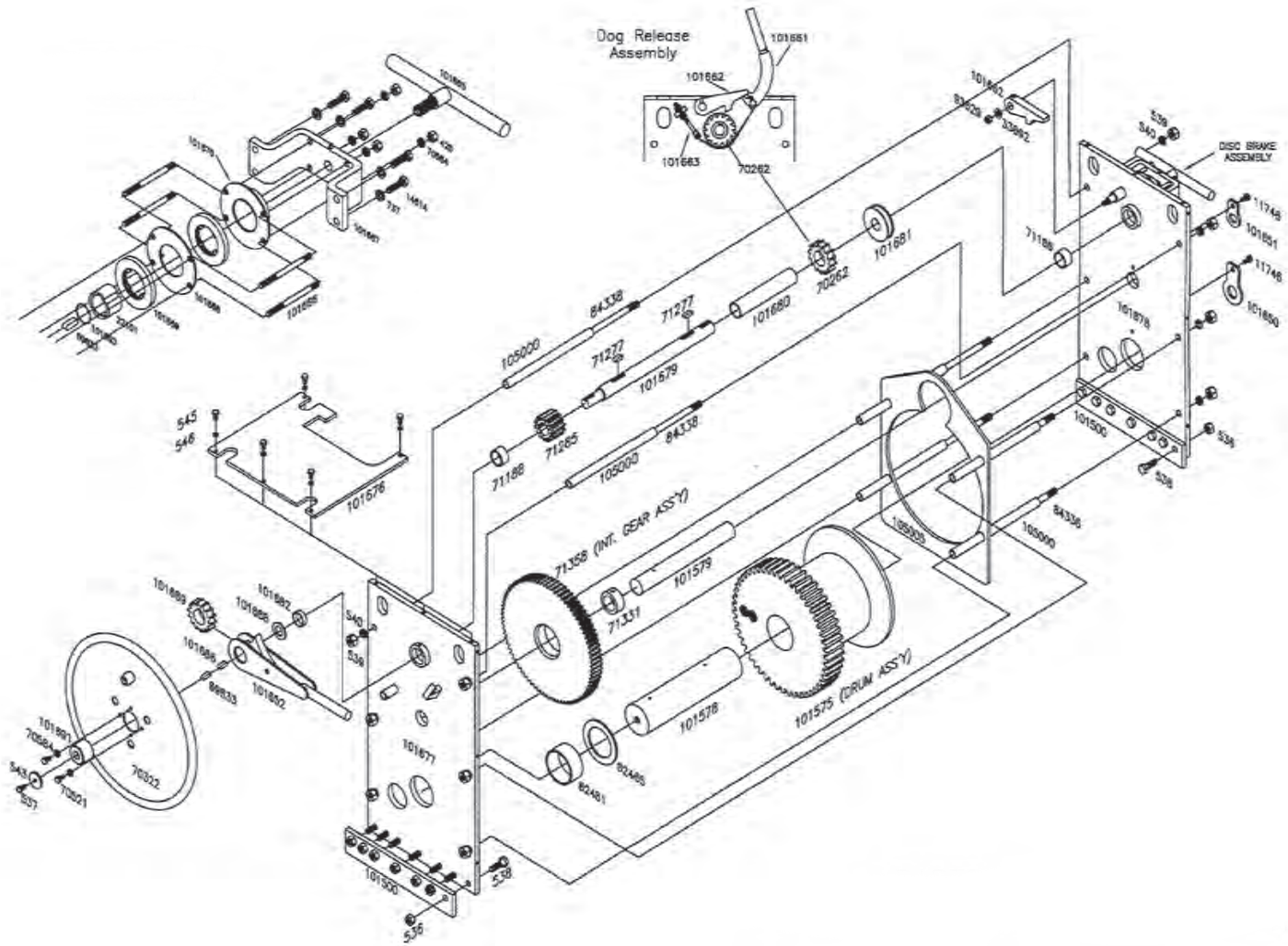
| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|------------------------|-----|---------|---------|---------|----------|---------|-----|-----|------------|
| DF-3-30 | REFER TO COATING TABLE | 22" | 19 3/8" | 33 1/2" | 35 1/2" | 44 9/16" | 10 3/4" | 11" | 16" | 1065 |

LEFT HAND WINCH SHOWN
RIGHT HAND WINCH OPPOSITE

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 94241 | 94242 |
| GALVANIZED | 94243 | 94244 |

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30 TON UPRIGHT MANUAL WINCH PARTS BREAKDOWN



2

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30 TON UPRIGHT MANUAL WINCH PARTS BREAKDOWN

2

| DF-3 (20 / 30 Ton) Manual Upright Winch Parts List | | |
|--|----------|-------------------------------|
| (refer to winch drawing for location) | | |
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Heavy Hex Nut 3/4" (SS) | 12 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 1 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 12 | 538 |
| Hex Nut 7/8" (SS) | 12 | 539 |
| Lock Washer 7/8" (SS) | 12 | 540 |
| Washer 9/16" ID x 2-1/2" OD (SS) | 1 | 543 |
| Hex Head Bolt 3/8" x 1" (SS) | 6 | 545 |
| Lock Washer 3/8" (SS) | 6 | 546 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Flat Washer 5/8" (Brass) | 2 | 33892 |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Locking Dog Gear | 1 | 70262 |
| Hand Wheel Assembly with Speed Handle | 1 | 70322 |
| Hex Head Bolt 1/2" x 1" (SS) | 4 | 70521 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Key (Drive Pinion) 3/8" SQ x 2-1/2" | 1 | 71277 |
| Key (Locking Dog Gear) 3/8" SQ x 2-1/2" | 1 | |
| Drive Pinion | 1 | 71285 |
| Intermediate Shaft Collar | 1 | 71331 |
| Intermediate Gear Assembly | 1 | 71358 |
| Drum Washer | 1 | 82465 |
| Drum Pipe Spacer | 1 | 82481 |
| Pipe Separator Rod (SS) | 6 | 84338 |
| Slotted Hex Nut 5/8" (Brass) | 2 | 93629 |
| Base Bar | 2 | 101500 |
| Drum Assembly | 1 | 101575 |
| Drum Shaft | 1 | 101578 |
| Intermediate Shaft | 1 | 101579 |
| Keeper Plate (BIG) | 1 | 101650 |
| Keeper Plate (small) | 1 | 101651 |
| Locking Dog (with bronze bushing) | 1 | 101662 |
| Brake Band Assembly | 1 | 101663 |
| Top Plate | 1 | 101676 |
| Drive Shaft | 1 | 101679 |
| Pipe Spacer (drive shaft) | 1 | 101680 |
| Brake Drum | 1 | 101681 |
| Pipe Spacer (hand ratchet area) | 1 | 101682 |
| Key (Ratchet Gear) 1/2" SQ x 1-5/8" | 1 | 101686 |
| Washer 1-9/16" ID x 2-11/16" OD (SS) | 1 | 101688 |
| Ratchet Gear | 1 | 101689 |
| Hand Wheel Hub Insert (SS) | 1 | 101691 |
| Pipe Separator | 6 | 105000 |
| Cable Guard Plate | 1 | 105005 |

| DF-3 Bushings and Bearings | | |
|----------------------------|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Drive Shaft Bushing | 2 | 71188 |
| Drum Gear Bushing | 2 | 71226 |
| Intermediate Gear Bushing | 1 | 71382 |

| DF-3 Left Hand or Right Hand Specific Components | | |
|--|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Left Hand Winch | | |
| Hand Ratchet Assembly | 1 | 101652 |
| Locking Dog Handle Assembly | 1 | 101661 |
| Side Plate Assembly (Hand Wheel Side) | 1 | 101677 |
| Side Plate Assembly (Disc Brake Side) | 1 | 101678 |
| Right Hand Winch | | |
| Side Plate Assembly (Hand Wheel Side) | 1 | 101694 |
| Side Plate Assembly (Disc Brake Side) | 1 | 101695 |
| Locking Dog Handle Assembly | 1 | 101696 |
| Hand Ratchet Assembly | 1 | 101698 |

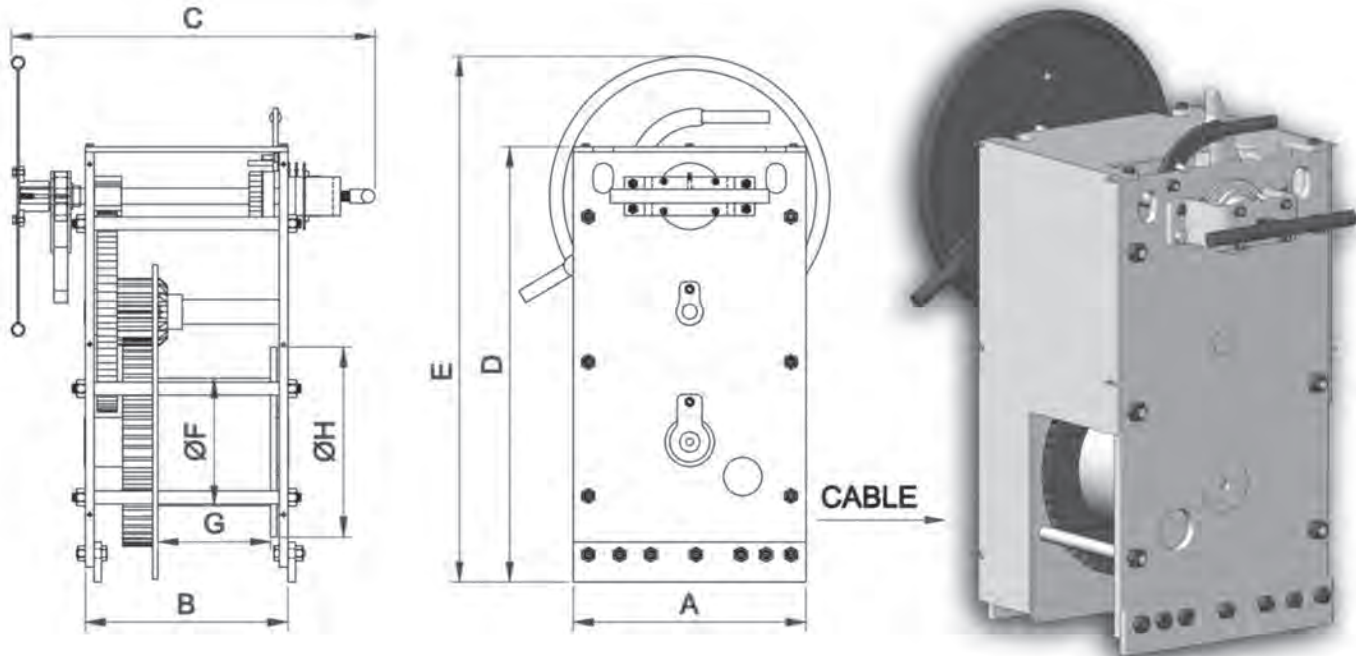
| DF-3 Miscellaneous Components (not shown in drawings) | | |
|---|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Cover Mounting Stud 3/8" x 1-1/2" | 10 | 549 |
| Brass Wing Nut 3/8" | 10 | 550 |
| Ratchet Handle Extension | 1 | 70323 |
| Protective Rubber Cover | 2 | 80223 |
| U-Bolt with Fasteners (7/8" Wire Rope) | 1 | 82562 |

| DF-3 Disc Brake Assembly | | |
|-------------------------------------|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Hex Nut 1/2" (SS) | 4 | 428 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Head Bolt 5/8" x 2" (SS) | 4 | 14614 |
| Sleeve (Disc Brake) | 1 | 22101 |
| Key (Brake Sleeve) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Handle Assembly | 1 | 101665 |
| Threaded Rod (SS) | 4 | 101666 |
| Brake Housing | 1 | 101667 |
| Engaging Plate | 1 | 101668 |
| Brake Disc | 2 | 101669 |
| Engaging Cap | 1 | 101670 |
| Rubber O-Ring | 1 | 101693 |

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40 TON UPRIGHT MANUAL WINCH



2

| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|----------|---------|----------|---------|---------|-----|------------|
| DF-3-40 | REFER TO COATINGS TABLE | 23 1/4" | 20 1/8" | 36 1/16" | 43 1/2" | 52 9/16" | 12 3/4" | 11 1/4" | 19" | 1525 |

LEFT HAND WINCH SHOWN
RIGHT HAND WINCH OPPOSITE

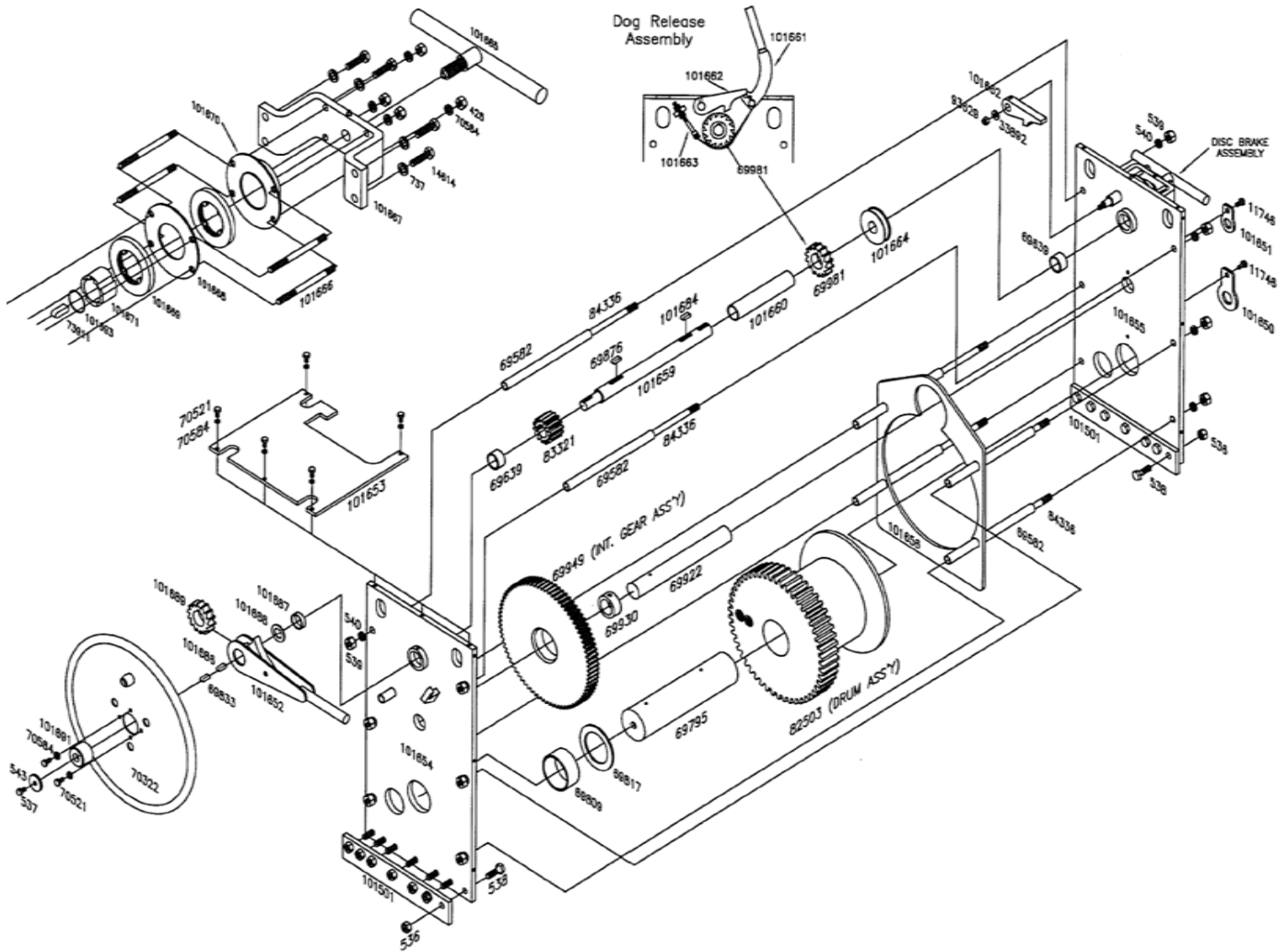
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 94237 | 94238 |
| GALVANIZED | 94239 | 94240 |

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40 TON UPRIGHT MANUAL WINCH PARTS BREAKDOWN

2



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40 TON UPRIGHT MANUAL WINCH PARTS BREAKDOWN



| DF-3 (40 Ton) Manual Upright Winch Parts List | | |
|---|----------|----------------------------|
| (refer to winch drawing for location) | | |
| Part Description | Quantity | DF-3 (40 Ton) Part Numbers |
| Heavy Hex Nut 3/4" (SS) | 14 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 1 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 14 | 538 |
| Hex Nut 7/8" (SS) | 12 | 539 |
| Lock Washer 7/8" (SS) | 12 | 540 |
| Washer 9/16" ID x 2-1/2" OD (SS) | 1 | 543 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Flat Washer 5/8" (Brass) | 2 | 33892 |
| Pipe Separator | 6 | 69582 |
| Drum Shaft | 1 | 69795 |
| Drum Pipe Spacer | 1 | 69809 |
| Drum Washer | 1 | 69817 |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Key (Drive Pinion) 1/2" SQ x 2-3/4" | 1 | 69876 |
| Intermediate Shaft | 1 | 69922 |
| Intermediate Shaft Collar | 1 | 69930 |
| Intermediate Gear Assembly | 1 | 69949 |
| Locking Dog Gear | 1 | 69981 |
| Hand Wheel Assembly with Speed Handle | 1 | 70322 |
| Hex Head Bolt 1/2" x 1" (SS) | 9 | 70521 |
| Lock Washer 1/2" (SS) | 9 | 70584 |
| Drum Assembly | 1 | 82503 |
| Drive Pinion | 1 | 83321 |
| Pipe Separator Rod (SS) | 6 | 84336 |
| Slotted Hex Nut 5/8" (Brass) | 2 | 93629 |
| Base Bar | 2 | 101501 |
| Keeper Plate (BIG) | 1 | 101650 |
| Keeper Plate (small) | 1 | 101651 |
| Top Plate | 1 | 101653 |
| Cable Guard Plate | 1 | 101656 |
| Drive Shaft | 1 | 101659 |
| Pipe Spacer (drive shaft) | 1 | 101660 |
| Locking Dog (with bronze bushing) | 1 | 101662 |
| Brake Band Assembly | 1 | 101663 |
| Brake Drum | 1 | 101664 |
| Key (Locking Dog Gear) 1/2" SQ x 2-1/2" | 1 | 101684 |
| Key (Ratchet Gear) 1/2" SQ x 1-5/8" | 1 | 101686 |
| Pipe Spacer (hand ratchet area) | 1 | 101687 |
| Washer 1-9/16" ID x 2-11/16" OD (SS) | 1 | 101688 |
| Ratchet Gear | 1 | 101689 |
| Hand Wheel Hub Insert (SS) | 1 | 101691 |

| DF-3 Bushings and Bearings | | |
|----------------------------|----------|----------------------------|
| Part Description | Quantity | DF-3 (40 Ton) Part Numbers |
| Drive Shaft Bushing | 2 | 69639 |
| Intermediate Gear Bushing | 1 | 69973 |
| Drum Gear Bushing | 2 | 82511 |

| DF-3 Left or Right Hand Specific Components | | |
|---|----------|----------------------------|
| Part Description | Quantity | DF-3 (40 Ton) Part Numbers |
| Left Hand Winch | | |
| Hand Ratchet Assembly | 1 | 101652 |
| Side Plate Assembly (Hand Wheel Side) | 1 | 101654 |
| Side Plate Assembly (Disc Brake Side) | 1 | 101655 |
| Locking Dog Handle Assembly | 1 | 101661 |
| Right Hand Winch | | |
| Locking Dog Handle Assembly | 1 | 101696 |
| Hand Ratchet Assembly | 1 | 101698 |
| Side Plate Assembly (Hand Wheel Side) | 1 | 101699 |
| Side Plate Assembly (Disc Brake Side) | 1 | 101707 |

| DF-3 Miscellaneous Components (not shown in drawings) | | |
|---|----------|----------------------------|
| Part Description | Quantity | DF-3 (40 Ton) Part Numbers |
| Cover Mounting Stud 3/8" x 1-1/2" | 10 | 549 |
| Brass Wing Nut 3/8" | 10 | 550 |
| Ratchet Handle Extension | 1 | 70323 |
| Protective Rubber Cover | 2 | 80243 |
| U-Bolt with Fasteners (1" Dia. Wire Rope) | 1 | 82570 |

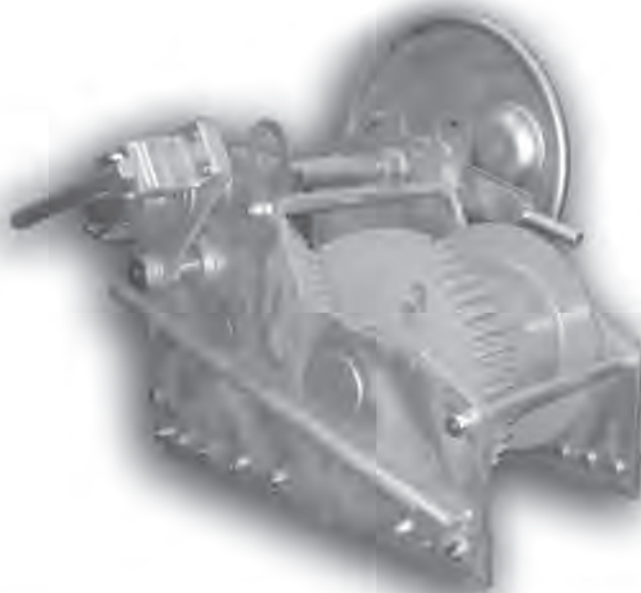
| DF-3 Disc Brake Assembly | | |
|-------------------------------------|----------|----------------------------|
| Part Description | Quantity | DF-3 (40 Ton) Part Numbers |
| Hex Nut 1/2" (SS) | 4 | 428 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Head Bolt 5/8" x 2" (SS) | 4 | 14614 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Key (Brake Sleeve) 1/2" SQ x 1-3/4" | 1 | 73911 |
| Handle Assembly | 1 | 101665 |
| Threaded Rod (SS) | 4 | 101666 |
| Brake Housing | 1 | 101667 |
| Engaging Plate | 1 | 101668 |
| Brake Disc | 2 | 101669 |
| Engaging Cap | 1 | 101670 |
| Sleeve (Disc Brake) | 1 | 101671 |
| Rubber O-Ring | 1 | 101692 |

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DF-156 MANUAL WINCHES



2

FEATURES

- All steel construction.
- High load release brake is a multi-disc system that incorporates all stainless steel moving parts.
- Fastest acting and most powerful brake available.
- 4 bolt hub removable hand wheel.
- Simpler heavy duty ratchet assembly with no springs or levers.
- Bronze bushed bearings.
- Alemite fittings for proper lubrication.
- True left and right hand model for use in pairs.
- Blasted and painted, galvanized and other coatings available.

| MODEL | MOUNT | DOG HOLDING (1) | LINE PULL | | GEAR RATIO | DRUM FLANGE DIAM. | DRUM | |
|---------|------------|-----------------|--------------------|------------------------------|------------|-------------------|-------|-----------|
| | | | HAND WHEEL ONE MAN | RATCHET W/STANDARD EXTENSION | | | DIAM. | WIDTH (2) |
| DF-156 | | S.T. | LBS. | LBS. | | IN. | IN. | IN. |
| 10-6-M | Right/Left | 10 | 5,200 | 7,000 | 5.57:1 | 18 | 8.625 | 6.0 |
| 20-7-M | Right/Left | 20 | 14,000 | 14,400 | 18.57:1 | 16 | 10.75 | 7.25 |
| 40-11-M | Right/Left | 40 | 14,000 | 17,800 | 18.57:1 | 19 | 12.75 | 11.25 |
| 40-18-M | Right/Left | 40 | 14,000 | 17,800 | 18.57:1 | 19 | 12.75 | 18.125 |
| 60-11-M | Right/Left | 60 | 24,000 | 28,800 | 27.0:1 | 24 | 14.00 | 10.625 |

| MODEL | DRUM CAPACITIES (FT.) | | | | | | | | | WEIGHT (LBS.) |
|---------|-----------------------|-----|-----|-----|-----|-----|-------|-------|-------|---------------|
| | CABLE SIZE | | | | | | | | | |
| DF-156 | 7/16 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1-1/8 | 1-1/4 | 1-1/2 | |
| 10-6-M | 353 | 317 | 174 | 129 | - | - | - | - | - | 500 |
| 20-7-M | 270 | 186 | 109 | 57 | 39 | 21 | - | - | - | 850 |
| 40-11-M | - | - | 287 | 176 | 130 | 84 | 36 | 26 | - | 1250 |
| 40-18-M | - | - | 463 | 279 | 151 | 139 | 58 | 51 | - | 1350 |
| 60-11-M | - | - | 572 | 325 | 262 | 200 | 119 | 111 | 62 | 2100 |

1. HOLDING AND LINE PULL RATINGS ARE FOR FIRST LAYER OF CABLE.
2. WIDER DRUM WIDTHS AVAILABLE ON REQUEST.

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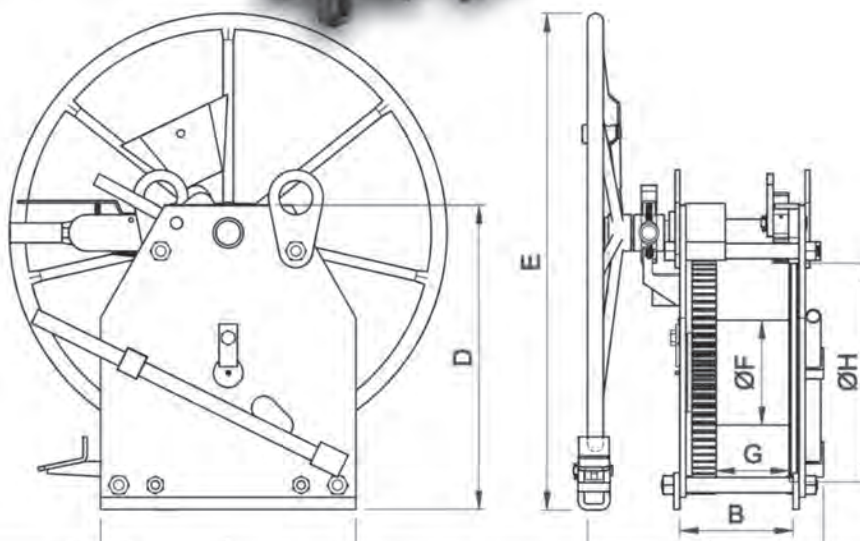
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10 TON MANUAL WINCH



2

LEFT HAND WINCH SHOWN
RIGHT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|----------|---------|-----|---------|--------|----|-----|------------|
| DF-156-10 | REFER TO COATINGS TABLE | 21" | 10 5/16" | 18 1/8" | 24" | 40 3/8" | 8 5/8" | 6" | 18" | 500 |

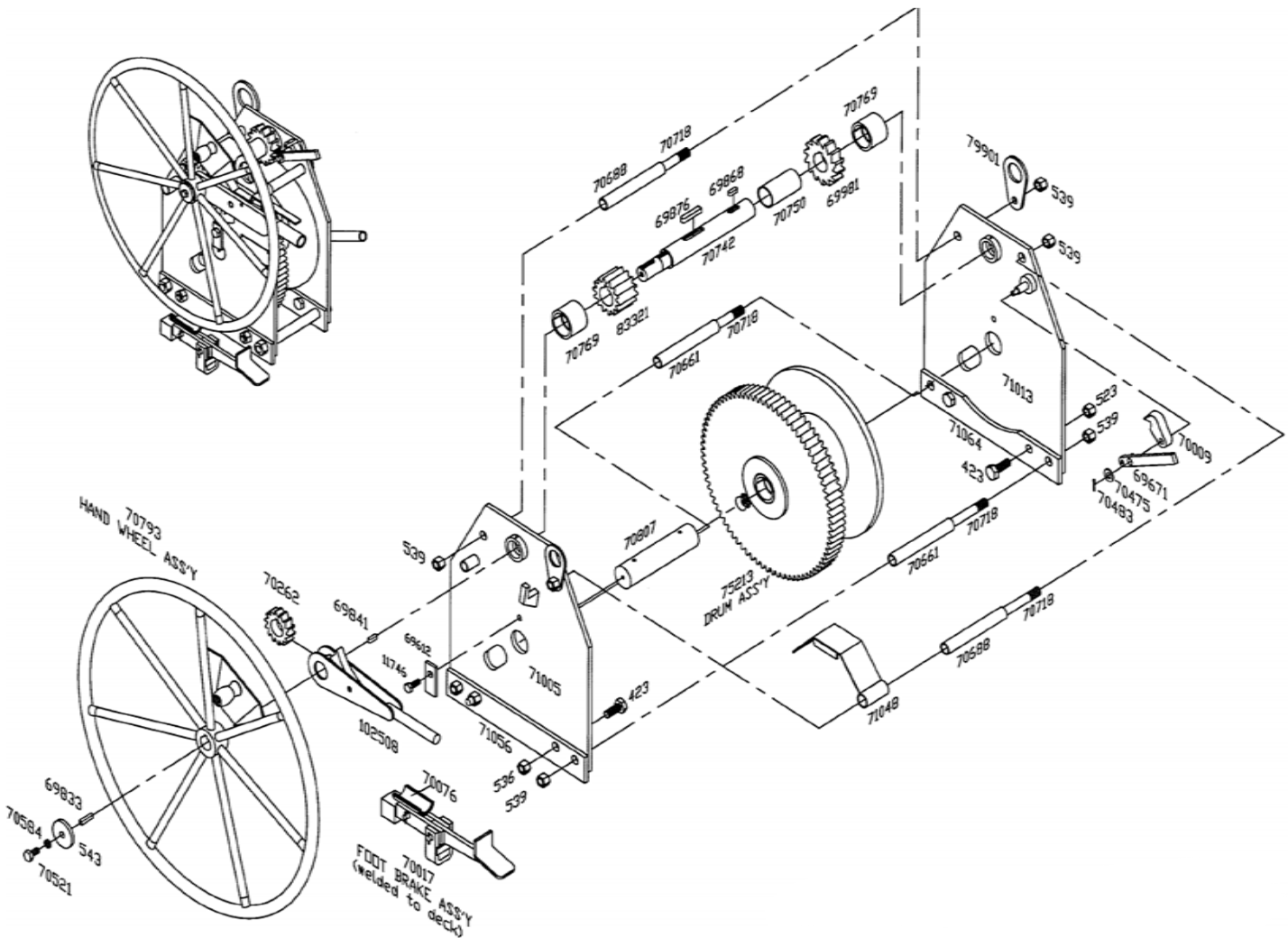
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 70971 | 15326 |
| GALVANIZED | 6591 | 6590 |

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10 TON MANUAL WINCH PARTS BREAKDOWN

2



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10 TON MANUAL WINCH PARTS BREAKDOWN



| DF-156-10 Ton Manual Winch Parts List (refer to winch drawings for location) | | |
|--|----------|------------------------------|
| Part Description | Quantity | DF-156 (10 Ton) Part Numbers |
| HH Bolt 3/4" x 2" (SS) | 4 | 423 |
| Heavy Hex Nut 3/4" (SS) | 4 | 536 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Flat Washer 9/16" ID x 2-1/2" OD (SS) | 1 | 543 |
| HH Bolt 5/8" x 1" | 1 | 11746 |
| Keeper Plate | 1 | 69612 |
| Locking Dog Handle (with bronze bushing) | 1 | 69671 |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Key (Ratchet Gear) 3/8" SQ x 1-3/16" | 1 | 69841 |
| Key (Locking Dog Gear) 1/2" SQ x 1-1/4" | 1 | 69868 |
| Key (Drive Pinion) 1/2" SQ x 2-3/4" | 1 | 69876 |
| Locking Dog Gear | 1 | 69981 |
| Locking Dog (with bronze bushing) | 1 | 70009 |
| Foot Brake Assembly | 1 | 70017 |
| Brake Pad | 1 | 70076 |
| Ratchet Gear | 1 | 70262 |
| Flat Washer 5/8" | 1 | 70475 |
| Cotter Pin (1/8" x 1") | 1 | 70483 |
| HH Bolt 1/2" x 1" (SS) | 1 | 70521 |
| Lock Washer 1/2" (SS) | 1 | 70584 |
| Pipe Separator (long) | 2 | 70661 |
| Pipe Separator (short) | 2 | 70688 |
| Pipe Separator Rod | 4 | 70718 |
| Drive Shaft | 1 | 70742 |
| Pipe Spacer (drive shaft) | 1 | 70750 |
| Hand Wheel Assembly with Speed Handle | 1 | 70793 |
| Drum Shaft | 1 | 70807 |
| Base Bar Straight | 1 | 71056 |
| Base Bar with Radius | 1 | 71064 |
| Drum Assembly | 1 | 75213 |
| Lifting Lug | 2 | 79901 |
| Drive Pinion | 1 | 83321 |

| DF-156 Bushings and Bearings | | |
|------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (10 Ton) Part Numbers |
| Drive Shaft Bushing | 2 | 70769 |
| Drum Gear Bushing | 2 | 70815 |

| DF-156 Left or Right Hand Specific Components | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (10 Ton) Part Numbers |
| Left Hand Winch | | |
| Side Plate Assembly Hand Wheel Side | 1 | 71005 |
| Side Plate Assembly Disk Brake Side | 1 | 71013 |
| Drive Pinion Guard | 1 | 71048 |
| Hand Ratchet Assembly | 1 | 102508 |
| Right Hand Winch | | |
| Drive Pinion Guard | 1 | 70904 |
| Side Plate Assembly Hand Wheel Side | 1 | 70939 |
| Side Plate Assembly Disk Brake Side | 1 | 70947 |
| Hand Ratchet Assembly | 1 | 102509 |

| DF-156 Miscellaneous Components (not shown in drawings) | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (10 Ton) Part Numbers |
| U-Bolt with Fasteners (1/2" Wire Rope) | 1 | 15547 |
| Ratchet Handle Extension | 1 | 70325 |

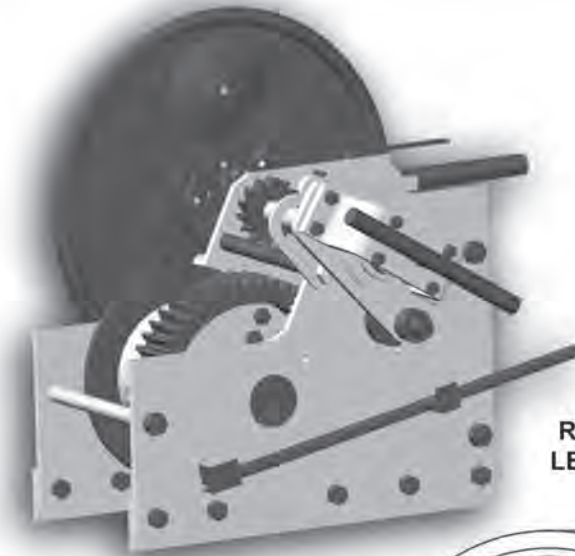
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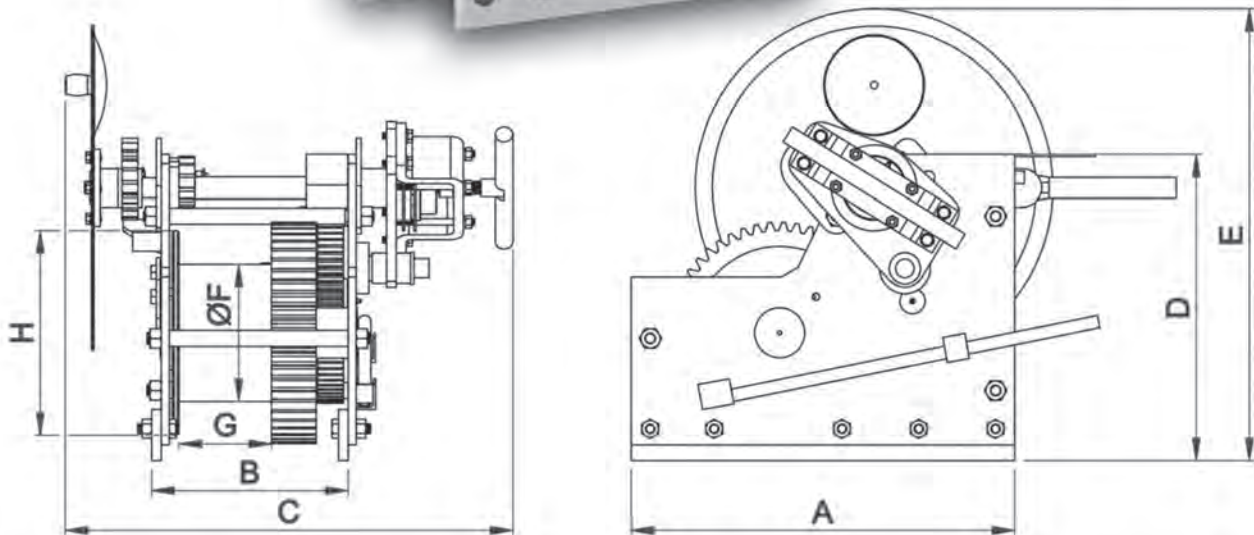


20 TON MANUAL WINCH

2



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|-----|-----|-----|---------|--------|-----|------------|
| DF-156-20 | REFER TO COATINGS TABLE | 30" | 15 3/8" | 33" | 24" | 34" | 10 3/4" | 7 1/4" | 16" | 850 |

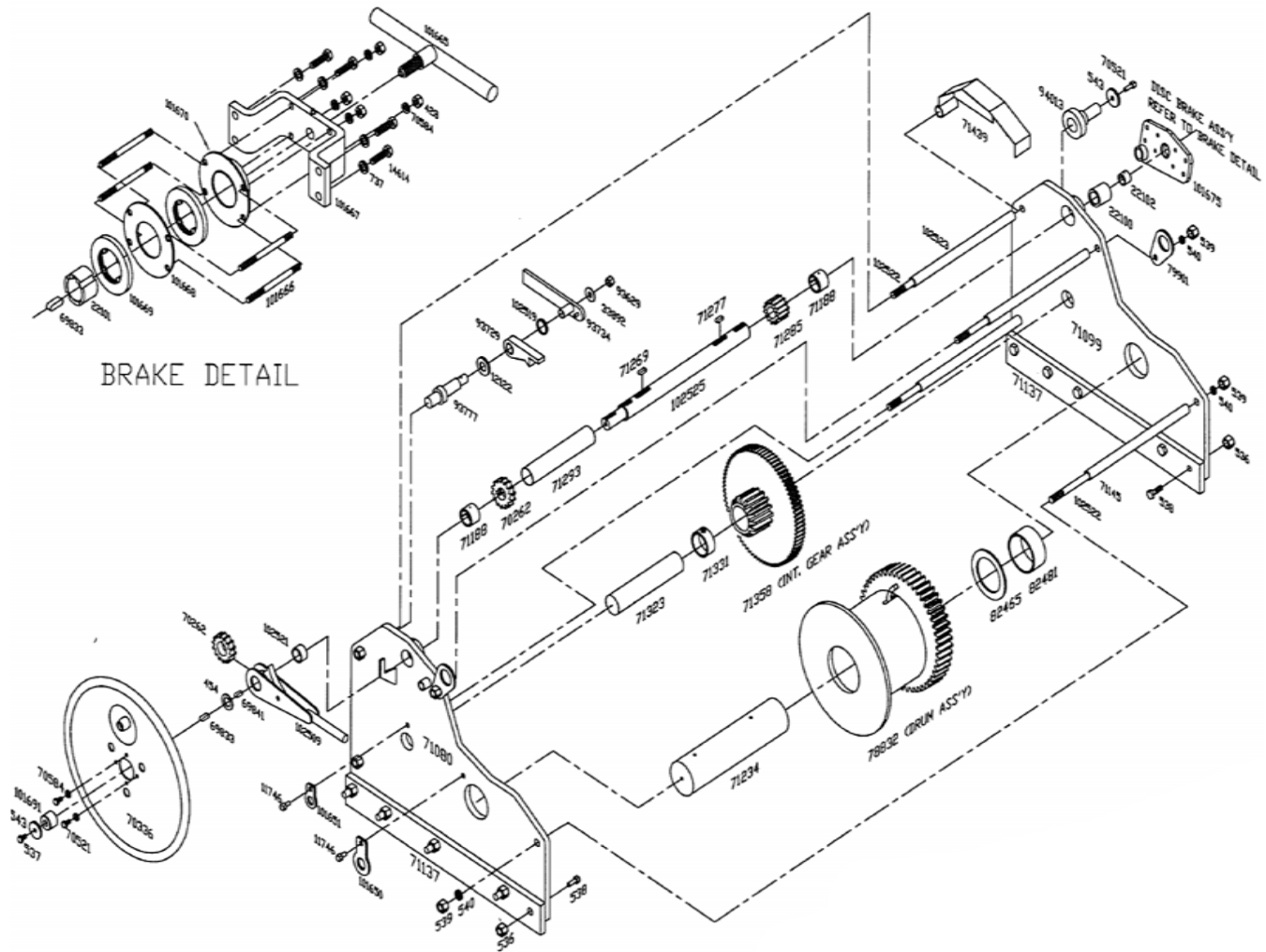
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 71503 | 6601 |
| GALVANIZED | 87509 | 87510 |

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20 TON MANUAL WINCH PARTS BREAKDOWN



2



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20 TON MANUAL WINCH PARTS BREAKDOWN

2

| DF-156-20 Ton Manual Winch Parts List (refer to winch drawings for location) | | |
|--|----------|------------------------------|
| Part Description | Quantity | DF-156 (20 Ton) Part Numbers |
| Flat Washer 1-1/2" ID x 2-1/2" OD | 1 | 454 |
| Heavy Hex Nut 3/4" (SS) | 10 | 536 |
| HH Bolt 1/2" x 2" (SS) | 1 | 537 |
| HH Bolt 3/4" x 2-1/2" (SS) | 10 | 538 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Lock Washer 7/8" (SS) | 8 | 540 |
| Flat Washer 9/16" ID x 2-1/2" OD (SS) | 2 | 543 |
| HH Bolt 5/8" x 1" | 2 | 11746 |
| Flat Washer 1" | 1 | 12122 |
| Pipe Spacer (disk brake area) | 1 | 22100 |
| Flat Washer 5/8" (Brass) | 1 | 33892 |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Key (Ratchet Gear) 3/8" SQ x 1-3/16" | 1 | 69841 |
| Locking Dog Gear | 1 | 70262 |
| Ratchet Gear | 1 | 70336 |
| Hand Wheel Assembly with Speed Handle | 1 | 70336 |
| HH Bolt 1/2" x 1" (SS) | 5 | 70521 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Base Bar Straight | 2 | 71137 |
| Pipe Separator | 3 | 71145 |
| Drum Shaft | 1 | 71234 |
| Key (Locking Dog Gear) 3/8" SQ x 1-1/4" | 1 | 71269 |
| Key (Drive Pinion) 3/8" SQ x 2-1/2" | 1 | 71277 |
| Drive Pinion | 1 | 71285 |
| Pipe Spacer (drive shaft) | 1 | 71293 |
| Intermediate Shaft | 1 | 71323 |
| Intermediate Shaft Collar | 1 | 71331 |
| Intermediate Gear Assembly | 1 | 71358 |
| Drum Assembly | 1 | 78832 |
| Lifting Lug | 2 | 79901 |
| Drum Washer | 1 | 82465 |
| Drum Pipe Spacer | 1 | 82481 |
| Slotted Hex Nut 5/8" (Brass) | 1 | 93629 |
| Locking Dog (with bronze bushing) | 1 | 93729 |
| Locking Dog Handle (with bronze bushing) | 1 | 93734 |
| Locking Pawl Post | 1 | 93777 |
| Brake Mounting Post | 1 | 94013 |
| Keeper Plate (BIG) | 1 | 101650 |
| Keeper Plate (small) | 1 | 101651 |
| Disk Brake Mounting Plate | 1 | 101675 |
| Hand Wheel Hub Insert (SS) | 1 | 101691 |
| Washer 1-3/4" ID x 2-1/16" OD (Brass) | 1 | 102519 |
| Pipe Spacer (hand ratchet area) | 1 | 102521 |
| Pipe Separator Rod (SS) | 4 | 102522 |
| Pipe Separator Assembly | 1 | 102523 |
| Drive Shaft (used with disc brake system) | 1 | 102525 |

| DF-156 Bushings and Bearings | | |
|-----------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (20 Ton) Part Numbers |
| Disk Brake Mounting Plate Bushing | 1 | 22102 |
| Drive Shaft Bushing | 2 | 71188 |
| Drum Gear Bushing | 2 | 71226 |
| Intermediate Gear Bushing | 1 | 71382 |
| Locking Dog Handle Bushing | 1 | 93874 |
| Locking Dog Bushing | 1 | 102507 |

| DF-156 Left Hand or Right Hand Specific Components | | |
|--|----------|------------------------------|
| Part Description | Quantity | DF-156 (20 Ton) Part Numbers |
| Left Hand Winch | | |
| Side Plate Assembly Hand Wheel Side | 1 | 71102 |
| Side Plate Assembly Disk Brake Side | 1 | 71110 |
| Drive Pinion Guard | 1 | 71447 |
| Hand Ratchet Assembly | 1 | 102508 |
| Right Hand Winch | | |
| Side Plate Assembly Hand Wheel Side | 1 | 71080 |
| Side Plate Assembly Disk Brake Side | 1 | 71099 |
| Drive Pinion Guard | 1 | 71439 |
| Hand Ratchet Assembly | 1 | 102509 |

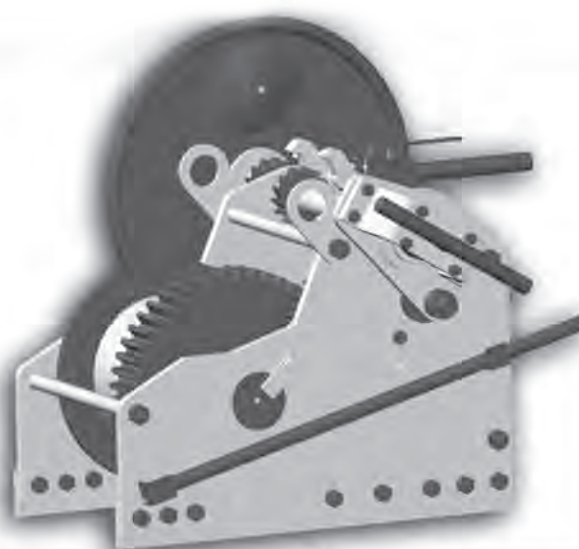
| DF-156 Miscellaneous Components (not shown in drawings) | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (20 Ton) Part Numbers |
| Ratchet Handle Extension | 1 | 70325 |
| U-Bolt with Fasteners (1" Wire Rope) | 1 | 82570 |

| DF-156 Disk Brake Assembly | | |
|-------------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (20 Ton) Part Numbers |
| Hex Nut 1/2" (SS) | 4 | 428 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| HH Bolt 5/8" x 2" (SS) | 4 | 14614 |
| Sleeve (Disk Brake) | 1 | 22101 |
| Key (Brake Sleeve) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Handle Assembly | 1 | 101665 |
| Threaded Rod (SS) | 4 | 101666 |
| Brake Housing | 1 | 101667 |
| Engaging Plate | 1 | 101668 |
| Brake Disk | 2 | 101669 |
| Engaging Cap | 1 | 101670 |

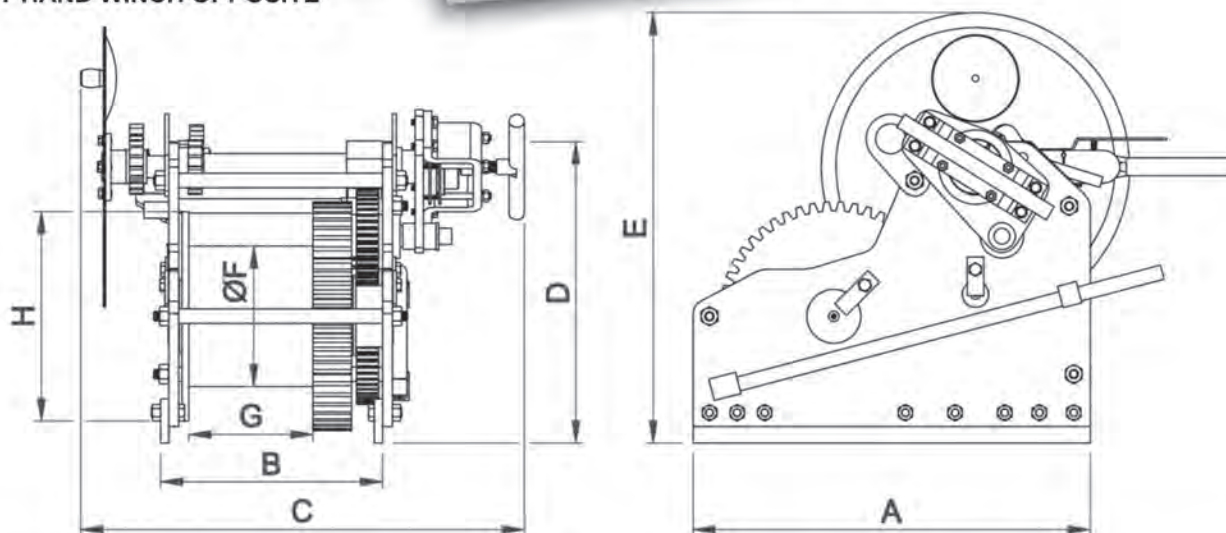
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40 TON MANUAL WINCH



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|-----|---------|-----|---------|---------|-----|------------|
| DF-156-40 | REFER TO COATINGS TABLE | 36" | 20 1/8" | 42" | 27 1/4" | 39" | 12 3/4" | 11 1/4" | 19" | 1250 |

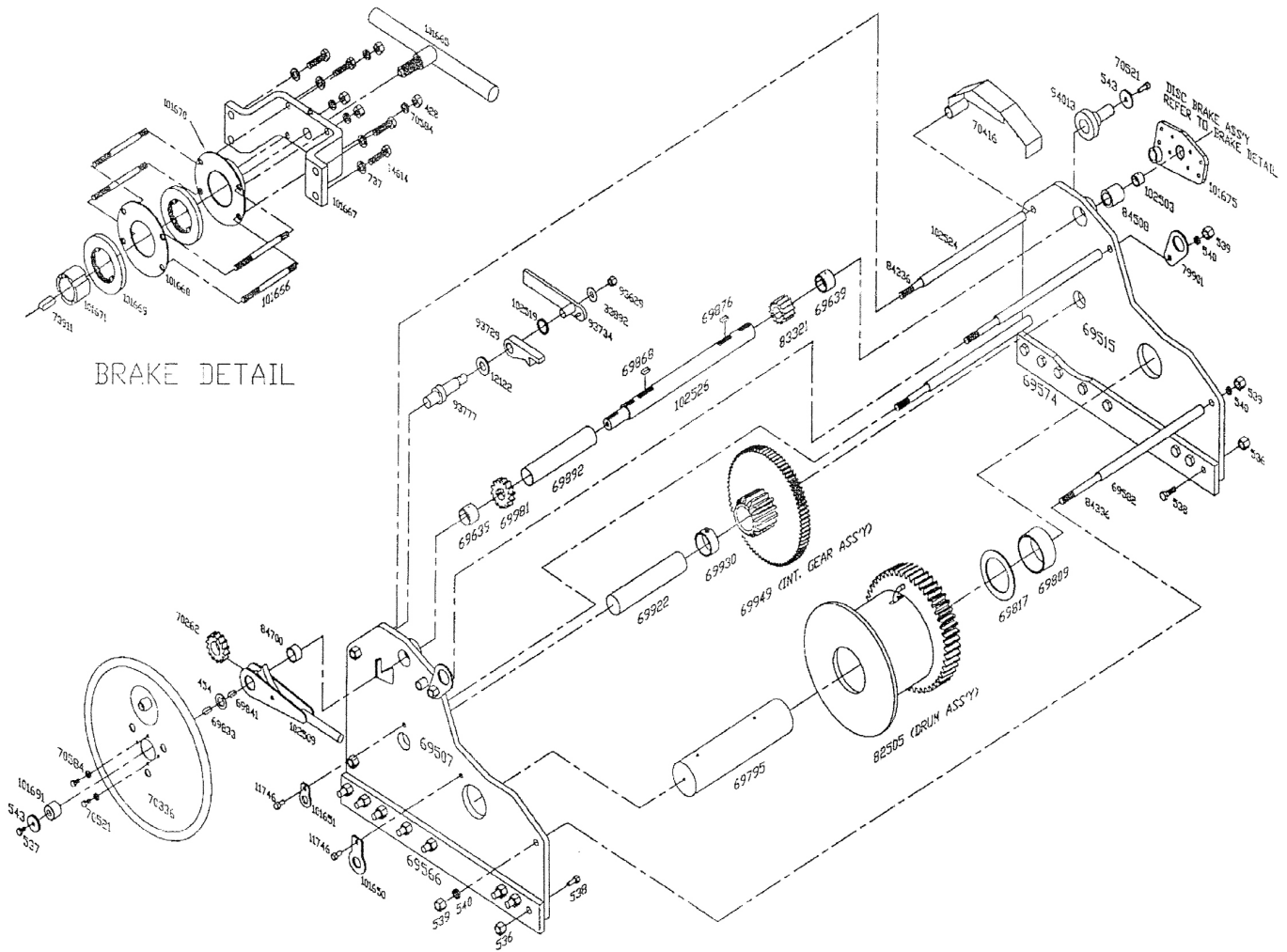
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 94213 | 94212 |
| GALVANIZED | 94224 | 94223 |

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40 TON MANUAL WINCH PARTS BREAKDOWN

2



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40 TON MANUAL WINCH PARTS BREAKDOWN



| DF-156-40 Ton Manual Winch Parts List (refer to winch drawings for location) | | |
|--|----------|------------------------------|
| Part Description | Quantity | DF-156 (40 Ton) Part Numbers |
| Flat Washer 1-1/2" ID x 2-1/2" OD | 1 | 454 |
| Heavy Hex Nut 3/4" (SS) | 16 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 1 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 16 | 538 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Lock Washer 7/8" (SS) | 8 | 540 |
| Flat Washer 9/16" ID x 2-1/2" OD (SS) | 2 | 543 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Flat Washer 1" | 1 | 12122 |
| Flat Washer 5/8" (Brass) | 1 | 33892 |
| Base Bar Straight | 1 | 69566 |
| Base Bar with Radius | 1 | 69574 |
| Pipe Separator | 3 | 69582 |
| Drum Shaft | 1 | 69795 |
| Drum Pipe Spacer | 1 | 69809 |
| Drum Washer | 1 | 69817 |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Key (Ratchet Gear) 3/8" SQ x 1-3/16" | 1 | 69841 |
| Key (Locking Dog Gear) 1/2" SQ x 1-1/4" | 1 | 69868 |
| Key (Drive Pinion) 1/2" SQ x 2-3/4" | 1 | 69876 |
| Pipe Spacer (drive shaft) | 1 | 69892 |
| Intermediate Shaft | 1 | 69922 |
| Intermediate Shaft Collar | 1 | 69930 |
| Intermediate Gear Assembly | 1 | 69949 |
| Locking Dog Gear | 1 | 69981 |
| Ratchet Gear | 1 | 70262 |
| Hand Wheel Assembly with Speed Handle | 1 | 70336 |
| Hex Head Bolt 1/2" x 1" (SS) | 5 | 70521 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Lifting Lug | 2 | 79901 |
| Drum Assembly | 1 | 82503 |
| Drive Pinion | 1 | 83321 |
| Pipe Separator Rod (SS) | 4 | 84336 |
| Pipe Spacer (disk brake area) | 1 | 84508 |
| Pipe Spacer (hand ratchet area) | 1 | 84700 |
| Slotted Hex Nut 5/8" (Brass) | 1 | 93729 |
| Locking Dog (with bronze bushing) | 1 | 93729 |
| Locking Dog Handle (with bronze bushing) | 1 | 93734 |
| Locking Pawl Post | 1 | 93777 |
| Brake Mounting Post | 1 | 94013 |
| Keeper Plate (BIG) | 1 | 101650 |
| Keeper Plate (small) | 1 | 101651 |
| Disk Brake Mounting Plate | 1 | 101675 |
| Hand Wheel Hub Insert (SS) | 1 | 101691 |
| Washer 1-3/4" ID x 2-1/16" OD (Brass) | 1 | 102519 |
| Pipe Separator Assembly | 1 | 102524 |
| Drive Shaft (used with disc brake system) | 1 | 102526 |

| DF-156 Bushings and Bearings | | |
|-----------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (40 Ton) Part Numbers |
| Drive Shaft Bushing | 2 | 69639 |
| Intermediate Gear Bushing | 1 | 69973 |
| Drum Gear Bushing | 2 | 82511 |
| Locking Dog Handle Bushing | 1 | 93874 |
| Disk Brake Mounting Plate Bushing | 1 | 102503 |
| Locking Dog Bushing | 1 | 102507 |

| DF-156 Left or Right Hand Specific Components | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (40 Ton) Part Numbers |
| Left Hand Winch | | |
| Side Plate Assembly Hand Wheel Side | 1 | 69531 |
| Side Plate Assembly Disk Brake Side | 1 | 69523 |
| Drive Pinion Guard | 1 | 70637 |
| Hand Ratchet Assembly | 1 | 102508 |
| Right Hand Winch | | |
| Side Plate Assembly Hand Wheel Side | 1 | 69507 |
| Side Plate Assembly Disk Brake Side | 1 | 69515 |
| Drive Pinion Guard | 1 | 70416 |
| Hand Ratchet Assembly | 1 | 102509 |

| DF-156 Miscellaneous Components (not shown in drawings) | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (40 Ton) Part Numbers |
| Ratchet Handle Extension | 1 | 70325 |
| U-Bolt with Fasteners (1" Wire Rope) | 1 | 82570 |

| DF-156 Disk Brake Assembly | | |
|-------------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (40 Ton) Part Numbers |
| Hex Nut 1/2" (SS) | 4 | 428 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Head Bolt 5/8" x 2" (SS) | 4 | 14614 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Key (Brake Sleeve) 1/2" SQ x 1-3/4" | 1 | 73911 |
| Handle Assembly | 1 | 101665 |
| Threaded Rod (SS) | 4 | 101666 |
| Brake Housing | 1 | 101667 |
| Engaging Plate | 1 | 101668 |
| Brake Disk | 2 | 101669 |
| Engaging Cap | 1 | 101670 |
| Sleeve (Disk Brake) | 1 | 101671 |

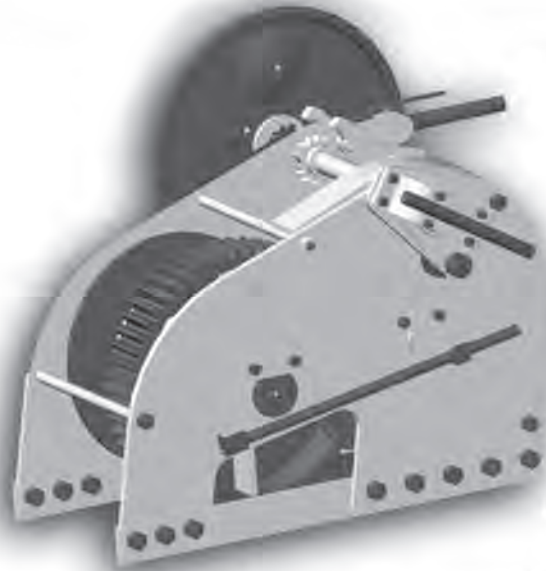
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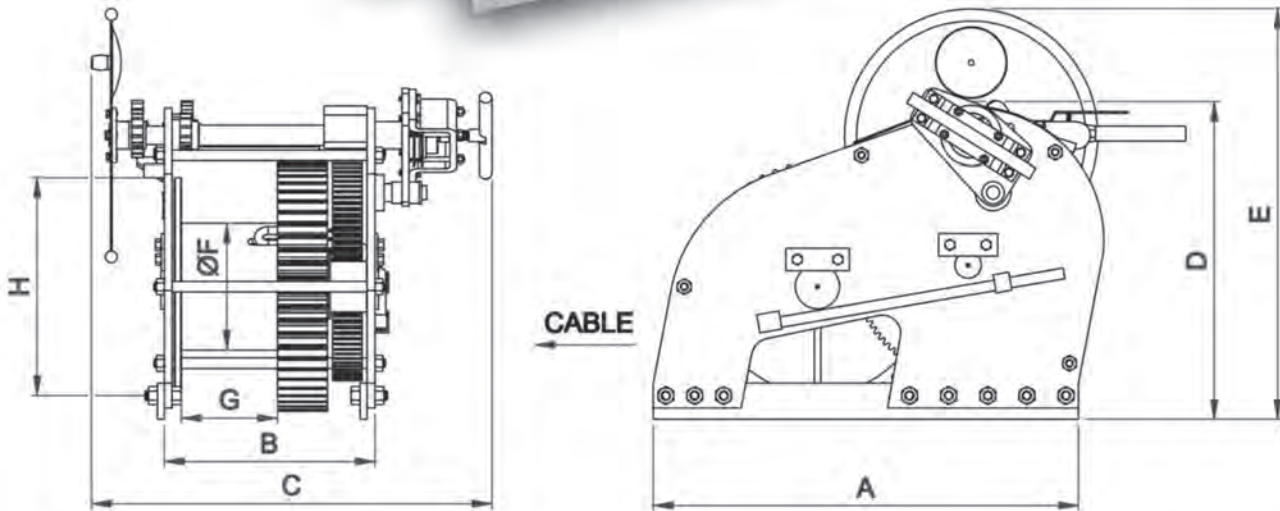


60 TON MANUAL WINCH

2



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

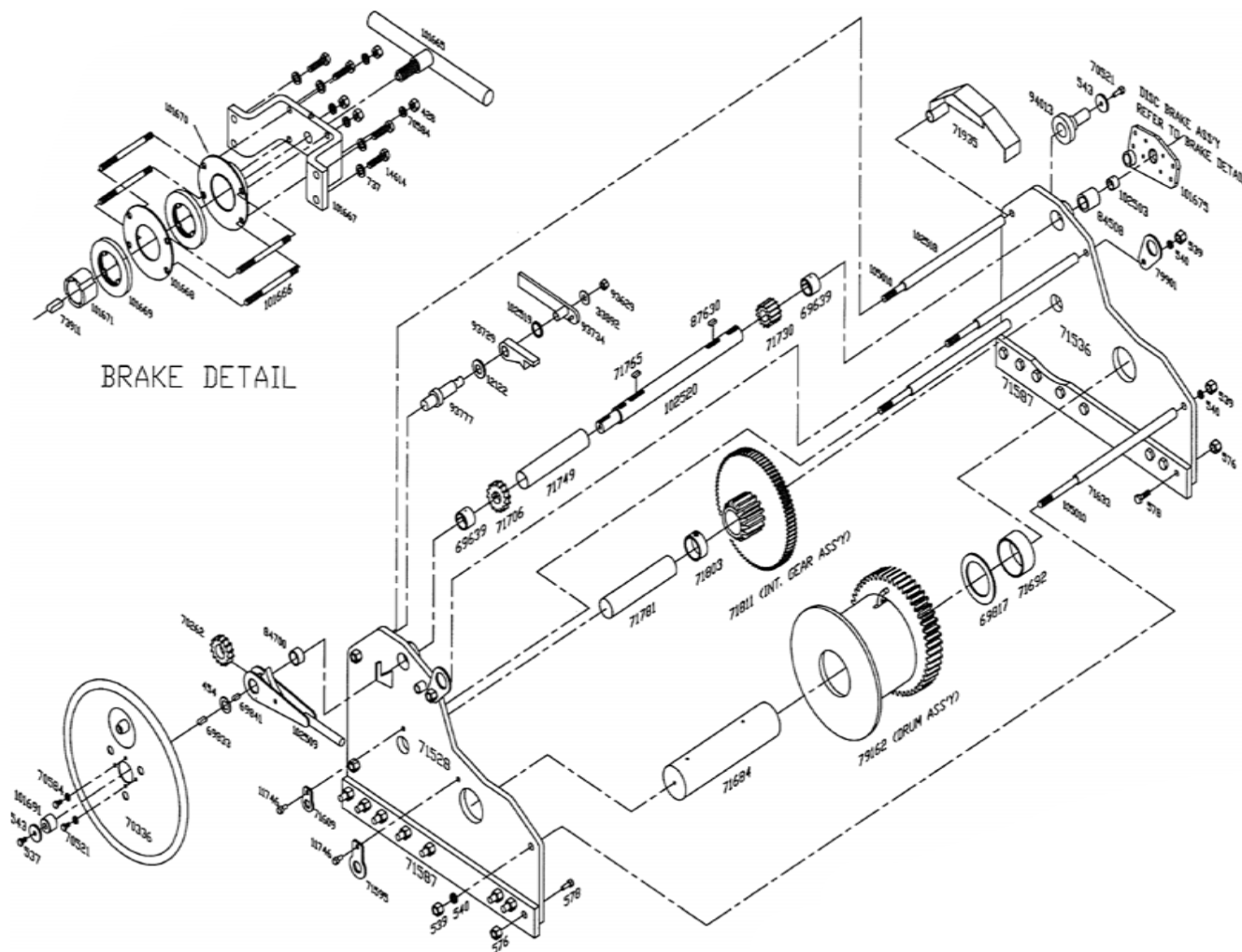


| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|-----|-----|---------|-----|---------|-----|------------|
| DF-156-60 | REFER TO COATINGS TABLE | 49 1/8" | 23 1/4" | 45" | 35" | 45 1/2" | 14" | 10 5/8" | 24" | 2300 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 72043 | 6528 |

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60 TON MANUAL WINCH PARTS BREAKDOWN



2

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60 TON MANUAL WINCH PARTS BREAKDOWN



2

| DF-156-60 Ton Manual Winch Parts List (refer to winch drawing for location) | | | |
|---|----------|-------------------|---------------|
| Part Description | Quantity | 10.625" Wide Drum | 36" Wide Drum |
| Flat Washer 1-1/2" ID x 2-1/2" OD | 1 | 454 | |
| Heavy Hex Nut 1" (SS) | 16 | 576 | |
| Hex Head Bolt 1/2" x 2" (SS) | 1 | 537 | |
| Hex Head Bolt 1" x 3" (SS) | 16 | 578 | |
| Hex Nut 7/8" (SS) | 8 | 539 | |
| Lock Washer 7/8" (SS) | 8 | 540 | |
| Flat Washer 9/16" ID x 2-1/2" OD (SS) | 2 | 543 | |
| Hex Head Bolt 5/8" x 1" | 8 | 11746 | |
| Flat Washer 1" | 1 | 12122 | |
| Flat Washer 5/8" (Brass) | 1 | 33892 | |
| Drum Washer | 1 | 69817 | |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 | |
| Key (Ratchet Gear) 3/8" SQ x 1-3/16" | 1 | 69841 | |
| Ratchet Gear | 1 | 70262 | |
| Hand Wheel Assembly with Speed Handle | 1 | 70336 | |
| Hex Head Bolt 1/2" x 1" (SS) | 5 | 70521 | |
| Lock Washer 1/2" (SS) | 4 | 70584 | |
| Base Bar Straight | 2 | 71587 | |
| Keeper Plate (BIG) | 2 | 71595 | |
| Keeper Plate (small) | 2 | 71609 | |
| Pipe Separator | 3 | 71633 | 102510 |
| Locking Dog Gear | 1 | see note #1 | |
| Drum Shaft | 1 | 71684 | 102511 |
| Drum Pipe Spacer | 1 | 71692 | |
| Drive Pinion | 1 | 71730 | |
| Pipe Spacer (drive shaft) | 1 | 71749 | 102512 |
| Key (Locking Dog Gear) 1/2" SQ x 2" | 1 | 71765 | |
| Intermediate Shaft | 1 | 71781 | 102513 |
| Intermediate Shaft Collar | 1 | 71803 | |
| Intermediate Gear Assembly | 1 | 71811 | |
| Drum Assembly | 1 | 79162 | 102514 |
| Lifting Lug | 2 | 79901 | |
| Pipe Spacer (disk brake area) | 1 | 84508 | |
| Pipe Spacer (hand ratchet area) | 1 | 84700 | |
| Key (Drive Pinion) 1/2" SQ x 4-1/4" | 1 | 87630 | |
| Slotted Hex Nut 5/8" (Brass) | 1 | 93629 | |
| Locking Dog (with bronze bushing) | 1 | 93729 | |
| Locking Dog Handle (with bronze bushing) | 1 | 93734 | |
| Locking Pawl Post | 1 | 93777 | |
| Brake Mounting Post | 1 | 94013 | |
| Disk Brake Mounting Plate | 1 | 101675 | |
| Hand Wheel Hub Insert (SS) | 1 | 101691 | |
| Pipe Separator Assembly | 1 | 102518 | 102516 |
| Washer 1-3/4" ID x 2-1/16" OD (Brass) | 1 | 102519 | |
| Drive Shaft (used with disc brake system) | 1 | 102520 | 102517 |
| Pipe Separator Rod (SS) | 4 | 105010 | 102515 |

Note #1 - locking dog gear is left or right hand specific, see left and right hand specific components table

| DF-156 Bushings and Bearings | | |
|-----------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (60 Ton) Part Numbers |
| Drive Shaft Bushing | 2 | 69639 |
| Drum Gear Bushing | 2 | 71676 |
| Intermediate Gear Bushing | 1 | 71854 |
| Locking Dog Handle Bushing | 1 | 93874 |
| Disk Brake Mounting Plate Bushing | 1 | 102503 |
| Locking Dog Bushing | 1 | 102507 |

| DF-156 Left or Right Hand Specific Components | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (60 Ton) Part Numbers |
| Left Hand Winch | | |
| Drive Pinion Guard | 1 | 71493 |
| Side Plate Assembly Hand Wheel Side | 1 | 71544 |
| Side Plate Assembly Disk Brake Side | 1 | 71552 |
| Locking Dog Gear | 1 | 71714 |
| Hand Ratchet Assembly | 1 | 102508 |
| Right Hand Winch | | |
| Side Plate Assembly Hand Wheel Side | 1 | 71528 |
| Side Plate Assembly Disk Brake Side | 1 | 71536 |
| Locking Dog Gear | 1 | 71706 |
| Drive Pinion Guard | 1 | 71935 |
| Hand Ratchet Assembly | 1 | 102509 |

| DF-156 Miscellaneous Components (not shown in drawings) | | |
|---|----------|------------------------------|
| Part Description | Quantity | DF-156 (60 Ton) Part Numbers |
| Ratchet Handle Extension | 1 | 70325 |
| U-Bolt with Fasteners (1-1/8" Wire Rope) | 1 | 72001 |

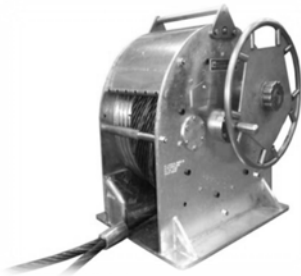
| DF-156 Disk Brake Assembly | | |
|-------------------------------------|----------|------------------------------|
| Part Description | Quantity | DF-156 (60 Ton) Part Numbers |
| Hex Nut 1/2" (SS) | 4 | 428 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Head Bolt 5/8" x 2" (SS) | 4 | 14614 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Key (Brake Sleeve) 1/2" SQ x 1-3/4" | 1 | 73911 |
| Handle Assembly | 1 | 101665 |
| Threaded Rod (SS) | 4 | 101666 |
| Brake Housing | 1 | 101667 |
| Engaging Plate | 1 | 101668 |
| Brake Disk | 2 | 101669 |
| Engaging Cap | 1 | 101670 |
| Sleeve (Disk Brake) | 1 | 101671 |

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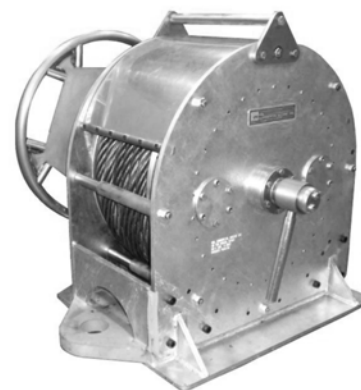
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ERL 40 TON BARGE CONNECTION WINCH



- Two Speed Design: One speed for fast take-up and cable pullout. Second speed for line tension and load release.
- Tensioning is accomplished by turning the hand wheel. No cheater bar is required to achieve 18,000 lbs. cable tension.
- No dogs used to hold/release the load. The load is released slowly simply by turning the hand wheel.
- Grooved drum holds 50 feet of 1" cable on a single layer. No risk of fouling or bird nesting.
- Zero Maintenance: No grease fittings to maintain, Fully Galvanized Steel Frame.
- All Gearing is concealed within the frame and permanently lubricated.
- All external parts are Stainless Steel or Bronze for long term operation.
- Additional tensioning of cable achieved simply turning the hand wheel further. No full release of the load is required.
- Made in the USA.
- Overall Dimensions (LxWxH) – 30.6"x24.5"x29.75"
- Weight – 900 lbs.
- Ultimate Capacity – 80,000 lbs.
- Drum Capacity – 50 feet (1" wire)



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DF-529 LOW PROFILE WINCH

2



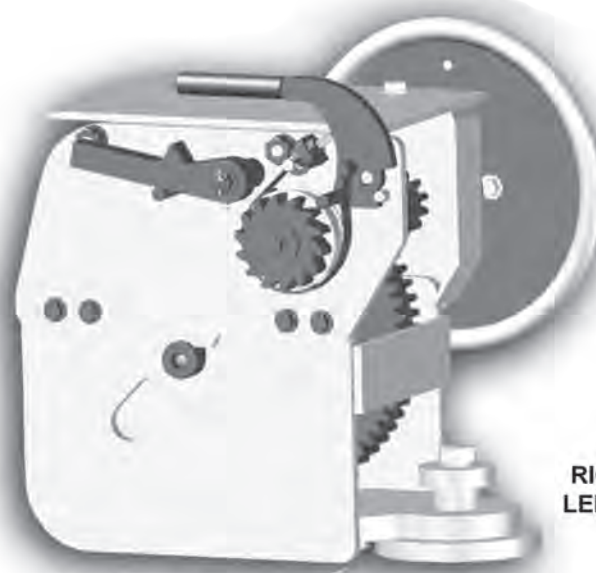
- Heavy duty springless, galvanized ratchet handles.
- Stainless steel brake drum and band.
- Chrome plated shafts.
- Bronze bushing with graphite inserts.
- Stainless / bronze hardware.
- Two-piece side plate for easy maintenance.

- "Easy off" handwheel.
- Doubler plate, base bar, d-ring, or swivel mounting.
- Right and left hand models.
- Blasted and epoxy painted.
- Hot dipped galvanized option available.
- High load release dog.

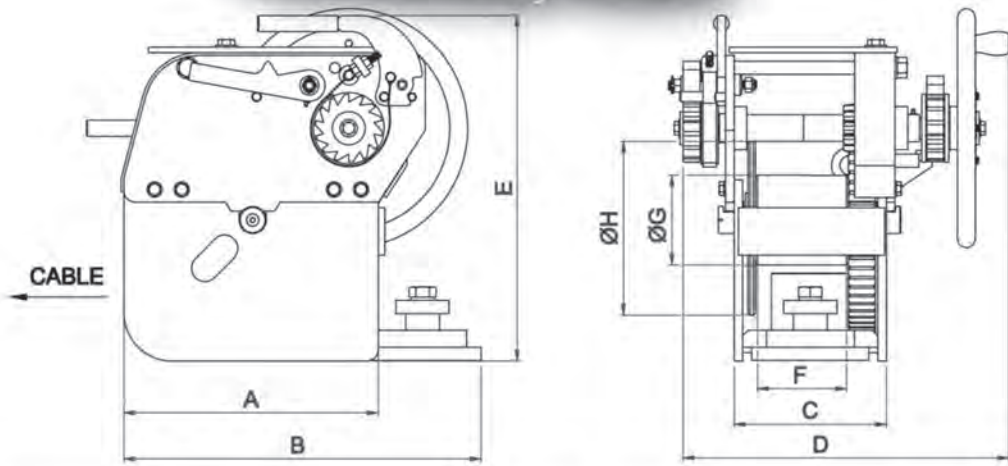
| MODEL No. | HOLDING DOG &/OR BRAKE | LINE PULL @ FIRST LAYER WITH ONE MAN (LBS) | | DRUM FLANGE DIAM. (INCHES) | DRUM INCHES | | DRUM CAPACITIES (FT) | | | | DIMENSIONAL DATA (INCHES) | | |
|-----------|------------------------|--|---------------------|----------------------------|-------------|-------|----------------------|------|------|----|---------------------------|---------|---------|
| | | HAND WHEEL | RATCHET W/STD. EXT. | | DIAM | WIDTH | 5/8" | 3/4" | 7/8" | 1" | W | L | H |
| DF-529 | 40 TONS | 2000 | 8000 | 14 | 6.6 | 6.89 | 126 | 95 | 85 | 70 | 12 1/2" | 19 3/4" | 22 3/4" |

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40 TON LOW PROFILE BUTTON MOUNT WINCH



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|---------|-----|---------|--------|--------|-----|------------|
| DF-529 | REFER TO COATINGS TABLE | 18 3/4" | 26 1/2" | 11 1/4" | 24" | 25 1/2" | 6 7/8" | 6 5/8" | 14" | 550 |

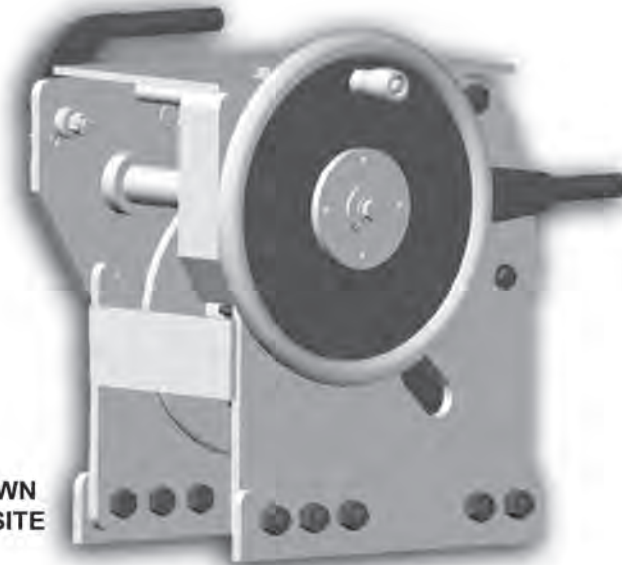
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 90088 | 90098 |
| GALVANIZED | 89101 | 89100 |

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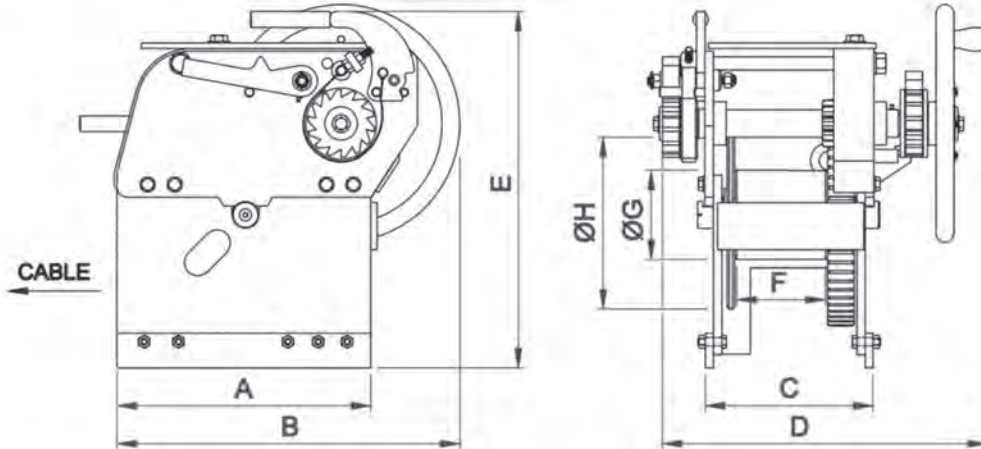


40 TON LOW PROFILE BASE BAR MOUNT WINCH

2



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

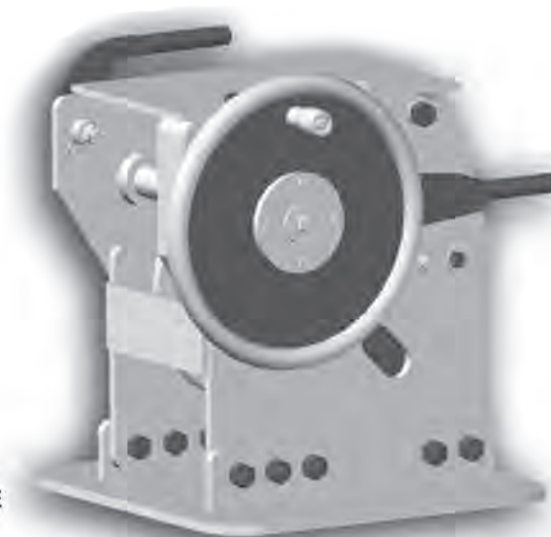


| MODEL No. | PART No. | A | B | C | D | E | F | ØG | ØH | WT. (lbs.) |
|-----------|-------------------------|-----------|---------|---------|-----|---------|--------|--------|-----|------------|
| DF-529 | REFER TO COATINGS TABLE | 19 11/16" | 26 1/2" | 12 1/2" | 24" | 25 1/2" | 6 7/8" | 6 5/8" | 14" | 480 |

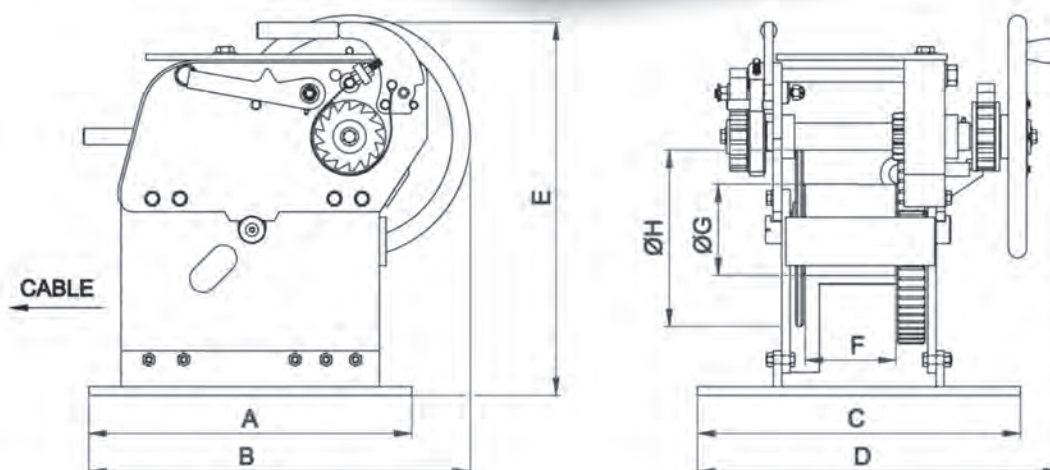
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 89081 | 89080 |
| GALVANIZED | 89103 | 89102 |

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40 TON LOW PROFILE DOUBLER PLATE MOUNT WINCH



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|---------|---------|---------|--------|--------|-----|------------|
| DF-529 | REFER TO COATINGS TABLE | 23 1/2" | 28 3/8" | 23 1/2" | 24 1/2" | 25 1/2" | 6 7/8" | 6 5/8" | 14" | 550 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 89088 | 89098 |
| GALVANIZED | 89092 | 89093 |

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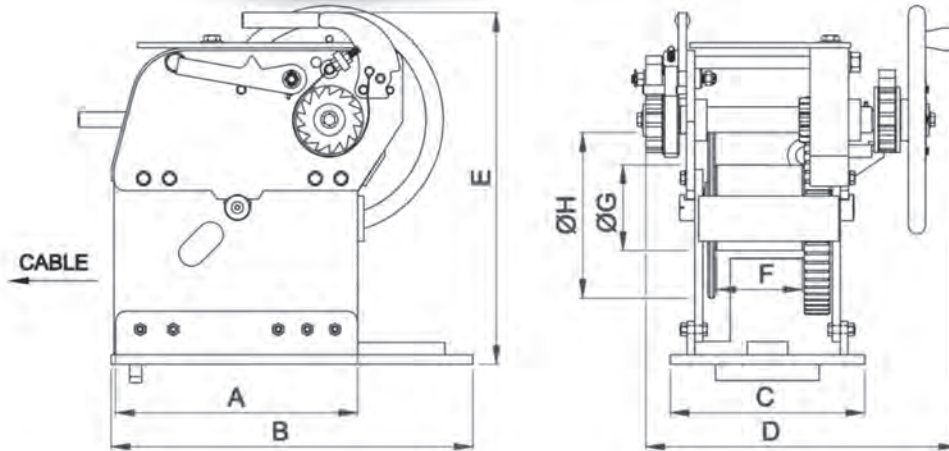


40 TON LOW PROFILE D-RING MOUNT WINCH

2



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

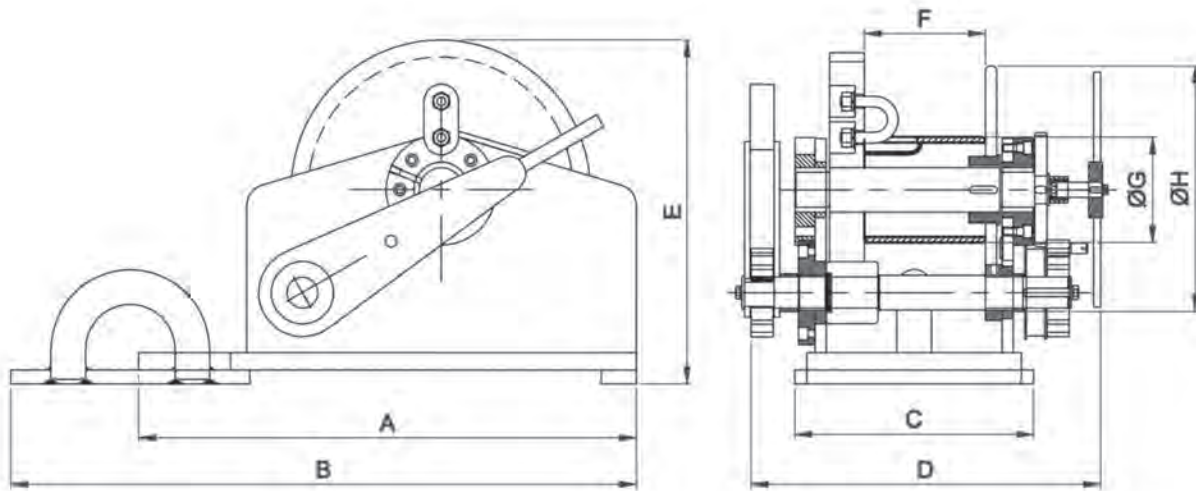


| MODEL No. | PART No. | A | B | C | D | E | F | ØG | ØH | WT. (lbs.) |
|-----------|-------------------------|-----------|---------|-----|-----|---------|--------|--------|-----|------------|
| DF-529 | REFER TO COATINGS TABLE | 19 11/16" | 29 1/2" | 15" | 24" | 25 1/2" | 6 7/8" | 6 5/8" | 14" | 550 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|---------------|-------------------|-------------------|
| PAINTED BLACK | 89083 | 89082 |
| GALVANIZED | 89090 | 89091 |

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40 TON COMPACT LOW PROFILE WINCH



2

| MODEL No. | PART No. | A | B | C | D | E | F | ØG | ØH | WT. (lbs.) |
|-----------|------------------------|----------|----------|----------|---------|---------|--------|----|-----|------------|
| DF-539 | REFER TO COATING TABLE | 28 5/16" | 35 9/16" | 13 9/16" | 19 7/8" | 19 1/2" | 6 7/8" | 6" | 14" | 500 |

LEFT HAND WINCH SHOWN
RIGHT HAND WINCH OPPOSITE

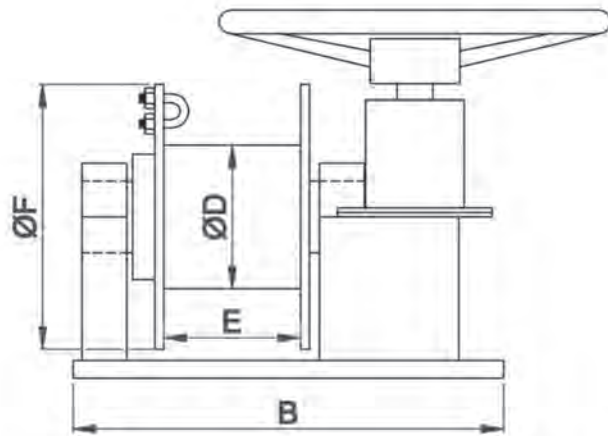
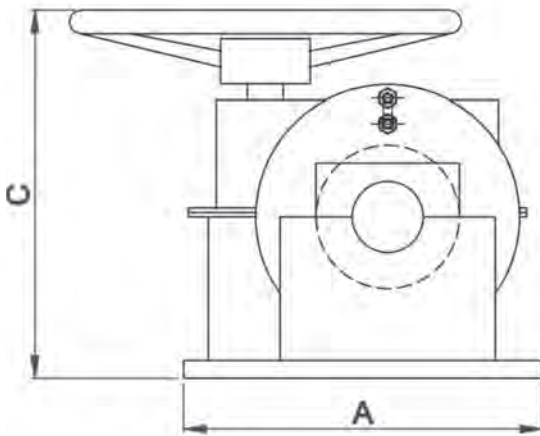
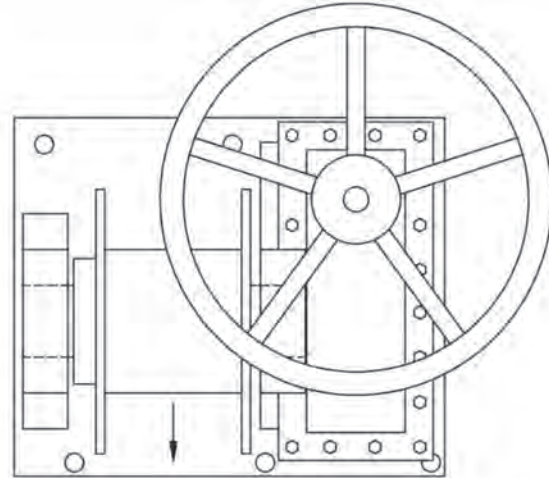
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 89061 | 89060 |

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25 TON PARKER WINCH

2



| MODEL No. | PART No. | A | B | C | ØD | E | ØF | WT. (lbs.) |
|-------------|-------------------------|-----|-----|---------|----|--------|---------|------------|
| DF-170-25-M | REFER TO COATINGS TABLE | 20" | 24" | 20 1/2" | 8" | 7 5/8" | 14 3/4" | 680 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|----------|-------------------|-------------------|
| PAINTED | 100506 | 100501 |

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DECK FITTING NOTES AND GENERAL INFORMATION



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All deck fittings and winches must be sized correctly, properly located and installed to serve their intended functions. It is the owner/operator's responsibility to adhere to the aforementioned.

Improper installation can result in failure of a casting or winch. Deck fittings which have failed due to overloads, or have been dislodged from foundations, or have fractures and/or deformations should be repaired or replaced immediately.

In particular, loads to bits must be applied to the posts between the base and the midpoint in a horizontal or downward direction. Properly placed chocks will prevent line chafing. Kevels should be installed horizontally on foundation bases of sufficient size. Forces to kevels must be directed to the trunk and not the horns. Horns will fail when exposed to direct loads.

Deck fittings are not designed for use to lift the vessel. Misapplication or misuse of a deck fitting is not the responsibility of the supplier or NABRICO.

All dimensions shown in this catalog are in feet and inches. Weights are in English pounds. Capacities are in short tons of 2000 pounds. Please note that dimensions and weights are nominal and are subject to standard variations.

NABRICO DECK FITTING WARRANTIES

NABRICO warrants that all deck fittings shall be free from defects in material and workmanship at the time of shipment. If, within six (6) months on all winches and within three (3) months on all products fabricated by NABRICO after date of shipment, (under normal conditions of use and service) defects shall be discovered which are not due to normal wear and tear or misuse, NABRICO shall correct such defects at its expense. NABRICO's obligation under this warranty is limited to its repair or replacement of its equipment or parts which upon examination NABRICO shall determine to have been defective. If defects occur in the equipment purchased by NABRICO from others, NABRICO's responsibility shall be limited to the guarantee or warranty extended by the manufacturer or supplier of such equipment. NABRICO shall not be liable directly or indirectly in contract, tort or otherwise, to the buyer or anyone in privity with the Buyer for any loss or damage to any vessel or its equipment, stores, cargo or other property, for any personal injury or death or for consequential damages resulting from any of the foregoing arising out of any such defect or occurring after expiration of the warranty period. This warranty is void where any deck fitting has been altered, repaired or misused by anyone other than NABRICO or its personnel.

The above warranty shall be in lieu of all other warranties whether express or implied, written or oral arising under common or statutory law.

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DF-1 UPRIGHT ELECTRIC WINCH

FEATURES

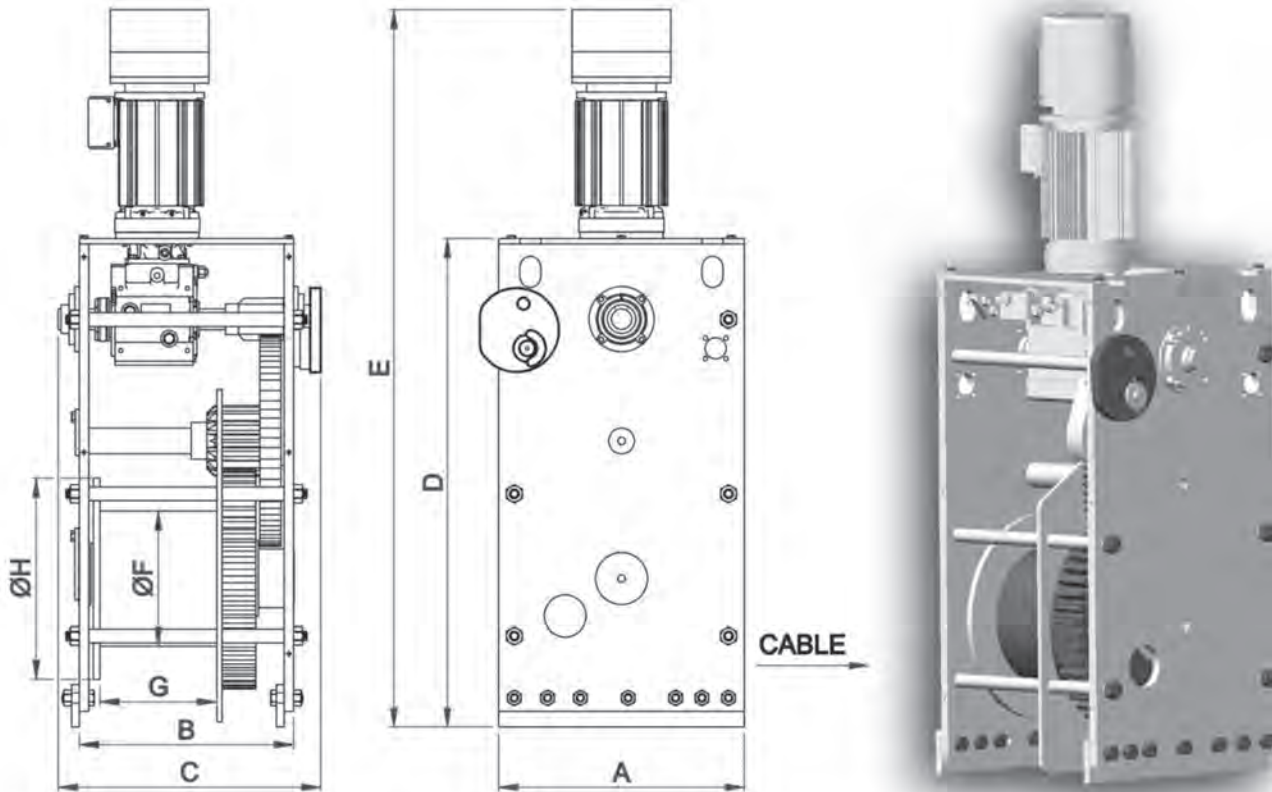


- Salt water package standard on all power winches.
- Hot-dipped galvanized.
- Stainless or silicon bronze fasteners.
- 3-ply conveyor belt covers (damage and corrosion resistant).
- 3-tooth locking dog with large release and fail-safe disc brake.
- Provisions for emergency manual operation with cordless drill.
- NEMA motor design with cycloidal gearbox available.
- Control box option: NEMA 4X stainless steel.
- Minimal maintenance and easy to repair.
- Variable frequency drive option available (Amp draw limits, variable speeds and motor protection).
- Made as one model adjustable to true right or left hand models for use in pairs.
- Over 100 fewer parts than other electric winches (no chain or sprockets).
- Heaviest winch in its class.
- 30 Ton - 5 HP motor standard.
- 40 Ton - 7.5 HP motor standard.
- 50 Ton - 10 HP motor standard.
- 65 Ton - 10 HP motor standard.
- Other line pulls and speeds available.

| MODEL No. | HOLDING DOG &/OR BRAKE | LINE PULL | | DRUM CAPACITIES (FT) | | | | | | WEIGH T | DIMENSIONAL DATA | | | |
|-----------|------------------------|-----------|--------------|----------------------|-----|------|------|------|------|---------|------------------|-----|-----|-----|
| | | S. TONS | @ RATED AMPS | @ MOTOR STALL | FPM | 1/2" | 5/8" | 3/4" | 7/8" | | 1" | LBS | W | L |
| DF-1-30 | | 30 | 12500 | 18750 | 14 | 361 | 228 | 138 | 120 | 66 | 1700 | 20" | 22" | 55" |
| DF-1-40 | | 40 | 15600 | 23400 | 16 | - | 287 | 180 | 130 | 100 | 1800 | 21" | 24" | 67" |
| DF-1-50 | | 50 | 20800 | 31200 | 16 | - | 287 | 180 | 130 | 100 | 1850 | 21" | 24" | 69" |
| DF-1-65 | | 65 | 37800 | 56700 | 9 | - | 572 | 325 | 262 | 200 | 3200 | 24" | 30" | 79" |

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30 TON UPRIGHT ELECTRIC WINCH



2

| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|-----|-----|---------|---------|-----|-----|------------|
| DF-1-30 | REFER TO COATINGS TABLE | 22" | 19 3/8" | 23" | 39" | 57 1/2" | 10 3/4" | 11" | 16" | 1700 |

RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

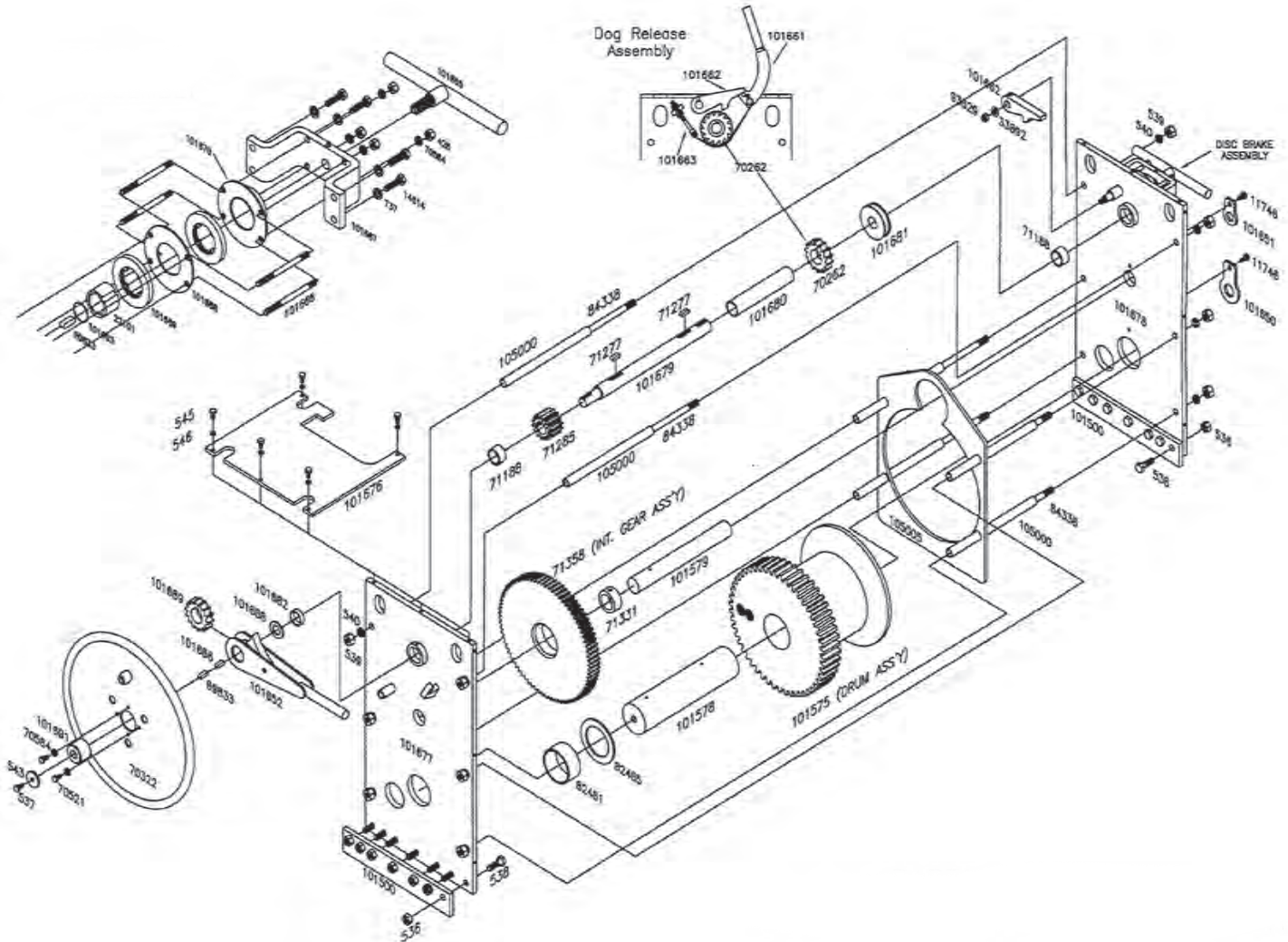
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 83391 | 83390 |

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30 TON UPRIGHT ELECTRIC WINCH PARTS BREAKDOWN

2



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30 TON UPRIGHT ELECTRIC WINCH PARTS BREAKDOWN



| DF-3 (20 / 30 Ton) Manual Upright Winch Parts List | | |
|--|----------|-------------------------------|
| (refer to winch drawing for location) | | |
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Heavy Hex Nut 3/4" (SS) | 12 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 1 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 12 | 538 |
| Hex Nut 7/8" (SS) | 12 | 539 |
| Lock Washer 7/8" (SS) | 12 | 540 |
| Washer 9/16" ID x 2-1/2" OD (SS) | 1 | 543 |
| Hex Head Bolt 3/8" x 1" (SS) | 6 | 545 |
| Lock Washer 3/8" (SS) | 6 | 546 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Flat Washer 5/8" (Brass) | 2 | 33892 |
| Key (Handwheel Hub) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Locking Dog Gear | 1 | 70262 |
| Hand Wheel Assembly with Speed Handle | 1 | 70322 |
| Hex Head Bolt 1/2" x 1" (SS) | 4 | 70521 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Key (Drive Pinion) 3/8" SQ x 2-1/2" | 1 | 71277 |
| Key (Locking Dog Gear) 3/8" SQ x 2-1/2" | 1 | |
| Drive Pinion | 1 | 71285 |
| Intermediate Shaft Collar | 1 | 71331 |
| Intermediate Gear Assembly | 1 | 71358 |
| Drum Washer | 1 | 82465 |
| Drum Pipe Spacer | 1 | 82481 |
| Pipe Separator Rod (SS) | 6 | 84338 |
| Slotted Hex Nut 5/8" (Brass) | 2 | 93629 |
| Base Bar | 2 | 101500 |
| Drum Assembly | 1 | 101575 |
| Drum Shaft | 1 | 101578 |
| Intermediate Shaft | 1 | 101579 |
| Keeper Plate (BIG) | 1 | 101650 |
| Keeper Plate (small) | 1 | 101651 |
| Locking Dog (with bronze bushing) | 1 | 101662 |
| Brake Band Assembly | 1 | 101663 |
| Top Plate | 1 | 101676 |
| Drive Shaft | 1 | 101679 |
| Pipe Spacer (drive shaft) | 1 | 101680 |
| Brake Drum | 1 | 101681 |
| Pipe Spacer (hand ratchet area) | 1 | 101682 |
| Key (Ratchet Gear) 1/2" SQ x 1-5/8" | 1 | 101686 |
| Washer 1-9/16" ID x 2-11/16" OD (SS) | 1 | 101688 |
| Ratchet Gear | 1 | 101689 |
| Hand Wheel Hub Insert (SS) | 1 | 101691 |
| Pipe Separator | 6 | 105000 |
| Cable Guard Plate | 1 | 105005 |

| DF-3 Bushings and Bearings | | |
|----------------------------|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Drive Shaft Bushing | 2 | 71188 |
| Drum Gear Bushing | 2 | 71226 |
| Intermediate Gear Bushing | 1 | 71382 |

| DF-3 Left Hand or Right Hand Specific Components | | |
|--|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Left Hand Winch | | |
| Hand Ratchet Assembly | 1 | 101652 |
| Locking Dog Handle Assembly | 1 | 101661 |
| Side Plate Assembly (Hand Wheel Side) | 1 | 101677 |
| Side Plate Assembly (Disc Brake Side) | 1 | 101678 |
| Right Hand Winch | | |
| Side Plate Assembly (Hand Wheel Side) | 1 | 101694 |
| Side Plate Assembly (Disc Brake Side) | 1 | 101695 |
| Locking Dog Handle Assembly | 1 | 101696 |
| Hand Ratchet Assembly | 1 | 101698 |

| DF-3 Miscellaneous Components (not shown in drawings) | | |
|---|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Cover Mounting Stud 3/8" x 1-1/2" | 10 | 549 |
| Brass Wing Nut 3/8" | 10 | 550 |
| Ratchet Handle Extension | 1 | 70323 |
| Protective Rubber Cover | 2 | 80223 |
| U-Bolt with Fasteners (7/8" Wire Rope) | 1 | 82562 |

| DF-3 Disc Brake Assembly | | |
|-------------------------------------|----------|-------------------------------|
| Part Description | Quantity | DF-3 (20/30 Ton) Part Numbers |
| Hex Nut 1/2" (SS) | 4 | 428 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Head Bolt 5/8" x 2" (SS) | 4 | 14614 |
| Sleeve (Disc Brake) | 1 | 22101 |
| Key (Brake Sleeve) 3/8" SQ x 1-3/4" | 1 | 69833 |
| Lock Washer 1/2" (SS) | 4 | 70584 |
| Handle Assembly | 1 | 101665 |
| Threaded Rod (SS) | 4 | 101666 |
| Brake Housing | 1 | 101667 |
| Engaging Plate | 1 | 101668 |
| Brake Disc | 2 | 101669 |
| Engaging Cap | 1 | 101670 |
| Rubber O-Ring | 1 | 101693 |

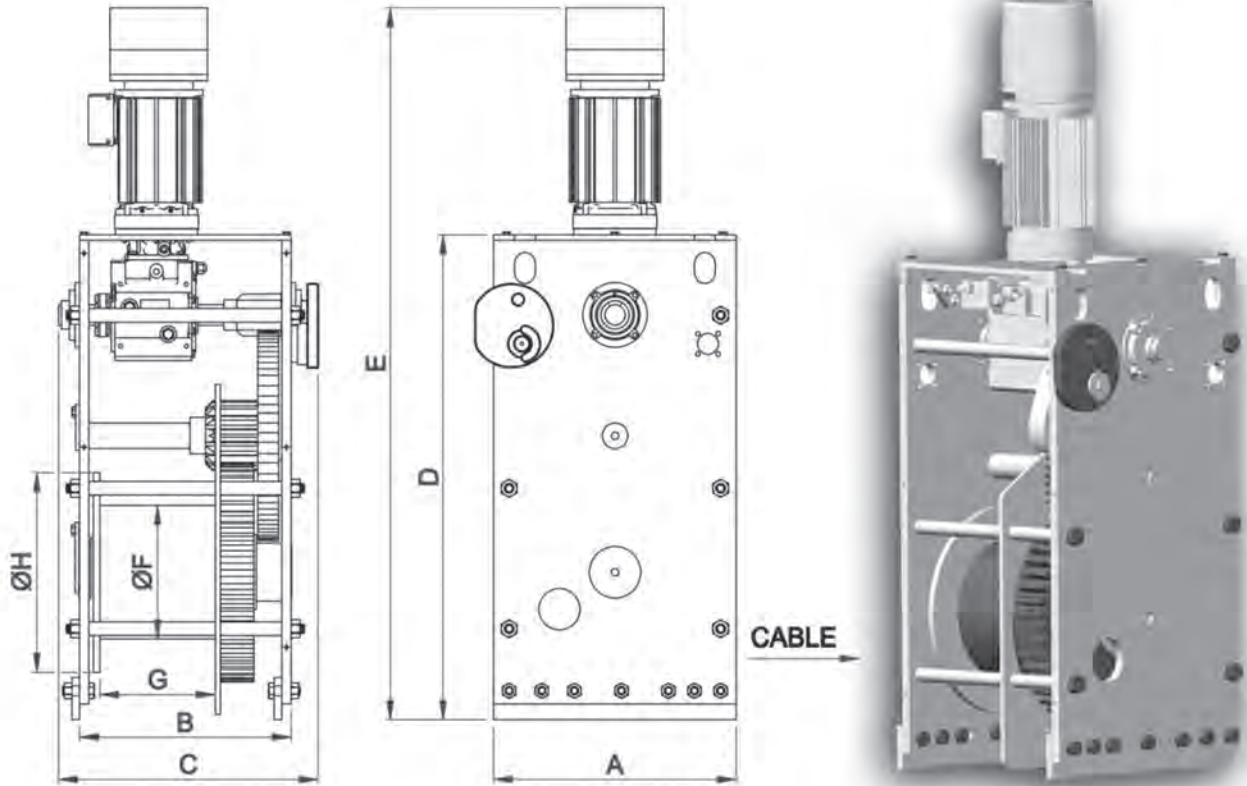
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40 TON UPRIGHT ELECTRIC WINCH

2



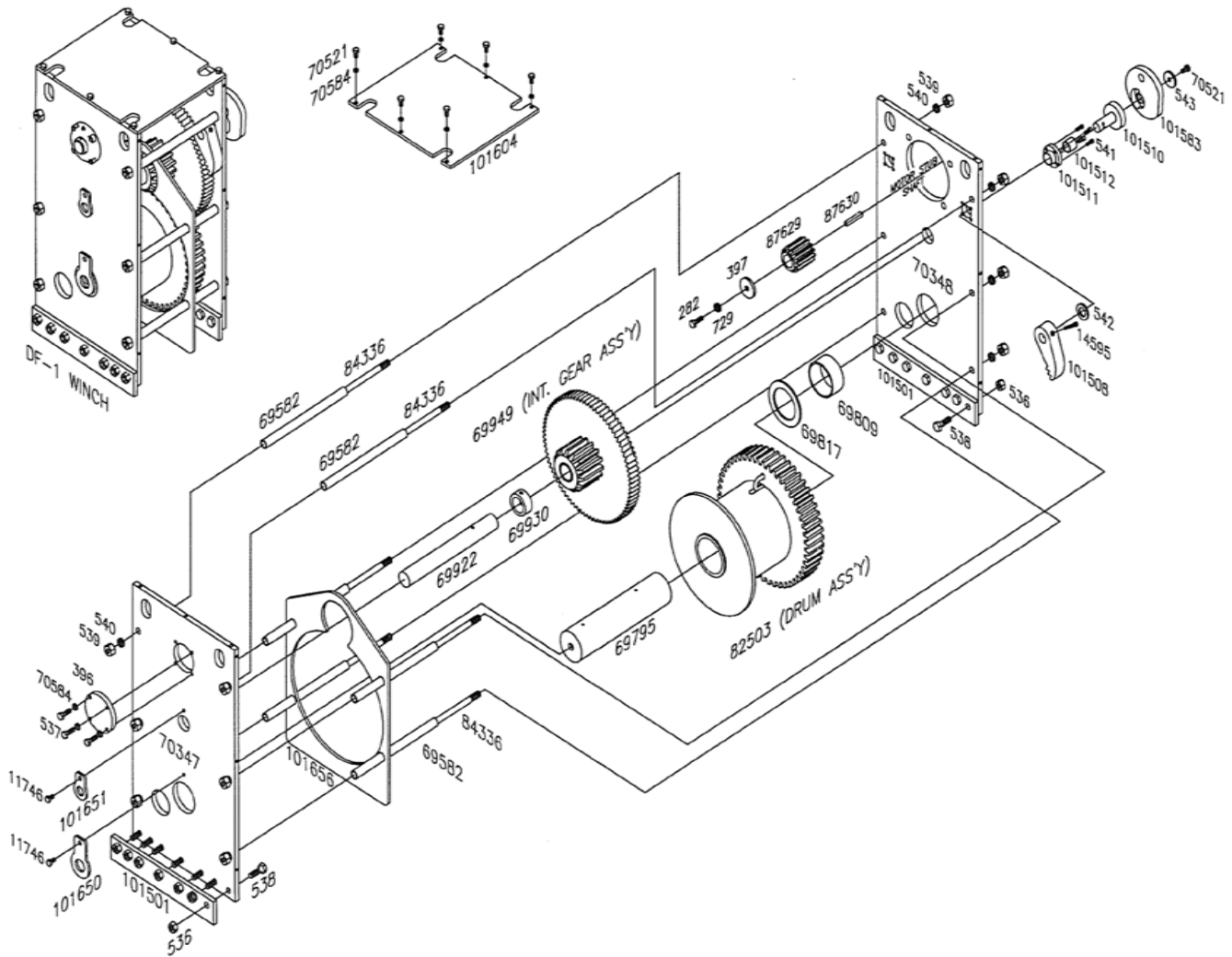
| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|-----|---------|-----|---------|---------|-----|------------|
| DF-1-40 | REFER TO COATINGS TABLE | 23 1/4" | 20 1/8" | 24" | 46 1/8" | 70" | 12 3/4" | 11 1/4" | 19" | 1800 |

RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 83393 | 83392 |

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40 TON UPRIGHT ELECTRIC WINCH PARTS BREAKDOWN



2

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40 TON UPRIGHT ELECTRIC WINCH PARTS BREAKDOWN

2

| DF-1 (40 Ton) Electric Upright Winch Parts List (Nord Drive System) | | |
|--|----------|-------------|
| Part Description | Quantity | Part Number |
| Hex Head Bolt 3/4" x 1-1/2" (SS) | 1 | 282 |
| Washer 13/16" ID x 2-1/2" OD | 1 | 397 |
| Bearing Cover Plate | 1 | 396 |
| Heavy Hex Nut 3/4" (SS) | 14 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 4 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 14 | 538 |
| Hex Nut 7/8" (SS) | 6 | 539 |
| Lock Washer 7/8" (SS) | 6 | 540 |
| Socket Head Cap Screw 3/8" x 1" (SS) | 4 | 541 |
| Locking Pawl Washer | 1 | 542 |
| Washer 9/16" ID x 2-1/2" OD (SS) | 1 | 543 |
| Lock Washer 3/4" (SS) | 1 | 729 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Socket Head Cap Screw 3/8" x 3" (SS) | 1 | 14595 |
| Pipe Separator | 6 | 69582 |
| Drum Shaft | 1 | 69795 |
| Drum Pipe Spacer | 1 | 69809 |
| Drum Washer | 1 | 69817 |
| Intermediate Shaft | 1 | 69922 |
| Intermediate Shaft Collar | 1 | 69930 |
| Intermediate Gear Assembly | 1 | 69949 |
| Side Plate (keeper side) | 1 | 70347 |
| Side Plate (locking pawl side) | 1 | 70348 |
| Hex Head Bolt 1/2" x 1" (SS) | 7 | 70521 |
| Lock Washer 1/2" (SS) | 10 | 70584 |
| Drum Assembly | 1 | 82503 |
| Pipe Separator Rod (SS) | 6 | 84336 |
| Drive Pinion | 1 | 87629 |
| Key (drive pinion) 1/2" SQ x 4-1/4" | 1 | 87630 |
| Base Bar | 2 | 101501 |
| Locking Pawl | 1 | 101508 |
| Locking Pawl Post | 1 | 101510 |
| Locking Pawl Sleeve | 1 | 101511 |
| Top Plate | 1 | 101604 |
| Keeper Plate (BIG) | 1 | 101650 |
| Keeper Plate (small) | 1 | 101651 |
| Cable Guard Plate | 1 | 101656 |

| Motors and Motor Components (Nord) | | |
|--------------------------------------|-----|-------------|
| Part Description | Qty | Part Number |
| Nord Motor and Gearbox (7.5 hp) | 1 | 85001 |
| Adaptor (Motor to Brake) 7.5 hp | 1 | 34450 |
| Dings Brake & Gear Combo (75 ft/lbs) | 1 | 397802 |
| Drive Mounting Hardware | | |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Nut 5/8"-11 (SS) | 2 | 16180 |
| Hex Head Bolt 5/8"-11 x 2-1/2" (SS) | 2 | 20843 |
| Hex Head Bolt 5/8"-11 x 2" (SS) | 2 | 70311 |

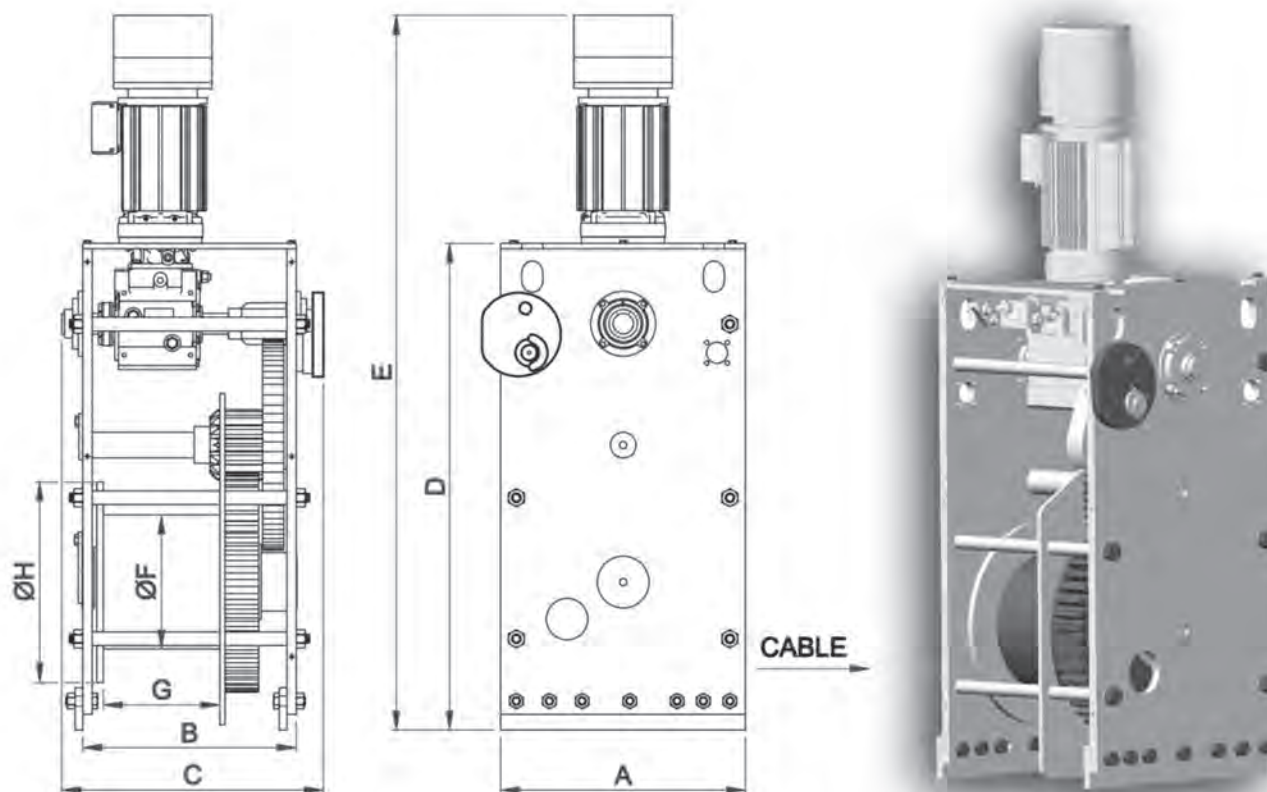
| DF-1 (40 Ton) Bushings and Bearings | | |
|-------------------------------------|-----|-------------|
| Part Description | Qty | Part Number |
| Intermediate Gear Bushing | 1 | 69973 |
| Drum Gear Bushing | 1 | 82511 |
| Locking Pawl Sleeve Bushing | 1 | 101512 |

| DF-1 (40 Ton) Hand Specific Components | | |
|--|-----|-------------|
| Part Description | Qty | Part Number |
| Locking Pawl Handle (LH) | 1 | 101582 |
| Locking Pawl Handle (RH) | 1 | 101583 |

| DF-1 (40 Ton) Miscellaneous Components (not shown in drawings) | | |
|---|-----|-------------|
| Part Description | Qty | Part Number |
| Cover Mounting Stud 3/8" x 1-1/2" | 10 | 549 |
| Brass Wing Nut 3/8" | 10 | 550 |
| Protective Rubber Cover | 2 | 80243 |
| U-Bolt with Fasteners (1" Dia. Wire) | 1 | 82570 |
| T-Handle (locking pawl handle) | 1 | 101580 |

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65 TON UPRIGHT ELECTRIC WINCH



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|-----|---------|-----|-----|---------|-----|------------|
| DF-1-65 | REFER TO COATINGS TABLE | 30" | 23 1/8" | 27" | 55 1/2" | 81" | 14" | 10 5/8" | 24" | 3200 |

RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

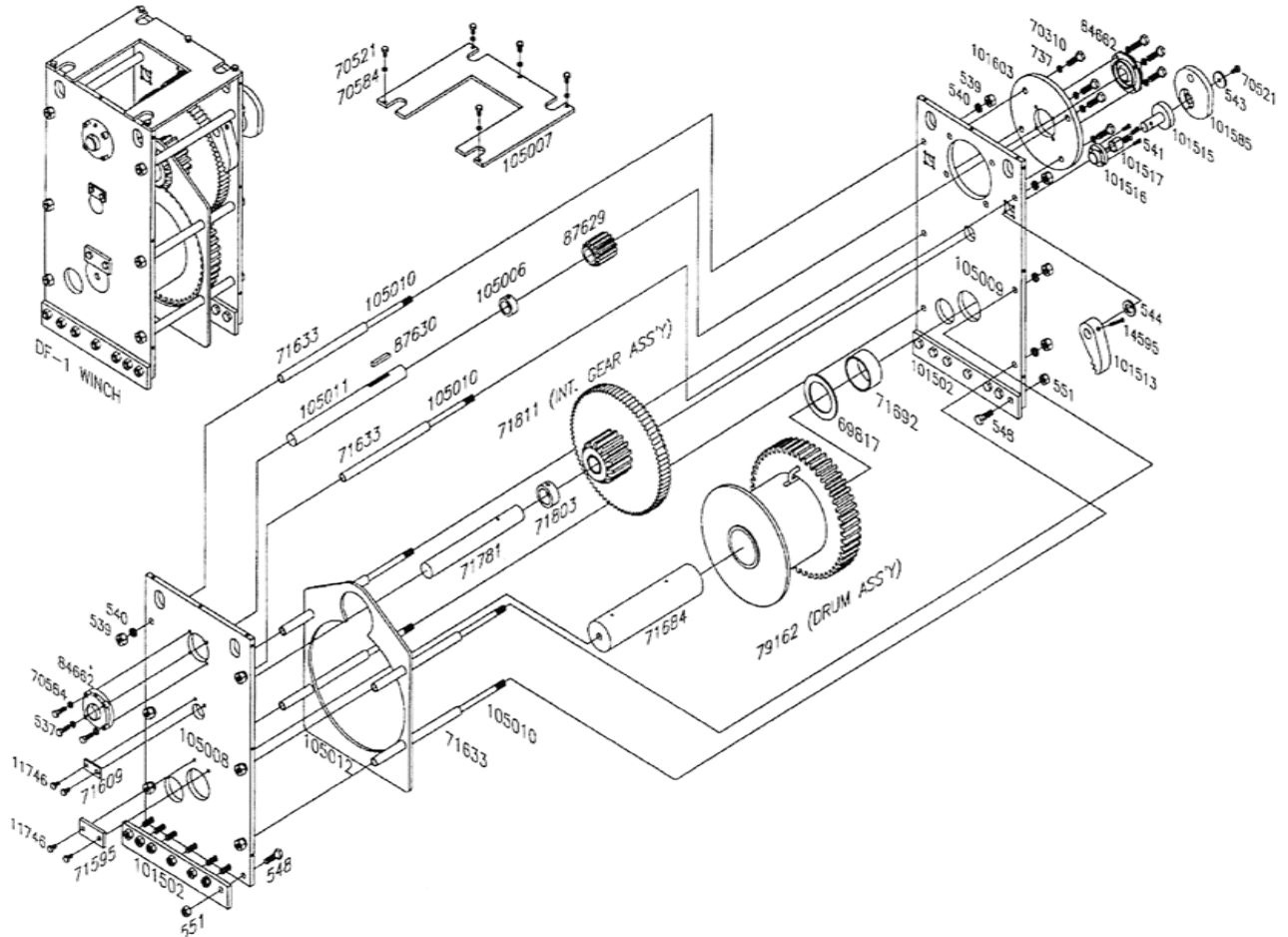
| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 83395 | 83394 |

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65 TON UPRIGHT ELECTRIC WINCH PARTS BREAKDOWN

2



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65 TON UPRIGHT ELECTRIC WINCH PARTS BREAKDOWN



| DF-1 (65 Ton) Electric Upright Winch Parts List | | |
|---|----------|-------------|
| (refer to winch drawing for location) | | |
| Part Description | Quantity | Part Number |
| Hex Head Bolt 1/2" x 2" (SS) | 8 | 537 |
| Hex Nut 7/8" (SS) | 6 | 539 |
| Lock Washer 7/8" (SS) | 6 | 540 |
| Socket Head Cap Screw 3/8" x 1" (SS) | 4 | 541 |
| Washer 9/16" ID x 2-1/2" OD (SS) | 1 | 543 |
| Locking Pawl Washer | 1 | 544 |
| Hex Head Bolt 7/8" x 2-1/2" (SS) | 14 | 548 |
| Heavy Hex Nut 7/8" (SS) | 14 | 551 |
| Lock Washer 5/8" (SS) | 4 | 737 |
| Hex Head Bolt 5/8" x 1" | 8 | 11746 |
| Socket Head Cap Screw 3/8" x 3" (SS) | 1 | 14595 |
| Drum Washer | 1 | 69817 |
| Hex Head Bolt 5/8" x 1-3/4" (SS) | 4 | 70310 |
| Hex Head Bolt 1/2" x 1" (SS) | 6 | 70521 |
| Lock Washer 1/2" (SS) | 13 | 70584 |
| Keeper Plate (BIG) | 2 | 71595 |
| Keeper Plate (small) | 2 | 71609 |
| Pipe Separator | 6 | 71633 |
| Drum Shaft | 1 | 71684 |
| Drum Pipe Spacer | 1 | 71692 |
| Intermediate Shaft | 1 | 71781 |
| Intermediate Shaft Collar | 1 | 71803 |
| Intermediate Gear Assembly | 1 | 71811 |
| Drum Assembly | 1 | 79162 |
| Drive Pinion | 1 | 87629 |
| Key (drive pinion) 1/2" SQ x 4-1/4" | 1 | 87630 |
| Base Bar | 2 | 101502 |
| Locking Pawl | 1 | 101513 |
| Locking Pawl Post | 1 | 101515 |
| Locking Pawl Sleeve | 1 | 101516 |
| Cover Plate | 1 | 101603 |
| Drive Shaft Collar | 1 | 105006 |
| Top Plate | 1 | 105007 |
| Side Plate (keeper side) | 1 | 105008 |
| Side Plate (locking pawl side) | 1 | 105009 |
| Pipe Separator Rod (SS) | 6 | 105010 |
| Drive Shaft | 1 | 105011 |
| Cable Guard Plate | 1 | 105012 |

| Motors and Motor Components | |
|-------------------------------------|-------------|
| Part Description | Part Number |
| 5 HP Sumitomo Drive | 83300 |
| 7.5 HP Sumitomo Drive | 83304 |
| 10 HP Sumitomo Drive | 83308 |
| Adaptor (Motor to Brake) 5 & 7.5 hp | 34445 |
| Adaptor (Motor to Brake) 10 hp | 34447 |
| Dings Brake & Gear Combo | 397800 |

| DF-1 (65 Ton) Bushings and Bearings | | |
|--|-----|-------------|
| Part Description | Qty | Part Number |
| Drum Gear Bushing | 1 | 71676 |
| Intermediate Gear Bushing | 1 | 71854 |
| Piloted Roller Bearing (2" Dia. Shaft) | 2 | 84662 |
| Locking Pawl Sleeve Bushing | 1 | 101517 |

| DF-1 (65 Ton) Hand Specific Components | | |
|--|-----|-------------|
| Part Description | Qty | Part Number |
| Locking Pawl Handle (LH) | 1 | 101584 |
| Locking Pawl Handle (RH) | 1 | 101585 |

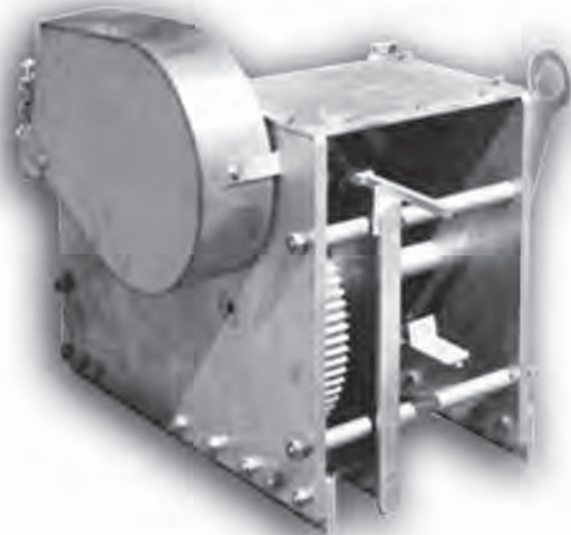
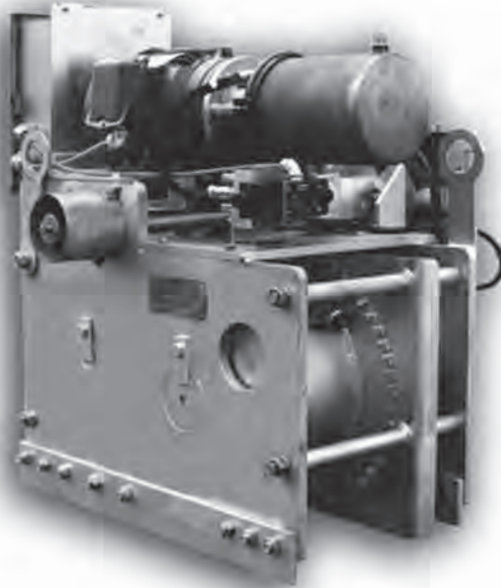
| DF-1 (65 Ton) Miscellaneous Components (not shown in drawings) | | |
|---|-----|-------------|
| Part Description | Qty | Part Number |
| Cover Mounting Stud 3/8" x 1-1/2" | 10 | 549 |
| Brass Wing Nut 3/8" | 10 | 550 |
| U-Bolt with Fasteners (1-1/8" Dia. Wire) | 1 | 72001 |
| Protective Rubber Cover | 2 | 80228 |
| T-Handle (locking pawl handle) | 1 | 101580 |

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HYDRA-ELECTRIC WINCH



- SELF-CONTAINED HYDRAULIC / ELECTRIC POWER UNIT WITH STAINLESS STEEL TANK.
- WINCH OPERATION CAN ALSO BE ACHIEVED BY CUSTOMER SUPPLIED HYDRAULIC POWER OR REMOTE MOUNTED POWER SUPPLY.
- FAIL-SAFE BRAKE.
- MECHANICAL DOG FOR EMERGENCY MANUAL OPERATION.
- HOT-DIPPED GALVANIZED STANDARD.

- FREE WHEELING FEATURE TO ALLOW FASTER CABLE PULL-OUT.
- STAINLESS STEEL COMPONENTS: CONTROL BOX, GUARDS, TANKS, AND FASTENERS.
- FULLY SYNTHETIC BIODEGRADABLE HYDRAULIC FLUID.
- TRUE LEFT OR RIGHT HAND MODELS FOR USE IN PAIRS.
- HYDRAULIC SYSTEM PREVENTS POWER SPIKES.

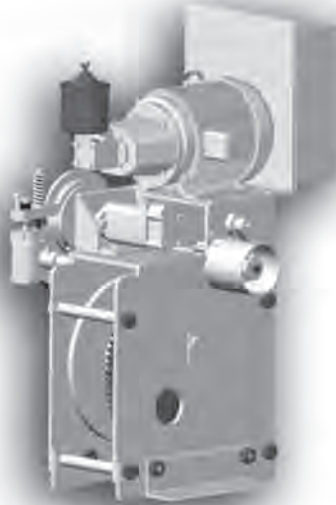
| MODEL No. | HOLDING DOG &/OR BRAKE | LINE PULL @ FIRST LAYER | | | DRUM CAPACITIES (FT) | | | | LINE SPEED FPM | WEIGHT LBS | DIMENSIONAL DATA | | | |
|-----------------|------------------------|-------------------------|----------------------|--------------------|----------------------|------|------|------|----------------|------------|------------------|----------|---------|---------|
| | | S. TONS | HYDRA ELECTRIC RATED | HYDRA ELECTRIC MAX | HANDWHEEL ONE MAN | 5/8" | 3/4" | 7/8" | | | 1" | W | L | H |
| DF-156-10-6-HE | | 10 | 2272 @ 830 PSI | 3150 @ 1119 PSI | 7000 | 174 | 129 | - | - | 23.5 | 897 | 10 5/16" | 22 1/2" | 42 3/8" |
| DF-156-20-7-HE | | 20 | 9382 @ 1138 PSI | 11700 @ 1381 PSI | 14000 | 109 | 57 | 39 | 21 | 17.2 | 1284 | 15 1/2" | 30" | 41" |
| DF-156-40-11-HE | | 40 | 17213 @ 1695 PSI | 18000 @ 1797 PSI | 15000 | 287 | 176 | 130 | 84 | 12.8 | 1930 | 20 1/8" | 36" | 40" |
| DF-156-60-11-HE | | 60 | 31771 @ 1998 PSI | 33480 @ 2105 PSI | 24000 | 572 | 325 | 262 | 200 | 9.9 | 3225 | 23 1/8" | 46 7/8" | 51" |

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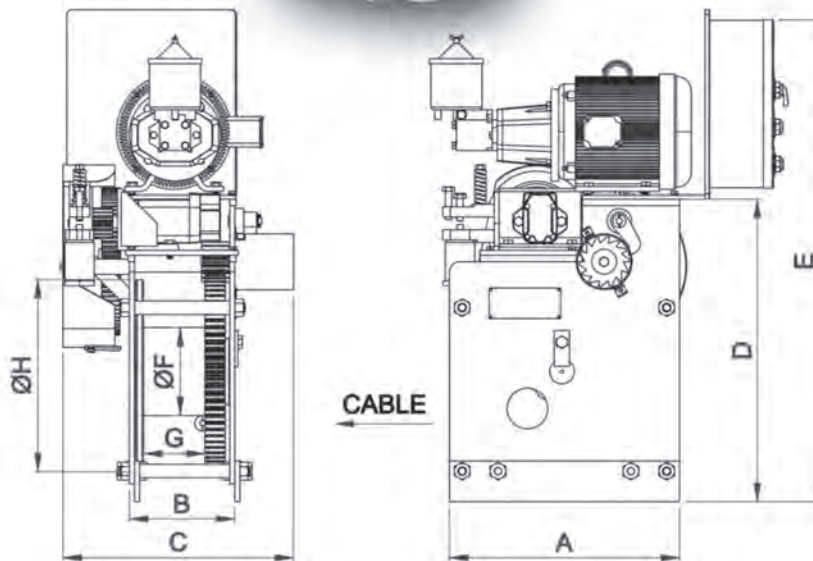
10 TON HYDRA-ELECTRIC WINCH



2



LEFT HAND WINCH SHOWN
RIGHT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|-----|---------|-----|--------|----|-----|------------|
| DF-156-10 | REFER TO COATINGS TABLE | 22 1/2" | 10 3/8" | 25" | 24 1/2" | 40" | 8 5/8" | 6" | 18" | 900 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 72478 | 72486 |

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10 TON HYDRA-ELECTRIC WINCH PARTS BREAKDOWN



| DF-156-10 Ton Hydra-Electric Winch Parts List (refer to winch drawings for location) | | |
|---|----------|--------|
| Part Description | Quantity | Part#s |
| U-Bolt with Fasteners (1/2" Clamp) | 1 | 15547 |
| Locking Pawl Spacer | 1 | 69728 |
| Key for Handwheel | 1 | 69833 |
| Key for Locking Gear | 1 | 69868 |
| Key for drive pinion | 1 | 69876 |
| Locking Dog Gear | 1 | 69981 |
| Locking Pawl | 1 | 70009 |
| Pipe Separator | 2 | 70661 |
| Pipe Separator | 2 | 70688 |
| Separator Rod (SS) | 2 | 70696 |
| Separator Rod (SS) | 2 | 70718 |
| Pipe Spacer (Drive Shaft) | 1 | 70751 |
| Drum Shaft | 1 | 70807 |
| Locking Gear Guard | 1 | 72745 |
| Brake Spring | 1 | 73105 |
| Brake Cylinder | 1 | 73377 |
| Brake Assembly | 1 | 73393 |
| Base Bar Radius | 1 | 74241 |
| Base Bar Straight | 1 | 74268 |
| Upper Cap Bar | 2 | 74292 |
| Lower Cap Bar | 2 | 74306 |
| Side Plate | 2 | 74314 |
| Drive Shaft | 1 | 74330 |
| Key for Drive Gear | 1 | 74349 |
| Drum Assembly | 1 | 75213 |
| Drive Gear | 1 | 75442 |
| Lifting Lug | 2 | 78912 |
| Locking Pawl Pin | 1 | 79765 |
| Drive Pinion | 1 | 83321 |
| Brake Stub Post Assembly | 1 | 84573 |
| Pipe Spacer (Drive Gear) | 1 | 84720 |
| Motor Pinion w/Brake Drum | 1 | 85057 |
| Keeper Plate 3-1/2" | 1 | 101651 |

| DF-156-10-HE Bushings and Bearings | | |
|------------------------------------|----------|--------|
| Part Description | Quantity | Part#s |
| Drive Shaft Bearing | 2 | 70769 |
| Drum Gear Bushing | 2 | 70815 |

| DF-156-10-HE Miscellaneous Components (not shown in drawings) | | |
|--|----------|--------|
| Part Description | Quantity | Part#s |
| 110V Coil for Directional Valve | 1 | 20338 |
| 230V Coil for Directional Valve | 1 | 20346 |
| 28" Solid Handwheel | 1 | 70336 |
| Directional Valve 230V | 1 | 73776 |

| DF-156-10-HE Bolts, Nuts, Washers | | |
|---------------------------------------|----------|--------|
| Part Description | Quantity | Part#s |
| Hex Head Bolt 3/4" x 2" (SS) | 4 | 423 |
| Heavy Hex Nut 3/4" (SS) | 4 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 2 | 537 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Lock Washer 7/8" (SS) | 8 | 540 |
| Flat Washer 9/16" ID x 2-1/2" OD (SS) | 2 | 543 |
| Lock Washer 3/8" (SS) | 7 | 546 |
| Hex Nut 3/8" (SS) | 4 | 566 |
| Hex Head Bolt 3/8" x 2-1/4" | 1 | 11495 |
| Hex Head Bolt 1/2" x 1-1/2" (SS) | 4 | 11585 |
| Hex Head Bolt 5/8" x 1" | 1 | 11746 |
| Hex Head Bolt 3/8" x 1-1/2" (SS) | 4 | 14593 |
| Socket Head Cap Screw 3/8" x 2-1/4" | 2 | 19224 |
| Flat Washer 5/8" (Brass) | 1 | 33892 |
| Cotter Pin 1/8" x 1" | 1 | 70483 |
| Lock Washer 1/2" (SS) | 6 | 70584 |
| Hex Head Bolt 3/8" x 3/4" (SS) | 1 | 72621 |
| Retainer Ring | 1 | 72699 |
| Socket Head Cap Screw 1/2" x 1" | 2 | 73834 |
| Washer 7/16" x 2" x 1/8" thk | 2 | 74012 |

| DF-156-10-HE Hydraulic Motor & Directional Control Valve Components | | |
|--|----------|--------|
| Part Description | Quantity | Part#s |
| Relief Valve for Aluminum Subplate | 1 | 20982 |
| Dir Valve Mounting Plate | 1 | 74195 |
| Hydraulic Motor Base Plate | 1 | 74276 |
| Directional Valve 110V | 1 | 75450 |
| Hydraulic Motor Bracket | 1 | 78794 |
| Hydraulic Motor | 1 | 78808 |
| Aluminum Subplate | 1 | 79006 |

| DF-156-10-HE Left or Right Hand Specific Components | | |
|---|----------|--------|
| Part Description | Quantity | Part#s |
| Left Hand Winch | | |
| Gear Guard | 1 | 74322 |
| Right Hand Winch | | |
| Gear Guard | 1 | 72826 |

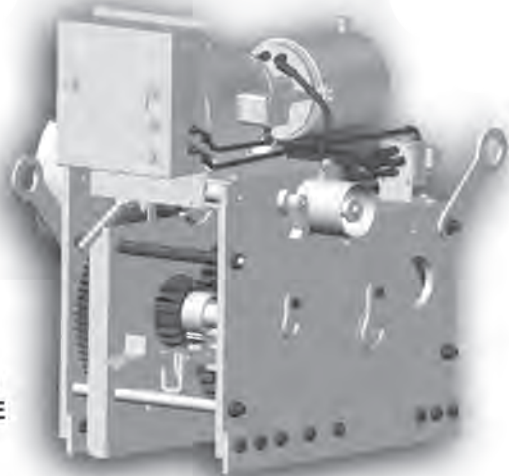
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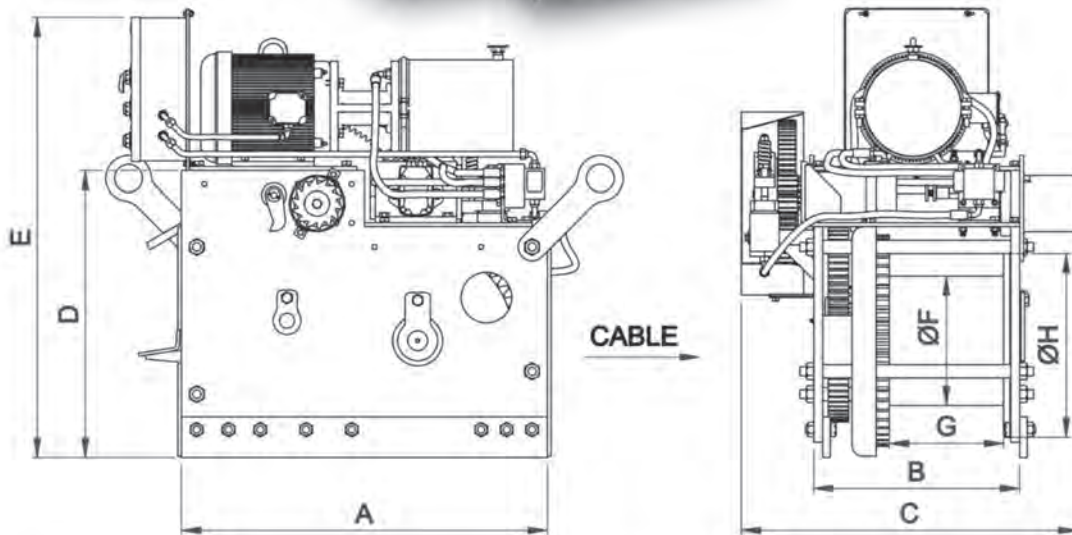


20 TON HYDRA-ELECTRIC WINCH

2



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

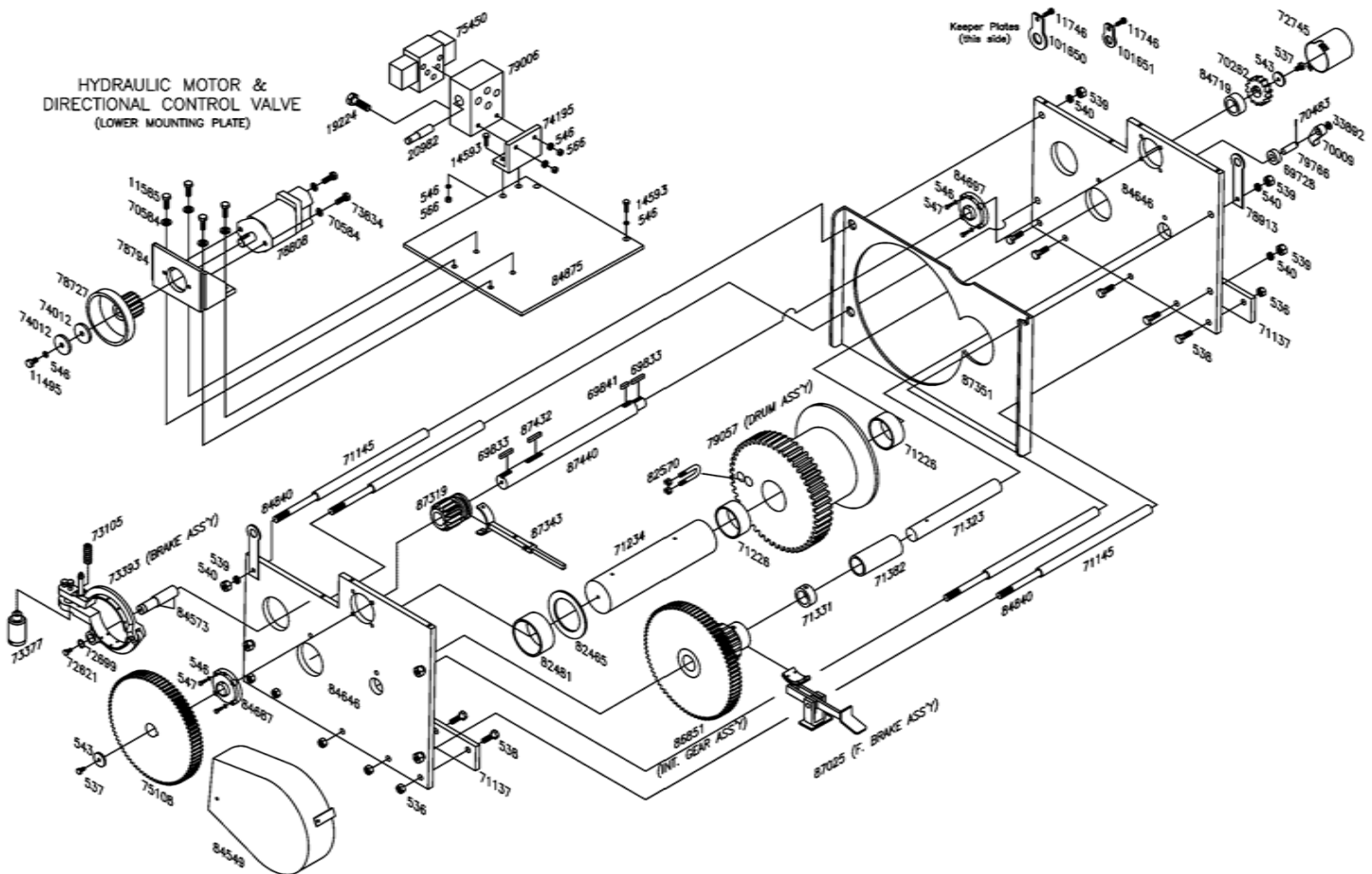


| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|---------|-----|-----|---------|--------|-----|------------|
| DF-156-20 | REFER TO COATINGS TABLE | 30" | 15 1/4" | 27 1/2" | 28" | 41" | 10 3/4" | 7 1/4" | 16" | 1300 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 87850 | 87599 |

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20 TON HYDRA-ELECTRIC WINCH PARTS BREAKDOWN



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20 TON HYDRA-ELECTRIC WINCH PARTS BREAKDOWN

2

| DF-156-20 Ton Hydra-Electric Winch Parts List (refer to winch drawings for location) | | |
|---|----------|--------|
| Part Description | Quantity | Part#s |
| Locking Pawl Spacer (SS) | 1 | 69728 |
| Key - Drive Gear & Handwheel | 2 | 69833 |
| Key - Locking Dog | 1 | 69841 |
| Locking Pawl | 1 | 70009 |
| Locking Dog Gear | 1 | 70262 |
| Base Bar | 2 | 71137 |
| Pipe Separator | 4 | 71145 |
| Drum Shaft | 1 | 71234 |
| Intermediate Shaft | 1 | 71323 |
| Intermediate Shaft Collar | 1 | 71331 |
| Locking Gear Guard | 1 | 72745 |
| Brake Spring | 1 | 73105 |
| Brake Cylinder | 1 | 73377 |
| Brake Assembly | 1 | 73393 |
| Drive Gear | 1 | 75108 |
| Lifting Lug | 2 | 78913 |
| Drum Assembly | 1 | 79057 |
| Locking Pawl Pin (SS) | 1 | 79766 |
| Drum Washer | 1 | 82465 |
| Drum Pipe Spacer | 1 | 82481 |
| U-Bolt with Fasteners (1" Wire Rope) | 1 | 82570 |
| Brake Stub Post Assembly | 1 | 84573 |
| Side Plate | 2 | 84646 |
| Pipe Spacer (locking dog area) | 1 | 84719 |
| Separator Rod (SS) | 4 | 84840 |
| Int. Gear & Pinion Assy w/ brake drum | 1 | 86851 |
| Foot Brake Assembly | 1 | 87025 |
| Drive Pinion | 1 | 87319 |
| Key - drive pinion | 1 | 87432 |
| Drive Shaft | 1 | 87440 |
| Keeper Plate 4-1/4" | 1 | 101650 |
| Keeper Plate 3-1/2" | 1 | 101651 |

| DF-156-20-HE Bushings and Bearings | | |
|------------------------------------|----------|--------|
| Part Description | Quantity | Part#s |
| Drum Gear Bushing | 2 | 71226 |
| Intermediate Gear Bushing | 1 | 71382 |
| Drive Shaft Bearing | 2 | 84697 |

| DF-156-20-HE Bolts, Nuts, Washers | | |
|--------------------------------------|----------|--------|
| Part Description | Quantity | Part#s |
| Heavy Hex Nut 3/4" (SS) | 10 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 2 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 10 | 538 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Lockwasher 7/8" (SS) | 8 | 540 |
| Washer 9/16" x2-1/2" x5/16" thk (SS) | 2 | 543 |
| Lockwasher 3/8" (SS) | 10 | 546 |
| Lockwasher 3/8" (SS) | 15 | 546 |
| Hex Head Bolt 3/8" x 1-3/4" (SS) | 8 | 547 |
| Hex Nut 3/8" (SS) | 4 | 566 |
| Hex Head Bolt 3/8" x 2-1/4" | 1 | 11495 |
| Hex Head Bolt 1/2" x 1-1/2" (SS) | 4 | 11585 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Hex Head Bolt 3/8" x 1-1/2" (SS) | 4 | 14593 |
| Socket Head Cap Screw 3/8" x 2-1/4" | 2 | 19224 |
| Flat Washer 5/8" (Brass) | 1 | 33892 |
| Cotter Pin 1/8" x 1" | 1 | 70483 |
| Lockwasher 1/2" (SS) | 6 | 70584 |
| Hex Head Bolt 3/8" x 3/4" (SS) | 1 | 72621 |
| Retainer Ring | 1 | 72699 |
| Socket Head Cap Screw 1/2" x 1" | 2 | 73834 |
| Washer 7/16" x2" x 1/8" thk | 2 | 74012 |

| DF-156-20-HE Hydraulic Motor & Directional Control Valve Components | | |
|---|----------|--------|
| Part Description | Quantity | Part#s |
| Relief Valve for Aluminum Subplate | 1 | 20982 |
| Angle Bracket for Directional Control Valve | 1 | 74195 |
| Directional Control Valve 110V | 1 | 75450 |
| Motor Pinion w/ Brake Drum | 1 | 78727 |
| Hydraulic Motor Bracket | 1 | 78794 |
| Hydraulic Motor | 1 | 78808 |
| Aluminum Subplate | 1 | 79006 |
| Base Plate for Dir. Ctrl. Valve & Hyd Motor | 1 | 84875 |

| DF-156-20-HE Left or Right Hand Specific Components | | |
|---|--|--|
|---|--|--|

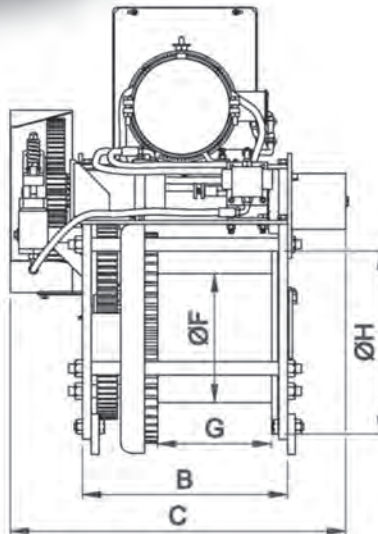
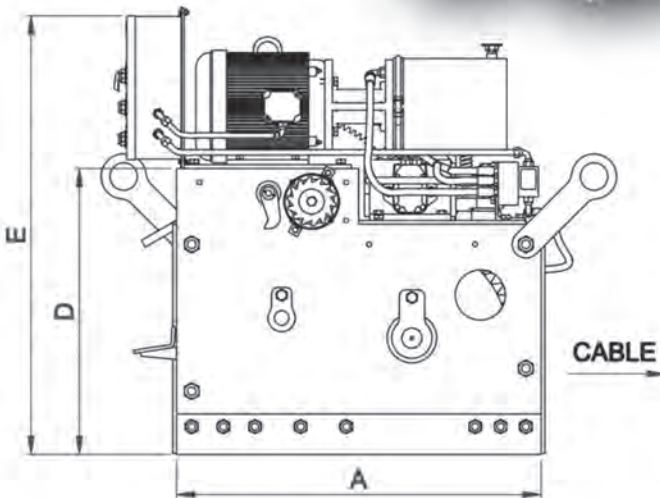
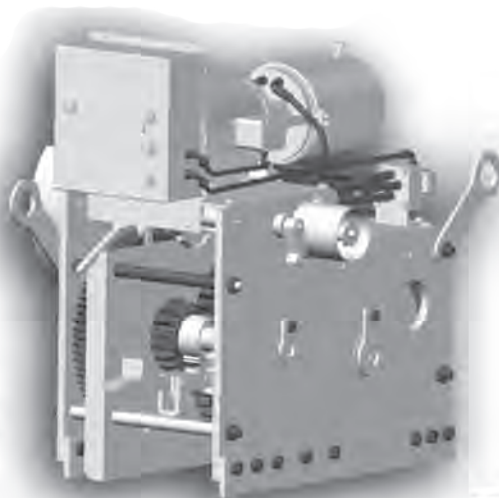
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40 TON HYDRA-ELECTRIC WINCH



2

RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|-----|---------|-----|---------|---------|-----|------------|
| DF-156-40 | REFER TO COATINGS TABLE | 36" | 20 1/4" | 33" | 28 1/2" | 44" | 12 3/4" | 11 1/4" | 19" | 2100 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 87297 | 87300 |

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40 TON HYDRA-ELECTRIC WINCH PARTS BREAKDOWN



| DF-156-40 Ton Hydra-Electric Winch Parts List (refer to winch drawings for location) | | |
|---|----------|--------|
| Part Description | Quantity | Part#s |
| Base Bar Straight | 2 | 69566 |
| Pipe Separator | 4 | 69582 |
| Locking Pawl Spacer | 1 | 69728 |
| Drum Shaft | 1 | 69795 |
| Drum Pipe Spacer | 1 | 69809 |
| Drum Washer | 1 | 69817 |
| Key - Handwheel | 1 | 69833 |
| Key - Locking Pawl Gear | 1 | 69868 |
| Intermediate Shaft | 1 | 69922 |
| Intermediate Shaft Collar | 1 | 69930 |
| Locking Pawl Gear | 1 | 69981 |
| Locking Pawl | 1 | 70009 |
| Locking Gear Guard | 1 | 72745 |
| Drive Gear | 1 | 72869 |
| Brake Cylinder | 1 | 73377 |
| Brake Assembly | 1 | 73393 |
| Brake Spring | 1 | 73520 |
| Key - Drive Gear | 1 | 73911 |
| Lifting Lug | 2 | 78913 |
| Locking Pawl Pin | 1 | 79774 |
| Drum Assembly | 1 | 82503 |
| U-Bolt with Fasteners (1" Wire Rope) | 1 | 82570 |
| Separator Rod (SS) | 4 | 84336 |
| Side Plate | 2 | 84492 |
| Brake Stub Post Assembly | 1 | 84573 |
| Pipe Spacer (locking pawl area) | 1 | 84700 |
| Int. Gear & Pinion Assy w/brake drum | 1 | 86878 |
| Drive Shaft | 1 | 87009 |
| Foot Brake Assembly | 1 | 87025 |
| Key - Drive Pinion | 1 | 87130 |
| Drive Pinion | 1 | 87149 |
| Keeper Plate 4-1/4" | 1 | 101650 |
| Keeper Plate 3-1/2" | 1 | 101651 |

| DF-156-40-HE Bushings and Bearings | | |
|------------------------------------|----------|--------|
| Part Description | Quantity | Part#s |
| Intermediate Gear Bushing | 1 | 69973 |
| Drum Gear Bushing | 2 | 82511 |
| Drive Shaft Bearing | 2 | 84662 |

| DF-156-40-HE Miscellaneous Components (not shown in drawings) | | |
|--|----------|--------|
| Part Description | Quantity | Part#s |
| 110V Coil for Directional Control Valve | 1 | 20338 |
| 230V Coil for Directional Control Valve | 1 | 20346 |
| Int. Gear & Pinion Assy NO brake drum | 1 | 69949 |
| 28" Diameter Solid Handwheel | 1 | 70336 |
| Hardened Drive Gear | 1 | 72870 |
| Directional Valve 230V | 1 | 73776 |
| Motor Pinion w/ Brake Drum (28 tooth) | 1 | 78735 |
| Drive pinion NO hub | 1 | 86983 |

| DF-156-40-HE Bolts, Nuts, Washers | | |
|--------------------------------------|----------|--------|
| Part Description | Quantity | Part#s |
| Heavy Hex Nut 3/4" (SS) | 16 | 536 |
| Hex Head Bolt 1/2" x 2" (SS) | 2 | 537 |
| Hex Head Bolt 3/4" x 2-1/2" (SS) | 16 | 538 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Lockwasher 7/8" (SS) | 8 | 540 |
| Washer 9/16" x2-1/2" x5/16" thk (SS) | 2 | 543 |
| Lockwasher 3/8" (SS) | 5 | 546 |
| Hex Nut 3/8" (SS) | 4 | 566 |
| Hex Head Bolt 3/8" x 2-1/4" | 1 | 11495 |
| Hex Head Bolt 1/2" x 1-1/2" (SS) | 6 | 11585 |
| Hex Head Bolt 1/2" x 2" (SS) | 8 | 11593 |
| Hex Head Bolt 5/8" x 1" | 2 | 11746 |
| Hex Head Bolt 3/8" x 1-1/2" (SS) | 2 | 14593 |
| Socket Head Cap Screw 3/8" x 2-1/4" | 2 | 19224 |
| Flat Washer 5/8" (Brass) | 1 | 33892 |
| Cotter Pin 1/8" x 1" | 1 | 70483 |
| Lockwasher 1/2" (SS) | 16 | 70584 |
| Hex Head Bolt 3/8" x 3/4" (SS) | 1 | 72621 |
| Retainer Ring | 1 | 72699 |
| Socket Head Cap Screw 1/2" x 1" | 2 | 73834 |
| Washer 7/16" x2" x 1/8" thk | 2 | 74012 |

| DF-156-40-HE Hydraulic Motor & Directional Control Valve Components | | |
|--|----------|--------|
| Part Description | Quantity | Part#s |
| Relief Valve for Aluminum Subplate | 1 | 20982 |
| Angle Bracket for Directional Control Valve | 1 | 74195 |
| Directional Control Valve 110V | 1 | 75450 |
| Motor Pinion w/ Brake Drum | 1 | 78727 |
| Hydraulic Motor Bracket | 1 | 78794 |
| Hydraulic Motor | 1 | 78816 |
| Aluminum Subplate | 1 | 79006 |
| Base Plate for Dir. Ctrl. Valve & Hyd Motor | 1 | 84735 |

| DF-156-40-HE Left or Right Hand Specific Components | | |
|---|----------|--------|
| Part Description | Quantity | Part#s |
| Left Hand Winch | | |
| Gear Guard | 1 | 84530 |
| Yoke Assembly | 1 | 86908 |
| Cable Guard Plate | 1 | 87181 |
| Right Hand Winch | | |
| Gear Guard | 1 | 84549 |
| Yoke Assembly | 1 | 86967 |
| Cable Guard Plate | 1 | 87092 |

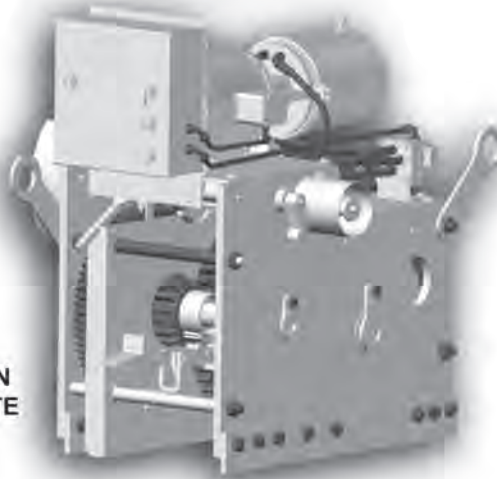
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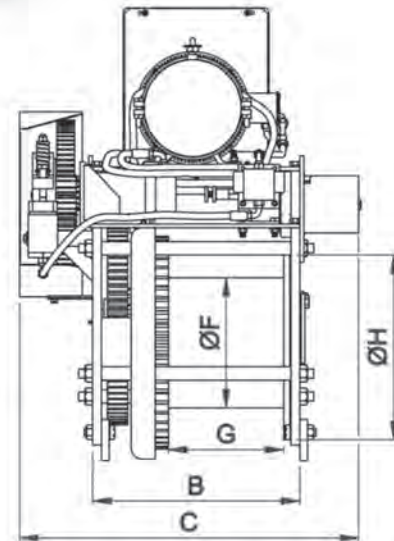
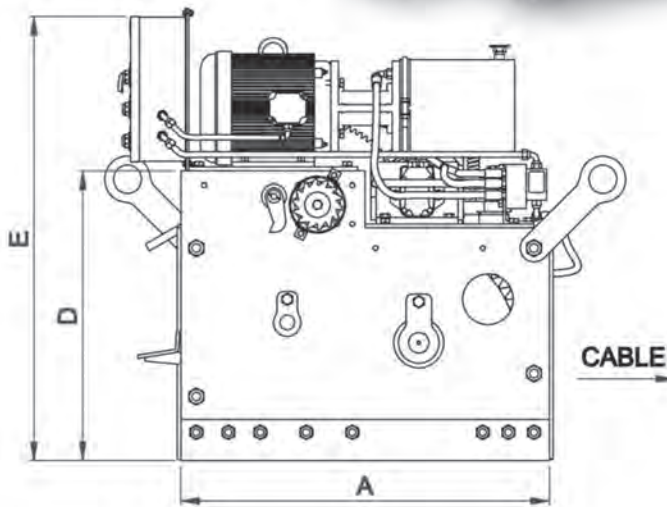


60 TON HYDRA-ELECTRIC WINCH

2



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

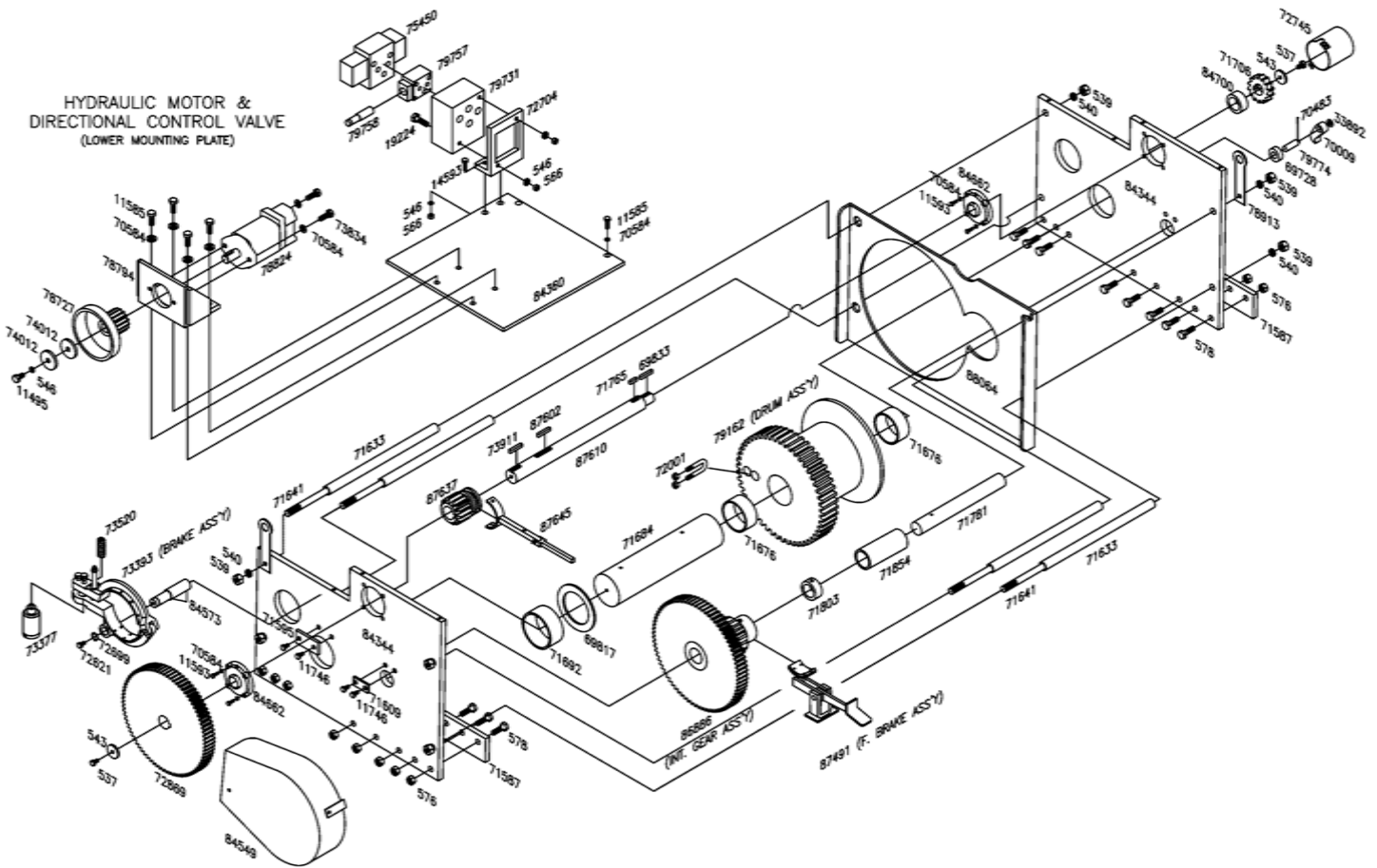


| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|-----|---------|-----|-----|---------|-----|------------|
| DF-156-60 | REFER TO COATINGS TABLE | 47" | 23 1/4" | 36" | 36 1/4" | 52" | 14" | 10 5/8" | 24" | 3500 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 87726 | 87734 |

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60 TON HYDRA-ELECTRIC WINCH PARTS BREAKDOWN



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60 TON HYDRA-ELECTRIC WINCH PARTS BREAKDOWN

2

| DF-156-60 Ton Manual Winch Parts List (refer to winch drawings for location) | | |
|---|----------|---------|
| Part Description | Quantity | Part #s |
| Locking Pawl Spacer | 1 | 69728 |
| Drum Washer | 1 | 69817 |
| Key - Handwheel | 1 | 69833 |
| Locking Pawl | 1 | 70009 |
| Base Bar Straight | 2 | 71587 |
| Keeper Plate (7" Length) | 2 | 71595 |
| Keeper Plate (6-1/2" Length) | 2 | 71609 |
| Pipe Separator | 4 | 71633 |
| Pipe Separator Rod (SS) | 4 | 71641 |
| Drum Shaft | 1 | 71684 |
| Drum Pipe Spacer | 1 | 71692 |
| Key - Locking Pawl Gear | 1 | 71765 |
| Intermediate Shaft | 1 | 71781 |
| Intermediate Shaft Collar | 1 | 71803 |
| U-Bolt with Fasteners (1.125" Wire Rope) | 1 | 72001 |
| Locking Gear Guard | 1 | 72745 |
| Drive Gear | 1 | 72869 |
| Brake Cylinder | 1 | 73377 |
| Brake Assembly | 1 | 73393 |
| Brake Spring | 1 | 73520 |
| Key - Drive Gear | 1 | 73911 |
| Lifting Lug | 2 | 78913 |
| Drum Assembly | 1 | 79162 |
| Locking Pawl Pin | 1 | 79774 |
| Side Plate | 2 | 84344 |
| Brake Stub Post Assembly | 1 | 84573 |
| Pipe Spacer (hand ratchet area) | 1 | 84700 |
| Int. Gear & Pinion Assy w/ Brake Drum | 1 | 86886 |
| Foot Brake Assembly | 1 | 87491 |
| Key - Drive Pinion | 1 | 87602 |
| Drive Shaft | 1 | 87610 |
| Drive Pinion | 1 | 87637 |

| DF-156-60-HE Bushings and Bearings | | |
|------------------------------------|----------|---------|
| Part Description | Quantity | Part #s |
| Drum Gear Bushing | 2 | 71676 |
| Intermediate Gear Bushing | 1 | 71854 |
| Drive Shaft Bearing | 2 | 84662 |

| DF-156-60-HE Miscellaneous Components (not shown in drawings) | | |
|--|----------|---------|
| Part Description | Quantity | Part #s |
| 110V Coil for Directional Control Valve | 1 | 20338 |
| 230V Coil for Directional Control Valve | 1 | 20346 |
| 28" Diameter Solid Handwheel | 1 | 70336 |
| Int. Gear & Pinion Assy NO brake drum | 1 | 71811 |
| Hardened Drive Gear | 1 | 72870 |
| Directional Control Valve 230V | 1 | 73776 |
| Motor Pinion w/Brake Drum (28 tooth) | 1 | 78735 |
| Drive pinion NO hub | 1 | 87629 |

| DF-156-60-HE Bolts, Nuts, Washers | | |
|--------------------------------------|----------|---------|
| Part Description | Quantity | Part #s |
| Hex Head Bolt 1/2" x 2" (SS) | 2 | 537 |
| Hex Nut 7/8" (SS) | 8 | 539 |
| Lockwasher 7/8" (SS) | 8 | 540 |
| Washer 9/16" x2-1/2" x5/16" thk (SS) | 2 | 543 |
| Lockwasher 3/8" (SS) | 5 | 546 |
| Hex Nut 3/8" (SS) | 4 | 566 |
| Hex Nut 1" (SS) | 16 | 576 |
| Hex Head Bolt 1" x 3" (SS) | 16 | 578 |
| Hex Head Bolt 3/8" x 2-1/4" | 1 | 11495 |
| Hex Head Bolt 1/2" x 1-1/2" (SS) | 6 | 11585 |
| Hex Head Bolt 1/2" x 2" (SS) | 8 | 11593 |
| Hex Head Bolt 5/8" x 1" | 8 | 11746 |
| Hex Head Bolt 3/8" x 1-1/2" (SS) | 2 | 14593 |
| Socket Head Cap Screw 3/8" x 2-1/4" | 2 | 19224 |
| Flat Washer 5/8" (Brass) | 1 | 33892 |
| Cotter Pin 1/8" x 1" | 1 | 70483 |
| Lockwasher 1/2" (SS) | 16 | 70584 |
| Hex Head Bolt 3/8" x 3/4" (SS) | 1 | 72621 |
| Retainer Ring | 1 | 72699 |
| Socket Head Cap Screw 1/2" x 1" | 2 | 73834 |
| Washer 7/16" x2" x 1/8" thk | 2 | 74012 |

| DF-156-60-HE Left or Right Hand Specific Components | | |
|---|----------|---------|
| Part Description | Quantity | Part #s |
| Left Hand Winch | | |
| Locking Dog Gear Assembly | 1 | 71714 |
| Gear Guard | 1 | 84530 |
| Yoke Assembly | 1 | 87646 |
| Cable Guard Plate | 1 | 88072 |
| Right Hand Winch | | |
| Locking Dog Gear Assembly | 1 | 71706 |
| Gear Guard | 1 | 84549 |
| Yoke Assembly | 1 | 87645 |
| Cable Guard Plate | 1 | 88064 |

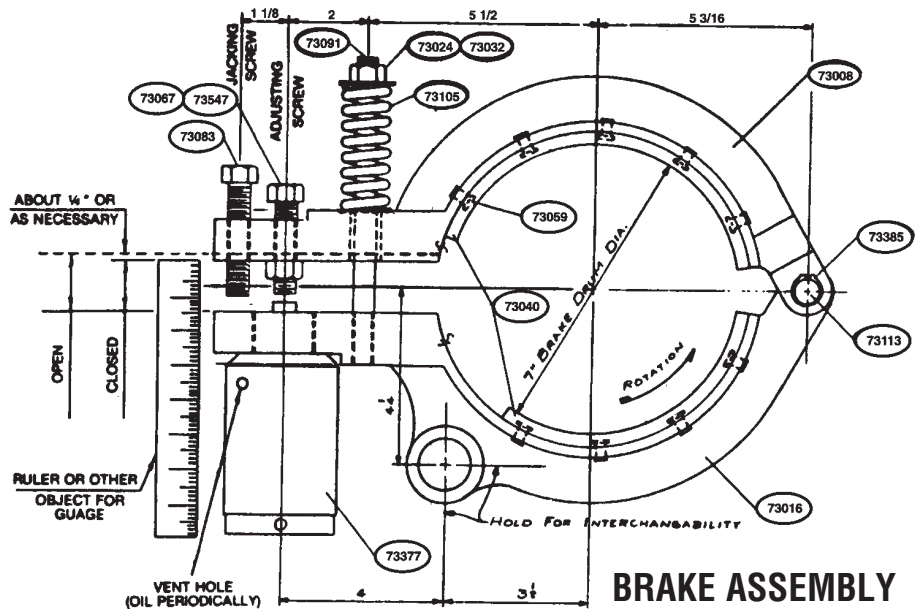
| DF-156-60-HE Hydraulic Motor & Directional Control Valve Components | | |
|---|----------|---------|
| Part Description | Quantity | Part #s |
| Angle Bracket for Directional Control Valve | 1 | 72704 |
| Directional Control Valve 110V | 1 | 75450 |
| Motor Pinion w/ Brake Drum | 1 | 78727 |
| Hydraulic Motor Bracket | 1 | 78794 |
| Hydraulic Motor | 1 | 78824 |
| Steel Subplate | 1 | 79731 |
| Aluminum Subplate Body | 1 | 79757 |
| Relief Valve for Aluminum Subplate Body | 1 | 79758 |
| Base Plate for Dir. Crtl. Valve & Hyd. Motor | 1 | 84360 |

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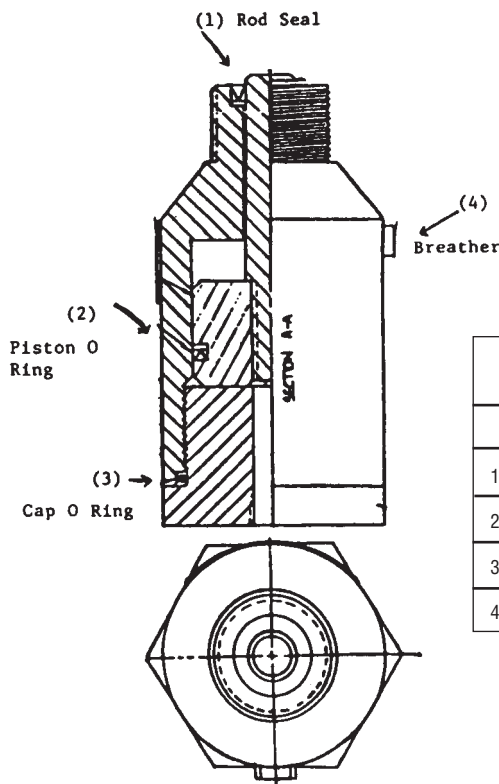


HYDRAULIC BRAKE ASSEMBLY PART NO. 73393

| LIST OF MATERIALS | | |
|-------------------|-------|-------------------------------|
| PART | QTY | DESCRIPTION |
| 73008 | 1 | Upper Band (Mn. Brz.) |
| 73016 | 1 | Lower Band (Mn. Brz.) |
| 73024 | 1 | 1/2" O Hex Nut |
| 73032 | 1 | 1" O Flat Washer |
| 73040 | 1 Set | Brake Lining |
| 73059 | 18 | 1/4" O x 5/8" Lg. Brass Rivet |
| 73067 | 1 | 5/8" O x 2 1/2" Lg. Cap Screw |
| 73083 | 1 | 5/8" O x 2 3/4" Lg. Cap Screw |
| 73091 | 1 | 1/2" O x 7 1/2" Lg. Stud |
| 73105 | 1 | Brake Spring 10/20 Ton |
| 73113 | 1 | Brake Hinge Pin |
| 73377 | 1 | Hyd. Cylinder Assembly |
| 73385 | 2 | Industrial Retaining Ring |
| 73547 | 1 | 5/8" O Hex Nut |
| 73520 | 1 | Brake Spring 40/60 Ton |



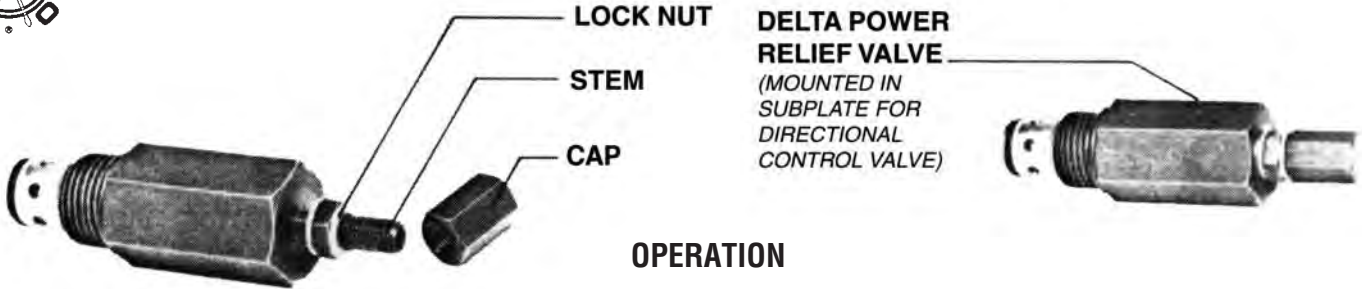
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BRAKE CYLINDER PART NO. 73377

| | CYLINDER | QTY. REQ. | DESCRIPTION |
|---|----------|-----------|---------------|
| | Part No. | | |
| 1 | 20915 | 1 | Rod Seal |
| 2 | 20923 | 2 | Piston O Ring |
| 3 | 20931 | 1 | Cap O Ring |
| 4 | 21059 | 1 | Breather |

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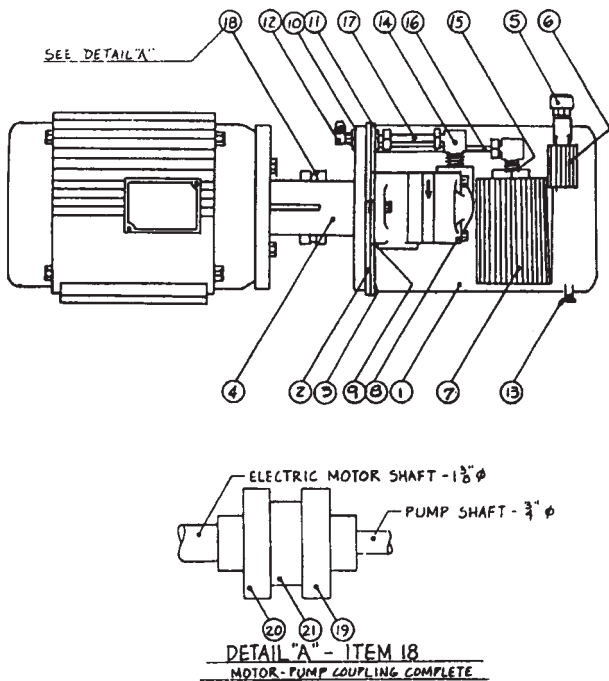
OPERATION

Standard NABRICO winches are equipped with one control station which is mounted on the winch. The start button starts the electric motor and the stop button stops the motor. The spring centered rotary switch above the pushbuttons activates the solenoid controlled hydraulic valve which allows the cable to be hoisted in or payed out.

To hoist in cable, push the start button; rotate the tope switch to the "in" position and hold until the desired tension is reached. To pay out cable, rotate the top switch to "out" and hold until the desired amount of cable has been unreeled. An optional remote control station can also be provided with the same controls as those mounted on the winch. When the remote station is provided, an optional remote-local switch can be added to the winch control station so that only one station at a time controls the winch.

HYDRAULIC RELIEF VALVE ADJUSTMENT

The hydraulic relief valve is factory set at 1800 psig for 20, 40 and 60 ton holding capacity winches and 1500 psig for 10 ton holding capacity winches. If adjustment is required, disconnect the brake line from the hydraulic brake cylinder (Part Number 73377) and install a pressure gauge in the brake line. Remove the threaded cap and back off the lock nut on the relief valve to increase pressure. Screw out the threaded stem to decrease pressure. Increase setting on the relief valve until the valve begins to relieve at 1800 psig or 1500 psig as required. Tighten lock nut and screw on the threaded cap.

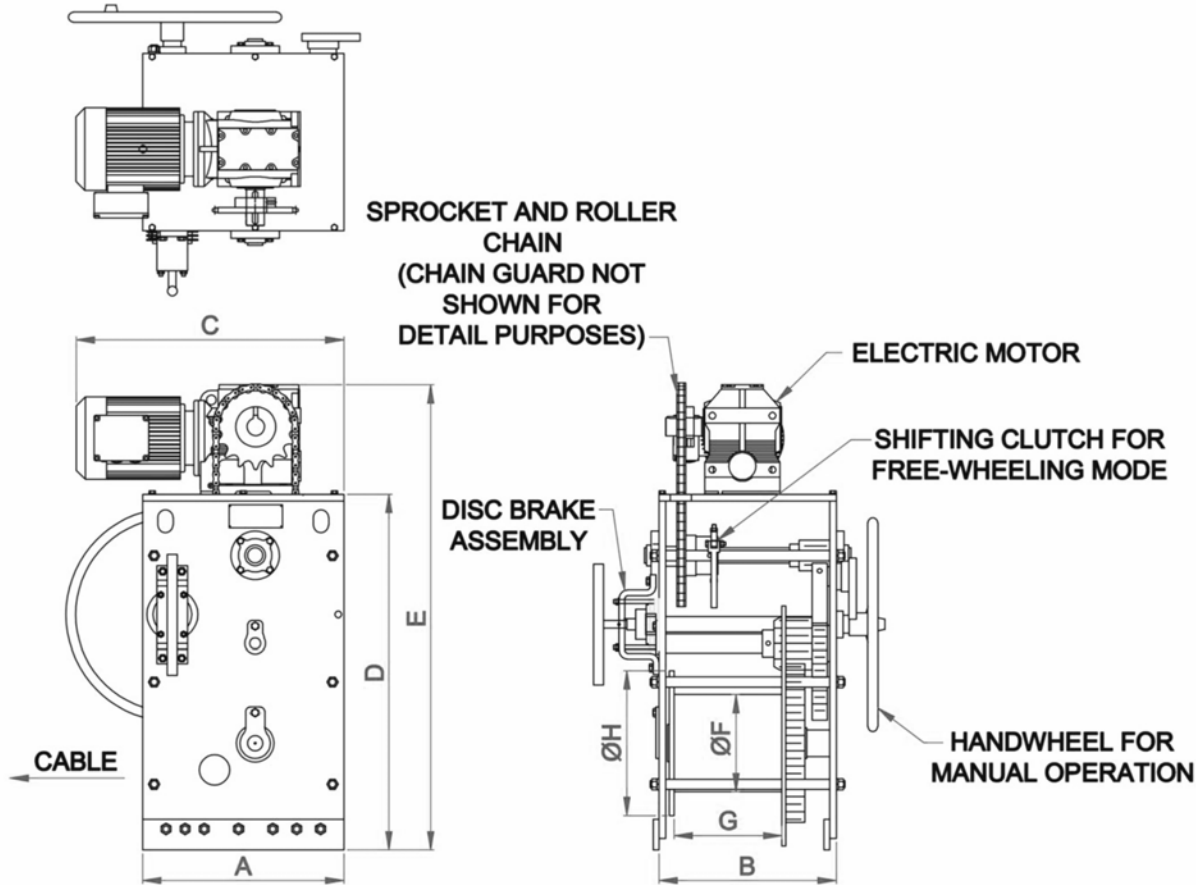


POWER PAK ASSEMBLY 20 & 40 TON H.E. WINCHES PART NO. 74667

| ITEM | NABRICO PART NO. | QTY | DESCRIPTION |
|------|------------------|-----|------------------------------|
| 1 | 20508 | 1 | Tank Modified |
| 2 | 20516 | 1 | Clamp |
| 3 | 20524 | 1 | Gasket |
| 4 | 20532 | 1 | Pump Motor Bracket |
| 5 | 75205 | 1 | Filler/Breather |
| 6 | 20540 | 1 | Filler/Filter |
| 7* | 20559 | 1 | Return Filter |
| 8 | 20567 | 1 | Pump Modified |
| 9 | 20575 | 1 | Pump Face O-Ring |
| 10 | 20583 | 2 | Bulkhead Fitting O-Ring |
| 11 | 20591 | 2 | Bulkhead Fitting |
| 12 | 20605 | 2 | Swivel Fitting |
| 13 | 20613 | 1 | Plug Fitting |
| 14 | 20621 | 2 | Elbow Fitting |
| 15 | 20648 | 1 | Filter Bushing |
| 16 | 20656 | 1 | Filter Tube 5/8" x .049" |
| 17 | 20664 | 1 | Pressure Tube 5/8" x .049" |
| 18 | 20672 | 1 | Motor-Pump Coupling Complete |
| 19 | 20680 | 1 | Pump Coupling Hub |
| 20 | 20702 | 1 | Motor Coupling Hub |
| 21 | 20699 | 1 | Coupling Insert |

*When replacing #7 you must also replace #15 and #16.

40 TON UPRIGHT SPUD WINCH



RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 84023 | 84022 |

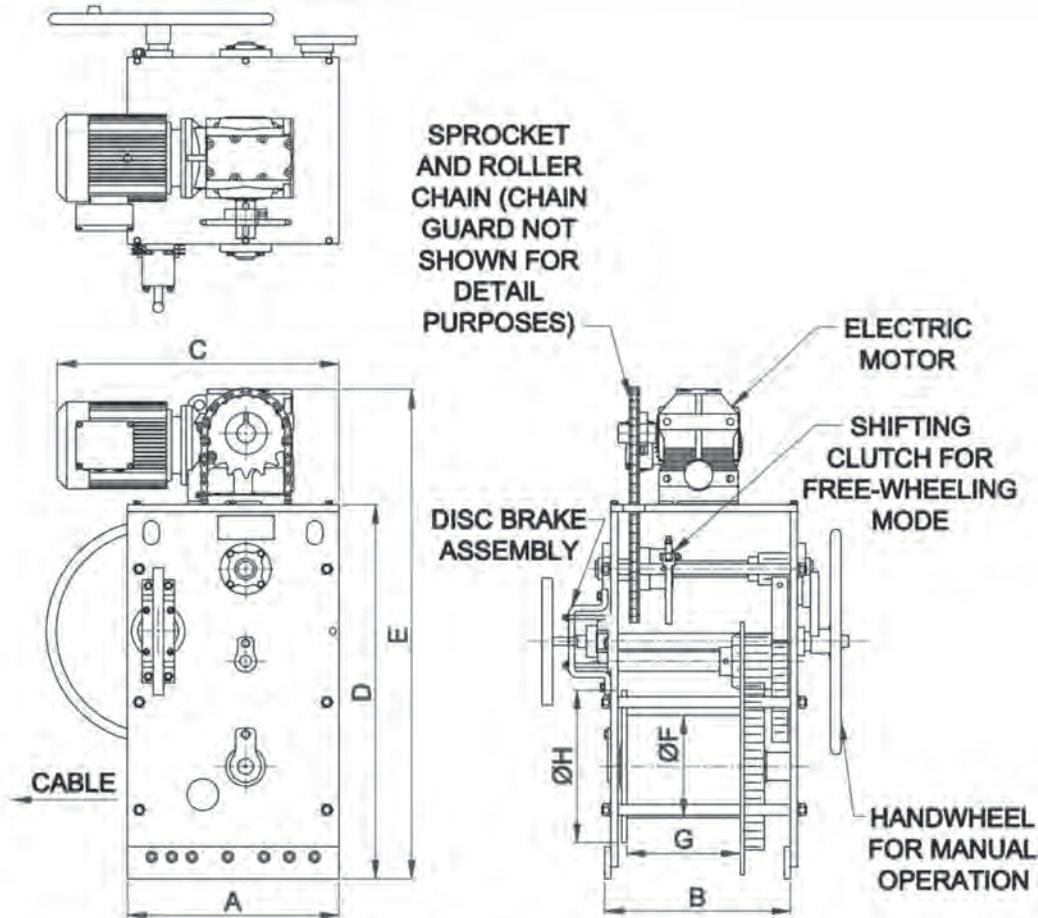
| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|---------|---------|-----|---------|-----|---------|---------|-----|------------|
| DF-1-40 | REFER TO COATINGS TABLE | 26 3/8" | 23 1/8" | 34" | 46 1/2" | 61" | 12 3/4" | 14 1/8" | 19" | 2100 |

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65 TON UPRIGHT SPUD WINCH

2



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | WT. (lbs.) |
|-----------|-------------------------|-----|---------|---------|-----|---------|-----|---------|-----|------------|
| DF-1-65 | REFER TO COATINGS TABLE | 32" | 26 1/8" | 38 1/2" | 56" | 70 1/2" | 14" | 13 5/8" | 24" | 2800 |

| COATINGS | RH WINCH PART No. | LH WINCH PART No. |
|------------|-------------------|-------------------|
| GALVANIZED | 83403 | 83402 |

RIGHT HAND WINCH SHOWN
LEFT HAND WINCH OPPOSITE

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CAPSTANS



2

SPECIFY THE FOLLOWING INFORMATION TO DETERMINE THE SIZE AND SPEED OF YOUR CAPSTANS:

HEAD SIZE _____
No. OF SPEEDS _____
LINE PULL _____
LINE SPEED _____
DRIVE _____

MODEL SHOWN

MODEL DF-C-18-15-30-H
HEAD SIZE 18 INCH
No. OF SPEEDS ONE
LINE PULL 5,000 Lbs.
LINE SPEED 30 FPM
DRIVE HYDRAULIC

- VERTICAL THRU-DECK OR ABOVE DECK MODELS
- FABRICATED STEEL CONSTRUCTION
- POLISHED STEEL CAPSTAN HEAD
- HEAD SIZES AVAILABLE TO 36" DIAMETER
- SINGLE OR VARIABLE SPEEDS AVAILABLE

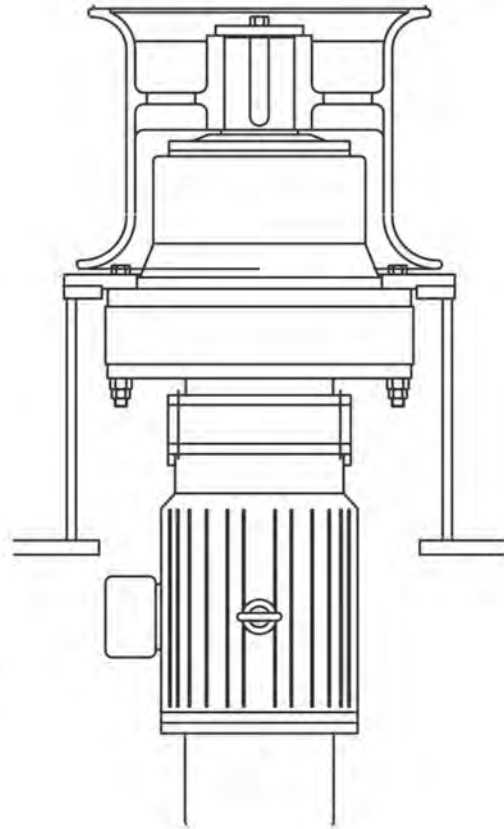
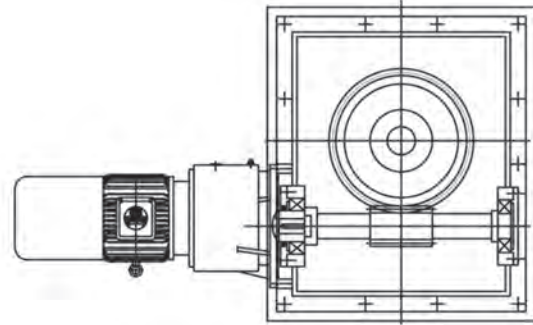
- LINE PULL UP TO 100,000 Lbs.
- STATIC OR BOLLARD PULL UP 300,000 Lbs.
- THREE COAT ZINC AND EPOXY PAINT SYSTEM
- PLANETARY OR WORM AND SPUR GEARING
- AVAILABLE WITH AN ELECTRIC OR HYDRAULIC DRIVE

TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.
 THE FACTORY WARRANTY OFFERED BY NABRICO IS THE ONLY WARRANTY EXTENDED TO THE PURCHASER OF NABRICO PRODUCTS.
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CAPSTANS

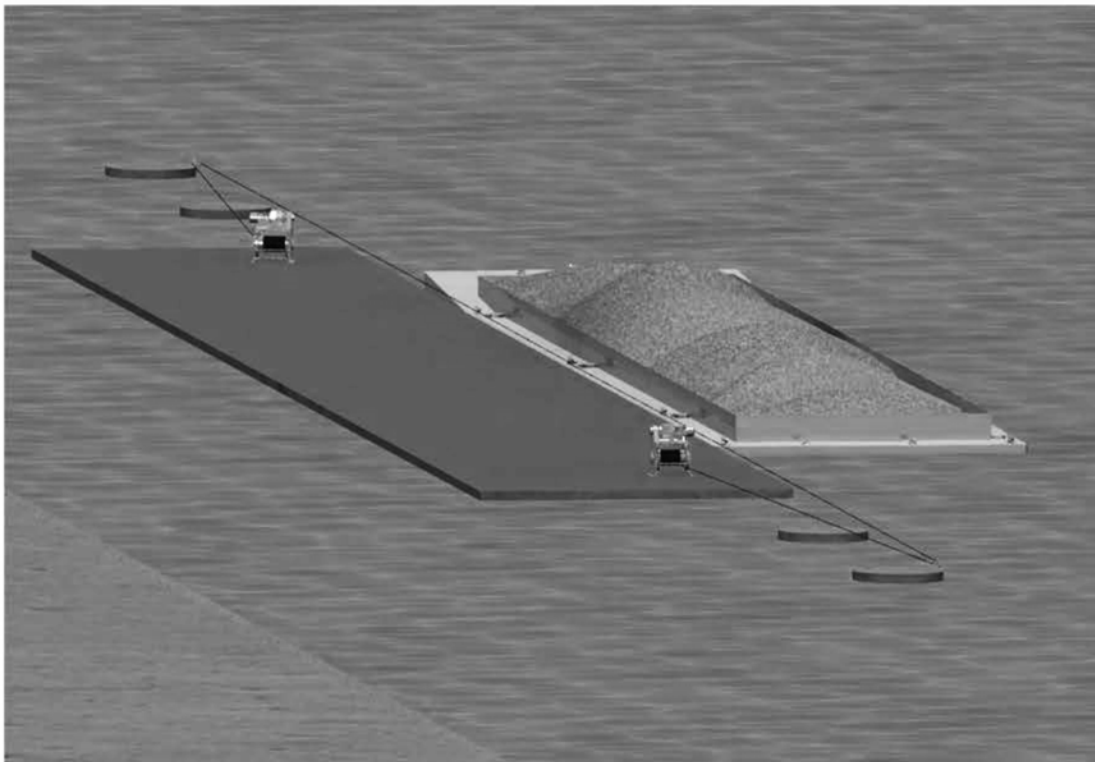


NABRICO provides a variety of capstan options to meet your specific requirements. Whether your needs require a thru-deck, above deck, electric, or hydraulic capstan, our engineers and sales people will provide a capstan to meet the demands of your applications.



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BARGE POSITIONING SYSTEM



NABRICO's all electric constant tension positioning winch system consists of two winches, two variable speed drives, variable speed motors, failsafe brakes, and PLC (programmable logic controls). These components have been engineered to allow one winch to be in a drive mode, pulling, while the other winch is in a torque mode, holding. When the object being positioned is at rest, both drives are in the torque mode, and the load holds its position on the dock, letting out cable during loading, and taking in cable during unloading. This also allows cable in and out as required during tide movement. The amount of torque/pull and speed on the cable is controlled by two potentiometers mounted on the control panel. The positioning winch system is capable of maintaining the full horsepower load at zero speed indefinitely. If there should be a loss of power or the emergency stop is pressed, the failsafe brakes hold the load.

NABRICO has utilized proven winch designs with the latest drive and touch screen technology. Adjustable ramps have been programmed into the system to minimize the shock on the cable and hardware associated with starting and stopping. For additional information, drawings, and specifications contact NABRICO.

NABRICO pioneered the positioning winch system. In addition to the standard model, the system is available in a larger 50 horsepower model and in a smaller 10 horsepower model. Using various motor and gearbox combinations, the line pull and speed can be changed since the basic engineering in the panel and winch remain the same. The positioning winch has industrial, marine, and rail applications. The winch can produce a full horsepower load at zero speed indefinitely. If there should be a loss of power or the emergency stop is pressed, the failsafe brakes hold the load.

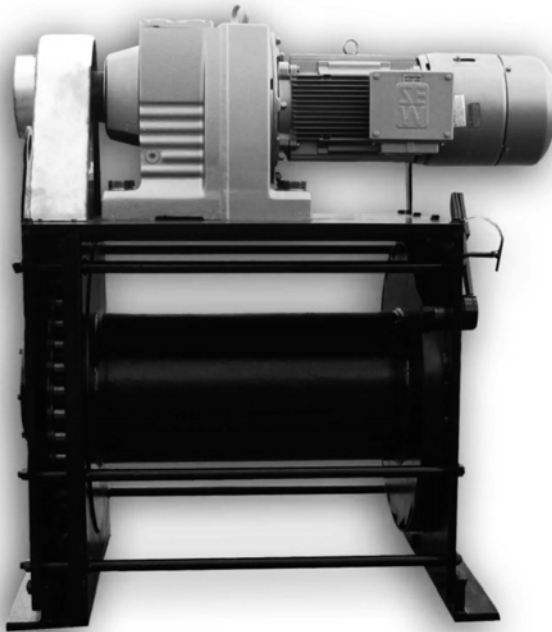
TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.

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BARGE POSITIONING SYSTEM 36" CHAIN DRIVE POSITIONING WINCH

2



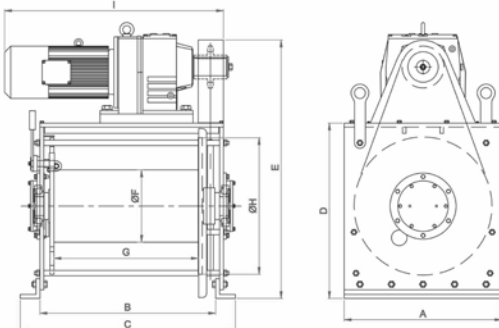
Control Cabinet for Winches

NABRICO's most technologically advanced winches, backed by more than a century of recognizing and meeting the needs of the towing and transportation industries, provide an infinite number of line pulls and line speeds. The standard model has a starting capacity of 24,000 lbs., with 16,000 lbs. of constant tension at 30 fpm. Drum capacity is substantial, varying from 572 to 1328 feet. Accessible, clearly marked controls are available in a wireless, wired remote, or local configuration.



| CABLE CAPACITY | | | LINE SPEED | LINE PULL |
|----------------|----------------|----------------|---|--|
| CABLE SIZE | 24" DRUM WIDTH | 36" DRUM WIDTH | | |
| 3/4" | 877 | 1328 | STANDARD: INFINITELY VARIABLE FROM 0-30 FPM. CUSTOM APPLICATION UP TO 100 FPM. | STANDARD INFINITELY VARIABLE LINE PULL 48,000 LBS. AT MOTOR STALL; 24,000 LBS. STARTING AND 16,000 LBS. CONTINUOUS. CUSTOM APPLICATIONS ARE AVAILABLE |
| 7/8" | 768 | 1165 | | |
| 1" | 686 | 1043 | | |
| 1 1/8" | 623 | 948 | | |
| 1 1/4" | 572 | 872 | | |

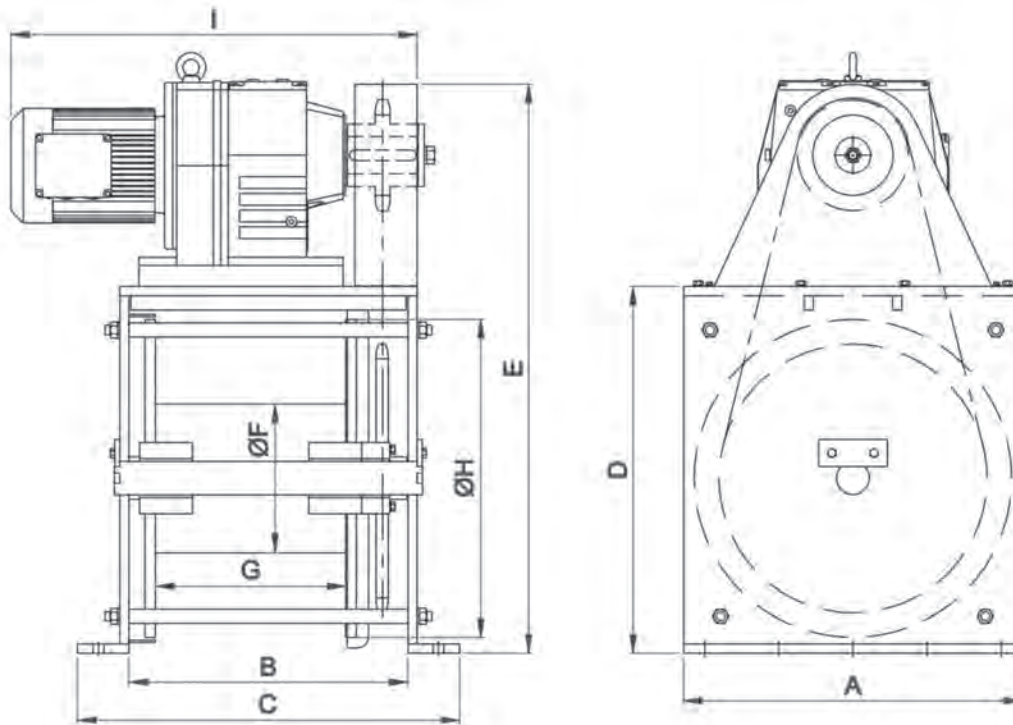
NOTE: THE CAPACITIES GIVEN ABOVE ARE BASED ON UNIFORM ROPE WINDING TO FIVE (5) LAYERS. TENSION APPLIED DURING SPOOLING WILL ALSO AFFECT THE LENGTH.



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | I | WT. (lbs.) |
|--------------|----------|---------|---------|-----------|---------|---------|-----|-----|-----|---------|------------|
| DF-CD-BMW-36 | 40038 | 39 3/8" | 43 7/8" | 53 11/16" | 43 3/4" | 65 3/4" | 18" | 36" | 34" | 57 5/8" | 4500 |

*Note: Cable capacities are at 5 layers.

BARGE POSITIONING WINCH (18" DRUM)



| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | I | WT. (lbs.) |
|--------------|----------|-----|---------|---------|---------|---------|-----|-----|-----|---------|------------|
| DF-CD-BMW-18 | 40031 | 32" | 26 3/8" | 36 1/8" | 34 5/8" | 54 1/8" | 14" | 18" | 30" | 38 1/2" | 3000 |

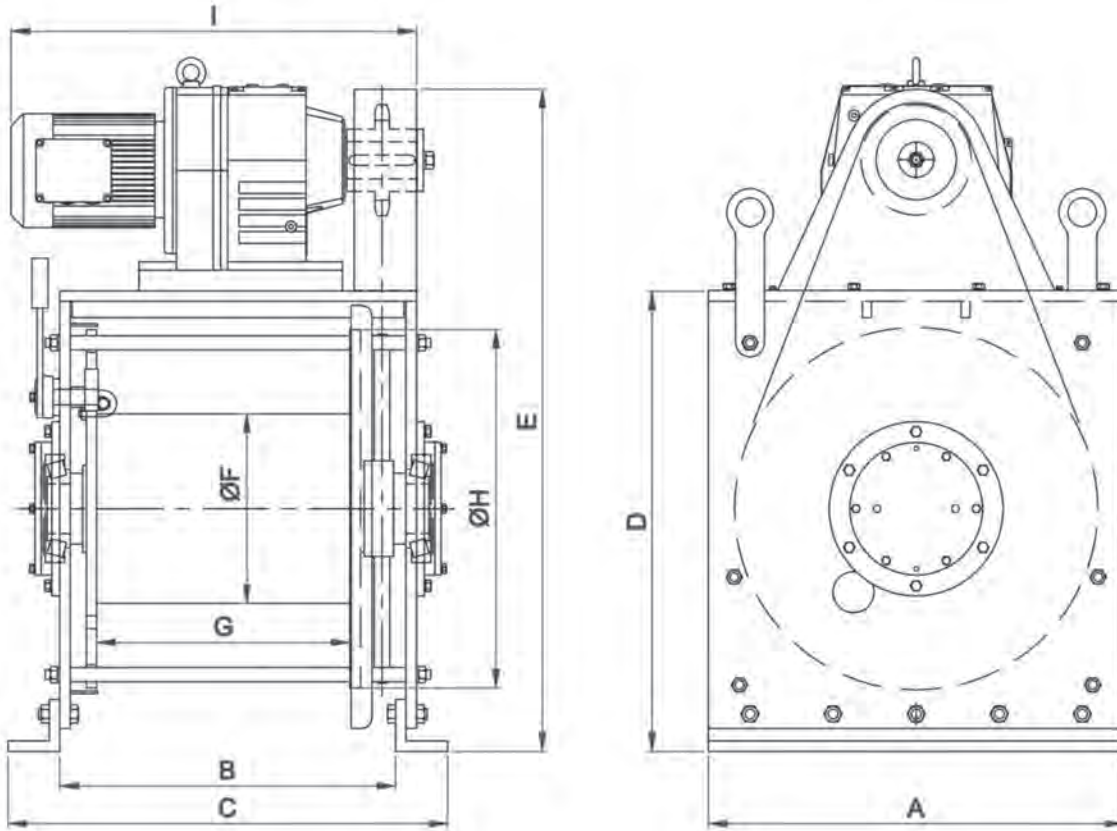
TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.

THE FACTORY WARRANTY OFFERED BY NABRICO IS THE ONLY WARRANTY EXTENDED TO THE PURCHASER OF NABRICO PRODUCTS. THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



BARGE POSITIONING WINCH (24" DRUM)

2

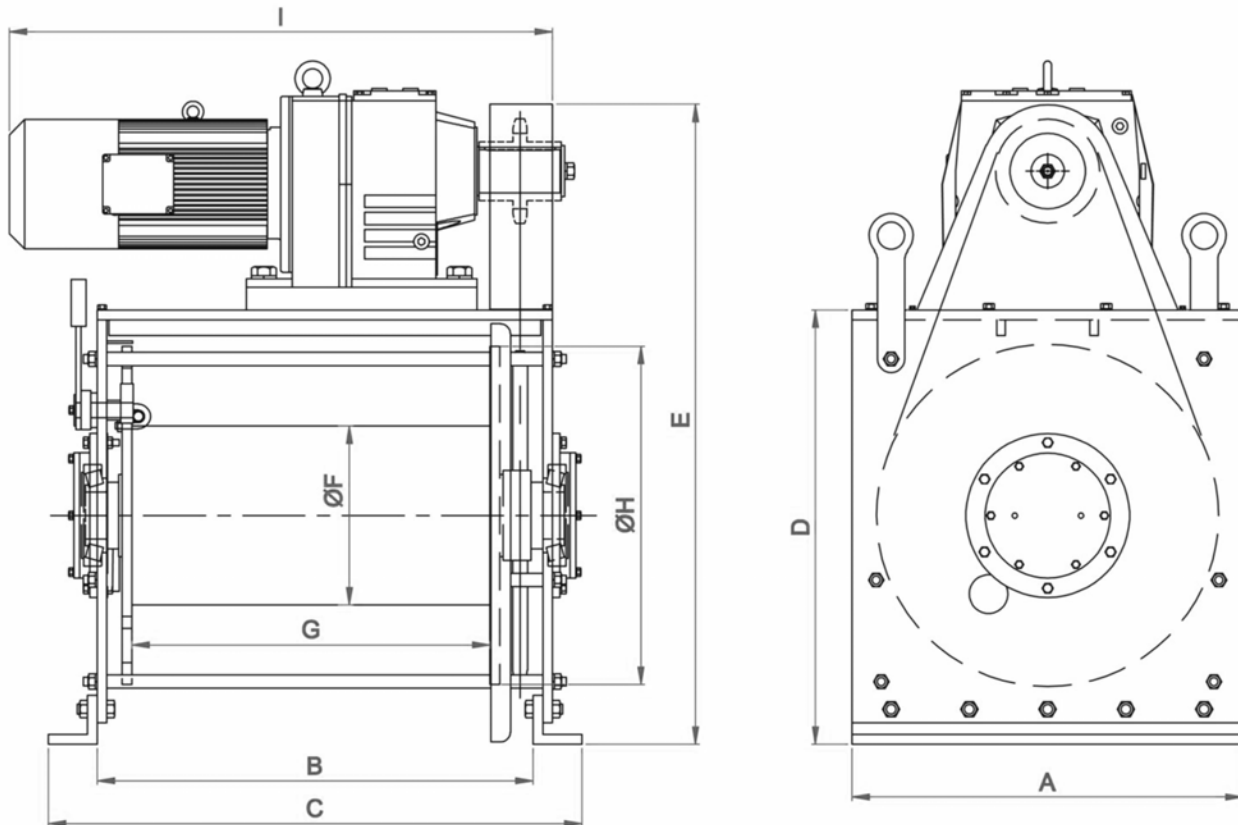


| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | I | WT. (lbs.) |
|--------------|----------|---------|---------|-----------|---------|---------|-----|-----|-----|---------|------------|
| DF-CD-BMW-24 | 40033 | 39 3/8" | 31 7/8" | 41 11/16" | 43 3/4" | 62 7/8" | 18" | 24" | 34" | 38 1/2" | 4000 |

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BARGE POSITIONING WINCH (36" DRUM)



2

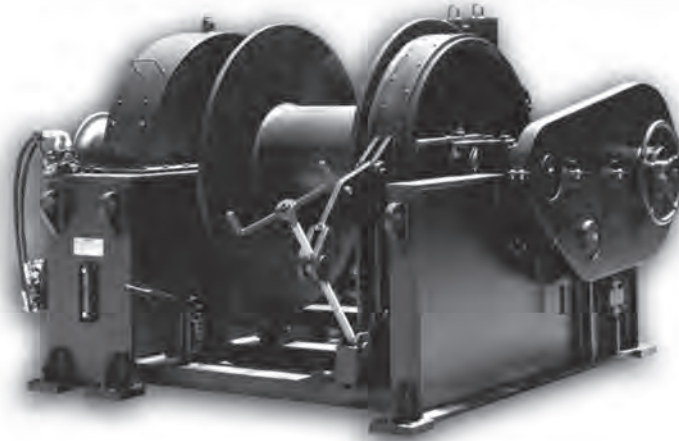
| MODEL No. | PART No. | A | B | C | D | E | ØF | G | ØH | I | WT. (lbs.) |
|--------------|----------|---------|---------|-----------|---------|---------|-----|-----|-----|---------|------------|
| DF-CD-BMW-36 | 40038 | 39 3/8" | 43 7/8" | 53 11/16" | 43 3/4" | 65 3/4" | 18" | 36" | 34" | 57 5/8" | 4500 |

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ANCHOR WINCHES



NABRICO is a full line supplier of electric and hydraulic anchor winches, mooring winches, and windlasses. We will custom fit each anchor winch, mooring winch, or windlass to your specific application to ensure the best possible configuration. Our winches can be fitted with warping heads and level winds along with many of our other standard features such as a locking dog, drum band brake, and a three coat zinc and epoxy paint system. NABRICO's hydraulic anchor winches can also be equipped with an electric auxiliary power source to operate the winch in case of a hydraulic failure. Please contact NABRICO for a quote specified to meet your requirements.

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ANCHOR WINCHES



SPECIFY THE FOLLOWING INFORMATION TO DETERMINE THE SIZE AND SPEED OF YOUR ANCHOR WINCH:

CABLE SIZE _____
DRUM CAPACITY _____
LINE PULL (FIRST LAYER) _____
LINE SPEED _____
MOTOR TYPE _____
OF GYPSY HEADS _____
GYPSY HEAD SIZE _____

MODEL SHOWN

MODEL DF-AW-1200-30-2/16H
CABLE SIZE 1-7/8 Inch
DRUM CAPACITY 1200 Ft.
LINE PULL (FIRST LAYER) 25,000 Lbs. @ 2400 PSI
LINE SPEED 30 FPM
MOTOR TYPE HYDRAULIC
OF GYPSY HEADS TWO
GYPSY HEAD SIZE 16 INCH

- HYDRAULIC OR ELECTRIC MOTOR WITH FAIL SAFE MOTOR BRAKE
- 4-WAY CONTROL VALVE MOUNTED AND PIPED ON THE WINCH
- MANUALLY OPERATED BAND BRAKE WITH STAINLESS STEEL BRAKE AND STEEL HAND WHEEL
- LEVER OPERATED MACHINED JAW CLUTCH
- WIRE ROPE LEVEL WIND FOR UNIFORM LAY OF WIRE ON THE DRUM
- RATCHET AND PAWL TYPE HOLDING DOG ON THE DRUM
- FABRICATED STEEL CONSTRUCTION.
- THREE COAT ZINC AND EPOXY PAINT SYSTEM.
- ELECTRIC OR HYDRAULIC POWER.
- JAW CLUTCHED DRUM.
- SINGLE OR DOUBLE WARPING HEADS.
- HYDRAULIC MOTOR WITH FAIL SAFE MOTOR BRAKE.
- SPUR GEAR REDUCTION OPERATING IN OIL BATH.
- LEVEL WIND AVAILABLE.
- DRUM BAND BRAKE AND HOLDING DOG.
- DRUM CAPACITY AND LINE PULL TO MEET CUSTOMER REQUIREMENTS.
- OTHER SIZES AND FEATURES AVAILABLE.
- OTHER AVAILABLE OFFSHORE DECK MACHINERY: MOORING WINCHES, TOWING WINCHES, ANCHORS, CHAIN AND CAPSTANS.
- CONTACT NABRICO WITH YOUR SPECIFIC REQUIREMENTS.

TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.

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TIMCO OFFERS PARTS FOR BEEBE BROTHERS, INC.

“LO PRO™” SERIES BARGE WINCH MODELS

LEFT HAND

25HL

50HL

75HL

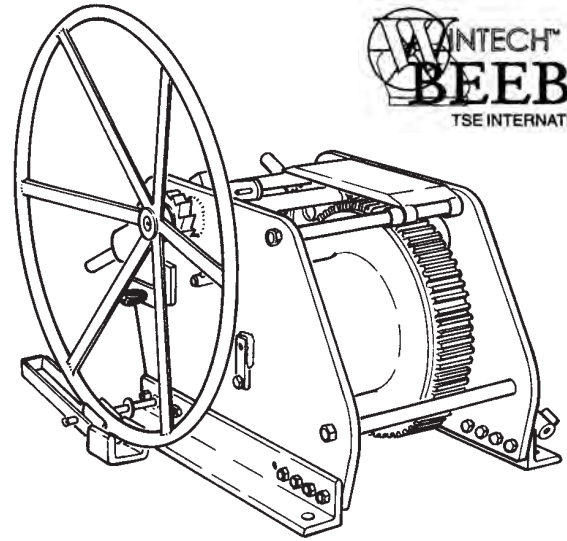
RIGHT HAND

25HR

50HR

75HR

Please Specify Winch Model Number When Ordering



2

Model Code Explanation:

Example: 50HL-41-16B

50H L - 41 - 16 B

Series/Capacity:

25H = 25 US Tons

50H = 50 US Tons

75H = 75 US Tons

Configuration:(handwheel to wire rope take-off)

R = Right hand.

L = Left hand.

Drum Lengths Available:

25H = 9 inches

= 17 inches

= 35 inches

= 52 inches

= 69 inches

50H = 11 inches

= 20 inches

= 41 inches

= 61 inches

= 82 inches

75H = 10 inches

= 20 inches

= 40 inches

= 61 inches

= 81 inches

Wire Rope Size (number equals rope diameter in sixteenths of an inch):

10 = 10/16 inch = 5/8 inch

12 = 12/16 inch = 3/4 inch

14 = 14/16 inch = 7/8 inch

16 = 16/16 inch = 1 inch

18 = 18/16 inch = 1-1/8 inch

20 = 20/16 inch = 1-1/4 inch

22 = 22/16 inch = 1-3/8 inch

24 = 24/16 inch = 1-1/2 inch

Options:

B = Angled deck bracket.

C = Overload clutch with handwheel.

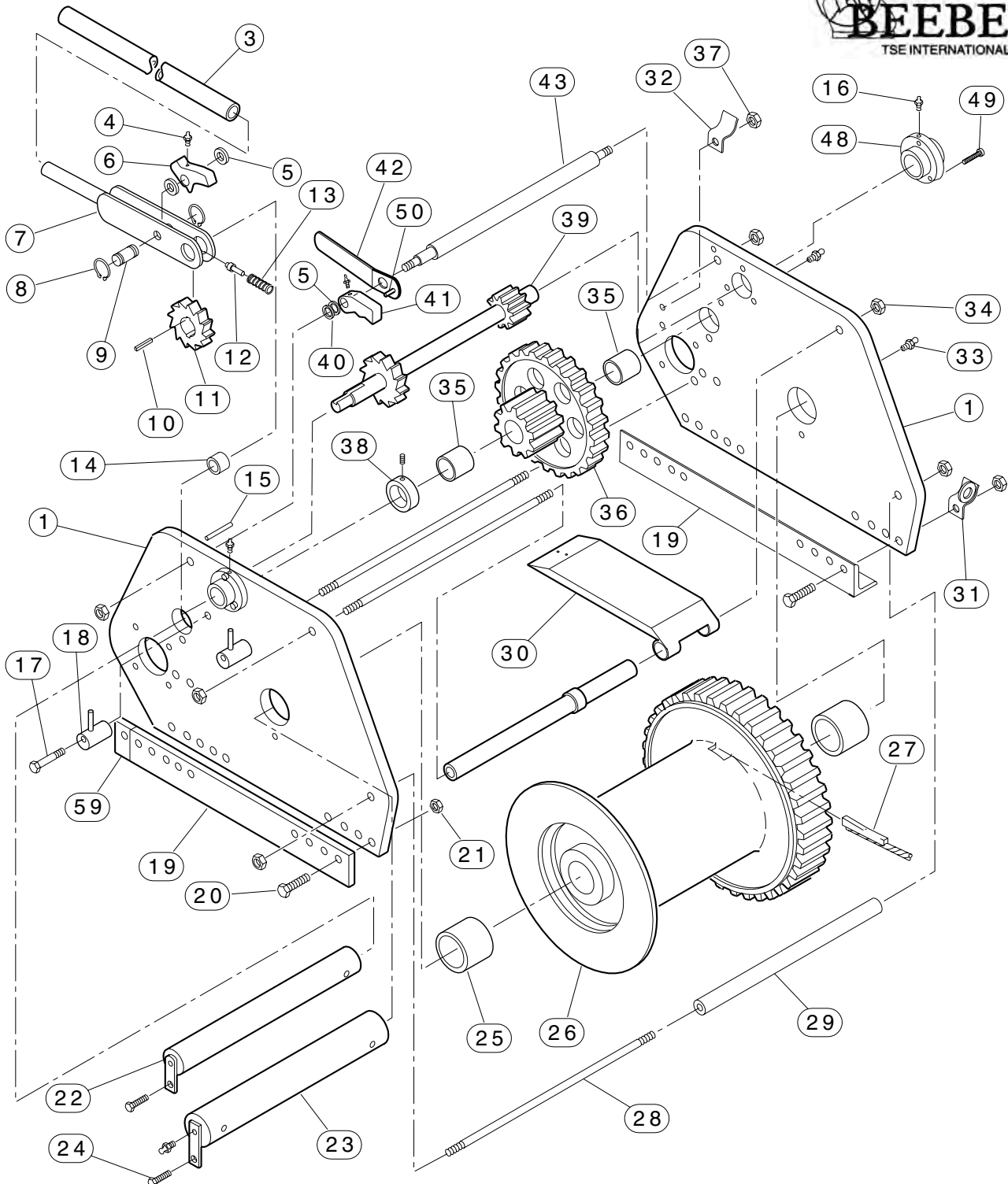
D = Drum divider with second wire rope anchor.

G = Grooved drum.

P = Special paint: Marine 812 top coat.

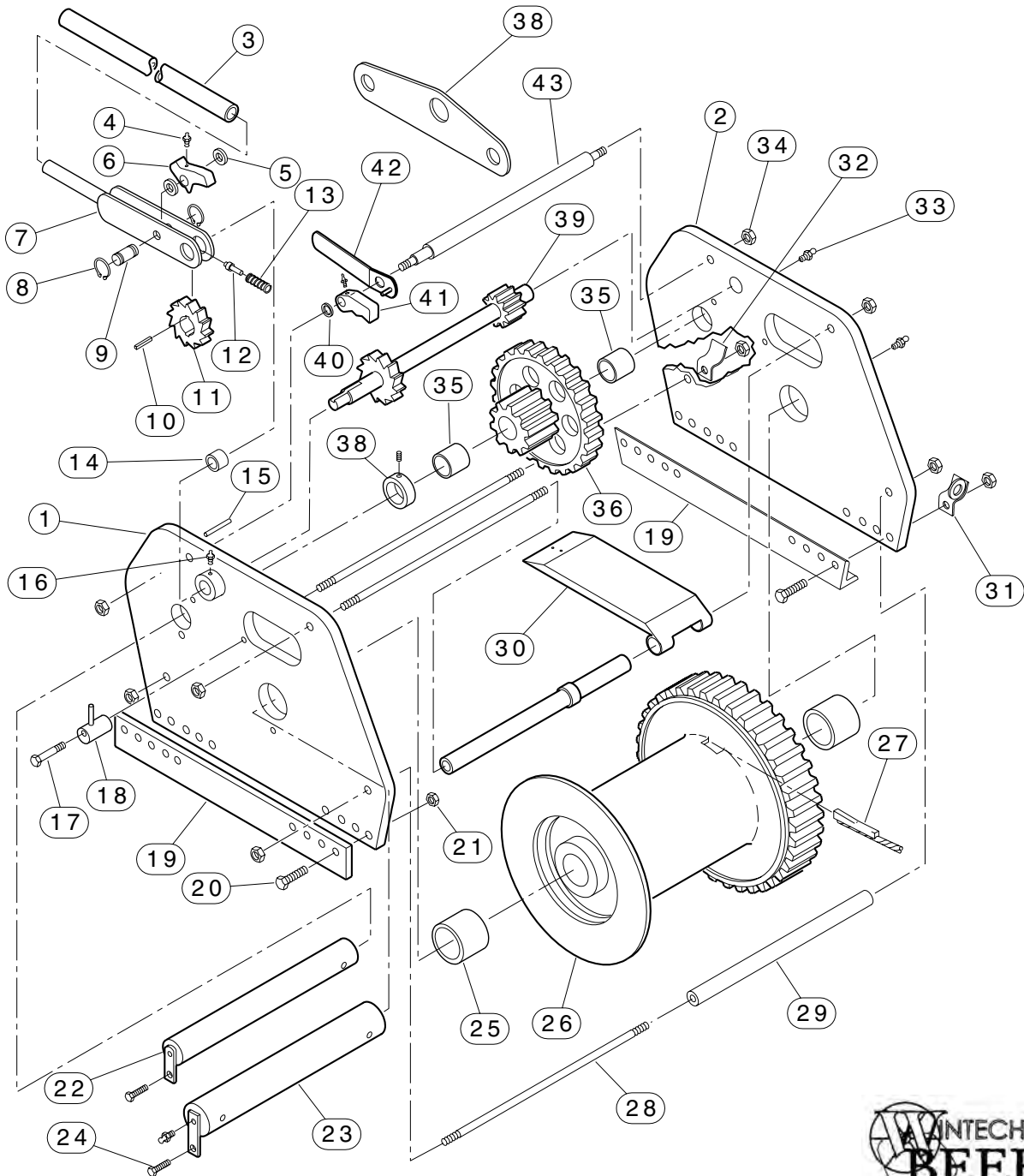
Z = Sand blasted/carbozinc plating.

25H, 50H AND 75H BARGE WINCH ASSEMBLY DRAWING (AFTER 15 JULY 1993)



25H, 50H AND 75H BARGE WINCH ASSEMBLY DRAWING (BEFORE 15 JULY 1993)

2



25H BARGE WINCH ASSEMBLY PARTS LIST



| Common Parts | | | |
|--------------|--|-----------|-----------|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
| 1 | Right Side Frame (before 15 July 1993)* | 1 | 22948 |
| | Side Frame | | |
| 2 | Left Side Frame (before 15 July 1993)* | 1 | 22948 |
| | Side Frame | | |
| 3 | Ratchet Lever Extension | 1 | 7900-35 |
| 4 | Grease Fitting, Dog | 2 | 52676 |
| 5 | Washer | 3 | 9779 |
| 6 | Ratchet Dog | 1 | 7907 |
| 7 | Ratchet Lever | 1 | 7966 |
| 8 | Retaining Ring | 2 | 50810 |
| 9 | Shaft | 1 | 7914 |
| 10 | Key, Ratchet Wheel | 2 | 19465-125 |
| 11 | Ratchet Wheel | 1 | 7965 |
| 12 | Spring Guide | 1 | 7911 |
| 13 | Spring | 1 | 50807 |
| 14 | Bushing | 2 | 1293-6 |
| 15 | Pin | 1 | 50823 |
| 16 | Grease Fitting, Bushing | 2 | 53497 |
| 17 | Cap Screw | 2 | 50884 |
| 18 | Ratchet Stop | 2 | 7917 |
| 19 | Deck Bracket, Straight | 2 | 589 |
| | Deck Bracket, Angled | | 513 |
| 20 | Cap Screw, Deck Bracket | 17 | 50902 |
| 21 | Nut | 18 | 50880 |

| | | | |
|----|--------------------------|---|----------|
| 24 | Cap Screw | 2 | 50160 |
| 25 | Bushing, Drum | 2 | 1293-1 |
| 27 | Anchor Wedge 5/8" | 1 | 530 |
| | Anchor Wedge 3/4" | | 529 |
| | Anchor Wedge 7/8" | | 528 |
| | Anchor Wedge 1" | | 527 |
| 30 | Gear Cover | 1 | 7963 |
| 31 | Lower Bracket, Left | 1 | 7967-L |
| | Lower Bracket, Right | | 7967-R |
| 32 | Upper Bracket | 1 | 7967 |
| 33 | Grease Fitting | 3 | 53095 |
| 34 | Nut, Shaft | 8 | 50825 |
| 35 | Cluster Gear Bushing | 1 | 1293-2 |
| 36 | Cluster Gear | 1 | 9104 |
| 38 | Shaft Collar (Old Style) | 1 | ** |
| | Set Collar | | 4046-6 |
| 40 | Washer | 1 | 9779-1 |
| 41 | Holding Dog | 1 | 7968 |
| 42 | Holding Dog Lever | 1 | 7969 |
| 44 | Washer, Holding Dog | 1 | 18492 |
| 45 | Cap Screw | 1 | 50824 |
| 46 | Warning Tag*** | 1 | 71087035 |
| 47 | Model Label*** | 1 | 71108831 |
| 48 | Bearing Boss | 2 | 22943 |
| 49 | Cap Screw | 6 | 51766 |
| 50 | Pin (Holding Dog Stop) | 1 | **** |
| 59 | Deck Bracket Extension | 1 | 8104 |

Parts by Drum Size (inches)

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|-----------------------------------|-----------|----------|-----------|-----------|-----------|-----------|
| | | | 9" | 17" | 35" | 52" | 69" |
| 22 | Intermediate Shaft | 1 | 511-1 | 511-2 | 511-4 | 511-5 | 511-6 |
| 23 | Drum Shaft | 1 | 512-1 | 512-2 | 512-4 | 512-5 | 512-6 |
| 26 | Drum | 1 | 7902-A-9 | 7902-A-17 | 7902-A-34 | 7902-A-51 | 7902-A-69 |
| 28 | Spacer Shaft | 3 | 7908-1 | 7908-2 | 7908-3 | 7908-4 | 7908-5 |
| 29 | Spacer Tube | 3 | 8291-8 | 8291-9 | 8291-10 | 8291-11 | 8291-12 |
| 39 | Handwheel Shaft - Right hand unit | 1 | 7905-1R | 7905-2R | 7905-3R | 7905-4R | 7905-5R |
| | Handwheel Shaft - Left hand unit | | 7905-1L | 7905-2L | 7905-3L | 7905-4L | 7905-5L |
| 43 | Holding Dog Shaft | 1 | 7906-A-1 | 7906-A-2 | 7906-A-3 | 7906-A-4 | 7906-A-5 |

* Right and left side frames purchased before 15 July 1993 have been replaced by new side frames which are completely interchangeable. For replacement parts, order new side frame (part number 22948) for both right and left applications.

** Old style Shaft Collar (38) not available. To replace purchase item 38 Set Collar.

*** Not shown on drawings.

**** Item 50, Pin, not sold separately. To replace order item 42, Holding Dog Lever.



50H BARGE WINCH ASSEMBLY PARTS LIST

2

| Common Parts | | | |
|--------------|---|-----------|-----------|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
| 1 | Right Side Frame (before 15 July 1993) * | 1 | 22937 |
| | Side Frame | | |
| 2 | Left Side Frame (before 15 July 1993) * | 1 | 22937 |
| | Side Frame | | |
| 3 | Ratchet Lever Extension | 1 | 7960-35 |
| 4 | Grease Fitting, Dog | 2 | 52676 |
| 5 | Washer | 3 | 9779 |
| 6 | Ratchet Dog | 1 | 7907 |
| 7 | Ratchet Lever | 1 | 7966 |
| 8 | Retaining Ring | 2 | 50810 |
| 9 | Shaft, Ratchet Dog | 1 | 7914 |
| 10 | Key, Ratchet Wheel | 2 | 19465-125 |
| 11 | Ratchet Wheel | 1 | 7965 |
| 12 | Spring Guide, Ratchet | 1 | 7911 |
| 13 | Spring, Ratchet | 1 | 50807 |
| 14 | Bushing, Bearing Boss | 2 | 1293-6 |
| 15 | Pin, Holding Dog | 1 | 50823 |
| 16 | Grease Fitting, Bushing | 1 | 53497 |
| 17 | Cap Screw, Ratchet Stop | 2 | 50884 |
| 18 | Ratchet Stop | 2 | 7917 |
| 19 | Deck Bracket, Straight | 2 | 324 |
| | Deck Bracket, Angled | | 1111 |
| 20 | Cap Screw, Deck Bracket | 17 | 54221 |
| 21 | Nut, Deck Bracket | 18 | 50880 |

| Common Parts | | | |
|--------------|------------------------|-----------|----------|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
| 24 | Cap Screw | 2 | 50878 |
| 25 | Bushing, Drum | 2 | 1293-4 |
| 27 | Anchor Wedge 7/8" | 1 | 334 |
| | Anchor Wedge 1" | | 333 |
| | Anchor Wedge 1 1/8" | | 332 |
| | Anchor Wedge 1 1/4" | | 331 |
| 30 | Gear Cover | 1 | 7963 |
| 31 | Lower Bracket, Left | 1 | 7967-L |
| | Lower Bracket, Right | | 7967-R |
| 32 | Upper Bracket | 1 | 7967 |
| 33 | Grease Fitting, Shaft | 3 | 53095 |
| 34 | Nut, Shaft | 8 | 50825 |
| 35 | B-C Gear Bushing | 1 | 1293-5 |
| 36 | B-C Gear | 1 | 338 |
| 38 | Set Collar | 1 | 4046-4 |
| 40 | Washer | 1 | 9779-1 |
| 41 | Holding Dog | 1 | 7968 |
| 42 | Holding Dog Lever | 1 | 7969 |
| 44 | Washer, Holding Dog | 1 | 18492 |
| 45 | Cap Screw | 1 | 50160 |
| 46 | Warning Tag** | 1 | 71087035 |
| 47 | Model Label** | 1 | 71108831 |
| 48 | Bearing Boss | 2 | 22943 |
| 49 | Cap Screw | 6 | 51766 |
| 50 | Pin (Holding Dog Stop) | 1 | *** |

| Parts by Drum Size (inches) | | | | | | | | |
|-----------------------------|-----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | | |
| | | | 11" | 20" | 41" | 61" | 82" | |
| 22 | Intermediate Shaft | 1 | 326-1 | 326-2 | 326-4 | 326-5 | 326-7 | |
| 23 | Drum Shaft | 1 | 325-1 | 325-2 | 325-4 | 325-5 | 325-7 | |
| 26 | Drum | 1 | 7962-A-11 | 7962-A-20 | 7962-A-41 | 7962-A-61 | 7962-A-82 | |
| 28 | Spacer Shaft | 3 | 7971-1 | 7971-2 | 7971-4 | 7971-5 | 7971-7 | |
| 29 | Spacer Tube | 3 | 8291-1 | 8291-2 | 8291-4 | 8291-5 | 8291-7 | |
| 39 | Handwheel Shaft - Right hand unit | 1 | 7964-1R | 7964-2R | 7964-4R | 7964-5R | 7964-7R | |
| | Handwheel Shaft - Left hand unit | | 7964-1L | 7964-2L | 7964-4L | 7964-5L | 7964-7L | |
| 43 | Holding Dog Shaft | 1 | 7970-1 | 7970-2 | 7970-4 | 7970-5 | 7970-7 | |

* Right and left side frames purchased before 15 July 1993 have been replaced by new side frames which are completely interchangeable. For replacement parts, order new side frame (part number 22937) for both right and left applications.

** Items not shown on drawings.

*** Item 50, Pin, not sold separately. To replace order item 42, Holding Dog Lever.

75H BARGE WINCH ASSEMBLY PARTS LIST



| Common Parts | | | |
|--------------|--|-----------|-----------|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
| 1 | Right Side Frame (before 15 July 1993)* | 1 | 22939 |
| | Side Frame | | |
| 2 | Left Side Frame (before 15 July 1993)* | 1 | 22939 |
| | Side Frame | | |
| 3 | Ratchet Lever Extension | 1 | 7960-35 |
| 4 | Grease Fitting, Dog | 2 | 52676 |
| 5 | Washer | 3 | 9779 |
| 6 | Ratchet Dog | 1 | 7907 |
| 7 | Ratchet Lever | 1 | 7966 |
| 8 | Retaining Ring | 2 | 50810 |
| 9 | Shaft, Ratchet Dog | 1 | 7914 |
| 10 | Key, Ratchet Wheel | 2 | 19465-125 |
| 11 | Ratchet Wheel | 1 | 7965 |
| 12 | Spring Guide, Ratchet | 1 | 7911 |
| 13 | Spring, Ratchet | 1 | 50807 |
| 14 | Bushing, Bearing Boss | 2 | 1293-6 |
| 15 | Pin, Holding Dog | 1 | 50823 |
| 16 | Grease Fitting, Bushing | 1 | 53497 |
| 17 | Cap Screw, Ratchet Stop | 2 | 50884 |
| 18 | Ratchet Stop | 2 | 7917 |
| 19 | Deck Bracket, Straight | 2 | 8068 |
| | Deck Bracket, Angled | | 8069 |
| 20 | Cap Screw, Deck Bracket | 17 | 54232 |
| 21 | Nut, Deck Bracket | 18 | 50880 |

| Common Parts | | | |
|--------------|------------------------|-----------|----------|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
| 24 | Cap Screw | 2 | 50878 |
| 25 | Bushing, Drum | 2 | 1293-8 |
| 27 | Anchor Wedge 1 1/8" | 1 | 8070-1 |
| | Anchor Wedge 1 1/4" | | 8070-2 |
| | Anchor Wedge 1 3/8" | | 8070-3 |
| | Anchor Wedge 1 1/2" | | 8070-4 |
| 30 | Gear Cover | 1 | 8064 |
| 31 | Lower Bracket, Left | 1 | 7967-L |
| | Lower Bracket, Right | | 7967-R |
| 32 | Upper Bracket | 1 | 7967 |
| 33 | Grease Fitting, Shaft | 3 | 53095 |
| 34 | Nut, Shaft | 8 | 50825 |
| 35 | Cluster Gear Bushing | 1 | 1289-1 |
| 36 | Cluster Gear | 1 | 8063-E |
| 38 | Set Collar | 1 | 4046-5 |
| 40 | Washer | 1 | 9779 |
| 41 | Holding Dog | 1 | 7968 |
| 42 | Holding Dog Lever | 1 | 7969 |
| 44 | Washer, Holding Dog | 1 | 18492 |
| 45 | Cap Screw | 1 | 50160 |
| 46 | Warning Tag** | 1 | 71087035 |
| 47 | Model Label** | 1 | 71108831 |
| 48 | Bearing Boss | 2 | 22944 |
| 49 | Cap Screw | 6 | 51766 |
| 50 | Pin (Holding Dog Stop) | 1 | *** |

Parts by Drum Size (inches)

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|-----------------------------------|-----------|----------|---------|---------|---------|---------|
| | | | 10" | 20" | 40" | 61" | 81" |
| 22 | Intermediate Shaft | 1 | 8066-1 | 8066-2 | 8066-3 | 8066-4 | 8066-5 |
| 23 | Drum Shaft | 1 | 8065-1 | 8065-2 | 8065-3 | 8065-4 | 8065-5 |
| 26 | Drum | 1 | 8062-10 | 8062-19 | 8062-40 | 8062-60 | 8062-81 |
| 28 | Spacer Shaft | 3 | 7971-1 | 7971-2 | 7971-4 | 7971-5 | 7971-7 |
| 29 | Spacer Tube | 3 | 8291-1 | 8291-2 | 8291-4 | 8291-5 | 8291-7 |
| 39 | Handwheel Shaft - Right hand unit | 1 | 7964-1R | 7964-2R | 7964-4R | 7964-5R | 7964-7R |
| | Handwheel Shaft - Left hand unit | | 7964-1L | 7964-2L | 7964-4L | 7964-5L | 7964-7L |
| 43 | Holding Dog Shaft | 1 | 7970-1 | 7970-2 | 7970-4 | 7970-5 | 7970-7 |

* Right and left side frames purchased before 15 July 1993 have been replaced by new side frames which are completely interchangeable. For replacement parts, order new side frame (part number 22939) for both right and left applications.

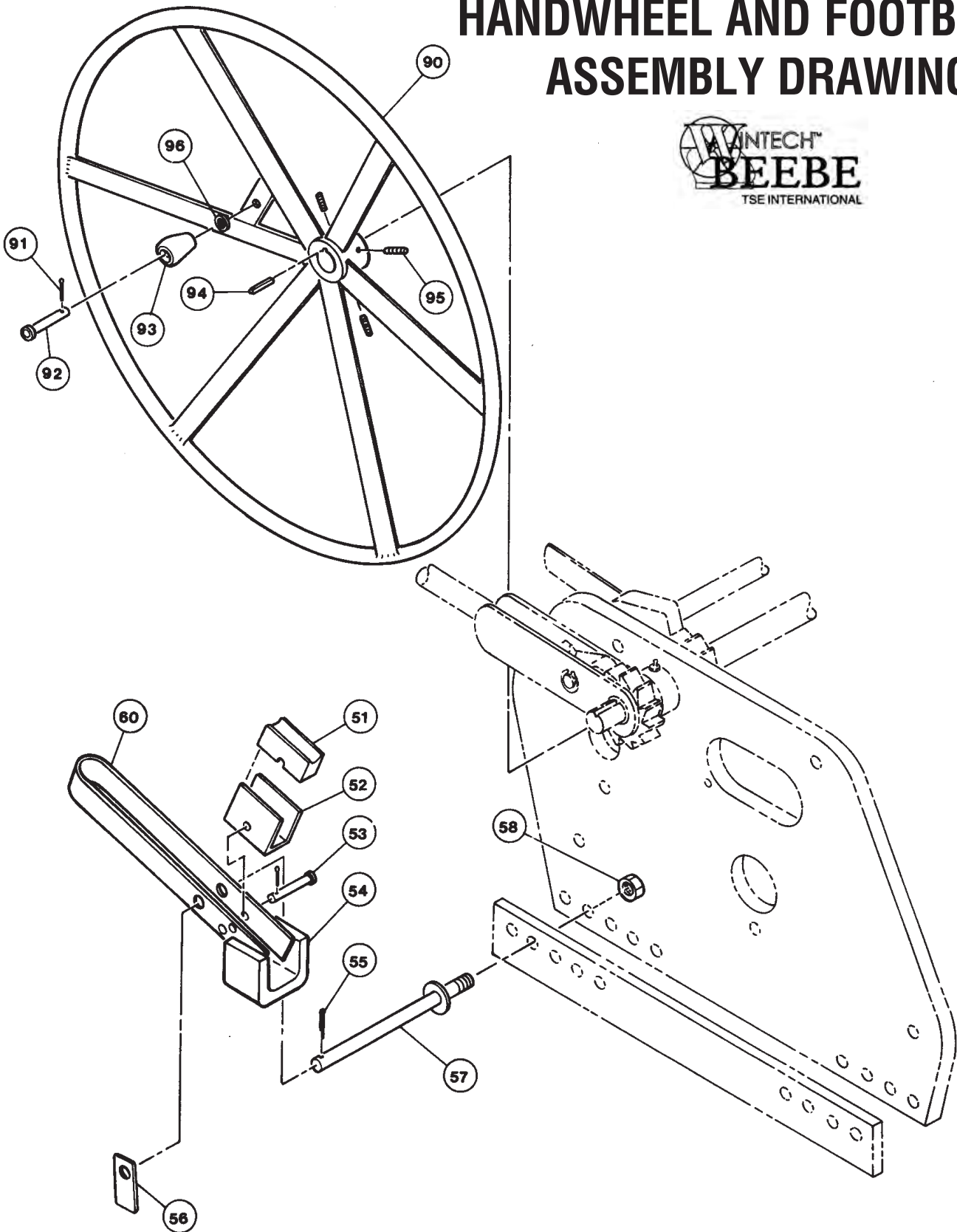
** Items not shown on drawings.

*** Item 50, Pin, not sold separately. To replace order item 42, Holding Dog Lever.

HANDWHEEL AND FOOTBRAKE ASSEMBLY DRAWING



2



HANDWHEEL AND FOOTBRAKE ASSEMBLY PARTS LIST



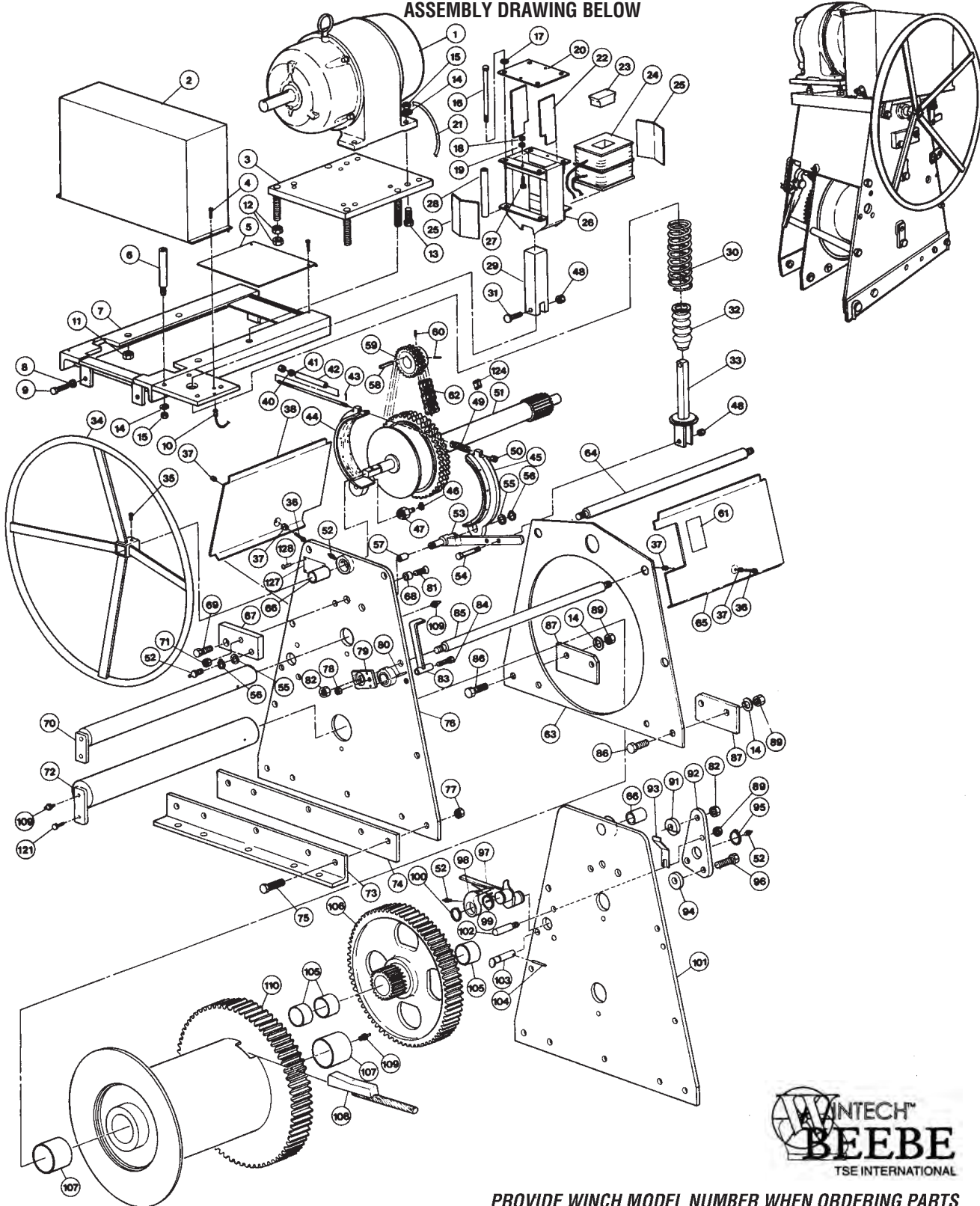
| Handwheel | | | | | |
|------------|---|-----------|-------------------------------------|-----|------|
| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | |
| | | | 25H | 50H | 75H |
| 90 | Handwheel | 1 | 7927 | 347 | 8067 |
| 91 | Cotter Pin (before 15 July 1993) | 1 | 51996 | | |
| | Nut (after 15 July 1993) | | 51750 | | |
| 92 | Shaft, Spinner Knob (before 15 July 1993) | 1 | 4867 | | |
| | Cap Screw (after 15 July 1993) | | 71059851 | | |
| 93 | Spinner Knob, Handwheel | 1 | 4868 | | |
| 94 | Key, Shaft | 1 | 19886-175 | | |
| 95 | Setscrew (before 15 July 1993) | 4 | 50900 | | |
| | Setscrew (after 15 July 1993) | 1 | | | |
| 96 | Washer (before 15 July 1993) | 1 | 50808 | | |
| | Washer (after 15 July 1993) | 3 | | | |
| Foot Brake | | | | | |
| — | Foot Brake Assembly | 1 | 22956 | 323 | |
| 60 | Brake Pedal Bar | 1 | 322 | | |
| 51 | Brake Block, Oak | 1 | 315 | | |
| 52 | Brake Pad | 1 | 316 | | |
| 53 | Pin, Clevis | 1 | 318 | | |
| 54 | Brake Pedal Counterbalance | 1 | Not sold separately. Order item 60. | | |
| 55 | Pin, Cotter | 2 | 51996 | | |
| 56 | Bracket | 1 | 317 | | |
| 57 | Shaft | 1 | 591 | 319 | |
| 58 | Nut | 1 | 50880 | | |

2

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

25 TON BEEBE WINCH, 300 SERIES BARGE WINCH

ASSEMBLY DRAWING BELOW



PROVIDE WINCH MODEL NUMBER WHEN ORDERING PARTS

2

300 SERIES 25 TON BARGE WINCH ASSEMBLY PARTS LIST



| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|--------------------------------|-----------|---|-------|-------|-------|-------|
| | | | 301 | 311 | 321 | 331 | 341 |
| 1 | Motor 5 HP, 1080 rpm | 1 | 50217 | | --- | | |
| | Motor 7.5 HP, 1080 rpm | | --- | 50351 | --- | 50351 | --- |
| | Motor 5 HP, 810 rpm | | --- | --- | 51371 | --- | 51371 |
| 2 | Brake and Solenoid Cover | 1 | 8622 (Left Hand) or 8621 (Right Hand) | | | | |
| 3 | Motor Adapter Plate | 1 | 8384-1 | | | | |
| 4 | Screw | 5 | 71007009 | | | | |
| 5 | Motor Base Cover (9 in. Drum) | 1 | Not Required | | | | |
| | Motor Base Cover (17 in. Drum) | | 2959-17 | | | | |
| | Motor Base Cover (34 in. Drum) | | 2959-34 | | | | |
| | Motor Base Cover (51 in. Drum) | | 2959-51 | | | | |
| | Motor Base Cover (69 in. Drum) | | 2959-69 | | | | |
| 6 | Solenoid Stud | 4 | 435 | | | | |
| 7 | Motor Base (9 in. Drum) | 1 | 8626-9 (Left Hand) or 8625-9 (Right Hand) | | | | |
| | Motor Base (17 in. Drum) | | 8626-17 (Left Hand) or 8625-17 (Right Hand) | | | | |
| | Motor Base (34 in. Drum) | | 8626-34 (Left Hand) or 8625-34 (Right Hand) | | | | |
| | Motor Base (51 in. Drum) | | 8626-51 (Left Hand) or 8625-51 (Right Hand) | | | | |
| | Motor Base (69 in. Drum) | | 8626-69 (Left Hand) or 8625-69 (Right Hand) | | | | |
| 8 | Lock Washer | 4 | 50203 | | | | |
| 9 | Cap Screw | 4 | 51837 | | | | |
| 10 | Grommet | 1 | 50193 | | | | |
| 11 | Motor Base Locknut | 4 | 50209 | | | | |
| 12 | Nut | 8 | 50159 | | | | |
| 13 | Cap Screw | 4 | 50197 | | | | |
| 14 | Lock Washer | 8 | 50181 | | | | |
| 15 | Nut | 8 | 50171 | | | | |
| 16 | Solenoid Spacer Cap Screw | 4 | 51949 | | | | |
| 17 | Lock Washer | 4 | 51486 | | | | |
| 18 | Nut | 2 | 53390 | | | | |
| 19 | Lock Washer | 2 | 53836 | | | | |
| 20 | Base Plate | 1 | 7007-G | | | | |
| 21 | Connector Cord | 1 | 50213 | | | | |
| 22 | Guide | 2 | 7007-E | | | | |
| 23 | Pole Piece | 1 | 7007-F | | | | |
| 24 | Solenoid 220V | 1 | 7007-220 | | | | |
| | Solenoid 440V | | 7007-440 | | | | |
| | Coil Only 220V | | R4318 WP | | | | |
| | Coil Only 440V | | R4317 WP | | | | |
| 25 | Guide (Brass) | 2 | 7007-D | | | | |
| 26 | Frame | 1 | 7007-C | | | | |
| 27 | Cap Screw | 2 | 51939 | | | | |
| 28 | Solenoid Spacer | 4 | 613 | | | | |
| 29 | Plunger | 1 | 7007-A | | | | |
| 30 | Compression Spring | 1 | 615 | | | | |
| 31 | Solenoid Link Pin (Upper) | 1 | 4969 | | | | |
| • 32 | Bellows Boot | 1 | 3802 | | | | |
| 33 | Solenoid Connector Link | 1 | 8116 | | | | |
| 34 | Handwheel | 1 | 1048 | | | | |
| 35 | Setscrew | 1 | 52857 | | | | |
| 36 | Screw | 2 | 50156 | | | | |

• Recommended Spare



300 SERIES 25 TON BARGE WINCH ASSEMBLY PARTS LIST

2

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | | |
|----------|---------------------------------|-----------|---|----------|----------|---------|----------|------|
| | | | 301 | 311 | 321 | 331 | 341 | 351 |
| 37 | Gear Guard Nut | 4 | 50161 | | | | | |
| 38 | Gear Guard (9 in. Drum) | 1 | 1051-1L (Left Hand) or 1051-1R (Right Hand) | | | | | |
| | Gear Guard (17 in. Drum) | | 051-2L (Left Hand) or 1051-2R (Right Hand) | | | | | |
| | Gear Guard (34 in. Drum) | | 1051-4L (Left Hand) or 1051-4R (Right Hand) | | | | | |
| | Gear Guard (51 in. Drum) | | 1051-5L (Left Hand) or 1051-5R (Right Hand) | | | | | |
| | Gear Guard (69 in. Drum) | | 1051-6L (Left Hand) or 1051-6R (Right Hand) | | | | | |
| 39 | Adjustment Stud | 1 | 1645 | | | | | |
| 40 | Adjustment Nut | 1 | 50170 | | | | | |
| 41 | Washer | 1 | 50177 | | | | | |
| 42 | Adjustment Spacer | 1 | 1646 | | | | | |
| 43 | Cotter Pin | 1 | 51937 | | | | | |
| •44 | Brake Shoe | 1 | 8123 | | | | | |
| •45 | Brake Shoe | 1 | 8122 | | | | | |
| •46 | Brake Shoe Retainer Ring | 2 | 53918 | | | | | |
| 47 | Anchor Eccentric | 1 | 8126 | | | | | |
| 48 | Nut | 2 | 51750 | | | | | |
| 49 | Adjustment Spring | 1 | 1647 | | | | | |
| 50 | Slotted Nut | 1 | 50169 | | | | | |
| 51 | Power Drive Assy. (9 in. Drum) | 1 | 8629-9 | 8628-9 | 8629-9 | 8628-9 | | |
| | Power Drive Assy. (17 in. Drum) | | 8629-17 | 8628-17 | 8629-17 | 8628-17 | | |
| | Power Drive Assy. (34 in. Drum) | | 8629-34 | 8628-34 | 8629-34 | 8628-34 | | |
| | Power Drive Assy. (51 in. Drum) | | 8629-51 | 8628-51 | 8629-51 | 8628-51 | | |
| | Power Drive Assy. (69 in. Drum) | | 8629-69 | 8628-69 | 8629-69 | 8628-69 | | |
| 52 | Grease Fitting | 6 | 51006 | | | | | |
| 53 | Brake Lever | 1 | 8120-1 (Left Hand) or 8120-2 (Right Hand) | | | | | |
| 54 | Solenoid Link Pin (Lower) | 1 | 4969-1 | | | | | |
| 55 | Brake Lever Washer | 2 | 50166 | | | | | |
| 56 | Brake Lever Retainer Ring | 2 | 50191 | | | | | |
| •57 | Brake Lever Bushing | 1 | 51406 | | | | | |
| 58 | Key | 1 | Not sold separately | | | | | |
| 59 | Motor Sprocket | 1 | 3185 | | 3179 | | 3185 | 3179 |
| 60 | Setscrew | 2 | 53154 | | | | | |
| 61 | Label | 1 | T25 | | | | | |
| 62 | Roller Chain | 1 | 50220-70 | 50220-80 | 50220-70 | | 50220-80 | |
| 63 | Wire Rope Guard | 1 | 1677 | | | | | |
| 64 | Spacer Shaft (9 in. Drum) | 3 | 678-1 | | | | | |
| | Spacer Shaft (17 in. Drum) | | 678-2 | | | | | |
| | Spacer Shaft (34 in. Drum) | | 678-4 | | | | | |
| | Spacer Shaft (51 in. Drum) | | 678-5 | | | | | |
| | Spacer Shaft (69 in. Drum) | | 678-6 | | | | | |
| 65 | Gear Guard (9 in. Drum) | 1 | 2171-1L (Left Hand) or 2171-1R (Right Hand) | | | | | |
| | Gear Guard (17 in. Drum) | | 2171-2L (Left Hand) or 2171-2R (Right Hand) | | | | | |
| | Gear Guard (34 in. Drum) | | 2171-4L (Left Hand) or 2171-4R (Right Hand) | | | | | |
| | Gear Guard (51 in. Drum) | | 2171-5L (Left Hand) or 2171-5R (Right Hand) | | | | | |
| | Gear Guard (69 in. Drum) | | 2171-6L (Left Hand) or 2171-6R (Right Hand) | | | | | |
| •66 | Power Driving Bushing | 2 | 1293-3 | | | | | |
| 67 | Brake Doubler Plate | 1 | 8623 | | | | | |
| 68 | Plate Locator Bushing | 1 | 8624 | | | | | |
| 69 | Cap Screw Anchor Bolt | 1 | 50208 | | | | | |

300 SERIES 25 TON BARGE WINCH ASSEMBLY PARTS LIST



| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | | |
|----------|-------------------------------|-----------|---------------------------------------|-----|-----|-----|-----|-----|
| | | | 301 | 311 | 321 | 331 | 341 | 351 |
| 70 | Cluster Shaft (9 in. Drum) | 1 | 511-1 | | | | | |
| | Cluster Shaft (17 in. Drum) | | 511-2 | | | | | |
| | Cluster Shaft (34 in. Drum) | | 511-4 | | | | | |
| | Cluster Shaft (51 in. Drum) | | 511-5 | | | | | |
| | Cluster Shaft (69 in. Drum) | | 511-6 | | | | | |
| 71 | Nut | 1 | 50211 | | | | | |
| 72 | Drum Shaft (9 in. Drum) | 1 | 512-1 | | | | | |
| | Drum Shaft (17 in. Drum) | | 512-2 | | | | | |
| | Drum Shaft (34 in. Drum) | | 512-4 | | | | | |
| | Drum Shaft (51 in. Drum) | | 512-5 | | | | | |
| | Drum Shaft (69 in. Drum) | | 512-6 | | | | | |
| 73 | Angle Deck Bracket (Optional) | 2 | 513 | | | | | |
| 74 | Deck Bracket (Standard) | 2 | 589 | | | | | |
| 75 | Cap Screw | 8 | 52829 | | | | | |
| 76 | Side Frame | 1 | 8619-2 | | | | | |
| 77 | Deck Bracket Nut | 8 | 50826 | | | | | |
| 78 | Nut | 1 | 50207 | | | | | |
| 79 | Lock Out Bar Bracket | 1 | 1124 | | | | | |
| 80 | Pin | 1 | 53909 | | | | | |
| 81 | Spacer Nut | 10 | 50154 | | | | | |
| 82 | Motor Base Locknut | 4 | 50209 | | | | | |
| 83 | Lock Out Bar | 1 | 1053 | | | | | |
| 84 | Cap Screw | 1 | 50206 | | | | | |
| 85 | Spacer Shaft (9 in. Drum) | 1 | 691-1 | | | | | |
| | Spacer Shaft (17 in. Drum) | | 691-2 | | | | | |
| | Spacer Shaft (34 in. Drum) | | 691-4 | | | | | |
| | Spacer Shaft (51 in. Drum) | | 691-5 | | | | | |
| | Spacer Shaft (69 in. Drum) | | 691-6 | | | | | |
| 86 | Capscrew | 4 | 50183 | | | | | |
| 87 | Cable Guard Desk Bracket | 2 | 1733 | | | | | |
| 89 | Nut | 5 | 50205 | | | | | |
| 90 | Nut | 1 | 50171 | | | | | |
| 91 | Bracket Spacer | 1 | 602-2 | | | | | |
| 92 | Dog Bracket | 1 | 601 | | | | | |
| 93 | Plunger Spring | 1 | 507 | | | | | |
| 94 | Bracket Spacer | 1 | 602-1 | | | | | |
| 95 | Lever Retainer Ring | 2 | W-137 | | | | | |
| 96 | Cap Screw | 1 | 52829 | | | | | |
| 97 | Dog Lever | 1 | 532 (Left Hand) or 453 (Right Hand) | | | | | |
| 98 | Dog (Includes item 52) | 1 | 1019A | | | | | |
| •99 | Dog Spring | 1 | 1011 (Left Hand) or 1010 (Right Hand) | | | | | |
| 100 | Dog Retainer Ring | 2 | W-125 | | | | | |
| 101 | Side Frame | 1 | 8619-1 | | | | | |
| 102 | Lever Stop | 1 | 522 | | | | | |
| 103 | Plunger Pin | 1 | 506 | | | | | |
| 104 | Pin | 1 | 52727 | | | | | |
| •105 | Cluster Gear Bushing | 3 | 1293-2 | | | | | |
| 106 | Cluster Gear | 1 | 504 | | | | | |



300 SERIES 25 TON BARGE WINCH ASSEMBLY PARTS LIST

2

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | | |
|----------|-----------------------------|-----------|-----------|-----|-----|-----|-----|-----|
| | | | 301 | 311 | 321 | 331 | 341 | 351 |
| •107 | Drum Bushing | 2 | 1293-1 | | | | | |
| 108 | Wire Rope Wedge 5/8" | 1 | 530 | | | | | |
| | Wire Rope Wedge 3/4" | | 529 | | | | | |
| | Wire Rope Wedge 7/8" | | 528 | | | | | |
| | Wire Rope Wedge 1" | | 527 | | | | | |
| 109 | Grease Fitting | 3 | 53095 | | | | | |
| 110 | Drum Assembly (9 in. Long) | 1 | 7902-A-9 | | | | | |
| | Drum Assembly (17 in. Long) | | 7902-A-17 | | | | | |
| | Drum Assembly (34 in. Long) | | 7902-A-34 | | | | | |
| | Drum Assembly (51 in. Long) | | 7902-A-51 | | | | | |
| | Drum Assembly (69 in. Long) | | 7902-A-69 | | | | | |
| 121 | Cap Screw | 2 | 50160 | | | | | |
| 127 | Nameplate | 1 | T53 | | | | | |
| 128 | Drive Screw | 4 | 50915 | | | | | |
| 129 | Master Link | 1 | 50329 | | | | | |

•Recommended Spare

Note: The use of motors with non-standard frames (bolt hole sizes) may require that the following optional parts be used to mount the motor.

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
|----------|-------------|-----------|----------|
| 13 | Cap Screw | 4 | 50196 |
| 14 | Lock Washer | 4 | 50200 |
| 15 | Nut | 4 | 50198 |

ASSEMBLIES

| ITEM NO. | DESCRIPTION | PART NO. | | | | | |
|----------|---|---------------------------------------|-----|-----|-----|-----|-----|
| | | 301 | 311 | 321 | 331 | 341 | 351 |
| 150 | Dog Assembly (Includes items 90 thru 95, 97, 100, 102, 103 and 104) | 521 (Left Hand) or 538 (Right Hand) | | | | | |
| 151 | Brake Assembly (Includes items 39 thru 50 and 53 thru 56) | 8119 (Left Hand) or 8118 (Right Hand) | | | | | |



NOTES

A series of horizontal lines for taking notes, consisting of 23 lines spaced evenly down the page.

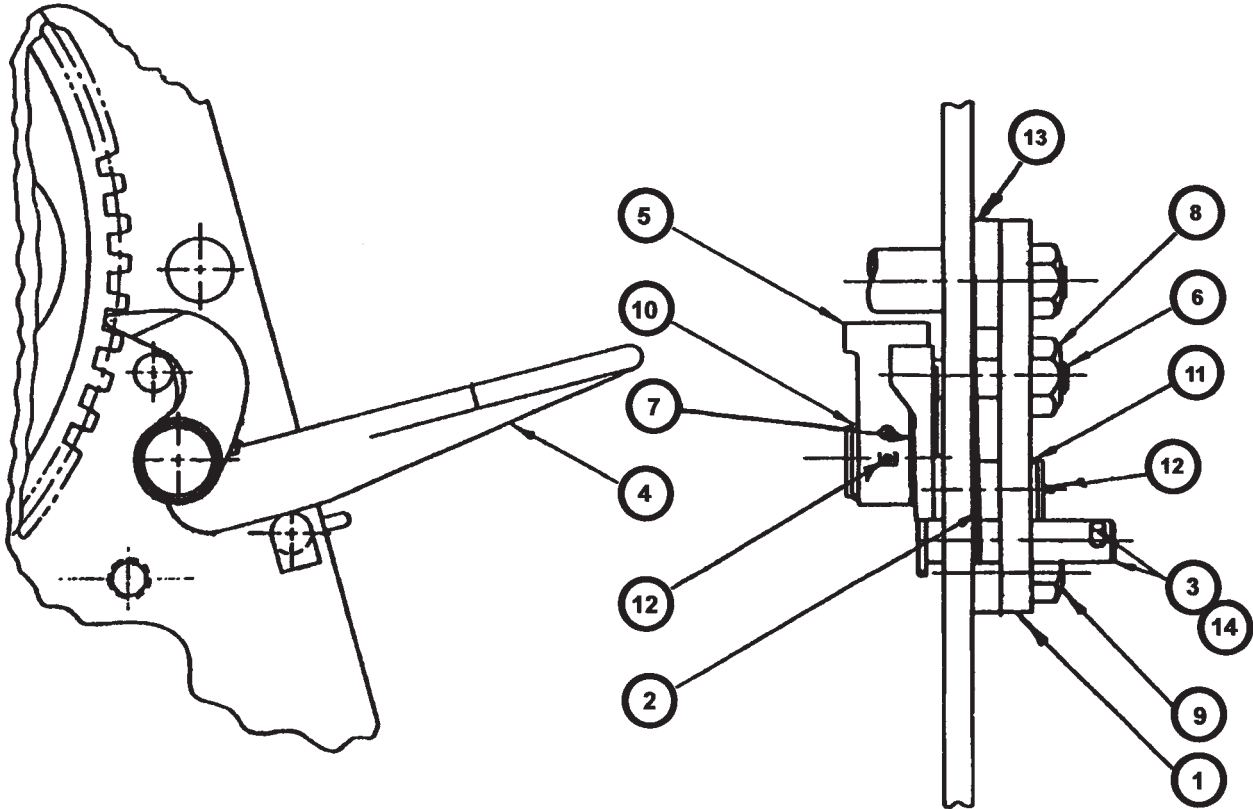


LEFT HAND DOG ASSEMBLY

PART NO. 538

300 SERIES 25 TON BARGE WINCH

2



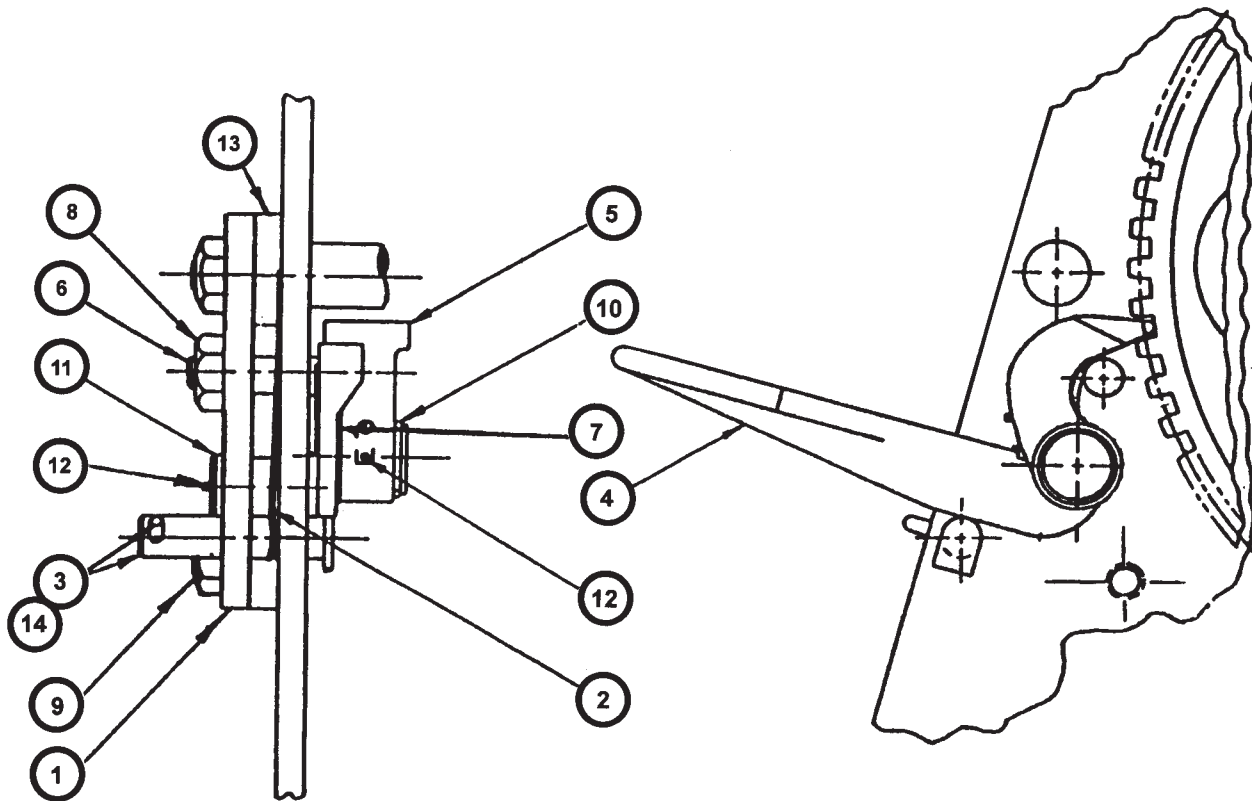
| ITEM NO. | DESCRIPTION | TOTAL QTY | MODEL/PART NO. | | | | | |
|----------|-------------------------|-----------|----------------|-----|-----|-------------|-----|-----|
| | | | 301 | 311 | 321 | 331 | 341 | 351 |
| 92 | Dog Bracket | 1 | | | | 601 | | |
| • 93 | Plunger Pin Spring | 1 | | | | 507 | | |
| 103 | Plunger Pin | 1 | | | | 506 | | |
| 97 | Dog Release Lever - LH | 1 | | | | 532 | | |
| • 98 | Dog | 1 | | | | 1019 | | |
| 102 | Lever Stop | 1 | | | | 522 | | |
| • 99 | Dog Spring - LH | 1 | | | | 1011 | | |
| 90 | Hex Nut | 1 | | | | 50171 | | |
| 96 | Cap Screw | 1 | | | | 52829 | | |
| 100 | Dog Retaining Ring | 2 | | | | W - 125 | | |
| 95 | Lever Retaining Ring | 2 | | | | W - 137 | | |
| 52 | Alemite Grease Fittings | 2 | | | | 51006 | | |
| 91/94 | Bracket Spacers | 1/1 | | | | 602-2/602-1 | | |
| 104 | Pin | 1 | | | | 955 | | |

• RECOMMENDED SPARES

RIGHT HAND DOG ASSEMBLY

PART NO. 521

300 SERIES 25 TON BARGE WINCH



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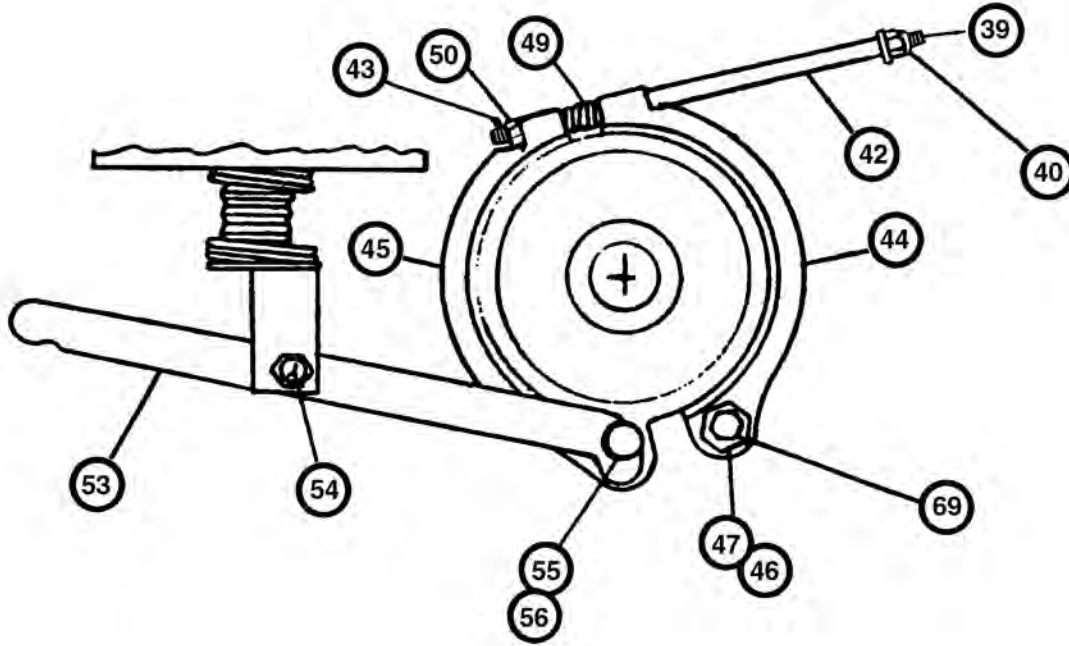
| ITEM NO. | DESCRIPTION | TOTAL QTY | MODEL/PART NO. | | | | | |
|----------|-------------------------|-----------|----------------|-----|-----|---------------|-----|-----|
| | | | 301 | 331 | 321 | 331 | 341 | 351 |
| 92 | Dog Bracket | 1 | | | | 601 | | |
| • 93 | Plunger Pin Spring | 1 | | | | 507 | | |
| 103 | Plunger Pin | 1 | | | | 506 | | |
| 97 | Dog Release Lever - RH | 1 | | | | 453 | | |
| • 98 | Dog | 1 | | | | 1019 | | |
| 102 | Lever Stop | 1 | | | | 522 | | |
| • 99 | Dog Spring - RH | 1 | | | | 1010 | | |
| 90 | Hex Nut | 1 | | | | 50171 | | |
| 96 | Cap Screw | 1 | | | | 52829 | | |
| 100 | Dog Retaining Ring | 2 | | | | W - 125 | | |
| 95 | Lever Retaining Ring | 2 | | | | W - 137 | | |
| 52 | Alemite Grease Fittings | 2 | | | | 51006 | | |
| 91/94 | Bracket Spacers | 1/1 | | | | 602-2 / 602-1 | | |
| 104 | Pin | 1 | | | | 955 | | |

• RECOMMENDED SPARES



OVERSIZED BRAKE ASSEMBLY 300 SERIES 25 TON BARGE WINCH

2

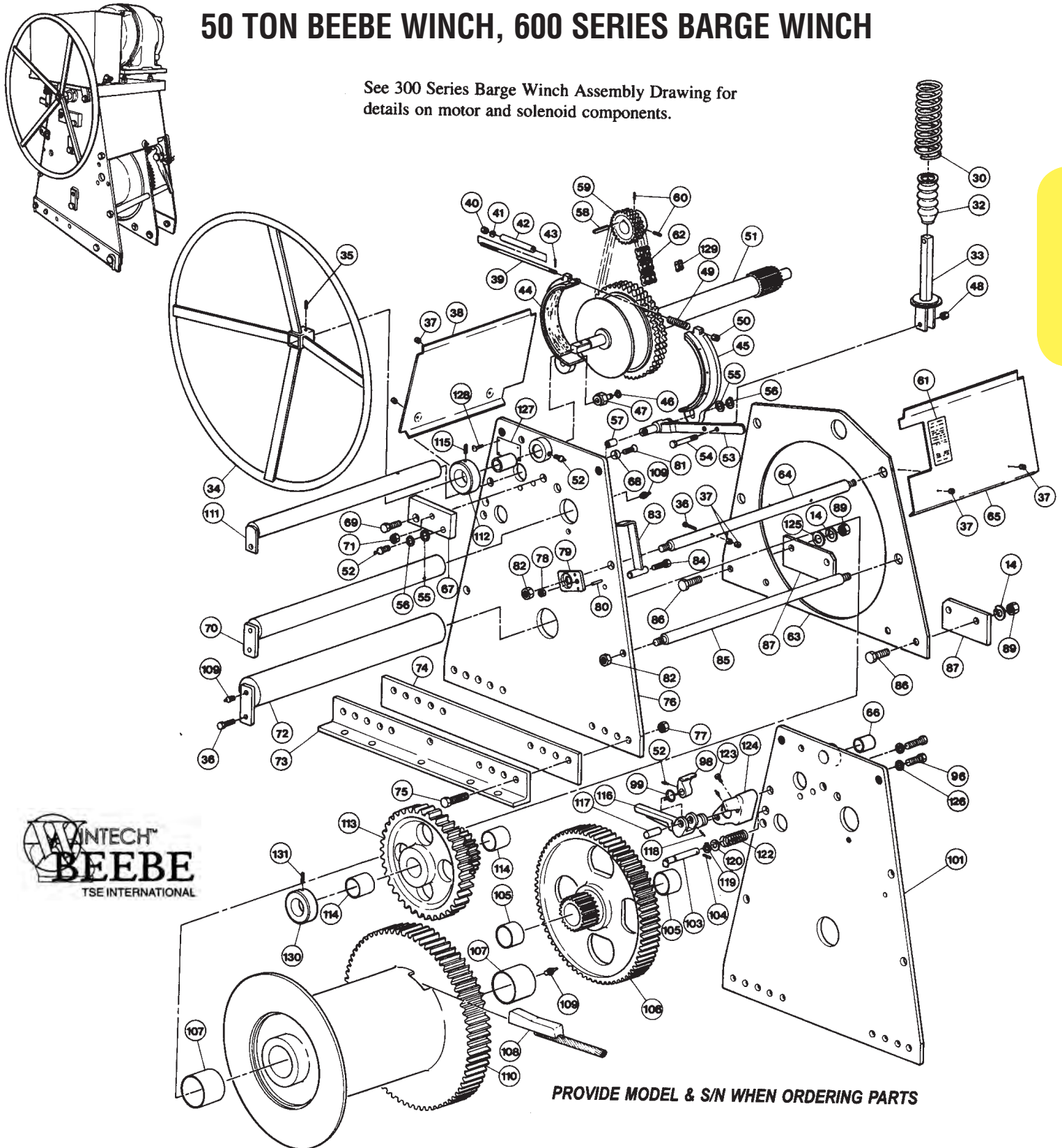


| ITEM NO. | DESCRIPTION | TOTAL QTY | MODEL/PART NO. | | | | | |
|----------|----------------------------|-----------|----------------|-----|-----|-----|-----|-----|
| | | | 301 | 311 | 321 | 331 | 341 | 351 |
| 53 | Brake Lever | XX | XX | | | | | |
| XX | Left Hand Brake Lever | 1 | 8120-2 | | | | | |
| XX | Right Hand Brake Lever | 1 | 8120-1 | | | | | |
| • 45 | Brake Shoe (lever side) | 1 | 8122 | | | | | |
| • 44 | Brake Shoe (anchor side) | 1 | 8123 | | | | | |
| 47 | Brake Anchor Eccentric | 1 | 8126 | | | | | |
| 39 | Adjustment Stud | 1 | 1645 | | | | | |
| 42 | Adjustment Spacer | 1 | 1646 | | | | | |
| 49 | Adjustment Spring | 1 | 1647 | | | | | |
| 54 | Solenoid Link Pin | 1 | 4969-1 | | | | | |
| 69 | Anchor Bolt | 1 | 50208 | | | | | |
| 40 | Adjustment Nut | 1 | 50170 | | | | | |
| 50 | Slotted Nut | 1 | 50169 | | | | | |
| 43 | Cotter Pin | 1 | 51937 | | | | | |
| 46 | Brake Shoe Retaining Ring | 2 | 53918 | | | | | |
| 55 | Brake Lever Washer | 2 | 50166 | | | | | |
| 56 | Brake Lever Retaining Ring | 2 | 50191 | | | | | |

• RECOMMENDED SPARES

50 TON BEEBE WINCH, 600 SERIES BARGE WINCH

See 300 Series Barge Winch Assembly Drawing for details on motor and solenoid components.





600 SERIES BARGE WINCH ASSEMBLY 50 TON PARTS LIST

2

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|--------------------------------|-----------|---|-------|-------|-------|-------|
| | | | 601 | 611 | 621 | 631 | 641 |
| 1 | Motor 5 HP, 1080 RPM | 1 | 50217 | --- | 50217 | --- | --- |
| | Motor 7.5 HP, 1080 RPM | | --- | 50351 | --- | --- | |
| | Motor 7.5 HP, 810 RPM | | --- | --- | --- | 50354 | --- |
| | Motor 10 HP, 1080 RPM | | --- | --- | --- | --- | 50357 |
| 2 | Brake and Solenoid Cover | 1 | 2537 (Left Hand) or 2538 (Right Hand) | | | | |
| 3 | Motor Adapter Plate | 1 | 8384-1 | | | | |
| 4 | Screw | 5 | 71007009 | | | | |
| 5 | Motor Base Cover (11 in. Drum) | 1 | Not Required | | | | |
| | Motor Base Cover (21 in. Drum) | | 3603-21 | | | | |
| | Motor Base Cover (41 in. Drum) | | 3603-41 | | | | |
| | Motor Base Cover (62 in. Drum) | | 3603-62 | | | | |
| | Motor Base Cover (82 in. Drum) | | 3603-82 | | | | |
| 6 | Solenoid Stud | 4 | 435 | | | | |
| 7 | Motor Base (11 in. Drum) | 1 | 8387-11 (Left Hand) or 8386-11 (Right Hand) | | | | |
| | Motor Base (21 in. Drum) | | 8387-21 (Left Hand) or 8386-21 (Right Hand) | | | | |
| | Motor Base (41 in. Drum) | | 8387-41 (Left Hand) or 8386-41 (Right Hand) | | | | |
| | Motor Base (62 in. Drum) | | 8387-62 (Left Hand) or 8386-62 (Right Hand) | | | | |
| | Motor Base (82 in. Drum) | | 387-82 (Left Hand) or 8386-82 (Right Hand) | | | | |
| 8 | Lock Washer | 4 | 52837 | | | | |
| 9 | Cap Screw | 4 | 52836 | | | | |
| 10 | Grommet | 1 | 50193 | | | | |
| 11 | Motor Base Lockout | 4 | 50209 | | | | |
| 12 | Nut | 8 | 50159 | | | | |
| 13 | Cap Screw | 4 | 50197 | | | | |
| 14 | Lock Washer | 8 | 50181 | | | | |
| 15 | Nut | 8 | 50171 | | | | |
| 16 | Solenoid Spacer Cap Screw | 4 | 50204 | | | | |
| 17 | Lock Washer | 4 | 50200 | | | | |
| 18 | Nut | 2 | 53390 | | | | |
| 19 | Lock Washer | 2 | 53836 | | | | |
| 20 | Base Plate | 1 | 7007-G | | | | |
| 21 | Connector Cord | 1 | 50213 | | | | |
| 22 | Guide | 2 | 7007-E | | | | |
| 23 | Pole Piece | 1 | 7007-F | | | | |
| 24 | Solenoid 220V | 1 | 7007-220 | | | | |
| | Solenoid 440V | | 7007-440 | | | | |
| | Coil Only 220V | | R4318 WP | | | | |
| | Coil Only 440V | | R4317 WP | | | | |
| 25 | Guide (Brass) | 2 | 7007-D | | | | |
| 26 | Frame | 1 | 7007-C | | | | |
| 27 | Cap Screw | 2 | 51939 | | | | |
| 28 | Solenoid Spacer | 4 | 613 | | | | |
| 29 | Plunger | 1 | 7007-A | | | | |
| 30 | Compression Spring | 1 | 615 | | | | |
| 31 | Solenoid Link Pin (Upper) | 1 | 4969 | | | | |
| • 32 | Bellows Boot | 1 | 3802 | | | | |
| 33 | Solenoid Connector Link | 1 | 8116 | | | | |
| 34 | Handwheel | 1 | 1048 | | | | |
| 35 | Setscrew | 1 | 52857 | | | | |
| 36 | Cap Screw | 2 | 54522 | | | | |

600 SERIES BARGE WINCH ASSEMBLY 50 TON PARTS LIST



2

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|---------------------------------|-----------|---|-----|----------|-----|------|
| | | | 601 | 611 | 621 | 631 | 641 |
| 37 | Gear Guard Nut | 8 | 50161 | | | | |
| 38 | Gear Guard (11 in. Drum) | 1 | 1346-1A (Left Hand) or 1365-1A (Right Hand) | | | | |
| | Gear Guard (21 in. Drum) | | 1346-2A (Left Hand) or 1365-2A (Right Hand) | | | | |
| | Gear Guard (41 in. Drum) | | 1346-4A (Left Hand) or 1365-4A (Right Hand) | | | | |
| | Gear Guard (62 in. Drum) | | 1346-5A (Left Hand) or 1365-5A (Right Hand) | | | | |
| | Gear Guard (82 in. Drum) | | 1346-7A (Left Hand) or 1365-7A (Right Hand) | | | | |
| 39 | Adjustment Stud | 1 | 1645 | | | | |
| 40 | Adjustment Nut | 1 | 50170 | | | | |
| 41 | Washer | 1 | 50177 | | | | |
| 42 | Adjustment Spacer | 1 | 1646 | | | | |
| 43 | Cotter Pin | 1 | 51937 | | | | |
| •44 | Brake Shoe | 1 | 8123 | | | | |
| •45 | Brake Shoe | 1 | 8122 | | | | |
| •46 | Brake Shoe Retainer Ring | 2 | 53918 | | | | |
| 47 | Anchor Eccentric | 1 | 8126 | | | | |
| 48 | Nut | 2 | 51750 | | | | |
| 49 | Adjustment Spring | 1 | 1647 | | | | |
| 50 | Slotted Nut | 1 | 50169 | | | | |
| 51 | Power Drive Assy. (11 in. Drum) | 1 | 8113-1 | | | | |
| | Power Drive Assy. (21 in. Drum) | | 8113-2 | | | | |
| | Power Drive Assy. (41 in. Drum) | | 8113-4 | | | | |
| | Power Drive Assy. (62 in. Drum) | | 8113-5 | | | | |
| | Power Drive Assy. (82 in. Drum) | | 8113-7 | | | | |
| 52 | Grease Fitting | 6 | 51006 | | | | |
| 53 | Brake Lever | 1 | 8120-1 (Left Hand) or 8120-2 (Right Hand) | | | | |
| 54 | Solenoid Link Pin (Lower) | 1 | 4969-1 | | | | |
| 55 | Brake Lever Washer | 2 | 50166 | | | | |
| 56 | Brake Lever Retainer Ring | 2 | 50191 | | | | |
| •57 | Brake Lever Bushing | 1 | 51406 | | | | |
| 58 | Key | 1 | Not sold separately | | | | |
| 59 | Motor Sprocket | 1 | 3185 | | | | 3179 |
| 60 | Setscrew | 2 | 53154 | | | | |
| 61 | Label | 1 | T26 | | | | |
| 62 | Roller Chain | 1 | 50220-70 | | 50220-66 | | |
| 63 | Wire Rope Guard | 1 | 1678 | | | | |
| 64 | Spacer Shaft (11 in. Drum) | 2 | 2883-1 | | | | |
| | Spacer Shaft (21 in. Drum) | | 2883-2 | | | | |
| | Spacer Shaft (41 in. Drum) | | 2883-4 | | | | |
| | Spacer Shaft (62 in. Drum) | | 2883-5 | | | | |
| | Spacer Shaft (82 in. Drum) | | 2883-7 | | | | |
| 65 | Gear Guard (11 in. Drum) | 1 | 1346-1B (Left Hand) or 1365-1B (Right Hand) | | | | |
| | Gear Guard (21 in. Drum) | | 1346-2B (Left Hand) or 1365-2B (Right Hand) | | | | |
| | Gear Guard (41 in. Drum) | | 1346-4B (Left Hand) or 1365-4B (Right Hand) | | | | |
| | Gear Guard (62 in. Drum) | | 1346-5B (Left Hand) or 1365-5B (Right Hand) | | | | |
| | Gear Guard (82 in. Drum) | | 1346-7B (Left Hand) or 1365-7B (Right Hand) | | | | |
| 66 | Power Driving Bushing | 2 | 1293-7 | | | | |
| 67 | Brake Doubler Plate | 1 | 8112-1 | | | | |
| 68 | Plate Locator Bushing | 1 | 8117 | | | | |
| 69 | Cap Screw | 1 | 50208 | | | | |



600 SERIES BARGE WINCH ASSEMBLY 50 TON PARTS LIST

2

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|-------------------------------|-----------|----------|-----|---------------------------------------|-----|-----|
| | | | 601 | 611 | 621 | 631 | 641 |
| 70 | B-C Shaft (11 in. Drum) | 1 | | | 326-1 | | |
| | B-C Shaft (21 in. Drum) | | | | 326-2 | | |
| | B-C Shaft (41 in. Drum) | | | | 326-4 | | |
| | B-C Shaft (62 in. Drum) | | | | 326-5 | | |
| | B-C Shaft (82 in. Drum) | | | | 326-7 | | |
| 71 | Nut | 1 | | | 50211 | | |
| 72 | Drum Shaft (11 in. Drum) | 1 | | | 325-1 | | |
| | Drum Shaft (21 in. Drum) | | | | 325-2 | | |
| | Drum Shaft (41 in. Drum) | | | | 325-4 | | |
| | Drum Shaft (62 in. Drum) | | | | 325-5 | | |
| | Drum Shaft (82 in. Drum) | | | | 325-7 | | |
| 73 | Angle Deck Bracket (Optional) | 2 | | | 1111 | | |
| 74 | Deck Bracket (Std) | 2 | | | 324 | | |
| 75 | Cap Screw | 8 | | | 54221 | | |
| 76 | Side Frame | 1 | | | 8112-L | | |
| 77 | Deck Bracket Nut | 18 | | | 50826 | | |
| 78 | Nut | 1 | | | 50207 | | |
| 79 | Lock Out Bar Bracket | 1 | | | 1124 | | |
| 80 | Pin | 1 | | | 53909 | | |
| 81 | Screw | 1 | | | 50210 | | |
| 82 | Spacer Nut | 10 | | | 50154 | | |
| 83 | Lock Out Bar | 1 | | | 1125-1 | | |
| 84 | Cap Screw | 1 | | | 50206 | | |
| 85 | Spacer Shaft (11 in. Drum) | 2 | | | 330-1 | | |
| | Spacer Shaft (21 in. Drum) | | | | 330-2 | | |
| | Spacer Shaft (41 in. Drum) | | | | 330-4 | | |
| | Spacer Shaft (62 in. Drum) | | | | 330-5 | | |
| | Spacer Shaft (82 in. Drum) | | | | 330-7 | | |
| 86 | Cap Screw | 4 | | | 50183 | | |
| 87 | Cable Guard Deck Bracket | 2 | | | 1732 | | |
| 89 | Nut | 4 | | | 50205 | | |
| 96 | Cap Screw | 2 | | | 52829 | | |
| 98 | Dog (Includes item 52) | 1 | | | 1020A | | |
| 99 | Dog Spring | 1 | | | 1011 (Left Hand) or 1010 (Right Hand) | | |
| 101 | Side Frame | 1 | | | 8112-R | | |
| 103 | Plunger Pin | 1 | | | 361 | | |
| 104 | Pin | 1 | | | 52727 | | |
| • 105 | B-C Gear Bushing | 2 | | | 1293-5 | | |
| 106 | B-C Gear | 1 | | | 338 | | |
| • 107 | Drum Bushing | 2 | | | 1293-4 | | |
| 108 | Wire Rope Wedge 3/4" | 1 | | | 336 | | |
| | Wire Rope Wedge 7/8" | | | | 334 | | |
| | Wire Rope Wedge 1" | | | | 333 | | |
| | Wire Rope Wedge 1 1/8" | | | | 332 | | |
| | Wire Rope Wedge 1 1/4" | | | | 331 | | |
| 109 | Grease Fitting | 4 | | | 53095 | | |

600 SERIES BARGE WINCH ASSEMBLY 50 TON PARTS LIST



| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. | | | | |
|----------|------------------------------|-----------|-------------------------------------|-----|-----|-----|-----|
| | | | 601 | 611 | 621 | 631 | 641 |
| 110 | Drum Assembly (11 in. long) | 1 | 7962-A-11 | | | | |
| | Drum Assembly (21 in. long) | | 7962-A-20 | | | | |
| | Drum Assembly (41 in. long) | | 7962-A-41 | | | | |
| | Drum Assembly (62 in. long) | | 7962-A-61 | | | | |
| | Drum Assembly (82 in. long) | | 7962-A-82 | | | | |
| 111 | D-E Shaft (11 in. long Drum) | 1 | 328-1 | | | | |
| | D-E Shaft (21 in. long Drum) | | 328-2 | | | | |
| | D-E Shaft (41 in. long Drum) | | 328-4 | | | | |
| | D-E Shaft (62 in. long Drum) | | 328-5 | | | | |
| | D-E Shaft (82 in. long Drum) | | 328-7 | | | | |
| 112 | Collar | 1 | 4046-2 | | | | |
| 113 | D-E Gear | 1 | 337 | | | | |
| • 114 | Gear Bushing | 2 | 1293-6 | | | | |
| 115 | Setscrew | 1 | 50855 | | | | |
| 116 | Dog Lever | 1 | 313 (Left Hand) or 365 (Right Hand) | | | | |
| 117 | Dog Shaft | 1 | 312 | | | | |
| 118 | Pin | 1 | 553-13 | | | | |
| 119 | "C" Clip | 1 | 553-11 | | | | |
| 120 | Washer | 1 | 553-12 | | | | |
| 122 | Spring | 1 | A348 | | | | |
| 123 | Retainer Screw | 1 | 733 | | | | |
| 124 | Dog Bracket | 1 | 314 (Left Hand) or 364 (Right Hand) | | | | |
| 125 | Flat Washer | 2 | 50182 | | | | |
| 126 | Lock Washer | 2 | 51012 | | | | |
| 127 | Nameplate | 1 | T53 | | | | |
| 128 | Drive Screw | 4 | 50915 | | | | |
| 129 | Master Link | 1 | 50329 | | | | |
| 130 | Collar | 1 | 4046-3 | | | | |
| 131 | Setscrew | 1 | 52528 | | | | |

• Recommended Spare

Note: The use of motors with non-standard frames (bolt hole sizes) may require that the following optional parts be used to mount the motor.

| ITEM NO. | DESCRIPTION | TOTAL QTY | PART NO. |
|----------|-------------|-----------|----------|
| 13 | Cap Screw | 4 | 50196 |
| 14 | Lock Washer | 4 | 50200 |
| 15 | Nut | 4 | 50198 |

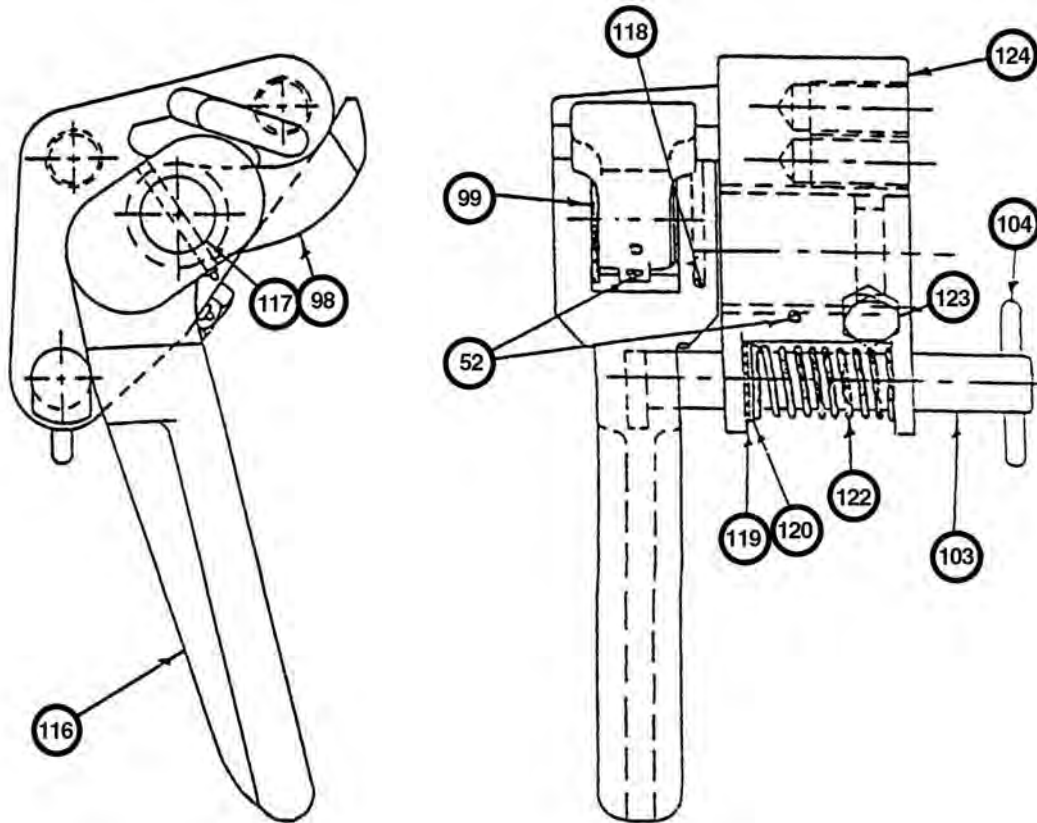
ASSEMBLIES

| ITEM NO. | DESCRIPTION | PART NO. | | | | | |
|----------|---|---------------------------------------|-----|-----|-----|-----|-----|
| | | 601 | 611 | 621 | 631 | 641 | 651 |
| 152 | Dog Assembly (Includes items 52, 98, 99, 103, 104 and 116 thru 126) | 553 (Left Hand) or 555 (Right Hand) | | | | | |
| 153 | Brake Assembly (Includes items 39 thru 50 and 53 thru 56) | 8118 (Left Hand) or 8119 (Right Hand) | | | | | |



LEFT HAND DOG ASSEMBLY PART NO. 553 600 SERIES 50 TON BARGE WINCH

2

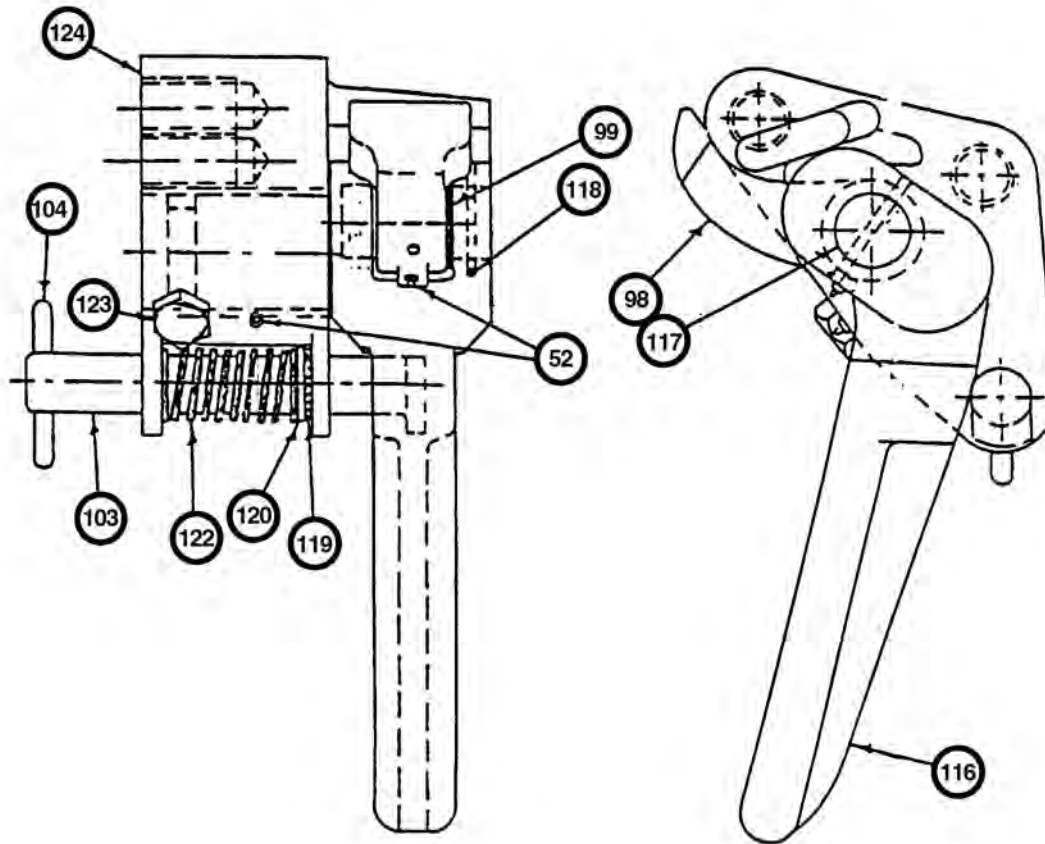


| ITEM NO. | DESCRIPTION | QTY. | DRAWING NO. |
|----------|-------------------------|------|-------------|
| 124 | Dog Bracket - Left Hand | 1 | 314 |
| 116 | Dog Lever - Left Hand | 1 | 313 |
| 98 | Dog | 1 | 1020A |
| 117 | Dog Shaft | 1 | 312 |
| 99 | Dog Spring - Left Hand | 1 | 1011 |
| 103 | Plunger Pin | 1 | 361 |
| 122 | Plunger Pin Spring | 1 | 348 |
| 104 | Plunger Pin Handle | 1 | 52727 |
| 123 | Retaining Screw | 1 | 733 |
| 52 | Alemite Grease Fittings | 1 | 51006 |
| 119 | "C" Clip | 1 | 553-11 |
| 120 | Washer | 1 | 553-12 |
| 118 | Rollpin | 1 | 553-13 |

RIGHT HAND DOG ASSEMBLY

PART NO. 555

600 SERIES 50 TON BARGE WINCH



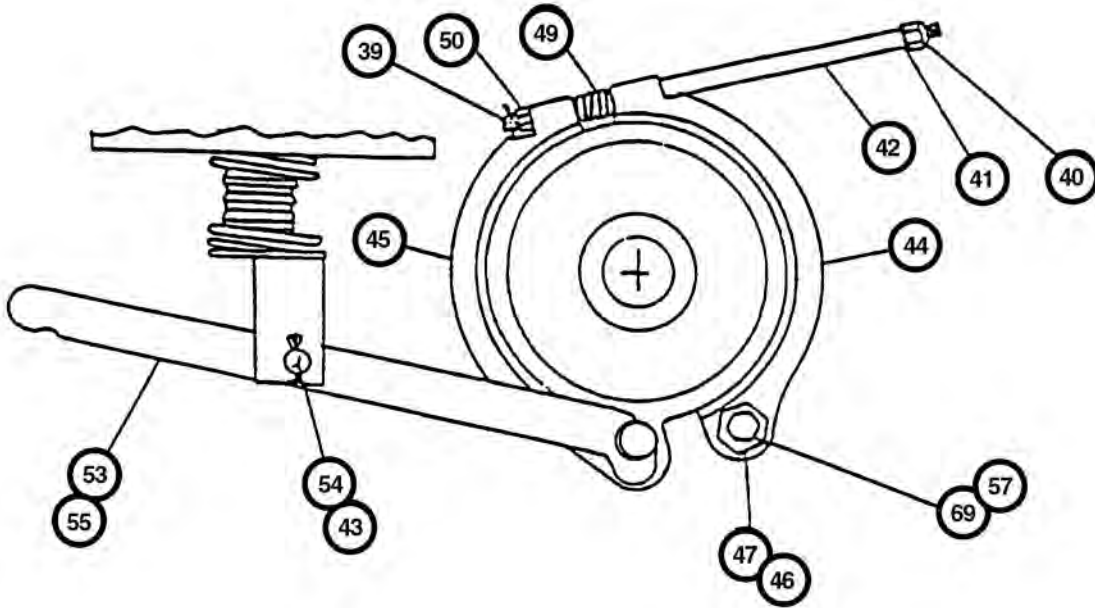
| ITEM NO. | DESCRIPTION | QTY. | DRAWING NO. |
|----------|--------------------------|------|-------------|
| 124 | Dog Bracket - Right Hand | 1 | 364 |
| 116 | Dog Lever - Right Hand | 1 | 365 |
| 98 | Dog | 1 | 1020A |
| 117 | Dog Shaft | 1 | 312 |
| 99 | Dog Spring - Right Hand | 1 | 1010 |
| 103 | Plunger Pin | 1 | 361 |
| 122 | Plunger Pin Spring | 1 | 348 |
| 104 | Plunger Pin Handle | 1 | 52727 |
| 123 | Retaining Screw | 1 | 733 |
| 52 | Alemite Grease Fittings | 1 | 51006 |
| 119 | "C" Clip | 1 | 553-11 |
| 120 | Washer | 1 | 553-12 |
| 118 | Rollpin | 1 | 553-13 |



BRAKE ASSEMBLY

600 SERIES 50 TON BARGE WINCH

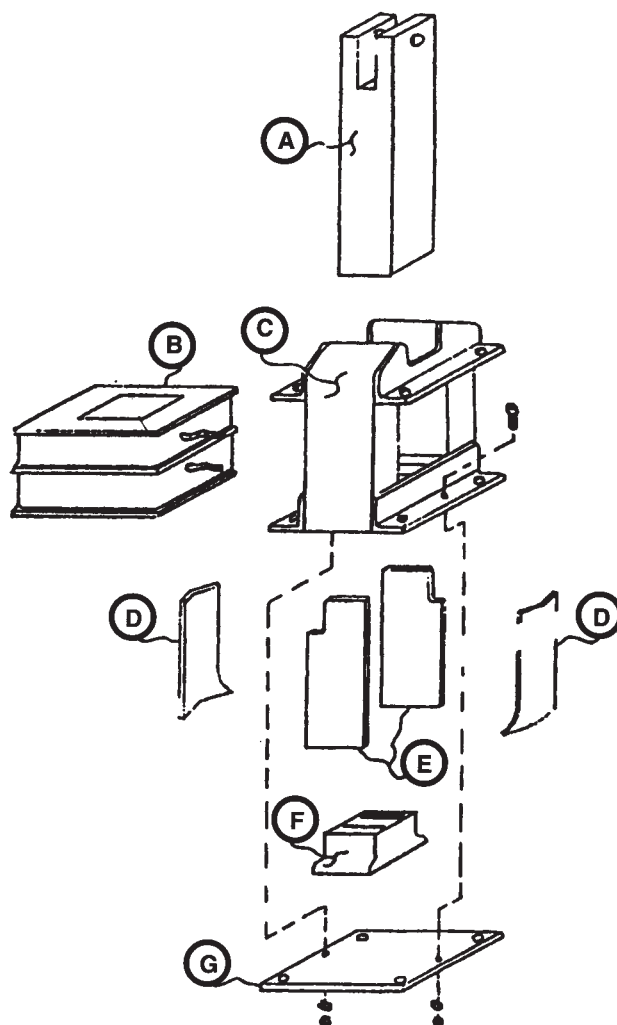
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| ITEM NO. | DESCRIPTION | QTY. | PART NO. |
|----------|---------------------------|------|----------|
| 53 | Brake Lever - Left Hand | 1 | 8120-2 |
| 53 | Brake Lever - Right Hand | 1 | 8120-1 |
| 45 | Brake Shoe - Lever Side | 1 | 8122 |
| 44 | Brake Shoe - Anchor Side | 1 | 8123 |
| 47 | Brake Anchor Eccentric | 1 | 8126 |
| 39 | Adjustment Stud | 1 | 1645 |
| 42 | Adjustment Spacer | 1 | 1646 |
| 49 | Adjustment Spring | 1 | 1647 |
| 54 | Solendid Link Pin | 1 | 4969-1 |
| 69 | Anchor Bolt | 1 | 50208 |
| 40 | Adjustment Nut | 1 | 50170 |
| 41 | Flat Washer | 1 | 50177 |
| 50 | Slotted Nut | 1 | 50169 |
| 46 | Brake Shoe Retaining Ring | 1 | 53918 |
| 55 | Brake Lever Washer | 1 | 50166 |
| 43 | Cotter Pins | 5 | 51937 |

SOLENOID PARTS BREAKDOWN

FOR 7007-220 & 7007-440



2

| ITEM NO. | DESCRIPTION | TOTAL QTY | MODEL/PART NO. | | | | | |
|----------|-----------------------------|-----------|----------------|-----|-----|-----|-----|-----|
| | | | 301 | 311 | 321 | 331 | 341 | 351 |
| A | Plunger | 1 | 7007-A | | | | | |
| B | Coil, 440V | 1 | R4317 WP | | | | | |
| XX | Coil, 220V | 1 | R4318 WP | | | | | |
| C | Frame | 1 | 7007-C | | | | | |
| D | Guides (Brass) | 2 | 7007-D | | | | | |
| E | Guides (Laminated Phenolic) | 2 | 7007-E | | | | | |
| F | Pole Piece | 1 | 7007-F | | | | | |
| G | Base Plate | 1 | 7007-G | | | | | |



WINCH HOISTS

The MAX Series

2



Model AC36 Shown

The UTILITY Series

Features:

- Worm gear reduction for positive load holding.
- Dynamic braking for instant stopping.
- Compact, heavy-duty construction.
- 115 Volt AC Power.
- Low voltage 10 ft. pendant control.
- Full power reversible.
- * Cable tensioner for better cable tracking.

Specifications:

- 3,000 lb. single line, 6,000 lb. Double line lift.
- Linespeed 8 FMP @ 3,000 lb., single line, first layer.
- Drum capacity: 110' of 3/8" cable.
- Unit size & weight 127 lb. 27"L x 13"W x 13"H.

The Max Series is available in Single-Phase electric and 12V DC models.



Model 10-12 Shown



Model 100A Shown

The STANDARD Series

Features:

- Worm gear reduction for positive load holding.
- Dynamic braking for instant stopping.
- Rugged construction.
- 115 Volt AC power.
- Low voltage 10 ft. pendant control.
- High-capacity cable drum.
- Frictionless bearings.
- Full power reversible.

Specifications:

- 1,000 lb. single line, 2,000 lb. double line lift.
- Linespeed 20 FMP @ 1,000 lb., single line, first layer.
- Drum capacity: 250' of 1/4" cable.
- Unit size & weight 67 lb. 22"L x 12"W x 13"H.

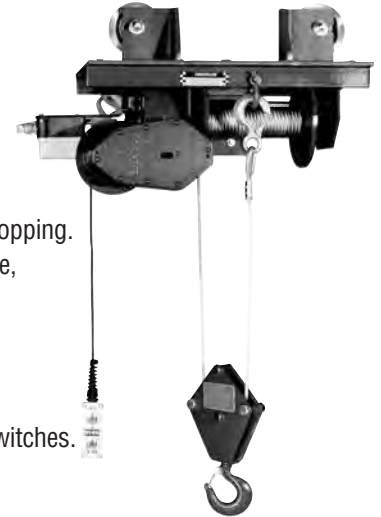
The Standard Series is available in Single-Phase, electric, pneumatic, hydraulic, and 12V DC models.

Model 800 Shown

The I-BEAM Series

Features:

- Worm gear reduction for positive load holding.
- Dynamic braking for instant stopping.
- Low headroom - 12" single line, 19" double line.
- Trolley built to beam size.
- Hoist complete with cable hook and block for 20-ft. lift
- Upper/lower adjustable limit switches.



Specifications:

- 1,000 lb. single line, 2000 lb. double line lift.
- Linespeed 10 FMP @ 2,000 lb., single line, first layer.
- Drum capacity: 250' of 1/4" cable.
- Unit size & weight 128 lb. 25"L x 15"W x 14"H.

The I-Beam Series is available in 115V or 230V single-phase and 12V DC with capacities to 3 tons. 1 ton Hydraulic and Pneumatic models are also available.

Motorized trolleys available.

WINCH HOISTS

The VERSATILE Series



Model 520 Shown

Features:

- Worm gear reduction for positive load holding
- Electromagnetic load brake for instant stopping
- Rugged construction
- Low-voltage, 10-ft. pendant control
- Full power reversible
- 50% duty cycle motor
- Cable tensioner for better cable tracking

Specifications:

- 1,500 lb. single line, 3000 lb. double line lift
- Linespeed 12 FPM @ 1,500 lb. single line, first layer
- Unit size & weight 115 lb. 32"L x 13"W x 11"H

The **Versatile Series** is available in 115 V AC, 230V Single-Phase and 230V 3-Phase, 50Hz or 60Hz.



2

MY-TE WINCH-HOIST SPECIFICATIONS

| Description | Standard | | | Max | | Utility | | | I-Beam | Versatile | | |
|--|---------------------------|--------------------|---------------------|---------------------|---------------------------|--------------------|---------------------------|--------------------|--------------------|---------------------------|---------------------------|---------------------------|
| | 100A | 10-12 | AIR1000 | HY1 | AC36 | DC48 | 300A | 30-12 | HY3 | 800 *** | 510 | 520*** |
| Lift Capacity (Lbs.)* Double Line - 1st Layer | 2000 | 2500 | 2500 | 3000 | 6000 | 6000 | 1600 | 1600 | 1600 | 2000 | 2000 | 3000 |
| Unit Voltage | 115V/1/60 or 230V/1/60 | 12 V-DC | Pneumatic** | Hydraulic** | 115V/1/60 or 230V/1/60 | 12 V-DC | 115v/1/60 or 230V/1/60 | 12 V-DC | Hydraulic | 115V/1/60 or 230V/1/60 | 115V/1/60 or 230V/1/60 | 115V/1/60 or 230V/1/60 |
| Drum Speed - FPM No Load | 30 | 10 | 32 | 17 | 11 | 4 | 59 | 21 | 29 | 30 | 12 | 12 |
| Lift Speed - Full Load Single Line | 20 FPM @ 1000 lb | 9 FPM @ 1250 lb | 15 FPM @ 1250 lb | 10 FPM @ 1500 lb | 7.25 FPM @ 3000 lb | 3 FPM @ 3000 lb | 30 FPM @ 800 lb | 15 FPM @ 800 lb | 29 FPM @ 800 lb | 20 FPM @ 1000 lb | 12 FPM @ 1000 lb | 12 FPM @ 1500 lb |
| Full Load Amps | 19 | 100 | - | - | 19 | 100 | 19 | 100 | - | 19 | 17 | 17 |
| Duty Cycle - Per Hour Operating @ Full Load | 25% | 25% | 50% | 50% | 25% | 25% | 25% | 25% | 25% | 25% | 50% | 50% |
| Cable Drum Capacity Normal Cable Size | 250'-1/4" | 250'-1/4" | 250'-1/4" | 250'-1/4" | 110'-3/8" | 110'-3/8" | Rope Capstan | Rope Capstan | Rope Capstan | 250'-1/4" | 250'-1/4" | 250'-1/4" |
| Unit Dimensions W x H x L | 12" x 14" x 22" | 12" x 14" x 23" | 12" x 11" x 22" | 9" x 9" x 21" | 13" x 13" x 27" | 13" x 13" x 28" | 12" x 14" x 18" | 12" x 14" x 18" | 8" x 8" x 16" | 15" x 14" x 25" | 13" x 11" x 32" | 13" x 11" x 31" |
| Shipping Weight - Lbs. | 67 | 69 | 77 | 60 | 128 | 138 | 64 | 65 | 60 | 126 | 115 | 115 |

* See Specification Sheet for multiple layer ratings ** See Specification Sheet for supply needed

*** Shipped with 42 Ft. 1/4" Cable and Safety Hook **** Available in 230V/3/60

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



WIRE ROPE CUTTERS

ALWAYS DEPENDABLE

THE STANDARD TOOL USED THROUGHOUT THE WORLD

2



THE Finest Quality Hammer-Type Cable Cutters

Here are the original portable impact cutters, invented by Morse-Starrett, and designed for one purpose: to cut wire rope. Actuated by striking with a hammer, they are simple to operate, and do a superior cutting job with only a few blows. These cutters are precision engineered to deliver a cut without affecting the original roundness of the wire rope. The blades and dies are made of the best tool steel available, heat treated and ground to close tolerances. No other similar product matches M-S quality of material and workmanship.

WARNING: Wear safety goggles, use cable bands and read instruction sheet before using this tool.

For Cutting Wire Rope:

- Up to 5/8" Model 1 designed for occasional on-the-job-cutting
- Up to 1 1/16" Model 1A
- Up to 1 1/2" Model 2

GUARANTEE: Morse-Starrett guarantees to replace - free of charge - any tools or parts that do not meet its specifications in material or workmanship. Performance guaranteed.

OTHER QUALITY CUTTERS FROM MORSE-STARRETT:

Manually Operated, HYDRAULIC Wire Rope Cutters

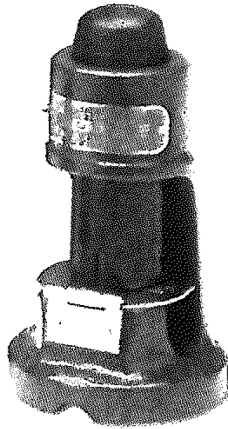
Power Operated, HYDRAULIC Wire Rope Cutters

Power Operated, PRESTRESSED CONCRETE STRAND, RE-BAR AND CHAIN CUTTERS.

SPECIFICATIONS: All are portable. Firm base required for operation.

| MODEL | CAPACITY | HEIGHT | BASE | WEIGHT |
|-------|----------|--------|--------|---------|
| 1 | 5/8" | 6" | 3 1/2" | 7 lbs. |
| 1A | 1 1/16" | 7" | 6 1/4" | 15 lbs. |
| 2 | 1 1/2" | 9" | 7 3/4" | 28 lbs. |

WIRE ROPE CUTTERS PARTS

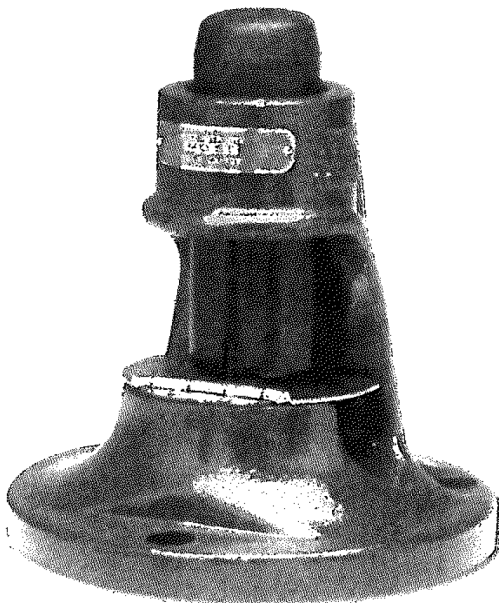



Model No. 1 (Light Duty) 3/4" capacity

| PART | DESCRIPTION | Packed Weight |
|------|-------------------|---------------|
| 101 | Cutter Complete | 8 lbs. |
| 102 | Casting Base | 4 lbs. |
| 103 | Plunger | 3 lbs. |
| 104 | Die (Set) | 4 oz. |
| 105 | Blade (With Pin) | 2 oz. |
| 106 | Blade Pin Only | 1 oz. |
| 107 | Plunger Guide Pin | 1 oz. |
| 108 | Guard | 1 oz. |
| 109 | Warning Decals | |

MODEL 1A (Heavy Duty) 1 1/16" capacity

| PART | DESCRIPTION | Packed Weight |
|------|-------------------|---------------|
| 121 | Cutter Complete | 17 lbs. |
| 122 | Casting Base | 12 lbs. |
| 123 | Plunger | 4 lbs. |
| 124 | Die (Set) | 7 oz. |
| 125 | Blade (With Pin) | 2 oz. |
| 126 | Blade Pin Only | 1 oz. |
| 127 | Plunger Guide Pin | 1 oz. |
| 128 | Guard | 2 oz. |
| 129 | Warning Decals | |



Model No. 2 (Extra Heavy Duty) 1 1/2" capacity

| PART | DESCRIPTION | Packed Weight |
|------|-------------------|---------------|
| 131 | Cutter Complete | 28 lbs. |
| 132 | Casting Base | 21 lbs. |
| 133 | Plunger | 7 lbs. |
| 134 | Die (Set) | 10 oz. |
| 135 | Blade (With Pin) | 5 oz. |
| 136 | Blade Pin Only | 1 oz. |
| 137 | Plunger Guide Pin | 1 oz. |
| 138 | Guard | 3 oz. |
| 139 | Warning Decals | |

TIMCO DOES NOT OFFER WARRANTY ON NABRICO PRODUCTS.

THE FACTORY WARRANTY OFFERED BY NABRICO IS THE ONLY WARRANTY EXTENDED TO THE PURCHASER OF NABRICO PRODUCTS.
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



HYDRAULIC WIRE ROPE CUTTERS MANUALLY OPERATED

2



INSERT WIRE ROPE



CLOSE LATCH
PUMP HANDLE TO CUT

SPECIFICATIONS: All are portable. Firm base required for operation.

| MODEL | CAPACITY | DIMENSIONS | WEIGHT |
|--------|----------|------------------------|---------|
| W-075 | 3/4" | 12" x 3 5/8" x 6" high | 21 lbs. |
| P-1125 | 1 1/8" | 14" x 4 1/8" x 7" high | 34 lbs. |
| C-1750 | 1 3/4" | 18 1/2" x 5" x 8" high | 66 lbs. |

The **FINEST** manually operated hydraulic cable cutter

A FEW STROKES MAKE A GOOD, CLEAN CUT

The efficient, portable Hydrashear is a self-contained hydraulic cable cutter recommended by wire rope manufacturers, and used by industries throughout the world.

This tool is precision and engineered to give a good, clean cut with minimum effort. Just pump the handle . . . no outside power needed. It can be easily carried to the job, and placed anywhere to do its work.

The blades and shear blades are made of the finest tool steel available, heat treated and ground to close tolerances, which means long life, as well as superior performance. Three models available.

Hydrashears are used by earthmoving and construction contractors, factory warehouses, rigging lofts, elevator repairmen. All models will operate underwater.

GUARANTEE: Pell Cable Cutter Co. guarantees to replace - free of charge - any parts that do not meet with its specifications in material or workmanship.

OTHER QUALITY CUTTERS FROM MORSE-STARRETT:

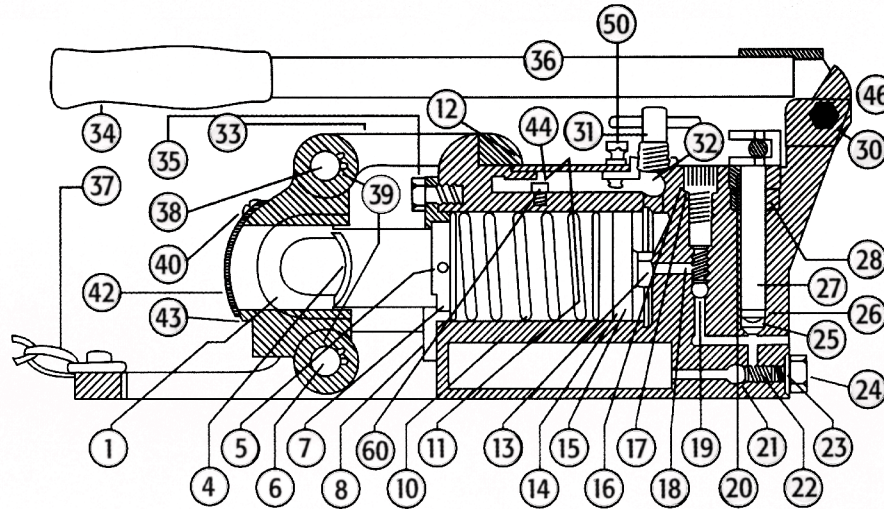
Power Operated, HYDRAULIC Wire Rope Cutters, see Pell Hydrashear, Models WRE, PRE, CRE and MRE.

Hammer Operated, IMACT-TYPE Wire Rope Cutters, see Morse-Starrett, Models 1, 1, and 2.

Power Operated, PRESTRESSED CONCRETE STRAND, RE-BAR AND CHAIN CUTTERS, see Pell Hydrashear, Model S.

SPECIFICATIONS: No firm base required for operation.

HYDRAULIC WIRE ROPE CUTTERS PARTS LIST

HYDRASHEAR REPLACEMENT PARTS

| Models |
|--------|
| W-075 |
| P-1125 |
| C-1750 |

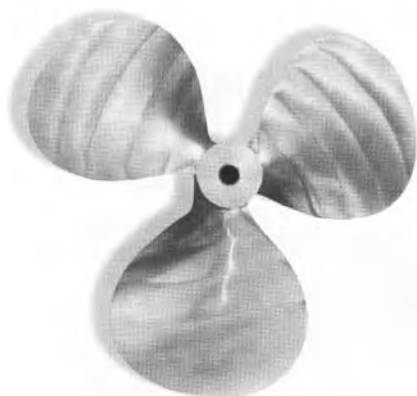
| PART NO. | DESCRIPTION | MODEL W | MODEL P | MODEL C |
|----------|--------------------------|---------|---------|---------|
| 1 | Die Set | W1 | P1 | C1 |
| 4 | Blade | W4 | P4 | C4 |
| 5 | Blade Pin | W5 | P5 | C5 |
| 6 | Hinge Pin | W6 | P6 | C6 |
| 7 | Ram | W7 | P7 | C7 |
| 8 | Ram Collar | W8 | P8 | C8 |
| 10 | Ram Retracting Spring | W10 | P10 | C10 |
| 11 | Cover Plate | W11 | P11 | C11 |
| 15 | Ram Cup Leather Retainer | W15 | P15 | C15 |
| 33 | Latch | W33 | P33 | C33 |
| 36 | Pump Handle | W36 | P36 | C36 |
| 38 | Latch Pin | W38 | P38 | C38 |
| 43 | Shear Blade Holder | W43 | P43 | C43 |
| 60 | Bypass Valve | N/A | P60 | C60 |
| 62 | Overhaul Kit | W62 | P62 | C62 |

Items listed in the Standard Repair Kit and Overhaul Kit must be purchased in kit form only.

#62 OVERHAUL KIT includes all parts listed below:

| | | |
|----------------------------|----------------------------|---------------------------|
| 12. Cover Plate Screws (3) | 23. Suction Valve Gasket | 35. Ram Collar Screws (3) |
| 13. Ram Retainer Screw | 24. Suction Valve Plug | 37. Bail |
| 14. Ram Cup Leather | 25. Plunger Packing Screw | 39. Snap Rings (4) |
| 16. Check Valve Plug | 26. Plunger End Packing | 40. Guard Screws (2) |
| 17. Check Valve Gasket | 27. Plunger | 42. Guard Plate |
| 18. Check Valve Spring | 28. Plunger Packing Set | 44. Cover Gasket |
| 19. Ball Check Valve | 30. Handle Hinge Bolt | 46. Lock Nut |
| 20. Packing Nut | 31. Release Valve Retainer | 47. Packing Nut Wrench |
| 21. Ball Suction Valve | 32. Release Valve | 50. Air Vent Valve |
| 22. Suction Valve Spring | 34. Handle Grip | |

PROPELLERS

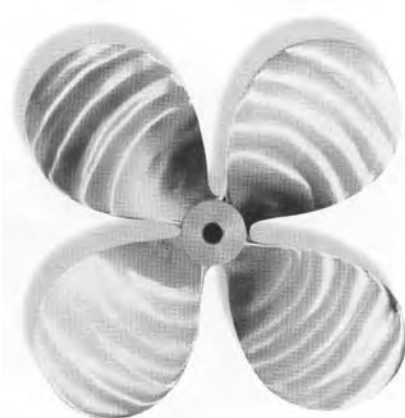


MACHINE PITCH™ (MP) / HEAVY DUTY (HD)

8"-60" Diameters - 0.51 D.A.R.
62"-96" Diameters - 0.47 D.A.R.

Machine Pitch™ (MP) is the finest and best known three-blade for all-purpose use. The style and design is primarily used on vessels with speeds less than 15 knots. MP style propellers incorporate a semi-elliptical shape, constant pitch and ogival blade sections.

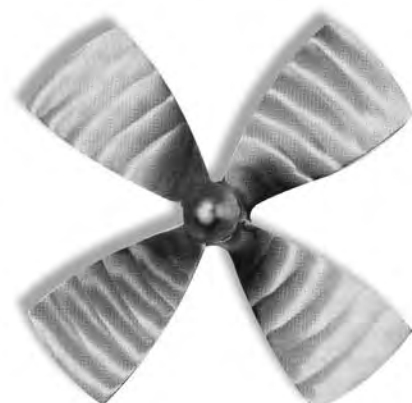
The Heavy Duty (HD) is identical in design to the MP, but includes thicker blade edges engineered specifically for severe conditions. Its heavy-duty edges resist abrasion and blade fracture.



WORK HORSE™

24"-60" Diameters - 0.71 D.A.R.
62"-96" Diameters - 0.622 D.A.R.

The Work Horse™ is known as the finest four-blade propeller in the world for its ability to push hard-working boats. It is designed for tugboats, push boats and applications requiring maximum thrust - where low speeds do not necessitate skewed blades. The semi-elliptical blade shape and constant pitch allows for the excellent reverse-thrust performance that is necessary in many work-boat applications.



KAPLAN™

35"-95" Diameters - 0.56 D.A.R.

The **Kaplan™** propeller is designed for hard working Trawlers, Dragger and Tugs. Manufactured to operate in a nozzle, such as Michigan's ducted propeller system, the highly loaded applications can develop substantially greater thrust than open or free propellers at working speed. The Kaplan system incorporates air foil sections at the inner radii and the flat face ogival sections at the outer radii, for maximum thrust.

0.56 D.A.R. is standard in the Kaplan series. Expanded area Kaplans, and skewed blade Kaplans may be more suited to an application. MWC analysis service will qualify.

Kaplan is available in NiBrAl, Manganese Bronze or Stainless Steel alloys.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

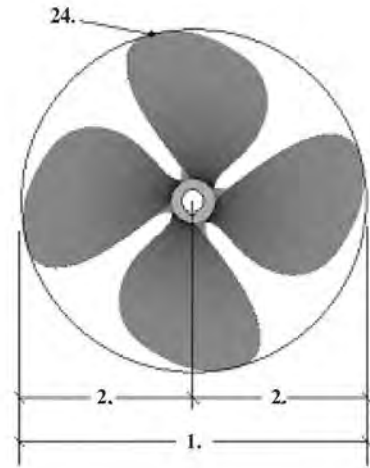
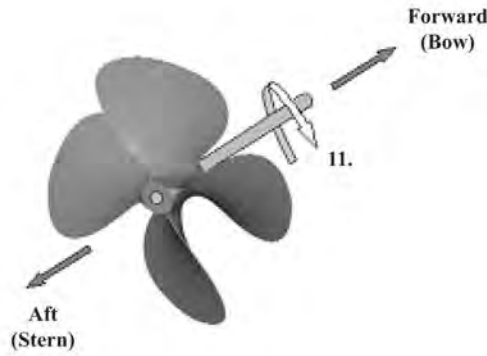
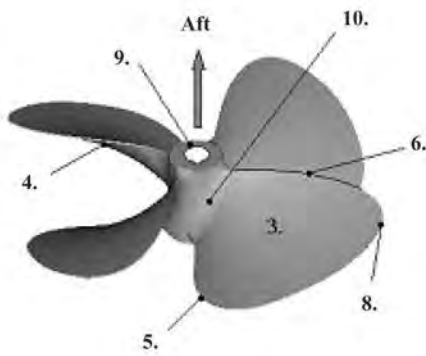
PROPELLERS TERMS AND DEFINITIONS

3

| | | |
|------|----------------------------------|---|
| 1. | Diameter | The diameter of the imaginary circle scribed by the blade tips as the propeller rotates. |
| 2. | Radius | The distance from the axis of rotation to the blade tip. The radius multiplied by two is equal to the diameter. |
| 3. | Blade Face | Pressure Side, Pitch Side. Aft side of the blade (surface facing the stern). |
| 4. | Blade Back | Suction Side. Forward side of the blade (surface facing the bow). |
| 5. | Leading Edge | The edge of the propeller blade adjacent to the forward end of the hub. When viewing the propeller from astern, this edge is furthest away. The leading edge leads into the flow when providing forward thrust. |
| 6. | Trailing Edge | The edge of the propeller adjacent to the aft end of the hub. When viewing the propeller from astern, this edge is closest. The trailing edge retreats from the flow when providing forward thrust. |
| 7. | Blade Number | Equal to the number of blades on the propeller. |
| 8. | Blade Tip | Maximum reach of the blade from the center of the hub. Separates the leading and trailing edges. |
| 9. | Hub | Solid cylinder located at the center of the propeller. Bored to accommodate the engine shaft. Hub shapes include cylindrical, conical, radius & barreled. |
| 10. | Blade Root | Fillet area. The region of transition from the blade surfaces and edges to the hub periphery. The area where the blade attaches to the hub. |
| 11. | Rotation (Right hand shown here) | When viewed from the stern (facing forward): Right-hand propellers rotate clockwise to provide forward thrust. Left-hand propellers rotate counter-clockwise to provide forward thrust. |
| 12. | Pitch | The linear distance that a propeller would move in one revolution with no slippage. |
| 13. | Cylindrical Section | A cross section of a blade cut by a circular cylinder whose centerline is the propeller axis of rotation. |
| 14. | Pitch Reference Line | Reference line used to establish the geometric pitch angle for the section. This line may pass through the leading and trailing edges of the section and may be equivalent to the chord line. |
| 15.* | Geometric Pitch Angle, α | The angle between the pitch reference line and a line perpendicular to the propeller axis of rotation. |
| 16.* | Controllable Pitch Propeller | The propeller blades mount separately on the hub, each on an axis of rotation, allowing a change of pitch in the blades and thus the propeller. |
| 17.* | Fixed Pitch Propeller | The propeller blades are permanently mounted and do not allow a change in the propeller pitch. |
| 18.* | Constant Pitch Propeller | The propeller blades have the same value of pitch from root to tip and from leading edge to trailing edge. |
| 19.* | Variable Pitch Propeller | The propeller blades have sections designed with varying values of local face pitch on the pitch side or blade face. |
| 20.* | Rake | The fore or aft slant of a blade with respect to a line perpendicular to the propeller axis of rotation. |
| 20a. | Aft Rake | Positive Rake. Blade slant towards aft end of hub. |
| 20b. | Forward Rake | Negative Rake. Blade slant towards forward end of hub. |
| 21. | Track | The absolute difference of the actual individual blade rake distributions to the other blade rake distributions. Always a positive value and represents the spread between individual blade rake distributions. |
| 22.* | Skew | The transverse sweeping of a blade such that viewing the blades from fore or aft shows an asymmetrical shape. |
| 22a. | Aft Skew | Positive Skew. Blade sweep in direction opposite of rotation. |
| 22b. | Forward Skew | Negative Skew. Blade sweep in same direction as rotation. |
| 23. | Cup | Small radius of curvature located on the trailing edge of blade. |
| 24. | D.A.R. | Developed Area Ratio is blade area expressed as the percentage of a circle shaded by the propeller. |

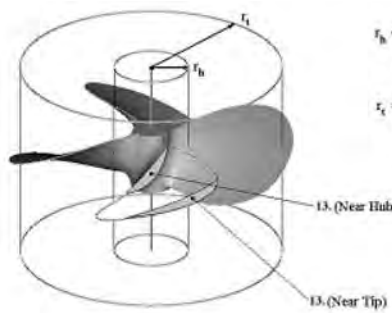
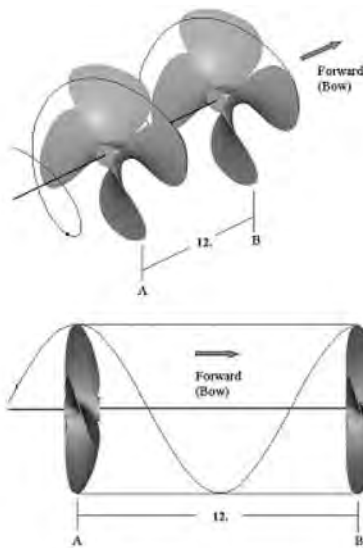
* denotes terms that do not have a graphic representation to aid in definition.

PROPELLERS



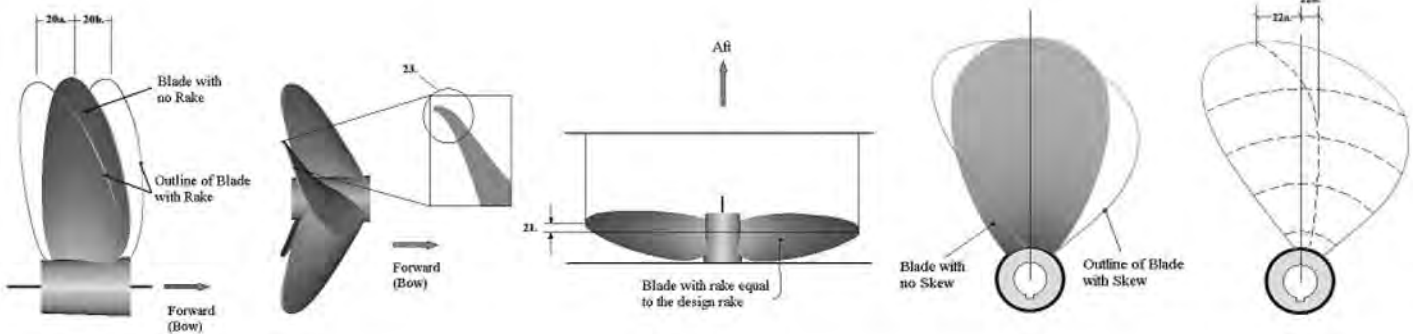
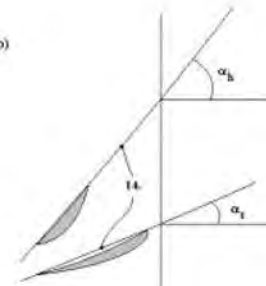
7. Blade Number = 4

3



r_h = The radius of a cutting cylinder near the hub. The cylindrical section near the hub is located on the surface of this cylinder.

r_t = The radius of a cutting cylinder near the tip. The cylindrical section near the tip is located on the surface of this cylinder.



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THE WORKWHEEL



IS
THICKER
HEAVIER
TOUGHER

The WorkWheel by Hung Shen is specifically designed for displacement vessels operating at less than 16 knots; such as tug boats, pushboats and a variety of utility vessels. They have a semi-elliptical blade outline with constant pitch and no skew. This provides excellent ahead thrust and maximum backing ability. The blade sections are standard ogival shapes with flat pressure faces allowing for easy measurement and repair.

WORKS
HARDER
LONGER
BETTER

The blades are extremely robust with generous edge and tip radii to avoid damage from debris. The 5-blade option provides additional blade area for high power, heavily loaded applications. Blade area can be adjusted as required for special applications. Anti-singing edges are standard on all 5-blade WorkWheels and an option on the 4-blade version.



When your livelihood depends on the gear that you run, you can count on the quality, durability and value that's crafted into every WorkWheel. This legendary prop has the following features:

- Available in 3, 4 or 5-blade configurations
- Available in Bronze, Ni-Al-Br and CF-3 Stainless Steel
- DAR <60": 4-blade is .70, 5-blade is .875
- DAR >60": 4-blade is .62, 5-blade is .775
- Blade Thickness Fraction .048
- Custom blade widths available



THE
INDUSTRY
STANDARD

POLLUTION-FREE MARINE BEARINGS

The clean bearing that cushions the shaft ...
installs in minutes ... and lasts for years.



STOCKED IN 3 DIFFERENT SERIES



- Sleeve bearings with Naval Brass outer shell super-bonded to a fluted rubber bearing surface. Stocked in 79 sizes from 3/4" through 6" shaft diameters. Engineered to meet the toughest service requirements in marine and industrial applications.



- Sleeve bearings with Non-Metallic outer shell super-bonded to a fluted rubber bearing surface. Stocked in 72 sizes from 3/4" through 6" shaft diameters. These light in weight sleeves are designed to eliminate metal-to-metal electrolysis that damages underwater parts.



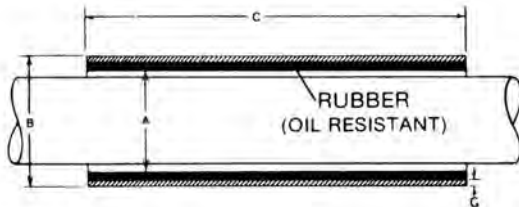
- Flanged Naval Brass outer shell super-bonded to a fluted rubber bearing surface. Stocked in 38 sizes from 3" through 12" shaft diameters. 12 additional standard sizes, 12 1/4" through 15" shaft diameters manufactured on request. Designed for rapid installation on the most severe duty applications.

Resistance to Various Liquids

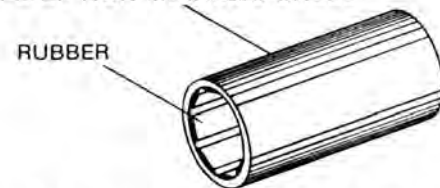
| Liquid | Conc. | Rubber Liner | | Brass Outer Shell | | Non-Metallic Outer Shell | |
|---------------------------------|------------|--------------|--------------|-------------------|--------------|--------------------------|--------------|
| | | 39°F - 70°F | 70°F - 158°F | 39°F - 70°F | 70°F - 158°F | 39°F - 70°F | 70°F - 158°F |
| | | -4°C - 21°C | -4°C - 70°C | -4°C - 21°C | -4°C - 70°C | -4°C - 21°C | -4°C - 70°C |
| Acids | | | | | | | |
| Hydrochloric | <10% | R | R | NR | NR | R | R |
| Hydrochloric | >10% | NR | NR | NR | NR | NR | NR |
| Nitric | <10% | R | NR | NR | NR | R | NR |
| Nitric | >10% | NR | NR | NR | NR | NR | NR |
| Sulfuric | <10% | R | R | NR | NR | R | R |
| Sulfuric | >10%, <50% | R | NR | NR | NR | C | NR |
| Sulfuric | >50% | NR | NR | NR | NR | NR | NR |
| Phosphoric | <20% | R | R | NR | NR | R | R |
| Acetic | | NR | NR | NR | NR | NR | NR |
| Citric | Sat. | R | C | R | C | R | C |
| Salts (Acids) | | | | | | | |
| Alum | Sat. | R | R | R | R | R | R |
| Ammonium Nitrate | Sat. | R | R | R | R | R | R |
| Cupric Sulfate | Sat. | R | R | R | R | R | R |
| Magnesium Chloride | 18% | R | R | R | R | R | R |
| Phosphorous Trichloride | Sat. | NR | NR | NR | NR | NR | NR |
| Zinc Chloride | Sat. | R | R | R | R | R | R |
| Zinc Sulfate | Sat. | R | R | R | R | R | R |
| Ammonium Carbonate | Sat. | NR | NR | NR | NR | NR | NR |
| Sodium Borate | Sat. | R | R | R | R | R | R |
| Sodium Bisulfite | Sat. | R | R | R | R | R | R |
| Sodium Carbonate | Sat. | R | R | R | R | R | R |
| Sodium Phosphate | Sat. | R | R | R | R | R | R |
| Sodium Silicate | Sat. | R | R | R | R | R | R |
| Alkaline Solutions | | | | | | | |
| Ammonium Hydroxide | | NR | NR | NR | NR | NR | NR |
| Calcium Hydroxide | Sat. | R | R | C | C | NR | NR |
| Potassium Hydroxide | 30% | R | R | C | C | NR | NR |
| Sodium Hydroxide | <10% | R | R | C | C | NR | NR |
| Sodium Hydroxide | >10% | R | NR | C | C | NR | NR |
| Alcohols | | | | | | | |
| Benzyl | | NR | NR | NR | NR | NR | NR |
| Butyl | | R | NR | R | NR | C | NR |
| Ethanolamine | | R | NR | R | NR | C | NR |
| Ethyl | | R | NR | R | NR | C | NR |
| Ethylene Glycol | | R | R | R | R | C | C |
| Glycerol | | R | R | R | R | C | C |
| Methyl | | R | NR | R | NR | C | NR |
| Propyl | | R | NR | R | NR | C | NR |
| Aldehydes | | | | | | | |
| | | NR | NR | NR | NR | NR | NR |
| Esters | | | | | | | |
| | | NR | NR | NR | NR | NR | NR |
| Ethers | | | | | | | |
| | | NR | NR | NR | NR | NR | NR |
| Halogenated Hydrocarbons | | | | | | | |
| | | NR | NR | NR | NR | NR | NR |
| Ketones | | | | | | | |
| | | NR | NR | NR | NR | NR | NR |
| Phenols | | | | | | | |
| | | NR | NR | NR | NR | NR | NR |
| Nitrogen Derivatives | | | | | | | |
| Acetamide | | R | NR | R | NR | C | NR |
| Liquified Ammonia | | C | | C | | C | NR |
| Aniline | | NR | NR | NR | NR | NR | NR |
| Nitrobenzene | | NR | NR | NR | NR | NR | NR |
| Nitroethane | | NR | NR | NR | NR | NR | NR |
| Pyridine | | NR | NR | NR | NR | NR | NR |
| Neutral Salts | | | | | | | |
| Calcium Acetate | Sat. | R | R | R | R | R | R |
| Calcium Chloride | Sat. | R | R | R | R | R | R |
| Calcium Nitrate | Sat. | R | R | R | R | R | R |
| Potassium Acetate | Sat. | R | R | R | R | R | R |
| Potassium Chloride | Sat. | R | R | R | R | R | R |
| Potassium Nitrate | Sat. | R | R | R | R | R | R |
| Sodium Chloride | Sat. | R | R | R | R | R | R |
| Sodium Nitrate | Sat. | R | R | R | R | R | R |
| Sodium Sulfate | Sat. | R | R | R | R | R | R |
| Vegetable Oils | | | | | | | |
| Castor | | R | C | R | C | C | C |
| Cottonseed | | R | C | R | C | C | C |
| Linseed | | R | C | R | C | C | C |
| Hydrocarbons | | | | | | | |
| Benzene | | NR | NR | NR | NR | NR | NR |
| Butane, Liquified | | R | | R | | C | |
| Diphenyl Oxide | | NR | NR | NR | NR | NR | NR |
| Dowtherm | | NR | NR | NR | NR | NR | NR |
| Ethyl Benzene | | NR | NR | NR | NR | NR | NR |
| Gasoline | | C | C | C | C | C | C |
| Hexane | | R | | R | | R | |
| Hydraulic Oil | | R | R | R | R | C | C |
| Kerosene | | R | R | R | R | R | R |
| Toluene | | NR | NR | NR | NR | NR | NR |
| Turpentine | | C | NR | C | NR | C | NR |
| Xylene | | NR | NR | NR | NR | NR | NR |

R = Resistant NR = Non-Resistant C = Consult Factory > = Greater Than < = Less Than Sat. = Saturated

BRASS OR EF NON-METALLIC MARINE BEARINGS



BRASS OR TYPE EF NON-METALLIC SHELL



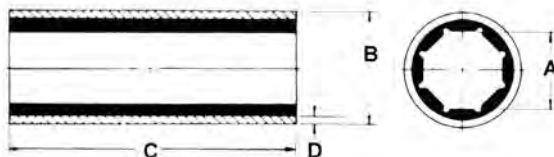
SMALL STD. SLEEVE BEARINGS

| TIMCO MORSE CODES | | B. F. Goodrich Code | Johnson Code | A Shaft Size | B Outside Dia. | C Length | G Metal Wall |
|-------------------|--------------|---------------------|--------------|--------------|----------------|----------|--------------|
| Brass | Non-Metallic | | | | | | |
| ALBACORE | ADDER | Kate | Able | 3/4" | 1 1/4" | 3" | 1/8" |
| BLENNY | AMBERJACK | | Acid | 7/8" | 1 1/4" | 3 1/2" | 3/64" |
| BARRACUDA | AGII | Katy | Apex | 7/8" | 1 3/8" | 3 1/2" | 1/8" |
| BASS | ANCHOVY | | Atom | 7/8" | 1 1/2" | 3 1/2" | 1/8" |
| BLACKFISH | ANABLEPS | Katz | Back | 1" | 1 1/4" | 4" | 3/64" |
| BLOATER | ARROWANA | Kava | Bait | 1" | 1 3/8" | 4" | 3/64" |
| BONITO | ANGEL | Kayak | Bale | 1" | 1 1/2" | 4" | 1/8" |
| BROADBILL | BARBEL | Kefer | Band | 1" | 1 5/8" | 4" | 1/8" |
| BULLHEAD | BILLFISH | Keeper | Base | 1" | 2" | 4" | 1/8" |
| CAMA | BLOODFIN | | Beam | 1 1/8" | 1 1/2" | 4 1/2" | 3/64" |
| CARP | BLUEFISH | Kersey | Belt | 1 1/8" | 1 5/8" | 4 1/2" | 1/8" |
| CATFISH | BONE | Kerny | Bend | 1 1/8" | 1 3/4" | 4 1/2" | 1/8" |
| CHOBIE | BREAM | Kid | Bill | 1 1/8" | 2" | 4 1/2" | 1/8" |
| CHOGSET | BRICHARDI | Kibbie | Bind | 1 1/4" | 1 1/2" | 5" | 3/64" |
| CHUB | BRILL | Kidnap | Bird | 1 1/4" | 1 3/4" | 5" | 1/8" |
| COD | BURBOT | Kiano | Bite | 1 1/4" | 2" | 5" | 1/8" |
| CROAKER | CAPELIN | Kidney | Blow | 1 1/4" | 2 1/8" | 5" | 1/8" |
| DEVILFISH | CHIRUS | Kin | Boat | 1 3/8" | 1 7/8" | 5 1/2" | 1/8" |
| DOGFISH | CISCOES | Kinah | Bold | 1 3/8" | 2" | 5 1/2" | 1/8" |
| DOLPHIN | COAL | Kincy | Bond | 1 3/8" | 2 1/8" | 5 1/2" | 1/8" |
| EEL | CONY | Kindle | Boot | 1 3/8" | 2 3/8" | 5 1/2" | 1/8" |
| FLATFISH | CORBINA | Kine | Boss | 1 1/2" | 2" | 6" | 1/8" |
| FLOUNDER | CRAIG | Kingdom | Brad | 1 1/2" | 2 3/8" | 6" | 1/8" |
| GAR | CRAMP | Kinky | Brew | 1 5/8" | 2 1/8" | 6 1/2" | 1/8" |
| GRAYBACK | DIDON | Kinship | Brim | 1 5/8" | 2 5/8" | 6 1/2" | 1/8" |
| GROUPER | DORADE | Kip | Brow | 1 3/4" | 2 3/8" | 7" | 1/8" |
| HADDO | GERRES | Kite | Buck | 1 3/4" | 2 5/8" | 7" | 1/8" |
| HAKE | GILTHEAD | Kitem | Bulb | 1 7/8" | 2 5/8" | 7 1/2" | 1/8" |
| HALIBUT | GLOBE | Kitez | Bull | 1 7/8" | 2 15/16" | 7 1/2" | 1/8" |
| HERRING | GOBIE | Kith | Call | 2" | 2 5/8" | 8" | 1/8" |
| KINGFISH | GUPPY | Knave | Calm | 2" | 3" | 8" | 1/8" |
| MACKEREL | HADDOCK | Knit | Came | 2 1/8" | 2 15/16" | 8 1/2" | 1/8" |
| MANTA | HAYHO | Knob | Cape | 2 1/8" | 3 1/8" | 8 1/2" | 1/8" |
| MARLIN | HOLIA | Knoll | Care | 2 1/4" | 2 15/16" | 9" | 1/8" |
| MINNOW | HOOPID | Koran | Cart | 2 1/4" | 3 1/8" | 9" | 1/8" |
| MUDFISH | HORNED | Kumiss | Case | 2 1/4" | 3 3/8" | 9" | 1/8" |
| MULLET | JUREL | Nabas | Cook | 2 3/8" | 3 3/8" | 9 1/2" | 1/8" |
| MUSKY | LAUNCE | Naked | Cord | 2 1/2" | 3 1/8" | 10" | 1/8" |
| PERCH | LOACH | Nation | Corn | 2 1/2" | 3 3/8" | 10" | 1/8" |

3

BRASS MARINE BEARINGS

STANDARD SLEEVE BEARINGS



SMALL STD. SLEEVE BEARINGS

| TIMCO CODE NAME | PART NO. | A SHAFT DIA. | B OUTSIDE DIA. | C LENGTH | D SHELL THICK | WEIGHT (LBS.) |
|-----------------|----------|-----------------|-------------------|-------------|------------------|------------------|
| ALBACORE | E00100 | 3/4" | 1 1/4" | 3" | 1/8" | .50 |
| BLHENNY | E00200 | 7/8" | 1 1/4" | 3 1/2" | 1/16" | .31 |
| BARRACUDA | E00300 | 7/8" | 1 3/8" | 3 1/2" | 1/8" | .69 |
| BASS | E00400 | 7/8" | 1 1/2" | 3 1/2" | 1/8" | .75 |
| BETTA | E00500 | 1" | 1 1/4" | 3" | 1/32" | .13 |
| BLACKFISH | E00600 | 1" | 1 1/4" | 4" | 1/32" | .31 |
| CARIBE | E00650 | 1" | 1 1/4" | 6" | 1/32" | .47 |
| BLOATER | E00700 | 1" | 1 3/8" | 4" | 1/16" | .38 |
| BONITO | E00800 | 1" | 1 1/2" | 4" | 1/8" | .81 |
| BROADBILL | E00900 | 1" | 1 5/8" | 4" | 1/8" | .88 |
| BULLHEAD | E01000 | 1" | 2" | 4" | 1/8" | 1.25 |
| CAMA | E01100 | 1 1/8" | 1 1/2" | 4 1/2" | 1/16" | .50 |
| CARP | E01200 | 1 1/8" | 1 5/8" | 4 1/2" | 1/8" | 1.00 |
| CATFISH | E01300 | 1 1/8" | 1 3/4" | 4 1/2" | 1/8" | 1.19 |
| CHOBIE | E01400 | 1 1/8" | 2" | 4 1/2" | 1/8" | 1.38 |
| CHOGSET | E01500 | 1 1/4" | 1 1/2" | 5" | 1/32" | .50 |
| CHUB | E01600 | 1 1/4" | 1 3/4" | 5" | 1/8" | 1.13 |
| COD | E01700 | 1 1/4" | 2" | 5" | 1/8" | 1.50 |
| CROAKER | E01800 | 1 1/4" | 2 1/8" | 5" | 1/8" | 1.75 |
| DEVILFISH | E01900 | 1 3/8" | 1 7/8" | 5 1/2" | 1/8" | 1.44 |
| DOGFISH | E0200 | 1 3/8" | 2" | 5 1/2" | 1/8" | 1.69 |
| DOLPHIN | E02100 | 1 3/8" | 2 1/8" | 5 1/2" | 1/8" | 1.75 |
| EEL | E02200 | 1 3/8" | 2 3/8" | 5 1/2" | 1/8" | 2.13 |
| FLAMEN | E02300 | 1 1/2" | 2" | 4 3/8" | 1/8" | 1.13 |
| FLATFISH | E02400 | 1 1/2" | 2" | 6" | 1/8" | 1.63 |
| FLOUNDER | E02500 | 1 1/2" | 2 3/8" | 6" | 1/8" | 2.19 |
| GAR | E02600 | 1 5/8" | 2 1/8" | 6 1/2" | 1/8" | 1.88 |
| GRAYBACK | E02700 | 1 5/8" | 2 5/8" | 6 1/2" | 1/8" | 2.75 |
| GROUPE | E02800 | 1 3/4" | 2 3/8" | 7" | 1/8" | 2.38 |
| HADDO | E02900 | 1 3/4" | 2 5/8" | 7" | 1/8" | 2.81 |
| HAKE | E03000 | 1 7/8" | 2 5/8" | 7 1/2" | 1/8" | 3.00 |
| HALIBUT | E03100 | 1 7/8" | 2 15/16" | 7 1/2" | 1/8" | 3.69 |
| HERRING | E03200 | 2" | 2 5/8" | 8" | 1/8" | 3.06 |

These bearings are engineered to meet the toughest service requirements in corrosive and abrasive marine or industrial applications. And the fluted rubber bearing surface will outlast hard surface bearings by more than 10 times.

They operate in any water-based liquids, most chemicals and petro products. Operating temperatures range from +39°F to 158°F, +4 to 70°C.

Normal loading capacity up to 35 psi, .0246 kg. per sq. mm. Shaft is cushioned by continuous flow of gals/ in.; 7.5 liters/25 mm of shaft diameter/min. through the bearing.

All materials meet U.S. Navy specifications. MIL-B-17901A CLII.

Available with stainless steel or aluminum shell. Prices furnished upon request.

Bearings are designed to meet requirements of American Bureau of Shipping.

Stock Brass, Non-Metallic and Brass Flanged Series are machinable on all surfaces and thus can be reworked in your locale to meet standard metric dimensions.

BRASS OR NONMETALLIC MARINE BEARINGS

Brass Bearing

These bearings are engineered to meet the toughest service requirements in corrosive and abrasive marine or industrial applications. And the rubber bearing surface will outlast hard surface bearings by more than 10 times

Non-Metallic Bearings

The Type EF is Morse's answer to the need for a maring bearing that checks electrolytic corrosion of metal-hulled boats while retaining the advantages of a rubber bearing.

3

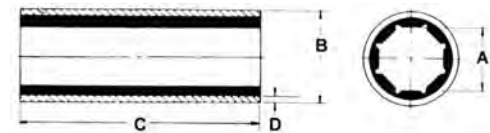
| TIMCO MORSE CODES | | B. F. Goodrich Code | Johnson Code | A Shaft Size | B Outside Dia. | C Length | G Metal Wall |
|-------------------|--------------|---------------------|--------------|--------------|----------------|----------|--------------|
| Brass | Non-Metallic | | | | | | |
| PICKEREL | LUMP | Natism | Crab | 2 5/8" | 3 3/8" | 10 1/2" | 1/8" |
| PICUDA | MIDGE | Native | Crow | 2 3/4" | 3 3/8" | 11" | 1/8" |
| PINFISH | MONDA | Nature | Curd | 2 3/4" | 3 3/4" | 11" | 1/8" |
| PORGY | MORAY | Naval | Cure | 2 7/8" | 3 3/4" | 11 1/2" | 1/8" |
| RAY | NUMB | Navy | Dane | 3" | 3 3/4" | 12" | 1/8" |
| REDFIN | OARFISH | Neck | Dare | 3" | 4" | 12" | 1/8" |
| REDFISH | OX | Necking | Dark | 3 1/8" | 4 1/4" | 12 1/2" | 1/8" |
| ROCKFISH | ONO | Nectar | Darn | 3 1/4" | 4" | 13" | 1/8" |
| SAILFISH | PADDLE | Negative | Dell | 3 1/4" | 4 1/4" | 13" | 1/8" |
| SALMON | PIPE | Neglect | Dike | 3 3/8" | 4 1/2" | 13 1/2" | 1/8" |
| SANDFISH | PLAICE | Negro | Dine | 3 1/2" | 4 1/4" | 14" | 1/8" |
| SAWFISH | PILOT | Neighbor | Dock | 3 1/2" | 4 1/2" | 14" | 1/8" |
| SCULPIN | PIPER | Nephew | Dole | 3 5/8" | 4 1/2" | 14 1/2" | 1/8" |
| SHAD | SPRATE | Neptune | Done | 3 3/4" | 4 1/2" | 15" | 1/8" |
| SHARK | SALTIE | Nerve | Dove | 3 3/4" | 5" | 15" | 3/16" |
| SILVERFISH | SOLE | Nest | Draw | 3 3/4" | 5 1/4" | 15" | 3/16" |
| SMELT | SARDINE | Newell | Dull | 3 7/8" | 5 1/4" | 15 1/2" | 3/16" |
| SNAPPER | SKATE | Nibble | Earn | 4" | 5" | 16" | 3/16" |
| SOCKEYE | SKITTLE | Nibbled | Ease | 4" | 5 1/4" | 16" | 3/16" |
| SPEARFISH | STAR | Nibbling | Echo | 4 1/8" | 5 1/4" | 16 1/2" | 3/16" |
| SQUIT | SAND | Nicety | Edit | 4 1/4" | 5 1/2" | 17" | 3/16" |
| STREAKER | SPOTTED | Niche | Else | 4 3/8" | 5 3/4" | 17 1/2" | 3/16" |
| SUCKER | STING | Nick | Epic | 4 1/2" | 5 1/2" | 18" | 3/16" |
| SUNFISH | STURGEON | Niggard | Edge | 4 1/2" | 5 3/4" | 18" | 3/16" |
| SWORDFISH | STERLET | Niggardly | Even | 4 5/8" | 6 1/8" | 18 1/2" | 1/4" |
| TARPON | SEA | Nighless | Ever | 4 3/4" | 6 1/8" | 19" | 1/4" |
| TROUT | SCALD | Nightly | Evil | 4 7/8" | 6 1/8" | 19 1/2" | 1/4" |
| WAHOO | SCARINA | Night | Face | 5" | 6 1/8" | 20" | 1/4" |
| WALLEYE | SCOMBER | Noble | Fact | 5" | 6 1/2" | 20" | 1/4" |
| WANDTAIL | SEACAL | Noblish | Fade | 5 1/4" | 6 3/4" | 21" | 1/4" |
| WAP | SHANNY | Nobody | Fare | 5 1/4" | 7" | 21" | 1/4" |
| WARFISH | SKIPJACK | Nobob | Fear | 5 3/8" | 6 3/4" | 21 1/2" | 1/4" |
| WARSAW | SCAD | Nobur | Felt | 5 3/8" | 7" | 21 1/2" | 1/4" |
| WHITEFISH | TUNNY | Nomad | Find | 5 1/2" | 7" | 22" | 1/4" |
| WINDFISH | SKIPPY | Nomar | Flat | 5 5/8" | 7" | 22 1/2" | 1/4" |
| YELLOWTAIL | SNOOK | Nonage | Fork | 5 3/4" | 7" | 23" | 1/4" |
| YOWLING | SPINOUS | Nonary | Fuel | 5 7/8" | 7 1/2" | 24" | 1/4" |
| ZANCLUS | SERRONO | Nook | Gale | 6" | 7 1/2" | 24" | 1/4" |

BRASS MARINE BEARINGS

| TIMCO CODE NAME | PART NO. | A SHAFT DIA. | B OUTSIDE DIA. | C LENGTH | D SHELL THICK | WEIGHT (LBS.) |
|-----------------|----------|--------------|----------------|----------|---------------|---------------|
| KINGFISH | E03300 | 2" | 3" | 8" | 1/8" | 3.88 |
| LAMPREY | E03350 | 2" | 3" | 10" | 1/8" | 4.85 |
| MACKEREL | E03400 | 2 1/8" | 2 15/16" | 8 1/2" | 1/8" | 3.69 |
| MANTA | E03500 | 2 1/8" | 3 1/8" | 8 1/2" | 1/8" | 4.50 |
| MARLIN | E03600 | 2 1/4" | 2 15/16" | 9" | 1/8" | 3.94 |
| MARGATE | E03650 | 2 1/4" | 3" | 9" | 1/8" | 4.980 |
| MINNOW | E03700 | 2 1/4" | 3 1/8" | 9" | 1/8" | 4.44 |
| MUDFISH | E03800 | 2 1/4" | 3 3/8" | 9" | 1/8" | 5.44 |
| MULLET | E03900 | 2 3/8" | 3 3/8" | 9 1/2" | 1/8" | 5.44 |
| MUSKY | E04000 | 2 1/2" | 3 1/8" | 10" | 1/8" | 4.63 |
| PERCH | E04100 | 2 1/2" | 3 3/8" | 10" | 1/8" | 5.50 |
| PIKE | E04150 | 2 1/2" | 3 1/2" | 10" | 1/8" | 6.47 |
| PICKEREL | E04200 | 2 5/8" | 3 3/8" | 10 1/2" | 1/8" | 5.75 |
| PICUDA | E04300 | 2 3/4" | 3 3/8" | 11" | 1/8" | 5.63 |
| PINFISH | E04400 | 2 3/4" | 3 3/4" | 11" | 1/8" | 6.88 |
| PORGY | E04500 | 2 7/8" | 3 3/4" | 11 1/2" | 1/8" | 7.13 |
| RAY | E04600 | 3" | 3 3/4" | 12" | 1/8" | 7.06 |
| REDFIN | E04700 | 3" | 4" | 12" | 1/8" | 7.94 |
| REDFISH | E04800 | 3 1/8" | 4 1/4" | 12 1/2" | 1/8" | 9.25 |
| ROCKFISH | E04900 | 3 1/4" | 4" | 13" | 1/8" | 8.136 |
| SAILFISH | E05000 | 3 1/4" | 4 1/4" | 13" | 1/8" | 9.38 |
| SALMON | E05100 | 3 3/8" | 4 1/2" | 13 1/2" | 1/8" | 10.63 |
| SANDFISH | E05200 | 3 1/2" | 4 1/4" | 14" | 1/8" | 9.56 |
| SAWFISH | E05300 | 3 1/2" | 4 1/2" | 14" | 1/8" | 10.25 |
| SCULPIN | E05400 | 3 5/8" | 4 1/2" | 14 1/2" | 1/8" | 10.81 |
| SHAD | E05500 | 3 3/4" | 4 1/2" | 15" | 1/8" | 11.00 |
| SHARK | E05600 | 3 3/4" | 5" | 15" | 3/16" | 17.56 |
| SILVERFISH | E05700 | 3 3/4" | 5 1/4" | 15" | 3/16" | 18.19 |
| SMELT | E05800 | 3 7/8" | 5 1/4" | 15 1/2" | 3/16" | 20.00 |
| SNAPPER | E05900 | 4" | 5" | 16" | 3/16" | 18.25 |
| SOCKEYE | E06000 | 4" | 5 1/4" | 16" | 3/16" | 19.63 |
| SPEARFISH | E06100 | 4 1/8" | 5 1/4" | 16 1/2" | 3/16" | 20.06 |
| SQUIT | E06200 | 4 1/4" | 5 1/2" | 17" | 3/16" | 22.00 |
| STREAKER | E06300 | 4 3/8" | 5 3/4" | 17 1/2" | 3/16" | 24.31 |
| SUCKER | E06400 | 4 1/2" | 5 1/2" | 18" | 3/16" | 22.00 |
| SUNFISH | E06500 | 4 1/2" | 5 3/4" | 18" | 3/16" | 24.63 |
| SWORDFISH | E06600 | 4 5/8" | 6 1/8" | 18 1/2" | 1/4" | 34.00 |
| TARPON | E06700 | 4 3/4" | 6 1/8" | 19" | 1/4" | 34.00 |
| TROUT | E06800 | 4 7/8" | 6 1/8" | 19 1/2" | 1/4" | 33.00 |
| WAHOO | E06900 | 5" | 6 1/8" | 20" | 1/4" | 35.00 |
| WALLEYE | E07000 | 5" | 6 1/2" | 20" | 1/4" | 39.00 |
| WANDTAIL | E07100 | 5 1/4" | 6 3/4" | 21" | 1/4" | 44.00 |
| WAP | E07200 | 5 1/4" | 7" | 21" | 1/4" | 48.00 |
| WARFISH | E07300 | 5 3/8" | 6 3/4" | 21 1/2" | 1/4" | 57.00 |
| WARSAW | E07400 | 5 3/8" | 7" | 21 1/2" | 1/4" | 62.00 |
| WHITEFISH | E07500 | 5 1/2" | 7" | 22" | 1/4" | 59.00 |
| WINDFISH | E07600 | 5 5/8" | 7" | 22 1/2" | 1/4" | 44.50 |
| YELLOWTAIL | E07700 | 5 3/4" | 7" | 23" | 1/4" | 48.00 |
| YOWLING | E07800 | 5 7/8" | 7 1/2" | 24" | 1/4" | 52.00 |
| ZANCLUS | E07900 | 6" | 7 1/2" | 24" | 1/4" | 55.00 |
| ZEBRAFISH• | E07950 | 6 1/2" | 8 3/8" | 30" | 7/16 | 150.00 |



STANDARD SLEEVE BEARINGS



Caution: If the bearing is to be shrink fitted, care is required to prevent damage to the bearing. Cool the bearing gradually. Do not cool the bearing below -20°F (-28°C). Dry ice or other super cool materials **SHOULD NOT BE USED**. Pounding the bearing in a chilled state can cause damage to the bond between the rubber and the shell material.

- Replacement clearances per Dept. Navy Ship System Command Tech Manual NAVSHIP 0901-0002. Standard practice for bore measurement is with plug gauges.

SELECTION - Sleeve and Flanged Bearings

Normal design practice is to select a bearing with a length equal to 4 times the shaft diameter. It may be acceptable to deviate from this rule when application load requirements permit the use of shorter bearing lengths.

The projected bearing area is the product of bearing I.D. (Shaft Diameter) x Bearing Length. Therefore the loading capability is determined by multiplying the Bearing Area x 35 psi.

Example:

The load capacity for an OARFISH will be:
 3" I.D. (Shaft Dia.) x 12" L = 36 sq. inch Bearing Area
 36 sq. inch Bearing Area
 x 35 psi
 1,260 lbs. Bearing Load Capacity

76.2 mm. I.D. x 304.8 mm. L = 23,233.66 sq. mm. Bearing Area
 23,233.66 sq. mm. Bearing Area
 x .0246 kg. Per sq. mm.
 571.3 kg. Bearing Load Capacity

3

TOLERANCES - Sleeve and Flanged Bearings

| SHAFT DIA. | | STD. MARINE SHAFT CLEARANCE | IND. PUMP SHAFT CLEARANCE | O.D. TOL. | | TIR | *REPLACEMENT CLEARANCE |
|------------|---------|-----------------------------|---------------------------|----------------|--------|-----|---------------------------------|
| INCHES | mm. | | | SLEEVE | FLANGE | | |
| 3/4 | 19.050 | +.003/.008 .08/.20mm | +.002/.007 .05/.18mm | | | | +.070 1.78mm |
| 7/8 | 22.225 | | | | | | |
| 1 | 25.400 | | | | | | |
| 1 1/8 | 28.575 | | | | | | |
| 1 1/4 | 31.750 | | | | | | |
| 1 3/8 | 34.925 | | | | | | |
| 1 1/2 | 38.100 | +.004/.010 .10/.25mm | +.003/.009 .08/.23mm | ±.001 .03mm | | | +.081 2.06mm |
| 1 5/8 | 41.275 | | | | | | |
| 1 3/4 | 44.450 | | | | | | |
| 1 7/8 | 47.625 | | | | | | |
| 2 | 50.500 | +.006/.012 .15/.30mm | +.004/.010 .10/.25mm | | | | +.091 2.31mm +.100 2.54mm |
| 2 1/8 | 53.975 | | | | | | |
| 2 1/4 | 57.150 | | | | | | |
| 2 3/8 | 60.325 | | | | | | |
| 2 1/2 | 63.500 | +.007/.014 .18/.36mm | +.005/.011 .13/.28mm | | | | +.107 2.72mm |
| 2 5/8 | 66.675 | | | | | | |
| 2 3/4 | 69.850 | | | | | | |
| 2 7/8 | 73.025 | | | | | | |
| 3 | 76.200 | | | | | | |
| 3 1/8 | 79.375 | +.008/.015 .20/.38mm | | | | | +.120 3.05mm |
| 3 1/4 | 82.550 | | | | | | |
| 3 3/8 | 85.725 | | | | | | |
| 3 1/2 | 88.900 | | | | | | |
| 3 5/8 | 92.075 | | | | | | |
| 3 3/4 | 95.250 | | | | | | |
| 3 7/8 | 98.425 | +.010/.017 .25/.43mm | | ±.002 .05mm | | | |
| 4 | 101.600 | | | | | | |
| 4 1/8 | 104.775 | | | | | | |
| 4 1/4 | 107.950 | | | | | | |
| 4 3/8 | 111.125 | +.012/.019 .30/.48mm | +.008/.015 .20/.38mm | | | | +.142 3.61mm |
| 4 1/2 | 114.300 | | | | | | |
| 4 5/8 | 117.475 | | | | | | |
| 4 3/4 | 120.650 | | | | | | |
| 4 7/8 | 123.825 | | | | | | |
| 5 | 127.000 | +.015/.023 .38/.58mm | +.008/.017 .20/.43mm | | | | |
| 5 1/4 | 133.350 | | | | | | |
| 5 3/8 | 136.525 | | | | | | |

| SHAFT DIA. | | STD. MARINE SHAFT CLEARANCE | IND. PUMP SHAFT CLEARANCE | O.D. TOL. | | TIR | *REPLACEMENT CLEARANCE |
|------------|---------|-----------------------------|---------------------------|----------------|----------------|-----|------------------------|
| INCHES | mm | | | SLEEVE | FLANGE | | |
| 5 1/2 | 139.700 | +.017/.025 .43/.64mm | +.008/.017 .20/.43mm | ±.002 .05mm | ±.004 .10mm | | +.142 3.61mm |
| 5 5/8 | 142.875 | | | | | | |
| 5 3/4 | 146.050 | | | | | | |
| 5 7/8 | 149.225 | | | | | | |
| 6 | 152.400 | | | | | | |
| 6 1/4 | 158.750 | +.020/.029 .51/.74mm | | | | | +.153 3.89mm |
| 6 1/2 | 165.100 | | | | | | |
| 6 3/4 | 171.450 | +.022/.032 .56/.81mm | | | | | +.164 4.17mm |
| 7 | 177.800 | | | | | | |
| 7 1/4 | 184.150 | | | | | | |
| 7 1/2 | 190.500 | +.024/.034 .61/.86mm | +.008/.018 .20/.46mm | ±.005 .13mm | | | +.175 4.45mm |
| 7 3/4 | 196.850 | | | | | | |
| 8 | 203.200 | | | | | | |
| 8 1/4 | 209.550 | | | | | | |
| 8 1/2 | 215.900 | +.025/.035 .64/.89mm | | | | | +.185 4.70 |
| 8 3/4 | 222.250 | | | | | | |
| 9 | 228.600 | +.027/.037 .69/.94mm | +.009/.021 .23/.53mm | | | | +.196 4.98mm |
| 9 1/4 | 234.950 | | | | | | |
| 9 1/2 | 241.300 | | | | | | |
| 9 3/4 | 247.650 | | | | | | |
| 10 | 254.000 | +.028/.040 .71/1.02mm | | | | | +.206 5.23mm |
| 10 1/4 | 260.350 | | | | | | |
| 10 1/2 | 266.700 | | | | | | |
| 10 3/4 | 273.050 | | | | | | |
| 11 | 279.400 | | | | | | |
| 11 1/4 | 285.750 | +.030/.042 .76/1.07mm | | | | | +.216 5.49mm |
| 11 1/2 | 292.100 | | | | | | |
| 11 3/4 | 298.450 | | | | | | |
| 12 | 304.800 | +.032/.044 .81/1.12mm | | | | | +.226 5.74mm |
| 12 1/4 | 311.150 | | | | | | |
| 12 1/2 | 317.500 | | | | | | |
| 12 3/4 | 323.850 | | | | | | |
| 13 | 330.200 | +.034/.048 .86/1.22mm | | | | | +.235 5.97mm |
| 13 1/4 | 336.550 | | | | | | |
| 13 1/2 | 342.900 | +.035/.050 .89/1.27mm | +.009/.024 .23/.61mm | | | | |
| 13 3/4 | 349.250 | | | | | | |
| 14 | 355.600 | | | | | | |
| 14 1/4 | 361.950 | | | | | | |
| 14 1/2 | 368.300 | | | | | | |
| 14 3/4 | 374.650 | +.037/.052 .94/1.32mm | | | | | |
| 15 | 381.000 | | | | | | |
| 14 3/4 | 374.650 | +.040/.055 1.02/1.47mm | +.009/.025 .23/.64mm | | | | |
| 15 | 381.000 | | | | | | |

STANDARD FLANGED MARINE BEARINGS



Heavy-duty flange bearings are engineered to meet the toughest application requirements in marine and industrial applications. The flange type bearing requires only a light press fit and is locked into position by bolting thru the flange. The flange is supplied plain enabling you to machine bolt holes to individual requirements.

They operate in any water-base liquids, most chemicals and petro products. Operating temperatures range from +39° to 158°F, +4° to 70°C.

Normal loading capacity up to 35 psi, .0246 kg. per sq. mm. Shaft is cushioned by continuous flow of 2 gals/in.; 7.5 liters/25 mm of shaft diameter/min. through the bearing.

All materials meet U.S. Navy specifications. MIL-B-17901A CLII.

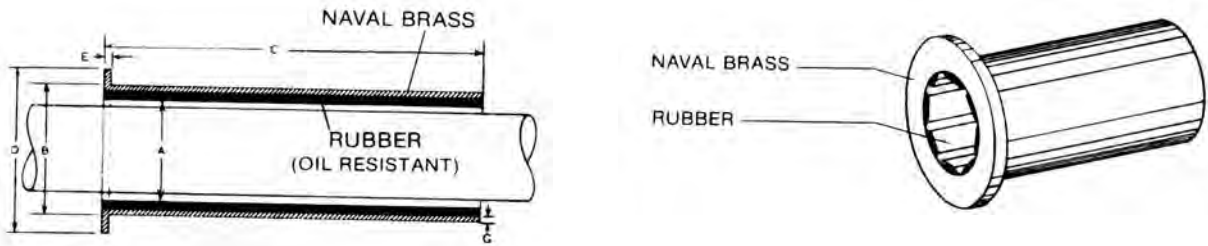
Prices on split shaft bearings and other sizes available on request.

Bolt holes drilled to your requirements. Prices furnished upon request.

Sizes thru 12" shaft diameter are in stock for immediate shipment. All other standard sizes manufactured on request.

Caution: If the bearing is to be shrink fitted, care is required to prevent damage to the bearing. Cool the bearing gradually. Do not cool the bearing below -20°F (-28°C). Dry ice or other super cool materials should not be used. Pounding the bearing in a chilled state can cause damage to the bond between the rubber and the shell material.

FLANGED BEARINGS



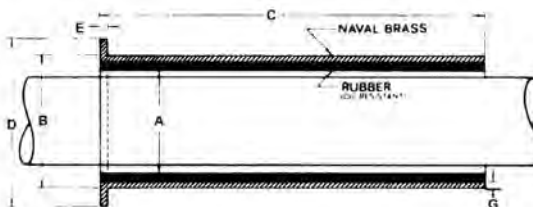
Flanged Bearings

Heavy-duty flange bearings are engineered to meet the toughest application requirements in marine and industrial applications. The flange is supplied plain enabling you to machine bolt holes to individual requirements.

3

| TIMCO MORSE CODE | B. F. Goodrich Code | Johnson Code | A Shaft Size | B Outside Dia. | C Length | D Flange Dia. | E Flange Thickness | G Metal Thickness |
|------------------|---------------------|--------------|--------------|----------------|----------|---------------|--------------------|-------------------|
| ABALONE | Quaker | Catch | 3" | 4 1/4" | 12" | 6 3/4" | 1/2" | 1/4" |
| BARNACLE | Qualm | Clamp | 3 1/4" | 4 1/2" | 13" | 7" | 1/2" | 1/4" |
| CRAB | Quarts | Clear | 3 1/2" | 4 7/8" | 14" | 7 3/8" | 1/2" | 5/16" |
| CRAWFISH | Quash | Civil | 3 3/4" | 5 1/4" | 15" | 7 3/4" | 1/2" | 5/16" |
| LOBSTER | Quay | Draft | 4" | 5 1/2" | 16" | 8" | 1/2" | 5/16" |
| MUSSEL | Quench | Dread | 4 1/4" | 5 3/4" | 17" | 8 1/4" | 1/2" | 5/16" |
| NAUTILUS | Quibble | Drink | 4 1/2" | 6" | 18" | 8 7/8" | 1/2" | 5/16" |
| OCTOPUS | Quid | Drove | 4 3/4" | 6 1/4" | 19" | 9 1/8" | 1/2" | 5/16" |
| OYSTER | Quince | Earth | 5" | 6 3/4" | 20" | 9 5/8" | 9/16" | 3/8" |
| PRAWN | Quirk | Easel | 5 1/4" | 6 7/8" | 21" | 9 7/8" | 9/16" | 3/8" |
| SCALLOP | Quiver | Erase | 5 1/2" | 7 1/4" | 22" | 10 1/4" | 9/16" | 3/8" |
| SEAHORSE | Quota | Event | 5 3/4" | 7 1/4" | 23" | 10 1/4" | 9/16" | 3/8" |
| SHRIMP | Quorum | Fault | 6" | 7 3/4" | 24" | 11" | 9/16" | 3/8" |
| BARK | Rabbit | Fence | 6 1/4" | 8" | 22 1/2" | 10 5/8" | 9/16" | 3/8" |
| BRIG | Raccoon | Flare | 6 1/2" | 8 3/8" | 23 1/2" | 11" | 9/16" | 7/16" |
| CANOE | Raceme | Fancy | 6 3/4" | 8 3/4" | 24 1/2" | 11 3/8" | 9/16" | 7/16" |
| CARAVEL | Racial | Gavel | 7" | 9" | 25 1/2" | 11 5/8" | 9/16" | 7/16" |
| CORSAIR | | Globe | 7 1/2" | 9 5/8" | 27 1/2" | 12 1/4" | 9/16" | 7/16" |
| CORVETTE | Raffle | Gipsy | 7 3/4" | 9 7/8" | 28 1/2" | 12 1/2" | 9/16" | 1/2" |
| CUTTER | Ragtime | Heart | 8" | 10 1/4" | 29 1/2" | 13 1/4" | 5/8" | 3/8" |
| CUTTERINE | Ragged | Hedge | 8" | 10 1/2" | 29 1/2" | 13 1/4" | 5/8" | 5/8" |
| DOGGER | Raid | Hitch | 8 1/4" | 10 1/2" | 30 1/2" | 13 1/2" | 5/8" | 1/2" |
| FRIGATE | Rainbow | Hoist | 8 1/2" | 10 3/4" | 31 1/2" | 13 3/4" | 5/8" | 1/2" |
| GALLEON | Raindrop | Hover | 8 3/4" | 11" | 32 1/2" | 14" | 5/8" | 1/2" |
| GONDOLA | Ralph | Infra | 9" | 11 1/4" | 33 1/2" | 14 1/4" | 3/4" | 1/2" |
| KETCH | Rasher | Irish | 9 1/4" | 11 1/2" | 34 1/2" | 14 5/8" | 3/4" | 1/2" |
| OUTRIGGER | Regent | Inset | 9 1/2" | 11 3/4" | 35 1/2" | 14 7/8" | 3/4" | 1/2" |
| SAMPAN | | Ivory | 9 3/4" | 12 1/8" | 36 1/2" | 15 1/4" | 3/4" | 9/16" |
| SCHOONER | Sage | Jewel | 10" | 12 3/8" | 37 1/2" | 15 1/2" | 3/4" | 9/16" |
| SCOOTER | Sagebrush | Jetty | 10 1/4" | 12 5/8" | 38 1/2" | 15 7/8" | 3/4" | 9/16" |
| SHALLOP | Sail | Jumbo | 10 1/2" | 12 7/8" | 39 1/2" | 16 1/8" | 3/4" | 9/16" |
| SLOOP | Salema | Judge | 10 3/4" | 13 1/8" | 40 1/2" | 16 3/8" | 3/4" | 9/16" |
| SMACK | Salic | Knock | 11" | 13 1/2" | 41 1/2" | 17 1/4" | 3/4" | 9/16" |
| SNOW | Salient | Kraft | 11 1/4" | 13 3/4" | 42 1/2" | 17 1/2" | 3/4" | 9/16" |
| TARTAN | Somovar | Kneel | 11 1/2" | 14 1/8" | 43 1/2" | 17 7/8" | 3/4" | 5/8" |
| YACHT | Sander | Knots | 11 3/4" | 14 3/8" | 44 1/2" | 18 1/8" | 3/4" | 5/8" |
| YAWL | Sandering | Labor | 12" | 14 3/4" | 45 1/2" | 18 1/2" | 3/4" | 5/8" |

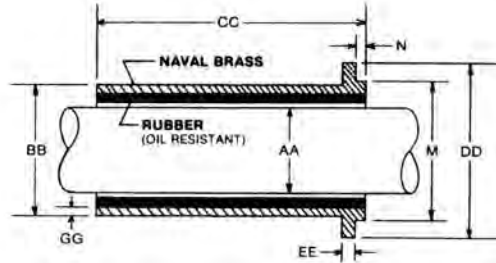
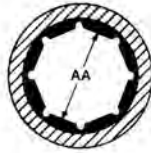
STANDARD FLANGE MARINE BEARINGS



| Sizes below available from stock | | | | | | | | |
|----------------------------------|----------|--------------|----------------|----------|---------------|-----------------|----------------|------------|
| TIMCO Code Name | Part No. | A SHAFT DIA. | B OUTSIDE DIA. | C LENGTH | D FLANGE DIA. | E FLANGE THICK. | G SHELL THICK. | Wt. (Lbs.) |
| ABALONE | E20100 | 3" | 4 1/4" | 12" | 6 3/4" | 1/2" | 1/4" | 29 |
| BARNACLE | E20200 | 3 1/4" | 4 1/2" | 13" | 7" | 1/2" | 1/4" | 30 |
| CRAB | E20300 | 3 1/2" | 4 7/8" | 14" | 7 3/8" | 1/2" | 5/16" | 38 |
| CRAWFISH | E20400 | 3 3/4" | 5 1/4" | 15" | 7 3/4" | 1/2" | 5/16" | 45 |
| LOBSTER | E20500 | 4" | 5 1/2" | 16" | 8" | 1/2" | 5/16" | 50 |
| MUSSEL | E20600 | 4 1/4" | 5 3/4" | 17" | 8 1/4" | 1/2" | 5/16" | 55 |
| NAUTILUS | E20700 | 4 1/2" | 6" | 18" | 8 7/8" | 1/2" | 5/16" | 63 |
| OCTOPUS | E20800 | 4 3/4" | 6 1/4" | 19" | 9 1/8" | 1/2" | 5/16" | 66 |
| OYSTER | E20900 | 5" | 6 3/4" | 20" | 9 5/8" | 9/16" | 3/8" | 81 |
| PRAWN | E21000 | 5 1/4" | 6 7/8" | 21" | 9 7/8" | 9/16" | 3/8" | 88 |
| SCALLOP | E21100 | 5 1/2" | 7 1/4" | 22" | 10 1/4" | 9/16" | 3/8" | 95 |
| SEAHORSE | E21200 | 5 3/4" | 7 1/4" | 23" | 10 1/4" | 9/16" | 3/8" | 98 |
| SHRIMP | E21300 | 6" | 7 3/4" | 24" | 11" | 9/16" | 3/8" | 109 |
| BARK | E21400 | 6 1/4" | 8" | 22 1/2" | 10 5/8" | 9/16" | 3/8" | 101 |
| BRIG | E21500 | 6 1/2" | 8 3/8" | 23 1/2" | 11" | 9/16" | 7/16" | 125 |
| CANOE | E21600 | 6 3/4" | 8 3/4" | 24 1/2" | 11 3/8" | 9/16" | 7/16" | 135 |
| CARAVEL | E21700 | 7" | 9" | 25 1/2" | 11 5/8" | 9/16" | 7/16" | 142 |
| CLIPPER | E21800 | 7 1/4" | 9 1/4" | 26 1/2" | 11 7/8" | 9/16" | 7/16" | 150 |
| CORSAIR | E21900 | 7 1/2" | 9 5/8" | 27 1/2" | 12 1/4" | 9/16" | 7/16" | 168 |
| CORVETTE | E22000 | 7 3/4" | 9 7/8" | 28 1/2" | 12 1/2" | 9/16" | 1/2" | 187 |
| CUTTER | E22100 | 8" | 10 1/4" | 29 1/2" | 13 1/4" | 5/8" | 3/8" | 200 |
| CUTTERINE | E22200 | 8" | 10 1/2" | 29 1/2" | 13 1/4" | 5/8" | 1/2" | 242 |
| DOGGER | E22300 | 8 1/4" | 10 1/2" | 30 1/2" | 13 1/2" | 5/8" | 1/2" | 222 |
| FRIGATE | E22400 | 8 1/2" | 10 3/4" | 31 1/2" | 13 3/4" | 5/8" | 1/2" | 235 |
| GALLEON | E22500 | 8 3/4" | 11" | 32 1/2" | 14" | 5/8" | 1/2" | 240 |
| GONDOLA | E22600 | 9" | 11 1/4" | 33 1/2" | 14 1/4" | 3/4" | 1/2" | 255 |
| KETCH | E22700 | 9 1/4" | 11 1/2" | 34 1/2" | 14 5/8" | 3/4" | 1/2" | 275 |
| OUTRIGGER | E22800 | 9 1/2" | 11 3/4" | 35 1/2" | 14 7/8" | 3/4" | 1/2" | 278 |
| SAMPAN | E22900 | 9 3/4" | 12 1/8" | 36 1/2" | 15 1/4" | 3/4" | 9/16" | 350 |
| SCHOONER | E23000 | 10" | 12 3/8" | 37 1/2" | 15 1/2" | 3/4" | 9/16" | 355 |
| SCOOTER | E23100 | 10 1/4" | 12 5/8" | 38 1/2" | 15 7/8" | 3/4" | 9/16" | 360 |
| SHALLOP | E23200 | 10 1/2" | 12 7/8" | 39 1/2" | 16 1/8" | 3/4" | 9/16" | 365 |
| SLOOP | E23300 | 10 3/4" | 13 1/8" | 40 1/2" | 16 3/8" | 3/4" | 9/16" | 385 |
| SMACK | E23400 | 11" | 13 1/2" | 41 1/2" | 17 1/4" | 3/4" | 9/16" | 438 |
| SNOW | E23500 | 11 1/4" | 13 3/4" | 42 1/2" | 17 1/2" | 3/4" | 9/16" | 432 |
| TARTAN | E23600 | 11 1/2" | 14 1/8" | 43 1/2" | 17 7/8" | 3/4" | 5/8" | 496 |
| YACHT | E23700 | 11 3/4" | 14 3/8" | 44 1/2" | 18 1/8" | 3/4" | 5/8" | 486 |
| YAWL | E23800 | 12" | 14 3/4" | 45 1/2" | 18 1/2" | 3/4" | 5/8" | 529 |

| Sizes below manufactured on request | | | | | | | | |
|-------------------------------------|--------|---------|---------|---------|---------|------|--------|-----|
| YANQUI | E23900 | 12 1/4" | 15" | 46 1/2" | 18 3/4" | 3/4" | 5/8" | 545 |
| YAPOK | E24000 | 12 1/2" | 15 1/4" | 47 1/2" | 19" | 3/4" | 5/8" | 545 |
| YARBOROUGH | E24100 | 12 3/4" | 15 1/2" | 48 1/2" | 19 1/4" | 3/4" | 5/8" | 550 |
| YATAGHAN | E24200 | 13" | 15 7/8" | 50" | 19 5/8" | 7/8" | 11/16" | 563 |
| YEOMEN | E24300 | 13 1/4" | 16 1/8" | 51" | 19 7/8" | 7/8" | 11/16" | 610 |
| YORK | E24400 | 13 1/2" | 16 3/8" | 52" | 20 1/8" | 7/8" | 11/16" | 640 |
| ZEPHYR | E24500 | 13 3/4" | 16 5/8" | 53" | 20 3/8" | 7/8" | 11/16" | 650 |
| ZEPPELIN | E24600 | 14" | 16 7/8" | 54" | 20 5/8" | 7/8" | 11/16" | 675 |
| ZEPPLO | E24700 | 14 1/4" | 17 1/8" | 55" | 20 7/8" | 7/8" | 11/16" | 701 |
| ZIRCON | E24800 | 14 1/2" | 17 1/2" | 56" | 21 1/4" | 7/8" | 3/4" | 754 |
| ZODIAK | E24900 | 14 3/4" | 17 3/4" | 57" | 21 1/2" | 7/8" | 3/4" | 775 |
| ZULU | E25000 | 15" | 18" | 58" | 21 3/4" | 7/8" | 3/4" | 795 |

FORWARD STERN TUBE BEARINGS



3

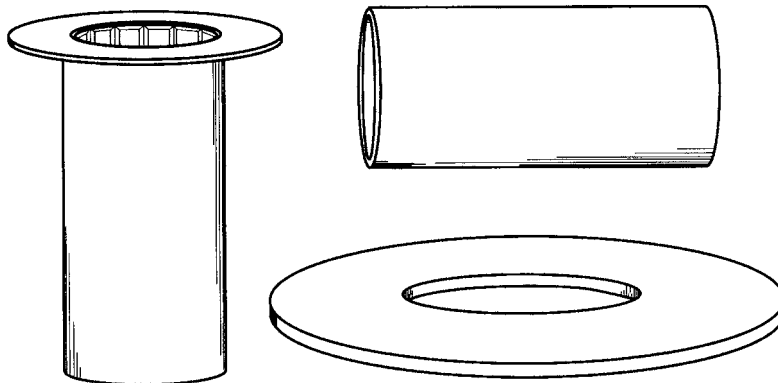
| Sizes below available from stock | | | | | | | | | |
|----------------------------------|---------------|-------------------------|-----------|----------------|------------------|-----------------|--------------|----------------|----------------------|
| TIMCO PART NO. | AA SHAFT SIZE | BB BEARING OUTSIDE DIA. | CC LENGTH | DD FLANGE DIA. | EE FIANGE THICK. | GG METAL THICK. | M PILOT DIA. | N PILOT THICK. | SHIPPING WEIGHT LBS. |
| FB0100 | 3" | 4 1/4" | 12" | 7 1/2" | 1/2" | 1/4" | 4 3/4" | 3/16" | 21 |
| FB0200 | 3 1/4" | 4 1/2" | 13" | 7 1/2" | 1/2" | 1/4" | 4 3/4" | 3/16" | 24 |
| FB0300 | 3 1/2" | 4 7/8" | 14" | 8 1/8" | 1/2" | 5/16" | 5 1/4" | 3/16" | 38 |
| FB0400 | 3 3/4" | 5 1/4" | 15" | 8 1/8" | 1/2" | 5/16" | 5 1/4" | 3/16" | 43 |
| FB0500 | 4" | 5 1/2" | 16" | 8 5/8" | 1/2" | 5/16" | 5 3/4" | 3/16" | 48 |
| FB0600 | 4 1/4" | 5 3/4" | 17" | 8 5/8" | 1/2" | 5/16" | 5 3/4" | 3/16" | 52 |
| FB0700 | 4 1/2" | 6" | 18" | 9 3/8" | 1/2" | 5/16" | 6 1/2" | 3/16" | 58 |
| FB0800 | 4 3/4" | 6 1/4" | 19" | 9 3/8" | 1/2" | 5/16" | 6 1/2" | 3/16" | 61 |
| FB0900 | 5" | 6 3/4" | 20" | 10 1/8" | 9/16" | 3/8" | 7 1/4" | 3/16" | 75 |
| FB1000 | 5 1/4" | 6 7/8" | 21" | 10 1/8" | 9/16" | 3/8" | 7 1/4" | 3/16" | 79 |
| FB1100 | 5 1/2" | 7 1/4" | 22" | 10 5/8" | 9/16" | 3/8" | 7 3/4" | 3/16" | 90 |
| FB1200 | 5 3/4" | 7 1/4" | 23" | 10 5/8" | 9/16" | 3/8" | 7 3/4" | 3/16" | 92 |
| FB1300 | 6" | 7 3/4" | 15" | 11 3/8" | 9/16" | 3/8" | 8" | 3/8" | 75 |
| FB1400 | 6 1/4" | 7 7/8" | 15" | 11 3/8" | 9/16" | 3/8" | 8" | 3/8" | 77 |
| FB1500 | 6 1/2" | 8 3/8" | 15" | 13 1/2" | 5/8" | 7/16" | 8 5/8" | 3/8" | 91 |
| FB1600 | 6 3/4" | 8 3/4" | 15" | 13 3/4" | 5/8" | 7/16" | 9" | 3/8" | 99 |
| FB1700 | 7" | 9" | 17 1/2" | 13 3/4" | 5/8" | 7/16" | 9" | 3/8" | 116 |
| FB1800 | 7 1/4" | 9 1/4" | 17 1/2" | 14 1/8" | 5/8" | 7/16" | 9 5/8" | 3/8" | 122 |
| FB1900 | 7 1/2" | 9 5/8" | 17 1/2" | 14 1/2" | 5/8" | 7/16" | 10" | 3/8" | 123 |
| FB2000 | 7 3/4" | 9 7/8" | 17 1/2" | 14 1/2" | 5/8" | 1/2" | 10" | 3/8" | 126 |
| FB2100 | 8" | 10 1/4" | 20" | 14 7/8" | 3/8" | 1/2" | 10 3/8" | 3/8" | 145 |
| FB2200 | 8" | 10 1/2" | 20" | 14 7/8" | 5/8" | 1/2" | 10 3/8" | 3/8" | 150 |
| FB2300 | 8 1/4" | 10 1/2" | 20" | 15 1/4" | 5/8" | 1/2" | 10 3/4" | 3/8" | 157 |
| FB2400 | 8 1/2" | 10 3/4" | 20" | 15 1/4" | 5/8" | 1/2" | 10 3/4" | 3/8" | 162 |
| FB2500 | 8 3/4" | 11" | 20" | 15 5/8" | 3/4" | 1/2" | 11 1/8" | 3/8" | 170 |
| FB2600 | 9" | 11 1/4" | 22 1/2" | 16" | 3/4" | 1/2" | 11 1/2" | 3/8" | 193 |
| FB2700 | 9 1/4" | 11 1/2" | 22 1/2" | 16" | 3/4" | 1/2" | 11 1/2" | 3/8" | 200 |
| FB2800 | 9 1/2" | 11 3/4" | 22 1/2" | 16 3/8" | 3/4" | 1/2" | 11 7/8" | 3/8" | 205 |
| FB2900 | 9 3/4" | 12 1/8" | 22 1/2" | 16 7/8" | 3/4" | 9/16" | 12 3/8" | 3/8" | 217 |
| FB3000 | 10" | 12 3/8" | 25" | 16 7/8" | 3/4" | 9/16" | 12 3/8" | 3/8" | 240 |
| FB3100 | 10 1/4" | 12 5/8" | 25" | 17 7/8" | 3/4" | 9/16" | 12 3/4" | 3/8" | 244 |
| FB3200 | 10 1/2" | 12 7/8" | 25" | 18 1/4" | 3/4" | 9/16" | 13 1/8" | 3/8" | 247 |
| FB3300 | 10 3/4" | 13 1/8" | 25" | 18 1/4" | 3/4" | 9/16" | 13 1/8" | 3/8" | 250 |
| FB3400 | 11" | 13 1/2" | 27 1/2" | 18 5/8" | 3/4" | 9/16" | 13 1/2" | 3/8" | 300 |
| FB3500 | 11 1/4" | 13 3/4" | 27 1/2" | 19" | 3/4" | 9/16" | 13 7/8" | 3/8" | 312 |
| FB3600 | 11 1/2" | 14 1/8" | 27 1/2" | 19" | 3/4" | 5/8" | 13 7/8" | 3/8" | 326 |
| FB3700 | 11 3/4" | 14 3/8" | 27 1/2" | 19 3/8" | 3/4" | 5/8" | 14 1/8" | 3/8" | 335 |
| FB3800 | 12" | 14 3/4" | 30" | 19 3/4" | 3/4" | 5/8" | 14 1/2" | 3/8" | 360 |

More standard flanged and forward stern tube bearings are available in split form upon request. Non-standard materials are available upon request. Special configurations can be manufactured to your specifications.

NON-METALLIC BEARINGS

TUBE STOCK

| O.D. | I.D. | O.D. | I.D. | O.D. | I.D. | | |
|--------|--------|--------|---------|--------|--------|---------|-----|
| 1" | 1/2" | 6" | 1" | 9" | 7 1/2" | | |
| | 1" | | 1 1/2" | | 6" | 6" | |
| 2" | 1" | | 2" | | 6 1/2" | 7" | |
| 2 1/2" | 1 1/2" | | 2 1/2" | | 7" | 7 1/2" | |
| | 1" | | 3" | | 8" | 8" | |
| | 1 1/2" | | 3 1/2" | | 8 1/2" | 9" | |
| 3" | 2" | | 4" | | 9" | 10" | |
| | 1" | | 4 1/2" | | 10" | 10 1/2" | |
| | 1 1/2" | | 5" | | 11" | 11" | |
| | 2" | | 5 1/2" | | 12" | 12" | |
| | 2 1/2" | 6 1/2" | 3" | 10" | 10" | | |
| 3 1/2" | 1" | | 3 1/2" | | 9" | 9" | |
| | 1 1/2" | | 4" | | 10" | 10" | |
| | 2" | | 4 1/2" | | 11" | 11" | |
| | 2 1/2" | | 5" | | 12" | 12" | |
| 4" | 3" | | 5 1/2" | | 13" | 13" | |
| | 1" | | 6" | | 14" | 14" | |
| | 1 1/2" | | 6 1/2" | | 15" | 15" | |
| | 2" | | 7" | | 16" | 16" | |
| | 2 1/2" | | 7" | | 3" | 11" | 11" |
| | 3" | 3 1/2" | | 10" | 10" | | |
| | 2 1/2" | 4" | | 11" | 11" | | |
| 4 1/2" | 3 1/2" | 4 1/2" | | 12" | 12" | | |
| | 1" | 5" | | 13" | 13" | | |
| | 1 1/2" | 5 1/2" | | 14" | 14" | | |
| | 2" | 6" | | 15" | 15" | | |
| | 2 1/2" | 6 1/2" | | 16" | 16" | | |
| | 3" | 7" | | 17" | 17" | | |
| | 3 1/2" | 7 1/2" | | 3 1/2" | 12" | | 12" |
| 1/2" | 3 1/2" | | 4" | 11" | | 11" | |
| | 4" | | 4 1/2" | 12" | | 12" | |
| 5" | 1" | | 5" | 13" | | 13" | |
| | 1 1/2" | | 5 1/2" | 14" | | 14" | |
| | 2" | | 6" | 15" | | 15" | |
| | 2 1/2" | | 6 1/2" | 16" | | 16" | |
| | 3" | | 7" | 17" | | 17" | |
| | 3 1/2" | | 7 1/2" | 18" | | 18" | |
| | 4" | | 8" | 4" | | 13" | 13" |
| | 4 1/2" | 4 1/2" | | 14" | 14" | | |
| 5 1/2" | 1" | 5" | | 15" | 15" | | |
| | 1 1/2" | 5 1/2" | | 16" | 16" | | |
| | 2" | 6" | | 17" | 17" | | |
| | 2 1/2" | 6 1/2" | | 18" | 18" | | |
| | 3" | 7" | | 19" | 19" | | |
| | 3 1/2" | 7 1/2" | | 20" | 20" | | |
| | 4" | 8 1/2" | | 7 1/2" | 14" | | 14" |
| | 4 1/2" | | | 8" | | | 15" |
| | 5" | | 8 1/2" | 16" | | 16" | |
| | 5 1/2" | | 9" | 17" | | 17" | |
| | 6" | | 9 1/2" | 18" | | 18" | |
| | 6 1/2" | | 10" | 19" | | 19" | |
| | 7" | | 10 1/2" | 20" | | 20" | |
| | 7 1/2" | | 11" | 21" | | 21" | |
| | 8" | | 11 1/2" | 22" | | 22" | |
| | 8 1/2" | | 12" | 23" | | 23" | |



**FLANGED OR SLEEVE STYLE
RUDDER BEARINGS &
THRUST WASHERS**

The bearings may be used in the following applications:

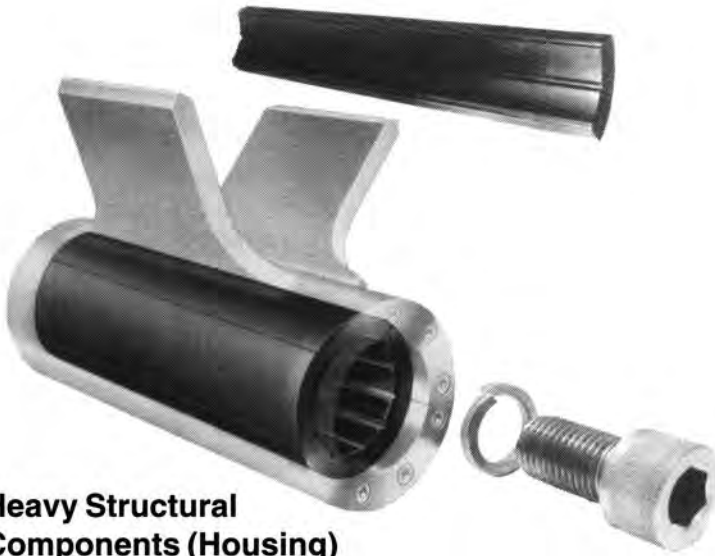
- Rudder Bearings
- Thrust Washers
- Pintle Bearings
- Flanged Bushings
- Sleeve Bushings

| | |
|-----------------------------------|---------|
| Limiting PV (Dry) | 3,000 |
| "K' Factor (Wear Rate) | 83 |
| Coefficient of Friction (Static) | .17-.25 |
| Coefficient of Friction (Kinetic) | .17-.25 |
| Compressive Strength | 14,000 |
| Compressive Modulus | 400,000 |

- Predictable rate of thermal and hydraulic expansion.
- May be either interference or bonded fit.

DEMOUNTABLE STAVE BEARING ASSEMBLIES

3



Heavy Structural Components (Housing)

Model No. DBA1

For V-strut, Stern Tube, Rudders and Cutter Head Shafts

Consists of –

1. Demountable Head Assembly (Two 180° Segments).
2. Stainless Steel Socket Head Cap Screws.
3. Stainless Steel Hi-Collar Lock Washers.
4. Bearing Stave Complement, Solid Rubber.



**Heavy Structural Components (Housing)
Not Supplied By Johnson**

MODEL NO. DBA2

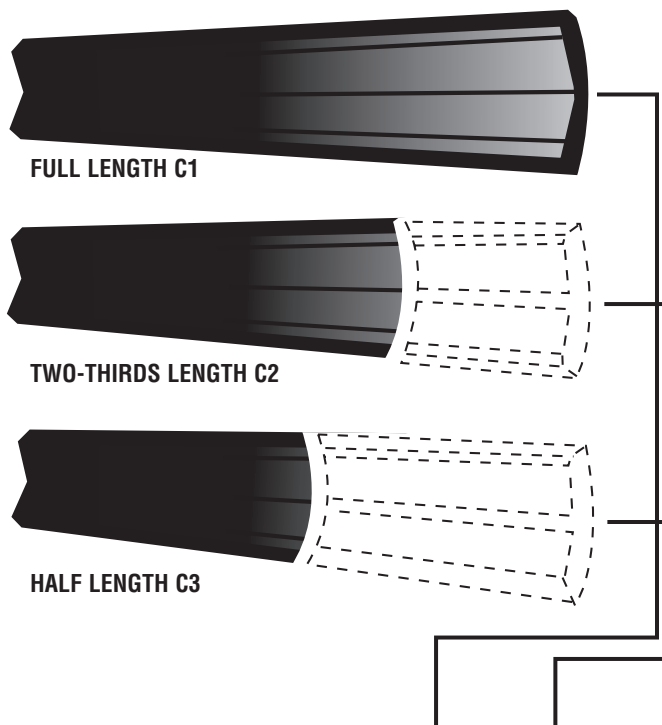
For Forward Stern Tube Shafts and Stuffing Box Assemblies. Used in conjunction with any style Stuffing Box.

Consists of –

1. Special 304 Stainless Steel Suds.
2. Special 304 Stainless Steel Nuts.
3. Special 304 Stainless Steel Jam Nuts.
4. Bearing Stave Complement, Solid Rubber.
5. Stuffing Box Assembly.

STAVE BEARINGS

| Journal Size (Bearing I.D.) A | DBA 1 Demountable Bearing Assy. Number | Bearing Number (Set) | C-1 Replacement Bearing Set Full Length | C-2 Replacement Bearing Set 2/3 Length | C-3 Replacement Bearing Set 1/2 Length |
|-------------------------------|--|----------------------|---|--|--|
| 2-1/2" | DBA1-L-0212 | L-0212-0312 x 4 | 10" | 6-3/4" | 5" |
| 3" | DBA1-L-0300 | L-0300-0412 x 4 | 14" | 9-1/4" | 7" |
| 3-1/2" | DBA1-L-0312 | L-0312-0412 x 4 | | | |
| 4" | DBA1-L-0400 | L-0400-0512 x 4 | 17" | 11" | 8-1/2" |
| 4-1/4" | DBA1-L-0414 | L-0414-0512 x 4 | | | |
| 4-1/2" | DBA1-L-0412 | L-0412-0618 x 4 | 19" | 12-1/2" | 9-1/2" |
| 4-3/4" | DBA1-L-0434 | L-0434-0618 x 4 | | | |
| 5" | DBA1-L-0500 | L-0500-0612 x 4 | 21" | 14" | 10-1/2" |
| 5-1/4" | DBA1-L-0514 | L-0514-0612 x 4 | | | |
| 5-1/2" | DBA1-L-0512 | L-0512-0712 x 4 | 23" | 15" | 11-1/2" |
| 5-3/4" | DBA1-L-0534 | L-0534-0712 x 4 | | | |
| 6" | DBA1-L-0600 | L-0600-0800 x 6 | 25" | 16-1/2" | 12-1/2" |
| 6-1/4" | DBA1-L-0614 | L-0614-0800 x 6 | | | |
| 6-1/2" | DBA1-L-0612 | L-0612-0812 x 6 | 27" | 18" | 13-1/2" |
| 6-3/4" | DBA1-L-0634 | L-0634-0812 x 6 | | | |
| 7" | DBA1-L-0700 | L-0700-0914 x 6 | 29" | 19" | 14-1/2" |
| 7-1/4" | DBA1-L-0714 | L-0714-0914 x 6 | | | |
| 7-1/2" | DBA1-L-0712 | L-0712-1014 x 6 | 32" | 21" | 16" |
| 7-3/4" | DBA1-L-0734 | L-0734-1014 x 6 | | | |
| 8" | DBA1-L-0800 | L-0800-1014 x 6 | 35" | 23" | 17-1/2" |
| 8-1/4" | DBA1-L-0814 | L-0814-1100 x 8 | | | |
| 8-1/2" | DBA1-L-0812 | L-0812-1100 x 8 | 38" | 25" | 19" |
| 8-3/4" | DBA1-L-0834 | L-0834-1100 x 8 | | | |
| 9" | DBA1-L-0900 | L-0900-1134 x 8 | 41" | 27" | 20-1/2" |
| 9-1/4" | DBA1-L-0914 | L-0914-1134 x 8 | | | |
| 9-1/2" | DBA1-L-0912 | L-0912-1134 x 8 | 44" | 29" | 22" |
| 9-3/4" | DBA1-L-0934 | L-0934-1234 x 8 | | | |
| 10" | DBA1-L-1000 | L-1000-1234 x 8 | 47" | 31" | 23-1/2" |
| 10-1/4" | DBA1-L-1014 | L-1014-1234 x 8 | | | |
| 10-1/2" | DBA1-L-1012 | L-1012-1334 x 10 | 50" | 33" | 25" |
| 10-3/4" | DBA1-L-1034 | L-1034-1334 x 10 | | | |
| 11" | DBA1-L-1100 | L-1100-1334 x 10 | 53" | 35" | 26-1/2" |
| 11-1/4" | DBA1-L-1114 | L-1114-1412 x 10 | | | |
| 11-1/2" | DBA1-L-1112 | L-1112-1412 x 10 | 56" | 37" | 28" |
| 11-3/4" | DBA1-L-1134 | L-1134-1412 x 10 | | | |
| 12" | DBA1-L-1200 | L-1200-1512 x 10 | 59" | 39" | 29-1/2" |
| 12-1/4" | DBA1-L-1214 | L-1214-1512 x 10 | | | |
| 12-1/2" | DBA1-L-1212 | L-1212-1512 x 10 | 62" | 41" | 31" |
| 12-3/4" | DBA1-L-1234 | L-1234-1614 x 10 | | | |
| 13" | DBA1-L-1300 | L-1300-1614 x 10 | 65" | 43" | 32-1/2" |
| 13-1/4" | DBA1-L-1314 | L-1314-1614 x 10 | | | |
| 13-1/2" | DBA1-L-1312 | L-1312-1714 x 12 | | | |
| 13-3/4" | DBA1-L-1334 | L-1334-1714 x 12 | | | |
| 14" | DBA1-L-1400 | L-1400-1714 x 12 | | | |
| 14-1/4" | DBA1-L-1414 | L-1414-1814 x 12 | | | |
| 14-1/2" | DBA1-L-1412 | L-1412-1814 x 12 | | | |
| 14-3/4" | DBA1-L-1434 | L-1434-1814 x 12 | | | |
| 15" | DBA1-L-1500 | L-1500-1900 x 12 | | | |
| 15-1/4" | DBA1-L-1514 | L-1514-1900 x 12 | | | |
| 15-1/2" | DBA1-L-1512 | L-1512-1900 x 12 | | | |
| 15-3/4" | DBA1-L-1534 | L-1534-2000 x 12 | | | |
| 16" | DBA1-L-1600 | L-1600-2000 x 12 | | | |



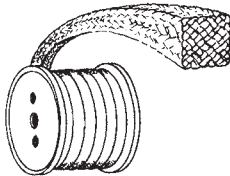
3

| Journal Size (Bearing I.D.) A | DBA 1 Demountable Bearing Assy. Number | Bearing Number (Set) | C-1 Replacement Bearing Set Full Length | C-2 Replacement Bearing Set 2/3 Length | C-3 Replacement Bearing Set 1/2 Length |
|-------------------------------|--|----------------------|---|--|--|
| 16-1/4" | DBA1-L-1614 | L-1614-2000 x 12 | | | |
| 16-1/2" | DBA1-L-1612 | L-1612-2012 x 12 | 68" | 45" | 34" |
| 16-3/4" | DBA1-L-1634 | L-1634-2012 x 12 | | | |
| 17" | DBA1-L-1700 | L-1700-2012 x 12 | 71" | 47" | 35-1/2" |
| 17-1/4" | DBA1-L-1714 | L-1714-2114 x 14 | | | |
| 17-1/2" | DBA1-L-1712 | L-1712-2114 x 14 | 74" | 49" | 37" |
| 17-3/4" | DBA1-L-1734 | L-1734-2114 x 14 | | | |
| 18" | DBA1-L-1800 | L-1800-2200 x 14 | 77" | 51" | 38-1/2" |
| 18-1/4" | DBA1-L-1814 | L-1814-2200 x 14 | | | |
| 18-1/2" | DBA1-L-1812 | L-1812-2200 x 14 | 80" | 53" | 40" |
| 18-3/4" | DBA1-L-1834 | L-1834-2234 x 14 | | | |
| 19" | DBA1-L-1900 | L-1900-2234 x 14 | | | |
| 19-1/4" | DBA1-L-1914 | L-1914-2234 x 14 | | | |
| 19-1/2" | DBA1-L-1912 | L-1912-2312 x 14 | | | |
| 19-3/4" | DBA1-L-1934 | L-1934-2312 x 14 | | | |
| 20" | DBA1-L-2000 | L-2000-2312 x 14 | | | |

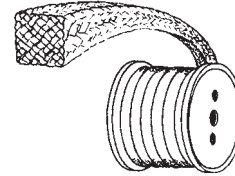
C-4 SPECIAL
DENOTES NON-STANDARD LENGTHS – CUT TO YOUR CHOICE - NO EXTRA CHARGE
SPECIAL LENGTH – Price is based on longer standard length.



COMPRESSION PACKING



TEFLON® / FLAX WITH LUBE



Max Temp: 200° F (90° C)
PSI: 300 PSI
FPM: 1200 FPM (6 MPS)
PH: 5-11
Construction: Plait Braided

High quality flax and ramie fibers are impregnated with an inert compound and generously lubricated with Teflon™ suspension for a smooth white finish. Primarily used in marine applications such as stern tubes and rubber posts.

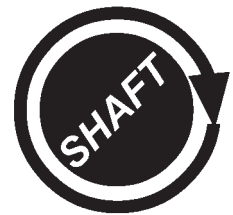
3

| ITEM NO. | SIZE | APPROX. FEET PER LB. (METERS PER KG) |
|----------|----------------|---|
| 345-125 | 1/8" (3.2 mm) | 108' (72.4) |
| 345-187 | 3/16" (4.8 mm) | 43' (28.8) |
| 345-250 | 1/4" (6.4 mm) | 25' (16.8) |
| 345-312 | 5/16" (7.9 mm) | 19' (12.7) |
| 345-375 | 3/8" (9.5 mm) | 11' (7.4) |
| 345-437 | 7/16" | 10.5' |
| 345-50 | 1/2" (12.7 mm) | 7.7' (5.2) |
| 345-525 | 9/16" | 5.1' |
| 345-625 | 5/8" (15.9 mm) | 5.8' (3.9) |
| 345-75 | 3/4" (19.1 mm) | 3.2' (2.1) |
| 345-875 | 7/8" (22.2 mm) | 2.7' (1.8) |
| 345-10 | 1" (25.4 mm) | 1.8' (1.2) |

Calculating Shaft Circumference

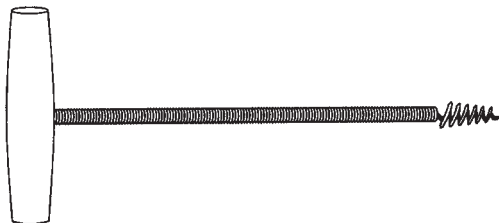
To calculate the circumference of your shaft, which is equal to the length of one ring of packing around the shaft, use this formula:

$$\text{Shaft Diameter} \times 3.141 = \text{Length of One Packing Ring}$$



* Packing available in other sizes and materials.
 * Die-Formed Packing Rings are also available, pre-compressed and pre-sized for faster installation and better seating.

FLEXIBLE PACKING PULLERS



| PART NO. | DESCRIPTION |
|----------|------------------------------|
| F1 | Small - 7-1/2" Removable Tip |
| F2 | Medium - 11" Removable Tip |
| F3 | Large - 14" Removable Tip |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

COMPRESSION PACKING



Cross Reference Chart

| TIMCO | Chemstar | Chesterton | Crane | Garlock | RM | Sepco | Teadit | Utex |
|----------|--------------|--------------|----------------|--------------|--------------|-------------------|-------------|------|
| 300 | 170 | 1740 | K-1730 | 5200 PM-5 | 981 | ML-4800 | 2004 | 212 |
| 320 | 1190 | 1727 | - | - | 980 | ML-2400 | - | 248 |
| 340 | - | - | - | 5861 | 963 | - | 2008 | - |
| 340-BIL | 152 | 322 1722 | C-60 | 5862 | 851-SW | 2225 | 2009 | - |
| 344 | 154 | 324 1724 | C-1045 | 5888 PM-7 | 847 | ML-2254 | 2005 | 232 |
| 344-BIL | 154-S | 328 1728 | C-1050 | 5889 PM-8 | 849 | ML-2235 | 2006-S | 231 |
| 344-FDA | - | - | - | - | - | - | - | - |
| 345 | 525-T | 329 | 867 | 5413 | 528-T | 219 | 2421 | 201 |
| 802 | 398 | 315 | 810 | 234 | 368 | ML-402 | GA-8 255 | - |
| 895 | 49 | 420 | 550 | 344 | - | - | - | - |
| 921 | 528 | 80 | 863 | 18 | 522 | 2 | 2138 | 200 |
| 921-G | - | - | - | - | - | - | - | - |
| 3000-G | 1398 1430 | 1315 | 1340 | 8913 PM-2 | 943 | ML-402 | 2255 | 236 |
| 3000-TK | 1152-K | - | - | 8921-K | 945 | ML-2225 | - | 241 |
| 3030-I | 414 | 1500 | 187-I | 127 | 325 | 310 | 3981 | - |
| 3030-INA | 1414 | 1800 | 287-I 387-I | 127-AFP | - | ML-310 | - | 683 |
| 4000 | 50 | 1738 | 1655-CF | 5000 8968 | 864 | ML-4412 | 2012 | 228 |
| 4000-G | 90 | 370 477-1 | 1650-CF | 98 | 862 | ML-4460 | 2002 | 226 |
| 5000 | 1100-TCP | 1400 | 1656-G | 1300 | GRAPHA BRAID | ML-2001 ML-911 | 2000 | 686 |
| 5000-C | - | - | - | - | - | - | - | - |
| 5000-I | 1100-I | 1600 | - | - | GRAPHA BRAID | - | - | - |
| 5000-IFE | - | - | - | 1303-FEP | GRAPHA STAR | - | - | - |
| 5000-T | - | - | - | - | GRAPHA LUBE | - | - | - |
| 8000-LC | 160 | 1-2 | 1630-G | G-700 | 863 | ML-4444 | 2001 | 229 |
| 8000-G | 160 | 375 | 1625-G | 200 | 861 | ML-4500 | - | - |
| 8000-T | 165 | - | - | 2100 | 845 | ML-4002 | - | 210 |
| 8000-TK | 165-K | 1740 | C-1064 | 6-K | 844 | ML-4004 | 2017 | 214 |
| 8010 | - | 555 | 110-G | 631 | - | 180 | - | 616 |
| 8011 | - | 666 | 100-AL | 633 | - | 184 | - | 631 |
| 8012 | - | - | 100-M | 632 | - | - | - | 610 |
| 8013 | - | - | 124 | 634 | - | - | - | 632 |
| 8100-BIL | 3165 | 1760 | 1070 | - | 846 | ML-8002 | - | 244 |
| 8200-BIL | 165-LA | 1750 | C-1065 | PM-6 | - | ML-3600 | 2007 | - |

BRONZE AIR-SEAL STUFFING BOXES FOR 1/2" TO 15" IN. DIAMETER SHAFT SIZES

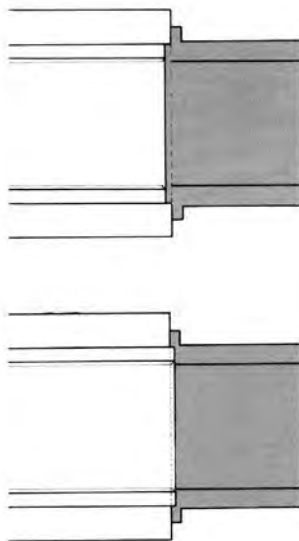
3



The new improved "Air-Seal" stuffing boxes, designed by Johnson Rubber Company, permit complete change of packing without dry docking of vessel. The "Air-Seal" ring design with exclusive "Positive Retraction" feature, is incorporated in standard size stuffing boxes (size 3" and up) with provisions for water service, grease service, or combination water and grease service as a unique design feature.

The exclusive "Bi-Stable" concave-convex design of the Johnson Air Seal Ring permits continuous inflation-deflation cycles without distending the inner rubber wall. When ring is deflated, the journal contract surface "retracts" to the original concave configuration away from journal while remaining perfectly smooth. No wrinkles develop to cause wearing contact against rotating shaft.

NOTE: PACKING NOT SUPPLIED



Flange Configurations – For Mating With Stern Bearings

Female Recess – For use where a flange-type forward stern tube bearing with a male boss is mated with the stuffing box. Models shown on opposite page may be ordered with a female recess precisely machined to fit the male pilot of the bearing flange. The two flanges when joined thus form a solid unit insuring alignment.



Male Pilot – When specified for use with Johnson demountable rubber stave bearing at the forward stern tube position, stuffing box flange has a machined male pilot which fits into the stern tube, thereby compressing bearing staves and locking them in place. This flange is called out for the Johnson DBA-2 Forward Stern Tube Demountable Bearing/Stuffing Box Assembly. Where a forward demountable bearing is used, the male pilot flange assures alignment with the stern tube.

Flanges are drilled unless otherwise specified.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

AIR-SEAL STUFFING BOXES

FIG. 1786-IR – WATER-GREASE LUBRICATION, WITH “AIR-SEAL”

For use with water-lubricated stern tube bearings. Fig. 1786-IR is fitted with inflatable “Air-Seal” ring; also inlets for water lubrication to bearings, and “zerk” fitting with lantern-ring for grease lubrication of packing.

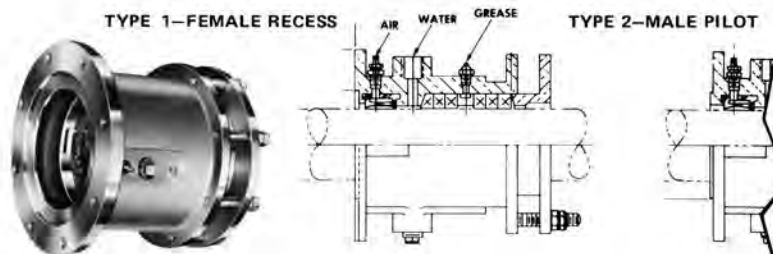


FIG. 1787-IR – GREASE LUBRICATION, WITH “AIR SEAL”

Identical to Fig. 1786-IR, but does not include inlets for water lubrication. Suitable for a short stern-tube where a forward bearing is not used. Includes “zerk” fitting and lantern-ring for grease-lubrication of packing.

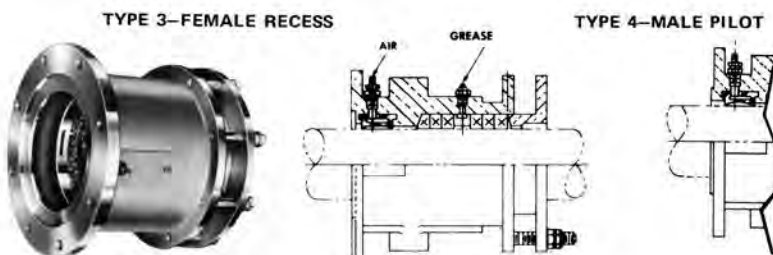


FIG. 1788-IR – WATER LUBRICATION ONLY, WITH “AIR SEAL”

Fitted with water inlet for bearing lubrication. Does not include grease fitting or lantern-ring; packing gland accommodates seven rings of packing as opposed to six for grease-lubricated glands. For use with self-lubricated packing.

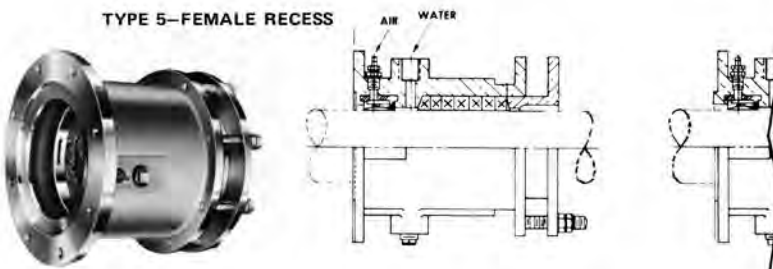


FIG. 1789 – WATER LUBRICATION

Lower in cost, does not include “Air-Seal” feature nor packing grease-fitting, but is otherwise the equal of the foregoing models. Water inlet delivers water to stern tube bearings.

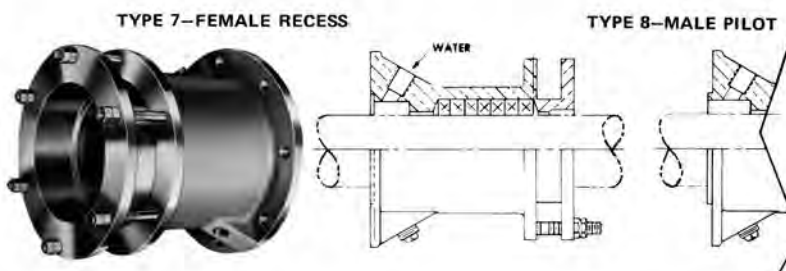
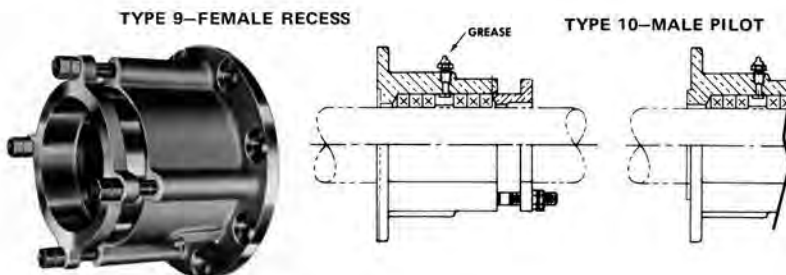


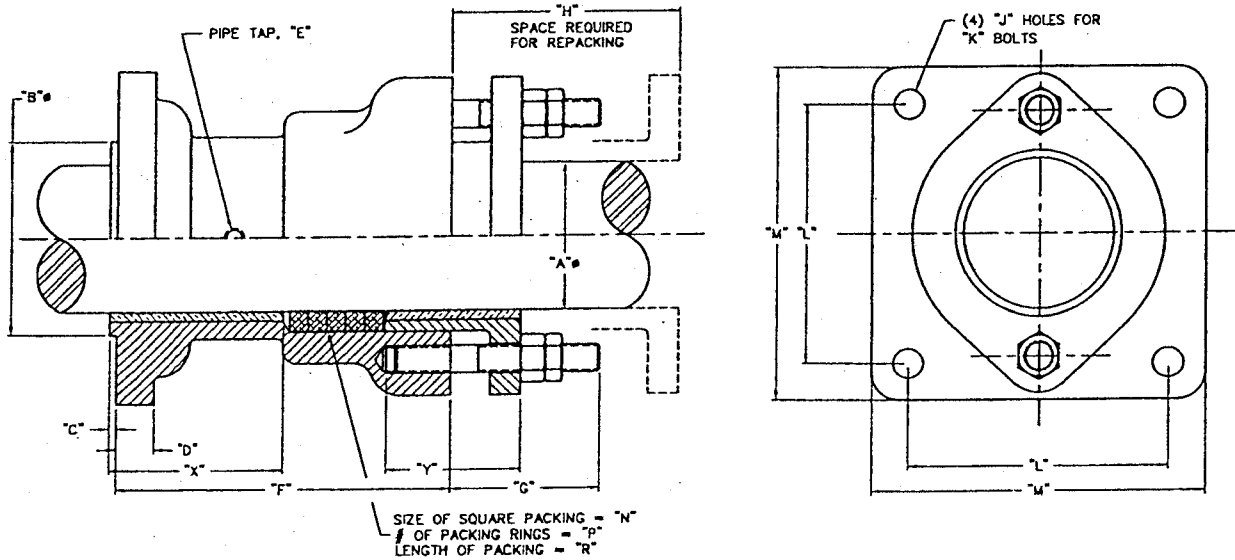
FIG. 1790 – GREASE LUBRICATED
2-1/2” TO 7-3/4” (63.50 TO 196.85 mm)

For vessels with shafts up to 7-3/4” (196.85 mm) this economical unit offers high efficiency at moderate cost. Equipped with grease-fitting, lantern-ring and space for six rings of packing. Four glandstuds are mounted in ridges cast in barrel, providing high strength for gland compression.



3

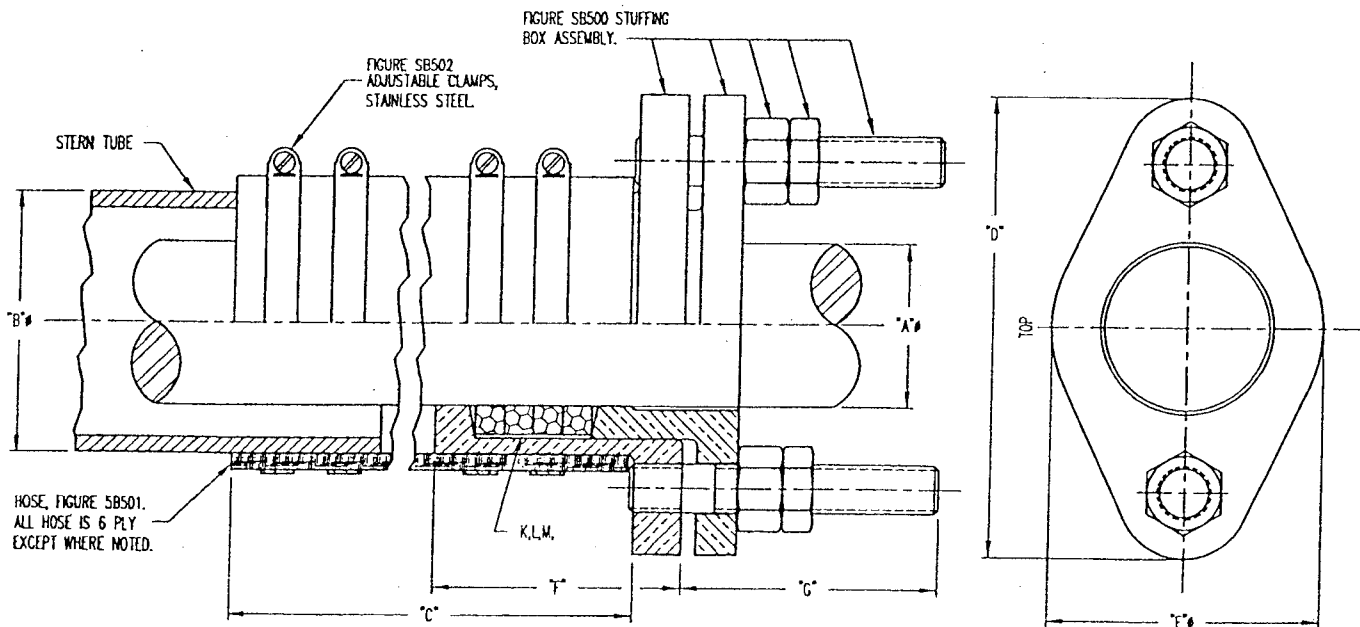
FLANGED STUFFING BOXES



| A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | X | Y |
|--------|--------|-------|--------|------|---------|--------|--------|---------|------|--------|--------|-------|---|-----------|----------|---------|
| 2" | 3 1/2" | 1/8" | 5/8" | 1/4" | 5 1/8" | 3 1/4" | 3 1/4" | 9/16" | 1/2" | 4" | 5 1/4" | 3/8" | 5 | 7 13/16" | 2 9/16" | 2 3/16" |
| 2 1/4" | 3 3/4" | 1/8" | 3/4" | 1/4" | 5 1/8" | 3 1/4" | 3 5/8" | 11/16" | 5/8" | 4 3/8" | 5 7/8" | 3/8" | 6 | 8 7/16" | 2 15/16" | 2 9/16" |
| 2 1/2" | 3 7/8" | 1/8" | 13/16" | 1/4" | 6 1/2" | 4" | 4 1/8" | 11/16" | 5/8" | 4 7/8" | 6 1/2" | 7/16" | 5 | 9 13/16" | 3 3/16" | 3 1/16" |
| 2 3/4" | 4 3/8" | 1/8" | 7/8" | 1/4" | 7 1/2" | 4" | 4 1/8" | 11/16" | 5/8" | 5 3/8" | 7 1/8" | 9/16" | 5 | 10 3/4" | 4" | 3 1/16" |
| 3" | 4 3/8" | 1/8" | 7/8" | 1/4" | 7 1/2" | 4" | 4 1/8" | 11/16" | 5/8" | 5 3/8" | 7 1/8" | 7/16" | 6 | 11 3/16" | 4" | 3 1/16" |
| 3 1/4" | 4 3/8" | 1/8" | 7/8" | 1/4" | 7 1/2" | 4" | 4 1/8" | 11/16" | 5/8" | 5 3/8" | 7 1/8" | 7/16" | 6 | 12" | 4 1/16" | 3 1/8" |
| 3 1/2" | 4 3/4" | 1/8" | 1" | 1/4" | 8 5/8" | 4" | 4 3/4" | 13/16" | 3/4" | 7" | 9" | 1/2" | 6 | 12 15/16" | 4 3/8" | 3 5/8" |
| 3 3/4" | 5 1/4" | 1/8" | 1" | 1/4" | 9" | 4" | 4 3/4" | 13/16" | 3/4" | 7" | 9" | 1/2" | 7 | 13 3/4" | 4 3/16" | 3 5/8" |
| 4" | 5 1/4" | 1/8" | 1" | 1/4" | 9" | 4" | 4 3/4" | 13/16" | 3/4" | 7" | 9" | 1/2" | 7 | 14 1/2" | 4 3/16" | 3 5/8" |
| 4 1/4" | 6" | 3/16" | 1" | 1/4" | 9" | 4" | 4 3/4" | 13/16" | 3/4" | 7" | 9" | 3/8" | 8 | 14 5/8" | 4 3/16" | 3 5/8" |
| 4 1/2" | 6 1/2" | 3/16" | 1" | 1/4" | 9" | 4 1/2" | 5 1/4" | 15/16" | 7/8" | 7 3/4" | 10" | 3/4" | 4 | 17 3/4" | 4 3/4" | 3 5/8" |
| 4 3/4" | 6 3/4" | 3/16" | 1" | 1/4" | 9" | 4 1/2" | 5 1/4" | 15/16" | 7/8" | 7 3/4" | 10" | 9/16" | 5 | 16 7/8" | 4 7/8" | 3 1/2" |
| 5" | 7" | 3/16" | 1" | 1/4" | 9" | 4 1/2" | 5 1/2" | 15/16" | 7/8" | 7 3/4" | 10" | 9/16" | 6 | 17 7/8" | 4 7/8" | 3 1/2" |
| 5 1/4" | 7" | 3/16" | 1 1/8" | 1/4" | 10 1/2" | 5 1/2" | 6" | 15/16" | 7/8" | 7 3/4" | 10" | 3/4" | 6 | 19 1/2" | 5 5/16" | 4 7/16" |
| 5 1/2" | | | | | | | | | | | | | | | | |
| 5 3/4" | | | | | | | | | | | | | | | | |
| 6" | 9" | 3/8" | 1 1/8" | 1/4" | 11 3/8" | 5 5/8" | 6" | 1 1/16" | 1" | 11" | 14" | 1" | 4 | 22 3/8" | 5 3/4" | 4 5/8" |
| 6 1/4" | 9" | 3/8" | 1 1/8" | 1/4" | 11 3/8" | 5 5/8" | 6" | 1 1/16" | 1" | 11" | 14" | 7/8" | 4 | 22 3/4" | 5 3/4" | 4 5/8" |
| 6 1/2" | 9" | 3/8" | 1 1/8" | 1/4" | 11 3/8" | 5 5/8" | 6" | 1 1/16" | 1" | 11" | 14" | 3/4" | 5 | 23 5/32" | 5 3/4" | 4 5/8" |
| 6 3/4" | 9" | 1/4" | 1 1/8" | 1/4" | 11 1/2" | 5 5/8" | 6" | 1 1/16" | 1" | 13" | 16" | 1" | 5 | 24 3/4" | 5 3/4" | 4 5/8" |
| 7" | 9" | 1/4" | 1 1/8" | 1/4" | 11 1/2" | 5 5/8" | 6" | 1 1/16" | 1" | 13" | 16" | 7/8" | 6 | 25 1/8" | 5 3/4" | 4 5/8" |
| 7 1/4" | 9" | 1/4" | 1 1/8" | 1/4" | 11 1/2" | 5 5/8" | 6" | 1 1/16" | 1" | 13" | 16" | 3/4" | 6 | 25 1/8" | 5 3/4" | 4 5/8" |
| 7 1/2" | 9" | 1/4" | 1 1/8" | 1/4" | 11 1/2" | 5 5/8" | 6" | 1 1/16" | 1" | 13" | 16" | 5/8" | 6 | 25 7/8" | 5 3/4" | 4 5/8" |
| 7 3/4" | 9" | 1/4" | 1 1/8" | 1/4" | 11 1/2" | 5 5/8" | 6" | 1 1/16" | 1" | 13" | 16" | 9/16" | 6 | 26 1/16" | 5 3/4" | 4 5/8" |

3

HOSE TYPE STUFFING BOXES



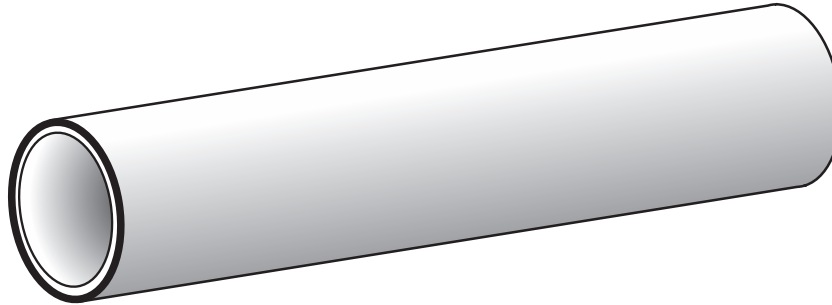
| A | B | C | D | E | F | G | K | L | M |
|--------|--------|----|--------|----------|--------|--------|-------|---|----------|
| 1 1/4" | 2 1/4" | 8" | 5" | 3" | 3 1/4" | 3 7/8" | 5/16" | 5 | 5" |
| 1 3/8" | 2 1/4" | 8" | 5" | 3" | 3 1/4" | 3 3/4" | 5/16" | 5 | 5 7/16" |
| 1 1/2" | 3" | 8" | 5 3/4" | 3 21/32" | 3 3/4" | 3 3/4" | 9/16" | 4 | 6 1/2" |
| 1 3/4" | 3" | 8" | 5 3/4" | 3 21/32" | 3 3/4" | 3 3/4" | 7/16" | 4 | 7 1/2" |
| 2" | 3 1/2" | 9" | 6 1/2" | 4" | 3 3/4" | 3 3/4" | 7/16" | 4 | 8" |
| 2 1/4" | 4" | 9" | 6 3/4" | 4 1/8" | 3 3/4" | 3 3/4" | 7/16" | 4 | 8 3/4" |
| 2 1/2" | 4" | 9" | 7" | 4 1/8" | 3 3/4" | 3 3/4" | 7/16" | 4 | 10" |
| 2 3/4" | 4 1/2" | 9" | 7" | 4 5/8" | 3 3/4" | 3 3/4" | 7/16" | 4 | 10 1/2" |
| 3" | 4 1/2" | 9" | 7 1/2" | 4 7/8" | 3 3/4" | 3 3/4" | 7/16" | 4 | 11" |
| 3 1/4" | 4 3/4" | 9" | 7 1/2" | 4 7/8" | 3 3/4" | 3 3/4" | 3/8" | 5 | 11 3/8" |
| 3 1/2" | 5 1/2" | 9" | 8 1/4" | 6 1/8" | 3 3/4" | 3 3/4" | 5/8" | 3 | 12 9/16" |
| 3 5/8" | 5 1/2" | 9" | 8 1/4" | 6 1/8" | 3 3/4" | 3 3/4" | 5/8" | 3 | 12 9/16" |
| 4" | 6" | 9" | 8 3/4" | 6 3/4" | 3 3/4" | 3 3/4" | 9/16" | 3 | 16 1/8" |
| 4 1/2" | 6 5/8" | 9" | 9 3/8" | 7 1/2" | 3 3/4" | 3 3/4" | 5/8" | 3 | 16 1/4" |
| 5" | 6 5/8" | 9" | 9 3/8" | 7 7/16" | 3 3/4" | 3 3/4" | 3/8" | 5 | 16 7/8" |

3



TAILSHAFT SLEEVES

NICKEL-CHROME-BORON HARD-COATED SLEEVES



3

The Complete Thermal Coating Facility

- NCB Shaft Sleeves
- Shafts
- Pump Components
- Other Castings

Available in:

- Stainless Steel
- U.S. Naval Bronze
- Brass Castings

Timco offers complete repair and fabrication of pump components, hardened shaft sleeves and shafts in both the marine and industrial fields. As part of our maintenance cost-savings solution, we offer NCB shaft sleeves, which have been proven to extend both shaft and bearing life in abrasive marine and industrial applications.

Nickel-Chrome-Boron Fused Coatings

Nickel-Chrome-Boron (NCB), properly blended with exacting amounts of copper, molybdenum, iron and carbon, offer a superior material for hard-coating the outside surface of tailshafts and rudder stock liners. NCB offers abrasion- and corrosion-resistance superior to #316 stainless steel and, when fused to carbon steel, will not chip, crack or peel. The finished, hard-coated surface has a low coefficient-of-friction and hardness in the 60 Rockwell "C" scale range. NCB fuse-coated shafts or shaft sleeves increase shaft life when operating in corrosive/abrasive environments.

Our High Velocity Oxy Fuel (HVOF) System delivers alloys in a fused state with superior bond strength. The advantage of this system is the ability to hard-coat irregular shapes such as pump impellers and pump casings. Again, the advantage of hard-coating pump parts, centrifuge parts and other wear-related components is to reduce wear and extend operating life.

Our complete machine is shop capable of machining parts up to 64" in diameter. Pump components, shafts and shaft sleeves are final-machined to specifications and ground to the specified surface finish. The shop also includes horizontal milling capabilities and complete cylinder grinding, as well as welding fabrication departments.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

TAILSHAFT SLEEVES



NICKEL-CHROME-BORON HARD-COATED SLEEVES

Extend Bearing & Shaft Life!

When ordering, specify the following information (use the illustration below, if necessary):

_____ Finished Sleeve O.D. (Outside Diameter)

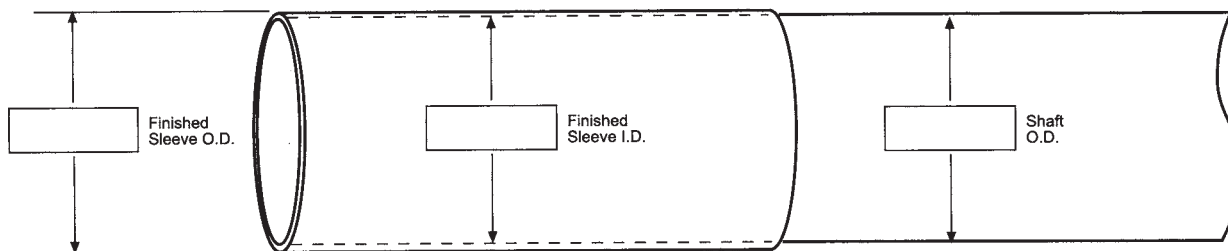
_____ Finished Sleeve I.D. (Inside Diameter)

_____ Tolerance (if sleeve is to be bore finished)

_____ I.D. Rough-Bored (undersized) Sleeve

_____ Shaft O.D. (Outside Diameter)

No bevel Bevel one end Bevel both ends



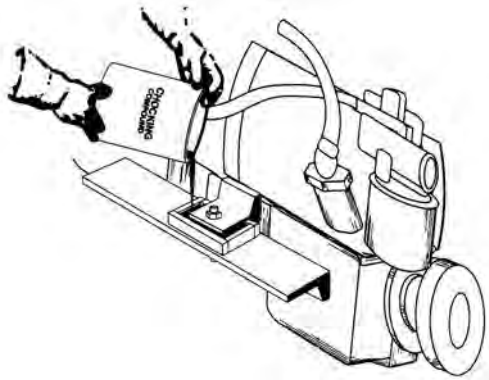
Only a trained machinist should perform sleeve installation.

Your tailshaft must be concentric and free of taper or excessive run-out in way of the sleeve mounting area.

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MARINE CHOCKING COMPOUNDS



Two-Component, 100% Solids, High Strength, Heat Resistant Epoxy Resin Chocking Compound

3

Description

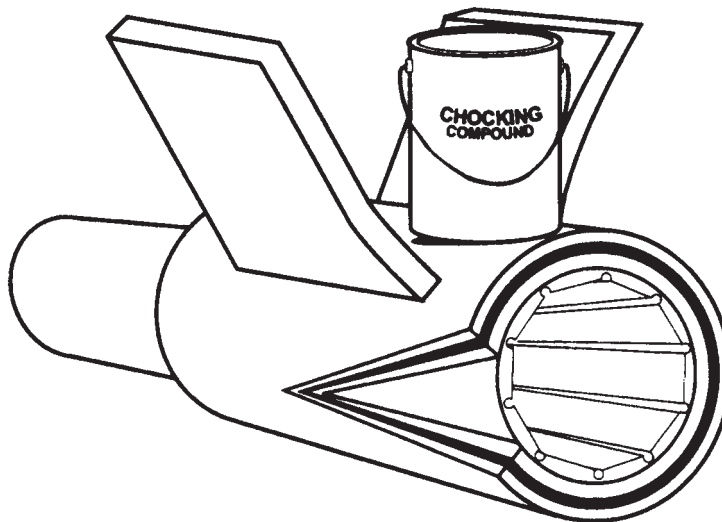
A two-component, 100% solids, high-strength, heat-resistant, pourable epoxy-resin chock designed to replace steel chocks for maintaining permanent alignment of industrial equipment and machinery.

Features:

- Thin pour, depths of 1" or less
- High modulus and high compressive strength
- High heat-distortion temperature, 210°F
- Maximum effective load-bearing area
- Lower thermal conductivity than steel
- Increased free-flow of air under equipment
- Excellent resistance to corrosion and degradation by water, oils, salts, non-oxidizing acids and most solvents

Basic Uses

- Marine bearings
- Reciprocating and centrifugal equipment
- Steam and gas turbines
- Pumps and motors
- Crushers, grinding mills, hoists
- Hydraulic presses and other equipment
- Marine engines & transmissions

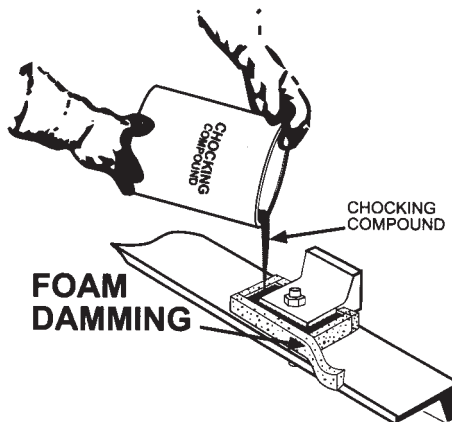


THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MARINE CHOCKING COMPOUNDS

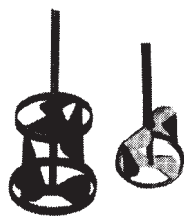


CHOCKING INSTALLATION MATERIALS



Open-Cell Foam Damming

- Chocks Must Be Retained Within Forms Until Cured
- Forms Must Be Sealed Watertight At Joints



Jiffy Mixers

Jiffy Mixers

- Used To Mix Chocking Compounds
- Mix About 3-Minutes At A Slow Speed Of 200-300 Rpm



Release Agent

- To Be Sprayed On Bolts, Foam Damming Or Other Surfaces To Prevent Adhesion To Chock
- 13oz. Size

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BLUE SEAL COATING SYSTEM

PRODUCT DATASHEET

Blue Seal is a two-part epoxy-vinyl-ester coating system with glass flake incorporated for superior chemical resistance. Blue Seal is extremely durable and immune to corrosion, cavitation and electrolysis.

Typical Uses

- marine: hulls, decks, tanks, holds, pumps, impellers, valves, piping, housings, heat exchangers, propellers, Kort nozzles, thru-hull fittings, jet tunnels, tubes, rudders, manifolds, etc
- wastewater treatment plants
- power industry
- pulp and paper mills
- transportation

Advantages

- Immune to corrosion, cavitation and electrolysis
- High adhesive strength: steel - 5,700 psi/401 kg/cm², aluminum - 4,500 psi/316 kg/cm²
- Excellent chemical resistance
- Virtually impermeable to liquids and vapors
- Durable and resistant to impact and abrasion damage

Coverage

Base and topcoat:

60 sf per US gal/1.3 m² per kg @ 10 mils/250 microns per coat

Reinforcement:

43 sf per US gal/1.0 m² per kg @ 15 mils/380 microns per coat

Surface Preparation

Abrasive blast surfaces to white metal (SSPC-SP5) with a 4-6 mil/100-150 microns profile. Smooth out weld seams and sharp edges. If applying on concrete, high pressure water or abrasive blast. Fill and reinforce any cracks. Ensure all surfaces are clean, dry and free from contaminants. Apply coating *immediately* after blasting.

Mixing Instructions

Thoroughly mix product after opening container. For large containers, use a power mixer. Pour into a plastic mixing container only the amount of Blue Seal that may be applied within 15 minutes. Do not use a mixing paddle that has been used with catalyzed material. Add catalyst at a ratio of 11/2%. For faster set time, increase catalyst to a maximum of 3%. To extend working time, decrease catalyst to a minimum of 3/4%.

| Working Time - Minutes | 50o F | 60o F | 77o F | 90o F |
|------------------------|-------|-------|-------|-------|
| Catalyst ratio | 3% | 2% | 1% | 1% |
| 2 quart/1 kg container | 25 | 20 | 15 | 10 |

Application

Brush - recommended for small areas.

For best adhesion, first apply one layer of basecoat at 10-15 mils/250-300 microns thickness. Thoroughly rub basecoat onto surface to fill any voids and to ensure 100% coverage. Brush on one layer of reinforcement, then trowel on second layer of reinforcement. Sand any surface imperfections, then apply one layer of topcoat.

Sprayer - recommended for large areas.

Use conventional airless gelcoat, wet out or fiberglass resing spray equipment. For best results, use a post-catalyzing spray system that mixes the coating with catalyst after leaving the tip of spray gun, and apply one base coat, one to two reinforcement coats and one top coat.

| | |
|-----------------------------|------------|
| Air motor/pump ratio (min.) | 37:1 |
| Catalyst-coating pump ratio | 1.25% |
| Tip orifice | .052 in. |
| Spray angle | 40 degrees |

Curing Schedule

| | 50o F | 60o F | 77o F | 90o F |
|----------------|----------|----------|----------|----------|
| Ambient Temp. | 10o C | 16o C | 25o C | 32o C |
| Catalyst ratio | 3% | 2% | 1% | 1% |
| Tack Free | 60 min. | 45 min. | 30 min. | 20 min. |
| Light Load | 5 hours | 4 hours | 3 hours | 2 hours |
| Full Load | 24 hours | 24 hours | 18 hours | 12 hours |
| Chemical Load | 24 hours | 24 hours | 18 hours | 12 hours |

Clean Up

Blue Seal cures to a solid mass very quickly. Clean all equipment immediately after use with acetone. Do not allow any material to remain in hoses, guns or spray equipment.

Technical Data

| | | |
|----------------------|---------------------------|----------------------------|
| Compressive Strength | ASTM D695 22,000 psi | 1,547 kg/cm ² |
| Compressive Modulus | 1,700,000 psi | 119,522 kg/cm ² |
| Flexural Strength | ASTM D790 16,000 psi | 1,125 kg/cm ² |
| Flexural Modulus | 845,000 psi | 59,409 kg/cm ² |
| Tensile Strength | ASTM D638 14,500 psi | 1,109 kg/cm ² |
| Tensile Modulus | 2,460,000 psi | 172,955 kg/cm ² |
| Impact Resistance | ASTM D256 4.42 ft-lb/in | 236 J/m |
| Shore D Hardness | ASTM D2240 88.2 | |
| Dielectric Strength | ASTM D149 20,000 volts/mm | |
| Heat Deflection | ASTM D68 145o F | 68o C |

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BLUE SEAL COATING SYSTEM

Inspection

After coating, surfaces should be inspected with a porosity/holiday detector. All defects must be re-coated and re-tested.

Packaging

Blue Seal is packaged in US quart, one gallon and five gallon pails. For international shipments, **product is sold by weight in 1, 5 and 20 kg units.** Sufficient catalyst is included with all coating units. Additional glass flake may be ordered as needed.

Storage

Store unopened containers in dry, shaded conditions away from heat and ignition sources and above freezing temperatures. For best results, store at a temperature range of 60o F/16o C to 77o F/25o C.

Shelf Life

Six months when stored at 68o F/20o C.

Standard Colors

Blue Seal is available in blue, grey, white and black as standard colors. Custom colors are available - exact color match is not guaranteed.

Safety

When applying Blue Seal, always wear gloves and appropriate protective clothing. If spraying in confined areas, use full body protection and a fresh air-fed mask and any other required confined space safety equipment. See MSDS sheet for further product information prior to handling product. Blue Seal is for industrial and professional use only. All application instructions must be followed.

Chemical Resistance

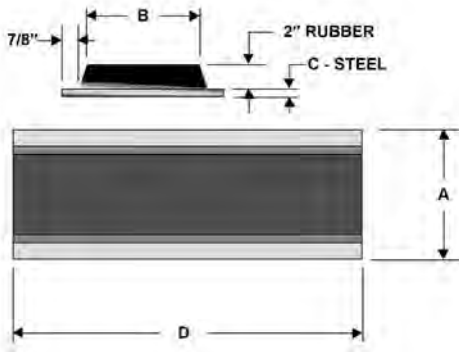
Blue Seal is resistant to a wide variety of chemicals and liquids, some of which are listed below. For a full listing of chemical resistance please contact your Blue Seal distributor.

| | |
|-----------------------------|-------------------------|
| Aluminum Sulfate 10% | Magnesium Hydroxide |
| Barium Hydroxide | Mercury |
| Benzoic Acid | Mineral Spirits |
| Calcium Hydroxide | Nitric Acid 40% |
| Distilled Water | Phosphoric Acid |
| Fertilizer Solution | Potassium Hydroxide 45% |
| Gasoline, Leaded & Unleaded | Sodium Hydroxide 50% |
| Hydrobromic Acid 48% | Stearic Acid |
| Hydrochloric Acid 36% | Sulfuric Acid 75% |
| Hydrofluoric Acid 20% | Tartaric Acid |
| Kerosene | Sea Water |

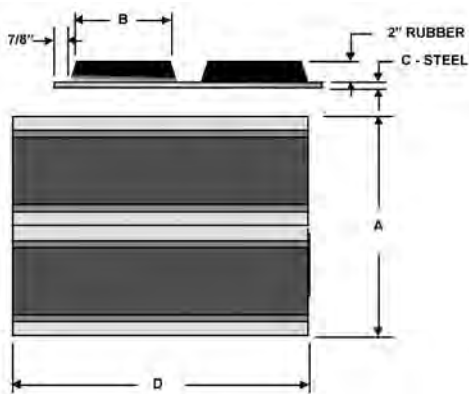
Warranty

Blue Seal Inc. will replace any material found to be defective. Blue Seal Inc. disclaims all warranties expressed, or implied, including warranties of merchantability and fitness for a particular purpose or use. Liability, if any, is limited to product replacement only.

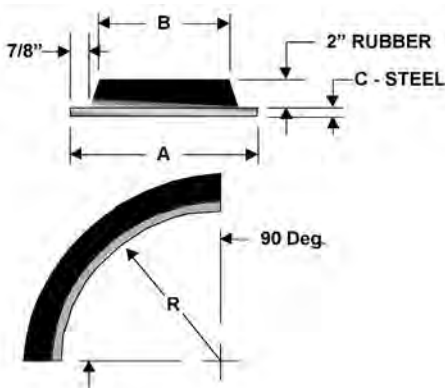
PUSHNEE® WELD-ON BUMPERS



| PART NO. | A | B | C | D | WT. |
|----------|---------|---------|------|-----|-------|
| UNITS | INCHES | | | | (lbs) |
| E42000 | 10" | 7" | 3/4" | 36" | 100 |
| E43000 | 10" | 7" | 3/4" | 48" | 133 |
| E42010 | 10" | 7" | 1/2" | 36" | 77 |
| E43010 | 10" | 7" | 1/2" | 48" | 103 |
| E42004 | 10" | 7" | 1/4" | 36" | 50 |
| E43004 | 10" | 7" | 1/4" | 48" | 67 |
| E42005 | 13-1/2" | 10-1/4" | 3/4" | 36" | 138 |
| E42041 | 13-1/2" | 10-1/4" | 1/2" | 36" | 110 |
| E42042 | 13-1/2" | 10-1/4" | 1/4" | 36" | 75 |



| PART NO. | C* | D | WT. |
|----------|--------|-----|-------|
| UNITS | INCHES | | (lbs) |
| E42002 | 3/4" | 36" | 200 |
| E43002 | 3/4" | 48" | 267 |
| E42034 | 1/2" | 36" | 150 |
| E43034 | 1/2" | 48" | 200 |
| E42035 | 1/4" | 36" | 100 |
| E43035 | 1/4" | 48" | 133 |



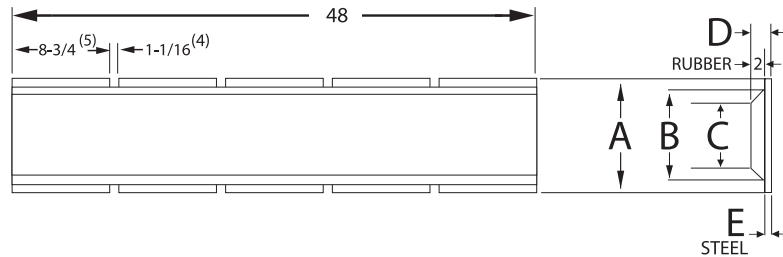
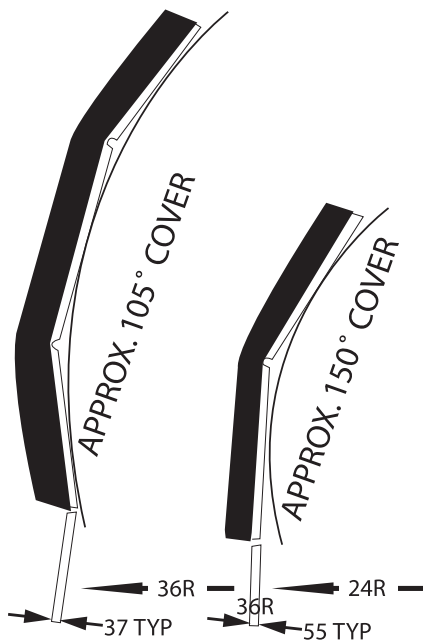
| PART NO. | E* | R | WT. |
|----------|--------|---------|-------|
| UNITS | INCHES | | (lbs) |
| E42012 | 3/4" | 18" | 100 |
| E42049 | 1/2" | 18-1/4" | 70 |
| E42050 | 1/4" | 18-1/2" | 43 |

*STEEL IS STANDARD

SPECIAL PLATE STOCK & THICKNESSES AVAILABLE UPON FACTORY REQUEST

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HEAVY DUTY MODULAR BUMPERS

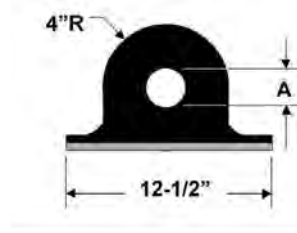
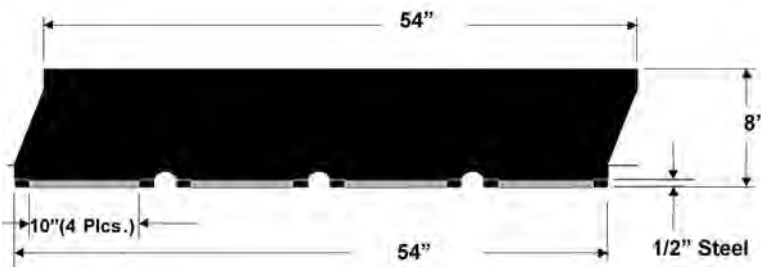


| PART NO. | A | B | C* | D | E | WT. |
|----------|--------|----|--------|--------|------|-------|
| UNITS | INCHES | | | | | (lbs) |
| E47950 | 6" | 3" | 4-1/4" | 2-1/4" | 1/4" | 34 |
| E47951 | 6" | 3" | 4-1/4" | 2-1/2" | 1/2" | 54 |
| E47952 | 6" | 3" | 4-1/4" | 2-3/4" | 3/4" | 73 |
| E47960 | 8" | 5" | 6-1/4" | 2-1/4" | 1/4" | 50 |
| E47961 | 8" | 5" | 6-1/4" | 2-1/2" | 1/2" | 75 |
| E47962 | 8" | 5" | 6-1/4" | 2-3/4" | 3/4" | 99 |
| E47970 | 10" | 7" | 8-1/4" | 2-1/4" | 1/4" | 65 |
| E47971 | 10" | 7" | 8-1/4" | 2-1/2" | 1/2" | 96 |
| E47972 | 10" | 7" | 8-1/4" | 2-3/4" | 3/4" | 127 |

VALUES GIVEN ON SKETCHES DO NOT ALLOW FOR PLATE BENDING TO RADIUS.

NOTES:

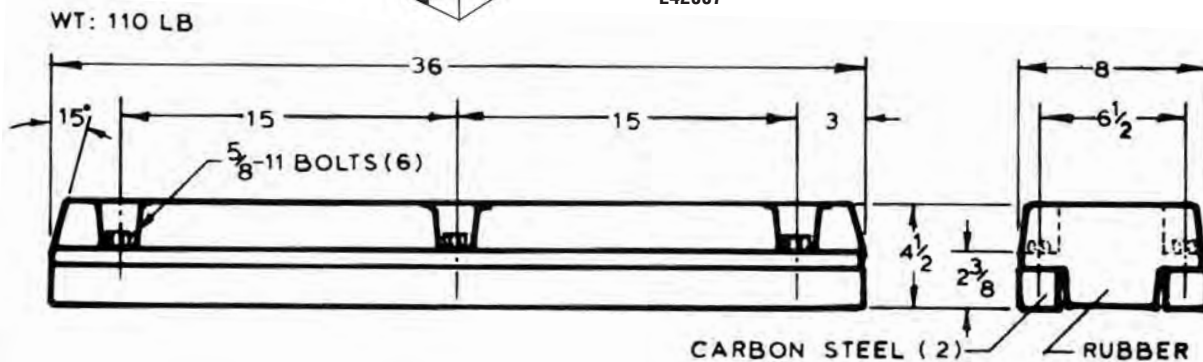
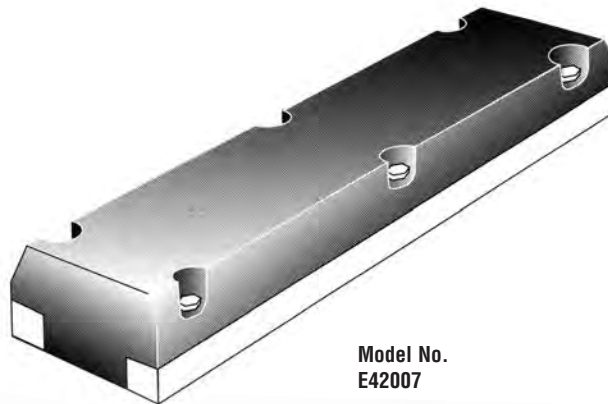
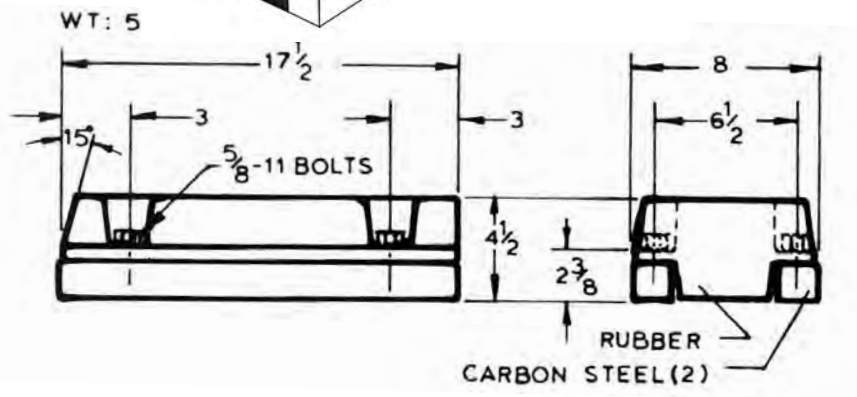
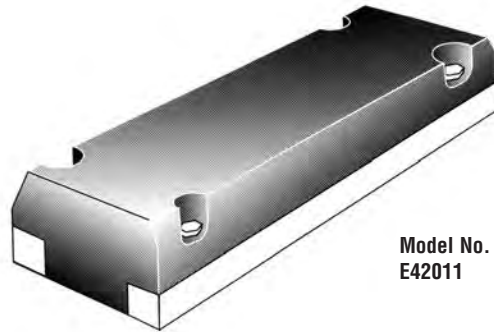
- USE LOAD & ENERGY CURVES FOR STANDARD EXTRUSIONS F9-0000 & F9-5000
- ONE SECTION WILL COVER APPROXIMATELY 75" ON 36" RADIUS



| PART NO. | A | WT. |
|----------|--------|-------|
| UNITS | INCHES | (lbs) |
| E44311 | 2" | 168 |
| E44300 | 4" | 133 |

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PUSHNEE® BOLT-ON BUMPERS

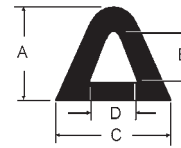


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EXTRUDED FENDERING

| PART NO. | A | B | C | D | E | F | WT./FT. | R/E |
|----------|--------|-------|-------|-------|-------|-------|---------|-------------|
| UNITS | INCHES | | | | | | (lbs) | kip/ft. kip |
| F9-4000 | 3.75" | 2.25" | 4.50" | .75" | 2" | 1.5" | 4.5 | 16.7 |
| F9-1000 | 6" | 3" | 6.75" | 1.25" | 2.87" | 2.37" | 12.3 | 13.3 |

SLOPE SIDE
"D" SHAPE
EXTRUSION



| PART NO. | A | B | C | D | E | WT./FT. | R/E | |
|----------|--------|----|-----|------|----|---------|-------|-------------|
| UNITS | INCHES | | | | | | (lbs) | kip/ft. kip |
| G5-4000 | 6" | 3" | 5" | 2.5" | 3" | 11.5 | 15.2 | |
| F9-0000 | 8" | 4" | 8" | 4" | 4" | 22 | 10 | |
| G0-7000 | 10" | 5" | 10" | 5" | 5" | 38 | 8.6 | |
| F9-7000 | 12" | 6" | 12" | 6" | 6" | 54 | 7.7 | |
| G0-6000 | 14" | 7" | 14" | 7" | 7" | 73 | 4.2 | |

"D" SHAPE
"D" BORE
EXTRUSION



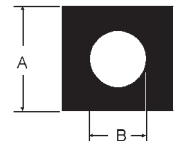
| PART NO. | A | BORE | C | D | E | WT./FT. | R/E | |
|----------|--------|------|------|------|-------|---------|-------|-------------|
| UNITS | INCHES | | | | | | (lbs) | kip/ft. kip |
| F7-0000 | 3" | 1" | 6" | .75" | 1.5" | 4.3 | 25 | |
| F7-8000 | 4" | 2" | 7.5" | 1.0" | 2.25" | 10 | 19.5 | |
| F7-1000 | 6" | 3" | 9" | 1.5" | 3" | 15.5 | 13.5 | |
| F8-1000 | 8" | 4" | 12" | 2.0" | 4" | 30 | 11 | |
| F8-4000 | 10" | 5" | 15" | 2.5" | 5" | 44 | 9 | |
| F7-3000 | 12" | 6" | 18" | 3.0" | 6" | 58.5 | 6.3 | |

CYLINDRICAL
WING
EXTRUSION



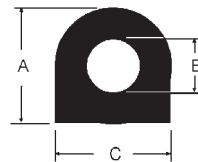
| PART NO. | A | BORE | WT./FT. | R/E |
|----------|--------|------|---------|-------------|
| UNITS | INCHES | | (lbs) | kip/ft. kip |
| F6-0000 | 4.5" | 1.5" | 4.5 | 20 |
| F6-2000 | 6" | 2" | 17 | 16 |
| F5-6000 | 7" | 2.5" | 22.5 | 12.5 |
| F5-0000 | 8 | 3" | 29.5 | 10 |
| F5-7000 | 10" | 4" | 45 | 8.5 |
| F5-1000 | 12" | 5" | 63 | 7 |
| F5-2000 | 14" | 6" | 81 | 3.7 |
| G6-2000 | 16" | 7" | 112 | 2.5 |

SQUARE
EXTRUSION



| PART NO. | A | B | C | D | WT./FT. | R/E | | |
|----------|--------|------|-----|-----|---------|------|-------|-------------|
| UNITS | INCHES | | | | | | (lbs) | kip/ft. kip |
| F9-2000 | 6" | 2.5" | 5" | .3" | 11.5 | 15.2 | | |
| F9-5000 | 8" | 3" | 8" | 4" | 22 | 10 | | |
| G0-5000 | 10" | 4" | 10" | 5" | 38 | 8.6 | | |
| F9-3000 | 12" | 5" | 12" | 6" | 54 | 7.7 | | |
| F9-8000 | 14" | 6" | 14" | 7" | 73 | 4.2 | | |

"D" SHAPE
"O" BORE
EXTRUSION



| PART NO. | O.D. | I.D. | WT./FT. | R/E |
|----------|--------|------|---------|-------------|
| UNITS | INCHES | | (lbs) | kip/ft. kip |
| F3-0000 | 3" | 1.5" | 3 | 14 |
| F3-8000 | 5" | 2.5" | 7 | 10 |
| F3-9000 | 6" | 2" | 14 | 11 |
| F3-1000 | 8" | 4" | 18.5 | 10 |
| F3-2000 | 10" | 5" | 30 | 6.2 |
| F3-5000 | 12" | 6" | 42.5 | 5.3 |
| F3-6000 | 15" | 7.5" | 68.5 | 3.5 |
| F3-3000 | 18" | 9" | 97.5 | 2.9 |

CYLINDRICAL
EXTRUSION



ALL AVAILABLE IN LENGTHS UP TO 20 FT.
OTHER SIZES AVAILABLE UPON REQUEST.

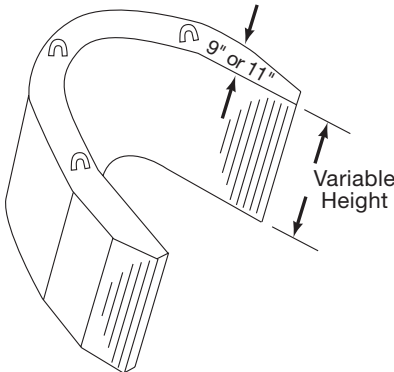
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LAMINATED BOW FENDERS

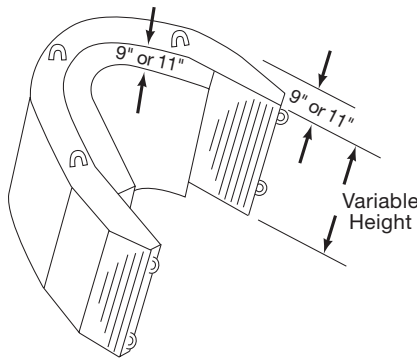
SINGLE LAYER BOW

Model 100 A



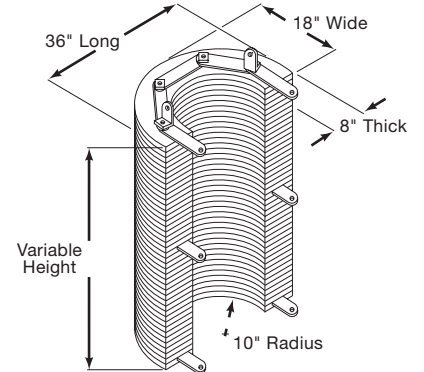
DOUBLE LAYER BOW

Model 100 C



HALF ROUND BOW

Model 105

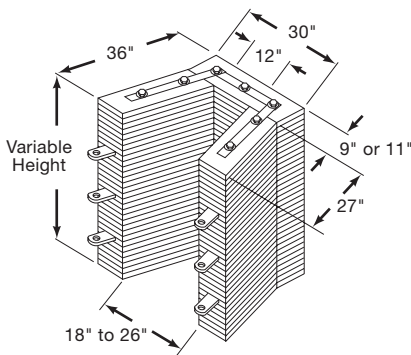


These fenders were originally designed by Schuyler, and are custom-built of durable nylon cloth-reinforced synthetic rubber – no other rubber is stronger. The rubber laminates are compressed onto high quality steel rods, welded or attached with nuts to end plates. The steel rod and plate frame is allowed to flex through the use of a patented hinge type assembly system. Chain links are installed top and bottom as specified, and the end plates can be flat or angle. Our fenders are manufactured for a tight hull fit. These models are also available with weld-tabs.

This fender takes the place of old tires in tire type bow fenders. This fender is versatile and can be used in a number of places, including push knees.

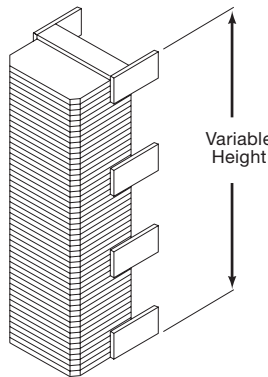
TURK'S HEAD

Model 112



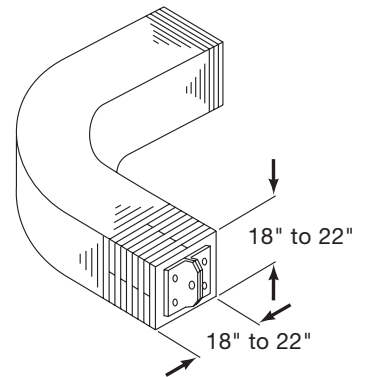
VERTICAL BOW

Model 106



CROSS BLOCK BOW

Model 100 D



The turk's head is a universal bow fender, designed principally for the lower bow. It fits almost any bow in as much as it is adjust-able and takes the shape of the boat as it is being drawn into place. It comes in two widths, 9" or 11".

More durable and economical than extruded rubber. All weld-tabs (or continuous flatbar) fit over and are welded to existing bow box.

The rubber laminates are laid at 90° to each other and retained with a combination of steel rods and/or cable. This fender was designed for increased strength and durability required by large-radius bows and remains the most economical and durable alternative to extruded rubber.

Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

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4

LAMINATED STERN FENDERS



SINGLE LAYER STERN

Model 101 A

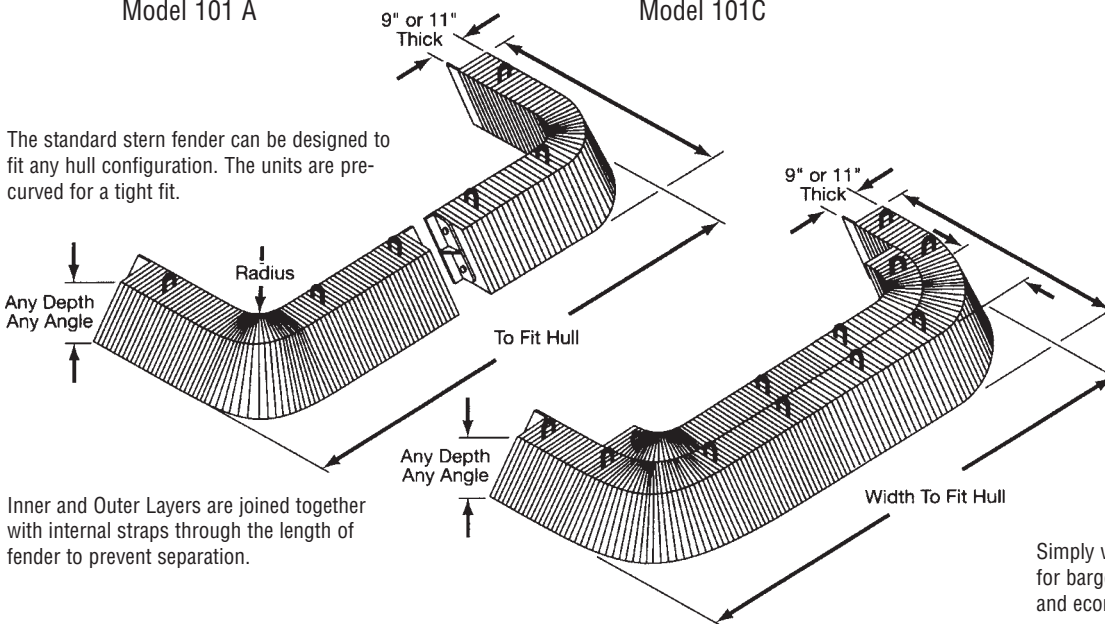
DOUBLE LAYER STERN

Model 101C

VERTICAL STERN

Model 105

The standard stern fender can be designed to fit any hull configuration. The units are pre-curved for a tight fit.



Inner and Outer Layers are joined together with internal straps through the length of fender to prevent separation.

Simply weld to tumblehome hull or lower stern for barge and scow protection. More durable and economical than extruded rubber.

D-GUARD STERN

Model 130

TUMBLEHOME

Model 131

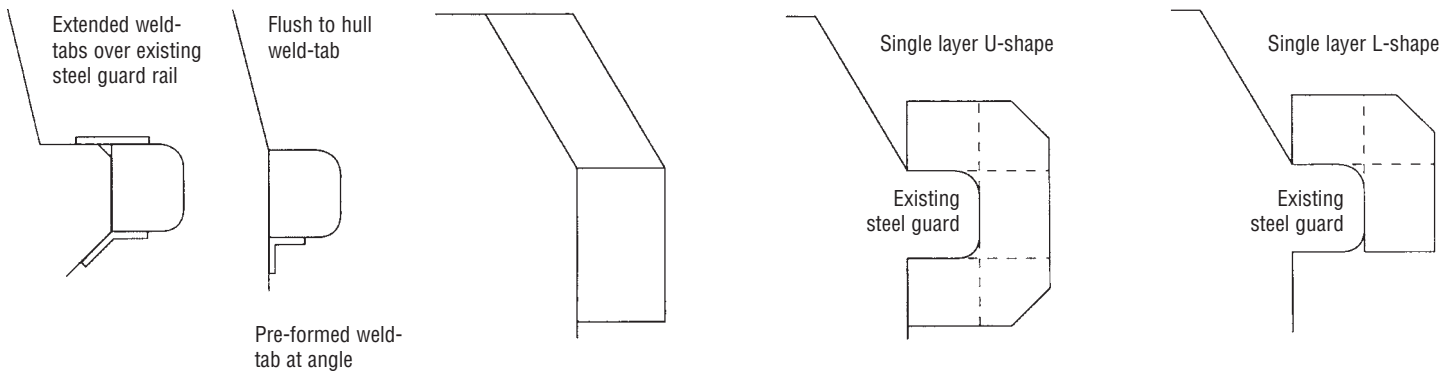
U-GUARD

Model 132

L-GUARD

Model 133

Side Views



Schuyler D-Guard is designed to be welded directly to the existing steel rub rail or bull-works, welded into channel, or chain hung to hull. The pre-curved sections come ready for installation – no need to scarf rail, build channel or drill holes.

These special-design stern fenders can be chain-hung or welded-on.

Schuyler can design the fender to complement the tug's task and hull design.

The stern fenders are custom-built of durable, nylon-reinforced, synthetic rubber. The rubber laminates are compressed onto high-quality steel rods welded or attached to end plates. The steel rod and plate frame is allowed to flex through the use of a patented hinge-type assembly system. Chain links are installed top and bottom as specified, and the end plates can be flat or angled. Our fenders are manufactured for a tight hull fit. These models are also available with weld-tabs.

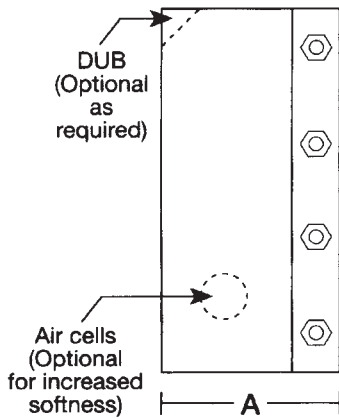
Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

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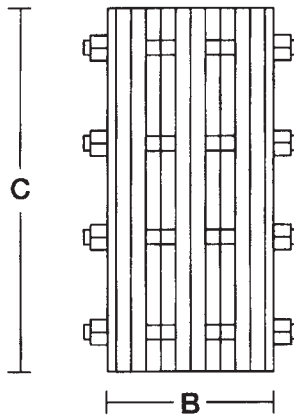


VERTICAL PUSH KNEE FENDER MODEL 115 – DESIGN SPECIFICATIONS

Side View



Front View



Attachment Systems

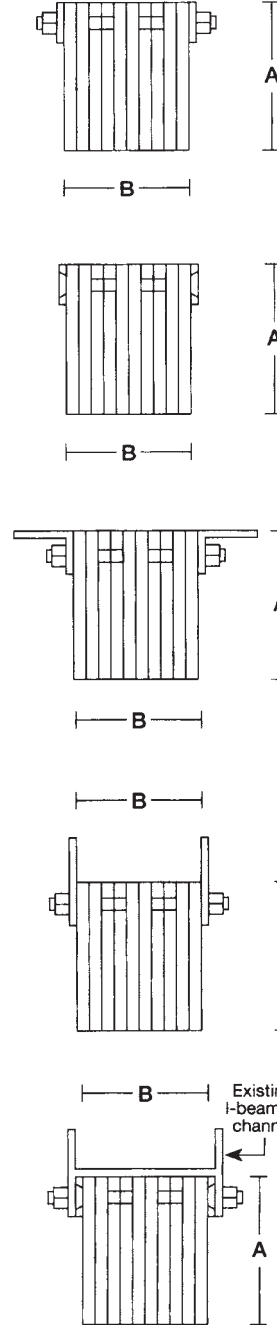
A. STANDARD
- Securing flatbar welded directly to knee

B. COUNTERSINK
- Same as A except through rods are countersunk and welded into flatbar
- Welded or bolted onto existing channel

C. ANGLE
- Securing angle welded or bolted directly to knee

D. EXTENDED
- Securing flatbar extends over knee structure for welding or bolting

E. WELD-LESS
- Countersink style with pre-punched through ways
- Attachment bolts pass through I-beam or channel and pre-punched through ways in fender
- No welding required



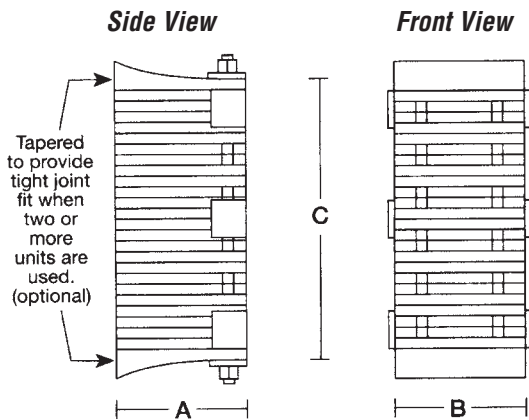
Features

- Nylon-reinforced rubber sections compressed onto 1-1/4" or 1-1/2" steel rods and secured with heavy-duty steel flatbar or angle
- Entire length of fender can be welded directly to push knee structure
- Provides up to 550% more rubber protection (11" vs. 2") compared to molded rubber
- Tough plies of nylon-reinforced rubber virtually eliminate chipping, unlike molded rubber or wood plank bumpers
- Compression tests have demonstrated maximum impact absorption and reflection
- Air cells can be punched into rubber sections to increase "softness"
- U.S. Coast Guard accepted
- Unaffected by salt water, ozone and oil
- 100% of rubber content is certified to be recycled

| PART NO. | A | B | C | WT. (Lbs. per Sq. Ft.) |
|----------|-----------|------------|-------------|---------------------------|
| SR 115 V | 6" to 11" | 6" to 240" | 12" to 120" | 6" - 43 |
| | | | | 7" - 47 |
| | | | | 8" - 52 |
| | | | | 9" - 56 |
| | | | | 10" - 61 |
| | | | | 11" - 65 |

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D-GUARD PUSH KNEE FENDER MODEL 114B – DESIGN SPECIFICATIONS



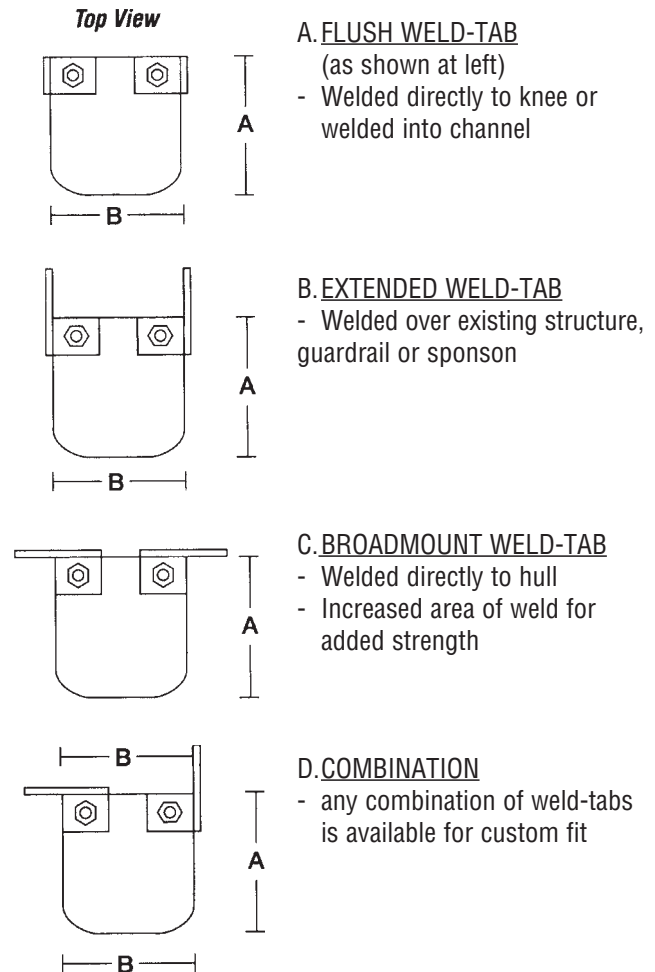
Features

- Nylon-reinforced rubber D-guard sections are compressed onto 1-1/4" steel rods and secured with heavy-duty flatbar or angle
- Weld-tabs are compressed onto steel rods typically at 12" intervals and are welded directly to hull
- Each weld-tab floats and works independent of other weld-tabs, thereby providing quick installation on irregular and damaged hulls
- Rubber is tapered at ends to provide tight joint when two or more units are used (optional)
- Provides up to 500% more rubber protection (10" vs. 2") compared to molded rubber
- Tough plies of nylon-reinforced rubber virtually eliminate chipping, unlike molded rubber or wood plank bumpers
- Fenders come complete with weld-tabs – no need to incur costs associated with pinning extruded rubber into channel
- Mounted vertically on push knees
- Mounted horizontally as side, stern and bow fenders
- Compression tests have demonstrated maximum impact absorption and reflection
- U.S. Coast Guard accepted
- Unaffected by salt water, ozone and oil
- 100% of rubber content is certified to be recycled

| PART NO. | A | B | C | WT. (Lbs. per Sq. Ft.) |
|---------------|-----|-----|------|---------------------------|
| SR 114 B 0609 | 6" | 9" | | 36 |
| SR 114 B 0808 | 8" | 8" | 12" | 37 |
| SR 114 B 0810 | 8" | 10" | to | 42 |
| SR 114 B 1010 | 10" | 10" | 480" | 46 |

Specify attachment system when placing order.

Attachment Systems



A. FLUSH WELD-TAB

- (as shown at left)
- Welded directly to knee or welded into channel

B. EXTENDED WELD-TAB

- Welded over existing structure, guardrail or sponson

C. BROADMOUNT WELD-TAB

- Welded directly to hull
- Increased area of weld for added strength

D. COMBINATION

- any combination of weld-tabs is available for custom fit

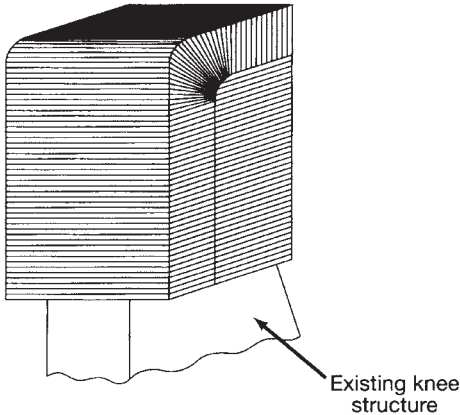
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WRAP AROUND PUSH KNEE & TOW KNEE PADS

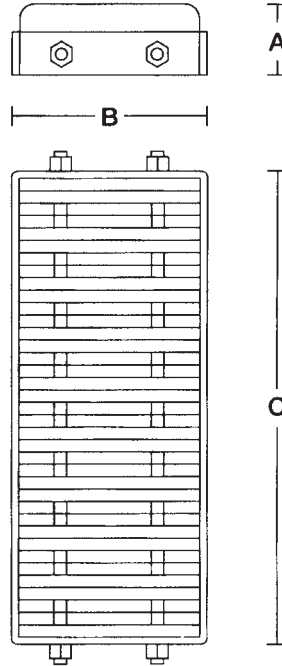
MODEL 140

MODEL 142 & 143

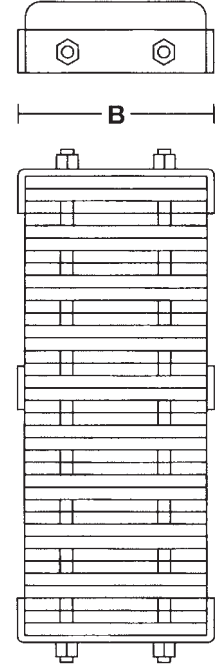


Covers top and one or both sides of knee structure – prevents damage during ship assist and empty barge service

Super-Duty Towknee
Model 142



Heavy-Duty Towknee
Model 143



Compressed rubber pads and steel bars or rods are totally enclosed with 3/8" steel plate to form an integrated steel box, which is welded directly to knee.

Fully integrated weld-tabs every 12" allow for quick and easy installation.

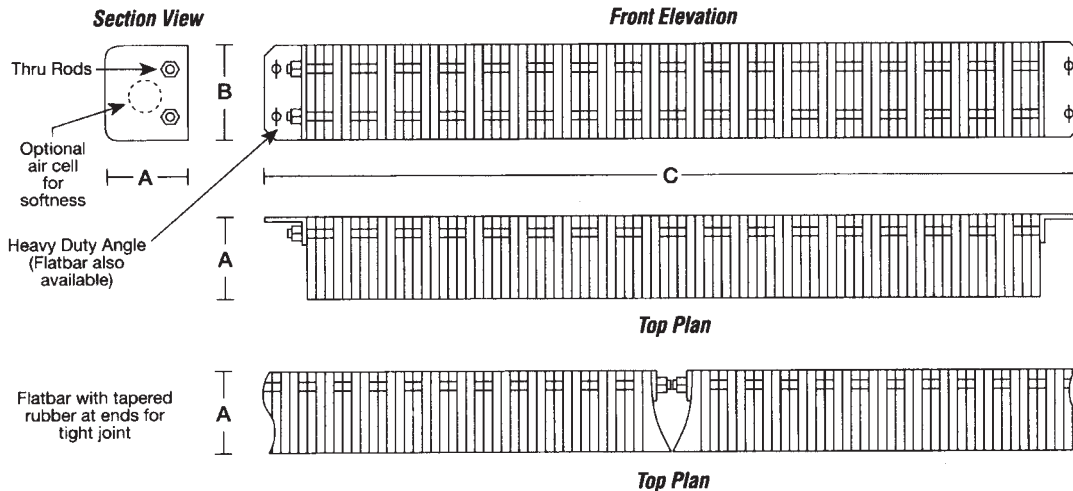
| PART NO. | A | B | C | WT. (Lbs. per Linear Ft.) |
|-------------------------|------|-----|-------------------|------------------------------|
| SR 142 and SR 143 | 4" | 4" | 12" to 240" | 10 |
| | 4" | 5" | | 11 |
| | 4" | 6" | | 14 |
| | 4" | 8" | | 20 |
| | 4" | 10" | | 26 |
| | 4.5" | 10" | | 27 |
| | 4.5" | 12" | | 32 |
| | 6" | 6" | | 23 |
| | 6" | 10" | | 36 |
| | 6" | 12" | | 38 |

Laminated rubber sections are compressed onto 3/4" steel rods.

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D-GUARD FENDERS

MODEL 114D – DESIGN SPECIFICATIONS



Features

- More economical, durable and practical than virgin rubber products
- Nylon-reinforced rubber D-guard sections are compressed onto steel rods and secured with heavy-duty flatbar or angle
- Weld-tabs are compressed onto steel rods at 12" intervals and are welded directly to the hull
- No need to incur costs associated with pinning extruded rubber into channel
- Each weld-tab floats and works independent of other weld-tabs, thereby providing quick installation on irregular and damaged hulls
- Rubber is tapered at ends to provide tight joint when two or more units are used
- Tough plies of nylon-reinforced rubber virtually eliminate chipping, unlike extruded and molded rubber
- 100% of rubber contents is certified to be recycled from post-consumer waste
- Pre-curved sections available

Standard Sizes

- Schuyler manufactures D-Guard Fenders with or without a cylindrical or D-shaped bore. The variable size and shape of the bore, if required, will give you the specific physical characteristics needed
- Standard sizes are noted in chart. Please specify size of bore, if required, when ordering. Also note that Schuyler has the capability to manufacture non-standard D-Guard sizes

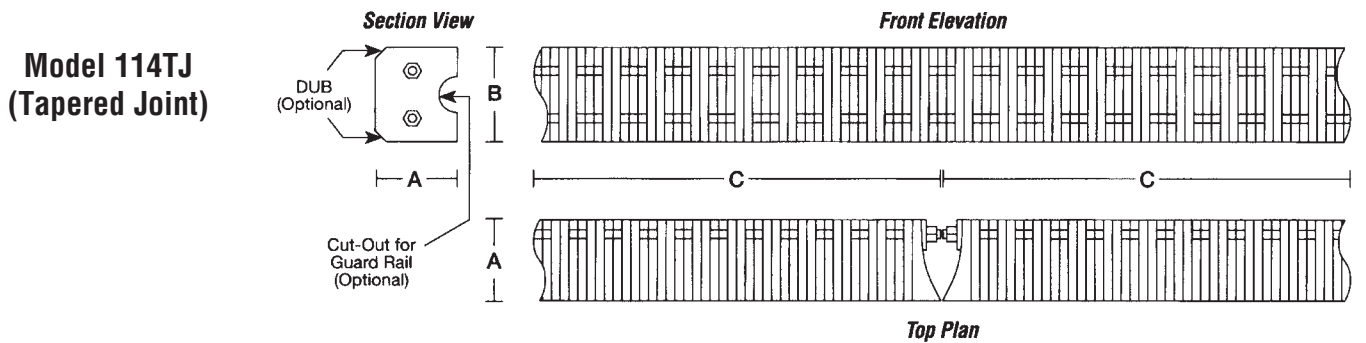
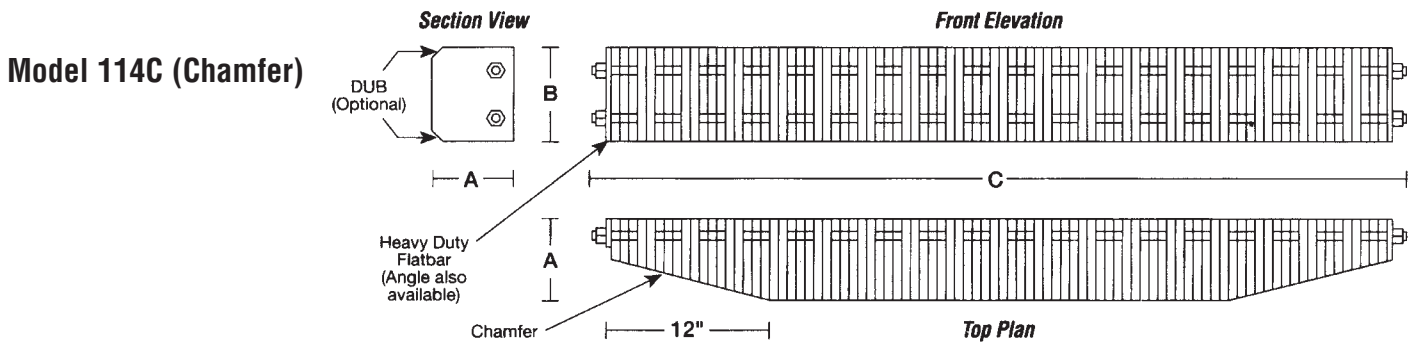
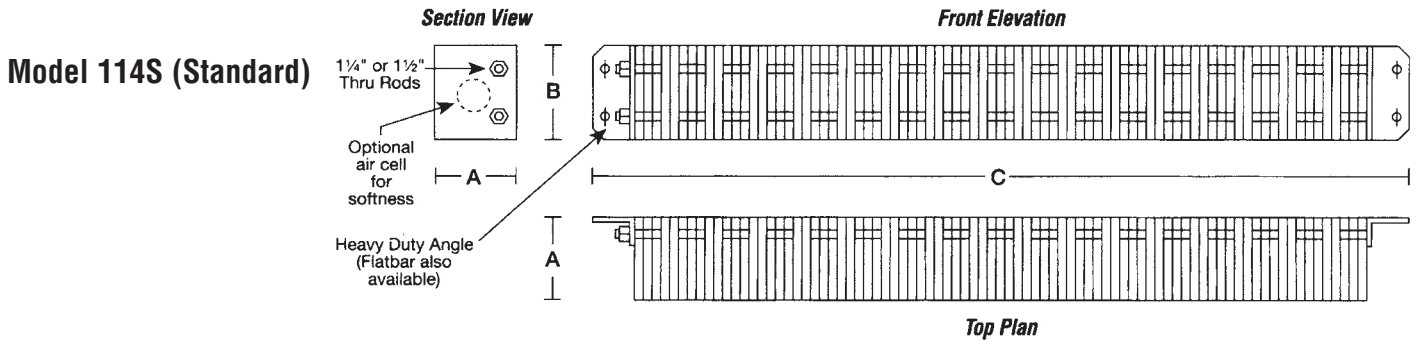
| 1-1/4" RODS PART NO. | A | B | C | WT. (Lbs per Linear Ft.) |
|-------------------------|-----|-----|------|-----------------------------|
| SR114D 0606 | 6" | 6" | | 25 |
| SR114D 0609 | 6" | 9" | | 36 |
| SR114D 0707 | 7" | 7" | 12" | 33 |
| SR114D 0808 | 8" | 8" | to | 40 |
| SR114D 0810 | 8" | 10" | 240" | 44 |
| SR114D 0909 | 9" | 9" | | 45 |
| SR114D 1010 | 10" | 10" | | 50 |

| 3/4" RODS PART NO. | A | B | C | WT. (Lbs per Linear Ft.) |
|-----------------------|------|-----|------|-----------------------------|
| SR114D 0404 | 4" | 4" | | 10 |
| SR114D 0405 | 4" | 5" | | 11 |
| SR114D 0406 | 4" | 6" | | 14 |
| SR114D 0408 | 4" | 8" | | 20 |
| SR114D 0410 | 4" | 10" | 12" | 26 |
| SR114D 4510 | 4.5" | 10" | to | 27 |
| SR114D 4512 | 4.5" | 12" | 240" | 32 |
| SR114D 0606 | 6" | 6" | | 23 |
| SR114D 0610 | 6" | 10" | | 36 |
| SR114D 0612 | 6" | 12" | | 38 |

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RECTANGULAR SIDE FENDERS MODEL 114 SERIES – DESIGN SPECIFICATIONS



Features

- Schuyler manufactures **Model 114** fenders with or without air cells. The variable size and shape of the air cells will give you the specific physical characteristics required.
- Tough laminated rubber sections are compressed onto steel rod and secured with heavy-duty angle or flatbar.
- Specify attachment system detail when placing order.
- Sections can be pre-curved to fit radius of any corner.

Standard Sizes

| A | B | C |
|-----------|-------------|-------------|
| 6" to 22" | 10" to 120" | 12" to 240" |

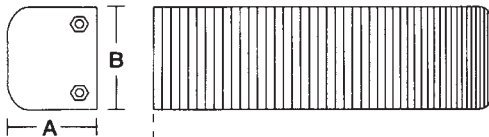
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D-GUARD, RECTANGULAR CORNER & SIDE FENDERS

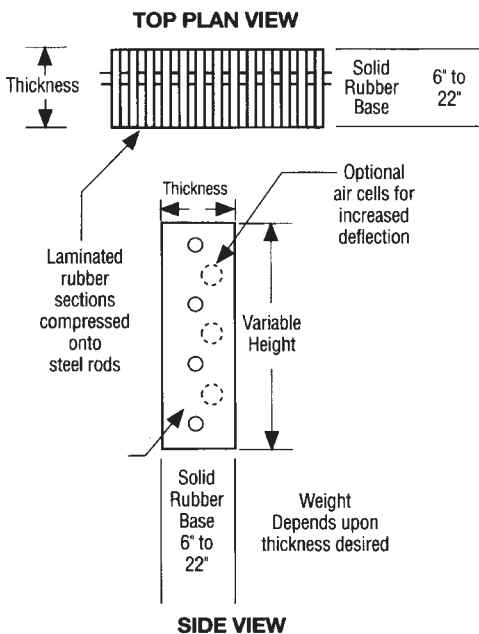
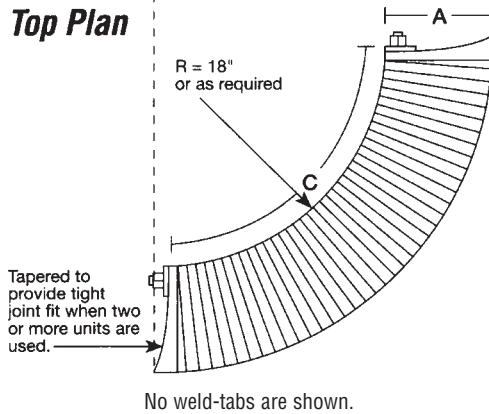


MODEL 114

Front Elevation



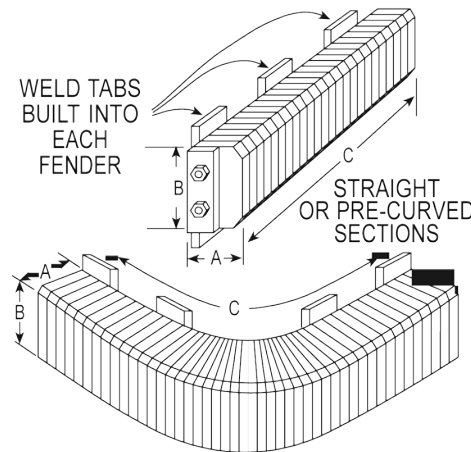
Top Plan



D-Guard Standard Sizes

| 1-1/4" RODS PART NO. | A | B | C | WT. (Lbs per Linear Ft.) |
|-------------------------|-----|-----|------|-----------------------------|
| SR114 DC 0606 | 6" | 6" | | 25 |
| SR114 DC 0609 | 6" | 9" | | 36 |
| SR114 DC 0707 | 7" | 7" | 12" | 33 |
| SR114 DC 0808 | 8" | 8" | to | 40 |
| SR114 DC 0810 | 8" | 10" | 240" | 44 |
| SR114 DC 0909 | 9" | 9" | | 45 |
| SR114 DC 1010 | 10" | 10" | | 50 |

MODEL 114



Rectangular Standard Sizes

| PART NO. | A | B | C | WT. (Lbs per Sq. Ft.) |
|----------|-----------|-------------|-------------|---------------------------------|
| SR114 RC | 6" to 22" | 10" to 120" | 30" to 480" | (Varies depending on thickness) |

- Specify radius of corner
- Specify weld tab attachment system detail

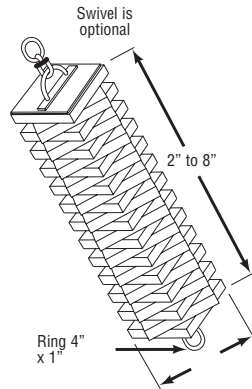
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SIDE FENDERS

PIGTAIL SIDE FENDER

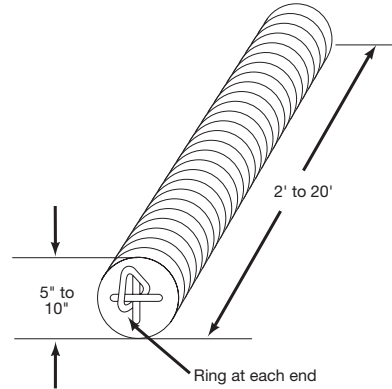
Model 109



These side fenders protect the vulnerable sides and gunwales exposed to docking fixtures. Easily removable, these side fenders never lose their shape and are virtually maintenance-free. Manufactured in lengths from 2" to 8" with optional swivels. Easy to handle and store.

CYLINDRICAL SIDE FENDER

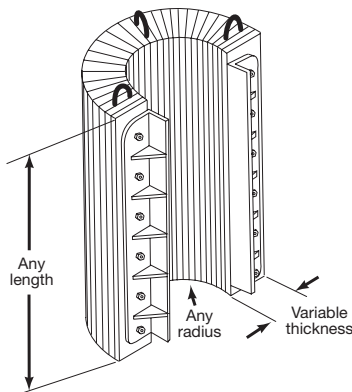
Model 152



Compressed rubber retained with galvanized cable in variable lengths can be used for many purposes – retractable side fenders, additional bow and stern coverage, and so on.

WRAP-AROUND FENDER

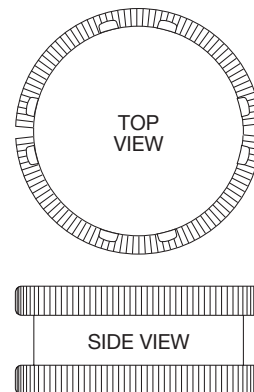
Model 153



These fenders are excellent for boat dock, barge mooring areas and pile cluster fendering. The 180° coverage provides protection for offshore support legs and structures. These fenders can be fabricated to fit any number of shapes and lengths.

BUOY FENDERING

Model 154



Pre-curved laminated rubber sections are welded directly to buoy body or existing steel rub rail. Provides lifetime protection, unlike wood or other fendering materials. Many sizes and lengths are available. Let Schuyler design the right system for you.

Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

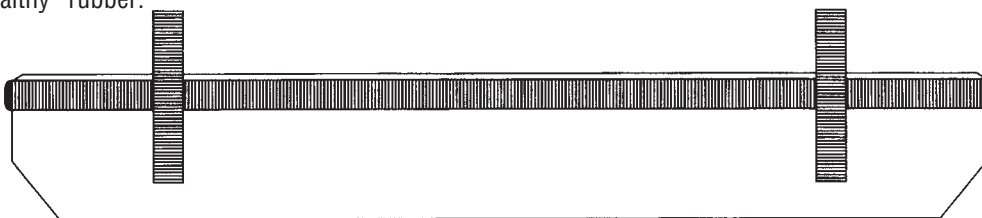
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BARGE – WORKBOAT – SCOW FENDERS

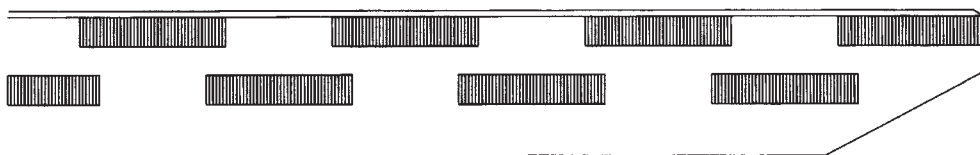


Tough Schuyler rubber can be manufactured in any size and shape to fit around the corners and staggered horizontally and/or vertically to fit the sides or rake ends of a barge or workboat. Rectangular, SR3D or D-Guard rubber can be adapted to solve your fendering problem - in lengths up to 20'. The laminated rubber sections can be welded, bolted or chain-hung to the bullworks of the vessel.

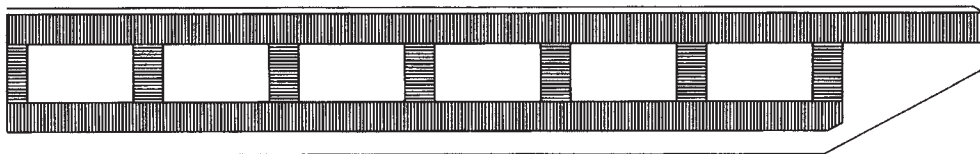
Unlike extruded rubber, Schuyler rubber comes in standardized lengths which can be easily removed, if damaged, without disturbing the "healthy" rubber.



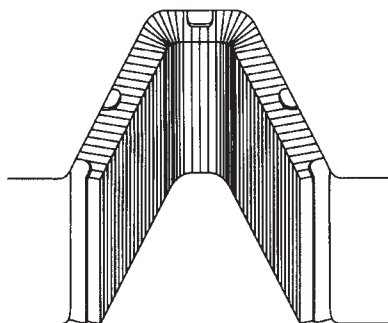
Horizontal bow/stern fenders with push knee verticals



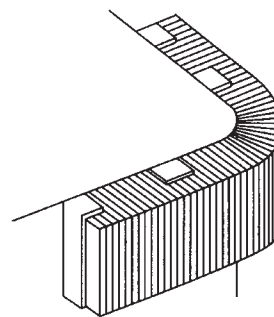
Staggered horizontal coverage



Continuous horizontal and vertical coverage



Pre-formed barge notch fender with weld-tabs



Pre-formed barge corner with weld-tabs

Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

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ATTACHMENT SYSTEM DETAIL

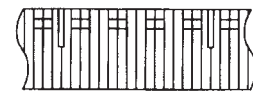
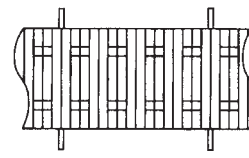
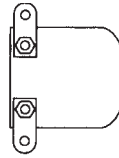
Section View

Front Elevation

Top Plan

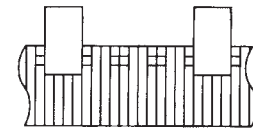
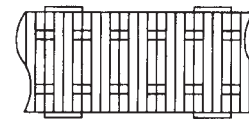
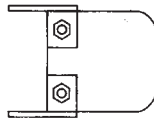
A. FLUSH WELD-TAB

- Welded directly to hull or into existing channel



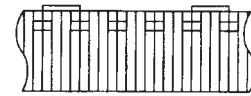
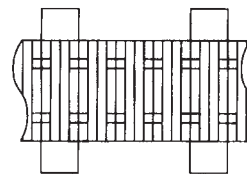
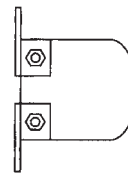
B. EXTENDED WELD-TAB

- Welded over existing structure, guard rail or sponson



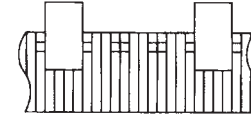
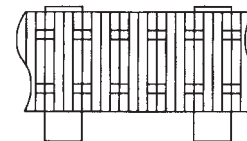
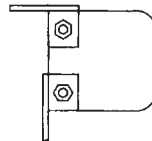
C. BROADMOUNT WELD-TAB

- Welded directly to hull
- Increased area of weld for extra strength



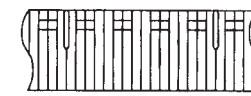
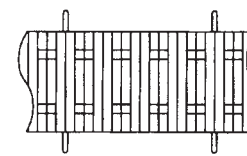
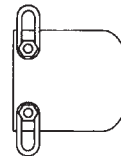
D. COMBINATION EXTENDED AND BROADMOUNT WELD-TAB

- Any combination of weld-tabs is available for custom fit



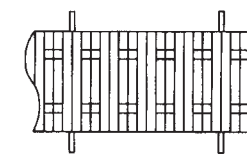
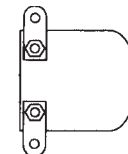
E. CHAIN LINK HANGER

- Pinned, chained or turnbuckled to hull



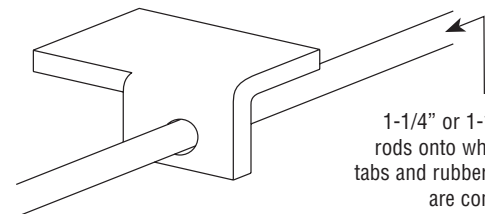
F. FLAT BAR HANGER

- Pinned, chained or turnbuckled to hull



Features

- Each weld-tab and hanger is compressed onto steel rods at required intervals (typically 12") between laminated rubber sections
- Sections float and work independently for ease of welding to damaged and irregular hulls
- Allows for increased movement of fender through weld-tab



1-1/4" or 1-1/2" steel rods onto which weld-tabs and rubber sections are compressed

Weld-tabs are constructed of 3/8" or 1/2" steel angle with no welds, for maximum strength.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

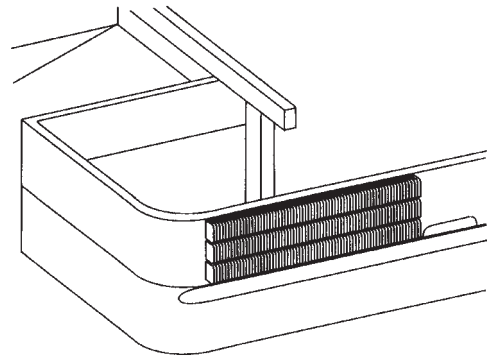
TRAWLER FENDERS MODEL 180



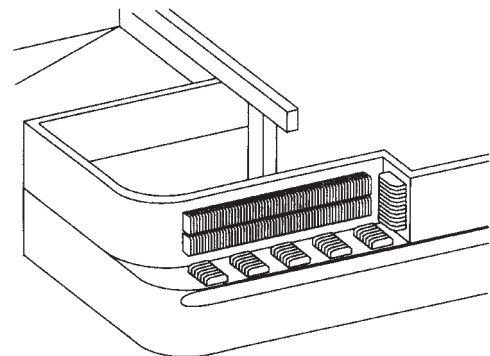
Easy-to-install, weld-on trawler fenders provide Hull and Trawl Door protection and eliminate door impact noise and abrasion. Our rubber provides increased protection over steel half rounds.

Bolt-on models are available for fiberglass vessels.

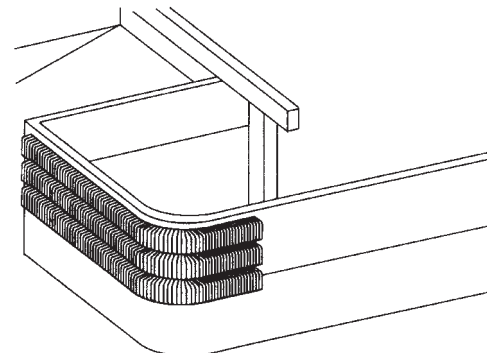
Short trawl fender pads can be welded to deck and just inside rail to support trawl doors while not in use. Decreases trawl door damage and deck damage.



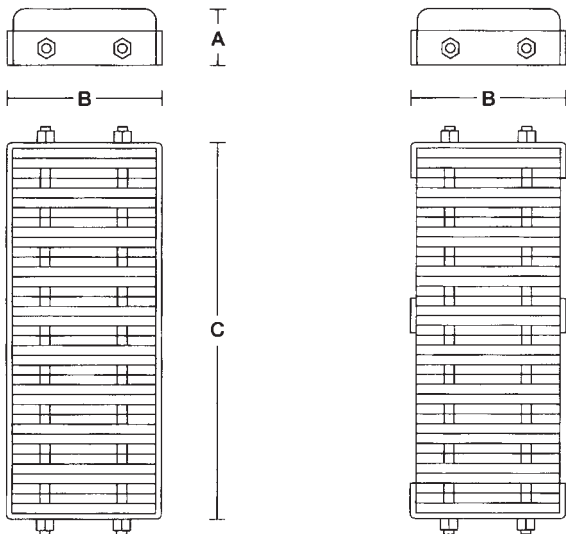
Horizontal pads welded to exterior of vessel at door impact areas



Horizontal, vertical and deck pads welded within door pocket



Horizontal pads welded to stern of processor/catcher with stern draw doors



Compressed rubber pads and steel bars or rods are totally enclosed with 3/8" steel plate to form an integrated steel box which is welded directly to knee.

Fully integrated weld-tabs every 12" allow quick and easy installation.

| PART NO. | A | B | C | WT. (Lbs per Linear Ft.) |
|-------------------------|------|-----|-------------------|-----------------------------|
| SR 142 and SR 143 | 4" | 4" | 12" to 240" | 10 |
| | 4" | 5" | | 11 |
| | 4" | 6" | | 14 |
| | 4" | 8" | | 20 |
| | 4" | 10" | | 26 |
| | 4.5" | 10" | | 27 |
| | 4.5" | 12" | | 32 |
| | 6" | 6" | | 23 |
| | 6" | 10" | | 36 |
| 6" | 12" | 38 | | |

Laminated rubber sections are compressed onto 3/4" steel rods.

Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

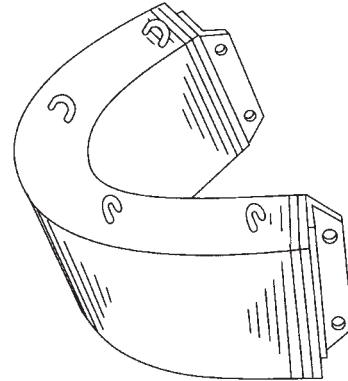




BOW FENDER MEASUREMENT

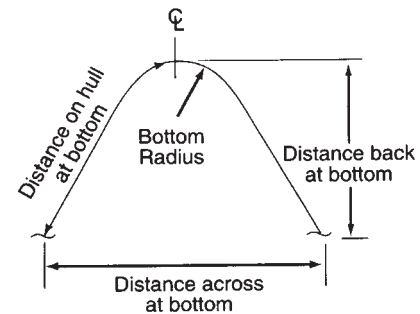
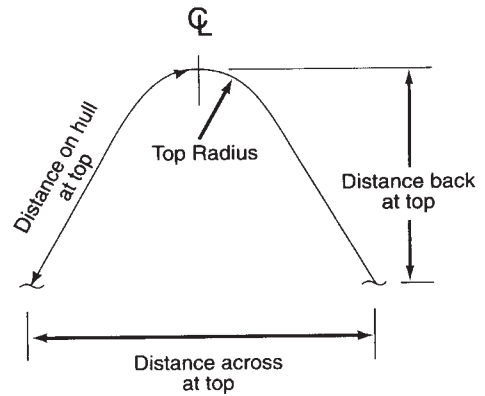
To ensure proper fit on bow fender orders, please supply the following information:

(A) Three-dimensional sketch of the fender required



(B) The following measurements on hull at top and bottom of fender:

- Radius of stem
- Distance back from stem to back of fender
- Distance across
- Distance on hull from stem to back of fender



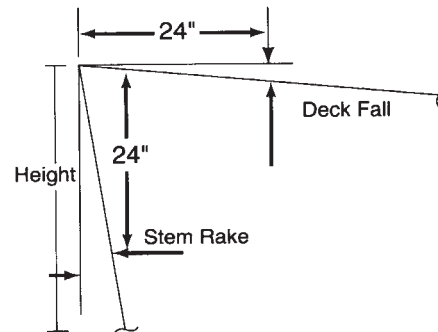
(C) Deck fall at 24"

(D) Stem rake at 24"

(E) Height of fender

(F) Identify any unusual features (such as guardrails, hawse pipe, nose cap, etc.) along with their dimensions

(G) Identify rubber fender thickness – single layer or



Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

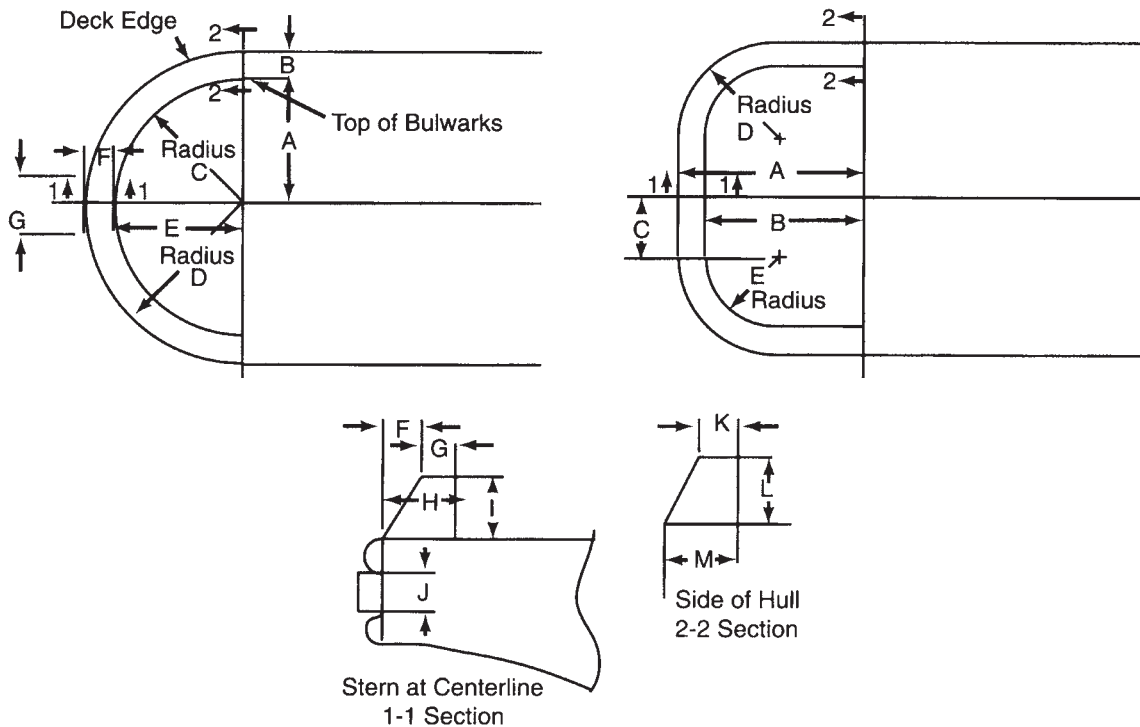
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

STERN BULWARK & STERN HULL FENDER MEASUREMENT



To ensure a proper fit on stern fender orders, please supply the following information, including a three-dimensional sketch of fender required.

Identify any unusual features (such as guardrails, hawse pipe, nose cap, etc.) along with their dimensions. Also identify model number and rubber fender thickness.



4

Vessel Identification _____

Company Name _____

Address _____

A _____ I _____

B _____ J _____

C _____ K _____

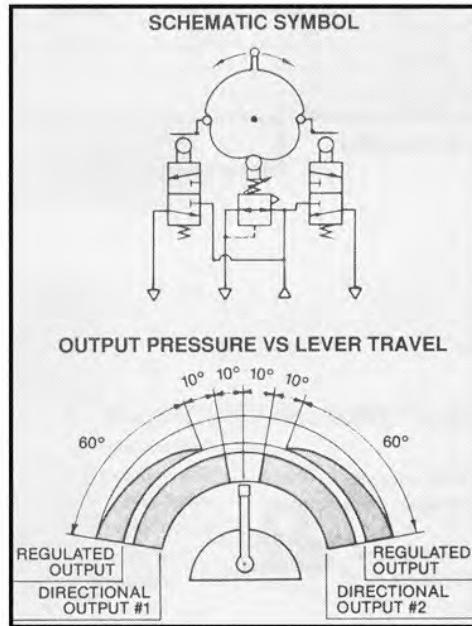
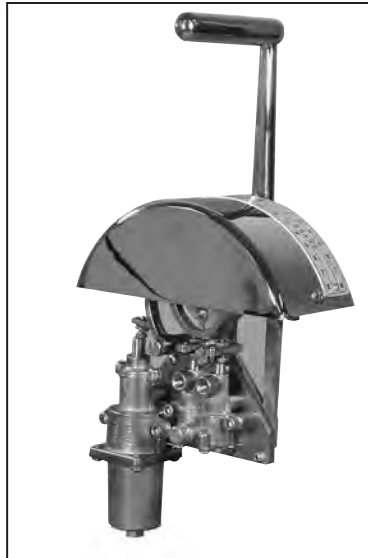
D _____ L _____

Please specify hot rolled, cold rolled, alloy or stainless steel construction. Aluminum and hot-dip galvanizing also available.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

2544 DUAL FUNCTION CONTROL HEAD 1/8" NPT



5

DESCRIPTION

The 2544 Control Head consists of two 3-way directional control valves and an accurate, self-relieving pressure regulating valve. All valves are handle-cam actuated. With the handle in center position, both 3-way valve outputs are vented to atmosphere and the regulating valve output pressure is lowest. Movement of the handle through the first 20° in either direction actuates one of the 3-way valves, delivering full supply pressure to the chosen directional output. Handle output beyond 20° actuates the regulating valve, delivering its output according to handle position. The chosen directional output remains at full supply pressure from 10° to 80° of handle travel.

Weight: 9.1 lbs. (4.1 kg.)

Materials: Die-cast silicon bronze and stainless steel hardware.

Maximum Supply Pressure: 150 PSI (10.34 BAR)

Operating Temperature Range: -40°C to +90°C.

Pipe Port Size: 1/8" NPT

APPLICATIONS

- Used primarily for the control of throttles or governors and reverse clutches by a single handle.
- For pneumatic control of two mechanisms, one directional and the other proportional, by a single handle.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ORDERING INFORMATION

Model Designation Order Codes:

| | | | |
|---|---|---|---|
| C | - | One short handle (standard) | |
| D | - | One long handle | |
| E | - | Spring return handle | |
| V | - | Handle with plastic grip | |
| H | - | Chrome finish dome | |
| J | - | Polished brass finish dome and handle | |
| K | - | Black epoxy finish dome and chrome handle | |
| N | - | 0-60 | Standard Pressure Ranges (PSI) Other Ranges Available on Request |
| P | - | 0-80 | |
| R | - | 0-100 | |
| S | - | 0-120 | |
| T | - | 10-60 | |
| U | - | 10-80 | |
| W | - | 10-100 | |
| X | - | 10-120 | |

The Standard Model 2544 Control Head is supplied as follows:

1. Short handle
2. Chrome finish cover and handle
3. In any standard pressure range

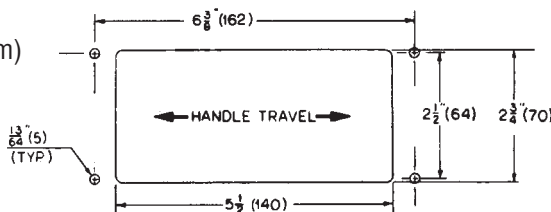
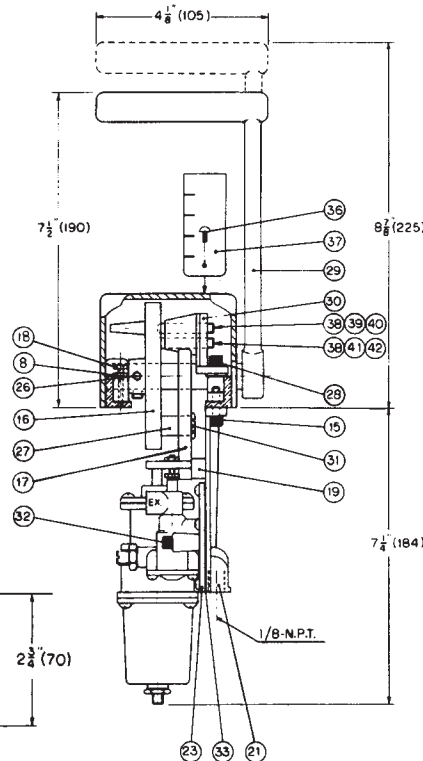
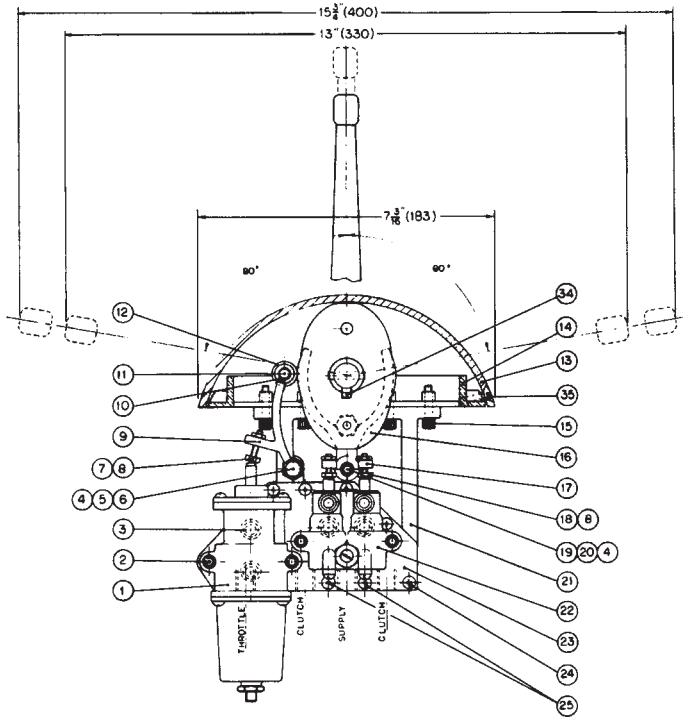
To order, state Model Number, followed by Model Designation Letter Codes listed above.

Example: Standard 2544 with 10-80 PSI pressure range. Order No. 2544-CHU.

2544 DUAL FUNCTION SINGLE ENGINE CONTROL HEAD

HOBELT

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|----------------------------------|
| 1 | 1 | 3217 | Valve* |
| 2 | 2 | 1002-1024 | Socket Head Screw |
| 3 | 5 | 1101-0010 | "O" ring |
| 4 | 2 | 1023-0232 | Flat Washer |
| 5 | 1 | 1001-1028 | Hex Head Screw |
| 6 | 1 | 2545-0002 | Spacer |
| 7 | 3 | 1001-0808 | Hex Head Screw |
| 8 | 5 | 1022-0108 | Nut |
| 9 | 1 | 2545-0001 | Roller Arm |
| 10 | 2 | 1029-1031 | Snap Ring |
| 11 | 1 | 2542-0011 | Pin |
| 12 | 1 | 2543-0009 | Roller |
| 13 | 1 | 2543-0001 | Cover |
| 14 | 1 | 2543-0002 | Frame |
| 15 | 4 | 1002-1010 | Socket Head Screw |
| 16 | 1 | 2545-0003 | Cam |
| 17 | 1 | 2545-0008 | "Fork" Cam |
| 18 | 2 | 1001-0812 | Hex Head Screw |
| 19 | 1 | 2544-0007 | Bushing |
| 20 | 1 | 1001-1020 | Hex Head Screw |
| 21 | 1 | 2544-0001 | Ports Support |
| 22 | 1 | 3803-B | Valve |
| 23 | 1 | 2544-0003 | Plate |
| 24 | 5 | 1010-0806 | Round Head Screw |
| 25 | 3 | 1009-0806 | Flat Head Screw |
| 26 | 1 | 1024-0816 | Spring Pin |
| 27 | 1 | 2544-0004 | Roller |
| 28 | 2 | 1002-1008 | Socket Head Screw |
| 29 | 1 | 2545-0005 | Handle (Short) |
| 29 | 1 | 2545-0014 | Handle (Long) |
| 29 | 1 | 2545-2005 | Handle with Plastic Grip (Short) |
| 29 | 1 | 2545-2014 | Handle with Plastic Grip (Long) |
| 30 | 1 | 2542-0009 | Bracket |
| 31 | 1 | 2544-0005 | Shoulder Screw |
| 32 | 2 | 1002-1020 | Socket Head Screw |
| 33 | 1 | 2544-0008 | Gasket |
| 34 | 1 | 1016-1004 | Set Screw |
| 35 | 2 | 1005-0808 | Oval Head Screw |
| 36 | 2 | 1032-0304 | Rivet |
| 37 | 1 | 2545-0013 | Indicator Strip |
| 38 | 2 | 1016-1205 | Set Screw |
| 39 | 1 | 1201-0062 | Spring |
| 40 | 1 | 2545-0012 | Detent Pin |
| 41 | 1 | 1201-0003 | Spring |
| 42 | 1 | 2545-0021 | Friction Pad |



• When ordering valve, specify pressure range using Model Designation Letter Codes from previous page.

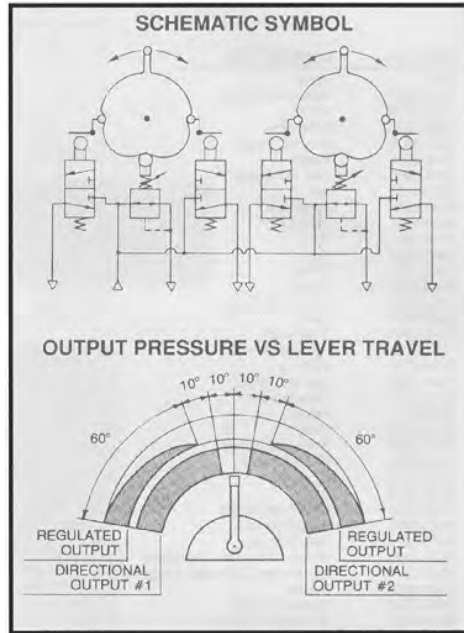
A Repair Kit is available consisting of all seals and gaskets. Order No. 2544-RK.

ALL DIMENSIONS IN INCHES (mm)

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

2545 TWIN DUAL-FUNCTION CONTROL HEAD 1/8" NPT



5

DESCRIPTION

The 2545 control is designed for twin-engine, single-lever clutch and throttle control. Its all bronze and stainless steel construction gives years of trouble-free service in a marine environment.

It basically consists of two single engine controls under one cover. Movement of either one of the handles through 20° from the center position actuates one of the 3-way valves, delivering full supply pressure to its corresponding output port. Moving the handle beyond 20° actuates an accurate pressure regulating valve. The output of this valve is proportional to the handle movement, therefore giving precise control over the engine speed setting device.

Weight: 19.9 lbs. (9.1 kg)

Materials: Die-cast silicon bronze and stainless steel

Operating Temperature Range: -40°C to +90°C

Pipe Port Size: 1/8" NPT (Outputs)

1/4" NPT (Supply)

Maximum Supply Pressure: 150 PSI (10.3 BAR)

APPLICATIONS

- Used principally for the control of twin engines and twin clutches by two dual-function handles.
- Used whenever two sets of directional and proportional pneumatic controls are required.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ORDERING INFORMATION

Model Designation Order Codes:

- | | | | |
|----|---|---|---|
| CC | - | Two short handle (standard) | |
| DD | - | One long handle | |
| E | - | Spring return handles | |
| V | - | Handles with plastic grip | |
| H | - | Chrome finish dome | |
| J | - | Polished brass finish dome and handle | |
| K | - | Black epoxy finish dome and chrome handle | |
| N | - | 0-60 | } Standard Pressure Ranges (PSI) Other Ranges Available on Request |
| P | - | 0-80 | |
| R | - | 0-100 | |
| S | - | 0-120 | |
| T | - | 10-60 | |
| U | - | 10-80 | |
| W | - | 10-100 | |
| X | - | 10-120 | |

The Standard Model 2545 Control Head is supplied as follows:

- Short handles
1. Chrome finish cover and handles
 2. In any standard pressure range

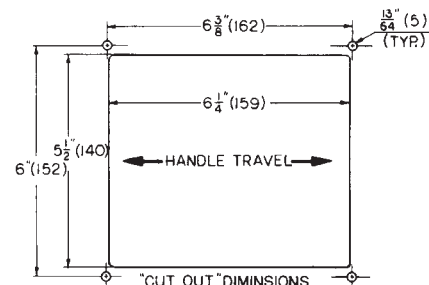
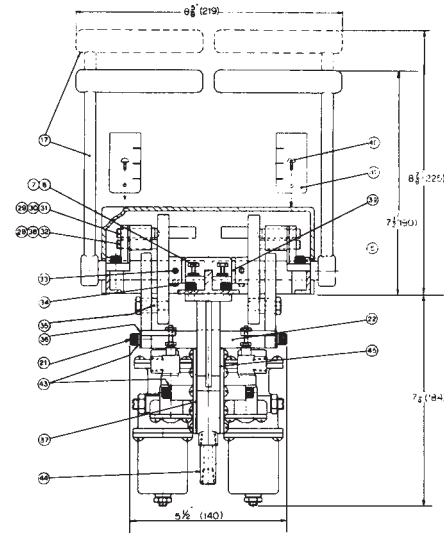
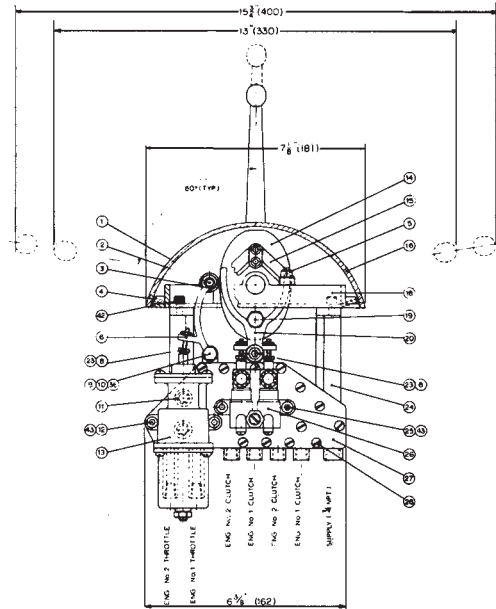
To order, state Model Number, followed by Model Designation Order Codes listed above.

Example: Standard 2545 with 10-80 PSI pressure range. Order No. 2545-CCHU.

2545 TWIN DUAL-FUNCTION CONTROL HEAD

HOBELT

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|----------------------------------|
| 1 | 2 | 2543-0009 | Roller |
| 2 | 2 | 2542-0011 | Pin |
| 3 | 4 | 1029-1031 | Snap Ring |
| 4 | 2 | 1005-0808 | Oval Head Screw |
| 5 | 4 | 1002-1010 | Socket Head Screw |
| 6 | 2 | 2545-0001 | Roller Arm |
| 7 | 4 | 1001-0812 | Hex Head Screw |
| 8 | 10 | 1022-0108 | Nut |
| 9 | 2 | 1001-1028 | Hex Head Screw |
| 10 | 2 | 2545-0002 | Spacer |
| 11 | 10 | 1101-0010 | "O" Ring |
| 12 | 4 | 1002-1024 | Socket Head Screw |
| 13 | 2 | 3217 | Air Pressure Regulating Valve* |
| 14 | 2 | 2545-0003 | Cam |
| 15 | 2 | 2542-0009 | Bracket |
| 16 | 1 | 2545-0004 | Dome |
| 17 | 2 | 2545-0005 | Handle (Short) |
| 17 | 2 | 2545-0014 | Handle (Long) |
| 17 | 2 | 2545-2005 | Handle with Plastic Grip (Short) |
| 17 | 2 | 2545-2014 | Handle with Plastic Grip (Long) |
| 18 | 1 | 2545-0006 | Frame |
| 19 | 2 | 2544-0005 | Shoulder Screw |
| 20 | 2 | 2545-0008 | "Fork" Cam |
| 21 | 2 | 1002-1040 | Socket Head Screw |
| 22 | 2 | 2545-0009 | Spacer |
| 23 | 6 | 1001-0808 | Hex Head Screw |
| 24 | 1 | 2545-0010 | Ports Support |
| 25 | 4 | 1002-1020 | Socket Head Screw |
| 26 | 2 | 3803-B | Four-Way Valve |
| 27 | 2 | 2545-0011 | Plate |
| 28 | 26 | 1010-0806 | Round Head Screw |
| 29 | 4 | 1016-1205 | Set Screw |
| 30 | 2 | 1201-0062 | Spring |
| 31 | 2 | 2545-0012 | Detent Pin |
| 32 | 2 | 2545-0021 | Friction Pad |
| 33 | 2 | 1024-0816 | Spring Pin |
| 34 | 2 | 1016-1004 | Set Screw |
| 35 | 2 | 2544-0004 | Roller |
| 36 | 4 | 1023-0232 | Flat Washer |
| 37 | 1 | 2545-0017 | Gasket (Left Hand) |
| 38 | 2 | 1201-0003 | Spring |
| 39 | 2 | 2545-0020 | Spacer |
| 40 | 4 | 1032-0304 | Rivet |
| 41 | 2 | 2545-0013 | Indicator Strip |
| 42 | 4 | 1002-1008 | Socket Head Screw |
| 43 | 6 | 1023-0410 | Highcollar Washer |
| 44 | 2 | 2545-0015 | Extension |
| 45 | 1 | 2545-0018 | Gasket (Right Hand) |



•When ordering valve, specify pressure range using Model Designation Order Codes from previous page.

A Repair Kit is available consisting of all seals and gaskets. Order No. 2545-RK.

ALL DIMENSIONS ARE IN INCHES (mm.)

MODEL 2555 DESCRIPTION

Model 2555 is essentially Model 2545, but it is equipped with illuminated side scales and with handles having pointers to indicate their position.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



HOBELT MODEL 3217 COMPENSATING SELF-RELIEVING AIR PRESSURE REGULATING VALVE



DESCRIPTION

The 3217 is a mechanically actuated, sub-plate mounted regulating valve. It is both compensating and self-relieving, with an adjustable spring for setting the valve working pressure range. Movement of the spool stem into the valve produces a proportional output pressure, within the working range of the valve.

Weight: 1.70 lbs. (0.78 kg.)

Materials: Die-cast silicon bronze and stainless steel hardware.

Maximum Supply Pressure: 250 PSI (17.24 BAR)

Operating Temperature Range: -40°C to +90°C

Spool Stem Travel: 0.25" (6 mm.)

Hysteresis: 2 PSI

Sub-plate Port: 1/8"

APPLICATIONS

- Used mainly in Kobelt pressure control heads and dual-function control heads for accurate control of throttle actuators, positioner actuators and air-applied brakes.
- Used anywhere an accurate air pressure is required.

ORDERING INFORMATION

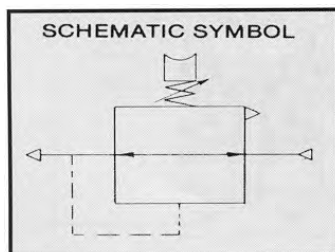
The standard 3217 is supplied in the following Model Designation Order Codes:

| | | |
|---|---|------------|
| N | - | 0-60 PSI |
| P | - | 0-80 PSI |
| R | - | 0-100 PSI |
| S | - | 0-120 PSI |
| T | - | 10-60 PSI |
| U | - | 10-80 PSI |
| W | - | 10-100 PSI |
| X | - | 10-120 PSI |

To order, state model number 3217 followed by the desired Model Designation Order Code.

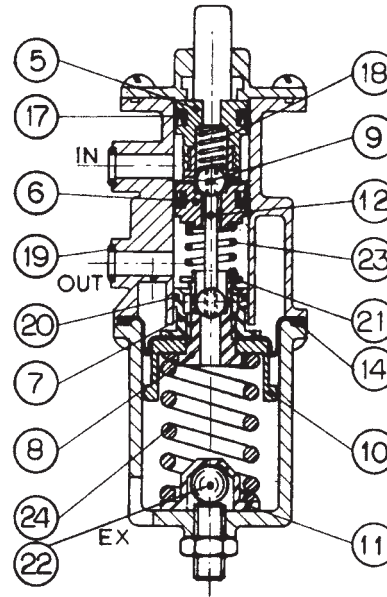
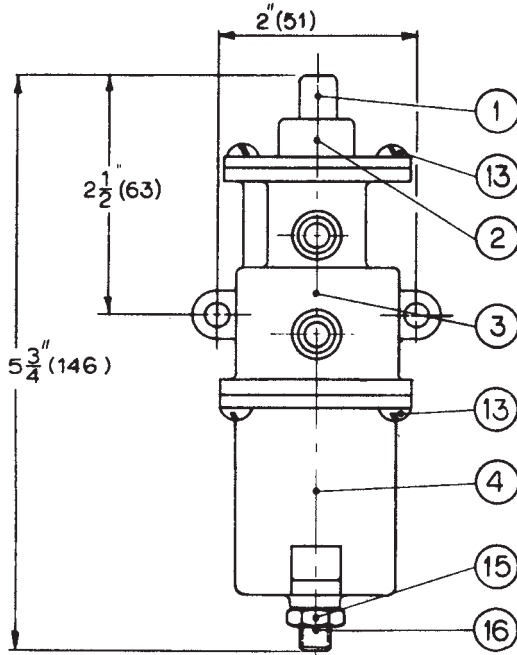
Example: Standard 3217 with 0-60 PSI pressure range. Order 3217-N.

Other pressure ranges available upon request.

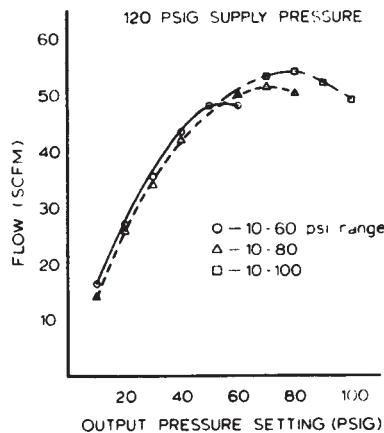
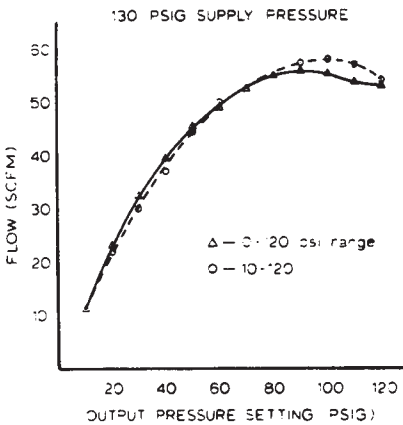
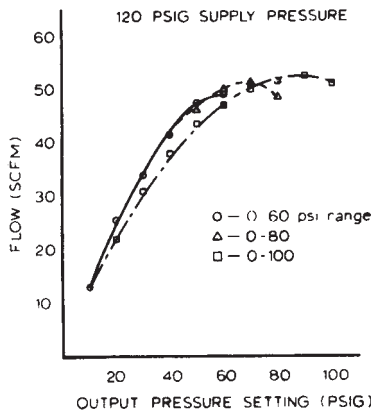


THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT



OUTPUT PRESSURE SETTING VS. FLOW



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|-------------------------|
| 1 | 1 | 3217-0001 | Spool Stem |
| 2 | 1 | 3217-0002 | End Cap |
| 3 | 1 | 3217-0003 | Valve Body (Upper Half) |
| 4 | 1 | 3217-0004 | Valve Body (Lower Half) |
| 5 | 1 | 3217-0005 | Upper Half Spool |
| 6 | 1 | 3217-0006 | Lower Half Spool |
| 7 | 1 | 3217-0007 | Piston Nut |
| 8 | 1 | 3217-0008 | Piston Keeper |
| 9 | 2 | 3217-0009 | Ball |
| 10 | 1 | 3217-0010 | Piston |
| 11 | 1 | 3217-0011 | Spring Retainer |
| 12 | 1 | 3217-0012 | Ball Stem |
| 13 | 8 | 1010-0806 | Round Head Screw |
| 14 | 1 | 1104-2001 | Diaphragm |
| 15 | 1 | 1022-0211 | Jam Nut |
| 16 | 1 | 1016-1116 | Set Screw |
| 17 | 2 | 1102-0005 | "U" Cup |
| 18 | 1 | 1201-0004 | Spring |
| 19 | 2 | 1101-0010 | "O" Ring |
| 20 | 1 | 1101-0016 | "O" Ring |
| 21 | 1 | 1023-0242 | Washer |
| 22 | 1 | 1301-0010 | Ball |
| 23 | 1 | 1201-0005 | Spring |
| 24 | 1 | 1201-0007 | Spring 60 PSI (Silver) |
| 24* | 1 | 1201-0006 | Spring 80 PSI (Black) |
| 24* | 1 | 1201-0008 | Spring 100 PSI (Blue) |
| 24* | 1 | 1201-0015 | Spring 120 PSI (Red) |

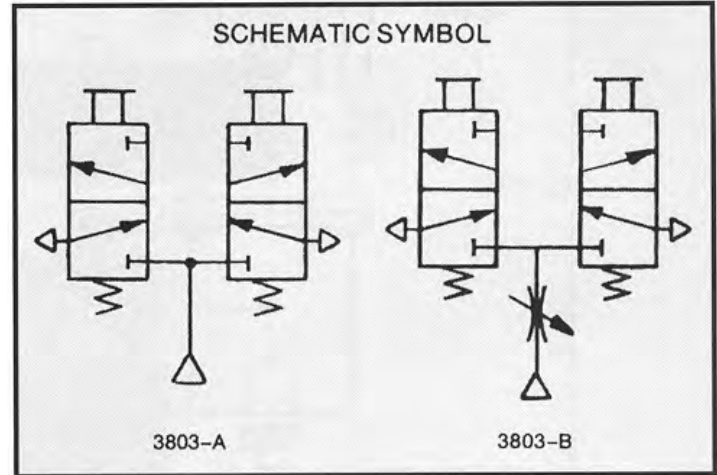
*Optional, depending on pressure configuration.

A Repair Kit is available, consisting of all seals and gaskets. Order No. 3217-RK.

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KOBELT

MODEL 3803 MECHANICALLY ACTUATED FOUR-WAY BLOCK MOUNT VALVE



5

DESCRIPTION

The 3803 is a mechanically actuated, sub-plate mounted, four-way directional control valve. It is a poppet type valve consisting of two normally closed three-way valves with a common supply port. Movement of the desired spool stem into the valve opens the chosen three-way valve and directs the air supply to the chosen directional output. An inlet flow control is available as an optional extra.

SPECIFICATIONS

- Weight:** 0.62 lbs. (0.28 kg)
- Materials:** Die-cast silicon bronze and stainless steel hardware
- Maximum Supply Pressure:** 250 PSI (17.24 BAR)
- Operating Temperature Range:** -40°C to +90°C
- Spool Stem Travel:** 0.175" (3.92 mm.)
- Recommended Sub-plate Port:** 1/8" NPT

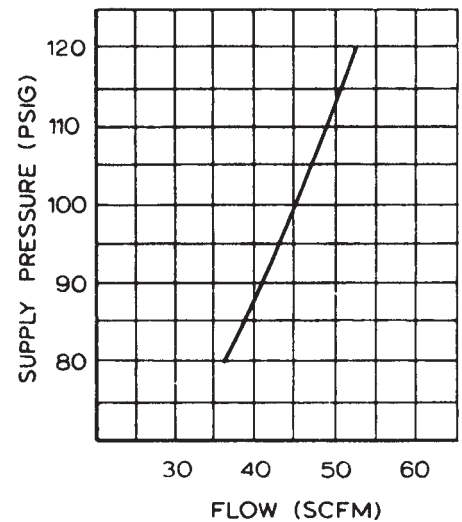
APPLICATIONS

- Used mainly in Kobelt dual-function control heads 2544 and 2545 as a directional control valve
- Used wherever a mechanically actuated, four-way directional control valve is required

ORDERING INFORMATION

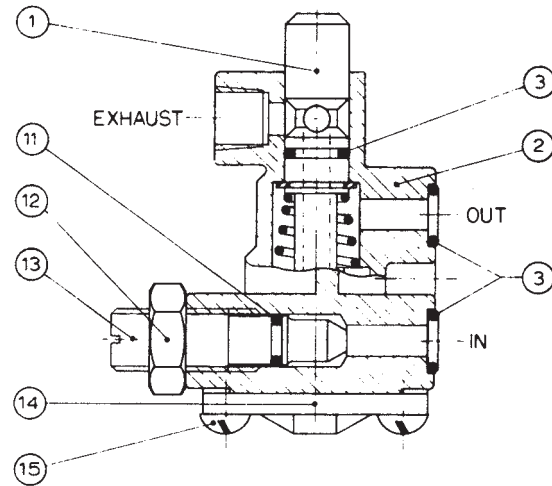
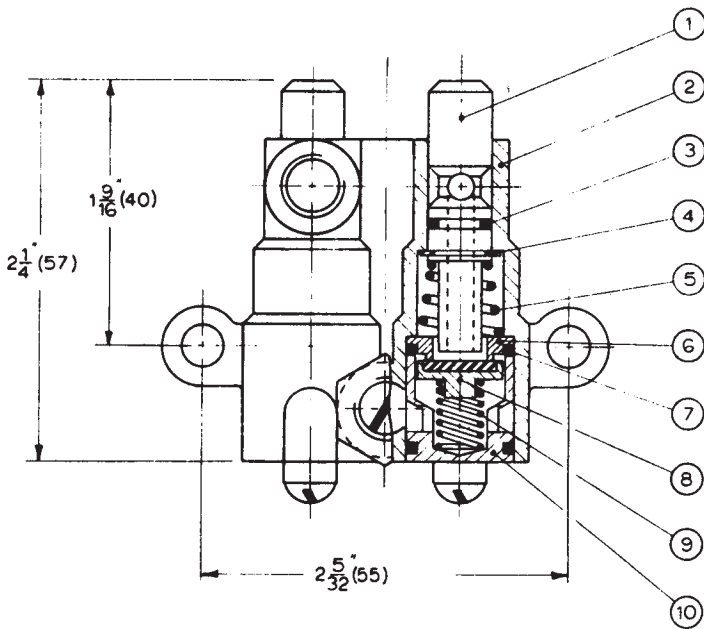
| | | | |
|------|---|---|-------------------|
| 3803 | - | A | Standard Model |
| 3803 | - | B | With Flow Control |

SUPPLY PRESSURE VS. FLOW



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ALL DIMENSIONS IN INCHES (mm.)



3803

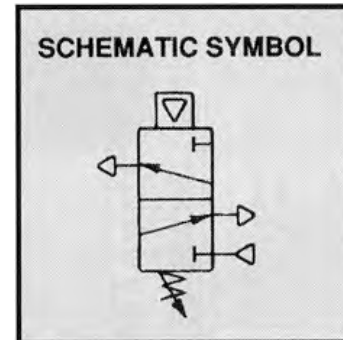
| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|-------------|
| 1 | 2 | 3803-0001 | Spool |
| 2 | 1 | 3803-0002 | Body |
| 3 | 5 | 1101-0010 | "O" Ring |
| 4 | 2 | 1029-2037 | Snap Ring |
| 5 | 2 | 1201-0013 | Spring |
| 6 | 2 | 3803-0003 | Seat |
| 7 | 4 | 1101-0014 | "O" Ring |
| 8 | 2 | 3803-0004 | Poppet |
| 9 | 2 | 1201-0004 | Spring |
| 10 | 2 | 3803-0005 | Retainer |
| 11 | 1 | 1101-0008 | "O" Ring |
| 12 | 1 | 1022-0262 | Jam Nut |
| 13 | 1 | 3803-0006 | Needle |
| 14 | 2 | 3803-0007 | End Cap |
| 15 | 4 | 1010-0806 | Screw |

A Repair Kit is available, consisting of all seals. Order No. 3803-RK.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

3324 NORMALLY CLOSED ADJUSTABLE RELAY VALVE 1/4" NPT



This valve is also available with dual piloting on special request.

SPECIFICATIONS

Weight: 3.5 lbs. (1.6 kg)

Materials: Die-cast silicon bronze and stainless steel hardware

Maximum Supply Pressure: 200 PSI (13.79 BAR)

Maximum Pilot Pressure: 700 PSI (48 BAR)

Operating Temperature Range: -40°C to +90°C

Pipe Port Size: 1/4" NPT

ORDERING INFORMATION

Model Designation Order Codes:

- A - Standard inlet cap
- B - With flow control inlet cap
- C - Heavy spring (40-120 PSI range)
- CC - Extra heavy spring (100-160 PSI range)
- D - Light spring (25-60 PSI range)
- DD - Extra light spring (10-20 PSI range)
- E - Left hand model
- F - Right hand model

The Standard Model 3324 Relay Valve is supplied as follows:

1. Standard inlet cap
2. Extra heavy spring (100-160 PSI range)
3. Left or right hand model

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

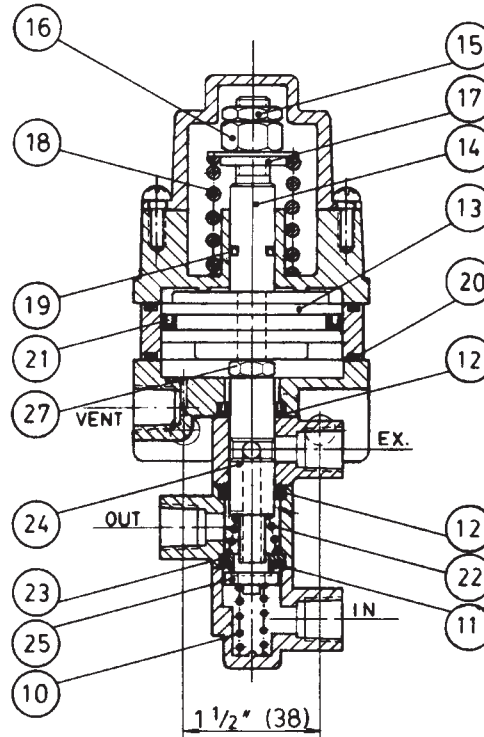
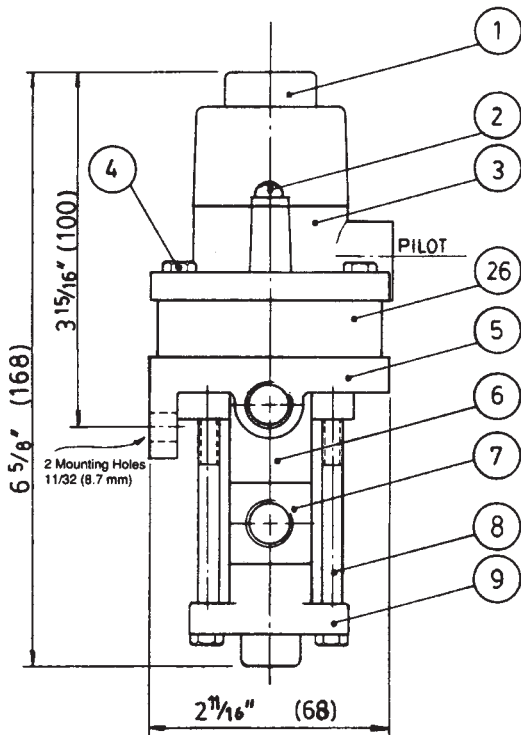
Example: To order a 3324 standard left hand model.
Order No. 3324-ACCE.

DESCRIPTION

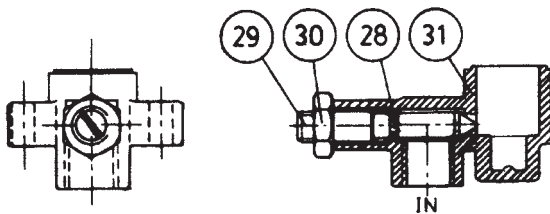
The 3324 is a normally closed, adjustable poppet-type valve which is controlled by a piston and spring arrangement. The spring keeps this valve in a closed position and pilot pressure will open the valve, allowing the air flow from the source of supply to the device actuated. The maximum pilot pressure is 700 PSI. The maximum control pressure (pneumatic) is 200 PSI. Many of these valves are used for clutch and throttle inter-locks in marine propulsion applications, where the gear box has to accumulate hydraulic pressure to lock up the forward or reverse clutch. After clutch lock up, the hydraulic pressure will open this valve, allowing the throttle signal to go through to the engine speed setting device.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT



3324



ALTERNATIVE INLET CAP WITH FLOW CONTROL

ALL DIMENSION IN INCHES (mm.)

**A Repair Kit is available consisting of all seals.
Order No. 3324-RK.**

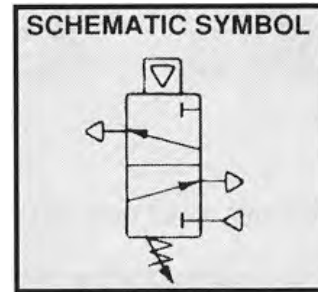
| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---------------------------|
| 1 | 1 | 3326-0001 | End Cap |
| 2 | 2 | 1010-0806 | Round Head Phillips Screw |
| 3 | 1 | 3326-0002 | Pilot Port |
| 4 | 4 | 1001-1020 | Hex Head Cap Screw |
| 5 | 1 | 3325-0002 | Vent Port (Left Hand) |
| 5 | 1 | 3325-0013 | Vent Port (Right Hand) |
| 6 | 1 | 3325-0008 | Exhaust Port |
| 7 | 1 | 3325-0009 | Outlet Port |
| 8 | 2 | 1001-1044 | Cap Screw |
| 9 | 1 | 3325-0010 | Inlet Cap |
| 10 | 1 | 1201-0009 | Spring |
| 11 | 1 | 1101-0016 | "O" Ring |
| 12 | 2 | 1102-0005 | "U" Cup |
| 13 | 1 | 3326-0008 | Piston |
| 14 | 1 | 3326-0010 | Spool |
| 15 | 1 | 1022-0212 | Jam Nut |
| 16 | 1 | 1022-0112 | Nut |
| 17 | 1 | 3326-0005 | Retainer |
| 18 • | 1 | 1201-0050 | Spring (10-20 PSI) |
| 18 • | 1 | 1201-0010 | Spring (25-60 PSI) |
| 18 • | 1 | 1201-0012 | Spring (40-120 PSI) |
| 18 | 1 | 1201-0030 | Spring (100-160 PSI) |
| 19 | 1 | 1102-1001 | "U" Cup |
| 20 | 2 | 1101-0139 | "O" Ring |
| 21 | 1 | 1102-0021 | "U" Cup |
| 22 | 1 | 1201-0016 | Spring |
| 23 | 1 | 3804-0003 | Seat |
| 24 | 1 | 3326-0007 | Spool |
| 25 | 1 | 3804-0004 | Poppet |
| 26 | 1 | 3326-0009 | Spacer |
| 27 | 1 | 1022-0261 | Jam Nut |
| 28 • | 1 | 1101-0008 | "O" Ring |
| 29 • | 1 | 3325-0011 | Needle |
| 30 • | 1 | 1022-0262 | Jam Nut |
| 31 • | 1 | 3325-0012 | Inlet Cap |

• Optional, depending on model configuration.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

3326 NORMALLY CLOSED ADJUSTABLE AIR PILOT RELAY VALVE 1/4" NPT



SPECIFICATIONS

- Weight:** 2.4 lbs. (1.09 kg)
- Materials:** Die-cast silicon bronze and stainless steel hardware
- Maximum Supply Pressure:** 200 PSI (13.79 BAR)
- Maximum Pilot Pressure:** 700 PSI (48 BAR)
- Operating Temperature Range:** -40°C to +90°C
- Pipe Port Size:** 1/4" NPT

ORDERING INFORMATION

Model Designation Order Codes:

- A - Standard inlet cap
- B - With flow control inlet cap
- C - Heavy spring (40-120 PSI range)
- D - Light spring (25-60 PSI range)
- DD - Extra light spring (10-20 PSI range)
- E - Left hand model (as shown in drawing)
- F - Right hand model

The Standard Model 3326 Relay Valve is supplied as follows:

1. Standard inlet cap
2. Heavy spring (40-120 PSI range)
3. Left or right hand model

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

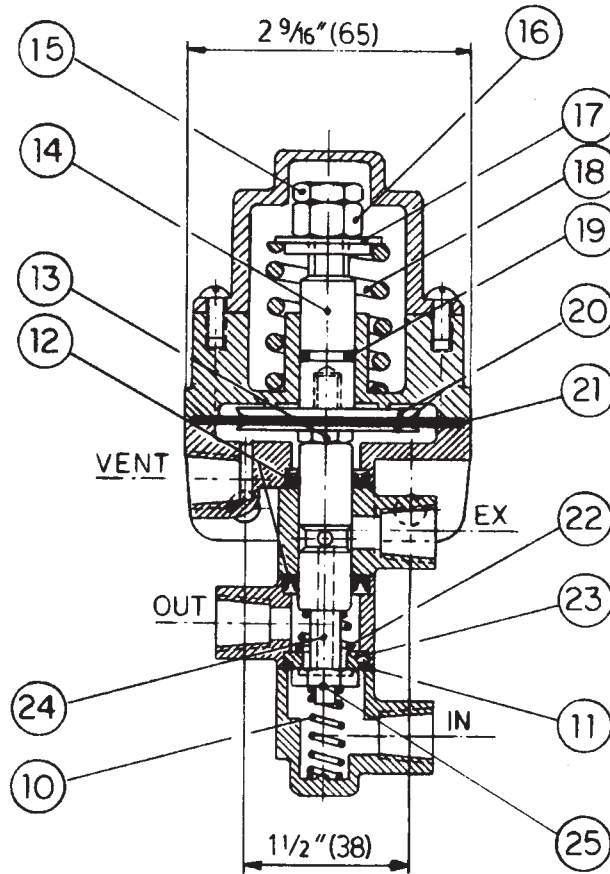
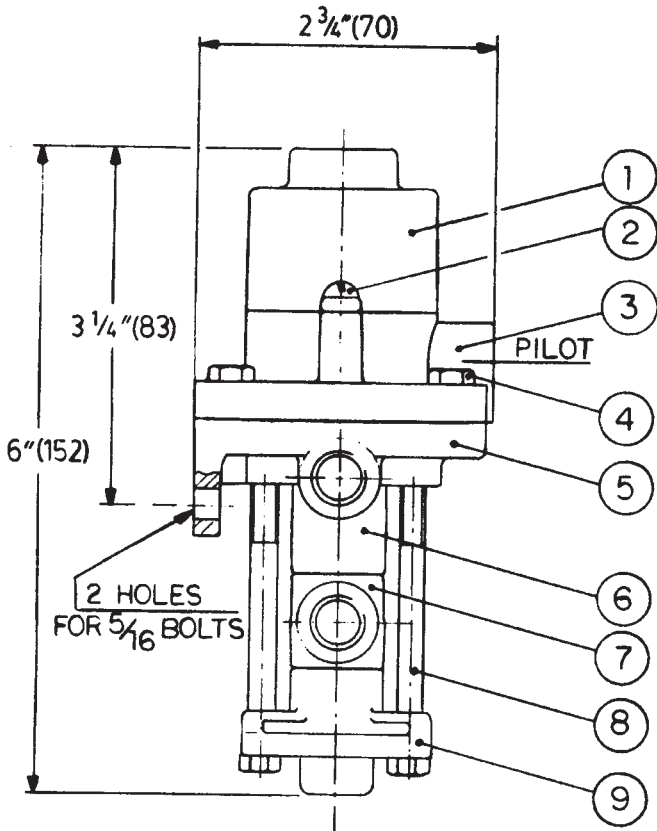
Example: To order a 3326 standard left hand model. Order No. 3326-ACE.

DESCRIPTION

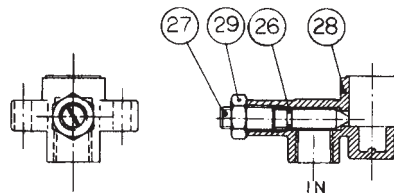
The 3326 is a poppet-type, normally closed relay valve. The spring keeps this valve in a closed position. The supply line is blocked and the outgoing line is vented through the exhaust port. When air pressure enters the pilot port, the main spring is compressed. This will permit the supply air to flow through the out port and close the port to exhaust. Several spring ratings are available, up to 120 PSI. The valve lends itself extremely well for inter-locking and time-delay circuitry. Its all bronze and stainless steel construction will give many years of trouble-free service. This valve has a full flow, 1/4" capacity, without restrictions.

An optional inlet cap is available which is equipped with an adjustable flow control that permits the volume regulation of the supply air.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



3326 RELAY VALVE



ALTERNATIVE INLET CAP WITH FLOW CONTROL
REPLACES ITEM 9.

ALL DIMENSIONS IN INCHES (mm.)

KOBELT

A Repair Kit is available, consisting of all seals and gaskets. Order No. 3326-RK.

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|------------------------|
| 1 | 1 | 3326-0001 | End Cap |
| 2 | 2 | 1010-0806 | Round Head Screw |
| 3 | 1 | 3326-0002 | Pilot Port |
| 4 | 4 | 1101-1012 | Hex Head Screw |
| 5 | 1 | 3325-0002 | Vent Port (Left Hand) |
| 5 | 1 | 3325-0013 | Vent Port (Right Hand) |
| 6 | 1 | 3325-0008 | Exhaust Port |
| 7 | 1 | 3325-0009 | Outlet Port |
| 8 | 2 | 1001-1044 | Hex Head Screw |
| 9 | 1 | 3325-0010 | Inlet Cap |
| 10 | 1 | 1201-0009 | Spring |
| 11 | 1 | 1101-0016 | "O" Ring |
| 12 | 2 | 1102-0005 | "U" Cup |
| 13 | 1 | 1001-1010 | Hex Head Screw |
| 14 | 1 | 3326-0004 | Spool |
| 15 | 1 | 1022-0212 | Jam Nut |
| 16 | 1 | 1022-0112 | Nut |
| 17 | 1 | 3326-0005 | Retainer |
| 18 • | 1 | 1201-0010 | Spring (25-60 PSI) |

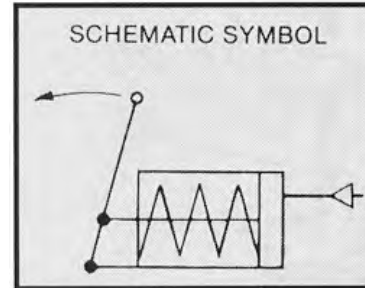
| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---------------------|
| 18 • | 1 | 1201-0050 | Spring (10-20 PSI) |
| 18 | 1 | 1201-0012 | Spring (40-120 PSI) |
| 19 | 1 | 1101-0012 | "O" Ring |
| 20 | 2 | 3326-0006 | Washer |
| 21 | 1 | 1105-2002 | Diaphragm |
| 22 | 1 | 1201-0016 | Spring |
| 23 | 1 | 3804-0003 | Seat |
| 24 | 1 | 3326-0007 | Spool |
| 25 | 1 | 3804-0004 | Puppet |
| 26 • | 1 | 1101-0008 | "O" Ring |
| 27 • | 1 | 3325-0011 | Needle |
| 28 • | 1 | 3325-0012 | Inlet Cap |
| 29 • | 1 | 1022-0262 | Jam Nut |

• Optional, depending on model configuration.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

4105 ACTUATOR POSITIONER



5

DESCRIPTION

The 4105 Actuator Positioner is used in conjunction with pressure control heads to provide fast, accurate positioning of low-force mechanisms.

Input pressure acts against a piston, "U" cup and a spring, producing lever position output corresponding to input pressure.

The piston, "U" cup and large bearing surfaces for the rod and all lever pins assure low friction for fast, accurate response and long life.

SPECIFICATIONS

Weight: 4 lbs. (1.8 kg)

Materials: Die-cast silicon bronze and stainless steel hardware

Maximum Supply Pressure: 200 PSI (13.79 BAR)

Operating Temperature Range: -40°C to +90°C

Pipe Port Size: 1/4" NPT

Stroke: Approximately 2 3/8" at longest lever position

NOTE: THE 4105 SUPERCEDES AND REPLACES THE 4106.

APPLICATIONS

- For accurate positioning and control of governors, throttles and valves.
- Used anywhere low-force positioning is required.

ORDERING INFORMATION

Model Designation Order Codes:

- U - 10-80 PSI input pressure range
- R - 0-100 PSI input pressure range

Other ranges available upon request.

The Standard Model 4105 Relay Valve is supplied as follows:

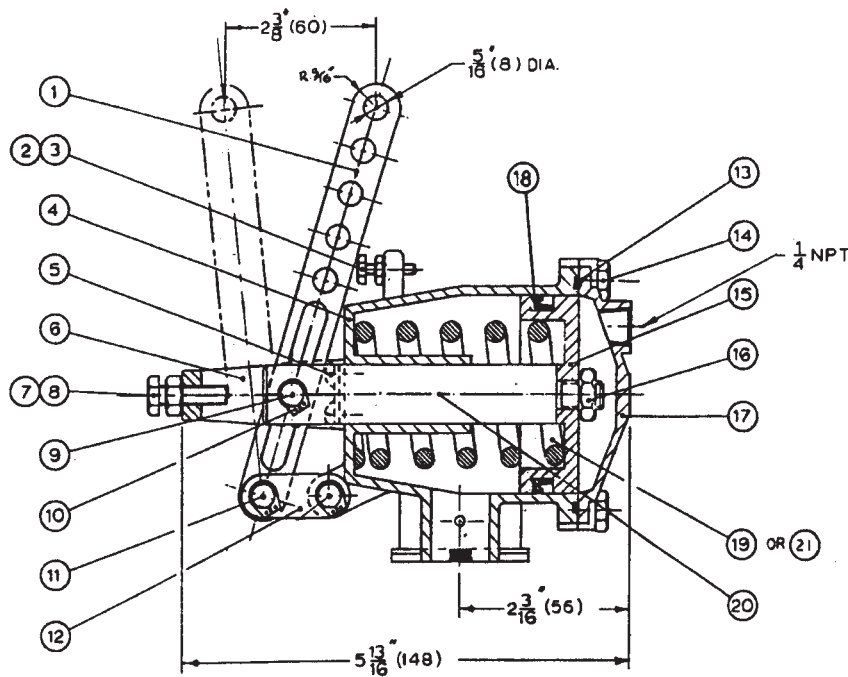
1. With adjustable stops and multi position lever
2. With 10-80 PSI pressure range

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

Example: To order a standard 4105 with 10-80 PSI pressure range. Order No. 4105-U.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

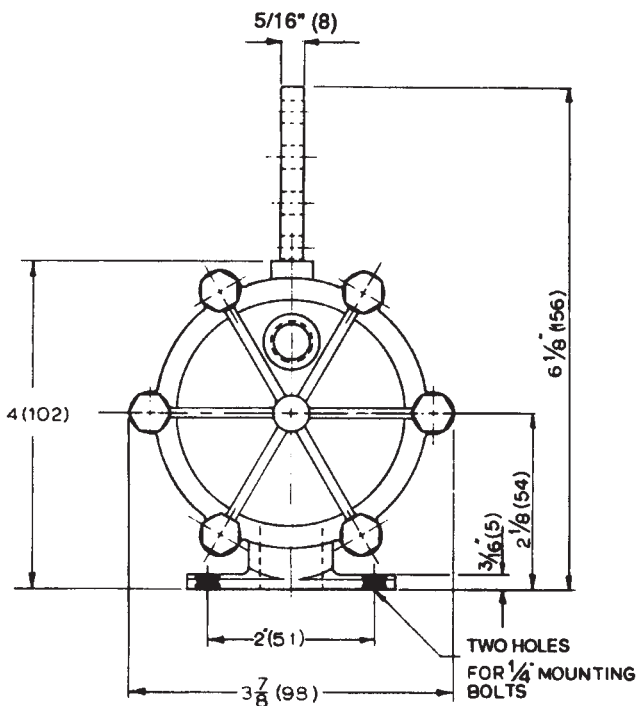


ALL DIMENSIONS IN INCHES (mm.)

A Repair Kit is available, consisting of all seals and gaskets. Order No. 4105-RK.

4105 THROTTLE ACTUATOR

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|--------------------------|
| 1 | 1 | 4105-0001 | Lever |
| 2 | 1 | 1001-0812 | Cap Screw |
| 3 | 1 | 1022-0108 | Nut |
| 4 | 1 | 4105-0002 | Piston Housing |
| 5 | 4 | 1004-0806 | Round Head Machine Screw |
| 6 | 1 | 4105-0003 | Bracket |
| 7 | 1 | 1001-1018 | Cap Screw |
| 8 | 1 | 1022-0210 | Jam Nut |
| 9 | 1 | 4105-0004 | Pin |
| 10 | 6 | 1029-1031 | Snap ring |
| 11 | 2 | 4105-0005 | Pin |
| 12 | 2 | 4105-0006 | Linkage |
| 13 | 1 | 1101-0149 | "O" Ring |
| 14 | 6 | 1001-1008 | Cap Screw |
| 15 | 1 | 4105-0007 | Piston |
| 16 | 1 | 1022-0212 | Hex Nut |
| 17 | 1 | 4105-0008 | End Cap |
| 18 | 1 | 1102-0063 | "U" Cup |
| 19 | 1 | 1201-0017 | Spring |
| 20 | 1 | 4105-0010 | Piston Rod |

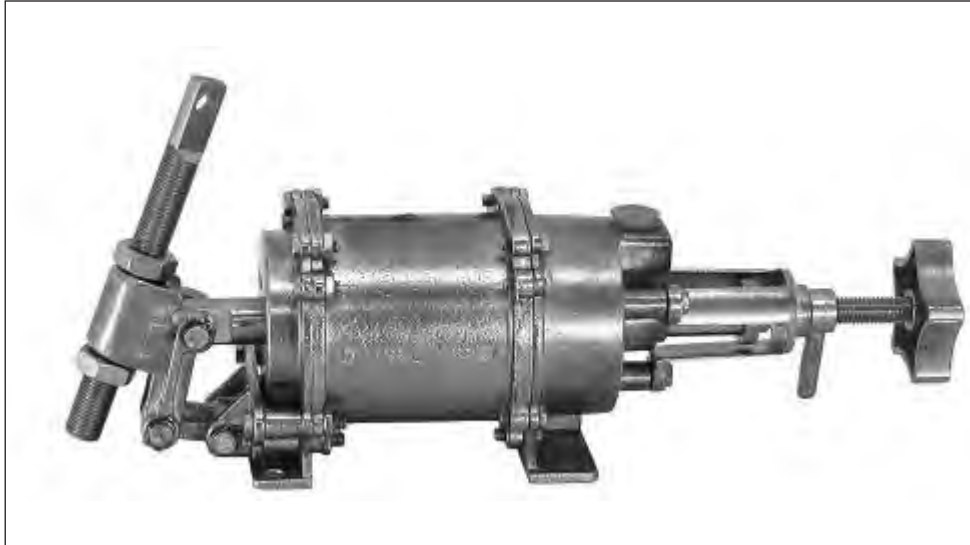


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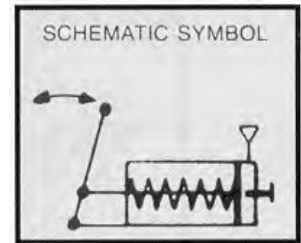
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

4107 THROTTLE ACTUATOR



PATENT PENDING



5

DESCRIPTION

The 4107 Throttle Actuator is used in conjunction with pressure control heads to provide fast, accurate positioning of low- and medium-force mechanisms. Input pressure acts on a rolling diaphragm and against a spring, producing lever position output corresponding to input pressure. The output lever is provided (threaded rod) with two jam nuts on either side of the output linkage, which permits infinite stroke selection. The arrangement is ideally suited for multi-engine installations with a single source of control air pressure. The fine adjustment of the linkage will allow throttle adjustment for load equalization (not an automatic load share). This cylinder also features a manual override. This allows the engineer to position the throttle actuator if there is no air supply. It can be done without having to disconnect any part of the linkage from the actuator.

SPECIFICATIONS

Weight: 6.1 lbs. (2.76 kg)
Materials: Die-cast silicon bronze and stainless steel hardware
Maximum Supply Pressure: 125 PSI (8.62 BAR)
Operating Temperature Range: -40°C to +90°C
Pipe Port Size: 1/4" NPT
Maximum Stroke: 3 1/2" (89 mm.)
Stroke as Linear Activator: 1" (25.4 mm.)

APPLICATIONS

- For accurate positioning and control of governors, throttles and valves.
- Used anywhere low- and medium-force positioning is required.

ORDERING INFORMATION

Model Designation Order Codes:

- U - 10-80 PSI input pressure range
- R - 0-100 PSI input pressure range

Other ranges available upon request.

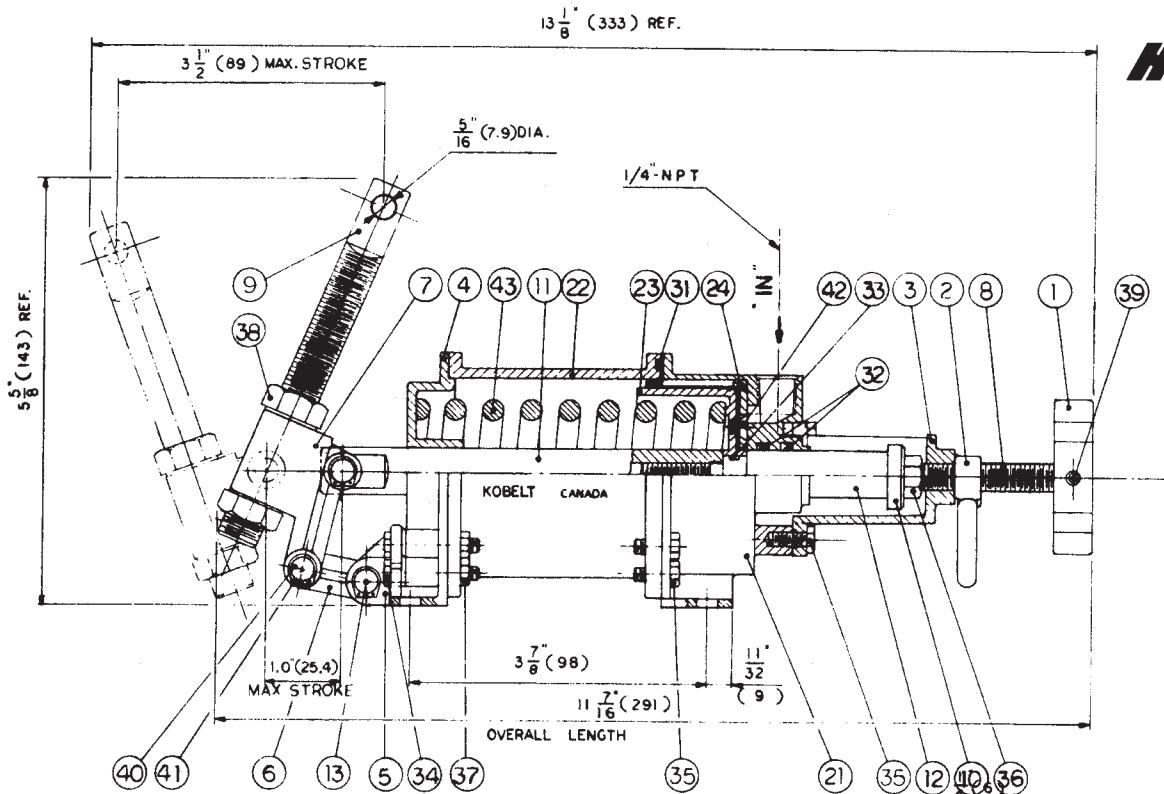
The Standard Model 4107 Relay Valve is supplied as follows:

1. With adjustable stops and multi position lever
2. With 10-80 PSI pressure range

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

Example: To order a standard 4107 with 10-80 PSI pressure range. Order No. 4107-SU.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

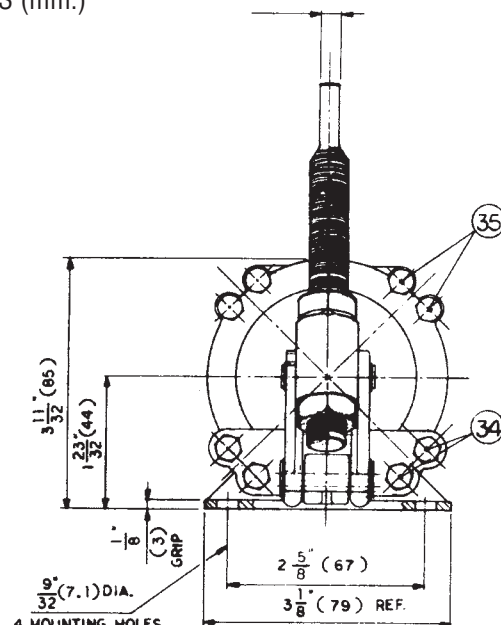


KOBELT

ALL DIMENSIONS ARE IN INCHES (mm.)

4107 THROTTLE ACTUATOR

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|----------------------------------|
| 1 | 1 | 4107-0001 | Knob |
| 2 | 1 | 4107-0002 | Locking Lever |
| 3 | 1 | 4107-0003 | Knob Bracket |
| 4 | 1 | 4107-0004 | Front End Cap |
| 5 | 1 | 4107-0005 | Linkage Mounting Bracket |
| 6 | 1 | 4107-0006 | Linkage |
| 7 | 1 | 4107-0007 | Output Link |
| 8 | 1 | 4107-0008 | Knob Screw |
| 9 | 1 | 4107-0009 | Adjustable Lever |
| 10 | 1 | 4107-0010 | Stop |
| 11 | 1 | 4107-0011 | Flat End Shaft |
| 12 | 1 | 4107-0012 | Rear End Shaft |
| 13 | 1 | 4107-0013 | Solid Pin |
| 14 | 1 | 2048-0002 | Dome |
| 21 | 1 | 4221-0001 | End Cap |
| 22 | 1 | 4221-0002 | Cylinder Housing |
| 23 | 1 | 4221-0003 | Piston |
| 24 | 1 | 4221-0004 | Diaphragm Retainer Plate |
| 31 | 1 | 1104-2004 | Diaphragm |
| 32 | 2 | 1102-0006 | "U" Cup |
| 33 | 1 | 1101-0012 | "O" Ring |
| 34 | 4 | 1001-0820 | Hex Head Cap Screw |
| 35 | 15 | 1001-0808 | Hex Head Cap Screw |
| 36 | 1 | 1001-6112 | Hex Head Cap Screw |
| 37 | 8 | 1022-0208 | Jam Nut |
| 38 | 2 | 1022-0264 | Jam Nut |
| 39 | 1 | 1024-0512 | Spring Pin |
| 40 | 2 | 1025-0519 | Solid Pin |
| 41 | 6 | 1029-1031 | Snap Ring |
| 42 | 4 | 1009-0804 | Phillips Flat Head Machine Screw |
| 43* | 1 | 1201-0116 | "U" Spring (10-80 PSI) |
| 43* | 1 | 1201-0117 | "R" Spring (0-100 PSI) |



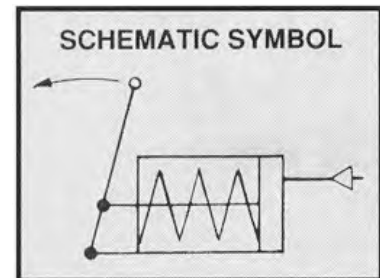
FRONT VIEW

*Optional, depending on pressure configuration.

A Repair Kit is available, consisting of all seals and gaskets. Order No. 4107-RK.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT 4108 ACTUATOR POSITIONER



5

DESCRIPTION

The 4108 Pneumatic Positioner is used to position throttles, variable delivery pumps and innumerable items that need infinite positioning. Due to its large diaphragm area and heavy spring, the 4108 is a very powerful positioning device. It is very accurate, although the accuracy decreased proportionally to the resistance of the object to be controlled. The output lever is provided with a threaded rod which permits infinite stroke selection. This is accomplished by moving the nuts on the output lever up and down, thus changing the effective lever length. Mechanical stops are provided for minimum and maximum pressure setting. The output linkage can be rotated at 90° increments to provide horizontal or vertical movement. The available stroke is 5/32" (4 mm.) to 4 3/16" (106 mm.). For small output movements, the threaded rod can be inserted from the opposite side.

SPECIFICATIONS

Weight: 15 lbs. (6.8 kg)

Materials: Die-cast silicon bronze and stainless steel hardware

Maximum Supply Pressure: 200 PSI (13.79 BAR)

Operating Temperature Range: -40°C to +90°C

Pipe Port Size: 1/4" NPT

APPLICATIONS

- For accurate positioning and control of governors, throttles and valves
- Used anywhere low- and medium-force positioning is required

ORDERING INFORMATION

Model Designation Order Codes:

U - 10-80 PSI input pressure range

R - 0-100 PSI input pressure range

Other ranges available upon request.

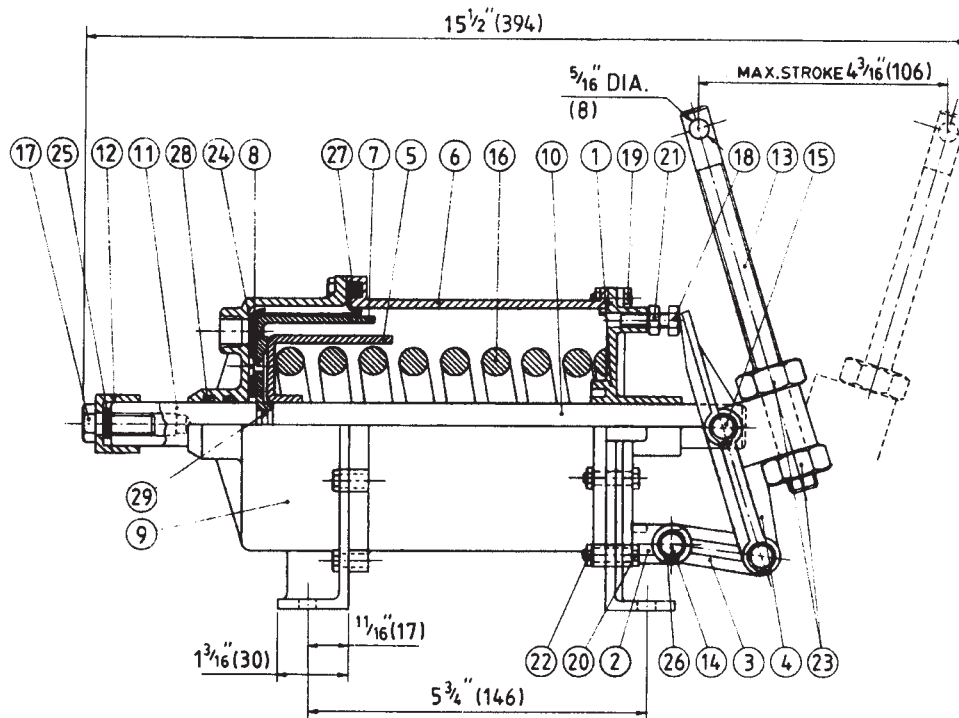
The Standard Model 4108 Relay Valve is supplied as follows:

1. With adjustable stops and multi position lever
2. With 10-80 PSI pressure range

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

Example: To order a standard 4108 with 10-80 PSI pressure range. Order No. 4108-U.

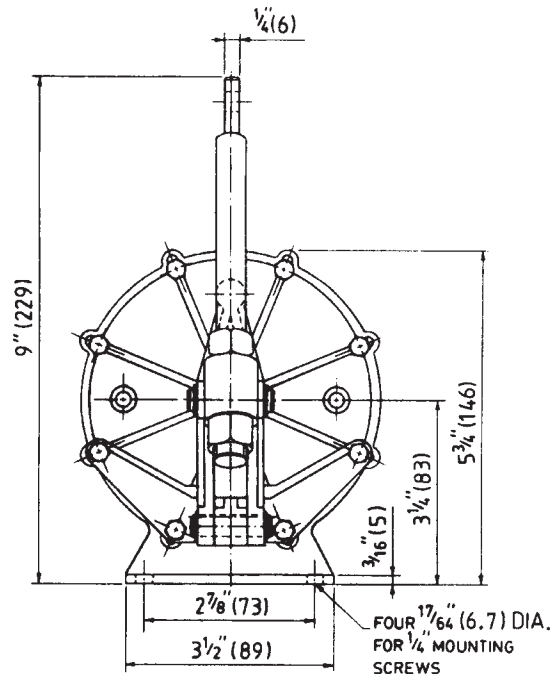
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



4108 ACTUATOR

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|--------------------------|
| 1 | 1 | 4108-0001 | End Cap |
| 2 | 1 | 4108-0002 | Linkage Mounting Bracket |
| 3 | 1 | 4108-0003 | Linkage |
| 4 | 1 | 4108-0004 | Output Link |
| 5 | 1 | 4108-0007 | Spring Retainer |
| 6 | 1 | 4224-0001 | Cylinder Housing |
| 7 | 1 | 4224-0004 | Piston |
| 8 | 1 | 4224-0005 | Retainer Plate |
| 9 | 1 | 4224-0006 | End Cap |
| 10 | 1 | 4108-0008 | Piston Rod |
| 11 | 1 | 4108-0006 | Piston Rod Extension |
| 12 | 1 | 4108-0009 | Stop |
| 13 | 1 | 4108-0005 | Threaded Output Rod |
| 14 | 1 | 4108-0010 | Snap Ring Pin |
| 15 | 2 | 4108-0011 | Snap Ring Pin |
| 16• | 1 | 1201-1044 | Spring 10-80 PSI (Black) |
| 16• | 1 | 1201-1045 | Spring 0-100 PSI (Blue) |
| 17 | 1 | 1001-6216 | Hex Head Screw |
| 18 | 1 | 1001-1014 | Hex Head Screw |
| 19 | 12 | 1001-0810 | Hex Head Screw |
| 20 | 4 | 1001-0814 | Hex Head Screw |
| 21 | 1 | 1022-0210 | Jam Nut |
| 22 | 4 | 1022-0108 | Nut |
| 23 | 2 | 1022-0164 | Nut |
| 24 | 6 | 1009-0804 | Phillips Flathead Screw |
| 25 | •• | 1023-0242 | Washer |
| 26 | 6 | 1029-1037 | Snap Ring |
| 27 | 1 | 1104-2003 | Rolling Diaphragm |
| 28 | 2 | 1102-0007 | "U" Cup |
| 29 | 1 | 1101-0012 | "O" Ring |

- Optional, depending on pressure configuration.
- As required for shimming.



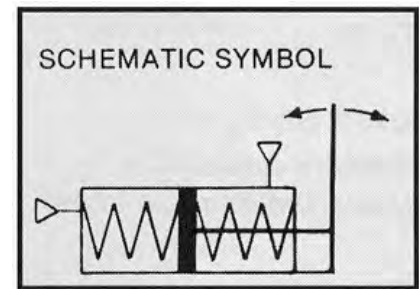
ALL DIMENSIONS IN INCHES (mm.)

A Repair Kit is available, consisting of all seals and gaskets. Order No. 4108-RK.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

KOBELT

4207 DOUBLE-ACTING, SELF-CENTERING ACTUATOR



5

DESCRIPTION

The 4207 is a double-acting and spring-centered air actuator. The rod-lever configuration provides fourteen (14) different strokes which could be positioned into eight (8) different planes by rotating the rod end cap.

APPLICATIONS

- Used in conjunction with Kobelt pressure control head 2543, the 4207-A provides infinite positioning in two directions. It is best suited for accurate positioning and control of variable hydraulic pumps, and variable hydraulic valves or governors
- Used in conjunction with Kobelt control heads 3609, 2544 and 2545, the 4207-C is a most versatile 3-position cylinder, providing fourteen (14) different strokes

SPECIFICATIONS

Weight: 7.46 lbs. (3.4 kg)

Materials: Die-cast silicon bronze and stainless steel hardware

Maximum Input Pressure: 150 PSI (11.4 BAR)

Operating Temperature Range: -40°C to +90°C

Pipe Port Size: 1/4" NPT

Stroke: Approximately 2 3/8" each way at longest lever position

Maximum Operating Output Force at

| | | | |
|--------------------------------|--------|---|-------------------|
| Longest Lever Position: | 4207-A | - | 8 lbs. @ 80 PSI |
| | 4207-C | - | 60 lbs. @ 100 PSI |

ORDERING INFORMATION

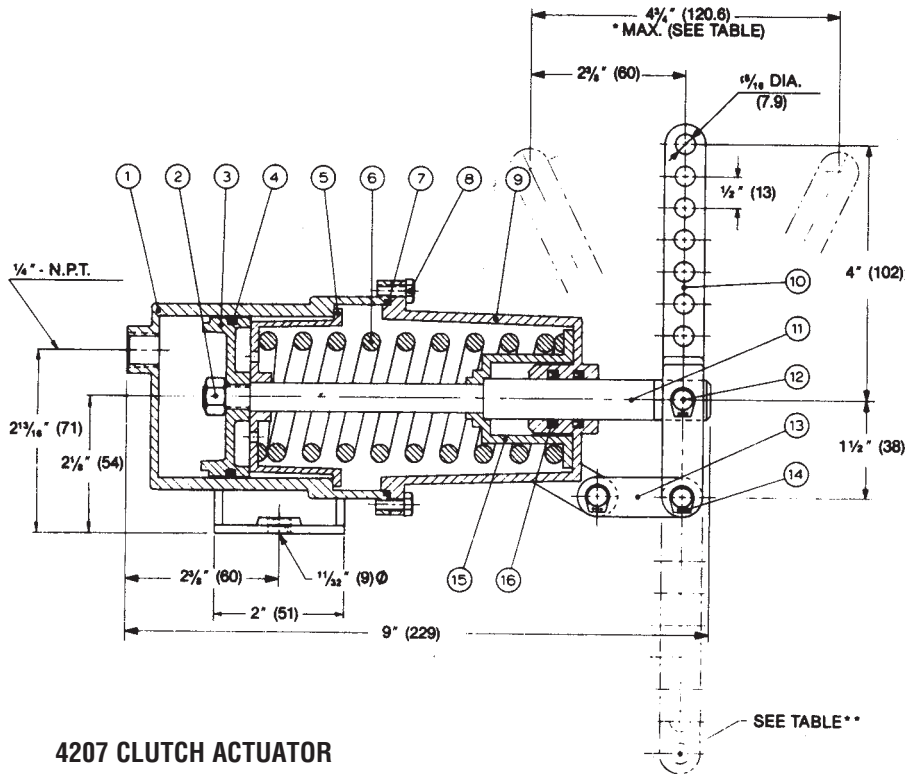
4207-A 2-direction positioner
Actuator
10-80 PSI range

4207-C 3-position clutch cylinder
10-80 PSI range

Other ranges for special applications available upon request.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

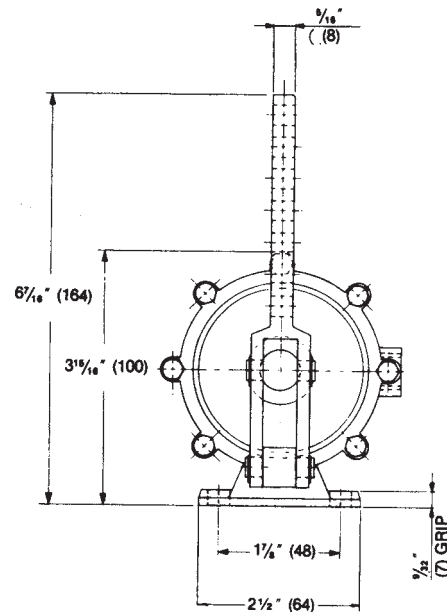


4207 CLUTCH ACTUATOR

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---------------------------------------|
| 1 | 1 | 4207-0001 | Actuator Barrel (Rear) |
| 2 | 1 | 1022-0001 | 3/8" UNF Nut |
| 3 | 1 | 4207-0007 | Piston |
| 4 | 1 | 1101-0228 | "O" Ring |
| 5 | 1 | 4207-0006 | Spring Retainer (Cylinder Extension) |
| 6 | 1 | 1201-0018 | Spring (4207-A) |
| 6 | 1 | 1201-0019 | Spring (4207-C) |
| 7 | 1 | 1101-0040 | "O" Ring |
| 8 | 8 | 1001-0888 | Hex Head Cap Screw |
| 9 | 1 | 4207-0002 | Actuator Barrel (Front) |
| 10 | 1 | 4207-0003 | Fork Lever |
| 11 | 1 | 4207-0008 | Piston Rod |
| 12 | 3 | 4207-0009 | Pin |
| 13 | 1 | 4207-0004 | Lever Linkage |
| 14 | 6 | 1029-1031 | Snap Ring |
| 15 | 1 | 4207-0005 | Spring Retainer (Cylinder Retraction) |
| 16 | 2 | 1102-0006 | "U" Cup |

••14 STROKES AVAILABLE

| FORK LEVER AS DRAWN | FORK LEVER INVERTED |
|---------------------|---------------------|
| 4 3/4" (120.6 mm.) | 3 3/8" (85.7 mm.) |
| 4 5/16" (109.5 mm.) | 2 15/16" (74.6 mm.) |
| 3 7/8" (98.4 mm.) | 2 1/2" (69.5 mm.) |
| 3 7/16" (87.3 mm.) | 2 1/16" (52.4 mm.) |
| 3" (72.6 mm.) | 1 11/16" (42.9 mm.) |
| 2 9/16" (65.1 mm.) | 1 1/4" (31.8 mm.) |
| 2 1/8" (54 mm.) | 13/16" (20.6 mm.) |



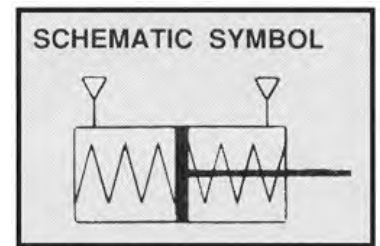
ALL DIMENSIONS IN INCHES (mm.)

A Repair Kit is available, consisting of all seals and gaskets. Order No. 4207-RK.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

KOBELT

4204 DOUBLE-ACTING, SELF-CENTERING ACTUATOR



5

DESCRIPTION

The 4204 is a pivot-mounted, spring-centered cylinder. Applying air pressure to either side of the piston will cause the piston rod to move accordingly. This cylinder is mostly used for the control of marine hydraulic reverse reduction gears and serves as a three-position actuator, providing control over the hydraulic clutch valve. With no air pressure in either control port, the output rod is centered. By applying air pressure (minimum 65 PSI), the piston rod stroke is one inch in either direction (total stroke, two inches). The construction is all bronze and stainless steel, and will provide many years of trouble-free service. When used as a three-position control cylinder, order Model 4202-C. The same configuration cylinder is also available for infinite positioning of variable hydraulic delivery valves and pumps. It is possible to infinitely position the output rod by varying the air pressure to either side of cylinder. When ordering this configuration, order model 4204-A. The basic difference between the two configurations is the spring.

APPLICATIONS

- Used in conjunction with Kobelt pressure control head 2543/53 and 2547/57, the 4204-A provides infinite positioning in two directions. It is best suited for accurate positioning of low-force mechanisms.
- Used in conjunction with Kobelt control heads 3604, 3609, 2544/54 and 2545/55, the 4204-C is a compact 3-position, self-centering cylinder.

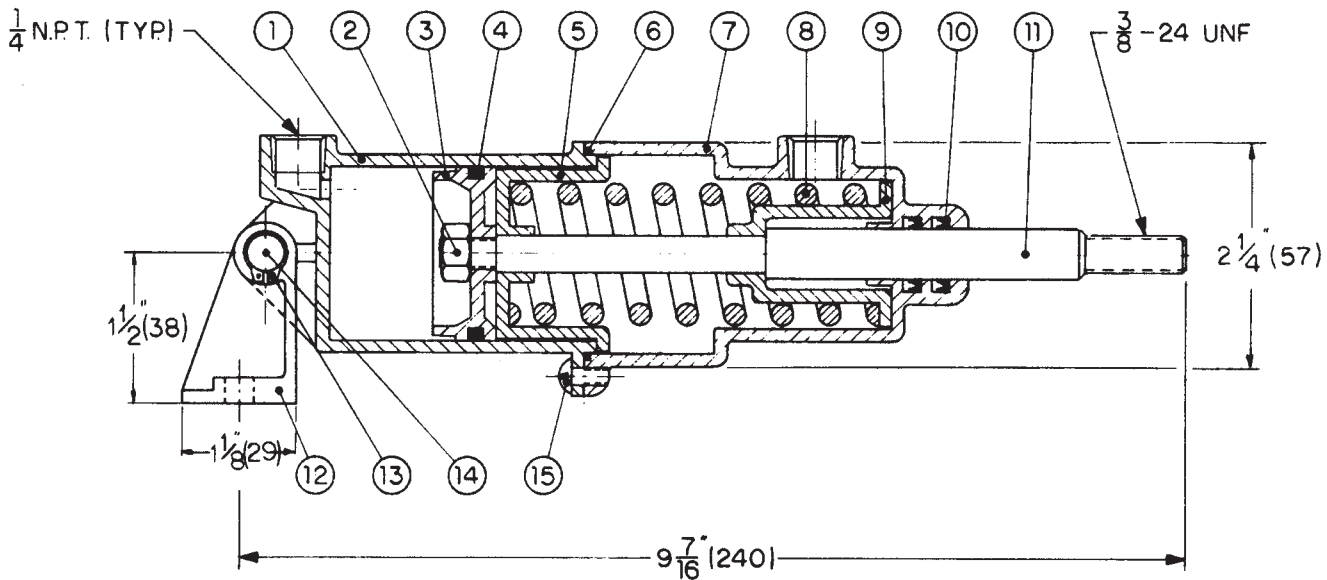
SPECIFICATIONS

- Weight:** 3.3 lbs. (1.5 kg)
- Materials:** Die-cast silicon bronze and stainless steel
- Maximum Input Pressure:** 200 PSI (13.79 BAR)
- Operating Temperature Range:** -40°C to +90°C
- Pipe Port Size:** 1/4" NPT
- Stroke:** 1" each way

ORDERING INFORMATION

- 4204-A 2-direction positioner actuator
10-80 PSI range
- 4204-C 3-position self-centering cylinder
35-65 PSI range

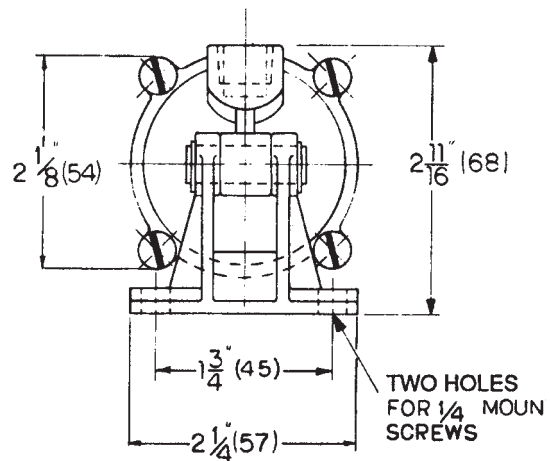
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



4204 CLUTCH ACTUATOR

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|--------------------------|
| 1 | 1 | 4204-0001 | Cylinder Barrel |
| 2 | 1 | 1022-0161 | Nut |
| 3 | 1 | 4204-0002 | Piston |
| 4 | 1 | 1101-0222 | "O" Ring |
| 5 | 1 | 4204-0003 | Spring Retainer |
| 6 | 1 | 1101-0033 | "O" Ring |
| 7 | 1 | 4204-0004 | Front Barrel |
| 8 | 1 | 1201-0023 | Spring (Clutch Cylinder) |
| 8 | 1 | 1201-0024 | Spring (Positioner) |
| 9 | 1 | 4204-0005 | Spring Retainer |
| 10 | 2 | 1102-0005 | "U" Cup |
| 11 | 1 | 4204-0006 | Piston Rod |
| 12 | 1 | 4204-0007 | Swivel Mount |
| 13 | 2 | 1029-1037 | Snap Ring |
| 14 | 1 | 4204-0008 | Pin |
| 15 | 4 | 1010-0806 | Screw |

A Repair Kit is available, consisting of all seals.
Order No. 4204-RK.



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

KOBELT

MODEL 3403 2-POSITION, 4-WAY AIR PILOT DIRECTIONAL CONTROL VALVE 1/4" NPT

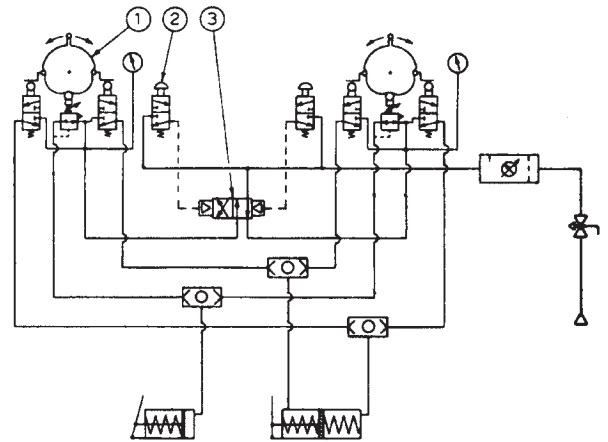


ORDERING INFORMATION

Order No. 4204-A

TYPICAL APPLICATION

REMOTE STATION COMMAND TRANSFER



5

DESCRIPTION

The 3403 consists of a cylinder-cam actuated 2-position, 4-way poppet type valve. A momentary burst of pilot air pressure shifts the 4-way valve to direct the supply air to the chosen directional output.

APPLICATIONS

- Used in remote station command transfer
- Used in the remote control of double-acting cylinders, brakes and clutches
- Used whenever a 4-way, air pilot directional control valve is required

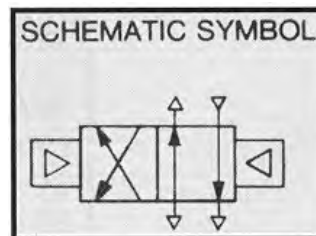
SPECIFICATIONS

- Weight:** 3.74 lbs. (1.7 kg)
- Materials:** Die-cast silicon bronze and stainless steel
- Maximum Input Pressure:** 200 PSI (13.79 BAR)
- Operating Temperature Range:** -40°C to +90°C
- Pipe Port Size:** 1/4" NPT
- Minimum Pilot Pressure:** 35 PSI
- Flow Capacity:** 78 SCFM @ 100 PSI

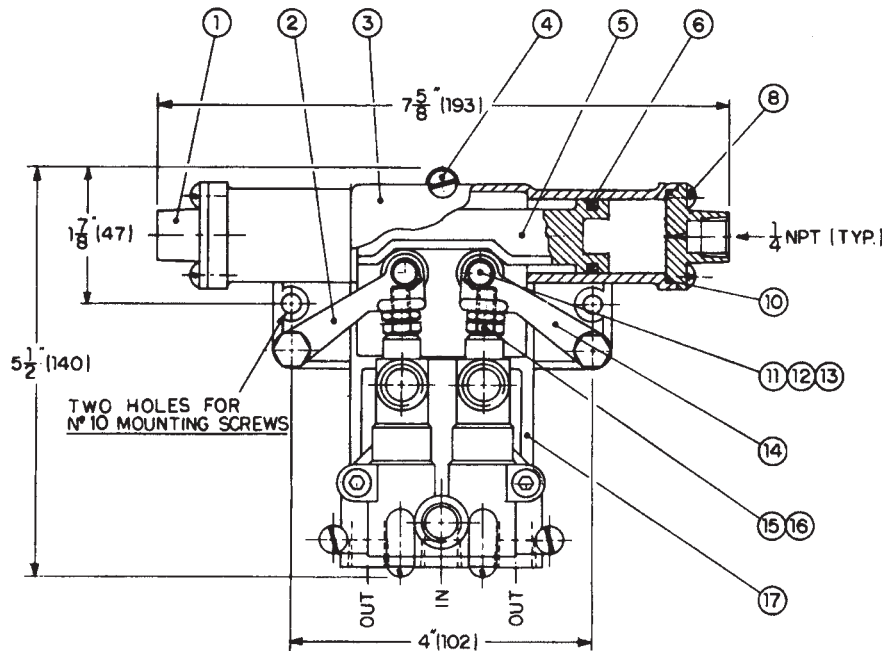
APPLICATION DESCRIPTION

When the Push Button Valve #3517 (Item #2) is pressed, it sends a momentary air signal to the Directional Control Valve #3403 (Item #3). Supply air going to #3403 is then directed to the Dual Function Control Head #2544 (Item #1). The Control is now at Station #1.

When the Push Button Valve #3517 at Station #2 is pressed, it sends a momentary air signal to the Directional Control Valve #3403. Supply air going to Station #1 is automatically re-directed to the Dual Function Control Head #2544 at Station #2. The Control is now at Station #2.

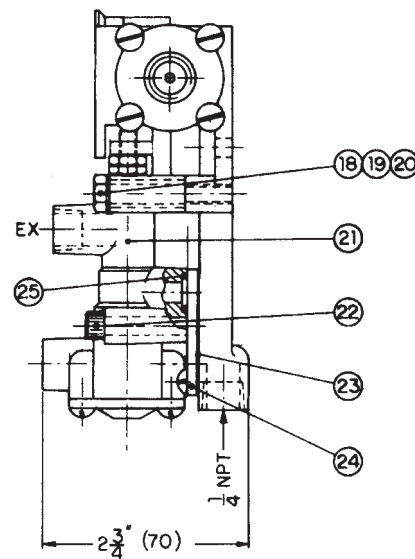


THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



3403

| | 1 | 2 | 3403-0007 End Cap |
|----|----|-----------|-------------------------|
| 2 | 1 | 3403-0005 | Roller Arm (Left Hand) |
| 3 | 1 | 3403-0004 | Cover |
| 4 | 1 | 1003-0810 | Screw |
| 5 | 1 | 3403-0002 | Pilot Piston |
| 6 | 2 | 1102-0007 | "U" Cup |
| 8 | 11 | 1010-0806 | Screw |
| 10 | 2 | 1101-0024 | "O" Ring |
| 11 | 2 | 2542-0011 | Pin |
| 12 | 4 | 1029-1031 | Snap Ring |
| 13 | 2 | 2543-0009 | Roller |
| 14 | 1 | 3403-0006 | Roller Arm (Right Hand) |
| 15 | 2 | 1001-1008 | Cap Screw |
| 16 | 2 | 1022-0210 | Nut |
| 17 | 1 | 3403-0001 | Frame |
| 18 | 2 | 1001-1024 | Cap Screw |
| 19 | 2 | 1023-0210 | Washer |
| 20 | 2 | 3403-0009 | Bushing |
| 21 | 1 | 3804 | 4-Way Valve |
| 22 | 2 | 1002-1028 | Cap Screw |
| 23 | 1 | 3609-0013 | Gasket |
| 24 | 1 | 3403-0003 | Mounting Plate |
| 25 | 3 | 1101-0012 | "O" Ring |



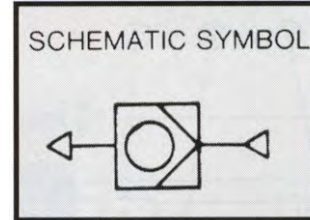
ALL DIMENSIONS IN INCHES (mm.)

A Repair Kit is available, consisting of all seals and gaskets. Order No. 3403-RK.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

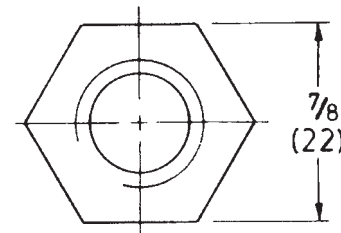
MODEL 3007 CHECK VALVE 1/4" NPT



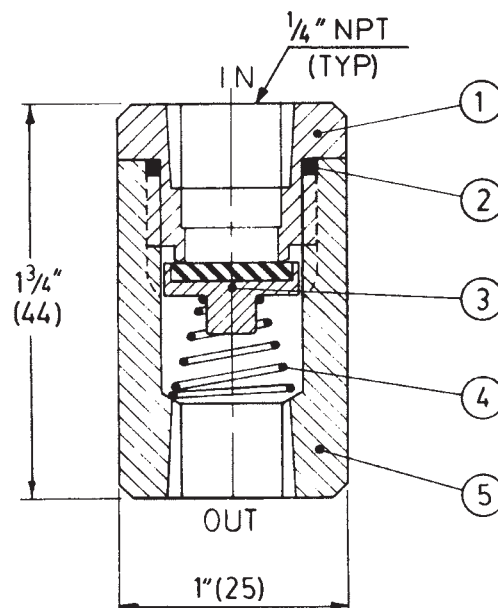
DIMENSIONS AND PARTS

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|-------------|
| 1 | 1 | 3007-0001 | End Cap |
| 2 | 1 | 1101-0016 | "O" Ring |
| 3 | 1 | 3804-0004 | Poppet |
| 4 | 1 | 1201-0022 | Spring |
| 5 | 1 | 3007-0002 | Valve Body |

A Repair Kit is available, consisting of all seals.
Order No. 3007-RK.



ALL DIMENSIONS ARE IN INCHES (mm.)



5

DESCRIPTION

The 3007 check valve allows air to travel in one direction only. The unique heavy-duty poppet design ensures long, trouble-free service.

APPLICATION

Used wherever fluids are required to flow in one direction only

SPECIFICATIONS

Weight: .22 lbs. (0.1 kg)

Materials: Brass and stainless steel

Operating Temperature Range: -40°C to +90°C

Pipe Port Size: 1/4" NPT

Maximum Operating Pressure: 250 PSI (17.24 BAR)

Flow Capacity: 66 SCFM @ 100 PSI supply pressure

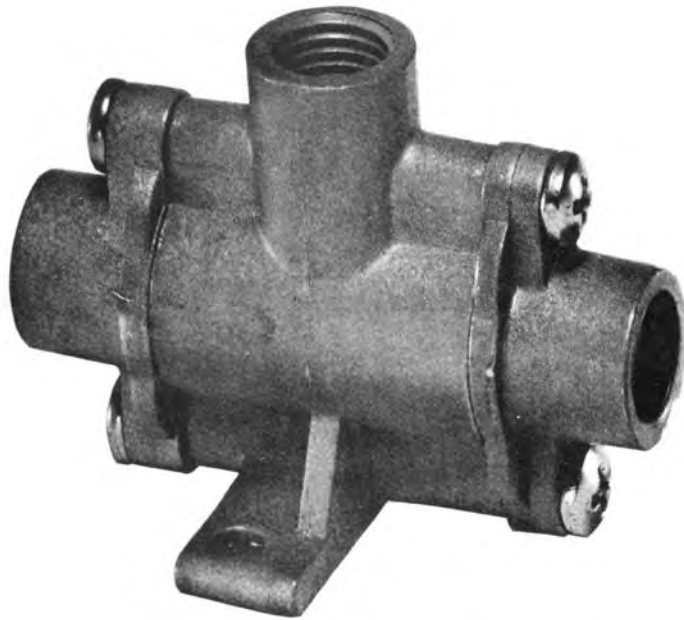
ORDERING INFORMATION

Order No. 3007

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

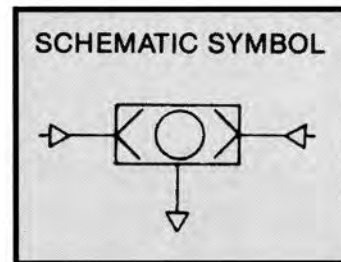
3009 SHUTTLE OR 2-WAY CHECK VALVE

HOBELT

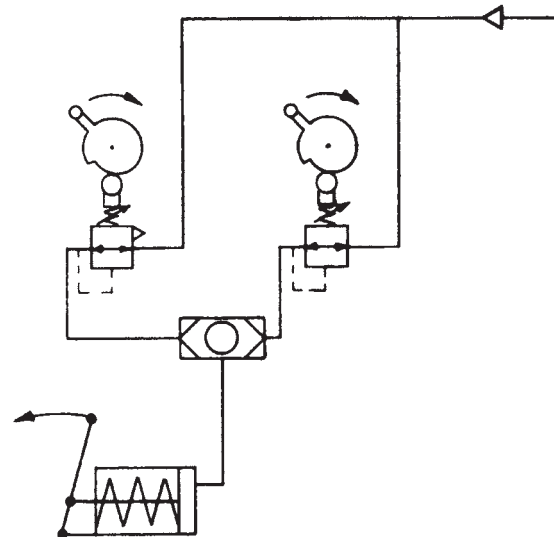


| 3009 | | | |
|------|----------|-----------|-------------|
| ITEM | QUANTITY | PART NO. | DESCRIPTION |
| 1 | 2 | 3009-0001 | End Cap |
| 2 | 1 | 3009-0002 | Body |
| 3 | 1 | 3009-0003 | Shuttle |
| 4 | 2 | 1106-3001 | Seat |
| 5 | 4 | 1010-0808 | Screw |

A Repair Kit is available consisting of all seals. Order No. 3009-RK.



TYPICAL SHUTTLE VALVE APPLICATION



TWO-STATION REMOTE CONTROL OF ACTUATOR POSITIONER WITHOUT STATION SELECTOR CIRCUITRY

In this circuit, the station not in use must be left in the "off" position.

Note that a Shuttle Valve must be used. A simple "tee" would not suffice, as the operating signal from one pressure control head would pass out the exhaust port of the other.

DESCRIPTION

The 3009 Shuttle Valve directs air flow from one of two possible inputs to a single output, while preventing any air flow through the second input.

The 3009 consists of only one moving part, the shuttle. The shuttle shifts when the pressure on one input exceeds that on the other.

SPECIFICATIONS

- Weight:** .4 lbs. (192 g)
- Materials:** Die-cast silicon bronze and stainless steel
- Operating Temperature Range:** -40°C to +90°C
- Pipe Port Size:** 1/4" NPT
- Flow Capacity:** 1/4" Orifice Equivalent
- Maximum Operating Pressure:** 200 PSI (13.79 BAR)

Important: Shuttle valves must be mounted horizontally.

ORDERING INFORMATION

Order No. 3009

AIR CLUTCH CONTROL UNITS

| Ordering Information | | | |
|----------------------|------------|----------------|---|
| Model | Part No. | Old Part No. | Description |
| LMAC-1 | R431007550 | P-090196-00000 | Standard Unit |
| LMAC-2 | R431007552 | P-090197-00000 | Standard Unit with shaft brake control signal |
| LMAC-3 | R431009156 | P-090198-00000 | Unit with proportional reversing interlock timing |
| LMAC-3C | R431009167 | P-090393-00000 | Unit with proportional reversing interlock timing for 3600 Series Caterpillar® engine |

LMAC CONTROL UNITS INCORPORATE THE FOLLOWING INTERLOCKS AND OPERATIONAL FEATURES . . .

Weight: 87 lbs. (40kg.)

Maintenance kit for the above units is Part Number R431006453 (P-064517-00000).

Caterpillar® engine is a registered trademark of Caterpillar, Inc., Mossville, IL

GOVERNOR POWER BOOST—applied at the time of clutch engagement to prevent engine stalling and possible engine reversal—boost is adjustable for magnitude and duration.

CROSS-ENGAGEMENT INTERLOCKS—monitor clutch pressure to insure that one clutch fully vents before the opposite clutch can be inflated, i.e. “ahead” clutch must fully disengage before “astern” clutch can engage.

TIMED REVERSING INTERLOCK CONTROL—provides an adjustable “neutral” hold time during fast reversals to allow engine and propeller speed to decrease to an acceptable level before opposite clutch can be engaged.

CLUTCH PRESSURE/ENGINE SPEED INTERLOCK—insures that selected clutch inflates to lock-up pressure before engine speed can be increased.

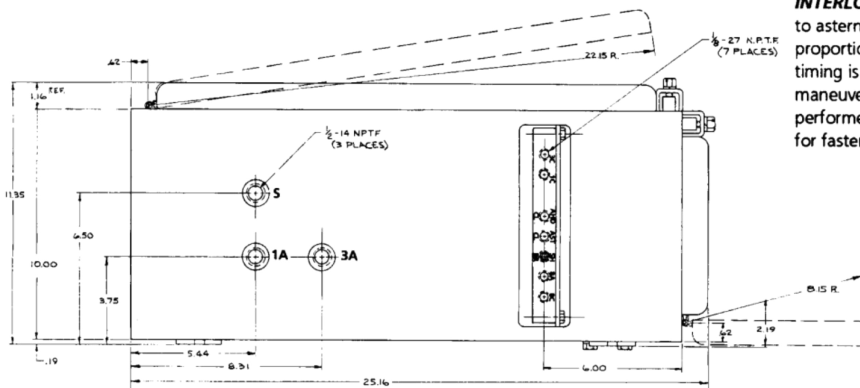
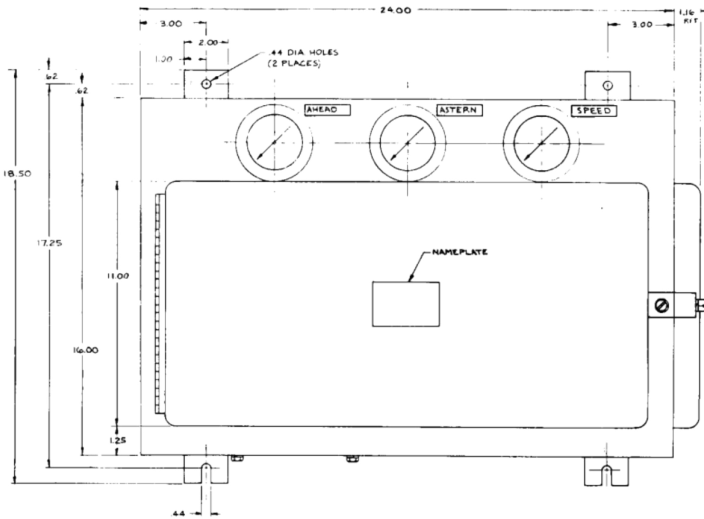
SOFT CLUTCH ENGAGEMENT—provides smooth engagement to reduce gear shock and engine loading by two-stage rate of clutch fill. Initial fill is at a controlled rate for soft engagement then opens to maximum flow rate for rapid fill.

SHAFT BRAKE CONTROL (optional)—activates shaft brake in synchronization with clutches. Brake releases when clutch engagement starts and applies when clutches release. With brake control the “timed reversing interlock” provides neutral hold time to permit the propeller to be stopped.

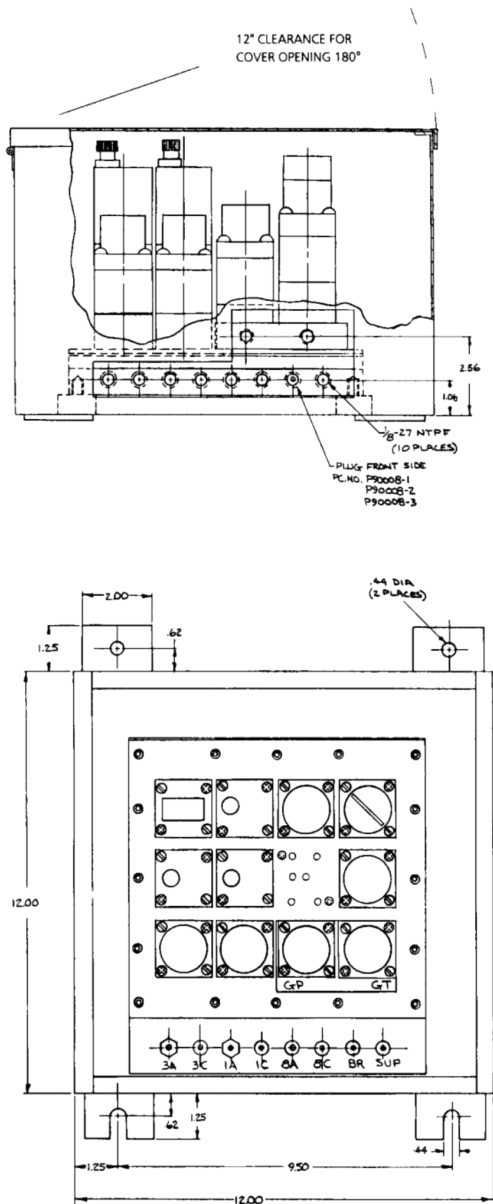
PROPORTIONAL TIMED REVERSING INTERLOCK (optional)—provides an ahead to astern reversing time which is in proportion to vessel speed (adjustable). Since timing is proportional to speed, low speed maneuvers for docking and shifting are performed with minimum interlock timing for faster handling.

Port Numbers

- 1A – Ahead Clutch Out
- 1C – Ahead Signal In
- 3A – Astern Clutch Out
- 3C – Astern Signal In
- 8A – Speed Signal Out
- 8C – Speed Signal In
- AHD CL – Ahead Interlock
- AST CL – Astern Interlock
- SH BR – Shaft Brake Signal



HYDRAULIC CLUTCH CONTROL UNITS & CONTROL SYSTEM



LOGICMASTER® Hydraulic Clutch Control systems are specifically designed for the hydraulic clutch type of marine reverse gears and include these service proven interlocks and features:

POWER BOOST...Advances governor setting during clutch engagement to provide increased engine torque and prevent stalling as the propeller load is applied. On completion of clutch engagement, the boost drops off and the governor is positioned to the setting called for by the pilothouse control lever. Governor power boost can be adjusted for desired magnitude and duration.

CLUTCH PRESSURE—THROTTLE CONTROL INTERLOCK...Monitors the buildup of hydraulic pressure in the clutch during engagement. Clutch pressure must reach preset engagement level before engine speed can be advanced from the remote control station to prevent high engine speed during clutch engagement and resultant clutch wear. This feature also protects the reverse gear if clutch pressure drops during operation. Loss of clutch pressure releases the interlock and engine speed is reduced to idle, preventing clutch damage.

TIMED REVERSING INTERLOCK...Holds the clutch control in neutral position for a preset time on reversals even though the remote control lever is shifted directly through neutral. This allows engine and propeller speeds to decrease to an acceptable level before reversal is initiated. When a shaft brake is used, the neutral timing is long enough for the brake to apply and stop the propeller before reversing. Timing is adjustable.

CLUTCH PRESSURE—SHAFT BRAKE INTERLOCK...Prevents the shaft brake from being applied when either clutch is engaged. As the clutch pressure is applied, the shaft brake control valve is actuated to release the brake. This clutch pressure interlock prevents simultaneous engagement of the clutch and brake.

- Port Numbers
- 1A - Ahead Out
- 1C - Ahead In
- 3A - Astern Out
- 3C - Astern In
- 8A - Speed Out
- 8C - Speed In
- GP - Gear Pressure
- GT - Hydraulic Safety Return
- BR - Shaft Brake Signal
- SUP - Supply

| Ordering Information | | | |
|----------------------|------------|----------------|---|
| Model | Part No. | Old Part No. | Description |
| LM1 | R431007529 | P-090008-00001 | Unit less shaft brake control |
| LM2 | R431007528 | P-090008-00000 | Unit with shaft brake control signal |
| | R431006452 | P-064517-00000 | Maintenance kit for R431007529 (Old Part No. P-090008-00001) |
| | R431006454 | P-064518-00000 | Maintenance kit for R431007528 (Old Part No. P-090008-00000) |

Weight: 31 lbs. (14.1kg.)

GEARMASTER PROPULSION CONTROL SYSTEM

| Ordering Information | | |
|----------------------|-----------------|--|
| Part No. | Old Part No. | Description |
| R431007068 | P -067393-00000 | Pneumatic throttle interlock unit |
| R431007069 | P -067394-00000 | Hydraulic throttle interlock unit |
| R43100806 | P -027493-00000 | Maintenance kit for R431007068 (Old Part No. P -067393-00000) |
| R43100807 | P -027494-00000 | Maintenance kit for R431007069 (Old Part No. P -067394-00000) |

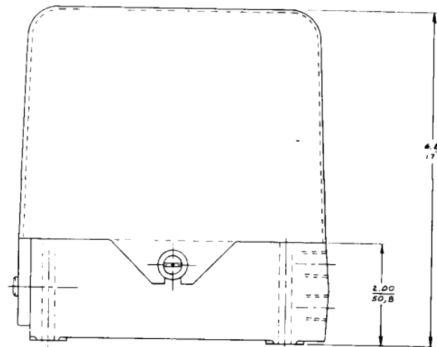
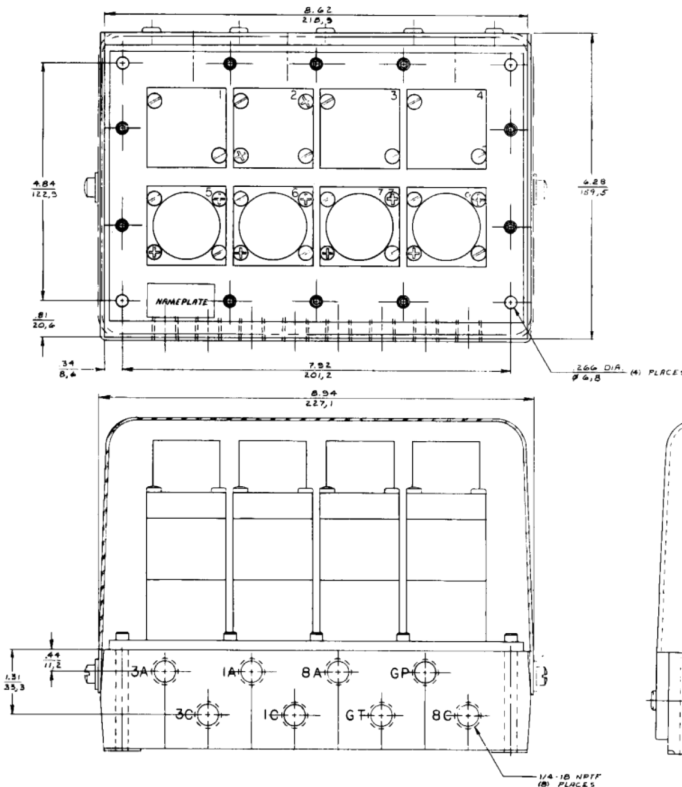
Weight: 15 lbs. (6.8 kg.)



Port Numbers

- 1A - Ahead Clutch Out
- 1C - Ahead Signal In
- 3A - Astern Clutch Out
- 3C - Astern Signal In
- 8A - Speed Signal Out
- 8C - Speed Signal In
- GP - Gear Pressure
- GT - Hydraulic Safety Return

Dimensions = $\frac{IN}{mm}$



FEATURES...

- COMPACT SIZE...SIMPLIFIED INSTALLATION
- SIMPLICITY...MINIMUM NUMBER OF COMPONENTS
- SERVICEABILITY...MANIFOLD MOUNTED COMPONENTS
- SERVICE PROVEN...COMPONENTS AND CONTROL CIRCUIT
- MINIMUM PIPING CONNECTIONS WITH MANIFOLDED CIRCUIT
- TIMED REVERSING INTERLOCKS
- CLUTCH ENGAGEMENT/THROTTLE INTERLOCK
- CONTROLLED ENGINE ACCELERATION
- SHAFT BRAKE TIMING

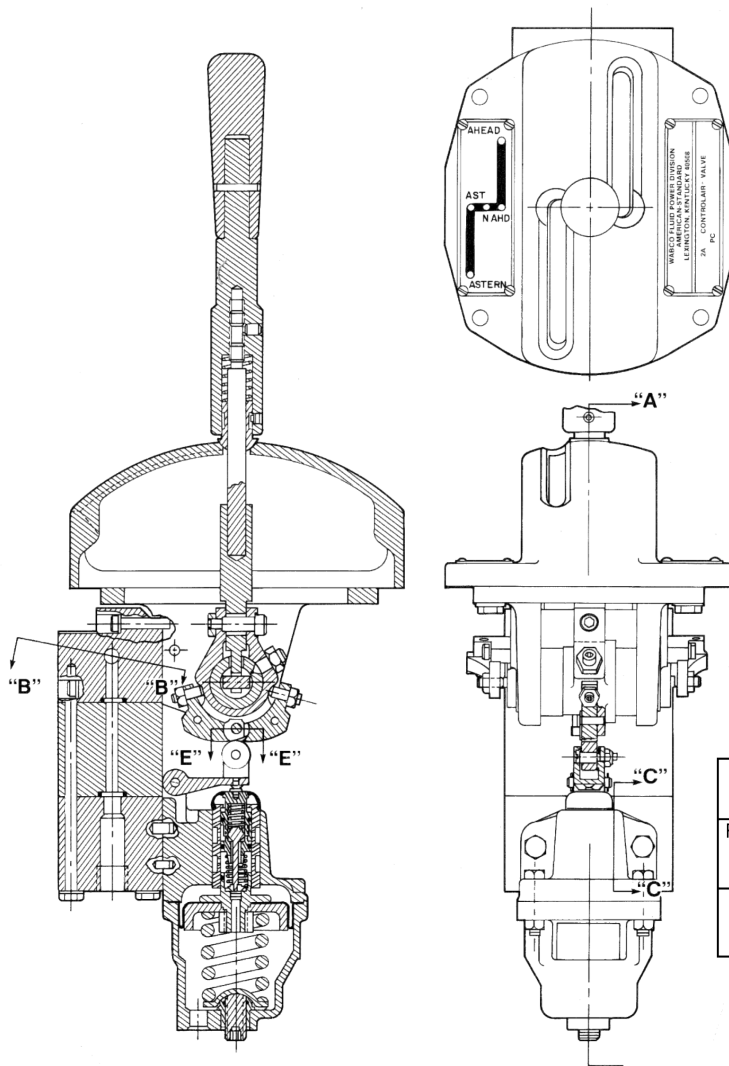
2A-2A CONTROLAIR PNEUMATIC CONTROL HEAD

2A-2A CONTROLAIR® PNEUMATIC CONTROL HEAD

safe and efficient single lever control

The 2A-2A valve was designed especially for marine control applications. It provides single-handed control of propulsion direction and engine speed for finger-tip maneuvering control. The large easy-to-operate control handle moves through a "Z" slot, putting the clutch in neutral when the handle is in the middle of crossover portion of the "Z". The handle locks in any position simply by twisting the handle.

The deluxe 2A-2A valves are completely constructed of non-ferrous materials for long, hard service. An attractive and durable polished chrome-plated 303 stainless steel cover and chrome-plated brass handle help preserve the rugged good looks of a bridge console where only the finest is good enough.



MAJOR REPAIR KIT ORIGINAL 2A-2A:
(OLD PART NUMBER) P-064735-001,
(NEW PART NUMBER) R431006487

Ordering Reference

Not recommended for exposed weather deck installation due to open cover slot.

2A-2A Controlair Valve

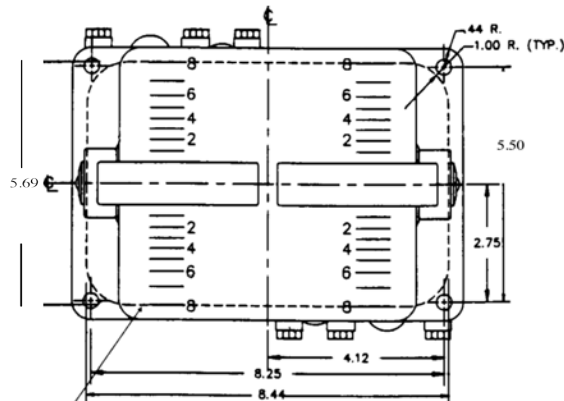
| New Part Number | Old Part Number | Pressure Range |
|-----------------|-----------------|------------------------------|
| R431009268 | P-065775-00000 | 7 - 61 psi (0.5-4.2 bar) |
| R431009269 | P-065775-00001 | 28 - 71 psi (1.9-4.9 bar) |

Installation Drawing DP65775
Weight - 25 lb. 11.34 kg.

CONTROLAIR VALVE MODEL THD-2-FM TWIN ENGINE MARINE CONTROL VALVE

THD-2-FM Valves provide single handle control for propulsion direction and engine speed for two engines. This top of the line model is ruggedly built from non-ferrous materials and has an attractive chrome plated brass cover with chrome handles. The completely enclosed cover and rugged construction make it ideal for exposed station installations.

Fore or aft movement of either control handle from neutral to the clutch position delivers supply pressure into the appropriate ahead or astern control line to engage the clutch. Further movement increases the pressure signal delivered to the engine governor. The neutral and clutch positions are detented for positive position indication. An adjustable friction brake holds the handles in any selected position.

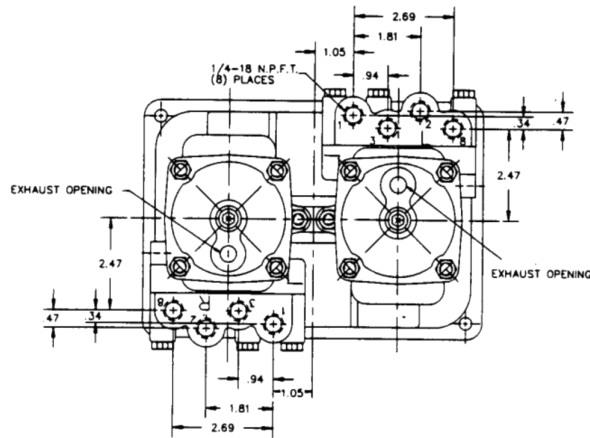
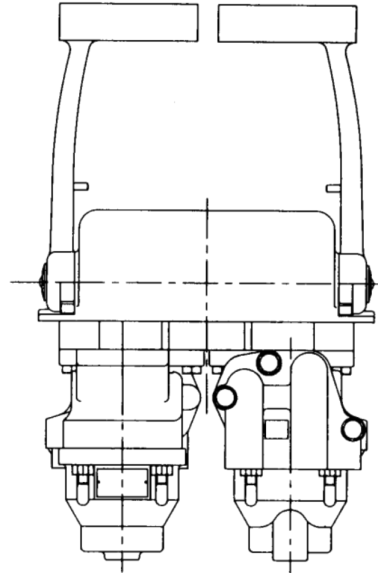
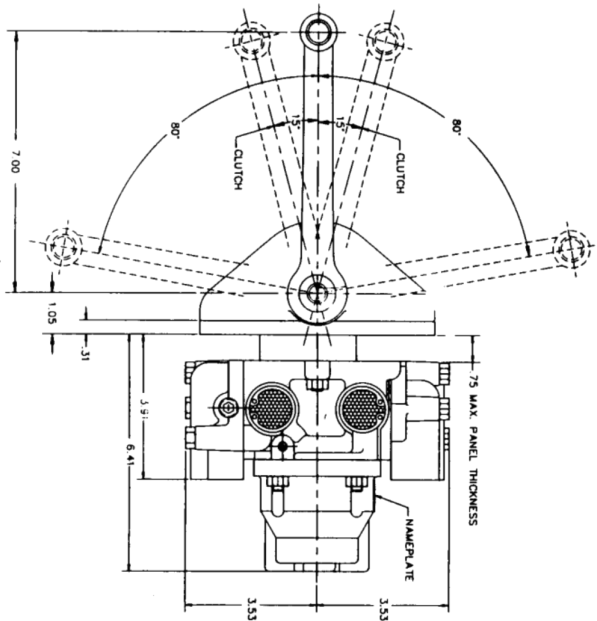


NOTE:
(1) PANEL MOUNTING CUTOUT- ONE PIPE BRACKET MUST BE REMOVED FOR INSTALLATION.
(2) CUTOUT TEMPLATE PACKAGED WITH EACH VALVE.

FEATURES...

- Modern, Low Profile Design
- Rugged Construction
- Polished Chrome Plated Brass Cover and Handles
- Provides Direction and Speed Control of Two Engines in One Assembly
- Enclosed Upper Cover for Exposed Station Service
- Simplified Console Installation
- Accommodates up to 3/4" Console Thickness

CONTROLAIR VALVE MODEL THD-2-FM



MAX. INLET AIR
200 PSI (13.8 BAR)

TEMPERATURE
-40°F TO 160°F
(-40°C TO 71°C)

PORT CONNECTIONS:
2 = SUPPLY
1 = CLUTCH
3 = CLUTCH
8 = SPEED
WEIGHT: 25 LBS.
(11.3 KG.)

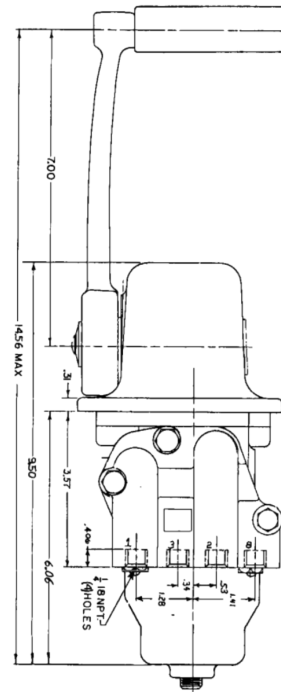
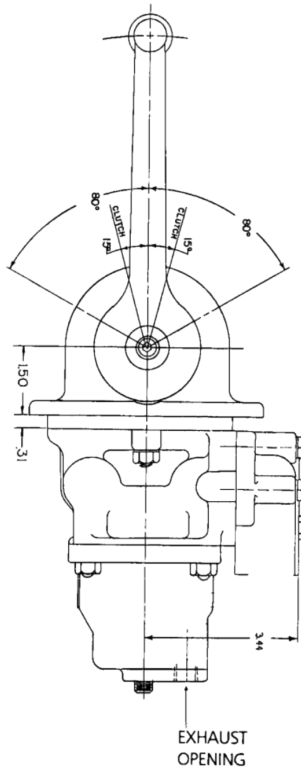
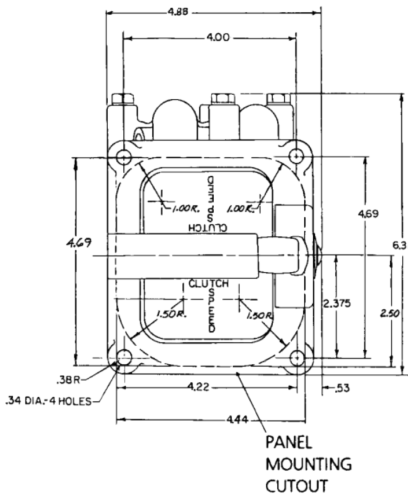
| THD-2-FM Order Information: | | |
|-----------------------------|-----------------|----------------------|
| Part No. | Old Part No. | Description |
| R431000720 | P -027121-00101 | THD-2-FM (10-65 PSI) |
| R431000721 | P -027121-00109 | THD-2-FM (30-70 PSI) |

Maintenance kit (2 Required) R431006521
(Old Part No. P -064894-0002)

CONTROLAIR VALVE MODEL HD-2-FM

HD-2-FM Valves provide single handle control for propulsion direction and engine speed. This middle of the line model is ruggedly built from non-ferrous materials and has an attractive chrome plated bronze cover with a chrome handle. The completely enclosed cover and rugged construction make it ideal for exposed station installations.

Fore or aft movement of the control handle from neutral to the clutch position delivers supply pressure into the ahead or astern control line to engage the appropriate clutch. Further movement increases the pressure signal delivered to the engine governor. The neutral and clutch positions are detented for positive position indication. The HD-2-FM is designed with an L-shaped handle so that two units can be mounted side by side for operation with one hand. An adjustable friction brake holds the handle in any selected position.



5

| HD-2-FM Order Information: | | | |
|----------------------------|------------|-----------------|-----------|
| Designation | Part No. | Old Part No. | Setting |
| HD-2-FM | R431006281 | P -063470-00101 | 10-65 PSI |
| HD-2-FM | R431006282 | P -063470-00109 | 30-70 PSI |
| HD-2-FM | R431006283 | P -063470-00111 | 10-70 PSI |

Maintenance kit R431006521 (Old Part No. P -064894-00002)

MAX. INLET AIR
200 PSI (13.8 BAR)

TEMPERATURE
-40°F TO 160°F
(-40°C TO 71°C)

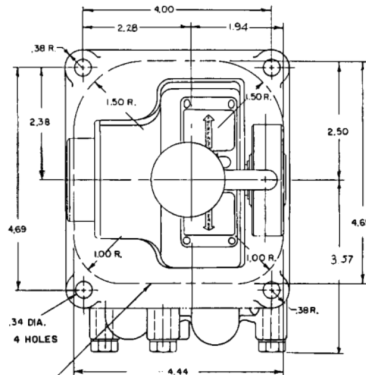
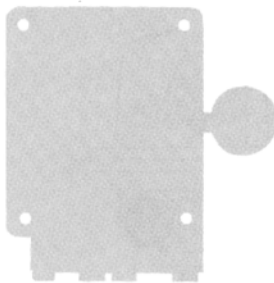
PORT CONNECTIONS:
2 = SUPPLY
1 = CLUTCH
3 = CLUTCH
8 = SPEED
WEIGHT: 12 LBS.
(5.44 KG.)

CONTROLAIR VALVE MODEL HD-2-FC

The HD-2-FC CONTROLAIR Valve is a handle operated pressure control and directional flow control valve. It contains two 3-way directional valves and a pressure regulating portion, which are arranged to furnish inlet air pressure to two directional clutch control lines and graduated pressure to one infinite positioning speed control line.

The selection between the two clutch control lines depends upon handle movement to either side of "Neutral" position. The pressure in the speed control line is proportional to the position of the handle in either quadrant.

The cover is die-cast aluminum with grey textured polyester paint, with stainless steel handle, hub and yoke. The angled handle, so designed that when mounted side by side they can be operated by one hand, is equipped with an adjustable friction brake that will hold the handle in any selected position.



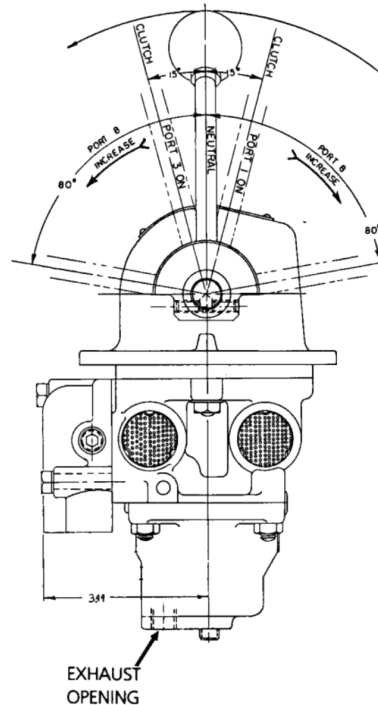
PANEL MOUNTING CUTOUT

| HD-2-FC Order Information: | | | | |
|----------------------------|------------|-------------------------------|----------|------------|
| Designation | Part No. | Old Part No. | Setting | Style |
| HD-2-FC | R431006249 | P-063420-00001 | 0-65 PSI | Right Hand |
| HD-2-FC | R431006251 | P-063421-00001 | 0-65 PSI | Left Hand |
| Maintenance kit | R431006521 | (Old Part No. P-064894-00002) | | |

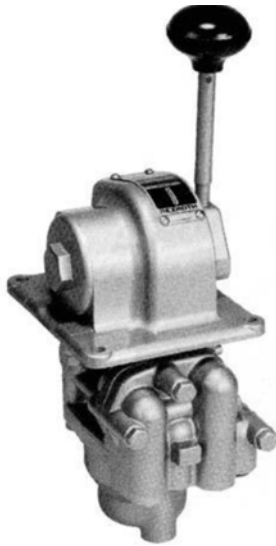
PORT CONNECTIONS:
 2 = SUPPLY
 1 = CLUTCH
 3 = CLUTCH
 8 = SPEED
 WEIGHT: 8.1 LBS.
 (3.7 KG.)

MAX. INLET AIR
 200 PSI (13.8 BAR)
 TEMPERATURE
 -40°F TO 160°F
 (-40°C TO 71°C)

Shaded areas illustrate twin engine applications

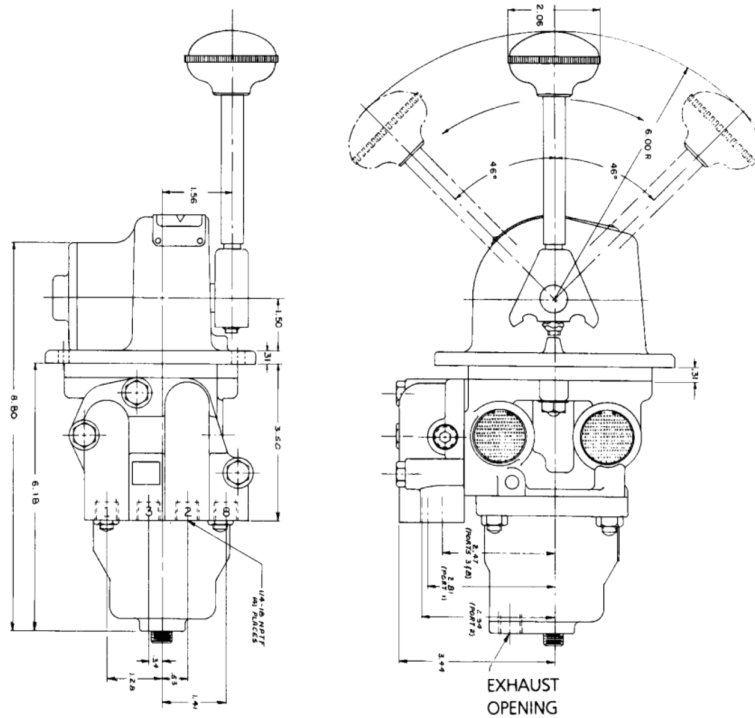


CONTROLAIR VALVE MODEL HD-2-FX



The HD-2-FX valve provides simple and efficient single handle control for propulsion direction and engine speed. It is frequently used as an engine room control, or on smaller craft as a bridge control.

Lightweight and rugged, non-ferrous construction, HD-2-FX valves are made of anodized die-cast aluminum for economy. The lever remains in the position where released. Holding friction is adjustable. Functional operation is the same as HD-2-FM and HD-2-FC CONTROLAIR Valves.

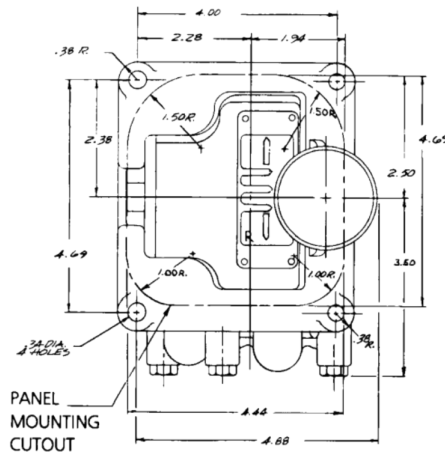


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MAX. INLET AIR
200 PSI (13.8 BAR)

TEMPERATURE
-40°F TO 160°F
(-40°C TO 71°C)

PORT CONNECTIONS:
2 = SUPPLY
1 = CLUTCH
3 = CLUTCH
8 = SPEED
WEIGHT: 7 LBS.
(3.17 KG.)



| HD-2-FX Order Information: | | | |
|----------------------------|----------------|-----------|---------|
| Part No. | Old Part No. | Pressure | Cover |
| R431002823 | P-050970-00001 | 0-65 PSI | Plain |
| R431002824 | P-050970-00002 | 0-100 PSI | Plain |
| R431001204 | P-066514-00001 | 0-65 PSI | Chrome* |
| R431001749 | P-064924-00017 | 30-70 PSI | Plain |

*Chrome cover and handle yoke.

Maintenance kit R431006521

(Old Part No. P-064894-00002)

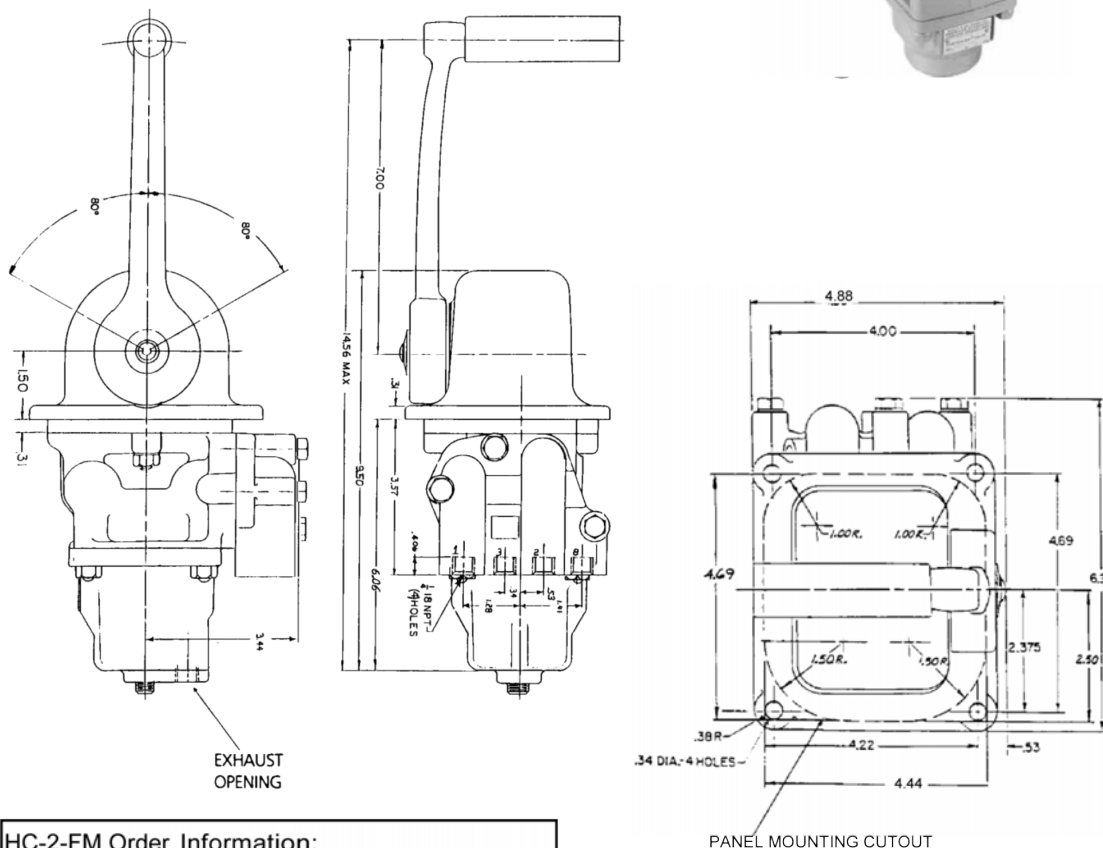
CONTROLAIR VALVE MODEL HC-2-FM

The HC-2-FM valve is designed for open deck marine service and is the same as the HC-2-FX CONTROLAIR valve, except it features longer handle travel, more accurate positioning and a polished chrome plated bronze cover and handle.

The valve is a lever operated, pressure regulating, 4-way directional valve. It consists of two 3-way directional valves and a 3-way pressure regulating portion. The regulating portion furnishes inlet air to the directional valves. Each directional valve has its own outlet port.

Initial lever movement from "mid" position selects the outlet port to be activated. Further lever movement in the same direction controls the outlet pressure at that point. The opposite port remains connected to atmosphere. Lever remains in the position where released. Handle holding friction is adjustable.

Use these valves to control two clutches, a clutch and a brake, two single acting cylinders or a double acting cylinder...wherever you want to selectively control pressure in either of two separate air lines with one lever.



| HC-2-FM Order Information: | | | | |
|----------------------------|---------------|----------|--------|---------------|
| Part No. | Old Part No. | Pressure | Style | Handle Travel |
| R431000809 | P-027592-0101 | 0-65 PSI | Chrome | 80° |

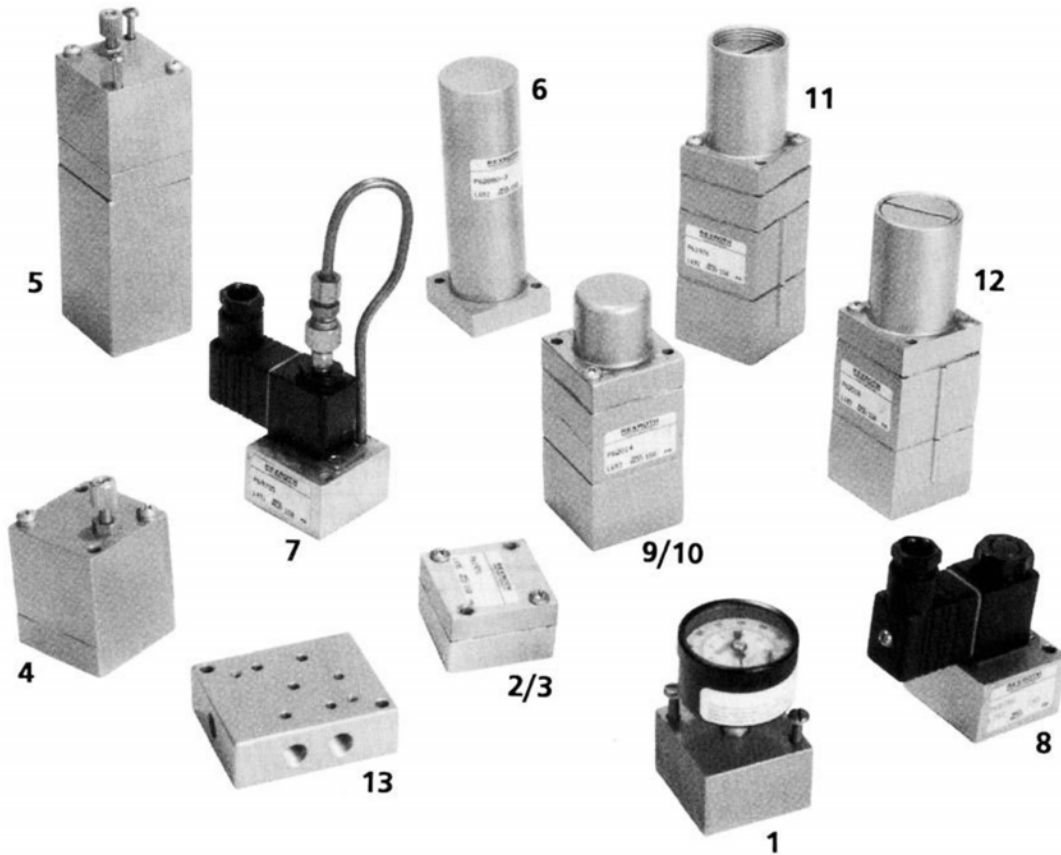
MAX. INLET AIR
200 PSI (13.8 BAR)

TEMPERATURE
-40°F TO 160°F
(-40°C TO 71°C)

PORT CONNECTIONS:
2 = SUPPLY
1 = CONTROL OUT
3 = CONTROL OUT
8 = PLUGGED
WEIGHT: 12 LBS.
(5.44 KG.)

Maintenance kit R431006521 (Old Part No. P-064894-00002)

AIR LOGIC VALVES AND ACCESSORIES



| REF # | DESCRIPTION/Page | PART NO. | OLD PART NO. |
|-------|--------------------------------------|------------|------------------------|
| 1 | Gauge Block p. 24 | R431006136 | P -062885-00000 |
| 2 | Shuttle Valve , Marine Logic p. 25 | R431005928 | P -061971-00000 |
| 3 | Check Valve p. 26 | R431009231 | P -062988-00002 |
| 4 | Flow Control Valve p. 27 | R431005931 | P -061975-00002 |
| 5 | Timer (Timed Application) p. 28 | R431006335 | P -064003-00000 |
| 5 | Timer (Timed Release) p. 28 | R431006336 | P -064003-00001 |
| 6 | Volume p. 29 | R431006133 | P -062880-00003 |
| 7 | Solenoid Valve (N.O.) p. 30 | R431007506 | P -069785-00000 |
| 8 | Solenoid Valve (N.C.) p. 31 | R431007507 | P -069786-00000 |
| 9 | Multifunction Pneumatic Valve p. 32 | R431005976 | P -062016-00000 series |
| 10 | Multifunction Hydraulic Valve p. 33 | R431005962 | P -062014-00000 series |
| 11 | Multifunction Adjustable Valve p. 34 | R431005932 | P -061976-00000 series |
| 12 | Pressure Regulator p. 35 | R431005985 | P -062018-00000 |
| 13 | Subplate p. 36 | R431006017 | P -062129-00001 |

SHUTTLE VALVE, INLINE

◆ NPT Ports

Type
 Supply Pressure 200 psi max.
 Temperature range -40°F to 160°F; intermittent 200°F is permissible.
 Media Air or inert gas

► Application data

The Shuttle Valve automatically selects and directs the flow of air from one or the other of two controlling devices to a common outlet. It serves to connect two independent lines to a common line without destroying the segregation.



| | Port (NPT) | Valve Part No. | Old Part No. | Weight lbs. (kg) | Flow C _v | Repair Kit |
|--|------------|----------------|-----------------|------------------|---------------------|------------|
| | 1/8" | R431003347 | P -054350-00001 | 0.44 (0.20) | 1.25 | R431005614 |
| | 1/4" | R431003348 | P -054350-00002 | 0.44 (0.20) | 1.58 | R431005614 |
| | 3/8" | R431003349 | P -054350-00003 | 1.19 (0.54) | 3.61 | R431005615 |
| | 1/2" | R431003350 | P -054350-00004 | 1.19 (0.54) | 5.12 | R431005615 |

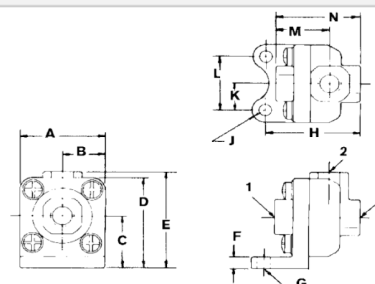
Repair kits include diaphragm and gasket.

◆ Operating Characteristics

FEATURES-
SIMPLE-Contains only one moving part-an easily replaceable fabric reinforced synthetic rubber diaphragm.
Two body segments, a gasket and four screws complete the assembly.
It has no spring; nothing can bind or stick. Its compact size presents no installation problems.
LIGHTWEIGHT-The Shuttle Valve can easily be supported by piping alone.
Mounting feet are included, however, for installations with vibration or long pipe runs.
SENSITIVE-Will seal off the opposite inlet line with less than one psi pressure differential.
LONG LIFE-Tests have shown no diaphragm wear after hundreds of thousands of cycles.

► To order, refer to port size and part number.

When a pressure differential of one psi or more exists at either inlet port, the higher pressure forces the diaphragm to seal against the opposite
 The low (or zero) pressure inlet port is sealed from both the outlet and the opposite inlet port.



□ DIMENSIONS

| DRYSEAL NPTF Ports | | |
|--------------------|---------------------|---------------------|
| ALL PORTS | 1/8"-27 and 1/4"-18 | 3/8"-18 and 1/2"-14 |
| A | 1 7/8" | 2 1/2" |
| B | 15/16" | 1 1/4" |
| C | 1 1/2" | 1 7/8" |
| D | 2 7/16" | 3 1/8" |
| E | 2 5/8" | 3 3/4" |
| F | 9/32" | 5/16" |
| G dia. | 9/32" | 9/32" |
| H | 2 1/8" | 3 1/4" |
| J radius | 9/32" | 21/64" |
| K | 21/32" | 29/32" |
| L | 1 5/16" | 1 13/16" |
| M | 1 7/32" | 2 1/8" |
| N | 1 29/32" | 3 3/8" |

5

QUICK RELEASE VALVE, INLINE

Technical Data

| | |
|-------------------|---|
| Type | Aluminum Body, for in-line or right-angle piping |
| Working Pressure | 200 psi (13.8 bar) max. on 1/4" and 3/8" 150 psi (10.3 bar) max. on 1/2" thru 1" sizes |
| Temperature Range | -40°F to 160°F, 200°F intermittent (-40° to 71°C, 93°C intermittent) |
| Media | Air or inert gas |
| Port Size | 1/4" to 1" NPTF |



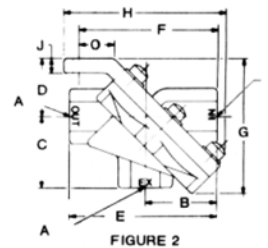
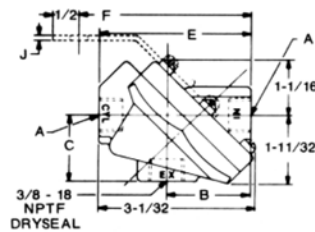
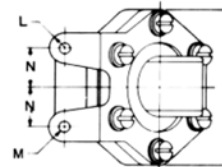
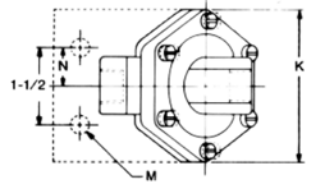
| Port (NPT) | Piping | Valve Part No. | Old Part No. | Weight lbs. (kg) | C _v in to out | C _v out to exh. | Repair Kit | Old Repair Kit |
|------------|-------------|----------------|----------------|------------------|--------------------------|----------------------------|------------|----------------|
| 1/4" | Inline | R431003038 | P-052935-00002 | 0.64 (0.29) | 1.77 | 2.50 | R431005410 | P-060213-00002 |
| 1/4" | Right angle | R431003043 | P-052935-00021 | 0.64 (0.29) | 1.77 | 2.50 | R431005410 | P-060213-00002 |
| 3/8" | Inline | R431003039 | P-052935-00003 | 0.64 (0.29) | 2.73 | 3.08 | R431005410 | P-060213-00002 |
| 3/8" | Right angle | R431003044 | P-052935-00031 | 0.64 (0.29) | 2.73 | 3.08 | R431005410 | P-060213-00002 |
| 1/2" | Inline | R431003040 | P-052935-00004 | 1.44 (0.46) | 5.00 | 5.50 | R431005412 | P-060214-00002 |
| 3/4" | Inline | R431003041 | P-052935-00006 | 2.88 (1.31) | 9.70 | 10.55 | R431005414 | P-060215-00001 |
| 1" | Inline | R431003042 | P-052935-00008 | 3.32 (1.51) | 11.95 | 13.45 | R431005414 | P-060215-00001 |

Mounting bracket for 1/4" and 3/8" models: Part no. R431003093 (old part no. P-053067-00000).

Sizes 1/2" through 1" have integral mounting brackets.

Repair kits include diaphragm and gasket.

Inch dimensions: QRV-Aluminum (in-line configuration shown)



Inch dimensions: QRV-Aluminum

| Fig. No. | A NPTF Dryseal | B | C | D | E | F | G | H | J | K | L | M (2 Holes) | N | O |
|----------|----------------|---------|---------|--------|---------|--------|---------|-------|------|---------|--------|-------------|-------|-------|
| Fig. 1 | 1/4-18 | 1 3/4 | 1 11/32 | - | 3 | 3 3/8 | - | - | 1/16 | 3 | - | 11/32 ∅ | 3/4 | - |
| Fig. 1 | 3/8-14 | 1 3/4 | 1 11/32 | - | 3 | 3 3/8 | - | - | 1/16 | 3 | - | 11/32 ∅ | 3/4 | - |
| Fig. 2 | 1/2-14 | 1 3/4 | 1 11/32 | 1 1/2 | 3 11/16 | 3 7/16 | 3 15/32 | 4 1/8 | 3/8 | 3 15/16 | 3/8 R. | 9/32 ∅ | 1 | 7/8 |
| Fig. 2 | 3/4-14 | 2 11/16 | 2 21/32 | 2 1/16 | 5 1/4 | 5 | 4 13/16 | 5 1/2 | 7/16 | 6 1/2 | 1/2 R. | 13/32 ∅ | 1 1/2 | 1 1/8 |
| Fig. 2 | 1"-11 1/2 | 2 11/16 | 2 21/32 | 2 1/16 | 5 1/4 | 5 | 4 13/16 | 5 1/2 | 7/16 | 6 1/2 | 1/2 R. | 13/32 ∅ | 1 1/2 | 1 1/8 |

RELAYAIR VALVE, TYPE "H" & "L"

▣ "H" and "L" Relayair® Valves

Type Pilot operated sequence valve
 Supply Pressure 200 PSI Max. Except P -059158-00045 (300 PSI)
 Control Pressure 140 psi max.
 Temperature range -40°F to 160°F
 Media Air or inert gas
 Port Size:
 Control port (port 10), breather port (port 1): 1/4" NPT
 All other ports: 3/8" NPT



▣ Operating Characteristics

The Relayair® Valve has three basic uses:

1. As a nongraduated relay to provide a large flow of air from a separate source when piloted by small amount of control media and to stop this flow and exhaust the air to atmosphere when the control pressure is vented.
2. As an interlock to govern the flow in one circuit by placing its control in another independent circuit.
3. As a pressure-sensitive sequence valve for such circuit functions as timing, cycling, etc.

► Application Notes

RELAYAIR Valves operated by pilot pressures less than 35 psi utilize one control spring while valves operated by pilot pressures greater than 35 psi use two springs. To obtain pilot pressures less than 10 psi, two diaphragms are used in series.

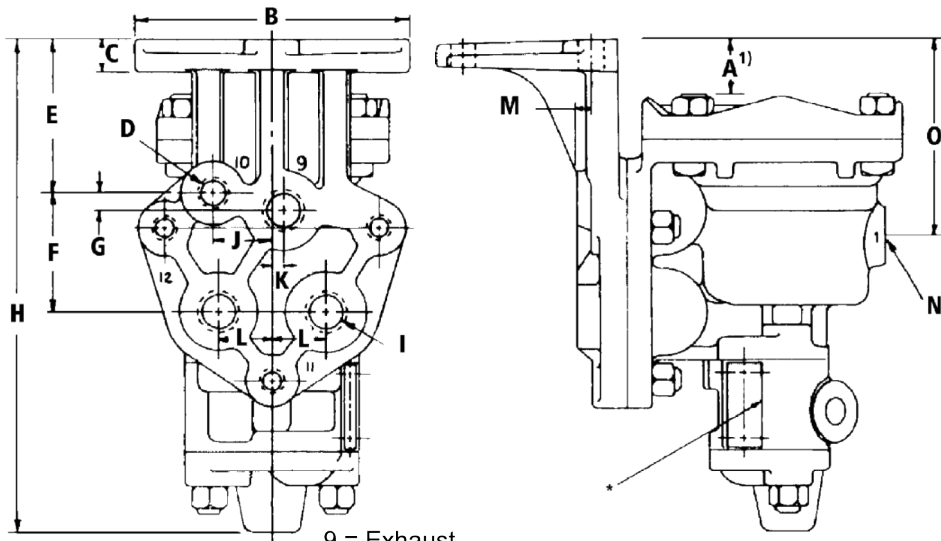
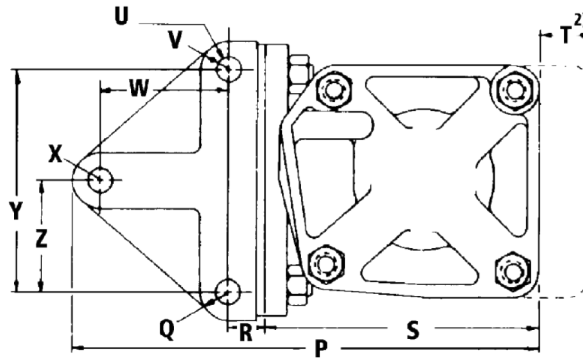
| Model | Part No | Old Part No | Pilot | Max Supply | Max Control | Weight lbs (kg) |
|-------|------------|-----------------|-------|------------|-------------|-----------------|
| H-5 | R431004910 | P -059155-00010 | 10 | 200 | 140 | 5 (2.3) |
| H-5 | R431004918 | P -059155-00060 | 60 | 200 | 140 | 5 (2.3) |
| H-5 | R431004920 | P -059155-00080 | 80 | 200 | 140 | 5 (2.3) |
| L-2-A | R431006065 | P -062482-00110 | 110 | 200 | 300 | 5.75 (2.6) |
| L-2-A | R431006067 | P -062482-00135 | 135 | 200 | 300 | 5.75 (2.6) |

Repair Kits:

| | | | | | | |
|-------|------------|-----------------|---|--|--|--|
| H-5-D | R431005479 | P -060310-00000 | H-5-D rubber parts repair kit | | | |
| H-5 | R431005478 | P -060309-K0000 | H-5 rubber parts repair kit | | | |
| L-2-A | R431005480 | P -060311-00000 | L-2-A rubber parts repair kit | | | |
| | R431005482 | P -060312-K0000 | Metal parts repair kit, all models up to 200 psi supply | | | |
| | R431005483 | P -060313-00000 | Metal parts repair kit, all models up to 300 psi supply | | | |

RELAYAIR VALVE, TYPE "H" & "L"

H-5 Relayair Valve Dimensions



9 = Exhaust
 10 = Pilot
 11 = Delivery
 12 = Supply

* Nameplate location.

 H-5 Relay Dimensions

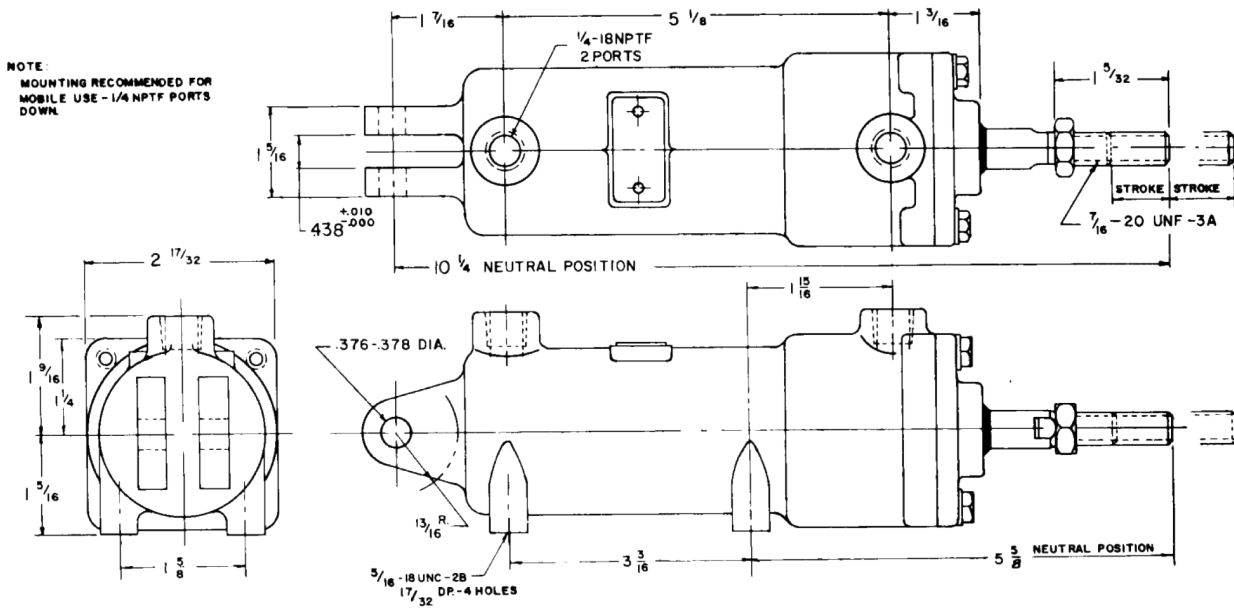
| | | | | | | | | | | | | |
|-----------------|-------|-------|----------|--------|-------|-----------------|-----------------|----------|-------|--------|-------|-------|
| A ¹⁾ | B | C | D - NPTF | E | F | G | H | I - NPTF | J | K | L | M |
| 13/16 | 4-3/8 | 1/2 | 1/4-18 | 2-7/16 | 1-7/8 | 9/32 | 7-3/4 | 3/8-18 | 15/16 | 3/16 | 27/32 | 1/4 |
| N - NPT | O | P | Q | R | S | T ²⁾ | U (3 places) | V | W | X | Y | Z |
| 1/4-18 | 3-1/8 | 7-3/8 | ∅ 7/16 | 9/16 | 4-3/8 | 13/16 | 13/32 | ∅ 7/16 | 2 | ∅ 7/16 | 3-1/2 | 1-3/4 |

1) H-5 shown. "A" for H-5-D = 1/8"; for L-2-A = 5/16".

2) Clearance required for removal.

* Nameplate location.

THREE-POSITION CYLINDER - SPRING CENTERED



| Part No. | Old Part No. | Stroke* |
|------------|----------------|---------|
| R431004060 | P-057378-00312 | 0.312 |
| R431004053 | P-057378-00375 | 0.375 |
| R431004053 | P-057378-00438 | 0.438 |
| R431004055 | P-057378-00500 | 0.500 |
| R431004056 | P-057378-00625 | 0.625 |
| R431004057 | P-057378-00688 | 0.688 |
| R431004058 | P-057378-00750 | 0.750 |
| R431004059 | P-057378-00875 | 0.875 |
| R431004060 | P-057378-01000 | 1.000 |
| R431004943 | P-059211-00000 | 1.062 |

*Effective stroke each side of center.
Repair kit part no. R431005249 (old part no. P-059819-K0000)

The three-position cylinder is a fixed position device when controlled by a four-way, three-position, exhaust-center, control valve such as the "A" or "D" PILOTAIR Valve. The cylinder has a wide range of applications, being particularly suited for shifting transmissions and positioning hydraulic valves. It is corrosion-resistant and constructed of lightweight, die-cast, anodized aluminum heads, pistons and body.

Maximum stroke of the piston rod is one inch of each side of the center position, making a total piston rod travel of two inches. External envelope dimensions of the cylinder do not change, but shorter strokes are available in increments of 1/16-inch for each position. The complete piece number of the cylinder and the piece number of the piston stop will have an identical four-digit suffix. The first digit denotes the stroke in inches; the last three digits show the stroke in thousandths of an inch.



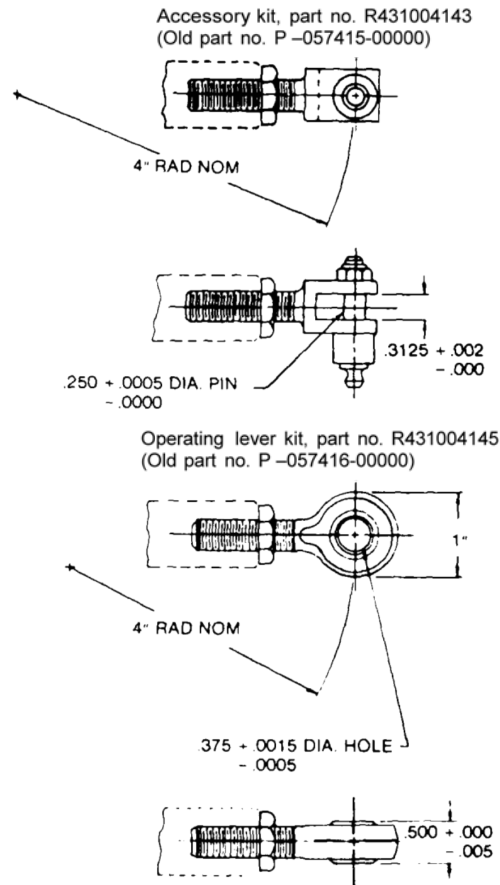
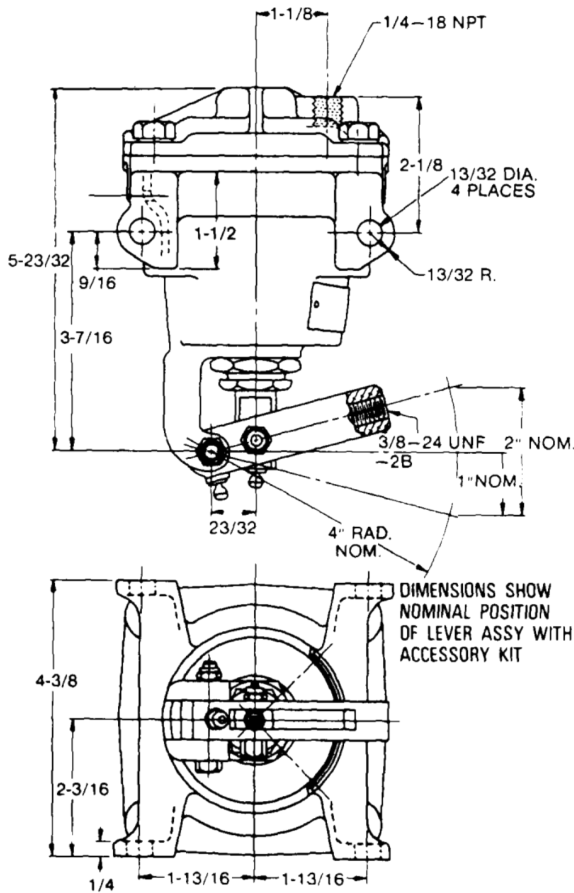
A-2-H ACTUATOR



| Pressure Range psi (bar) | Description | Part No. | Old Part No. |
|-----------------------------|---------------------------|------------|-----------------|
| 3-15 (0.21 - 1.0) | Less Accessories | R431005216 | P -059718-00010 |
| 3-15 (0.21 - 1.0) | With Accessories | R431005217 | P -059718-00011 |
| 10-60 (0.69 - 4.14) | Less Access.-w/Drain Hole | R431005745 | P -061289-00010 |
| 10-60 (0.69 - 4.14) | Less Accessories | R431004009 | P -057159-00010 |
| 10-60 (0.69 - 4.14) | With Accessories | R431004010 | P -057159-00011 |
| 10-60 (0.69 - 4.14) | With Ball Joint Kit | R431004011 | P -057159-00012 |
| 15-80 (1.0 - 5.52) | With Accessories | R431004529 | P -058430-00011 |
| 35-90 (2.41 - 6.21) | Less Accessories | R431003983 | P -057086-00010 |
| 35-90 (2.41 - 6.21) | With Accessories | R431003984 | P -057086-00011 |

Force rating: 410 in.-lb. degrees (46.3 Nm)
 Nominal stroke: 2" (50.8 mm), adjustable from 1 7/8" to 2 1/4" (47.63 to 57.15 mm)
 Weight: 3 lbs. (1.36 kg)
 Integral mounting lugs make installation simple and clean

5



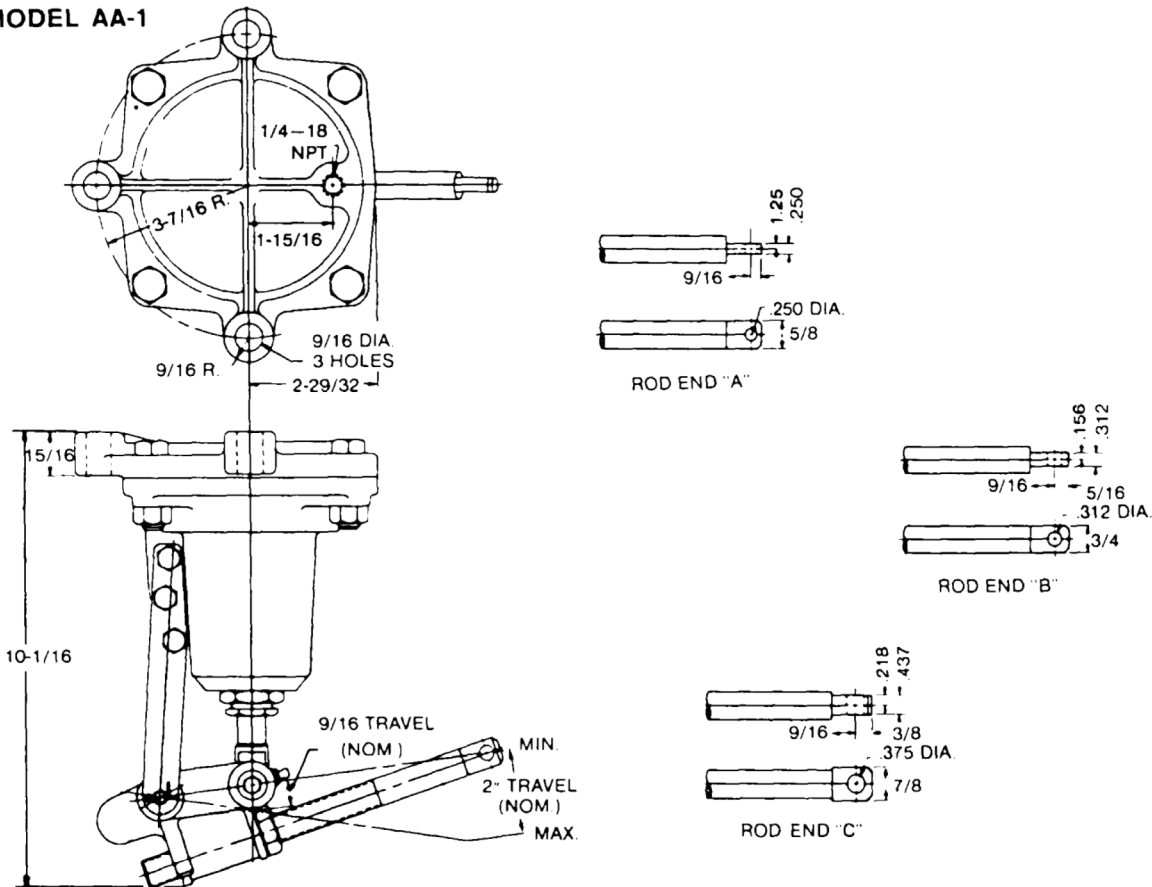
AA-1 ACTUATOR



| Description | Part No. | Old Part No. | Weight lbs. (kg) |
|---------------------|------------|-----------------|------------------|
| AA-1, 1/4" rod eye | R431005436 | P -060263-00001 | 8 (3.63) |
| AA-1, 5/16" rod eye | R431005437 | P -060263-00002 | 8.5 (3.86) |
| AA-1, 3/8" rod eye | R431005438 | P -060263-00003 | 8.5 (3.86) |

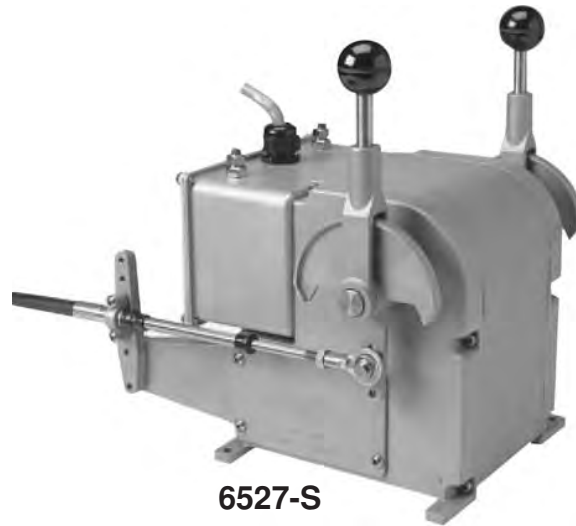
Type: diaphragm-lever actuator, single direction
 Force rating: 1125 in.-lb. degrees (127.1 Nm)
 Pressure range: 10 to 60 psi (0.69 to 4.14 bar)
 Output travel adjustment: from 7/8" to 2 1/4" (22.23 to 57.15 mm)
 Weight: 3 lbs. (1.36 kg)

MODEL AA-1



HOBELT

MIGHTY MARINER



Why do Boat Owners Insist on Kobelt Controls?

Kobelt is committed to manufacturing the finest marine controls in the world. Our reputation for superior marine controls is international spanning over 60 countries and backed by over 40 years of experience.

We are the only company to use die-cast bronze components and stainless steel hardware wherever possible, increasing the durability and lifespan of our products dramatically.

Kobelt offers the widest selection of electronic controls, available both in single and twin engine configurations, and governed by the strong principles of precision, reliability and flexibility.

Always striving to improve and update our product line, we recognize the need for a simplified, reasonably-priced electronic control system for small and medium vessels; and the mighty mariners was born...

* the bottom is not watertight and must be protected from the environment.

† Can only be used for clutch and throttle functions.

**Synchronizer kit is extra.

Navigate to the Mighty Mariner

Kobelt is proud to introduce its latest development in quality electronic control systems – The Mighty Mariner. This new mini system has all the same attention to detail and quality as its larger predecessor, yet offers a compact economical solution for small and medium craft.

The system is comprised of the 6505S control head in combination with the 6527-S electronic actuator, both in sturdy bronze and stainless steel.

The control head is completely watertight from topside* and can be used in any location on board. The 6527-S is a stand-alone actuator† with manual override. The electronics are stored in the housing of the actuator itself, eliminating the need for the separate microprocessor unit. The result is a pared-down, economical electronic control system perfectly suited to simplified needs.

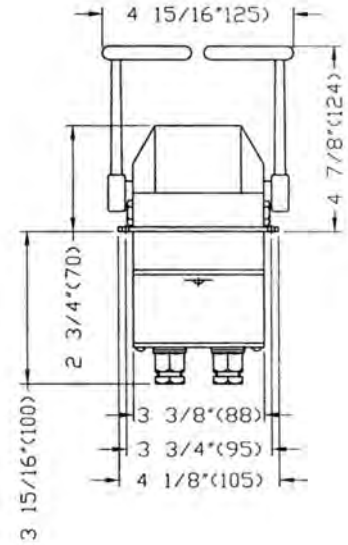
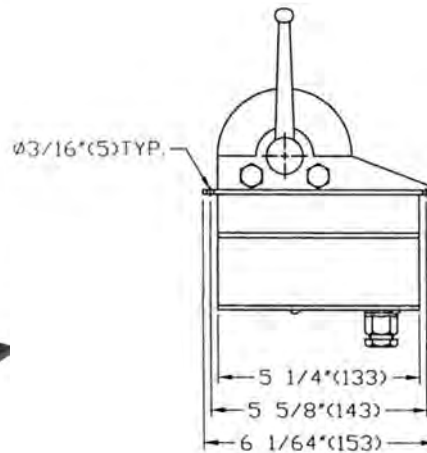
The installation requirements for the Might Mariner are minimal. Communications is via a CAN Bus. This system offers up to 4 stations with station select, station lock, overriding throttle and synchronization**.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MIGHTY MARINER

Diagrams & Parts

KOBELT



Model 6505S Electronic Control Head

The 6505 Electronic Control Head is compact, yet it offers all the features and accuracy of our bigger models. The housing and handles (available in two handle lengths) are constructed in all bronze and stainless steel. The standard unit is available in either chrome, black epoxy, white or polished bronze. Optional self-adhesive side scales are available. The 6505 incorporates the latest electronic technology. The touch pad buttons are water tight, and come standard with station accept, station lock, throttle override and synchronizer. The unit is totally water-tight from the topside and can be used anywhere on board ship. The bottom side must be protected from the elements.

Features:

- Self-monitoring
- Wire break monitoring
- System temperature monitoring
- Potentiometer monitoring
- Clutch and throttle delay
- Overriding throttle
- Neutral safety
- Engine synchronization
- Station lock
- 24 Volts DC

| Ordering Information | |
|----------------------|----------------|
| Model | Designations |
| B | Black |
| W | White |
| C | Chrome |
| L | Polished Brass |
| S | Single Engine |
| T | Twin Engine |

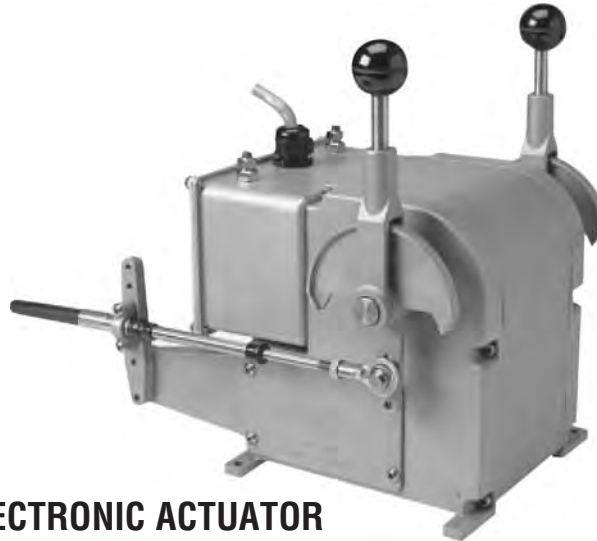
The Mighty Mariner is also available for controlling electronic engines and electric gearboxes without actuators, with all the same features as above using the 6503-3001 Electronic Interface Panel.

Mighty Mariner Configurations

- Single Engine One Station - Model 6500-S1
- Single Engine Two Station - Model 6500-S2
- Single Engine Three Station - Model 6500-S3
- Single Engine Four Station - Model 6500-S4
- Twin Engine One Station - Model 6500-T1
- Twin Engine Two Station - Model 6500-T2
- Twin Engine Three Station - Model 6500-T3
- Twin Engine Four Station - Model 6500-T4

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MIGHTY MARINER Model 6527-S Electronic Actuator



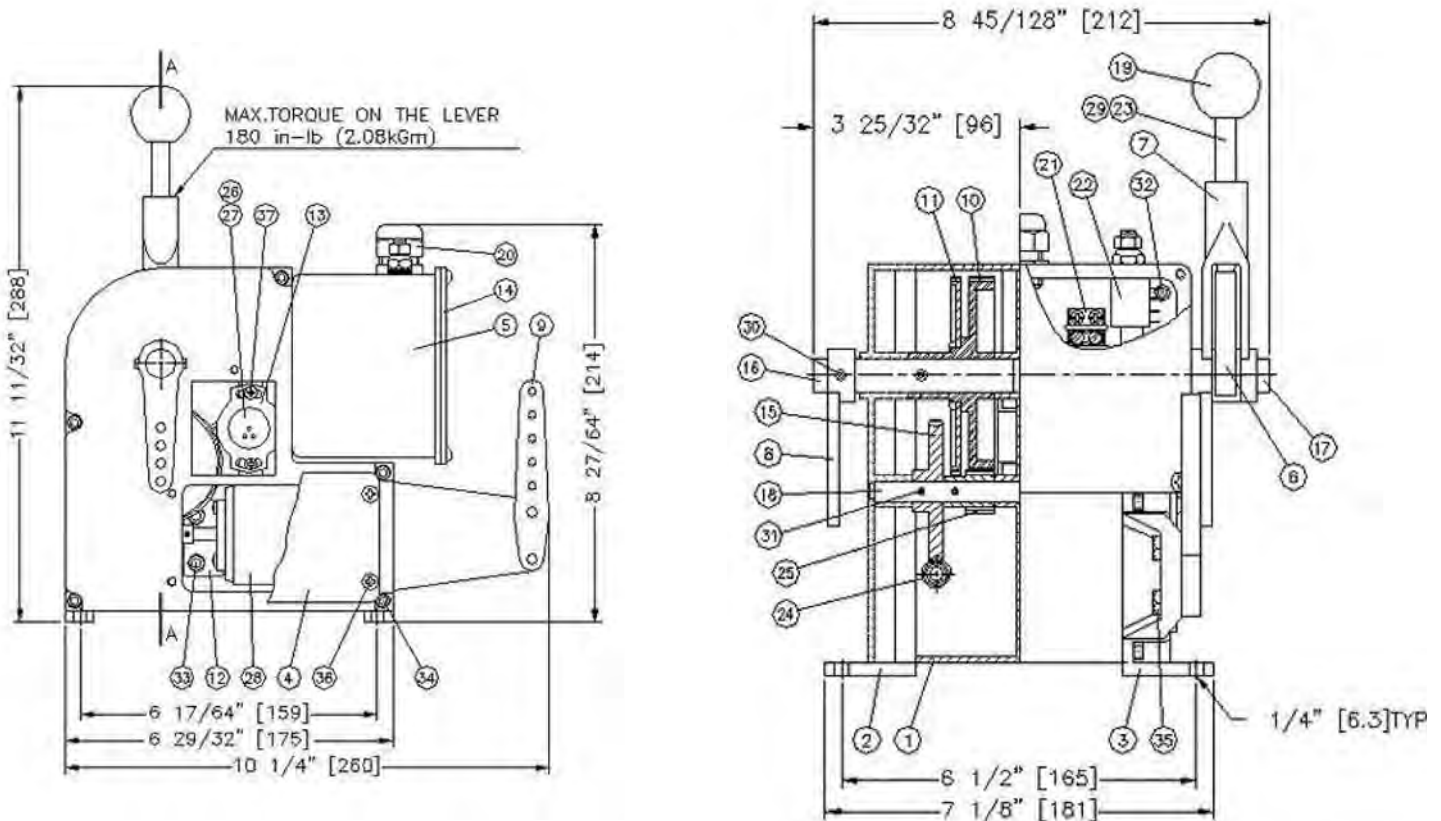
The 6527-S electronic actuators are constructed in bronze and stainless steel, except for the motor and worm. It can be used for many marine and industrial applications to operate and position lever actuated mechanisms.

MODEL 6527-S ELECTRONIC ACTUATOR

The basic control unit comes with manual override and one trim pot per side to adjust the stroke. This actuator does not have an internal resilient link like our model 6524. Therefore, the stroke must be adjusted precisely to suit the device to be controlled. This unit, has a high torque of 180 ins. lbs. All actuators are not waterproof and therefore should not be immersed in liquid or washed.

5

The actuator comes with two 43-series connection kits. If you prefer 33-series cable, please let us know and we'll provide the 30 series connection kit.



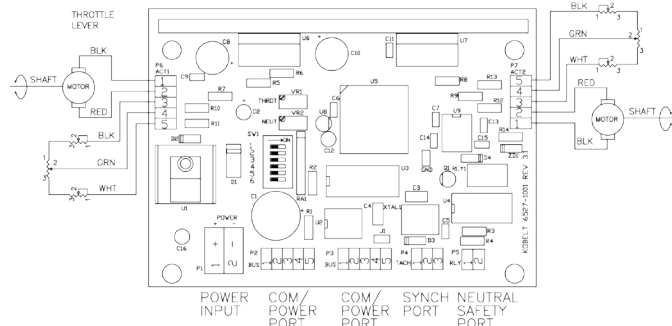
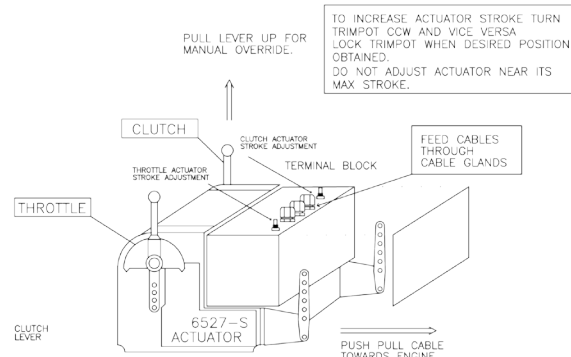
6527-S ACTUATOR WIRING

5

| SW 1 FUNCTION | | | | | |
|---------------|---------------|---------------|-------------|-------------------|--------------------|
| POS | 2 | OFF POSITION | ON POSITION | ACTUATOR | FUNCTION |
| ☐ | PORT ACTUATOR | STBD ACTUATOR | N/A | THROTTLE ACTUATOR | PORT/STBD ACTUATOR |
| ☐ | NORMAL | REVERSE | N/A | CLUTCH ACTUATOR | TRAVEL DIRECTION |
| ☐ | AUXILIARY | MAN | N/A | THROTTLE BOOST | TRAVEL DIRECTION |
| ☐ | SEE TIMING | SEE TIMING | SEE TIMING | THROTTLE ACTUATOR | THROTTLE BOOST |
| ☐ | SEE TIMING | SEE TIMING | SEE TIMING | THROTTLE ACTUATOR | THROTTLE BOOST |

| SYSTEM TIMING | | | | | |
|---------------|----------------|--------------|----------|----------|------------|
| POT | FUNCTION | DELAY | INCREASE | DECREASE | RATE |
| VR 1 | THROTTLE DELAY | 0-24 SECONDS | CW | CCW | 2 TURN/SEC |
| VR 2 | NEUTRAL DELAY | 0-24 SECONDS | CW | CCW | 2 TURN/SEC |

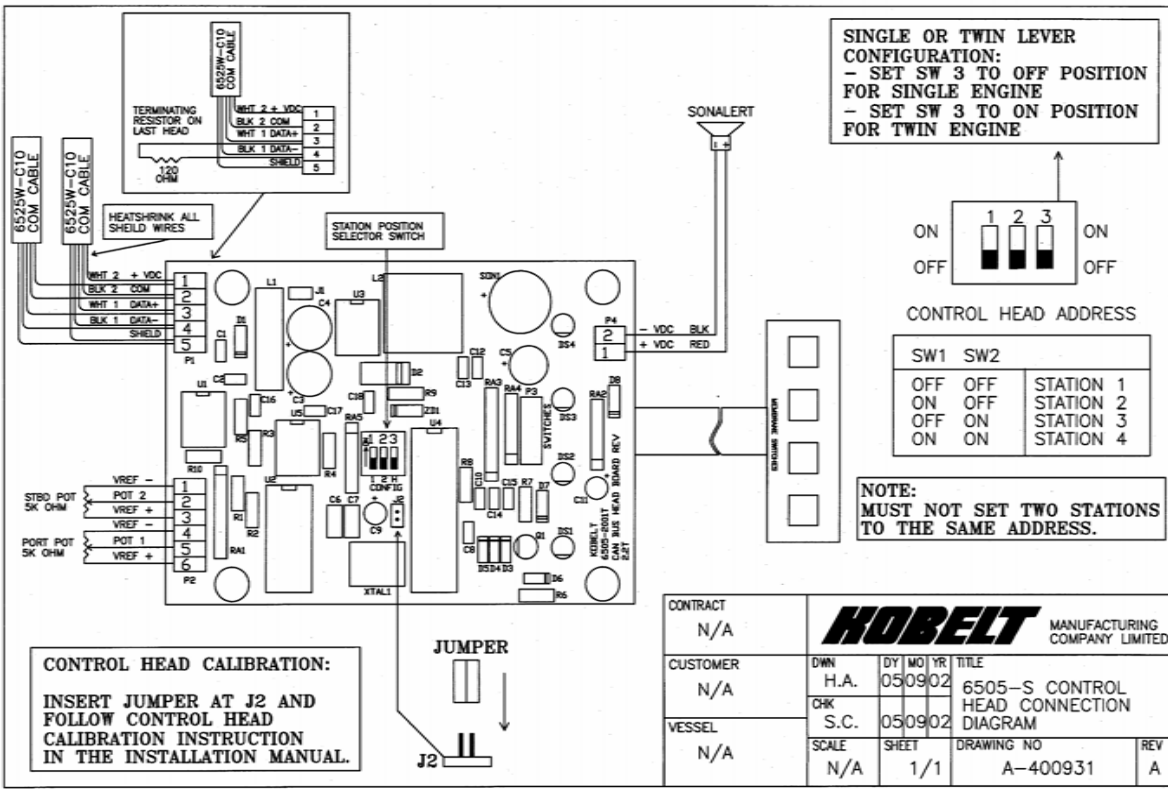
| THROTTLE BOOST TIMING | | | |
|-----------------------|------|----------------|---------------------|
| SW 5 | SW 6 | THROTTLE BOOST | THROTTLE BOOST TIME |
| OFF | OFF | 0 % | 0 SECONDS |
| ON | OFF | 10 % | 2 SECONDS |
| OFF | ON | 20 % | 2 SECONDS |
| ON | ON | 20 % | 3 SECONDS |



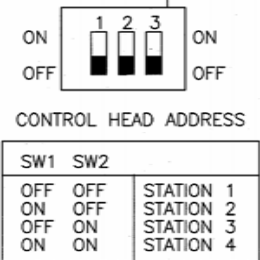
NOTE FOR TWIN ENGINE CONFIGURATION:
NEUTRAL DELAY AND THROTTLE DELAY MUST BE SET IDENTICAL FOR BOTH ACTUATORS.
ONE ACTUATOR MUST BE SET TO PORT AND THE OTHER TO STBD.
DO NOT SET BOTH TO THE SAME SWITCH POSITION (SW 1).
ONE ACTUATOR MUST BE SET TO MAIN AND THE OTHER TO AUXILIARY.
DO NOT SET BOTH TO THE SAME SWITCH POSITION (SW 4).

NOTE FOR SINGLE ENGINE CONFIGURATION:
SW 1 MUST BE SET TO OFF POSITION (PORT ACTUATOR).

| | | | | | | |
|----------|-----|---|-------|------------|----|--------------------------------|
| CONTRACT | N/A | HOBELT MANUFACTURING COMPANY LIMITED | | | | |
| CUSTOMER | N/A | DWN | BY | MO | YR | TITLE |
| | | H.A. | 18 | 12 | 03 | 6527-S ACTUATOR WIRING DIAGRAM |
| VESSEL | N/A | CHK | S.C. | 18 | 12 | 03 |
| | | SCALE | SHEET | DRAWING NO | | REV |
| | | N/A | 1/1 | B-400932 | | B |



SINGLE OR TWIN LEVER CONFIGURATION:
- SET SW 3 TO OFF POSITION FOR SINGLE ENGINE
- SET SW 3 TO ON POSITION FOR TWIN ENGINE

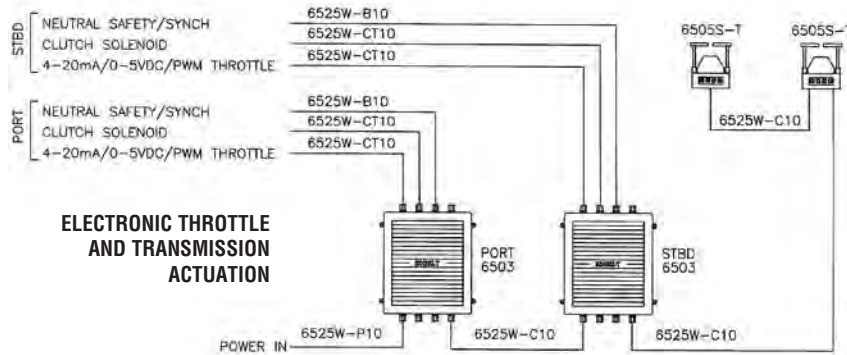
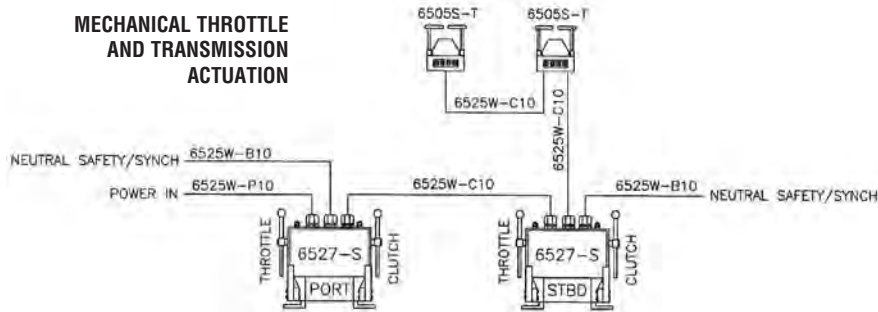


NOTE: MUST NOT SET TWO STATIONS TO THE SAME ADDRESS.

| | | | | | | |
|----------|-----|---|-------|------------|----|--|
| CONTRACT | N/A | HOBELT MANUFACTURING COMPANY LIMITED | | | | |
| CUSTOMER | N/A | DWN | BY | MO | YR | TITLE |
| | | H.A. | 05 | 09 | 02 | 6505-S CONTROL HEAD CONNECTION DIAGRAM |
| VESSEL | N/A | CHK | S.C. | 05 | 09 | 02 |
| | | SCALE | SHEET | DRAWING NO | | REV |
| | | N/A | 1/1 | A-400931 | | A |

MIGHTY MARINER

Typical Mighty Mariner Installation Drawings



CABLE SCHEDULE - ELECTRONIC ENGINE CONTROLS

POWER CABLE

| P/N 6525W-P10 2 COND. 12 AWG 10 MTR. | |
|--------------------------------------|-------------|
| FUNCTION | WIRE COLOUR |
| VDC + | RED |
| COM | BLK |

COMMUNICATION / POWER CABLE

| P/N 6525W-C10 2 PAIR 18 AWG SHIELDED 10 MTR. | |
|--|-------------|
| FUNCTION | WIRE COLOUR |
| VDC + | WHT 2 |
| VDC - | BLK 2 |
| DATA + | WHT 1 |
| DATA - | BLK 1 |
| SHIELD | SHIELD |

ELECTRIC CLUTCH CABLE

| P/N 6525W-CT10 3 COND. 18 AWG SHIELDED 10 MTR. | |
|--|-------------|
| FUNCTION | WIRE COLOUR |
| FWD | WHT |
| COM | BLK |
| REV | RED |
| NOT USED | SHIELD |

SYNCHRO/NEUTRAL SAFETY/BRAKE CABLE

| P/N 6525W-B10 7 COND. 18 AWG 10 MTR. | |
|--------------------------------------|-------------|
| FUNCTION | WIRE COLOUR |
| + VDC | BRN |
| SYNCH PULSE | BLK |
| COM | BLU |
| NEUT. / BRAKE N/ O | RED |
| NEUT. / BRAKE COM | WHT |
| NOT USED | GRN |
| NOT USED | ORG |

ELECTRONIC THROTTLE CABLE

| P/N 6525W-C10 3 COND. 18 AWG SHIELDED 10 MTR. | |
|---|-------------|
| FUNCTION | WIRE COLOUR |
| THROTTLE SIGNAL | WHT |
| THROTTLE COM | BLK |
| NOT USED | RED |
| SHIELD | SHIELD |

MODEL 6509 INTEGRATED ELECTRONIC CONTROL HEAD



Picture showing dome with handles only

The compact design of this control head allows it to be fitted into small spaces. The upper portion is of a water tight construction and can, therefore, be installed anywhere on board ship. It is made entirely in bronze and stainless steel and is well adapted to the harsh marine environment.

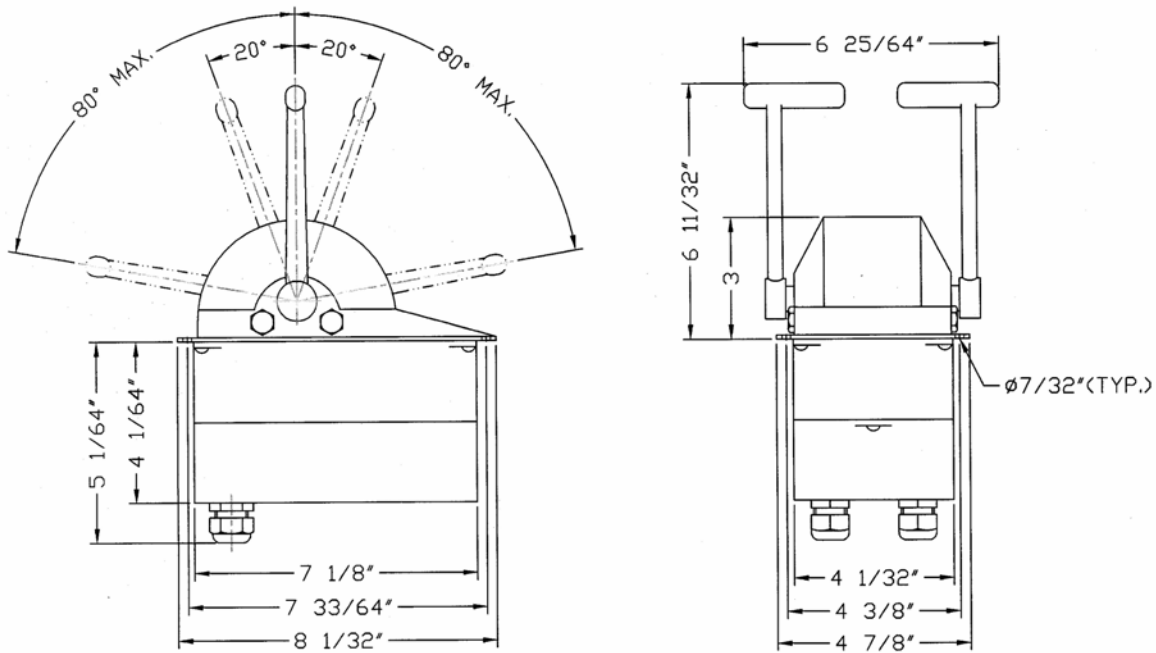
The 6509 control head is also available in a single engine configuration. Non-illuminated side decals can be attached to the control head for fixed propulsion applications.

The membrane key pad has four standard switches and provides:

- Station Select
- Station Lock
- Overriding Throttle
- Engine Synchronization

Trolling valve options are also available in place of either one of the above four switches. The membrane has back lit lenses that indicate which function is working.

MODEL 6509



All Dimensions in inches (mm)

MODEL 6505 - 2000 REMOTE SELECTOR PANEL

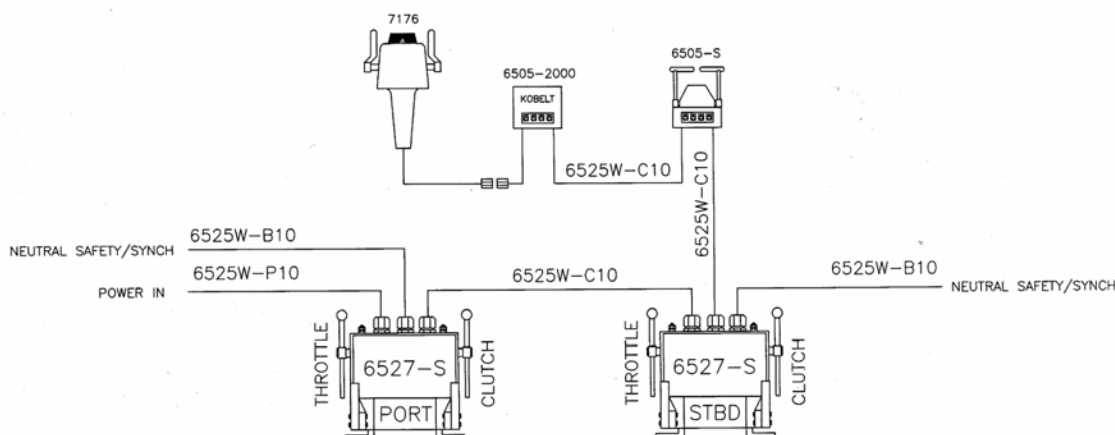


**MODEL 6505-2000
REMOTE SELECTOR PANEL**

The 6505-2000 Remote Selector Panel allows the Walk-About Controller (Model 7176), the Side Mount Controls (Model 6506) or the Model 6555 Control Head to interface with the Kobelt Mighty Mariner System.

This remote unit has all the basic functions available on a 6505S Control station and is suitable for inside or outside installation.

An example of a twin engine, two station system using 7176 is shown as below. You can also get systems for one or two engines, and from one to four stations as well.



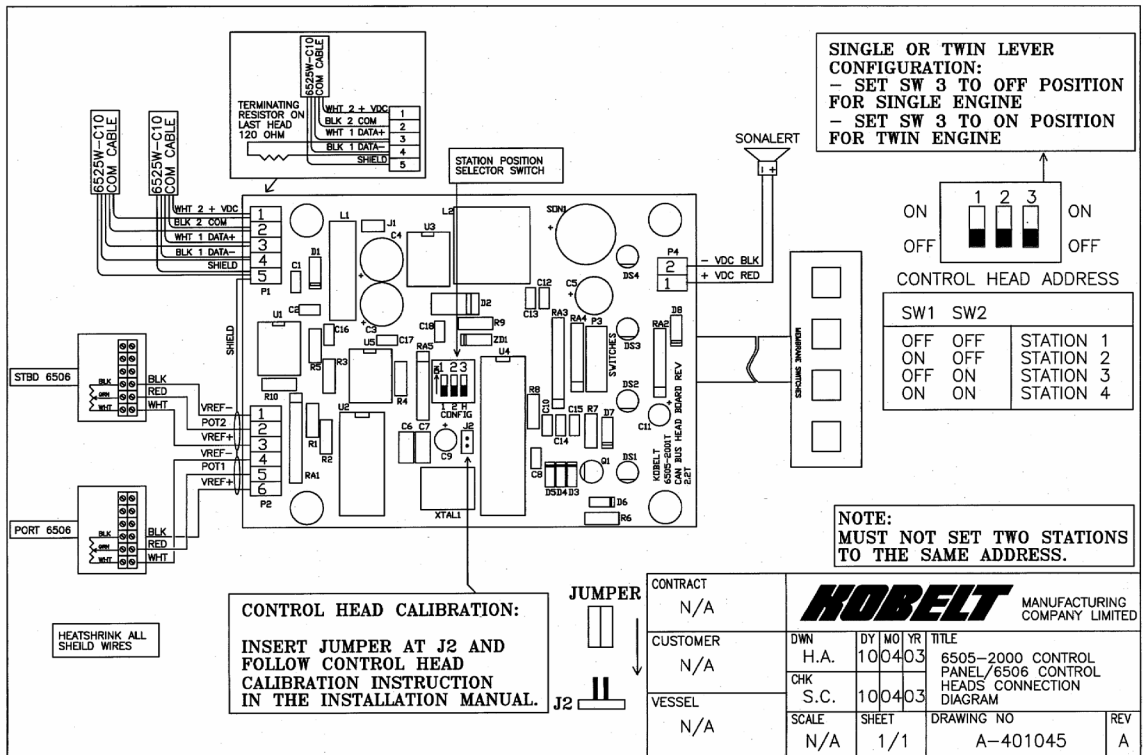
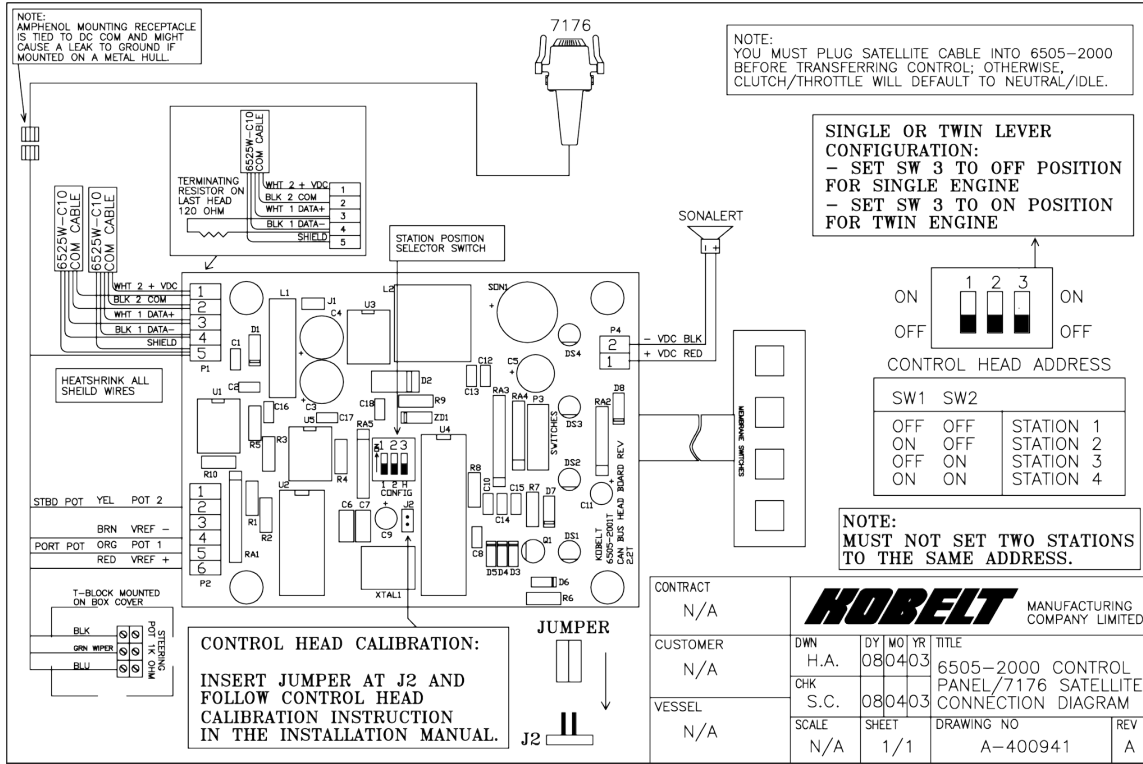
TYPICAL SYSTEM ARRANGEMENT

(Note: 7176 can be replaced by selected Kobelt Control Head)

5

CONTROL PANEL SATELLITE CONNECTION

5



CONTROL PANEL CONNECTION



Model 6503 Electronic Control Interface Unit

The 6503 unit is a two function control card that will provide electronic throttle output and clutch solenoid control signals in the Kobelt Mighty Mariner control system.

It can

- monitor all input information from the control heads and their associated switch panels;
- monitors its clutch and throttle positions and the synchronizer inputs;
- controls and positions its electronic throttle and its electric clutch in accordance with the Control Head lever movement;
- communicates with the control stations through panel lights and sonalerts.

The purpose of the 6503 is to operate the clutch solenoid via dry contacts and the electronic throttle signal. The 6503 uses standard Microchip Picprocessor circuitry. All the system adjustments can be maintained through adjustable trimpots and DIP switches. All connections to the 6503 are hard wired into pluggable connectors on the board.

The 6503 is housed in a heavy duty enclosure (7173-K box) designed to prevent dust and moisture intrusion.

The 6503 has three types of electronic throttle output available:

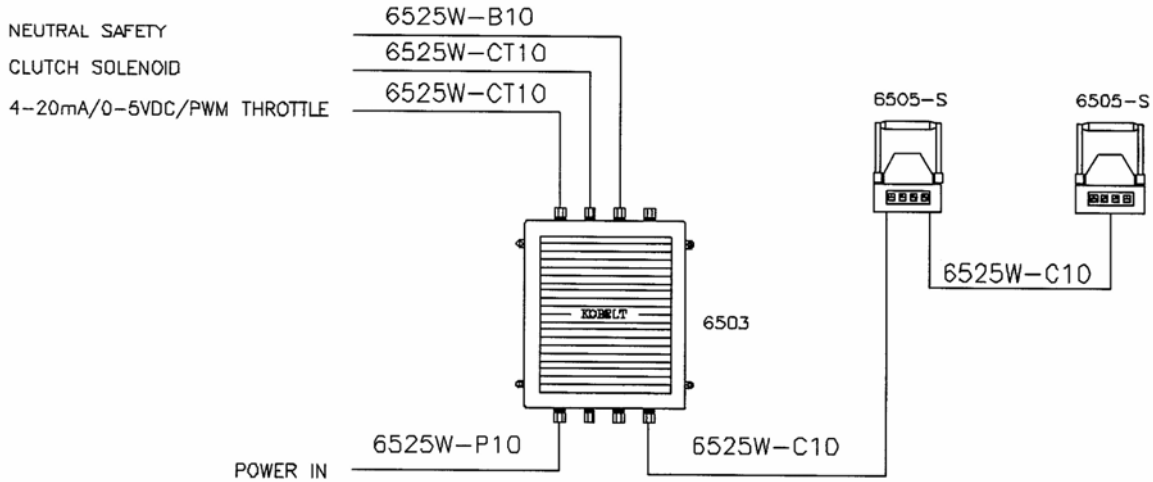
- 4-20mA,
- 0-5VDC and
- PWM (Pulse Width Modulation).

These outputs change proportionately with the station control head lever positioning.

The Synchronizer System is adjustable to designate either the Port or the Starboard engine as the Main Engine.

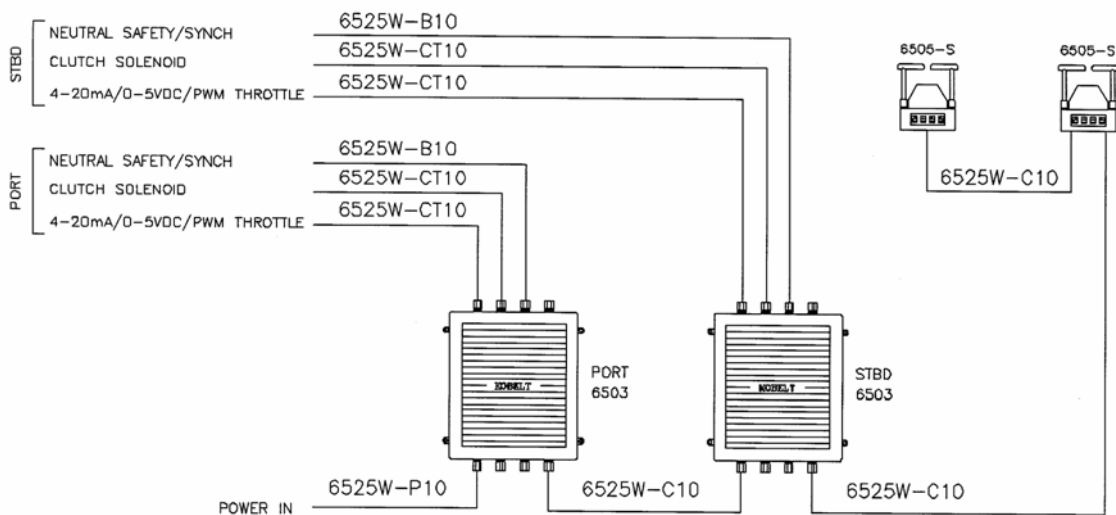
Operating range of the 6503 is -10° to +55° Celsius.

MODEL 6503 TYPICAL APPLICATION LAYOUT



Double Station Single Engine Electric Clutch / Electronic Throttle

5



Double Station Twin Engine Electric Clutch / Electronic Throttle

MAREX OS II

In Hanover, Germany, Bosch Rexroth produce electrical remote controls for ship propulsion systems. Profiting from the experience gained within more than 40 years, Bosch Rexroth developed the modular remote control system Maren OS II. With the Maren OS II, Bosch Rexroth provide a technologically well-engineered system for almost every type of ship and any propulsion system. No matter whether for reversing gears or controllable pitch propeller. Ready to connect, flexible, and comfortable.



The individual solution

The schematic diagram shows an example of a remote control for yachts with two propulsion systems and four control stations.

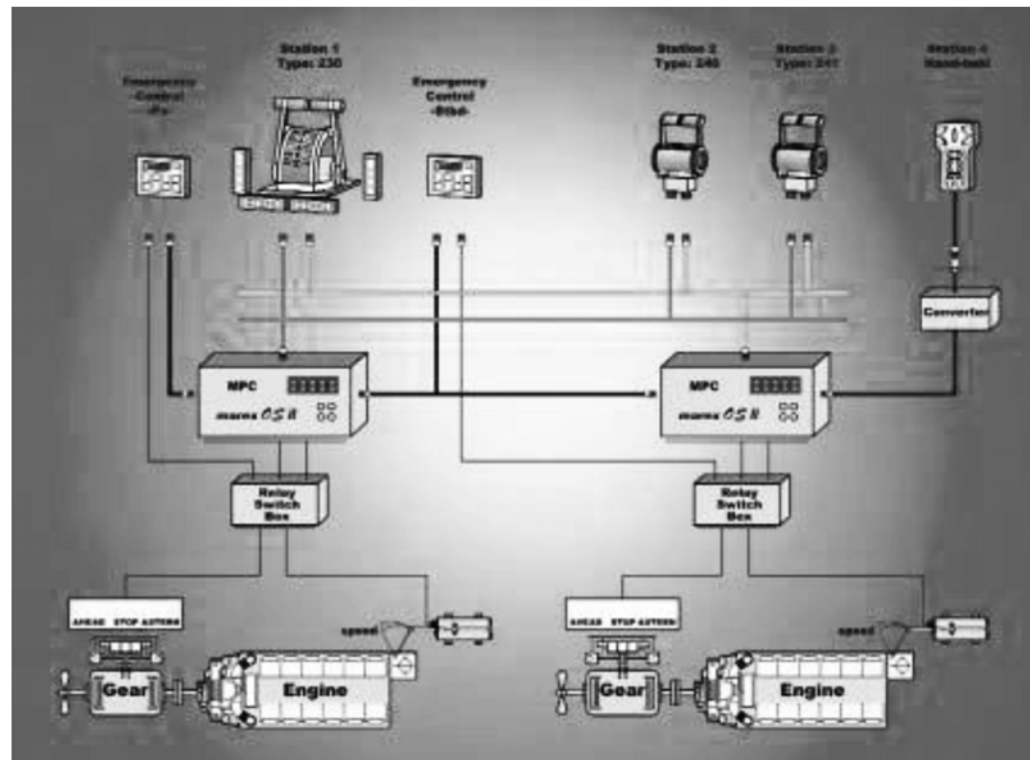
In case of multiple engines (2, 3, 4 ...), the system is set up several times accordingly. There, all engines can either be operated separately or, by means of pressing a key, conjointly from one control head lever.

All components are ready to connect, which simplifies the installation in new buildings and retrofits. Wiring faults are avoided: just install the system, switch it on, make the necessary adjustments and commission the system – that's all.

The components

- Control head to set rpm and gear direction, in different sizes, designs and optionally with lever follow-up system
- Emergency control to operate the propulsion system in case of a remote control failure
- Hand-held control station to operate the remote control during docking and launching manoeuvres
- Operating modules to control and indicate special functions
- Indication modules to display rpm, pitch of propeller and direction
- Ready-to-connect cables between the remote control's components

maren OS II



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ACTUATOR

< Technical data

| | |
|--|---|
| Design Operating mode | actuator with internal electronic board |
| Operating temperature | S5 - 40 % DIN EN 60034-1 (VDE 0530) |
| Protection | - 25 °C to + 60 °C |
| Weight | IP 54 acc. to IEC 60 529 (DIN VDE 0470) |
| Supply voltage | see table |
| Operating current | 24 V DC - 25 % / + 30 % |
| Nominal stroke | 4 A max. |
| Nominal lifting force | see table |
| Nominal lifting speed | 100 N |
| I The actuator will be needed if gear shifting, speed or pitch setting is realized by mechanical levers. | |

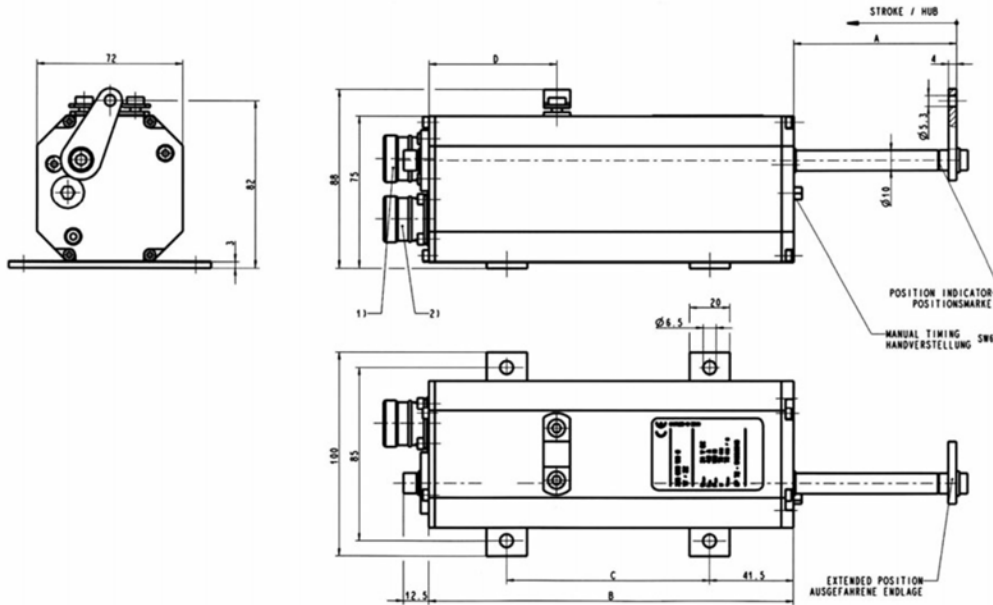


I Type numbers

| Stroke [mm] | Weight [kg] | Type number |
|---------------|---------------|---------------|
| 70 * | 1.8 | 323 698 100 0 |
| 120 ** | 2.0 | 323 698 110 0 |

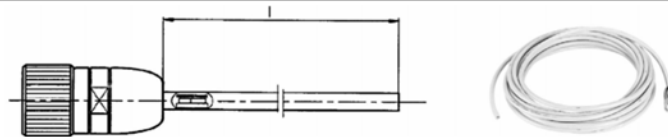
* standard for mechanical gear or speed setting
 ** for mechanical pitch setting where the propeller can be shifted to sailing position

Technical drawing



| Stroke [mm] | A [mm] | B [mm] | C [mm] | D [mm] |
|---------------|----------|----------|----------|----------|
| 70 | 80 | 180 | 100 | 63 |
| 120 | 130 | 230 | 150 | 60 |

▲ Accessories



| Device | Length [m] | Type number |
|--|------------|---------------|
| Cable for signal (with two plugs to connect actuator to MPC-plus) | 10 | R417 000 523 |
| Cable for signal (to connect actuator to MPC-modular and MPC-cabinet) | 10 | 894 620 203 2 |
| Cable for power supply | 10 | 894 620 250 2 |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

CONTROL UNIT - MPC

< Technical Data

| | |
|-----------------------|---|
| Design | plus |
| Operating temperature | - 20 °C to + 70 °C |
| Vibration resistance | 4g (2...100Hz) – IEC 60068-2-6, test Fc |
| Weight | 2,4 kg |
| Operating voltage | 24 V DC – 25 % / + 30 % or 12 V DC – 20 % / + 30 % |
| Operation current | 24 V DC: 3 A max. 12 V DC: 6 A max. |
| Protection | with screw cable gland IP 54 acc. to IEC 60529 (DIN VDE 0470) |
| Fuse | 10 A (T) |



↑ The MPC

is the central processing unit of the remote control. They is also responsible for data in- and output.

↑ Type numbers

| | |
|----------------------------------|---------------|
| For application | Type number |
| Reversing gear propulsion system | 346 069 003 0 |

▲ Accessories

| Device | MPC – plug no. | Length | Type number |
|---|----------------|--------|---------------|
| Cable for prop-valve and gear setting / feed back signal | 4, 5 | 2 m | 894 620 279 2 |
| | | 5 m | 894 620 271 2 |
| | | 10 m | 894 620 270 2 |
| | | 15 m | 894 620 272 2 |
| Cable for rpm setting / feed back signal and trolling setting | 6, 7 | 2 m | 892 620 229 2 |
| | | 5 m | 892 620 221 2 |
| | | 10 m | 892 620 220 2 |
| | | 15 m | 892 620 222 2 |
| Actuator for mechanical trolling | 3 | | 323 698 000 0 |
| Actuator for mechanical speed or gear setting* | 7 | | 323 698 100 0 |

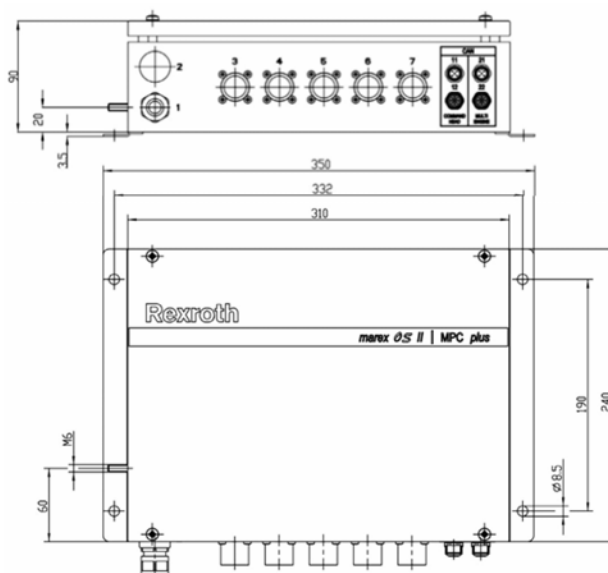
* see page of actuator 323 698 100 0 for power supply and signal cable of actuator

▲ Spare parts

| Device | Description | Type number |
|------------------|--|---------------|
| Fuse | Fuse 10 A | 894 245 201 4 |
| Repair / replace | Only repair or complete changing of device possible* | - |

* Software version and adjusted parameters (parameter list) are needed to repair or replace the MPC

Technical drawing



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

CONTROL HEAD - TYPE 240

< Technical data

| | |
|-----------------------|---|
| Design | CAN-bus suitable control head |
| Operating temperature | - 25 °C to + 70 °C |
| Weight | see table |
| Power supply | via CAN-bus cable |
| Protection | IP 66 acc. to IEC 60 529 (DIN-VDE 0470) |
| Indication | by LED and buzzer |



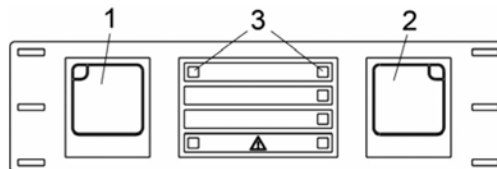
↑ The control head is transmitting signals to the MPC for reversing gear or controllable pitch propeller propulsion system. Depending on the function the control heads are equipped with detents in positions O (neutral), I (ahead) and II (astern). Integrated in the control head is a operating and indication panel.

↑ Type numbers

| For application | Special | Number of engines / levers | Lever | Weight [kg] | Type number |
|-------------------------------------|---------------------------------|----------------------------|----------|---------------|---------------|
| Reversing gear propulsion system | | 1 | standard | 1.4 | 362 240 160 0 |
| | | | short | 1.4 | on request |
| | | 2 | standard | 1.4 | 362 240 060 0 |
| | | | short | 1.4 | on request |
| | scale points | 1 | standard | 1.4 | on request |
| | | | short | 1.4 | on request |
| 2 | | standard | 1.4 | 362 240 032 0 | |
| | | short | 1.4 | 362 240 031 0 | |
| Controllable pitch propeller system | combinator | 1 | standard | 1.4 | R417 000 368 |
| | | 2 | standard | 1.4 | R417 000 372 |
| | only rpm (blocked in astern) | 1 | standard | 1.4 | R417 000 366 |
| | | 2 | standard | 1.4 | R417 000 374 |
| | separate rpm / pitch only pitch | 1 engine / 2 levers | standard | 1.4 | R417 000 370 |
| | | 2 | standard | 1.4 | R417 000 376 |

↑ Functions

| Type number | Push button 1 for | Push button 2 for | Indication 3 for | Figure |
|--------------------------------|---|-----------------------------|--|--------|
| 362 240 160 0 362 240 060 0 | station transfer, low/high idle, warming up | synchronization or trolling | command active, synchronization, trolling, alarm | 1 |
| 362 240 032 0 362 240 031 0 | station transfer, low/high idle, warming up | synchronization or trolling | command active, synchronization, trolling, alarm | 2 |
| R417 000 368 | station transfer, rpm constant | clutch on/off | command active, clutch on, rpm constant, alarm | 3 |
| R417 000 372 | station transfer | rpm-constant | command active, rpm constant, alarm | 4 |
| R417 000 366 | station transfer, rpm constant | clutch on/off | command active, clutch on, rpm constant, alarm | 5 |
| R417 000 374 | station transfer, rpm constant | combinator on/off | command active, combinator on, rpm constant, alarm | 6 |
| R417 000 370 | station transfer, rpm constant | clutch on/off | command active, clutch on, rpm constant, alarm | 7 |
| R417 000 376 | clutch 1 on/off | clutch 2 on/off | command active, clutch 1 on, clutch 2 on, alarm | 8 |

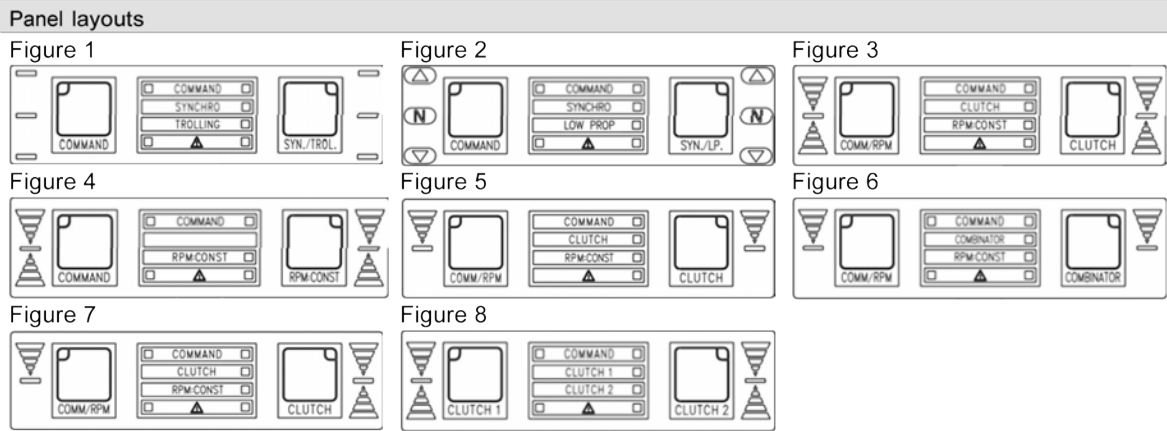


▲ Spare parts

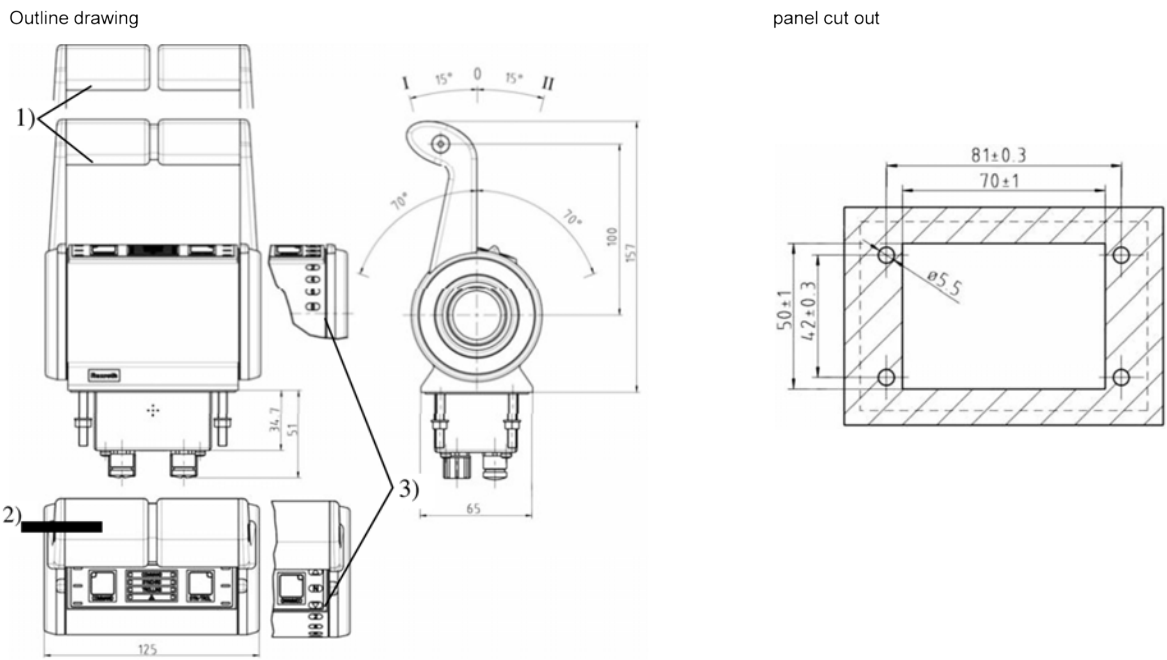
| Device | Description | Type number |
|-------------|-------------|-------------|
| Spare parts | | on request |

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CONTROL HEAD - TYPE 240

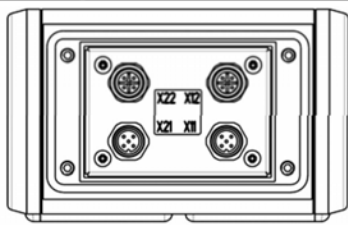


Technical drawing / panel cut out



Remark: 1) See table "number of levers" 2) See table "panel layouts" 3) Housing modification for figure 2

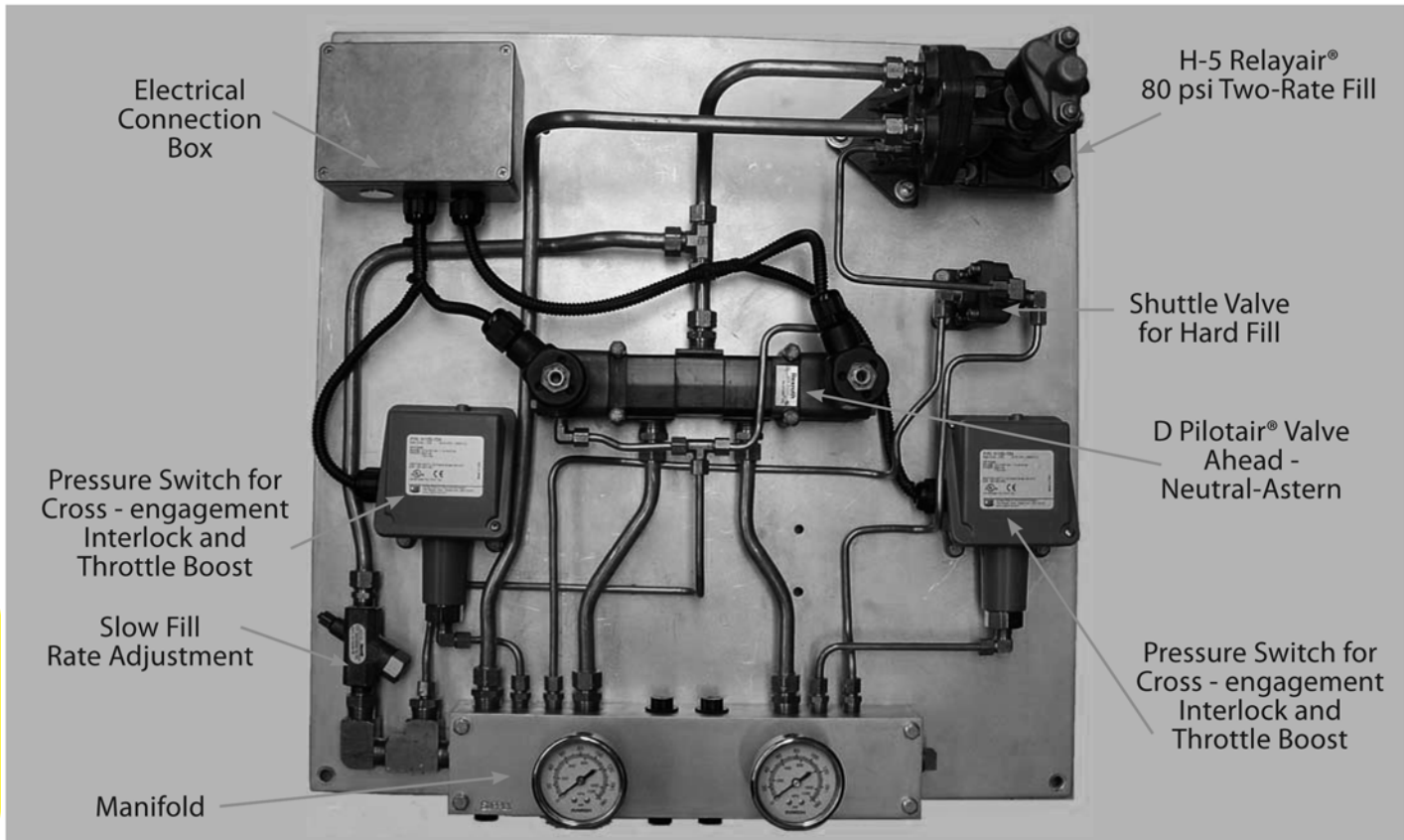
Terminal assignment



X11, X21* = CAN input
 X12, X22* = CAN output
 * only on control head with two levers

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

AIR CLUTCH PANEL INTERFACE



5

- ▲ Completely factory assembled and tested - combines proven, dependable control components
- ▲ Reduces shipboard layout, mounting and piping
- ▲ Two-rate clutch inflation for soft initial engagement
- ▲ Hard fill from starts at 50 psi (optional) trip points available
- ▲ Pressure switches for clutch interlock and throttle boost
- ▲ Gauges to show ahead and astern clutch pressure
- ▲ Aluminum mounting plate with stand offs
- ▲ Aluminum header for easy ship board connections
- ▲ Electrical junction box with terminal strip for easy installation
- ▲ Includes (2) quick exhaust valves pre-piped

F-AC_01.2012
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www.boschrexroth-us.com/brp

MODEL 2015 TWO HANDLE PUSH PULL CONTROL HEAD

HOBELT


DESCRIPTION

This control incorporates all the features of the Kobelt standard Push Pull Control: 3" stroke, all bronze and stainless steel and extremely heavy-duty construction. The cable support bracket has been shortened to improve cable attachment access to the Control Head.

ORDERING INFORMATION

Model Designation Order Codes:

- A - One short handle with friction and one long handle with detent
- AA- One short handle with friction and one long handle with friction
- B - Two long handles with detent
- C - Two long handles with friction
- D - Two long handles with one detent and one friction
- E - Two short handles with detent
- F - Two short handles with friction
- G - Two short handles with one detent and one friction
- K - With chrome finish cover and handles
- L - With polished brass finish cover and handles
- M - With black epoxy finish cover and chrome handles
- S - Right Hand Model with interlock (gear on right side)
- T - Left Hand Model with interlock (gear on left side)
- U - With curved handles and red or black knobs
- V - With red or black plastic grips

NOTE:

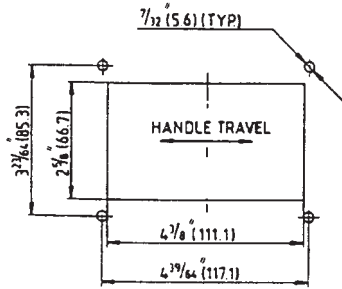
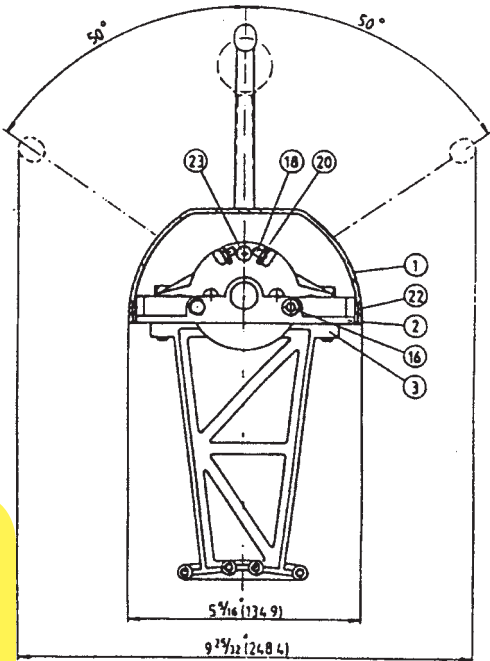
Cable connector kits are ordered separately.
Each Push Pull cable end attached to the control head requires one kit.

CONNECTION KIT ORDERING INFORMATION

- 2015-0901** Connection Kit (30 series cable)
- 2015-0902** Connection Kit (40 series cable)

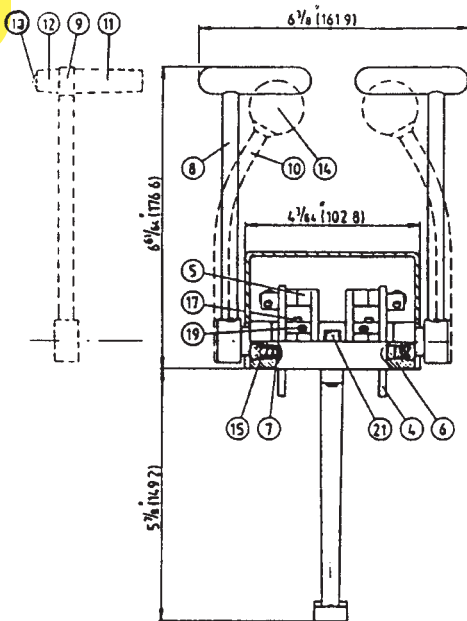
KOBELT

MODEL 2015 TWO HANDLE PUSH PULL CONTROL HEAD



ALL DIMENSIONS IN INCHES (mm.)

5



*Optional, depending on desired configuration.

| ITEM | QUANTITY | PART NO. | DESCRIPTION |
|------------------------|----------|------------|----------------------------------|
| 1 | 1 | 2015-0001 | Dome |
| 2 | 1 | 2015-0002 | Frame |
| 3 | 1 | 2015-0003 | Support |
| 4 | 2 | 2015-0004 | Cam |
| 5 | 2 | 2015-0005 | Retainer Plate |
| 6 | 1 | 2016-0011 | Friction |
| 7 | 1 | 2009-0011 | Detent |
| 8* | 2 | 2009-0015 | Long Handle (Standard) |
| 8* | 2 | 2009-0016 | Short Handle (Standard) |
| 9* | 2 | 2009-2015 | Long Handle (Plastic Grip) |
| 9* | 2 | 2009-2016 | Short Handle (Plastic Grip) |
| 10* | 2 | 2009-3015 | Curved Handle |
| 11* | 2 | 2111-0001B | Plastic Grip (Black) |
| 11* | 2 | 2111-0001R | Plastic Grip (Red) |
| 12* | 2 | 2111-0004B | Grip End (Black) |
| 12* | 2 | 2111-0004R | Grip End (Red) |
| 13* | 2 | 1011-1028 | Oval Head Machine Screw |
| 14* | 2 | 2030-0011 | Black Knob |
| 14* | 2 | 2030-0012 | Red Knob |
| 15 | 2 | 1201-0003 | Spring |
| 16 | 2 | 1016-1204 | Hex Socket Set Screw |
| 17 | 4 | 1016-0804 | Hex Socket Set Screw |
| 18 | 4 | 1016-0808 | Hex Socket Set Screw |
| 19 | 4 | 1024-0816 | Spring Pin |
| 20 | 4 | 1022-0108 | Hex Jam Nut |
| 21 | 2 | 1002-0016 | Hex Socket Head Cap Screw |
| 22 | 2 | 1005-0808 | Oval Head Machine Screw |
| 23 | 6 | 1019-0808 | Flat Head Phillips Machine Screw |
| 2015-0901 Parts | | | |
| 1 | | 2019-0001 | Spacer |
| 1 | | 2018-0001 | Clamp |
| 1 | | 1022-0158 | Nut |
| 2 | | 1010-0810 | Machine Screw |
| 1 | | 2105-0003 | Swivel |
| 2015-0902 Parts | | | |
| 1 | | 2015-0006 | Plate |
| 1 | | 2108-0002 | Clamp |
| 1 | | 2109-0002 | Spacer |
| 2 | | 1012-0814 | Machine Screw |
| 2 | | 1010-0808 | Machine Screw |
| 1 | | 1022-0260 | Nut |
| 1 | | 2105-0004 | Swivel |

MODEL 2046 MEDIUM-DUTY SINGLE-LEVER CONTROL HEAD

KOBELT


Patent Pending

DESCRIPTION

The 2046 control head was made for a marine environment and to give the boat owner years of trouble-free service. Its compact and rugged design exceeds any competitive product in value and performance. The control handle will engage the gear in either direction before throttle acceleration takes place. In order to warm up the engine without gear engagement, the control handle is pulled away from the dome approximately 1/4". This will disengage the clutch mechanism and will allow engine acceleration. When the control handle is returned to the neutral position, the clutch mechanism is automatically engaged. The control head also provides a small detent in the full throttle position in one direction only (forward). This will prevent the engine from creeping back, causing loss of RPM. By reversing the detent roller and spring assembly, the full speed detent can also be reversed.

SPECIFICATIONS

Weight: 7.5 lbs. (3.4 kg)

ORDERING INFORMATION

Model Designation Order Codes:

- H - With one neutral safety switch
- K - With chrome finish cover and handle
- L - With satin brass finish cover and handle
- M - With black epoxy finish cover with chrome handle

The Standard Model 2046 Control Head is supplied as follows:

1. With chrome finish handle and cover
2. Without neutral safety switch

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

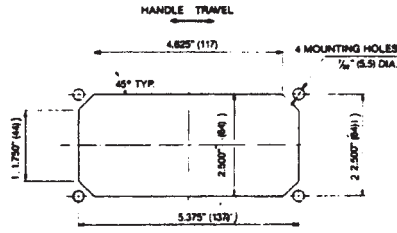
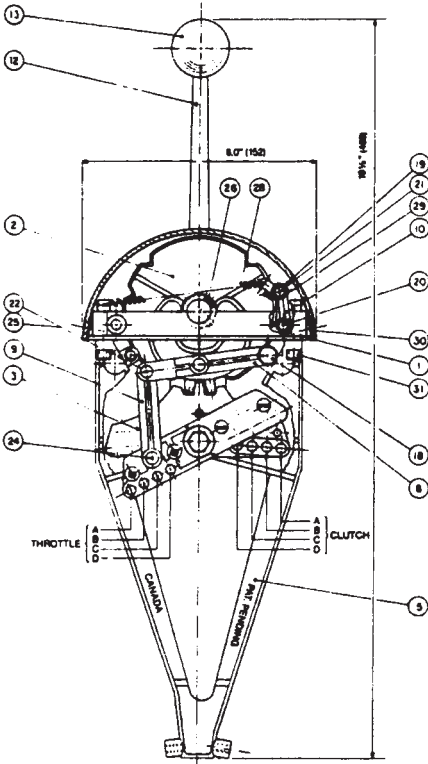
Example: A standard model 2046 Control Head with chrome finish. Order No. **2046-K**.

NOTES:

- * Plastic labels are available to indicate Neutral, Forward and Reverse positions, as well as speed scales. Order Part No. **2046-0015**.
- * Cable connector kits are ordered separately. Each push pull cable end attached to the control head requires one kit.

CONNECTION KIT ORDERING INFORMATION

- 2046-0901** No. 10-32 (30 series cable) Connection Kit
- 2046-0902** 1/4"-28 (40 series cable) Connection Kit
- 2046-0903** Neutral Safety Switch Kit



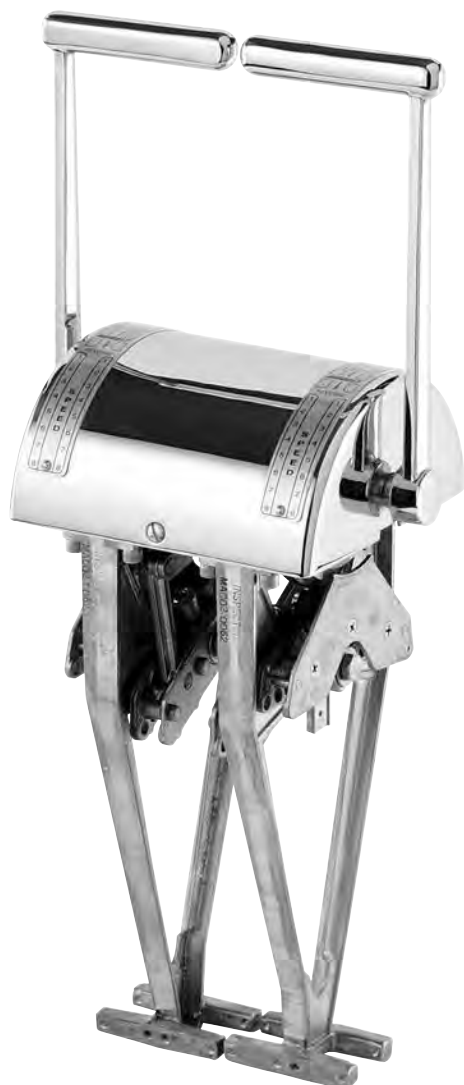
“CUT OUT” DIMENSIONS
ALL DIMENSIONS SHOWN IN INCHES (mm.)

| | A | B | C | D |
|-----------------|-----------------|----------------|-----------------|----------------|
| THROTTLE TRAVEL | 1-5/8" (41 mm.) | 1-3/8" (35mm.) | 1-1/16" (27mm.) | 13/16" (21mm.) |
| CLUTCH TRAVEL | 3" (76mm.) | 2-1/2" (64mm.) | 1-7/8" (48mm.) | 1-1/4" (32mm.) |

| ITEM | QUANTITY | PART NO. | DESCRIPTION |
|------|----------|-----------|----------------------------------|
| 1 | 1 | 2046-0001 | Frame |
| 2 | 1 | 2046-0002 | Center Cam |
| 3 | 1 | 2046-0003 | Pivot Cam |
| 4 | 1 | 2046-0004 | Retainer |
| 5 | 1 | 2046-0005 | Support |
| 6 | 1 | 2046-0006 | End Plate |
| 7 | 1 | 2046-0007 | Throttle Cam |
| 8 | 1 | 2046-0008 | Link No. 1 |
| 9 | 1 | 2046-0009 | Link No. 2 |
| 10 | 1 | 2046-0010 | Detent Lever |
| 11 | 1 | 2046-0011 | Cam Retainer |
| 12 | 1 | 2046-0012 | Handle |
| 13 | 1 | 2030-0001 | Knob |
| 14 | 1 | 2004-0002 | Dome |
| 15 | 1 | 2046-0015 | Name Plate |
| 16 | 1 | 2046-0016 | Throttle Bushing |
| 17 | 1 | 2046-0017 | Clutch Bushing |
| 18 | 1 | 2046-0018 | Shoulder Bolt |
| 19 | 1 | 2046-0019 | Roller |
| 20 | 1 | 2046-0020 | Frame Pin |
| 21 | 1 | 2046-0021 | Detent Link Pin |
| 22 | 1 | 2046-0022 | Link Pin |
| 23 | 1 | 2046-0023 | Link Solid Pin |
| 24 | 1 | 2046-0024 | Pivot Plate Pin |
| 25 | 2 | 1024-0510 | Spring Pin |
| 26 | 1 | 1016-0804 | Set Screw |
| 27 | 1 | 2046-0027 | Throttle Roller |
| 28 | 1 | 1202-0001 | Spring |
| 29 | 4 | 1029-1025 | Snap Ring |
| 30 | 2 | 1005-0806 | Oval Head Slotted Machine Screw |
| 31 | 4 | 1002-1010 | Socket Head Cap Screw |
| 32 | 4 | 1004-0806 | Round Head Slotted Machine Screw |
| 33 | 2 | 1023-0211 | Washer |
| 34 | 1 | 1001-1136 | Hex Head Cap Screw |
| 35 | 1 | 1024-0816 | Spring Pin |
| 36 | 1 | 1201-0108 | Spring |
| 37 | 2 | 1009-0804 | Flat Head Phillips Machine Screw |
| 38 | 3 | 1003-0806 | Flat Head Slotted Machine Screw |
| 39 | 1 | 1022-0311 | Lock Nut |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

2048 TWIN ENGINE MEDIUM-DUTY DUAL LEVER CONTROL HEAD

KOBELT


DESCRIPTION

The 2048 control head is a twin engine version of the 2046 control head. It has the same features as the 2046 single lever control head, with each of two levers separately controlling each of the twin engines. In order to warm up an engine without gear engagement, a control handle is pulled away from the dome approximately 1/4". This disengages the clutch mechanism and allows engine acceleration. When the control handle is returned to the neutral position, the clutch mechanism is automatically re-engaged.

The control head also provides a detent for each handle in the full throttle position in one direction only (forward). This prevents the engine creeping back, lowering the RPM. By reversing the detent roller and spring assembly, the full speed detent can also be reversed.

IMPORTANT:

Model 2048 is designed to work as a single station unit ONLY. If two stations are to be interconnected, a transfer unit MUST be used. Please consult with Kobelt Mfg. Co.

SPECIFICATIONS

Weight: 14.37 lbs. (6.5 kg)

ORDERING INFORMATION

Model Designation Order Codes:

- K - With chrome finish cover and handles
- L - With satin brass finish cover and handles
- M - With black epoxy finish cover and chrome handles

The Standard Model 2048 Control Head is supplied as follows:

1. With chrome finish handles and cover

To order, state Model Number, followed by desired Model Designation Order Codes listed above.

Example: A standard model 2048 Control Head with chrome finish cover and handles. Order No. **2048-K**.

Patent Pending

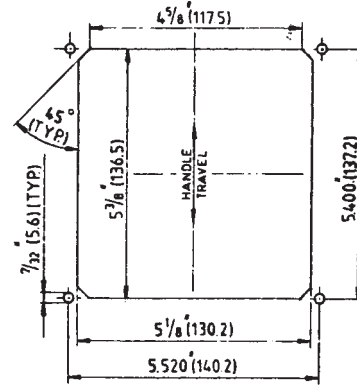
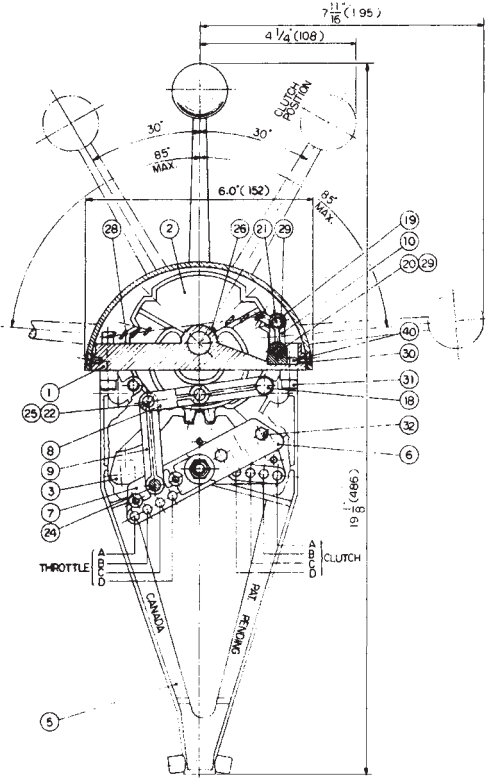
NOTES:

- * Plastic labels are available to indicate Neutral, Forward and Reverse positions, as well as speed scales. Order Part No. **2046-0015**.
- * Cable connector kits are ordered separately. Each push pull cable end attached to the control head requires one kit.

CONNECTION KIT ORDERING INFORMATION

- 2046-0901** No. 10-32 (30 series cable) Connection Kit
- 2046-0902** 1/4"-28 (40 series cable) Connection Kit
- 2046-0903** Neutral Safety Switch Kit

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



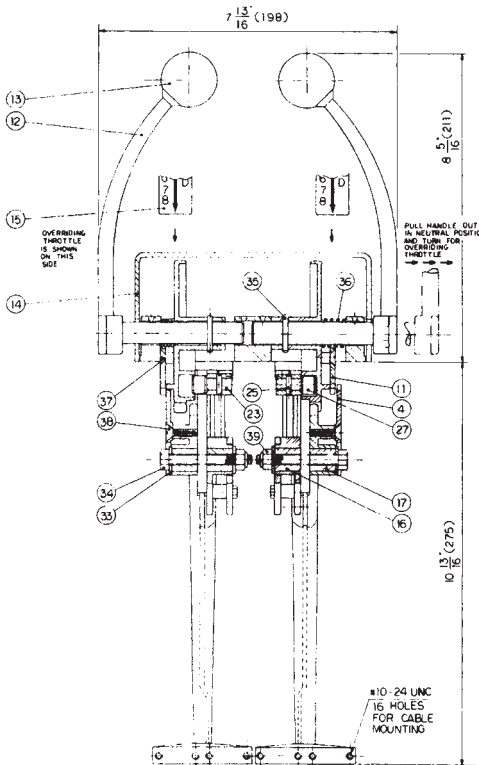
NOTES:

1. Overriding throttle motions are shown on Dwg. C-2046-1001 and C-2046-1002.
2. All dimensions are in inches (mm.)

“CUT OUT” DIMENSIONS

| TRAVEL | CODE NUMBERS | | | |
|-----------------|----------------|----------------|-----------------|----------------|
| | A | B | C | D |
| THROTTLE TRAVEL | 1-5/8" (41mm.) | 1-3/8" (35mm.) | 1-1/16" (27mm.) | 13/16" (21mm.) |
| CLUTCH TRAVEL | 3" (76mm.) | 2-1/2" (64mm.) | 1-7/8" (48mm.) | 1-1/4" (32mm.) |

5



*Optional

| ITEM | QUANTITY | PART NO. | DESCRIPTION |
|------|----------|-----------|----------------------------------|
| 1 | 1 | 2048-0001 | Frame |
| 2 | 2 | 2046-0002 | Center Cam |
| 3 | 2 | 2046-0003 | Pivot Plate |
| 4 | 2 | 2046-0004 | Retainer |
| 5 | 2 | 2046-0005 | Support |
| 6 | 2 | 2046-0006 | End Plate |
| 7 | 2 | 2046-0007 | Throttle Cam |
| 8 | 2 | 2046-0008 | Link No. 1 |
| 9 | 2 | 2046-0009 | Link No. 2 |
| 10 | 2 | 2046-0010 | Detent Lever |
| 11 | 2 | 2046-0011 | Cam Retainer |
| 12 | 2 | 2046-0012 | Handle |
| 13 | 2 | 2030-0001 | Black Knob |
| 14 | 1 | 2004-0002 | Dome |
| 15* | 2 | 2046-0015 | Name Plate |
| 16 | 2 | 2046-0016 | Throttle Bushing |
| 17 | 2 | 2046-0017 | Clutch Bushing |
| 18 | 2 | 2046-0018 | Shoulder Bolt |
| 19 | 2 | 2046-0019 | Detent Roller |
| 20 | 1 | 2048-0006 | Pillow Block Pin |
| 21 | 2 | 2046-0021 | Detent Link Pin |
| 22 | 2 | 2046-0022 | Link Pin |
| 23 | 2 | 2046-0023 | Link Solid Pin |
| 24 | 2 | 2046-0024 | Pivot Plate Pin |
| 25 | 4 | 1024-0510 | Spring Pin |
| 26 | 2 | 1016-0804 | Set Screw |
| 27 | 2 | 2046-0027 | Throttle Roller |
| 28 | 2 | 1202-0002 | Spring |
| 29 | 6 | 1029-1025 | Snap Ring |
| 30 | 2 | 1005-0808 | Oval Head Slotted Machine Screw |
| 31 | 8 | 1002-1010 | Socket Head Cap Screw |
| 32 | 8 | 1001-0808 | Hex Head Cap Screw |
| 33 | 4 | 1023-0238 | Washer |
| 34 | 2 | 1001-1136 | Hex Head Cap Screw |
| 35 | 2 | 1024-0816 | Spring Pin |
| 36 | 2 | 1201-0108 | Spring |
| 37 | 4 | 1009-0806 | Flat Head Phillips Machine Screw |
| 38 | 6 | 1009-0808 | Flat Head Phillips Machine Screw |
| 39 | 2 | 1022-0311 | Lock Nut |
| 40 | 1 | 2048-0005 | Pillow Block |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL 7168 RUDDER ANGLE FEEDBACK UNIT

HOBELT

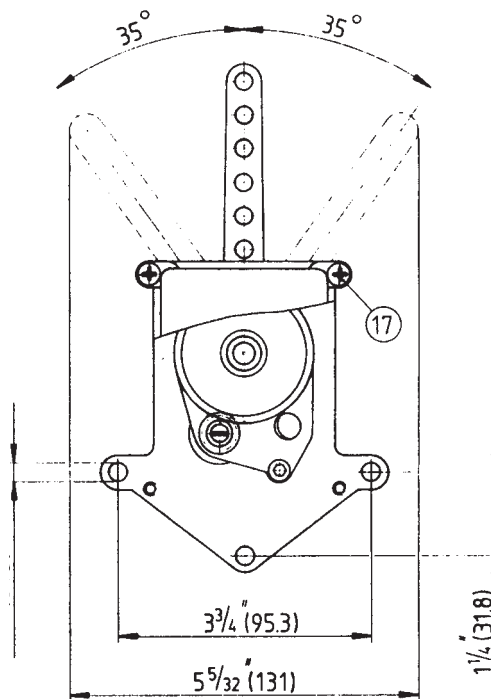
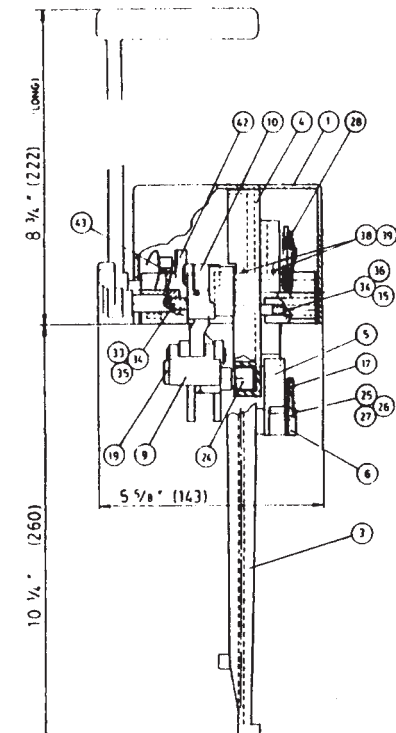


| ITEM | QUANTITY | PART NO. | DESCRIPTION |
|------|----------|------------|-----------------------------------|
| 1 | 1 | 7168-0001 | Frame |
| 2 | 1 | 7168-0002 | Cover |
| 3 | 1 | 7168-0003 | Plate |
| 4 | 1 | 7168-0004 | Gasket |
| 5 | 1 | 7168-0005 | Bushing |
| 6 | 1 | 7168-0006 | Shaft |
| 7 | 3 | 7174-0008 | Spacer |
| 8 | 1 | 6001-0248 | Gland |
| 9 | 1 | 7170-0010 | Spur Gear |
| 10 | 1 | Y-3216 | Gear |
| 11 | 1 | 2104-0006 | Lever |
| 12 | 1 | 6657-1-102 | Potentiometer |
| 13 | 3 | 1002-0822 | Hex Socket Head Cap Screw |
| 14 | 1 | 1016-0804 | Hex Socket Set Screw |
| 15 | 1 | 1016-0602 | Hex Socket Set Screw |
| 16 | 1 | 1001-0814 | Hex Head Cap Screw |
| 17 | 4 | 1010-0806 | Round Phillips Head Machine Screw |
| 18 | 2 | 1024-1512 | Spring Pin |

DESCRIPTION

This small version of a rudder angle feedback unit, with its all bronze and stainless steel construction, is available with one or two potentiometers. Its compact design and watertight construction will allow it to be installed in very tight quarters. Because of the non-corrosive construction, it is intended for a saltwater environment. Its uses are to give a rudder angle position feedback signal to an autopilot, angle indicator or electronic steering components.

5



ORDERING INFORMATION

- 7168-P 1 Potentiometer
- 7168-PP 2 Potentiometers

Standard potentiometers are 1K.

3 Pillars also available.
Order Part No. 7168-1001.

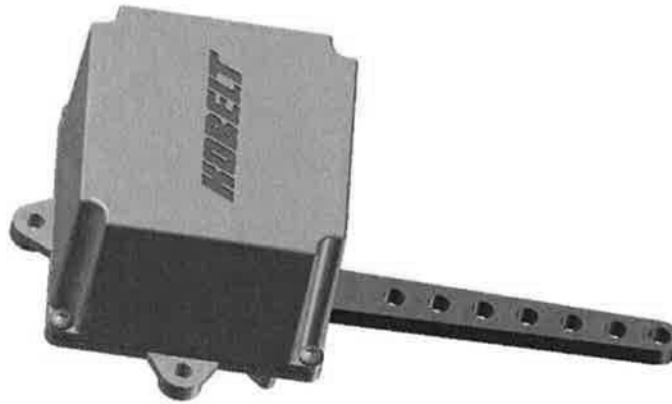
Model 7174 (not shown)
Rudder Angle Feedback Unit
is available with up to
3 potentiometers, 3 trim pots,
and 4 microswitches.

ALL DIMENSIONS SHOWN IN INCHES (mm.)

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

KOBELT

MODEL 7163 RUDDER FEEDBACK UNIT



5

This unit is compact version of the series of rudder angle indicators. It is designed to be mechanically connected to the rudder stock. Its purpose is to feed back the rudder angle position to such items as the Auto Pilot, Full Follow Up control systems and Rudder Angle Indicators. This unit is available with up to 3 potentiometers and 2 micro switches. As all Kobelt products do, this product is constructed of bronze and stainless steel which is well suited for the marine environment.

Approx. weight: 4.5 lb (2 kg)

ORDERING INFORMATION

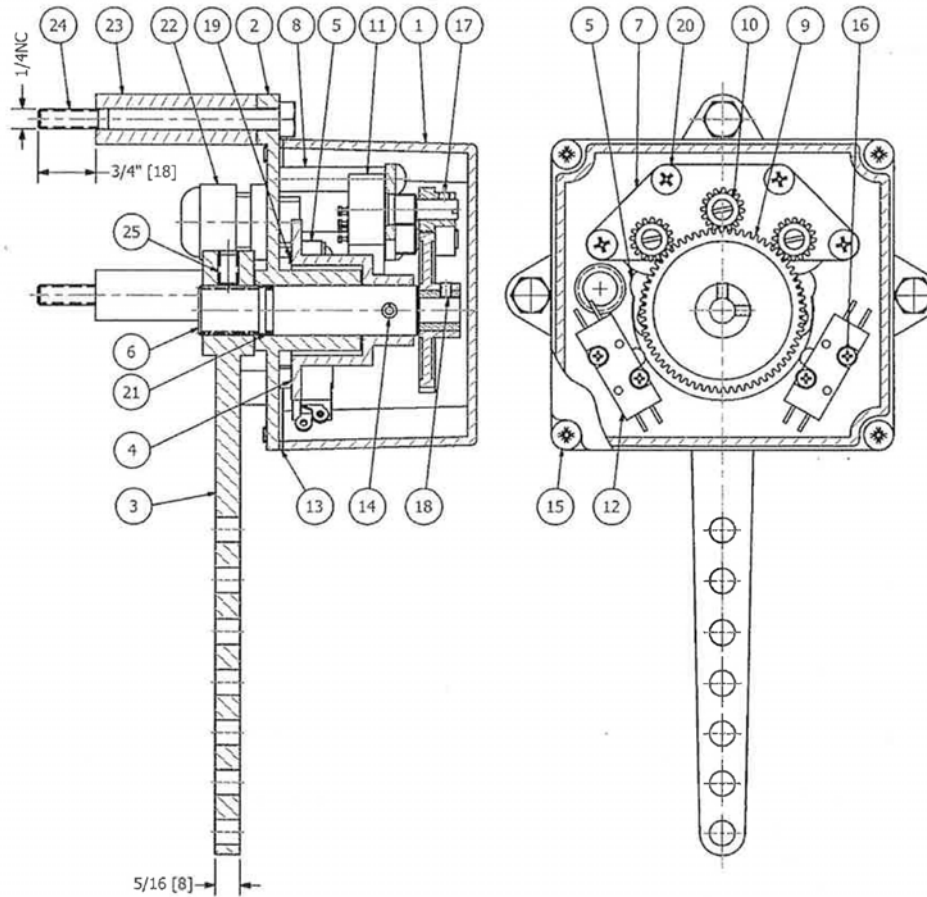
- A 2 Switches and 1 Potentiometer
- B 2 Switches and 2 Potentiometers
- C 2 Switches and 3 Potentiometers
- P 1 Potentiometer

e.g. 7163-C
2 switches and 3 potentiometers

Note: Ohms rating for potentiometer must be specified when ordering. Standard rating is 1 K-ohm.

MODEL 7163 RUDDER FEEDBACK UNIT

DIMENSIONS AND PARTS LIST MODEL 7163



| ITEM | QTY | PART NUMBER | DESCRIPTION | ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|------------------|------|-----|-------------|------------------|
| 1 | 1 | 7163-0001 | Housing | 14 | 1 | 1024-0814 | Spring Pin |
| 2 | 1 | 7163-0002 | Cover | 15 | 4 | 1012-0806 | Pan Head Screw |
| 3 | 1 | 7163-0003 | Lever | 16 | 4 | 1006-0310 | Round Head Screw |
| 4 | 1 | 7163-0004 | Cam Plate | 17 | 6 | 1038-0602 | Set Screw |
| 5 | 2 | 7163-0005 | Cam | 18 | 2 | 1016-0603 | Set Screw |
| 6 | 1 | 7163-0006 | Shaft | 19 | 4 | 1012-0606 | Pan Head Screw |
| 7 | 1 | 7163-0007 | Plate | 20 | 4 | 1010-0828 | Round Head Screw |
| 8 | 4 | 7163-0008 | Spacer | 21 | 1 | 1101-0014 | "O" Ring |
| 9 | 1 | YPB-3264 | Gear 32-64 | 22 | 2 | 6001-0248 | Cable Gland |
| 10 | 3* | Y-3216 | Gear 32-16 | 23 | 3 | 7174-0009 | Spacer |
| 11 | 3* | POT-1 | Potentiometer 1K | 24 | 3 | 1001-1048 | Hex Bolt |
| 12 | 2 | 6001-0104 | Micro Switch | 25 | 1 | 1016-1006 | Set Screw |
| 13 | 1 | 7163-0009 | Gasket | | | | |

5

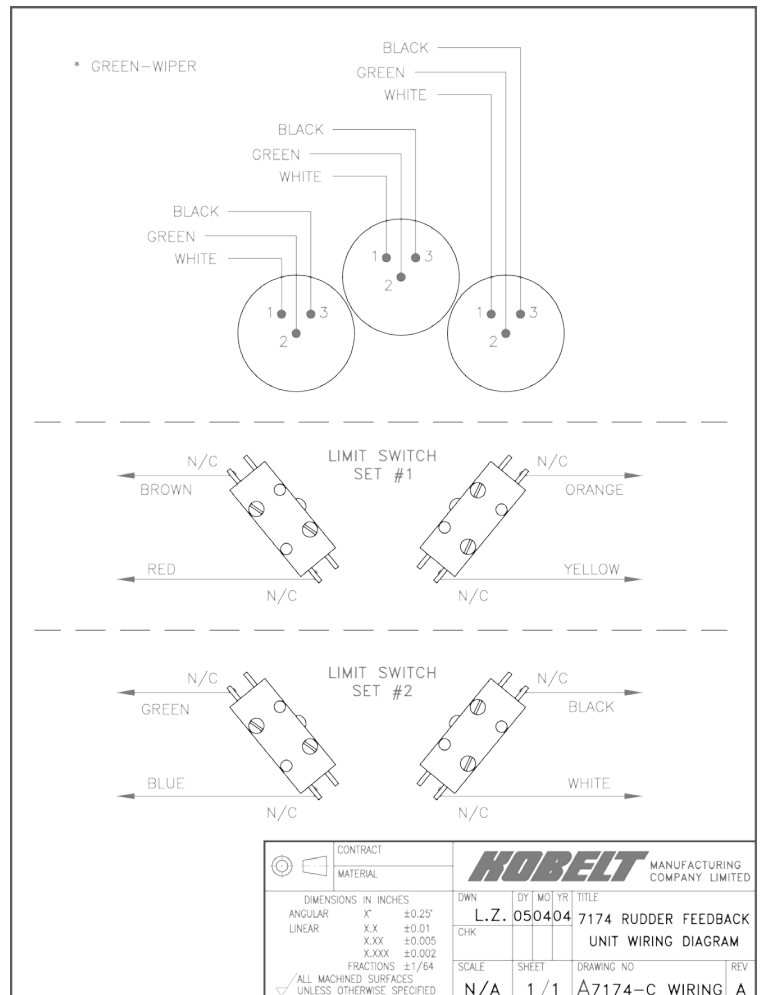
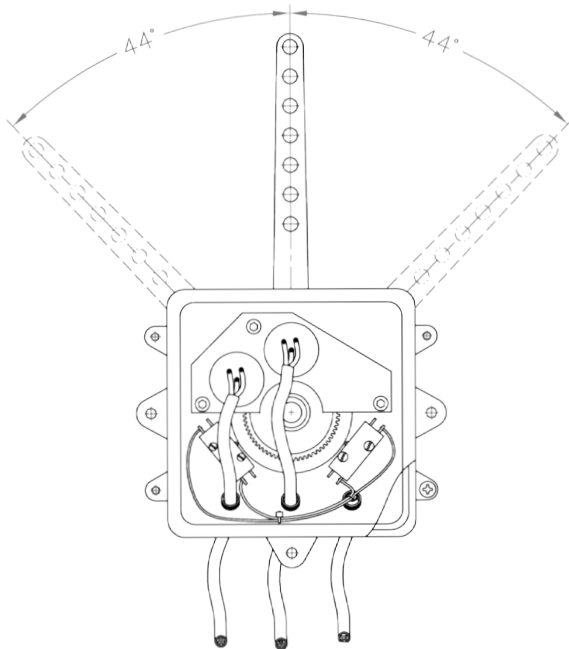
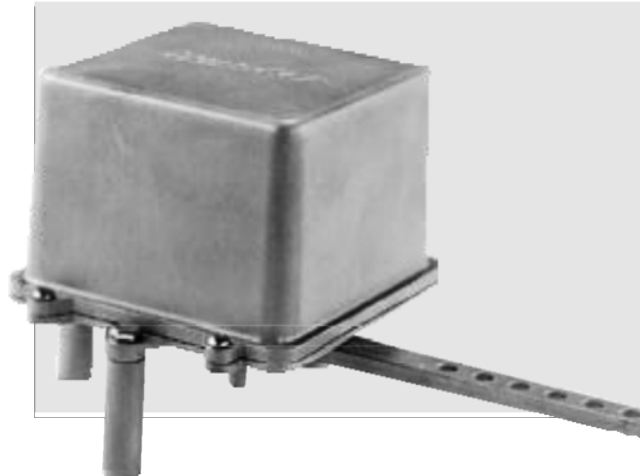
MODEL 7174 RUDDER ANGLE FEEDBACK UNIT

This unit is designed to be mechanically connected to the rudder stock. Its purpose is to feed back the rudder angle position to such items as Auto Pilot, Full Follow Up control systems and Rudder Angle indicator. The 7174 is available with up to 3 Potentiometers, 3 Trim Pots and 4 Microswitches. It is constructed of bronze and stainless steel and will withstand vibration and corrosion for years. It is available with fittings for oil-filled applications.

weight 6.6 lbs. (3.0 kg)

ordering information

- A 2 switches & 1 potentiometer
- B 2 switches & 2 potentiometers
- C 2 switches & 3 potentiometers
- D 1 trim pot
- E 2 trim pots
- F 3 trim pots
- G 4 switches
- e.g. 7174-CE



MODEL 7175 RUDDER INDICATOR

KOBELT



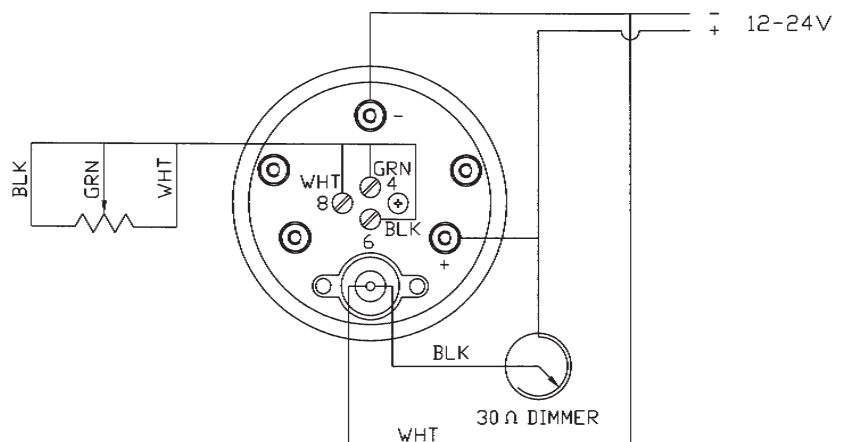
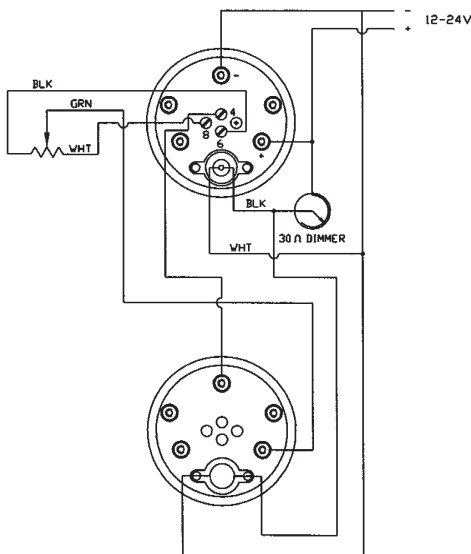
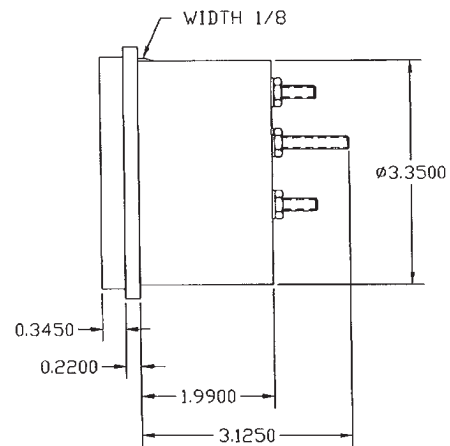
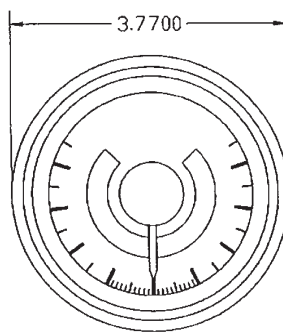
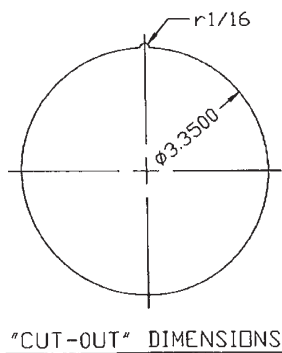
The 7175 rudder indicator system will continuously monitor and indicate the position of your rudder.

Whether you are manoeuvring, power steering or changing course, an accurate readout of the rudder position will be shown on a three inch, three colour display.

The basic system consists of a 7175-M Master Station, and a Kobelt 7174 Feed Back Unit. Up to five additional "repeater stations" can be installed by using the 7175-S repeater.

Both the master and repeater have a backlit translucent display and are waterproof on the front face.

Up to 5 remote stations may be connected in series.



5

KOBELT

MODEL 7170 JOG LEVER



Specifications

Weight: 2.1 lbs. (0-95 kg)

Materials: Die cast silicone bronze and stainless steel hardware

Ordering Information

Model Designations

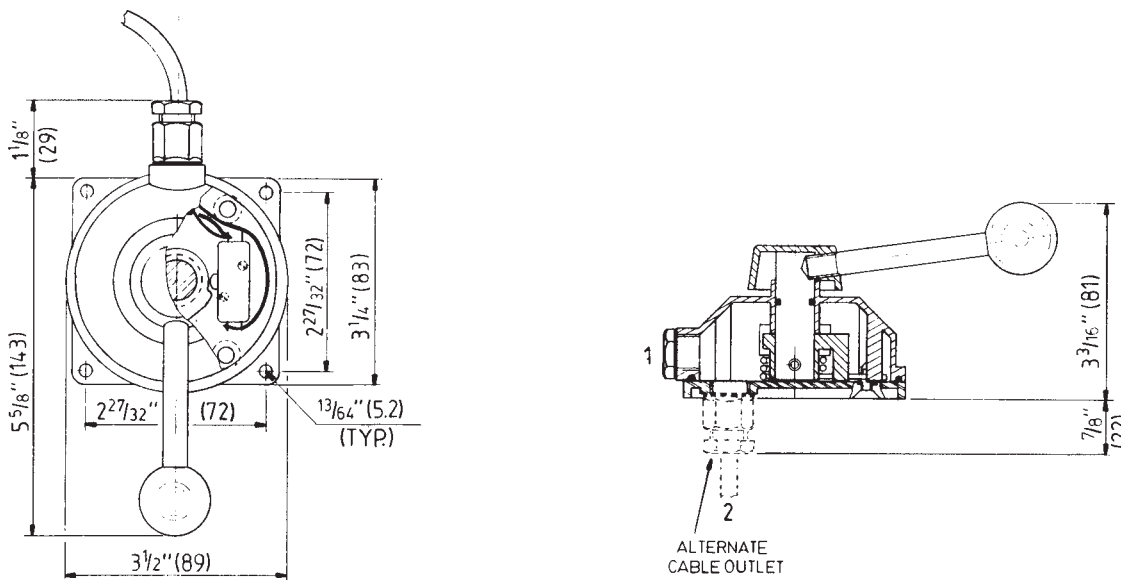
- A Black epoxy base with chrome hub
- B All black epoxy
- C All chrome
- D All polished bronze
- 1 Cable leading straight out (see diagram below)
- 2 Cable leading down (see diagram below)

Example: Model **7170** with black epoxy base, chrome hub and the cable leading straight out: **7170-A1**.

DESCRIPTION

This Jog Lever is used in power hydraulic steering systems. The operator can maneuver the boat by simply jogging the lever for port or starboard movement. The unit is operated by two internal microswitches. Its watertight construction in bronze and stainless steel will ensure years of trouble free operation. The Jog Lever will override the steering wheel, however it will not cause any interference should the power hydraulics fail.

Various finishes are available and the unit can be ordered with the cable running straight out or down. The cable configuration can easily be changed in the field.



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

5

MODEL 7171 CONTROL LEVER LEVER *KOBELT*



The Model 7171 is manufactured in all bronze and stainless steel, and is suited for installation anywhere on the ship. Its watertight construction will not allow seaspray to enter the unit.

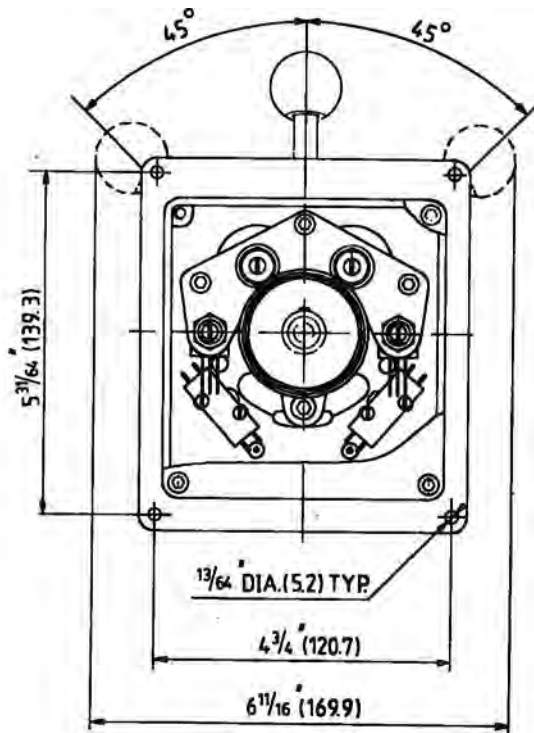
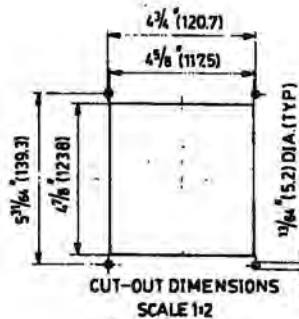
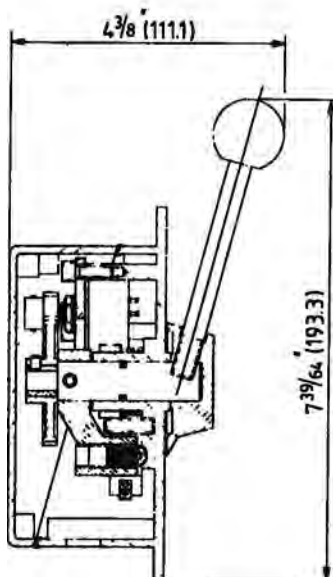
This control device is a full follow-up rudder control. It is equipped with a detent in mid-handle position; the straight-ahead position. Moving the control lever to either port or starboard will cause the rudder to follow proportionately. In order to complete a system of this nature, a feedback device connected with a link to the rudder stock, such as our Model 7174, and an electronic interface will then give the operator complete control over the rudder. This is possible at all times since the control lever and the 7171 correspond with the rudder position.

The 7171 is available with 2 Microswitches (1 per side), 2 Potentiometers and 2 Trim Pots. The 7171 is also available as a Jog Lever with 2 Microswitches per side.

Ordering Information

- A 2 switches & 1 potentiometer
- B 2 switches & 2 potentiometers
- G 4 switches
- P 1 potentiometer

OHMS rating for potentiometer must be specified when ordering. A trim pot will be supplied with each potentiometer.



MODEL 7165 COMPACT SINGLE AXIS JOY STICK



Shown with potentiometer



Shown with switch

This unit is especially designed to control positioning devices for either on/off or infinite positioning. It can be equipped with either 2 micro switches or a potentiometer. The micro switches would give an off/on signal in either direction while the potentiometer can provide infinite control in both directions. This unit is available either with spring return or with detent and/or friction. The potentiometer is available in either 1K or 5K ohms. The entire unit is constructed

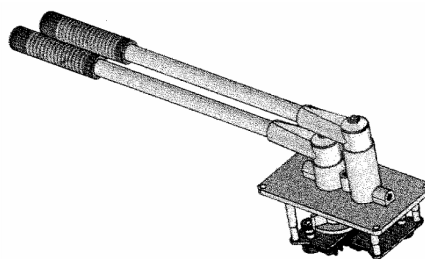
mainly in bronze and stainless steel. Its compact design allows the unit to be installed on virtually any small space.

OPTIONS

- A Detent
- B Spring Return
- C Terminal Strip
- D 1K Potentiometer
- H Jog Switches
- W Friction

Approx. weight: 1 lb. (0.5 kg)

STACKED FFU LEVER CONTROLLER

HOBELT


This dual stacked lever controller provides full follow up control of the dual steering gear systems commonly found on Push Boats. These vessels are a regular sight on the Mississippi and adjoining river systems. One steering gear controls the steering rudders aft of the propellers and the other the flanking rudders forward of the propellers.

The 7195 is intended for use with electric over hydraulic steering systems. To complete the systems, a 7173-K steering amplifier, steering (directional control) solenoid valve and Rudder feedback unit complete with potentiometers and limit switches such as our 7174-A is required for each gear. For systems with more than one station, a transfer box and station selector switches at each station are also required

Operating the FFU lever controller allows the hydraulic steering gear to move in the desired direction. When the handle is released, the FFU lever stays in that position (does not spring back to center) and the steering gear will continue to move ("FOLLOWING UP") until it reaches that predetermined position, at which point the amplifier will stop the steering gear from moving further and holds at that position. The position of the rudders is proportional to the position of the FFU lever. Returning the lever to midship will cause the steering gear to "FOLLOW UP" to the midship position and stop and stay there until the next signal is given.

The 7195 is available with one potentiometer for each handle with a maximum of two potentiometers per handle and each handle includes a friction tensioning device. The top handle (usually for the flanking rudder system) also comes with a center detent. The standard handle length is 16" (18" from center of hub) but can be made shorter or longer on request. The controller (with the exception of switches and potentiometers) is constructed entirely of die cast bronze complemented by stainless steel hardware for longevity in a marine environment.

CAUTION Before selecting FFU mode of steering control at a given station, align the steering lever with the position of the rudder. The lever must be within a few degrees of the rudder before selecting FFU mode at that station. The helm order indicator and rudder angle indicator must match before selecting FFU mode control.

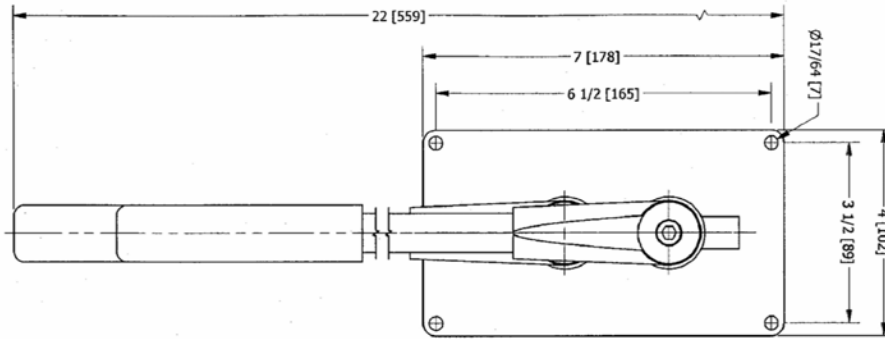
Net weight: 9.5 lbs. (4.3 kg) approx.

Dimensions: see other page

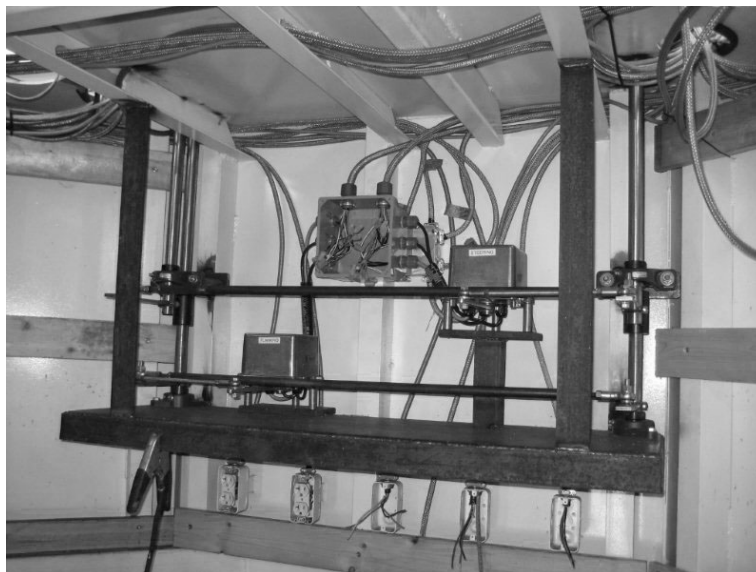
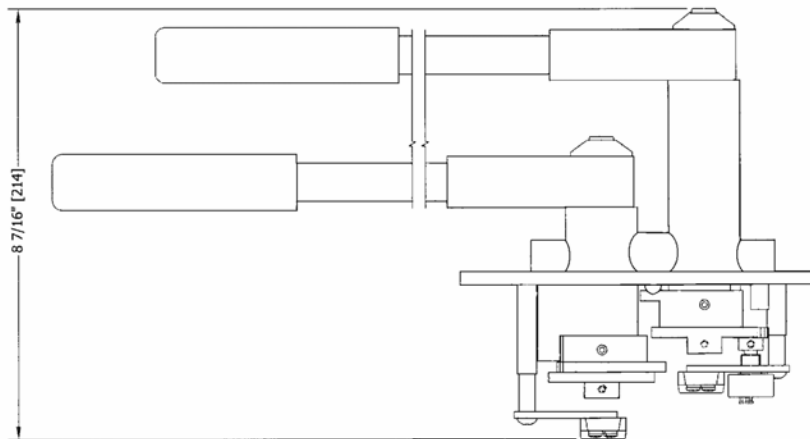
Options: finish – black or chrome

No. of potentiometer – one (standard) or PP - two potentiometer per handle

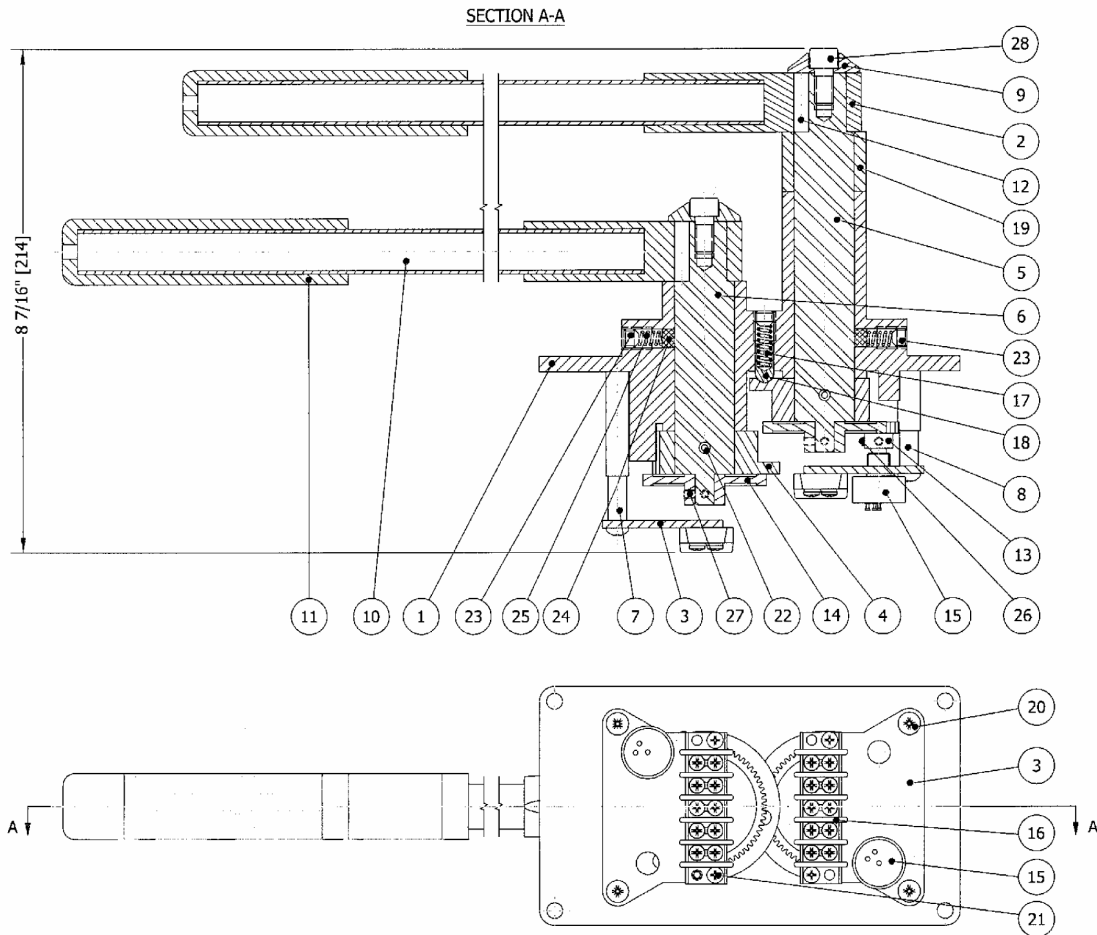
KOBEL STACKED FFU LEVER CONTROLLER



Dimensions are in inches [mm]



STACKED FFU LEVER CONTROLLER *HOBELT*



| Item | Qty | Part No. | Description | Item | Qty | Part No. | Description |
|------|-----|-----------|----------------|------|-----|-----------|----------------------|
| 1 | 1 | 7195-0001 | Body | 15 | 2 | POT-1 | Potentiometer 1K |
| 2 | 2 | 7195-0002 | Handle | 16 | 2 | 6009-0005 | Terminal block |
| 3 | 2 | 7195-0003 | Bracket | 17 | 1 | 1201-0062 | Spring |
| 4 | 2 | 7195-0004 | Cam | 18 | 1 | 2012-0007 | Detent plunger |
| 5 | 1 | 7195-0005 | Shaft - long | 19 | 1 | 7195-0013 | Spacer |
| 6 | 1 | 7195-0006 | Shaft - short | 20 | 4 | 1010-0820 | Round head screw |
| 7 | 2 | 7195-0007 | Spacer - long | 21 | 4 | 1012-0606 | Pan head screw |
| 8 | 2 | 7195-0008 | Spacer - short | 22 | 2 | 1024-0824 | Spring Pin |
| 9 | 2 | 7195-0009 | Handle cap | 23 | 3 | 1016-1104 | Set screw |
| 10 | 2 | 7195-0010 | Handle tube | 24 | 2 | 2016-0011 | Friction plug |
| 11 | 2 | 7195-0011 | Handle grip | 25 | 2 | 1201-0002 | Spring |
| 12 | 2 | 7195-0012 | Key | 26 | 4 | 1016-0602 | Setscrew |
| 13 | 2 | Y-3220 | Brass gear | 27 | 4 | 1016-0603 | Setscrew |
| 14 | 2 | .YPB-3264 | Gear | 28 | 2 | 1002-1110 | Hex socket cap screw |

5

KOBELT **MODEL 7173-K ELECTRONIC FULL FOLLOW-UP AMPLIFIER**



5

Weight: 5.5 lbs (2.5 kg)

This unit is designed to accept the command signal from our Models 7165, 7166, 7167, 7169, 7171, 7175 and 7176, and coordinates the desired rudder position with our feedback unit Models 7168 and 7174. Fluid flow control models 7144, 7145 and 7148 are equipped with solenoid valves and, when activated by the Model 7173-K, will disperse hydraulic fluid to the hydraulic steering system to maintain the desired position.

The device can be located anywhere aboard ship, even in the steering compartment, because of its watertight and non-corrosive enclosure that can protect the internal electronics from the effect of the environment.

The Model 7173-K is a multi-optional driver board (12- or 24-Volt DC) which can control

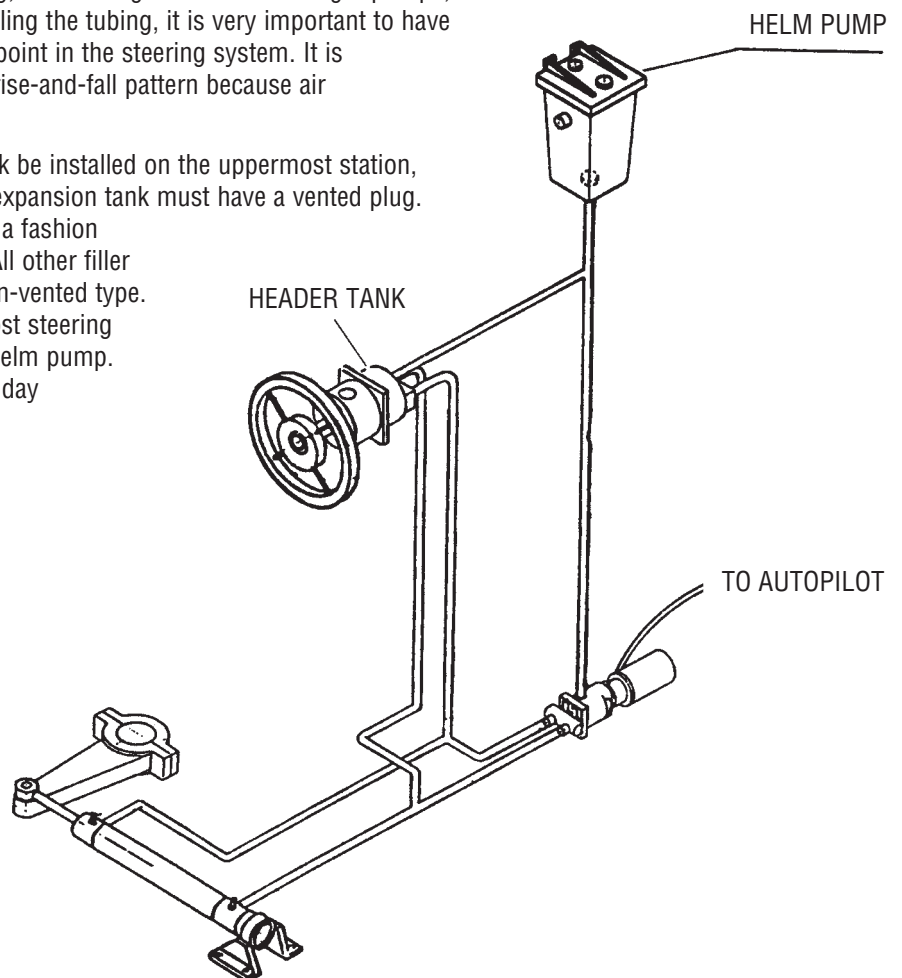
1. Single speed steering system
2. Dual speed steering system
3. Two independent steering systems controlled by the same controller (This is ideal for catamaran steering because of its electronic tie bar capability)
4. Two independent hydraulic systems, i.e. steering and bucket control

It can also be easily changed in the field.

KOBELT

Basic Installation Instructions for Helm Pumps

1. It is important to ensure that the steering wheel can be operated without any interference. The Helm Pump must be mounted on a secure structure that will support the helmsman in a rough sea without the pump breaking loose. It is also recommended to have access to the connecting lines on the rear of the pump and the flow adjustment on the face of the pump, as well as the filler plug front and back.
2. During installation, it is of utmost importance to keep dirt and foreign matter out of the system. **Cleanliness is extremely important.**
3. We do not recommend the use of Teflon tape for pipe sealing. This often rolls over the edge of the fitting and is cut off on installation; it then floats in the system. It is recommended that liquid Teflon sealant or its equivalent be used. It is easier to ensure that none of this type of sealant gets in the system.
4. Copper or stainless steel tubing is preferred for the piping material. The tubing should be of fairly large inside diameter to avoid excessive friction in the hydraulic system, especially in cold weather environments. Depending on the number of stations, the length of runs and the size of the helm pump, the piping must be chosen accordingly. We recommend a minimum of 1/2" I.D. tubing, but on long runs and with larger pumps, 3/4" I.D. tubing is recommended. When installing the tubing, it is very important to have a steady rise in the lines towards the highest point in the steering system. It is very difficult to bleed a tubing system with a rise-and-fall pattern because air gets trapped in the elevated pockets.
5. It is also recommended that an expansion tank be installed on the uppermost station, to provide an additional reservoir of oil. This expansion tank must have a vented plug. The plug, however, must be arranged in such a fashion that water cannot enter the steering system. All other filler plugs on the steering stations must be the non-vented type. If an expansion tank is not used, the uppermost steering station must have a vented filler plug on the helm pump. This is to allow the oil to expand during a hot day and contract when the temperature declines.



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HYDRAULIC STEERING TECHNICAL DATA SHEET

KOBELT

To properly size the steering system require for your vessel, please fill out the following accurately.

Customer Name _____ Date _____

Address _____ Phone _____

_____ Fax _____

Signature _____

Vessel Name _____

Vessel Length _____

Vessel Type (Power, Sail, Workboat, etc.)

Hull type Planing Displacement Sail

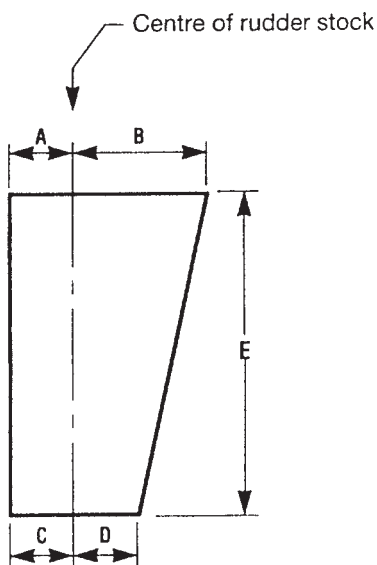
Maximum speed _____

Number of rudders _____

Degree of rudder angle 2x _____

Please specify other details (Nozzle, Tunnel, etc.) _____

Dimensions and counter balance of rudder, **provide sketch as per sample:**



Unit of measure mm. inches (circle one)

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Kobelt Manufacturing produces three different Helm Pumps, all of which are made from bronze and stainless steel, with the exception of the thrust and roller bearings and, of course, hardened and ground pistons. These Helm Pumps can be installed in **any** location on the vessel because of their durable materials and watertight construction.

The Helm Pumps incorporate lock valves, filler plugs and interconnecting plugs for multi-station applications. A front mounting plate is available for all pumps (optional) where the pump is mounted behind the console face. The following Kobelt Hydraulic Pumps are based on the same design and are of the VARIABLE DELIVERY TYPE. The delivery of these pumps is fully adjustable, with easy-to-alter output flow as simple as turning an external adjusting screw on the pumps' front face with a standard screwdriver.

| | |
|------------|---|
| Model 7003 | 1 - 3 cu. inches displacement per turn |
| Model 7005 | 2 - 6 cu. inches displacement per turn |
| Model 7012 | 4 - 12 cu. inches displacement per turn |

Helm Pump volumes are nominal

These pumps have been extremely well received by the industry, because of their variable displacement capability, which allows the operator to select the number of turns from hardover to hardover, without installing a different pump.

One must remember, however, that producing 12 cubic inches per turn at 600 to 1000 PSI requires a tremendous amount of human effort, and it is not practical to expect a person to produce this kind of pressure and volume continuously.

Ordering Options

- A Bronze Finish
- B Black Epoxy Finish
- L Long Shaft
- N Short Shaft
- P Porting Block (no lock valve)
- T Tapered Shaft

"T" is standard with 7003, optional with 7005. Mounting plates can be ordered as well. They should be ordered with the pump number plus -0011. A letter would then be added for finish, e.g. 7003-0011B = Black mounting plate for 7003 pump.

KOBELT

Kobelt Model 7035 Tilt Up Steering

This patented Kobelt design eliminates the universal joint – instead the whole helm pump moves with the wheel when rotated up or down so you don't need to worry about leaks or failures.

The tilting mechanism provides 5 locking positions at 10° increments with a total rotation of 50°. This unit is available with helm pumps Model No. 7031 or Model No. 7004.

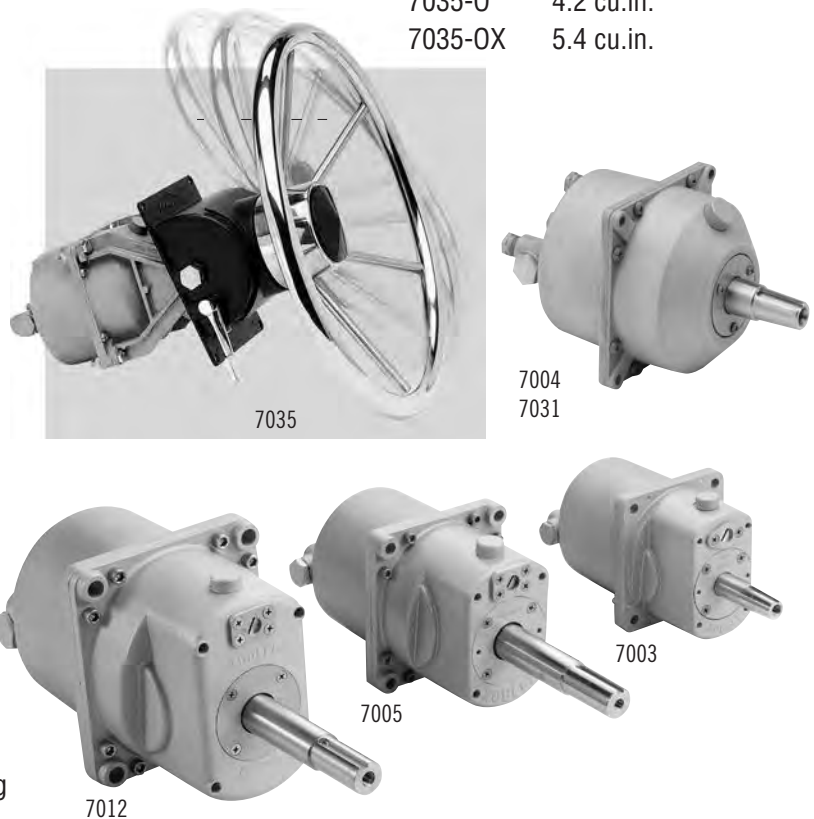
The 7031 has 2 cu.in. or (7031-X) 2.6 cu.in. volume per turn and our Model No. 7004, which has a nominal volume of 4.2 or (7004-X) 5.4 cu.in. per turn.

The tilt up mechanism and the helm pumps are constructed in bronze with stainless steel hardware.

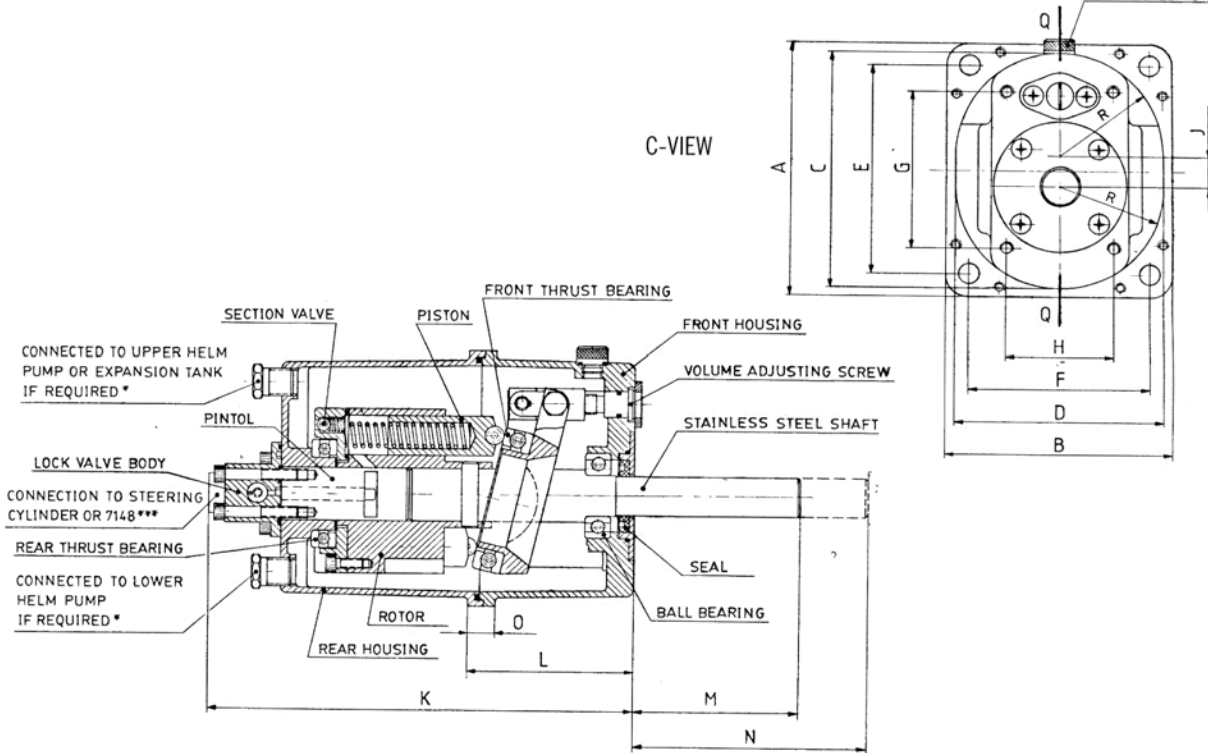
Due to the simplified construction and selection of superb materials, this pump will outlast any other product on the market 10 to 1.

Options

| | |
|---------|------------|
| 7035 | 2 cu.in. |
| 7035-X | 2.6 cu.in. |
| 7035-O | 4.2 cu.in. |
| 7035-OX | 5.4 cu.in. |



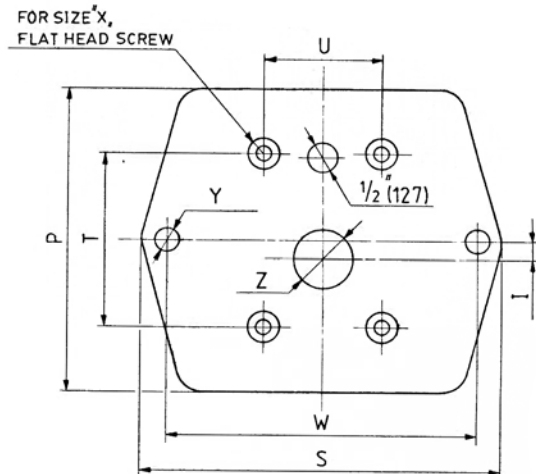
TOP STATION MUST HAVE VENTED FILLER PLUG IF PUMP IS NOT CONNECTED TO EXPANSION TANK**



| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
|-------------------|--|--|--|---|--|--|--|---|---|--|---|---|---|--|--|--|
| Model 7003 | 4 ⁷ / ₈ " (123.8) | 4 ¹ / ₄ " (108) | 4 ¹⁷ / ₃₂ " (115.1) | 3 ⁵⁹ / ₆₄ " (99.6) | 4" (101.6) | 3 ³ / ₈ " (85.7) | 3" (76.2) | 2" (50.8) | 1 ⁹ / ₆₄ " (7.5) | 1 ⁹ / ₃₂ " (15.1) | 7 ⁷ / ₈ " (200) | 3" (76.2) | 1 ¹ / ₂ " (38.1) | 2 ¹ / ₂ " (63.5) | 1 ⁷ / ₃₂ " (13.5) | 5 ¹ / ₄ " (133.4) |
| Model 7005 | 5 ³ / ₈ " (136.6) | 5" (127) | 5" (127) | 4 ⁵ / ₈ " (117.5) | 4 ⁵ / ₈ " (117.5) | 4 ¹ / ₄ " (108) | 3 ¹ / ₄ " (82.6) | 2 ¹ / ₂ " (63.5) | 3 ³ / ₁₆ " (4.8) | 3 ³ / ₈ " (9.5) | 9 ¹ / ₄ " (235) | 4 ¹ / ₁₆ " (103.2) | 2 ¹ / ₂ " (63.5) | 5" (127) | 7 ⁷ / ₈ " (22.2) | 6" (152.4) |
| Model 7012 | 7" (177.8) | 6 ¹ / ₄ " (158.8) | 6 ¹ / ₂ " (165.1) | 5 ³ / ₄ " (146.1) | 6" (152.4) | 5 ¹ / ₄ " (133.4) | 4 ³ / ₈ " (111.1) | 3 ¹ / ₄ " (82.6) | 3 ³ / ₈ " (9.5) | 3 ³ / ₄ " (19.1) | 11 ¹ / ₈ " (282.6) | 5" (127) | 2 ⁵ / ₈ " (66.7) | 5 ¹ / ₈ " (130.2) | 1 ¹ / ₁₆ " (27) | 7 ⁵ / ₈ " (193.7) |

| | R | S | T | U | W | X | Y | Z |
|-------------------|---|--|--|---|--|---|--|---|
| Model 7003 | 1 ³¹ / ₃₂ " (50) | 6 ¹ / ₈ " (155.6) | 3" (76.2) | 2" (50.8) | 5 ¹ / ₄ " (133.4) | 1 ¹ / ₄ " (6.4) | 1 ³ / ₃₂ " (10.3) | 1" (25.4) |
| Model 7005 | 2 ⁵ / ₁₆ " (537) | 8 ¹ / ₄ " (209.6) | 3 ¹ / ₄ " (82.6) | 2 ¹ / ₂ " (63.5) | 7" (177.8) | 5 ⁵ / ₁₆ " (7.9) | 1 ¹ / ₂ " (12.7) | 1 ¹ / ₄ " (31.8) |
| Model 7012 | 2 ⁷ / ₈ " (73) | 9 ¹ / ₂ " (241.3) | 4 ³ / ₈ " (111.1) | 3 ¹ / ₄ " (82.6) | 8 ¹ / ₄ " (209.6) | 3 ³ / ₈ " (9.5) | 1 ¹ / ₂ " (12.7) | 1 ¹ / ₄ " (31.8) |

| THREAD SIZE | | | |
|-------------------|---------------|------------|----------------|
| | * | ** | *** |
| Model 7003 | 1/4 N.P.T. | 1/2 UNF | 1/2 O-RING |
| Model 7005 | 1/4 N.P.T. | 5/8 UNF | 9/16 O-RING |
| Model 7012 | 1/4 N.P.T. | 5/8 UNF | 7/8 O-RING |



HOBELT

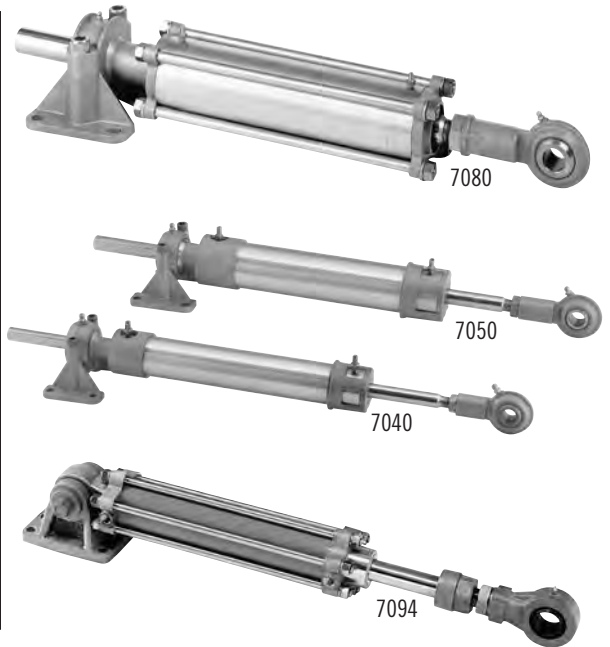
STEERING CYLINDERS

BALANCED CYLINDERS
RUDDER ANGLE (RA) 35°

| MODEL | TORQUE | | STROKE | | DISPLACEMENT | | A | | B | | C | | D | | E | | F | | G | | H | |
|-------|----------|------|--------|-------|-----------------|-----------------|------|-----|-------|------|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|------|
| | lbs. ft. | kgm | in | mm. | in ³ | cm ³ | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. |
| 7040 | 428 | 57 | 5.5 | 139.7 | 8 | 131 | 2.75 | 70 | 18.04 | 458 | 4.79 | 122 | 4.31 | 109 | 16.5 | 419 | | | | | | |
| | 652 | 90 | 7.5 | 191 | 11 | 180 | 3.75 | 95 | 22.04 | 560 | 6.54 | 166 | 5.95 | 151 | 19.50 | 495 | 2 | 51 | 3.187 | 81 | 11/32 | 8.7 |
| | 869 | 120 | 10 | 254 | 14.6 | 239 | 5 | 127 | 27.04 | 687 | 8.72 | 221 | 7.93 | 201 | 23.25 | 591 | | | | | | |
| | 1205 | 167 | 7.5 | 191 | 20.3 | 333 | 3.75 | 95 | 23.75 | 603 | 6.54 | 166 | 5.95 | 151 | 20.85 | 530 | | | | | | |
| 7050 | 1607 | 223 | 10 | 254 | 27 | 442 | 5 | 127 | 28.75 | 730 | 8.72 | 221 | 7.93 | 201 | 24.60 | 625 | 2.5 | 64 | 3.625 | 92 | 25/64 | 9.9 |
| | 1928 | 267 | 12 | 305 | 32.4 | 531 | 6 | 152 | 32.75 | 832 | 10.46 | 266 | 9.51 | 242 | 27.6 | 701 | | | | | | |
| | 2454 | 340 | 10 | 254 | 41 | 672 | 5 | 127 | 30.27 | 769 | 8.72 | 221 | 7.93 | 201 | 28.11 | 714 | | | | | | |
| 7065 | 2944 | 407 | 12 | 305 | 49 | 803 | 6 | 152 | 34.27 | 870 | 10.46 | 266 | 9.51 | 242 | 31.11 | 790 | 3 | 76 | 4 | 102 | 1/2 | 13 |
| | 3926 | 543 | 16 | 406 | 66 | 1082 | 8 | 203 | 42.27 | 1074 | 13.95 | 354 | 12.69 | 322 | 37.11 | 943 | | | | | | |
| 7080 | 2603 | 359 | 7.5 | 191 | 43.8 | 718 | 3.75 | 95 | 26.82 | 681 | 6.54 | 166 | 5.95 | 151 | 26.25 | 667 | | | | | | |
| | 3493 | 482 | 10 | 254 | 58.4 | 958 | 5 | 127 | 31.82 | 808 | 8.72 | 221 | 7.93 | 201 | 30.00 | 762 | 4 | 102 | 4.875 | 124 | 21/32 | 16.7 |
| | 4170 | 577 | 12 | 305 | 70.1 | 1149 | 6 | 152 | 35.82 | 910 | 10.46 | 266 | 9.51 | 242 | 33.00 | 838 | | | | | | |
| | 5561 | 770 | 16 | 406 | 93.4 | 1531 | 8 | 203 | 43.82 | 1113 | 13.95 | 354 | 12.69 | 322 | 39.00 | 991 | | | | | | |
| 7085 | 4580 | 633 | 10 | 254 | 79 | 1295 | 5 | 127 | 36.25 | 921 | 8.72 | 221 | 7.93 | 201 | 36.19 | 919 | | | | | | |
| | 5560 | 769 | 12 | 305 | 94 | 1540 | 6 | 152 | 40.25 | 1022 | 10.46 | 266 | 9.51 | 242 | 39.19 | 995 | 4 1/4 | 108 | 6 1/4 | 159 | 13/16 | 21 |
| | 7400 | 1023 | 16 | 406 | 126 | 2065 | 8 | 203 | 48.25 | 1226 | 13.95 | 354 | 12.69 | 322 | 45.19 | 1148 | | | | | | |
| 7093 | 9200 | 1272 | 20 | 508 | 157 | 2573 | 10 | 254 | 56.25 | 1429 | 17.43 | 443 | 15.85 | 403 | 51.19 | 1300 | | | | | | |
| | 7256 | 1004 | 12 | 305 | 122 | 1999 | 6 | 152 | 39.34 | 999 | 10.46 | 266 | 9.51 | 242 | 38.59 | 980 | | | | | | |
| | 9674 | 1339 | 16 | 406 | 163 | 2671 | 8 | 203 | 47.34 | 1202 | 13.95 | 354 | 12.69 | 322 | 44.59 | 1133 | 5 | 127 | 6 | 152 | 3/4 | 19 |
| | 12093 | 1673 | 20 | 508 | 203 | 3327 | 10 | 254 | 55.34 | 1406 | 17.43 | 443 | 15.85 | 403 | 50.59 | 1285 | | | | | | |
| | 14512 | 2008 | 24 | 610 | 244 | 3998 | 12 | 305 | 63.34 | 1609 | 20.92 | 531 | 19.03 | 483 | 56.59 | 1437 | | | | | | |

RUDDER ANGLE (RA) 45°

| MODEL | TORQUE | | STROKE | | DISPLACEMENT | | A | | B | | C | | D | | E | |
|-------|----------|------|--------|-------|-----------------|-----------------|------|-----|-------|------|-------|-----|-------|-----|-------|------|
| | lbs. ft. | kgm | in | mm. | in ³ | cm ³ | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. |
| 7040 | 298 | 41 | 5.5 | 139.7 | 8 | 131 | 2.75 | 70 | 18.04 | 458 | 3.89 | 99 | 3.32 | 84 | 16.5 | 419 |
| | 456 | 63 | 7.5 | 191 | 11 | 180 | 3.75 | 95 | 22.04 | 560 | 5.3 | 135 | 4.52 | 115 | 19.50 | 495 |
| | 608 | 84 | 10 | 254 | 14.6 | 239 | 5 | 127 | 27.04 | 687 | 7.07 | 180 | 6.03 | 153 | 23.25 | 591 |
| 7050 | 1125 | 156 | 10 | 254 | 27 | 442 | 5 | 127 | 28.75 | 730 | 7.07 | 180 | 6.03 | 153 | 24.60 | 625 |
| | 1351 | 187 | 12 | 305 | 32.4 | 531 | 6 | 152 | 32.75 | 832 | 8.49 | 216 | 7.25 | 184 | 27.60 | 701 |
| 7065 | 1718 | 238 | 10 | 254 | 41 | 672 | 5 | 127 | 30.27 | 769 | 7.07 | 180 | 6.03 | 153 | 28.11 | 714 |
| | 2062 | 285 | 12 | 305 | 49 | 803 | 6 | 152 | 34.27 | 870 | 8.49 | 216 | 7.25 | 184 | 31.11 | 790 |
| | 2749 | 380 | 16 | 406 | 66 | 1082 | 8 | 203 | 42.27 | 1074 | 11.31 | 287 | 9.65 | 245 | 37.11 | 943 |
| 7080 | 2432 | 335 | 10 | 254 | 58.4 | 958 | 5 | 127 | 31.82 | 808 | 7.07 | 180 | 6.04 | 153 | 30.00 | 762 |
| | 2922 | 405 | 12 | 305 | 70.1 | 1149 | 6 | 152 | 35.82 | 910 | 8.49 | 216 | 7.25 | 184 | 33.00 | 838 |
| | 3892 | 539 | 16 | 406 | 93.4 | 1531 | 8 | 203 | 43.82 | 1113 | 11.31 | 287 | 9.65 | 245 | 39.00 | 991 |
| 7085 | 3270 | 452 | 10 | 254 | 79 | 1295 | 5 | 127 | 36.25 | 921 | 7.07 | 180 | 6.03 | 153 | 36.19 | 919 |
| | 3920 | 542 | 12 | 305 | 94 | 1540 | 6 | 152 | 40.25 | 1022 | 8.49 | 216 | 7.25 | 184 | 39.19 | 995 |
| | 5230 | 723 | 16 | 406 | 126 | 2065 | 8 | 203 | 48.25 | 1226 | 11.31 | 287 | 9.65 | 245 | 45.19 | 1148 |
| 7093 | 6500 | 899 | 20 | 508 | 157 | 2573 | 10 | 254 | 56.25 | 1429 | 14.14 | 359 | 12.07 | 307 | 51.19 | 1300 |
| | 5081 | 703 | 12 | 305 | 122 | 1999 | 6 | 152 | 39.34 | 999 | 8.49 | 216 | 7.25 | 184 | 38.59 | 980 |
| | 6774 | 937 | 16 | 406 | 163 | 2671 | 8 | 203 | 47.34 | 1202 | 11.31 | 287 | 9.65 | 245 | 44.59 | 1133 |
| | 8468 | 1172 | 20 | 508 | 203 | 3327 | 10 | 254 | 55.34 | 1406 | 14.14 | 359 | 12.07 | 307 | 50.59 | 1285 |
| | 10161 | 1406 | 24 | 610 | 244 | 3998 | 12 | 305 | 63.34 | 1609 | 16.97 | 431 | 14.48 | 368 | 56.59 | 1437 |



5

STEERING CYLINDERS



UNBALANCED CYLINDERS
RUDDER ANGLE (RA) 35°

| MODEL | TORQUE | | STROKE | | DISPLACEMENT | | A | | B | | C | | D | | E | |
|-------|----------|------|--------|-----|-----------------|-----------------|------|-----|-------|------|-------|-----|-------|-----|-------|------|
| | lbs. ft. | kgm | in | mm. | in ³ | cm ³ | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. |
| 7040 | 1441 | 200 | 7.5 | 191 | 24.2 | 397 | 3.75 | 95 | 20.85 | 530 | 6.54 | 166 | 5.95 | 151 | 19.50 | 495 |
| | 1921 | 266 | 10 | 254 | 32.3 | 529 | 5 | 127 | 24.60 | 625 | 8.72 | 221 | 7.93 | 201 | 23.25 | 591 |
| 7050 | 2608 | 361 | 7.5 | 191 | 43.8 | 718 | 3.75 | 95 | 22.48 | 571 | 6.54 | 166 | 5.95 | 151 | 20.85 | 530 |
| | 3477 | 481 | 10 | 254 | 58.4 | 957 | 5 | 127 | 26.23 | 666 | 8.72 | 221 | 7.93 | 201 | 24.60 | 625 |
| | 4171 | 578 | 12 | 305 | 70.1 | 1149 | 6 | 152 | 29.23 | 742 | 10.46 | 266 | 9.51 | 242 | 27.60 | 701 |
| 7065 | 5375 | 744 | 10 | 254 | 90 | 1475 | 5 | 127 | 30.17 | 766 | 8.72 | 221 | 7.93 | 201 | 28.11 | 714 |
| | 6450 | 893 | 12 | 305 | 108 | 1770 | 6 | 152 | 33.17 | 843 | 10.46 | 266 | 9.51 | 242 | 31.11 | 790 |
| | 8599 | 1190 | 16 | 406 | 144 | 2360 | 8 | 203 | 39.17 | 995 | 13.95 | 354 | 12.69 | 322 | 37.11 | 943 |
| 7080 | 5763 | 798 | 7.5 | 191 | 96.8 | 1586 | 3.75 | 95 | 28.87 | 733 | 6.54 | 166 | 5.95 | 151 | 26.25 | 667 |
| | 9217 | 1276 | 12 | 305 | 154.9 | 2538 | 6 | 152 | 35.62 | 905 | 10.46 | 266 | 9.51 | 242 | 33.00 | |
| 838 | 12292 | 1702 | 16 | 406 | 206.6 | 3386 | 8 | 203 | 41.62 | 1057 | 13.95 | 354 | 12.69 | 322 | 39.00 | 991 |
| | 10800 | 1493 | 10 | 254 | 174 | 2851 | 5 | 127 | 39.07 | 992 | 8.72 | 221 | 7.93 | 201 | 36.19 | 919 |
| 7085 | 12360 | 1709 | 12 | 305 | 209 | 3425 | 6 | 152 | 42.07 | 1069 | 10.46 | 266 | 9.51 | 242 | 39.19 | 995 |
| | 16430 | 2272 | 16 | 406 | 279 | 4572 | 8 | 203 | 48.07 | 1221 | 13.95 | 354 | 12.69 | 322 | 45.19 | 1148 |
| | 20450 | 2827 | 20 | 508 | 349 | 5719 | 10 | 254 | 54.07 | 1373 | 17.43 | 443 | 15.85 | 403 | 51.19 | 1300 |
| | 16229 | 2246 | 12 | 305 | 272 | 4457 | 6 | 152 | 41.90 | 1064 | 10.46 | 266 | 9.51 | 242 | 38.59 | 980 |
| 7093 | 21639 | 2994 | 16 | 406 | 363 | 5949 | 8 | 203 | 47.90 | 1217 | 13.95 | 354 | 12.69 | 322 | 44.59 | 1133 |
| | 27048 | 3743 | 20 | 508 | 454 | 7440 | 10 | 254 | 53.90 | 1369 | 17.43 | 443 | 15.85 | 403 | 50.59 | 1285 |
| | 32458 | 4492 | 24 | 610 | 546 | 8947 | 12 | 305 | 59.90 | 1521 | 20.92 | 531 | 19.03 | 483 | 56.59 | 1437 |
| 7095 | 25798 | 3570 | 12 | 305 | 434 | 7112 | 6 | 152 | 43.25 | 1099 | 10.46 | 266 | 9.51 | 242 | 38.39 | 975 |
| | 34398 | 4760 | 16 | 406 | 578 | 9472 | 8 | 203 | 49.25 | 1251 | 13.95 | 354 | 12.69 | 322 | 44.39 | 1128 |
| | 42997 | 5950 | 20 | 508 | 723 | 11848 | 10 | 254 | 55.25 | 1403 | 17.43 | 443 | 15.85 | 403 | 50.39 | 1280 |
| | 51597 | 7140 | 24 | 610 | 867 | 14208 | 12 | 305 | 61.25 | 1556 | 20.92 | 531 | 19.03 | 483 | 56.39 | 1432 |

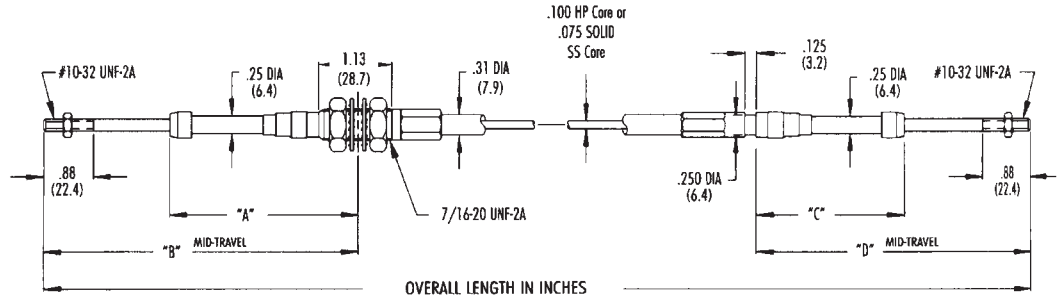
RUDDER ANGLE (RA) 45°

| MODEL | TORQUE | | STROKE | | DISPLACEMENT | | A | | B | | C | | D | | E | |
|-------|----------|------|--------|-----|-----------------|-----------------|------|-----|-------|------|-------|-----|-------|-----|-------|------|
| | lbs. ft. | kgm | in | mm. | in ³ | cm ³ | in | mm. | in | mm. | in | mm. | in | mm. | in | mm. |
| 7040 | 1008 | 140 | 7.5 | 191 | 24.2 | 397 | 3.75 | 95 | 20.85 | 530 | 5.3 | 135 | 4.52 | 115 | 19.50 | 495 |
| | 1344 | 186 | 10 | 254 | 32.3 | 529 | 5 | 127 | 24.60 | 625 | 7.07 | 180 | 6.03 | 153 | 23.25 | |
| 7050 | 2434 | 337 | 10 | 254 | 58.4 | 957 | 5 | 127 | 26.23 | 666 | 7.07 | 180 | 6.03 | 153 | 24.60 | |
| | 2923 | 405 | 12 | 305 | 70.1 | 1149 | 6 | 152 | 29.23 | 742 | 8.49 | 216 | 7.25 | 184 | 27.60 | |
| 7065 | 3763 | 521 | 10 | 254 | 90 | 1475 | 5 | 127 | 30.17 | 766 | 7.07 | 180 | 6.03 | 153 | 28.11 | 714 |
| | 4516 | 625 | 12 | 305 | 108 | 1770 | 6 | 152 | 33.17 | 843 | 8.49 | 216 | 7.25 | 184 | 31.11 | 790 |
| | 6021 | 833 | 16 | 406 | 144 | 2360 | 8 | 203 | 39.17 | 995 | 11.31 | 287 | 9.65 | 245 | 37.11 | 943 |
| 7080 | 6458 | 894 | 12 | 305 | 154.9 | 2538 | 6 | 152 | 35.62 | 905 | 8.49 | 216 | 7.25 | 184 | 33.00 | 838 |
| | 8603 | 1191 | 16 | 406 | 206.6 | 3386 | 8 | 203 | 41.62 | 1057 | 11.31 | 287 | 9.65 | 245 | 39.00 | 991 |
| 7085 | 7260 | 1004 | 10 | 254 | 174 | 2851 | 5 | 127 | 39.07 | 992 | 7.07 | 180 | 6.03 | 153 | 36.19 | 919 |
| | 8730 | 1207 | 12 | 305 | 209 | 3425 | 6 | 152 | 42.07 | 1069 | 8.49 | 216 | 7.25 | 184 | 39.19 | 995 |
| | 11640 | 1609 | 16 | 406 | 279 | 4572 | 8 | 203 | 48.07 | 1221 | 11.31 | 287 | 9.65 | 245 | 45.19 | 1148 |
| | 14480 | 2002 | 20 | 508 | 349 | 5719 | 10 | 254 | 54.07 | 1373 | 14.14 | 359 | 12.07 | 307 | 51.19 | 1300 |
| 7093 | 11364 | 1573 | 12 | 305 | 272 | 4457 | 6 | 152 | 41.90 | 1064 | 8.49 | 216 | 7.25 | 184 | 38.59 | 980 |
| | 15152 | 2097 | 16 | 406 | 363 | 5949 | 8 | 203 | 47.90 | 1217 | 11.31 | 287 | 9.65 | 245 | 44.59 | 1133 |
| | 18940 | 2621 | 20 | 508 | 454 | 7440 | 10 | 254 | 53.90 | 1369 | 14.14 | 359 | 12.07 | 307 | 50.59 | 1285 |
| | 22727 | 3145 | 24 | 610 | 546 | 8947 | 12 | 305 | 59.90 | 1521 | 16.97 | 431 | 14.48 | 368 | 56.59 | 1437 |
| 7095 | 18064 | 2500 | 12 | 305 | 434 | 7112 | 6 | 152 | 43.25 | 1099 | 8.49 | 216 | 7.25 | 184 | 38.39 | 975 |
| | 24086 | 3333 | 16 | 406 | 578 | 9472 | 8 | 203 | 49.25 | 1251 | 11.31 | 287 | 9.65 | 245 | 44.39 | 1128 |
| | 30107 | 4166 | 20 | 508 | 723 | 11848 | 10 | 254 | 55.25 | 1403 | 14.14 | 359 | 12.07 | 307 | 50.39 | 1280 |
| | 36128 | 4999 | 24 | 610 | 867 | 14208 | 12 | 305 | 61.25 | 1556 | 16.97 | 431 | 14.48 | 368 | 56.39 | 1432 |

PUSH-PULL HP CABLES®

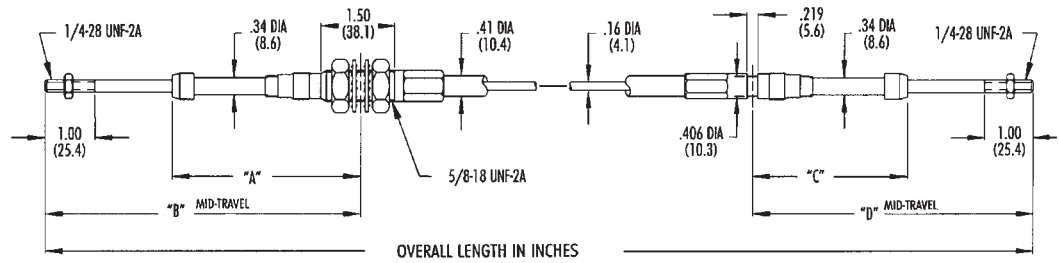
3 SERIES

- HP Core or Solid Core
- 10-32 Thread
- 3" Bend Radii (HP)
- 6" Bend Radii (Solid Core)



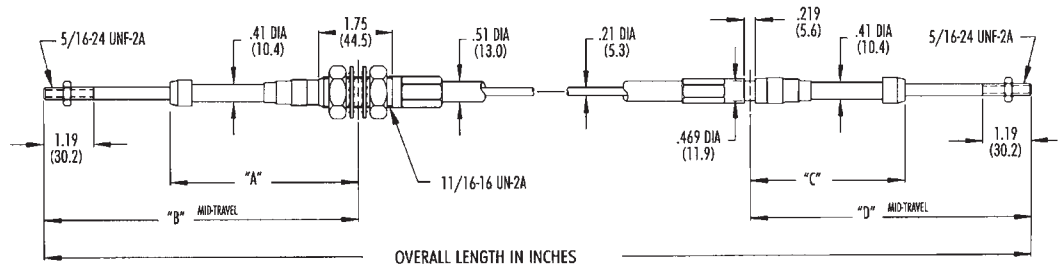
4 SERIES

- HP Core
- 1/4-28 Thread
- 5" Bend Radii



6 SERIES

- HP Core
- 5/16-24 Thread
- 7" Bend Radii



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PUSH-PULL HP CABLES®

- **TEMPERATURE RANGE**
 -65°F to +225°F / -54°C to +107°C – Standard
 -65°F to +300°F / -54°C to +149°C – Heft 2
- **LOW BACKLASH**
- **HIGH EFFICIENCY**
- **CONDUIT COLOR**
 -Dark Maroon – HP Cable Standard
 -Gloss Black – Heft 2

3-SERIES SPECIFICATIONS

| TRAVEL Inch (mm.) | BULKHEAD END | | CLAMP END | | OPERATING LOADS | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|-----------------|
| | DIM "A" Inch (mm.) | DIM "B" Inch (mm.) | DIM "C" Inch (mm.) | DIM "D" Inch (mm.) | PUSH Lb. (N) | PULL Lb. (N) |
| 1.0" (25.4) | 3.00" (76.2) | 4.44" (112.8) | 2.31" (58.7) | 3.75" (95.3) | 80 (356) | 120 (534) |
| 2.0" (50.8) | 4.00" (101.6) | 5.94" (150.9) | 3.31" (84.1) | 5.25" (133.4) | 80 (356) | 120 (534) |
| 3.0" (76.2) | 5.00" (127.0) | 7.44" (189.0) | 4.31" (109.5) | 6.75" (171.5) | 70 (311) | 120 (534) |
| 4.0" (101.6) | 6.00" (152.4) | 8.94" (227.1) | 5.31" (134.9) | 8.25" (209.6) | 60 (267) | 120 (534) |
| 5.0" (127.0) | 7.00" (177.8) | 10.44" (265.2) | 6.31" (160.3) | 9.75" (247.7) | 45 (200) | 120 (534) |
| 6.0" (152.4) | 8.0" (203.2) | 11.94" (303.3) | 7.31" (185.6) | 11.25" (285.7) | 35 (155.8) | 120 (534) |
| 7.0" (177.8) | 9.0" (228.6) | 13.44" (341.4) | 8.31" (211.0) | 12.75" (323.8) | 25 (111.3) | 120 (534) |

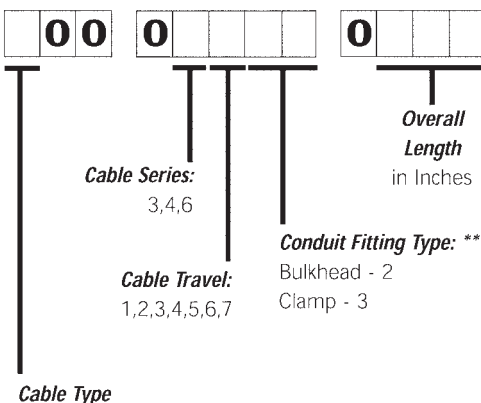
4-SERIES SPECIFICATIONS

| TRAVEL Inch (mm.) | BULKHEAD END | | CLAMP END | | OPERATING LOADS | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|-----------------|
| | DIM "A" Inch (mm.) | DIM "B" Inch (mm.) | DIM "C" Inch (mm.) | DIM "D" Inch (mm.) | PUSH Lb. (N) | PULL Lb. (N) |
| 1.0" (25.4) | 3.13" (79.5) | 4.69" (119.1) | 2.50" (63.5) | 4.06" (103.1) | 150 (667) | 230 (1023) |
| 2.0" (50.8) | 4.13" (104.9) | 6.19" (157.2) | 3.50" (88.9) | 5.56" (141.2) | 150 (667) | 230 (1023) |
| 3.0" (76.2) | 5.13" (130.3) | 7.69" (195.3) | 4.50" (114.3) | 7.06" (179.3) | 125 (556) | 230 (1023) |
| 4.0" (101.6) | 6.13" (155.7) | 9.19" (233.4) | 5.50" (139.7) | 8.56" (217.4) | 100 (445) | 230 (1023) |
| 5.0" (127.0) | 7.13" (181.1) | 10.69" (271.5) | 6.50" (165.1) | 10.06" (255.5) | 75 (334) | 230 (1023) |
| 6.0" (152.4) | 8.13" (206.5) | 12.19" (309.6) | 7.50" (190.5) | 11.56" (293.6) | 55 (244.8) | 230 (1023) |
| 7.0" (177.8) | 9.13" (231.9) | 13.6" (347.7) | 8.50" (215.9) | 13.06" (331.7) | 45 (200.3) | 230 (1023) |

6-SERIES SPECIFICATIONS

| TRAVEL Inch (mm.) | BULKHEAD END | | CLAMP END | | OPERATING LOADS | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|-----------------|
| | DIM "A" Inch (mm.) | DIM "B" Inch (mm.) | DIM "C" Inch (mm.) | DIM "D" Inch (mm.) | PUSH Lb. (N) | PULL Lb. (N) |
| 1.0" (25.4) | 3.25" (82.6) | 5.00" (127.0) | 2.56" (65.0) | 4.31" (109.5) | 250 (1112) | 400 (1779) |
| 2.0" (50.8) | 4.25" (108.0) | 6.50" (165.1) | 3.56" (90.4) | 5.81" (147.6) | 250 (1112) | 400 (1779) |
| 3.0" (76.2) | 5.25" (133.4) | 8.00" (203.2) | 4.56" (115.8) | 7.31" (185.7) | 210 (934) | 400 (1779) |
| 4.0" (101.6) | 6.25" (158.8) | 9.50" (241.3) | 5.56" (141.2) | 8.81" (223.8) | 170 (756) | 400 (1779) |
| 5.0" (127.0) | 7.25" (184.2) | 11.00" (279.4) | 6.56" (166.6) | 10.31" (261.9) | 130 (578) | 400 (1779) |
| 6.0" (152.4) | 8.25" (209.6) | 12.50" (317.5) | 7.56" (192.0) | 11.81" (299.9) | 90 (400.5) | 400 (1779) |
| 7.0" (177.8) | 9.25" (235.0) | 14.00" (355.6) | 8.56" (217.4) | 13.31" (338.0) | 60 (267) | 400 (1779) |

Building a Part Number



BC COMBO HUBS = 5

(Bulkhead and Clamp on same end.)

To order a Bulkhead/Clamp Combination Cable, use digits "55" in the conduit fitting type boxes above.
 Note: Clamp mounting dimensions are the same as clamp dimensions shown on these pages. Bulkhead mounting dimensions grow.

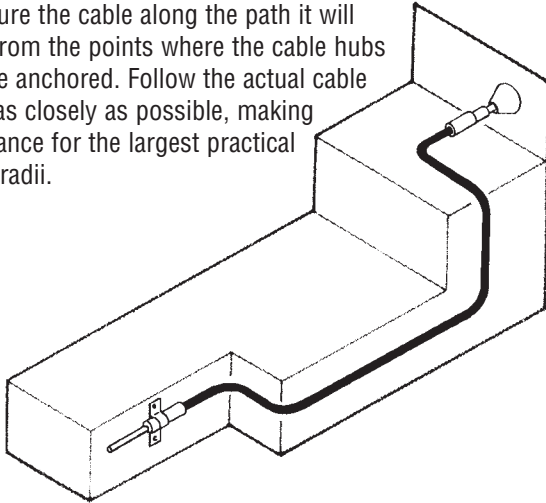
The BC Combo hub is a flexible solution for applications where the exact hub fitting (clamp vs. bulkhead) is not known.

- 0 Solid Core (3 Series Only)
- 1 Hi-Performance (Standard)
- 2 Marine
- 3 HEFT 2 (Hi-Performance & High Temperature)
- 4 Marine HEFT 2

PUSH-PULL HP CABLES®

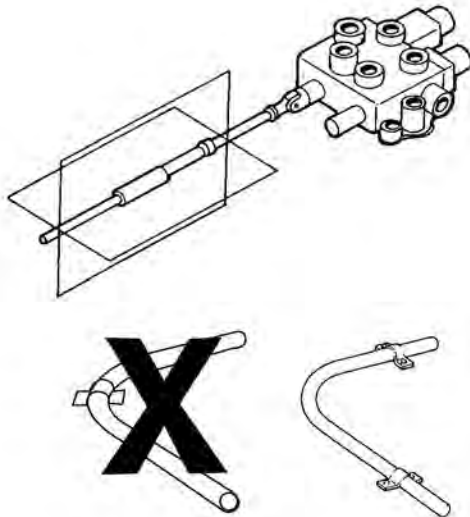
ROUTING/MEASURING

Measure the cable along the path it will take from the points where the cable hubs will be anchored. Follow the actual cable path as closely as possible, making allowance for the largest practical bend radii.



Installation Notes: Control and Work End

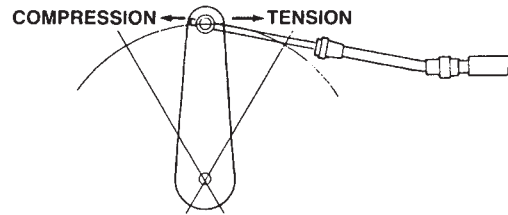
Where a Felsted cable is to be connected to objects requiring linear movement only (e.g. spool valves), maximum life and efficiency is achieved by accurately aligning, in both planes, the cable hubs and the controlled object. See illustration.



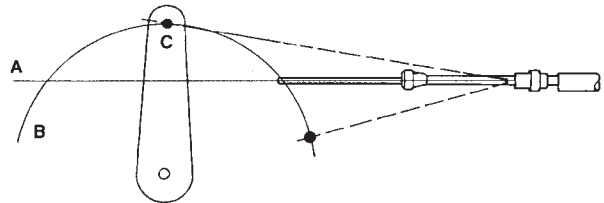
It is important to securely anchor the cable hubs. Looseness of the mounting bracket will be perceived as lost motion "sponginess" and will inhibit detent feel. Also, clamping in the bend area may reduce bend radii under operating loads. Clamping at tangents to the bend is preferred.

| OPTIMUM LIFE BEND RADII | |
|-------------------------|------------------------|
| Series | Operating Life Minimum |
| 3 | 3 Inches* |
| 4 | 5 Inches |
| 6 | 7 Inches |
| 8 | 10 Inches |

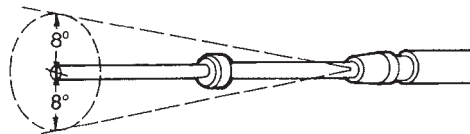
*HP CORE. Solid Core has 6" Bend Radii.



For highest efficiency and long life in lever actuating operations, install cable so that the highest loads are operated with tension (pulling), rather than compression (pushing).



Where the cable is connected to a lever, the cable will be mounted so that it lies on a plane (A) midway on the arc (B) described by the movement of the connection point on the lever (C).



All Felsted cables with rod and sleeve type end fittings have a built-in swivel to handle deflections up to 8°.

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SPECIALTY CABLES

FELSTED
control cables

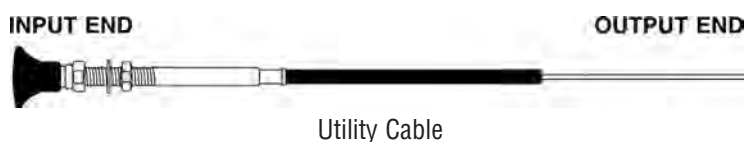
An easy-to-install, easy-to-operate flexible cable for remote control of choke, throttle, shut off, fuel valves, vents and many other applications. Solid stainless steel core wire resists corrosion, moves easily in non-metallic liner, even after months of storage.

Vernier Cables

Just push the button for fast, easy setting of approximate position, then turn the knob for micro adjustment. Positive, adjustable brake maintains settings regardless of vibration or governor backpressure. Ideal for throttles or other applications where precise control is desired. Uses standard Morse throttle connection kits.

Positive Lock Cables

Just a twist of the "T" handle locks cable in any setting. It is the ideal control when separate throttle control is required for engine warm-up or for operating auxiliary equipment. Solid stainless steel core wire resists corrosion, moves easily in non-metallic liner.



| PART NO. | DESCRIPTION |
|--|------------------------------------|
| 18872-060 | 5 ft. Utility Cable with Knob |
| 18872-120 | 10 ft. Utility Cable with Knob |
| 18872-180 | 15 ft. Utility Cable with Knob |
| 18872-240 | 20 ft. Utility Cable with Knob |
| 18872-300 | 25 ft. Utility Cable with Knob |
| 18872-360 | 30 ft. Utility Cable with Knob |
| 18873-060 | 5 ft. Utility Cable with T-Handle |
| 18873-120 | 10 ft. Utility Cable with T-Handle |
| 18873-180 | 15 ft. Utility Cable with T-Handle |
| 18873-240 | 20 ft. Utility Cable with T-Handle |
| 18873-300 | 25 ft. Utility Cable with T-Handle |
| 18873-360 | 30 ft. Utility Cable with T-Handle |
| 0003-43820-060 | 5 ft. Positive Lock Cable |
| 0003-43820-120 | 10 ft. Positive Lock Cable |
| 0003-43820-180 | 15 ft. Positive Lock Cable |
| 0003-43820-240 | 20 ft. Positive Lock Cable |
| 0003-43820-300 | 25 ft. Positive Lock Cable |
| 0003-43820-360 | 30 ft. Positive Lock Cable |
| 300673 | Bulkhead Adapter Kit |
| 302485 | Clamp Adapter Kit |
| The Vernier Cable requires ordering two part numbers. | |
| 307141-120 | 10 ft. Vernier Cable |
| 307941-003 | Vernier Cable Head |



Hub Adapter Kits

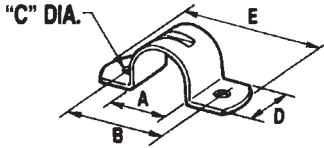
These kits are used in the field to adapt utility, neutral throttle and vernier cables to mount in bulkhead or clamp applications.

5

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

FELSTED
control cables

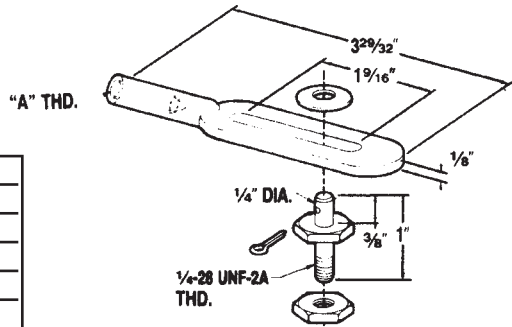
HARDWARE



CLAMP

| PART NO. | A | B | C | D | E |
|-----------------|--------------|---------------|--------------|-------------|---------------|
| 3 SERIES | | | | | |
| 39001 | 3/8" (9.5) | 1" (25.4) | 13/64" (5.2) | 1/2" (12.7) | 1-1/2" (38.1) |
| 4 SERIES | | | | | |
| 49001 | 1/2" (12.7) | 1" (25.4) | 7/32" (5.6) | 1/2" (12.7) | 1-1/2" (38.1) |
| 6 SERIES | | | | | |
| 69001 | 9/16" (14.3) | 1-1/4" (31.8) | 9/32" (7.1) | 5/8" (15.9) | 1-5/8" (41.3) |

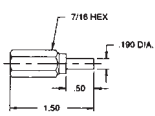
Measurements above shown in English (metric)



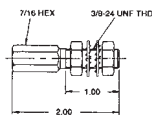
SLIP LINK KIT

| | KIT NUMBER | A THD. |
|---------|-------------|---------------|
| Polymer | 59049-1 | 10-32 UNF-2A |
| | 59049-2 | 1/4-28 UNF-2A |
| Metal | M00-59049-1 | 10-32 UNF-2A |
| | M00-59049-2 | 1/4-28 UNF-2A |

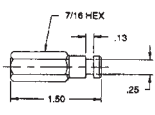
FIELD HUB KITS FOR STANDARD FELSTED 3-SERIES CABLES (SOLID OR HP CORE)
(Conduit outside diameter of .31")



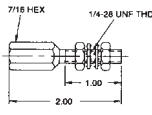
KIT #39067-1
SHOULDER HUB



KIT #39067-2
3/8-24 THD. HUB



KIT #39067-3
CLAMP HUB



KIT #39067-4
1/4-28 THD. HUB

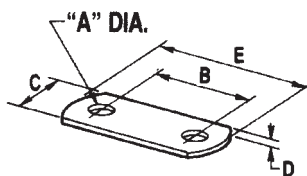
FIELD HUB KITS FOR SPECIAL LIGHT-DUTY 3-SERIES CABLES
(Conduit outside diameter of .26")

KIT #39068-1 - SHOULDER HUB
(Same as #39067-1 except 3/8" hex hub size)

KIT #39068-2 - 3/8"-24 THREADED HUB
(Same as #39067-2 except 3/8" hex hub size)

KIT #39068-3 - CLAMP HUB
(Same as #39067-3 except 3/8" hex hub size)

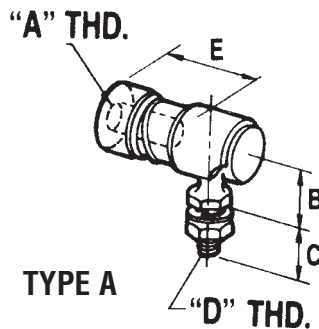
KIT #39068-4 - THREADED HUB
(Same as #39067-4 except 3/8" hex hub size)



SHIM

| PART NO. | A | B | C | D | E |
|-------------------------|--------------|---------------|-------------|-------------|---------------|
| 3 & 4 SERIES | | | | | |
| 39002 | 13/64" (5.2) | 1" (25.4) | 1/2" (12.7) | 3/32" (2.4) | 1-1/2" (38.1) |
| 6 SERIES | | | | | |
| 69002 | 9/32" (7.5) | 1-1/4" (31.8) | 5/8" (15.9) | 5/64" (2.0) | 1-3/4" (44.5) |

Measurements above shown in English (metric)



TYPE A

BALL JOINT

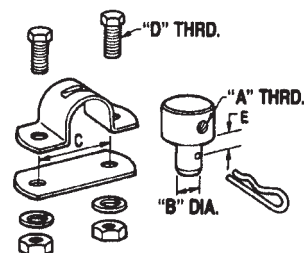
| PART NO. | TYPE | A | B | C | D | E |
|-----------------|------|----------------|---------------|---------------|----------------|---------------|
| 3 SERIES | | | | | | |
| 39006 | A | 10-32 UNF-2B | 15/32" (11.9) | 9/16" (14.3) | 1/4-28 UNF-2A | 31/32" (24.6) |
| 4 SERIES | | | | | | |
| 49006 | A | 1/4-28 UNF-2B | 15/32" (11.9) | 9/16" (14.3) | 1/4-28 UNF-2A | 31/32" (24.6) |
| 49007 | A | 1/4-28 UNF-2B | 15/32" (11.9) | 7/8" (22.2) | 5/16-24 UNF-2A | 31/32" (24.6) |
| 6 SERIES | | | | | | |
| 69007 | A | 5/16-24 UNF-2B | 17/32" (13.5) | 11/16" (17.5) | 5/16-24 UNF-2A | 1-1/8" (28.5) |

Measurements above shown in English (metric)

SHIFTER CABLE CONNECTION KIT

| KIT NUMBER | A THD. | B DIA. | C | D THD. | E |
|------------|----------------|-------------|---------------|---------------|------------|
| 50030 | 1/4-28 UNF-2B | 5/16" (7.9) | 1" (25.4) | 10-32 UNF-2A | 1/8" (3.2) |
| 50035 | 5/16-24 UNF-2B | 5/16" (7.9) | 1-1/4" (31.8) | 1/4-20 UNC-2A | 1/8" (3.2) |
| 59033 | 10-32 UNF-2B | 5/16" (7.9) | 1" (25.4) | 10-32 UNF-2A | 1/8" (3.2) |

Measurements above shown in English (metric)

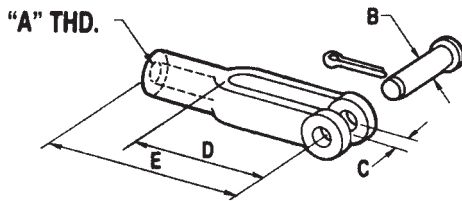


THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HARDWARE

FELSTED
control cables

CLEVISES

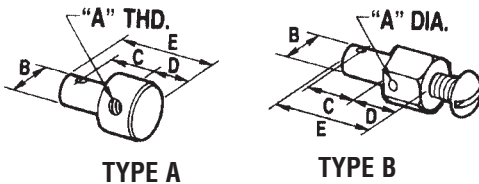


| PART NO. | A | B | C | D | E |
|-----------------|----------------|--------------|--------------|----------------|----------------|
| 3 SERIES | | | | | |
| 39003-1* | 10-32 UNF-2B | 3/16" (4.8) | 7/32" (5.6) | 1" (25.4) | 1-9/16" (39.7) |
| 49003-2 | 10-32 UNF-2B | 1/4" (6.4) | 9/32" (7.1) | 1-1/4" (31.8) | 2" (50.8) |
| 69003-2** | 10-32 UNF-2B | 5/16" (7.9) | 11/32" (8.7) | 1-7/16" (36.5) | 2-1/4" (57.2) |
| 4 SERIES | | | | | |
| 49003-1 | 1/4-28 UNF-2B | 1/4" (6.4) | 9/32" (7.1) | 1-1/4" (31.8) | 2" (50.8) |
| 49044-1** | 1/4-28 UNF-2B | 1/2" (12.7) | 9/16" (14.3) | 1-7/8" (47.6) | 3" (76.2) |
| 69003-3 | 1/4-28 UNF-2B | 5/16" (7.9) | 11/32" (8.7) | 1-7/16" (36.5) | 2-1/4" (57.2) |
| 6 SERIES | | | | | |
| 49003-3 | 5/16-24 UNF-2B | 1/4" (6.4) | 9/32" (7.1) | 1-1/4" (31.8) | 2" (50.8) |
| 49004-2 | 5/16-24 UNF-2B | 1/2" (12.7) | 9/16" (14.3) | 1-7/8" (47.6) | 3" (76.2) |
| 69003-1 | 5/16-24 UNF-2B | 5/16" (7.9) | 11/32" (8.7) | 1-7/16" (36.5) | 2-1/4" (57.2) |
| 69034 | 5/16-24 UNF-2B | 7/16" (11.1) | 1/2" (12.7) | 1-7/8" (47.6) | 2-7/8" (73.1) |
| 89003-2 | 5/16-24 UNF-2B | 3/8" (9.5) | 7/16" (11.1) | 1-5/8" (41.3) | 2-1/2" (63.5) |

Measurements above shown in English (metric)

*Note: The 39003-1 clevis is made of polymer and is not identical to illustration shown above.

**Consult factory for lead-time and availability.



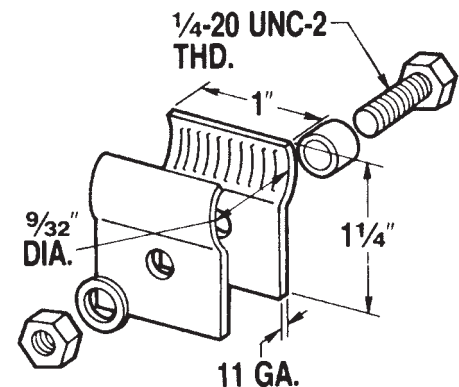
PIVOT

| PART NO. | TYPE | A | B | C | D | E |
|-----------------|------|----------------|-------------|---------------|--------------|---------------|
| 3 SERIES | | | | | | |
| 39011-1 | B | 7/64" (2.8) | 1/4" (6.4) | 5/32" (4.0) | 5/16" (7.9) | 9/16" (14.3) |
| 39011-2 | B | 7/64" (2.8) | 1/4" (6.4) | 19/64" (7.5) | 5/16" (7.9) | 11/16" (17.5) |
| 39050-1* | B | 7/64" (2.) | 5/16" (7.9) | 5/32" (4.0) | 5/16" (7.9) | 9/16" (14.3) |
| 39050-2* | B | 7/64" (2.8) | 5/16" (7.9) | 19/64" (7.5) | 5/16" (7.9) | 11/16" (17.5) |
| 39042 | A | 10-32 UNF-2B | 1/4" (6.4) | 13/64" (5.2) | 21/64" (8.3) | 5/8" (15.9) |
| 39045* | A | 10-32 UNF-2B | 5/16" (7.9) | 3/8" (9.5) | 3/8" (9.5) | 15/16" (23.8) |
| 4 SERIES | | | | | | |
| 49008* | A | 1/4-28 UNF-2B | 1/4" (6.4) | 13/32" (10.3) | 1/2" (12.7) | 1-1/16" |
| (27.0) | | | | | | |
| 49008-1 | A | 1/4-28 UNF-2B | 1/4" (6.4) | 5/16" (7.9) | 1/2" (12.7) | 31/32" (24.6) |
| 49011 | A | 1/4-28 UNF-2B | 1/4" (6.4) | 13/64" (5.2) | 7/16" (11.1) | 3/4" (19.1) |
| 49042 | A | 1/4-28 UNF-2B | 3/8" (9.5) | 15/32" (11.9) | 1/2" (12.7) | 1-3/16" |
| (30.2) | | | | | | |
| 50061-1 | A | 1/4-28 UNF-2B | 5/16" (7.9) | 3/16" (4.8) | 9/16" (14.3) | 27/32" (21.4) |
| 6 SERIES | | | | | | |
| 50061-2 | A | 5/16-24 UNF-2B | 5/16" (7.9) | 3/16" (4.8) | 9/16" (14.3) | 27/32" (21.4) |

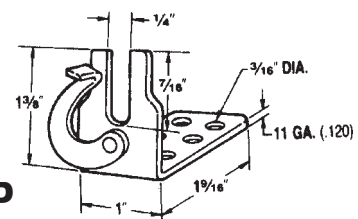
Measurements above shown in English (metric)

*Consult TIMCO for lead-time and availability.

CONDUIT CLIP



TYPE B
PART NO. 39064-1



FIELD CLAMP

PART NO. 39030-1

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOBELT

CONTROL CABLE FITTINGS AND HARDWARE

Levers are used to connect a rod ball end, or ball-joint to another mechanical connection. This is useful for changing the stroke required, or turning a shaft.

The part numbers are shown below the levers.
e.g. 2104-0001 is the leftmost.



2104 Levers -0001 -0002 -0003 -0004
 -0005 -0006 -0007 -0008

| Part# | Length | Holes | Hole size | Bore sizes for shaft |
|-----------|--------|---------|-----------|----------------------|
| 2104-0001 | 5" | 6 | 1/4" | 1/2", 5/8", 3/4" |
| 2104-0002 | 3 1/2" | 4 | 1/4" | 1/2", 5/8" |
| 2104-0003 | 3" | 5 | 3/16" | 5/8" |
| 2104-0004 | 4 1/4" | 6 | 3/16" | 1/2" |
| 2104-0005 | 4 1/4" | 6 | 3/16" | 5/8" |
| 2104-0006 | 4 1/4" | 6 | 1/4" | 5/8" |
| 2104-0007 | 3" | slotted | 1/4" | 5/8" |
| 2104-0008 | 4 3/8" | slotted | 1/4" | 5/8" |

Please specify the bore size you would like. You can tell us the size or add the following letter code to complete the part number. e.g.
 2104-0001-A
 Add "-A" for 1/2"
 Add "-B" for 5/8"
 Add "-C" for 3/4"

UNIVERSAL CATCH-A-BOLT

This is a universal adaptor kit which replaces all specialty adaptor kits.

Part # 2128

This adaptor kit can be used to take either 30 or 40 series cables, and either single or double cables (similar to the 2131 and 2142 adaptors).

Order the 2128 and the connector you need:

| Part# | Description |
|-----------|--------------------------------|
| 2128-0031 | 30 series - Single cable clamp |
| 2128-0032 | 30 series - Double cable clamp |
| 2128-0041 | 40 series - Single cable clamp |
| 2128-0042 | 40 series - Double cable clamp |



CONTROL CABLE FITTINGS AND HARDWARE

KOBELT



CONTROL HEAD CONNECTION KITS

These kits are designed for attaching a push-pull cable to the control head. Since cables are either 33 series or 43 series, you need to have the kit that matches the control head and the cable series being used. That's why kits are not just included with the control heads.

To order a connection kit, order either:

0901 (for 33 series cables)

0902 (for 43 series cables)

0912 (for 60 series cables; **not available for all models**)

The part number looks like this:

20xx-0901 where xx is the control head. e.g. 2009-0901 for a 2009 control head.

You need one kit for every cable connected to a control head. If you are running cables in "series", you will need more control head connection kits because the cable runs from control head to control head. For example, a 2 station, single engine system would use 4 connection kits for a parallel installation, but a series installation would need 6 kits.

2091 to 2094 control heads include connection kits for the 47 series "interconnecting" cable. You still need to get the -0901 or -0902 kits for the primary control head.

Connection kits are not always interchangeable. If you happen to have a kit for one control head, it probably will not work on a different model.

THROTTLE EXTENSION KITS

The throttle extension kits will add up to 1" of extra stroke for the throttle on Models 2046, 2048, 2081, 2083, 2085, 2091 to 2094. Please state the control head number followed by the numbers:

- 0905** 30 Series Throttle (including Connection Kit)
- 0906** 40 Series Throttle (including Connection Kit)
- 0907** 30 Series Override/Trolling Kit (including Connection Kit)
- 0908** 40 Series Override/Trolling Kit (including Connection Kit)

ROD BALL ENDS

Rod Ball Ends are commonly used to connect a push-pull cable to the engine or clutch. The rod ball end is screwed onto the end of the cable, and the rod ball end uses a bolt through the ball end that attaches it to a lever.



We have rod ball ends of various sizes:

| Part# | Thread size | Bolt Hole |
|--------|-------------|-----------|
| 2143 | 3/16" UNF | 3/16" |
| 2143/4 | 3/16" UNF | 1/4" |
| 2144 | 1/4" UNF | 1/4" |
| 2144/3 | 1/4" UNF | 3/16" |
| 2145 | 5/16" UNF | 5/16" |
| 2146 | 3/8" UNF | 5/16" |
| 2148 | 1/2" UNF | 5/8" |
| 2149 | 5/8" UNF | 3/4" |

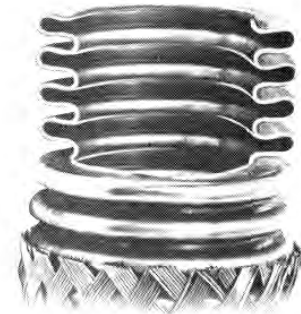
5

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

FLEXIBLE METAL CONNECTORS



Flexible metal connectors isolate vibration from being transferred to other related equipment, plumbing and systems. This prolongs the service life of the entire system. Annular corrugated metal hose is contained by a braided stainless steel sleeve. Standard material for hose and braid is type 321 stainless steel. Corrugated hose and fittings can be supplied in model, T316ss, T304ss, and carbon steel.



M
Male Pipe Threads



W
Weld Ends



SOF
Slip On Flanges



RF
Weld Neck Flanges



FRF
Weld Neck Flanges
and Floating Flanges

5

FLEXIBLE BRAID CONNECTORS

| INSIDE DIAM. | 1/4" (.635cm) | 3/8" (.953cm) | 1/2" (1.27cm) | 3/4" (1.90cm) | 1" (2.54cm) | 1 1/4" (3.18cm) | 1 1/2" (3.81cm) | 2" (5.04cm) | 2 1/2" (6.35cm) |
|--|---------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-------------------|-----------------|
| LIVE LENGTH | 8" (20.32cm) | 8" (20.32cm) | 8" (20.32cm) | 8" (20.32cm) | 8" (20.32cm) | 8" (20.32cm) | 8" (20.32cm) | 5 3/4" (14.6cm) | 5 3/4" (14.6cm) |
| OVERALL LENGTH (33.66cm) | M or W | 12" (30.48cm) | 12" (30.48cm) | 12" (30.48cm) | 12" (30.48cm) | 12" (30.48cm) | 12" (30.48cm) | 13 3/4" (35.56cm) | 13 3/4" |
| | SOF or PLATE | - | - | - | - | - | - | 9" (22.86cm) | 9" (22.86cm) |
| | RF | - | - | - | - | - | - | 12 3/4" (32.38cm) | 13 1/4" |
| | FRF | - | - | - | - | - | - | 11" (27.94cm) | 11" (27.94cm) |
| MAX. WORKING PRESSURE (Atmos. @ 21°C) | 2000 (136.1) | 1420 (96.6) | 1040 (70.7) | 670 (45.6) | 540 (36.7) | 500 (34.0) | 450 (30.6) | 420 (28.6) | 350 (23.8) |

| INSIDE DIAM. | 3" (7.62cm) | 3 1/2" (8.89cm) | 4" (10.16cm) | 5" (12.7cm) | 6" (15.24cm) | 8" (20.32cm) | 10" (25.40cm) | 12" (30.48cm) | 14" (35.56cm) | 16" (40.64cm) |
|--|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|---------------|---------------|---------------|
| LIVE LENGTH | 5 3/4" (14.6cm) | 5 3/4" (14.6cm) | 5 3/4" (14.6cm) | 7 1/2" (19.05cm) | 7 1/2" (19.05cm) | 8" (20.32cm) | 9" (22.86cm) | 10" (25.40cm) | 10" (25.40cm) | 10" (25.40cm) |
| OVERALL LENGTH | M or W | 13 3/4" (35.56cm) | 13 3/4" (35.56cm) | 13 3/4" (35.56cm) | 17 1/2" (45.72cm) | 17 1/2" (45.72cm) | - | - | - | - |
| | SOF or PLATE | 9" (22.86cm) | 9" (22.86cm) | 9" (22.86cm) | 11" (27.94cm) | 11" (27.94cm) | 12" (30.48cm) | 13" (33.02cm) | 14" (34.56cm) | 14" (34.56cm) |
| | RF | 13 1/4" (33.66cm) | 13 1/4" (33.66cm) | 13 1/4" (33.66cm) | 16 1/2" (41.91cm) | 16 1/2" (41.91cm) | 18" (45.72cm) | - | - | - |
| | FRF | 11" (27.94cm) | 11" (27.94cm) | 11" (27.94cm) | 13" (33.02cm) | 13" (33.02cm) | 14" (34.56cm) | 13" (33.02cm) | 16" (40.64cm) | 16" (40.64cm) |
| MAX. WORKING PRESSURE (Atmos. @ 21°C) | 315 (21.4) | 300 (20.4) | 270 (18.4) | 200 (13.6) | 185 (12.6) | 180 (12.2) | 150 (10.2) | 130 (8.8) | 110 (7.5) | 100 (6.8) |

Numbers in parentheses are metric equivalents.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

STANDARD FLEXIBLE EXHAUST ASSEMBLIES



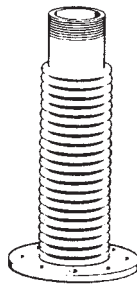
TYPE SS
SLIP X SLIP



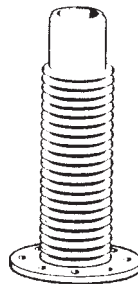
TYPE M
NPT X NPT



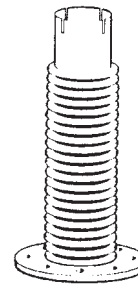
TYPE SM
SLIP X NPT



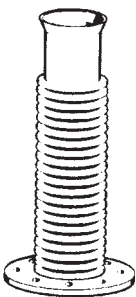
TYPE MA
NPT X FLANGE



TYPE WA
WELD END X FLANGE



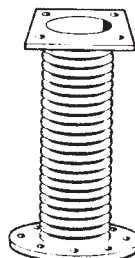
TYPE SA
FLANGE X SLIP



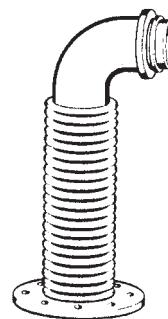
TYPE DA
DETROIT MARMOM
X FLANGE



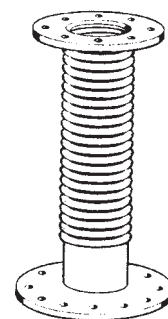
TYPE DM
DETROIT
MARMOM X NPT



TYPE KA
CAT FLANGE
X FLANGE



TYPE TA
FLANGE X ELBOW,
TURBO



TYPE XKA
FLANGE X CONCENTRIC
INCREASER FLANGE

EXHAUST ASSEMBLIES ARE MADE TO ANY LENGTH REQUIRED.
STANDARD ASSEMBLIES ARE PROVIDED IN TYPE 321 STAINLESS STEEL WITH CARBON STEEL END FITTINGS.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.





ANNULAR CORRUGATED HOSE

We specialize in a complete line of corrugated hose assemblies for any length, size and configuration. We manufacture our own lightweight steel plate flanges, drilled to 150 ASA specifications. We stock special engine flanges for ALCO, Allis-Chalmers, Caterpillar, Cummins and Detroit Diesel.

END FITTINGS
First two characters denote end fittings—

125/150 # ASA drilled plate flange

Cummins special drilled plate flange

Detroit/Marmon 20 degree flare tube

Caterpillar special drilled plate flange

National pipe thread (male)

Standard pipe weld end

ORDERING INFORMATION

FLEX SECTION

Second Two characters (separated by decimal point)* indicate inside diameter

Last character indicates type of material
c-carbon steel
s-stainless steel

*Decimal point and zero can be omitted to simplify ordering

5

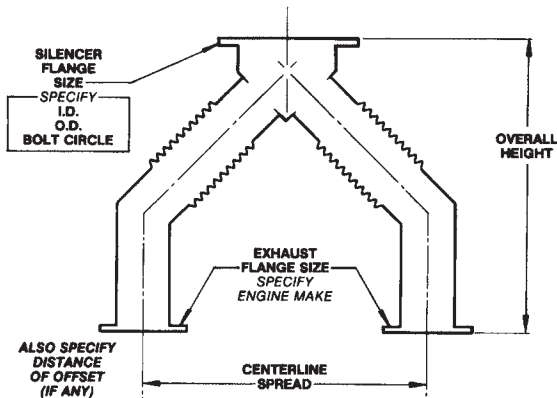
STAINLESS STEEL CONNECTORS

| NOMINAL HOSE I.D. | NOMINAL HOSE O.D. PER FOOT | APPROX. WEIGHT RADIUS | MIN. STATIC INSIDE BEND (Intermittent Flexing) | MIN. INSIDE BEND RADIUS (Per Foot) | MAX. LATERAL OFFSET (Per Foot) | MAX. AXIAL MOVEMENT (ATM = 1) | MAX. OPERATING PRESSURE | MAX. OPERATING TEMP. |
|-------------------|----------------------------|-----------------------|--|------------------------------------|--------------------------------|-------------------------------|-------------------------|----------------------|
| 1.5" (3.81cm) | 2.19" (5.56cm) | 1.27 lb. (2.024 kg) | 2.7" (6.86cm) | 28" (71.12cm) | 1.25 (10.42) | .14 (1.17) | 50 (4.40) | 1500°F (815.6°C) |
| 2" (5.04cm) | 2.75" (6.98cm) | 1.35 lb. (2.010 kg) | 3.5" (8.89cm) | 36" (91.44cm) | .96 (8.00) | .14 (1.17) | 45 (4.06) | 1500°F (815.6°C) |
| 2.5" (6.35cm) | 3.17" (8.05cm) | 1.50 lb. (2.232 kg) | 4.0" (10.16cm) | 46" (116.84cm) | .82 (6.82) | .22 (1.83) | 30 (3.04) | 1500°F (815.6°C) |
| 3" (7.62cm) | 3.75" (9.53cm) | 2.13 lb. (3.169 kg) | 4.7" (11.94cm) | 55" (139.70cm) | .74 (6.17) | .22 (1.83) | 30 (3.04) | 1500°F (815.6°C) |
| 3.5" (8.89cm) | 4.30" (10.92cm) | 2.13 lb. (3.169 kg) | 5.5" (13.97cm) | 60" (152.40cm) | .65 (5.41) | .22 (1.83) | 25 (2.70) | 1500°F (815.6°C) |
| 4" (10.16cm) | 4.82" (12.24cm) | 2.64 lb. (3.928 kg) | 6.1" (15.49cm) | 65" (165.10cm) | .60 (4.99) | .22 (1.83) | 20 (2.36) | 1500°F (815.6°C) |
| 5" (12.70cm) | 5.87" (14.91cm) | 3.62 lb. (5.387 kg) | 7.5" (19.05cm) | 89" (226.06cm) | .47 (3.94) | .22 (1.83) | 20 (2.36) | 1500°F (815.6°C) |
| 6" (15.24cm) | 6.94" (17.63cm) | 4.00 lb. (5.952 kg) | 8.5" (21.59cm) | 103" (261.62cm) | .42 (3.51) | .22 (1.83) | 18 (2.22) | 1500°F (815.6°C) |
| 8" (20.32cm) | 9.00" (22.86cm) | 4.82 lb. (7.172 kg) | 11.0" (27.94cm) | 155" (393.70cm) | .30 (2.49) | .22 (1.83) | 16 (2.08) | 1500°F (815.6°C) |
| 10" (25.40cm) | 11.00" (27.94cm) | 5.70 lb. (8.482 kg) | 13.6" (34.54cm) | 163" (414.20cm) | .20 (1.67) | .22 (1.83) | 10 (1.68) | 1500°F (815.6°C) |
| 12" (30.48cm) | 13.00" (33.02cm) | 6.4 lb. (9.523 kg) | 16.5" (41.91cm) | 188" (477.52cm) | .17 (1.41) | .22 (1.83) | 10 (1.68) | 1500°F (815.6°C) |
| 14" (35.56cm) | 14.37" (36.50cm) | 7.2 lb. (10.714 kg) | 19.0" (48.26cm) | 221" (561.34cm) | .15 (1.25) | .22 (1.83) | 10 (1.68) | 1500°F (815.6°C) |
| 16" (40.64cm) | 16.37" (41.58cm) | 8.6 lb. (12.796 kg) | 22.0" (55.88cm) | 267" (678.18cm) | .13 (1.08) | .22 (1.83) | 10 (1.68) | 1500°F (815.6°C) |

Numbers in parentheses are metric equivalents.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

FLEXIBLE EXHAUST Y-CONNECTIONS



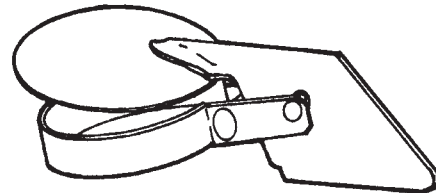
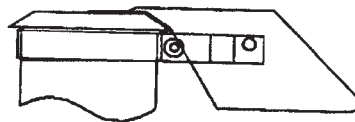
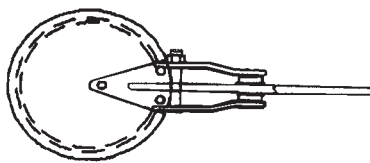
'Y' JOINTS

Valley Forge "Y" Joints feed dual exhaust engines into single flow systems using a single silencer. Corrugated flexible hose in the "Y" isolates engine vibration and helps to compensate for misalignment. Flexible legs of the "Y" can be stainless steel or carbon steel. Carbon steel can be used for operating temperatures up to 850°F. Valley Forge can supply "Y" joints for the largest Detroit Diesel and Cummins dual exhaust engines. The joint that appears above is a Detroit Diesel 16V149T. The photo to the left shows a joint with an offset that is for a Cummins VT1710. Just specify engine make, operating temperature range and dimensions shown in the drawing to the above left.



5

EXHAUST RAIN CAPS



AVAILABLE IN SIZES FROM 1.25" TO 16"

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

INSULATION BLANKETS



Removable insulation blankets are made to fit your personal application. The use of removable insulation blankets has many advantages:

- Easy installation
- Reusable time and again
- Reduced down time
- Improved energy efficient
- Lower maintenance costs
- Reduced risk of burns in high-traffic areas
- Reduce equipment noise

A insulation blanket consists of a ceramic-fiber blanket sewn into a cover. The cover can be made in a variety of materials, the most common of which are silicon-coated cloth, fiberglass cloth or wire mesh. Or you can use any combination of the components, including all three. You also have the option of using Velcro® straps, drawstrings or wire sewn into the blanket to close up the ends.

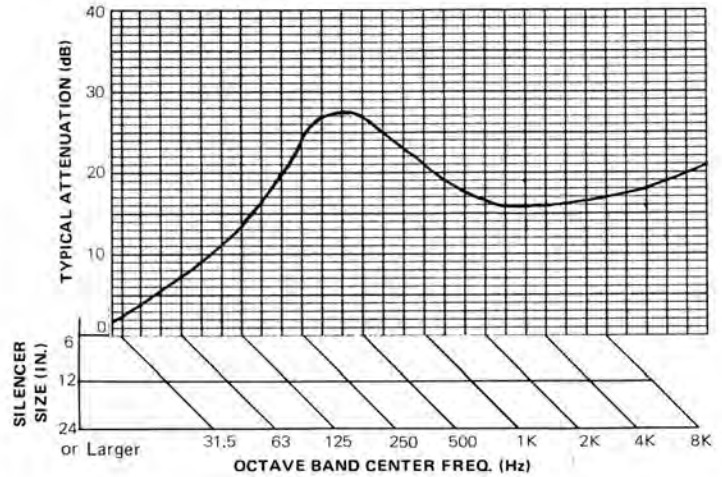
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MAXIM® SILENCERS

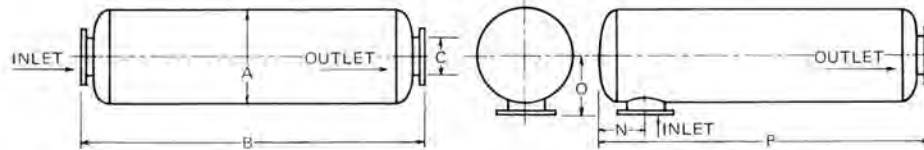


MAXIM® MODEL M21 SILENCERS, ACCESSORIES AND STANDARD MODIFICATIONS

Handholes for cleaning and companion flanges are available as optional accessories at additional charge. All models can be supplied with a side inlet or side outlet connection to facilitate installation. The tables for the M21 Silencer indicate minimum and maximum locations of side outlet connections.



FLANGE CONNECTIONS CONFORM TO AMERICAN STANDARD 125-150 POUND DRILLING



5

| DIMENSIONS IN INCHES | | | | | | | | EST. WT. (Lbs.) |
|----------------------|-----|------|-----|---------|---------|---------|----------|-----------------|
| SIZE | A | B | C | N | | O | P | |
| | | | | MIN. | MAX. | | | |
| 4" | 14" | 34" | 4" | 5 1/2" | 14" | 10" | 31" | 80 |
| 5" | 16" | 39" | 5" | 6 1/2" | 16" | 11" | 36 1/2" | 110 |
| 6" | 18" | 45" | 6" | 7" | 19" | 12" | 42 1/4" | 145 |
| 8" | 22" | 56" | 8" | 8 1/2" | 25" | 14" | 53 1/2" | 265 |
| 10" | 26" | 59" | 10" | 10 1/2" | 24 1/2" | 16 1/2" | 56" | 380 |
| 12" | 30" | 69" | 12" | 12" | 30" | 18 1/2" | 66 1/4" | 570 |
| 14" | 36" | 77" | 14" | 14" | 33" | 21 1/2" | 74 1/4" | 745 |
| 16" | 40" | 87" | 16" | 17" | 39" | 23 1/2" | 84 1/2" | 1090 |
| 18" | 45" | 100" | 18" | 19" | 44" | 26 1/2" | 97" | 1430 |
| 20" | 50" | 108" | 20" | 21" | 47" | 29" | 105 1/4" | 1790 |
| 22" | 54" | 116" | 22" | 22" | 51" | 31" | 113 1/4" | 2210 |
| 24" | 60" | 128" | 24" | 24" | 57" | 34" | 125 1/4" | 2645 |
| 26" | 64" | 136" | 26" | 26" | 62" | 36" | 133 1/2" | 2950 |
| 28" | 68" | 151" | 28" | 27" | 70" | 38" | 148 3/4" | 3840 |
| 30" | 72" | 162" | 30" | 29" | 75" | 40" | 159 3/4" | 4470 |

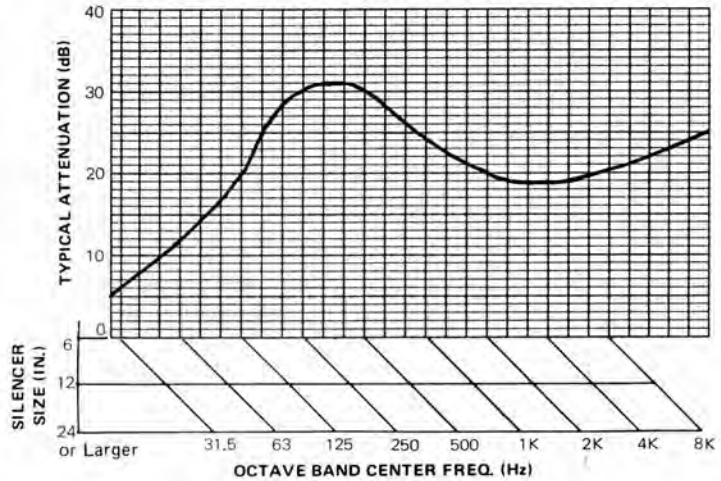
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MAXIM® SILENCERS

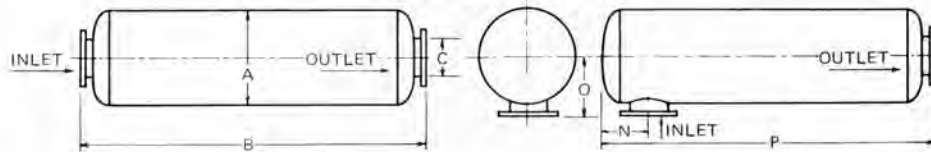


MAXIM® MODEL M31 SILENCERS, ACCESSORIES AND STANDARD MODIFICATIONS

Handholes for cleaning and companion flanges are available as optional accessories at additional charge. All models can be supplied with a side inlet or side outlet connection to facilitate installation. The tables for the M31 Silencer indicate minimum and maximum locations of side outlet connections.



FLANGE CONNECTIONS CONFORM TO AMERICAN STANDARD
125-150 POUND DRILLING



| DIMENSIONS IN INCHES | | | | | | | | |
|----------------------|-----|------|-----|---------|---------|---------|----------|-----------------|
| SIZE | A | B | C | N | | O | P | EST. WT. (Lbs.) |
| | | | | MIN. | MAX. | | | |
| 4" | 14" | 48" | 4" | 5 1/2" | 22" | 10" | 45" | 110 |
| 5" | 16" | 55" | 5" | 6 1/2" | 25" | 11" | 52 1/4" | 120 |
| 6" | 18" | 63" | 6" | 7" | 29 1/2" | 12" | 60 1/4" | 170 |
| 8" | 22" | 76" | 8" | 8 1/2" | 36 1/2" | 14" | 73 1/2" | 285 |
| 10" | 26" | 91" | 10" | 10 1/2" | 43" | 16 1/2" | 88" | 460 |
| 12" | 30" | 109" | 12" | 12" | 53" | 18 1/2" | 106 1/4" | 745 |
| 14" | 36" | 102" | 14" | 14" | 48" | 21 1/2" | 99 1/4" | 965 |
| 16" | 40" | 119" | 16" | 17" | 56" | 23 1/2" | 116 1/2" | 1340 |
| 18" | 45" | 127" | 18" | 19" | 60" | 26 1/2" | 124" | 1850 |
| 20" | 50" | 144" | 20" | 21" | 69" | 29" | 141 1/4" | 2175 |
| 22" | 54" | 161" | 22" | 22" | 78" | 31" | 158 1/4" | 2650 |
| 24" | 60" | 165" | 24" | 24" | 79" | 34" | 162 1/4" | 3400 |
| 26" | 64" | 183" | 26" | 26" | 89" | 36" | 180 1/2" | 3850 |
| 28" | 68" | 200" | 28" | 27" | 98" | 38" | 197 3/4" | 4840 |
| 30" | 72" | 216" | 30" | 29" | 107" | 40" | 213 3/4" | 5150 |

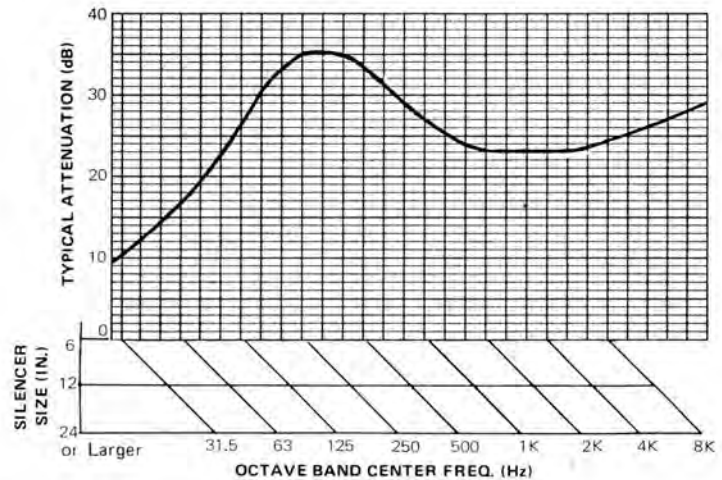
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MAXIM® SILENCERS

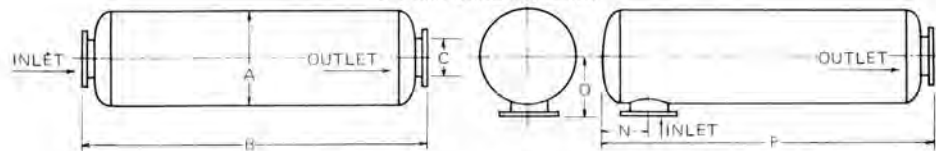


MAXIM MODEL M41 SILENCERS, ACCESSORIES AND STANDARD MODIFICATIONS

Handholes for cleaning and companion flanges are available as optional accessories at additional charge. All models can be supplied with a side inlet or side outlet connection to facilitate installation. The tables for the M41 Silencer indicate minimum and maximum locations of side outlet connections.



FLANGE CONNECTIONS CONFORM TO AMERICAN STANDARD 125-150 POUND DRILLING



5

| DIMENSIONS IN INCHES | | | | | | | | |
|----------------------|-----|------|-----|--------|---------|---------|----------|-----------------|
| SIZE | A | B | C | N | | O | P | EST. WT. (Lbs.) |
| | | | | MIN. | MAX. | | | |
| 4" | 16" | 54" | 4" | 6" | 25" | 11" | 51" | 120 |
| 5" | 18" | 64" | 5" | 6 1/2" | 31" | 12" | 61 1/4" | 170 |
| 6" | 22" | 72" | 6" | 8" | 35" | 14" | 69 1/4" | 255 |
| 8" | 26" | 85" | 8" | 9 1/2" | 41 1/2" | 16" | 82 1/2" | 390 |
| 10" | 30" | 103" | 10" | 11" | 50" | 18 1/2" | 100" | 670 |
| 12" | 36" | 118" | 12" | 13" | 58" | 21 1/2" | 115" | 1010 |
| 14" | 40" | 117" | 14" | 16" | 56" | 23 1/2" | 114" | 1300 |
| 16" | 45" | 134" | 16" | 18" | 65" | 26" | 131" | 1830 |
| 18" | 50" | 152" | 18" | 20" | 74" | 29" | 149" | 2350 |
| 20" | 54" | 175" | 20" | 21" | 87" | 31" | 172" | 2870 |
| 22" | 60" | 185" | 22" | 23" | 92" | 34" | 182" | 3470 |
| 24" | 64" | 208" | 24" | 25" | 105" | 36" | 205 1/4" | 4450 |
| 26" | 68" | 228" | 26" | 26" | 115" | 38" | 225 1/4" | 5500 |
| 28" | 72" | 253" | 28" | 28" | 128" | 4" | 250 1/2" | 6240 |
| 30" | 78" | 262" | 30" | 30" | 133" | 43" | 259 1/2" | 7150 |

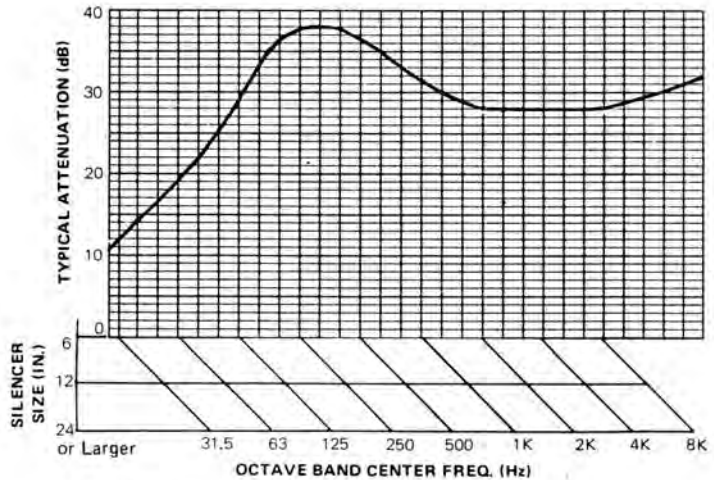
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MAXIM® SILENCERS

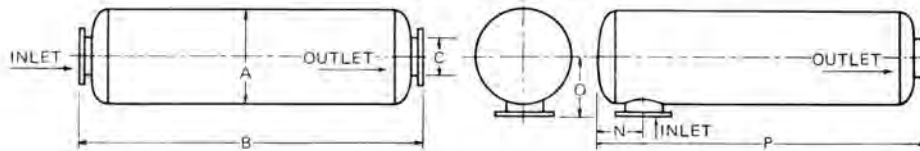


MAXIM® MODEL M51 SILENCERS, ACCESSORIES AND STANDARD MODIFICATIONS

Handholes for cleaning and companion flanges are available as optional accessories at additional charge. All models can be supplied with a side inlet or side outlet connection to facilitate installation. The tables for the M51 Silencer indicate minimum and maximum locations of side outlet connections.



FLANGE CONNECTIONS CONFORM TO AMERICAN STANDARD
125-150 POUND DRILLING



| DIMENSIONS IN INCHES | | | | | | | | |
|----------------------|---------|------|--------|---------|---------|---------|----------|-----------------|
| SIZE | A | B | C | N | | O | P | EST. WT. (Lbs.) |
| | | | | MIN. | MAX. | | | |
| 1 1/2"* | 7" | 26" | 1 1/2" | 3" | 11" | 6 1/2" | 24" | 13 |
| 2"* | 10 1/4" | 25" | 2" | 3 1/2" | 10 1/2" | 8" | 23" | 20 |
| 2 1/2"* | 12" | 36" | 2 1/2" | 4 1/2" | 15 1/2" | 9" | 33 1/4" | 35 |
| 3"* | 14" | 45" | 3" | 5 1/4" | 21 1/4" | 10" | 42 1/2" | 80 |
| 3 1/2"* | 16" | 53" | 3 1/2" | 6" | 25" | 11" | 50 1/4" | 95 |
| 4" | 18" | 64" | 4" | 6 1/2" | 31" | 12" | 61 1/4" | 200 |
| 5" | 22" | 72" | 5" | 8" | 35" | 14" | 69 1/4" | 285 |
| 6" | 26" | 85" | 6" | 9" | 41 1/2" | 16" | 82 1/2" | 370 |
| 8" | 30" | 103" | 8" | 10 1/2" | 50" | 18 1/2" | 100" | 585 |
| 10" | 36" | 118" | 10" | 12 1/2" | 59" | 21 1/2" | 115" | 860 |
| 12" | 36" | 146" | 12" | 13" | 58" | 21 1/2" | 143" | 1295 |
| 14" | 40" | 145" | 14" | 16 1/2" | 56" | 23 1/2" | 142" | 1450 |
| 16" | 45" | 164" | 16" | 18" | 63" | 26" | 161 1/4" | 2030 |
| 18" | 50" | 188" | 18" | 20" | 74" | 29" | 185" | 2520 |
| 20" | 54" | 217" | 20" | 21" | 84" | 31" | 214" | 3090 |
| 22" | 60" | 230" | 22" | 23" | 92" | 34" | 227" | 3930 |
| 24" | 64" | 258" | 24" | 25" | 105" | 36" | 255 1/4" | 4550 |
| 26" | 68" | 283" | 26" | 26" | 115" | 38" | 280 1/4" | 6830 |
| 28" | 72" | 315" | 28" | 28" | 128" | 40" | 312 1/4" | 7560 |
| 30" | 78" | 326" | 30" | 30" | 133" | 43" | 323 1/2" | 8760 |

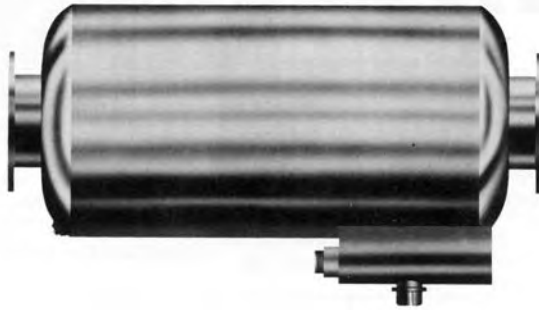
*Sizes 3 1/2" and smaller have NPT connections



NOTE: SIDE INLET OPTIONAL AT EXTRA COST THRU 12" SIZE

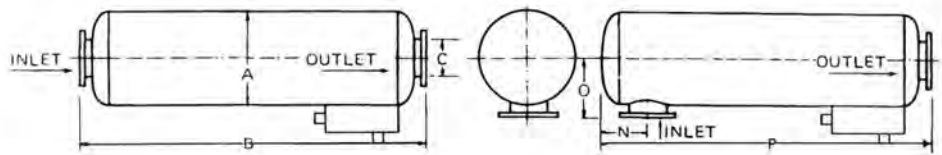
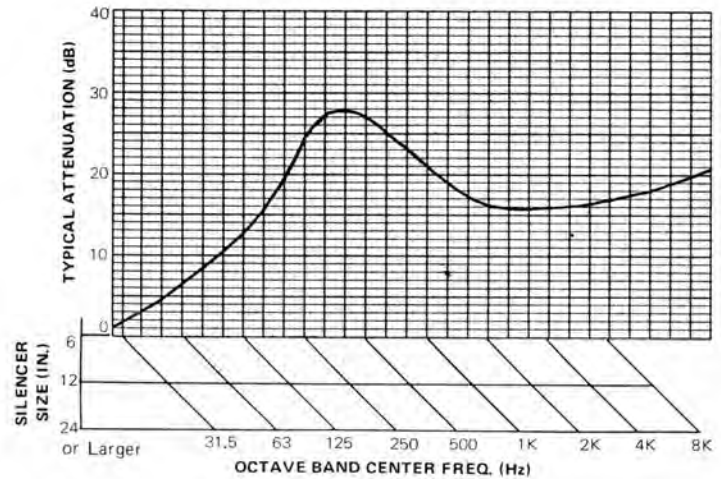
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MAXIM® SILENCERS



MSA1 SPARK ARRESTOR SILENCERS

Flange Connections Conform to American Standard 125-150 Pound Drilling



5

| DIMENSIONS IN INCHES | | | | | | | EST. WT. (Lbs.) |
|----------------------|---------|------|--------|---------|---------|----------|--------------------|
| SIZE | A | B | C | N | O | P | |
| 1 1/2"* | 8 1/2" | 20" | 1 1/2" | - | - | - | 17 |
| 2"* | 8 1/2" | 21" | 2" | - | - | - | 19 |
| 2 1/2"* | 10 1/4" | 22" | 2 1/2" | - | - | - | 26 |
| 3"* | 12" | 26" | 3" | - | - | - | 36 |
| 3 1/2"* | 14" | 30" | 3 1/2" | - | - | - | 55 |
| 4" | 14" | 34" | 4" | 5 1/2" | 10" | 31" | 80 |
| 5" | 16" | 39" | 5" | 6 1/2" | 11" | 36 1/2" | 110 |
| 6" | 18" | 45" | 6" | 7" | 12" | 42 1/2" | 145 |
| 8" | 22" | 56" | 8" | 8 1/2" | 14" | 53 1/2" | 265 |
| 10" | 26" | 59" | 10" | 10 1/2" | 16 1/2" | 56" | 380 |
| 12" | 30" | 69" | 12" | 12" | 18 1/2" | 66 1/4" | 570 |
| 14" | 36" | 77" | 14" | 14" | 21 1/2" | 74 1/2" | 745 |
| 16" | 40" | 87" | 16" | 17" | 23 1/2" | 84 1/2" | 1090 |
| 18" | 45" | 100" | 18" | 19" | 26 1/2" | 97" | 1430 |
| 20" | 50" | 108" | 20" | 21" | 29" | 105 1/4" | 1790 |
| 22" | 54" | 116" | 22" | 22" | 31" | 113 1/4" | 2210 |
| 24" | 60" | 128" | 24" | 24" | 34" | 125 1/4" | 2645 |
| 26" | 64" | 136" | 26" | 26" | 36" | 133 1/2" | 2950 |
| 28" | 68" | 151" | 28" | 27" | 38" | 148 3/4" | 3840 |
| 30" | 72" | 162" | 30" | 29" | 40" | 159 3/4" | 4470 |

*Sizes 3 1/2" and smaller have NPT connections



Data on larger sizes available on request.

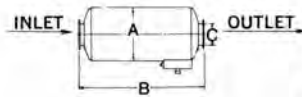
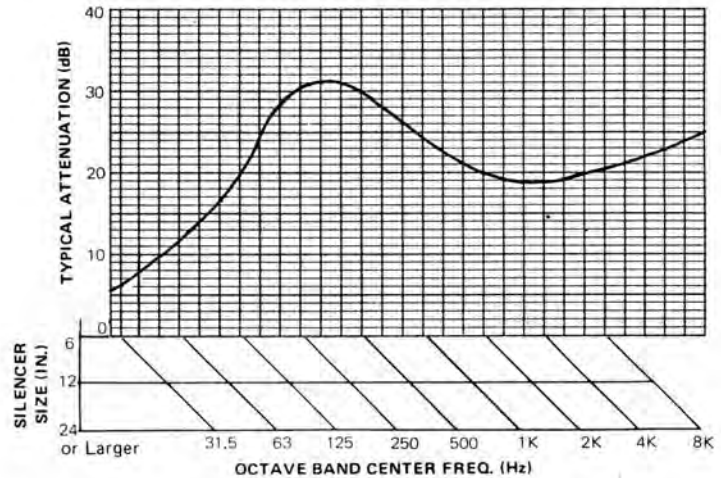
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MAXIM® SILENCERS



MSA2 SPARK ARRESTOR SILENCERS

The MSA2 Maxim® Spark Arrestor Silencer is a highly efficient spark arrestor with a high silencing performance. This silencer removes hot carbon particles from the exhaust and is designed for application to the exhaust system of internal combustion engines where a fire hazard or dirt nuisance would exist from particles of carbon or ash in the exhaust stream.



*Sizes 3 1/2" and smaller have NPT connections

EXHAUST RAINCAPS & EXHAUST SYSTEM INSULATION ALSO AVAILABLE

| DIMENSIONS IN INCHES | | | | |
|----------------------|---------|------|--------|-----------------|
| SIZE | A | B | C | EST. WT. (Lbs.) |
| 1 1/2"* | 8 1/2" | 30" | 1 1/2" | 23 |
| 2"* | 8 1/2" | 30" | 2" | 24 |
| 2 1/2"* | 10 1/4" | 34" | 2 1/2" | 36 |
| 3"* | 12" | 38" | 3" | 48 |
| 3 1/2"* | 14" | 42" | 3 1/2" | 70 |
| 4" | 14" | 48" | 4" | 110 |
| 5" | 16" | 55" | 5" | 120 |
| 6" | 18" | 63" | 6" | 170 |
| 8" | 22" | 76" | 8" | 285 |
| 10" | 26" | 91" | 10" | 460 |
| 12" | 30" | 109" | 12" | 745 |
| 14" | 36" | 102" | 14" | 965 |
| 16" | 40" | 119" | 16" | 1340 |
| 18" | 45" | 127" | 18" | 1850 |
| 20" | 50" | 144" | 20" | 2175 |
| 22" | 54" | 161" | 22" | 2650 |
| 24" | 60" | 165" | 24" | 3400 |
| 26" | 64" | 183" | 26" | 3850 |
| 28" | 68" | 200" | 28" | 4840 |
| 30" | 72" | 216" | 30" | 5150 |

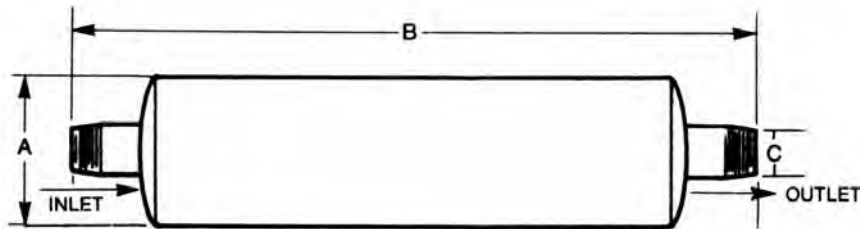
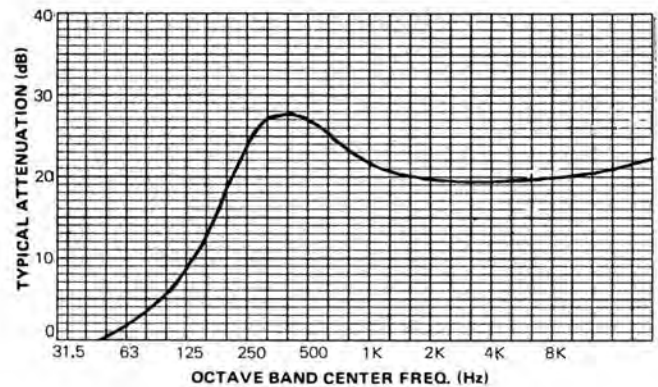
Data on larger sizes available on request.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MUL MODEL



Maxim Model MUL Silencers will provide good silencing characteristics over a wide frequency range. They are designed for the smaller size engines, those with exhaust pipes sizes from 1" to 3 1/2". Of advanced and efficient design, the Maxim line of silencers offers the purchase an opportunity to buy the degree of silencing desired for a particular location.



| DIMENSIONS IN INCHES | | | | |
|----------------------|---------|---------|--------|-----------------|
| SIZE | A | B | C | EST. WT. (Lbs.) |
| 1" | 4 5/8" | 14 1/2" | 1" | 6 |
| 1 1/2" | 5 3/4" | 28" | 1 1/2" | 14 |
| 2" | 7" | 34 1/4" | 2" | 22 |
| 2 1/2" | 8 1/2" | 42" | 2 1/2" | 34 |
| 3" | 10 1/4" | 46" | 3" | 50 |
| 3 1/2" | 12" | 50" | 3 1/2" | 65 |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MAXIM® SILENCERS

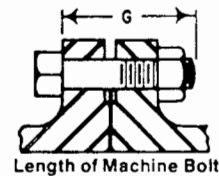
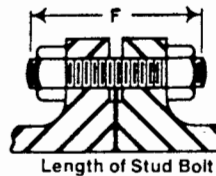
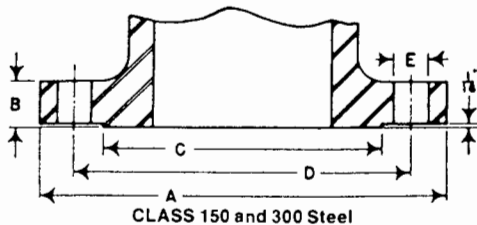
ORDERING INFORMATION

Sizing data requested is the minimum required to size a silencer. Other pertinent data such as connection sizes, degree of silencing desired, support arrangements, material of construction, installation arrangement, etc. are helpful in determining the best silencer application. Please provide as much information about your system as possible.

ENGINE EXHAUST

Models M21, M31, M41, M51, MSA1, MSA2, MSA3, MSA4, MUL

1. Silencer Model Considered _____
2. Maximum Exhaust Gas Flow Rate _____ ACFM _____ PPH
3. Maximum Exhaust Gas Temperature _____ °F _____ °C
4. Maximum Allowable Press. Drop _____ Inches WC
5. Other Considerations _____



Class 150 Steel Flange Dimensions

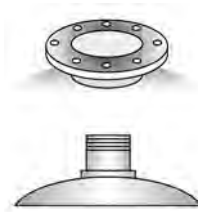
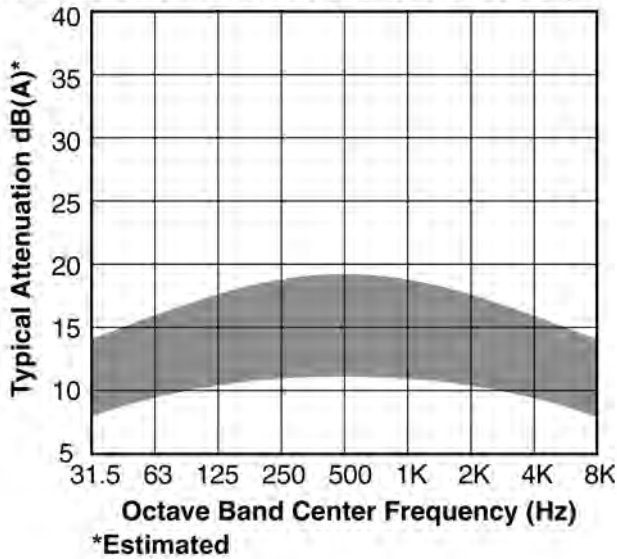
Dimensions in Inches

| Nominal Pipe Size | Flange Diameter A | Flange Thickness Companion Flange B | Valve Flange B | Diameter of Raised Face C | Diameter of Bolt Circle D | Diameter of Bolt Holes E | Number of Bolts | Diameter of Bolts | Length of Stud Bolts with 2 Nuts F | Length of Machine Bolts G |
|-------------------|-------------------|-------------------------------------|----------------|---------------------------|---------------------------|--------------------------|-----------------|-------------------|------------------------------------|---------------------------|
| 1/2 | 3-1/2 | 7/16 | ----- | 1-3/8 | 2-3/8 | 5/8 | 4 | 1/2 | 2-1/4 | 1-3/4 |
| 3/4 | 3-7/8 | 1/2 | ----- | 1-11/16 | 2-3/4 | 5/8 | 4 | 1/2 | 2-1/4 | 2 |
| 1 | 4-1/4 | 9/16 | 7/16 | 2 | 3-1/8 | 5/8 | 4 | 1/2 | 2-1/2 | 2 |
| 1-1/4 | 4-5/8 | 5/8 | 1/2 | 2-1/2 | 3-1/2 | 5/8 | 4 | 1/2 | 2-1/2 | 2-1/4 |
| 1-1/2 | 5 | 11/16 | 9/16 | 2-7/8 | 3-7/8 | 5/8 | 4 | 1/2 | 2-3/4 | 2-1/4 |
| 2 | 6 | 3/4 | 5/8 | 3-5/8 | 4-3/4 | 3/4 | 4 | 5/8 | 3 | 2-3/4 |
| 2-1/2 | 7 | 7/8 | 11/16 | 4-1/8 | 5-1/2 | 3/4 | 4 | 5/8 | 3-1/4 | 3 |
| 3 | 7-1/2 | 15/16 | 3/4 | 5 | 6 | 3/4 | 4 | 5/8 | 3-1/2 | 3 |
| 3-1/2 | 8-1/2 | 15/16 | 13/16 | 5-1/2 | 7 | 3/4 | 8 | 5/8 | 3-1/2 | 3 |
| 4 | 9 | 15/16 | 13/16 | 6-3/16 | 7-1/2 | 3/4 | 8 | 5/8 | 3-1/2 | 3 |
| 5 | 10 | 15/16 | 1 | 7-5/16 | 8-1/2 | 7/8 | 8 | 3/4 | 3-3/4 | 3-1/4 |
| 6 | 11 | 1 | 1 | 8-1/2 | 9-1/2 | 7/8 | 8 | 3/4 | 3-3/4 | 3-1/4 |
| 8 | 13-1/2 | 1-1/8 | 1-1/8 | 10-5/8 | 11-3/4 | 7/8 | 8 | 3/4 | 4 | 3-1/2 |
| 10 | 16 | 1-3/16 | 1-3/16 | 12-3/4 | 14-1/4 | 1 | 12 | 7/8 | 4-1/2 | 3-3/4 |
| 12 | 19 | 1-1/4 | 1-1/4 | 15 | 17 | 1 | 12 | 7/8 | 4-1/2 | 4 |



100 LEVEL EXHAUST SILENCERS

Typical Attenuation Curve dB(A)*
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)

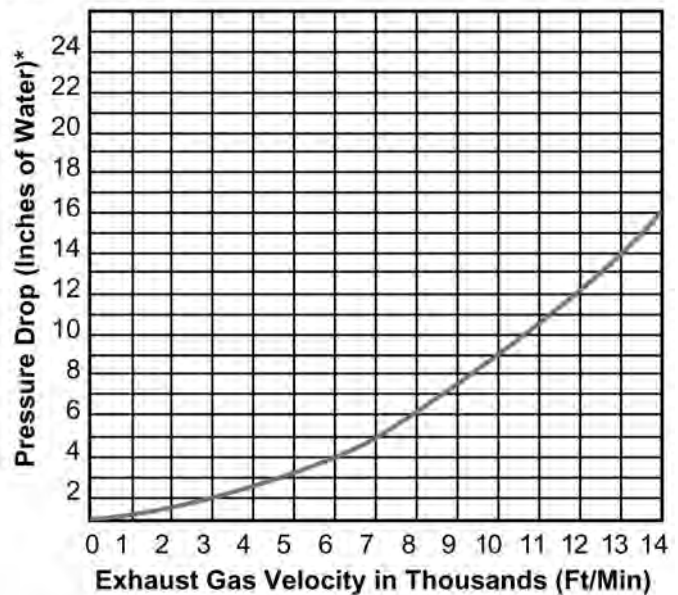


"F" Mounting Flange:
Standard in sizes 4" to 22". Drilling matches 125/150# ASA standard.

"P" Male Pipe Threads:
NPT ends offered in sizes 3/4" through 4".

Companion flanges available for 4" to 22".

Pressure Drop



Note: When figuring pressure drop for side inlet add 3" H₂O to back pressure shown on above curve.

*Estimated

Application:

These silencers are recommended where minimum silencing is required and ambient noise levels are medium to high.

Construction:

Aluminized Steel: Nelson Silencers through 26" O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

Mild Steel/Aluminized Steel: Nelson Silencers 30" O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30" O.D. through 36" O.D. have aluminized steel bodies with all other components fabricated from mild steel. Silencers 42" O.D. and larger are fabricated from mild steel.

Silicone Aluminum Paint: Nelson Silencers through 26" O.D. are given a coat of high heat resistant silicone aluminum paint.

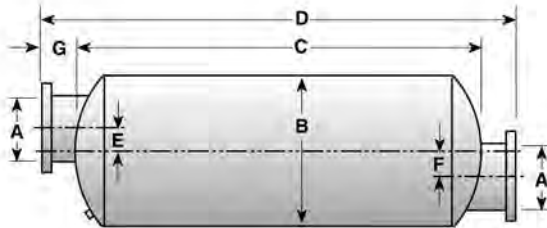
Primer/Silicone Aluminum Paint: Nelson Silencers 30" O.D. and larger are given a coat of high heat, rust inhibiting primer and then a top coat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

100 LEVEL EXHAUST SILENCERS

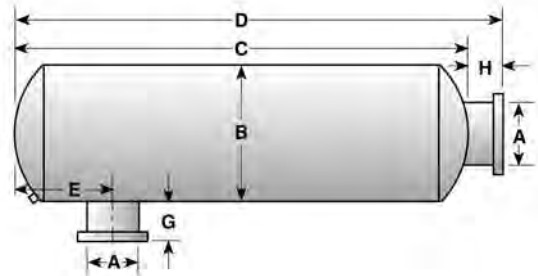


Type 1



| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|
| 41120 | 2.0 | 7.6 | 22.8 | 26.6 | 0 | 0 | 1.9 |
| 41125 | 2.5 | 8.1 | 27.2 | 32.6 | 0 | 0 | 2.7 |
| 41130 | 3.0 | 8.5 | 31.1 | 36.6 | 0 | 0 | 2.7 |
| 41135 | 3.5 | 9.0 | 32.8 | 37.6 | 0 | 0 | 2.4 |
| 41140* | 4.0 | 10.1 | 32.2 | 38.0 | 2.3 | 2.3 | 2.9 |
| 41150* | 5.0 | 12.1 | 32.3 | 37.9 | 2.8 | 2.8 | 2.8 |
| 41160* | 6.0 | 14.1 | 32.9 | 38.4 | 3.4 | 3.4 | 2.8 |
| 41180 | 8.0 | 18.1 | 48.8 | 58.0 | 0 | 0 | 4.6 |
| 41182 | 10.0 | 22.1 | 50.6 | 58.0 | 0 | 0 | 3.7 |
| 41184 | 12.0 | 22.2 | 65.6 | 73.0 | 0 | 0 | 3.7 |
| 41186 | 14.0 | 36.2 | 70.6 | 76.0 | 0 | 0 | 2.7 |
| 41188 | 16.0 | 42.2 | 84.2 | 90.8 | 0 | 0 | 3.3 |
| 41199 | 18.0 | 42.2 | 96.2 | 103.0 | 0 | 0 | 3.4 |
| 41121 | 20.0 | 48.3 | 98.4 | 104.0 | 0 | 0 | 2.8 |
| 41122 | 22.0 | 54.3 | 99.6 | 107.3 | 0 | 0 | 3.9. |

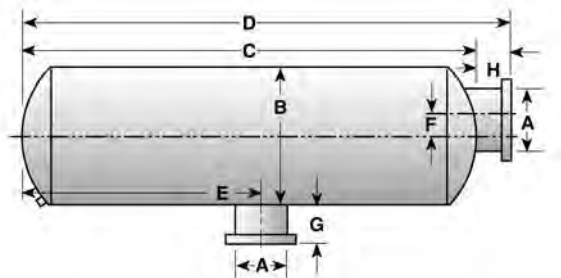
Type 3



| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|-------------------|--------------------|
| 43120 | 2.0 | 7.6 | 22.4 | 24.5 | 3.2 | 2.0 | 2.1 |
| 43125 | 2.5 | 8.1 | 27.7 | 30.2 | 3.9 | 2.5 | 2.4 |
| 43130 | 3.0 | 8.5 | 30.6 | 33.6 | 3.8 | 3.0 | 2.3 |
| 43135 | 3.5 | 9 | 32.8 | 35.4 | 4.9 | 3.0 | 2.6 |
| 43140 | 4.0 | 9 | 32.8 | 35.4 | 5.4 | 3.0 | 2.6 |
| 43150 | 5.0 | 12.1 | 30.4 | 34.2 | 5.7 | 4.0 | 3.8 |
| 43160 | 6.0 | 14.1 | 30.6 | 34.5 | 6.8 | 4.0 | 3.9 |
| 43180 | 8.0 | 18.1 | 48.4 | 53.2 | 9.2 | 4.0 | 4.8 |
| 43182 | 10.0 | 22.2 | 50.6 | 54.3 | 12.3 | 4.0 | 3.7 |
| 43184 | 12.0 | 22.2 | 65.6 | 69.3 | 14.3 | 4.0 | 3.7 |
| 43186 | 14.0 | 36.2 | 70.6 | 73.8 | 15.3 | 4.0 | 3.2 |
| 43188 | 16.0 | 42.2 | 84.2 | 87.5 | 18.1 | 4.0 | 3.3 |
| 43199 | 18.0 | 42.3 | 96.2 | 99.6 | 19.0 | 4.0 | 3.3 |
| 43121 | 20.0 | 48.3 | 97.9 | 101.2 | 20.0 | 4.0 | 3.3 |
| 43122 | 22.0 | 54.3 | 99.6 | 103.5 | 21.8 | 4.0 | 3.9 |

| Part Number | A Nominal Inlet Diameter | B Body Diameter O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|-------------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 44640 | 4.0 | 10.1 | 49.2 | 52.1 | 24.6 | 0 | 3.0 | 2.9 |
| 44650 | 5.0 | 14.1 | 43.6 | 47.5 | 21.8 | 2.6 | 4.0 | 3.9 |
| 44660 | 6.0 | 14.1 | 57.6 | 61.5 | 28.8 | 3.1 | 4.0 | 3.9 |
| 44680 | 8.0 | 22.1 | 54.6 | 58.3 | 26.3 | 0 | 4.0 | 3.7 |
| 44682 | 10.0 | 22.1 | 84.6 | 88.2 | 42.3 | 0 | 4.0 | 3.6 |
| 44684 | 12.0 | 26.1 | 79.5 | 83.4 | 39.9 | 0 | 4.0 | 3.6 |
| 44686 | 14.0 | 36.2 | 88.7 | 91.9 | 44.3 | 0 | 4.0 | 3.2 |

Type 4



*Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

Note: Specifications are subject to change without notice.
Note: All dimensions are in inches.

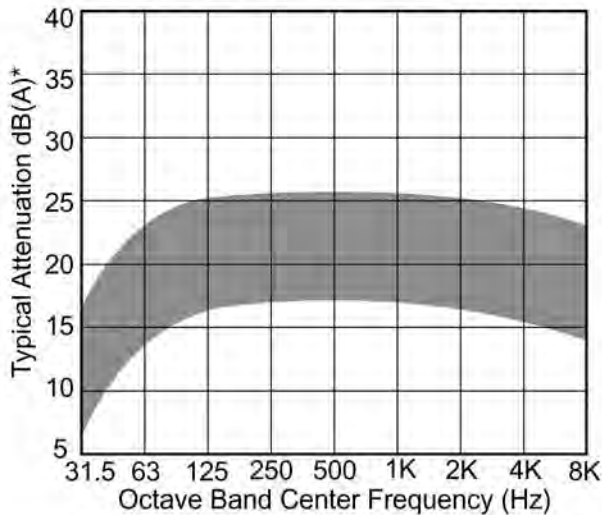
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.





200 LEVEL EXHAUST SILENCERS

Typical Attenuation Curve dB(A)*
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)



*Estimated

Application:

These silencers are recommended where minimum silencing is required and ambient noise levels are medium to high.

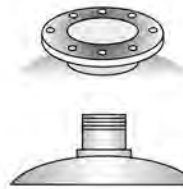
Construction:

Aluminized Steel: Nelson Silencers through 26" O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

Mild Steel/Aluminized Steel: Nelson Silencers 30" O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30" O.D. through 36" O.D. have aluminized steel bodies with all other components fabricated from mild steel. Silencers 42" O.D. and larger are fabricated from mild steel.

Silicone Aluminum Paint: Nelson Silencers through 26" O.D. are given a coat of high heat resistant silicone aluminum paint.

Primer/Silicone Aluminum Paint: Nelson Silencers over 30" O.D. and larger are given a coat of high heat, rust inhibiting primer and then a top coat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.



"F" Mounting Flange:

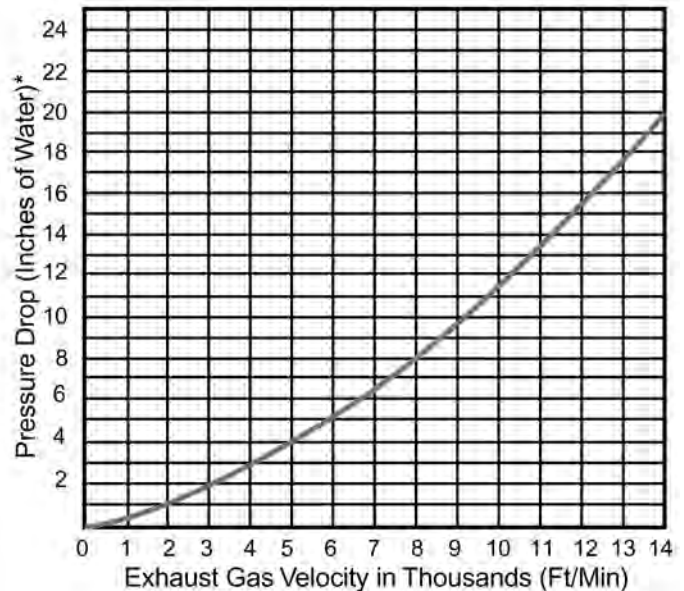
Standard in sizes 4" to 22". Drilling matches 125/150# ASA standard.

"P" Male Pipe Threads:

NPT ends offered in sizes 3/4" through 4".

Companion flanges available for 4" to 22".

Pressure Drop



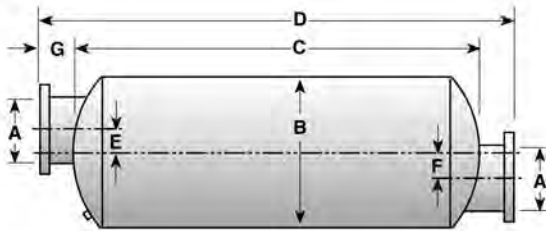
Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

*Estimated

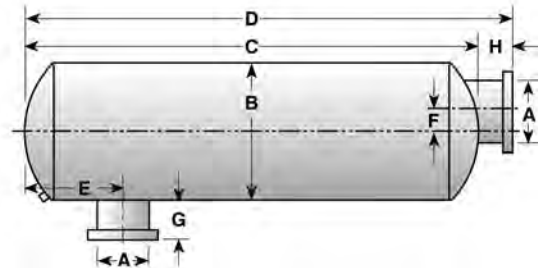
200 LEVEL EXHAUST SILENCERS



Type 1



Type 3

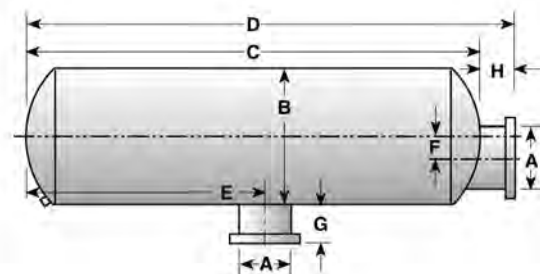


| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|
| 41220* | 2.0 | 8.1 | 31.7 | 35.6 | 1.25 | 1.25 | 1.9 |
| 41225* | 2.5 | 9.0 | 38.8 | 42.8 | 1.50 | 1.50 | 2.0 |
| 41230* | 3.0 | 10.1 | 38.2 | 44.0 | 2.75 | 2.75 | 2.9 |
| 41235* | 3.5 | 10.1 | 44.2 | 50.0 | 2.06 | 2.06 | 2.9 |
| 41240* | 4.0 | 10.1 | 49.2 | 55.0 | 2.31 | 2.31 | 2.9 |
| 41250* | 5.0 | 14.1 | 43.5 | 51.4 | 3.61 | 3.61 | 4.0 |
| 41260* | 6.0 | 14.1 | 57.5 | 65.4 | 3.60 | 3.60 | 4.0 |
| 41280 | 8.0 | 22.2 | 56.6 | 64.0 | 0 | 0 | 3.7 |
| 41282 | 10.0 | 22.2 | 84.7 | 92.0 | 0 | 0 | 3.7 |
| 41284 | 12.0 | 26.2 | 79.7 | 87.0 | 0 | 0 | 3.7 |
| 41286 | 14.0 | 36.2 | 94.6 | 101.0 | 0 | 0 | 3.2 |
| 41288 | 16.0 | 42.2 | 108.2 | 115.0 | 0 | 0 | 3.4 |
| 41299 | 18.0 | 42.3 | 108.2 | 114.9 | 0 | 0 | 3.3 |
| 41221 | 20.0 | 48.3 | 134.1 | 140.1 | 0 | 0 | 3.0 |
| 41222 | 22.0 | 54.3 | 135.5 | 143.2 | 0 | 0 | 3.9 |

| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 43220 | 2.0 | 8.1 | 31.7 | 32.8 | 3.4 | 0 | 2.0 | 1.9 |
| 43225 | 2.5 | 9.0 | 38.8 | 40.8 | 4.4 | 1.5 | 2.5 | 2.0 |
| 43230 | 3.0 | 10.1 | 38.2 | 41.1 | 4.1 | 1.8 | 3.0 | 2.9 |
| 43235 | 3.5 | 10.1 | 44.2 | 47.1 | 4.6 | 2.1 | 3.0 | 2.9 |
| 43240 | 4.0 | 10.1 | 49.2 | 51 | 5.1 | 0 | 3.0 | 2.9 |
| 43250 | 5.0 | 14.1 | 43.5 | 45.7 | 5.8 | 2.6 | 4.0 | 3.9 |
| 43260 | 6.0 | 14.1 | 57.6 | 61.5 | 6.8 | 3.1 | 4.0 | 3.9 |
| 43280 | 8.0 | 22.2 | 56.6 | 60.3 | 11.3 | 0 | 4.0 | 3.7 |
| 43282 | 10.0 | 22.2 | 84.7 | 88.3 | 11.3 | 0 | 4.0 | 3.6 |
| 43284 | 12.0 | 26.2 | 79.8 | 83.4 | 12.9 | 0 | 4.0 | 3.6 |
| 43286 | 14.0 | 36.2 | 94.7 | 97.9 | 15.3 | 0 | 4.0 | 3.2 |
| 43288 | 16.0 | 42.1 | 108.2 | 111.6 | 16.1 | 0 | 4.0 | 3.4 |
| 43299 | 18.0 | 42.2 | 108.2 | 111.5 | 19.1 | 0 | 4.0 | 3.3 |
| 43221 | 20.0 | 48.3 | 134.1 | 137.1 | 19.8 | 0 | 4.0 | 3.0 |
| 43222 | 22.0 | 54.3 | 135.6 | 139.4 | 21.8 | 0 | 4.0 | 3.8 |

| Part Number | A Nominal Inlet Diameter | B Body Diameter O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|-------------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 44640 | 4.0 | 10.1 | 49.2 | 52.1 | 24.6 | 0 | 3.0 | 2.9 |
| 44650 | 5.0 | 14.1 | 43.6 | 47.5 | 21.8 | 2.6 | 4.0 | 3.9 |
| 44660 | 6.0 | 14.1 | 57.6 | 61.5 | 28.8 | 3.1 | 4.0 | 3.9 |
| 44680 | 8.0 | 22.1 | 54.6 | 58.3 | 26.3 | 0 | 4.0 | 3.7 |
| 44682 | 10.0 | 22.1 | 84.6 | 88.2 | 42.3 | 0 | 4.0 | 3.6 |
| 44684 | 12.0 | 26.1 | 79.5 | 83.4 | 39.9 | 0 | 4.0 | 3.6 |
| 44686 | 14.0 | 36.2 | 88.7 | 91.9 | 44.3 | 0 | 4.0 | 3.2 |

Type 4



* Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

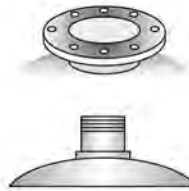
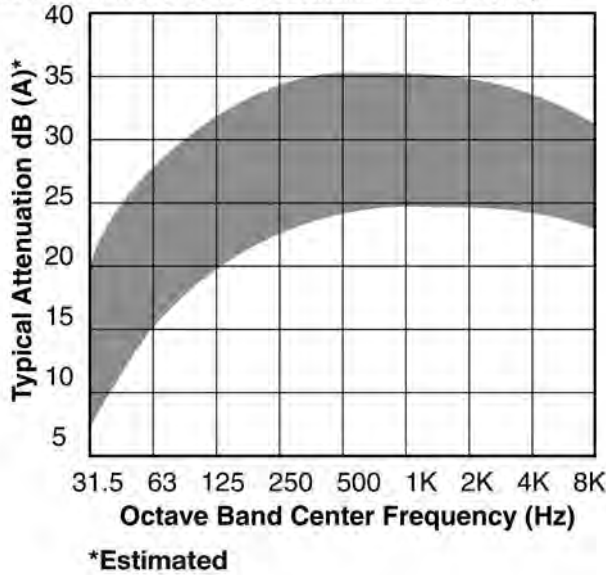
Note: Specifications are subject to change without notice.

Note: All dimensions are in inches.



300 LEVEL EXHAUST SILENCERS

Typical Attenuation Curve dB(A)*
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)

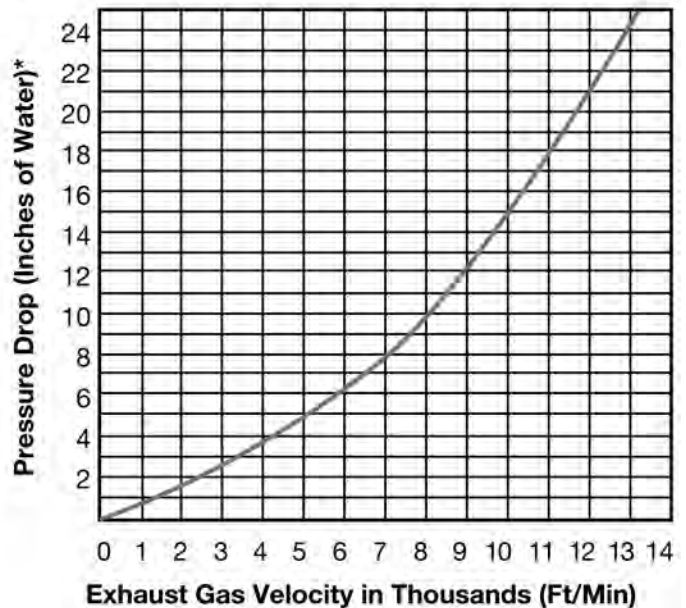


“F” Mounting Flange:
Standard in sizes 4” to 22”. Drilling matches 125/150# ASA standard.

“P” Male Pipe Threads:
NPT ends offered in sizes 3/4” through 4”.

Companion flanges available for 4” to 22”.

Pressure Drop



Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

*Estimated

5

Application:

These silencers are recommended where ambient noise is low and a high degree of silencing is necessary.

Construction:

Aluminized Steel: Nelson Silencers through 26” O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

Mild Steel/Aluminized Steel: Nelson Silencers 30” O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30” O.D. and larger have aluminized steel bodies with all other components fabricated from mild steel.

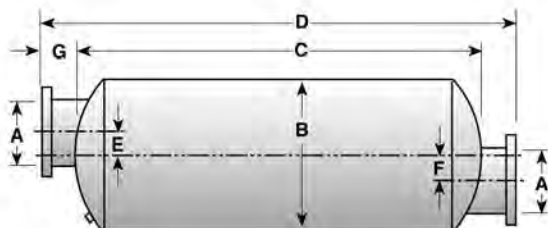
Silicone Aluminum Paint: Nelson Silencers through 26” O.D. are given a coat of high heat resistant silicone aluminum paint.

Primer/Silicone Aluminum Paint: Nelson Silencers 30” O.D. and larger are given a coat of high heat, rust inhibiting primer and then a top coat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.

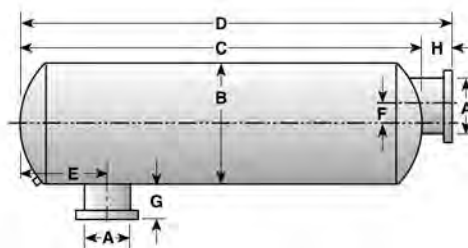
300 LEVEL EXHAUST SILENCERS



Type 1



Type 3



| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|
| 41307 | 0.75 | 4.2 | 21.3 | 23.8 | 0 | 0.0 | 1.3 |
| 41310* | 1.00 | 5.0 | 23.4 | 27.0 | 0.75 | 0.7 | 1.8 |
| 41313 | 1.25 | 6.1 | 27.5 | 31.2 | 0 | 0 | 1.8 |
| 41315 | 1.50 | 8.1 | 30.7 | 34.6 | 0 | 0 | 1.9 |
| 41320 | 2.00 | 9.0 | 40.8 | 44.0 | 0 | 0 | 1.6 |
| 41325 | 2.50 | 10.1 | 47.2 | 52.0 | 0 | 0 | 2.4 |
| 41330 | 3.00 | 11.1 | 49.5 | 55.6 | 0 | 0 | 3.1 |
| 41335 | 3.50 | 12.1 | 51.3 | 57.0 | 0 | 0 | 2.3 |
| 41340* | 4.00 | 12.1 | 58.3 | 64.0 | 1.82 | 1.80 | 2.9 |
| 41350* | 5.00 | 14.1 | 63.5 | 71.4 | 2.6 | 2.56 | 4.0 |
| 41360* | 6.00 | 16.1 | 72.0 | 80.8 | 2.00 | 2.00 | 4.4 |
| 41380 | 8.00 | 22.1 | 78.7 | 86.0 | 0 | 0 | 3.7 |
| 41382 | 10.00 | 26.2 | 79.7 | 87.0 | 0 | 0 | 3.7 |
| 41384 | 12.00 | 30.2 | 104.8 | 112.0 | 0 | 0 | 3.6 |
| 41386 | 14.00 | 42.2 | 108.2 | 115.0 | 0 | 0 | 3.4 |
| 41388 | 16.00 | 42.2 | 156.2 | 163.0 | 0 | 0 | 3.4 |
| 41389 | 18.00 | 48.2 | 133.9 | 139.9 | 0 | 0 | 3.1 |
| 41321 | 20.00 | 54.3 | 159.6 | 165.5 | 0 | 0 | 3.3 |
| 41322 | 22.00 | 60.3 | 161.3 | 166.8 | 0 | 0 | 2.8 |

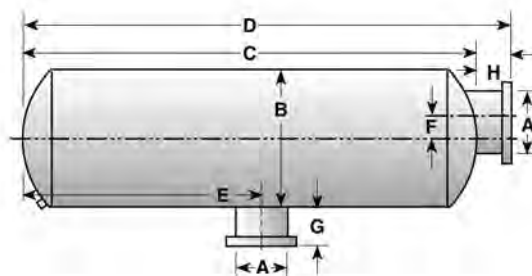
| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 43320 | 2.0 | 9 | 40.8 | 42.4 | 3.9 | 0 | 2.0 | 1.6 |
| 43325 | 2.5 | 10.1 | 46.6 | 49.3 | 3.8 | 0 | 2.5 | 2.7 |
| 43330 | 3.0 | 11.1 | 50 | 52.8 | 4.5 | 0 | 3.0 | 2.8 |
| 43335 | 3.5 | 12.1 | 51.4 | 54.2 | 5.2 | 0 | 3.0 | 2.8 |
| 43340 | 4.0 | 12.1 | 58.4 | 61.2 | 5.7 | 1.8 | 3.0 | 2.8 |
| 43350 | 5.0 | 14.1 | 63.5 | 67.4 | 5.8 | 2.6 | 4.0 | 3.9 |
| 43360 | 6.0 | 16.1 | 72 | 76.4 | 6.5 | 3.1 | 4.0 | 4.4 |
| 43380 | 8.0 | 22.1 | 78.7 | 82.3 | 11.3 | 0 | 4.0 | 3.6 |
| 43382 | 10.0 | 26.2 | 79.9 | 83.4 | 12.9 | 0 | 4.0 | 3.5 |
| 43384 | 12.0 | 30.2 | 104.8 | 108.4 | 14.4 | 0 | 4.0 | 3.6 |
| 43386 | 14.0 | 42.2 | 108.2 | 111.6 | 16.1 | 0 | 4.0 | 3.4 |
| 43388 | 16.0 | 42.2 | 156.2 | 159.6 | 16.1 | 0 | 4.0 | 3.4 |
| 43399 | 18.0 | 48.2 | 134 | 137.0 | 19.9 | 0 | 4.0 | 3.0 |
| 43321 | 20.0 | 54.3 | 159.7 | 162.9 | 22.1 | 0 | 4.0 | 3.2 |
| 43322 | 22.0 | 60.3 | 161.3 | 164.1 | 22.6 | 0 | 4.0 | 2.8 |

*Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 44740 | 4.0 | 12.1 | 58.4 | 61.2 | 29.2 | 1.8 | 3.0 | 2.8 |
| 44750 | 5.0 | 14.1 | 63.6 | 67.5 | 31.8 | 2.6 | 4.0 | 3.9 |
| 44760 | 6.0 | 16.1 | 72.0 | 76.4 | 36 | 3.1 | 4.0 | 4.4 |
| 44780 | 8.0 | 22.1 | 78.7 | 82.3 | 39.3 | 0 | 4.0 | 3.6 |
| 44782 | 10.0 | 26.2 | 79.9 | 83.4 | 39.9 | 0 | 4.0 | 3.5 |
| 44784 | 12.0 | 30.2 | 104.8 | 108.4 | 52.4 | 0 | 4.0 | 3.6 |
| 44786 | 14.0 | 42.2 | 108.2 | 111.5 | 54.1 | 0 | 4.0 | 3.3 |

Type 4



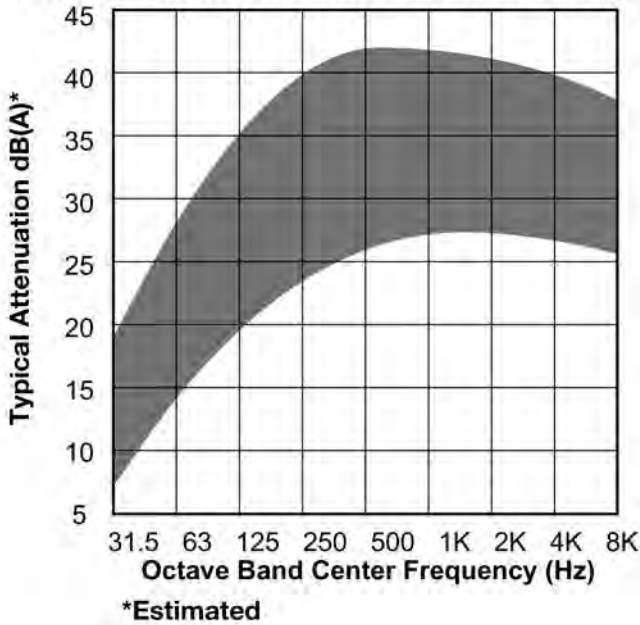
Note: Specifications are subject to change without notice.
Note: All dimensions are in inches.

5



400 LEVEL EXHAUST SILENCERS

Typical Attenuation Curve dB(A)*
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)



Application:

These silencers are recommended where ambient noise is low and a high degree of silencing is necessary.

Construction:

Aluminized Steel: Nelson Silencers through 26" O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

Mild Steel/Aluminized Steel: Nelson Silencers 30" O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30" O.D. and larger have aluminized steel bodies with all other components fabricated from mild steel.

Silicone Aluminum Paint: Nelson Silencers through 26" O.D. are given a coat of high heat resistant silicone aluminum paint.

Primer/Silicone Aluminum Paint: Nelson Silencers 30" O.D. and larger are given a coat of high heat, rust inhibiting primer and then a top coat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.

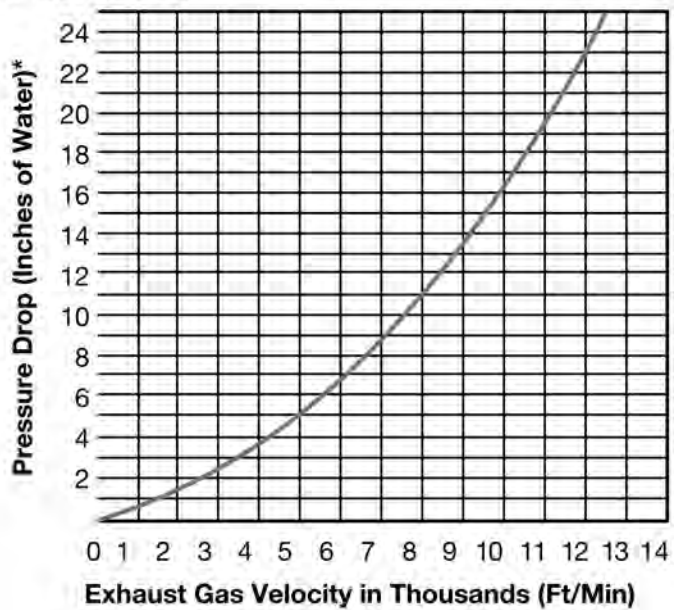


"F" Mounting Flange:

Standard in sizes 4" to 14". Drilling matches 125/150# ASA standard.

Companion flanges available for 4" to 22".

Pressure Drop



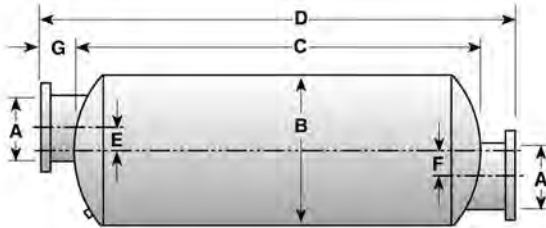
Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

*Estimated

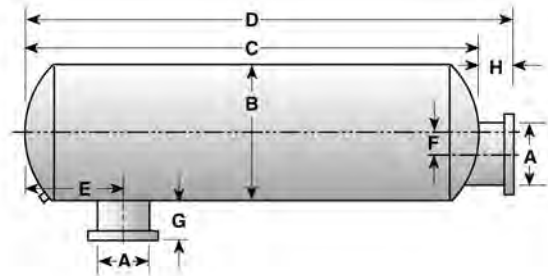
400 LEVEL EXHAUST SILENCERS



Type 1



Type 3

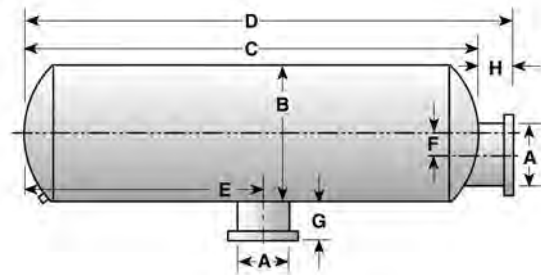


| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|
| 41440* | 4.0 | 14.1 | 66.5 | 72.0 | 4.0 | 4.0 | 2.8 |
| 41450* | 5.0 | 16.1 | 72.4 | 80.0 | 4.7 | 4.7 | 3.8 |
| 41460* | 6.0 | 18.1 | 82.7 | 90.0 | 5.0 | 5.0 | 3.7 |
| 41480 | 8.0 | 26.1 | 91.7 | 98.9 | 0 | 0 | 3.6 |
| 41482 | 10.0 | 30.2 | 104.8 | 112.0 | 0 | 0 | 3.4 |
| 41484 | 12.0 | 36.2 | 130.6 | 137.0 | 0 | 0 | 3.2 |
| 41486 | 14.0 | 42.2 | 132.2 | 138.9 | 0 | 0 | 3.4 |

| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 43440 | 4.0 | 14.1 | 66.6 | 69.3 | 5.8 | 4.0 | 3.0 | 2.7 |
| 43450 | 5.0 | 16.1 | 72.4 | 77.0 | 6.0 | 4.7 | 4.0 | 3.8 |
| 43460 | 6.0 | 18.1 | 82.6 | 86.3 | 6.8 | 5.0 | 4.0 | 3.7 |
| 43480 | 8.0 | 26.2 | 91.8 | 95.5 | 10.9 | 0 | 4.0 | 3.7 |
| 43482 | 10.0 | 30.2 | 104.8 | 108.4 | 12.4 | 0 | 4.0 | 3.6 |
| 43484 | 12.0 | 36.2 | 130.6 | 133.8 | 14.3 | 0 | 4.0 | 3.2 |
| 43486 | 14.0 | 42.2 | 132.2 | 135.6 | 16.1 | 0 | 4.0 | 3.4 |

| Part Number | A Nominal Inlet Diameter | B Body Dia. O.D. | C Body Length | D Overall Length | E Offset To C/L | F Offset To C/L | G Inlet Length | H Outlet Length |
|-------------|-----------------------------|---------------------|------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| 44840 | 4.0 | 14.1 | 66.5 | 69.2 | 33.3 | 4.0 | 3.0 | 2.7 |
| 44850 | 5.0 | 16.1 | 72.4 | 76.2 | 36.2 | 4.7 | 4.0 | 3.8 |
| 44860 | 6.0 | 18.1 | 82.6 | 86.3 | 41.3 | 5.0 | 4.0 | 3.7 |
| 44880 | 8.0 | 26.2 | 91.9 | 95.5 | 46.0 | 0 | 4.0 | 3.6 |
| 44882 | 10.0 | 30.2 | 104.8 | 108.2 | 52.4 | 0 | 4.0 | 3.4 |
| 44884 | 12.0 | 36.2 | 130.6 | 133.9 | 65.3 | 0 | 4.0 | 3.3 |
| 44886 | 14.0 | 42.2 | 132.2 | 135.6 | 66.1 | 0 | 4.0 | 3.4 |

Type 4



* Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

Note: Specifications are subject to change without notice.

Note: All dimensions are in inches.



SPARK ARRESTERS AND ARRESTING SILENCERS

5



Reduce Fire and Explosion Hazards

Nelson Spark Arresters will remove nearly all dangerous sparks from the exhaust gas. The spark arresting silencers also will provide industrial, residential and critical noise levels. Fire causing sparks are removed through centrifugal force created within the spark arrester/silencer. The hot carbon particles are then trapped safely within the arrester for removal later.

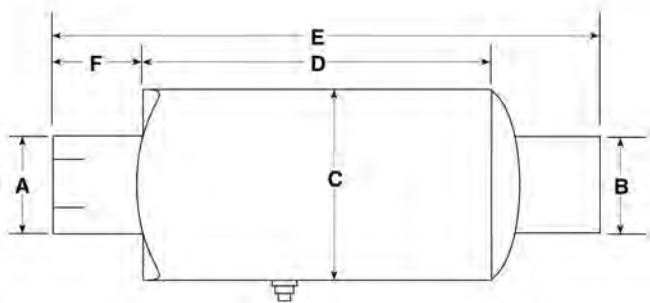
Performance Features

Nelson Spark Arresters can be installed either horizontally or vertically. Efficiency in either position is expected to exceed 95% at rated flow.



- Unique vane arrangement resists heat and vibration, giving increased noise reduction and service life.
- Brass plug with steel fitting makes cleaning arrester easier and will not rust shut.
- Perforated tubes and resonator chambers reduce noise without restricting exhaust gas flow.
- Fully welded construction is standard on spark arresting silencers for maximum strength and service life.
- Variety of inlet and outlet connections, slotted tube, male pipe thread and mounting flanges are available.

SPARK ARRESTERS AND ARRESTING SILENCERS



| Part Number | A Inlet ID. | B Outlet OD. | C Body Dia. | D Body Length | E Overall Length | F Inlet Length | CFM Rating |
|-------------|-------------|--------------|-------------|---------------|------------------|----------------|------------|
| 49110U* | 1.05 | 1.25 | 4.24 | 3.2 | 5.9 | 1.3 | 80 |
| 49115U* | 1.50 | 1.50 | 4.24 | 3.1 | 5.9 | 1.4 | 165 |
| 49120B* | 2.00 | 2.00 | 5.62 | 6.4 | 11.0 | 2.0 | 295 |
| 49125A* | 2.50 | 2.63 | 5.62 | 8.6 | 12.8 | 2.0 | 450 |
| 49130A* | 3.00 | 3.13 | 6.62 | 10.2 | 14.9 | 2.0 | 660 |
| 49135A* | 3.50 | 3.63 | 7.62 | 12.0 | 17.6 | 3.0 | 900 |
| 49140A* | 4.00 | 4.13 | 8.50 | 14.6 | 21.2 | 3.4 | 1180 |
| 49150A* | 5.00 | 5.13 | 9.62 | 16.0 | 24.0 | 4.0 | 1840 |
| 49160A* | 6.00 | 6.13 | 12.12 | 22.0 | 27.0 | 2.0 | 2650 |

*All arresters are qualified and tested for vertical and horizontal installations under the U.S. Forestry Service Standard 5100-1b.

All inlets are slotted tube connections. Outlets are O.D. tubing.

CFM rating is with a pressure drop of 1 PSI.

**Estimated

Note: All dimensions are in inches.

Nelson Standard Spark Arresters...

Nelson Spark Arresters are designed for universal application with a minimum of restriction on the engine. They work well as add-on units to existing exhaust systems. Their light weight and small size reduce stress and vibration to the rest of the exhaust system. Typical applications include logging and construction equipment, agricultural machinery, over-the-road trucks, airport equipment, forestry and military vehicles.

If the diameter of the spark arrester inlet is as large as the exhaust pipe, restriction generally will be within engine guidelines. However, to be sure, you should check the exhaust CFM of the engine against the CFM rating of the spark arrester. Some applications (e.g. turbo-charged and two-cycle diesel engines) may require larger arresters and an adapter will be needed to complete the installation.

How to Select the Proper Spark Arrester...



"F" Mounting Flange:

Standard in sizes 4" to 22". Drilling matches 125/150# ASA standard.

Companion flanges available for 4" to 22".

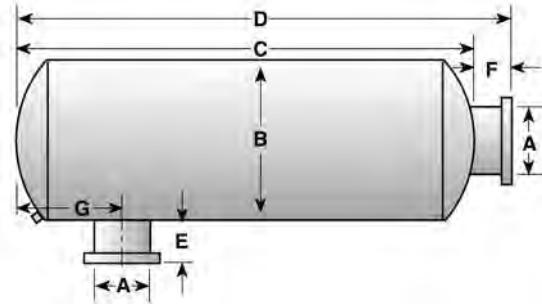
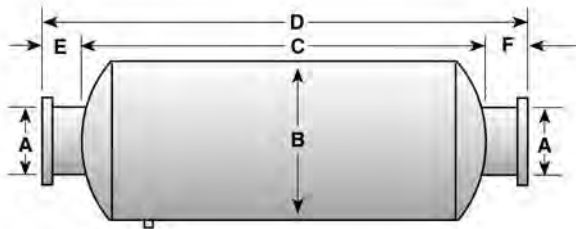


NPT Male Pipe Threads:

NPT ends offered in sizes .75" through 3.5" (spark arresting silencers only).



SPARK ARRESTERS AND ARRESTING SILENCERS



Nelson Standard Spark Arresters...

Nelson Spark Arresters provide high efficiency spark arresting and good-to-excellent sound attenuation where fire hazards and noise must be minimized. Three attenuation levels, industrial, residential and critical are available with spark arresting efficiency expected to exceed 95%.

Heavy gauge material is used with fully welded construction to provide maximum strength and service life. Applications include stationary and portable gen sets, oil field equipment, main propulsion engines on ships and gas compression equipment.

5

| Part Number | A Inlet Size | B Body Dia. | C Body Length | D Overall Length | E Inlet Length | F Outlet Length |
|-----------------------|--------------|-------------|---------------|------------------|----------------|-----------------|
| 100 INDUSTRIAL LEVEL | | | | | | |
| 49325U | 2.5 | 9.00 | 21.8 | 25.0 | 1.9 | 1.9 |
| 49330U | 3.0 | 9.00 | 24.3 | 29.5 | 2.6 | 2.6 |
| 49335U | 3.5 | 9.00 | 23.8 | 29.5 | 2.6 | 2.6 |
| 49340U | 4.0 | 10.12 | 23.7 | 31.5 | 3.9 | 3.9 |
| 49350U | 5.0 | 12.12 | 28.3 | 35.5 | 3.6 | 3.6 |
| 49360U | 6.0 | 14.12 | 31.5 | 38.0 | 2.7 | 2.7 |
| 49380U | 8.0 | 18.12 | 48.3 | 56.0 | 3.8 | 3.8 |
| 49382U | 10.0 | 22.12 | 53.6 | 60.0 | 3.2 | 3.2 |
| 49384U | 12.0 | 26.15 | 67.7 | 74.0 | 3.2 | 3.2 |
| 49386U | 14.0 | 36.21 | 72.2 | 77.0 | 2.4 | 2.4 |
| 49388U | 16.0 | 36.18 | 80.6 | 90.0 | 4.7 | 4.7 |
| 49399U | 18.0 | 42.23 | 92.2 | 100.0 | 3.9 | 3.9 |
| 49321U | 20.0 | 48.12 | 103.9 | 109.9 | 3.0 | 3.0 |
| 49322U | 22.0 | 54.12 | 115.5 | 123.1 | 3.8 | 3.8 |
| 200 RESIDENTIAL LEVEL | | | | | | |
| 49415U | 1.5 | 7.00 | 16.4 | 20.0 | 1.6 | 1.6 |
| 49420U | 2.0 | 8.12 | 20.7 | 25.0 | 2.1 | 2.1 |
| 49425U | 2.5 | 9.59 | 25.0 | 30.0 | 2.5 | 2.5 |
| 49430U | 3.0 | 10.12 | 31.2 | 36.0 | 2.4 | 2.4 |
| 49435U | 3.5 | 11.12 | 33.0 | 38.0 | 2.9 | 2.9 |
| 49440U | 4.0 | 12.12 | 35.3 | 42.0 | 3.1 | 3.1 |
| 49450U | 5.0 | 14.11 | 41.5 | 48.0 | 3.3 | 3.3 |
| 49460U | 6.0 | 16.11 | 45.5 | 55.0 | 4.8 | 4.8 |
| 49480U | 8.0 | 18.12 | 62.3 | 72.0 | 4.9 | 4.9 |
| 49482U | 10.0 | 22.15 | 74.6 | 82.0 | 3.7 | 3.7 |
| 49484U | 12.0 | 26.12 | 86.7 | 93.0 | 3.1 | 3.1 |
| 49486U | 14.0 | 36.21 | 90.2 | 95.0 | 2.4 | 2.4 |
| 300 CRITICAL LEVEL | | | | | | |
| 49540U | 4.0 | 14.14 | 41.5 | 48.0 | 3.3 | 3.3 |
| 49550U | 5.0 | 16.12 | 47.0 | 54.0 | 3.8 | 3.8 |
| 49560U | 6.0 | 18.12 | 52.7 | 62.0 | 4.7 | 4.7 |
| 49580U | 8.0 | 22.18 | 66.6 | 72.0 | 2.7 | 2.7 |
| 49582U | 10.0 | 26.18 | 79.7 | 86.0 | 3.2 | 3.2 |
| 49584U | 12.0 | 30.18 | 86.8 | 92.0 | 2.6 | 2.6 |

| Part Number | A Inlet Size | B Body Dia. | C Body Length | D Overall Length | E Inlet Length | F Outlet Length | G Offset to C/L |
|-----------------------|--------------|-------------|---------------|------------------|----------------|-----------------|-----------------|
| 100 INDUSTRIAL LEVEL | | | | | | | |
| 49640U | 4.0 | 10.12 | 23.7 | 27.8 | 3.0 | 3.7 | 4.8 |
| 49650U | 5.0 | 12.12 | 28.9 | 32.2 | 3.0 | 3.3 | 5.7 |
| 49660U | 6.0 | 14.12 | 31.6 | 34.8 | 4.0 | 3.2 | 6.8 |
| 49680U | 8.0 | 18.11 | 48.6 | 52.3 | 4.0 | 3.7 | 7.8 |
| 49682U | 10.0 | 22.15 | 56.6 | 58.3 | 4.0 | 1.7 | 10.8 |
| 49684U | 12.0 | 26.15 | 67.8 | 70.9 | 4.0 | 3.1 | 11.9 |
| 49686U | 14.0 | 36.21 | 73.6 | 75.3 | 4.0 | 1.7 | 15.3 |
| 200 RESIDENTIAL LEVEL | | | | | | | |
| 49740U | 4.0 | 12.11 | 35.4 | 38.7 | 3.0 | 3.3 | 5.2 |
| 49750U | 5.0 | 14.11 | 41.6 | 44.8 | 4.0 | 3.2 | 6.3 |
| 49760U | 6.0 | 16.11 | 46.0 | 50.5 | 4.0 | 4.5 | 6.0 |
| 49780U | 8.0 | 18.15 | 62.6 | 67.3 | 4.0 | 4.7 | 8.3 |
| 49782U | 10.0 | 22.15 | 74.6 | 78.3 | 4.0 | 3.7 | 10.3 |
| 49784U | 12.0 | 26.15 | 85.7 | 88.9 | 4.0 | 3.1 | 11.9 |
| 49786U | 14.0 | 36.21 | 94.6 | 97.8 | 4.0 | 3.2 | 15.3 |
| 300 CRITICAL LEVEL | | | | | | | |
| 49840U | 4.0 | 14.12 | 41.5 | 44.5 | 4.0 | 3.5 | 5.3 |
| 49850U | 5.0 | 16.12 | 47.0 | 50.5 | 4.0 | 3.5 | 6.0 |
| 49860U | 6.0 | 18.12 | 52.6 | 57.3 | 4.0 | 4.7 | 6.3 |
| 49880U | 8.0 | 22.15 | 66.6 | 69.3 | 4.0 | 2.7 | 10.3 |
| 49882U | 10.0 | 26.18 | 79.8 | 85.9 | 4.0 | 6.1 | 10.9 |
| 49884U | 12.0 | 30.18 | 86.4 | 89.2 | 4.0 | 2.8 | 12.2 |
| 49886U | 14.0 | 42.23 | 108.2 | 111.6 | 4.0 | 3.4 | 15.1 |

Male pipe thread connections through 3.5", 4" and larger are 125/150# ASA drilled flanges.

Drains are standard on all silencers with a 9" body diameter or larger.

Note: Side in end out configuration is designed for side inlet flow only. Unit cannot be run backward.

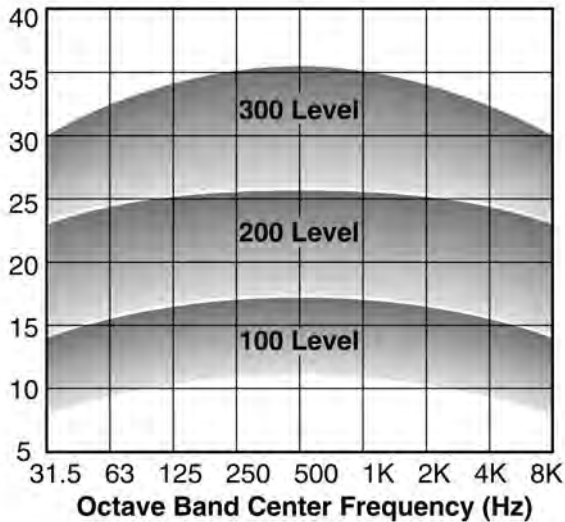
Note: All dimensions are in inches.

SPARK ARRESTERS AND ARRESTING SILENCERS



Specifications:

Typical Attenuation Curve dB(A)*
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)



(SEE STANDARD SILENCER SPECIFICATION SHEET FOR ATTENUATION DETAIL)

Performance:

All Nelson Spark Arresters/Silencers can be installed either horizontally or vertically. Efficiency in either position is expected to exceed 95% of rated flow.

Material:

Aluminized Steel/Mild Steel: Nelson Spark Arresting Silencers are manufactured of aluminized steel and/or mild steel depending on design. (See standard silencer specification sheet for material details.)

Stainless Steel: Nelson Spark Arresting Silencers are available in stainless steel by special request. Excellent resistance to corrosion. The maximum operating temperature is 1500° F.

Finishes:

Silicone Aluminum Paint/Primer: Nelson Spark Arresting Silencers are given a coat of high heat resistant silicone aluminum paint and/or a coat of high heat rust inhibiting primer.

Note: Specifications subject to change without notice.

Note: All dimensions are in inches.

Note: When determining back pressure, velocity should not exceed 10,000 feet/minute regardless of the allowable back pressure.

Warranty:

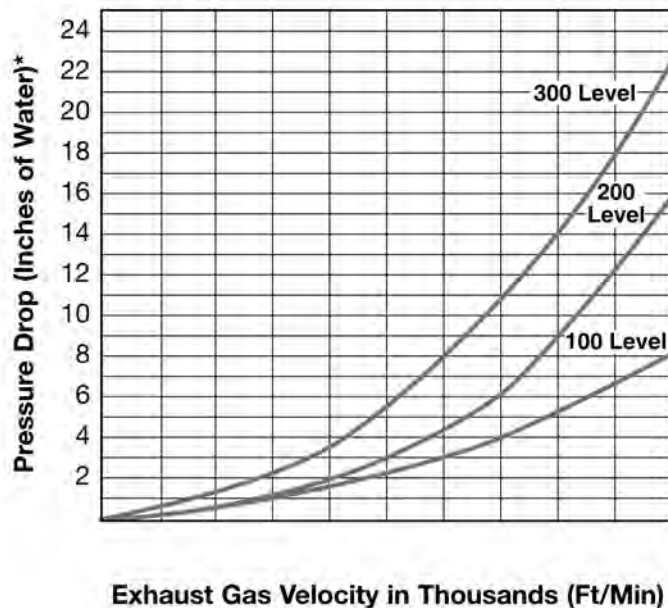
All spark arresters are warranted against defects in material and workmanship. These spark arresters will not remove 100% of all particles, and no warranty to this effect is expressed or implied.

Additional Accessories:

Companion Flanges...are available in both cast iron threaded and mild steel weld-on versions. They come in kits which include all of the nuts, bolts and gaskets for proper installation.

Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

Pressure Drop



MARINE AIR FILTERS



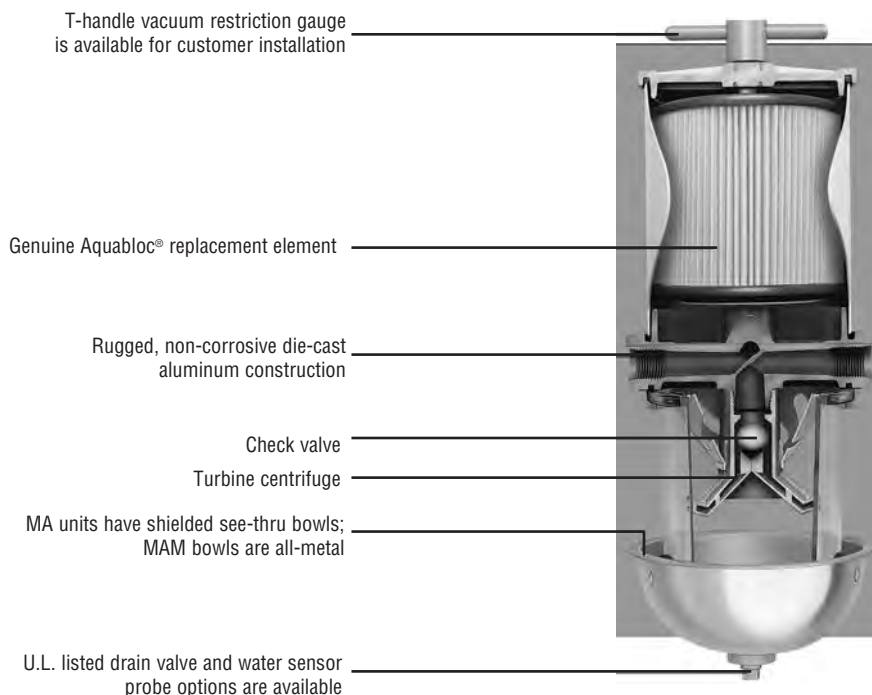
| Specifications | AF M408512 | AF M501012 | AF M601212 | AF M701212** |
|--|---------------------------------|--------------------|--------------------|--------------------|
| Max. Air Flow* | 800 CFM (378 l/s) | 1200 CFM (566 l/s) | 1600 CFM (755 l/s) | 2000 CFM (944 l/s) |
| Outlet Diameter | 4.0 in. (10.2 cm) | 5.0 in. (12.7 cm) | 6.0 in. (15.2 cm) | 7.0 in. (17.8 cm) |
| Filter | AF M8040 | AF M8050 | AF M8060 | AF M8070 |
| Length | 12.5 in. (31.8 cm) | 12.5 in. (31.8 cm) | 12.5 in. (31.8 cm) | 12.5 in. (31.8 cm) |
| Depth | 9.6 in. (24.4 cm) | 11.5 in. (29.2 cm) | 13.5 in. (34.3 cm) | 13.5 in. (34.3 cm) |
| Hose Barb Size | 1.0 in. (2.5 cm) | 1.25 in. (3.2 cm) | 1.25 in. (3.2 cm) | 1.0 in. (2.5 cm) |
| Weight | 4.2 lbs (1.9 kg) | 5.0 lbs (2.3 kg) | 8.0 lbs (3.6 kgs) | 8.0 lbs (3.6 kgs) |
| Operating Temperature | -40° to +240°F (-40° to +116°C) | | | |
| *Values given are cubic feet per minute (CFM) and liters per second (l/s). **AF M701212-01 is available with a 1.25 in. hose barb. | | | | |

CCV Crankcase Filtration



| Specifications | CCV1500 | CCV4500 | CCV6000 | CCV8000 | CCV12000 |
|--|-----------------------|---------------------|---------------------|---------------------|---------------------|
| Maximum Flow Rate | 1 CFM (28 LM) | 10 CFM (283 LM) | 20 CFM (566 LM) | 40 CFM (1133 LM) | 50 CFM (1416 LM) |
| Maximum Engine Rating | 40 HP (29.8 KW) | 400 HP (298.3 KW) | 800 HP (596.6 KW) | 1600 HP (1193.1 KW) | 2000 HP (1491.4 KW) |
| Inlet/Outlet Port Size | 3/4" hose | 1 3/16"-12 STOR | 1 5/8"-12 STOR | 1 7/8"-12 STOR | 1 7/8"-12 STOR |
| Weight (approx.) | 1.5 lbs (0.7 kg) | 3.3 lbs (1.5 kg) | 5.0 lbs (2.3 kg) | 8.7 lbs (3.9 kg) | 9.3 lbs (4.2 kg) |
| Replacement Filter Media Density: Low | CCV55365-04 | CCV55248-04 | N/A | N/A | N/A |
| Replacement Filter Media Density: High | N/A | CCV55248-08 | CCV55274-08 | CCV55222-08 | CCV55222-12-08 |
| Replacement Filter Media Density: Ultra | N/A | CCV55248-10 | CCV55274-10 | CCV55222-10 | CCV55222-12-10 |
| Crankcase Pressure Regulator | Vacuum Limiting valve | Integral | Integral | Integral | Integral |
| Bypass/Change Indicator | N/A | Integral or Remote | Integral or Remote | Integral or Remote | Integral or Remote |
| Engine Block Check Valve Return Fitting | N/A | 1/4" NPT | 1/4" NPT | 3/8" NPT | 3/8" NPT |
| Swivel Fitting (Qty.) | N/A | #6 JIC (2 pcs.) | #6 JIC (2 pcs.) | #8 JIC (2 pcs.) | #8 JIC (2 pcs.) |
| Oil Drain Hose I.D. | N/A | 0.375 in. (0.95 cm) | 0.375 in. (0.95 cm) | 0.5 in. (1.27 cm) | 0.5 in. (1.27 cm) |
| Units can be manifolded to handle higher flow rates. Do not use CCV1500 in continuous duty applications. | | | | | |

TURBINE FUEL FILTERS

RACOR®


SELECTION INFORMATION

General

For more than 25 years, **Racor Turbine Series Fuel Filters/Water Separators** have been protecting engines from water, dirt, foulants and other contaminants using a patented three-stage process:

1. **Separation.** The turbine centrifuge separates solids and “free” water through centrifugal action. Although the turbine has no moving parts, more than 30% of the contaminants are removed here.
2. **Coalescing.** Smaller water droplets and solids coalesce on the specially designed conical baffle and fall to the collection bowl.
3. **Filtration.** Engines benefit from near 100% water separation and fuel filtration with Racor’s proprietary Aquabloc® water-repelling media.

These units are designed for installation on the suction (vacuum) side of the fuel transfer pump for best efficiency, but may be installed on the pressure side up to 15 PSI.

Filters

High-capacity Aquabloc® replaceable cartridge elements stop water and remove solid contamination, and are available in 2, 10 or 30 micron. Boat owners can specify their filtration needs based on application, fuel quality, operating climates and maintenance schedules.

A 30-micron filter (or primary filter) is used to filter raw fuel (or poor quality fuel) before it can be further filtered by finer media such as a 10- or 2-micron filter. A 10-micron filter (or secondary and even final filter) is used to filter fuel that is known to be of good quality. A 2-micron filter (or final filter) is the finest filtration available and is the last filter used prior to engine ingestion.

A simple rule to remember is that the finer the filtration, the more frequent the filter change. (Be sure to carry extra filters on board.)

Collection Bowls

The see-through bowls used with these models won’t discolor from alcohol, additives or UV light and feature NPT tapered thread plugs for removing contaminants. An optional U.L. Listed shut-off drain valve may be ordered to simplify servicing. For gasoline or severs service in diesel applications, specify metal bowls only.

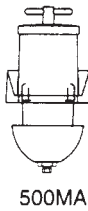
Diesel Fuel System Options

Water Probe RK21069. All units may be ordered with an in-bowl water probe to alert the operator of a high-water condition, even while the unit is operating. The bowl is then drained of water at the earliest convenience. Requires a Racor Water Detection Module (call Timco for further information).

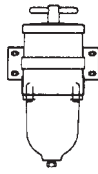
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

RACOR

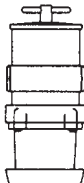
FUEL FILTERS



500MA



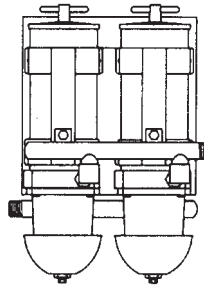
500MAM



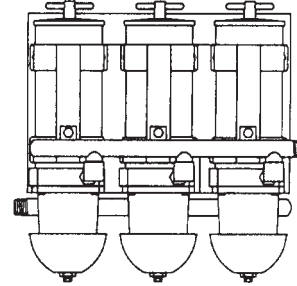
900MA



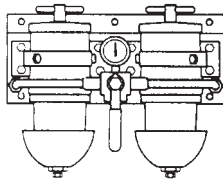
1000MA



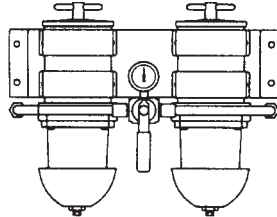
73/1000MA



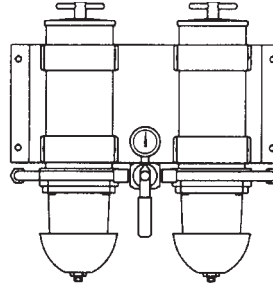
77/1000MA



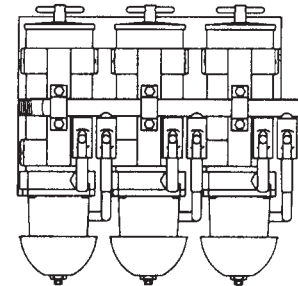
75/500MAX



75/900MAX



75/1000MAX



79/1000MAV

5 When engines demand heavy-duty, high capacity water separation and fuel filtration, the Turbine Series is the most complete, efficient and reliable engine protection you can install. Symbolizing Racor's continuing commitment to the science of filtration, the Turbine Series has established its position as the filter/separator often imitated, but never equaled. Models which include an aluminum bowl or stainless steel shield meet ASTM FS1201 certification, are UL-listed, American Bureau of Shipping, Veritas Det Norske Veritas, ISO 10088 and USCG accepted. For severe service, all-metal bowls should be specified.

TURBINE SERIES

The Inside Story

- As fuel enters, it moves past the internal check valve then through the turbine centrifuge where it flows in a spiraling direction, spinning off large particulates and water droplets. Being heavier than fuel, they fall to the bottom of the collection bowl
- Smaller water droplets bead-up along and on the sides of the internal components and on the surface of the Aquabloc® II element. Because Aquabloc® II elements are waterproof, they remain effective longer
- Besides repelling water and tiny solids, Aquabloc® II elements filter asphaltenes, algae and rust from the fuel. Because Aquabloc® II elements are waterproof, they remain effective longer

| MODEL | 500MA | 900MA | 1000MA | 75/500MAX* | 75/900MAX* | 73/1000MA* | 75/1000MA* | 77/1000MA*, ** | 79/1000MA |
|---|---------------------------|---------------------------|---------------------------|------------------|------------------|-------------------|---------------------------|-------------------|----------------------------|
| Maximum Flow Rate | 60gph 227lph | 90gph 341lph | 180gph 681lph | 120gph 454lph | 180gph 681lph | 360gph 1363lph | 180/360gph 681/1363lph | 540gph 2044lph | 360/540gph 1363/2044lph |
| Height - Inches (mm.) | 11.5" (292) | 17" (432) | 22" (559) | 11.5" (292) | 17" (432) | 22" (559) | 22" (559) | 22" (559) | 22 (559) |
| Width - Inches (mm.) | 5.8" (147) | 6" (152) | 6" (152) | 14.5" (368) | 18.75" (476) | 17" (432) | 18.75" (476) | 21.5" (546) | 21.5" (546) |
| Depth - Inches (mm.) | 4.8" (122) | 7" (178) | 7" (178) | 9.5" (241) | 11" (279) | 12" (305) | 11" (279) | 12" (305) | 12" (305) |
| Weight - Lbs (kg) | 4 (2) | 6 (3) | 10 (5) | 17 (7.7) | 23 (10) | 26 (11.8) | 30 (13.6) | 39 (17.7) | 52 (23.6) |
| Port Size Std. (Option) | 3/4"-16UNF 14mm. x 1.5 | 7/8"-14UNF 22mm. x 1.5 | 7/8"-14UNF 22mm. x 1.5 | 3/4"-16UNF | 7/8"-14UNF | 3/4" NPT | 7/8"-14UNF | 1"-11.5 NPT | 3/4" NPT |
| Clean Pressure Drop | .61 PSI 4.23 kPa | .34 PSI 2.4 kPa | .49 PSI 3.4 kPa | .70 PSI 4.83 kPa | 1.7 PSI 11.7 kPa | 1.7 PSI 11.7 kPa | 3.7 PSI 25.5 kPa | 1.7 PSI 11.7 kPa | 2.5 PSI 17.2 kPa |
| Maximum*** | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa | 15 PSI 103 kPa |
| Element # | 2010 | 2040 | 2020 | 2010 | 2040 | 2020 | 2020 | 2020 | 2020 |
| Element Rmvl. Clearance - Inches (mm.) | 4" (102) | 5" (127) | 10" (254) | 4" (102) | 5" (127) | 10" (254) | 10" (254) | 10" (254) | 10" (254) |

* For double or triple manifold models with 1/2" isolation valves, specify MAV. For double manifold models with single isolation valve and standard filter restriction gauge, specify MAX. The engine may be left operating during isolation of either filter.

** 77/1000 triple manifold without shutoff valve also available.

*** Vacuum installation only, for accurate fuel flow rates consult your engine manual. As a guideline, gph = 0.18 x maximum engine horsepower (diesel only).

**** Filter/separators are available with metric tapped ports. Specify metric ports when ordering.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

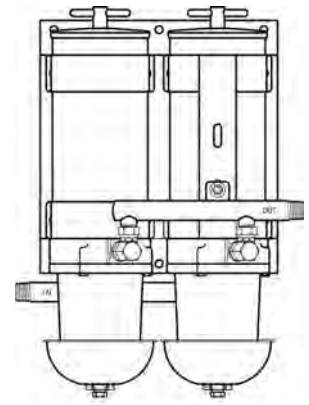
TURBINE FUEL FILTERS - 73/1000MA



| 73/1000MA | P | 10 |
|------------------------|---------------------------|--------------------------------|
| Basic Model | Water Probe. ¹ | Element Filtration Rating. |
| 360 GPH | Add 'P' for an in - bowl | Specify one: '2' for 2 micron |
| Add 'M' for metal bowl | water probe. | '10' for 10 micron or '30' for |
| Example: 73/1000MAM | (Omit if not desired). | 30 micron |

Replacement Service Elements – Order two (2) per unit.
 SERVICE ELEMENT INCLUDES LID SEAL AND T-HANDLE O-RING.

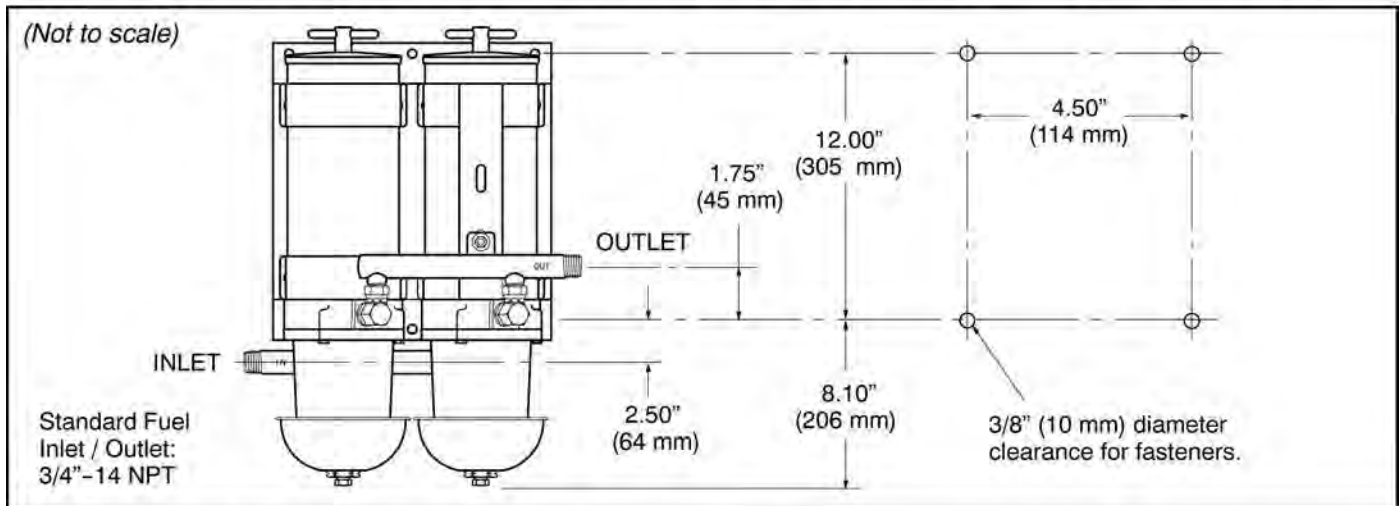
| | |
|------------------|---|
| 2020SM-OR | 2 Micron (Brown end caps) Recommended for Final/Secondary Filtration |
| 2020TM-OR | 10 Micron (Blue end caps) Recommended for Primary or Secondary Filtration |
| 2020PM-OR | 30 Micron (Red end caps) Recommended for Primary Filtration* Only. *A secondary/final filter is required downstream |



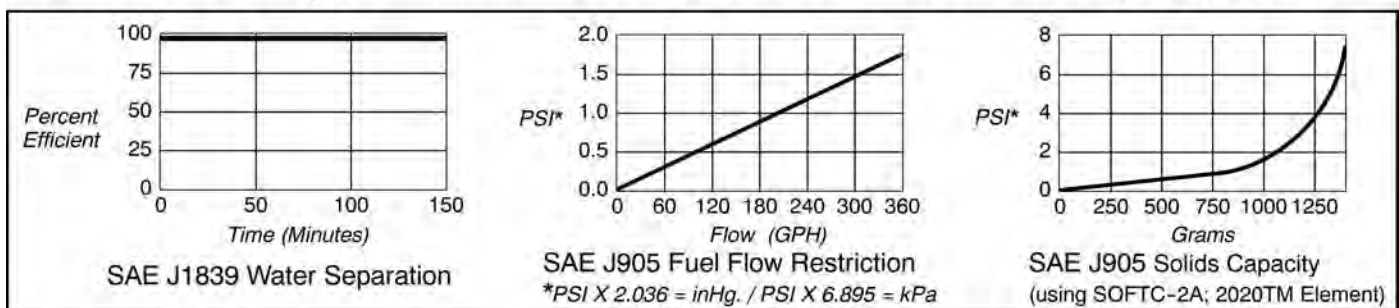
73/1000MA



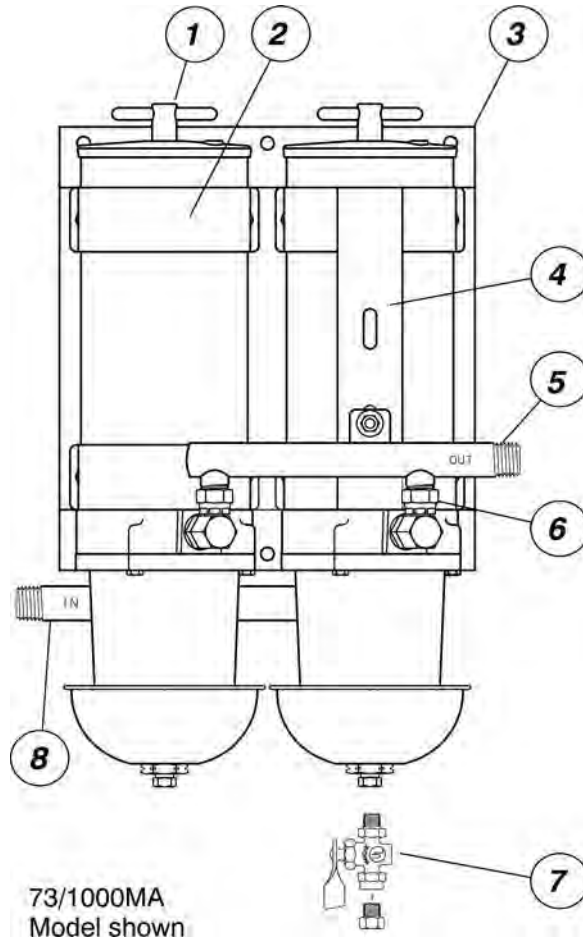
Mounting Hole Pattern -Refer to Turbine Series introduction page for filter dimensions.



Performance Graphs -These results are from controlled laboratory tests. Field results may vary by application.



RACOR® TURBINE FUEL FILTERS - 73/1000MA



| Item | Part No. | Description | Case Qty. |
|------|----------|---|-----------|
| 1 | 1000MA | Shell. Refer to Model 1000MA for a complete parts list. | |
| 2 | RK111895 | Clamp Bracket | 1 |
| 3 | 11-1629 | Dual unit Bracket | 1 |
| 4 | 11895 | Clamp Bracket Assembly | 1 |
| 5 | 11923 | Outlet Manifold | 1 |
| 6 | 11072 | Elbow Fitting, Parker #2507-10-8 | 1 |
| 7 | RK19492 | UL Listed Marine Drain Valve (order two for use with this unit) | 1 |
| 8 | 11892 | Inlet Manifold | 1 |
| | 11-1831 | Installation Instructions, 73/1000MA | |

TURBINE FUEL FILTERS - 1000MA

RACOR

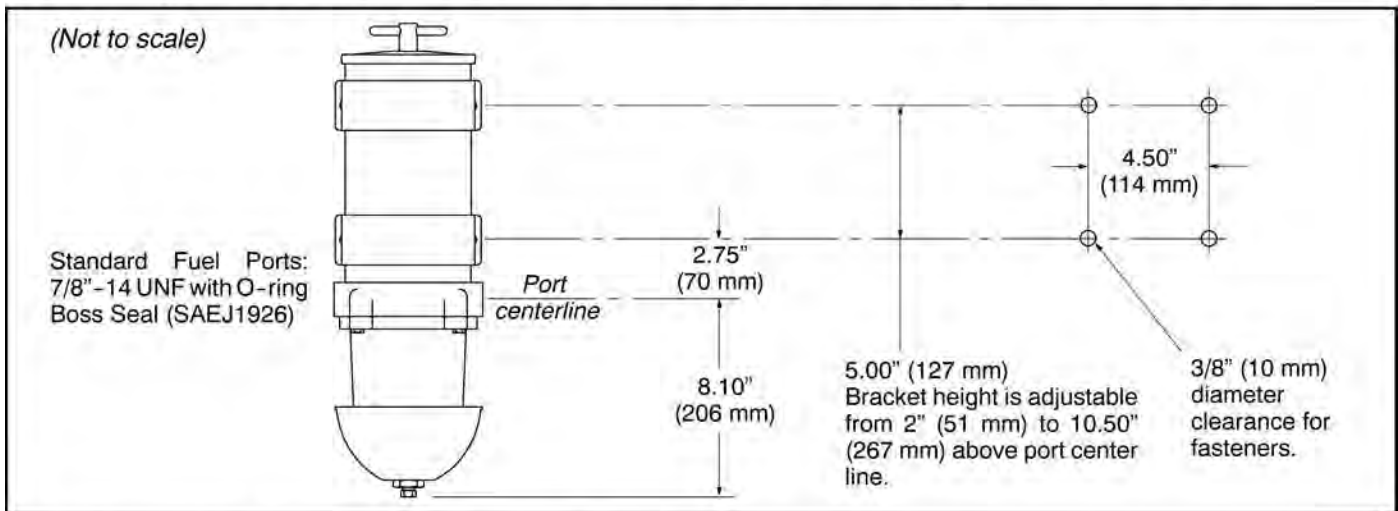
| 1000MA | P | 10 |
|------------------------|---------------------------|--------------------------------|
| Basic Model | Water Probe. ¹ | Element Filtration Rating. |
| 180 GPH | Add 'P' for an in – bowl | Specify one: '2' for 2 micron |
| Add 'M' for metal bowl | water probe. | '10' for 10 micron or '30' for |
| Example: 1000MAM | (Omit if not desired). | 30 micron |

Replacement Service Elements – For all Model 1000 Series
SERVICE ELEMENT INCLUDES LID SEAL AND T-HANDLE O-RING.

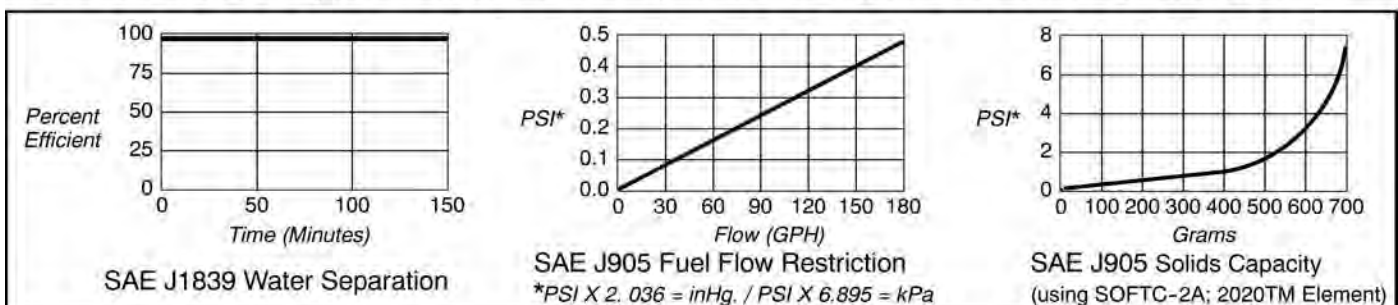
| | |
|------------------|--|
| 2020SM-OR | 2 Micron (Brown end caps) Recommended for Final/Secondary Filtration |
| 2020TM-OR | 10 Micron (Blue end caps) Recommended for Primary or Secondary Filtration |
| 2020PM-OR | 30 Micron (Red end caps) Recommended for Primary Filtration* Only. *A secondary/final filter is required downstream. |



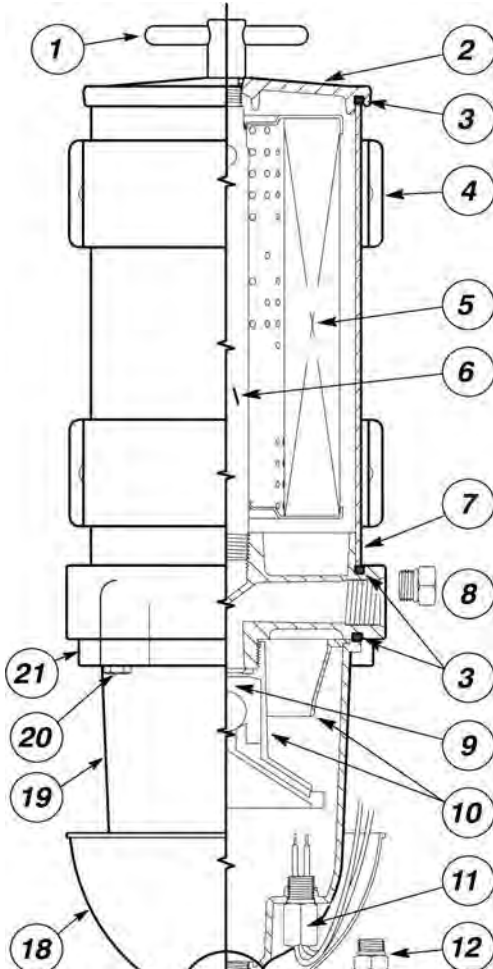
Mounting Hole Pattern – Refer to Turbine Series introduction page for filter dimensions.



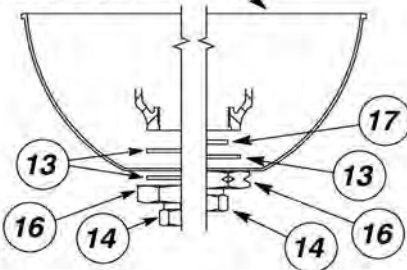
Performance Graphs – These results are from controlled laboratory tests. Field results may vary by application.



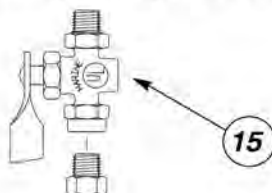
RACOR TURBINE FUEL FILTERS - 1000MA



1000MAP Model shown



Old Style³ New Style
Drain Fitting Configurations



| Item | Part No. | Description | Case Qty. |
|------|-------------|---|-----------|
| 1 | RK11888 | T-handle | 1 |
| | 11350 | T-handle O-ring | 10 |
| 2 | RK11005B | Lid | 1 |
| | RK11005B-02 | Lid with Vent Port and Plug Kit (not shown) | 1 |
| 3 | 11007 | Square-cut Gasket (Lid & Bowl ring) | 10 |
| 4 | RK11815-101 | Body Clamp Bracket | 1 |
| 5 | 2020SMOR | 2 Micron Element with Seals | 12 |
| | 2020TMOR | 10 Micron Element with Seals | 12 |
| | 2020PMOR | 30 Micron Element with Seals | 12 |
| 6 | RK11008 | Return Tube (w/ tapered pipe body-end threads) | 1 |
| | RK11-1775 | Return Tube (w/ straight body-end threads) | 1 |
| 7 | RK11021 | Outer Cylinder | 1 |
| 8 | RK11-1679 | Plastic Body Plug | 1 |
| 9 | RK11028B | Check Ball and Seal | 10 |
| 10 | RK11026D | Turbine Centrifuge / Conical Baffle | 1 |
| 11 | RK210691 | Water Probe (MA Bowls) | 1 |
| 12 | RK20022 | Metal Water Probe Port Plug | 1 |
| 13 | RK11341 | Bowl Drain Gasket Kit (for New and Old Styles) | 10 |
| | 11041 | Bowl Drain Washer (New and Old Style) | 1 |
| 14 | 918-N4 | Bowl Plug, 1/4" NPT (New and Old Style) | 1 |
| 15 | RK19492 | Shut-off Drain Valve Kit (for diesel use, only) | 1 |
| 16 | 11-1910 | Bowl Drain Fitting (New Style) | 10 |
| | RK11-1910 | Complete Bowl Drain Fitting Kit (New Style) | 1 |
| | 11040 | Bowl Drain Washer (Old Style) | 10 |
| 17 | 11340 | Drain Fitting O-ring (New Style) | 1 |
| 18 | RK118682 | Heat Deflector Shield (MA) | 1 |
| 19 | RK11-1606-1 | Clear Bowl with Water Probe Port | 1 |
| | RK11734 | Metal Bowl (MAM - not shown) | 1 |
| | RK11734-01 | Metal Bowl w/ 1/4" NPT Drain & Water Probe Port | 1 |
| 20 | RK11542 | Hex/Washer Head Capscrew, 1/4" - 20 x 1" (4) | 1 |
| 21 | RK11037A | Bowl Ring | 1 |
| 22 | RK11-1404 | Seal Service Kit (all models - not shown) | 1 |
| | 19466 | Installation Instructions, 900/1000MA | |

1 For diesel service only. Must be used with a Water Detection Kit.
 2 For replacement only. The Coast Guard does not accept "FG" units converted to "MA" configurations.
 3 Units built prior to Fall, 1998.

5

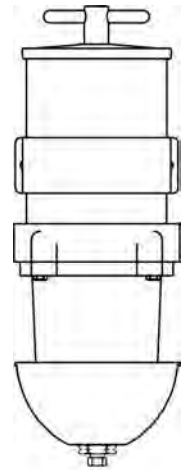
TURBINE FUEL FILTERS - 900MA



| 900MA | P | 10 |
|------------------------|---------------------------|--------------------------------|
| Basic Model | Water Probe. | Element Filtration Rating. |
| 90 GPH | Add 'P' for an in – bowl | Specify one: '2' for 2 micron |
| Add 'M' for metal bowl | water probe. ¹ | '10' for 10 micron or '30' for |
| Example: 900MAM | (Omit if not desired). | 30 micron |

Replacement Service Elements – For all Model 1000 Series
SERVICE ELEMENT INCLUDES LID SEAL AND T-HANDLE O-RING.

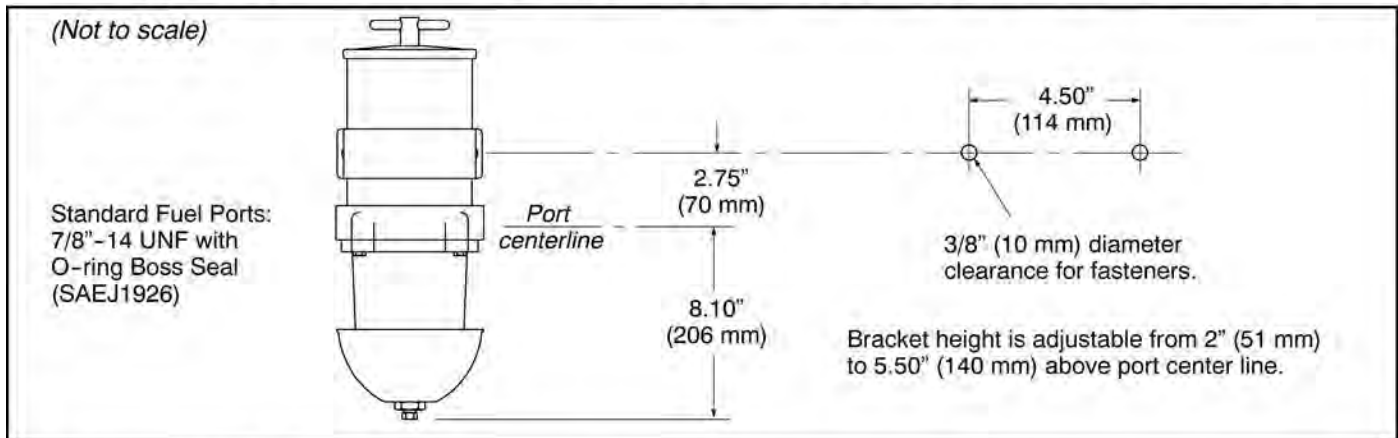
| | |
|------------------|--|
| 2040SM-OR | 2 Micron (Brown end caps) Recommended for Final/Secondary Filtration |
| 2040TM-OR | 10 Micron (Blue end caps) Recommended for Primary or Secondary Filtration |
| 2040PM-OR | 30 Micron (Red end caps) Recommended for Primary Filtration* Only. *A secondary/final filter is required downstream. |



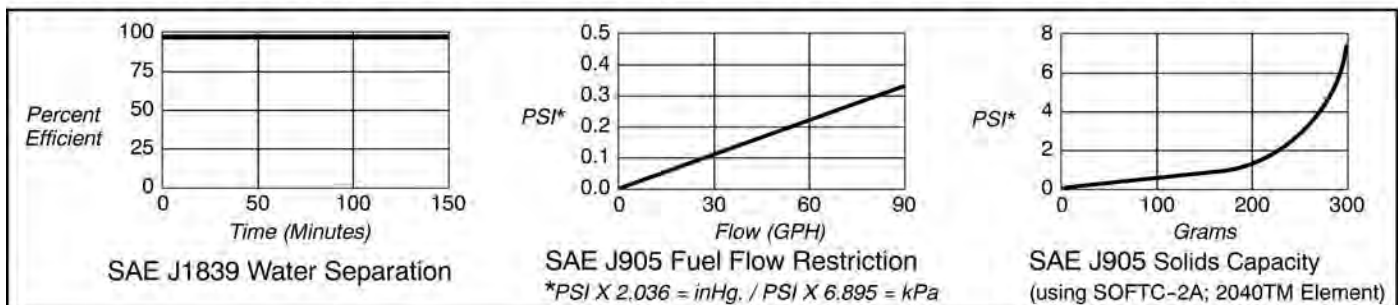
900MA



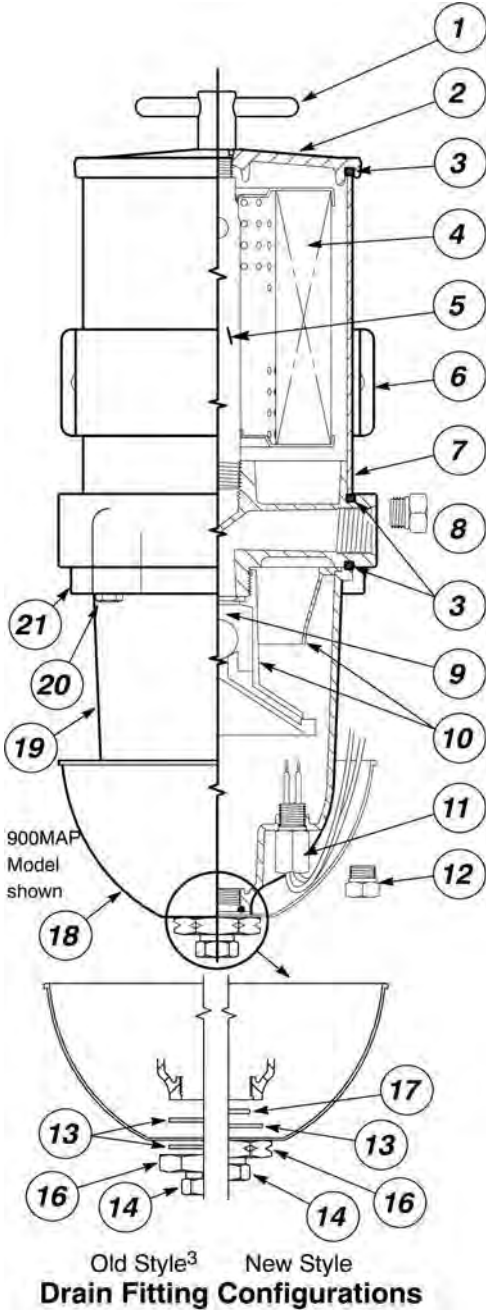
Mounting Hole Pattern – Refer to Turbine Series introduction page for filter dimensions.



Performance Graphs – These results are from controlled laboratory tests. Field results may vary by application



RACOR TURBINE FUEL FILTERS - 900MA

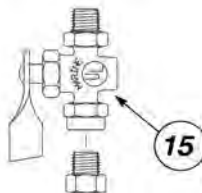


| Item | Part No. | Description | Case Qty. |
|------|-------------|---|-----------|
| 1 | RK11888 | T-handle | 1 |
| | 11350 | T-handle O-ring | 10 |
| 2 | RK11005B | Lid | 1 |
| | RK11005B | Lid with Vent Port and Plug Kit (not shown) | 1 |
| 3 | 11007 | Square-cut Gasket (Lid & Bowl ring) | 10 |
| 4 | 2040SMOR | 2 Micron Element with Seals | 12 |
| | 2040TMOR | 10 Micron Element with Seals | 12 |
| | 2040PMOR | 30 Micron Element with Seals | 12 |
| 5 | RK19001 | Return Tube (w/ tapered pipe body-end threads) | 1 |
| | RK19474 | Return Tube (w/ straight body-end threads) | 1 |
| 6 | RK11815-101 | Body Clamp Bracket | 1 |
| 7 | RK19002 | Outer Cylinder | 1 |
| 8 | RK11-1679 | Plastic Body Plug | 1 |
| 9 | RK11028B | Check Ball and Seal | 10 |
| 10 | RK11026D | Turbine Centrifuge / Conical Baffle | 1 |
| 11 | RK210691 | Water Probe Assembly | 1 |
| 12 | RK20022 | Metal Water Probe Plug | 1 |
| 13 | RK11341 | Bowl Drain Gasket Kit (for New and Old Styles) | 10 |
| | 11041 | Bowl Drain Washer (New and Old Style) | 1 |
| 14 | 918-N4 | Bowl Plug, 1/4" NPT (New and Old Style) | 1 |
| 15 | RK19492 | Diesel Marine Shut-off Valve Kit | 1 |
| 16 | 11-1910 | Bowl Drain Fitting (New Style) | 10 |
| | RK11-1910 | Complete Bowl Drain Fitting Kit (New Style) | 1 |
| | 11040 | Bowl Drain Fitting (Old Style) | 10 |
| 17 | 11340 | Drain Fitting O-ring (New Style) | 1 |
| 18 | RK118682 | Heat Deflector Shield (MA) | 1 |
| 19 | RK11-1606-1 | Clear Bowl with Water Probe Port | 1 |
| | RK11734 | Metal Bowl (MAM - not shown) | 1 |
| | RK11734-01 | Metal Bowl w/ 1/4" NPT Drain & Water Probe Port | 1 |
| 20 | RK11542 | Hex/Washer Head Capscrew, 1/4" - 20 x 1" (4) | 1 |
| 21 | RK11037A | Bowl Ring | 1 |
| 22 | RK11-1404 | Seal Service Kit (all models - not shown) | 1 |
| | 19466 | Installation Instructions, 900/1000MA | |

1 For diesel service only. Must be used with a Water Detection Kit.

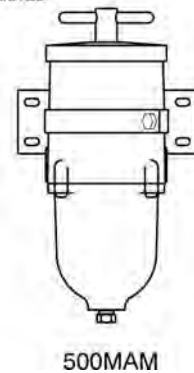
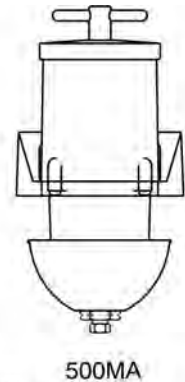
2 For replacement only. The Coast Guard does not accept "FG" units converted to "MA" configurations.

3 Units built prior to Fall, 1998



TURBINE FUEL FILTERS - 500MA

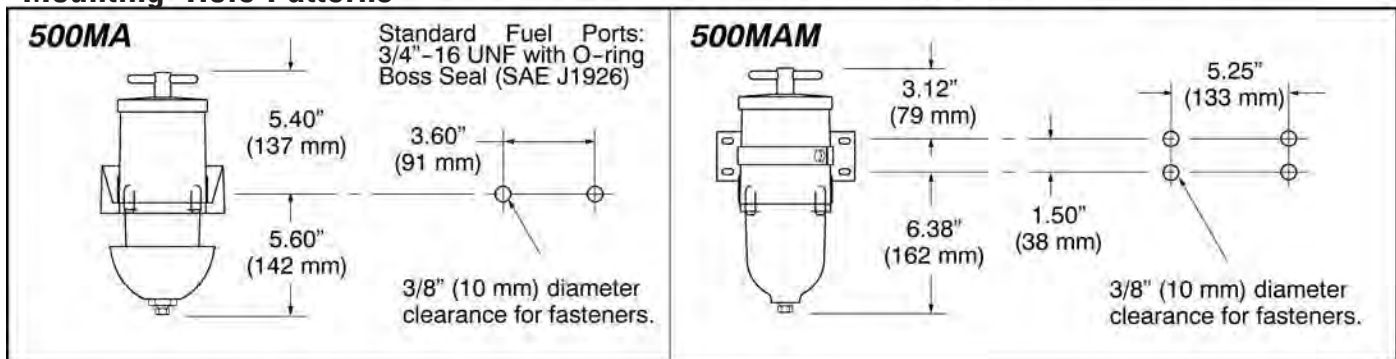
| 500MA | P | 10 |
|---|---|--|
| Basic Model 60 GPH Add "M" for metal bowl Example:500MAM | Water Probe ¹ Add "P" for an in-bowl water probe. (Omit if not desired). | Element Filtration Rating Specify one: '2' for 2 micron '10' for 10 micron or '30' for 30 micron |
| ¹ Must be used with Water Detection Kit. | | |



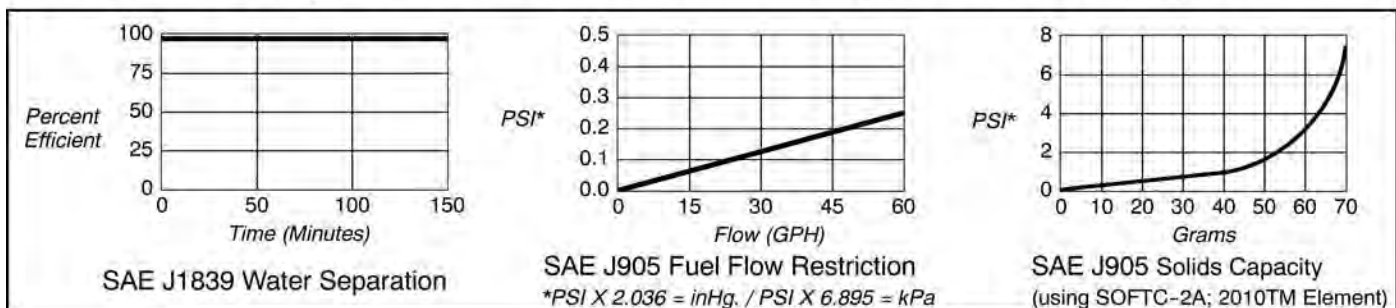
Replacement Service Elements – For all Model 500 Series SERVICE ELEMENT INCLUDES LID SEAL AND T-HANDLE O-RING.

| | |
|------------------|---|
| 2010SM-OR | 2 Micron (Brown end caps) Recommended for Final/Secondary Filtration |
| 2010TM-OR | 10 Micron (Blue end caps) Recommended for Primary or Secondary Filtration |
| 2010PM-OR | 30 Micron (Red end caps) Recommended for Primary Filtration* Only. <small>*A secondary/final filter is required downstream.</small> |

Mounting Hole Patterns

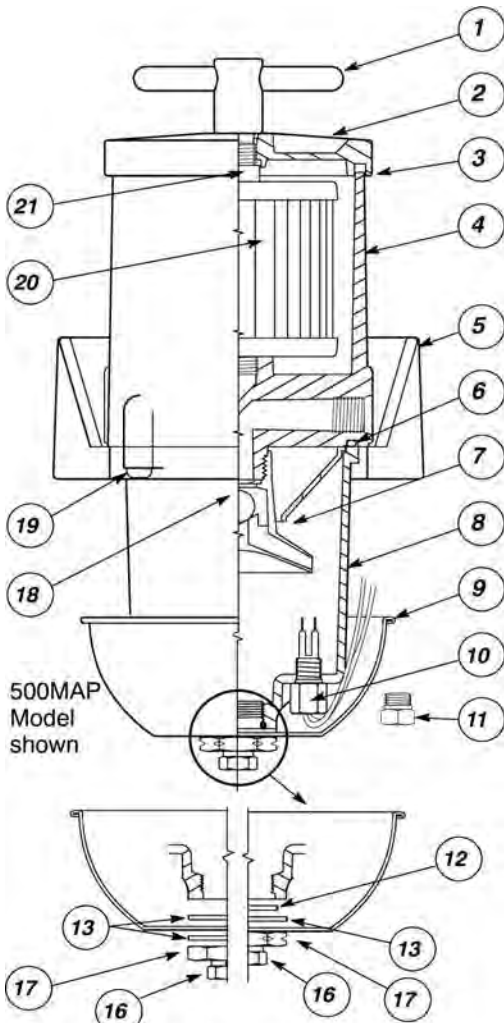


Performance Graphs – These results are from controlled laboratory tests. Field results may vary by application.

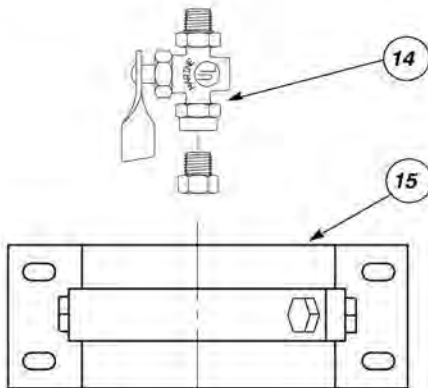


RACOR

TURBINE FUEL FILTERS - 500MA



Old Style⁴ New Style
Drain Fitting Configurations



500MAM 3-Piece Bracket

| Item | PartNo. | Description | Case Qty. |
|------|-------------|--|-----------|
| 1 | RK11888 | T-handle | 1 |
| | 11350 | T-handle O-ring | 10 |
| 2 | RK15078 | Lid | 1 |
| 3 | 15005 | Lid Gasket | 10 |
| 4 | RK15377-01 | Body, 3/4"-16 UNF Ports (MA, effective 1/15/96) | 1 |
| | RK15082 | Body, 9/16"-18 UNF Ports (prior to 1/15/96) | 1 |
| 5 | RK15090 | Mounting Bracket, unitized with Bowl Ring (MA) | 1 |
| 6 | 15374 | Bowl Gasket (supercedes 15009 O-ring-All models) | 10 |
| 7 | RK15013D | Turbine Centrifuge/Conical Baffle | 1 |
| 8 | RK15279-01 | See-thru Bowl w/Water Probe Plug, (MA) | 1 |
| | RK15301-01 | Metal Bowl w/1/4" NPT Drain & Water Probe Port | 1 |
| 9 | RK151041 | Heat Deflector Shield (MA) | 1 |
| 10 | RK210692 | Water Probe Assembly | 1 |
| 11 | RK20022 | Metal Water Probe Port Plug | 1 |
| 12 | 11340 | Drain Fitting O-ring (New Style) | 1 |
| 13 | 11041 | Bowl Drain Washer (New and Old Style) | 10 |
| 14 | RK19492 | Diesel Marine Shut-off Valve Kit | 1 |
| 15 | RK15300 | Mounting Bracket, 3-piece (MAM) | 1 |
| 16 | 918-N4 | Bowl plug, 1/4" NPT (Old and New Style) | 1 |
| 17 | 11-1910 | Bowl Drain Fitting (New Style) | 1 |
| | RK11-1910 | Complete Bowl Drain Fitting Kit (New Style) | 1 |
| | 11040 | Bowl Drain Fitting (Old Style) | 10 |
| 18 | RK15010B | Check Ball w/Seal | 1 |
| 19 | RK15081-013 | Phillips Head Cap screws 10-24x1" (4) | 1 |
| | RK150813 | Hex/Washer Head Cap screws 10-24x7/8" (4) | 1 |
| 20 | 2010SM-OR2 | Micron Element w/Seals | 12 |
| | 2010TM-OR10 | Micron Element w/Seals | 12 |
| | 2010PM-OR30 | Micron Element w/Seals | 12 |
| 21 | RK15079 | Return Tube (w/tapered pipe base threads) | 1 |
| 22 | RK15211 | Seal Service Kit (all models - not shown) | 1 |
| | 15335 | Installation Instructions, 500MA | |

¹For replacement only. The Coast Guard does not accept 'FG' units converted to 'MA' configurations.

²For diesel service only. Must be used with a Water Detection Kit.

³Models built prior to 2/96 use RK15081-01, after 2/96 use RK15081. (Fuel ports have 1-1/4" square boss on models made after 2/96).

⁴Units built prior to Fall, 1998.

20 and 25 Series Pressure SWICHGAGE®



25 Series



20 Series

Description

The 20 Series (2 inch/51 mm. dial) and the 25 Series (2-1/2 inch/64 mm. dial) SWICHGAGE® models are diaphragm-actuated, pressure-indicating gages, with built-in electrical switches. These switches are used for tripping alarms and/or shutdown devices.

Ranges are available from 0-15 PSI (103 kPa) [1.0 bar] thru 0-400 PSI (2.8 MPa) [28 bar].

The gage mechanism is enclosed in a steel case coated to resist corrosion. A polycarbonate, break-resistant lens and a polished, stainless steel bezel help protect this rugged, built-to-last instrument.

Accuracy and protection from moderate overpressure is assured by a unique, unitized diaphragm chamber. A built-in pulsation dampener helps eliminate pointer flutter and is removable for cleaning.

For models 20P and 25P, the gage pointer acts as a pressure indicator and as one switch pole which completes a circuit when it touches the adjustable limit contact. Contacts are grounded through the SWICHGAGE® case and have self-cleaning motion to ensure electrical continuity. Models 20PE and 25PE have internal snap-acting SPDT switches.

Gage-only models, without the switches (MURPHYGAGE®) are also available.

Applications

The SWICHGAGE® was specifically designed to protect engines/equipment in Oil Field, Marine, Irrigation, Construction and Trucking applications to monitor Engine Lube Pressure, Water Pump Pressure, Hydraulic Pressure, Air Pressure, etc.

CE

Specifications

Dial: White on black, dual scale; U.S.A.

standard scale is psi/kPa; U.K. standard scale is psi/bar; others available

Case: Plated steel; mounting clamp included (except for direct mount models).

Bezel: Polished stainless steel, standard; others are available (see How to Order).

Lens: Polycarbonate, high-impact.

Oil: Silicon Oil.

Temperature Range:

Ambient: -40°F (-40°C) thru 150°F (66°C).

Process: -40°F (-40°C) thru 250°F (121°C).

Process Connection: 1/8-27 NPTM brass.

Sensing Element: Beryllium copper diaphragm.

Gage Accuracy (% of Full Scale):

| RANGE | LOWER 1/4 | MIDDLE 1/2 | UPPER 1/4 |
|-------------------|-----------|------------|-----------|
| ≤300 psi (20 Bar) | ±3% | ±2% | ±3% |
| 400 psi (28 Bar) | ±3% | ±3% | ±5% |

Maximum Pressure: See Pressure Ranges and Factory Settings table on page 2.

Adjustable Limit Contact (20P and 25P):

SPST contact; pilot-duty only, 2 A @ 30 VAC/DC; Normally Close (NC) when the low limit is met. Normally Open (NO) when pointer is in normal operating range. Contacts are gold flashed silver.

Limit Contact Adjustment: by a 1/16 in. hex wrench through 100% of the scale.

Limit Contact Wire Leads: 18 AWG (1.0 mm²) x 12 in. (305 mm.).

Snap-Switch Rating (20PE and 25PE):

SPDT, 3 A @ 30 VDC inductive; 4 A @ 125 VAC inductive.

Snap-Switch Wire Leads: 20 AWG (0.75 mm²) x 2 in. (305 mm.).

2 and 2-1/2 in. (51 and 64 mm.) Dial

- Combination Indicating Gage and Limit Switch
- Critical Pressure Limit Switch Is Visible and Adjustable (Most Models)
- Switch Can Activate Alarms and/or Shutdown Equipment
- Exceeds SAE Standards

Unit Weight: 20 Series: 8 oz. (0.23 kg).

25 Series Models: 11 oz. (0.31 kg).

Unit Dimensions: 20 Series: 3 x 3 x 3 in. (76 x 76 x 76 mm.). 25 Series Models: 4-3/4 x 4-3/4 x 2-3/4 in. (121 x 121 x 70 mm.).

Base Models

20P and 25P Series SWICHGAGE®
The gage pointer makes with an adjustable contact to complete a pilot-duty circuit.

20PE and 25PE SWICHGAGE®
20PE (was 20EO) and 25PE (was 25EO). Features internal snap-acting SPDT switches, instead of the single pole/pointer contacts. When the switch closes on falling pressure, it becomes Set, as pressure rises the switch Resets.

20PABS and 25PABS SWICHGAGE®
Same as 20P and 25P with internal SPDT snap-switch for pre-alarm.

20P7 and 25P7 Lockout SWICHGAGE®
Same as 20P and 25P Series. They also include a front, semi-automatic lockout for startup override. This built-in device holds the pointer away from the contact on startup. When pressure exceeds the set point, the lockout is automatically disengaged.

20PG and 25PG MURPHYGAGE®
Gage without contact(s).

Warranty

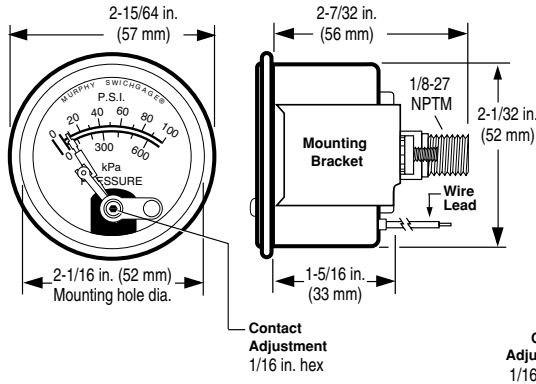
A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

**Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.

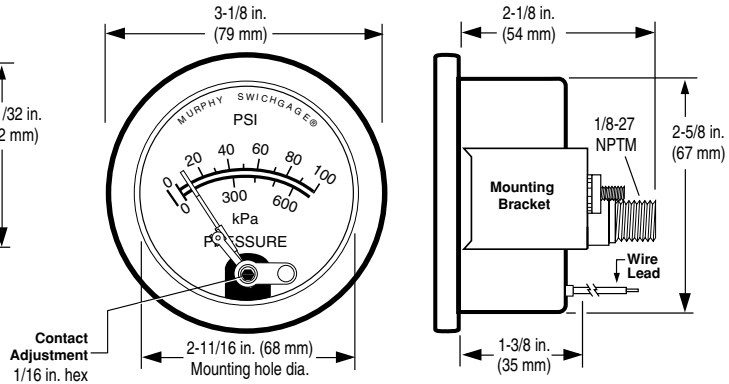
Dimensions



20 Series Models



25 Series Models



Pressure Ranges and Factory Settings

NOTES

- Values in () are mathematical conversions from psi to kPa/MPa—they do not reflect actual second scale range. U.S.A. standard scale is psi/kPa; U.K. standard scale is psi/bar—exact set-point shown. Consult factory for other scales.
- For models A20PE and A25PE; the switch trip point cannot be set at either the low or high extreme of the scale. The trip point must allow for the reset differential.
- For adjustable switch models, the trip point is adjustable only over the lower half of the scale.

| Ranges Available | Maximum Pressure | Standard Settings | | | High Settings* | | | A20PABS and A25PABS Settings Alarm† | | | | | | | |
|------------------|------------------|-------------------|-------------------|-------|----------------|-------|-------|-------------------------------------|-------|-------|-------|-------|-------|---------|-------|
| | | psi | (kPa) | [bar] | psi | (kPa) | [bar] | psi | (kPa) | [bar] | psi | (kPa) | [bar] | | |
| 0-15 | (103) | [1.0] | 30 psi (207) | 3 | (21) | [0.2] | 12 | (83) | [0.8] | 3 | (21) | [0.2] | 6 | (41) | [0.3] |
| 0-30 | (207) | [2.0] | 60 psi (413) | 7 | (48) | [0.4] | 24 | (165) | [1.6] | 7 | (48) | [0.4] | 10 | (69) | [0.6] |
| 0-50 | (345) | [3.5] | 100 psi (690) | 10 | (69) | [0.8] | 40 | (276) | [2.8] | 10 | (69) | [0.8] | 13 | (90) | [1.0] |
| 0-75 | (517) | [5.0] | 150 psi (1.0mpa) | 15 | (103) | [1.0] | 60 | (414) | [4.0] | 15 | (103) | [1.0] | 18 | (124) | [1.5] |
| 0-100 | (690) | [7.0] | 200 psi (1.4mpa) | 20 | (138) | [1.5] | 80 | (552) | [5.5] | 20 | (138) | [1.0] | 23 | (159) | [1.5] |
| 0-150 | (1.0 MPa) | [10] | 300 psi (2.1 mpa) | 30 | (207) | [2.0] | 120 | (827) | [8.0] | 30 | (207) | [1.5] | 33 | (228) | [2.0] |
| 0-200 | (1.4 MPa) | [14] | 400 psi (2.8 mpa) | 50 | (345) | [3.0] | 150 | (1 MPa) | [10] | 50 | (345) | [3.0] | 53 | (365) | [4.0] |
| 0-300 | (2.1 MPa) | [20] | 500 psi (3.4 mpa) | 75 | (517) | [5.0] | 225 | (1.6 MPa) | [15] | 75 | (517) | [5.0] | 78 | (538) | [5.0] |
| 0-400 | (2.8 MPa) | [28] | 500 psi (3.4 mpa) | 150 | (1.0 MPa) | [7.0] | 300 | (2.1 MPa) | [20] | 75 | (517) | [5.0] | 150 | (1 MPa) | [10] |

*Low settings for Hi/Lo option same as standard settings. Hi/Lo option available for A20P and A25P models only.
†SPDT Snap-switch is the alarm switch.

Features

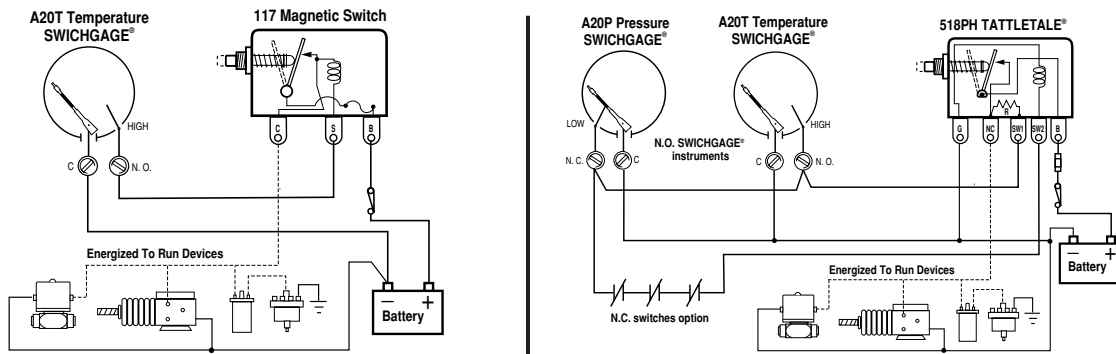
- Process Connection and Port: Machined from brass bar stock. Together with the diaphragm forms the diaphragm chamber.
- Diaphragm (not shown): Beryllium copper die formed and heat treated to very close physical and metallurgical specifications.
- Pulsation Dampener: Designed to minimize undesirable pointer chatter. It is removable for cleaning.
- Dial: White letters on a black background, dual scale; others available on request—see How to Order.
- Case: Polycarbonate/glass filled, corrosion resistant; mounting clamp included.
- Bezel: Polished stainless steel standard, black bezel also available.
- Lens: Made of high-impact resistant treated polycarbonate.
- Pointer: Tempered nickel silver for continuity and corrosion resistance—mounted on a machined brass post. Red tip.
- Limit Contact: SPST contact; N.C. when low limit is met. N.O. when pointer operates above limit.
- Limit Contact Adjustment: by 1/16 in. hex type wrench thru 100% of the scale. Easy adjustment knob available.
- Electrical Connections: Number 4 screw terminals for A20 Series; and number 6 screw terminals for A25 Series models.



Magnetic Switch

Inductive and high current loads require the use of a Magnetic Switch. The SWICHGAGE® contacts are for light-duty electrical switching to operate alarms or control devices. Murphy manufactures the Magnetic Switch for protection of the pilot-duty SWICHGAGE® limit contacts.

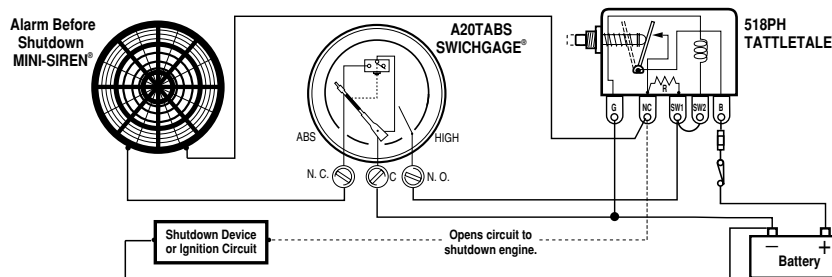
TATTLETALE® Magnetic Switches show the cause of shutdown for applications that include: capacitor discharge or magneto ignitions, battery systems and electric motor driven equipment. Typical wiring diagrams are shown below.



Pre-Alarm Using A20/A25PABS

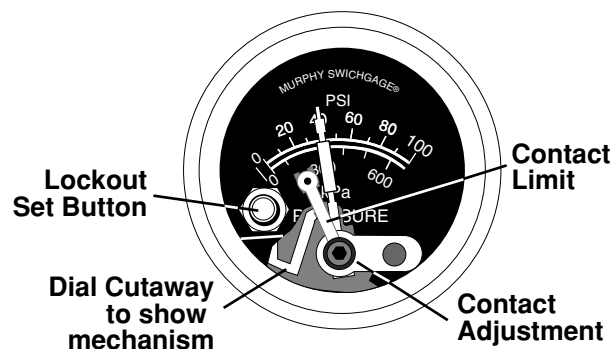
The A20PABS and A25PABS features a standard limit contact for equipment shutdown on low pressure. It also has an internal SPDT snap-switch to signal an alarm before shutting down. When the snap-switch trips (preset point), on falling pressure, the switch completes a circuit to activate an alarm. If the pressure continues to fall, the face-adjustable pointer contact will make and the shutdown circuit will be

completed (see the typical diagram below for reference). The front contact shutdown limit setting (which is adjustable) and the snap-switch are preset at the factory. Refer to "Pressure Ranges and Factory Settings" table on opposite page for settings. For alternative alarm before shutdown, see Magnetic Switch model 760A or 761APH.



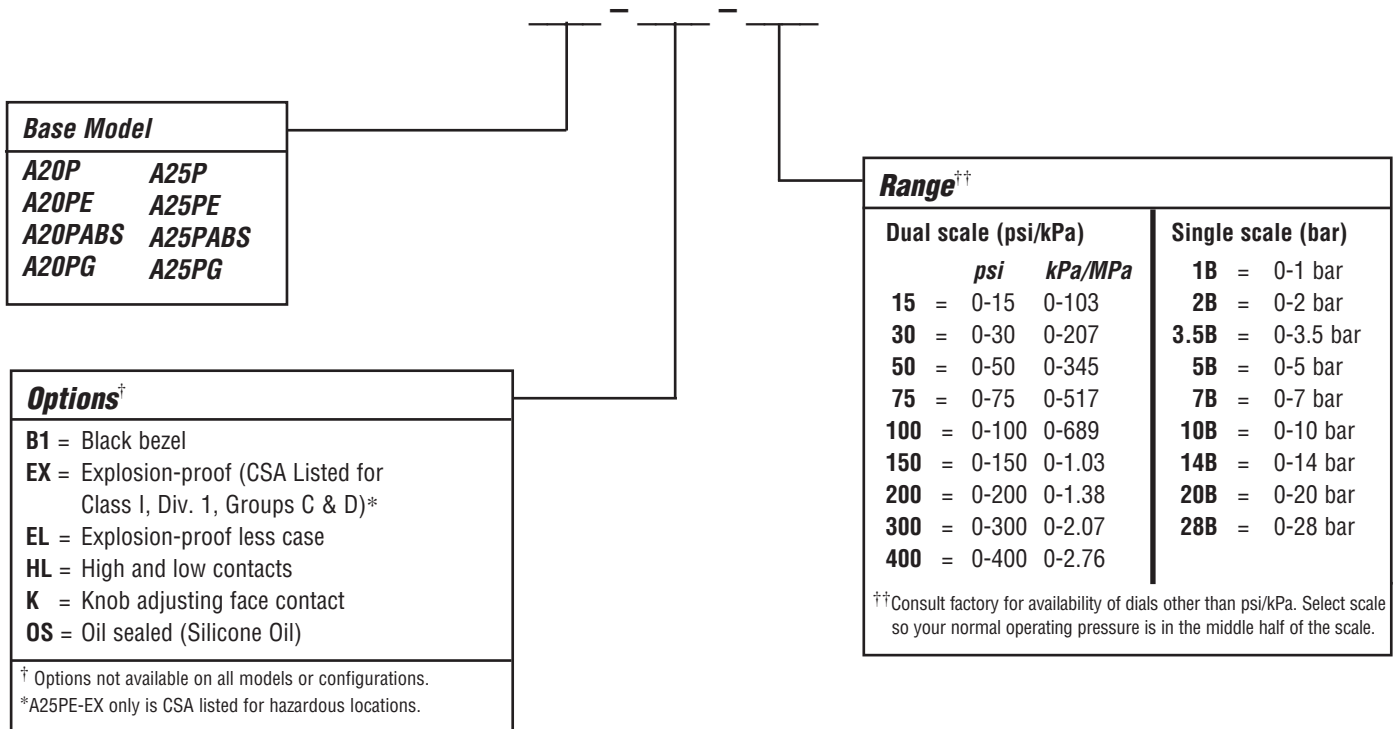
Start-Up Lockout

The SWICHGAGE® low limit contact can be by-passed on start-up by pushing this optional lockout button. It holds the pointer away from the shutdown contact while the engine starts. The lockout will disengage automatically on rising pressure.



How to Order

To order, use the diagram below. List options in ascending alphabetical order (A-Z). Example: A20P-K-100.



Illumination – Order Separately
A20 Series: Clamp Lite Assembly; 12 V= 05702176; 24 V= 05702177
A25 Series: N/A.

5

CAUTION: "OIL FILLED INSTRUMENTS CONTAIN SILICON OIL" Exposure may be hazardous under certain circumstances. "Keep out of Eyes, Mouth and Do Not expose to Skin". Keep out of reach of children. Flush thoroughly with water and seek medical attention. If swallowed, call physician immediately. MSDS Sheets are available by calling: 918/317-4100.

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

Oil Pressure Tubing Kit



DHK Model

- Custom Fit Oil Pressure Line for Any Engine
- Swaged Fittings
- Wide Pressure and Temperature Compatibility
- Tough Materials for Industrial Use
- Adapters for U.S. or Metric

Description

The Deluxe (DHK) oil pressure tubing kit can be used with a variety of Murphy SWICHGAGE® and MURPHYGAGE® instruments. This kit consists of gauge fitting, pressure tubing, and engine fitting.

The Deluxe kit is ideal for heavy-duty industrial applications. The nylon core is reinforced with a synthetic fiber braid and polyurethane cover. Both ends of the pressure tubing have swaged fittings.

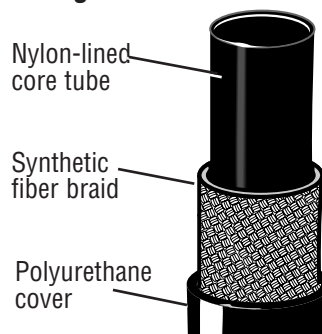
The Deluxe kit allows you to choose the type of gauge and engine fittings for your application. Choose straight or elbow fittings for both gauge and engine connections. In addition, the kit offers a variety of engine adapters to fit your application. These adapters are available in U.S. or metric threads.

Features

Deluxe Kit

- Tubing will not swell or absorb fluids which can cause restriction of the I.D. or release contaminants into the system.
- Synthetic fiber reinforcing braid eliminates wire that often fatigues, breaks, and may puncture the core tube.
- Thermoplastic core tube is resistant to practically all oils and hydraulic fluids.
- Swaged fittings for tough applications.

Deluxe Kit Tubing Detail



Specifications

Tubing: Nylon, 1/8 in. (3 mm.) I.D. suitable for continuous service from -40 to 200°F (-40 to 93°C). Intermittent service +250°F (121°C).

Fittings: Brass and steel.

Adaptors: Brass and steel.

Washers: Copper (supplied with all non-tapered thread fittings).

Working Pressure:
2,500 psi (17.2 MPa) [172.0 bar].

Minimum Burst Pressure:
10,000 psi (68.9 MPa) [689.0 bar]
@ 200°F (93°C).

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

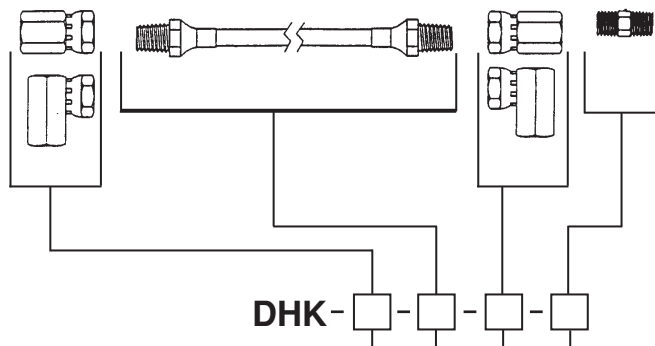


Oil Pressure Tubing Kit

How to Order

To order the oil pressure tubing kit to fit your application use the diagram below. Specify the Deluxe base model number, gauge fitting, length of hose in inches, engine fitting, and engine adapter (Note: designate "Z" if no gauge fitting, engine fitting or adapter is required). Model number example: DHK-A-72-C-Z

Deluxe Tubing Kit



Gauge Fitting
 Z: No fitting
 A: 1/8 NPT female x 1/8 NPSM swivel, straight (89-09-0202)
 B: 1/8 NPT female x 1/8 NPSM swivel, 90° (85-04-0202)

Tubing Length
 Specify end to end length in inches (1/8 I.D. with 1/8 NPT male both ends).
 For meters specify "m" after length.
 For millimeters specify "mm" after length.

Engine Connection Fitting
 Z: No fitting
 C: 1/8 NPT female x 1/8 NPSM swivel, straight (89-09-0202)
 D: 1/8 NPT female x 1/8 NPSM swivel, 90° (85-04-0202)

Engine Connection Adapter
 Z: No adapter
 G: 1/8 NPT male x 1/8 NPT, male, straight (86-03-0204)
 H: 1/8 NPT male x 1/4 NPT, male, straight (65-05-0460)
 K: 1/8 NPT male x M10-1.0, straight (65-05-0461) with seal washer (65-05-0465)
 M: 1/8 NPT male x M12-1.5, straight (65-05-0462) with seal washer (65-05-0456)
 N: 1/8 NPT male x M14-1.5, straight (65-05-0463) with seal washer (10-05-0601)
 O: 1/8 NPT male x M18-1.5, straight (65-05-0474) with seal washer (10-05-0605)
 P: 1/8 NPT male x 1/8 BSPT, male, straight (65-05-0464)

5

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

DIRECT MOUNT PRESSURE SWITCH



MODEL PSB

- Limit Switch for Critical Pressure
- Operate Alarms or Shutdown Equipment
- SPDT Snap-Acting Switch
- Fits Most Engine Applications

Description

The PSB switch is a direct mount switch for critical pressure points. It has one limit contact that can be used to activate an alarm, actuate indicator lights or shutdown equipment.

The construction of this instrument is the same as our time-proven SWICHGAGE®. A precision machined brass mounting plate and port captures a high quality stamped beryllium copper diaphragm. The single-pole, double-throw (SPDT) snap-switch is operated directly from the diaphragm for quick acting and positive switching. Trip point is factory preset according to your specifications.

Housing is weather sealed to prevent entry of moisture, dust, etc. A glass-filled nylon terminal block with quick screw terminal connections gives the PSB switch a real advantage in industrial engine applications. The PSB is ideal when reading is not desired, but pressure is critical to operational efficiency.

Intended for use in general purpose non-classified areas.

Applications

- Engine Lubrication
- Water pumps
- Compressors
- Oil field systems
- Irrigation systems
- Construction Equipment
- Mobile Equipment
- Marine engines
- Generators

Features

- Fits all engine applications
- SPDT snap-switch
- Activates indicator lights, alarms, or shut down equipment
- Time-proven SWICHGAGE® construction
- Easy wiring terminal block
- Steel housing specially coated to resist corrosion
- Factory preset to your specifications

Specifications

Housing: Plated steel.

Pressure Connection: 1/8-27 NPT, Brass.

Diaphragm: Formed beryllium copper (heat treated).

Pulsation Dampener: Brass (it is removable for cleaning).

Terminal Block: Three #4-40 screws.

Accuracy: Trip point: $\pm 3\%$ of full scale.
Switch reset differential: $\pm 7\%$ of full scale.

Repeatability: $\pm 1\%$ of full scale.

Contact Rating: SPDT 3 A @ 30 VDC inductive.

Maximum Pressure: See Trip Point

Chart on reverse side.

Temperature Range:

Ambient= -40°F (-40°C) thru 150°F (66°C).

Process= -40°F (-40°C) thru 250°F (121°C).

Factory Trip Point Setting: See Trip Point Chart.

Pressure Range: Specify from 0-400 psi (0-2.76 MPa) [0- 27.58 bar].

Contact: Operates on rising or falling pressure (specify).

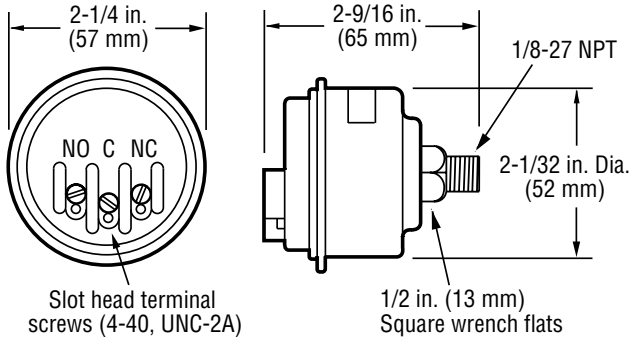
Shipping Weight: 8 oz. (0.25 kgs).

Shipping Dimensions: 3 x 2-3/4 x 2-3/4 in. (76 x 70 x 70 mm.).

NOTE: No customer replacement parts.

DIRECT MOUNT PRESSURE SWITCH

Dimensions



Installation Instructions

Mounting

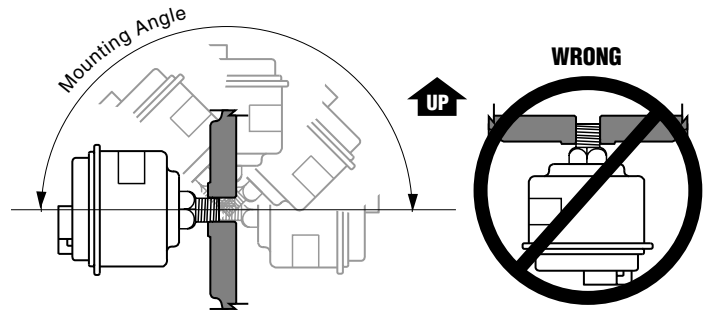
CAUTION: Use wrench on shank to tighten or loosen pressure connection. DO NOT TWIST CASE, which will damage the unit and void the warranty.

1. Before installing the PSB switch, apply sealant, such as Teflon tape, to the threads (be sure sealant does not block the inlet orifice).
2. The PSB can be mounted in horizontal or vertical angles (do not mount switch facing down).
3. Locate the unit in place and secure it by tightening the

Trip Point Chart

| Ranges available psi (kPa/MPa) [bar] | Factory setting* psi (kPa) [bar] Falling | Maximum pressure psi (kPa) [bar] |
|---|---|-------------------------------------|
| 0-15 (0-103) [0-1.03] | 3 (21) [2.1] | 30 (207) [2.07] |
| 0-30 (0-207) [0-2.07] | 7 (48) [4.8] | 60 (414) [4.14] |
| 0-50 (0-345) [0-3.45] | 10 (69) [6.9] | 100 (0-689) [0-6.89] |
| 0-75 (0-517) [0-5.17] | 15 (103) [1.03] | 150 (0-1.03) [0-10.34] |
| 0-100 (0-689) [0-6.89] | 20 (138) [1.38] | 200 (0-1.38) [0-13.79] |
| 0-150 (0-1.03) [0-10.34] | 30 (207) [2.07] | 300 (0-2.07) [0-20.70] |
| 0-200 (0-1.38) [0-13.79] | 50 (345) [3.45] | 400 (0-2.76) [0-27.60] |
| 0-300 (0-2.07) [0-20.70] | 75 (517) [5.17] | 500 (3.45) [34.50] |
| 0-400 (0-2.76) [0-27.60] | 150 (1.03) [10.34] | 500 (3.45) [34.50] |

*These points will be used if switch trip point is not specified.

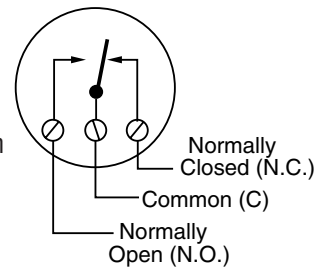


1/8-27 NPT fitting into the desired location (do not over tighten). DO NOT TWIST CASE.

Wiring

CAUTION: DISCONNECT Electrical power before wiring.

1. Switch contacts (below) are shown with no pressure applied to the PSB switch.
2. A spade (forked) terminal is recommended for all PSB switch connections.
3. Complete the wiring operation making sure the voltage and current requirements are within the PSB switch electrical rating (see the typical wiring diagram at right).



To order the PSB model use the diagram below.

PSB - - -

Pressure Range

Specify maximum value from chart above.

Switch Trip Point†

F= Factory set to trip on falling. Specify "F" and the set point value.
Example: PSB-100-**F20**.

R= Factory set to trip on rising, Specify "R" and the set point value.
For units of measure other than psi, specify the set point value followed by unit of measure as follows:

B = Bar

K = kPa/MPa

M = kg/cm²

Example: PSB-7**B**-2**B**

†Switch set point value will be stated on label.

A20 and A25 Series Temperature SWICHGAGE®



2 and 2-1/2 in. (51 and 64 mm.) Dial

- Corrosion Resistant Polycarbonate Case
- Indicating Gage and Limit Switch
- Switch Can Activate Alarms and/or Shut Down Equipment
- Critical/High Temperature Limit Switch Is Visible and Adjustable (Most Models)
- Contact(s) Isolated From Ground

Description

The A20 Series (2 inch/51 mm. dial) and the A25 Series (2-1/2 inch/64 mm. dial) SWICHGAGE® models are diaphragm-actuated, temperature-indicating gages, with built-in electrical switches for tripping alarms and/or shutdown devices.

Ranges are available from 32-120°F (0-45°C) thru 300-440°F (160-220°C).

All models of these rugged, built-to-last instruments are fully sealed from the environment by the unique combination of a polycarbonate case and lens, a polished stainless steel bezel, and O-ring seals.

These vapor/pressure actuated gages feature a sealed capillary tube and a sensing bulb. When subjected to heat, the liquid in the sensing bulb changes to vapor creating pressure against a diaphragm mechanism. The diaphragm translates this vapor pressure into a mechanical gage reading.

For series A20T and A25T, the gage pointer acts as a temperature indicator and as one switch pole which completes a circuit when it touches the adjustable limit contact. Contact(s) are isolated from ground. They have self-cleaning motion to enhance electrical continuity.

Models A20TE and A25TE have internal snap-acting SPDT switches.

Gage-only models, without contacts (MURPHYGAGE®) are also available.

Applications

Applications for A20 and A25 Series temperature SWICHGAGE® instruments include: engines and equipment in Oil Field, Marine, Irrigation, Construction and Trucking industries. Monitoring Engine Coolant temperature, Crankcase Oil, Transmission Oil.

Specifications

Dial: White on black; U.S.A. standard scale is dual scale °F/°C; others available.

Case: Glass filled/Polycarbonate, corrosion-resistant; steel mounting clamp included.

Bezel: Polished stainless steel, standard; others are available.

Pointer: Tempered nickel silver; red tip.

Lens: Polycarbonate, high-impact.

Sensing Element: Beryllium copper diaphragm.

Capillary: PVC armored copper; 4 ft. (1.2 m). * Galvanized and stainless steel armor optional.

Sensing Bulb: Copper.*

Gage Accuracy: See accuracy chart, on page 2.

Maximum Temperature: See Temperature Ranges and Factory Settings table on page 2.

Adjustable Limit Contact (A20T and A25T): SPST contact; pilot-duty only, 2 A @ 30 VAC/VDC; isolated from case ground. Normally Closed when the high limit is met. Normally Open when pointer is in normal operating range. Contacts are gold flashed silver. Limit Contact Adjustment: by a 1/16 in. hex wrench thru 100% of the scale.

Wiring: A20T: Number 4 screw terminals; A25T: Number 6 screw terminals.

Snap-Switch Rating (A20TE and A25TE): SPDT, 3 A @ 30 VDC inductive; 4 A @ 125 VAC inductive.

Wiring: A20TE: Number 4 screw terminals; A25TE: Number 6 screw terminals.

Unit Weight: A20 Series: 11.9 oz. (0.370 kg). A25 Series Models: 13.3 oz. (0.413 kg).

Unit Dimensions: A20 Series: 4-3/4 x 4-3/4 x 3 in. (121 x 121 x 76 mm.). A25 Series Models: 4-3/4 x 4-3/4 x 2-3/4 in. (121 x 121 x 70 mm.).

Base Models

Coolant or Oil Temperature

A20T and A25T Series SWICHGAGE®

For these models the gage pointer makes with an adjustable contact to complete a pilot-duty circuit.

A20TL and A25TL SWICHGAGE®

For use on Ford Worldwide engines. Supplied with special sensing bulb.

A20TE and A25TE SWICHGAGE®

A20TE (was A20ESR) and A25TE (was A25ESR). Models with internal SPDT snap-switches, instead of the single pole/pointer contact(s). When the switch closes on rising temperature, it becomes Set. As temperature decreases the switch Resets. Model A25TE is CSA listed for non-hazardous areas. Model A25TE-EX is CSA listed for Class I, Division 1, Groups C & D hazardous areas.

A20TABS and A25TABS SWICHGAGE®

Same as 20 and 25T with internal SPDT snap-switch for pre-alarm.

Cylinder Head Temperature

A20TH and A25TH SWICHGAGE®

A20TH (was A20TL8133) and A25TH (was A25TL8133). For use on Air Cooled engines.

Gage-Only Models

A20TG and A25TG MURPHYGAGE®

Gage without contact(s).

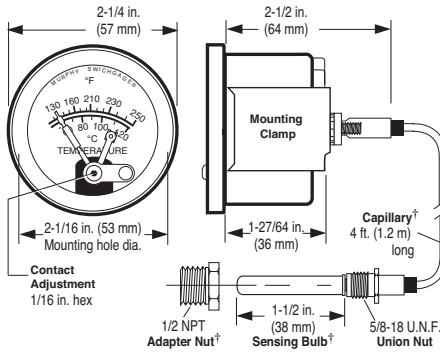
* For optional capillary lengths, engine adapters, sensing bulbs and range combinations, see Murphy bulletin T-8428B.

** Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.

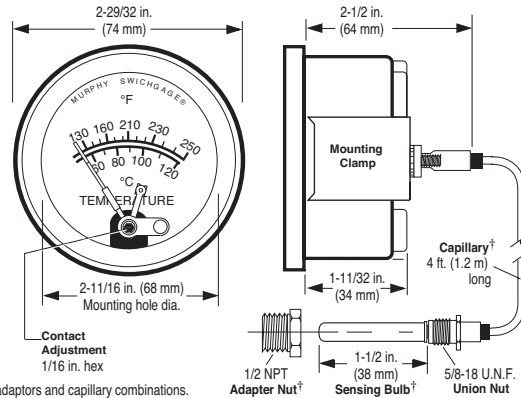
Dimensions



A20 Series Models (typical)



A25 Series Models (typical)



†Standard combinations. See Murphy bulletin T-8428B for optional sensing bulb, engine adaptors and capillary combinations.

Temperature Ranges and Factory Settings

NOTES

- Values in () are mathematical conversions from °F to °C—they do not reflect actual second scale range. U.S.A. standard scale is °F/°C.
- For models A20TE and A25TE; the switch trip point cannot be set at either the low or high extreme of the scale. The trip point must allow for the reset differential.
- For adjustable switch models, the trip point is adjustable only over the upper half of the scale.

| Ranges Available Dual Scale Dial °Fahrenheit (°Celsius) | Single Scale °Celsius only | Max. Temp. °F (°C) | Std. Settings* | | | Hi/Lo Settings | | 20TABS and 25TABS Settings | | | |
|---|-------------------------------|-----------------------|----------------|---------|---------|----------------|-----------------|----------------------------|---------|-----------|---------|
| | | | °F (°C) | °F (°C) | °C only | Low °F (°C) | High °F (°C) | Alarm** | | Shutdown | |
| | | | °F (°C) | °F (°C) | °C only | °F (°C) | °F (°C) | °F (°C) | °C only | °F (°C) | °C only |
| 32 – 120 (0 – 49) | — | 185 (85) | 110 (43) | — | — | 32 (0) | 110 (43) | 100 (38) | — | 110 (43) | — |
| 32 – 160 (0 – 71) | 0 – 70 | 215 (102) | 150 (66) | 66 | 66 | 32 (0) | 150 (66) | 140 (60) | 60 | 150 (66) | 66 |
| 130 – 220 (54 – 104) | 45 – 100 | 260 (127) | 210 (99) | 85 | 85 | 160 (71) | 210 (99) | 200 (93) | 80 | 210 (99) | 85 |
| 130 – 250 (54 – 121) | 50 – 120 | 310 (154) | 210 (99) | 97 | 97 | 160 (71) | 210 (99) | 200 (93) | 95 | 210 (99) | 100 |
| 140 – 300 (60 – 149) | 60 – 140 | 340 (173) | 275 (135) | 130 | 130 | 200 (93) | 275 (135) | 265 (129) | 125 | 275 (135) | 130 |
| 160 – 320 (71 – 160) | 70 – 160 | 370 (192) | 300 (149) | 150 | 150 | 200 (93) | 300 (149) | 290 (143) | 145 | 300 (149) | 150 |
| 180 – 350 (82 – 177) | — | 400 (209) | 330 (166) | — | — | 240 (116) | 330 (166) | 320 (160) | — | 330 (166) | — |
| 300 – 440 (149 – 227) | — | 500 (260) | 400 (204) | — | — | 300 (149) | 400 (204) | 390 (199) | — | 400 (204) | — |

* Standard setting for A20T, A25T, A20TE and A25TE models.

** SPDT snap-switch is the alarm switch.

Temperature Accuracy Chart

| Temperature Range | Lower 1/3 of Scale | Middle 1/3 of Scale | Upper 1/3 of Scale |
|-----------------------------|--------------------|---------------------|--------------------|
| 32 to 120°F (0 to 49°C) | ± 12°F (± 6°C) | ± 5°F (± 2.4°C) | ± 6°F (± 3°C) |
| 32 to 160°F (0 to 71°C) | ± 20°F (± 10°C) | ± 8°F (± 4.4°C) | ± 7°F (± 4°C) |
| 130 to 220°F (54 to 104°C) | ± 6°F (± 3°C) | ± 3°F (± 1.6°C) | ± 4°F (± 2°C) |
| 130 to 250°F (54 to 121°C) | ± 9°F (± 5°C) | ± 5°F (± 2.4°C) | ± 4°F (± 2°C) |
| 140 to 300°F (60 to 149°C) | ± 10°F (± 5.2°C) | ± 6°F (± 3°C) | ± 5°F (± 2.4°C) |
| 160 to 320°F (71 to 160°C) | ± 10°F (± 5.2°C) | ± 5°F (± 2.4°C) | ± 5°F (± 2.4°C) |
| 180 to 350°F (82 to 177°C) | ± 12°F (± 6°C) | ± 5°F (± 2.4°C) | ± 5°F (± 2.4°C) |
| 300 to 440°F (149 to 227°C) | ± 9°F (± 5°C) | ± 5°F (± 2.4°C) | ± 4°F (± 2°C) |

Maximum Temperature

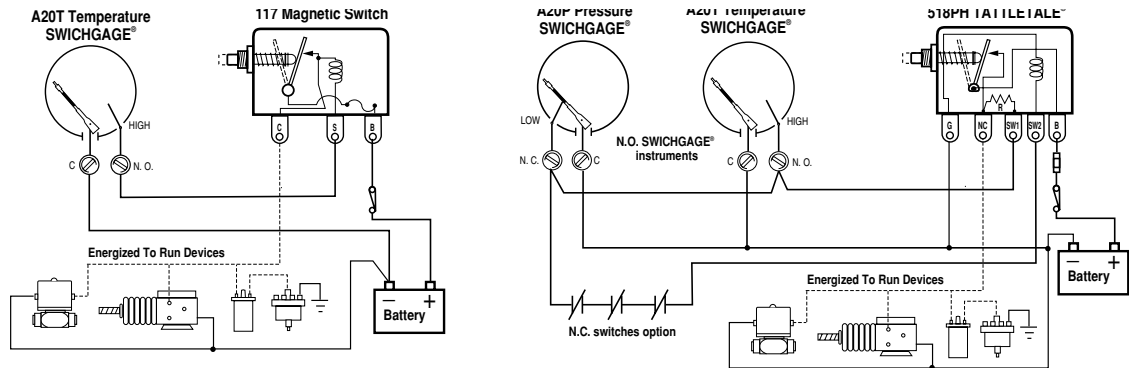
MAXIMUM AMBIENT Temperature: -40° (-40°) through 150° (66°)

| RANGE | MAXIMUM PROCESS Temperature |
|--------------|-----------------------------|
| ≤250° (120°) | 120% OF FULL SCALE |
| 300° (140°) | 350° (198°) |
| ≥320° (160°) | 120% OF FULL SCALE |

Magnetic Switch

Inductive and high current loads require the use of a Magnetic Switch. The SWICHGAGE® contacts are for light-duty electrical switching to operate alarms or control devices. Murphy manufactures the Magnetic Switch for protection of the pilot-duty SWICHGAGE® limit contacts. TATTLETALE® Magnetic Switches

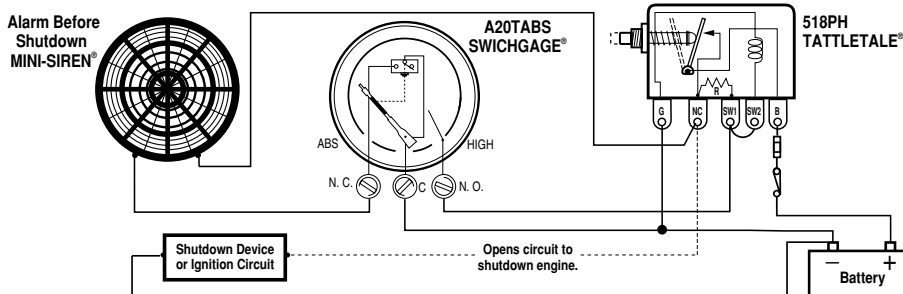
show the cause of shutdown for applications that include: capacitor discharge or magneto ignitions, battery systems and electric motor driven equipment. Typical wiring diagrams are shown below.



Pre-Alarm Using A20/A25TABS

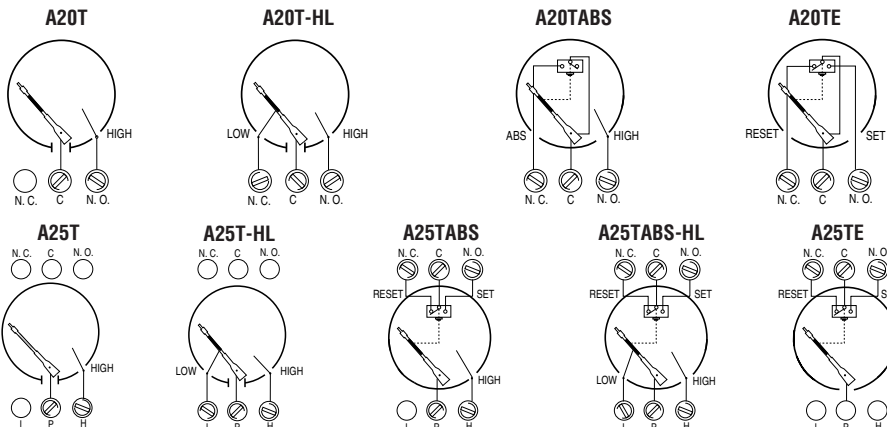
The A20TABS and A25TABS features a standard limit contact for equipment shutdown on high temperature. It also has an internal SPDT snap-switch to signal an alarm before shutting down. When the snap-switch trips (preset point), on rising temperature, the switch completes a circuit to activate an alarm. If the temperature continues to increase, the face-adjustable pointer contact will make

and the shutdown circuit will be completed (see the typical diagram below for reference). The front contact shutdown limit setting (which is adjustable) and the snap-switch are preset at the factory. Refer to "Temperature Ranges and Factory Settings" table on opposite page for settings. For alternative alarm before shutdown, see Magnetic Switch model 760A or 761APH.



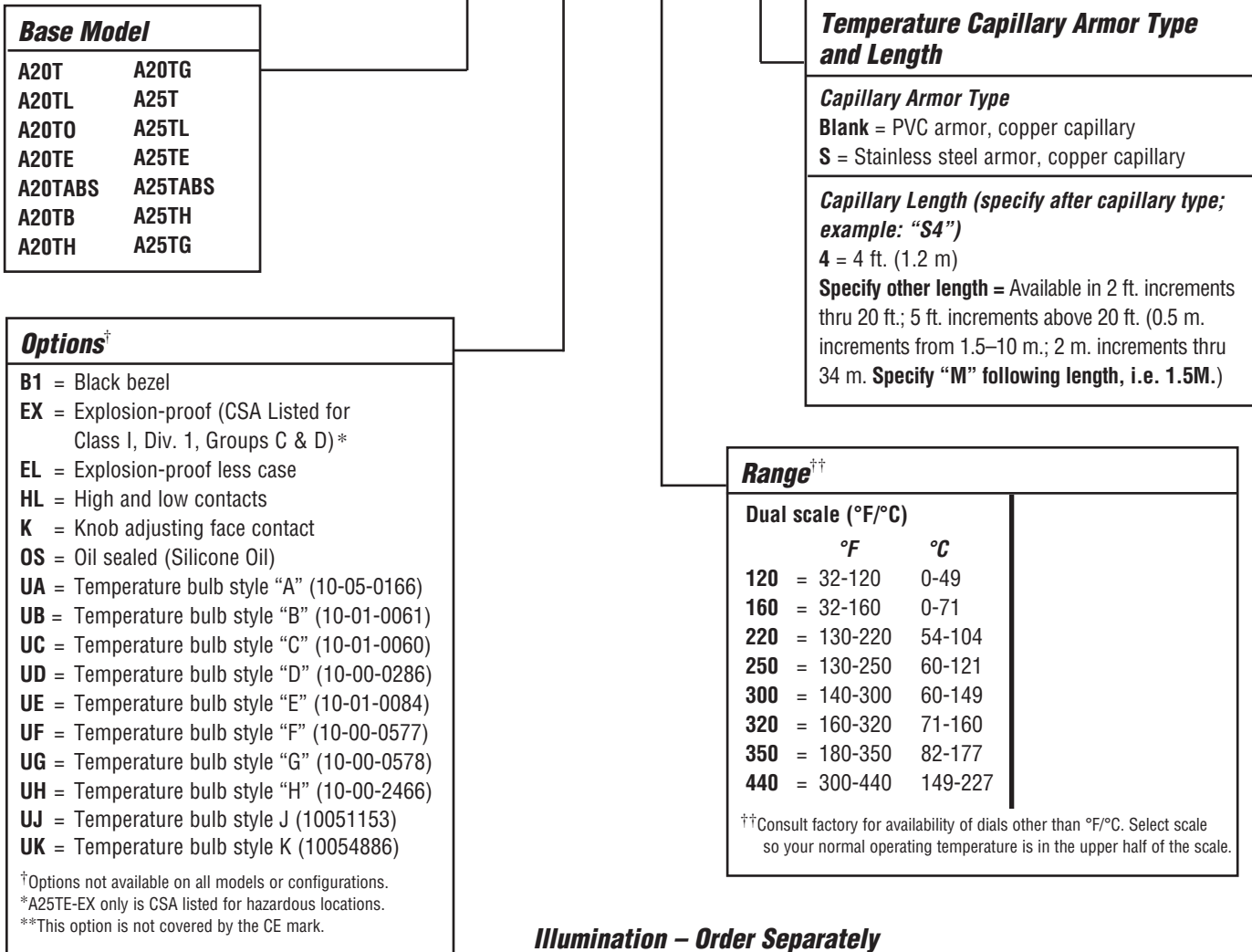
Typical Internal Wiring Diagrams

Pointer shown in the shelf position. Pointer type contact rating: pilot-duty 2 A @ 30 VAC/VDC resistive. Snap-acting switch rating: 3 A @ 30 VDC inductive. 4 A @ 125 VAC inductive.



How to Order

To order, use the diagram below. List options in ascending alphabetical order (A-Z). Example: A20T-B1-250-4.



5

Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

Illumination – Order Separately

A20 Series: Clamp Lite Assembly; 12 V= 05702176; 24 V= 05702177

A25 Series: N/A.



CAUTION: "OIL FILLED INSTRUMENTS CONTAIN SILICON OIL" Exposure may be hazardous under certain circumstances. "DO NOT CUT CAPILLARY" It contains chemicals or solvents which may be hazardous under certain circumstances.

"Keep out of Eyes, Mouth and Do Not expose to Skin". Keep out of reach of children. Flush thoroughly with water and seek medical attention. If swallowed, call physician immediately. MSDS Sheets are available by calling: 918/317-4100.

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

DIRECT MOUNT TEMPERATURE SWITCH



MODEL TSB

Limit Switch for Critical Temperature

Operate Alarms or Shutdown Equipment

SPDT Snap-Acting Switch

Fits Most Engine Applications

Description

The TSB switch is a direct mount switch for temperature sensing. It has one limit contact that can be used to activate an alarm, actuate indicator lights or shut down equipment.

The construction of this instrument is the same as our time-proven SWICHGAGE®. A precision machined brass mounting plate and port captures a high quality stamped beryllium copper diaphragm. The single-pole, double-throw (SPDT) snap switch is operated directly from the diaphragm, for quick acting and positive switching. Trip point is factory preset according to your specifications.

Housing is weather sealed to prevent entry of moisture, dust, etc. A glass-filled nylon terminal block with quick-screw terminal connections gives the TSB switch a real advantage in industrial engine applications. The TSB is ideal when reading is not desired, but temperature is critical to operational efficiency.

Intended for use in general purpose non-classified areas.

Applications

- Engine Coolant
- Compressors
- Engine Lubrication
- Construction equipment
- Mobile Equipment
- Generators
- Irrigation Systems
- Oil Field Systems
- Marine Engines
- Electric Motors

Features

- Fits most engine applications
- SPDT snap-switch
- Activates indicator lights, alarms or shutdown equipment
- Time-proven SWICHGAGE® construction
- Easy wiring terminal block
- Steel housing specially coated to resist corrosion
- Trip point is factory preset to your specifications

Specifications

Housing: Plated steel.

Connections: Popular NPT and metric (specify).

Diaphragm: Formed beryllium copper (heat treated).

Sensing Bulb: Copper.

| Accuracy | 150-295°F (66-146°C) |
|---------------------------|----------------------|
| Switch Trip Point Range | |
| Trip Point | ±3°F (1.7°C) |
| Switch Reset Differential | ± 15°F (9°C) |
| Repeatability | ±3°F (1.7°C) |

Terminal Block: Three # 4-40 screws.
Contact Rating: SPDT 3 A @ 30 VDC inductive.

Maximum Temperature: 325°F (163°C).

Factory Trip Point Setting: 210°F (99°C)

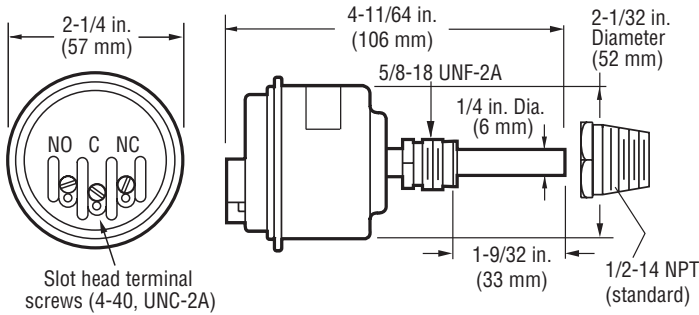
Rising. Other trip point setting must be specified at time of order (see How to Order on reverse side).

Contact: Operates on rising or falling temperature (specify).

Shipping Weight: 10 oz (0.31 kg).

Shipping Dimensions: 4-3/4 x 4-3/4 x 2-5/8 in. (121 x 121 x 67 mm.).

NOTE: No customer replacement parts.



How to Order

To order the TSB model use the diagram below.

TSB – R230 – 3/8

Standard Switch Trip Point

Specify "R" for trip point on rising temperature and "F" for trip point on falling temperature followed by the trip point value.
Example: TSB-R200; TSB-F160. All settings specified in °F.

Standard Switch Trip Point Values (rising)*

- 165 = 165°F (74°C)
- 180 = 180°F (82°C)
- 200 = 200°F (93°C)
- 205 = 205°F (96°C)
- 210 = 210°F (99°C)
- 220 = 220°F (104°C)
- 225 = 225°F (107°C)
- 230 = 230°F (110°C)
- 240 = 240°F (116°C)
- 250 = 250°F (121°C)

* Non standard trip points require a minimum quantity order.
Trip point must be in 5°F increments between 150–295°F (66–146°C).

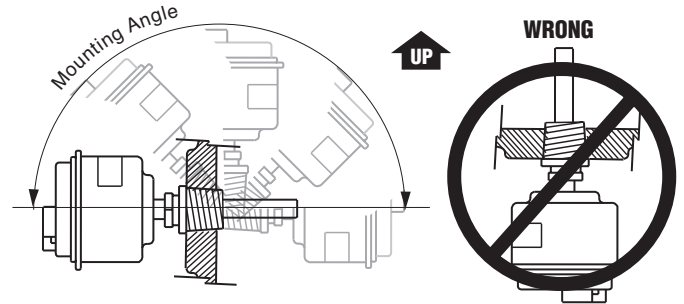
Connection Size

| | | |
|-------|-----------------|--------------|
| Blank | = 1/2-14 NPT** | 10-05-0131** |
| 1/4 | = 1/4-18 NPT | 10-05-0167 |
| 3/8 | = 3/8-18 NPT | 10-05-0069 |
| 5/8 | = 5/8-18 UNF | 10-05-0068 |
| 3/4 | = 3/4-14 NPT | 10-05-0105 |
| 7/8 | = 7/8-9 UNC | 10-05-0093 |
| 3/8B | = 3/8-19 BSPT | 10-05-0284 |
| 1/2B | = 1/2 BSPT | 10-05-0330 |
| M14 | = 14 mm x 1.5 † | 10-05-0104 † |
| M16 | = 16 mm x 1.5 † | 10-05-0514 † |
| M18 | = 18 mm x 1.5 † | 10-05-0399 † |
| M20 | = 20 mm x 1.5 † | 10-05-0670 † |
| M22 | = 22 mm x 1.5 † | 10-05-0606 † |
| M24 | = 24 mm x 1.5 † | 10-05-0907 † |

** Standard connection.
† Includes copper seal.

MOUNTING

1. The TSB can be mounted in horizontal or vertical angles (do not mount the switch facing down).



2. Install the TSB switch in the engine water jacket location recommended by the engine manufacturer.

3. Install the appropriate adapter nut into the engine water jacket. Use thread sealant such as Teflon® tape as necessary.

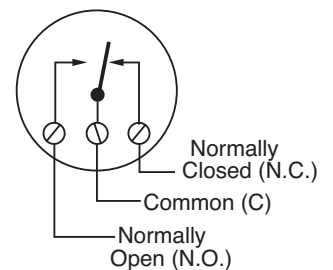
4. Insert the sensing bulb through the adapter nut. The sensing bulb must be fully immersed in coolant/liquid flow so liquid flows across the sensing bulb.

5. Tighten the 5/8-18 UNF-2A compression nut to complete a liquid tight seal.

WIRING

CAUTION: DISCONNECT Electrical Power before wiring.

1. See wiring schematic below. Switch contacts are shown with no temperature applied to the TSB switch.



2. A spade (forked) terminal is recommended for all TSB switch connections.

3. Complete the wiring operation making sure the voltage and current requirements are within the TSB switch electrical rating.

Level SWICHGAGE® Series For Engine Liquids



L150/ EL150K1 Series

- Monitors Level of Coolant, Lube Oil, Diesel Fuel And Hydraulic Fluid.
- Indicating Gauge
- Low Limit Switch
- Float Operated
- Explosion-Proof Model Is Available.



** Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.

EL150EX Models are CSA Listed for Class I, Division 1, Group C & D Hazardous Locations.

Description

The L150 Series Level SWICHGAGE® is a combination liquid level gauge and low limit switch; each unit includes (1) a chamber with pivotal float, (2) an indicating dial with pointer, and (3) a low level contact. When properly installed and maintained, the float operates the pointer which, in turn, both indicates level during normal operation, and closes a switching circuit if the level falls to the low-limit set point.

Applications

The primary use of the L150/EL150K1 is for engine cooling systems, surge or expansion tanks, condenser radiator or vapor phase systems, pressurized or atmospheric systems. The Level SWICHGAGE® can also be used to monitor lube oil, hydraulic fluid or diesel fuel reservoirs and activates alarms and/or shut-down at a predetermined minimum level. These instruments are built for low pressure systems with a maximum of 25 psi (172 kPa) [1.72 bar].

L150 Specifications

Case: Die cast aluminum, poly-urethane coated; approximate dimensions; 4-1/2 x 4-3/4 x 2-3/4 in. (114 x 121 x 70 mm.).

Mounting Holes: (2) 9/32 in. (7 mm.) diameter at 4-1/2 in. (114 mm.) on center.

Float: Brass.

Lens: Polycarbonate.

O-rings: Saturated Nitrile, are suitable for coolant or hydrocarbons. Maximum temperature 250°F (121°C).

Gasket: Neo-cork.

Vent Tube: 1/4 x 5 in. (6 x 127 mm.) copper cane with 1/4 NPT x 1/4 in. (6 mm.) tube fitting.

Contact Rating: 2 A @ 30 VAC/DC.

Wire: (1) 16 AWG x 26 in. (1.5 mm² x 660 mm.) with terminals.

Shipping Weight: 29 oz. (0.82 kg.).

Shipping Dimensions: 5-1/4 x 5-1/4 x 5-1/2 in. (133 x 133 x 140 mm.).

EL150K1 Specifications

Case: Die cast aluminum, poly-urethane coated; approximate dimensions; 5 x 4-3/4 x 2-3/4 in. (127 x 121 x 70 mm.).

Mounting Holes: (2) 9/32 in. (7 mm.) diameter at 4-1/2 in. (114 mm.) on center.

Float: Brass.

Lens: Polycarbonate.

O-rings: Saturated Nitrile, are suitable for coolant or hydrocarbons. Maximum temperature 250°F (121°C).

Gasket: Neo-cork.

Vent Tube: 1/4 x 5 in. (6 x 127 mm.) copper cane with 1/4 NPT x 1/4 in. (6 mm.) tube fitting.

Snap-Switch: SPDT rated 10 A @ 125 VAC;

0.5 A @ 125 VDC; 10 A 30 VDC.

Wire: (3) 18 AWG x 14 in. (1 mm² x 356 mm.).

Shipping Weight: 42 oz. (1.2 kg.).

Shipping Dimensions: 5-1/4 x 5-1/4 x 5-1/2 in. (133 x 133 x 140 mm.).

EL150EX Specifications

Case: Sand cast aluminum, painted; approximate dimensions; 6-1/2 x 5-3/4 x 5-1/4 in. (165 x 146 x 133 mm.).

Mounting Holes: (2) 5/16 in. (8 mm.) diameter at 5-1/2 in. (140 mm.) on center.

Float: 304 Stainless steel.

Lens: Tempered glass.

O-rings: Saturated Nitrile, are suitable for coolant or hydrocarbons. Maximum temperature 250°F (121°C).

Gasket: Neo-cork.

Vent Tube: 1/4 x 5 in. (6 x 127 mm.) copper cane with 1/4 NPT x 1/4 in. (6 mm.) tube fitting and 1/2 NPT to 1/4 NPT reducer fitting.

Snap-Switch: SPDT rated 10 A @ 125 VAC; 0.5 A @ 125 VDC; 10 A 30 VDC.

Wire: Wired to terminal block.

Laboratory Approvals:

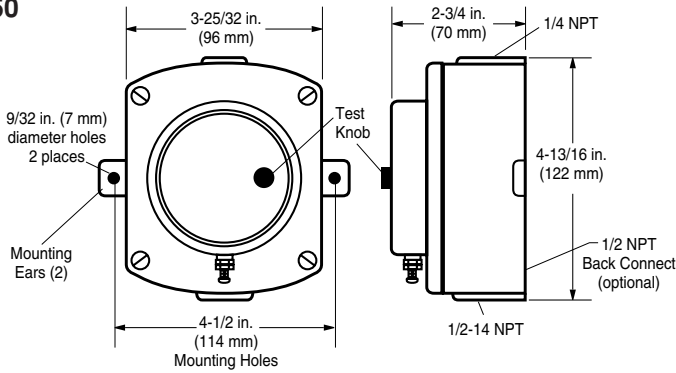
CSA Listed for Hazardous Locations Class I, Division 1, Groups C & D.

Shipping Weight: 5 lbs. (2.26 kg.).

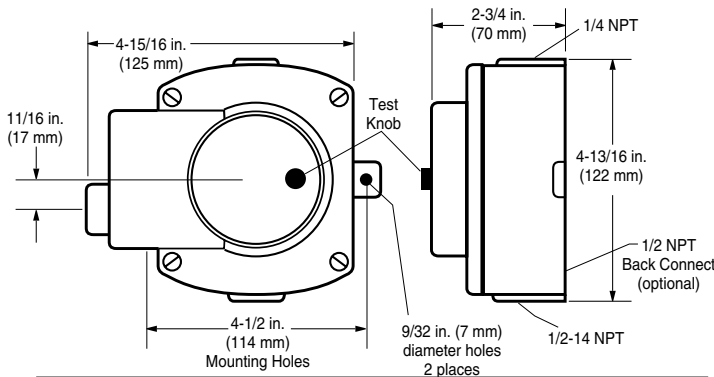
Shipping Dimensions: 6-1/2 x 6-3/4 x 6-3/8 in. (165 x 171 x 162 mm.).

Dimensions

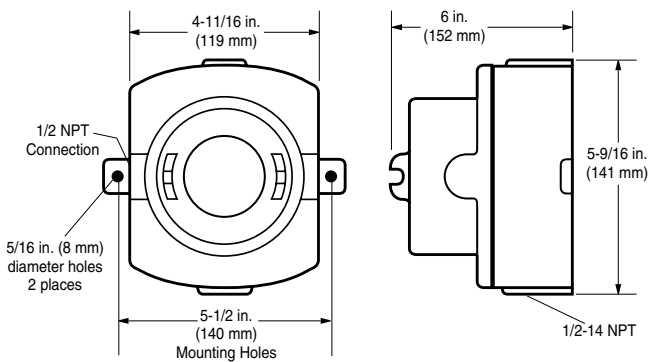
L150



EL150K1



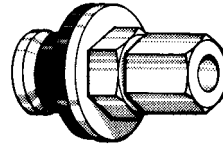
EL150EX



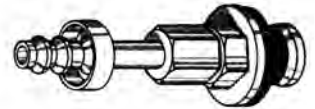
Radiator Fittings

Murphy PS, PS Barbed and PS-D fittings allow the installation of the L150/EL150K1 to the radiator when a fitting is not available.

- 15-00-0107 (PS): thin wall, 1/4 in. (6 mm.) tube fitting.
- 15-01-0167 (PS-Barbed): thin wall, 1/4 in. (6 mm.) tubing or hose.
- 15-01-0202 (PS-D): for diesel or oil, thick wall (to 1/4 in. [6 mm.]), accepts 1/2 in. (13 mm.) I.D. hose or 1/4 in. (6 mm.) O.D. tubing.



15-00-0107 (PS)



15-01-0167 (PS Barbed)

Repair Kits

- L150
- 15-00-0138 All parts except case and body
 - 15-00-0101 Case/body assembly

- EL150K1
- 15-00-0139 All parts except case and body
 - 15-00-0101 Case/body assembly
 - 15-00-0100 Lens/switch assembly

- EL150EX
- 15-00-0110 Cover and float assembly
 - 15-00-0108 Lid assembly
 - 15-00-0109 Switch/terminal assembly

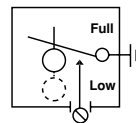
Accessories

- | Specify | Description |
|------------|------------------------------|
| 15-00-0107 | Radiator fitting (PS) |
| 15-01-0202 | Radiator fitting (PS-D) |
| 15-01-0167 | Radiator fitting (PS Barbed) |

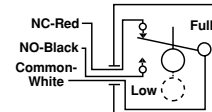
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WARNING: This typical wiring diagram is shown for clarity only. It is not intended for use as installation instructions.

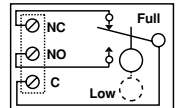
L150



EL150K1



EL150EX



Warranty

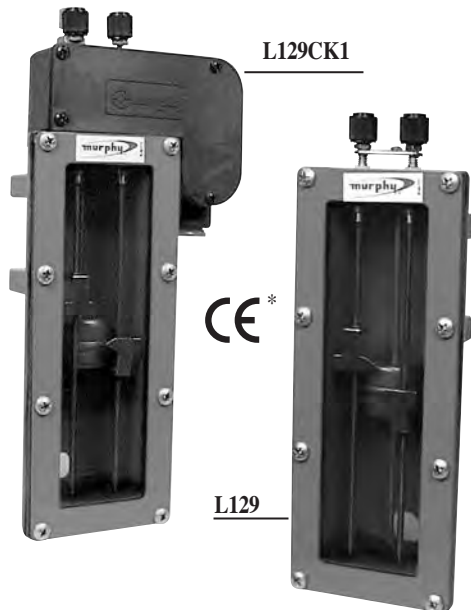
A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

Fittings Kits Order Separately

- 15010235 FM3
- 15010236 FM4
- 15010237 FM5
- 15010238 FM12
- 15000349 CECO

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

Lube Level SWICHGAGE®



L129 Series

- Check Lube Level Without Shutting Down
- Use On Engines, Pumps, And Compressors
- Combination Indicating Gage with Low and High Limit Switch
- Float Operated

Description

The L129 Series Lube Level SWICHGAGE® is a combination lube level indicating gage and adjustable low and high limit switches. It provides protection against low oil level or high level caused by overfill or fuel or water seepage into the crankcase.

A 6-3/4 inch (171 mm.) deep sight gauge allows you check the condition and level of your oil without shutting down the equipment. Fingertip adjustable limit contacts, thru 4-7/8 inch (122 mm.) range, make it simple to set high and low limit contacts. If the float touches the high or low limit contact, a normally open circuit will be completed which can activate alarms and/or shutdown the equipment.

There are two models in the L129 Series: L129 and L129CK1. The L129 model is designed for grounded, low voltage electrical systems. It features a one-wire-to-ground electrical circuit. The L129CK1 was designed for applications requiring a three-wire, above ground electrical circuit. It features

ungrounded contacts and a conduit hub to protect electrical wiring.

Options are available for both models.

A flow restrictor plug is available that restricts oil flow from the crankcase to the L129 Series switch and vice versa. It is typically used on applications where the engine is not stationary such as marine and mobile equipment.

The L129 Series Lube Level SWICHGAGE®, when properly installed and maintained, can monitor and protect your engines and pumps from improper lubrication level, which can result in extensive damage.

Applications

The L129 Series is recommended for engines and pumps with larger crankcase capacity. Although designed primarily for stationary engines, the L129 Series is often used in mobile applications such as marine, rail and some large off-highway trucks.

Specifications

Case: Die Cast Aluminum

Lens: Trogamid Nylon

Maximum Working Pressure:
10 psi (68.9 kPa)

Process Connection: 1/2 NPT

Float Material: Brass

Contact Rating: 2 A @ 30 VAC/DC, pilot duty

Shipping Weight:

L129: 3 lb. (1.4 kg)

L129CK1: 3 lb. 9 oz. (1.6 kg)

Shipping Dimensions (both models):

12 x 4-1/2 x 4-3/4 in. (305 x 114 x 121 mm.)

Warranty

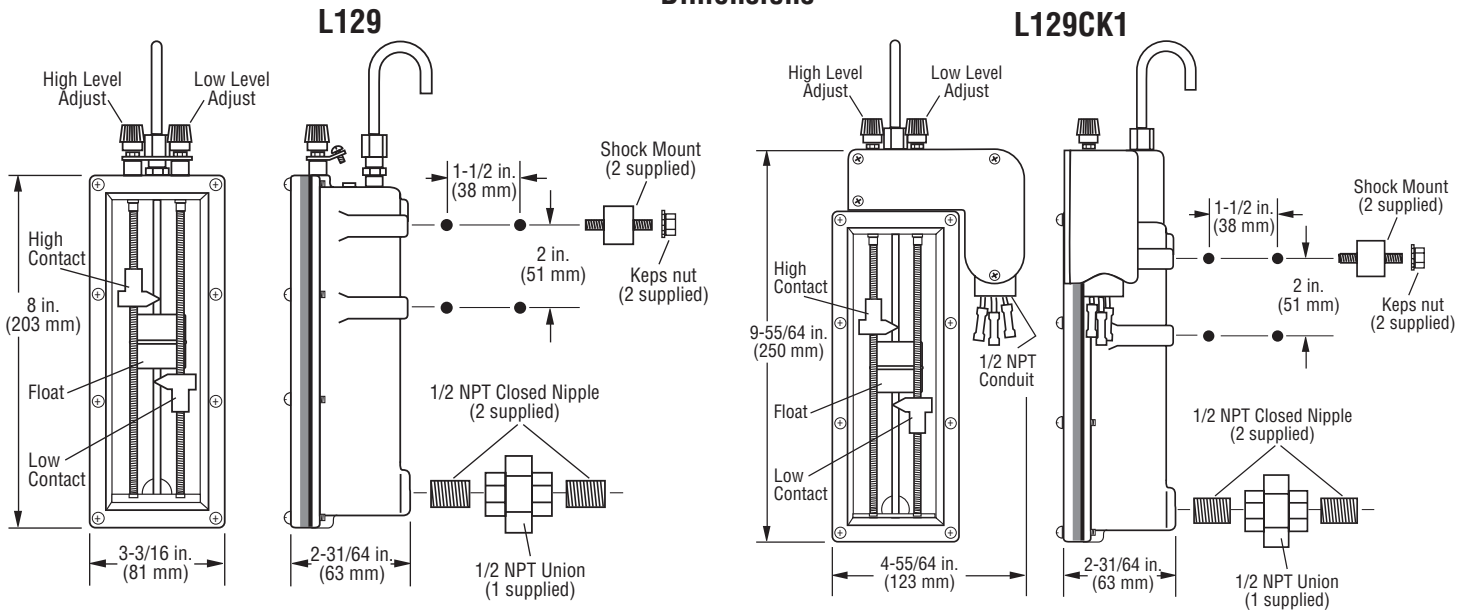
A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

* Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.



Lube Level SWICHGAGE®

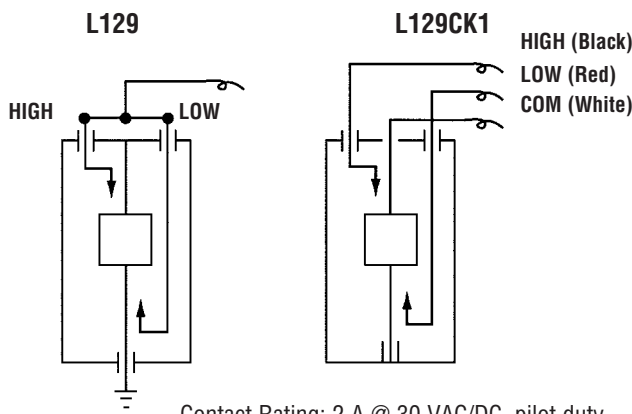
Dimensions



5

Wiring Diagrams

These diagrams are shown with the float in the "full" position.



Repair Kits

Specify part number.

L129

| | |
|----------|--|
| 15000888 | For units with date code T2 (Feb '98) through W6 (i.e. T3, T4, U1, U2, etc.) |
| 15050241 | Restrictor plug |
| 15050245 | Glass through W6 |
| 15050246 | Gasket through W6 |

L129CK1

| | |
|----------|-------------------|
| 15050241 | Restrictor plug |
| 15050245 | Glass through W6 |
| 15050246 | Gasket through W6 |

TUBE-TYPE SIGHT GLASSES



Model 436



Model 440

GENERAL INFORMATION FOR ASSEMBLIES ON THESE PAGES:

- All **PRESSURE RATINGS** are subject to the limitations of the tubular gauge glass, also pressure ratings decline as temperature rises.
- All **TEMPERATURE RATINGS** are subject to the limitations of the gaskets.
- All Valve Sets are furnished **LESS GLASS AND RODS** unless specified.
- These Valve Sets can be supplied with the following

TUBULAR GAUGE GLASSES

- Cat. 505 – Clear
- Cat. 506 – Red Line
- Cat. 507 – Extra Strength
- Cat. 508 – Red Line X-Strength

Specifications (sizes in inches)

| Catalog Number | Male Pipe Size | Glass O.D. | MATERIALS | | PRESSURE TEMP. RATINGS | | | | | | Notes |
|----------------|----------------|------------|-----------|----------------------|--|-----------------|------------------|-------------------------|---------------------|---------|-------|
| | | | Body | Gasket | MAX. LIQUID PSIG @ F | PSIG Sat. Steam | Lgth. from Ctrs. | Glass Hand Wheel/ Lever | Valve Auto Ball Chk | | |
| 412-04 | 1/2 | 5/8 | Steel | Neo.* | 500/100°F to 500/425°F | 500 | -2 | HW | yes | a, d, e | |
| 412-05 | 3/4 | 3/4 | Steel | Neo.* | 500/100°F to 500/425°F | 500 | -2 | HW | yes | a, d, e | |
| 422-04 | 1/2 | 5/8 | Bronze | | This is a Center Piece Unit used with Cat. 414 or 415. | | | | | | |
| 422-05 | 3/4 | 3/4 | Bronze | | Ratings are the same. | | | | | | |
| 426-04 | 1/2 | 5/8 | Iron | Neo.* | 185/100°F to 160/425°F | 165 | -2 | HW | yes | a, d, e | |
| 426-05 | 3/4 | 3/4 | Iron | Neo.* | 490/100°F to 415/425°F | 415 | -2 | HW | yes | a, d, e | |
| 432-04 | 1/2 | 5/8 | CS | | This is a Center Piece Unit used with Cat. 412 or 426. | | | | | | |
| 432-05 | 3/4 | 3/4 | CS | | Ratings are the same. | | | | | | |
| 436-04 | 1/2 | 5/8 | 316 SS | Tef. TM * | 500/100°F to 500/425°F | 500 | -2 | HW | ASME | c, d, m | |
| 436-05 | 3/4 | 3/4 | 316 SS | Tef. TM * | 500/100°F to 500/425°F | 500 | -2 | HW | ASME | c, d, m | |
| 440-02 | 1/4 | 5/8 | 316 SS | Neo.* | 150/100°F to 150/300°F | N.A. | -2 1/16 | none | no | e, n | |
| 440-03 | 3/8 | 5/8 | 316 SS | Neo.* | 150/100°F to 150/300°F | N.A. | -2 1/16 | none | no | e, n | |
| 440-04 | 1/2 | 5/8 | 316 SS | Neo.* | 150/100°F to 150/300°F | N.A. | -2 1/16 | none | no | e, n | |
| 440-05 | 3/4 | 5/8 | 316 SS | Neo.* | 150/100°F to 150/300°F | N.A. | -2 1/16 | none | no | e, n | |
| 443-04 | 1/2 | 5/8 | 316 SS | | This is a Center Piece Unit used with Cat. 446. | | | | | | |
| 443-05 | 3/4 | 3/4 | 316 SS | | Ratings are the same. | | | | | | |
| 446-04 | 1/2 | 5/8 | 316 SS | Tef. TM * | 500/100°F to 500/425°F | 500 | -2 | HW | yes | a, d, m | |
| 446-05 | 3/4 | 3/4 | 316 SS | Tef. TM * | 500/100°F to 500/425°F | 500 | -2 | HW | yes | a, d, m | |

Pressure subject to the limitations of the Glass.
 Temperature subject to the limitations of the Gaskets.
 * = See notes in right hand column.

NOTATIONS:

- Automatic Ball Checks: Rolling Ball in Upper & Lower Valve Bodies (Non-ASME).
- Automatic Ball Checks: Rolling Ball in Upper Valve Body, Rising Ball in Lower Body (Non-ASME).
- Automatic Ball Checks: Rolling Ball in Upper Valve Body, Rising Ball in Lower Valve Body (ASME).
- All Valve Sets with Automatic Ball Checks can be made “non-automatic” by removal of the Balls.
- Higher temperature ratings are attained with higher temp-rated gaskets.



TUBE-TYPE SIGHT GLASSES

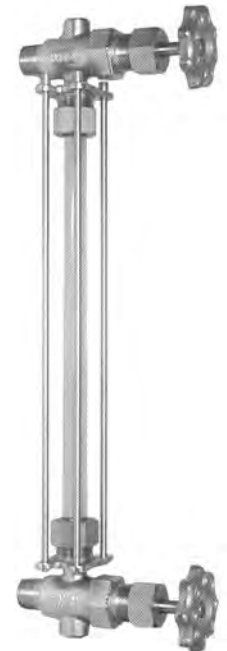
- Gaskets Materials vary from Valve Set to Valve Set. EPMD is superior for water and steam, Neoprene is superior for petroleum and Teflon® has highest temperature rating and superior chemical resistance.
- **STUFFING BOXES** are designed to assure positive seal with minimum compression of the packing and are provided with a packing gland or washer to prevent torsional stress on glass when packing nuts are tightened, plus they add protection against packing blow-out.
- **THE AUTOMATIC BALL CHECK** feature prevents spraying the operator in the event of glass breakage. The sudden rush of the Liquid will push the Balls to their seats thereby shutting off the liquid.
- **GAUGE GLASS PROTECTORS** for extra protection for the Tubular gauge glass are available.
- There will be a **BOXING CHARGE** for all shipments over 6 ft. and for all Export Shipments.

Specifications (sizes in inches)

| Catalog Number | Male Pipe Size | Glass O.D. | MATERIALS | | PRESSURE TEMP. RATINGS | | | Lgth. from Ctrs. | Glass Hand Wheel/ Lever | Valve Auto Ball Chk | Notes |
|----------------|----------------|------------|-----------|---|-------------------------|-----------------|------|------------------|-------------------------|---------------------|---------|
| | | | Body | Gasket | MAX. LIQUID PSIG @ F | PSIG Sat. Steam | | | | | |
| | | | | | | | | | | | |
| 447-04 | 1/2 | 5/8 | 316 SS | Neo.* | 300/100°F to 300/300°F | N.A. | -2 | 5/8 | HW | no | e |
| 447-05 | 3/4 | 5/8 | 316 SS | Neo.* | 300/100°F to 300/300°F | N.A. | -2 | 5/8 | HW | no | e |
| 448-04 | 1/2 | 5/8 | 316 SS | Tef.TM* | 250/100°F to 125/300°F | N.A. | -2 | | HW | no | f, m |
| 448-05 | 3/4 | 5/8 | 316 SS | Tef.TM* | 250/100°F to 125/425°F | N.A. | -2 | | HW | no | f, m |
| 454-04 | 1/2 | 5/8 | CS or SS | Tef.TM* | 600/100°F to 345/400°F | 345 | -1 | 3/4 | HW or L | yes | a, d, m |
| 454-05 | 3/4 | 3/4 | CS or SS | Tef.TM* | 600/100°F to 345/400°F | 345 | -1 | 3/4 | HW or L | yes | a, d, m |
| 454-06 | 1 | 3/4 | CS or SS | Tef.TM* | 600/100°F to 345/400°F | 345 | -1 | 3/4 | HW or L | yes | a, d, m |
| 456-04 | 1/2 | 5/8 | CS or SS | Tef.TM* | 600/100°F to 345/400°F | 345 | -1 | 3/4 | HW or L | yes | a, d, m |
| 456-05 | 3/4 | 3/4 | CS or SS | Tef.TM* | 600/100°F to 345/400°F | 345 | -1 | 3/4 | HW or L | yes | a, d, m |
| 456-06 | 1 | 3/4 | CS or SS | Tef.TM* | 600/100°F to 345/400°F | 345 | -1 | 3/4 | HW or L | yes | a, d, m |
| 465-04 | 1/2 | 3/4 | PVC | Vit/Tef.TM* | 120/75°F to 75/100°F | N.A. | -2 | | HW | no | m |
| 465-05 | 3/4 | 3/4 | PVC | Vit/Tef.TM* | 120/75°F to 75/100°F | N.A. | -2 | | HW | no | m |
| 466-04 | 1/2 | 3/4 | PVC | Vit/Tef.TM* | 120/75°F to 75/100°F | N.A. | -2 | | none | no | m |
| 466-05 | 3/4 | 3/4 | PVC | Vit/Tef.TM* | 120/75°F to 75/100°F | N.A. | -2 | | none | no | m |
| 473 | 1/2-20 NF | 1/2 | Brass | Buna-N | (9")390/150°F-300/425°F | N.A. | N.A. | | none | no | e |
| 474-04 | 1/2 | 3/4 | PVC | This is a Center Piece Unit used with Cat. 465 and 466. | | | | | | | |
| 474-05 | 3/4 | 3/4 | PVC | Ratings are the same. | | | | | | | |
| 475 | 1/2-20 NF | 1/2 | Alum | Buna-N | (9")390/150°F-300/425°F | N.A. | N.A. | | none | no | e |

Pressure subject to the limitations of the Glass.
 Temperatures subject to the limitations of the Gaskets.
 * = See notes in right hand column.

- f. Lower Valve Body has Hand-wheel shut-off, Upper Body has no shut-off.
- m. Teflon™ gaskets are not (hard) solid. They are a softer gasket made of a composite of Teflon™ and other materials for better sealing. (Ref: Cat. 556.)
- n. Lower Body has 3-way Drain Valve for opening and closing Valve and Drain.



Model 447



Model 465

Hydrostatic Head Level Switches



- Salt Water Disposal Systems
- Cooling Towers
- Crude Oil Tanks
- Waterflood Systems
- Diesel Day Tanks
- Sumps



Description

The DF series are diaphragm operated “hydrostatic head pressure” level switches. A pressure sensitive diaphragm operates a snap-switch that can be wired directly to electric pilot circuits to control pumps at predetermined levels. Typical application is to start and stop electric driven pump(s) to maintain tank levels. It is also applicable to engine driven pumps.

The nitrile sensing diaphragm is impervious to most liquids and is sensitive enough to control levels with 1/4 in. (6 mm.) repeatability. See model descriptions for limits of switch trip point adjustability. Materials include aluminum or optional bronze body for maximum corrosion resistance, nylon bottom plate and a special alloy leaf snap-switch as standard.

This simple level switch is highly reliable and can be worked into almost any new or existing system without major modification or special tools.

DF755 and DF757 are suitable for atmospheric tanks in a non-hazardous area. The SPDT snap-switch for the DF755 is preset for a 4 in. (102 mm.) differential in liquid level. The DF757 trip point is adjustable over a 108 in. (2743 mm.) differential.

DF755EX is the same as the DF755 except CSA listed for Class I, Division 1, Groups C and D hazardous areas.

Minimum trip point for all models is 1 in. (25 mm.) above the internal diaphragm.

Applications

- Water Flood Systems
- Crude Oil Tanks
- Salt Water Disposal Systems
- Diesel Day Tanks
- Sumps
- Cooling Towers

Specifications

Snap-switch Ratings

- SPDT (standard—all models)
 - 5 A @ 125, 250, or 480 VAC
 - 1/2 A @ 125 VDC, 1/4 A @ 250 VDC

SPDT (optional) †

- 15 A @ 125, 250 or 480 VAC
- 1/2 A @ 125 VDC, 1/4 A @ 250 VDC
- 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC

DPDT (optional) ††

- 10 A @ 28 VDC
- 10 A @ 120, 230 VAC

Case/Lid: Aluminum (standard);
Bronze (optional)—all non-explosion proof models

Bottom Plate: Glass-filled Nylon

Process Connection: 1 NPT (standard)

Maximum Pressure Rating:
25 psi (172 kPa [1.72 Bar])

Conduit Connection (electrical): 1/2 NPT

*CSA listing applies to DF755EX 20 in. (508 mm.) or less water column differential, 5A @ 125, 250, or 480 VAC.

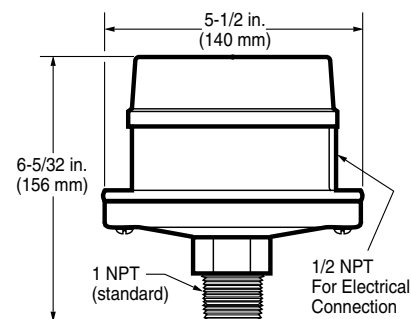
**Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.

† Not recommended for Sour Gas-H₂S areas.

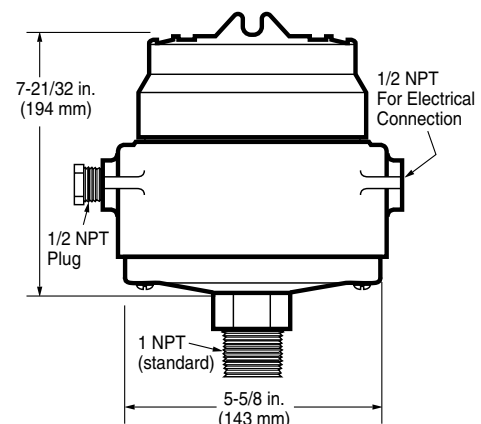
†† Not available on DF757 model.

Dimensions

DF755 and DF757



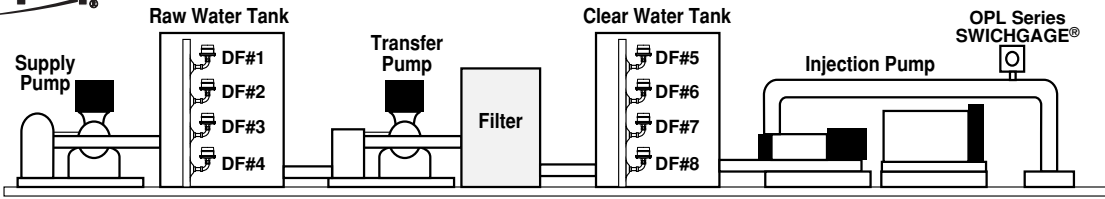
DF755EX



Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

Applications



Typical Water Flood Control System

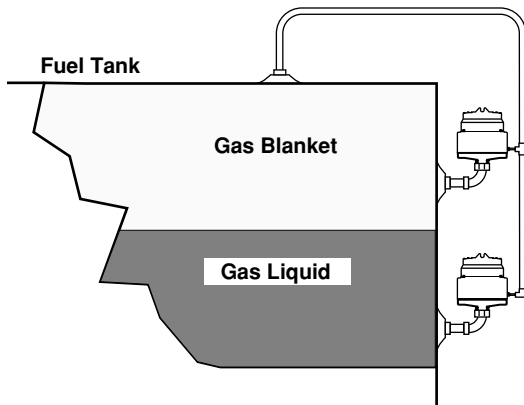
The diagram above displays eight DF Series switches installed on a Raw Water tank and a Clear Water tank. When raw water rises to predetermined level, DF#1 stops the supply pump. As tank level falls below the predetermined level, DF#2 starts the supply pump. If the tank level continues to fall, DF#3 initiates shutdown of the supply pump. DF#4 stops transfer pump before raw water tank is completely pumped out. When clear water reaches the predetermined level, DF#5 stops the

transfer pump. As tank level falls to predetermined low level, DF#6 starts the transfer pump. If the tank level continues to fall due to the failure of the filters section, DF#7 initiates shutdown of the transfer pump. (DF755 located at this level will also operate backwash equipment). DF#8 stops injection pump before tank pumps completely out.

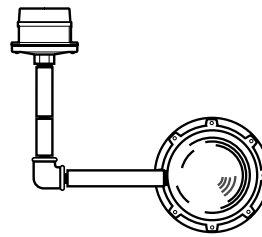
An OPL Series Pressure SWICHGAGE® stops injection pump when pressure reaches predetermined high or low pressure.

Tank with Low Pressure Gas Blanket (DF755EX)

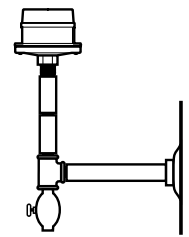
The DF level switch (below) is shown installed on a crude oil tank where a low pressure gas blanket is used to prevent evaporation loss. It is mounted directly to the side of the tank or on riser pipe 4 to 7 in. (102 to 178 mm.) below level to be controlled. Pump automatically stops or starts when liquid reaches predetermined high or low level.



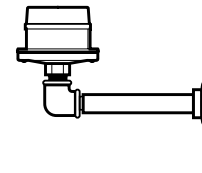
Typical Tank Mounting Methods (DF755)



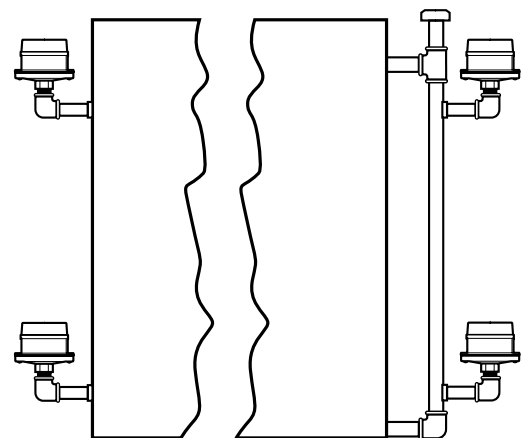
Bull Plug Installation



Tank Wall Mounting with Drain Cock



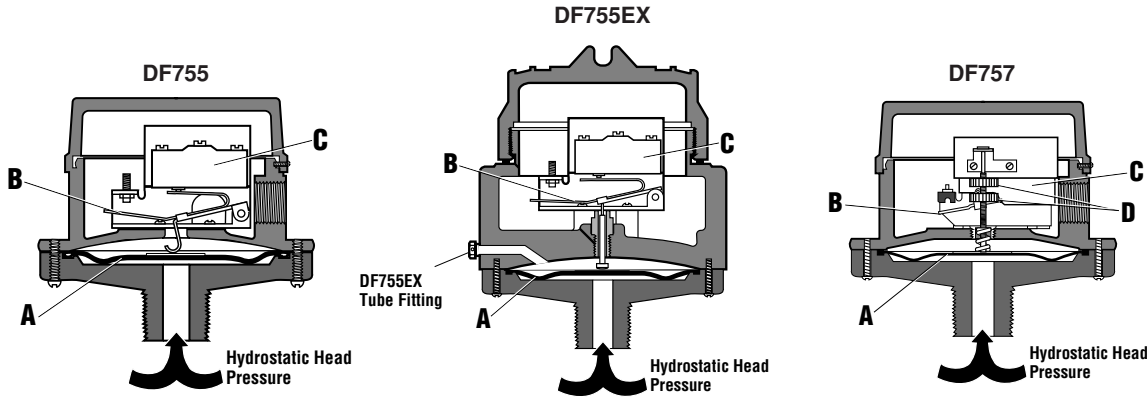
Tank Wall Mounting



Directly on Tank

Riser Pipe Method

Basic Operation



As the liquid level rises, hydrostatic head pressure is applied to the diaphragm A. The diaphragm is forced upward forcing the actuator arm B to activate the snap-switch C.

Models DF755 and DF755EX are factory set and operate at approximately 2 in. (51 mm.) and 6 in. (152 mm.) above the level at which the diaphragm is mounted. The trip point(s) for Model DF757 are adjustable

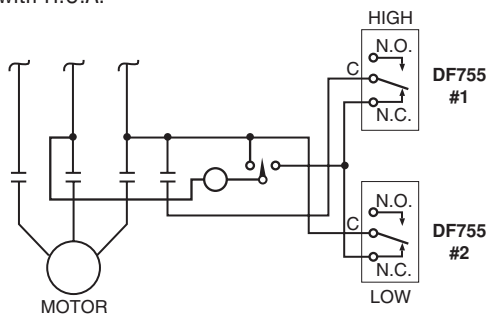
between 2 in. (51 mm.) and 110 in. (2794 mm.) for high and low (make/break) operation by knobs, D.

For sealed tanks, model DF755EX has a tube fitting to balance the top of the diaphragm chamber to a tank gas blanket (see Applications).

Typical Wiring

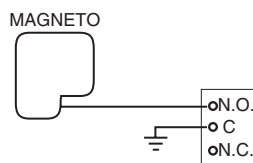
Starts at Low Level, Stops at High

Start motor when predetermined low level is reached and stop when high level is reached. Keeps tank level within selected limits. Motor starter equipped with H.O.A.



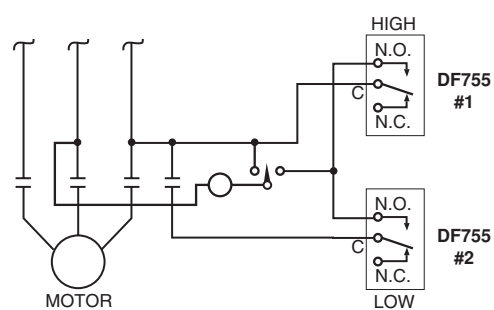
Single Magneto Shutdown

Shut down single ignition engine when fluid reaches low level. Simple wiring of magneto to N.O. switch terminal will shut down engine at predetermined high level, shown below.



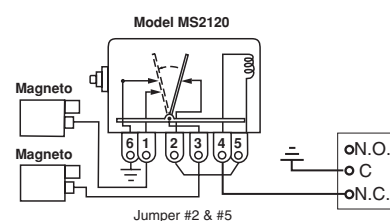
Starts at High Level, Stops at Low

Start motor when predetermined high level is reached and stop when low level is reached. Motor starter equipped with H.O.A.



Dual Magneto Shutdown

Shut down dual magneto engines using Murphy 307 Magnetic Switch. Diagram below shows hookup for low level shutdown. Simple wiring changes and mounting locations are necessary for high level shutdowns.



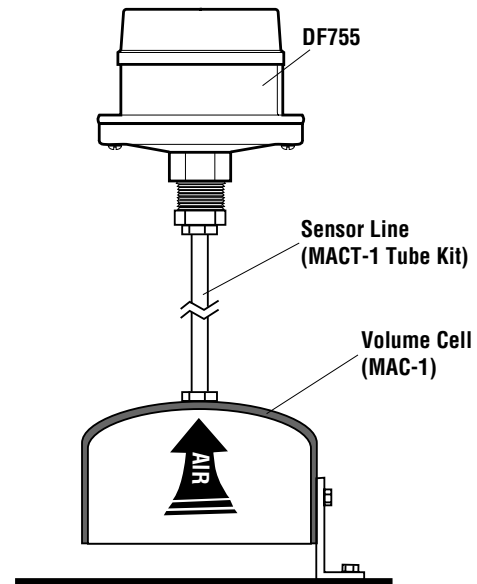
Accessories

Murphy offers the MAC-1 Volume Air Cell that can be attached to the DF755 to monitor water levels on a sump. Activates alarms or start a pump directly. The MAC-1 Volume Air Cell is non-corrosive and provides 1/4-20 stainless steel mounting studs.

The MACT-1 Tubing Kit provides 4 ft. (1.2 m) flexible, non-corrosive 1/4 in. (6 mm.) tubing (cut to fit). The kit includes necessary fittings to attach tubing.

Volume Cell Operation

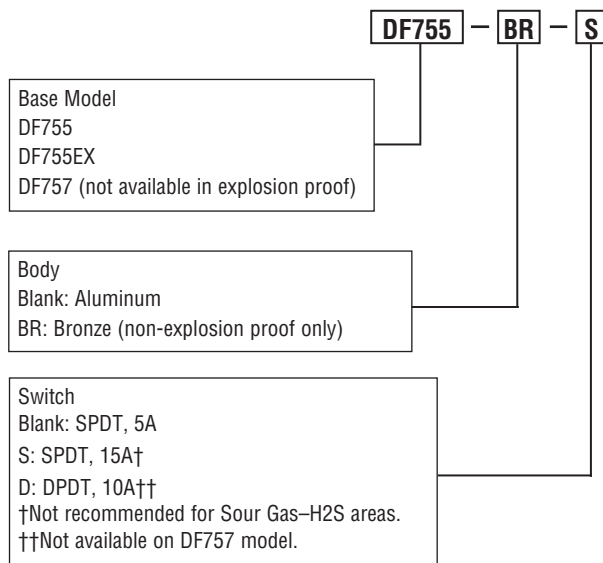
As liquid rises around the volume cell, it compresses air inside the cell and forces it up in the sensor line. As air pressure increases due to the water level continuing to rise, sufficient pressure will be applied to activate the internal snap-switch, which in turn starts the pump. As the liquid level is pumped down, pressure decreases and the above procedure is reversed. The pump is stopped and held in a standby condition. An air purge may be required in the sensor line. Consult factory.



How to Order

5

To order the DF series, use the model number designation diagram below.



Accessories

The accessories below are sold separately and are available from Murphy.

Specify

MAC-1: air volume cell

MACT-1: air volume cell tube kit

Shipping Weights

DF755: 3 lb. (1.4 kg)

DF755 (bronze): 6 lb. 6 oz. (2.9 kg)

DF755EX: 6 lb. 9 oz. (3 kg)

DF757: 3 lb. (1.4 kg)

DF757 (bronze): 6 lb. 6 oz. (2.9 kg)

Shipping Dimensions

DF755, DF755 (bronze), DF757, and

DF757 (bronze): 6-1/4 x 6-1/4 x 6-1/4 in. (159 x 159 x 159 mm.)

Service Parts: DF Series

15000123 Diaphragm Repair Kit

Service Parts: DF755 Series

15000121 Snap-switch, and insulator assembly

15000122 Snap-switch, insulator and movement assembly

15000313 Movement and bracket assembly

Service Parts: DF757 Series

15000174 Snap-switch and bracket assembly

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

Bilge Level Switch System



BLSK1 Series

- Operates Bilge Pumps or Alarms
- Uses Proven "Air Cell" Actuated System
- Remote Switch and Moving Parts Kept Unaffected by Corrosion
- Aluminum or Bronze Body and Cover
- Includes 3 Assemblies:
 - (1) BLS1 Bilge Level Switch
 - (2) MACT1 Tube Kit (Sensor Line and Fittings)
 - (3) MAC1 "Air Cell" (Volume Cell)

Description

The BLSK1 Bilge Level Switch System gives you all items and fittings necessary to install in your bilge. Or, you can have only the parts you want and you provide brackets, tubing and mounting hardware.

Using the proven "Air Cell" actuating system, all moving parts and switching are remote from bilge liquids and are thus not affected by corrosion, rust, etc. All wetted parts are of non-corrosive materials.

As bilge level rises a column of air is captured in the MAC1 Air Volume Cell. The rising bilge level compresses the column of air creating pressure against the large diaphragm in the BLS1 Bilge Level Switch and the switch trips. Switch set point is adjustable.

The switch resets as the bilge is pumped out. Air cell recharges itself during normal operation. The BLS1 is constructed of materials not affected by marine atmospheres; Aluminum or Bronze body and cover, Buna-N diaphragm.

Specifications

BLS1 Bilge Level Switch

Snap-Switch SPDT (standard)

- 5 A @ 125, 250, or 480 VAC

- 1/2 A @ 125 VDC, 1/4 A @ 250 VDC

NOTE: A pilot relay may be used for higher contact ratings (see Typical Wiring Diagram).

Case/Lid: Aluminum (std); Bronze (optional).

Bottom Plate: Glass-filled Nylon.

Process Connection: 1/4 NPTF.

Max. Pressure: 25 psi (172 kPa) [1.72 bar].

Conduit Connection (electrical): 1/2 NPT.

BLS1 Weight: 3 lb. (1.4 kg).

BLS1 Weight (Bronze): 6.5 lb. (2.9 kg).

BLS1 Dimensions: 6-1/4 x 6-1/4 x 6-1/4 in. (159 x 159 x 159 mm.).

15050737 Optional mounting bracket
16 ga., 304 stainless steel (see Dimensions).

MACT1 Tube Kit (fittings included)
4 ft. (1.21 m) flexible non-corrosive tubing, 1/4 in. (6 mm.) dia. (cut to fit).

MACT1 Weight: 0.5 lb. (0.23 kg).

MACT1 Dimensions: 6 x 6 x 6 in. (152 x 152 x 152 mm.).

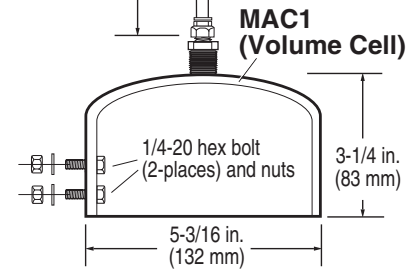
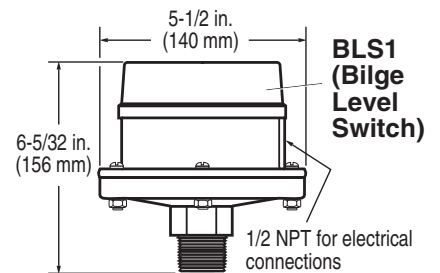
MAC1 Air Cell (Volume Cell)

- Made of non-corrosive materials
- (2) 1/4-20 stainless steel hex bolts and nuts.

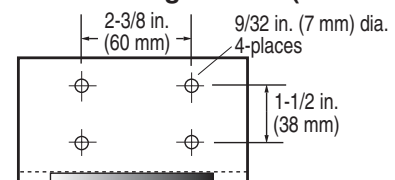
MAC1 Weight: 2 lb. (1 kg).

MAC1 Dimensions: 6 x 6 x 6 in. (152 x 152 x 152 mm.).

Dimensions



Optional Mounting Bracket (15050737)





Installation Instructions

1. Select a mounting location in lower part

WARNING

Before beginning installation of this Murphy product:

- Disconnect all electrical power to the machine
- Make sure the machine cannot operate during installation
- Follow all safety warnings of the machine manufacturer
- Read and follow all installation instructions

of the bilge for the MAC1 air cell, but do not mount cell at this time. MAC1 must be placed so that no debris will become trapped inside it. Position the air cell approximately 1-1/2 to 2 in. (38 to 51 mm.) below desired operation point and note location for attaching the cell to a stringer or bulkhead, etc. Vertical adjustment may be necessary for

2. Mount the BLS1 switch via optional mounting bracket 15050737 or one of your supply. Keep the BLS1 switch within 4 ft. (1.21 m) off the MAC1 air cell. Tubing must NOT have a loop or flat area for moisture to collect. Always maintain a downward slope.

CAUTION: Air cell tubing and connections must remain air tight. Seal any holes placed in the air cell.

3. Attach the MACT1 tubing kit to the air cell and to the BLS1 switch. Any tubing can be used as long as it does not corrode and it provides air tight connections.
4. Wire the SPDT snap-switch according to instructions and your requirements. See typical wiring diagrams, below.
5. The BLS1 trip point is preset to operate when bilge level rises approximately 1-1/2 in. (38 mm.) above the bottom of the air cell. It will reset when level falls approximately 3/4

in. (19 mm.).

6. Raise or lower the air cell so that the distance from the hull to the trip point level on the side of the air cell is equal to desired level of bilge. Secure the air cell via the 2 hex bolts.

If necessary, adjustment can be made prior to installation by placing the air cell in a bucket of water and adjusting the white knurled knob inside the BLS1 until the snap-switch actuates at the desired level. Or, build a coffer dam around the air cell in the bilge, add the desired amount of bilge water, and adjust the switch trip knob as explained above. BE SURE to remove coffer dam prior to placing the BLS1 into service.

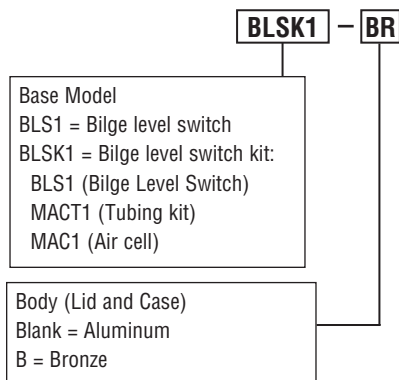
7. Verify proper operation at desired levels prior to launch.

NOTE: The air cell will automatically recharge itself anytime the bilge level falls below the air cell.

5

How to Order the BLSK1

To order use the model number designation diagram below.

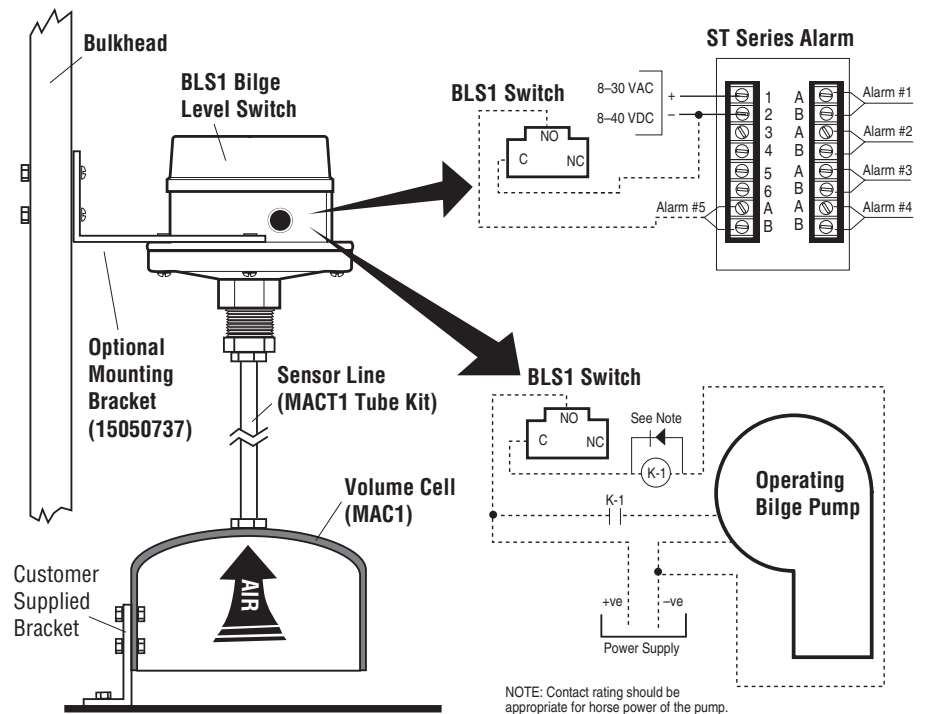


- Accessories and Replacement Parts (order separately)
- 15050737: BLS1 mounting bracket
 - 15010205: 5 A snap-switch and movement assembly
 - 15000123: Diaphragm assembly
 - 15050823: Piston
 - 15050824: Knob for limit adjustment

Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

Typical Installation and Wiring



Tachometers and Tach/Hourmeters

Series: ATS, ATA, ATHA, ATHS

3000 RPM – 0 to 100,000 Hours



ATHS-30-12 model

- Sensing from Magnetic Sensor Signal or Battery Charging Alternator
- High Visibility Analog Readout
- Air Core Movement
- Easy Calibration
- Through Dial Lighting
- Powered by 12 VDC Battery Converter for 24 to 12 VDC Available

Description

The tachometer is a rugged, transistorized instrument with solid-state circuitry for indication of engine revolutions per minute (RPM). It is equipped with a bracket for mounting into a standard 3-3/8 in. (86 mm.) dash mounting hole. The tachometer's full 270° sweep of the pointer gives an accurate indication on a large easy-to-read scale. The dial can be illuminated for night reading. The models equipped with tachometer and hourmeter also record the elapsed running time of an engine.

Models for Alternator or Magnetic Sensor
These instruments are designed to function from pulses generated by an alternator with 4, 8, 12, 14 or 16 poles on the rotor, or the pulses can be obtained from the ring gear of an engine by means of an electromagnetic sensor (magnetic pickup). Murphy's magnetic sensor driven models are designed to function with flywheels having anywhere from 70 to 225 teeth.

All models are for negative ground, positive ground or isolated electrical systems and are protected against reverse polarity hookup. If the instrument is connected reverse polarity, it will not operate until proper connections are made. The tachometer is powered by 12 VDC.

* To determine pulses per engine revolution, work the formulas on the back of this page and use the pulses per revolution number to determine if the tachometer can be used for your application.

** Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.

Applications

These tachometers are specially designed for use on truck, marine, industrial or stationary engines.

Basic Models

| | |
|--|----------------------------------|
| Magnetic Sensor Signal Tachometer | 70 - 225 pulses* 12 VDC |
| Model | Designation |
| ATS-30-12 | Bright Stainless Steel Bezel |
| ATS-30-12-A | Black Stainless Steel Bezel |
| ATS-30-12-B | SAE Bright Stainless Steel Bezel |
| ATS-30-12-C | SAE Black Stainless Steel Bezel |
| Magnetic Sensor Signal Tach/Hourmeter | 70 - 225 pulses* 12 VDC |
| Model | Designation |
| ATHS-30-12 | Bright Stainless Steel Bezel |
| ATHS-30-12-A | Black Stainless Steel Bezel |
| ATHS-30-12-B | SAE Bright Stainless Steel Bezel |
| ATHS-30-12-C | SAE Black Stainless Steel Bezel |
| Alternator Signal Tachometer | 3 - 27 pulses* 12 VDC |
| Model | Designation |
| ATA-30-12 | Bright Stainless Steel Bezel |
| ATA-30-12-A | Black Stainless Steel Bezel |
| ATA-30-12-B | SAE Bright Stainless Steel Bezel |
| ATA-30-12-C | SAE Black Stainless Steel Bezel |
| Alternator Signal Tachometer/Hourmeter | 3 - 27 pulses* 12 VDC |
| Model | Designation |
| ATHA-30-12 | Bright Stainless Steel Bezel |
| ATHA-30-12-A | Black Stainless Steel Bezel |
| ATHA-30-12-B | SAE Bright Stainless Steel Bezel |
| ATHA-30-12-C | SAE Black Stainless Steel Bezel |
| ATVC12/24 Converter | 24 to 12 VDC |

Bezels



Specifications

- Power Input:** 12 VDC (11.5 – 16 V)
- RPM Input Signal Voltage:** 1.5 Vrms minimum from a magnetic pickup or alternator (minimum 3-pole)
- Accuracy: Tachometer:** ± 2% full scale
Hourmeter: ± 0.01% hours, ± 1 count
- Temperature Range:** -5°F to 185°F (-20°C to +85°C)
- Dial (Face Plate):** 270° sweep with white numerals (over black background)
- Bezel:** 304 Stainless Steel
- Scale:** 0-3000 RPM
- Case Material:** Plastic
- Hourmeter Range:** Measures elapsed time: 100,000 hours in 0.1 increments (tenths)
- Shipping Weight:** 0.89 lb. (403 g)
- Shipping Dimensions:** 5-1/2 x 5-1/2 x 5-1/2 in. (140 x 140 x 140 mm.)

Warranty

A one-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.



Tachometers and Tach/Hourmeters

Determine if the tachometer or tachometer/ hour-meter can be used for your application

- A. When used with magnetic sensor systems, the tachometer will operate from 70 to 225 tooth flywheels.
- B. The alternator tachometer will operate from 3 to 27 pulses per engine revolution. Obtain the number of pulses per engine revolution for your alternator system by working the following formulas:
 1. Determine the number of poles on your alternator. Look for the designation/type in the manufacturer's manual or remove the pulley and fan to count the number of poles on the rotor.
 2. The Alternator Tachometer Chart lists common alternators and their minimum and maximum pulley ratios. Determine pulley ratio with the following formula:

$$\text{PULLEY RATIO} = \frac{\text{CRANK SHAFT PULLEY DIAMETER}}{\text{ALTERNATOR PULLEY DIAMETER}}$$
 3. Check that Pulley Ratio falls within the range shown on the Pulley Ratios Chart for a particular alternator. If ratio falls in the shaded area, the tachometer can be calibrated for the application.
 4. To determine the pulses per engine revolution:

$$\frac{\text{Number of poles} \times \text{PULLEY RATIO}}{2} = \text{PULSES PER ENGINE REVOLUTION}$$

PULLEY RATIOS CHART

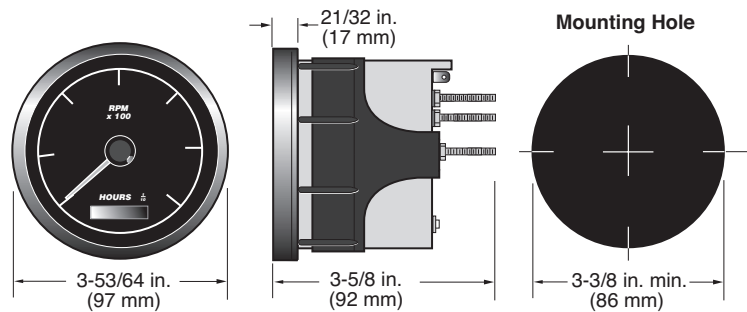
| NO. OF POLES | RATIO | | | | | | | | | | Minimum | Maximum |
|--------------|-------|-----|-----|-----|-----|-----|-----|-----|-----|--|---------|---------|
| | 0.5 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | | | |
| 4 | | | | | | | | | | | 1.5 | 13 |
| 8 | | | | | | | | | | | 0.75 | 6.5 |
| 12 | | | | | | | | | | | 0.5 | 4.3 |
| 14 | | | | | | | | | | | 0.42 | 3.7 |
| 16 | | | | | | | | | | | 0.375 | 3.25 |

ALTERNATOR TACHOMETER CHART

| Manufacturer | Designation/Type | Poles | Minimum pulley-ratio | Maximum* pulley-ratio |
|---------------|------------------------|-------|----------------------|-----------------------|
| Prestolite | All | 8 | 0.75 | 6.5 |
| Load Handler | 88A, 8LHA, 89C, 8LHC | 16 | 0.375 | 3.25 |
| Load Handler | All 5 inch models | 12 | 0.5 | 4.3 |
| Leece Neville | All | 12 | 0.5 | 4.3 |
| Bosch | G and K Series | 12 | 0.5 | 4.3 |
| C.E. Neihoff | All | 12 | 0.5 | 4.3 |
| Delco Remy | 30DN | 4 | 1.5 | 13 |
| Delco Remy | 15SI, 21SI, 40DN, 40SI | 12 | 0.5 | 4.3 |
| Delco Remy | 10DN, 10SI, 12SI | 14 | 0.42 | 3.7 |
| Delco Remy | 20DN, 25SI, 27SI | 16 | 0.375 | 3.25 |
| Delco Remy | 29SI, 30SI | 16 | 0.375 | 3.25 |
| Hitachi | LT125, LT130, LT133 | 8 | 0.75 | 6.5 |
| Hitachi | LT150 | 12 | 0.5 | 4.3 |
| Lucas | All | 12 | 0.5 | 4.3 |
| Mando | All | 12 | 0.5 | 4.3 |
| Motorcraft | All | 12 | 0.5 | 4.3 |
| Nippondenso | All | 12 | 0.5 | 4.3 |
| Powerline | Series 23 | 14 | 0.42 | 3.7 |
| Powerline | Series 24, 25, 26 | 12 | 0.5 | 4.3 |
| Valeo | All | 12 | 0.5 | 4.3 |

* Although the tach may be calibrated for higher input frequencies in some cases, as shown on the Pulley Ratio chart, pulley ratios in excess of 5.0 are NOT recommended nor are they normally used.

Dimensions



How to Order

Order the Tachometer or Tachometer/Hourmeter by model designation.

Example: ATA-30-12

Basic Models

Magnetic Sensor Signal Tachometer 70 - 225 pulses 12 VDC

| Model | Designation |
|-------------|----------------------------------|
| ATS-30-12 | Bright Stainless Steel Bezel |
| ATS-30-12-A | Black Stainless Steel Bezel |
| ATS-30-12-B | SAE Bright Stainless Steel Bezel |
| ATS-30-12-C | SAE Black Stainless Steel Bezel |

Magnetic Sensor Signal Tach/Hourmeter 70 - 225 pulses 12 VDC

| Model | Designation |
|--------------|----------------------------------|
| ATHS-30-12 | Bright Stainless Steel Bezel |
| ATHS-30-12-A | Black Stainless Steel Bezel |
| ATHS-30-12-B | SAE Bright Stainless Steel Bezel |
| ATHS-30-12-C | SAE Black Stainless Steel Bezel |

Alternator Signal Tachometer 3 - 27 pulses 12 VDC

| Model | Designation |
|-------------|----------------------------------|
| ATA-30-12 | Bright Stainless Steel Bezel |
| ATA-30-12-A | Black Stainless Steel Bezel |
| ATA-30-12-B | SAE Bright Stainless Steel Bezel |
| ATA-30-12-C | SAE Black Stainless Steel Bezel |

Alternator Signal Tachometer/Hourmeter 3 - 27 pulses 12 VDC

| Model | Designation |
|--------------|----------------------------------|
| ATHA-30-12 | Bright Stainless Steel Bezel |
| ATHA-30-12-A | Black Stainless Steel Bezel |
| ATHA-30-12-B | SAE Bright Stainless Steel Bezel |
| ATHA-30-12-C | SAE Black Stainless Steel Bezel |
| ATVC12/24 | 24 VDC to 12 VDC Converter |

Digital Tachometer

by Murphy SELECTRONIC®



MT90 Model

- ±1 RPM Accuracy
- Easy Calibration
- Clear-Read LCD Display
- Back Light for Night Viewing (Battery Powered models)
- Input Source Can Be a Magnetic Pickup or Engine Alternator
- Power Supplied by Magnetic Pickup or 12, 24 or 32 VDC Battery System

Description

The Murphy SELECTRONIC® MT90 is a digital tachometer. Its high accuracy and dependability result from use of a quartz crystal time based and digital, solid-state electronics.

Tachometer power is supplied by either a Murphy magnetic pickup, mounted at the fly-wheel ring-gear of an engine, or by a 12, 24 or 32 volt DC battery system.

RPM data is supplied by either a Murphy magnetic pickup or by the alternator in your battery charging circuit. The MT90 also has back-lighting for easy readings in low lit areas; this lighting requires a battery power source.

RPM Calibration

The MT90 is calibrated to engine RPM by setting a series of calibration rotary switches on the back of the tachometer. The proper switch sequence for the engine is determined by (1) the number of ring gear teeth for the magnetic pickup, or (2) by the ratio of alternator to engine pulley diameter, and the number of poles of the alternator.

Applications

Typical applications include: Generators, Compressors, Industrial Engines, Oil Field Equipment, Marine Vessels, Vehicles, Farm Equipment, and Construction Equipment.

Specifications

Signal Input Voltage: 4 to 35 Vrms from a magnetic pickup or alternator**

Pulses per Revolution: 3 to 999

Power Requirements:

- Pickup Power: 4-35Vrms**
- Battery Power: 8-40 VDC (12, 24, 32 volt)

Current:

- Tach back-light Off, 4mA @ 40 VDC
- Tach back-light On, 25 mA @ 40 VDC

Case: 1018 polycarbonate/polyester blend

Lens: Polycarbonate

Bezel: #430 Stainless Steel

Display: LCD, 4-digit, seven segment

Operating Temperature: -4 to 158°F (-20 to 70°C)

Storage Temperature: -13 to 185°F (-25 to 85°C)

Mounting Hole: 3-7/16 in. (87 mm.)

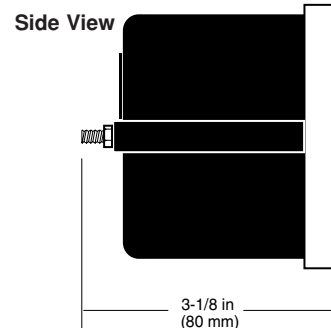
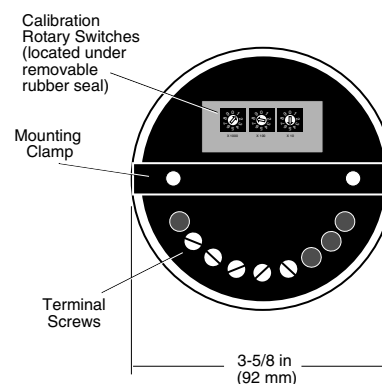
Shipping Weight: 14 oz. (0.4 kg)

Shipping Dimensions: 5-1/2 x 5-1/2 x 5-1/2 in. (140 x 140 x 140 mm.)

Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

Dimensions



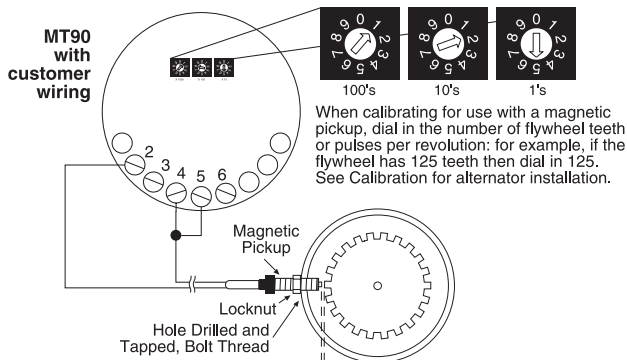
* Products covered by this bulletin comply with EMC Council directive 89/336/EEC regarding electromagnetic compatibility except as noted.

**See "Special Note" for Magnetic Pickup Powered MT90 applications (back page).

Typical Wiring Diagrams for MT90

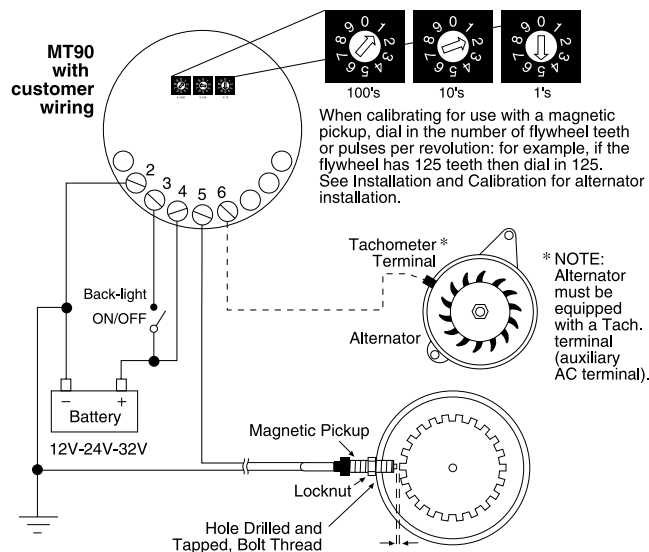
- Terminal 2: connects to battery (-) or ground
- Terminal 3: connects the back-light to battery (+), (back-light can only be used when powering from battery)
- Terminal 4: connects to battery (+) or power from magnetic pickup or alternator
- Terminal 5: RPM input signal from magnetic pickup
- Terminal 6: RPM input signal from alternator

Magnetic Pickup Powered MT90 (No back-lighting)



NOTE: Gap from face of gear tooth must be enough for gear to move. Rotate gear completely to be sure of minimum, no-touch clearance. See instructions supplied with the magnetic sensors. To get minimum of 4 VAC RMS, gap tolerance is critical. Turn the pickup in until it stops against the face of a gear tooth. Back the pickup out only enough to allow rotation of the gear. Rotate the gear, if any tooth touches the pickup, back it out to clear the tooth. After clear rotation secure the pickup locking nut.

Battery Powered MT90 (With back-lighting)



NOTE: Gap from face of gear tooth must be enough for gear to move. Rotate gear completely to be sure of minimum, no-touch clearance. See instructions supplied with magnetic sensor.

Calibration

To calibrate the MT90 for your engine, remove the rubber seal on the back of the tachometer and dial in the correct number.

- **Magnetic Pickup:** dial in the number of teeth on your ring gear. Set the switches from left to right. For example, if the engine gear has 125 teeth, dial a 1 on the left switch, a 2 on the center switch, and a 5 on the right switch. Using this setting, the MT90 will count the passing teeth and convert them into engine RPM.
- **Alternator:** Multiply the ratio of alternator to engine pulley diameter, times, the number of poles of the alternator divided by two, to determine the correct calibration number (also see "Other Calibration Methods").

Other Calibration Methods (teeth or ratio unknown)

For setting the calibration switches when the number of pulses per revolution are not known, set the rotary switches on back of the MT90 to 0-6-0 and read the tachometer at a known engine RPM. This can be read by a hand-held tachometer or any means which tells actual RPM. The reading is the input frequency in hertz. Multiply the frequency times 60 and divide the result by the engine RPM. Set this number into the rotary calibration switches. **NOTE:** If pulses per revolution are not a whole number, for example: 21.5, a setting of 021 will read slightly high and a setting of 022 will read slightly low.

Magnetic Pickups

MP3298



| Pickup Models | Total Length | Threaded Length | Thread Size |
|---------------|---------------------|---------------------|-------------|
| MP3298* | 3 in. (76 mm.) | 3 in. (76 mm.) | 5/8-18 UNF |
| MP7906† | 3 in. (76 mm.) | 3 in. (76 mm.) | 3/4-16 UNF |
| MP7905†† | 4-1/2 in. (114 mm.) | 4-1/2 in. (114 mm.) | 3/4-16 UNF |

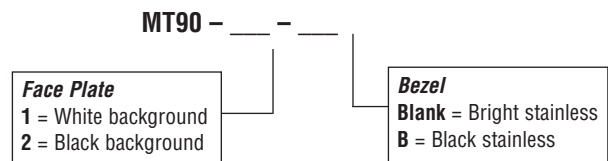
* Replaces 20-01-0080 and MP100. Lead wire hookup (12 in. [305 mm.]).

† Replaces 20-01-0081. Lead wire hookup (12 in. [305 mm.]).

†† Replaces 20-01-0082. Lead wire hookup (12 in. [305 mm.]).

How to Order

To order a MT90 for your application, use the diagram below.



To order a magnetic pickup, specify model number.
Example: MP3298

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

Digital Tachometer and Hourmeter With Adjustable Overspeed Set Point



Model MTH6

- Tachometer and Hourmeter With Overspeed Shutdown or Alarm Switch
- 3-1/2 Inches (89 mm.) Diameter Dial
- Reads RPM Data from a Magnetic Pickup or Battery Charging Alternator
- Powered by 8 to 40 VDC
- Large 5-Digit LCD Display
- Maintains Hours Count When Power Is Lost
- Front Panel Programming
- Hours Can Be Reset to Zero

Description

This microprocessor-based digital tachometer and hourmeter with a built-in overspeed switch is highly accurate and dependable. It measures speed and running hours and can give an alarm or shut down the engine on overspeed.

The MTH6 case is polycarbonate, and its dial measures 3-1/2 in. (89 mm.) in diameter.

RPM data for the tachometer and overspeed switch is supplied by a magnetic pickup or battery charging alternator. The magnetic pickup is installed into the flywheel housing of an internal combustion engine. The starter ring gear acts upon the magnetic pickup to generate a voltage pulse each time a gear tooth passes the end of the sensor.

Applications

- Industrial Engines
- Generators
- Compressors
- Oil Field Equipment
- Marine Engines
- Vehicles
- Farm Equipment
- Construction Equipment

Basic Operation

During normal operation, the MTH6 displays RPM. Its five-digit, liquid crystal display is updated every second. When the MTH6 is displaying hours and a speed signal is present, the far left digit and decimal point will flash indicating the hourmeter is operating.

The overspeed set point and running hours can be viewed by manipulating three membrane switches located on the MTH6 front panel.

When the overspeed set point is met an LED, also located on the front panel, lights.

Easy-Calibration

The MTH6 calibration is simple. The operator enters the number of pulses per engine revolution and the overspeed set point value using the membrane-switches located on the front of the MTH6.

Specifications

Power Requirements:

8-40 VDC (12, 24 or 32 VDC systems)

Maximum Current:

12 VDC: 0.011 A, backlight Off;
0.025 A, backlight On

24 VDC: 0.008 A, backlight Off;
0.015 A, backlight On
32 VDC: 0.007 A, backlight Off;
0.010 A, backlight On

Operating Temperature: -4° to 158°F
(-20° to 70°C)

Storage Temperature: -40° to 185°F
(-40° to 85°C)

Case: 1018 Polycarbonate/Polyester blend
Mounting Hole Dim.: 3-3/8 in. (86 mm.) Dia.

Speed Input: 4.5 Vrms minimum

Overspeed Switch Rating: 2 A, 50 VDC

Overspeed Range: 0 to 9000 RPM

Pulses per Revolution: 4 to 255

Tachometer Range: 0 to 65,535 RPM

Tachometer Accuracy: ±1% of the display reading or -2 RPM whichever is greater

Input Frequency Range: 25 Hz to 20 kHz

Hourmeter Range: 0 to 99999 hrs

Hourmeter Resolution: ±0.1 Hour up to 9999.9; ±1 hour 10,000 and up

Reset Hourmeter: Apply temporary ground to terminal #5 to reset hours to zero

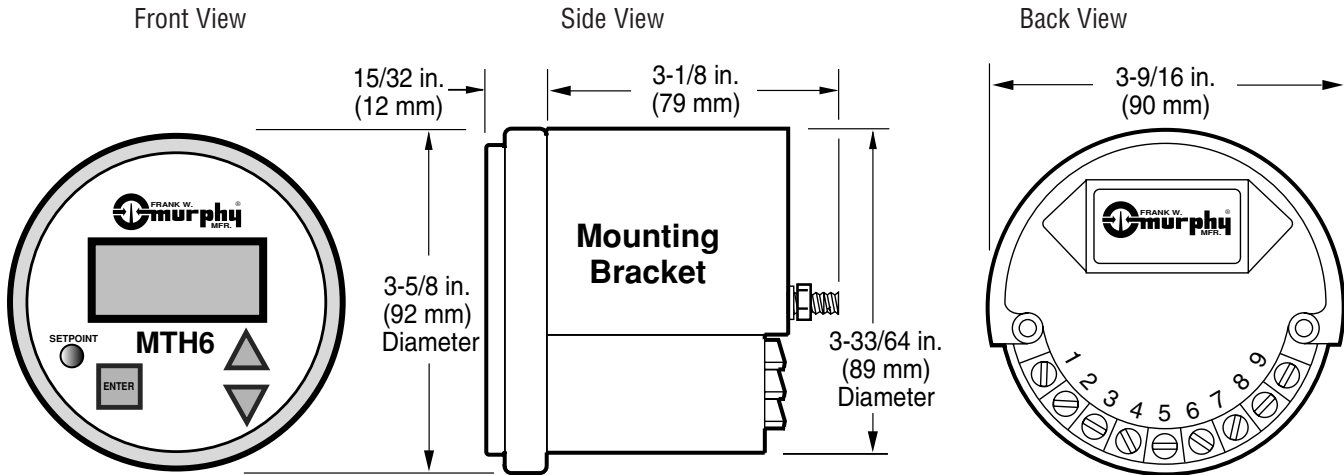
Shipping Weight: 14 oz. (435 g)

Shipping Dimensions: 5-1/2 x 5-1/2 x 5-1/2 in. (140 x 140 x 140 mm.)

Digital Tachometer and Hourmeter With Adjustable Overspeed Set Point



Dimensions



5

How to Order

Order by model designation:

MTH6 -- --|

Face Plate:

- 1 = White Background
- 2 = Black Background

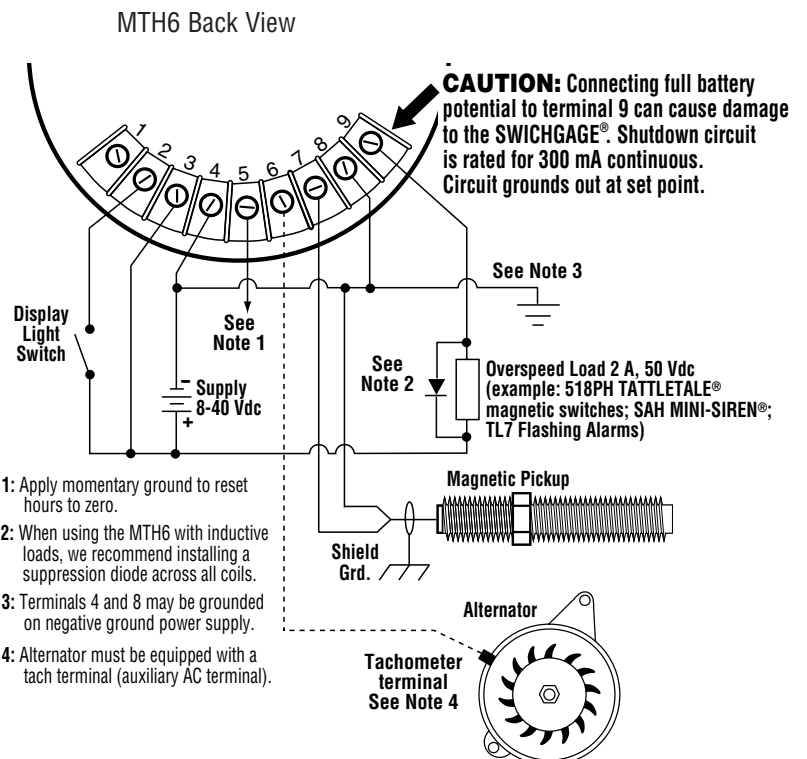
Bezel:

- Blank = Bright Stainless
- A = Black Stainless

Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

Typical Wiring Diagram



In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.



TATTLETALE® Annunciators and Magnetic Switches



- Nerve Centers for Murphy SWICHGAGE® Instruments and Automation Systems



Description

TATTLETALE® annunciators and Magnetic Switches are the nerve centers that translate SWICHGAGE® contact operations into decisions and operate the alarm or shutdown device. They are the electrical load carrying devices for the alarm or shutdown device. TATTLETALE® annunciators indicate which monitored function failed leading to the alarm or shutdown whereas magnetic switches do not. Magnetic switches operate basically as a latching relay.

Application

Magnetic Switches and TATTLETALE® annunciators are available for use with engines or electric motors. Various circuits, time delays, and contact configurations are available to match the power source and mode of operation required for alarm only, alarm before shutdown or shutdown only.

For distributor ignition engines, the magnetic switch opens the distributor coil circuit to cause shutdown. For magneto or CD ignitions the magnetic switch grounds the ignition output. Some models can also trip fuel valves instead of or in addition to grounding the ignition. Diesel engines are shut down by either closing off the fuel or air supply. Magnetic switches and TATTLETALE® annunciators can make or break circuits for these engines.

For electric motor applications, various magnetic switches are available to operate the motor starter, holding coil directly or in conjunction with appropriate Murphy Transformer-Relay assembly.

Features

Magnetic switches and TATTLETALE® annunciators described in this bulletin are electrically tripped relay type devices. Models are available to operate from battery power, 120 VAC, conventional magnetos and capacitor discharge type ignitions. Energized to run models allow CLOSED LOOP circuitry. Others draw momentary power to trip. Configurations are available for contact make or contact break to cause shutdown. Some models have both make and break contacts.

All models have a weather resistant case with screw terminals for ease of customer hookup. Manually reset models have a face mounted reset push button which also serves as a fault indicator in the TATTLETALE® version. In this application, one or more TATTLETALE®/magnetic switches are used to advise operating personnel which monitored function caused shutdown. Only the TATTLETALE® connected to that function sensor trips causing the reset push button to pop out.

Electrically reset models perform the same functions as the manually reset models and are reset by cycling the power supply off and then on.

Time delay models use reliable solid state timing circuits to lockout operated switch contacts for start-up and/or to allow operation of alarms before shutdown occurs. Specific models allow application of power to a shutdown circuit and automatic disconnect of power after a given time delay.

* Applies to selected models.

| Specifications | T17 | T17PH | MS2100 | MS2110 | MS2117 | MS2120 | 518PH | 518APH | 520APH | 521PH | 760A ‡ | 761APH | 822PH | M4264-1 | R129A | ET330S |
|------------------------------------|-----|-------|--------|--------|--------|--------|-------|--------|--------|-------|--------|--------|-------|---------|-------|--------|
| Coil Voltage | | | | | | | | | | | | | | | | |
| 12 volt | | | | | | • | • | • | • | • | • | | | | | • |
| 24 volt | | | | | | • | • | • | • | • | • | | | | | • |
| 12/24 volt* | • | • | • | • | | | | | | | | | • | | | • |
| 120 VAC | | | • | | | | | | | | | | | | | |
| Magneto ignition | | | | | • | | | | | | | | | • | | |
| CD ignition | | • | | | | | | | | | | | • | | | |
| Contacts (see Note 2 below) | | | | | | | | | | | | | | | | |
| NCH | • | • | A | A | A | | • | • | • | | • | • | • | | | |
| NOH | | | A | A | A | | • | • | | • | • | • | | | | • |
| NCG | | | | | | B | | | | | | | | B | | B |
| NOG | | | | | | B | | | • | | | | B | | B | |
| Latch Type | | | | | | | | | | | | | | | | |
| Energize to trip | • | • | • | • | • | • | | | | • | • | • | • | | • | • |
| Energize to latch | | | | | | | • | • | • | • | | | | | | |
| Reset Type | | | | | | | | | | | | | | | | |
| Manual indicating | | • | • | • | • | • | • | • | • | | • | • | • | | | |
| Manual non-indicating | • | | | | | | | | | | | | | | | |
| Electric non-indicating | | | | | | | | | | • | | | | | • | • |
| Time Delay | | | | | | | | | | | | | | | | |
| Before shutdown | | | | | | | | • | | • | • | | | | | |
| Start only | | | | | | | | | | • | • | | | | | |
| After shutdown | | | | | | | | | | | | | | | | • |

* Multi-voltage AC or DC systems. See circuit descriptions below and on next page.

A: Dry contacts normally wired in hot circuit.
B: Dry contacts normally wired in ground circuit.

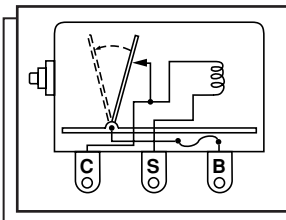
‡ Does not latch after shutdown signal clears, automatically resets.

5

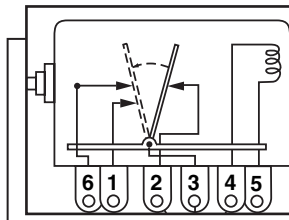
NOTES

The chart above indicates features/configurations available for each model.

- Coil Voltage-Coils are specific voltage rated or multiple voltage rated.
- Contacts-This is the control circuit output. In the latched position the NCH contact has a "hot" output; in the tripped position the NOH contact has a "hot" output. In the latched position, the NCG has a "grounded" output; in the tripped position, the NOG has a "grounded" output.
- Latch Type-Refers to whether the magnetic coil is momentarily energized to trip or requires continuous power in the operating mode and de-energizes to trip.
- Reset Type-Refers to manual or electric reset; manual indicating type is a TATTLETALE®.
- Time Delay-Indicates operation of the time delay.

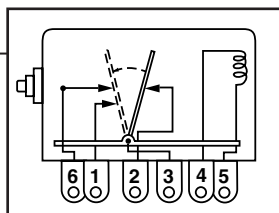


117/117PH Use to shutdown 12V thru 32V distributor ignition or diesel engines. Breaks circuit when tripped. Opens distributor coil circuit or power circuit to diesel run device. Automatically disconnects from battery after trip. Contacts 10 amps 32 VDC. 14 amp fuse.

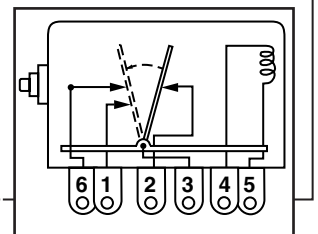


MS2110 Multi purpose Tattletale® with dry contacts that can be used to make two circuits and break another when tripped. Operates from 12 or 24 VDC or 24 VAC. The operating coil is intermittent duty and must be disconnected by an external circuit when tripped. The MS2110 is a replacement for 221PH, 169PH, 274 and 274PH.

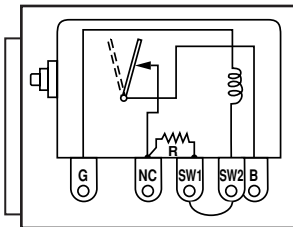
MS2100 Multi purpose Tattletale® with dry contacts that can be used to make two circuits and break another when tripped. Operates from 120 VAC or Capacitor Discharge Ignition. The operating coil is intermittent duty and must be disconnected by an external circuit when tripped. The MS2100 is a replacement for 100PH, 307CD, 307PHCD and 224CD.



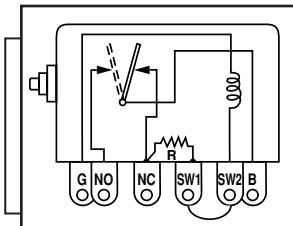
MS2120 Multi purpose Tattletale® with dry contacts that can be used to make two circuits and break another when tripped. Operates from Magneto Ignition. The operating coil is intermittent duty and must be disconnected by an external circuit when tripped. The MS2120 is a replacement for 307, 307PH and 224.



TATTLETALE® Annunciators and Magnetic Switches

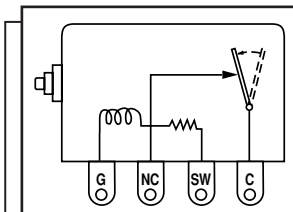
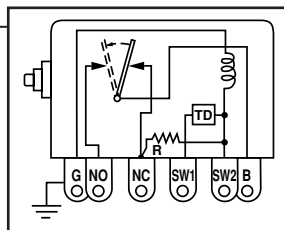


518PH Same as 517PH except allows for SWICHGAGE® and/or N.C. contacts to be wired "Closed Loop" (in series). Any contact open or SWICHGAGE® contact close in the circuit shunt trips the 518PH. Specify 12 or 24 VDC. Contacts 10 amps 24V. 14 amp fuse.



518APH Same as 517APH except allows for SWICHGAGE® and/or N.C. contacts to be wired "Closed Loop" (in series). Any contact open or SWICHGAGE® contact close in the circuit shunt trips the 518APH. Specify 12 or 24 VDC. Contacts 10 amps 24V. 14 amp

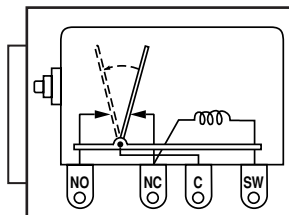
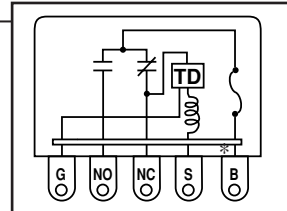
520APH Same as 518APH except with 30 second time delay before trip on one SWICHGAGE® contact input but immediate trip on the second SWICHGAGE® contact input. Typical use is for immediate stop of engine from oil pressure or coolant temperature, but delayed shutdown from alignment switches on center pivot irrigation system. Specify 12 or 24 VDC and length of time delay. Time delays are available from 5 to 120 seconds. Contacts 10 amps 24 V. 14 amp fuse.



521PH Use with N.C. SWICHGAGE® or switches to ground magneto or CD ignition when tripped. Trip coil energized to run, de-energized to shutdown when N.C. contacts open. Specify 12 or 24 VDC. Contacts 10 amps 24 V.

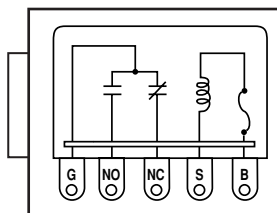
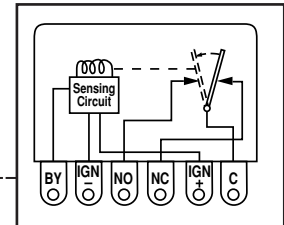


760A/760AF/761APH Use for distributor ignition or diesel. Time delay lockout of SWICHGAGE® contacts on start-up only; customer wired for delayed or immediate trip on shutdown. Breaks and makes circuits when tripped. 760A resets automatically when power is removed. 761APH has manual reset. 760AF is 760A with inline fuse. Must specify 12 or 24 VDC, and length of time delay. Optional time delays: 15, 30 (standard) or 60 seconds. Contacts 10 amps 24 V. 14 amp fuse. Models 760A and 761APH carry the CE mark.



822PH Used in Murphy TR-assemblies as master disconnect. 24 VAC coil energizes when SWICHGAGE® contact closes to ground; breaks and makes circuit when tripped. Manual reset.

M4264 Series Detects loss of magneto/CD ignition output and transfers contacts for customer use. Contacts 10 amps; 48 VAC/VDC. M42641M/M42641CD transfers SPDT dry contacts when tripped. M42642M/M42642CD is used with Murphy M-series fuel valve. Power is stored in the M42642 to trip the fuel valve coil. M42643M/M42643CD is version M42641 with a bypass terminal which allows manual shutdown of the engine without tripping the M42643.



R129A A SPDT relay with 10 amp dry contacts. Specify 12 or 24 VDC. Contacts 10 amps 24 VDC. 14 amp fuse.

ETS30S All solid-state time delay for energized to stop circuits such as solenoids. When a shutdown signal is received, the ETS30S applies power to the shutdown device for 30 seconds and then disconnects the power. Input power 12 or 24 VDC.

773 All solid-state time delay magnetic switch for energized to stop circuits such as engine intake air shutoff. SWICHGAGE® contact closure causes unit to apply power to the shutdown device for 10 seconds and then disconnects the power. Input voltage 8-40 VDC. Contacts rated 10 amps 30 VDC. 773 has a 30 second time delay lockout on start only—immediate shutdown on all functions. Overspeed is not locked out on start.

TD781 Turbo cool-down module. Manual push button starts 5 minute cool-down delay; key switch must then be turned off. De-energizes engine run solenoid/device. Key switch "on" overrides shutdown. Input power 12-30 VDC.



TATTLETALE® Annunciators and Magnetic Switches

How to Order

Specify model number and options using the diagram below. List options in alphabetical order (A to Z) followed by numeric in ascending order. Place a dash (-) between each option.

760AF - 15 - 12 -

| Base Models | |
|-------------|----------|
| 117* | M42642M |
| 117PH* | M42642CD |
| 518PH | M42643M |
| 518APH | M42643CD |
| 520APH | R129A |
| 521PH | 773 |
| 760A* | TD781 |
| 761APH* | ETS30S |
| 822PH | MS2100 |
| M42641M | MS2110 |
| M42641CD | MS2120 |

| Options |
|---|
| Not all options may not be available on all models in combination with other options. See "Configurations Available" chart below. |
| AS = Auxiliary SPDT switch |
| ES = Environmentally sealed |
| EL = Explosion-proof less case |

| Voltage/Ground (where applicable) |
|-----------------------------------|
| 12 = 12 VDC |
| 24 = 24 VDC |

| Time Delay (where applicable) |
|-------------------------------|
| 15 = 15 seconds |
| 30 = 30 seconds |
| 60 = 60 seconds |
| Specify other. |

*Add the letter "F" to the base model to indicate an inline fuse instead of a base mounted fuse. Example: 760AF, 761APHF, 117F.

5

Configurations Available

| | 117 | MS2110 | MS2110 | MS2120 | MS2111 | 517/517A | 518/518A | 520A | 521 | 760A | 760AF | 761A | 822 | M42641 |
|---------------|-----|--------|--------|--------|--------|----------|----------|------|-----|------|-------|------|-----|--------|
| Non-PH | 1,2 | | | | | | | | | 1 | 1 | | | 1 |
| PH | 1,2 | 1,2 | 1,2 | 1,2 | 1 | 1 | 1 | 1 | | | | 1 | 1 | |
| PH-ES | 1 | 1 | 1 | 1 | 1 | | | | | | | | | |

1= Offered
2= Auxiliary snap-switch

Accessories

- Order accessories as a separate item. Specify part number when ordering.
- 25050016 Weathercap
 - 25050547 Clear flexible dust boot for push button
 - 30050323 Single unit mounting panel
 - 65010026 In-line fuse holder with 14 amp fuse

Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

CAUTION: Certain dangers to human safety and to equipment may occur if some equipment is stopped without pre-warning. It is recommended that monitored functions be limited to alarm-only or to alarm before shutdown.

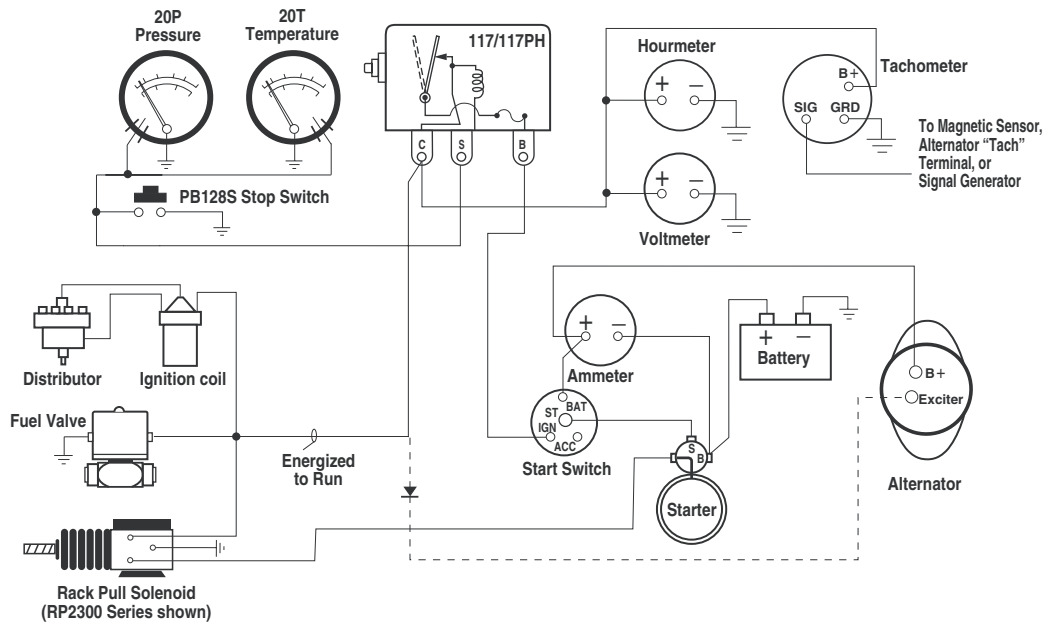
In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

TATTLETALE® Annunciators and Magnetic Switches



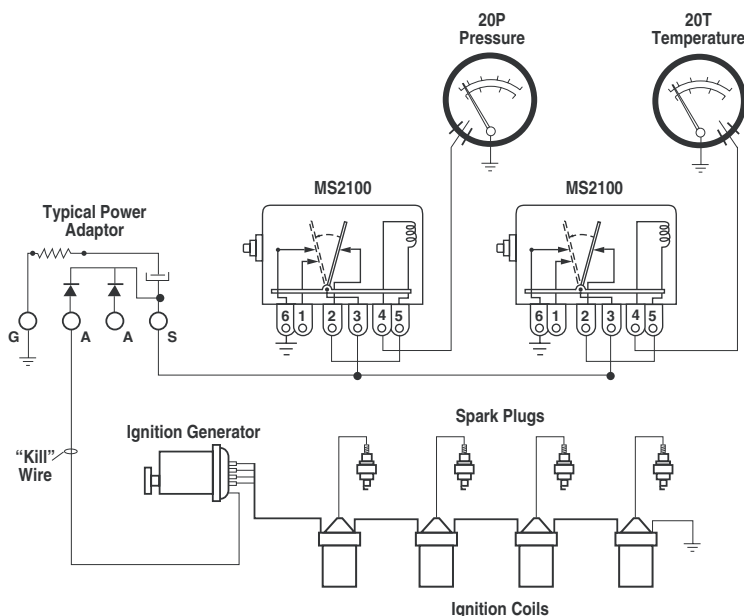
Typical Wiring Tech Sheet for Magnetic Switches and TATTLETALE® Annunciators

Typical Wiring Diagram with 117/117PH Magnetic Switch



5

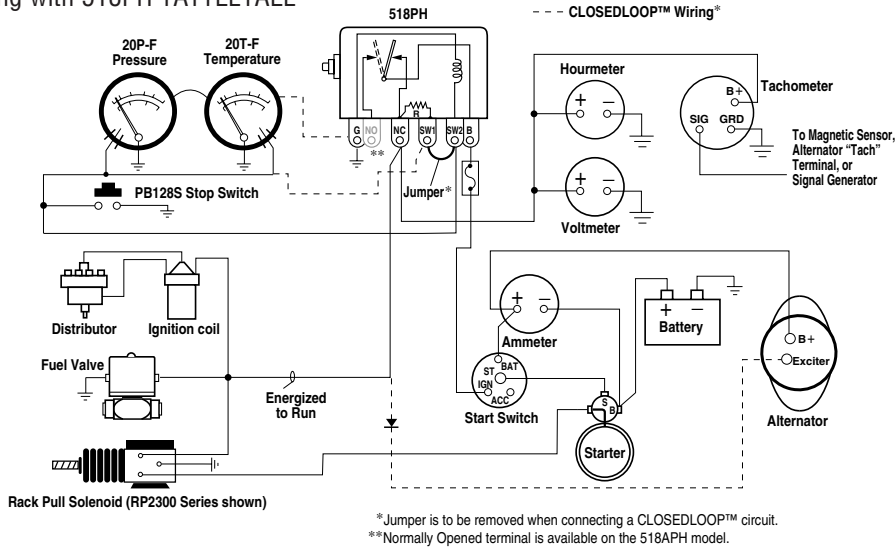
Typical Wiring Diagram with MS2100 TATTLETALE®





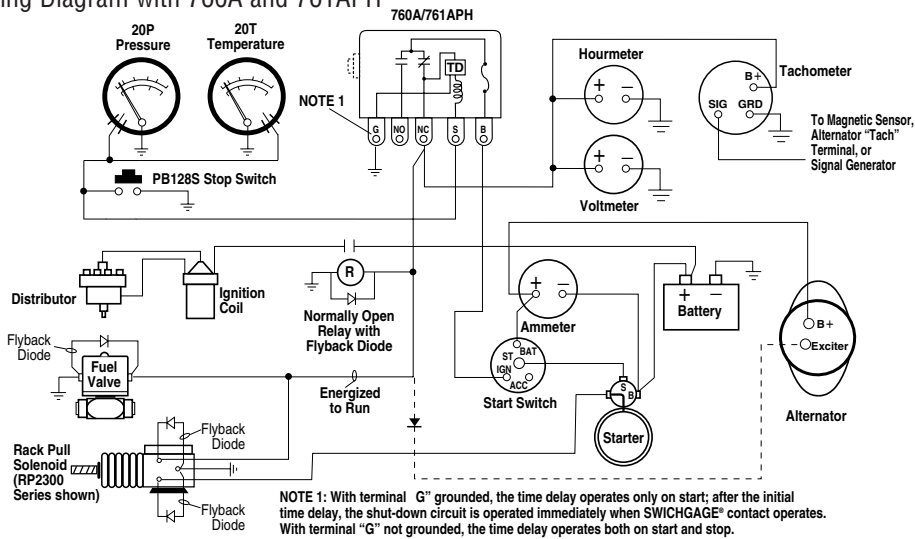
TATTLETALE® Annunciators and Magnetic Switches

Typical Wiring with 518PH TATTLETALE®



5

Typical Wiring Diagram with 760A and 761APH



CAUTION: "OIL FILLED INSTRUMENTS CONTAIN SILICON OIL" Exposure may be hazardous under certain circumstances.

"DO NOT CUT CAPILLARY" It contains chemicals or solvents which may be hazardous under certain circumstances.

"Keep out of Eyes, Mouth and Do Not expose to Skin". Keep out of reach of children. Flush thoroughly with water and seek medical attention. If swallowed, call physician immediately. MSDS Sheets are available by calling: 918/317-4100.

CAUTION: Certain dangers to human safety and to equipment may occur if some equipment is stopped without pre-warning. It is recommended that monitored functions be limited to alarm-only or to alarm before shutdown.

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SWICHGAGE® Shutdown Panel Kit



W0168

W0168 and W0241

- Protection Against Dangerously Low Oil Pressure or High Temperature
- CLOSED-LOOP Circuitry Ensures Proper Operation at All Times
- Operates on 12 or 24 VDC Systems*
- Complete Kit Ready for Easy Installation
- Universal Mounting Panel



Description

The W0168 and W0241 panel kits are universal-fit instrument panels for most industrial engines. They include SWICHGAGE® protection for low engine oil pressure and high coolant or high oil temperature. These Panel Kits are similar—the W0168 has a start/stop key switch and the W0241 has a start push button.

Panel kits include:

- Low Lube Oil Pressure SWICHGAGE®
- High Coolant/Oil Temperature SWICHGAGE®
- 518PH Magnetic Switch
- Emergency stop push button
- Ignition key switch for start/stop (W0168)
- Push button for start (W0241)
- Ammeter 60-0-60
- Provisions for additional SWICHGAGE® controls, such as irrigation pump pressure or engine oil temperature
- Provisions for tachometer and throttle cable

SWICHGAGE® is two-instruments-in-one: (1) an accurate indicating gage with (2) a built-in, adjustable limit switch.

A 518PH Magnetic Switch provides a CLOSED-LOOP circuit to ensure proper operation at all times. The 518PH allows the system to be sensitive to open circuits, broken wires, false grounds, corrosion, loss of power and other factors which could otherwise prevent the protective controls from operating. It can be wired to either make or break a circuit for shutdown.

The universal mounting panel is enclosed on all 4 sides with open back. An optional back cover (model no. 30050800) is available for both kits. Panel Kits are prewired and ready to install and are available for 12 or 24 VDC systems.*

Specifications

Low Lube Oil Pressure SWICHGAGE®:

- 0-100 psi (0-689 kPa) [0-6.89 bar]
- 1/8 NPT process connection

High Coolant/Oil Temperature SWICHGAGE®:

- 130-250°F (54-121°C)
- 48 in. (1.2 m) capillary
- 1/2 NPT process connection

518PH Magnetic Switch:

12 or 24 volt (specify)

Ammeter: 60-0-60

Shipping Weight: 8 lbs. 8 ozs. (3.9 kgs.)

Shipping Dimensions:

16 x 11 x 5-1/2 in. (406 x 279 x 140 mm.)

Warranty

A two-year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and are packed with each unit.

How to Order

To order a Shutdown Panel Kit for your application, specify model number.

W0168

W0168B (back cover)

W0241

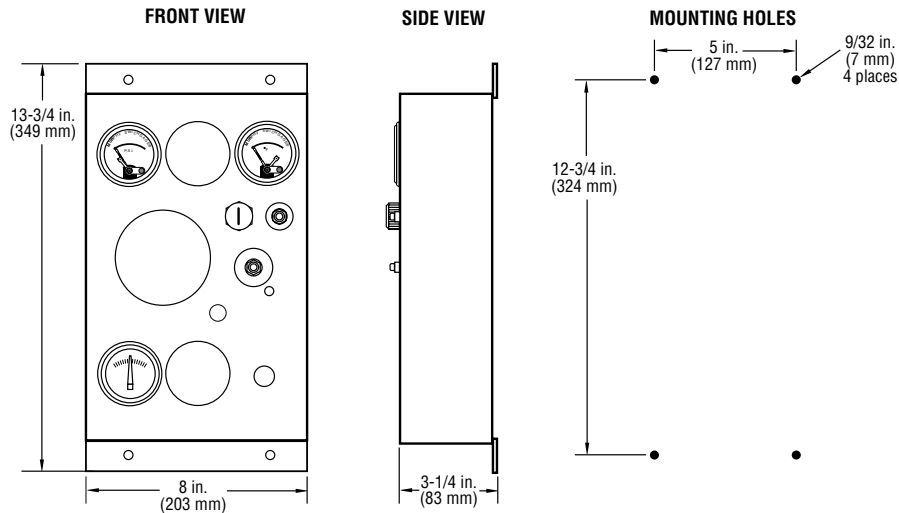
*NOTE: 12 volt kit is standard. If you require 24 volt kit—specify when ordering.



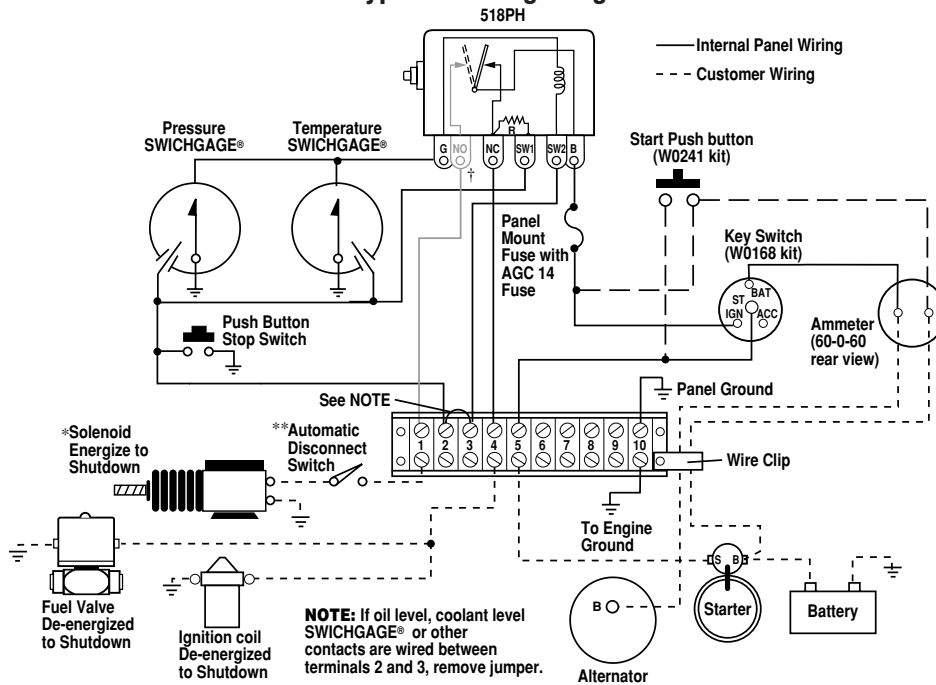
SWICHGAGE® Shutdown Panel Kit

Dimensions

Dimensions below are for both Panel Kits.



Typical Wiring Diagram



*Key Switch must remain in "ON" position.

**Such as N.O. fuel pressure switch part number 00-00-0421.

†Normally Open terminal available on model 518APH.

CAUTION: "OIL FILLED INSTRUMENTS CONTAIN SILICON OIL." Exposure may be hazardous under certain circumstances.

"DO NOT CUT CAPILLARY" It contains chemicals or solvents which may be hazardous under certain circumstances.

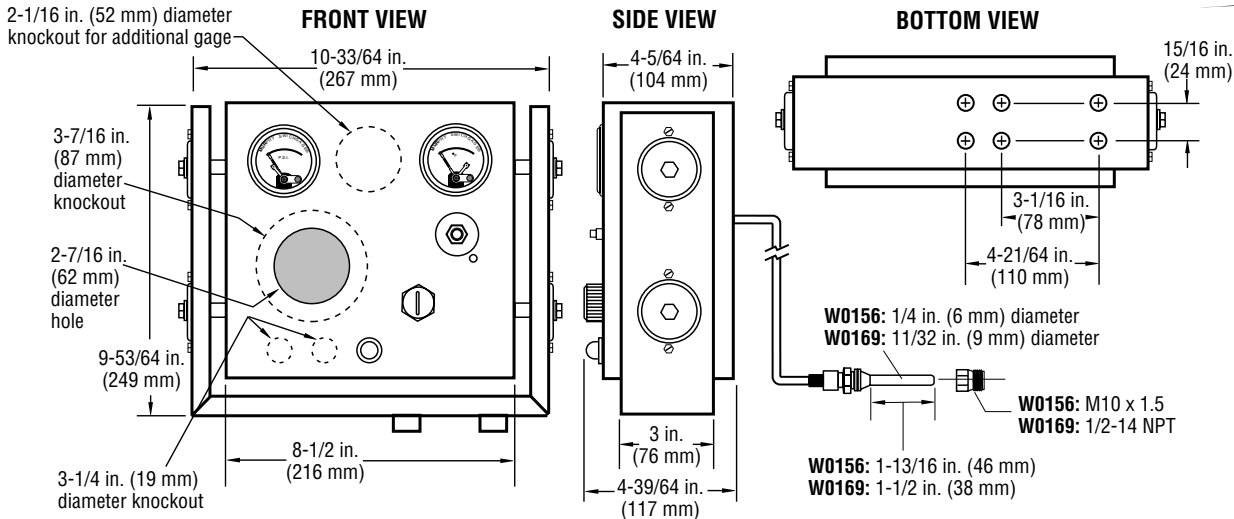
"Keep out of Eyes, Mouth and Do Not expose to Skin". Keep out of reach of children. Flush thoroughly with water and seek medical attention. If swallowed, call physician immediately. MSDS Sheets are available by calling: 918/317-4100.

CAUTION: Certain dangers to human safety and to equipment may occur if some equipment is stopped without pre-warning. It is recommended that monitored functions be limited to alarm-only or to alarm before shutdown.

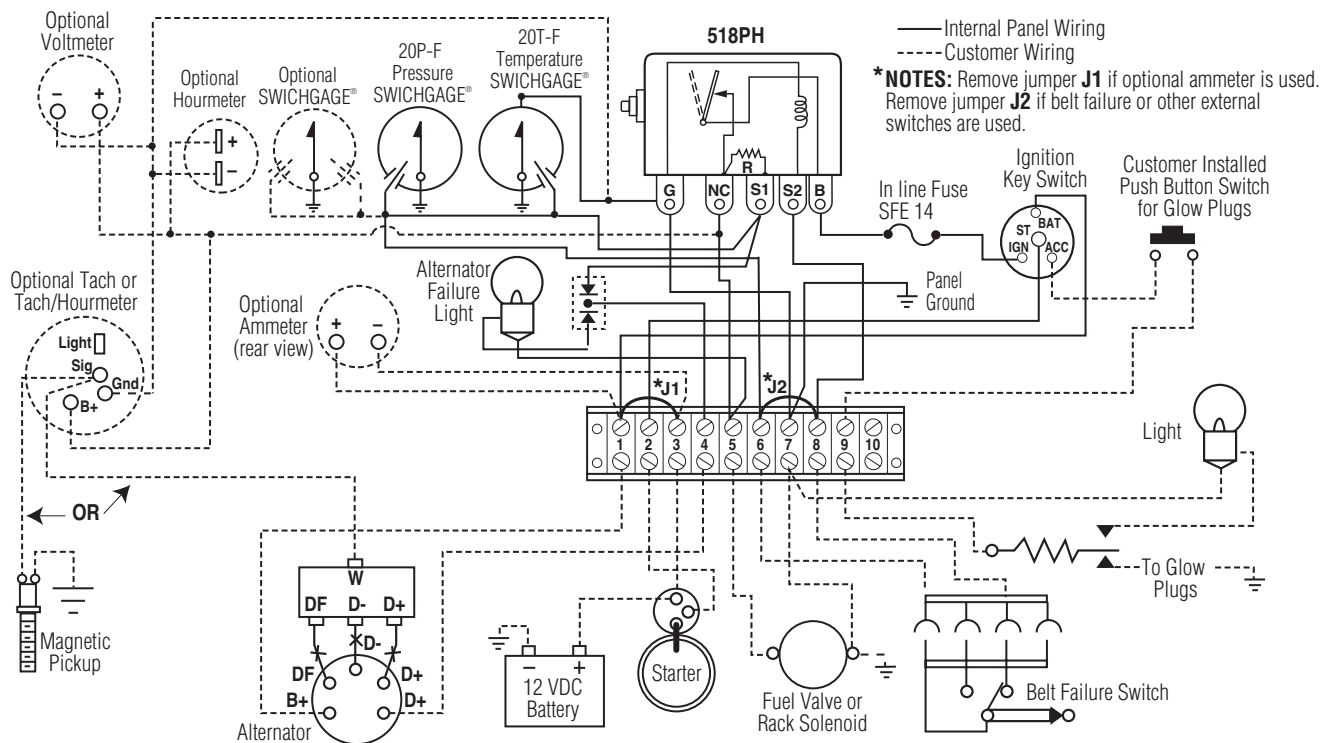
In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

Dimensions

Dimensions are for both Panel Kits.



Typical Wiring Diagram for DEUTZ



CAUTION: "OIL FILLED INSTRUMENTS CONTAIN SILICON OIL" Exposure may be hazardous under certain circumstances. "DO NOT CUT CAPILLARY" It contains chemicals or solvents which may be hazardous under certain circumstances. "Keep out of Eyes, Mouth and Do Not expose to Skin". Keep out of reach of children. Flush thoroughly with water and seek medical attention. If swallowed, call physician immediately. MSDS Sheets are available by calling: 918/317-4100.

CAUTION: Certain dangers to human safety and to equipment may occur if some equipment is stopped without pre-warning. It is recommended that monitored functions be limited to alarm-only or to alarm before shutdown.

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.



MOBILE EQUIPMENT KITS

You get accurate engine readings and time-delayed automatic shutdowns. Flashing light and MINI-SIREN® signal a warning before the shutdown. Alarm-only panels (without shutdown capabilities) are

also available. See details on opposite page. WAI kits are easy to install and function test without the need for expensive auxiliary equipment. Each is a cost competitive and effective system for engine protection.

WAI2 Panel Assembly

- Enclosed panel and mounting hardware with:
- Oil Pressure SWICHGAGE®
- Coolant Temperature* SWICHGAGE®
- MINI-SIREN®
- FL3/TL2 flasher and light
- 760AF Magnetic Switch with 30 second time delay for alarm before shutdown; 12 VDC, (optional 24 V)



5



WAI7 Panel ASSEMBLY

- Open Style Panel with:
- Oil Pressure SWICHGAGE®
- Coolant Temperature* SWICHGAGE®
- MINI-SIREN®
- TL7 flashing alarm light
- 760AF Magnetic Switch with 30 second time delay for alarm before shutdown; 12 VDC, (optional 24 V)

WAI8 Panel ASSEMBLY

- Open-Style Panel with:
- Oil Pressure SWICHGAGE®
- Coolant Pressure SWICHGAGE®
- Coolant Temperature* SWICHGAGE®
- MINI-SIREN®
- TL7 flashing alarm light
- 760AF Magnetic Switch w/30 second time delay for alarm before shutdown; 12 VDC, (optional 24 V)



*Temperature capillary length is standard 6 ft. (1.8 m). Specify longer lengths.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

IN DASH INSTRUMENTS



Murphy's direct-reading, mechanical SWICHGAGE® is a gauge and limit switch in one unit. The SWICHGAGE® gives accurate visual indication of engine conditions and includes an integral switch set point which

initiates the alarm and/or shutdown. This set point is easily adjustable on the gage face or can be factory set and made tamper-resistant. Internally illuminated for nighttime viewing.

Engine Oil Pressure

201P-1-75 SWICHGAGE®
0-75 psi (0-517 kPa) range, 1/8 NPT connection. Other ranges, premium pressure line, and adapters available (refer to Accessories and Components on page 5).



Block Coolant Pressure

202P-1-15 SWICHGAGE®
0-15 psi (103 kPa) set low contact 3 psi (20 kPa), 1/8 NPT connection. Also available in 30 psi (207 kPa).



Transmission Temperature

203T-1-3 00-6 SWICHGAGE®
140-300°F range, 6 ft. (1.8 m) capillary and 1/2 NPT adapter. Specify other ranges, adapters and capillary lengths.



FUEL PRESSURE/Crankcase Pressure

20PWC Series SWICHGAGE®
Monitors natural gas fuel or engine crankcase pressure. Range: 0-10 in. (254 mm.). Available as SWICHGAGE® or indicating-only MURPHYGAGE®.



Block Coolant Temperature

202T-1-220-6 SWICHGAGE®
130-220°F, 6 ft. (1.8 m) capillary with 1/2 NPT engine adapter nut. Specify other ranges, adapters and capillary lengths.



Air Filter Restriction

20VWC-IP1-30 SWICHGAGE®
0-30 in. (0-76 cm) VWC, 1/8 NPT connection. Use for monitoring the condition of dry air filter. See Accessories and Components, on page 3, for pressure line.



Oil Filter Restriction

20DP-IP1-30 SWICHGAGE®
Differential pressure instrument to measure oil, fuel or water filter restriction. Alarm only function or gage only.



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ELECTRIC GAGE INSTRUMENTS

Our EG21 Series electric gages include shock resistance air core movement, polyester (PBT) case, polycarbonate lens, and stainless steel bezel. The gages are environmentally sealed to exclude moisture and other corrosive elements.

The EGS21 Series electric SWICHGAGE®s have the same features as the EG21 Series, plus adjustable set-point PowerHall* switch output for operating alarms or equipment shutdown. Both Series fit in standard 2-1/16 in (52 mm.) openings.
Patents 5121109, 4975687, 5608386



PRESSURE

EG21P MURPHYGAGE®; EGS21P SWICHGAGE®
 Scales through 400 psi (2.76 MPa) [27.6 bar]. Various units of measurement available.



TEMPERATURE

EG21T MURPHYGAGE®; EGS21T SWICHGAGE®
 Dual scale dials in degrees Fahrenheit and Celsius. Suitable for engine coolant or oil temperature. Ranges available for 100 to 250°F (38 to 120°C) or 140 to 300°F (60 to 150°C).



FUEL LEVEL

EG21F MURPHYGAGE®; EGS21F SWICHGAGE®
 Accurate level indication. Monitors tank level from full to empty.



AMMETER

EG21AM MURPHYGAGE®; EGS21AM SWICHGAGE®
 Easy-to-read with center zero. For ±60 amperes or ±100 amperes (internal shunt).



ESF (Level)



ESP (Pressure)



EST (Temperature)

VOLTMETER (not shown)

EG21VM MURPHYGAGE®; EGS21VM SWICHGAGE®
 Easy-to-read dial. Models available for 12 or 24 Volt systems.

ELECTRIC GAGE sendERS

ESP (Pressure), EST (Temperature), ESF (Level)
 Available in 1-wire and 2-wire models.

- For pressures up to 400 psi (2.76 kPa) [27.6 bar].
- For temperatures of 130-250°/140-300°F (54-121°/60-149°C).
- For fuel tanks only, depths: 6-24 in. (152-610 mm.).

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ACCESSORIES AND COMPONENTS



TIME DELAY / ALARM BEFORE SHUTDOWN

760AF CONTROL RELAY
 Select 15, 30, or 60 second Time delay before shutdown.
 Available for 12 or 24 VDC, positive or negative ground.



SAH MINI-SIREN® AUDIBLE ALARM

Attention getting audible alarm.



HIGH VISIBILITY FLASHING VISUAL ALARM

TL7 SELECTRONIC® ALARM
 Designed by Murphy for use with SWICHGAGE® instruments.
 Select 12 or 24 VDC, positive or negative ground.



SINGLE SET POINT SPEED SWITCH

SS300 SPEED SWITCH
 Senses engine overspeed. SPDT relay operates alarm or initiates engine shutdown. Also use to engage and disengage 4-Wheel drive solenoids.



TURBO COOLDOWN CONTROL

TD781 CONTROL RELAY
 Designed for turbo or unattended five minute cooldown before shutdown, driver initiated. Model TD780 available for excessive idle shutdown.



ALARM ONLY DIODE 65010098

Isolates a SWICHGAGE® from the shutdown circuit to provide alarm only.



OIL PRESSURE LINE (Deluxe Tubing Kit)

The premium hose can be ordered to exact length; it has 1/8 NPT swaged fittings. Optional adapters are available, call Murphy for details.



DESIGNER BEZELS (All bezels Stainless steel)

Special styles are available for selected SWICHGAGE® instruments. The standard is Low Profile stainless steel; High Profile and Black, Non-glare finished optional.



TEMPERATURE ADAPTERS (not shown)

American, British, Metric
 Adapter bushings available for all engine makers/models.

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ACCESSORIES AND COMPONENTS



COOLANT LOSS SHUTDOWN

EL150K1 SWICHGAGE®

Instantly detects loss of coolant due to “blown” hoses. It offers manual test switch operation and visual level indication.



PUSH / PULL DC SOLENOIDS

RP SERIES SHUTDOWN SOLENOIDS

Optional pull/push action and dual coil design allow easy use as diesel rack puller. Four models available. For 12 or 24 VDC.



DIESEL SV VALVE

SV SERIES DIESEL FUEL VALVE

Use with a Murphy control relay to shutoff fuel for shutdown (energized to run). Available for 12 or 24 VDC.

EMS SERIES CONTROLLERS

5

The EMS Series Controllers are microprocessor-based monitoring and control systems. Basic programs provide auto-start or manual start and first-out shutdown

for engine functions. Field adjustable parameters, service reminders, shutdown history file, and data logging are also included.



COMPREHENSIVE ENGINE CONTROL

EMS447 SERIES

- Monitoring/control of engine equipment functions
- Standard programs available or can be pre-programmed to a wide variety of engine/equipment requirements
- Includes password protected program, field adjustable parameters and service reminders
- Accepts analog (for a variety of resistive senders, see page 4) and digital inputs (positive or ground such as Murphy SWICHGAGE® instruments). Transistor, Digital and Relay outputs are standard. Additional relay contact boards available
- Includes RS485 communications port



EMS448 SERIES

Same as EMS447 except features a weatherproof NEMA 4/4X fiberglass enclosure.

EMS547 SERIES (not shown)

Same as EMS447 except features enhanced external communications capabilities.

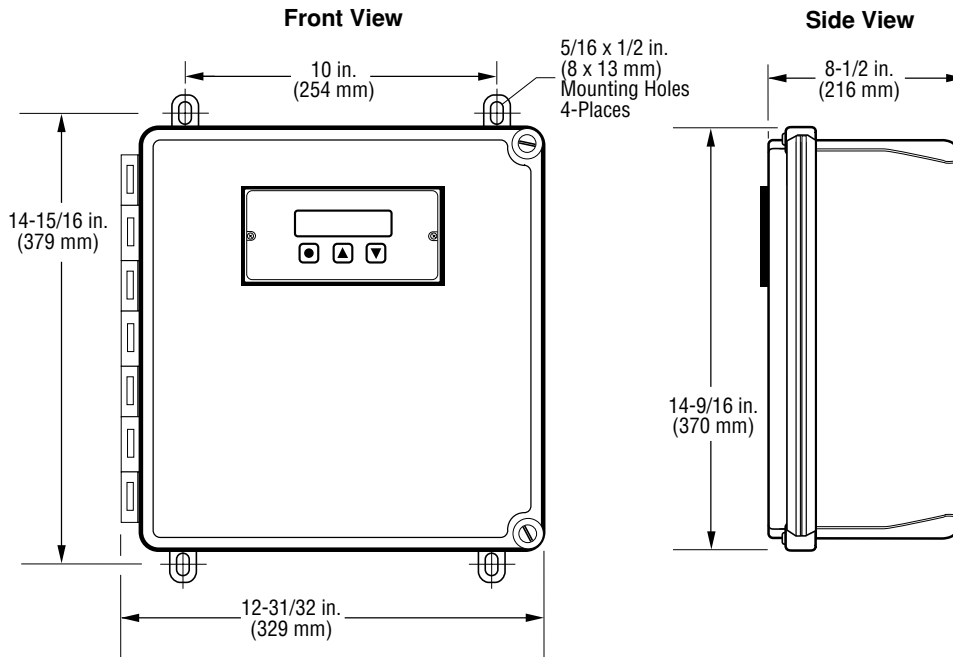
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Marine Engine Monitoring and Information System

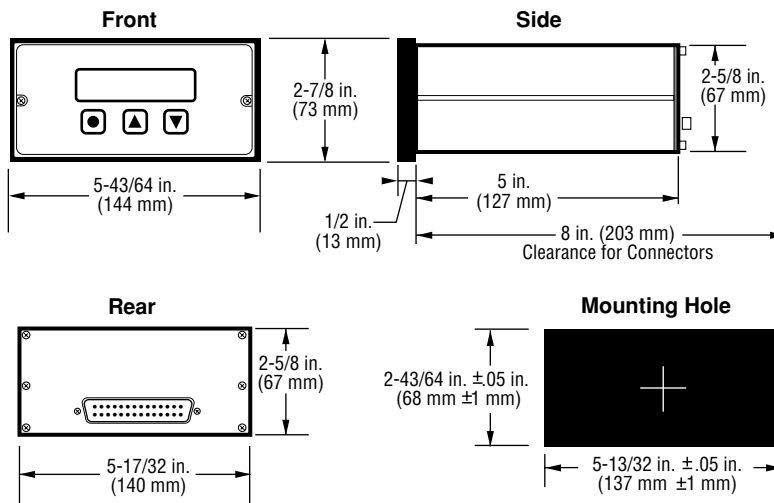


Dimensions

Master Unit (Engine Room)



Repeater Unit (Bridge)



Pull/Push DC Solenoids for Diesel Engines

Watts Power/Cold Force in Pounds at 100% Voltage/Inches Stroke

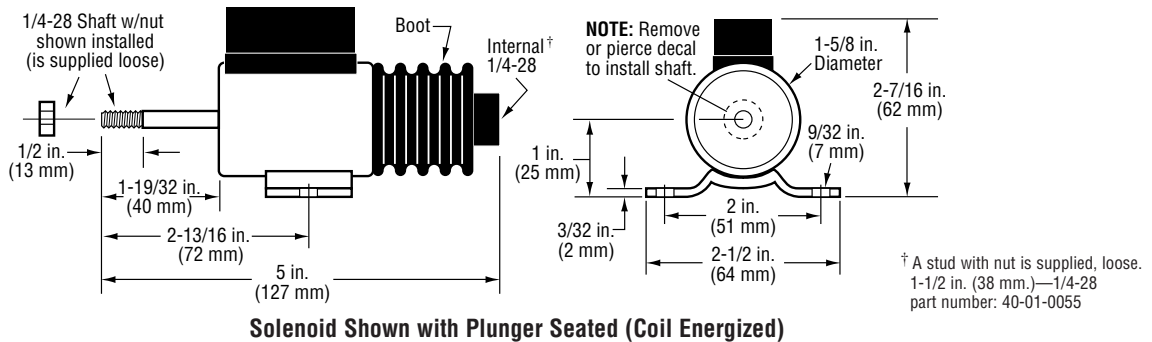
| Maximum Stroke In. (mm.) | Power in Watts | | Force* in Pounds [Kilograms] at 100% Voltage** Stroke in Inches (Millimeters) | | | | | | | | |
|-----------------------------|----------------|--------|--|---------------------------|---------------------------|---------------------------|--------------------------|-------------------------|-------------------------|------------------------|--|
| | Seated | Inrush | Continuous Hold | 1/8 (3) | 1/4 (6) | 1/2 (13) | 3/4 (19) | 1 (25) | 1-1/4 (32) | 1-1/2 (38) | |
| RP2307B 1 (25) | 12 | 624 | 25 [11.34] <13> [5.90] | 22 [9.98] <12> [5.44] | 21 [9.53] <11> [4.99] | 17 [7.71] <10> [4.54] | 14 [6.35] <8> [3.63] | 10 [4.54] <6> [2.72] | — | — | |
| RP2308B 1 (25) | 12 | 696 | 27 [12.25] <15> [6.80] | 25 [11.34] <14> [6.35] | 23 [10.43] <13> [5.90] | 19 [8.62] <12> [5.44] | 15 [6.80] <9> [4.08] | 11 [4.99] <7> [3.18] | — | — | |
| RP2309B 1-1/2 (38) | 12 | 1029 | 32 [14.52] <19> [8.62] | 30 [13.61] <18> [8.16] | 27 [12.25] <16> [7.26] | 22 [9.98] <14> [6.35] | 18 [8.16] <11> [4.99] | 13 [5.90] <9> [4.08] | 8 [3.63] <6> [2.72] | 6 [2.72] <4> [1.81] | |
| RP2310B 1-1/2 (38) | 12 | 960 | 35 [15.88] <20> [9.07] | 34 [15.42] <19> [8.62] | 31 [14.06] <17> [7.71] | 26 [11.79] <15> [6.80] | 22 [9.98] <12> [5.44] | 17 [7.71] <9> [4.08] | 12 [5.44] <7> [3.18] | 7 [3.18] <4> [1.81] | |

*Forces shown are without return spring. Forces shown < > are with return spring. Forces shown in [] are in kilograms.

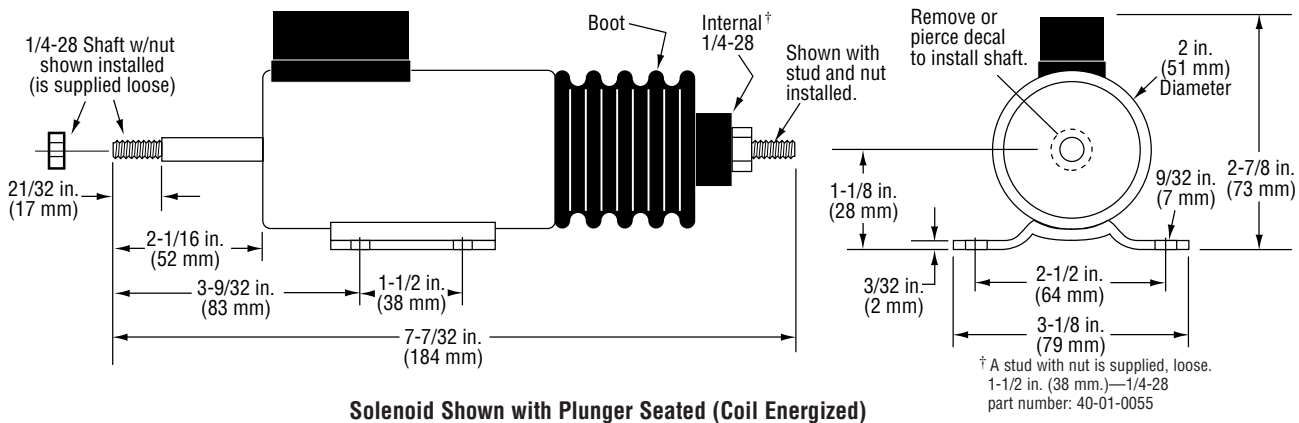
**To determine the operating current, divide the power (watts) indicated in the above table by the applied voltage. Solenoids will operate at any stroke less than maximum.

Solenoid Dimensions

RP2307B and RP2308B



Solenoid Shown with Plunger Seated (Coil Energized)



Solenoid Shown with Plunger Seated (Coil Energized)

Note 1. Typical operating temperature is: 140°F(60°C) ± 10°F (6°C) for 1 in. (25 mm.) Stroke Solenoids (70°F/21°C Rise above ambient)
120°F(49°C) ± 10°F (6°C) 1-1/2 in. (38 mm.) Stroke Solenoids (50°F/10°C Rise above ambient)
See CAUTION statement on next page and note maximum housing temperature is 185°F (85°C).

Note 2. The energize-coil should not be activated for more than 15 seconds. Longer energize-coil activation times will damage the solenoid.

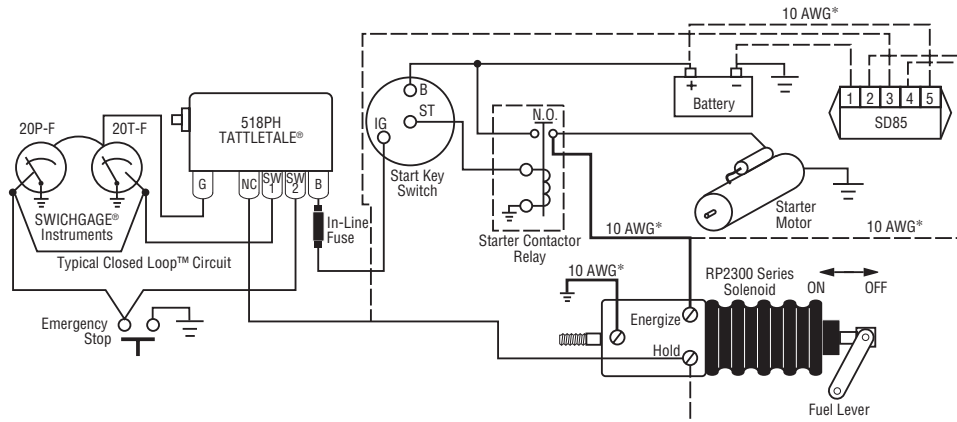
Note 3. Allow 15 minutes for cooling between activations of energize-coil to retain full pulling force.

Note 4. The energize-coil must fully seat the plunger to allow the hold-coil to function properly.

Pull/Push DC Solenoids for Diesel Engines

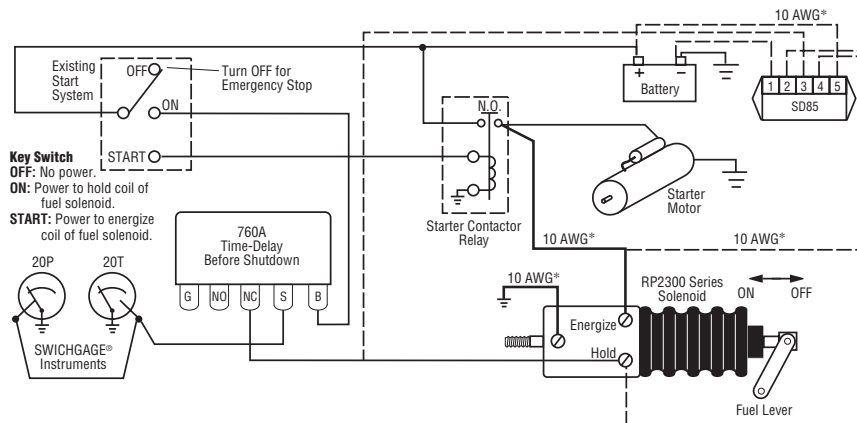
Typical Wiring Diagrams

Typical auto-shutdown system using a 518PH magnetic switch



*Wires must be minimum 10 AWG (65/0.3 mm. [4.5 mm.]) to develop full force.

Typical time-delayed shutdown using a 760A magnetic switch



*Wires must be minimum 10 AWG (65/0.3 mm. [4.5 mm.]) to develop full force.

Mechanical Installation

1. Bolt the solenoid securely to the mounting bracket.
2. Connect linkage and check for binding. Plunger should move freely throughout the complete stroke and be allowed to "bottom" at the internal stop of the solenoid.

DO NOT mount with boot down.

DO NOT apply any grease or lubrication to parts.

IMPORTANT: If the plunger does not seat, it will release prematurely when shifted to the "holding" mode of operation. Readjust linkage to shorten the plunger stroke. Adjust the yoke in increments of 1/2 turn until plunger will remain in hold position.

Electrical Installation

1. Refer to the diagrams above for typical electric wiring.
2. Use minimum 10 AWG [65/0.3 mm. (4.5 mm.)] wire size, as noted in the wiring diagrams. A smaller wire will reduce the current available and thus the pulling force. Wire length must be kept to a minimum.

Operation

The solenoid coil is connected to the existing engine starter system or an equivalent circuit. At starting both the Energize and Hold-in coils are energized. In the run mode, the Hold-in coil is continuously energized while the Energize coil is disconnected, reducing the heating effect and power consumption.

NOTE: Coils that burn out due to improper electrical hookup or misadjustment are not covered by Murphy factory warranty.

NOTE: A cool down period of 2 minutes minimum should be allowed between energized pull in cycles.



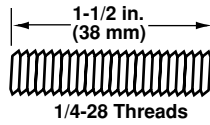
CAUTION: The solenoid housing is hot to the touch. A temperature rise to 185°F (85°C) is permissible.

Pull/Push DC Solenoids for Diesel Engines

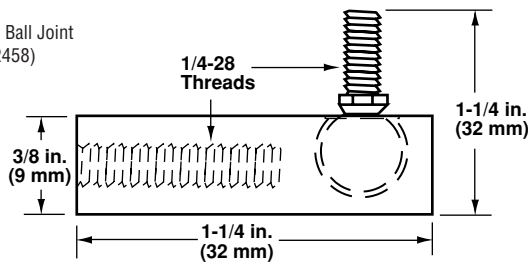
Accessories

RPS Linkage Parts and Assemblies

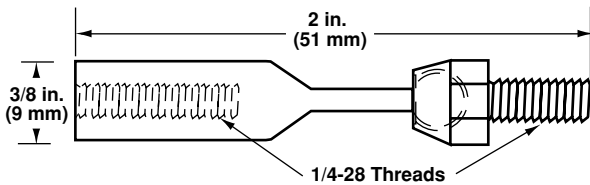
Threaded Rod
(40-05-0315)



RPS 90° Ball Joint
(00-00-2458)



RPS In-Line Ball Joint (00-00-2457)

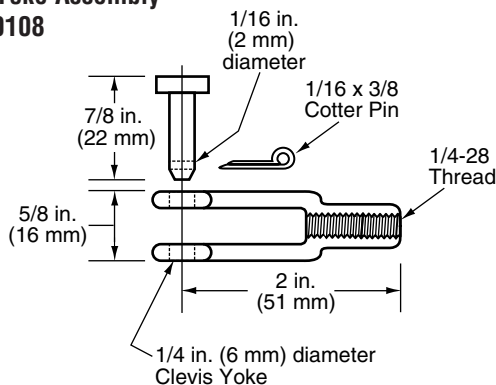


Clevis Yoke Bead Chain Assemblies 65-01-0110

12 inch
(300 mm.)
Chain

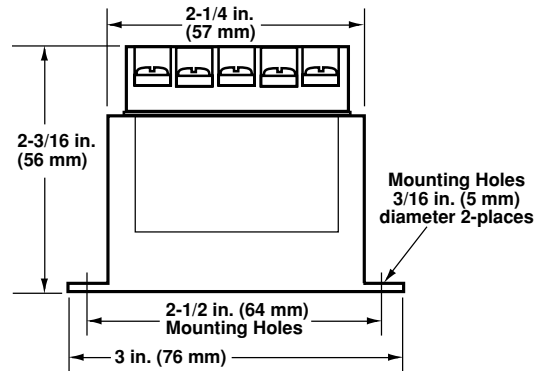


Clevis Yoke Assembly 65-01-0108

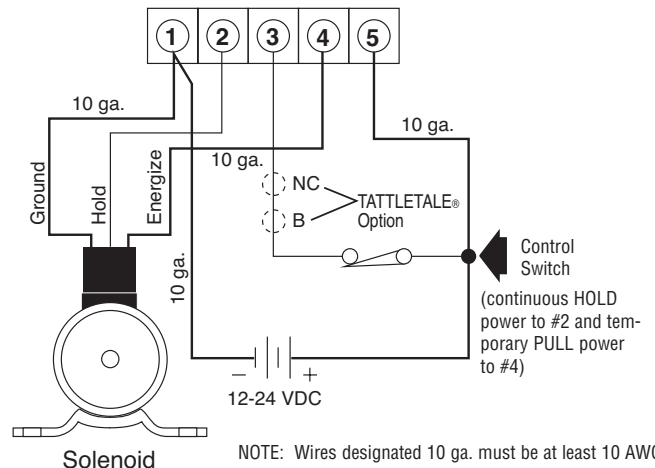


SD85: Solenoid Drive Time Delay

The SD85 is used when the solenoid is duty cycled for short time periods such as 2-position throttle operation. It also provides enhanced operational control for normal on-off applications. The SD85 activates both coils of the solenoid for a short time then de-energizes the Energize-coil. The Hold-in coil remains energized.



SD85 Terminal Block



NOTE: Wires designated 10 ga. must be at least 10 AWG [65/0.3 mm. (4.5 mm.)] to develop full force.

HOURMETER



TM SERIES

- 2 in. (51 mm.) Diameter Dial
- Tamperproof and Environmentally Sealed
- Mechanical Counter—No Battery Needed to Maintain Elapsed Time
- Reversed Polarity Protected
- Quartz-Crystal Time Base for Accurate Long-Term Timekeeping
- Powered by 12 to 24 VDC

Description

The TM Series hourmeters record the operating time of vehicles or powered equipment. They are electro-mechanical and have a quartz base time counter that insures accuracy (better than $\pm 0.02\%$ over the entire range). They can record up to 99,999.9 hours (9,999.9 for TM612/624) and include an automatic recycle to zero hours feature. The TM Series models have a shock-proof and tamperproof, totally sealed case made of an engineered plastic. These small, lightweight time meters are rugged and durable. They are the answer to applications requiring a low DC power, reliable hourmeter.

The TM612/624 model includes a 3-hole mounting shock ring for extreme-shock protection.



Basic Models

6-Digits Hourmeters

| Model | Bezel Type |
|--------|----------------------------------|
| TM4592 | Bright Stainless Steel Bezel |
| TM4593 | Black Stainless Steel Bezel |
| TM4594 | SAE Bright Stainless Steel Bezel |
| TM4595 | SAE Stainless Steel Black Bezel |

5-Digits Hourmeter with Shock Ring Mounting
TM612/624 3-Hole Mount, Black Bezel

Applications

These hourmeters can be used on any engine where operating time needs to be recorded. All it requires is a DC power source (refer to Specifications, at right).

Outstanding Features

- Solid-State Electronic Drive Circuit
- Quartz-Crystal for Accurate Timing
- Quiet Operation—Permanently Lubricated
- High-Impact, Tamperproof Plastic Case
- Sealed Against Moisture and Dirt
- Indicates Operating Time in Hours and Tenths
- No Battery Back Up Required
- Made in the U.S.A.

Specifications

Power Input: 12 to 24 VDC

Power Consumption: Less than 0.03 W @ 12 VDC; 0.4 W @ 24 VDC.

Accuracy: $\pm 0.02\%$ over entire range.

Temperature Range: -40°F to 185°F (-40°C to $+85^{\circ}\text{C}$).

Dial (Face Plate): White numerals (over black background).

Time Scale: TM4592-95 models: 6-digits 99,999.9 hours; TM612/624 models: 5-digits 9,999.9 hours. Automatic recycle to zero.

Vibration Resistance: Withstands 10 to 75 Hz @ 1 to 8 G's.

Case Material: Plastic.

Bezel: Stainless Steel.

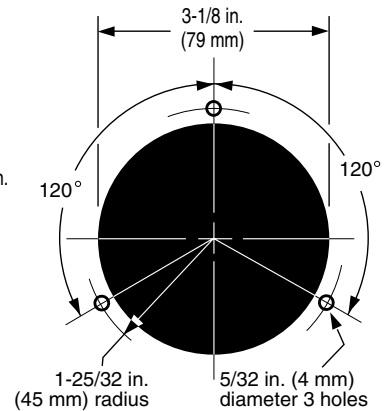
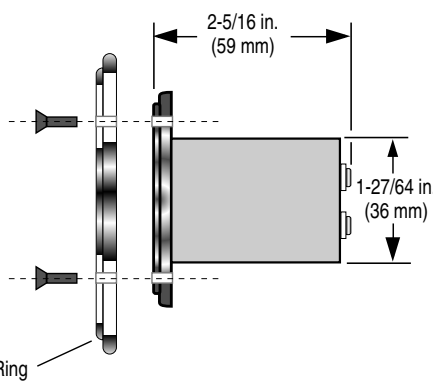
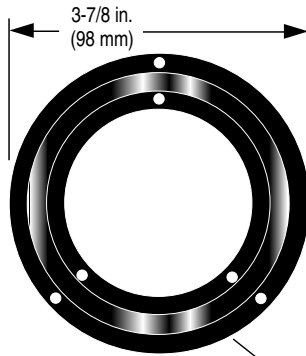
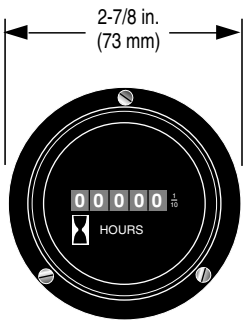
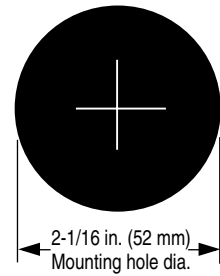
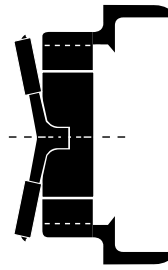
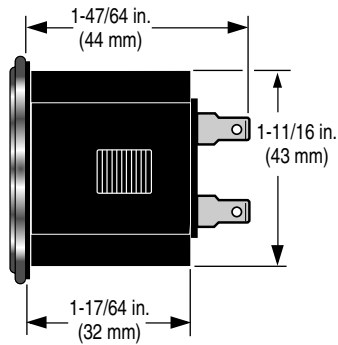
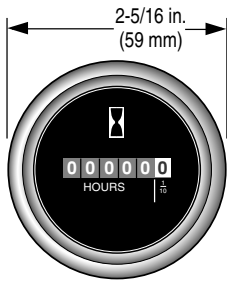
Terminations: 1/4 in. (6 mm.) male blade terminals.

TM4592/4595 Shipping Weight: 5 ozs. (140 g).

Shipping Dimensions: 3-1/8 x 3 x 3 in. (79 x 76 x 76 mm.) approximately.

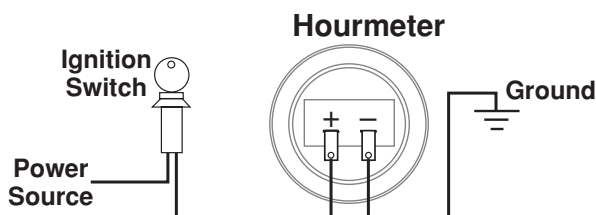
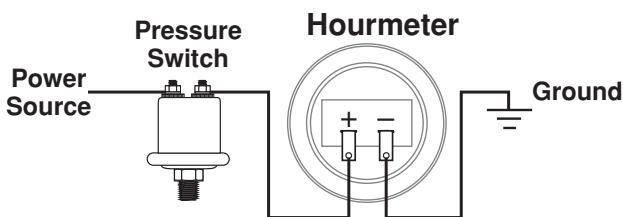
TM612/624 Shipping Weight: 8 ozs. (230 g).

TM612/624 Shipping Shipping Dimensions: 5 x 5 x 3-1/4 in. (127 x 127 x 83 mm.) approx.



5

Typical Wiring Diagrams



How to Order

Example: TM4592

Model Designation

| Model | Description |
|-----------|---|
| TM4592 | 6-digits w/Bright Stainless Steel Bezel |
| TM4593 | 6-digits w/Black Stainless Steel Bezel |
| TM4594 | 6-digits w/SAE Bright Stainless Steel Bezel |
| TM4595 | 6-digits w/SAE Stainless Steel Black Bezel |
| TM612/624 | 5-digits w/Shock Ring Mount Black Bezel |
| 00000355 | Shock Ring only for TM612/624 |

EG SERIES Electric Gage and SWICHGAGE®



Leading Edge SELECTRONIC® Technology In
The Murphy Quality Tradition



5

PRESSURE TEMPERATURE FUEL LEVEL AMPS VOLTS VOLTS
AMPS FUEL LEVEL TEMPERATURE PRESSURE PRESSURE
TEMPERATURE FUEL LEVEL AMPS VOLTS VOLTS AMPS
FUEL LEVEL TEMPERATURE PRESSURE

Leading edge SELECTRONIC® technology

The EG21 Series Electric Gage and the EGS21 Series SWICHGAGE® take the electric gage to new heights with proven state of the art technology and reliability. Utilizing our proven EG Air Core movement design, the EG21 Series offers technological improvements in overall operation, lighting, accuracy in reading, wiring and installation. The EG21 Series give you assurance of highest reliability and service.

These rugged gages are environmentally sealed and exceed the rigid SAE J1810 standard for reliable operation under tough off-road and power unit environments. Corrosion-resistant materials are used throughout, making the EG21 highly desirable for marine and other environmentally sensitive applications. Soft, non-glare dial and pointer illumination is provided by a "cold light" LED and when

powered the white lettering and clear pointer become soft red. Mirror band eliminates parallax reading error when the pointer and its reflection are aligned.

Electric SWICHGAGE®
The EGS21 Series SWICHGAGE® has all of the features of the EG21 Series Gage plus an adjustable set point PowerHall® Effect switch output for operating alarms or equipment shutdown. The trip point is adjustable over 90% of the scale and has a set point indicator visible from the gage face. Now you can have both, the ease of electric gage installation and the reliable switching of Murphy's famous SWICHGAGE®.

Specifications

Power Input: For Gage, SWICHGAGE® and Sender: 12 VDC;
24 or 32 VDC when specified (see below for 32 VDC limitations).

NOTE: EG21 Series gage and EGS21 Series SWICHGAGE® MOVEMENT and ILLUMINATION require 12 VDC to function. For 24 or 32 volt systems, voltage converters are built into the electrical wire/connector assembly and supplied with instrument. Specify voltage when ordering.

Ranges:

| | | | |
|-----------|-----|------------|-------------|
| Pressure: | 80 | (552 kPa) | [5.52 bar] |
| | 100 | (689 kPa) | [6.89 bar] |
| | 200 | (1.38 MPa) | [13.80 bar] |
| | 300 | (2.07 MPa) | [20.70 bar] |
| | 400 | (2.76 MPa) | [27.60 bar] |

| | | |
|--------------|-------|---------|
| Temperature: | 250°F | (121°C) |
| | 300°F | (149°C) |

Fuel Level: Empty — 1/4 — 1/2 — 3/4 — Full

Ammeter: 60 — 0 — 60 amps (internal shunt)*
100 — 0 — 100 amps (internal shunt)*

Voltmeter: 12 VDC: 8 — 18 Volts *
24 VDC: 16 — 36 Volts *

* EGS21AM Ammeter SWICHGAGE®, EG21VM Voltmeter gage and EGS21VM Voltmeter SWICHGAGE® are for 12 VDC and 24 VDC ONLY.

Case: Polyester (PBT), impact and weather resistant; with convenient screw-on mounting clamp.

Bezel: Polished 316 stainless steel bezel is supplied as standard; Available in black. SAE style optional.

Lens: Clear Polycarbonate and UV stabilized.

Air Core Movement: Silicon dampened pointer.

Dial: Black background and white markings; behind dial lighting (white marking becomes red when illuminated); dual scale with mirror band to reduce parallax reading errors.

SWICHGAGE® Sensor: PowerHall® Effect; outputs ground signal (sinking output) rated: 300 mA continuous (EGS21 Series only). Pressure, Fuel, Volts set on decreasing scale. Temperature and Amps set on increasing scale. Output saturation voltage (voltage drop across switch): 1.3-2.3 Volts @ 25°C (May require some conditioning to work with logic inputs)

SWICHGAGE® Set Point Indicator: Visible on mirror band (scale); adjustable from the back of the unit (1/16 in. hex type wrench).

Wiring: Plug connector with wire leads, 18 AWG (1.0 mm²) x 8 in. (203 mm.) length.

Operating Temperature: -40 to 185°F (-40 to +85°C).

Storage Temperature: -77 to 185°F (-60 to 85°C).

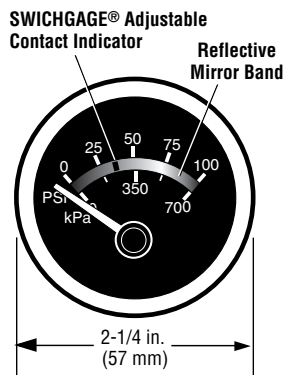
Over Voltage (Gage Movement): Withstands a voltage of 200% of nominal system voltage for 5 minutes. (Meets SAE J1810 standards).

Reversed Polarity (Gage Movement): Withstands reversed battery terminal polarity indefinitely within operating temperatures.

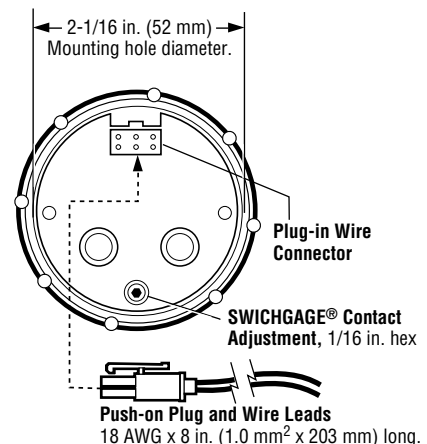
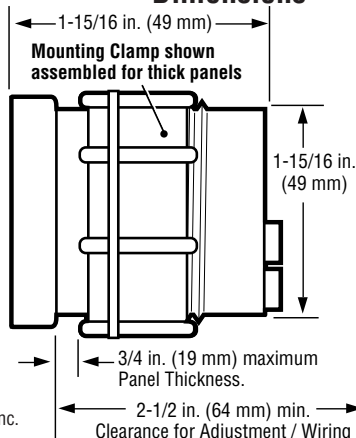
Environment and Test: Meets SAE J1810 standards.

5

Dimensions



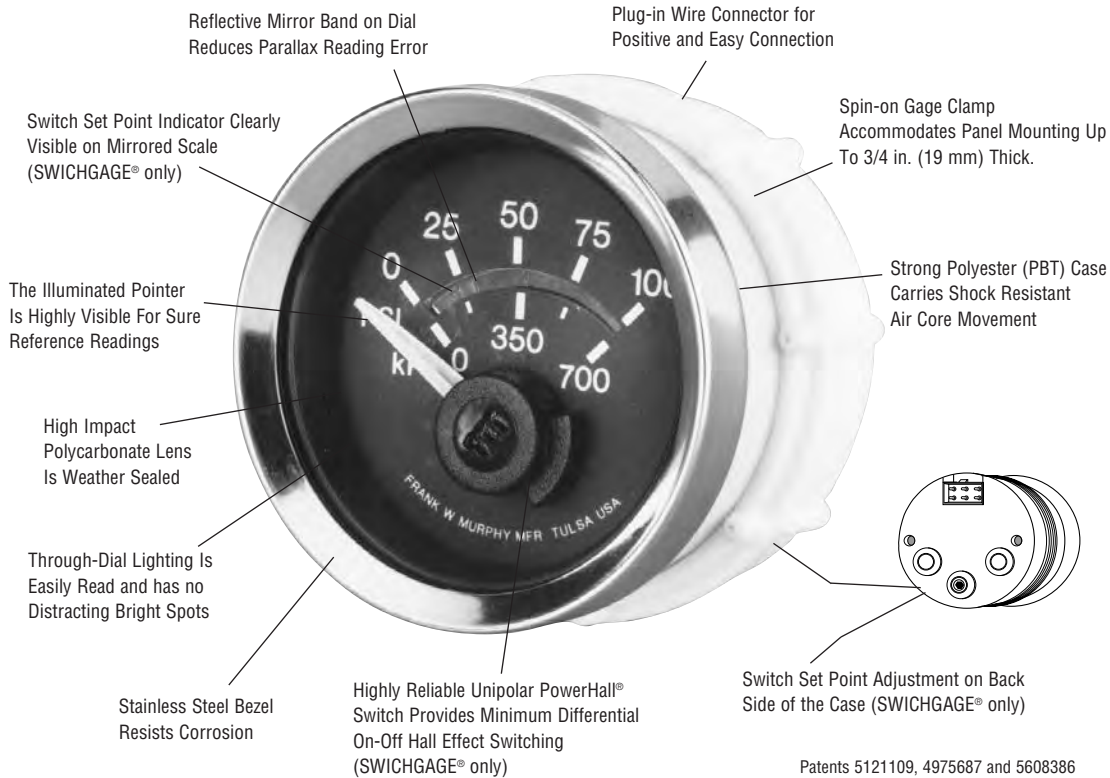
PowerHall® is a registered trademark of Allegro MicroSystems, Inc.



EG SERIES Electric Gage and SWICHGAGE®

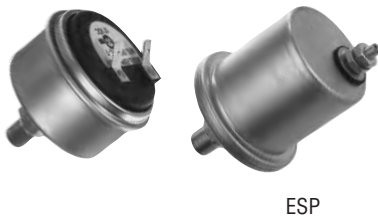
Features

NOTE: The features below apply to both the EG21 Series Gage and EGS21 Series SWICHGAGE® unless indicated.



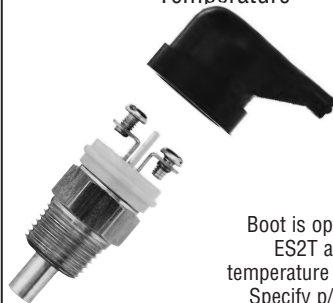
Senders

Pressure



ESP

Temperature

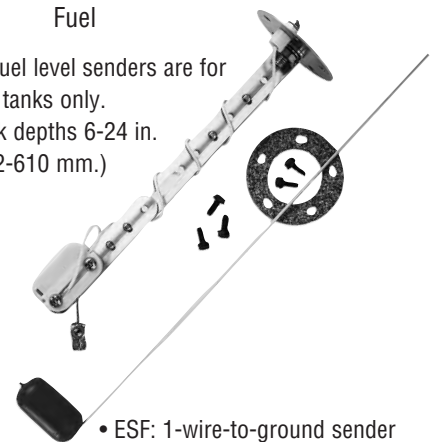


Boot is optional on ES2T and ESDT temperature senders. Specify p/n 00-00-3624

ES2T

Fuel

All fuel level senders are for fuel tanks only. Tank depths 6-24 in. (152-610 mm.)



- ESF: 1-wire-to-ground sender
- ES2F: 2-wire ungrounded sender
- ESDF: 2-wire ungrounded sender, drives 2 gages

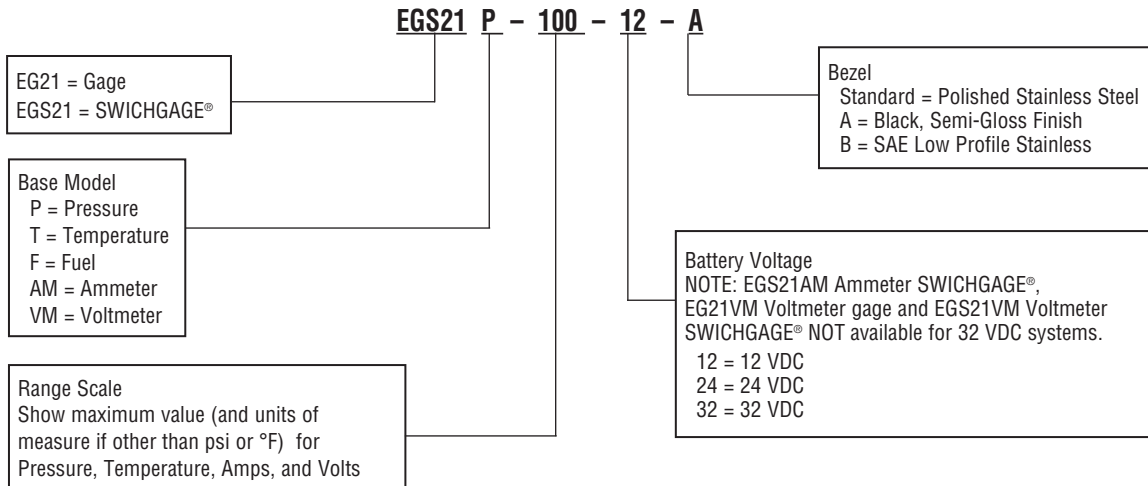


How to order

EG Series Gage and SWICHGAGE®



NOTE: EG21 and EGS21 Series are designed for use with 12 volt systems. For 24 or 32 volt systems, voltage reducing resistors are included in the wire/connector assembly. No designator required for Standard configurations.



5

EG Series Senders

ES 2 T - 250/300 - 1/4

Sender Type
Blank = 1-wire
2 = 2-wire
D = 2-wire, dual

Process to be Measured
P = Pressure †
PM = Pressure ††**
T = Temperature
F = Fuel

† Thru 100 psi (689 kPa) [6.89 bar].
†† Ranges above 100 psi (689 kPa) [6.89 bar].
** Mounting off-equipment recommended.

Range/Scale
Show maximum value (and units of measure if other than psi or °F) for Pressure, Temperature, Amps, and Volts.

Thread Sizes
(temperature senders only)

- X = 5/8-18 UNF†
- 1/8 = 1/8-27 NPT*
- 1/4 = 1/4-18 NPT
- 3/8 = 3/8-18 NPT
- 3/8B = 3/8-19 BSPT
- 1/2 = 1/2-14 NPT*
- 1/2B = 1/2-14 BSPT
- 5/8 = 5/8-18 UNF
- 3/4 = 3/4-14 NPT
- 7/8 = 7/8-9 UNC
- M14 = 14 mm. x 1.5
- M16 = 16 mm. x 1.5
- M18 = 18 mm. x 1.5
- M20 = 20 mm. x 1.5
- M22 = 22 mm. x 1.5
- M24 = 24 mm. x 1.5

*Separate adapter nut not required.

†Straight threads, for use with adapter nut.

Accessories and Replacement Parts

Off-Equipment Mounting Kit

This kit allows off-equipment mounting of the ESPM, ES2PM and ESDPM pressure senders. Recommended for protection from damaging vibration. Customer supplies hose and fittings. Specify part number 30-00-0213 when ordering.

Wire/Connector Assembly

Listed below are replacement part numbers for all wire/connector assemblies. Voltage converter included for 24 and 32 volt. Specify part number when ordering.

| | 12 VDC | 24 VDC | 32 VDC |
|----------------|----------|----------------------|----------------------|
| EG21P / T / F | 05004506 | 05006166 (05004546)* | 05006167 (05004547)* |
| EGS21P / T / F | 05004507 | 05006168 (05004548)* | 05006169 (05004549)* |
| EG21AM | 05004505 | 05006170 (05004550)* | 05006171 (05004551)* |
| EGS21AM | 05004504 | 05006172 (05004552)* | — |
| EG21VM | 05004508 | 05004508 | — |
| EGS21VM | 05004504 | 05004504 | — |

*For gages with date code R1 (January 1996) or earlier (Q12, Q11, etc.) specify part number shown in parenthesis.

Warranty

A two year warranty on materials and workmanship is given with these products. Details are available on request and are packed with each unit.

CAUTION: Certain dangers to human safety and to equipment may occur if some equipment is stopped without pre-warning. It is recommended that monitored functions be limited to alarm-only or to alarm before shutdown.

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.



POWERSVIEW

- For Modern Electronic Engines and Equipment Applications Using SAE J1939 Controller Area Network
- Displays Over 30 Standard SAE J1939 Parameters Broadcast by Engine and Transmission ECU's
- Graphical Display Features Wide Operating Temperature Range Viewing (-40 to 167°F/75°C).
- Displays Active and ECU-Stored Faults with Text Description for Diagnosing Equipment Malfunctions
- Simple Connection to Optional Components

Description

The PowerView is a powerful new display in a line of components manufactured by FWMurphy as part of its J1939 MurphyLink™ Family. The J1939 MurphyLink™ Family of products has been developed to meet the needs for instrumentation and control on electronically controlled engines communicating using the SAE J1939 Controller Area Network (CAN).

The PowerView System is comprised of the PowerView and the MLink™ PowerView Analog Gages. The PowerView is a multifunction tool that enables equipment operators to view many different engine or transmission parameters and service codes. The system provides a window into modern electronic engines and transmissions. The PowerView includes a graphical backlit LCD screen. Back lighting can be controlled via menu or external dimmer potentiometer. The display can show either a single parameter or a quadrant display showing four parameters simultaneously. Diagnostic capabilities include fault codes with text translation for the most common fault conditions.

The PowerView has four buttons using touch sensitive technology, which eliminates the

concern for push button wear and failure. In addition, operators can navigate the display with ease. Enhanced alarm indication uses ultra-bright alarm and shutdown LEDs (amber and red). It has a wide operating temperature range of -40 to 185°F (-40 to +85°C), display viewing -40 to 167°F (-40 to +75°C), and environmental sealing to +/-5 PSI (±34 kPa). In addition the PowerView features Deutsch DT style connectors molded into casing and fits quickly and easily into existing 2-1/16 in. (52 mm.) diameter gage openings with little effort.

Other components in the system are microprocessor-based MLink™ PowerView Analog Gages for displaying critical engine data broadcast by an electronic engine or transmission's Engine Control Unit (ECU): engine RPM, oil pressure, coolant temperature, system voltage, etc. and a combination audible alarm and relay unit for warning and shutdown annunciation. Up to 32 components may be linked to the PowerView using a simple daisy chain wire connection scheme using RS485. The PowerView and all connected components can be powered by either 12 or 24-volt systems.

Display Parameters

The following are some of the engine and

transmission parameters displayed by the PowerView in English or Metric units (when applicable) consult engine or transmission manufacturer for SAE J1939 supported parameters:

- Engine RPM
- Engine Hours
- Machine Hours
- System Voltage
- % Engine Load at the Current RPM
- Coolant Temperature
- Oil Pressure
- Fuel Economy
- Throttle Position
- Engine Manifold Air Temperature
- Current Fuel Consumption
- Transmission Gear Oil Pressure
- Transmission Gear Oil Temperature
- Transmission Gear Position
- Active Service Codes
- Stored Service Codes from the engine
- Set Units for Display (English or Metric)
- View Engine Configuration Parameters



POWerview

Specifications

- Display: 1.3 x 2.6 in. (33 x 66 mm.), 64 x 128 pixels
- Operating Voltage: 8 VDC minimum to 32 VDC max
- Reversed Polarity: Withstands reversed battery terminal polarity indefinitely within operating temperatures
- Operating Temperature: -40 to +85°C (-40 to 185°F)
- Display Viewing Temperature: -40 to +75°C (-40 to 167°F)
- Storage Temperature: -40 to +85°C (-40 to 185°F)
- Environmental Sealing: IP68, +/- 5 PSI (+/- 34.4 kPa)
- Power Supply Operating Current: (@ 14 VDC) = 52 mA minimum; 268 mA maximum (LCD heater on)
- CAN BUS: SAE J1939 Compliant
- Case: Polycarbonate / Polyester
- Clamp: Polyester (PBT)
- Connectors: 6-Pin Deutsch DT06 Series
- Maximum Panel Thickness: 3/8 in. (9.6 mm.)
- Mounting Hole: 2.062 inch (52 mm.) in diameter
- Auxiliary Communications (Gage):
 - One (1) RS485 port, MODBUS RTU master, 38.4K baud, N, 8, 1 or 2, half duplex
- Potentiometer Input: 1K ohm, 1/4 W
- Shipping Weights (all models): 1 lb. (450 g)
- Shipping Dimensions (all models): 6 x 6 x 6 in. (152 x 152 x 152 mm.)

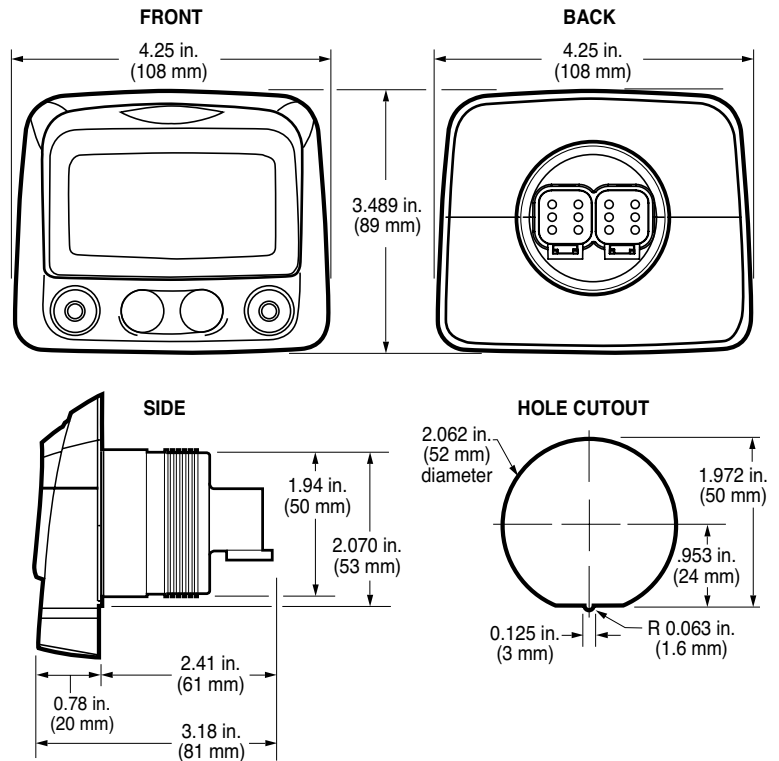
Warranty

A two-year warranty on materials and workmanship is given with this FWMurphy product. A copy of the warranty may be viewed or printed by going to www.fwmurphy.com/warranty.asp.

Accessories

- PowerView Analog Gages
 - PowerView Wiring Harnesses
- For details see bulletin PVC-03020B

Dimensions



How to Order

To order the PowerView use the model number designation diagram below.

PV100 - A

Model
PV100 = PowerView

Model Style
A = Black Overmold Faceplate with Silver Bezel

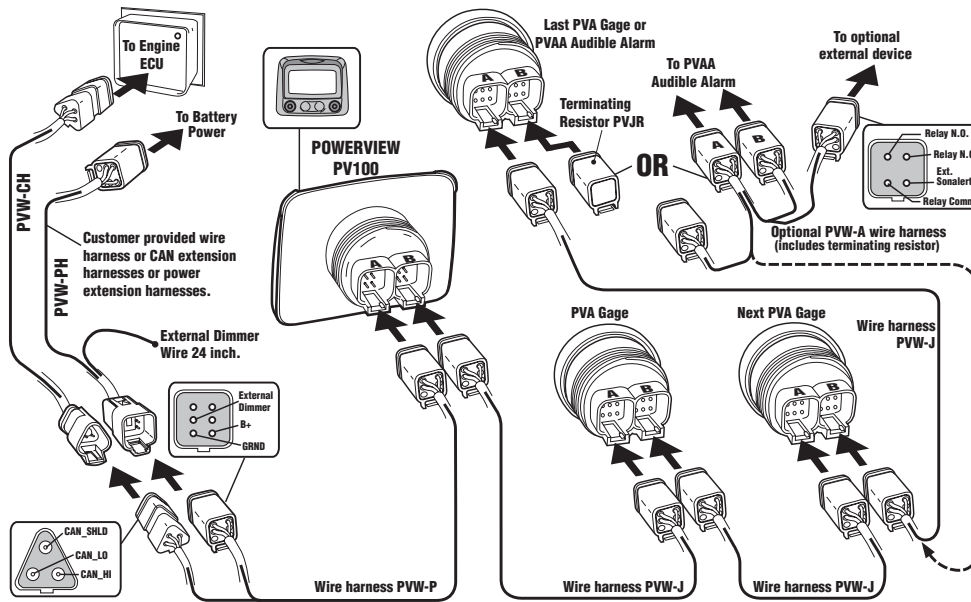
† MurphyLink™ is a registered trademark of FWMurphy. All other trademarks and service marks used in this document are the property of their respective owners.

Wiring Harness Accessories for PV100 PowerView Module and PVA Analog Gages



Use the Easy Connect Diagram (shown below) to help you locate the wiring harness you need. The charts (below the diagram) include the harness

accessories' part number, a brief description of the item and a designation schematic to help you with selection of wiring leads length (if applicable).



| Model | Wiring Harness Rendering | Wiring Harness Designation Schematic | Part Number |
|--|-----------------------------------|--|----------------------------------|
| PVW-P-12 CAN and Power Harness for PowerView Module | Length: 12 in. (305 mm.) | PVW-P-12 CAN and Power Harness (includes 120Ω CAN resistor) | 78000124 |
| PVW-J PowerView Jumper Harness | | PVW-J-9 Audible Alarm Jumper Harness Length: - 9 : 9 in. (229 mm.) - 12 : 12 in. (305 mm.) - 24 : 24 in. (607 mm.) | 78000121 78000122 78000123 |
| PVW-A-12 PowerView Audible Alarm Jumper Harness: Provides alarm relay contacts for external devices. | 3 Relay Contacts PVAA Gage | PVW-A-9 Jumper Harness Includes terminating Length: - 9 : 9 in. (229 mm.) - 12 : 12 in. (305 mm.) - 24 : 24 in. (607 mm.) | 78000153 78000154 78000155 |
| PVJR Terminating Resistor | | PVJR Use on last PVA Gage — not needed for PV100 | 78000128 |



Wiring Harness Accessories for PV100 PowerView Module and PVA Analog Gages

| Model | Wiring Harness Rendering | Wiring Harness Designation Schematic | Part Number |
|---|---|---|--|
| PVW-CH PowerView CAN Extension Harness | | PVW-CH-72 PowerView CAN Extension Harness Length: - 72 : 72 in. (1.82 m) - 144 : 144 in. (3.65 m) - 240 : 240 in. (6.10 m) - 360 : 360 in. (9.10 m) | 78000157 78000158 78000159 78000160 |
| PVW-PH PowerView Battery Power Extension Harness | | PVW-PH-72 PowerView Battery Power Extension Harness Length: - 72 : 72 in. (1.82 m) - 144 : 144 in. (3.65 m) - 240 : 240 in. (6.10 m) - 360 : 360 in. (9.10 m) | 78000149 78000150 78000151 78000152 |
| PVW-K PowerView Wiring Kit Includes: (1) PVW-P (4) PVW-J (1) PVJR | (1) PVW-P (4) PVW-J (1) PVJR | PVW-K-12 Length: - 12 : 12 in. (305 mm.) - 24 : 24 in. (607 mm.) | 78000188 78000189 |
| PVW-PW-30 | PowerView CAN Loose Wiring Length: 30 in. (762 mm.) | Wiring Harness Designation PVW-PW-30 | Part Number 78000125 |
| PVW-CC-24 | PowerView CAN Loose Wiring Length: 24 in. (607 mm.) | Wiring Harness Designation PVW-CC-24 | Part Number 78000127 |
| PVW-PC-24 | PowerView Power Loose Wiring Length: 24 in. (607 mm.) | Wiring Harness Designation PVW-PC-24 | Part Number 78000126 |
| PVW-CT | CAN BUS Tee Wiring Harness | Wiring Harness Designation PVW-CT | Part Number 00009510 |

5

REMOTE ALARM ANNUNCIATORS SELECTRONIC® TATTLETALE®



ST SERIES

- Provide Audible and Visual Alarm
- Simple and Inexpensive
- Wide Range of Applications
- Gen-Set Models Meet NFPA-99 and NFPA-110 Requirements

DESCRIPTION

The ST Series SELECTRONIC® TATTLETALE® annunciators are a simple and inexpensive answer to your remote alarm annunciator needs. Basic models ST5AS and ST10AS are general purpose alarms suitable for a variety of applications. Model ST8 gives first out annunciation of fault. Model STA16 is designed for generator set applications and can be configured to meet NFPA requirements for standby generators.

These compact TATTLETALE® annunciators tell you by a flashing LED which variable malfunctioned. Many feature a pulsating MINI-SIREN® to audibly alert you to the malfunction. The audible alarm is silenced by depressing the Alarm Silence push button, but the visual signal remains in operation until the fault is corrected and the contacts are cleared.

A test push button allows you to test all alarm LEDs. Because LEDs are solid state, cold light, electronic devices,

they don't burn out as incandescent light bulbs do.

Basic models accept 8-32 VAC or 8-40 VDC input voltage. Others are available for either 12 VDC or 24 VDC input. Preprinted peel and stick nameplates for common faults are supplied with each unit. Most of the SELECTRONIC® TATTLETALE® annunciators accept either normally open (N.O.) or normally closed (N.C.) contacts. You can mix N.O. and N.C. contacts on the same unit.

Two mounting styles are offered;

A recessed panel mounting flange and a free-standing gimbal mounting. (Model STA16 is available only in flange mount).

All models except STA16 have a time delay available to lockout the audible alarm on startup.

These unique alarm panels have wide ranging applications and can be grouped in many configurations. Ask any Murphy sales/engineer for assistance.

BASIC OPERATION

When an alarm sensor trips, the LED flashes and, if equipped, the MINI-SIREN® sounds. At the same time an output circuits activated which allows you to connect an external relay to operate a general alarm, operate a shutdown device, etc.

APPLICATIONS

- Marine
- Generator Sets
- Oil Field
- Agriculture
- Construction

Murphy Basic ST-SERIES SELECTRONIC® TATTLETALE® annunciators are used wherever a remote alarm and annunciation is required. Typical applications are in marine pilot houses to alert the crew of problems developing in engine, gear, bilge, auxiliary power plants, etc. Repeater panels can be added for additional locations such as flybridge, on deck, galley or engineer's quarters. Each repeater panel can be acknowledged individually or alternate wiring allows for one master control to silence all repeater panels.

Other applications include power plant control rooms or building maintenance, for remote drilling rigs, construction sites, agricultural and construction equipment.

When a fault occurs, the contact operation causes the appropriate LED to flash and the audible MINI-SIREN® to pulse. At the same time an output signal is generated which allows an external relay to be wired to operate a general alarm such as a bell or horn. Depressing the Alarm Silent button silences the local audible alarm and disconnects the output for the remote alarm. The flashing LED remains in operation until the fault is corrected and the contacts reset. Alarm Silence/Test button allows you to test all LEDs.

Preprinted peel and stick nameplates for common faults are supplied with each unit.

5



5-Points

- ST5ASF (flange mount) and ST5ASG (gimbal mount)
- Provides 5 alarm points and output for remote alarm relay.
- Accepts N.O. and/or N.C. contacts.
- Use individually or gang for multiple applications.
- Input voltage 8-32 VAC or 8-40 VDC.



10-Points

- ST10ASF (flange mount) and ST10ASG (gimbal mount)
- Provides 10 alarm points and output for remote alarm relay.
- Accepts N.O. and/or N.C. contacts.
- Use individually or gang for multiple applications.
- Input voltage 8-32 VAC or 8-40 VDC.



Dual 5-Points

- ST5DASF (flange mount) and ST5DASG (gimbal mount)
- Provides two separate sets of 5 alarm points in one package. Each set of 5 points is powered separately from the other, but they share the same negative of the power source.
- Primary application is on twin engine boats. Since each set of alarm points is powered separately, if only one engine is running there is no alarm on the engine not running.
- Accepts N.O. and/or N.C. contacts.
- Input voltage 8-32 VAC or 8-40 VDC.

REMOTE ALARM ANNUNCIATORS SELECTRONIC® TATTLETALE®

SPECIFICATIONS

MODELS

| | ST5AS | ST10AS | ST5DAS | ST8 | STA16 |
|--|-------|--------|--------|-----|-------|
| Number of Alarm Points | | | | | |
| • 5 Visual | • | | | | |
| • 10 Visual | | • | • | | |
| • 8 First Out Visual | | | | • | |
| • 16 Visual | | | | | • |
| Audible Alarm | | | | | |
| • 1 local; common to all inputs | • | • | • | | • |
| • 1 local; common to all inputs except battery charger malfunction and generator operating | • | • | • | | • |
| Alarm Silence: Silences audible only | • | • | • | | • |
| Test Push Button: Tests all LED's | • | • | • | | • |
| Alarm Output: Customer supplied relay same voltage as input; coil not to exceed 500 mA. | • | • | • | | • |
| Input Voltage | | | | | |
| • 8-32 VAC / 8-40VDC | • | • | • | • | |
| • 12 or 24 VDC (specify) | | | | | • |
| Startup Time Delay: Customer selectable: 25-35 seconds | • | • | • | • | |
| Sensor Input | | | | | |
| • Accepts N.O. positive or negative | | | | | • |
| • Accepts N.O. and/or N.C. | • | • | • | • | |
| Mounting Options | | | | | |
| • Less Mounting kit | • | • | • | • | |
| • Flange Mounting kit | • | • | • | • | |
| • Gimbal Mounting kit | • | • | • | • | |
| First Out Shutdown: Amber-No; Red-Yes | | | | • | |
| Shutdown Relay Output: SPDT dry contacts; 2 A @ 28 VDC | | | | • | |
| Alarm Reset: Repair fault; contacts open | | | | | |
| Shutdown Reset: Repair fault; contacts open; push reset button; remove power | | | | • | |
| Battery Charger Malfunction: Built-in sensing; visual alarm only | | | | | • |
| Shipping Weights | | | | | |
| • 1.25 lbs (567 g) | • | | | | |
| • 1.50 lbs (680 g) | | • | • | • | |
| • 2 lbs (907 g) | | | | | • |
| Shipping Dimensions | | | | | |
| • 6-1/4 x 6-1/4 x 6-1/4 in. (159 x 159 x 159 mm.) | • | • | • | • | |
| • 12 x 7-1/2 x 5-1/2 in. (305 x 191 x 140 mm.) | | | | | • |

ACCESSORIES AND OPTIONS

TDST3-5 AND TDST8-10

TDST3-5 and TD8-10 single point time delays inhibit sensor input to ST Series annunciators for 3-5 or 8-10 seconds. Compensates for momentary contact operation due to vessel movement, etc.

GIMBAL and FLANGE Mounting Kits

These kits are available for change-over mounting and as service parts. They fit all "LM" (less mounting) configurations.

25700007 Gimbal mount kit fits ST5ASLM. **25020138**

25700008 Flange mount kit fits ST5ASLM. **25020139**

25700034 Gimbal mount kit fits ST10ASLM, ST5DASLM and ST8LM. **25020141**

257000371 Flange mount fits ST10ASLM, ST5DASLM and ST8LM. **25020142**

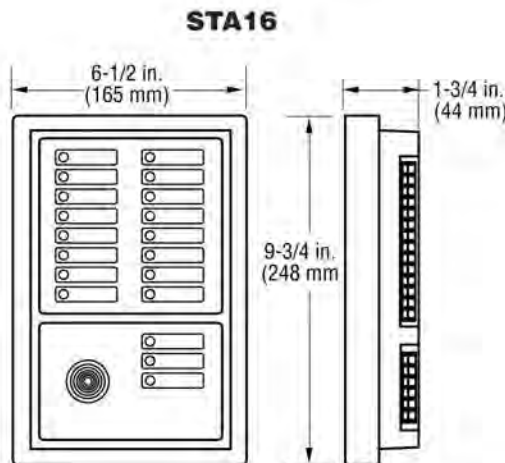
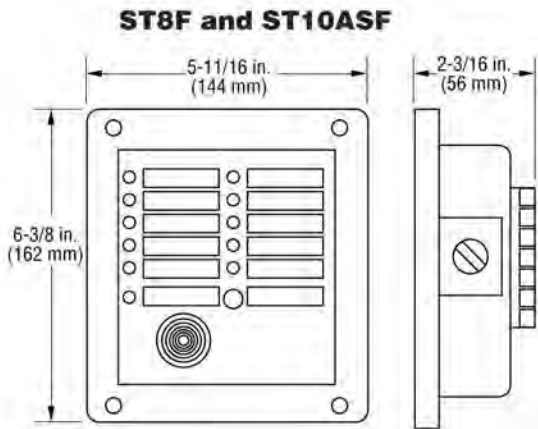
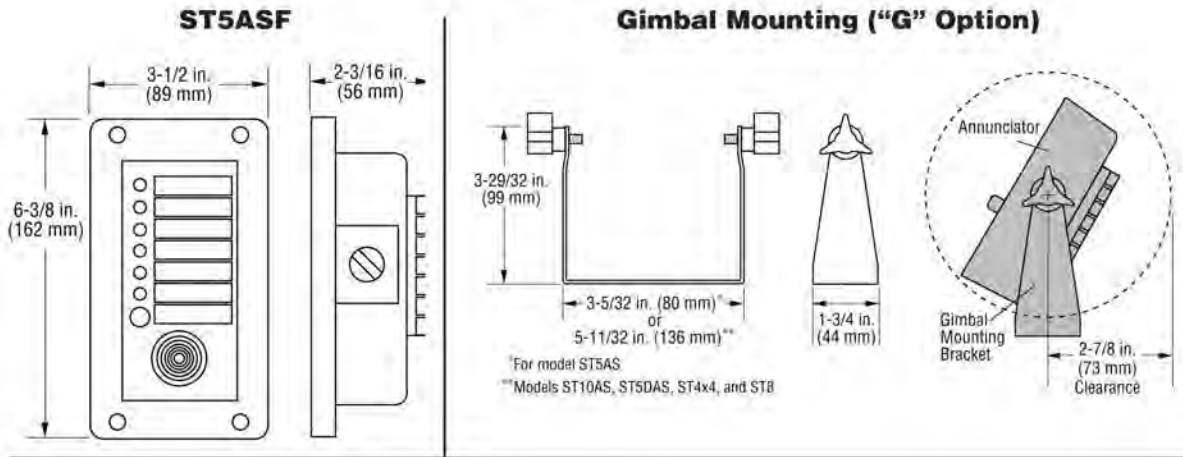
FLANGE Mount



GIMBAL Mount

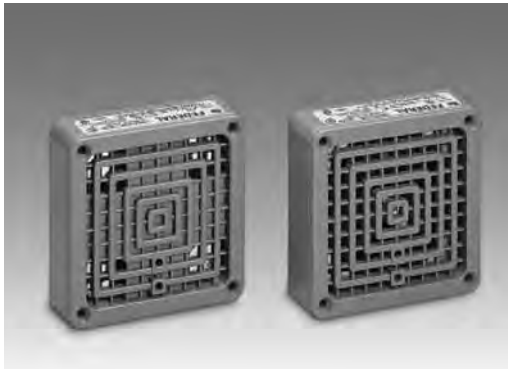


REMOTE ALARM ANNUNCIATORS SELECTRONIC® TATTLETALE®



VIBRATONE® HORNS

MODEL 350 & 450



- Range of up to 200 feet (61m)
- Coded or sustained tones
- Model 350 – 12, 24, 120 and 240VAC;
Model 450 – 12, 24, 125 and 250VDC
- Model 350 produces 100dB at 10' (110dB at 1 m); Model 450 produces 99dB at 10' (109dB at 1 m)
- UL and cUL Listed, CSA Certified, FM Approved
- Type 4X when installed with Panel Mount Gasket Kit or Weatherproof Backbox (Model WB); Type 4X and Type 12 when installed with Surface Mount Trim Ring (ModelTR)

The Models 350 and 450 Vibratone Horns produce a very loud horn tone by the electro-mechanical vibration of a diaphragm. Capable of reproducing coded blasts or sustained tones, Federal Signal's Vibratone horn is excellent for general alarm, start and dismissal, coded paging, and process control signaling in areas of high ambient noise levels.

The Vibratone Model 350 is available in AC voltages; 12VAC, 24VAC, 120VAC and 240VAC. The Model 350 produces 100dB @10', except the 12VAC model, which produces 94dB @ 10'. The Model 450 is available in DC voltages; 12VDC, 24VDC, 125VDC and 250VDC. The Model 450 produces 99dB @ 10'.

Vibratone mounting options provide for surface, flush or semi-flush mounting on walls, panels, in cabinets, on 4-inch square outlet boxes, or in concrete and deep wall constructions.

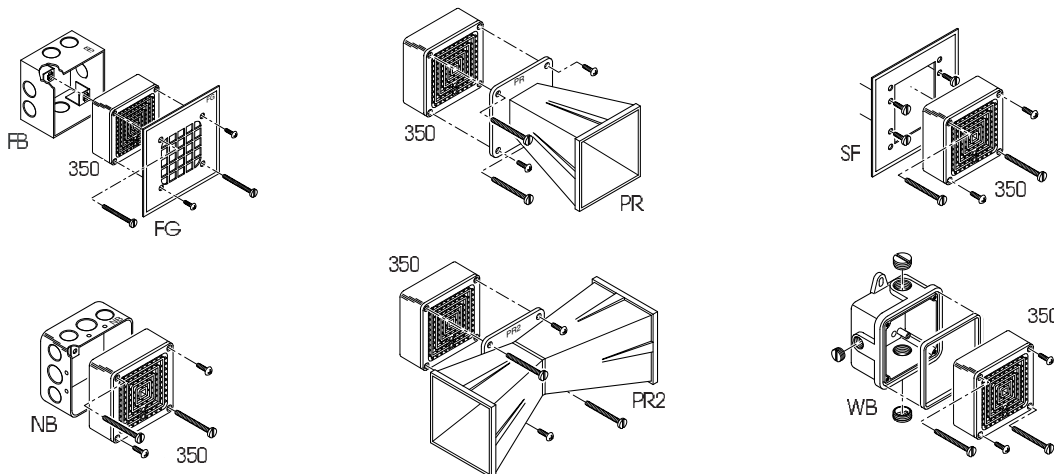
Installed on the front of a Vibratone Horn, the optional Model PR Projector or Model PR2 Double Projector direct sound output straight ahead or to the sides, optimizing sound output for long, narrow rooms or corridors.

Vibratone horns are UL Listed, cUL Listed, CSA Certified and FM Approved. They are designed and approved for use in Type 4X applications when installed with the Panel Mount Gasket Kit or Weatherproof Backbox (Model WB). They are approved for Type 4X and Type 12 applications when installed with the Surface Mount Trim Ring.

| Model | Voltage | Operating Current | Decibels @ 10' | @ 1m |
|-------|----------------|-------------------|----------------|------|
| 350 | 12VAC 50/60Hz | 0.90 amps | 94 | 104 |
| 350 | 24VAC 50/60Hz | 0.90 amps | 100 | 110 |
| 350 | 120VAC 50/60Hz | 0.18 amps | 100 | 110 |
| 350 | 240VAC 50/60Hz | 0.09 amps | 100 | 110 |
| 450 | 12VDC | 0.50 amps | 99 | 109 |
| 450 | 24VDC | 0.25 amps | 99 | 109 |
| 450 | 125VDC | 0.05 amps | 99 | 109 |
| 450 | 250VDC | 0.03 amps | 99 | 109 |

Each Vibratone horn is enclosed in a zinc diecast housing and sealed with grey powder-coat paint. The Model 350 features a stainless steel diaphragm. The Model 450 utilizes an aluminum alloy diaphragm and heavy duty contacts. The rugged construction of the Vibratone horns resists vandalism and the effects of harsh industrial environments.

Compact size, loud output and heavy-duty construction make the VibraTone horns ideal for industrial and institutional signaling applications.



VIBRATONE® BELL ASSEMBLIES MODELS 504WB AND 506WB



- Four-inch or six-inch gong
- Available in 120VAC or 240VAC
- Four-inch gong produces 98dB @ 10' (107dB @ 1m)
- Six-inch gong produces 100dB @ 10' (109dB @ 1m)
- UL and cUL Listed, CSA Certified, FM Approved
- Type 3R enclosure

Federal Signal's Vibratone® Bells Models 504WB and 506WB are completely assembled and include the gong, vibrating AC mechanism, and the gasketed back box. These assemblies feature heavy-duty, industrial grade housings and powdercoat paint treatments for added durability and performance.

These bells are offered in 120VAC or 240VAC versions.

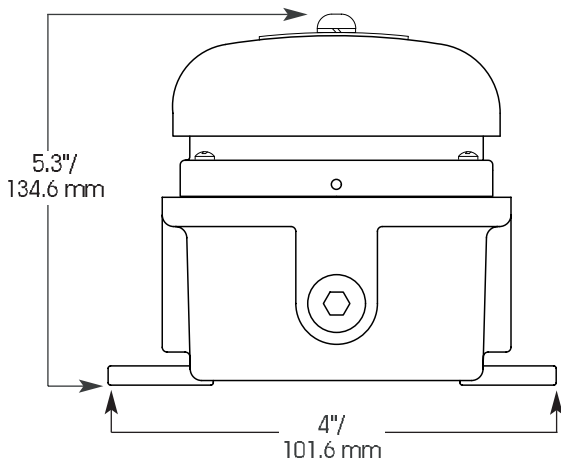
The four inch, heavy duty gong, produces 98dB @ 10' (107dB @1m). The six inch heavy duty gong produces 100dB @ 10'(109dB @ 1m). Vibratone gongs are tempered to give them superior output and long lasting durability.

The Models 504WB and 506WB both contain internal terminal blocks which simplifies installation. This method also allows for an uninterrupted, single run of wiring.

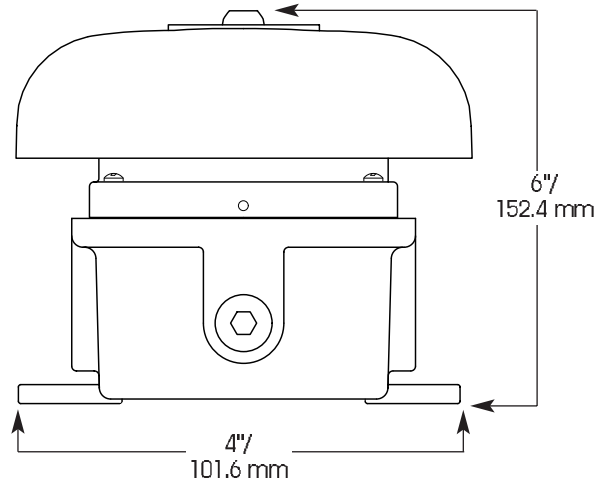
These bells are UL and cUL Listed, CSA Certified and FMAApproved. The entire assembly is rated for Type 3R.

| Model | Voltage | Operating Current | Decibels @ 10' | Decibels @ 1m |
|-------|---------------|-------------------|----------------|---------------|
| 504WB | 120VAC | 0.08 amps | 98 | 107 |
| 504WB | 24VAC 50/60Hz | 0.90 amps | 100 | 110 |
| 504WB | 240VAC | 0.04 amps | 98 | 107 |
| 506WB | 120VAC | 0.08 amps | 100 | 109 |
| 506WB | 240VAC | 0.04 amps | 100 | 109 |

504WB



506WB



ELECTRAFLASH STROBE WARNING LIGHT MODEL 141ST



- Available in 12VDC, 24VDC, 120VAC and 240VAC
- Four dome colors
- 4,000 hour strobe tube
- Surface mount or integrated 1/2-inch pipe mount
- UL Listed and CSA Pending for indoor/outdoor use
- Type 3R enclosure

Federal Signal's Electraflash® 141ST is an economical strobe light designed for a variety of industrial uses. This compact warning light is less than six inches tall and six inches in diameter. Models are available in four fresnel dome colors, including amber, blue, green and red. All models are UL Listed for indoor/outdoor use and the 120VAC models are CSA Certified.

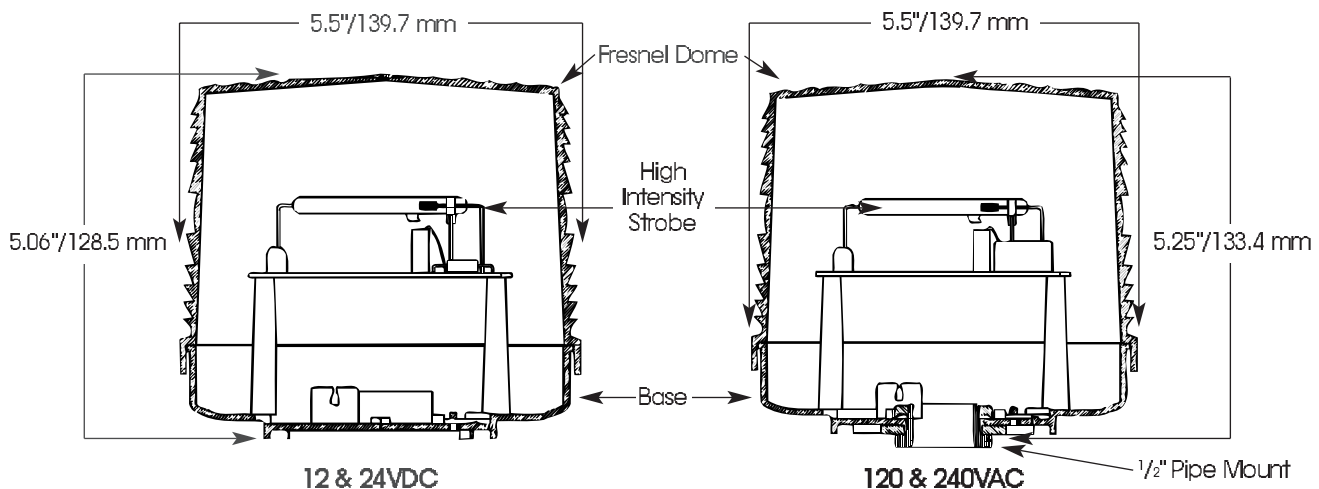
The Model 141ST is available in 12VDC, 24VDC, 120VAC and 240VAC and includes a removable strobe mechanism. The 12VDC and 24VDC units have three holes for flat surface mounting. The 120VAC and 240VAC versions come ready to mount on a 1/2-inch pipe. Optional wall mounting brackets (Model LWMB2) or corner mounting brackets (Model LCMB2) are available for the 120VAC and 240VAC units.

Federal Signal's Electraflash strobe lights are designed for both indoor and outdoor industrial environments. The unit's convenient size and intense light output make it ideal for use on maintenance vehicles, fork lifts, and other material handling equipment. The economical Model 141ST effectively alerts of hazardous conditions or dangerous areas.

Federal Signal's Electraflash strobe warning light is an affordable visual signal which is ideally suited for light duty applications.

| Model | Voltage | Operating Current | Flash Rate/Minute | Peak ¹ Candlepower | Mount |
|-------|----------------|-------------------|-------------------|-------------------------------|-----------|
| 141ST | 12VDC | 0.18 amps | 80 | 100,000 | Surface |
| 141ST | 24VDC | 0.08 amps | 80 | 100,000 | Surface |
| 141ST | 120VAC 50/60HZ | 0.06 amps | 80 | 100,000 | 1/2" Pipe |
| 141ST | 240VAC 50/60HZ | 0.03 amps | 80 | 100,000 | 1/2" Pipe |

¹Peak candlepower is the maximum light intensity generated by a flashing light during its light pulse



STARFIRE® STROBE WARNING LIGHT

MODEL 131ST AND 131DST



- Available in 12-24VDC, 120VAC and 240VAC
- Five dome colors
- 10,000 hour strobe tube
- Single or double flash strobe
- 1/2-inch pipe mount or optional magnetic mount
- UL and cUL Listed, CSA Certified for indoor/outdoor use
- Type 3R, IP45 enclosure

Federal Signal's Starfire® strobe warning lights are available in single-flash (131ST) and double-flash (131DST) models. Through precise timing of the strobe flash, the double flash unit produces 1,200 effective candlepower; the single flash unit produces 1,000 effective candlepower.

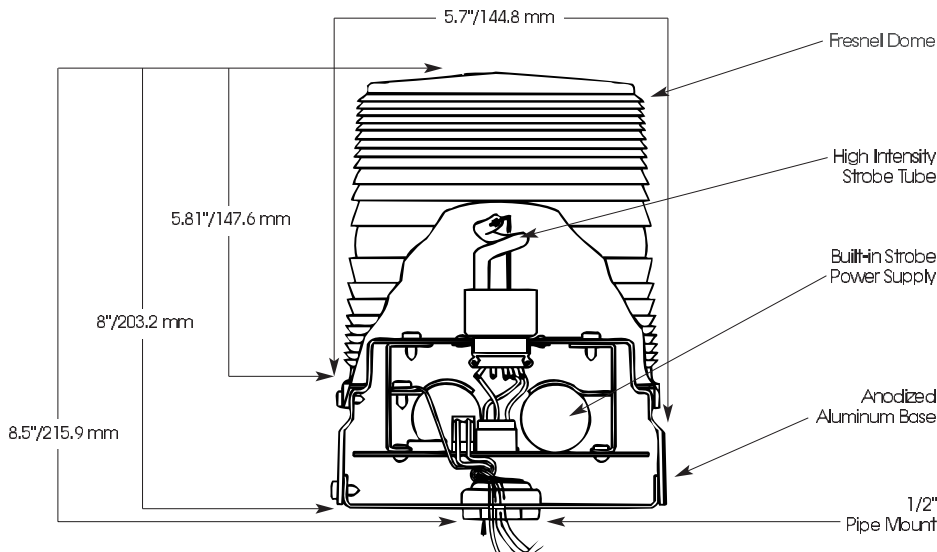
Starfire models are available in 12-24VDC, 120VAC (50/60Hz) and 240VAC (50/60Hz). All units are less than nine inches high and six inches in diameter, but powerfully effective.

Starfire strobe warning lights contain their own strobe power supply in the base of the light. The strobe flash tube is mounted in an eight-pin octal socket base. The fresnel dome stands up to impact and abuse and is available in amber, blue, clear, green and red. The base of the light is made of corrosion-resistant anodized aluminum. Each Starfire model comes with a standard 1/2-inch pipe mount. An optional magnetic mount or surface mount can be ordered.

Because of its convenient size and intense light output, the Starfire strobes can be used for multiple applications. Excellent for in-plant use, the Models 131ST/DST warn of hazardous conditions, mark dangerous areas (either permanently or temporarily) and mounts on lift trucks, cranes and other moving devices. By using the magnetic mounting kit, these powerful strobes can be used on emergency, utility, maintenance or any other vehicle requiring temporary emergency warning.

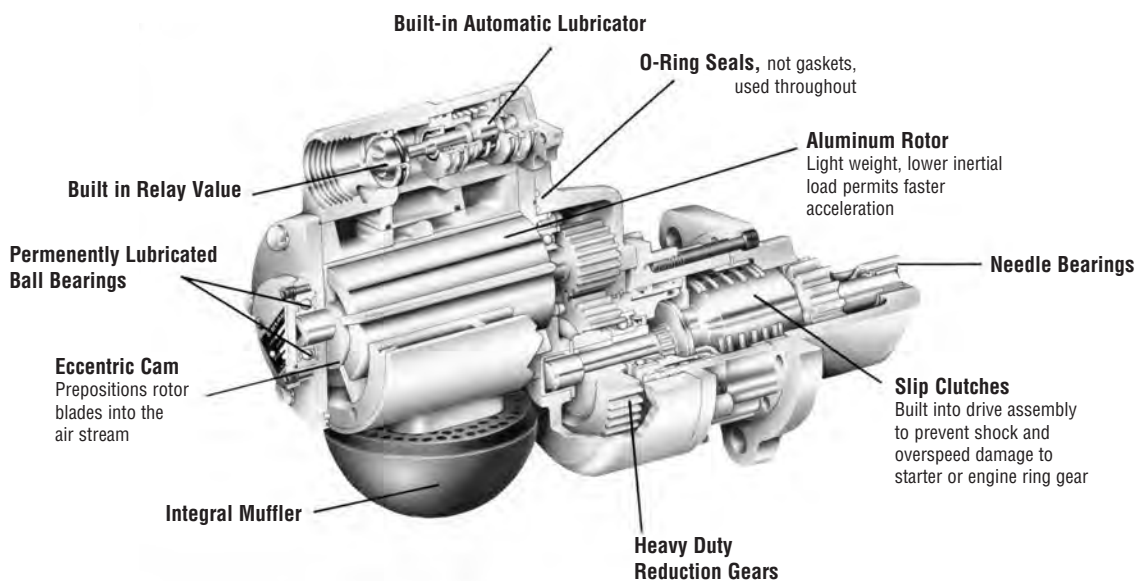
| Model | Voltage | Operating Current | Flash Rate/Minute | Candlepower Peak ¹ | ECP ² | Mount ⁴ |
|--------|----------------|-------------------|-------------------|-------------------------------|------------------|--------------------|
| 131DST | 12-24VDC | 3.0-1.9 amps | 80 ³ | 1,000,000 | 1,200 | 1/2" Pipe |
| 131DST | 120VAC | 0.60 amps | 80 ³ | 1,000,000 | 1,200 | 1/2" Pipe |
| 131DST | 240VAC | 0.30 amps | 80 ³ | 1,000,000 | 1,200 | 1/2" Pipe |
| 131ST | 12-24VDC | 2.75-1.25 amps | 80 | 2,000,000 | 1,000 | 1/2" Pipe |
| 131ST | 120VAC 50/60Hz | 0.60 amps | 80 | 2,000,000 | 1,000 | 1/2" Pipe |
| 131ST | 240VAC 50/60Hz | 0.30 amps | 80 | 2,000,000 | 1,000 | 1/2" Pipe |

¹Peak candlepower is the maximum light intensity generated by a flashing light during its light pulse
²ECP (Effective Candlepower) is the intensity that would appear to an observer if the light were burning steadily
³Double Flash⁴
Magnet and surface mount kits available



AIR STARTING SYSTEMS

MODEL SM-250



Why air beats electricity for starting every time.

Air starters were created to tackle the special starting requirements of diesel engines. In applications ranging from highway trucks to gas compressor sets, air offers major advantages over electric starters.

Twice the cranking power. Air starters generate more than double the torque and horsepower of electric starters, and air units get engines up to cranking RPM in about 60 percent of the elapsed time.

Superior performance in cold weather. At 0°F, engines need more than twice the power to get to ignition speed than they do at 80°F. At the same time, batteries lose about 60 percent of their cranking power. No such problem with air starters – their performance is virtually unaffected by subzero temperatures.

Better “hot start” capacity. Engines that

are heat-soaked from high ambient temperatures or from shut-down without idling will often expand internally to the point that getting them to turn that first revolution can be a real chore for electric starters. But the superior power of air starters will bring even the balkiest engines to ignition speed almost instantaneously.

Spark-free operation. In applications such as oil and gas drilling, underground mining, petroleum trucking, etc., electric starters can present an explosive hazard. Air starters, using compressed air as the power source, minimize the risk of explosion. In fact, there are specially-sealed models available that use natural gas to power the starter.

Fewer batteries, less maintenance. Because air starters are completely independent of the electrical system, many pieces of equipment can operate on a single battery. Users report drastic savings in electrical maintenance costs and in downtime. The simple concept and design of air starters make any trouble-shooting a breeze. Longer starter life. Since air starters are

not subject to prolonged cranking and burn-out, they will last at least twice as long as electric units. Reports of air starters lasting 10 years and more are not unusual. Rebuilding, when necessary, is a quick and simple field process.

Exclusive “Positive Blade Displacement”

Conventional air starters rely on differential air pressure to move the rotor blades out into the air stream. Any dirt or frost on the blades can cause them to stick in the rotor, preventing the starter from turning. Every StartMaster starter features a patented eccentric cam built into both motor end plates that forces the rotor blades into their proper position to ensure reliable starting.

AIR STARTING SYSTEMS

MODELS TO START VIRTUALLY ANY ENGINE MADE!!!

REBUILT / EXCHANGE / NEW STARTER REPAIR KITS AND MAJOR COMPONENTS



SM-250 Series

- For engines up to 1800 cubic inches.
- Pre-engaged operation.
- Integral lubricator, relay valve and muffler.

The StartMaster SM-250 air starters are widely used in trucks, buses and other heavy vehicles and equipment. All models are "pre-engaged": when the starter is activated, a small air servo signal engages the starter pin with the engine ring gear before the full thrust of air enters the starter motor. The unique design of the SM-250 series features a choice of built-in lubricator, relay valve and/or muffler. This reduces the hose and fittings required by nearly 50 percent, saving installation time and cost, and decreasing the potential for leaks in the air system. Complete application kits, including air tank, brackets, hose, fittings and required accessories, are available for truck and bus installation.



SM-500 Series

- For engines up to 10,000 cubic inches.
- Inertia drive.
- Unique twin rotor design.

Designed for the large diesel engines used in application such as marine vessels, ore haulers and locomotives, the SM-500 starters deliver cranking power well in excess of 60 hp. And 200 foot pounds of torque. The twin air motor design offers high efficiency, compact size and reduced weight.

Replacement Parts Available:

| |
|--------------|
| Housing |
| Cylinder |
| End Plate |
| Rotor |
| Rotor Pinion |
| Shaft |
| Vane Set |

GRIDCOOLERS

A brief history of keel cooling

Keel cooling first appeared in the early 1800's when someone hung a copper tube over the edge of a boat to condense steam. It later evolved into pieces of channel welded onto the hull. These channel-cooling systems offered important advantages over raw water-cooling. They eliminated silt and sand buildup in engine jackets and protected engines against salt-water corrosion. Unfortunately, their sheer bulk reduced a ship's capacity and increased its drag. They were also prone to seaweed foulup. Clearly, a more compact and streamlines cooler was needed. This led to packaged keel coolers, and the FERNSTRUM success story.

Some Cool Facts About Fernstrum Gridcoolers

The GRIDCOOLER is a heat exchanger of the outboard or hull type, often referred to as a keel cooler.

The GRIDCOOLER eliminates sand and silt deposits in engine jackets, and protects your engine from corrosion and deposits in salt-water operation.

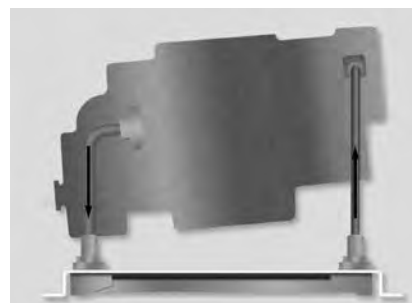
The GRIDCOOLER'S unique design eliminates the objections associated with keel cooling – such as bulkiness, drag, fouling and weight. In many cases, a GRIDCOOLER requires only one twentieth of the space needed for channel cooling.

LOW DRAG – Independent test run at the Vienna Model Test Basin have shown that drag is negligible or almost non-existent when GRIDCOOLERS are recessed in a ship's hull. On our high speed test boats, we found that the difference between rolling and brushing regular anti-foulant hull paint on the hull of the boats created more drag than our GRIDCOOLERS.

PRESSURE DROP – Because the pressure drop over the GRIDCOOLER is extremely low, it does not restrict the flow of jacket water, making possible the use of a centrifugal circulating pump, as well as displacement types.

EASILY INSTALLED – The design of the GRIDCOOLER presents no greater problem than the ordinary through – hull fittings. The GRIDCOOLER eliminates the sea-water pump, strainer, scoop and sea cock. (Except for wet type exhaust system, which usually require a small capacity pump). The GRIDCOOLER is a completely assembled unit ready for installation, complete with heavy neoprene gaskets for sealing the inside and outside of the hull.

VARIETY – GRIDCOOLERS are available in over 8000 models to meet your operating conditions and the engine manufacturer's exact cooling requirements for your engine.





INFORMATION REQUIRED TO MAKE A GRIDCOOLER RECOMMENDATION

1. Make of Engine _____

q Propulsion q Generator Set q Other

Model of Engine _____

HP/RPM or KW/RPM Rating _____

2. Age of Gear _____

Model of Gear _____

3. Heat Rejection _____

4. Fresh Water Flow Rate _____

5. Fresh Water Temperature
into Gridcooler _____

6. Fresh Water Temperature
from Gridcooler _____

7. Type of Boat in Service _____

8. Propulsion Engine Minimum Hull Speed at Full Rated Power and Load

9. Maximum Sea Water Temperature _____

10. Hull Material _____

5



SIMPLEX BASKET STRAINERS

MODEL 72 - Sizes 3/8" to 8"

Available in Iron, Bronze, Stainless Steel, Carbon Steel



Hayward's Model 72 Simplex Strainer has been the industry standard simplex basket strainer for over 75 years. It's perfect for industrial and commercial applications where the line can be temporarily shut down for strainer basket cleaning or change-out.

A few of the reasons for its popularity are, first, the unusually large basket capacity. The free straining area is at least 6 times the cross sectional pipe area (even more in many sizes). Next, no tools are needed to open the cover. The quick opening, swinging yoke can be disassembled and the basket removed in seconds. On sizes 4" and larger, a special cover clamp is provided to distribute the seating pressure and to insure positive seating of the cover.

Another feature is a threaded drain on every size strainer (fitted with a plug). This can be used as a backwash connection, if desired. Sizes 2" and larger are provided with legs for bolting to the floor for rock solid installation.

Wall thicknesses are exceptionally heavy. We have not stinted on weight to save material costs. The basket seats are precision machined to give a tight seal and prevent any material from by-passing the basket. The Hayward Model 72 Simplex Basket Strainer is a top quality, heavy duty unit designed to stand up to the most demanding of application. There is simply no better simplex basket strainer made.



Features

- Quick open cover - no tools needed
- Heavy Wall construction
- Large capacity basket
- Machined Basket seat
- Threaded drain
- Perforated stainless basket

Options

- Basket perforations from 1/32" to 1/2"
- Basket mesh from 20 to
- Monel baskets
- Viton, PTFE-encapsulated, or EPDM seals
- Vent valves
- 1/4" NPT taps
- Magnetic basket inserts
- Pressure differential gauge and switch

| Size | Materials | End Connection* | Seals | Pressure Rating |
|------------|-----------------|-----------------|--------|-----------------|
| 3/8" to 3" | Iron and Bronze | Threaded | Buna N | 200 psi @ 100F |
| 1" to 3" | Carbon Steel | | Viton® | |
| | Stainless Steel | | | |
| 1" to 8" | Iron | Flanged 125# | Buna N | |
| | Bronze | Flanged 150# | | |
| | Carbon Steel | | Viton® | |
| | Stainless Steel | | | |

*DIN flanges and BSP threads available

Model 72 Cv Factors*

| Size | Value | Size | Value |
|--------|-------|--------|-------|
| 3/8" | 15.0 | 2" | 73 |
| 1/2" | 15.0 | 2-1/2" | 125 |
| 3/4" | 15.0 | 3" | 180 |
| 1" | 22.5 | 4" | 350 |
| 1-1/4" | 31.5 | 6" | 900 |
| 1-1/2" | 4 | 6.08" | 1400 |

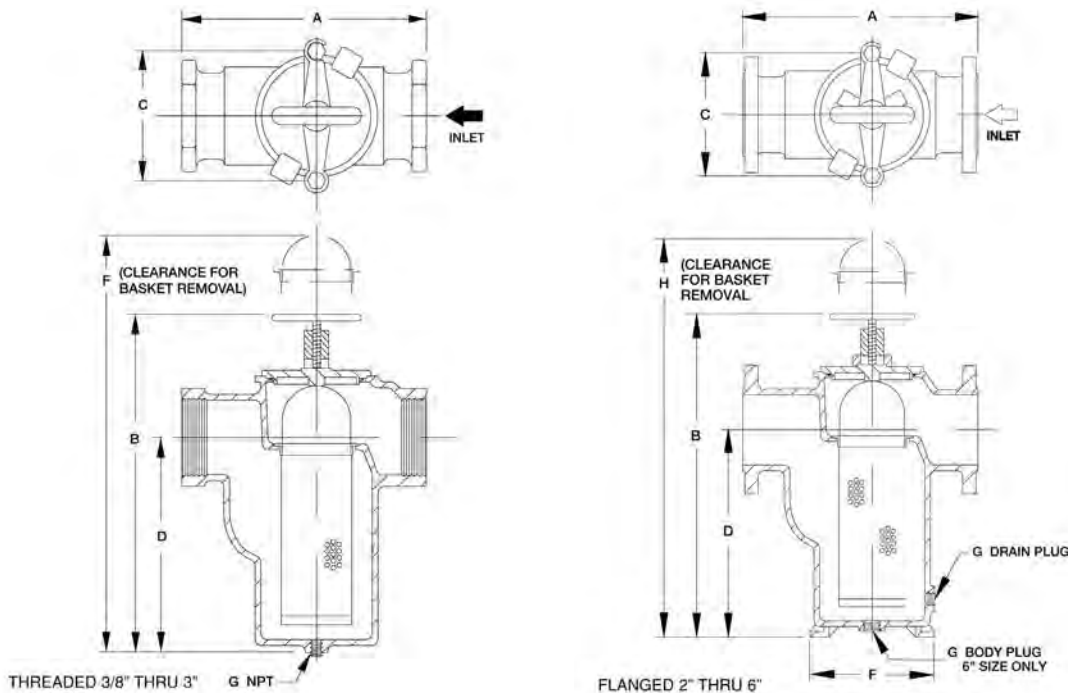
*For water with clean, perforated basket

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SIMPLEX BASKET STRAINERS



MODEL 72



| Pipe Size | Threaded Model 72 Dimensions (in/ mm) | | | | | | | | | Net Wt. - lb / kg | | |
|--------------------------------------|---------------------------------------|--------------|-------------|-------------|-------------|-------------|------------|--------------|-------------|-------------------|-----------|-----------|
| | A | B | C | D | E | F | G | H | Carbon | | Stainless | |
| | | | | | | | | | Bronze | Steel | Iron | Steel |
| 3/8 | 4.00 / 102 | 6.63 / 168 | 2.88 / 73 | 4.00 / 102 | 2.38 / 60 | 11 / 279 | 3/8 / 10 | - | 4 / 1.8 | - | 4 / 1.8 | - |
| 1/2 | 4.00 / 102 | 6.63 / 168 | 2.88 / 73 | 4.00 / 102 | 2.38 / 60 | 11 / 279 | 3/8 / 10 | - | 4 / 1.8 | - | 4 / 1.8 | - |
| 3/4 | 5.38 / 137 | 8.38 / 213 | 4.00 / 102 | 5.00 / 127 | 3.06 / 78 | 13 / 330 | 1/2 / 15 | - | 8 / 3.6 | - | 7 / 3.2 | - |
| 1 | 5.38 / 137 | 8.38 / 213 | 4.00 / 102 | 5.00 / 127 | 3.06 / 78 | 13 / 330 | 1/2 / 15 | - | 8 / 3.6 | 7 / 3.2 | 7 / 3.2 | 7 / 3.2 |
| 1-1/4 | 6.75 / 172 | 9.88 / 251 | 4.88 / 124 | 5.88 / 149 | 3.88 / 99 | 14 / 356 | 1/2 / 15 | - | 13 / 6 | - | 12 / 6 | - |
| 1-1/2 | 7.25 / 184 | 11.00 / 279 | 4.88 / 124 | 7.00 / 178 | 4.00 / 102 | 16 / 406 | 3/4 / 20 | - | 16 / 7 | 15 / 7 | 15 / 7 | 16 / 7.3 |
| 2 | 8.75 / 222 | 13.38 / 340 | 6.75 / 172 | 7.63 / 194 | 5.13 / 130 | 21 / 533 | 1-1/4 / 32 | - | 32 / 15 | 36 / 16 | 28 / 13 | 31 / 14 |
| 2-1/2 | 10.38 / 264 | 14.88 / 378 | 8.00 / 203 | 8.63 / 219 | 6.38 / 162 | 26 / 660 | 1-1/2 / 40 | - | 49 / 22 | 52 / 24 | 42 / 19 | 51 / 23 |
| 3 | 11.50 / 292 | 17.75 / 468 | 8.00 / 203 | 1.38 / 298 | 6.63 / 168 | 28 / 711 | 1-1/2 / 40 | - | 60 / 27 | 60 / 27 | 52 / 23 | 60 / 27 |
| Flanged Model 72 Dimensions (in/ mm) | | | | | | | | | | | | |
| 2 | 10.50 / 268 | 13.75 / 349 | 6.75 / 172 | 7.63 / 194 | 5.13 / 130 | 6.25 / 159 | 3/8 / 10 | 20.00 / 508 | 49 / 22.3 | 36 / 16 | 36.5 / 17 | 36 / 16 |
| 2-1/2 | 11.63 / 295 | 15.63 / 397 | 8.00 / 203 | 8.88 / 226 | 6.38 / 162 | 7.63 / 194 | 3/8 / 102 | 3.00 / 584 | 64 / 29.1 | 63 / 27 | 54 / 25 | 63 / 29 |
| 3 | 13.13 / 334 | 18.00 / 457 | 8.00 / 203 | 10.63 / 270 | 6.50 / 165 | 8.00 / 203 | 3/8 / 10 | 27.00 / 686 | 85 / 38.6 | - | 76 / 35 | - |
| 3 | 13.13 / 334 | 18.75 / 476 | 7.94 / 202 | 12.00 / 305 | 6.50 / 165 | 8.00 / 203 | 1/2 / 152 | 7.00 / 686 | - | 86 / 39 | - | 86 / 39 |
| 4 | 16.75 / 425 | 19.88 / 505 | 10.75 / 273 | 10.75 / 273 | 9.63 / 245 | 11.38 / 28 | 9-1/2 / 15 | 30.00 / 762 | 140 / 63.6 | - | 125 / 55 | - |
| 4 | 17.25 / 438 | 19.88 / 505 | 10.69 / 272 | 10.69 / 272 | 9.25 / 235 | 11.38 / 28 | 9-1/2 / 15 | 30.00 / 762 | - | 130 / 59 | - | 130 / 59 |
| 5 | 18.13 / 461 | 25.13 / 638 | 10.75 / 273 | 15.25 / 387 | 10.00 / 254 | 11.38 / 289 | 1/2 / 15 | 41.00 / 1041 | 182 / 82.7 | - | 170 / 775 | - |
| 6 | 19.63 / 499 | 28.50 / 724 | 10.69 / 272 | 18.38 / 467 | 10.00 / 254 | 11.38 / 289 | 1/2 / 15 | 46.00 / 1168 | 270 / 122.7 | 235 / 107 | 200 / 91 | 235 / 107 |
| 8 | 27.00 / 686 | 40.50 / 1029 | - | 27.00 / 686 | 13.75 / 349 | 17.50 / 445 | 1/2 / 15 | 60.00 / 1524 | 600 / 272.7 | 550 / 250 | 500 / 227 | 550 / 250 |



DUPLEX BASKET STRAINERS

MODEL 50 - TAPERED PLUG TYPE



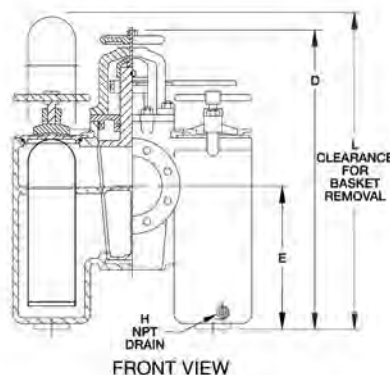
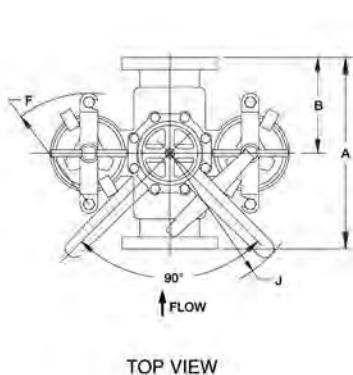
The Hayward Model 50 Plug Type Duplex Strainer is a simple, economical, and trouble free design...time tested in applications around the world over many years. This type of strainer is actually a high quality, pressure rated plug valve with integral straining baskets.

Switching the flow from one basket to the other is accomplished by moving the operating handle through a 90 degree arc. The design is such that is impossible for this operation to stop the flow because of the unique port design in the diverter plug. The entire switching operation takes less than 30 seconds. No tools are needed. The plug is automatically positioned each time in exactly the right spot by integral stops.

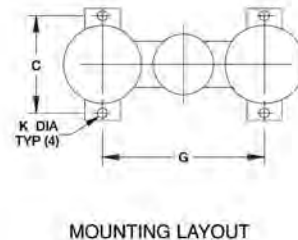
Before operating the handle a manual, integral lifting jack, built into the strainer is used to lift the diverter plug off of its seat. After the switching operation the lifting jack is used to reseal the plug. The lifting jack is specially designed to lift and seat the plug easily, even under high pressures. A built in stop limits the distance the diverter plug can be raised. This minimizes the possibility of material bypassing the plug while it is rotated. It also prevent debris from building up under the plug and making it difficult to reseal.

Other important features of the plug type Model 50 Duplex Basket Strainers include Hayward's quick opening, swing away yoke design covers. No tools are required to remove the covers for quick and easy access to the strainer baskets, and they go back on just as fast as they came off. Draining of the basket chambers is simplified with the standard NPT drain taps – and all sizes are provided with mounting legs for bolting the strainer to the floor for a rock solid installation.

Hayward's plug type Model 50 Duplex Basket Strainer is your best choice for most applications. Its rugged design and ease of operation have made it the duplex strainer of choice around the world in hundreds of different industries.

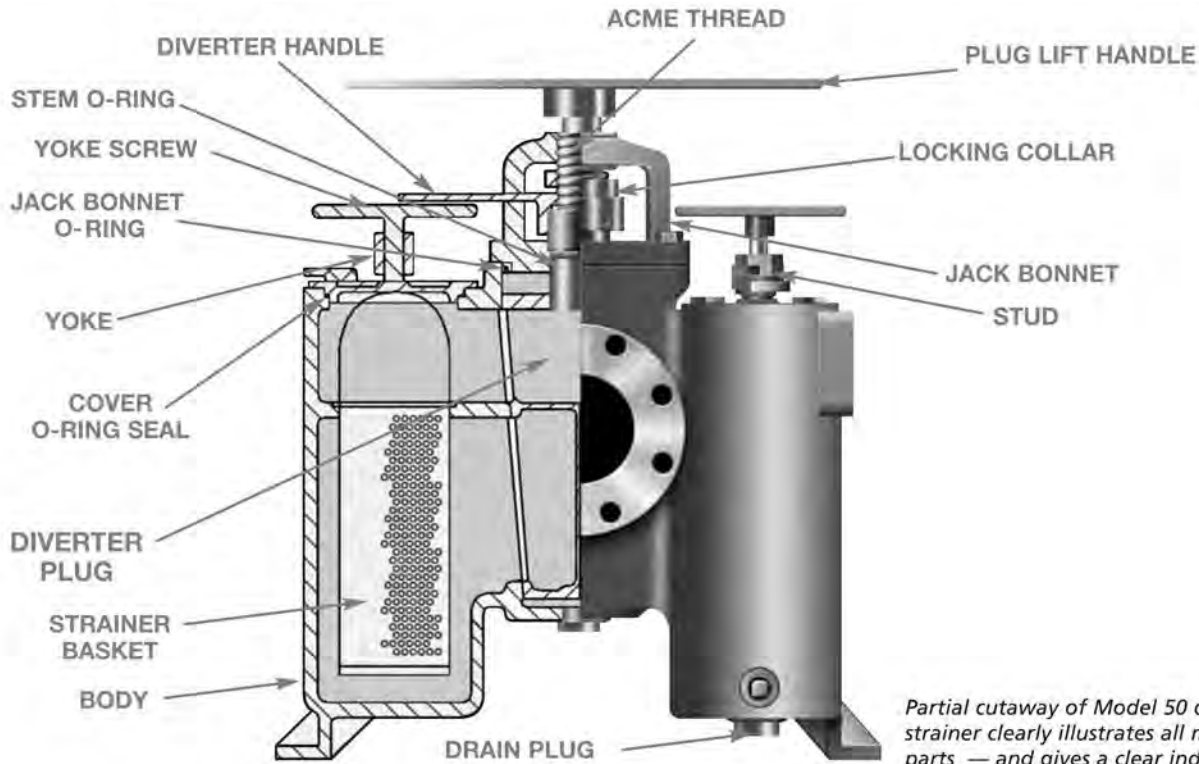


Flanged - 5" to 8"



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

DUPLEX BASKET STRAINERS



Partial cutaway of Model 50 duplex strainer clearly illustrates all major parts — and gives a clear indication of the simplicity of design and ease of maintenance.

6

| | ALL WETTED PART | EXTERIOR TRIM | BASKETS | COVER & STEM GASKETS |
|------------------------|---|---------------|--------------------|----------------------|
| Iron | ASTM A-126 Bodies, Bonnets & Covers; Bronze Diverter Plug | Ductile Iron | Brass, SS or Monel | Buna-N |
| Bronze | ASTM B-62 Valve Bronze | Ductile Iron | Brass, SS or Monel | Buna-N |
| Stainless Steel | ASTM A-351, Grade CF-8M, Type 316 | Ductile Iron | SS or Monel | Viton-A |
| Carbon Steel | ASTM A216, Grade WCB Carbon Steel; Bronze Diverter Plug | Ductile Iron | SS or Monel | |

| END CONNECTIONS | | | |
|-----------------------------------|---------------------------|-------------|--------------------------|
| MATERIALs150 Lbs. ANSI Dimensions | PRESSURE RATING @ 100° F. | Screwed | Flanged |
| Iron | 200 PSI WOG | NPT Threads | 125 Lbs. ANSI Dimensions |
| Bronze | 200 PSI WOG | NPT Threads | 150 Lbs. ANSI Dimensions |
| Stainless Steel | 200 PSI WOG | NPT Threads | 150 Lbs. ANSI Dimensions |
| Carbon Steel | 200 PSI WOG | NPT Thread | |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SIMPLEX BASKET STRAINERS

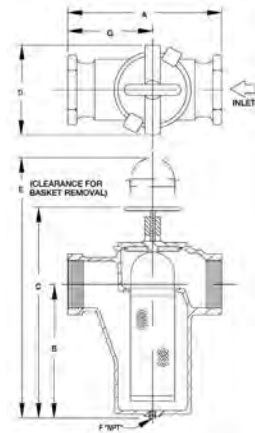
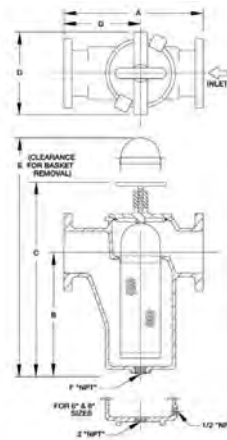


Features

- Hand-removable cover
- Drain plug
- Machined basket seat
- Standard perforated
- Stainless steel basket

Options

- Basket perforations from 1/32" to 1/2"
- Basket mesh from 20 to 400
- Monel baskets
- Vent Valves
- Drain Valves
- 1/4" NPT taps
- Magnetic basket inserts
- Pressure differential gauges and switches



The Hayward Model 30R is a high quality, low cost simplex basket strainer...perfect for cost sensitive applications. While the cost of the Model 30R is low, its design incorporates many features found only on more expensive units including machined basket seats to protect against bypass insuring all of the flow is strained. The cover of the Model 30R is a clamp type and is hand removable without the need for tools, this makes access to the basket quick and easy for cleaning or change out and every size strainer comes standard with a drain plug. The Model 30R is the best choice simplex strainer for low or moderate pressure applications such as swimming pools, cooling towers and large air conditioning installations.

6

| Pipe Size | Dimensions (in / mm) Flanged | | | | | | | Dry Wt. lb / kg |
|-----------|------------------------------|-------------|-------------|-------------|--------------|------------|-------------|-----------------|
| | A | B | C | D | E | F | G | |
| 1-1/2 | 7.75 / 197 | 6.50 / 165 | 10.63 / 270 | 6.00 / 152 | 14.88 / 378 | 3/4 / 20 | 4.44 / 113 | 12 / 5.5 |
| 2 | 9.63 / 245 | 7.50 / 191 | 11.63 / 295 | 7.50 / 191 | 17.38 / 441 | 1-1/4 / 32 | 5.63 / 143 | 27 / 12.3 |
| 2-1/2 | 11.00 / 279 | 9.13 / 232 | 15.25 / 387 | 8.00 / 203 | 22.38 / 568 | 1-1/4 / 32 | 5.88 / 149 | 45 / 20.5 |
| 3 | 11.88 / 302 | 9.13 / 232 | 15.25 / 387 | 8.00 / 203 | 22.38 / 568 | 1-1/4 / 32 | 6.50 / 165 | 59 / 26.6 |
| 4 | 13.75 / 349 | 9.63 / 245 | 16.63 / 422 | 9.25 / 235 | 30.00 / 762 | 1-1/2 / 40 | 8.44 / 214 | 71 / 32.2 |
| 6 | 17.50 / 445 | 12.38 / 315 | 26.13 / 664 | 14.75 / 375 | 35.00 / 889 | 2 / 50 | 10.31 / 262 | 150 / 68.1 |
| 8 | 23.63 / 600 | 17.75 / 451 | 32.63 / 829 | 14.75 / 375 | 48.00 / 1219 | 2 / 50 | 14.50 / 368 | 230 / 104.3 |

| Dimensions (in / mm) Flanged | | | | | | | | |
|------------------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1-1/2 | 2 | 2-1/2 | 3 | 4 | 6 | 8 | 10 | 12 |
| 7.00 / 178 | 8.50 / 216 | 11.50 / 292 | 11.50 / 292 | 6.50 / 165 | 7.50 / 191 | 9.13 / 232 | 9.13 / 232 | 10.63 / 270 |
| 6.00 / 152 | 7.50 / 191 | 8.00 / 203 | 8.00 / 203 | 14.88 / 378 | 17.38 / 441 | 22.38 / 568 | 22.63 / 575 | 14.88 / 378 |
| 3/4 / 20 | 1-1/4 / 32 | 1-1/4 / 32 | 1-1/4 / 32 | 3.88 / 99 | 4.81 / 122 | 6.00 / 152 | 6.00 / 152 | 3.88 / 99 |
| 7 / 3.2 | 20 / 9.1 | 34 / 15.5 | 34 / 15.5 | | | | | |

Selection Chart

| Size | Material | End Connections* | Seals | Pressure Rating |
|--------------|----------|--------------------------|--------|-----------------|
| 1-1/2" to 3" | Iron | Threaded | Buna N | 200 psi at 100F |
| 1-1/2" to 8" | | Threaded or Flanged 125# | | |

Cv Factors*

| Size | Value | Size | Value |
|--------|-------|------|-------|
| 1-1/2" | 58 | 4" | 240 |
| 2" | 90 | 6" | 370 |
| 2-1/2" | 140 | 8" | 600 |
| 3" | 200 | | |

STRAINER BASKETS



Models 30, 50 & 72 - Sizes 3/8" to 8"

The strainer cover presses down on the bow-shaped handle and assures a tight seal. This is the standard, basic strainer basket, available in stainless steel, Monel or brass, with a wide range of perforations and mesh linings to handle virtually any straining problem.

Cylindrical Strainer Baskets



Models 50 & 72 - Sizes 10" to 18"

Gives very low pressure drop and, due to its convoluted structure, provides a much greater straining area. Available in plain, perforated metal or with a fine mesh lining.

Magnetic Inserts

Available For All Models

Hayward Strainer Baskets can be supplied with optional magnetic inserts. They are primarily used when microscopic iron or steel particles are present in the flowing fluid. These particles may be small enough to pass through even a fine mesh lining, but the magnetic insert will catch them. Our powerful magnets are encased in stainless steel to prevent corrosion.



Recommended Standard Screen Sizes Monel, Carbon Steel or Stainless Steel

| SIZEtions | THREADED* | FLANGED* 1/4" to 2" |
|---------------|-----------|-------------------------------|
| 20 Mesh | - | 0.033" Perforations |
| 1/2" to 2" | - | 0.033" to 0.045" Perforations |
| 2-1/2" to 10" | - | 0.062" to 0.125" Perforations |

Other stock stainless steel screens available:

- Perforated - 1.078, 0.109, 0.158, 0.185, 0.250 & 0.375
- Mesh - 40, 60, 80 & 100

Special screens available upon request.

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INTAKE WATER STRAINERS

Perko Water Strainers are designed for easy installation and cleaning. Features include mounting lugs cast into both sides to assure universal mounting, four outside tie rods and a 304 stainless steel strainer basket to minimize electrolysis. Screen hole size diameter .077 inches, 46% open area. Hinged lugs for the cast bronze cover permit easy removal and cleaning of the strainer basket. A drain plug in the bronze bottom casting is provided for easily removing sediment and draining for winterizing. Fig. 500 is for higher-capacity applications.



Fig. 493



Fig. 500

Fig. 493 Ordering Information

| PIPE SIZE (Inches) | OVERALL HEIGHT (Inches) | OVERALL WIDTH (Inches) | STANDARD PACKAGE (1 pc.) | CYLINDER DIMENSIONS (Inches) | BASKET DIMENSIONS (Inches) | OPEN AREA TO PIPE SIZE RATIO | WEIGHT (Lbs.) | SPARE GASKET KIT*(Display Package-5 Kits /1 Kit per Bag) |
|--------------------|-------------------------|------------------------|--------------------------|------------------------------|----------------------------|------------------------------|---------------|--|
| 1/2" | 5-3/4" | 4-1/2" | 493 004 PLB | 3-1/2" x 4" | 1-13/16" x 4-3/8" | 30:1 | 5 | 493 DP4 99M |
| 3/4" | 8-3/8" | 4-1/2" | 493 005 PLB | 3-1/2" x 6" | 1-13/16" x 6-1/4" | 25:1 | 5 | 493 DP5 99M |
| 1" | 9-1/2" | 5-1/2" | 493 006 PLB | 4-1/2" x 5-1/2" | 2-5/8" x 5-7/8" | 20:1 | 8 | 493 DP6 99M |
| 1-1/4" | 10" | 5-1/2" | 493 007 PLB | 4-1/2" x 6" | 2-5/8" x 6-1/4" | 13:1 | 8 | 493 DP7 99M |
| 1-1/2" | 11-1/2" | 7-1/4" | 493 008 PLB | 6" x 8" | 3-5/16" x 8-7/16" | 17:1 | 14 | 493 DP8 99M |
| 2" | 16" | 7-1/2" | 493 009 PLB | 6" x 12" | 3-5/16" x 12-1/4" | 13:1 | 18 | 493 DP9 99M |
| 2-1/2" | 16" | 7-1/2" | 493 010 PLB | 6" x 12" | 3-5/16" x 12-1/2" | 10:1 | 18 | 493 DPX 99M |

Fig. 500 Ordering Information

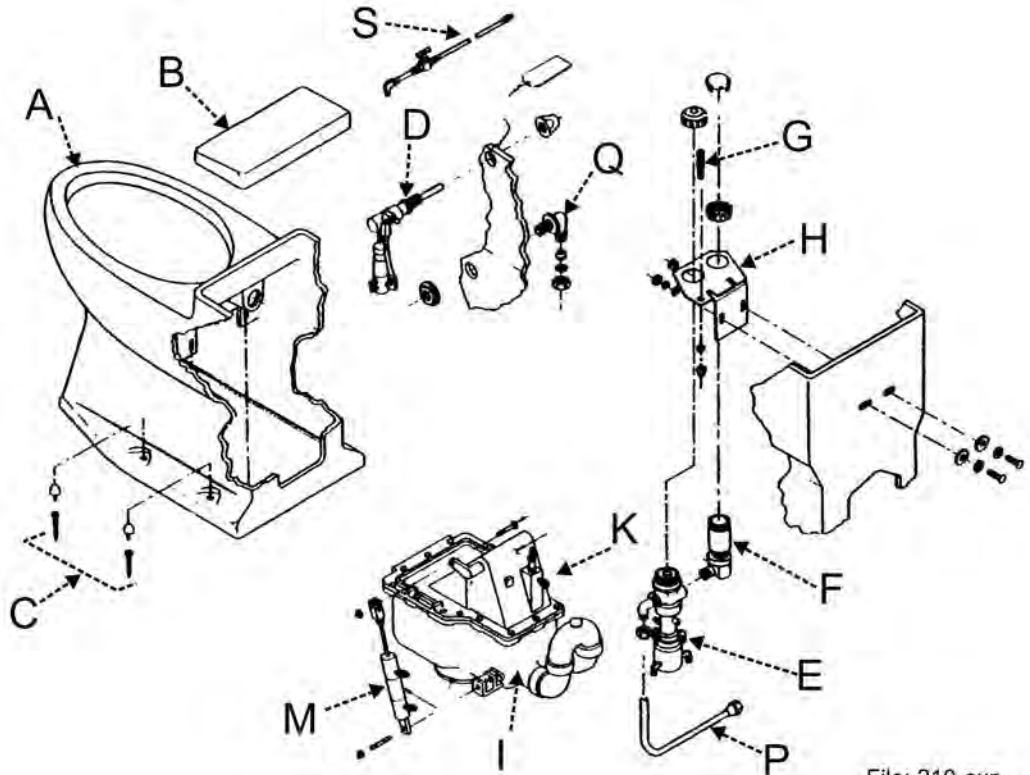
| PIPE SIZE (Inches) | OVERALL HEIGHT (Inches) | OVERALL WIDTH (Inches) | STANDARD PACKAGE (1 pc.) | CYLINDER DIMENSIONS (Inches) | BASKET DIMENSIONS (Inches) | OPEN AREA TO PIPE SIZE RATIO | WEIGHT (Lbs.) | SPARE GASKET KIT*(Display Package-5 Kits /1 Kit per Bag) |
|--------------------|-------------------------|------------------------|--------------------------|------------------------------|----------------------------|------------------------------|---------------|--|
| 2" | 14-1/2" | 9" | 500 009 PLB | 8" x 10" | 3-7/8" x 10-1/4" | 20:1 | 34 | 500 009 99M |
| 2-1/2" | 16-1/2" | 9" | 500 010 PLB | 8" x 12" | 3-7/8" x 12-1/4" | 18:1 | 34 | 500 010 99M |
| 3" | 18-1/2" | 9" | 500 011 PLB | 8" x 14" | 3-7/8" x 14-1/4" | 14:1 | 34 | 500 011 99M |

*Spare Gasket Kit Consists of: 1 Cover Gasket and 2 Cylinder Gaskets.

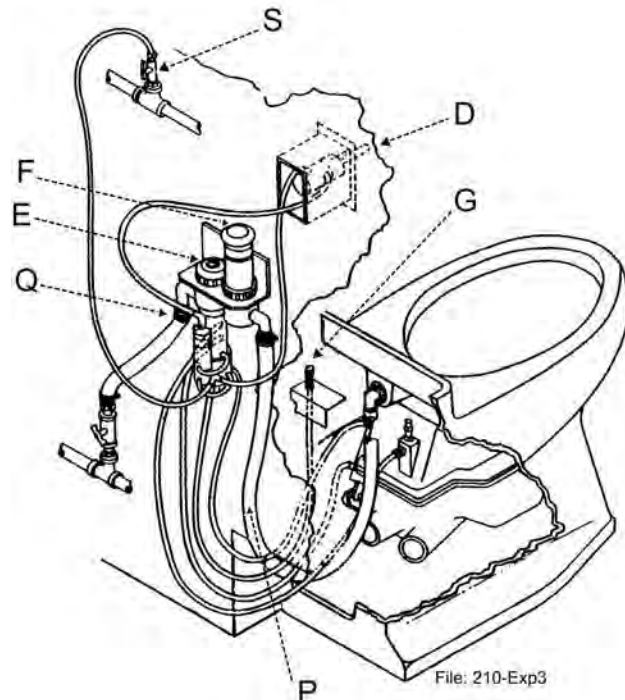
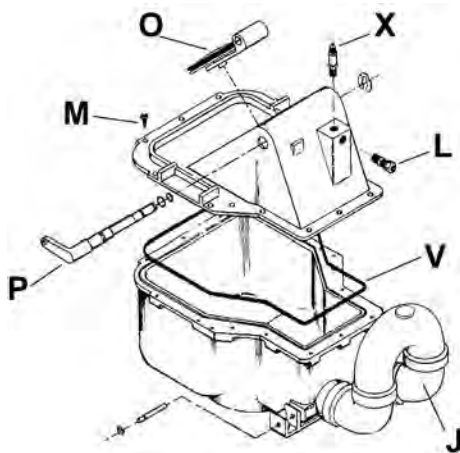
Microphor

LOW FLUSH MARINE HEAD PARTS

| | |
|---|--------------------------|
| A | Toilet Shell |
| B | Toilet Lid |
| C | Closet Screws |
| D | Flush Activator |
| E | Air/Water Seq. Valve |
| F | Vacuum Breaker |
| G | Bleed Off Assembly |
| H | Valve Bracket </td |
| I | Hopper |
| J | P-Trap, Rear Discharge |
| K | Hopper Mounting Assembly |
| L | Marine Bleed Valve |
| M | Hopper Screws |
| N | Air Cylinder |
| O | Flapper Assembly |
| P | Crank Assembly |
| Q | Spud Assembly |
| R | Water Supply Tube |
| S | Water Connection |
| T | See chart on next page |
| U | See chart on next page |
| V | Hopper Gasket |
| W | Air Supply Kit |
| X | Pressure Relief Valve |



File: 210-exp



File: 210-Exp3

PARTS LIST

Microphor

| PARTS CHART | | | | | | |
|-------------|---------------------------|--|-------------------------------------|---|--|-------------------------------------|
| | MODEL PART | LF-210 China Round | LF-210 China Elongated | LF-219 China Round Integral & Remote | LF-310 SS Round | LF-320 SS Round |
| A | Toilet Shell | 44032 - white colors - see chart | 44010 - white colors - see chart | 44151 - integral, white 44133 - remote, white colors - see chart | 93082 - shell 93084 - top shroud 93085 - bottom shroud colors - see chart | 93008 - shell colors - see chart |
| B | Toilet Lid | 99064 - white 99073 - bolt down, white colors - see chart | | Not applicable | | |
| C | Closet Screws & Bolt Caps | 93972 - white colors - see chart | | | Not applicable | |
| D | Flush Activator | 95002 - standard 95054 - positive | | 40046-5/40049-5 int, wht 40046-9/40049-9 int, blk 40046-7/40049-7 int, bone 95151 - remote | 95561 - standard | 95031 - standard |
| E | Air/Water Sequence Valve | 39501 - no fittings | | | | |
| F | Vacuum Breaker | 33559 - integral 33039 - remote | | 33421 - check valve 33039 - remote | 96539 - integral | 33039 - remote |
| G | Bleed-Off Plug Assembly | 94598 | | | 30382-3 | 94598 |
| H | Valve Bracket | 91897 - integral 20003 - remote | | 91866 - integral 20003 - remote | Not applicable | 20003 - remote |
| I | Hopper | 90016-3 - rear 90008 - downward conversion kit 40050-3 - tank isolation valve 27282 - Hopper Adaptor O-ring | | 90016-3 - rear 95157 - downward hose | 90039 - 3 rear 40050-3 tank isolation valve | |
| J | P-Trap, Rear Discharge | 96029 | | | | |
| K | Hopper Mounting Assy | 90899-5 | | | 00006 (4 each) and 00106 (4 each) | |
| L | Hopper Bleed Valve | 37548 | | | | |
| M | Hopper Screws | 00064 (14 each) | | | 000644 (10 each) | |
| N | Air Cylinder | 94540 | | | | |
| O | Flapper Assy | 90048 | | | | |
| P | Crank Assy | 90042 | | | | |
| Q | Spud Assy | 96347 | | 95155 | 96579 | |
| R | Water Supply Tube | 96012 - integral 35053 - remote | | 35484 - integral 35484 - remote | 96002 | 96008 |
| S | Water Connection | 96387 | | N/A - integral 33352 - remote | 96515 | 33352 |
| T | Air Fittings | 30385 - 90 Elbow, 30365 - Starlight | | | | |
| U | Air Tubing/ft | green - 35381, blue - 35382, red - 35383, yellow - 35384, white - 35384, black - 35419 | | | | |
| V | Hopper Gasket | 27272 | | | 27270 | |
| W | Air Supply Kit | 93086 | | | N/A | |
| X | Pressure Relief Valve | 37518 | | | | |

WASTEWATER TREATMENT SYSTEMS

MARINE APPLICATION SYSTEMS

The "Mariner Series" Marine Sanitation Device is a self-contained biological treatment system that is sized to fit almost any application.

The MSD's can meet any crew requirements for USCG, IMO, International, Local and State regulations. Units can also be custom designed to fit in many tight spaces.

The Mariner Series comes complete with NEMA 4 waterproof enclosures with high level alarm, and discharge pump.

MODEL 100 COMPACT

Crew Size: 3

H 4' x L 5'-6" x W 2'

MODEL 100

Crew Size: 3

H 5' x L 5'-6" x W 1'-10"

MODEL 200

Crew Size: 6

H 5' x L 7' x W 2'

MODEL 300

Crew Size: 12

H 5' x L 7' x W 2'-6"

MODEL 400

Crew Size: 18

H 5'-6" x L 7' x W 2'-6"

MODEL 500

Crew Size: 23

H 7' x L 9'-6" x W 2'-6"

FEATURES & BENEFITS:

- USCG/IMO Certified Type II MSD
- Low Maintenance – few moving parts and no special tools required
- Crew sized from 1 to 450+
- Certified to treat up to 8500 GPD per single system
- Meets or exceeds all EPA, State or International requirements
- Standard Configurations and custom designs
- Operates in Fresh and Saltwater
- Carbon Steel, Stainless Steel and Aluminum Construction
- Standard carbon steel unit



STANDARD CARBON STEEL UNIT

INCINOLET ELECTRIC TOILET SYSTEM

When you push the start button, heater and blower both come on. Heater alternates off and on for an hour. Blower stays on for an additional 30 to 55 minutes. YOU CAN USE INCINOLET ANY TIME DURING THE INCINERATION CYCLE. Push start button after each use.

YOU SHOULD INCINERATE WASTE AFTER EACH USE. ACCUMULATED WASTE, PARTICULARLY SOLIDS, RESULTS IN ODOR AND CAN REDUCE LIFE OF THE HEATER.

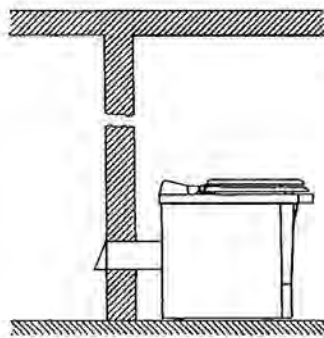
If INCINOLET is used primarily in the morning, with little or no use during the day, then reset the timer to 1-1/2 or 2 hours to insure complete incineration.

Preparing Vent-Line

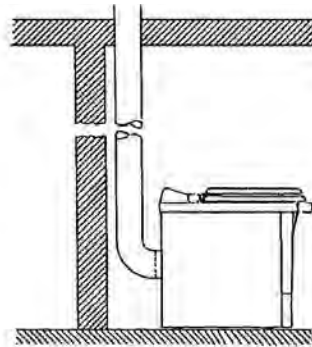
Vent pipe can run horizontally or vertically. Venting materials can be placed within a wall and INCINOLET can be placed close to a wall at the back. Allow 6 to 8 inches on the right side (facing the toilet) to operate the foot pedal.

Vertical vent-line should terminate with a rain cap. For horizontal venting use a dryer flap or add a PVC elbow turned downward to prevent back-drafting.

VENTING OPTIONS:



Method A



Method B

6

MODEL WB

| | |
|-----------|---------------------|
| Uses: | Houseboat, Workboat |
| Serves: | 4 (8) |
| Volts: | 120 (240) |
| Watts: | 1800 (3600) |
| Amps: | 15 |
| Warranty: | 2 years |

General Dimensions

| | |
|-------------------------|------------|
| Width: | 15 in. |
| Height: | 20 in. |
| Depth: | 24 in. |
| Vent collar from floor: | 10-3/4 in. |
| Ventpipe: | 3 in. dia. |



BIO-SANITIZER DISINFECTING TABLETS



Bio-Sanitizer disinfecting tablets are scientifically formulated to provide efficient and reliable disinfection for commercial, industrial or municipal wastewater treatment systems. Manufactured from pure calcium hypochlorite, Bio-Sanitizer disinfecting tablets dissolve slowly and evenly, providing effective and economical bacteria killing power. Each tablet contains a minimum of 70% available chlorine to insure maximum effectiveness. Bio-Sanitizer disinfecting tablets are a dependable, long-term source of chlorine that automatically adjust their chemical application to the rate of flow. Bio-Sanitizer disinfecting tablets insure reliable disinfection rates up to intermittent peak flow factors of four and maintain a uniform chlorination rate even when the significant runoff period is six hours. When used as directed in any approved, gravity flow tablet dispenser, Bio-Sanitizer disinfecting tablets provide positive disinfection and inhibit bacteria regrowth.

Bio-Sanitizer disinfecting tablets represent refinement in dry chlorination technology, providing maximum disinfection without releasing unnecessary quantities of chlorine into the environment. Extensive product research and tablet development has provided a precise chemical formulation uniquely suitable for this application. Registered with the United States Environmental Protection Agency, Canadian Ministry of Environment and all fifty State Departments of Agriculture, Bio-Sanitizer disinfecting tablets provide reliable, high quality chlorination to assist in the maintenance of environmental standards. Packed in 10 lb., 25 lb., 45 lb. and 100 lb. DOT approved containers, Bio-Sanitizer disinfecting tablets are the preferred cost effective alternative to dangerous liquid and gas chlorination systems. If a safe and dependable disinfection system is desired, consider the advantages of Norweco's Bio-Sanitizer disinfecting tablets.

BIO-SANITIZER DISINFECTING TABLETS

Advantages

- Environmentally safe when used as directed
- Predictable chlorine residual
- Consistent chlorine dose
- Beveled edge design minimizes wicking
- Slow dissolve rate
- Inhibits bacteria regrowth
- No mixing of chemicals or solutions

Specifications

| | |
|------------------------|---|
| Tablet Size | 2 5/8" diameter, 13/16" thick |
| Approx. Tablet Weight | 5 oz. (140 grams) |
| Approx. Tablet Density | 125 lbs./ft. ³ |
| Active Ingredient | Calcium Hypochlorite Ca (OCl) ₂ • H ₂ O |
| Available Chlorine | 70% |
| Inert Ingredients | 30% |
| Appearance and odor | White tablet with mild chlorine odor |
| USEPA Registration | 63243-1 |

Caution

Bio-Sanitizer disinfecting tablets are a strong oxidizing agent and highly corrosive. Contact with oils, acids, petroleum based products, reducing agents or other chlorine compounds, such as swimming pool tablets, is extremely dangerous - fire or explosion could result. Improper use of this product may cause personal injury or property damage. Tablets may be fatal if swallowed and tablet dust is irritating to the eyes, nose and throat. Keep out of the reach of children and do not allow tablets or feed tubes to contact skin, eyes or clothing. Do not handle the tablets or feed tubes without first contacting your local distributor and obtaining specific instructions for usage, handling and storage. Store only in sealed original container and in a well-ventilated area. Read the product container label carefully prior to use. It is unsafe and a violation of Federal law to use Bio-Sanitizer disinfecting tablets in a manner inconsistent with its labeling.

Bio-Dynamic®
LF 1000
Tablet Feeder



Blue Crystal®
Residential
Disinfecting
Tablets



Bio-Max®
Dechlorination
Tablets



Bio-Neutralizer®
Dechlorination
Tablets



Bio-Perc®
Biological
Remediation
Tablets



HOLDING TANK CLEANER



HOLDING TANK CLEANER

Degrades Waste and Compatible with All MSD Configurations. BacTANK T3® HOLDING TANK: Although drain lines and interceptors are not designed to be microbial reactors, they provide nutrient-rich environments for bacterial growth. But they need the right microbes to optimize biological treatment. Hydraulic retention time is limited and organisms with very high rates of activity are required. THE RIGHT MICROBES OR "PROMICROBIALS" MAKE HOLDING TANKS WORK MORE EFFECTIVELY. FEATURES: LIQUID OR POWDER Easy to use formulation that can be applied manually. Stable, high count blend of promicrobials with a 2 year shelf life. Contains 200 billion bacteria per gallon. **16oz, 32oz, 64oz, 1Gal, 5Gal, 55Gal, 275Gal.**



SOLUPACK DRY POWDER

Easy to Use Dissolving Packs that Break Down Waste. BacTANK T3® DRY POWDER: A dry bioenzymatic organic digester. The powder has a blend of 8 strains of non-pathogenic bacteria and multiple enzymatic properties. Various counts of bacteria are available from 1 billion/gram to 6 billion/gram. The formula is designed to improve liquefaction and digestion of fats, proteins, starches and carbohydrates. It has a specific bug for grease degradation, which is lacking in most dry powders. **4oz., 8oz., 5lb, 55lb, 10lb, 25lb**



SAFE SCRUB

Attack waste and stains with this Bio-enzymatic Solution. BacTANK T3® SAFE SCRUB: A bio-enzymatic product specifically designed to clean tough stains on hard surfaces. It is an exceptional cleaner for bathrooms, toilet bowls, sinks and fixtures. Use with BacTANK T3® HOLDING TANK. It has compatible bacteria along with a non-scouring silicone abrasive. **16oz.**

ULTRA-SEP AUTOMATIC

Drawing on our quarter of a century of design and development leadership, the ULTRA-SEP Automatic sets a NEW standard for oily water separators and performance.

ULTRA-SEP Automatic maintains peak performance with a regular automated cleaning schedule, pre-programmed and controlled from the ULTRA-SEP Control Panel. The system uses pressure logic and/or pre-set timers to perform both routine cleaning and periodic deep cleaning. The programmable logic controller (PLC) allows users to adapt to the parameters of operating conditions and to the composition of bilge water. This automatic operation eliminates crew involvement.

The ULTRA-SEP Automatic includes all the features of our standard ULTRA-SEP with the addition of:

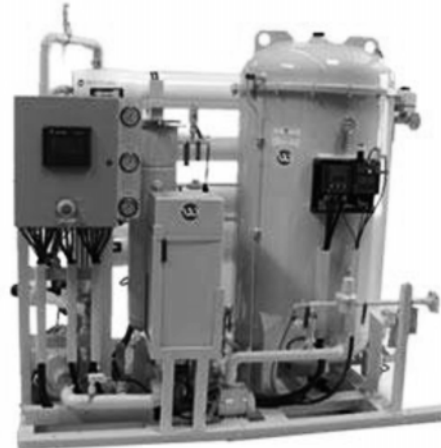
- Integrated membrane cleaning solution tank
- Cleaning solution injection pump
- Automatic HELI-SEP® solids dump valve

Currently available for ULTRA-SEP Systems with 2.0 m³/h to 10.0 m³/h capacity.

The AutoClean Module Upgrade Option

Boost performance and minimize crew involvement by adding automatic SPIR-O-LATOR® Membrane cleaning and solids dumping to your standard ULTRA-SEP system. The compact module easily fits through doorways and hatches, allowing upgrading while underway, without disrupting other activities. Simple piping, simple electrical hookups and pre-programmed software update for controls.

ULTRA-SEP AutoClean is now available as an upgrade to your existing ULTRA-SEP



ULTRA-SEP 5000 with optional paint color shown



Specifications for ULTRA-SEP™ Systems from 0.5 to 10 Cubic Meters per Hour Capacity

| Model No. | Capacity m ³ /h (GPM) | Length* mm (in) | Width* mm (in) | Height * mm (in) | Weight kg (lbs) | Oily Water Inlet mm (in) | Oil Outlet mm (in) | Clean Water Inlet mm (in) | Processed Water Outlet Discharge mm (in) | Processed Water Outlet Recirculate mm (in) | Power kW |
|-----------|-------------------------------------|--------------------|-------------------|---------------------|--------------------|--------------------------------|-----------------------|---------------------------------|---|---|-------------|
| US500 | 0.5 (2.2) | 890 (35) | 760 (30) | 1525 (60) | 243 (536) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 3 |
| US1000 | 1.0 (4.4) | 965 (38) | 890 (35) | 1525 (60) | 298 (658) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 4 |
| US2000 | 2.0 (8.8) | 1830 (72) | 1320 (52) | 1670 (66) | 625 (1380) | 40 (1.5) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 8.6 |
| US3000 | 3.0 (13.2) | 1830 (72) | 1320 (52) | 1670 (66) | 690 (1525) | 40 (1.5) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 8.6 |
| US5000 | 5.0 (22.0) | 2640 (104) | 1420 (56) | 1880 (74) | 863 (1902) | 50 (2.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 25 (1.0) | 8.8 |
| US7500 | 7.5 (33.0) | 2640 (104) | 1815 (71.5) | 1995 (78.5) | 1430 (3550) | 50 (2.0) | 25 (1.0) | 25 (1.0) | 50 (2.0) | 50 (2.0) | 12.5 |
| US10000 | (10.0) 44.0 | 2640 (104) | 1815 (71.5) | 1995 (78.5) | 1535 (3880) | 50 (2.0) | 25 (1.0) | 25 (1.0) | 50 (2.0) | 50 (2.0) | 12.5 |

*Approximate dimensions for single skid system. The system can also be installed in modular skids depending on the space available.

Note: For ships with challenging bilge conditions, CWS has developed and offers an array of technical solutions from tank design to automated pretreatment.

CONTROL SWITCHES



COMPARE THESE FEATURES

- Float is constructed of durable PVC/polypropylene encasing variable level switch.
- Standard mechanical variable level control switches are rated for 115/230V, 5 Amps.
- Low current mechanical variable level control switches are rated for 125 VAC/30 VDC, 0.1 Amps.
- 18/2 Type SJOW CPE cord standard.
- Long cords are available in 15-25-35-50 foot lengths.
- Temperature rating of 140°F (60°C).
- Approximately 1.5" liquid level differential in switching action.

Variable Level Control Switch is normally open when hanging vertically above liquid level. Switch closes when it reaches a few degrees above the horizontal position.


APPLICATIONS

- Switch for Simplex or Duplex pump control and High Level Alarm on Electrical Alternating Control Panel systems for dewatering, effluent and sewage applications.
- Switch for A-Pak.
- High Level Alarm Switch.




| FLOAT SWITCHES | | | |
|----------------|--------------------|-------------|-------------------|
| Mechanical | | Cord Length | Mounting Method |
| Standard P/N* | Low Current P/N*** | | |
| 10-0743 | 10-2060 | 15 | Clamp |
| 10-0744 | 10-2061 | 20 | Clamp |
| 10-1877 | 10-2062 | 25 | Clamp |
| 10-1878 | 10-2063 | 35 | Clamp |
| 10-1879 | 10-2064 | 50 | Clamp |
| 10-1880 | 10-2065 | 15 | Adjustable Weight |
| 10-1881 | 10-2066 | 25 | Adjustable Weight |
| 10-1882 | 10-2067 | 35 | Adjustable Weight |
| 10-1883 | 10-2068 | 50 | Adjustable Weight |

VARIABLE LEVEL CONTROL SWITCHES



CLAMP TYPE



ADJUSTABLE WEIGHT TYPE

May not be exactly as pictured. See back for application drawings.

| FLOAT SWITCH TREES | | | |
|--------------------|--------------------------|-------------|-----------------------|
| Mechanical | | Cord Length | Mounting Method |
| Standard P/N* | Intrinsically Safe P/N** | | |
| 10-1456 | 10-1456 | --- | Tree Only |
| 10-1886 | 10-2069 | 15 | (3) 15' Floats & Tree |
| 10-1887 | 10-2070 | 15 | (4) 15' Floats & Tree |

* Do not use with intrinsically safe control systems.
** For use with intrinsically safe control systems only.



53-57 CAST IRON SERIES

COMPARE THESE FEATURES

- Non-Clogging vortex impeller
- Float operated, submersible (NEMA 6) 2-pole mechanical switch & variable level long cycle systems available
- UL Listed 3-wire cord plug; 9 ft. standard for automatic, 15 ft. standard for nonautomatic
- Corrosion resistant powder coated epoxy finish
- No sheet metal parts to rust or corrode
- Stainless steel screws, switch arm, guard and handle
- No screens to clog
- Watertight neoprene "□" ring between motor and pump housing
- Solid buoyant polypropylene float
- Motor - 60 Hz, 1550 RPM, oil-filled, hermetically sealed, automatic reset thermal overload protected
- Upper and lower sleeve bearings running in bath of oil
- Entire unit pressure tested after assembly
- Carbon and ceramic shaft seal
- Maximum temperature for effluent or dewatering—130°F (54°C)
- Passes ½" inch spherical solids
- 1½" NPT Discharge.
- On point—7¼" • Off point—3"
- Major width—10 3/32" • Height—10 1/16"

SPECIAL MODEL FEATURES:

MODEL 53

- Cast iron switch case, motor & pump housing
- Engineered thermoplastic base
- Engineered, glass-filled, plastic impeller with metal insert
- Stainless steel guard & handle
- Bearing - lower & upper oil fed cast iron

MODEL 57

- All cast iron construction
- Stainless steel guard & handle
- Bearing - lower & upper oil fed cast iron
- Cast iron impeller

MODEL 55

- Bronze switch case, motor & pump housing
- Engineered thermoplastic base
- Engineered, glass-filled, plastic impeller with metal insert
- Stainless steel guard & handle
- Bearing - lower & upper oil fed bronze

MODEL 59

- All bronze construction
- Stainless steel guard & handle
- Bearing - lower & upper oil fed bronze
- Bronze impeller

ALL MODELS ARE COMPLETELY SUBMERSIBLE HERMETICALLY SEALED

Watertight - dust tight. Permanently oiled bearings.

VARIABLE LEVEL CONTROL SYSTEMS AVAILABLE

Note: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

53 - 57 Cast Iron Series 55 - 59 Bronze Series

(For Pump Prefix Identification see News & Views 0052)

"MIGHTY-MATE"

**SUBMERSIBLE PUMP
FOR
DEWATERING (SUMP)
OR**

EFFLUENT (SEPTIC TANK SYSTEMS)

**PASSES ½" SOLIDS
1½" NPT DISCHARGE**



Tested to UL Standard UL778



C SA US
(Tested to UL778 and CSA22.2 106 Standards)



AUTOMATIC MODEL



VORTEX TYPE IMPELLER



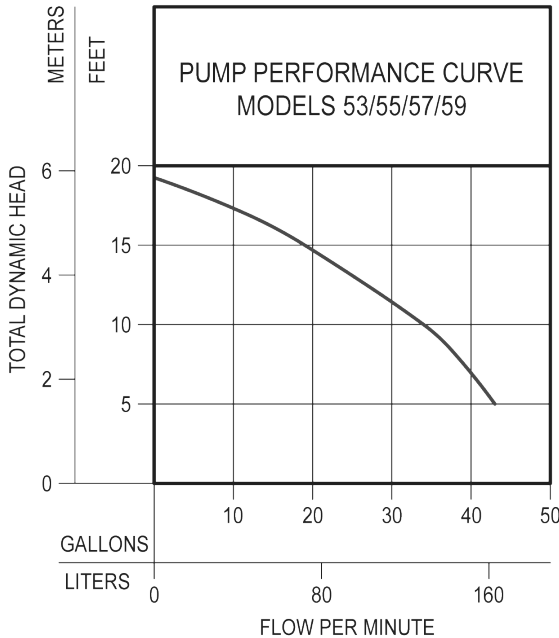
BN MODEL



MODELS AVAILABLE

- Automatic or Nonautomatic
- "53 - 57" - .3 HP, 115V or 230V
- "55 - 59" - .3 HP, 115V or 230V
- BE53/BE57 & BN53/BN57 available packaged with Piggyback Variable Level Float Switch

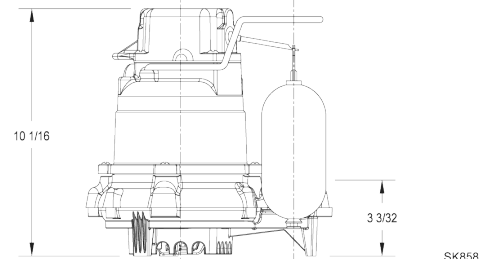
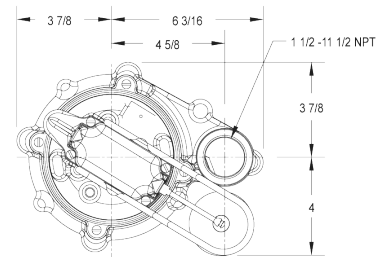
53-57 CAST IRON SERIES



TOTAL DYNAMIC HEAD/FLOW PER MINUTE
EFFLUENT AND DEWATERING

| MODEL | | 53/55/57/59 | |
|----------------|--------|-----------------|--------|
| Feet | Meters | Gal. | Liters |
| 5 | 1.5 | 43 | 163 |
| 10 | 3.0 | 34 | 129 |
| 15 | 4.6 | 19 | 72 |
| Shut-off Head: | | 19.25 ft.(5.9m) | |

009897



CONSULT FACTORY FOR SPECIAL APPLICATIONS

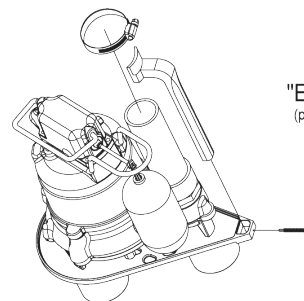
- Variable level float switches available
- Variable level long cycle systems available
- Available with special cord lengths of 15', 25', 35', (50' 230V only)
- Alarm systems available
- Duplex systems available

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. Single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. Mechanical alternator "M-Pak" 10-0072 or 10-0075.
4. See FM0712 for correct model of Electrical Alternator.
5. Variable level control switch 10-0225 used as a control activator, with Electrical Alternator (3) or (4) float system.

| Single Seal Model | Control Selection | | | | | | Listings | |
|-------------------|-------------------|-------|------|------|---------|------------|----------|----|
| | Volts | Phase | Mode | Amps | Simplex | Duplex | CSA | UL |
| M53/55 & M57/59 | 115 | 1 | Auto | 9.7 | 1 | ----- | Y | Y |
| N53/55 & N57/59 | 115 | 1 | Non | 9.7 | 2 | 3 or 4 & 5 | Y | Y |
| * BN53 | 115 | 1 | Auto | 9.7 | * | ----- | Y | Y |
| * BN57 | 115 | 1 | Auto | 9.7 | * | ----- | N | Y |
| * BE53/57 | 230 | 1 | Auto | 4.8 | * | ----- | Y | Y |
| D53/55 & D57/59 | 230 | 1 | Auto | 4.8 | 1 | ----- | Y | Y |
| E53/55 & E57/59 | 230 | 1 | Non | 4.8 | 2 | 3 or 4 & 5 | Y | Y |

* Single piggyback switch included.



"Easy assembly"
(pump & discharge pipe not included.)

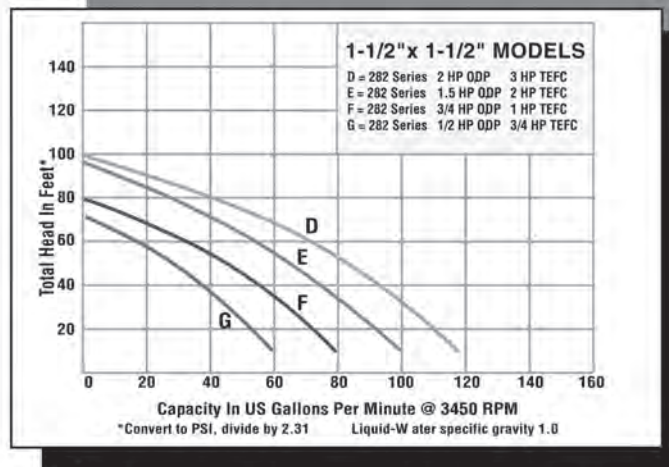
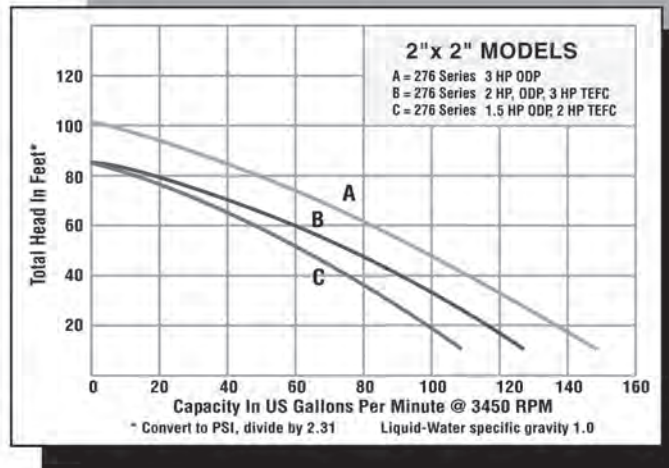
OPTIONAL PUMP STAND P/N 10-2421

- Reduces potential clogging by debris
 - Replaces rocks or bricks under the pump
 - Made of durable, noncorrosive ABS
 - Raises pump 2" off bottom of basin
 - Provides the ability to raise intake by adding sections of 1 1/2" or 2" PVC piping
 - Attaches securely to pump
 - Accommodates sump, dewatering and effluent applications
- NOTE: Make sure float is free from obstruction.



SELF-PRIMING CENTRIFUGAL PUMPS

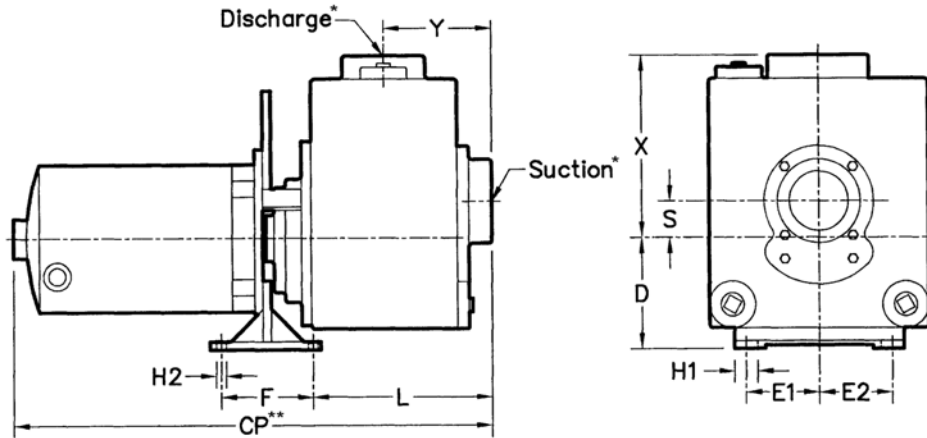
- > **300 Series Investment Cast Stainless Steel Construction with Viton® Seals; Maximum Temperature 200° F**
- > **Cast Iron Construction with Buna-N Seals; Maximum Temperature 180° F**
- > **Optional Silicon Carbide Seals Available**
- > **1-1/2" and 2" NPT Port Sizes**
- > **Self-Priming up to 20 Ft.**
- > **Maximum Working Pressure 75 PSI**
- > **Maximum Flow 150 GPM**
- > **Maximum Head 102 Ft. (44 PSI)**
- > **Dual Volute Design**
- > **Self-cleaning, Clog Resistant Impeller**
- > **Built In Check Valve**
- > **Available with Open Drip Proof (ODP) or Totally Enclosed Fan Cooled (TEFC) Motors**
- > **1/2 to 3 HP 56J Single and Three Phase, 3450 RPM Motors**



This line of AMT Self-priming Centrifugal pumps is designed for Industrial and Commercial applications requiring high volume liquid transfer, waste water drainage and processing. These pumps feature self-cleaning clog resistant impeller capable of handling up to 3/8" diameter semi-solids. Built in flapper/check valves enable consistent self-priming to 20 ft. Dual volute design reduces radial load on motor. Stainless Steel models are especially effective in applications where rust and/or corrosion can develop in systems and also are highly resistant to erosion and chemicals. Cast Iron models offer durability, high quality and value that continue to set the standard in the industry.

AMT Centrifugal pumps are reliable, cost effective and low maintenance. Many are readily available "Off-the-Shelf" for fast 24 hour shipment. For use with non-flammable liquids compatible with pump component materials.

SELF-PRIMING CENTRIFUGAL PUMPS



Pump Dimensional & Specification Chart

| Cast Iron Models | Curve | Stainless Models | HP | PH | ENC | Voltage @ 60 Hz+ | Full Load Amps | SUC* | DIS* | CP** | D | E1 | E2 | F | H1 | H2 | L | S | X | Y | Cast Iron Ship Wt | Stainless Ship Wt |
|------------------|-------|------------------|-------|----|------|------------------|----------------|--------|--------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------|-------------------|
| 2827-95 | G | 2827-98 | 1/2 | 1 | ODP | 115/230 | 10/5 | 1-1/2" | 1-1/2" | 16.9 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 47 Lbs. | 50 Lbs. |
| 282J-95 | G | 282J-98 | 1/2 | 3 | ODP | 230/460 | 4/2 | 1-1/2" | 1-1/2" | 17.4 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 51 Lbs. | 53 Lbs. |
| 2825-95 | F | 2825-98 | 3/4 | 1 | ODP | 115/230 | 13/7 | 1-1/2" | 1-1/2" | 17.6 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 50 Lbs. | 53 Lbs. |
| 2826-95 | F | 2826-98 | 3/4 | 3 | ODP | 230/460 | 4/2 | 1-1/2" | 1-1/2" | 17.8 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 50 Lbs. | 53 Lbs. |
| 282D-95 | G | 282D-98 | 3/4 | 1 | TEFC | 115/230 | 9/5 | 1-1/2" | 1-1/2" | 19.0 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 52 Lbs. | 55 Lbs. |
| 282F-95 | G | 282F-98 | 3/4 | 3 | TEFC | 230/460 | 3/2 | 1-1/2" | 1-1/2" | 18.4 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 49 Lbs. | 52 Lbs. |
| 282C-95 | F | 282C-98 | 1 | 1 | TEFC | 115/230 | 12/6 | 1-1/2" | 1-1/2" | 19.4 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 55 Lbs. | 58 Lbs. |
| 282K-95 | F | 282K-98 | 1 | 3 | TEFC | 230/460 | 4/2 | 1-1/2" | 1-1/2" | 19.0 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 51 Lbs. | 54 Lbs. |
| 282I-95 | E | 282I-98 | 1-1/2 | 1 | ODP | 115/230 | 22/11 | 1-1/2" | 1-1/2" | 16.8 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 62 Lbs. | 65 Lbs. |
| 2822-95 | E | 2822-98 | 1-1/2 | 3 | ODP | 230/460 | 7/4 | 1-1/2" | 1-1/2" | 16.6 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 58 Lbs. | 61 Lbs. |
| 2828-95 | D | 2828-98 | 2 | 1 | ODP | 115/230 | 28/14 | 1-1/2" | 1-1/2" | 17.6 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 69 Lbs. | 72 Lbs. |
| 282L-95 | D | 282L-98 | 2 | 3 | ODP | 230/460 | 7/4 | 1-1/2" | 1-1/2" | 17.7 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 68 Lbs. | 71 Lbs. |
| 282A-95 | E | 282A-98 | 2 | 1 | TEFC | 115/230 | 22/11 | 1-1/2" | 1-1/2" | 19.2 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 74 Lbs. | 77 Lbs. |
| 282B-95 | E | 282B-98 | 2 | 3 | TEFC | 230/460 | 6/3 | 1-1/2" | 1-1/2" | 18.0 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 69 Lbs. | 71 Lbs. |
| 282E-95 | D | 282E-98 | 3 | 1 | TEFC | 230 | 16 | 1-1/2" | 1-1/2" | 20.0 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 80 Lbs. | 83 Lbs. |
| 282M-95 | D | 282M-98 | 3 | 3 | TEFC | 230/460 | 8/4 | 1-1/2" | 1-1/2" | 20.8 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 5.4 | 0.9 | 5.1 | 3.5 | 80 Lbs. | 83 Lbs. |
| 2762-95 | C | 2762-98 | 1-1/2 | 1 | ODP | 115/230 | 17/9 | 2" | 2" | 18.4 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 68 Lbs. | 72 Lbs. |
| 2764-95 | C | 2764-98 | 1-1/2 | 3 | ODP | 230/460 | 7/4 | 2" | 2" | 18.6 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 69 Lbs. | 73 Lbs. |
| 2761-95 | B | 2761-98 | 2 | 1 | ODP | 115/230 | 28/14 | 2" | 2" | 19.1 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 74 Lbs. | 78 Lbs. |
| 276B-95 | C | 276B-98 | 2 | 1 | TEFC | 115/230 | 22/11 | 2" | 2" | 20.7 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 79 Lbs. | 83 Lbs. |
| 2763-95 | B | 2763-98 | 2 | 3 | ODP | 230/460 | 7/4 | 2" | 2" | 19.1 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 67 Lbs. | 71 Lbs. |
| 276D-95 | C | 276D-98 | 2 | 3 | TEFC | 230/460 | 6/3 | 2" | 2" | 19.4 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 68 Lbs. | 72 Lbs. |
| 2767-95 | A | 2767-98 | 3 | 1 | ODP | 230 | 18 | 2" | 2" | 20.2 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 76 Lbs. | 79 Lbs. |
| 276A-95 | B | 276A-98 | 3 | 1 | TEFC | 230 | 16 | 2" | 2" | 21.4 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 79 Lbs. | 83 Lbs. |
| 2766-95 | A | 2766-98 | 3 | 3 | ODP | 230/460 | 9/5 | 2" | 2" | 19.9 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 74 Lbs. | 78 Lbs. |
| 276C-95 | B | 276C-98 | 3 | 3 | TEFC | 230/460 | 8/4 | 2" | 2" | 20.9 | 4.5 | 2.2 | 2.2 | 3.0 | 0.5 | 0.7 | 6.7 | 1.2 | 6.7 | 4.4 | 76 Lbs. | 80 Lbs. |

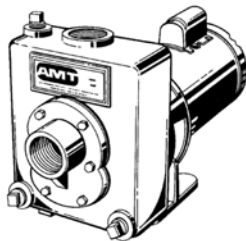
(*) Standard NPT (female) pipe thread.

(**) This dimension may vary due to motor manufacturer's specifications.

(+) 3-Phase motors can also operate on 50 Hz. (This will change Full Load Amps, Service Factor, RPM and Priming Capabilities)

NOTE: Dimensions have a tolerance of ±1/8".

NOTE: Electric supply for ALL motors must be within ±10% of nameplate voltage rating (Ex. 230V ±10%= 207 to 253)



Standard Features

- ▶ 300 Series Investment Cast Stainless Steel Construction with Viton® seals, Max. Temperature 200° F
- ▶ Cast Iron Construction with Buna-N seals, Max. Temperature 180° F
- ▶ Dual Volute Design
- ▶ Handles 3/8" Diameter Semi-solids
- ▶ Self-cleaning, Clog Resistant Impeller
- ▶ Built in Flapper/Check Valve
- ▶ Steel Base and Handle
- ▶ "Off-the-Shelf" Availability for Many Models
- ▶ Nema 56J Motors with Stainless Steel Shafts
- ▶ Available in ODP or TEFC, Single or Three Phase
- ▶ Self-priming to 20 Ft.



ENGINE DRIVEN HIGH PRESSURE PUMPS

- ▶ **Cast Iron and Aluminum Construction**
- ▶ **Dual Volute Design on Single Stage Models**
- ▶ **Buna-N Mechanical Seal and O-Ring**
- ▶ **Optional Vitor® Mechanical Seal & O-Ring Available on Single Stage Models**
- ▶ **Single and Two Stage Models Available**
- ▶ **1-1/2" and 2" NPT Port Size**
- ▶ **Self-Priming***
- ▶ **Stainless Steel Closed Impellers on 396/478 Series Models**
- ▶ **Aluminum Closed Impellers on 583 Series Models**
- ▶ **Engine Options: Honda or Briggs & Stratton Gasoline or Yanmar Diesel**
- ▶ **Pumps Include Heavy Duty Steel Roll Frame**
- ▶ **Wheel Kits Available with Semi-Pneumatic or Pneumatic Wheels**

* Requires Foot Valve Above 10ft.



1.5" 2 Stage High Pressure Pumps

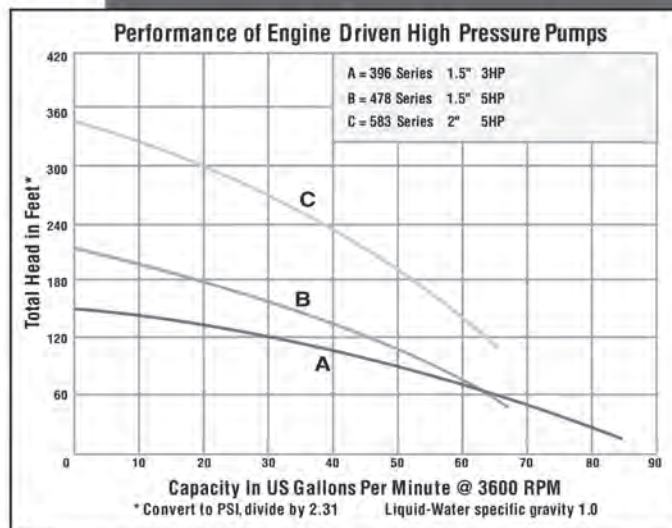
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1.5" High Pressure Pumps with Wheel Kit A734-90

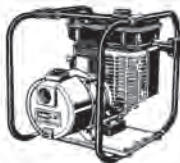
The AMT line of Engine Driven High Pressure pumps is designed for lawn sprinkling, agricultural spraying, dewatering, fire fighting, emergency water supply and pressure boosting. Single stage models feature replaceable Cast Iron dual volutes and stainless steel high efficiency closed impellers. Two-stage models feature Cast Iron diffusers and closed impellers for high efficiency producing up to 155 PSI that generally requires 8 horsepower or more from a single stage pump. Pumps offer a broad selection of gasoline engines from the leading engine manufacturers with dependable service worldwide. All models include Cast Iron pipe nipples and rugged steel roll frame for protection and durability.

AMT Engine Driven High Pressure pumps are reliable, cost effective and low maintenance. Many are readily available "Off-the-Shelf" for fast 24 hour shipment. For use with non-flammable liquids which are compatible with pump component materials.





ENGINE DRIVEN HIGH PRESSURE PUMPS



1-1/2" High Pressure Pumps (Single Stage)

| Model# | Driver | Ship Wt. | Run Time | Tank Size |
|---------|---------|----------|----------|-----------|
| 3960-95 | B&S 525 | 50 Lbs. | 180 Min. | 3 Qt. |

Cast Iron Construction with Stainless Steel Impellers



1-1/2" High Pressure Pumps (2 Stage)

| Model# | Driver | Ship Wt. | Run Time | Tank Size |
|---------|-------------|----------|----------|-----------|
| 4787-95 | B&S CP650 | 104 Lbs. | 120 Min. | 3 Qt. |
| 4789-95 | Honda GX160 | 99 Lbs. | 100 Min. | 3.8 Qt. |

Cast Iron Construction with Stainless Steel Impellers
 2 Stage Models Feature Oil Alert on Engines
 * Based on a Full Tank of Gas @ Maximum RPM (Approx.)
 + Overhead Valve Engine (OHV)

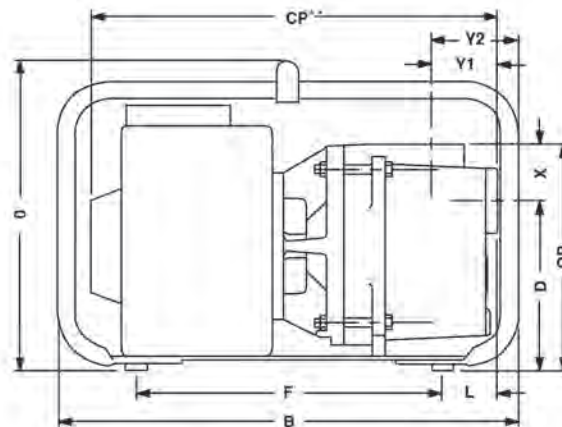
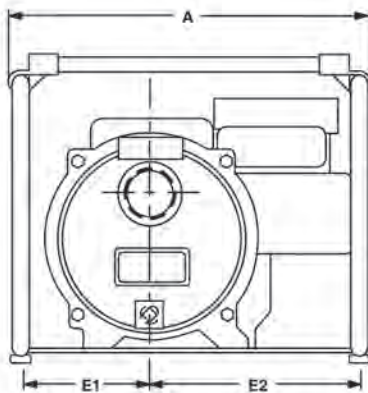
2" High Pressure Pumps (2 Stage)

| Model# | Driver | Ship Wt. | Run Time | Tank Size |
|---------|-------------------|----------|----------|-----------|
| 5830-96 | B&S CP650 | 70 Lbs. | 120 Min. | 3 Qt. |
| 5831-96 | Honda GX160 | 66 Lbs. | 100 Min. | 3.8 Qt. |
| 5830-D6 | Yanmar Diesel L48 | 87 Lbs. | 110 Min. | 2.6 Qt. |

Aluminum Construction

Standard Features

- > Two NPT Pipe Nipples
- > Buna-N Mechanical Seal and O-Ring
- > Optional Viton® Mechanical Seal and O-Ring Available on Single Stage
- > Self-primers to 10 ft. w/o Foot Valve on 2 Stage Models
- > Replaceable Volute/Diffuser
- > Stainless Steel High Efficiency Closed Impellers on 396/478 Series
- > Maximum Temperature 180° F
- > Maximum Working Pressure 150 PSI
- > Single Stage Models Deliver up to 70 PSI and 4500 GPH
- > Two Stage Models Deliver up to 150 PSI and 5000 GPH
- > Optional Wheel Kits
 A734-90 10" Semi Pneumatic
 A735-90 16" Pneumatic



| MODEL# | CURVE | HP Class** | A | B | CP** | D | E1 | E2 | F | L | D | OP | X | Y1 | Y2 |
|------------|-------|------------|------|------|------|-----|-----|------|-----|-----|------|------|-----|-----|-----|
| 396 Series | A | 3.5 HP | 15.5 | 19.0 | 17.5 | 6.8 | 5.0 | 10.0 | 8.5 | 4.5 | 16.0 | 9.5 | 2.6 | 3.5 | 4.6 |
| 395 Series | B | 5.5 HP | 19.5 | 24.3 | 19.0 | 8.5 | 7.0 | 11.0 | 9.3 | 6.0 | 20.0 | 11.5 | 3.0 | 3.5 | 5.3 |
| 478 Series | C | 5.5 HP | 19.5 | 24.3 | 19.0 | 7.1 | 7.0 | 11.0 | 9.3 | 6.5 | 20.0 | 9.7 | 2.6 | 3.1 | 4.1 |
| 583 Series | D | 5.5 HP | 19.5 | 24.3 | 19.0 | 6.0 | 7.0 | 11.0 | 9.3 | 6.5 | 20.0 | 15 | 8 | 4 | 5 |

(***) HP Class represents market category and is not intended to define actual horsepower.
 (***) This dimension may vary due to engine manufacturer's specifications.
NOTE: Dimensions have a tolerance of ±1/8".



2" AND 3" ENGINE DRIVEN TRASH PUMPS

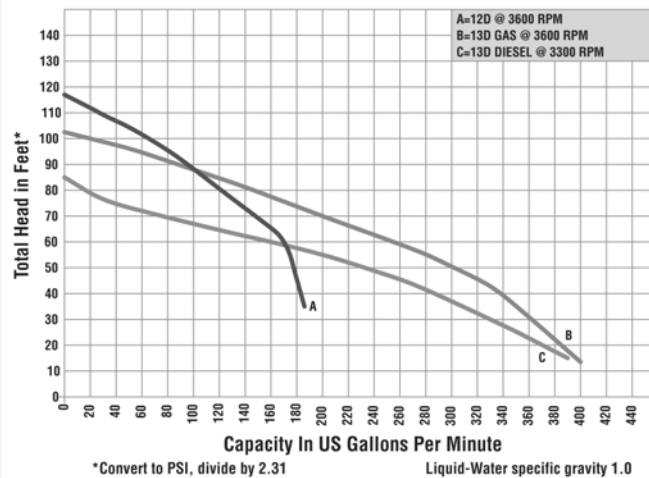


Model 13D1-GX240

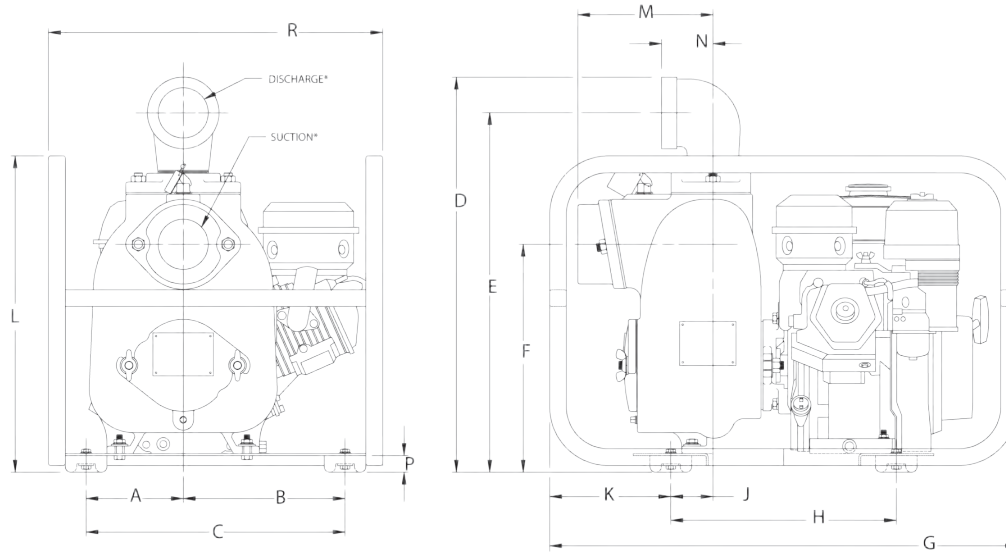
- > *Cast Aluminum Construction*
- > *Pump Includes Heavy Duty Steel Roll Cage*
- > *2" or 3" NPT Port Sizes*
- > *Self-Priming to 25 Ft.*
- > *Engine Options: B&S or Honda Gasoline; Yanmar Diesel*
- > *Available with 4.7 to 8 HP Engines*
- > *Solids Handling to 1-1/2" Diameter*
- > *Viton® /Silicon Carbide Mechanical Seals*

The Gorman-Rupp line of Engine Driven trash pumps is designed for applications which require high flow efficiency and solids handling capability. Pumps are constructed of heavy duty sand cast aluminum components featuring replaceable ductile iron impellers and steel wearplates. Simple front cleanout design permits easy removal of trash and debris without disconnecting hoses. Pumps are available with Briggs & Stratton or Honda gasoline engine or Yanmar diesel engine. All are furnished with heavy-duty steel roll cages, suction strainers, and 90 degree discharge elbows.

Composite of Performance Curves



2" AND 3" ENGINE DRIVEN TRASH PUMPS



DIMENSIONS:
INCHES
(MILLIMETERS)

| MODEL | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | SUCT* | DISCH* |
|----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|-----------------|------------------|-----------------|----------------|----------------|------------------|-------|--------|
| 12D1-GX160 | 6.12 [155.4] | 10.88 [276.4] | 17.00 [431.8] | 20.94 [531.9] | 19.47 [494.5] | 10.84 [275.3] | 22.00 [558.8] | 12.00 [304.8] | 2.56 [65.0] | 5.00 [127.0] | 18.12 [460.2] | 6.00 [152.4] | 2.25 [57.2] | .62 [15.7] | 18.00 [457.2] | 2.00 | 2.00 |
| 12D1-L48EE | 8.50 [215.9] | 8.50 [215.9] | 17.00 [431.8] | 21.56 [547.6] | 20.12 [511.0] | 11.44 [290.6] | 22.00 [558.8] | 12.00 [304.8] | .96 [24.4] | 5.00 [127.0] | 18.12 [460.2] | 5.96 [151.4] | 2.25 [57.2] | .62 [15.7] | 18.00 [457.2] | 2.00 | 2.00 |
| 13D1-GX270 | 5.81 [147.6] | 9.69 [246.1] | 15.50 [393.7] | 23.62 [599.9] | 21.50 [546.1] | 13.62 [345.9] | 28.00 [711.2] | 13.50 [342.9] | 3.06 [77.7] | 7.25 [184.2] | 18.90 [480.1] | 8.06 [204.7] | 3.08 [78.2] | 1.00 [25.4] | 20.00 [508.0] | 3.00 | 3.00 |
| 13D1-L70EE | 9.81 [249.2] | 10.19 [258.8] | 20.00 [508.0] | 24.41 [620.0] | 22.28 [565.9] | 14.44 [366.8] | 28.00 [711.2] | 13.50 [342.9] | 2.28 [57.9] | 7.25 [184.2] | 20.87 [530.1] | 8.06 [204.7] | 3.08 [78.2] | 1.00 [25.4] | 21.00 [533.4] | 3.00 | 3.00 |
| 13D1-L70EE S/G | 9.81 [249.2] | 10.19 [258.8] | 20.00 [508.0] | 24.41 [620.0] | 22.28 [565.9] | 14.44 [366.8] | 28.00 [711.2] | 13.50 [342.9] | 2.28 [57.9] | 7.25 [184.2] | 20.87 [530.1] | 8.06 [204.7] | 3.08 [78.2] | 1.00 [25.4] | 21.00 [533.4] | 3.00 | 3.00 |

(*) STANDARD NPT PIPE THREADS.

2" & 3" ENGINE DRIVEN TRASH PUMPS

| Model No. | Description/ Type of Pump | Ship Wt (lbs.) | Driver Type & HP | Port size Suc x dis (NPT) | Basic Construction | Seal Type & Elastomer/ Faces | Tank Size (Qts.) | Run time | Mounting |
|----------------|------------------------------|----------------|------------------|---------------------------|--------------------|------------------------------------|------------------|-----------|-----------|
| 12D1-GX160 | 2" Engine Driven Trash Pumps | 84 | Honda 5.5 | 2" x 2" | Alum | Viton [®] Silicon-Carbide | 0.95 gal. | 2.03 hrs. | Roll Cage |
| 12D1-L48EE | 2" Engine Driven Trash Pumps | 138 | Yanmar 4.7 | 2" x 2" | Alum | Viton [®] Silicon-Carbide | 0.66 gal. | 1.8 hrs. | Roll Cage |
| 13D1-GX270 | 3" Engine Driven Trash Pumps | 136 | Honda 9 | 3" x 3" | Alum | Viton [®] Silicon-Carbide | 1.6 gal. | 2.7 hrs. | Roll Cage |
| 13D1-L70EE | 3" Engine Driven Trash Pumps | 124 | Yanmar 6.7 | 3" x 3" | Alum | Viton [®] Silicon-Carbide | 0.92 gal. | 2.2 hrs. | Roll Cage |
| 13D1-L70EE S/G | 3" Engine Driven Trash Pumps | 124 | Yanmar 6.7 | 3" x 3" | Alum | Viton [®] Silicon-Carbide | 0.92 gal. | 2.2 hrs. | Roll Cage |

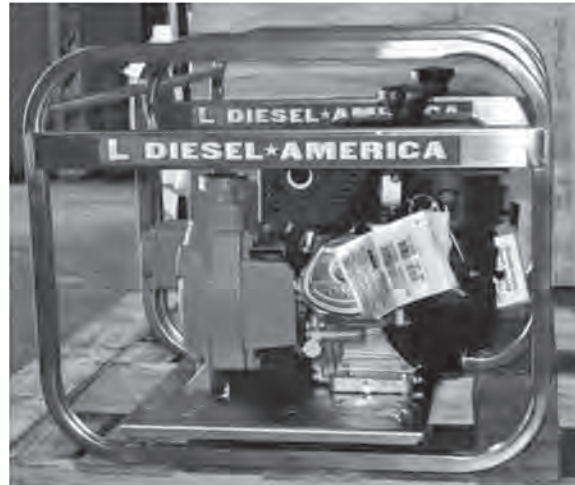
*Viton[®] is a registered trademark of DuPont.

Standard Features

- Suction Strainer and 90° Discharge Elbow
- Self-primers to 25 ft. with Built-in Flapper Valve
- Replaceable Ductile Iron Impeller and Steel Wearplate
- Maximum Temperature 160° F
- Maximum Operating Pressure to 78 PSI
- Mechanical Seals
- Engine Options: Briggs & Stratton or Honda Gasoline; Yanmar Diesel
- Electric start (13D1-L70EE S/G)

WARNING: Do not use in explosive atmosphere or for pumping volatile flammable liquids.

PORTABLE FIRE PUMPS

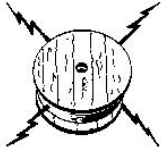


GASOLINE OR DIESEL ENGINE POWERED

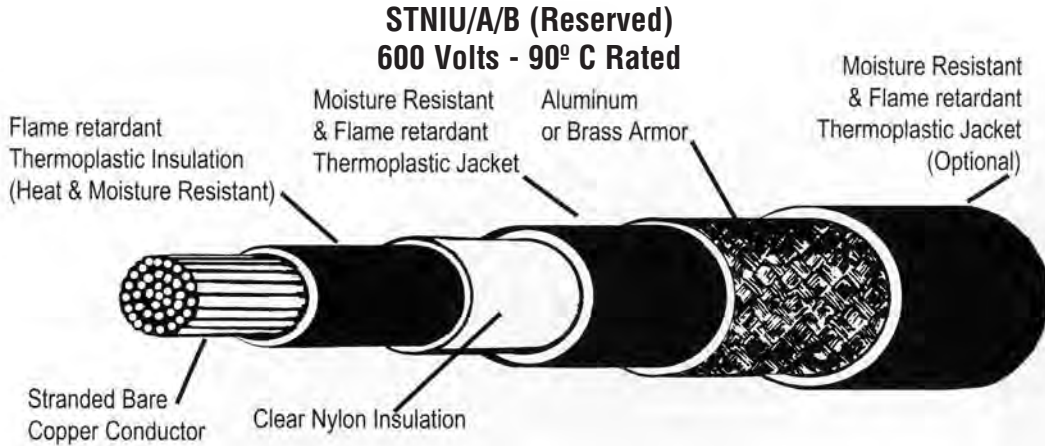
6

Standard Features:

- Overhead Valve Design
- Electronic Ignition
- Quad-Clean™ 4-Stage All-Season Heavy Duty Cyclonic Air Cleaner
- Dual Oil Fill Locations and Oil Drains
- Cast Iron Cylinder Liner
- 6.5 L Metal Tank w/Strainer
- Fuel Shut-off Valve
- Stellite® Exhaust Valve
- Oil Sentry™ Switch Installed (No Light)
- Dual Ball Bearings, PTO and Flywheel
- Balance Shaft
- Metal Blower Housing
- Indexable Recoil Starter
- Crankshaft - 1.0" (25.4 mm) Diameter x 3.49" (88.61 mm) PTO Length, Tapped 7/16-20 UNF
- PTO Face - 6.5" (165.1 mm) Diameter Bolt Circle (4 Holes) 3/8-16 UNC x 0.71" (18 mm) Deep and 5" (127 mm) Diameter Bolt Circle (4 Holes) 5/16-24 UNF x 0.71" (18 mm) Deep
- Large Capacity Muffler w/Heat Shield and Spark Arrestor
- Owner's Manual - Quad-language manual (English, Spanish, French, Chinese)
- 50 State Engine
- ABS type approval



COMMERCIAL SHIPBOARD CABLES



U.L. Listed Marine Shipboard Cable (UBVZ) E-83070 Specification #474

**STNIA™
STNIB™**

Product Description:

- Stranded Copper Conductor
- PVC/Nylon Insulated
- Thermoplastic Jacketed
- Armor (Optional)
- Flame Retardant

- Per IEEE Std 45
- Aluminum (A); Bronze (B); or Unarmored (U)
- Optional: Overall thermoplastic jacket in accordance with ICEA standards

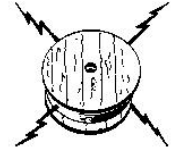
Acceptance by Classification Societies & Governing Bodies

- ABS:** American Bureau of Shipping
- USCG:** United States Coast Guard
- Lloyd's:** Lloyd's Register of Shipping
- BV:** Bureau Veritas

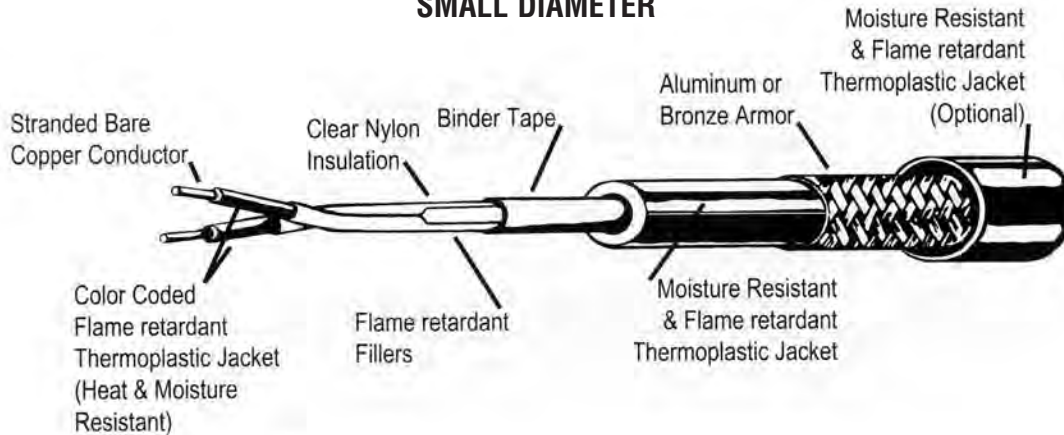
| CABLE TYPE | SIZE | EACH CONDUCTOR | | | | | Nom. Cable O.D. | | Approx Net Weight Lbs/M Ft | | | Copper Weight Lbs/M Ft |
|----------------|------|----------------|-----|---------------|---|-----------------------------------|-----------------|------|----------------------------|-------|-------|------------------------|
| | | AWG Size | STR | Circular Mils | Nom. Cross Sec. Area (mm ²) | Current Carrying Capacity @ 45° C | Inches | mm | U | A | B | |
| STNIU/A/B-3 | 3 | 16 | 7 | 2,583 | 1.31 | 21 | 0.27" | 6.9 | 32 | 45 | 74 | 8 |
| STNIU/A/B-4 | 4 | 14 | 7 | 4,107 | 2.08 | 34 | 0.29" | 7.4 | 38 | 51 | 80 | 13 |
| STNIU/A/B-6 | 6 | 12 | 7 | 6,530 | 3.31 | 43 | 0.31" | 7.9 | 47 | 60 | 89 | 20 |
| STNIU/A/B-10 | 10 | 10 | 7 | 10,380 | 5.26 | 54 | 0.34" | 8.6 | 67 | 83 | 118 | 32 |
| STNIU/A/B-16 | 16 | 8 | 7 | 16,510 | 8.36 | 68 | 0.40" | 10.2 | 101 | 119 | 162 | 51 |
| STNIU/A/B-26 | 26 | 6 | 7 | 26,250 | 13.30 | 88 | 0.44" | 11.2 | 140 | 161 | 210 | 81 |
| STNIU/A/B-41 | 41 | 4 | 7 | 41,740 | 21.14 | 118 | 0.52" | 13.2 | 210 | 237 | 304 | 129 |
| STNIU/A/B-66 | 66 | 2 | 7 | 66,370 | 33.62 | 156 | 0.58" | 14.7 | 317 | 346 | 417 | 205 |
| STNIU/A/B-83 | 83 | 1 | 19 | 83,690 | 42.40 | 180 | 0.67" | 17.0 | 391 | 424 | 506 | 258 |
| STNIU/A/B-106 | 106 | 1/0 | 19 | 105,500 | 53.44 | 207 | 0.71" | 18.0 | 472 | 505 | 587 | 326 |
| STNIU/A/B-133 | 133 | 2/0 | 19 | 133,100 | 67.43 | 240 | 0.76" | 19.3 | 572 | 607 | 691 | 411 |
| STNIU/A/B-168 | 168 | 3/0 | 19 | 167,800 | 85.01 | 278 | 0.82" | 20.8 | 694 | 734 | 825 | 518 |
| STNIU/A/B-212 | 212 | 4/0 | 19 | 211,600 | 107.19 | 324 | 0.87" | 22.1 | 847 | 890 | 987 | 653 |
| STNIU/A/B-250 | 250 | 250 MCM | 37 | 250,000 | 126.65 | 359 | 1.00" | 25.4 | 1,053 | 1,100 | 1,209 | 772 |
| STNIU/A/B-300 | 300 | 300 MCM | 37 | 300,000 | 151.98 | 412 | 1.05" | 26.7 | 1,244 | 1,294 | 1,409 | 926 |
| STNIU/A/B-350 | 350 | 350 MCM | 37 | 350,000 | 177.30 | 446 | 1.10" | 27.9 | 1,411 | 1,464 | 1,586 | 1,081 |
| STNIU/A/B-400 | 400 | 400 MCM | 37 | 400,000 | 202.63 | 489 | 1.15" | 29.2 | 1,604 | 1,660 | 1,789 | 1,235 |
| STNIU/A/B-500 | 500 | 500 MCM | 37 | 500,000 | 253.29 | 560 | 1.25" | 31.8 | 1,942 | 2,004 | 2,147 | 1,544 |
| STNIU/A/B-750 | 750 | 750 MCM | 61 | 750,000 | 379.94 | 723 | 1.43" | 36.3 | 2,850 | 2,924 | 3,089 | 2,316 |
| STNIU/A/B-1000 | 1000 | 1000 MCM | 61 | 1,000,000 | 506.59 | 867 | 1.58" | 40.1 | 3,740 | 3,820 | 4,004 | 3,088 |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

COMMERCIAL SHIPBOARD CABLES



**DTNIU/A/B (Reserved)
600 Volts - 90° C Rated
SMALL DIAMETER**



**U.L. Listed Marine Shipboard Cable (UBVZ) E-83070
Specification #474**

**DTNIA™
DTNIB™**

Product Description:

- Stranded Copper Conductor
- PVC/Nylon Insulated
- Thermoplastic Jacketed
- Armor (Optional)
- Flame Retardant

- Per IEEE Std 45
- Aluminum (A); Bronze (B); or Unarmored (U)
- Optional: Overall thermoplastic jacket in accordance with ICEA standards

Acceptance by Classification Societies & Governing Bodies

- ABS:** American Bureau of Shipping
- USCG:** United States Coast Guard
- Lloyd's:** Lloyd's Register of Shipping
- BV:** Bureau Veritas

| CABLE TYPE | SIZE | EACH CONDUCTOR | | | | | Nom. Cable O.D. | | Approx Net Weight Lbs/M Ft | | | Copper Weight Lbs/M Ft |
|---------------|------|----------------|-----|----------------|---|-----------------------------------|-----------------|------|----------------------------|-------|-------|------------------------|
| | | AWG Size | STR | Circular Mills | Nom. Cross Sec. Area (mm ²) | Current Carrying Capacity @ 45° C | Inches | mm | U | A | B | |
| DTNIU/A/B-3 | 3 | 16 | 7 | 2,583 | 1.31 | 18 | 0.39" | 9.9 | 62 | 80 | 123 | 17 |
| DTNIU/A/B-4 | 4 | 14 | 7 | 4,107 | 2.08 | 29 | 0.43" | 10.9 | 83 | 104 | 153 | 26 |
| DTNIU/A/B-6 | 6 | 12 | 7 | 6,530 | 3.31 | 36 | 0.47" | 11.9 | 105 | 129 | 193 | 41 |
| DTNIU/A/B-10 | 10 | 10 | 7 | 10,380 | 5.26 | 46 | 0.53" | 13.5 | 151 | 179 | 245 | 65 |
| DTNIU/A/B-16 | 16 | 8 | 7 | 16,510 | 8.36 | 60 | 0.68" | 17.3 | 245 | 278 | 360 | 104 |
| DTNIU/A/B-26 | 26 | 6 | 7 | 26,250 | 13.30 | 79 | 0.76" | 19.3 | 352 | 387 | 471 | 165 |
| DTNIU/A/B-41 | 41 | 4 | 7 | 41,740 | 21.14 | 101 | 0.97" | 24.6 | 554 | 601 | 710 | 263 |
| DTNIU/A/B-66 | 66 | 2 | 7 | 66,370 | 33.62 | 137 | 1.09" | 27.7 | 779 | 832 | 954 | 418 |
| DTNIU/A/B-83 | 83 | 1 | 19 | 83,690 | 42.40 | 161 | 1.21" | 30.7 | 963 | 1,022 | 1,158 | 527 |
| DTNIU/A/B-106 | 106 | 1/0 | 19 | 105,500 | 53.44 | 183 | 1.29" | 32.8 | 1,140 | 1,205 | 1,355 | 665 |
| DTNIU/A/B-133 | 133 | 2/0 | 19 | 133,100 | 67.43 | 233 | 1.39" | 35.3 | 1,365 | 1,436 | 1,596 | 838 |
| DTNIU/A/B-168 | 168 | 3/0 | 19 | 167,800 | 85.01 | 245 | 1.51" | 38.4 | 1,638 | 1,714 | 1,885 | 1,057 |
| DTNIU/A/B-212 | 212 | 4/0 | 19 | 211,600 | 107.19 | 284 | 1.61" | 40.9 | 1,985 | 2,065 | 2,249 | 1,333 |
| DTNIU/A/B-250 | 250 | 250 MCM | 37 | 250,000 | 126.65 | 316 | 1.83" | 46.5 | 2,472 | 2,566 | 2,781 | 1,575 |
| DTNIU/A/B-300 | 300 | 300 MCM | 37 | 300,000 | 151.98 | 354 | 1.93" | 49.0 | 2,916 | 3,016 | 3,243 | 1,890 |
| DTNIU/A/B-350 | 350 | 350 MCM | 37 | 350,000 | 177.30 | 387 | 2.03" | 51.6 | 3,309 | 3,415 | 3,654 | 2,205 |
| DTNIU/A/B-400 | 400 | 400 MCM | 37 | 400,000 | 202.63 | 419 | 2.13" | 54.1 | 3,756 | 3,867 | 4,119 | 2,519 |
| DTNIU/A/B-500 | 500 | 500 MCM | 37 | 500,000 | 253.29 | 479 | 2.33" | 59.2 | 4,526 | 4,649 | 4,935 | 3,150 |



600 Volts - 90° C Rated



TTNIA

Basically same construction as DTNIA/B, but with three conductors.

U.L. Listed Marine Shipboard Cable (UBVZ) E-83070 Specification #474

Product Description:

- Stranded Copper Conductor
- PVC/Nylon Insulated
- Thermoplastic Jacketed
- Armor (Optional)
- Flame Retardant
- Per IEEE Std 45

- Aluminum (A); Bronze (B); or Unarmored (U)
- Optional: Overall thermoplastic jacket in accordance with ICEA standards

Acceptance by Classification Societies & Governing Bodies

ABS: American Bureau of Shipping

USCG: United States Coast Guard

Lloyd's: Lloyd's Register of Shipping

BV: Bureau Veritas

| CABLE TYPE | SIZE | EACH CONDUCTOR | | | | | Nom. Cable O.D. | | Approx Net Weight Lbs/M Ft | | | Copper Weight Lbs/M Ft |
|---------------|------|----------------|-----|---------------|---|-----------------------------------|-----------------|------|----------------------------|-------|-------|------------------------|
| | | AWG Size | STR | Circular Mils | Nom. Cross Sec. Area (mm ²) | Current Carrying Capacity @ 45° C | Inches | mm | U | A | B | |
| TTNIU/A/B-3 | 3 | 16 | 7 | 2,583 | 1.31 | 15 | 0.40" | 10.2 | 74 | 92 | 135 | 24 |
| TTNIU/A/B-4 | 4 | 14 | 7 | 4,107 | 2.08 | 24 | 0.45" | 11.4 | 102 | 123 | 172 | 39 |
| TTNIU/A/B-6 | 6 | 12 | 7 | 6,530 | 3.31 | 29 | 0.49" | 12.4 | 137 | 161 | 225 | 62 |
| TTNIU/A/B-10 | 10 | 10 | 7 | 10,380 | 5.26 | 38 | 0.55" | 14.0 | 193 | 220 | 287 | 99 |
| TTNIU/A/B-16 | 16 | 8 | 7 | 16,510 | 8.36 | 48 | 0.71" | 18.0 | 327 | 360 | 442 | 157 |
| TTNIU/A/B-26 | 26 | 6 | 7 | 26,250 | 13.30 | 65 | 0.80" | 20.3 | 454 | 491 | 577 | 249 |
| TTNIU/A/B-41 | 41 | 4 | 7 | 41,740 | 21.14 | 83 | 1.02" | 25.9 | 728 | 778 | 893 | 396 |
| TTNIU/A/B-66 | 66 | 2 | 7 | 66,370 | 33.62 | 111 | 1.15" | 29.2 | 1,031 | 1,087 | 1,216 | 630 |
| TTNIU/A/B-83 | 83 | 1 | 19 | 83,690 | 42.40 | 131 | 1.28" | 32.5 | 1,284 | 1,349 | 1,499 | 795 |
| TTNIU/A/B-106 | 106 | 1/0 | 19 | 105,500 | 53.44 | 150 | 1.37" | 34.8 | 1,537 | 1,608 | 1,768 | 1,002 |
| TTNIU/A/B-133 | 133 | 2/0 | 19 | 133,100 | 67.43 | 173 | 1.48" | 37.6 | 1,865 | 1,941 | 2,112 | 1,264 |
| TTNIU/A/B-168 | 168 | 3/0 | 19 | 167,800 | 85.01 | 201 | 1.61" | 40.9 | 2,280 | 2,360 | 2,544 | 1,593 |
| TTNIU/A/B-212 | 212 | 4/0 | 19 | 211,600 | 107.19 | 232 | 1.71" | 43.4 | 2,878 | 2,964 | 3,160 | 2,009 |
| TTNIU/A/B-250 | 250 | 250 MCM | 37 | 250,000 | 126.65 | 259 | 1.95" | 49.5 | 3,388 | 3,488 | 3,715 | 2,374 |
| TTNIU/A/B-300 | 300 | 300 MCM | 37 | 300,000 | 151.98 | 290 | 2.06" | 52.3 | 4,009 | 4,115 | 4,354 | 2,848 |
| TTNIU/A/B-350 | 350 | 350 MCM | 37 | 350,000 | 177.30 | 317 | 2.16" | 54.9 | 4,552 | 4,663 | 4,915 | 3,324 |
| TTNIU/A/B-400 | 400 | 400 MCM | 37 | 400,000 | 202.63 | 342 | 2.27" | 57.7 | 5,223 | 5,342 | 5,623 | 3,798 |



FTNIA

Basically same construction as DTNIA/B, but with four conductors.

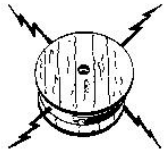
| Type Radius and Size | Ambient Temp. Amps | | No. Stds. | AWG Size | Cndr. Area C/M | Max. Over-all Diam. | | Approx. Net Wt. Per | | Min. of Bend Inches |
|----------------------|--------------------|--------|-----------|----------|----------------|---------------------|-------|---------------------|------|---------------------|
| | @ 40°C | @ 45°C | | | | in | Cm. | 1000 ft. Alum. | Brz. | |
| | Per Cndr. | | | | | | | | | |
| FTNIA (B) - 3 | 12 | 11 | 7 | 16 | 2,583 | 0.460 | 1.168 | 114 | 160 | 3.6 |
| FTNIA (B) - 4 | 25 | 24 | 7 | 14 | 4,107 | 0.520 | 1.321 | 131 | 186 | 4.2 |
| FTNIA (B) - 6 | 30 | 29 | 7 | 12 | 6,530 | 0.560 | 1.422 | 175 | 236 | 4.5 |
| FTNIA (B) - 10 | 40 | 38 | 7 | 10 | 10,380 | 0.660 | 1.676 | 262 | 331 | 5.1 |
| FTNIA (B) - 16 | 50 | 48 | 7 | 8 | 16,510 | 0.820 | 2.083 | 406 | 490 | 5.8 |
| FTNIA (B) - 26 | 68 | 65 | 7 | 6 | 26,250 | 0.960 | 2.438 | 604 | 708 | 6.3 |
| FTNIA (B) - 41 | 87 | 83 | 7 | 4 | 41,740 | 1.150 | 2.921 | 910 | 1035 | 8.6 |
| FTNIA (B) - 66 | 117 | 111 | 7 | 2 | 66,370 | 1.290 | 3.277 | 1304 | 1445 | 9.6 |
| FTNIA (B) - 83 | 138 | 131 | 19 | 1 | 83,690 | 1.460 | 3.708 | 1637 | 1793 | 11.1 |
| FTNIA (B) - 106 | 158 | 150 | 19 | 1/0 | 105,500 | 1.560 | 3.962 | 1974 | 2142 | 12.2 |
| FTNIA (B) - 133 | 182 | 173 | 19 | 2/0 | 133,100 | 1.700 | 4.318 | 2422 | 2605 | 13.4 |
| FTNIA (B) - 168 | 211 | 201 | 19 | 3/0 | 167,800 | 1.900 | 4.826 | 2994 | 3201 | 14.0 |
| FTNIA (B) - 212 | 244 | 232 | 19 | 4/0 | 211,600 | 2.050 | 5.207 | 3668 | 3892 | 15.2 |
| FTNIA (B) - 250 | 272 | 259 | 37 | 250 | 250,000 | 2.240 | 5.690 | 4330 | 4575 | 17.4 |
| FTNIA (B) - 300 | 305 | 290 | 37 | 300 | 300,000 | 2.390 | 6.071 | 5060 | 5321 | 18.6 |
| FTNIA (B) - 350 | 333 | 317 | 37 | 350 | 350,000 | 2.520 | 6.401 | 5811 | 6042 | 19.8 |
| FTNIA (B) - 400 | 359 | 342 | 37 | 400 | 400,000 | 2.640 | 6.706 | 6563 | 6853 | 20.8 |
| FTNIA (B) - 500 | 413 | 393 | 37 | 500 | 500,000 | 2.970 | 7.544 | 8038 | 8350 | 22.5 |

*M/R = Moisture Resistant

7

COMMERCIAL SHIPBOARD CABLES

600 Volts - 90° C Rated



MTNIA[®]™

Spec. #474

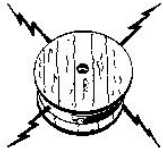
MTNIB[®]™

Multiple conductor, color coded, flame retardant thermoplastic and nylon insulated, *M/R and flame retardant thermoplastic jacketed, aluminum (A) or (B) armored, control cable.

No. 16 AWG

| Type and Size | No. of Cndrs. | AWG Size | Cndr. Area C/M | Max. Over-all Diam. | | Approx. Net Wt. Per 1000 Ft. | | Min. Radius of Bend |
|----------------|---------------|----------|----------------|---------------------|-------|------------------------------|-------|---------------------|
| | | | | In. | Cm. | Alum. | Brz. | Inches |
| | | | | MTNIA (B) - 4 | 4 | 16 | 2,580 | 0.440 |
| MTNIA (B) - 6 | 6 | 16 | 2,580 | 0.532 | 1.351 | 136 | 191 | 4.3 |
| MTNIA (B) - 7 | 7 | 16 | 2,580 | 0.532 | 1.351 | 149 | 204 | 4.3 |
| MTNIA (B) - 8 | 8 | 16 | 2,580 | 0.589 | 1.496 | 172 | 237 | 4.7 |
| MTNIA (B) - 10 | 10 | 16 | 2,580 | 0.672 | 1.707 | 217 | 285 | 5.4 |
| MTNIA (B) - 12 | 12 | 16 | 2,580 | 0.692 | 1.758 | 251 | 322 | 5.5 |
| MTNIA (B) - 14 | 14 | 16 | 2,580 | 0.718 | 1.824 | 278 | 349 | 5.7 |
| MTNIA (B) - 16 | 16 | 16 | 2,580 | 0.739 | 1.877 | 307 | 378 | 5.9 |
| MTNIA (B) - 20 | 20 | 16 | 2,580 | 0.782 | 1.986 | 364 | 438 | 6.3 |
| MTNIA (B) - 24 | 24 | 16 | 2,580 | 0.902 | 2.291 | 415 | 498 | 7.2 |
| MTNIA (B) - 30 | 30 | 16 | 2,580 | 0.950 | 2.413 | 533 | 631 | 7.6 |
| MTNIA (B) - 36 | 36 | 16 | 2,580 | 1.022 | 2.596 | 622 | 734 | 8.2 |
| MTNIA (B) - 37 | 37 | 16 | 2,580 | 1.022 | 2.596 | 635 | 749 | 8.2 |
| MTNIA (B) - 40 | 40 | 16 | 2,580 | 1.057 | 2.685 | 679 | 795 | 8.5 |
| MTNIA (B) - 44 | 44 | 16 | 2,580 | 1.134 | 2.880 | 742 | 859 | 9.1 |
| MTNIA (B) - 61 | 61 | 16 | 2,580 | 1.270 | 3.226 | 986 | 1,161 | 10.2 |
| MTNIA (B) 91 | 91 | 16 | 2,580 | 1.506 | 3.830 | 1,460 | 1,630 | 12.1 |

* M/R = Moisture Resistant



COMMERCIAL SHIPBOARD CABLES

600 Volts - 90° C Rated

No. 14 AWG

| Type and Size | No. of Cndrs. | AWG Size | Cndr. Area C/M | Max. Overall Diam. in | | Approx. Net Wt. Per 1000 Ft. | | Min. Radius of Bend |
|--------------------|---------------|----------|----------------|-----------------------|-------|------------------------------|-------|---------------------|
| | | | | In. | Cm. | Alum. | Brz. | Inches |
| | | | | MTNIA (B) - 4 (4) | 4 | 14 | 4,107 | 0.480 |
| MTNIA (B) - 6 (4) | 6 | 14 | 4,107 | 0.557 | 1.415 | 199 | 262 | 4.5 |
| MTNIA (B) - 7 (4) | 7 | 14 | 4,107 | 0.557 | 1.415 | 220 | 283 | 4.5 |
| MTNIA (B) - 8 (4) | 8 | 14 | 4,107 | 0.669 | 1.699 | 261 | 327 | 5.4 |
| MTNIA (B) - 10 (4) | 10 | 14 | 4,107 | 0.720 | 1.829 | 332 | 415 | 5.8 |
| MTNIA (B) - 12 (4) | 12 | 14 | 4,107 | 0.741 | 1.882 | 381 | 473 | 5.9 |
| MTNIA (B) - 14 (4) | 14 | 14 | 4,107 | 0.775 | 1.969 | 424 | 515 | 6.2 |
| MTNIA (B) - 16 (4) | 14 | 14 | 4,107 | 0.814 | 2.067 | 476 | 571 | 6.5 |
| MTNIA (B) - 20 (4) | 20 | 14 | 4,107 | 0.894 | 2.499 | 622 | 748 | 7.2 |
| MTNIA (B) - 24 (4) | 24 | 14 | 4,107 | 1.027 | 2.609 | 712 | 842 | 8.2 |
| MTNIA (B) - 30 (4) | 30 | 14 | 4,107 | 1.082 | 2.748 | 841 | 973 | 8.7 |
| MTNIA (B) - 36 (4) | 36 | 14 | 4,107 | 1.159 | 2.944 | 1029 | 1194 | 9.3 |
| MTNIA (B) - 37 (4) | 37 | 14 | 4,107 | 1.159 | 2.944 | 1049 | 1214 | 9.3 |
| MTNIA (B) - 40 (4) | 40 | 14 | 4,107 | 1.240 | 3.150 | 1127 | 1298 | 9.9 |
| MTNIA (B) - 44 (4) | 44 | 14 | 4,107 | 1.292 | 3.282 | 1227 | 1403 | 10.3 |
| MTNIA (B) - 61 (4) | 61 | 14 | 4,107 | 1.359 | 3.452 | 1310 | 1,585 | 10.9 |

No. 12 AWG

| Type and Size | No. of Cndrs. | AWG Size | Cndr. Area C/M | Max. Overall Diam. in | | Approx. Net Wt. Per 1000 Ft. | | Min. Radius of Bend |
|--------------------|---------------|----------|----------------|-----------------------|-------|------------------------------|-------|---------------------|
| | | | | In. | Cm. | Alum. | Brz. | Inches |
| | | | | MTNIA (B) - 4 (6) | 4 | 12 | 6,530 | 0.533 |
| MTNIA (B) - 6 (6) | 6 | 12 | 6,530 | 0.654 | 1.661 | 281 | 352 | 5.2 |
| MTNIA (B) - 7 (6) | 7 | 12 | 6,530 | 0.654 | 1.661 | 310 | 381 | 5.2 |
| MTNIA (B) - 8 (6) | 8 | 12 | 6,530 | 0.748 | 1.900 | 343 | 419 | 6.0 |
| MTNIA (B) - 10 (6) | 10 | 12 | 6,530 | 0.809 | 2.055 | 423 | 517 | 6.5 |
| MTNIA (B) - 12 (6) | 12 | 12 | 6,530 | 0.834 | 2.118 | 516 | 622 | 6.7 |
| MTNIA (B) - 14 (6) | 14 | 12 | 6,530 | 0.872 | 2.215 | 573 | 679 | 7.0 |
| MTNIA (B) - 16 (6) | 16 | 12 | 6,530 | 0.918 | 2.332 | 640 | 753 | 7.3 |
| MTNIA (B) - 20 (6) | 20 | 12 | 6,530 | 1.053 | 2.675 | 768 | 889 | 8.4 |
| MTNIA (B) - 24 (6) | 24 | 12 | 6,530 | 1.159 | 2.944 | 914 | 1063 | 9.3 |
| MTNIA (B) - 30 (6) | 30 | 12 | 6,530 | 1.216 | 3.089 | 1136 | 1288 | 9.7 |
| MTNIA (B) - 36 (6) | 36 | 12 | 6,530 | 1.314 | 3.338 | 1314 | 1485 | 10.5 |
| MTNIA (B) - 37 (6) | 37 | 12 | 6,530 | 1.314 | 3.338 | 1345 | 1516 | 10.5 |
| MTNIA (B) - 40 (6) | 40 | 12 | 6,530 | 1.408 | 3.576 | 1464 | 1647 | 11.3 |
| MTNIA (B) - 44 (6) | 44 | 12 | 6,530 | 1.468 | 3.729 | 1592 | 1782 | 11.7 |

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



MARINE GENERATORS

LIMA SER® 1200 RPM GENERATORS



**QUALITY...
RELIABILITY...
DEPENDABLE SHIPBOARD POWER**

Riding the crest of an ocean swell, owners and operators of work, supply and fish boats prefer LIMA SER 1200 RPM brushless marine generators for a reliable source of electrical power.

Noted for less system noise and vibration, LIMA SER 1200 RPM generators provide longer system life and are available with foot mountings for easy assembly to most standard marine gen-set engines. Built to last, the LIMA SER 1200 RPM family of generators is specially designed and constructed for the rigors of shipboard service, combining 50 years of field proven performance and the latest in technological design.

Check the advantages LIMA SER 1200 RPM designs offer you:

- 20 to 110 kW brushless, 12 lead designs, reconnectable to all popular three- and single-phase voltages.
- 15% voltage dip at rated kW at 80% power factor.
- Rugged Uni-weld steel frame, cast iron bearing carrier and oversized generator shaft for high mechanical strength.
- Oversized bearing pre-lubricated for life with minimum B-10 life of 100,000 hours.
- Marine-duty tropical insulation standard for high electrical

integrity, moisture and fungus protection.

- Rectifier assembly mounted outboard for ease of inspection and maintenance.
- SE100A encapsulated voltage regulator standard for moisture protection.

For traditional quality under the most demanding conditions... when performance counts... demand the LIMA SER 1200 RPM line of marine-duty generators.

7

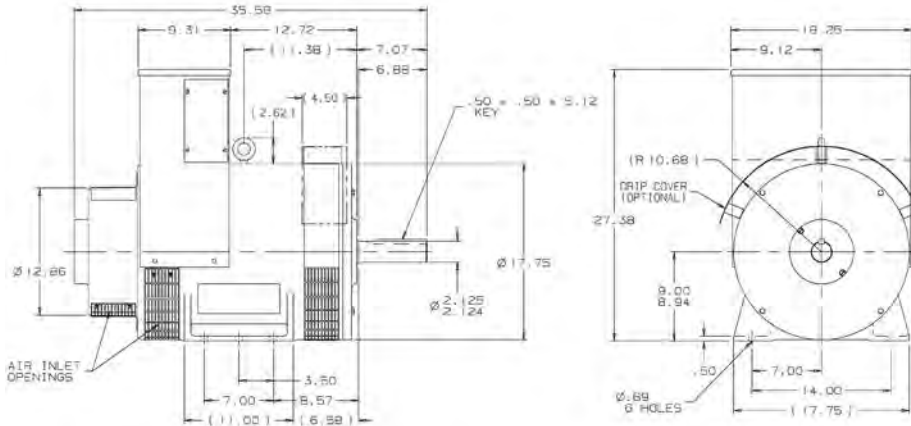
Product Features:

- Brushless, Self-Excited, Self Voltage-Regulated.
- No External Regulator, Current or Potential Transformers.
- Start and run 1 HP/kW 3-phase, Code G Induction Motors.
- Inherent Volts/Hertz over frequency range of 40-65 Hertz.
- Inherent 500% of rated current in fault-clearing capability.
- Drip proof (IP23) Enclosure.
- Single- or two-bearing construction.
- CSA, CE and ISO 9002 Certified.

USCG accepted
American Bureau of Shipping (ABS) Recognition

MARINE GENERATORS

LIMA SER® 1200 RPM GENERATORS



Dimensions:

Overall Dimensions: U.S. Customary (Inches)

NOTE: All dimensions are approximate. Please contact Timco or refer to the Dimension Section of the Marathon Generator Catalog for full dimensional data.

| FRAME SIZE | A | BA | C | D | E | 2F |
|------------|--------|-------|--------|--------|-------|--------|
| 361 | 17.75" | 7.00" | 27.12" | 17.75" | 7.00" | 7.00" |
| 441 | 21.25" | 6.62" | 31.31" | 21.75" | 9.00" | 11.00" |

| FRAME SIZE | H | P | X | Y | Z |
|------------|--------|--------|--------|--------|-------|
| 361 | 9.00" | 18.25" | 27.38" | 9.31" | 6.47" |
| 441 | 11.00" | 22.12" | 32.21" | 12.31" | 6.31" |

| FRAME SIZE | MODEL NUMBER | A2 | A3 | A4 | H2 | H3 | H4 |
|------------|--------------|--------|--------|--------|-------|-------|-------|
| 361 | 105,107,108 | 30.50" | --- | --- | 5.88" | --- | --- |
| 441 | 109,110,111 | --- | 30.50" | --- | --- | 6.50" | --- |
| 441 | 112 | --- | --- | 39.00" | --- | --- | 7.00" |

All dimensions are approximate.

All dimensions are approximate.

Ratings:

Standard LIMA SER™ Generator Ratings

All ratings based on a maximum of 40(C and 3300 Ft. Altitude (1000 Meters).

| 3-Phase, 0.8 Power Factor | | | | | Single-Phase | | | |
|---------------------------|------------|-----------------|-------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|
| 208-240/416-480 Volt | | | | | 120/240 Volt, 0.8 P.F. | | 120/240 Volt, .0 P.F. | |
| MODEL NUMBER | FRAME SIZE | NUMBER OF LEADS | NEMA CONTINUOUS DUTY kW (80(C R/R) | NEMA CONTINUOUS DUTY kW (105(C R/R) | NEMA CONTINUOUS DUTY kW (80(C R/R) | NEMA CONTINUOUS DUTY kW (105(C R/R) | NEMA CONTINUOUS DUTY kW (80(C R/R) | NEMA CONTINUOUS DUTY kW (105(C R/R) |
| 361S0105 | 361 | 12 | 21 | 23 | 12 | 13 | 15 | 16 |
| 361S0107 | 361 | 12 | 30 | 32 | 16 | 17 | 20 | 22 |
| 361S0108 | 361 | 12 | 42 | 45 | 22 | 23 | 27 | 29 |
| 441S0109 | 441 | 12 | 55 | 61 | 30 | 34 | 38 | 43 |
| 441S0110 | 441 | 12 | 67 | 75 | 36 | 40 | 45 | 50 |
| 441S0111 | 441 | 12 | 75 | 81 | 42 | 45 | 53 | 56 |
| 441S0112 | 441 | 12 | 103 | 112 | 50 | 52 | 62 | 65 |



MARINE GENERATORS

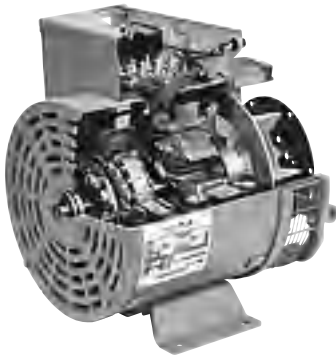
Marathon generators power industrial, agricultural, marine, military and transportation applications worldwide.

Marathon Electric maintains an extensive technical research and development effort to improve existing products and develop new ones. Marathon Electric leads the way with technology for power generation, including the patented DVR® 2000 Digital Voltage Regulator and the patented high motor inrush starting MAC design.

LIMA® MAC GENERATORS – 5-300 KILOWATT • 120-480 VOLT

M - Motor
A - Application
C - Characteristics

For more than thirty years, the LIMA(r) MAC line of superior motor starting AC generators has been the preferred choice of generator for demanding motor applications.



Product Features

- Brushless, self-excited, self-voltage-regulated
- No external regulator, current or potential transformers
- Start and run 1 HP/kW 3-phase, Code G induction motors
- Inherent Volts/Hertz over frequency range of 40-65 Hertz

TYPICAL SPECIFICATIONS

The LIMA(r) MAC, manufactured by Marathon Electric Manufacturing Corporation, is a brushless, synchronous, self-excited, self-voltage-regulated alternator rated for continuous duty at 80° C temperature rise, as measured by the resistance method over a maximum ambient temperature of 40° C. The LIMA(r) MAC provides superior three-phase induction motor starting performance, capable of starting, across the line, 1 HP NEMA starting Code G squirrel cage induction motors per kW of its name plated rating.

LIMA(r) MAC frames are either cast aluminum or welded steel, with cast iron bearing brackets. LIMA(r) MAC generators are available in either a single-bearing configuration with a flex disc type coupling rigidly bolted to the alternator shaft, or as a two-bearing type with keyed shaft extension. The unit's enclosure is fully guarded and meets the requirements of NEMA and IEC protective classification IP22.

The insulation system of both stationary and rotating windings is rated NEMA Class F or better, and is inorganic and non-hygroscopic. The main rotor is layer wound with thermosetting, 100% solids epoxy between each layer.

The 4-pole main revolving field construction consists of one-piece lamination. 360 and larger frame sizes incorporate full amortisseur windings. The main stator is random wound and lashed at the end turns to provide superior mechanical strength. Excitation is provided by an integral rotating-current-transformer induction frequency converter. The phase wound exciter stator is directly inter-connected with the main stator, and incorporates

- Inherent 500% of rated current in fault-clearing capability
- Drip-proof (IP23) enclosure
- Single- or two-bearing construction
- CSA, CE, and ISO 9002 Certified

two separate windings: a shunt winding and a series winding. No load excitation is provided by the shunt winding, while the series portion provides a load-compounding characteristic.

Voltage regulation is typically 4% from no load to full-rated load, at the rated operating temperature. The output voltage exhibits a "volts-per-hertz" characteristic throughout a minimum speed range of 60% to 125% of the unit's rated synchronous speed to assure the proper performance of induction motor loads, while exhibiting electro-magnetic interference suppressed to commercial standards.

The load-compounding characteristics of the three phase LIMA(r) MAC generator is capable of supporting fault current equivalent to 500% (5 PU) of its full load rated current for 10 seconds to assure clearance of a fault condition without the use of external current transformers or other vulnerable external circuitry.

280 Frame generators have a side mounted split "clam shell" type connection box that rotates through 360° in 90° increments to allow egress of leads to the top, bottom, right or left. 360 and larger frames have a top-mounted, saddle-type connection box constructed to allow lead egress from the top or either side.

All certified performance and temperature rise test data are the result of actual testing of the same or duplicate units. Temperature rise data is the result of full load heat runs at rated voltage and frequency.

MARINE GENERATORS



MAGNAPLUS®
Innovation, Performance, Reliability
 5 - 430 KILOWATT • 190 - 600 VOLT



Proven top performers in every respect, MAGNAPLUS® generators offer powerful performance, reliable power generation and easy installation. Ruggedly constructed with solid-state technology the SE350 voltage regulator, included with all standard equipment, is a solid performer.

MAGNAPLUS® designs offer an optional, field-adaptable, permanent magnet generator which can be coupled with our PM300 or DVR®2000 voltage regulators. This flexibility in configurations allows for application to the most demanding installations including loads that produce harmonic distortion as well as those requiring fault current support.

Constructed for extended life by utilizing Marathon's exclusive unirotor construction, featuring a UL recognized class H insulation system and long-life bearings, MAGNAPLUS® designs are the ideal general purpose generators for standby as well as prime power markets such as:

- **Agricultural**
- **Marine**
- **Construction**
- **Commercial Buildings**
- **Rental Markets**

Product Features

- Choice – More than 20 stock models, all 12 lead reconnectable, providing voltage and phase flexibility. All are capable of modification to a variety of standard and optional conduit box arrangements to meet customer requirements and ease installation.
- Easy-Mount SAE Adapters are provided with every generator to simplify coupling to the prime mover. Generator foot mounting dimensions are not affected by adapter choice. Special adapters can be ordered for any automotive engine as well.
- SE350 Regulator provides 1% voltage regulation and offers commercial features such as under speed protection and stability adjustment.
- Optimized Windings with brushless exciter. The 2/3-pitch design is utilized to minimize harmonic distortion.
- A Class H Insulation System that is recognized under UL1446 and is suitable for submission to UL2200 application approval



MARINE GENERATORS

GENERATOR RATINGS - 60 HZ

Specifications: NEMA Class H Insulation,
1800 RPM, 40° C Ambient, 3 Phase, 0.8 Power Factor Lagging.

| MODEL NUMBER | NET WEIGHT (Lbs.) | NUMBER OF LEADS | VOLTAGE | STD. AVR | kW @ .8 PF @ Designated NEMA Rise | | | | |
|--|-------------------|-----------------|-----------------|----------|-----------------------------------|---------------------|---------------------|---------------------|---------------------|
| | | | | | Continuous | | | Stand-By | |
| | | | | | NEMA B (80° C R/R) | NEMA F (105° C R/R) | NEMA H (125° C R/R) | NEMA F (130° C R/R) | NEMA H (150° C R/R) |
| Shunt (Non-PMG) Excitation MAGNAPLUS® | | | | | | | | | |
| 281PSL1500 | 205 | 12 | 208-240/416-480 | SE350 | 5.4 | 6 | 6.5 | 6.6 | 7 |
| 281PSL1501 | 210 | 12 | 208-240/416-480 | SE350 | 6.7 | 7.5 | 8.1 | 8.2 | 8.7 |
| 281PSL1502 | 220 | 12 | 208-240/416-480 | SE350 | 9 | 10 | 10.5 | 10.5 | 11 |
| 282PSL1503 | 240 | 12 | 208-240/416-480 | SE350 | 11 | 12.5 | 13 | 13.5 | 14 |
| 282PSL1504 | 250 | 12 | 208-240/416-480 | SE350 | 12.5 | 14.5 | 15.5 | 15.5 | 16.5 |
| 282PSL1505 | 275 | 12 | 208-240/416-480 | SE350 | 17 | 19 | 20 | 20 | 21 |
| 283PSL1506 | 310 | 12 | 208-240/416-480 | SE350 | 20 | 23 | 25 | 25 | 2 |
| 283PSL1507 | 350 | 12 | 208-240/416-480 | SE350 | 25 | 28 | 30 | 30 | 31 |
| 284CSL1542 | 420 | 12 | 208-240/416-480 | SE350 | 32 | 36 | 40 | 40 | 41 |
| 284PSL1508 | 405 | 12 | 208-240/416-480 | SE350 | 27 | 32 | 35 | 35 | 37 |
| 361PSL1600 | 518 | 12 | 208-240/416-480 | SE350 | 35 | 40 | 42 | 42 | 45 |
| 361PSL1601 | 569 | 12 | 208-240/416-480 | SE350 | 45 | 50 | 55 | 55 | 58 |
| 361PSL1602 | 620 | 12 | 208-240/416-480 | SE350 | 53 | 60 | 65 | 65 | 68 |
| 362PSL1604 | 706 | 12 | 208-240/416-480 | SE350 | 65 | 72 | 80 | 80 | 85 |
| 362PSL1606 | 796 | 12 | 208-240/416-480 | SE350 | 80 | 90 | 100 | 100 | 105 |
| 363PSL1607 | 943 | 12 | 208-240/416-480 | SE350 | 100 | 110 | 125 | 125 | 135 |
| 431PSL6202 | 1220 | 12 | 208-240/416-480 | SE350 | 125 | 140 | 147 | 151 | 155 |
| 431PSL6204 | 1310 | 12 | 208-240/416-480 | SE350 | 142 | 165 | 175 | 176 | 182 |
| 431PSL6206 | 1415 | 12 | 208-240/416-480 | SE350 | 165 | 191 | 202 | 210 | 217 |
| 431PSL6208 | 1455 | 12 | 208-240/416-480 | SE350 | 176 | 203 | 216 | 225 | 227 |
| 432PSL6210 | 1685 | 12 | 208-240/416-480 | SE350 | 211 | 255 | 275 | 280 | 287 |
| 432PSL6212 | 1760 | 12 | 208-240/416-480 | SE350 | 225 | 260 | 276 | 280 | 300 |
| 433PSL6216 | 2235 | 12 | 208-240/416-480 | SE350 | 280 | 342 | 366 | 375 | 387 |
| 433PSL6220 | 2245 | 12 | 208-240/416-480 | SE350 | 310 | 362 | 385 | 400 | 417 |
| PMG Excitation MAGNAMAXDVR® | | | | | | | | | |
| 431RSL4005 | 1280 | 12 | 208-240/416-480 | DVR2000 | 118 | 132 | 138 | 138 | 138 |
| 431RSL4007 | 1370 | 12 | 208-240/416-480 | DVR2000 | 132 | 150 | 160 | 160 | 168 |
| 432RSL4009 | 1550 | 12 | 208-240/416-480 | DVR2000 | 166 | 187 | 200 | 200 | 200 |
| 432RSL4011 | 1570 | 12 | 208-240/416-480 | DVR2000 | 183 | 207 | 219 | 221 | 221 |
| 432RSL4013 | 1600 | 12 | 208-240/416-480 | DVR2000 | 193 | 219 | 231 | 235 | 250 |
| 432RSL4015 | 1810 | 12 | 208-240/416-480 | DVR2000 | 230 | 262 | 262 | 262 | 262 |
| 432RSL4017 | 1830 | 12 | 208-240/416-480 | DVR2000 | 230 | 275 | 287 | 287 | 310 |
| 433RSL4019 | 2340 | 12 | 208-240/416-480 | DVR2000 | 290 | 325 | 350 | 350 | 360 |
| 433RSL4021 | 2365 | 12 | 208-240/416-480 | DVR2000 | 305 | 345 | 365 | 370 | 400 |
| 572RSL4024 | 2730 | 10 | 208-240/416-480 | DVR2000 | 380 | 435 | 440 | 440 | 450 |
| 572RSL4025 | 2730 | 12 | 208-240/416-480 | DVR2000 | 380 | 435 | 440 | 440 | 450 |
| 572RSL4027 | 2840 | 12 | 208-240/416-480 | DVR2000 | 400 | 445 | 470 | 475 | 505 |
| 572RSL4028 | 3050 | 10 | 208-240/416-480 | DVR2000 | 445 | 510 | 525 | 525 | 535 |
| 572RSL4029 | 3050 | 12 | 208-240/416-480 | DVR2000 | 445 | 510 | 525 | 525 | 535 |
| 572RSL4030 | 3110 | 10 | 208-240/416-480 | DVR2000 | 460 | 525 | 555 | 565 | 600 |
| 572RSL4031 | 3110 | 12 | 208-240/416-480 | DVR2000 | 460 | 525 | 555 | 565 | 600 |
| 573RSL4032 | 3400 | 10 | 208-240/416-480 | DVR2000 | 570 | 650 | 685 | 700 | 725 |
| 573RSL4033 | 3400 | 12 | 208-240/416-480 | DVR2000 | 570 | 650 | 685 | 700 | 725 |
| 573RSL4034 | 3620 | 10 | 208-240/416-480 | DVR2000 | 585 | 680 | 720 | 725 | 725 |
| 573RSL4035 | 3620 | 12 | 208-240/416-480 | DVR2000 | 585 | 680 | 720 | 725 | 725 |
| 574RSL4036 | 4080 | 10 | 208-240/416-480 | DVR2000 | 630 | 725 | 770 | 785 | 825 |
| 574RSL4037 | 4080 | 12 | 208-240/416-480 | DVR2000 | 630 | 725 | 770 | 785 | 825 |
| 741RSL4045 | 5490 | 12 | 208-240/416-480 | DVR2000 | 810 | 920 | 970 | 1000 | 1020 |
| 742RSL4049 | 6300 | 12 | 208-240/416-480 | DVR2000 | 950 | 1100 | 1160 | 1180 | 1210 |

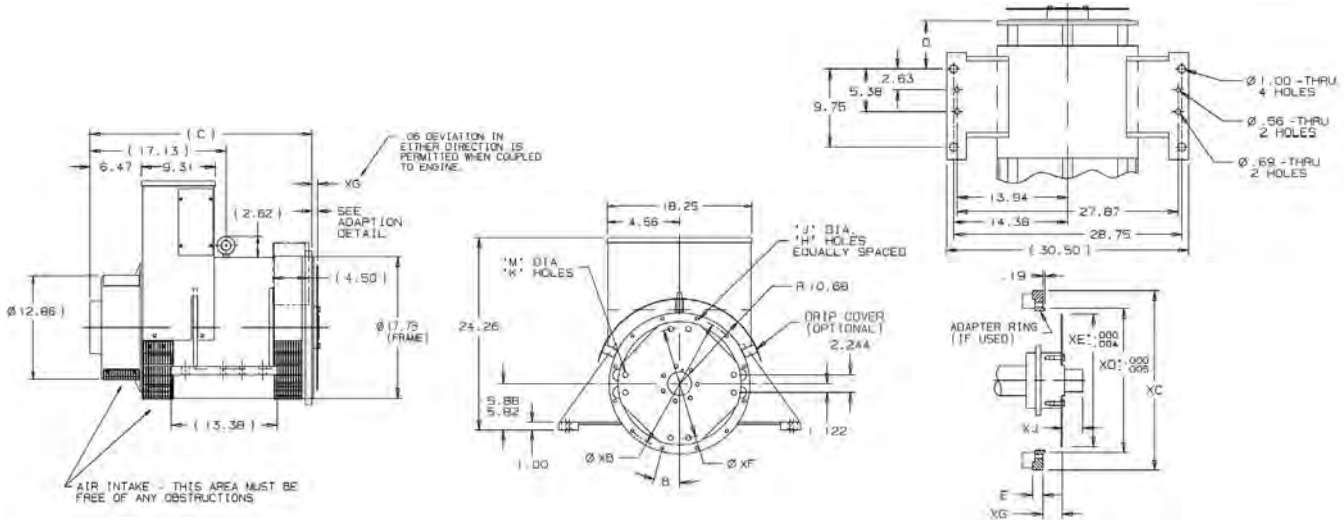
7

MARINE GENERATORS



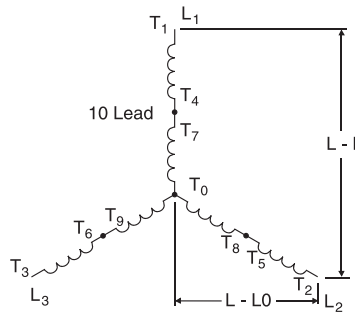
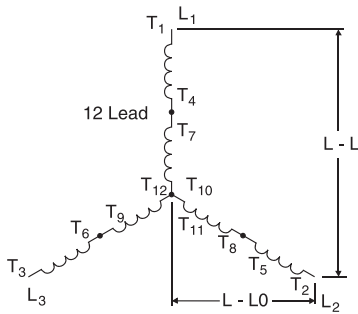
GENERATOR RATINGS - 60 HZ

Specifications: NEMA Class H Insulation,
1800 RPM, 40° C Ambient, 3 Phase, 0.8 Power Factor Lagging.



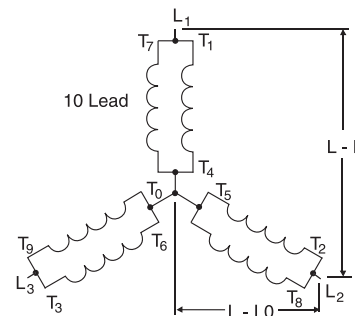
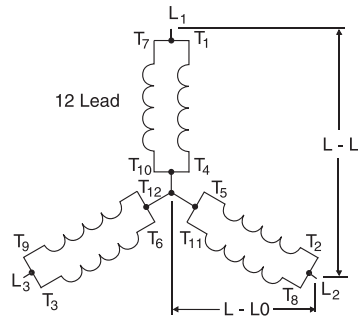
| MODEL NUMBER | NET WEIGHT (Lbs.) | NUMBER OF LEADS | VOLTAGE | STD. AVR | kW @ .8 PF @ Designated NEMA Rise | | | | |
|--|-------------------|-----------------|-----------------|----------|-----------------------------------|---------------------|---------------------|---------------------|---------------------|
| | | | | | Continuous | | | Stand-By | |
| | | | | | NEMA B (80° C R/R) | NEMA F (105° C R/R) | NEMA H (125° C R/R) | NEMA F (130° C R/R) | NEMA H (150° C R/R) |
| Shunt (Non-PMG) Excitation MAGNAPLUS® | | | | | | | | | |
| 281PSL1500 | 205 | 12 | 208-240/416-480 | SE350 | 6.8 | 7.5 | 8.2 | 8.3 | 8.8 |
| 281PSL1501 | 210 | 12 | 208-240/416-480 | SE350 | 8.4 | 9.4 | 10.2 | 10.3 | 10.9 |
| 281PSL1502 | 220 | 12 | 208-240/416-480 | SE350 | 11.3 | 12.5 | 13.2 | 13.2 | 13.8 |
| 282PSL1503 | 240 | 12 | 208-240/416-480 | SE350 | 13.8 | 15.6 | 16.3 | 16.9 | 17.5 |
| 282PSL1504 | 250 | 12 | 208-240/416-480 | SE350 | 15.6 | 18.1 | 19.4 | 19.4 | 20.6 |
| 282PSL1505 | 275 | 12 | 208-240/416-480 | SE350 | 21.3 | 23.8 | 25 | 25 | 26.3 |
| 283PSL1506 | 310 | 12 | 208-240/416-480 | SE350 | 25 | 28.8 | 31.3 | 31.3 | 32.5 |
| 283PSL1507 | 350 | 12 | 208-240/416-480 | SE350 | 31.3 | 35 | 37.5 | 37.5 | 38.8 |
| 284CSL1542 | 420 | 12 | 208-240/416-480 | SE350 | 40 | 45 | 50 | 50 | 51.3 |
| 284PSL1508 | 405 | 12 | 208-240/416-480 | SE350 | 33.8 | 40 | 43.4 | 43.8 | 46.3 |
| 361PSL1600 | 518 | 12 | 208-240/416-480 | SE350 | 43.8 | 50 | 52.5 | 52.5 | 56.3 |
| 361PSL1601 | 569 | 12 | 208-240/416-480 | SE350 | 56.3 | 62.5 | 68.9 | 68.8 | 72.5 |
| 361PSL1602 | 620 | 12 | 208-240/416-480 | SE350 | 66.3 | 75 | 81.3 | 81.3 | 85 |
| 362PSL1604 | 706 | 12 | 208-240/416-480 | SE350 | 81.3 | 90 | 100 | 100 | 106 |
| 362PSL1606 | 796 | 12 | 208-240/416-480 | SE350 | 100 | 113 | 125 | 125 | 131 |
| 363PSL1607 | 943 | 12 | 208-240/416-480 | SE350 | 125 | 138 | 156 | 156 | 169 |
| 431PSL6202 | 1220 | 12 | 208-240/416-480 | SE350 | 156 | 175 | 184 | 189 | 194 |
| 431PSL6204 | 1310 | 12 | 208-240/416-480 | SE350 | 178 | 206 | 219 | 220 | 228 |
| 431PSL6206 | 1415 | 12 | 208-240/416-480 | SE350 | 206 | 239 | 253 | 263 | 271 |
| 431PSL6208 | 1455 | 12 | 208-240/416-480 | SE350 | 220 | 254 | 270 | 281 | 284 |
| 432PSL6210 | 1685 | 12 | 208-240/416-480 | SE350 | 264 | 319 | 344 | 350 | 359 |
| 432PSL6212 | 1760 | 12 | 208-240/416-480 | SE350 | 281 | 325 | 345 | 350 | 375 |
| 433PSL6216 | 2235 | 12 | 208-240/416-480 | SE350 | 350 | 428 | 458 | 469 | 484 |
| 433PSL6220 | 2245 | 12 | 208-240/416-480 | SE350 | 388 | 453 | 481 | 500 | 521 |
| PMG Excitation MAGNAMAXDVR® | | | | | | | | | |
| 431RSL4005 | 1280 | 12 | 208-240/416-480 | DVR2000 | 148 | 165 | 173 | 173 | 173 |
| 431RSL4007 | 1370 | 12 | 208-240/416-480 | DVR2000 | 165 | 188 | 200 | 200 | 210 |
| 432RSL4009 | 1550 | 12 | 208-240/416-480 | DVR2000 | 208 | 234 | 250 | 250 | 250 |
| 432RSL4011 | 1570 | 12 | 208-240/416-480 | DVR2000 | 229 | 259 | 274 | 276 | 276 |
| 432RSL4013 | 1600 | 12 | 208-240/416-480 | DVR2000 | 241 | 274 | 289 | 294 | 313 |
| 432RSL4015 | 1810 | 12 | 208-240/416-480 | DVR2000 | 288 | 328 | 328 | 328 | 328 |

GENERATOR OUTPUT CONNECTIONS



SERIES HIGH WYE

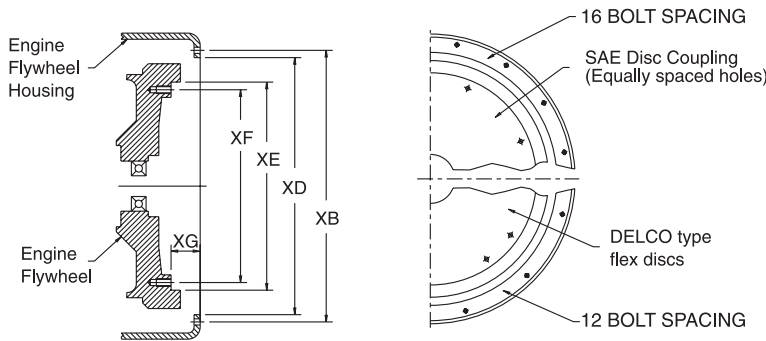
| Voltage | | |
|---------|-----|------|
| HZ | L-L | L-L0 |
| 60 | 380 | 219 |
| | 416 | 240 |
| | 440 | 254 |
| | 460 | 266 |
| | 480 | 277 |
| 50 | 380 | 219 |
| | 400 | 231 |
| | 415 | 240 |
| | 440 | 254 |



PARALLEL LOW WYE

| Voltage | | |
|---------|-----|------|
| HZ | L-L | L-L0 |
| 60 | 190 | 110 |
| | 208 | 120 |
| | 220 | 127 |
| | 230 | 133 |
| | 240 | 139 |
| 50 | 190 | 110 |
| | 200 | 115 |
| | 208 | 120 |
| | 220 | 127 |

STANDARD SAE DIMENSIONS

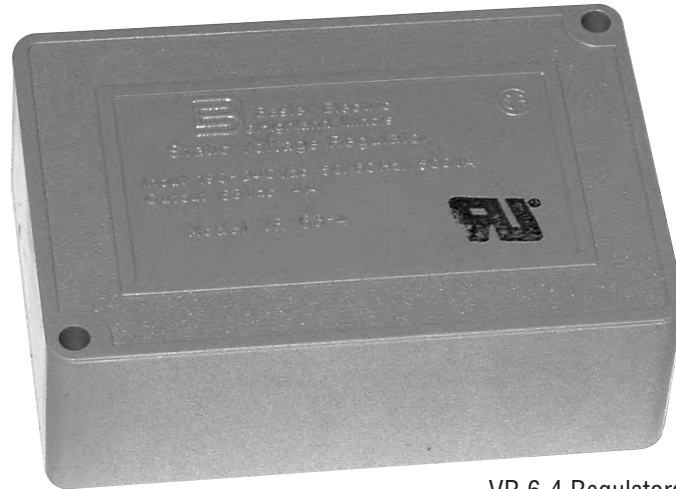


| SAE No. | Engine Flywheel Housing Dimensions | | Tapped Holes | |
|---------|------------------------------------|-------------|--------------|---------|
| | XD | XB | Qty. | Size |
| | | | | |
| 00 | 31.000 (787) | 33.50 (851) | 16 | 1/2-13 |
| 0 | 25.500 (678) | 26.75 (679) | 16 | 1/2-13 |
| 1/2 | 23.000 (584) | 24.38 (619) | 12 | 1/2-13 |
| 1 | 20.125 (511) | 20.88 (530) | 12 | 7/16-14 |
| 2 | 17.625 (448) | 18.38 (467) | 12 | 3/8-16 |
| 3 | 16.125 (410) | 16.88 (429) | 12 | 3/8-16 |
| 4 | 14.250 (362) | 15.00 (381) | 12 | 3/8-16 |
| 5 | 12.375 (314) | 13.12 (333) | 8 | 3/8-16 |
| 6 | 10.500 (267) | 11.25 (283) | 8 | 3/8-16 |

| Size | Engine Flywheel Dimensions | | | | Tapped Holes | |
|-------------|----------------------------|-------------|-----------|------|--------------|--|
| | XE | XF | XG | Qty. | Size | |
| | | | | | | |
| SAE 21 | 26.500 (673) | 25.25 (641) | 0 (0) | 12 | 5/8-11 | |
| SAE 18 | 22.500 (572) | 21.38 (543) | .62 (16) | 6 | 5/8-11 | |
| SAE 14 | 18.375 (467) | 17.25 (438) | 1.00 (25) | 8 | 1/2-13 | |
| SAE 11-1/2 | 13.875 (352) | 13.12 (333) | 1.56 (40) | 8 | 3/8-16 | |
| SAE 10 | 12.375 (314) | 11.62 (295) | 2.12 (54) | 8 | 3/8-16 | |
| SAE 8 | 10.375 (264) | 9.62 (244) | 2.44 (62) | 6 | 3/8-16 | |
| SAE 7-1/2 | 9.500 (241) | 8.75 (222) | 1.19 (30) | 8 | 5/16-18 | |
| SAE 6-1/2 | 8.500 (210) | 7.88 (200) | 1.19 (30) | 6 | 5/16-18 | |
| Delco 17.75 | 17.755 (451) | 15.50 (394) | .72 (18) | 8 | 5/8-11 | |
| Delco 15.50 | 15.500 (394) | 13.88 (353) | .72 (18) | 8 | 5/8-11 | |
| Delco 12.75 | 12.750 (324) | 11.00 (279) | 0 (0) | 4 | 1/2-13 | |

VOLTAGE REGULATORS

NEW • REBUILT • EXCHANGE



VR 6-4 Regulators

Basler New Electric Voltage Regulators

Basler Rebuilt Electric Voltage Regulators

| MODEL NO. | COMMENTS |
|-----------|-----------------|
| KR2F | |
| KR2FM | |
| KR2FF | |
| KR2FFM | |
| KR4F | |
| KR4FM | |
| KR4FF | |
| KR4FFM | |
| KR7F | |
| KR7FM | |
| KR7FF | |
| KR7FFM | |
| KR6F | |
| SR4A | 1-Phase Sensing |
| SR4A | 3-Phase Sensing |
| SR8A | 1-Phase Sensing |
| SR8A | 3-Phase Sensing |
| SR32A | 1-Phase Sensing |
| SR32A | 3-Phase Sensing |
| KT3B | |

| MODEL NO. | COMMENTS |
|-------------|-----------------|
| KR2FF | |
| KR4FFMX | |
| KR7FFMX | |
| SR4A | 1-Phase Sensing |
| SR4A | 3-Phase Sensing |
| SR8A | 1-Phase Sensing |
| SR8A | 3-Phase Sensing |
| SR32A | 1-Phase Sensing |
| SR32A | 3-Phase Sensing |
| VR63-4 | |
| VR63-4A | |
| VR63-4C | |
| AVC63-4 | |
| AVC63-4A | |
| VR485-100-L | Replaces KR6F |
| VR485-100-P | Replaces KR6F |
| APR 63-5 | |
| APR 125-5 | |
| KT3B | |
| SSR 32-12 | |
| SSR 63-12 | |
| SSR125-12 | |

VOLTAGE REGULATORS

DELCO & Gen-Power VR-180 & VR-700 Replacement Voltage Regulators Product Replacement Comparisons

| DELCO PRODUCTS MODEL NUMBER | GEN-POWER CONTROLS REPLACEMENT MODEL NO. |
|--------------------------------|---|
| 3H18010A | VR 181 |
| 3H18020A | VR 182 |
| 3H18030A | VR 183 |
| 3H18040A | VR 184 |
| 4H18010A | VR 185 |
| H70010A | VR 710 |
| H70020A | VR 720 |
| H70040A | VR740 |
| H6212A | DFR 2407 |
| H6226 | DFR 4407 |
| 3H3500 | VR 400 |
| 3H3500A | VR 401 |
| H9000 | VR 900 |
| H9000A | VR 901 |
| H9000B | VR 902 |
| H0010 | VR 100 |
| CURRENT BOOST MODULES | |
| H0038A | CBM 101 |
| H0038B | CBM 102 |
| H0038C | CBM 103 |
| H8000 | CBM 104 |
| 2803133 CT | 2803133 CT |
| MANUAL VOLTAGE CONTROLS | |
| 3H43350M | MVC 450 |
| H433800M | MVC 800 |
| H43801M | MVC 801 |

Replacement parts for GEN-POWER Controls voltage regulators

| PART NO. | DESCRIPTION |
|--------------------------------|--|
| GEN-POWER VR-180 SERIES | |
| 4973292 | Circuit Board |
| 4973449 | Transformer |
| 4963104 | Circuit Breaker |
| 4945040 | Rheostat |
| 4987100 | Kit (Circuit Board, Rheostat, Circuit Breaker) |
| GEN-POWER VR-700 SERIES | |
| 4988498 | Circuit Board |
| 4988514 | Transformer |
| 4995870 | Circuit Breaker |
| 4945040 | Rheostat |
| 4977195 | L.E.D. |
| 4997461 | Kit (Circuit Board, Rheostat, L.E.D., Circuit Breaker) |
| GEN-POWER VR-400 SERIES | |
| 2803259 | Rheostat |
| GEN-POWER VR-900 SERIES | |
| 4945040 | Rheostat (VR-900, VR-902) |
| 2803185 | Rheostat (VR-901) |
| 2802961 | Circuit Breaker (VR-900, VR-902) |
| 2803228 | Circuit Breaker (VR-901) |

7

VOLTAGE REGULATORS

Gen-Power VR-108 & VR-700 Replacement Voltage Regulators

VR-180



VR-700



Gen-Power Controls' VR-180 and VR-700 Series Voltage Regulators are available as direct "wire-for-wire" replacements for Delco Products Voltage Regulators. Equivalent in form, fit and function to Delco Products voltage regulator models as listed on the following page, these units provide added features including better regulation, faster response, wider ambient temperature range and better mechanical characteristics.

Features & Benefits

- Voltage regulation (1% R.M.S.
- Less than 9 millisecond response to load change.
- Built-in over-voltage protection (VR-700 Series only).
- Built-in under-speed protection (VR-700 Series only).
- Loss-of-sensing protection.
- Solid-state voltage build-up circuit.
- Anti-hunt circuitry to control transients.
- Built-in paralleling provisions.
- No relays or vibrating contacts to wear or break.
- Transient surge protection.
- Protection from adverse environments.
- 50 Hz or 60 Hz frequency selection.
- Over current protection.

Available Accessories

- Paralleling kit for applications of 600 volts or less.
- Triple action boost for very heavy motor starting.
- Manual control systems for back-up.
- Automatic under speed protection.
- Battery build-up control for fast on-line operation.

ANALOG AMMETERS, VOLTMETERS, FREQUENCY METERS

3 1/2" - 2% ACCURACY

AMMETERS



| PART NO. | SCALE RANGE | CURRENT TRANSFORMERS PART NO. |
|----------|--------------|-------------------------------|
| AM 0100 | 0 - 100 Amps | CT 5 - 100 |
| AM 0150 | 0 - 150 Amps | CT 5 - 150 |
| AM 0200 | 0 - 200 Amps | CT 5 - 200 |
| AM 0300 | 0 - 300 Amps | CT 5 - 300 |
| AM 0400 | 0 - 400 Amps | CT 5 - 400 |
| AM 0500 | 0 - 500 Amps | CT 5 - 500 |
| AM 0600 | 0 - 600 Amps | CT 5 - 600 |



VOLTMETERS

| PART NO. | SCALE RANGE |
|----------|------------------|
| VM 0300 | 0 - 300 AC VOLTS |
| VM 0600 | 0 - 600 AC VOLTS |



FREQUENCY METERS

| PART NO. | SCALE RANGE | INPUT VOLTAGE |
|----------|-----------------------|----------------|
| FM 120 | 45 to 65 Hz | 110 to 130 VAC |
| FM 240 | 45 to 65 Hz | 200 to 250 VAC |
| FM 480 | 45 to 65 Hz | 480 VAC |
| VRFM 120 | 56 to 64 Hz (9 Reeds) | 100 to 130 VAC |



NEWMAR

BATTERY CHARGERS PHASE THREE SERIES



Three Stage "Smart" Chargers

Phase Three "Smart" battery charging technology is now available in a wide range of power levels, allowing you to select the right size, features and flexibility you require for virtually any application from small recreational craft to large live-aboards, workboats and other commercial vessels. These chargers interact with batteries to put them through the optimum three stage charge process which provides for fastest recovery and ideal conditioning, maximizing battery performance and extending battery life.

A selector switch adjusts output voltage to adapt for gel-cell/flooded lead-acid/AGM battery types. An optional temperature compensation sensor also adjusts output for ideal voltage based on changes in the batteries' ambient temperature. All models are housed in a rugged stainless steel case with a durable white powder coat finish, and the internal circuitry is polyurethane coated for maximum corrosion resistance.

Features

- "Smart" circuitry provides three stage charging—bulk, absorption, float.
- Wide model range covers battery system ratings from 14-950 amp-hours
- Gel-Cell/Flooded Lead-acid/AGM battery type switch selects optimum charge/float voltages.
- Multiple isolated output banks; ammeter indicates total output current. (except PT-7)
- Optional sensor adjusts output voltage based on battery temperature. (except PT-7)
- Current limiting-prevents damage from overloading.
- Charger status clearly displayed with L.E.D. and/or audible indicators or optional remote panel.
- Use as a power supply; can power loads without a battery in line.
- Built to last—rugged stainless steel case with a durable white powder coat finish with an optional drip shield and marinized internal circuitry.
- Numerous Safety and EMC Compliances
- Two year parts and labor warranty

Models

| 12 Volt | 24 Volt | 32 Volt |
|---------|-----------|-----------|
| PT-7 | PT-24-8W | PT-32-25W |
| PT-14W | PT-24-13W | |
| PT-25W | PT-24-20W | |
| PT-40W | PT-24-45U | |
| PT-80 | PT-24-60W | |
| | PT-24-95U | |

See next page for detailed specifications.

Optional Accessories

Remote Indicator Panel, Model: RP (Not available for all models - refer to Specifications on following page)

DC Energy Monitor, reads Volts, Amps, Amp Hours (See page 20 for details)

Temperature Compensation Sensor, Model: TCS-12/24 shown (see next page for applicable sensor depending on charger model)

Phase Three Monitor/Control Unit For ABS Installation

This unit, when used in conjunction with certain PT Chargers* creates a system which is fully compliant with American Bureau of Shipping (ABS) Battery Charging standards for commercial installations

* For use with all models except PT-7, PT-24-60W, PT-24-95U, and PT-32-25.

Incorporates

- Digital readout of float voltage to 1/10th volt
- Output float voltage adjustment pot; permits fine tuning from -4% to +5%
- AC circuit breaker; provides overcurrent protection and manual disconnect
- AC power ON indicator light
- 10' wiring harness for easy connection of PT Series charger

Model: PT-MCU

Size (HxWxD): 8.7"x4.6"x5.5"

Weight: 3.5 lbs.



7

BATTERY CHARGERS PHASE THREE SERIES

NEW MAR

Specifications

| | 12 Volt Models | | | | | 24 Volt Models | | | | | | 32 Volt |
|---|-------------------|----------------------|-------------------|-------------------|----------------------|----------------------|-------------------|-------------------|----------------------|-----------|----------------------|-----------|
| | PT-7 | PT-14W | PT-25W | PT-40W | PT-80 | PT-24-8W | PT-24-13W | PT-24-20W | PT-24-45U | PT-24-60W | PT-24-95U | PT-32-25W |
| Input VAC (50-60 Hz.) | 88-132 or 176-264 | 85-264 | 90-132 or 180-264 | 85-135 or 170-270 | 90-264 | 85-264 | 90-132 or 180-264 | 85-135 or 170-270 | 90-264 | 207-253 | 90-264 | 104-126 |
| Input Amps @ Full Load @ 115 VAC | 2 | 2.8 | 6.5 | 8.5 | 12 | 2.8 | 6.5 | 8.5 | 12 | NA | 26 | 15 |
| @ 230 VAC | 1 | 1.4 | 4 | 4.3 | 7 | 1.4 | 4 | 4.3 | 7 | 13 | 14 | N/A |
| P.F. Rating | >.65 | .93@230V .98@115V | .7 | .7 | .95@230V .98@115V | .93@230V .98@115V | .7 | .7 | .95@230V .98@115V | .7 | .95@230V .98@115V | .7 |
| Max Output Amps | 7 | 14 | 25 | 40 | 80 | 8 | 13 | 20 | 45 | 60 | 95 | 25 |
| Output Banks | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Battery Capacity (Amp-Hours) | 14-70 | 28-140 | 50-250 | 80-400 | 160-800 | 16-80 | 26-130 | 40-200 | 90-450 | 120-600 | 180-950 | 50-250 |
| Operating Temp. | T-1 | T-2 | T-4 | T-5 | T-7 | T-2 | T-3 | T-5 | T-8 | T-6 | T-8 | T-6 |
| Rating Reference | | | | | | | | | | | | |
| Case Size Ref. | A-1 | A-2 | A-2 | A-3 | A-5 | A-2 | A-2 | A-3 | A-5 | A-6 | A-6 | A-4 |
| Weight: Lbs./Kg. | 3.2/1.5 | 8/4 | 8.2/4 | 12/6 | 15.2/7 | 8/4 | 8.2/4 | 12/6 | 12.2/6 | 24.1/11 | 24.5/11 | 12.2/6 |
| Optional Temp. Sensor Model | N/A | TCS-12/24 | TCS-12/24 | TCS-12/24 | TCS-12/24 | TCS-12/24 | TCS-12/24 | TCS-12/24 | TCS-12/24 | TP | TCS-12/24 | TP |
| Remote Panel Model | N/A | RP | RP | RP | RP | RP | RP | RP | RP | N/A | RP | N/A |
| Equalize Option | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No |
| Output indicator Ref. | M-1 | M-3 | M-3 | M-3 | M-3 | M-3 | M-3 | M-3 | M-3 | M-2 | M-3 | M-2 |
| Compliance Ref. | CG, CE | CG, CE | CG | CG, CE | CE | CG, CE | CG | CG, CE | EN, CE | EN, CE | EN, CE | EN, CE |

Case Size:

| Ref | Inches | | | Centimeters | | |
|-----|--------------------|-----|------------------|-------------------|------|-------------------|
| | H | W | D | H | W | D |
| A-1 | 10.5 | 5.0 | 2.8 | 26.7 | 12.7 | 7.1 |
| A-2 | 12.5 | 7.7 | 4.3 | 31.8 | 19.6 | 10.9 |
| A-3 | 13.85 ^A | 9.5 | 4.8 ^A | 35.2 ^A | 24.1 | 12.2 ^A |
| A-4 | 13.8 ^A | 9.8 | 5 ^A | 35 ^A | 24.9 | 12.7 ^A |
| A-5 | 14.8 ^B | 9.6 | 5.6 ^B | 37.6 ^B | 24.4 | 14.2 ^B |
| A-6 | 17.5 ^C | 12 | 7.2 ^C | 44.5 ^C | 30.5 | 18.3 ^C |

*A Add .75" (1.9 cm) to height and 1.35" (3.4 cm) to depth
 B Add 1.27" (3.2 cm) to height and 1.1" (2.8 cm) to depth
 C Add 1" (2.54 cm) to height and .5" (1.27 cm) to depth
 D Add 2" (5.08 cm) to height and 1" (2.54 cm) to depth*

Compliance References*:

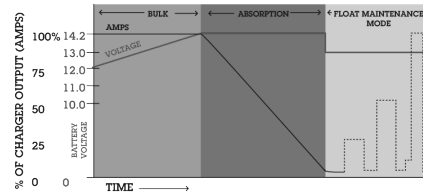
See matrix for applicable models
CG USCG CFR 183.410 (Ignition protected)
EN EN 60335-1, EN 60335-2-29

CE Carries the CE Mark
 * Numerous other Safety and EMC compliances may also apply. Contact factory if further compliance information is required.

Output Indicator References:

M-1 Charge/Float L.E.D.
M-2 Total output ammeter and charger status L.E.D.'s/Alarms
M-3 Total output ammeter and power-on L.E.D.

Typical Charge Curve



Temperature Rating References:

T-1 -10°C to +45°C; Derate linearly from 100% @ 0°C to 80% @ -10°C
T-2 -10°C to +60°C; Derate linearly from 100% @ 40°C to 60% @ 60°C
T-3 -10°C to +60°C; Derate linearly from 100% @ 50°C to 60% @ 60°C
T-4 -10°C to +60°C; Derate linearly from 100% @ 40°C to 60% @ 60°C
T-5 -40°C to +60°C; Derate linearly from 100% @ 50°C to 75% @ 60°C
T-6 -20°C to +50°C; Full output
T-7 -20°C to +70°C; Derate linearly from 100% @ 45°C to 50% @ 70°C
T-8 -20°C to +70°C; Derate linearly from 100% @ 50°C to 50% @ 70°C

Nominal Output Voltages at Gel/Flooded Switch Settings

(without Temperature Compensation option installed or at 22.2°C (72°F) with Temperature Compensation option installed.)

| Setting | 12 Volt Models | | 24 Volt Models | | 32 Volt Model | |
|-------------|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------|
| | Charge @ 50 % load | Float @ .5 amp load | Charge @ 50 % load | Float @ .5 amp load | Charge @ 50 % load | Float @ .5 amp load |
| Gel-Cell | 14.0 VDC | 13.6 VDC | 28.0 VDC | 27.2 VDC | 37.3 | 36.2 |
| Flooded/AGM | 14.2 VDC | 13.4 VDC | 28.4 VDC | 26.8 VDC | 37.8 | 35.7 |

Temperature Compensation: - 5 mV per cell per °C. Sensor supplied with 25' cable (40' cable optional) and plug-in connector

Protection (all models): Input/Output Fuses, Current Limiting, Thermal Protection, Forced Air Cooling, Drip Shield

Remote Panel, Model RP: LED's indicate charger output stage. Manual reset button reinitializes three stage charge cycle. Supplied with 25' cable and plug-in connector. Panel dimensions: 3" H x 4.75" W

7

NEWMAR

BATTERY CHARGERS PHASE THREE MODULAR

*A Battery Charging System with
Redundant, Easily Replaced Charge Modules
Providing High Reliability and Serviceability*

Reliability

- Redundant, independent, charger modules increase reliability – a malfunction of one does not disable the charging system; remaining modules continue to operate.

Serviceability

- Module change-out takes only minutes, while the system continues to operate
- Technical personnel not required
- No need to remove the charger case from the boat or disconnect any wiring
- No inconvenience of power interruption to the boat

Features

- Three stage "smart" charging; bulk, absorption, float
- Battery type selector switch; gel-cell, lead-acid, AGM
- Temperature compensated output option
- Numerous diagnostic and system status indicators
- 12 Volt; 33-100 amps or 24 Volt; 22-67 amps
- "Universal" input of 90-264 VAC, 50-60 Hz.–can be used anywhere in the world
- Powder coated stainless steel case

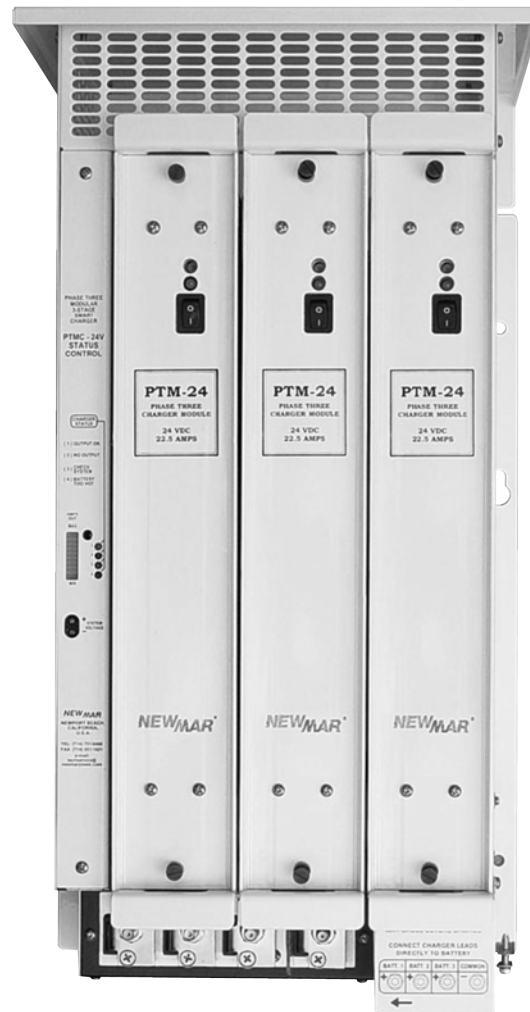
The Phase Three Modular (PTM) Concept

Super yachts and commercial vessels have complex electrical systems that support equipment essential to safe operation. These boats are frequently in transit or in remote locations where repair/service is not readily available. Down-time can be very costly and severely impact sailing schedules.

Recognizing that all equipment has a finite service life and random component failure can occur at any time, system reliability can be improved by reducing the number of single points of failure, thus diminishing the impact of a solitary fault on the overall system. The PTM series applies this "fault-tolerant" concept to battery chargers, by using multiple independent charger modules within the unit.

The PTM consists of a case which serves as connection point to AC input and battery bank output, as well as three front-facing power bays, each accommodating a 550 watt charger module which slides and locks in place. If a module fault occurs, a front panel indicator is activated and the system continues operating.

Captains and owners will appreciate this system approach to reliability. A dead charger and dead batteries can disable a vessel, but with the PTM redundant charging system a fault in one of the modules is easily identified and it can be quickly replaced with an on-hand spare or an exchange unit from the factory, while the charging system continues to operate.



BATTERY CHARGERS PHASE THREE MODULAR

NEWMAR

The Phase Three Modular (PTM) Series is a battery charging system consisting of a wall mount case, which serves as a connection point for AC input and battery bank output that accommodate up to three charging modules which slide and lock into front access power bays. Its redundant charger modules increase reliability, as the system remains operational in the event of a charger module fault. The system is easily and quickly restored to full output by simple module replacement.

The system features three stage charging for rapid recharge and optimal battery life. See pages 2 & 3 for a complete description of the three stage charging process.

Specifications

| System Model | Modules Installed* | Max Output Amps | Max Input Amps @ 115/230 VAC |
|--------------|--------------------|-----------------|------------------------------|
| PTMS-12-100 | 3 | 100 @ 12 V | 18/9 |
| PTMS-24-67 | 3 | 67 @ 24 V | 18/9 |

General System Specifications

Input Voltage/Frequency: 90-264 VAC, 47-63 Hz, single phase; derate linearly from 100% output @ 105 VAC to 80% output @ 90 VAC

Power Factor: .96-.99

Efficiency: 85% typical

Nominal Charge/Float Voltages: Refer to chart on page 3

Temperature Compensation (Option): - 5 mV per cell per °C (typical)

Temperature Rating: 0-60° C; derate linearly from 100% output @ 50° C to 80% output @ 60° C

Recommended Battery Type/Capacity: Gel-Cell, Flooded or Sealed Lead-Acid;

12 Volt Systems: 6 Cell, 80-400 A-H (per installed module); 240-1200 A-H (per system)

24 Volt Systems: 12 Cell, 40-200 A-H (per installed module); 120-600 A-H (per system)

Output Battery Banks: 3

Module Bays: 3*

Status Indicators: Output OK, No Output, Check System, Battery Too Hot, Total Output Bar Graph, Output Voltage Test Points, Contacts for Optional Remote Alarm

Case Material: Powder Coated Stainless Steel

Case Size: Refer to diagram at right

Weight: Empty: 16 lbs/7.3 kg. - With three modules installed: 34 lbs/15.5 kg.

* Note: Charge modules are shipped in the same carton as the PTM case and are then placed in position by the installer.

Individual Module Specifications

Models: PTM-12-33 (12 volt); PTM-24-22 (24 volt)

Input Voltage/Frequency: 90-264 VAC; 47-63 Hz; derate linearly from 100% output @ 105 VAC to 80% output @ 90 VAC

Input Current: 3 amps @ 230VAC; 6 amps @ 115 VAC

Power Factor: .96-.99

Efficiency: 85% typical

Protection Features: Input Fuse, Output Fuse, Current Limiting, Over Voltage Protection, Cooling Fan, Automatic Thermal Shutdown/Recovery

Compliances:

CE Mark, UL Recognized; E183223, Level 3

Safety: EN60950-1 USA, Canada, Europe

EMI Radiated and Conducted: FCC Part 15 Level A; EN55022 Class A

Status Indicators: Output OK/FAULT

Weight: 6 lbs.

Output Current:

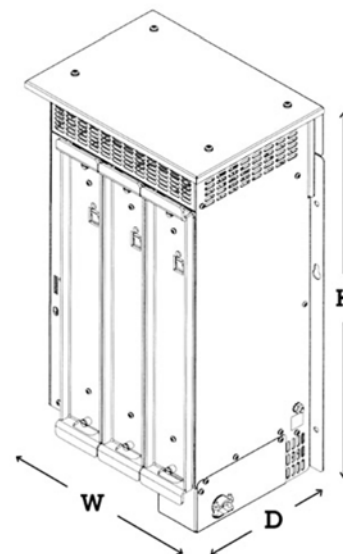
PTM-12-33: 33 amps max

PTM-24-22: 22.5 amps max in Bulk Phase;

20 amps max in Absorption/Float Phases

Optional

Temperature Compensation Sensor - Model TCS-12/24: See pages 2 & 3 for details



Case Size

| Inches | | | Centimeters | | |
|--------|------|-----|-------------|------|------|
| H | W | D | H | W | D |
| 20.9 | 10.9 | 8.8 | 53.1 | 27.7 | 22.4 |



NEWMAR

INVERTER - CHARGERS

A Complete Line of High Power DC-AC Inverters with Built-in Battery Chargers.

The circuitry of these Inverter/Chargers incorporates a technology which is field-proven and was carefully refined for years in both harsh industrial and sensitive utility applications. Now this rugged design is offered for marine applications where reliability and performance are paramount, and low noise operation has become a critical factor in the boat owner's choice of power products.

While incorporating numerous important features these inverter/chargers are engineered with a high functionality approach that installers will appreciate. All connectors and mounts are heavy duty commercial grade.

Ten models are available for use with 12, 24 or 32 volt battery systems and provide continuous rated AC power ranging from 1800 to 4800 watts at 115 VAC-60 Hz. The dual voltage models are a new addition to the line, ideal for large yachts and commercial vessels with power requirements for both 115 and 230 VAC equipment.

Called the "Perfect Wave" Series, these inverter-chargers deliver pure, sinusoidal* AC for flawless operation of all appliances and sensitive electronics. They are ideal for entertainment systems and micro-processor-based equipment such as computers which are intolerant to AC wave distortion.

** except model 2500IC, which produces quasi-sine wave*



All models incorporate a built-in automatic transfer switch which activates multi-stage battery charger for rapid and safe replenishment of the inverter battery bank whenever shore or generator AC power is available.

All models feature numerous circuit and safety protections, such as thermally controlled cooling fans, low voltage cutout, thermal and overload protection and ground fault interruption, and are housed in rugged powder coated aluminum cases suitable for permanent horizontal or bulkhead mounting. An optional remote indicator and control panel is available for all models.

Features

- Rugged hostile environment-proven circuitry generates "Perfect Wave" AC for powering any appliance, from wattage-hungry refrigeration to highly input-sensitive computers, electronic controllers/processors.
- Built-in high output charger for rapid battery bank replenishment— all models feature three stage, temperature compensated charger with output programmable for gel-cell, flooded lead-acid or AGM battery type, and amp-hour capacity selector for proper charging in various applications.
- Internal charger is activated by an automatic transfer relay via remote sensor whenever external AC power is available. Optional Battery Integrator permits charging of multiple banks (see page 14)
- Designed for maximum ease of installation and operation— installer and user-friendly. Large DC input terminal blocks and front panel GFCI protected outlet receptacles. AC output from the inverter may also be hard-wired.
- All important aspects of inverter and charger operation clearly displayed with front panel status indicators - optional remote panel available.
- Numerous safety and circuit protections: short circuit, overload, over-temperature, ground fault protection, output circuit breaker

- Thermally controlled cooling fan prolongs life of components
- Automatic low voltage shutdown circuit prevents damage to batteries due to over-discharge when using inverter function.
- Heavy duty powder coated aluminum construction and polyurethane coated internal circuitry—built to last in the harsh marine environment.
- UL listed with full two year warranty

Options/Accessories

- Remote control and indicator panel; ICR-2-25 provided with 25' of cable and ICR-2-50 provided with 50' of cable.
- Duplicates all status indicators found on unit front panel and allows remote ON/OFF capability
- Battery Integrator, Models BI-100, BI-200, and BI-24-100, enables of multiple isolated battery banks. (See page 14)
- AC and DC energy monitors. (See page 20)
- Inverter info center panel blanks. (See opposite page)
- High current fuse assembly. (See page 22)



Model: ICR-2-25 & ICR-2-50

INVERTER - CHARGERS



Specifications

| Model | 12-1800IC | 12-2500IC | 12-3000IC* | 12-3000IC-DV* |
|-------------------------|--------------|--------------|------------------|------------------|
| Inverter Output: | | | | |
| VAC | 115V, 60 Hz. | 115V, 60 Hz. | 115V, 60 Hz. | 115/230V, 60 Hz. |
| Watts (Surge) | 4000 | 5500 | 6500 | 6500 |
| Watts (Cont.) | 1800 | 2500 | 3000 | 3000 |
| Wave Type | PS | QS | PS | PS |
| Inverter Input: | | | | |
| VDC | 11-14 | 11-14 | 11-14 | 11-14 |
| Max Amps | 180 | 250 | 300 | 300 |
| Charger Input: | | | | |
| VAC | 115V, 60 Hz. | 115V, 60 Hz. | 115V, 60 Hz. | 230V, 60 Hz. |
| Max Amps | 15 | 15 | 20 | 10 |
| Charger Output: | | | | |
| Max Amps@V | 85A@12V | 100A@12V | 105A@12V | 105A@12V |
| Type | three stage | three stage | three stage | three stage |
| Case: | | | | |
| Size Reference | I-2 | I-2 | I-3 | I-3 |
| Weight: Lbs./Kg. | 54/25 | 54/25 | 75/35 | 80/37 |
| Model | 24-2200IC | 24-4800IC | 24-4800IC-DV* | 32-2400IC |
| Inverter Output: | | | | |
| VAC | 115V, 60 Hz. | 115V, 60Hz. | 115/230V, 60 Hz. | 115V, 60 Hz. |
| Watts (Surge) | 6500 | 14,000 | 14,000 | 6500 |
| Watts (Cont.) | 2200 | 4800 | 4800 | 2400 |
| Wave Type | PS | PS | PS | PS |
| Inverter Input: | | | | |
| VDC | 22-28 | 22-28 | 22-28 | 29-38 |
| Max Amps | 110 | 240 | 240 | 100 |
| Charger Input: | | | | |
| VAC | 115V, 60 Hz. | 115V, 60 Hz. | 230V, 60 Hz. | 115V, 60 Hz. |
| Max Amps | 15 | 40 | 15 | 15 |
| Charger Output: | | | | |
| Max Amps@V | 40A@24V | 105A@24V | 105A@24V | 30A@32V |
| Type | three stage | three stage | three stage | three stage |
| Case: | | | | |
| Size Reference | I-2 | I-3 | I-3 | I-2 |
| Weight: Lbs./Kg. | 57/26 | 95/43 | 80/37 | 59/27 |

*Special Order Only – Contact Factory

Charger Characteristics:

Three stage "smart charger"; programmable via selector switch for gel, flooded lead-acid or AGM battery type; temperature compensated. Output voltage temperature compensated via provided battery temp sensor with 20' cable

Case Size References:

| Case | Inches | | | Centimeters | | |
|------|--------|------|------|-------------|------|------|
| | H | W | D | H | W | D |
| I-2 | 7.5 | 16.0 | 15.5 | 19.1 | 40.6 | 39.4 |
| I-3 | 10 | 17 | 16 | 25.4 | 43.2 | 40.6 |



Protection Features (all models):

- Automatic low battery shutdown
- Output circuit breaker
- Auto high temperature shutdown/recovery
- Short circuit protection
- Overload protection

Mechanical Features (all models):

- Thermally controlled cooling fan
- Dual GFCI protected duplex outlet
- AC hard-wire (optional)
- Powder coated aluminum case with shelf or bulkhead mounting flanges
- Polyurethane coated printed circuit boards

Wave Type:

PS = Pure Sine QS = Quasi Sine

Operating Temperature (all models):

-22° C to +40° C (0° F to 104° F)

Inverter Regulation: 120 VAC RMS (110V-127V)





BATTERY CHARGERS ABC SERIES



ABC 12-25



ABC 12-8

ABC Series

The ABC Series chargers have been in the Newmar line for 30 years. They utilize time tested SCR charging circuitry, individually sensing and regulating each of 2 isolated battery banks, allowing the user to leave the charger operating indefinitely, even under no-load conditions without fear of overcharging. These chargers are ideal for vessels or vehicles which have an intermittent demand for battery power.

(For battery systems which require high continuous output, see our Phase Three Chargers on pages 2-3)

These chargers are housed in a rugged, black anodized aluminum, heat-sink case which extracts heat without introducing dust and moisture to the inside of the unit.

The rugged and reliable ABC charger is employed in hostile environments throughout the world in recreation and commercial marine applications, off-shore oil platforms, in mining equipment, emergency service vehicles and rugged off-road applications.

They feature a total output ammeter, on-off power switch, power "on" indicator light, 115/230 VAC input voltage selector switch, factory installed AC power cord with molded plug and shock-resistant rubber mounting grommets. Circuit boards are polyurethane conformal coated for corrosion resistance and all are protected against overheating by an automatically resetting thermal switch.

Features

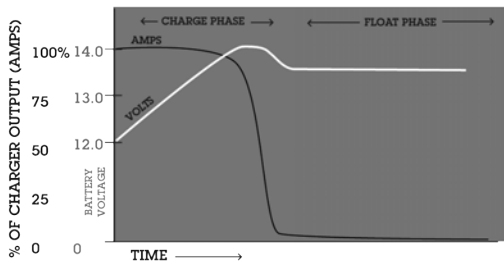
- Total output ammeter
- Dual independently regulated output banks
- On-off switch and power "on" indicator light
- Vibration absorbing mounting grommets
- Anodized aluminum case
- 115/230 VAC input selector switch
- Auto-reset thermal breaker
- Conformal coating of circuit board

Specifications

| Model | Input | Amps @ F. L. | | Output | | | Inches | | | Centimeters | | | Weight | |
|-----------|-------------------------------|--------------|-------|--------|------|------|--------|-----|------|-------------|------|-------|--------|--|
| | | Amps | Volts | Banks | Amps | H | W | D | H | W | D | (Lbs) | (Kg) | |
| ABC 12-8 | 105-125 VAC or 210-250 VAC | 1.5/.75 | 12 | 2 | 8 | 8.0 | 6.0 | 4.2 | 20.3 | 15.2 | 10.6 | 9 | 4.1 | |
| ABC 12-25 | 50-60Hz | 5/2.5 | 12 | 2 | 25 | 11.9 | 4.7 | 6.2 | 30.2 | 11.9 | 15.8 | 14 | 6.4 | |



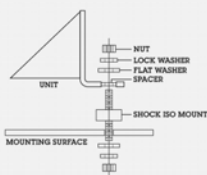
Typical Charge Curves ABC Series



Duty Cycle Ratings: Rated Charging Output 20 min., derate to 50% for continuous output

Operating Temperature: 0-40°C

Float Voltage: 13.4 VDC



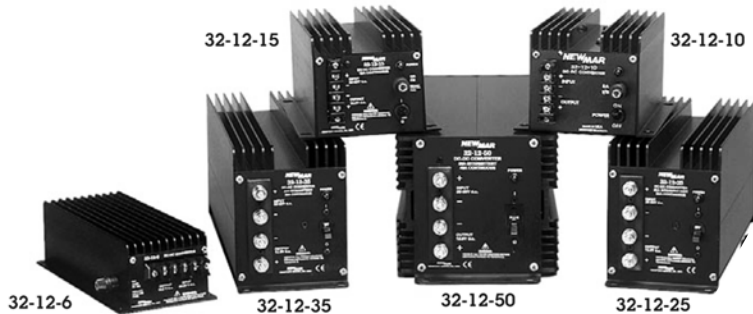
Option: Extreme Vibration Mounting Kit

The Extreme Vibration Mounting Kit is available to protect NEWMAR power converters from the extreme stresses of shock and vibration when mounted on high-vibration vehicles.

The kit (pictured here) replaces the standard vibration kit provided with the unit and fits into the unit's mounting flange to act as a "super shock absorber" for electronics in high-vibe applications. It is available to fit all NEWMAR units from 2 to 70 lbs. Specify KIT-L for units which weigh 2-15 lbs. and Kit-H for units which weigh 16-70 lbs.

DC-DC CONVERTERS STANDARD & ISOLATED SERIES

NEWMAR



NEW

| Model | Input voltage | Output voltage | Output Amps | | Case Size | Weight | |
|------------------------|---------------|----------------|--------------|------------|-----------|--------|-------|
| | | | Intermittent | Continuous | | (Lbs) | (Kg.) |
| Standard Series | | | | | | | |
| 24-12-3 | 17-32 | 13.6 | 3 | 3 | C-11 | 1 | .45 |
| 32-12-6 | 20-50 | 13.6 | 6 | 6 | C-10 | 2.5 | .9 |
| 32-24-6 | 32-50 | 24.5 | 6 | 6 | C-10 | 2.5 | .9 |
| 32-12-10 | 20-50 | 13.6 | 10 | 10 | C-2 | 4 | 1.8 |
| 32-24-10 | 32-50 | 24.5 | 10 | 10 | C-2 | 4 | 1.8 |
| 32-12-15 | 20-50 | 13.6 | 15 | 15 | C-2 | 5 | 2.3 |
| 32-24-15 | 32-50 | 24.5 | 15 | 15 | C-2 | 5 | 2.3 |
| 32-12-25 | 20-50 | 13.6 | 25 | 20 | C-3 | 7.5 | 3.4 |
| 32-24-25 | 32-50 | 24.5 | 25 | 20 | C-3 | 7.5 | 3.4 |
| 32-12-35 | 20-50 | 13.6 | 35 | 30 | C-4 | 12 | 5.5 |
| 32-24-35 | 32-50 | 24.5 | 35 | 30 | C-4 | 12 | 5.5 |
| 32-12-50 | 20-50 | 13.6 | 50 | 40 | C-5 | 16 | 7.3 |
| 32-24-50 | 32-50 | 24.5 | 50 | 40 | C-5 | 16 | 7.3 |
| Isolated Series | | | | | | | |
| 12-12-12I | 10-16* | 13.6 | 12 | 8 | C-8 | 6 | 2.7 |
| 12-24-6I | 10-16* | 24.5 | 6 | 4 | C-8 | 6 | 2.7 |
| 12-12-35I | 10-16* | 13.6 | 35 | 20 | C-9 | 12 | 5.5 |
| 12-24-18I | 10-16* | 24.5 | 18 | 10 | C-9 | 12 | 5.5 |
| 48-12-6I | 20-56 | 13.6 | 6 | 6 | C-7 | 7 | 2.7 |
| 48-24-3I | 20-56 | 24.5 | 3 | 3 | C-7 | 7 | 2.7 |
| 48-12-12I | 20-56 | 13.6 | 12 | 8 | C-8 | 6 | 2.7 |
| 48-24-6I | 20-56 | 24.5 | 6 | 4 | C-8 | 6 | 2.7 |
| 48-12-18I | 20-56 | 13.6 | 18 | 10 | C-8 | 8 | 3.6 |
| 48-24-9I | 20-56 | 24.5 | 9 | 5 | C-8 | 8 | 3.6 |
| 48-12-35I | 20-56 | 13.6 | 35 | 20 | C-9 | 12 | 5.5 |
| 48-24-18I | 20-56 | 24.5 | 18 | 10 | C-9 | 12 | 5.5 |

*11.5 VDC minimum start-up voltage, then operates @ 10-16 VDC from 1 amp minimum to full load

Performance Specifications – Standard & Isolated Series

Output: 13.6 VDC (internally adjustable 12.6-14.5) or 24.5 VDC (or specify) - except 24-12-3

Ripple: 150 mV P-P maximum

Regulation: Standard: 1% Line/Load
Isolated: 2% Line/Load

Duty Cycle Ratings*
Intermittent - 20 minutes max on 20% duty. Current limit set at approx. 105% of intermittent rating
*24-12-3: 2 minute max. on time

Continuous - 24 hours, 100% duty

Idle Current: Standard Series: Less than 100 mA (including power "ON" light)
Isolated Series: approx. 50 mA

Operating Temp: 0-50° C, Derate Linearly From 100% @ 40° C to 50% @ 50° C Thermal shutdown @ 70° C Case Temperature
Model 24-12-3I: Full Output -25° C to +30° C; Derate linearly from 100% @ +30° C to 45% @ +50° C

Switching Frequency: Standard: 40 Khz
Isolated: 70Khz

Efficiency: 85% - Typical.

Isolation - Output/Chassis: Input/Chassis: 250 VDC
Input/Output: 250 VDC (Isolated Series only)

Certification: Carries the CE mark (Standard Series only)

Standard Series

Convert 20-50 VDC to 12 or 24 VDC output for powering communication/navigation equipment, on negative ground systems. (See Isolated Series, below for positive ground applications.) Ideal for powering voice, data and navigation transceivers in mobile and marine applications.

- Excellent Regulation: Output voltage maintained within 1% under all line and load conditions within rating.
- Heat generated by semi-conductors is extracted and dissipated by large heat sink fins that maximize air contact for cool operation and long life of components.
- Polyurethane conformal coating on PC boards and corrosion-resistant anodized aluminum case with heavy duty shock mounts assure survival in hostile environments.
- Numerous converter and load protection circuits: Current limiting*; automatic thermal shutdown; short circuit proof*; reverse polarity and overvoltage protection*.
* Except 3 Amp. Model.
- Carries the CE mark

Isolated Series

Same features as Standard Series, but with the additional capability of permitting connection of negative ground gear to positive or floating ground battery systems, or vice-versa. Many models may also be used as 12 or 24 volt stabilizers for highly input voltage sensitive equipment (see page 13).

Input range: 10-56 VDC; positive, negative or floating ground.

Output: 12 or 24 VDC, 3 to 35 amps.

Options

- 24 VDC output (see specs at left)
- Operation as battery charger or parallel redundant operation* - derate to continuous duty rating (contact factory)
- Extreme vibration mounting kit. (See page 10)

* Except Model: 24-12-3

Case Size

| Ref. | Inches | | | Centimeters | | |
|------|--------|-----|------|-------------|------|------|
| | H | W | D | H | W | D |
| C-1 | 2.7 | 4.5 | 6.0 | 6.9 | 11.4 | 15.2 |
| C-2 | 4.5 | 5.9 | 11.0 | 11.4 | 15.0 | 27.9 |
| C-3 | 6.0 | 4.7 | 14.0 | 15.2 | 11.9 | 35.6 |
| C-4 | 6.0 | 4.7 | 16.0 | 15.2 | 11.9 | 40.6 |
| C-5 | 6.2 | 6.8 | 18.1 | 15.7 | 17.3 | 46.0 |
| C-7 | 4.25 | 5.9 | 7.7 | 10.8 | 15.0 | 19.6 |
| C-8 | 4.25 | 5.9 | 14.0 | 10.8 | 15.0 | 35.6 |
| C-9 | 6.0 | 6.8 | 16.5 | 15.2 | 17.3 | 41.9 |
| C-10 | 2.8 | 4.2 | 10.4 | 7.1 | 10.7 | 26.4 |
| C-11 | 3.5 | 3.5 | 1.75 | 8.9 | 8.9 | 4.5 |

NEWMAR

POWER SUPPLIES HEAVY DUTY SERIES

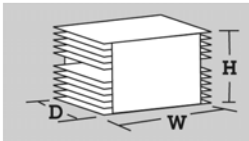


Specifications

| Model | Nominal Input VAC | Output Amperage | | Case Size Ref. | Weight | |
|-----------------------|-------------------|-----------------|------------|----------------|--------|------|
| | | Intermittent | Continuous | | Lbs. | Kg. |
| 12 Volt Output | | | | | | |
| 115-12-8 | 115/230 | 8 | 5 | P-2 | 10 | 4.5 |
| 115-12-20A | 115/230 | 20 | 8 | P-3 | 20 | 9.1 |
| 115-12-35CD | 115/230 | 35 | 35 | P-5 | 32 | 14.6 |
| 24-Volt Output | | | | | | |
| 115-24-10 | 115/230 | 10 | 4 | P-3 | 20 | 9.1 |
| 115-24-18CD | 115/230 | 18 | 18 | P-5 | 32 | 14.6 |
| 115-24-35CD | 115/230 | 35 | 35 | P-6 | 60 | 27.3 |

Case Size

| | Inches | | | Centimeters | | |
|-----|--------|------|-------|-------------|------|------|
| | H | W | D | H | W | D |
| P-2 | 6.0 | 4.6 | 8.5 | 15.2 | 11.7 | 21.6 |
| P-3 | 5.7 | 4.8 | 16.3 | 14.5 | 12.2 | 41.4 |
| P-5 | 6.5 | 9.5 | 14.0 | 16.5 | 24.1 | 35.6 |
| P-6 | 6.5 | 13.0 | 18.75 | 16.5 | 33.0 | 47.6 |



Output Voltage

12 V Models:

13.6 VDC (Internally adjustable 12.6-14.5 VDC)
Ripple: 40mV P-P (@ 110-125/220-250 VAC input)

24 V Models:

24.5 VDC (Internally adjustable 21-27.5 VDC)
Note: When modified for battery charger operation output voltage is factory set at 27.2 VDC
Ripple: 70mV P-P (@ 110-125/220-250 VAC input)

Regulation All Models: 1% Line and Load (@ 110-125 / 220-250 VAC input)

Heavy Duty Series

- Designed for powering 12 and 24 VDC communication/navigation equipment aboard commercial vessels where reliability is the primary consideration.
- Input voltage 115 or 230 VAC selected by slide switch on the front panel.
- Excellent Regulation and Ripple Spec: Output voltage maintained within 1% under all line and load conditions within rating; Ripple is less than 40 mV P-P. (12 volt) or 70 mV P-P (24-volt).
- Polyurethane conformal coated PC board and corrosion resistant heavy duty aluminum case with integral shock mounts assures survival in hostile environments.
- Heat generated by semi-conductors is extracted and dissipated by large heat sink fins that maximize air contact for cool operation and long life of components.
- Supply and Load Circuit Protection: overvoltage, current limit; (set @ 105% of intermittent rating), thermal overload and input/output fusing.
- Thermally activated cooling fan on "CD" units.

Input Range

105-125/210-250 VAC (selectable), 50-60 Hz
Derate to 50% output below 110 and 220 VAC

Operating Temperature

Standard Units

0-50°C, Derate Linearly From 100% @ 40°C To 50% @ 50°C Thermal shutdown @ 85°C Case temperature

C.D. Units

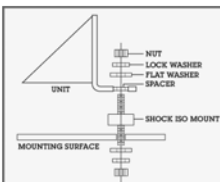
0-65°C, Derate Linearly From 100% @ 50°C To 50% @ 65°C Thermal Shutdown @ 85°C Case temperature

Duty Cycle

Intermittent: 20 minutes max on time, 20% duty
Continuous: 24 Hours/Day 100% Duty

Options

- Use as a Battery Charger
- Output voltage adjust (see Output Voltage for range)
- Transfer relay for back up battery in event of power failure (ERC option see page 15)



Option: Extreme Vibration Mounting Kit

The Extreme Vibration Mounting Kit is available to protect NEWMAR power converters from the extreme stresses of shock and vibration when mounted on high-vibration vehicles.

The kit (pictured here) replaces the standard vibration kit provided with the unit and fits into the unit's mounting flange to act as a "super shock absorber" for electronics in high-vibe applications. It is available to fit all NEWMAR units from 2 to 70 lbs. Specify KIT-L for units which weigh 2-15 lbs. and Kit-H for units which weigh 16-70 lbs.

POWER SUPPLIES WITH BUILT-IN BATTERY BACK-UP

NEWMAR

Power-Pac

Designed for critical applications such as VHF shore stations that must remain on the air, even during a power outage. The 12 volt supply features built-in back-up batteries which are charged during normal operation and then continue to power radios even when AC power is lost.

- Highly regulated, low ripple output for noise-free radio operation
- Battery automatically comes on-line if AC fails
- Low battery alarm and disconnect, with override switch for emergency power

General Specifications

- **Input:** 115/230 VAC, 50-60 Hz.
- **Output:** 13.6 VDC @ 5A cont., 10A Int.
- **Regulation:** 1% line and load
- **Ripple:** 1% P-P
- **Operating Temp:** 0-40° C

Models:

- **Power-Pac 7 A/H** (w/7 amp/hour battery), 18 lbs.
- **Power-Pac 14 A/H** (w/14 amp/hour battery), 24 lbs.
- **Dimensions** (both models): 5.3" H x 9.0" W x 10.5" D

Options:

- External battery packs available, contact factory for information on BM Series
- Also available without batteries installed; contact factory (subtract 15 lbs. from unit weight)



Integrated Power System

Precision-regulated power supply with built-in batteries, status indicators, alarms and low voltage disconnect. Ideal for GMDSS consoles and base stations. Rear terminals provided to expand back-up capacity by wiring additional batteries. 19" or 23" rackmount standard. Bulkhead/shelf mounting bracket optional. 115/230 VAC, 50-60 Hz input all models.

| Model | Output | | Internal Battery Capacity | Ground Reference | Weight | | Case Size Inches H x W x D |
|-----------|--------|-----------------|---------------------------|------------------|--------|------|----------------------------|
| | VDC | Amps Continuous | | | Lbs | Kg. | |
| IPS 12-40 | 13.6 | 40 | 16 A-H | Negative | 32 | 14.6 | 3.5 x 17 x 19.5 |
| IPS 24-22 | 27.2 | 22 | 8 A-H | Negative | 32 | 14.6 | 3.5 x 17 x 19.5 |
| IPS 48-11 | 54.4 | 11 | 4 A-H | Positive | 32 | 14.6 | 3.5 x 17 x 19.5 |

Power Modules & Power Function Manager

Power Modules

Power Modules function as power supply or battery charger; 12, 24 or 48 volts; positive, negative floating ground. Wire in parallel to create systems from 500-6,000 watts. Optional quick connect wiring kit allows swap-out of modules without system shutdown. 115/230 VAC, 50-60 Hz input. 19" or 23" rackmount standard. Bulkhead/shelf mounting bracket optional.



| Model | Input Amps @ F.L. 115/230V | Output | | Weight | |
|----------|----------------------------|-----------|-------------|--------|-----|
| | | VDC V OUT | Amps Cont.+ | Lbs | Kg. |
| PM-12-40 | 8.5/4.3 | 13.6 | 40 | 12.2 | 5.5 |
| PM-12-70 | 16/8 | 13.6 | 70 | 15.2 | 6.9 |
| PM-24-20 | 8.5/4.3 | 27.2 | 20 | 12.2 | 5.5 |
| PM-24-35 | 16/8 | 27.2 | 35 | 15.2 | 6.9 |
| PM-24-80 | */22 | 27.2 | 80 | 34 | 15 |
| PM-48-10 | 8.5/4.3 | 54.4 | 10 | 12.2 | 5.5 |
| PM-48-18 | 16/8 | 54.4 | 18 | 14.0 | 6.4 |
| PM-48-50 | */22 | 54.4 | 50 | 34 | 15 |

+ For parallel configuration/load sharing derate output 10%

Power Function Manager



Power Function Manager converts ordinary power supplies (or Power Modules, at left) into a fully integrated and ideally functional complete power system. The unit provides control, monitoring, paralleling and protection of 12, 24 or 48 VDC, positive, negative or floating ground power sources.

- Heavy duty (400 amp) input power parallel tie point
- Digital output monitoring of system voltage and amperage
- System status lights
- Five distribution circuit breaker capacity
- Auto low voltage or manual battery disconnect
- Summary alarm contacts

Model: PFM-400

19" or 23" rackmount only; 2 RU (3.5") high

Case Size - PM and PFM

| Inches | | | Centimeters | | |
|--------|----|------|-------------|------|------|
| H | W | D | H | W | D |
| 3.5 | 17 | 20.5 | 13.5 | 43.2 | 52.1 |

*19" and 23" mounting brackets provided



NEWMAR

DC POWER CONDITIONERS

StartGuard

The abrupt DC system voltage drop that accompanies engine starting can cause microprocessor-driven communication and navigation electronics to "dump" programmed memory.



StartGuard solves this problem by providing supplemental voltage to sensitive electronics while the engine is cranked. It contains a sealed rechargeable battery which is switched on-line to electronics when the starter switch or solenoid is engaged. When the engine is running StartGuard automatically goes off-line and the internal battery is recharged by the alternator.

Specifications

Input Voltage: 13.8 - 14.8 VDC nominal, 15.5 VDC max.

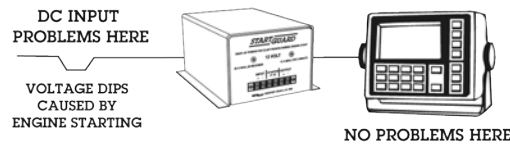
Relay Activation Input Voltage: 7-15 VDC

Output: 20 amps max.

Battery: 12 VDC, sealed rechargeable,
5 - 7 year life (typical)
5 amp-hour capacity

Certified by DOT and IATA for shipment by air
Replacement battery P/N: 591-0412-0

Back-up Capacity (Fully Charged): (See matrix below)



| Model | Input | Back-Up Capacity | | Dimensions | | Weight | |
|----------|---------------------------------------|------------------|-----------|------------------|-------------------|--------|-----|
| | | 1 Minute | 2 Minutes | Inches | Centimeters | Lbs | Kg. |
| NS-12-20 | 13.8-14.8 VDC Nominal 15.5 VDC Max | 20 amps | 15 amps | 8.25 x 4.9 x 3.5 | 20.1 x 12.5 x 8.9 | 5.5 | 2.5 |



U.S. PATENT #: 5172292

Model: NP-12

Input Voltage: 13.8-14.8 VDC nominal, 15.5 VDC max.

Output: 20 amps Max. @ 12 Volt

Back-Up Power:

7 Amps for fifteen (15) minutes

10 Amps for eight (8) minutes

15 Amps for two (2) minutes

20 Amps for one (1) minute

Battery: Sealed Rechargeable 5.0 Amp-Hour, 5-7 years typical life, can be replaced. Low-voltage disconnect circuit protects battery from total discharge. Certified by DOT and IATA for shipment by air. Replacement battery P/N: 591-0412-0

Noise Filtering: Audio through 200 MHZ

Voltage Spike Protection:

Transient energy capability: 100 Joules, 4,000 amps Max (8 x 20 micro seconds)

Size (H x W x D):

5.25" x 6.2" x 7.4" 5.9 lbs.,

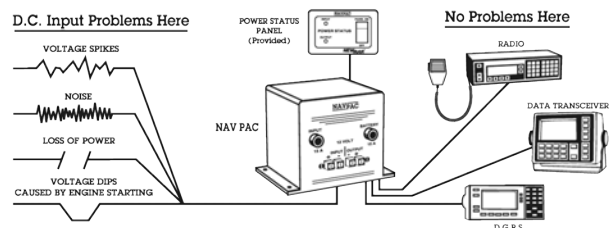
13.3 x 15.7 x 18.8 cm 2.7 Kg.,

Panel Dimensions: 3.5" W x 2" H (8.9 x 5.1 cm)

NAV-PAC®

Marine communication/navigation electronics such as programmable data transceivers, GPS and other microprocessor-controlled devices require clean and steady DC input power. Their sensitive circuitry is highly vulnerable to voltage drop from engine start, noise and line spikes from alternators and motors, and conducted noise from various other electronic devices. NAV-PAC prevents these conditions from affecting electronics.

- Prevents voltage "drop-out" to electronics during engine start
- Absorbs line "spikes"
- Filters out electrical interference
- Provides supplemental voltage/battery back-up for up to 15 min.
- Remote monitor panel included.



DC POWER STABILIZERS



12-12-3I



24-24-7I



12-12-12I

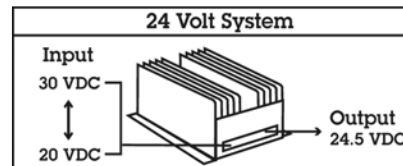
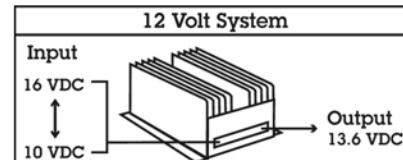
12 & 24 Volt Stabilizing Converters

Feed sensitive electronics with proper voltage regardless of battery condition. These stabilizing converters provide continuous, precisely regulated output over the entire range of a battery's usable voltage. This prevents subjecting loads to fluctuating input voltage which can cause shutdown, diminish performance and possibly damage sensitive circuitry.

Application Benefits Include:

- Operate electronics at optimal input voltage, even from nearly drained batteries
- Boost voltage to compensate for voltage drops in long wire runs from batteries
- Eliminate voltage drops during momentary high current drain from batteries, as during engine start
- Eliminate voltage fluctuation from charge sources
- Eliminate voltage overshoot due to sudden removal of high current load

These converters provide total input/output isolation, virtually eliminating conducted line noise and permitting connection of negative ground gear to positive or floating ground systems, or vice versa. They can also be modified for use as battery chargers, allowing them to maintain a battery at a great distance from the primary voltage source, providing reserve power if the main source fails. The rugged anodized aluminum case is ideal for marine applications



Options/Factory Modifications

- Operation as a battery charger (contact factory)
- Parallel/redundant operation (contact factory)
- High vibration mounting kit (see bottom of page 10)
- Non-standard output voltage (contact factory)

| Model | Input voltage | Output voltage | Output Amps Intermittent | Case Size | Weight (Lbs.) (Kg.) |
|-----------|---------------|----------------|--------------------------|-----------|---------------------|
| 12-12-3I | 10-16 | 13.6 | 3 | C-4 | 1 .45 |
| 12-12-6I | 10-16 | 13.6 | 6 | C-4 | 1 .45 |
| 12-12-12I | 10-16* | 13.6 | 12 | C-2 | 6 2.7 |
| 12-12-35I | 10-16* | 13.6 | 35 | C-3 | 12 5.5 |
| 24-24-3I | 20-56 | 24.5 | 3 | C-3 | 12 5.5 |
| 24-24-7I | 20-32 | 24.5 | 7 | C-5 | 2 .9 |
| 48-24-6I | 20-56 | 24.5 | 6 | C-2 | 6 2.7 |
| 48-24-9I | 20-56 | 24.5 | 9 | C-2 | 8 3.6 |
| 48-24-18I | 20-56 | 24.5 | 18 | C-3 | 12 5.5 |

*11.5 VDC minimum start-up voltage, then operates @ 10-16 VDC from 1 amp minimum to full load

See page 9, Isolated Series Converters for complete specifications and mechanical description.

Case Size

| Ref. | Inches | | | Centimeters | | |
|------|--------|-----|------|-------------|------|------|
| | H | W | D | H | W | D |
| C-1 | 4.25 | 5.9 | 7.7 | 10.8 | 15.0 | 19.6 |
| C-2 | 4.25 | 5.9 | 14.0 | 10.8 | 15.0 | 35.6 |
| C-3 | 6.0 | 6.8 | 16.5 | 15.2 | 17.3 | 41.9 |
| C-4 | 3.5 | 3.5 | 1.75 | 8.9 | 8.9 | 4.5 |
| C-5 | 7.0 | 3.5 | 1.75 | 17.8 | 8.9 | 4.5 |

NEWMAR

BATTERY ISOLATORS & INTEGRATORS



Battery Isolators

These heavy duty isolators allow charging multiple batteries automatically from one or two alternators, and prevent discharge or "dumping" of one battery into another. Each battery is charged according to its need without overcharging. Rated for 12-48 volt negative ground DC systems. Feature conservatively rated diodes and a rustproof anodized aluminum heat sink case. Models are available for 70, 120 and 165 amp alternators.

| Model | Alternator Sources | Battery Bank | Max Amperage Input Capacity | Weight | | Dimensions | | |
|---------|--------------------|--------------|-----------------------------|--------|-----|------------|------|--------|
| | | | | Lbs | Kg | L | W | H |
| 1-2-70 | 1 | 2 | 70 | 2 | .9 | 3.25 | 4.5 | 3.1 in |
| | | | | | | 8.3 | 11.4 | 7.9 cm |
| 1-3-70 | 1 | 3 | 70 | 2 | .9 | 3.25 | 4.5 | 3.1 in |
| | | | | | | 8.3 | 11.4 | 7.9 cm |
| 2-3-70 | 2 | 3 | 70 | 4 | 1.8 | 6.5 | 4.5 | 3.1 in |
| | | | | | | 16.5 | 11.4 | 7.9 cm |
| 1-2-120 | 1 | 2 | 120 | 3 | 1.4 | 6.5 | 4.5 | 3.1 in |
| | | | | | | 16.5 | 11.4 | 8.0 cm |
| 1-3-120 | 1 | 3 | 120 | 3 | 1.4 | 6.5 | 4.5 | 3.1 in |
| | | | | | | 16.5 | 11.4 | 8.0 cm |
| 2-3-120 | 2 | 3 | 120 | 5 | 2.3 | 12.5 | 4.5 | 3.1 in |
| | | | | | | 30.5 | 11.4 | 7.9 cm |
| 1-3-165 | 1 | 3 | 165 | 5 | 2.3 | 9 | 4.5 | 3.1 in |
| | | | | | | 22.9 | 11.4 | 8.0 cm |

Application Note: Battery Isolators may also be used to facilitate N+1 parallel/redundant operation of power supplies. Contact factory.

Features:

- Heavy duty construction
- Rated for systems up to 48 volts DC, negative ground
- Rust-proof anodized aluminum case
- Stainless steel mounting hardware provided
- Protective covers provided for terminals

Performance Specifications

Operating temperature: -40 to +80° C
Duty cycle: Continuous rating to 50° C
 Derate linearly to 70% @ 80° C
Temp. rise: 95° C at full rated current (mount vertically for optimum cooling)
Voltage drop: 0.7V @ 50% load
 0.9V @ full load
Note: These battery isolators are not compatible with self exciting alternators. Please consult the manufacturer of your alternator if you are unsure of your configuration.



Battery Integrator

Charging multiple battery banks without use of diode isolators dictates that the batteries be connected or "integrated" only

whenever a charge voltage is present so that they may be charged simultaneously, then disconnected or "isolated" when in use to allow for selective discharge and avoid having the secondary or standby battery drain into the primary battery.

Battery Integrators perform this function automatically, acting as a "smart" switch to connect independent battery banks only when a charging voltage is present. Otherwise, they are isolated, and discharge between banks is prevented.

Features

- Enables charging of two separate banks without voltage drop, yet maintains 100% isolation at all other times. For systems of three banks or more, an additional unit must be installed for each additional bank
- Heavy duty silver-plated contactor, continuous duty rated
- Voltage sense circuit, epoxy encapsulated and heavy duty continuous rated solenoid are all designed for use in marine environments
- 12 volt model has ignition protection rating
- Easy three-wire hook up for two bank systems (BATT +, BATT +, GROUND)
- Terminal for optional wiring of remote light indicating when battery banks are integrated
- Optional internal connection can be wired though key starter or manual override switch, tying battery banks together for extra boost during engine start

Specifications

Models: BI-100; BI-200; BI-24-100
Battery Integration Connect Point: 13.2 VDC (approx.)
 26.4 VDC (approx.)
Battery Disconnect Point: 12.8 VDC (approx.)
 25.6 VDC (approx.)
Maximum Continuous Current: 100 amps (100 amp models)
 200 amps (200 amp model)
Peak Maximum Current: 400 amps (100 amp models)
 600 amps (200 amp model)
Operating Temperature: Control: -40 to +85° C
 Solenoid: -28 to +48° C
Terminals: Battery Connections: 5/16" copper alloy stud
Dimensions (H x W x D): 3" x 3.25" x 2.5"
Weight: 1 lb.

Automatic Power Selector

The Automatic Power Selector (APS) is a solid state device which enables installation of a seamless, redundant power system for critical electronic loads. It selects the higher voltage of two isolated DC power sources and routes power to the load. Should one source falter or fail, the other will automatically supply the load with no transfer delay, operation continues uninterrupted.

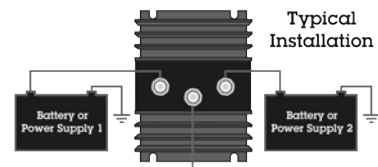
Easy installation, two independent power sources are wired to the APS and routed in a single output to the vital load. Rugged, rust-proof anodized aluminum case.

Models:

APS-70 Max. Load 70 amps., 3.25" x 4.5" x 3.1", 2 lbs.
APS-160 Max. Load 160 amps, 9.0" x 4.5" x 3.1", 5 lbs.
Voltage Rating: 6-50 VDC, neg. ground



APS-70



Typical Installation

Critical Electronics

DC POWER ACCESSORIES



Low Voltage Disconnect - LVD
Discharging batteries beyond a critical low voltage can damage the batteries and/or load, and require a longer recharge interval. A low voltage disconnect prevents this condition.



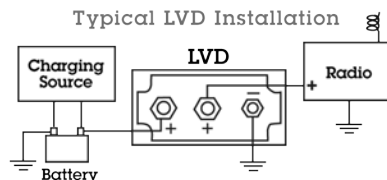
The LVD contains a sense and control circuit housed in a compact, rugged, vinyl-clad aluminum case. It is installed in-line between the battery and the load. The unit continually monitors battery voltage and if it falls below a preset voltage threshold, the load is automatically disconnected. When batteries are recharged past another pre-set voltage the load is reconnected. Connect and disconnect points are user adjustable.

- Models:**
LVD 12-30, LVD 12-75 (Neg. Ground)
LVD 24-50 (Neg. Ground)
LVD 48-30 (Pos. Ground)

Specifications

| Factory Set Actuation Voltages: | | | |
|---------------------------------|----------|----------|---------|
| | 12 VOLT | 24 VOLT | 48 VOLT |
| Disconnect | 10.4 VDC | 21.0 VDC | 42.0VDC |
| Connect | 12.2 VDC | 24.5 VDC | 49.0VDC |

Voltage and Contact Current Ratings:
Indicated By Model Number
(i.e., LVD 12-30 = 12 Volts, 30 Amps Continuous)
Dimensions (Mounted vertically, all models): 5.25" H x 5.25" W x 3.5" D
Weight: (All models): 1 LB.



Emergency Relay/Charger - ERC
The E.R.C. allows emergency battery tie-in to a radio system that is normally operated by a power supply.



Under normal conditions the radio is connected through the ERC to the power supply and the back-up battery receives only a trickle charge to keep it in peak condition.

In the event of AC power failure a relay automatically connects the radio to the back-up battery, restoring the system within one second. When AC power is restored the radio is automatically reconnected to the power supply and the trickle charge resumes to the battery.

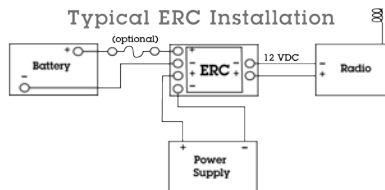
Available in 12 or 24 VDC, 15 or 35 Amp ratings, (not ignition protected.)

- Application notes:**
- 1 sec. switch over delay may not be suitable for data transceivers, use instead a system where the battery is floated on output of power supply – see Power-Pac or IPS (pg 11) or APS (pg 14).
 - Trickle charge current will maintain a back up battery and will slowly restore a deeply discharged battery. A separate high current charging source is recommended for deep discharge recovery.

Specifications

| ERC Model | Amps Int.Cont. | Size-inches H | W | D | Lbs | Kg |
|-----------|----------------|---------------|-------|-------|-----|-----|
| 12-15 | 15 | 10 | 2.25 | 2.875 | 4 | 1.5 |
| 24-15 | 15 | 10 | 2.25 | 2.875 | 4 | 1.5 |
| 12-35 | 35 | 30 | 3.875 | 2.875 | 4 | 2.9 |
| 24-35* | 35 | 30 | 3.875 | 2.875 | 4 | 2.9 |

*Built to order
Typical Trickle Charge Current:
1.5 amps – will vary depending on power supply voltage and battery condition.
Optimal Power Supply Voltage:
12 volt systems: 13.4 - 14.0 VDC
24 volt systems: 26.8 - 28.0 VDC



Lamp Dimmer System
Adjust DC lights to ease eye strain and enhance night vision. Light intensity is easily regulated by remote panel.



Control Panel - LDP
5000 Ohm dimmer control panel adjusts brightness between Off and 85% of full voltage. Black anodized aluminum panel.
Size: 3" x 3" (7.6 x 7.6 cm)

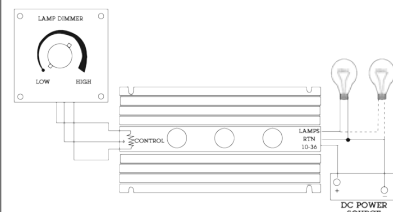


Dimmer Unit - LD
100 watt capacity, for 12, 24, and 32 VDC systems. Rugged anodized aluminum heat sink case.
Size: 9" x 4.5" x 2.75"; 2 lbs.
22.9 x 11.4 x 7cm. .9 Kg.

Model: LD Panel
Control Panel

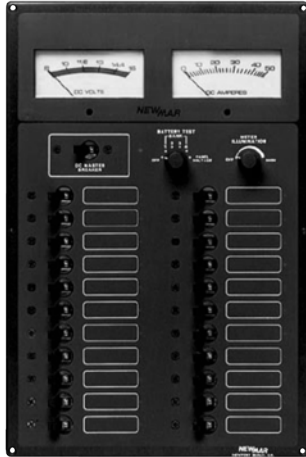
Model: LD
Dimmer only (no panel)

Typical LD Installation



NEWMAR

ELECTRICAL PANELS ELITE SERIES



ES-1

ES-1 DC Master Panel

This DC master control panel offers a large DC circuit capacity and full metering.

Features:

- Analog DC volt and ammeter, back illuminated with dimmer.
- 4 battery bank test switch.
- DC master breaker (100 Amp standard; 50 or 75 amp optional)
- 22 branch circuit capacity, 20 installed standard; 3-5A, 5-10A, 6-15A, 6-20A or specify
- Red circuit "on" indicator lights.
- LS-III Label set included.
- Multiple position ground Bus Bar included.
- Size: 10"W x 15"H x 4" D, (25.4 X 38.1 X 10.2 CM), Weight 8 lbs., (3.6 Kg.)

Because of their exact height match and style compatibility, the panels below are ideal companions for expanding circuit capacity of the ES-1 or ES-5, or they may be used as stand-alone load centers.



ES-6

ES-6 DC Load Center

Features:

- Accommodates one meter; analog standard. (DC 0-50A ammeter standard), or specify DC volts
- Master breaker (DC-75 amp standard; 50 or 100 amp optional, single pole)
- 10 branch circuit capacity, 8 installed standard: 1-5A, 2-10A, 4-15A, 1-20A
- Indicator lights on every circuit.
- LS-III set included.
- Multiple position ground Bus Bar included.
- Size: 5 1/4" W x 15" H x 4" D, (13.3 x 38.1 x 10.2 cm)

ES-7 AC or DC Accessory Panel

Features:

- AC or DC master breaker (AC 50 amp* standard, 30 amp optional, double pole or DC 100 amp standard; 50 or 75 amp optional, single pole.)
- 16 branch circuit capacity, 12 installed standard: ES-7A: 2-10A, 5-15A, 5-20A ES-7D: 2-5A, 3-10A, 5-15A, 2-20A
- Indicator lights on every circuit.
- LS-III label set included.
- Multiple position ground Bus Bar included.
- Size: 5 1/4" W x 15" H x 4" D, (13.3 x 38.1 x 10.2 cm) Weight: 7 lbs., (3.2 Kg.)

* Note 50 amp master OK for use on 230 VAC line-to-line systems. For 230 VAC line-to-neutral systems 30 amp is maximum master breaker value.



ES-7

Options

Meters:

Standard installed voltmeters are for 12 VDC or 115 VAC applications. (Ammeter range depends on master breaker value.) Optional voltmeters may be installed for 24 VDC or 230 VAC applications. Contact the factory for a complete list of metering options

Alternate Circuit Breaker Configurations:

Changing circuit breaker value mix or location is never a problem! Simply advise us of the breaker arrangement you need. (Panel specific illustrated order forms listing all options are available at www.newmarpower.com.) Please allow 3-5 days additional lead time to complete the modification.

Note: There is a mod. fee for special configurations - contact factory.

Installation Cut-Out Dimensions

| Model | Inches (H x W) | Centimeters (H x W) |
|------------|----------------|---------------------|
| ES-1 | 9 X 14 | 22.9 X 35.6 |
| ES-3 | 13 X 8.8 | 33 X 22.4 |
| ES-4 | 16.8 X 10.8 | 42.7 X 27.4 |
| ES-5 | 19 X 13 | 48.3 X 33 |
| ES-6D | 4.5 X 13 | 11.4 X 33 |
| ES-7A & 7D | 4 X 13.8 | 10.2 X 35.1 |

ELECTRICAL PANELS ELITE SERIES

NEW MAR

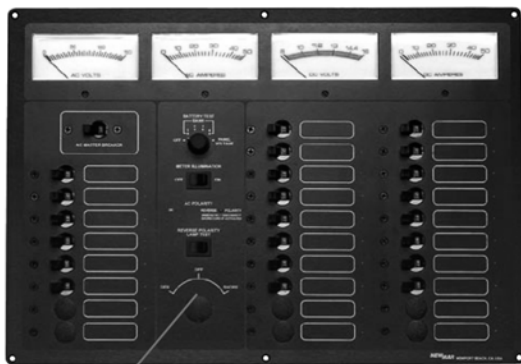
AC-DC Master Control

Locating all AC and DC functions on one panel provides a vessel with a central load distribution and monitoring center. Features common to all models include:

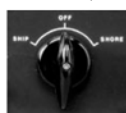
- Complete metering of voltage and current on AC and DC systems. Back-lit analog meters are standard.
- AC master breaker(s) with reverse polarity warning light.
- Power "on" indicator lights on all circuits.
- Four battery bank voltage test switch
- Deluxe label set (LS-III) included, 206 functions.
- Multiple position ground bus bar
- Rating 115/230 VAC, 65 VDC

ES-4

Large 3 1/2" scale meters and an ample circuit breaker capacity makes this the panel of choice for boats in the 35'-45' range. Circuit specifications listed at bottom of page. 17" W X 12" H X 4" D, 12 lbs (43.2 X 30.5 X 10.2 cm 5.5 Kg.)



ES-4



Option

For vessels with an onboard generator, the panel may be fitted with a 7.5 kW ship-shore AC source selector switch. Specify **ES-4SS** option when ordering.

Note: There is a modification fee for special configurations - contact factory.

ES-3

This panel combines AC and DC control into one compact panel. See list of specifications at bottom of page. 13.7" W X 10" H X 4" D, 10 lbs (34.8 X 25.4 X 10.2 cm, 4.5Kg.)

ES-3



ES-5

Exceptional yachts require an extraordinary panel which incorporates all the aspects of the vessel's electrical system. The ES-5 is such a panel. In addition to its large DC circuit capacity, the AC section includes two load groups and a source selector switch for two shore power lines and a 15kW generator. Pre-heat and start-stop controls are standard. Additional system capacity can be obtained by incorporating model ES-6 or ES-7 (listed on page 16). 20" W x 15" H x 6" D, 20 Lbs. (50.8 X 38.1 X 15.2 cm, 9.1Kg.)

ES-5



| Model | DC Circuits | AC Circuits |
|--------|--|---|
| ES-3 | 16 Breaker capacity, 12 Installed standard; 2-5A, 3-10A, 4-15A, 3-20A or specify | Master (D.P.) 30 amp standard 50 amp* optional, plus 6 S.P. branch capacity, 5 installed standard; 1-10A, 15A, 2-20A or specify |
| ES-4 | 20 Breaker capacity, 16 Installed standard; 3-5A, 3-10A, 5-15A, 5-20A or specify | Master (D.P.) 50 amp* standard plus 8 S.P. branch capacity, 6 installed standard; 1-10A, 3-15A, 2-20A or specify |
| ES-4SS | Same as above with 7.5 kW, three position (Shore-Off-Gen) ship shore | selector switch installed. <i>Special Order Only.</i> |
| ES-5 | Master plus 24 breaker capacity, 20 installed standard; 3-5A, 4-10A, 7-15A, 6-20A or specify | Two load groups each consisting of: Master breaker (D.P.) 50 amp* standard plus 10 S.P. branch capacity, 8 installed standard; 2-10A, 3-15A, 3-20A or specify |

*Note (For panels used in 230 VAC applications): 50 amp Master OK for use on 230 VAC line-to-line systems. Not for 230 VAC line-to-neutral systems.



NEWMAR

ELECTRICAL PANELS

NEWMAR offers a wide range of stylishly engineered electrical panels to provide control, protection and monitoring for on-board electrical circuits, ranging from basic meter panels to full-function AC/DC master distribution centers.

The panels are manufactured with 1/8" strong black anodized aluminum, feature elegant graphics, and their modular design allows integration of multiple units for a "custom" installation. All panels are pre-wired with bus bars and ground strips for easy installation, and come with extensive circuit identification label

sets. The circuit breakers use a "trip-free" magnetic-hydraulic mechanism and are UL recognized and CSA listed.

Individual circuit "ON" indicator lights are now standard for all distribution branch circuit breakers. Many models of meter panels and distribution panels are also available as blanks with bus bar, breaker mounting screws, labels and indicator light mounting hardware, allowing the installer to select from a wide array of components for maximum options in electrical system design.

Accessory Panels

These versatile panels are ideal for smaller vessels with only a limited number of electrical circuits, or for larger systems where their modular design makes for an easy and attractive expansion of existing system capacity.

Stock panels with breakers installed come standard with DC indicator lights, but may be factory modified with AC indicator lights instead. Blank versions of the panels come with all necessary hardware to install lights and breakers. All panels are provided with a circuit identification label set of 22 common on-board electrical functions (see below).

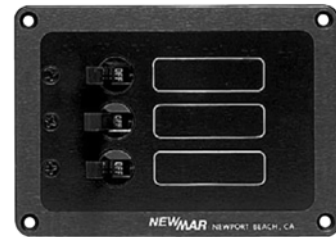


ACCY-IX: 8 breaker capacity, 5 installed standard; 2-5A, 1-10A, 1-15A, 1-20A or specify. 8 DC circuit "ON" indicator lights installed standard, AC lights optional. Size: 7 1/2" x 5 1/4", Weight: 2 lbs.

ACCY-IBX: Blank version of ACCY-IX above. No breakers provided. Label set, light and breaker mounting hardware provided. Weight: 1 lb.

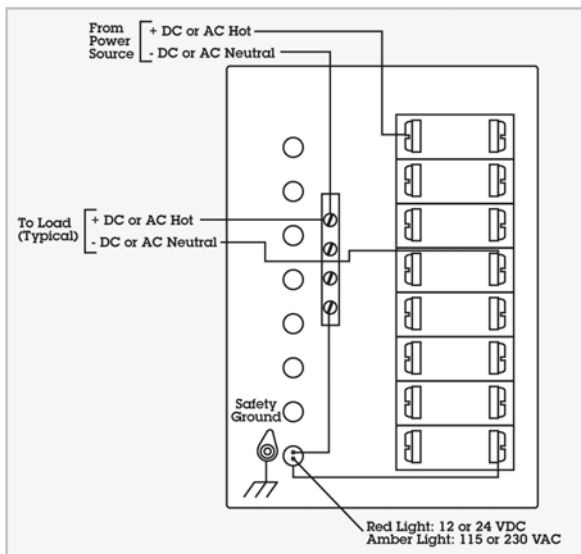
ACCY-IIX: Half-height version of ACCY-IX at left. 3 breaker capacity, 3 installed standard; 3 DC "ON" indicator lights installed standard - AC optional. 1-5A, 1-10A 1-15A or specify. Size: 3 3/4" x 5 1/4", Weight: 1 lb.

ACCY-IIBX: Blank version of ACCY-IIX above. No breakers or lights provided. Label set, light and breaker mounting hardware provided. Weight: 1 lb.



See page 22 for Panel Back Enclosures.

Typical Accessory Panel Wiring Diagram



Installation Cut-Out Dimensions*

| | Inches (W x H) | Centimeters (W x H) |
|------------------|----------------|---------------------|
| ACCY-IX | 4 X 6 | 10.2 X 15.2 |
| ACCY-IBX | 4 X 6 | 10.2 X 15.2 |
| ACCY-IIX | 4 X 2.5 | 10.2 X 6.4 |
| ACCY-IIBX | 4 X 2.5 | 10.2 X 6.4 |

* Allow approximately 3" depth clearance for all panels on this page.

Label Set Provided

Each panel is provided with a basic set of the following functions listed. Other more extensive label sets (up to 206 functions) are also available separately. To see the complete list, visit www.newmarpower.com and click on Electrical Panel Accessories.

LS-I Standard Set 22 Labels

| | | |
|--------------|--------------|----------------|
| ACCESSORY | FORE CABIN | SPARE |
| AFT CABIN | MAIN CABIN | SPREADER |
| ANCHOR | MAST | SUMP PUMP |
| BILGE PUMP | NAV/COM | WATER HEATER |
| BOW | OUTLETS | WATER PRESSURE |
| CABIN LIGHTS | REFRIGERATOR | WINDLASS |
| ENGINE ROOM | RUNNING | WINDSHIELD |

ELECTRICAL PANELS



DC Master Panel

DC monitor, protection, and control. Dimensional compatibility allows easy expansion of the system by incorporating additional accessory or monitor panels (see pages 18 and 21, respectively). Features an illuminated, expanded scale DC voltmeter with dual battery bank test switch and individual "ON" indicator lights. A label set of common on-board circuits is provided (see page 18, LS-I, for label list).

DC-IX: Voltmeter with dual battery bank test switch; 11 circuit breaker capacity, 9 installed standard 2-5A, 3-10A, 4-15A or specify.
Panel size: 10 1/2" x 7 1/2", (26.7 X 19 cm.); Weight: 4 lbs., (1.8Kg.)



Installation Cut-Out Dimensions

| | Inches | Centimeters |
|--------------|-----------|-------------|
| DC-IX | 8.3 X 6.3 | 21.1 X 16 |

AC Master Panels

Essential control/protection whenever AC from shorepower or generators is on board. A double pole master breaker with power on indicator light protects both hot and neutral legs of the AC circuit. A reverse polarity light provides clear warning when wiring is reversed and poses a shock hazard. Single pole branch circuit breakers (Model AC-IX) and individual "ON" indicator lights provide control and protection of various AC loads. For 115/230 VAC applications – see ratings note. A label set of common on-board circuits is provided (see page 18, LS-I, for label list).

AC-IX: 30 amp master breaker (15A or 50 A* optional), 5 branch circuit capacity 4 installed standard 1-10A, 2-15A, 1-20A, or specify. LS-I Label set included. Panel size: 5 1/4" x 7 1/2", (13.3 X 9.5 cm.)
Weight: 2 lbs., (.9 Kg.)

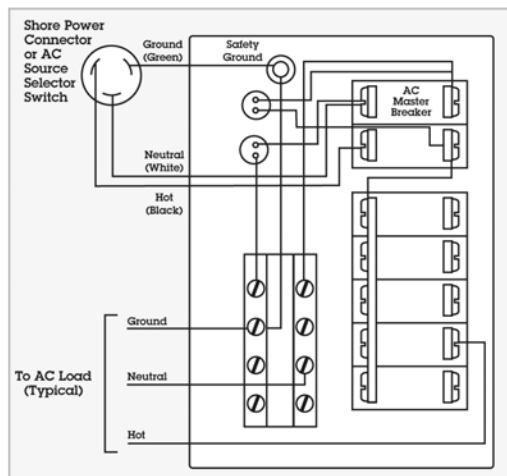
AC-II: 30 Amp master breaker (15A or 50A* optional).
Panel size: 5 1/4" x 3 3/4" (13.3 X 9.5 cm.)
Weight: 1 lb (.5 Kg.)

*50A option rating note: OK for use on 230 VAC line-to-line systems. Not rated for 230 VAC line-to-neutral systems.



See pg 23 for AC Source Selector Switch.

Typical AC Panel Wiring Diagram



Installation Cut-Out Dimensions

| | Inches | Centimeters |
|--------------|---------|-------------|
| AC-IX | 4 X 6 | 10.2 X 15.2 |
| AC-II | 4 X 2.5 | 10.2 X 6.4 |

Alternate Circuit Breaker Amperage Ratings

Changing circuit breaker value mix or location for any panel shown on these pages is no problem! Simply advise us of the breaker arrangement you need. (Panel specific illustrated order forms listing all options are available at www.newmarpower.com.) Please allow 3-5 days additional lead time to complete the modification. *Note: There is a modification fee for special configurations – contact factory.*



NEWMAR

DIGITAL INSTRUMENTS FOR AC/DC SYSTEMS

These highly versatile and sleekly designed digital instruments provide comprehensive monitoring of onboard AC and DC electrical systems. They give quick, accurate, up-to-the moment information on all important aspects of electrical system status – voltage, current, power consumed, power available, AC frequency, abnormal system conditions, and more.

All read-outs and programming of these multiple functions are easily controlled via touch-pads on the instrument face. LCD displays are easily read in bright sunlight and feature five level adjustable red back-lighting for conservation of night vision. High/low voltage and frequency alarms are standard, and DC monitors are NMEA 0183 compatible. Typical accuracy is +/- 1%.

These instruments are waterproof and are suitable for installation in exposed above deck areas, such as open cockpits and flybridges (provided there is no water ingress to the rear of the mounting surface). The meter/touch-pad and surrounding bezel are fully waterproof and the ABS housing is UV stabilized.

All models are designed for through-bulkhead mounting; 2 1/2" models may also be installed in NEWMAR's Single Universal Series panel (see page 21).

All instruments are pre-calibrated for typical use settings at the factory prior to shipment, however they may be recalibrated via touch pad after installation to suit the special needs or conditions of any particular vessel.



DCE

DCE: DC Energy Monitor

Displays volts, amps, energy used and remaining for 12 or 24 volt systems up to 500 amps and up to 3,000 amp-hour capacity. Makes DC energy management a breeze. Monitor voltage on up to three separate banks. House bank (or battery bank of choice) may be also be programmed for the following functions: 1) Monitor charge/discharge amperage. 2) Total energy monitor can be set for amp-hours or percent-of-charge. 3) High/low voltage alarm, plus alarm set-point for low amp-hours remaining. 500 amp shunt included. NMEA 0183 compatible output for data logging. Available in 2 1/2" or 4 1/4" square face.

Available in 2 Sizes



ACE

ACE: AC Energy Monitor

For 115/230 volt systems. Reads: 90-300 VAC (True RMS), 0-150 amps, frequency from 40-70 Hz and power from 0-45 kW. Features alarm circuits for high/low voltage and high/low frequency. Can be programmed to provide automatic generator shutdown (see Remote Alarm Option below) in the event that voltage or frequency exceed predetermined range. Current and voltage transformers are included. 12 or 24 volt source required to power meter. Available in 2 1/2" or 4 1/4" square face.

Available in 2 Sizes



DCV

DCV: DC Voltmeter

For three battery banks, 12 and/or 24 volt systems. Reads to the nearest 1/10 volt. Features a programmable high/low voltage alarm circuit for each bank. NMEA 0183 compatible for PC interface. Only available in 2 1/2" version.



DCE-VAH-110

Large Scale Models Now Available

Our DCE and ACE Digital Instruments are now offered in a large LCD read-out design. Digits are an easy-to-read 1 1/4" tall, allowing monitoring from a distance. Large button keypads make programming and function selection a breeze!

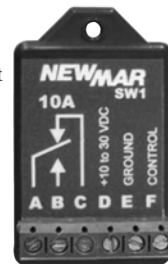
All instrument ratings and functions are identical to standard scale instruments described at left. Mounting hole requirements and hardware are also identical to standard scale models. Instrument face dimensions: 4 1/4" x 4 1/4" (110 mm x 110 mm)

Models

DCE-VAH-110 Large scale version of DCE shown at left
ACE-VAF-110 Large scale version of ACE shown at left

Remote Alarm Relay Option

All instruments shown on this page have programmable alarms. A relay is now available that activates from the instrument alarm signal output terminal allowing remote activation and/or connection to the vessel's 12 or 24 volt alarm panel.

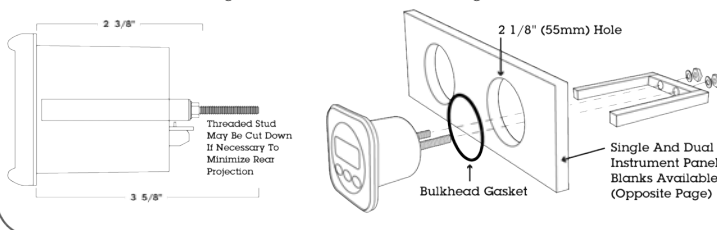


Model: DIR

Model:
DIR Digital Instrument Relay
Input Signal: 5 VDC
Relay Rating: 12/24 VDC, 10 amps
Size: 2.4" x 1.4" x 1.5"

Instrument Drawings & Mounting Options

2 1/2" model depicted: Large Scale Instruments use identical size mounting hole and hardware configuration



7

METERING

NEW MAR



Assemble an electrical monitoring system using these meters and the panel blanks shown below. Meters are now available in Digital and Analog format in 2 1/2" and 3 1/2" sizes. One pre-fab meter panel accommodates the 2 1/2" meters and digital instruments (see page 20).

Analog Meters

Easy to read graphics with unit divisions give precise readouts at a glance. Designed for easy front or rear panel mounting. See below for meter panel blanks.

AC Meters

- AC Volt 0-150
- AC Volt 0-300
- AC Amp 0-50 w/current transformer
- AC Amp 0-100 w/current transformer

DC Meters

- DC Volt 8-16
- DC Volt 16-32
- DC Amp 0-50 w/shunt
- DC Amp 0-100 w/shunt

Replacement Shunts/Current Transformers For Analog Meters

- Shunt for 0-50 DC ammeter
- Shunt for 0-100 DC ammeter
- Current transformer for 0-50 AC ammeter
- Current transformer for 0-100 AC ammeter

Meter Face Measurements

- 3.5" scale: 3 3/4" W x 2 7/8"H (9.5 X 7.3 cm)
- 2.5" scale: 2 1/2" W x 2 3/8"H (6.3 X 6.0 cm)

Meter Panel Blanks

Universal Series

MPB-SU: Single Universal Panel; accommodates one 2 1/2" meter or one Digital Instrument in front-mount configuration; can be oriented for either horizontal or vertical mounting. Panel dimensions: 3 3/4" x 5 1/4"



NEWMAR

ELECTRIC PANEL ACCESSORIES

Circuit Breakers

All circuit breakers offered by NEWMAR are UL recognized and CSA listed for AC and DC systems and meet USCG requirements as a qualified circuit protection device.

Standard Series: Single and Double Pole

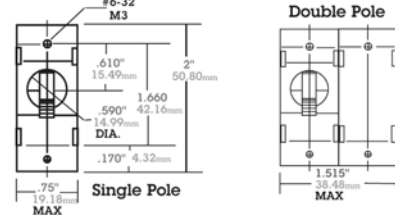
Fit all NEWMAR electrical panels, as well as most other brands

- Feature magnetic-hydraulic "trip-free" mechanism
- 5-30 amp rated to 65 VDC or 277 VAC; 40 and 50 amp rated to 32 VDC or 120 VAC (See rating note below).
- Mounting screws not provided order separately
- #10 screw terminals on rear for wiring

Options

- Red, white or black toggle handles
- Single pole values: 5, 10, 15, 20, 25, 30, 40 or 50 amp
- Double pole values: 15, 20, 30 or 50 amp

Important Circuit Breaker Rating Note: Standard series breakers shown on this page which are rated higher than 30 amps are acceptable for use in 230 VAC Line-to-Line systems (where each leg is 115 VAC - to - neutral), but are not rated for 230 VAC line-to-neutral systems.



High Amperage Series: Single Pole

Rated for up to 65 VDC or 120/240 VAC service

- Feature auxiliary contacts for optional remote monitoring of circuit breaker status
- "Trip-free" mechanism

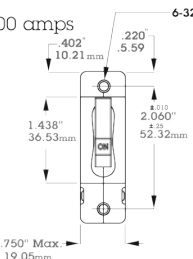
Options

- Current rating of 75 or 100 amps
- Black or white toggle

Note:

Square cut-out mounting configuration fits Elite Series Panel (manufactured 1995 or later) DC master breaker position only.

- 1/4" studs on rear for wiring
- Two 6-32 screws required for mounting; not included w/bulk pack - order separately
- Auxiliary alarm contacts (form C)



High Current Fuses / Fuseblocks

Essential safety item for all inverter installations and other high amperage DC circuit over-current protection.



- Heavy duty 500 amp, insulated, compact fuse block with corrosion-resistant 5/16" studs
- Secures to surface with two #10 flat head screws or bolts (not included)
- Clear lexan cover insulates conductive parts, per ABYC/USCG requirements
- Accepts industry standard ANL tin-plated copper fuses. Purchase separately.
- See-through mica element for easy identification of blown fuse

Fuseblock Model: AFB-500

Fuse Models (numeral indicates amperage): ANL-50, ANL-100, ANL-150, ANL-200, ANL-250, ANL-300, ANL-350, ANL-400, ANL-500 (All rated to 80 VDC)

Label Sets

Ideal for custom labeling of switch or circuit breaker positions on any NEWMAR or similarly constructed electrical panel. White lettering on black peel-and-stick mylar. Label size: 1.75" W x .5" H

Models:

- LS-I Standard Set - 22 labels
 - LS-II Electronic Set - 55 labels
 - LS-III Deluxe Set - 206 labels
- (Visit www.newmarpower.com for a complete list of Label Sets)



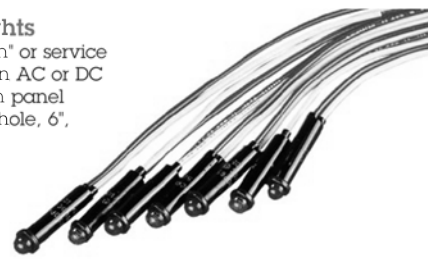
Panel Back Enclosures

Secure to the rear of many common electrical panels to protect crew against injury or panel against damage from accidental contact. Heavy duty ABS plastic. May be cut or drilled to suit wiring needs. (Intermediate mounting surface between panel and enclosure required)

| Model | Size (H x W x D) | Fits these NEWMAR Panels |
|---------|------------------|--------------------------|
| BE-432 | 4.5" x 3.2" x 2" | ACCY-IX, AC-II, METER-II |
| BE-855 | 8" x 5" x 5" | ACCY-IX, AC-IX |
| BE-1085 | 10" x 8" x 5" | DC-II |

Indicator Lights

Use as "circuit on" or service indicator light on AC or DC systems. Snap-in panel mount in 5/16" hole, 6", 18 AWG leads.



- Models:**
- 115/230 VAC Amber*
 - 115/230 VAC Red
 - 115/230 VAC Green

- 12/24 VDC Red*
- 12/24 VDC Green

* standard replacement light for Newmar panels available in skin pack or bulk pack

7

AC SOURCE SWITCHES



An AC source selector switch is an essential item for any boat with an onboard AC generator and/or inverter. The switch eliminates the safety hazard and/or damage that can occur if two AC sources are applied to the same circuit simultaneously.

These switches are fitted with a compact escutcheon plate with engraved switch position nomenclature (mounting dimensions below).

The switches carry UL and CSA approval, are CE marked, and feature heavy duty contacts and a positive step cam mechanism for low resistance contact closure. May be installed in panel with thickness up to 1/4".

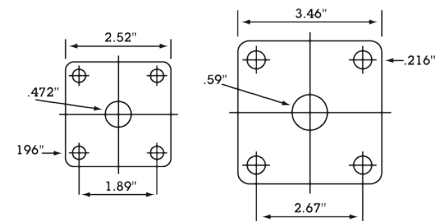
Standard Switches

| Model | Amperage @ 115/230 | Number of Poles | Switch Positions | Standard Plate Markings** |
|-------------|--------------------|-----------------|------------------|---------------------------|
| SS-3.0 | 30 | 2 | 2 + "OFF" | SHIP-OFF-SHORE |
| SS-7.5 | 63 | 2 | 2 + "OFF" | SHIP-OFF-SHORE |
| SS-7.5 INV† | 63 | 2 | 3 + "OFF" | OFF-GEN-INV-SHORE |
| SS-15* | 126 | 2 | 2 + "OFF" | SHIP-OFF-SHORE |

*May be configured as a 63 amp, 4 pole switch
 † For vessels with onboard generator and inverter

Mounting Flange Dimensions

All standard switches, plus 63 and 80 amp special order switches. 100 and 125 amp special order switches only.



Special Order Switches

If none of the standard switches listed above meet your requirements, NEWMAR will custom configure an AC selector switch for you. Please allow 2 weeks for shipment. Contact factory for pricing.

1) Determine the following:

- A) Amperage/kW rating required
- B) Number of switch positions required
- C) Number of poles required

2) Use the chart below to determine model number:

| Amperage/kw Rating @ 120 VAC | 2 Position Plus Off | | 3 Position Plus Off | | 4 Position Plus Off | |
|------------------------------|---------------------|--------|---------------------|--------|---------------------|--------|
| | 2 Pole | 3 Pole | 2 Pole | 3 Pole | 2 Pole | 3 Pole |
| 63 Amp (7.5 kw) | S-622 | S-632 | S-623 | S-633 | S-624 | S-634 |
| 80 Amp (10 kw) | S-822 | S-832 | S-823 | S-833 | S-824 | S-834 |
| 100 Amp (12.5 kw) | S-1022 | S-1032 | S-1023 | S-1033 | S-1024 | S-1034 |
| 125 Amp (15.5 kw) | S-1222 | S-1232 | S-1223 | S-1233 | S-1224 | S-1234 |

| Depth Dimensions | |
|------------------|--------|
| SS-3.0 | 2 1/8" |
| SS-7.5 | 2 3/8" |
| SS-7.5 INV | 3 1/2" |
| SS-15 | 4" |

3) Select the desired switch selector position labeling from the following list:

- SHORE GEN PORT SHORE PORT GEN
 - SHORE 1 GEN 1 STBD SHORE STBD GEN
 - SHORE 2 GEN 2 INV
- or specify the position labeling you require.

If you have need for a specific arrangement of the switch selector position labels, please mention this at the time of ordering. Note: Combination switches similar to one used in our ES-5 panel, (see page 17) also available. Contact factory for more information.



NEWMAR

AC SHORE POWER ACCESSORIES



GI-100

Galvanic Isolator

Sacrificial zincs corrode away as they protect metal thru hulls, shafts and props from damaging electrolysis. Stray, low voltage current flowing between the AC safety ground and DC bonding system is a principal cause of this "galvanic" action.

Installing the Galvanic Isolator between the AC safety ground and DC bonding system (see diagram), blocks a majority of the low voltage currents and corrosive action on the zincs is significantly reduced (while the integrity of the critical safety ground path is maintained.) This means a significant savings in boat haul-out fees and zinc replacement costs.

For additional safety, all units feature a large capacitor, providing a secondary low impedance path for sending AC current to ground.

Three models are offered; rated for 30 amp, 50 amp or 100 amp shorepower.

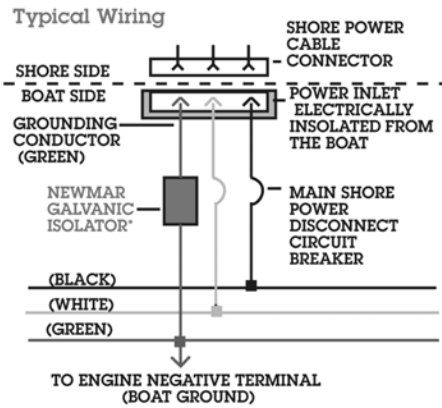


GI-50

GI-30

| Model | SHORE POWER VAC, Hz | Shore Power Rating, Amps | Dimensions | | | Weight | |
|---------|------------------------|-----------------------------|------------|------|------|--------|-----|
| | | | H | W | D | Lb. | Kg. |
| GI-30 | 115/230, 50-60 | 30 | 2.7 | 4.8 | 7.3 | 2.45 | 1.1 |
| | | | 6.9 | 12.2 | 18.5 | | |
| GI-50 | 115/230, 50-60 | 50 | 4.5 | 4.7 | 8.9 | 3.2 | 1.5 |
| | | | 11.4 | 11.9 | 22.6 | | |
| GI-100* | 115/230, 50-60 | 100 | 15 | 7.25 | 7.2 | 13.35 | 6 |
| | | | 38.1 | 18.4 | 18.2 | | |

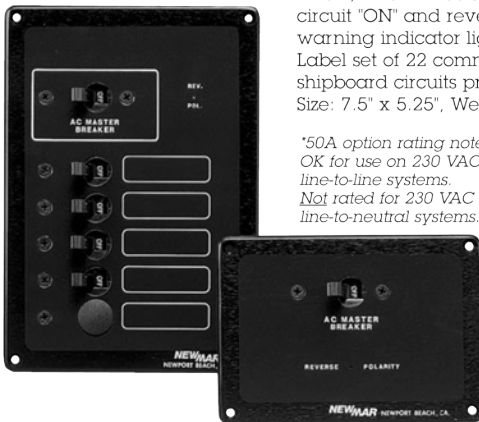
*Special order item.
Allow 2-3 weeks for delivery



AC Panels

These panels provide essential control and protection for shore and on-board AC sources. Two pole breakers with single toggle provide maximum protection with easy fingertip disconnect. All models feature a reverse polarity warning.

AC-IX: 30 amp double pole master breaker (15A or 50A optional) plus 5 single pole branch capacity, 4 installed standard; 1-10A, 2-15A, 1-20A. Master and branch circuit "ON" and reverse polarity warning indicator lights installed. Label set of 22 common shipboard circuits provided. Size: 7.5" x 5.25", Weight: 2 lbs.



*50A option rating note:
OK for use on 230 VAC line-to-line systems.
Not rated for 230 VAC line-to-neutral systems.

light to provide clear indication when hot/neutral wiring is reversed and presents a shock hazard. Master and branch circuit breakers have power "ON" indicator lights. For 115 or 230 VAC applications.

AC-II: 30 amp double pole master breaker only (15A or 50A optional). Master AC circuit "ON" and reverse polarity warning indicator lights installed. Size: 3.75" x 5.25", Weight: 1 lb.

AC Source Selector Switches



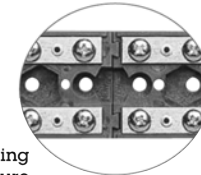
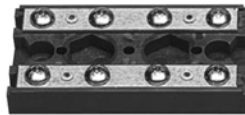
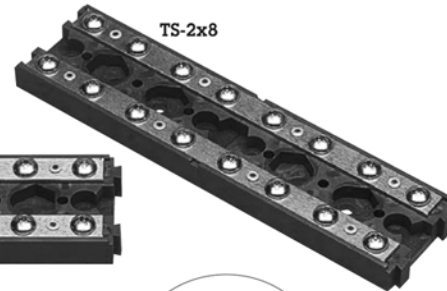
Wide range of sizes and styles available. See page 23.

TERMINAL STRIPS & BUS BARS

NEW MAR

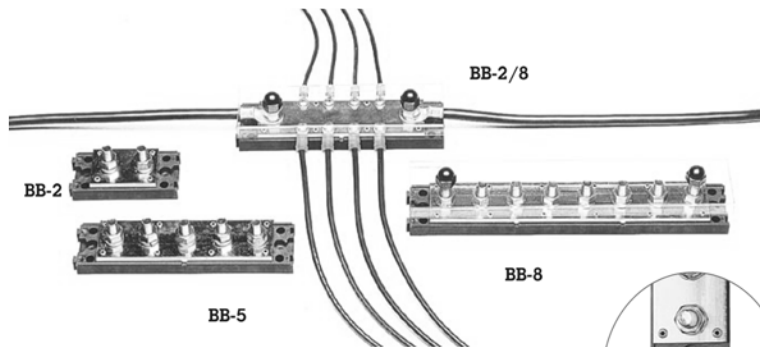
Terminal Strips

- Use as a common negative/neutral bus for AC or DC systems. Dual terminal strips in 4 or 8 screw positions on 3/4" centers are secured to a high density insulated base. All hardware, bus material and fasteners are nickel-plated brass.
- #8 screws accommodate various size ring terminals and each terminal strip is rated for 100 amps.
- Interlocking bases allow use of multiple terminal strips and bus bars (described below) to produce secure and neat wiring assemblies. The terminal strip bases have provisions for either #8 or #10 mounting screws, and no conductive parts in the base are exposed to the mounting surface.
- A clear plastic insulating cover is provided with skin packed units. Specify bulk or skin pack when ordering.



Interlocking Feature

| Model | Total # of Base Terminals | Size |
|--------|---------------------------|------------------|
| TS-2x4 | 8 | 3 1/16" x 1 1/2" |
| TS-2x8 | 16 | 6 1/16" x 1 1/2" |



Interlocking Feature

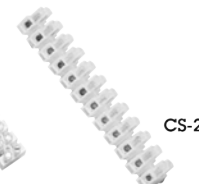
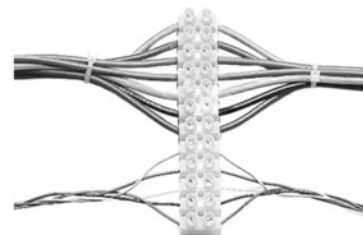
| Model | Qty. of 5/16" Studs | Base Size |
|--------|----------------------|------------------|
| BB-2 | 2 | 3 1/16" x 1 1/2" |
| BB-2/8 | 2 plus 8 - #8 screws | 6 1/16" x 1 1/2" |
| BB-5 | 5 | 6 1/16" x 1 1/2" |
| BB-8 | 8 | 9 1/16" x 1 1/2" |

Bus Bars

- Ideal as a DC ground tie point or positive bus, these heavy duty, 500 amp rated bus bar assemblies feature 5/16" studs on 1" centers in 1/4" thick copper bar for common connection/distribution of large wire gauges and accommodate 5/16" ring terminals.
- One combination model features two 5/16" studs and eight #8 screws, accommodating multiple size wire terminals.
- All bus material is nickel-plated copper.
- A clear insulating protective cover is provided to prevent short circuits and provide visibility of lugs.
- The mounting bases are keyed for interlocking and may be mated with the terminal strips (described above). Conductive parts are captured and recessed away from the mounting surface. Use #8 or #10 screws for mounting.

Connector Strips

- Molded nylon encases 6 or 12 pairs of connectors that use screw compression to secure wires without use of lugs. Ideal for electronic installations. Brass barrels capture wires and are held in place with a stainless steel "finger" compressed by a screw. The screw does not make contact with the wires, protecting the copper strands from cuts and breakage - Meets ABYC standards. (Same connector strip used in BX Series boxes - see page 26.)
- 3 Sizes: ranging from 6 to 16 gauge
- Strips are easily cut to meet wiring requirements and space limitations.
- All models clamshell packed for attractive retail display, or bulk packed for contractor use.



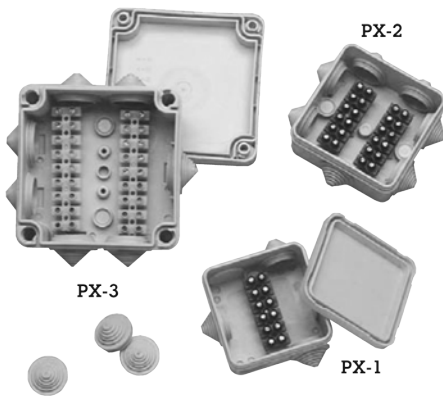
| Model | # of Terminal Pairs | Max Wire Gauge | Max Amps* | Size L X W X H |
|-------|---------------------|----------------|-----------|---------------------|
| CS-1 | 12 | 16 | 6 | 3.75" x .675" x .5" |
| CS-2 | 12 | 14 | 10 | 4.5" x .75" x .75" |
| CS-3 | 12 | 12 | 16 | 5.5" x .875" x .8" |

*Per set of terminals



NEW MAR

THRU-DEX WATERPROOF BOXES

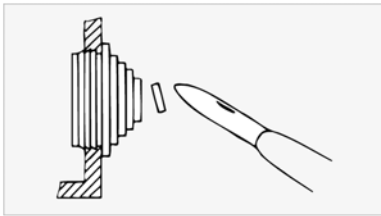


Waterproof Junction Boxes

PX Series

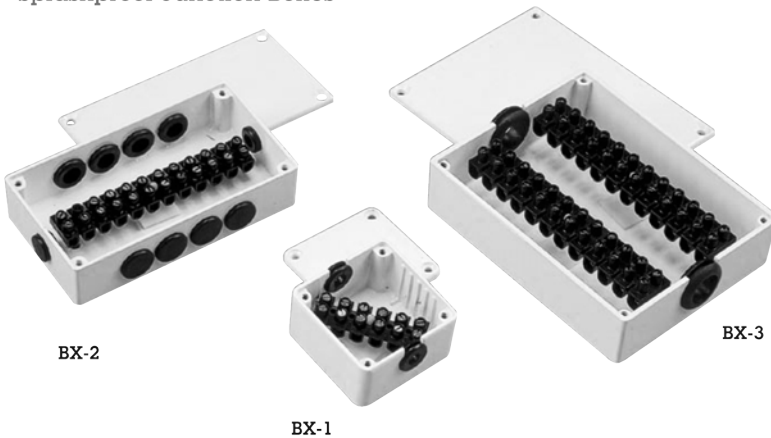
- Ideal for making wiring connections above or below decks, even in areas subject to occasional spray
- Similar to BX Series junction boxes, but made from rugged, non-corrosive, high impact polypropylene
- Snap-on cover provides watertight seal
- "Universal" cut-to-fit (see diagram) graduated diameter cable entries accommodate wide cable range
- Multiple position connector strips with "captive" screw compression wire terminals installed – meets ABYC standards (same type as CS-1, page 25)
- Multiple knockouts provided for conduit access (in addition to cable entries)
- IEC Waterproof Rating: IP54 – "Water projected in jets against the enclosure from any direction shall have no harmful effects."

Graduated Diameter,
Flexible Cut-to-fit Cable Entries



| Model | PX-1 | PX-2 | PX-3 |
|-----------------------------------|--------------------|--------------------|--------------------|
| Number of Connector Strips | 1 | 2 | 2 |
| Positions per Strip | 6 | 6 | 9 |
| Max Wire Gauge | 16 | 16 | 16 |
| Number of Cable Entry Ports | 5 | 7 | 7 |
| Number of Cable Entries Installed | 3 | 7 | 7 |
| Spare Cable Entries Provided | 2 | 0 | 0 |
| Cable Diameter Range (inches) | .14-.81 | .14-.81 | .14-.99 |
| Cable Diameter Range (mm) | 3.5-20.5 | 3.5-20.5 | 3.5-25.5 |
| Box Size (inches) | 2.95 x 2.95 x 1.66 | 3.35 x 3.35 x 1.66 | 4.45 x 4.45 x 2.29 |
| Box Size (cm) | 7.5 x 7.5 x 4.2 | 8.5 x 8.5 x 4.2 | 11.3 x 11.3 x 5.8 |

Splashproof Junction Boxes



BX Series

- Provides for secure, protected below-deck wiring connections, IP rating 54
- Rugged cast aluminum box with white enamel finish
- Easy wiring access through multiple grommeted cable entries
- Supplied with high quality connector strips - secure wires w/compression fittings - no terminals required (See CS-1 and CS-2, on opposite page for full description - see matrix below for number/gauge of terminals)

| Model | BX-1 | BX-2 | BX-3 |
|----------------------------|-----------------|------------------|------------------|
| Number of Connector Strips | 1 | 1 | 2 |
| Positions per Strip | 6 | 12 | 11 |
| Max Wire Gauge | 16 | 16 | 14 |
| Max amps (Per Position) | 6 | 6 | 10 |
| Cable Entries | 2 | 8 | 2 |
| Max Cable Diameter | .25" | .37" | .59" |
| Box Size (inches) | 2 x 2 x 1.2 | 4.4 x 2.4 x 1.2 | 4.7 x 3.7 x 1.3 |
| Box Size (cm) | 5.1 x 5.1 x 3.1 | 11.2 x 6.1 x 3.1 | 11.9 x 9.4 x 3.3 |

7

ELECTRICAL ENCLOSURES, CABLE ENTRIES

NEW MAR

EX Series Electrical Enclosures

These enclosures provide functional and professional protective cases for wire connectors, terminal blocks, relays, solenoids, fuses, etc. The corrosion-resistant polycarbonate cases are ideal for marine applications, and the deep cavity design leaves room for securing wiring and components and making connections. In addition, instruments, switches and panels can be surface mounted to the cover, as there is ample space for rear projection and wiring.

The enclosures have gasketed covers with captured non-corrosive securing screws and offer various levels of water resistant integrity per installer option, depending on type of cable entry used (see below). Waterproof entries provide IP68 protection while the splash-proof entries are rated at IP54. Two Splash-proof entries are (model SPF-1) included with the enclosures.



Application example - EX-474 shown with digital instruments mounted in cover

Enclosure mounting points are located in the bottom of the box and caps for waterproof sealing of the mounting holes are provided. Also supplied is an internal base plate with stand-off mounts for securing components inside the enclosure.

Knock-outs in numerous sizes are positioned on all four sides of the enclosures, giving the installer many options on cable entry type and location for convenient, professional wiring. (See choices of Cable Entries below.)

| Enclosure Model | Size L x W x D (inches) | Knock-Outs (size cross-reference below) |
|-----------------|-------------------------|---|
| EX-373 | 7.09 x 3.7 x 3.19 | 14 ea. PG-16 |
| EX-474 | 7.09 x 4.33 x 4.37 | 16 ea. PG-16, 4 ea. PG-21, 2 ea. PG-29 |
| EX-1074 | 7.09 x 10.0 x 4.37 | 24 ea. PG-16, 8 ea. PG-21, 4 ea. PG-29 |

Cable Entries

Choose from waterproof or splash-proof enclosure cable entries in various sizes.

Waterproof Fittings

For complete waterproof assembly (IP68) use these compression fittings. Retaining nut secures fitting to enclosures, compression hub creates waterproof seal around wires. Various sizes are available in a wide range of cable diameters.



| Model | Cable Diameter Range | Mounting Hole Diameter | EX Enclosure Knock-Out Size Ref. |
|-------|----------------------|------------------------|----------------------------------|
| WPF-1 | .2"-.47" | .91" (22.5 mm) | PG-16 |
| WPF-2 | .35"-.71" | 1.14" (29.0 mm) | PG-21 |
| WPF-3 | .55"-.98" | 1.48" (37.5 mm) | PG-29 |

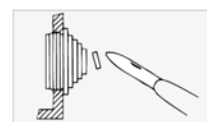
Splash-Proof Fittings

Flexible fittings snap into access holes on enclosures. Graduated diameter, cut-to-fit sizing accommodates a wide range of cable diameters. Can also function as a splash-proof plug on knocked-out enclosure access hole. Sold in pairs.



Graduated Diameter, Flexible Cut-to-fit Cable Entries

| Model | Cable Diameter Range | Mounting Hole Diameter | EX Enclosure Knock-Out Size Ref. |
|-------|----------------------|------------------------|----------------------------------|
| SPF-1 | .14"-.81" | .91" (22.5 mm) | PG-16 |
| SPF-2 | .14"-.99" | 1.14" (29.0 mm) | PG-21 |



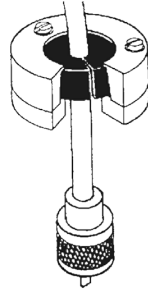
NEW MAR

ANTENNA/ CABLE ACCESSORIES

Waterproof Fittings

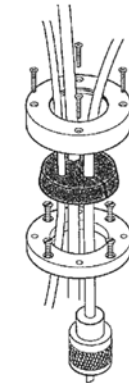
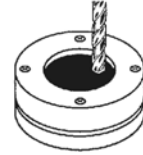
- Create a 100% waterproof seal when routing cables through decks and bulkhead
- Allow installation and/or removal of cable with connector still attached
- Accommodate wide range of cables
- Rugged, weatherproof glass-filled nylon
- Available in two series:

CCX Series – Entry hole pre-drilled in seal with slit to edge allowing feed thru of cable with factory-installed connector attached; multiple glands cover a wide range of cable sizes; one CCX fitting required for each cable.



| Model | Cable Diameter Range | Max Connector Diameter | Typical Connector |
|-------|----------------------|------------------------|------------------------------------|
| CCX-R | .47"-.59" | 1.57" | Large Radar Plug |
| CCX-S | .35"-.55" | .83" | Small Radar Plugs |
| CCX-T | .18"-.35" | .83" | PL-259, BNC, Wind Instrument Plugs |

DX Series – Drill holes and slit cable gland as required to accommodate cable with or without factory-installed connector. Multiple cables may be passed through a single fitting.



| Model | Drill Thru Aperture | Max. Connector Dia. |
|-------|---------------------|---------------------|
| DX-2 | 1.18" Diameter | 1.18" |
| DX-3 | 1.57" Diameter | 1.57" |
| DX-5* | 1.9" Diameter | 1.9" |

* Aluminum Housing

RailFast® Antenna Mounts

Quick, easy installation of antenna on 1" or 7/8" railing. Ideal for G.P.S., VHF radio, and whip antennas, has direct feed-thru hole for coax cable. Ratchet surface permits 360° rotation for adjustment/lay-down. Holds antennas up to 8' (2.4 meters) in length. No drilling required; all necessary hardware provided. (US Patent #4546949)

- **Model 311-N**
Strong, fiberglass filled nylon rail mount for permanent antenna installation with hex-key vertical adjustment. Smooth spherical shape won't catch lines or clothing.
- **Model 311-NLH**
Similar to 311-N (listed above), but has lay-down handle that permits quick, easy lay-down of antenna.



Antenna/Coax Switches



Manual
Model: CS-201
Two position switch allows manual selection of one of two antennas with a single radio or one of 2 radios with a single antenna. Die cast aluminum case.

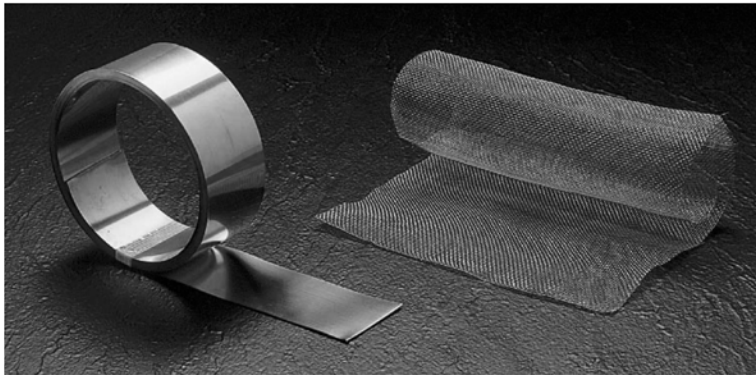
Power: 1.5 kW peak
1 kW continuous
Impedance: 50 ohm
Connectors: SO-239/UHF
Weight: 1Lb., .5 Kg.



Remote
Model: RCS
Operates on 12 VDC, single pole, double throw. Permits remote selection of two antennas with a single radio.

Power: 1 Kw.
Impedance: 48 ohm
Coil Current: 250 mA
Connectors: SO-239/UHF
Weight: 1 Lb., .5 Kg.

GROUNDING NOISE FILTERS *NEWMAR*



Copper Strap & Copper Screen Sizes

| Model | Width | Length | Weight |
|-----------|------------|-----------|---------|
| GS-2-25 | 2" | 25' | 3 lbs. |
| | 5.1 cm | 8 meters | 1.4 kg |
| GS-2-50 | 2" | 50' | 5 lbs. |
| | 5.1 cm | 17 meters | 2.3 kg |
| GS-2-100 | 2" | 100' | 8 lbs. |
| | 5.1 cm | 33 meters | 3.6 kg |
| GS-4-100 | 4" | 100' | 16 lbs. |
| | 10.2 cm | 33 meters | 7.3 kg |
| Screen-25 | 4" | 25' | 16 lbs. |
| | 1.2 meters | 8 meters | 7.3 kg. |

Copper Strap

- Ideal conductor for RF grounding of SSB radios and other noise sensitive transceivers or for bonding of thru-hulls, etc.
- Flexible – easily conforms to vessel contours
- .01" (25mm) thick – see matrix for available lengths and widths

Copper Screen

- Tight copper mesh (.05" x .01" wire spacing) ideal for creating a ground plane in hull. Length: 25'; Width: 4'
- May be placed into electronics enclosures to provide an RF barrier.

Ground Shoes

- Provide an excellent noise-free RF ground by making direct contact with water outside hull.
- Porous copper construction magnifies contact area – see matrix for surface area equivalent
- Silicon bronze hardware provided (Not intended for lightning protection)

| Model | Dimensions | | Ground Area | | Weight | |
|-------|--------------|-------------------|-------------|---------------------|--------|-----|
| | Inches | Centimeters | Equivalent | Lbs | Kg | |
| 8A | 8 x 2.5 x .5 | 20.3 x 6.3 x 1.3 | 20 sq. ft. | 6.1 M ² | 3 | 1.4 |
| 12C | 12 x 3 x .5 | 30.5 x 7.6 x 1.3 | 40 sq. ft. | 12.2 M ² | 4 | 1.8 |
| 18E | 18 x 6 x .5 | 45.7 x 15.2 x 1.3 | 100 sq. ft. | 30.5 M ² | 11 | 5 |



Noise Filters

The interference or electronic "noise" generated by alternators, ignition systems, motors, etc., can render a vehicle or vessel's radio or other electronic equipment virtually useless. This interference takes the form of popping or static on radios or audio gear and garbled images or "hash" on video displays.

These specialized filters can be used singly or in combination to attenuate conducted line noise, either at the affected equipment or at the noise source.



| Model | Rating | Installation Location | Size | | | Weight |
|-------|---------|--|-------|-------|-------|----------------|
| | | | H | W | D | |
| 150-A | 150 Amp | In the alternator output lead | 3.25" | 5.75" | 3.25" | 3 lbs. 1.4Kg. |
| PC-10 | 10 Amp | In the + and - power leads close to affected equipment | 1.25" | 4.25" | 3" | 1 lb. |
| | | | (3.2) | 10.8 | 8.2cm | .5Kg.) |
| PC-25 | 25 Amp | Same as PC-10 | 2" | 4.25" | 3.25" | 2 lbs. .9 Kg.) |
| | | | (5.1) | 10.8 | 8.2cm | |

Filter Features:

- Heavy duty aluminum construction
- Operate on 6-48 VDC systems
- Integral mounting flanges for secure installation
- Brass stud connectors on alternator filters accommodate high current cables and terminals
- Color coded wire leads on all other models make in-line installation easy

Filtered Frequencies

- Model 150A: 70 kHz – 100 MHz
- Models PC-10 and PC-25: Audio – 200 MHz



NEW MAR

TEST EQUIPMENT



Digital Battery Analyzer

The **Digital Battery Analyzer** (model DBA) is an essential tool for all DC system installers, technicians and battery dealers. Simple to use, it performs a complete analysis of battery condition in mere seconds, then displays conclusive data on a large clear LCD readout.

The DBA analyzes 12 and 6 volt lead-acid, gel-cell and AGM batteries of all types with ratings from 100-1400 CCA. It provides information on battery voltage, battery condition and available battery power. This gives you empirical data to assure your customers that their batteries are fine, or to support your recommendation that they be replaced.

The unit is housed in rugged ABS plastic, yet is light-weight and compact for use in cramped battery compartments and portability in tool kits. It comes equipped with 32" polarity color-coded test leads and quick-connect clamps. The DBA indicates whether the clamps have proper contact with battery posts.

Single-battery banks or batteries connected singly in series may be tested without disconnection. Parallel batteries must be disconnected prior to testing.

No internal battery nor external AC power source is required. Clear and concise operating instructions are provided.

Features:

- Analyzes 12 volt and 6 volt lead-acid batteries of all types: flooded, gel-cell or AGM; deep-cycle or gen/engine start
- Simple three step test procedure provides a comprehensive analysis of batteries in seconds. (See Inset.)
- No need to recharge batteries prior to testing; accurate results for batteries in any state of charge down to 5.5 volts
- Uses sophisticated conductance technology; will not harm or discharge batteries
- Rugged, compact, light-weight case; easy to use even in hard-to-access battery compartments
- Temperature compensation setting when testing batteries below 32°F (0°C)
- Handy water-resistant carry-case with shoulder strap provided

Specifications:

Model: DBA - Digital Battery Analyzer

Battery Type: 12 or 6 VDC nominal, lead-acid (flooded, gel or AGM), deep-cycle or gen/engine start

Battery Capacity: 100-1400 CCA (Cold Cranking Amps)

Operating Range: 5.5 - 14.0 VDC

Input Power: Operates on power of battery under test, down to 5.5 VDC

Display Type: LCD

Temp. Range: 32-120°F (0-50°C); temperature compensation provided below 32°F

Protection: Will not be harmed by accidental reverse polarity connection

Case Material: Acid resistant ABS plastic

Size: 9" x 4" x 2.5"

Weight: .9 lb., .4 kg.

Warranty: Two Years

Simple Testing Procedure

1. Clip DBA leads to battery terminals
2. Using touch pad, select battery CCA rating from display menu
3. Press start test button.

In less than a minute, the unit analyzes then displays:

1. Battery voltage
2. Available power (in CCA)
3. One of the following battery condition readouts:
GOOD BATTERY
GOOD-RECHARGE
CHARGE & RETEST
REPLACE BATTERY
BAD CELL-REPLACE BATTERY

Electrical System Analyzer

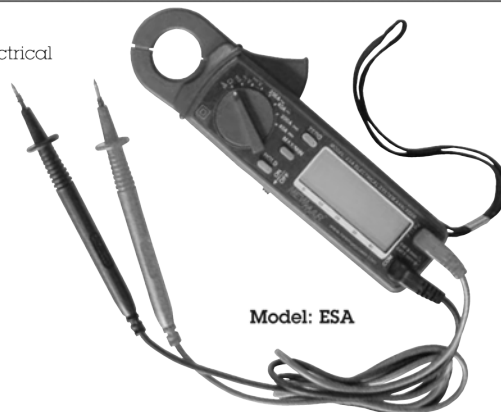
An essential tool for any marine electrical system installer or surveyor, the Electrical System Analyzer provides extremely accurate data on all major AC and DC electrical functions in a convenient hand-held device with large easy-to-read LCD display.

Measures and Displays:

- AC Voltage up to 400 VAC
- AC Current up to 200 Amps
- Frequency at 50-100,000 Hz
- DC Voltage up to 400 VDC
- DC Current up to 200 Amps
- Electrical Continuity

Features:

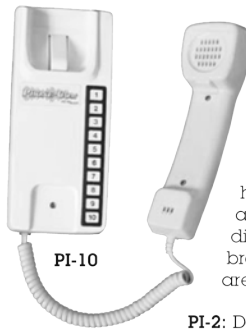
- Clamping sensor allows current measurement without disconnecting wiring or shunt installation
- Long easy-grip color coded needle-type test probes
- Operates on two AA batteries (provided)
- Protective carry-case included



Model: ESA

PHONE-COM SYSTEMS

NEWMAR



PI-10

The Phone-Com intercom system provides direct, wired, point-to-point communication anywhere on the vessel. Voice contact to any phone in the system is as easy as lifting the receiver and pressing the call button. Phone-Com operates on 12 VDC. They are constructed of high-impact plastic and are available in either bright white or traditional black. Bulkhead mounting bracket is provided. Two versions are available:

PI-2: Designed for communication between only two points. A single call button sounds a buzzer and illuminates an indicator lamp on the companion phone. Available singly or as a set with 40' of interconnect wire, fuse, terminal lugs and mounting hardware.

PI-10: For multiple station calling capability. Up to 10 phones may be interconnected, and each phone has 10 call buttons. Sold individually-- see wiring requirements below.

Phone-Com Wiring: Color-coded multi-conductor interconnect wire (22 AWG) is available from NEWMAR at any length desired with 5, 10 or 15 conductors. For PI-2, use 5 conductor wire. For PI-10, add 3 to the total number of stations to determine minimum number of conductors required.

Note: Phones are not waterproof and should be installed in a protected location.

PI-2: Two station phone with single call button; sold individually; 2 lbs.

PI-2 SET: Two station phone set, 40' interconnect wire, fuse, lugs, mounting hardware; 5 lbs.

PI-10: Multi-station phone with 10 call buttons, sold individually; 2 lbs.

22 AWG Wire: 5, 10 or 15 conductor; sold per foot.

BUZZER: External buzzer for use in high-noise areas, 1 lb.

(Specify White or Black when ordering)



PI-2

PI-10

AQ Series Waterproof Radio Covers



AQ-10L/R

Hand-held radios can be taken anywhere without being damaged by water, dust or sand when the AQ Series waterproof cover is used for protection. Even total immersion will not harm the radio. These covers are certified waterproof to a depth of 33 feet.

The case is made of super-tough, UV resistant PVC, which is engineered with enough flexibility to facilitate easy operation of knobs and keypads. Transparent design allows easy reading of digital displays. Sound is virtually unimpeded and RF transmission is unaffected.

A quick release clip allows easy insertion and removal of the radio and a handy lanyard provides extra security when hands are wet. But if the radio falls into deep water, no problem! Safely inside the AQ case, it will float! Weight (all models): 1 lb.

Models

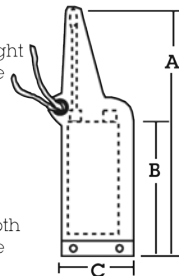
AQ-10L/R For compact hand-held radios. New reversible design accommodates both left and right hand antennas; Replaces AQ-10

AQ-20L/R For standard size hand-helds. New reversible design accommodates both left and right hand antennas; Replaces AQ-20L and AQ-20R

AQ-2MXL Larger and longer than AQ-20 for high power radios with large battery packs

Dimensions in inches

A=Overall height of radio/phone with antenna extended
B= Height of radio/phone body
C=Combined width and depth of radio/phone body



| Model | A | B | C |
|----------|-------|-------|------|
| AQ-20L/R | 15.7" | 7.8" | 5" |
| AQ-2MXL | 21.2" | 10.6" | 5.3" |
| AQ-10L/R | 13" | 6.1" | 4.1" |

Deck Horns/Hailers

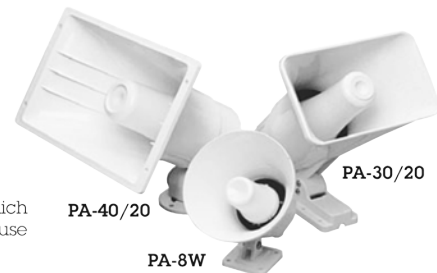


PA-60/40 Heavy Duty Commercial

Clear, distortion free, waterproof deck horns are ideal for shipboard paging, hailing, fog horn and alarm systems. High impact plastic with hook-up wire provided. 8 Ohm. Assembled with stainless steel hardware.

| Model | Output Nominal/Peak | Weight |
|----------|---------------------|--------|
| PA-8W | 8 watts / 12 watts | 1 lb. |
| PA-30/20 | 30 watts / 20 watts | 3 lbs. |
| PA-40/30 | 40 watts / 30 watts | 5 lbs. |
| PA-60/40 | 60 watts / 40 watts | 8 lbs. |

Note: Model PA-60/40 is a commercial grade horn which also features excellent sensitivity as a microphone for use in talk-back systems.



PA-40/20

PA-30/20

PA-8W



BATTERY CHARGERS

5000 SP Series Electronic Battery Chargers with Battery Type Selector Switch



Specifications

Battery Types: Lead Acid, Gel or AGM
Charge Voltage Bulk: 14.5V / 14.2V / 14.2V
Charge Voltage Float: 13.4V / 13.4V / 13.35V
DC Output Voltage: 12V or 24V
AC Input Voltage: 95-140VAC or 200-240VAC
Frequency: 50Hz or 60Hz
Temperature Range: -25°C to 55°C
Safety Features: Thermal, over current, reverse polarity and ignition protected
Dimensions: 10-30 amp: 3.7"x9.5"x8", 40 amp: 3.7"x9.5"x13.25",
 50-60 amp: 3.7"x9.5"x15.25", 80-100 amp: 3.7"x9.5"x21.5"
Housing: Anodized Aluminum



5000 SP Series chargers are the only Marine UL listed chargers available with a battery type selector switch, allowing you to charge Lead Acid, Gel or AGM batteries. They are tested by Marine UL for safety and durability against impact, vibration, temperature and shock. 3-stage charging, with temperature compensation, delivers the greatest charge when the battery is most able to accept it, prevents overcharging and extends battery life. Up to 3 battery banks can be simultaneously restored. These units also act as a power supply providing constant voltage to DC components such as bilge pumps or DC

lighting. A convenient design features an easy-to-read DC ammeter, access to terminal connections and fuses and exterior slots for easy mounting. Safety features include ignition and reverse-polarity protection. These units are designed with corrosion-resistant components, a heavy-duty enclosure and heat sink for durability in the marine environment. Units run cool and quiet, without generating significant RFI or EMI interference. All units meet FCC Class B requirements. Drip shield included. 5-year limited manufacturer's warranty, made in the USA.

12 Volt Models

| Amperage | 120 VAC · 50/60 Hz | 220 VAC · 50/60 Hz |
|----------|--------------------|--------------------|
| 10 | 93-12105SP-A | N/A |
| 15 | 93-12155SP-A | 9C-12155SPI-A |
| 20 | 93-12205SP-A | 9C-12205SPI-A |
| 30 | 93-12305SP-A | 9C-12305SPI-A |
| 40 | 93-12405SP-A | 9C-12405SPI-A |
| 50 | 93-12505SP-A | 9C-12505SPI-A |
| 60 | 93-12605SP-A | 9C-12605SPI-A |
| 80 | 93-12805SP-A | 9C-12805SPI-A |
| 100 | 93-121005SP-A | 9C-121005SPI-A |

24 Volt Models

| Amperage | 120 VAC · 50/60 Hz | 220 VAC · 50/60 Hz |
|----------|--------------------|--------------------|
| 10 | 93-24105SP-A | N/A |
| 20 | 93-24205SP-A | 9C-24205SPI-A |
| 30 | 93-24305SP-A | 9C-24305SPI-A |
| 40 | 93-24405SP-A | 9C-24405SPI-A |
| 50 | 93-24505SP-A | 9C-24505SPI-A |
| 60 | 93-24605SP-A | 9C-24605SPI-A |

5000 SP Series — Charger Accessories

| | |
|----------------|---|
| 21-104589-0 | Replacement Dripshield for 10 to 40 amp 5000 SP Series Battery Chargers |
| 93-TEMPPROBE-A | Temperature Probe for 30, 80 & 100 amp 12 volt models and 50 & 100 amp 24 volt models |

2000 SP Series Electronic Battery Chargers with Battery Type Selector Switch



Specifications

Battery Types: Lead Acid, Gel or AGM
Charge Voltage Bulk: 14.5V / 14.2V / 14.2V
Charge Voltage Float: 13.4V / 13.4V / 13.35V
DC Output Voltage: 12V
AC Input Voltage: 95-140VAC
Frequency: 50Hz or 60Hz
Temperature Range: -25°C to 55°C
Safety Features: Thermal, over current, reverse polarity and ignition protected
Dimensions: 10-40 amp: 3.7"x9.5"x8", 50 amp: 3.7"x9.5"x13.25"
Housing: Anodized Aluminum

An excellent choice for value-priced, high-performance DC charging, the 2000 SP Series units include a battery type selector switch allowing you to charge Lead Acid, Gel or AGM batteries. 3-stage charging delivers the greatest charge when the battery is most able to accept it, preventing overcharging and extending battery life. Units restore up to 3 banks simultaneously

Other features include the ability to act as a power supply, ignition and reverse-polarity protected, easy-to-read DC ammeter, corrosion-resistant components and housing, and a heavy-duty heat sink design. Exterior slots allow for easy mounting. 2-year limited manufacturer's warranty, made in the USA

12 Volt Models

| Amperage | 120 VAC · 50/60 Hz |
|----------|--------------------|
| 10 | 93-12102SP-A |
| 15 | 93-12152SP-A |
| 20 | 93-12202SP-A |
| 30 | 93-12302SP-A |
| 40 | 93-12402SP-A |
| 50 | 93-12502SP-A |

BATTERY CHARGERS



Fully Type Approved ABS Battery Charger!

ABS listed and certified Marine Battery Chargers that meet USCG requirements for megayacht and workboat fleets around the world.



The HQ Series offers a rugged battery charger and power supply all in one unit. Many government, military, homeland security, megayachts, and commercial marine vessels are required to meet ABS standards on all new construction over 150 gross tons and/or vessels over 90 meters. The HQ Series delivers full compliance for battery chargers.

Models available include 12VDC (25-105 amp) or 24VDC (15-65 amp) output.

All units available with 120/240VAC input.



FEATURES

- Agency approvals: ABS listed and certified, CE, meets USCG (10B) and ABYC (A-31) requirements
- LED indicator pilot lamp
- Quick disconnect on/off switch on front cover
- Separate voltmeter and ammeter
- Internal failure alarm (ready), customer to provide indicator
- Multi-bank (3), multi-stage (bulk, absorption and float) battery charger
- Ability to work as power supply
- Voltage and current limiting ability
- Thermal, over-current, ignition and reverse-polarity protected
- Input and output fusing
- Constructed with heavy-duty, corrosion resistant, UL recognized materials
- Designed to run cool, quiet and EMI/RFI interference free
- Temperature compensation - built for optimal performance in a variety of ambient temperatures
- AC input: 120VAC or 240VAC models
- DC output: 12VDC/25-105 amp or 24VDC/15-65 amp
- 50/60Hz for international and U.S. applications
- Drip shield (necessary) included
- Optional alarm relay available
- 5-year manufacturers limited warranty
- Made in the USA



HQ SERIES BATTERY CHARGERS ORDERING INFORMATION

| Part Number | Description | Weight | Part Number | Description | Weight |
|---------------|------------------------------------|---------|----------------|------------------------------------|---------|
| 9Q-12255HQ-A | 25 Amp, 12 Volt, 120VAC, 50/60 Hz | 9 lbs. | 9Q-12255HQI-A | 25 Amp, 12 Volt, 220VAC, 50/60 Hz | 9 lbs. |
| 9Q-12355HQ-A | 35 Amp, 12 Volt, 120VAC, 50/60 Hz | 9 lbs. | 9Q-12355HQI-A | 35 Amp, 12 Volt, 220VAC, 50/60 Hz | 9 lbs. |
| 9Q-12455HQ-A | 45 Amp, 12 Volt, 120VAC, 50/60 Hz | 12 lbs. | 9Q-12455HQI-A | 45 Amp, 12 Volt, 220VAC, 50/60 Hz | 12 lbs. |
| 9Q-12555HQ-A | 55 Amp, 12 Volt, 120VAC, 50/60 Hz | 15 lbs. | 9Q-12555HQI-A | 55 Amp, 12 Volt, 220VAC, 50/60 Hz | 15 lbs. |
| 9Q-12655HQ-A | 65 Amp, 12 Volt, 120VAC, 50/60 Hz | 15 lbs. | 9Q-12655HQI-A | 65 Amp, 12 Volt, 220VAC, 50/60 Hz | 15 lbs. |
| 9Q-12855HQ-A | 85 Amp, 12 Volt, 120VAC, 50/60 Hz | 20 lbs. | 9Q-12855HQI-A | 85 Amp, 12 Volt, 220VAC, 50/60 Hz | 20 lbs. |
| 9Q-121055HQ-A | 105 Amp, 12 Volt, 120VAC, 50/60 Hz | 22 lbs. | 9Q-121055HQI-A | 105 Amp, 12 Volt, 220VAC, 50/60 Hz | 22 lbs. |
| 9Q-24155HQ-A | 15 Amp, 24 Volt, 120VAC, 50/60 Hz | 9 lbs. | 9Q-24255HQI-A | 25 Amp, 24 Volt, 220VAC, 50/60 Hz | 9 lbs. |
| 9Q-24255HQ-A | 25 Amp, 24 Volt, 120VAC, 50/60 Hz | 13 lbs. | 9Q-24355HQI-A | 35 Amp, 24 Volt, 220VAC, 50/60 Hz | 13 lbs. |
| 9Q-24355HQ-A | 35 Amp, 24 Volt, 120VAC, 50/60 Hz | 15 lbs. | 9Q-24455HQI-A | 45 Amp, 24 Volt, 220VAC, 50/60 Hz | 15 lbs. |
| 9Q-24455HQ-A | 45 Amp, 24 Volt, 120VAC, 50/60 Hz | 15 lbs. | 9Q-24555HQI-A | 55 Amp, 24 Volt, 220VAC, 50/60 Hz | 15 lbs. |
| 9Q-24555HQ-A | 55 Amp, 24 Volt, 120VAC, 50/60 Hz | 21 lbs. | 9Q-24655HQI-A | 65 Amp, 24 Volt, 220VAC, 50/60 Hz | 21 lbs. |
| 9Q-24655HQ-A | 65 Amp, 24 Volt, 120VAC, 50/60 Hz | 21 lbs. | | | |



PERKO®

BATTERY SELECTOR SWITCHES



Ignition Protected

Standard features include a “make-before-break” design, for use with two or more batteries and single- or dual-engine systems.* They permit selection between batteries for starting and charging, or operation of both batteries in parallel. They allow the addition of an extra battery for use with accessories. The “OFF” position also acts as an emergency disconnect, in the event of an electrical problem. In addition, some models offer unique options, such as a keylock for additional theft protection.

Protected by the following U.S. patents: Design

260,637 - 4,280,028 - 4,424,424.

*For dual-engine systems, two switches are required.

Features

- Surface mount.
- Red plastic housing with large, black plastic knob.
- Improved design protects copper contacts and brass terminals used as electrical connection.
- For use with systems under 50 volts.

Capacity: 250 amps continuous, 360 amps intermittent

| Ordering Information | | | | | |
|----------------------|---|----------------------------|----------------|-------------|-----------------------|
| FEATURES: | DISPLAY PKG. - 5 PKGS. 1 Piece per Pkg. | OEM BULK PKG. 25 Pieces | DIAMETER (In.) | DEPTH (In.) | WEIGHT EACH (Lbs.) |
| Standard | 8501 DP | 8501 | 5-1/4" | 2-5/8" | 1 |
| With Keylock | 8502 DP | 8502 | 5-1/4" | 2-5/8" | 1 |

HEAVY-DUTY BATTERY SELECTOR SWITCH MODEL 8603

Ignition Protected

Utilizes a “make-before-break” design, for use with two or more batteries and single- or dual-engines. Alternator field disconnect prevents damage to alternator if accidentally switched to the “OFF” position while engine is running.

Features

- Fiber-reinforced polycarbonate body.
- 1/2-inch diameter brass battery terminals.
- For use with systems under 50 volts.

Capacity: 380 amps continuous, 850 amps intermittent



| ORDERING INFORMATION | | | |
|----------------------|-------------|--|---------------|
| DIMENSIONS | | DISPLAY PKG. - 2 PKGS. 1 Piece per Pkg. | WEIGHT (Lbs.) |
| Face (In.) | Depth (In.) | | |
| 5-1/4" x 5-1/4" | 3-3/8" | 8603 DP | 3 |

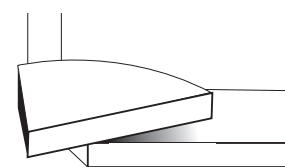
BATTERY SELECTOR SWITCHES

Take a look inside a typical battery switch and you'll find small, spring-loaded "line contacts" that provide the electrical gateway to your system. These line-contact designs provide a very small conductive area for high current flow, resulting in critical wear, carbon tracking and contact burns over time. At Guest, we understand the key to long, efficient switch life is large contact surface area.

That's why Guest switches feature an innovative "sweep contact" design, which provides a large, flat surface area for maximum conductivity and efficiency, without the excessive wear, carbon tracking and contact burns of inferior line-contact designs. All Guest battery switches safely provide positive battery disconnect, isolate all circuits and conform to U.S.C.G. safety standard 183.410 for ignition protection.

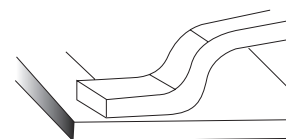
Guest Battery Switches Features

- Heavy-duty copper sweep contacts.
- Positive click-stop on all positions.
- Built-in skirt protects connections.
- "Make before break" contacts allow selection of all positions except "off" while engine is running.
- Alternator Field Disconnect (AFD) models allow selection of any position, including "off", without damage to alternator or electrical system.
- For 6, 12, 24 and 32 volt systems.
- Marine UL Listed.
- Momentary ratings are for five minutes continuous.
- 1-year limited warranty.



CONTACT AREA

GUEST SWEEP CONTACT



CONTACT AREA

LINE SWEEP CONTACT

Guest 'Sweep' Contacts Are Just Better

Guest's smooth, flat "sweep" contacts provide up to 60% more contact area than inferior line-contact designs. Our contacts are "machined" to guarantee an electrically sound path, while line-contact designs suffer from a lack of matched contact surfaces, leading to arcing and excessive carbon tracking. Guest contacts also provide a unique, self-cleaning sweep every time the switch is used, maintaining a matched contact area for maximum efficiency and long life.

Heavy-Duty Diesel Series

- Tough, glass-filled polycarbonate cases and high amp ratings for heavy wear.
- Rated at 360 amps continuous, 600 amps momentary.
- Selector switches permit selection of either battery, both batteries in parallel, or complete disconnect of both batteries.
- On/Off switch is rated at 450 amps continuous, 800 amps momentary.
- All switches feature AFD.
- Cable lug size: 5/8".

Size: 5-1/2" square x 3-1/2" deep

*Momentary rating is for 5 minutes continuous. UL and competitors use a momentary rating of only 15 seconds.

| Model | Description |
|-----------|--|
| 2300A | Heavy-duty battery selector switch |
| 2300A-1** | 2300A selector switch with remote light connections (light not included) |
| 2303A | Heavy-duty On/Off switch |

**For non-marine applications. Not Marine UL Listed.

Model #2304A Extra Heavy-Duty Diesel Switch

- Our maximum service switch features tough, glass-filled polycarbonate construction.
- Rated at 600 amps continuous, 1,000 amps momentary.
- Alternator disconnect feature.

Size: 5-1/2" square x 3-1/2"D.



Model 2300A

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



BATTERY BOXES

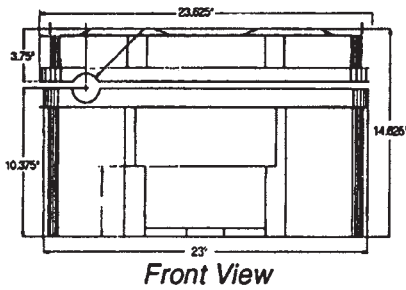
MADE FROM 100% POLYETHYLENE BY MOELLER



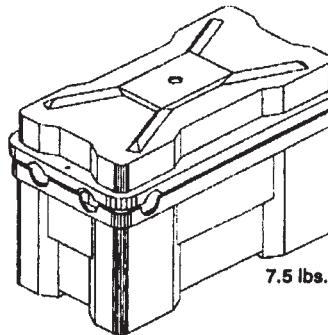
Moeller's heavy-duty molded products securely hold boat batteries in place and resist harmful effects of acid and water.

**When properly installed, they comply with
USCG CFR 33, 183.420.**

BATTERY BOXES

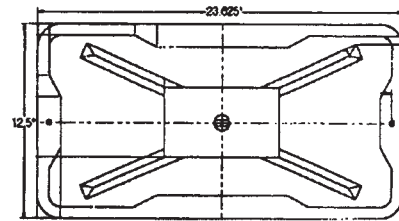


Front View

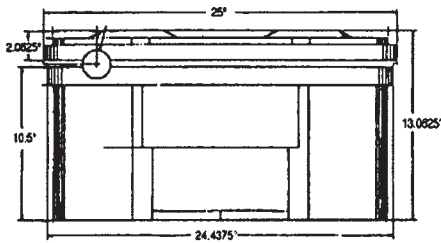


7.5 lbs.

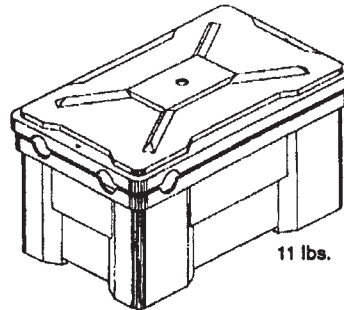
#42204 4D Battery Box



Top View

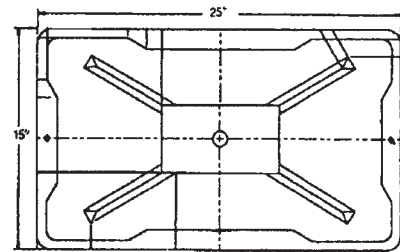


Front View

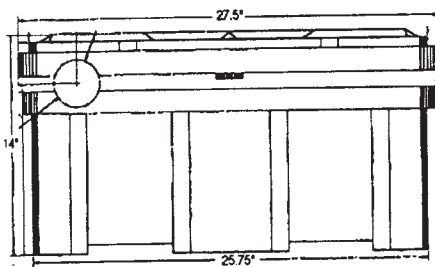


11 lbs.

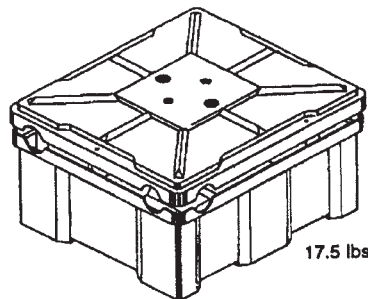
#42208 8D Battery Low



Top View

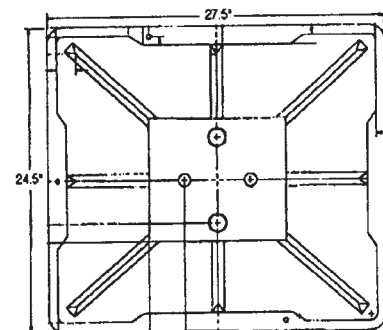


Front View



17.5 lbs.

#42210 8D Battery Low - double



Top View

DISCONNECT SWITCHES

Master Disconnect Switches D.P.S.T. OFF-ON - Disconnect battery circuit and field circuit.

- For 6-36 Volt, D.C. electrical systems

No. M-289

- Brass case.
- Chrome plated die-cast lever
- Brass mounting stem 3/4" (19.05mm) dia. 1-13/32" (46.05mm) long
- Fits panels up through 15/16" (23.81mm) thick



Master Disconnect Switches

S.P.S.T. OFF-ON - Disconnect battery circuit only.

Designed to prevent electrical fires, theft and battery drain when equipment is unattended. Marine UL 707B listed switches conforms to US Coast Guard Safety Standard Section 183.410 for ignition protection.

Electrical ratings on UL labels are conservative. Cole Hersee master disconnect switches are capable of handling higher amperages.

- For 6-36 Volt, D.C. electrical systems
- Brass case.
- Chrome plated die-cast lever
- Two 3/8" (9.52mm) diameter stud terminals.
- Fits panels up through 15/16" (23.81mm) thick



No. M-284-01

No. M-284-01-BP*

- UL rating at 6-36 volts, D.C. 175 Amps continuous. 800 amps intermittent, 15 seconds ON, 5 minutes OFF.
- UL listed and labeled
- Silver contacts.

7

SWITCHES

Momentary Push Button Switches

- Non-corrosive construction.
- Moisture repellent insulators.
- Brass case, stem, plunger button, terminals and mounting hardware.
- Heavy duty construction for 6-36 volt, D.C. applications.
- Bright chrome plated buttons and face nuts except where noted.
- Variations available; consult factory.

Normally OFF S.P.S.T.

OFF – MOMENTARY ON

ON with button depressed, spring return to OFF

Electrical Rating: 35 amps at 12 volts, D.C.

Electrical Rating: 10 amps at 12 volts, D.C.



No. M-626

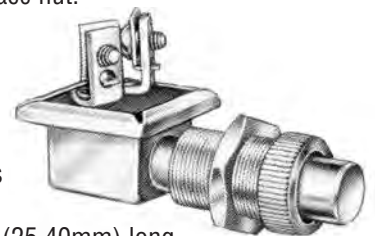
No. M-626-BP*

- Same as No. M-490 except with No. M-407-03 black moisture repellent cover which snaps over face nut.

No. M-485

No. M-485-BP*

- Gasket sealed case protects against moisture and dirt.
- Mounting stem 5/8"-32, 1" (25.40mm) long.
- Fits panels up through 7/8" (19.05mm) thick.



350 WATT XENON SEARCHLIGHTS



FEATURES

- 20 Million Candle Power
- Remote Electric Beam-Size Focus
- Small Solid State Current Regulated Supply
- Precision Electroformed Deep-Dish Reflector made of Indestructible Bullet-Resistant Nickel
- Controls: Distant Electric, Lever-Gear or Local Handle
- Door Interlock Safety Shut-Down Switch
- Manual Beam-size Focus Knob) provides back-up for focus motor failure)
- Long-Life Xenon Lamp
- Sealed Weatherproof Drum
- Exceeds 360° Span of Rotation

- Detachable Infrared Filter (Covert Surveillance)
- 24 Volt DC Input
- Multiple Control Stations: Interior and Outside Weatherproof
- Lamp-Life Hour Counter

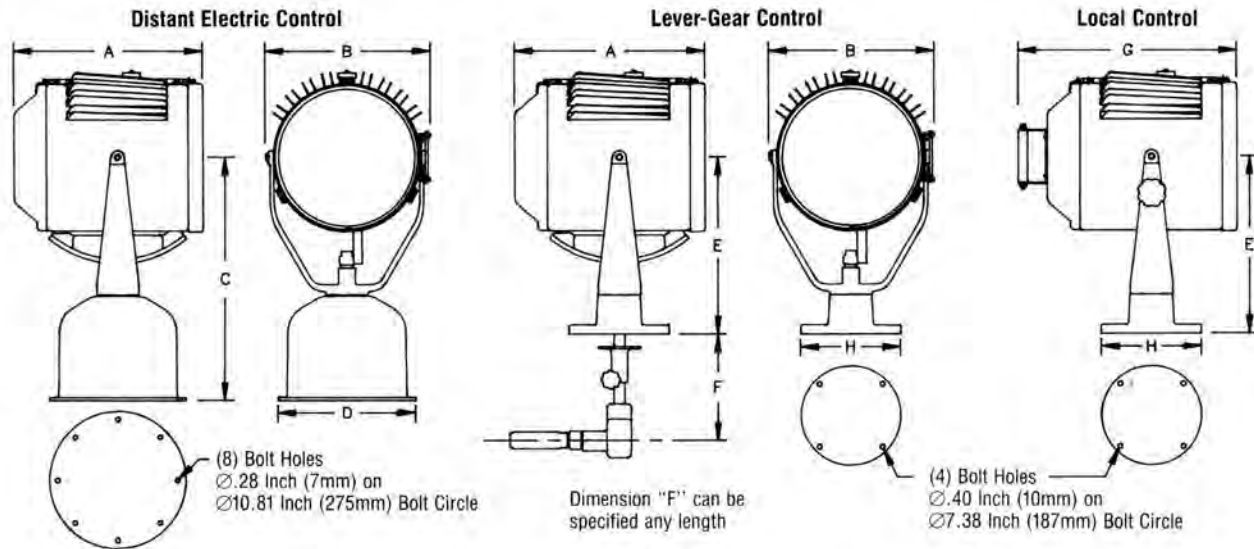
DESCRIPTION

This powerful compact and rugged searchlight utilizes Advanced Solid State Electronics Technology. The product is designed for those applications where size, weight and power consumption must be minimized, but High Performance and Safety cannot be compromised. Designed for Patrol Craft, Fast Ferries, Mobile Vehicles, Fixed Land-Based Security Applications and much more. The

weathertight sealed drum allows usage in Marine, desert and Severe Weather climates and includes benefits such as High Power Output, Adjustable Beam-Size Focus, Small Footprint, Light Weight, Low Power Consumption, Long Lamp-life, Shatter-proof Reflector and High Infrared Energy Output for Covert Surveillance.

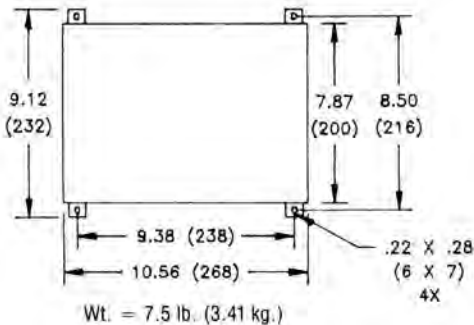
350W DIMENSION DRAWINGS Inch (mm)

| A | B | C | D | E | F | G | H |
|-------------|------------|------------|-------------|-------------|-------------|------------|------------|
| 15.75 (400) | 13.5 (343) | 20.0 (508) | 11.38 (289) | 14.62 (371) | 10.88 (276) | 19.0 (482) | 8.25 (209) |

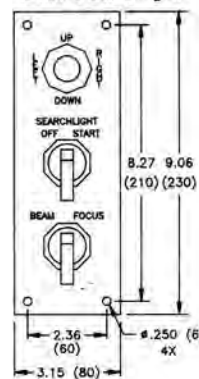


Power Supply: Efficient Electronic Current-Regulated Supply. Constant Regulated Current increases lamp-life and keeps searchlight intensity constant despite voltage input changes. Solid State Electronics includes Universal Power Input Feature, providing 115 Volts AC and 230 Volts AC Power Interfaces on the same printed circuit board. Current dimming switch adjusts amperage throughout a continuous spectrum.

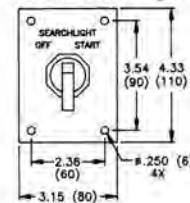
Control Stations Dimensions: Inches (mm)



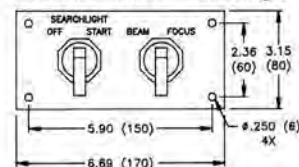
NO. C3-3
Used with Distant Electric Searchlight



NO. C1-1
Used with Local Control Searchlight



NO. C2-4
Used with Lever-Gear Searchlight



SPECIFICATIONS

| | |
|-------------------|---|
| Beam Intensity | 20 Million Candela |
| Beam Spread | Nominal 1 Degree to 15 Degrees, adjustable throughout continuous spectrum. |
| Light Efficiency | 57,142 Candela per Watt |
| Light Source | 350 Watt Xenon Lamp |
| Color Temperature | 6000 Kelvin (White Color) |
| Input Power | 115 VAC...4.5 amps (approx.) 230 VAC...2.25 amps (approx.) |
| Reflector | Prevision Electroformed Nickel with polished Rhodium finish. Diameter = 10.5 inches (267 mm) |
| Materials | Anti-corrosive Marine Grade Aluminum and Stainless Steel |

How to Order... Determine searchlight control and read horizontally across table selecting searchlight, power supply and control station. Multiple C3-3 control stations can be used to control the same searchlight. If weatherproof control stations, Infrared filters or 24 Volts are required, consult factory.

| Control Type | Searchlight | Power Supply | |
|------------------|-------------|------------------------|-----------------|
| | | 115 Volts or 230 Volts | Control Station |
| Distant Electric | XY3EDE-ARF3 | 3PS115 or 3PS230 | C3-3 |
| Lever-Gear | XY3ELG-ARF3 | 3PS115 or 3PS230 | C2-4 |
| Local | XY3EL-AE | 3PS115 or 3PS230 | C1-1 |

350 WATT XENON LEVER-GEAR CONFIGURATION GUIDE



Control Station

Select Control Station...

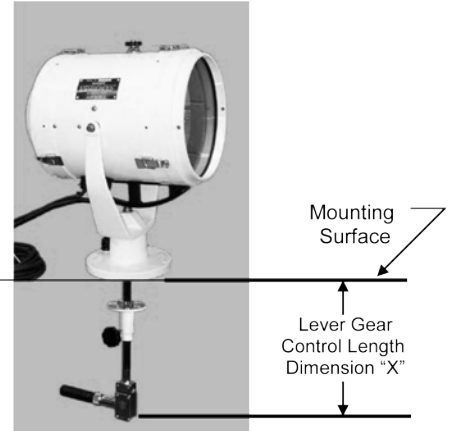
Model C2-4



Electronic Power Supply

Select Power Supply...

**Model 3PS115 (115VAC) or
Model 3PS230 (230VAC)**



Mounting Surface
Lever Gear Control Length Dimension "X"

Select Searchlight Model and Specify "X" Lever Dimension...

**Model XY3ELG-ARF3 (Powder) or
Model XY3CLG-BRF3 (Chrome)**

How to Specify... Each system consists of one Searchlight, one Power Supply and one Control Station. Specify Powder Coat or Chrome Searchlight, 115 VAC or 230 VAC Power Supply, and specify the desired lever control length Dimension "X". The lever control length (Dimension "X"), is a standard length of 10-7/8 inches (276mm), and is the distance from the bottom of the searchlight base to the centerline of the lever gear handle. Customer can specify this dimension to be any custom length desired.

Sample Configuration... A 230 VAC Lever Control Searchlight System with Powder Coat Finish would be: (1) Searchlight Model XY3ELG-ARF3, (1) Power Supply Model 3PS230 and (1) Control Station Model C2-4. **Please confirm desired control length.**

350 WATT XENON DEC SEARCHLIGHTS

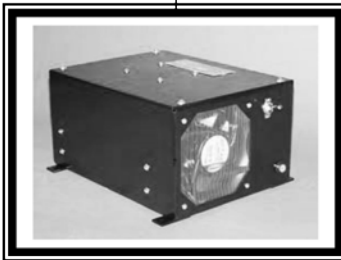
Select one Searchlight Model...



Model XY3EDE-24ARF3 (Standard Powder Coat Finish)
or
Model XY3CDE-24BRF3 (Optional Chrome Finish)

Then Select Additional Optional Features....

- To add Optional Anti-icing Heaters insert "H" before "RF" for either of above model numbers (i.e. XY3EDE-AHRF3)
- To add Optional Azimuth Indicator change "3" to "5" for either of above model numbers (i.e. XY3EDE-24ARF5)
- To mount product upside down, add "BU", i.e. Base-Up, to above numbers (i.e. XY3EDEBU-24ARF3)



Select one Power Supply Model...

Model 3PS115 or Model 3PS230

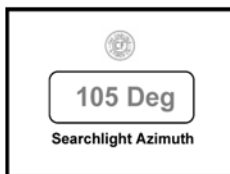
NOTE: The last three numbers designate the Voltage (115VAC or 230 VAC). Consult Factory for weatherproof enclosures. Power Supply must be no further than 30 feet away from searchlight.



Select one Master Station and any number of Optional Slave Stations...

Master Control Station..... Model C4-1-1
Indoor Slave Station (optional)..... Model C4-1M-1
Outdoor Slave Station (optional)..... Model C4E1M-1-2

NOTE: As many stations can be selected as desired. Above are recessed-mounted below console. If a station completely enclosed within a weatherproof box is desired, consult factory.



Select Optional Azimuth Indicator...

Model 10569A (must be indoors and recessed mounted)

Note: Azimuth Indicator is optional. Only add if required.

How to Specify... Select one Searchlight, one Power Supply and one or more Joystick Stations. Add an Optional Azimuth Indicator Panel if "5" is included in searchlight model. **Sample Configuration:** A 115 VAC Powder Coat Searchlight with Azimuth Indicator, Anti-icing Heaters, Mounted Upside Down, and includes (1) Indoor Master Station and (1) Outdoor Slave station would be: Qty(1) XY3EDEBU-24AHRF5 Searchlight, Qty(1) 3PS115 Power Supply, Qty(1) C4-1-1 Indoor Master Joystick Station, Qty(1) C4E1M-1-2 Outdoor Slave Joystick Station and Qty(1) 10569A Azimuth Indicator Panel.

500 WATT XENON SEARCHLIGHTS

SPECIFICATIONS

Searchlight Intensity. The beam of light is produced by a xenon arc lamp with a color temperature of 6000 degrees Kelvin and is rated at 45 Million Candle Power.

Lamp. Xenon-arc, 1500 hour average life, warranted for 1500 hours. Warranted hourly lamp cost is considerably less than non-warranted hourly carbon cost and non-warranted hourly cost of many incandescent lamps.

Adjustable Beam Size. The horizontally mounted lamp combined with the deep parabolic metal reflector gives the capability of changing from the most concentrated intense beam for long reaches to a much larger beam for lighting large areas at closer range. Beam size can be adjusted manually at the searchlight or electrically from a remote control station as an optional feature.

Reflector. Precision, parabolic, constructed of virtually indestructible nickel with corrosion resistant rhodium finish. Short focal length deep parabola captures a higher percentage of total light from the lamp than do most conventional reflectors thus producing a remarkably intense beam.

Cover Glass. Extremely strong impact and thermal shock resistant heat tempered clear glass.

Starter. Simple, reliable, and compact. Produces the high voltage necessary to start the lamp instantly. It is readily accessible and replaceable as a single unit.

Bases. Standard and pedestal for manual control. Motorized base for distant electric

control (DEC) can be controlled from one or more remote stations. All are constructed of high strength corrosion resistant aluminum and contain a sliding stop allowing horizontal rotations in excess of 360 degrees without damaging the electric cables.

Drum. Constructed of marine grade corrosion resistant material with a hinged front door for easy lamp replacement. Rear dome is removable for ease in servicing.

Finish. Drum interior finished with heat resistant flat black paint. Exterior surfaces are white enamel and mechanical control shafts inside pilot house are polished brass. The control parts that are normally polished can be chrome plated (see optional features).

Wiring. Three conductor (one ground) power cable and multiconductor control cables extend through watertight stuffing tubes in drum and are clamped to rotating base. Sufficient length is supplied to terminate in a junction box (not supplied) near the searchlight without causing mechanical stress when searchlight is moved through its entire horizontal and vertical travel.

Electrical. A power supply to produce the required ballasted DC for the searchlight, control station, and DEC components are required.

CONTROLS

Local Control. No pilot house controls. Searchlight has training handle on drum and hand clamps to lock searchlight in any position.

Lever-Gear Control. Operates conveniently with one hand. Horizontal movement controlled by pointing lever, vertical by twisting lever.

Vertical lock conveniently located on control handle. Ceiling lock clamps horizontal movement.

Wheel Control. Upper wheel controls horizontal movements, lower wheel vertical movements. Friction brake holds searchlight in any vertical position.

Distant Electric Control (DEC). Motors in searchlight base control horizontal and vertical beam movements so that searchlight can be located any distance from pilot house. Dynamic braking stops beam movement instantly upon controller release.

Distant Mechanical Control (DMC). Similar to lever-gear or wheel except that control shafts are at right angle to searchlight base.

OPTIONAL FEATURES

Searchlight can be tailored to your exact needs by specifying these features at time of order at extra charge.

Special control length. longer or shorter than standard. Specify length from bottom of base (vertical centerline of base if DM) to centerline of lever handle or large wheel.

Special pedestal height. higher or lower than standard. Specify height from bottom of base to centerline of beam.

Brass base and yoke. instead of marine aluminum. Add -B to searchlight cat. No.

Remote focus. Add -RF to searchlight cat. No.

Chromium plated pilot house controls. Add -CC to cat. No.

Anti-icing heaters. Supplied on DEC searchlights only. Add -H to cat. No.



500W DIMENSION DRAWINGS Inch (mm)

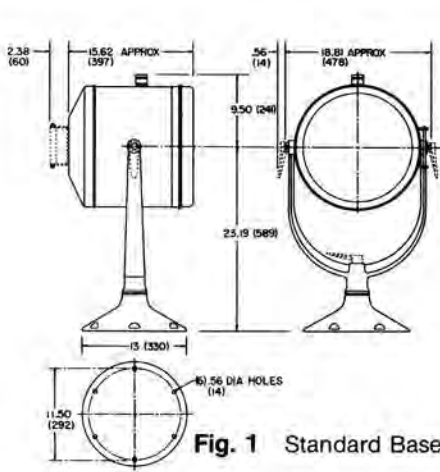


Fig. 1 Standard Base

Combine base and control figures for complete searchlight. (except DEC)

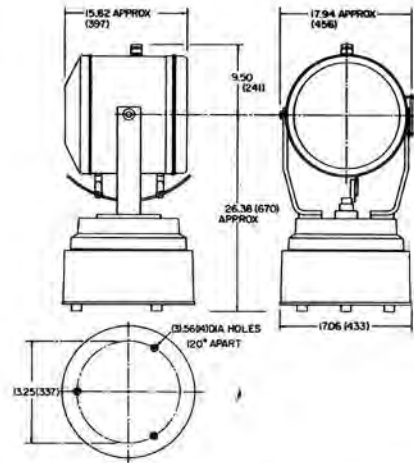
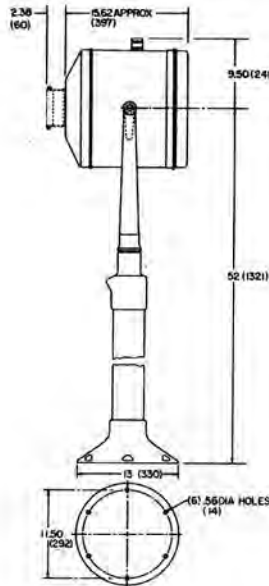


Fig. 3 Distant Electric Control (DEC)

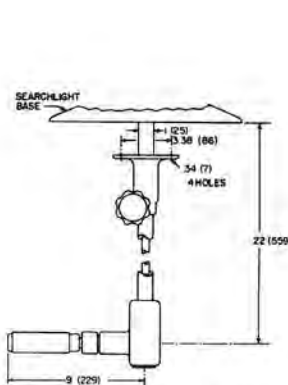


Fig. 4 Lever-Gear Control

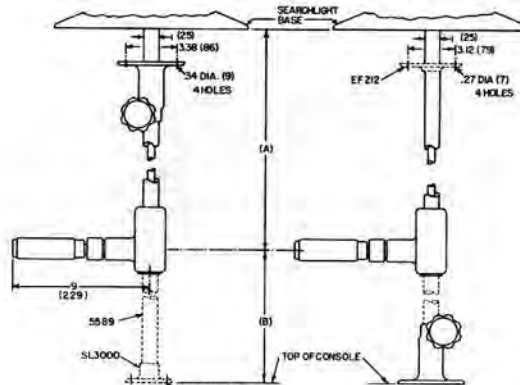


Fig. 5A

Fig. 5B

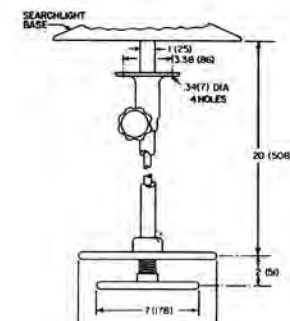


Fig. 6 Wheel Control

Alternate arrangements for lever-gear control with extra long control shafts. Parts shown as dashed lines priced separately.

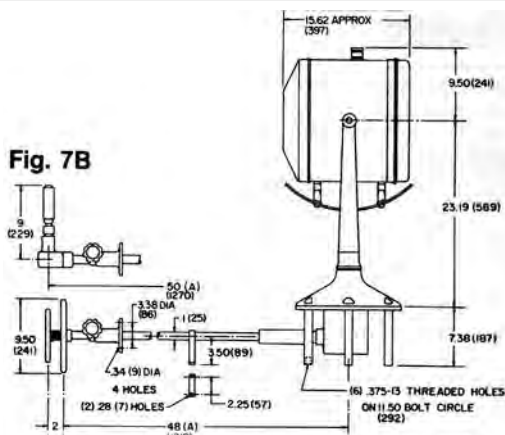


Fig. 7B

Fig. 7A Distant Mechanical Control (DMC)

Power Supply 4198PS

Operates on AC 120/1/50-6- to provide ballasted DC power to the searchlight. Also contains fused disconnect switch, contactor, DC ammeter, and time meter.

Net weight 99 lb (50 kg), shipping 131 lb (59 kg).

Optional Desk Stand Kit 6810X. Available at extra charge to permit power supply to be mounted on deck instead of bulkhead. Shown in fig. 8.

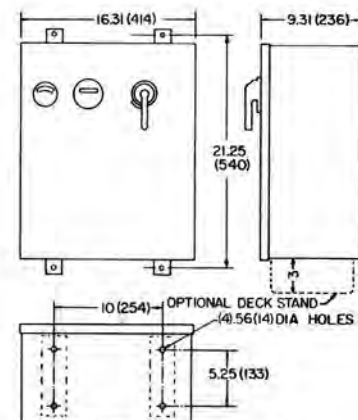
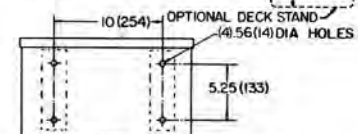


Fig. 8 Power Supply



500 WATT XENON COMPONENTS

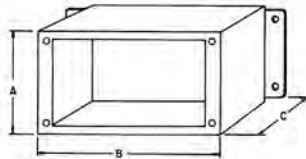


Control Station

- 4441X (without remote focus)
- 4441X-RF (with remote focus)

For manual control searchlights. Contains searchlight off-start switch, standby switch, and remote focus switch (if specified). Mounted on bright stainless steel plate 3.12" x 5.62" (79 x 143). Depth clearance 2.5" (64).

Net weight 1.00 lb. (0.40 kg).



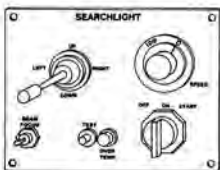
| Optional Enclosures for Control Stations | | | | | |
|--|----------|----------------------|-----------|-----------|--|
| Cat. No. | Used for | Dimensions inch (mm) | | | |
| | | A | B | C | |
| 5079A | 4441X,- | 3.25(83) | 5.75(146) | 2.75(70) | |
| 5288 | C5388,- | 6.00(152) | 8.00(203) | 3.50(89) | |
| 9824 | 4799X,- | 6.00(152) | 6.00(152) | 4.00(102) | |



- 8672X (without speed control)
- 8672XS (with speed control)

Used when DEC searchlights are controlled from more than one remote location. Only one required per searchlight regardless of quantity of 4799X type control stations used. Steel oiltight enclosure contains rectifier, relays, fuses, etc. In addition 8672XS contains beam speed control devices with external adjustment to preset the slow speed.

Enclosure size 12 x 10 x 5" (305 x 254 x 127 mm). Net weight 19.4 lb (8.80 kg).



Distant Electric Control Stations

Two types: 1) when searchlight is controlled from one location only and 2) when searchlight is controlled from more than one location. In each the basic station is a compact unit incorporating OFF-ON switch, UP-DOWN-LEFT-RIGHT joystick controller, and STANDBY-OFF switch. Operator can change searchlight aim with beam off when switch is on "Standby."

Optional controls are: 1) Remote Focus to change beam size and 2) Speed Control to change speed of beam travel. Remote focus requires searchlight also to be equipped with remote focus option. Speed control requires no additional feature in searchlight.

| TABLE I SINGLE-STATION CONTROLS | | | | | | |
|---------------------------------|----------------|---------|------------|-----------|----------|------------|
| Cat. No. | Options | | Dimensions | | Depth | Weight |
| | Single Control | Station | Inch (mm) | Inch (mm) | | |
| C5388 | No | No | 6 (152) | 8 (152) | 3.5 (89) | 4.8 (2.18) |
| C5388-RF | Yes | No | 6 (152) | 8 (152) | 3.5 (89) | 4.8 (2.18) |
| C5388-RFS | Yes | Yes | 6 (152) | 8 (152) | 3.5 (89) | 7.3 (3.31) |

| TABLE II MULTI-STATION CONTROLS | | | | | | | |
|---------------------------------|--------------------------|---------------------|------------|-----------|--------|----------|-----------|
| Cat. No. | Options | | Dimensions | | Depth | Weight | |
| | Multiple Control Station | Compatible Assembly | Inch (mm) | Inch (mm) | | | |
| 4799X | 8672X | No | No | 6(152) | 6(152) | 3.12(79) | 2.5(1.14) |
| 4799X-RF | 8672X | Yes | No | 6(152) | 6(152) | 3.12(79) | 2.5(1.14) |
| 4799-RFS | 8672XS | Yes | Yes | 6(152) | 6(152) | 3.12(79) | 5.0(2.27) |

OTHER ACCESSORIES & PARTS

| Description | Part No. | Description | Part No. | Description | Part No. |
|---------------------|----------|-------------------------|----------|------------------|----------|
| Capacitor (starter) | 2896 | Cover Glass | SL1085 | Lamp | 1000TRC |
| Capacitor (power) | 4404X | Fan | 4434X | Reflector | 9719X |
| Capacitor (power) | 4405 | Gasket (std & ped base) | SL3356 | Starter Assembly | 4636X |

How to Order Searchlight Systems

A minimum of 3 components must be specified separately to order a complete searchlight system: 1) searchlight (including suffix for optional feature(s)), 2) power supply and at least one operator's control station. Distant electric control searchlights to be controlled from more than one remote locations also require one 8672X type control assembly.

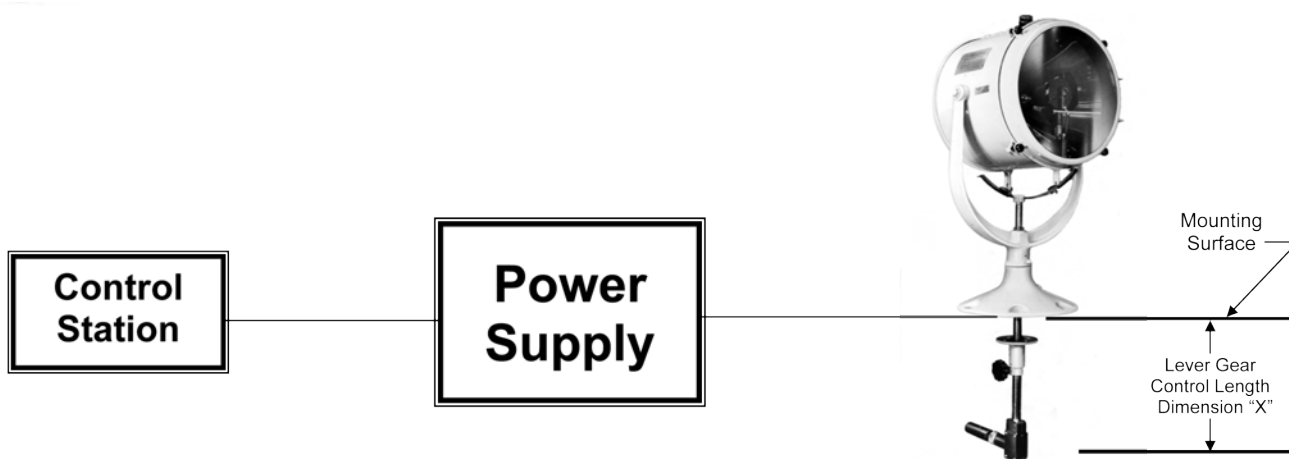
Example of manual control searchlight order:

- 2 X9396LG-CCRF 500W xenon searchlight, standard base, with remote focus and chrome plated lever-gear controls 46 inches longer than standard, arranged per dimension fig. 5A, complete with 5589 stem and SL3000 bearing.
- 2 4198PS 500W xenon power supply.
- 2 4441X-RF control station with remote focus.

Example of order for DEC system:

- 2 X9398-HRF 500W xenon searchlight, DEC, with anti-ice heaters and remote focus.
- 2 4198PS 500W xenon power supply.
- 2 8672XS control assembly with speed control.
- 3 4799X-RFS control station for multiple control of DEC xenon searchlight with remote focus and speed control.

500 WATT XENON LEVER-GEAR CONFIGURATION GUIDE



Select Control Station...

Model 4441X-RF

Select 115 VAC Power Supply...

Model 4198PS-1

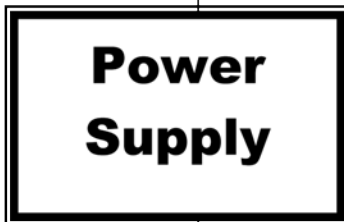
(NOTE: Consult Factory for 220/230 VAC)

Select Searchlight Model and Specify "X" Lever Dimension...

Model X9396LG-RF

How to Specify... Each system consists of (1) Searchlight Model X9396LG-RF, (1) 115 VAC Power Supply Model Number 4198PS-1 and (1) Control Station Model 4441X-RF. The lever gear control length, i.e. Dimension "X", is a standard length of 22-inches. Customer can specify a custom dimension, by providing factory the exact distance from the bottom of searchlight base, to the center line of the lever gear handle.

500 WATT XENON DEC SEARCHLIGHTS

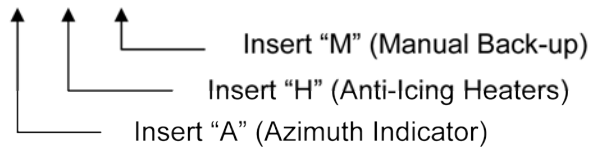


Select one Searchlight Model...

Model X9398-RF (standard)

...or add options

Model X9398- _ _ _ RF



Select one Power Supply Model...

Model 4198PSDE-1

NOTE: Above power supply is 115VAC-only. Consult Factory for 220/230VAC.

Select one or more Control Stations...

Indoor Station: C4-1M-1

Outdoor Station: C4E1M-1-1

NOTE: As many stations can be selected as desired. Above are recessed-mounted below console. If a station completely enclosed within a weatherproof box is desired, consult factory.

Select Optional Azimuth Indicator...

Model 10569A (must be indoors and recessed mounted)

Note: Azimuth Indicator is optional. Only add if required.

How to Specify... Select one Searchlight, one Power Supply and one or more Joystick Stations. Add an Optional Azimuth Indicator Panel if "A" is included in searchlight model. **Sample Configuration:** A 115 VAC Searchlight system with Azimuth Indicator, Anti-icing Heaters, Manual Back-up and includes (1) Indoor and (1) Outdoor weatherproof station would be: (1) X9398-AHMRF Searchlight, (1) 4198PSDE-1 Power Supply, (1) C4-1M-1 Indoor Joystick Station, (1) C4E1M-1-1 Outdoor Joystick Station and (1) 10569A Azimuth Indicator Panel.

1000 WATT XENON ELECTRIC CONTROL SEARCHLIGHT

Features

- **80 Million Beam Candlepower...** Powerful Beam services a distance of approximately 5 Miles on a clear night!
- **Remote Electric Beam-Size Focus...** Beam can be instantly narrowed or widened, with remote electric switch, throughout a continuous spectrum, on demand.
- **Advanced Proportional Speed Joystick...** Beam-Speed and Beam-Direction are controlled simultaneously with one hand, while operator uses free hand to steer vessel or hold binoculars... "move the Joystick to the first position and it will move slowly... move it further and it speeds up!"
- **Optional NightFINDER Camera...** Quickly see in total darkness by using the aiming platform of the searchlight to direct the camera, then turn on the searchlight to further identify the object.
- **Fast Searching Capability...** Beam-speed is approximately 30 degrees per second, providing a quick and accurate search.
- **Manual Focus Back-up Knob ...** External Knob changes the Beam-Size with no tools, if Focus Motor Fails.
- **Beyond Full Circle of Rotation...** Unique Sliding-Stop Design allows 385 Degrees horizontal motion.
- **Anti-corrosive Design...** Marine Grade Aluminum and Stainless Steel with High Quality Salt-Resistant Powder Coat Finish.
- **Optional Azimuth Indication...** LCD Display provides digital read out in Degrees for Horizontal Motion.
- **Optional IR Filter...** Attach the IR Filter to the searchlight and enhance your night vision capabilities when using your night vision equipment by increasing the amount of available IR on the target.
- **Optional Anti-Icing Heaters...** Used in colder climates to help prevent ice from forming on searchlight components that move.



Model # XE9666-RF is shown with the optional NF14400X-19 NightFINDER™

*United States Coast Guard
Approved Searchlight for
Marine Applications*

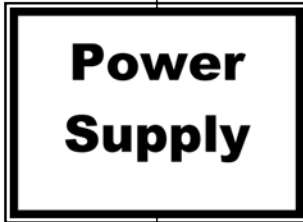
Powerful Searchlight for Marine Applications

This "USCG-Approved Fixture", with assigned "U.S. Military National Stock Number" (NSN: 6220-01-331-5923).

This Powerful, Rugged Design, composed of Marine Grade Aluminum and Stainless Steel, with a High Quality Salt and Scratch-Resistant Powder Coat Finish. The Indestructible, Nickel Reflector produces a precision 1-Degree Beam at a Powerful 80 Million Beam Candlepower. The Searchlight Focus has Safety Back-up, with no tools required (if the Focus Motor fails, the Beam-Size can be adjusted quickly and easily, with an external focus knob). The Searchlight is mounted on a rugged base, which includes ball bearings held captive within stainless steel races, producing greater than 385 Degrees of Horizontal Rotation with unique sliding stop. Top Beam-speed is a rapid 30 Degrees per second.

The Advanced Joystick changes the Beam-Speed and Beam-Direction simultaneously, requiring only one hand of operation (this technology eliminates a separate speed dial which requires two hands of operation!). Each control station will provide Remote Electric Beam-Size Focus, Beam-ON/OFF Control, Beam-ON Indication Light and the Advanced Joystick which controls Beam-Speed and Beam-Direction concurrently, using only one hand of operation!

1KW XENON DEC SEARCHLIGHTS



Select one Searchlight Model...

XE9666-RF (standard)

...or add options

XE9666- _____ RF

_____ Insert "M" (Manual Back-up)
 _____ Insert "H" (Anti-Icing Heaters)
 _____ Insert "A" (Azimuth Indicator)

Select one Power Supply Model...

5275PS _____ DE-1 _____

_____ Add "H" (Optional Anti-Icing Heaters)
 _____ Select Voltage: "2" (230 VAC)
 "3" (380 VAC)
 "4" (440 VAC)
 "5" (575 VAC)

Select one or more Control Stations...

Indoor Station: C4-1M-2

Outdoor Station: C4E1M-2

NOTE: As many stations can be selected as desired. Above are recessed-mounted below console. If a station completely enclosed within a weatherproof box is desired, consult factory.

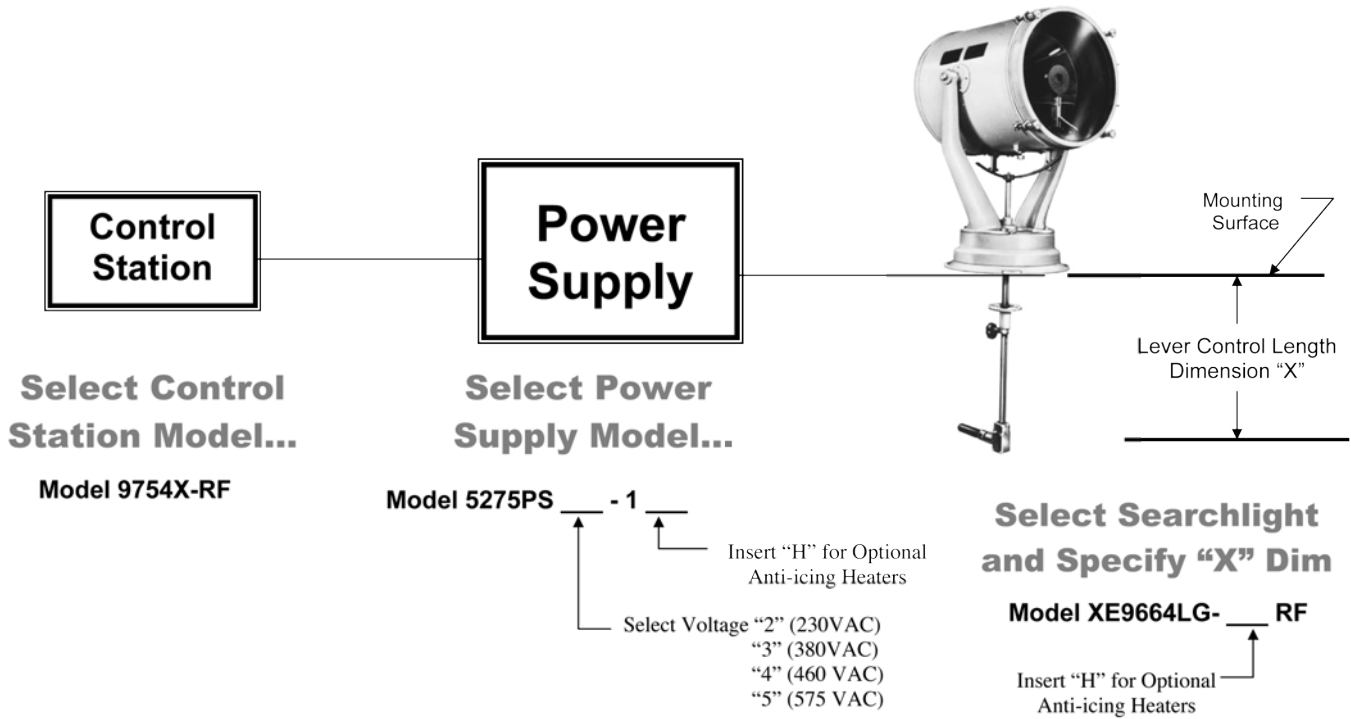
Select Optional Azimuth Indicator...

Model 10569A (must be indoors and recessed mounted)

Note: Azimuth Indicator is optional. Only add if required.

How to Specify... Select one Searchlight, one Power Supply and one or more Joystick Stations. Add Optional Azimuth Indicator Panel if "A" is included in searchlight model. **Sample Configuration:** A 380VAC Searchlight with Azimuth Indicator, Anti-icing Heater Circuits, Manual Back-up and (1) Indoor and (1) Outdoor weatherproof station would be: Qty(1) XE9666-AHMRF Searchlight, Qty(1) 5275PSDE-3H Power Supply, Qty(1) C4-1M-2 Indoor Joystick Station, Qty(1) C4E1M-2 Outdoor Joystick Station and Qty(1) 10569A Azimuth Indicator Panel.

1KW XENON LEVER-GEAR CONFIGURATION GUIDE



How to Specify... Each system includes one Searchlight, one Power Supply and one Control Station Model 9754X-RF. Add "H" to Searchlight Model Number if anti-icing heaters are required, and specify "X" dimension, which is the distance from mounting surface to centerline of lever handle (standard length is 26-inches but Factory will customize exactly to customer's specification). Add "H" to Power Supply Number if anti-icing heaters are required and specify power supply voltage. **Sample Configuration:** A 380 VAC Lever-Gear Searchlight System, with Anti-icing Heaters has the following model numbers: Searchlight Model XE9664LG-HRF, Power Supply Model Number 5275PS3-1H and Control Station Model 9754X-RF.

XENON COMPONENTS

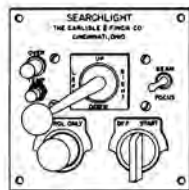


Control Station

- 9754X (without remote focus control)
- 9754X-RF (with remote focus control)

For manual control searchlights. Contains selector switch, light to indicate if searchlight or power supply is too hot, indicator light test switch, switch for remote focus control (if specified).

Mounted on bright stainless steel plate 3-1/8 x 5-5/8" (79 x 143 mm). Depth clearance 2-1/2" (64 mm). Fits enclosure 5079A. Net weight 1.00 lb (0.45 kg).

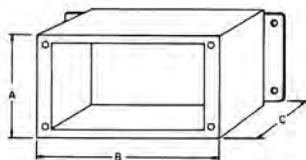


Control Station

- 9815X (without remote focus control)
- 9815X-RF (with remote focus control)

Used when DEC searchlight is to be controlled from multiple locations. Contains searchlight off-start switch single joystick for beam direction, over-temp light and test switch, switch to allow searchlight positioning with beam off, and remote focus control switch (if specified). As many stations as desired can be used with one 8672X Control Assembly to control one DEC searchlight.

Mounted on bright stainless steel plate 6 x 6" 9152 x 152 mm). Depth clearance 3-1/8" (79 mm). Fits enclosure 9824. Net weight 2.5 lb (1.14 kg).

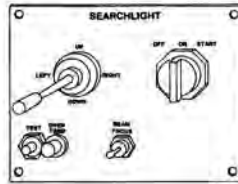


Optical Enclosures for Control Stations

| Cat. No. | Used for | Dimensions inch (mm) | | | Weight lb. (kg) |
|----------|----------------------|----------------------|------------|-----------|--------------------|
| | | A | B | C | |
| 5079A | 9754X, -RF | 3-1/4(83) | 5-3/4(146) | 2-3/4(70) | 2.4 (1.09) |
| 5079H | 9815, -RFS, -S | 6-1/4(159) | 7-1/4(184) | 3(76) | 4.6 (2.09) |
| 5288 | C5268, -RF, -RFS, -S | 6(152) | 8(203) | 3-1/2(89) | 5.4 (2.45) |
| 9824 | 9815X, -RF | 6(152) | 6(152) | 4(102) | 3.8 (1.73) |

Other Accessories & Parts

| Description | Catalog No. | | Description | Catalog No. | |
|----------------|-------------|-------|--------------|-------------|-------|
| | 1KW | 2.5KW | | 1KW | 2.5KW |
| Cover Glass | EF239 | EF239 | Reflector | 9719X | 5377X |
| Fan Assy (SL) | 9615X | 9615X | | | |
| Fan Motor (PS) | 8036 | 8036 | | | |
| Lamp, Xenon | 1000TRC | 7500 | Starter Assy | 9748X | 9748X |

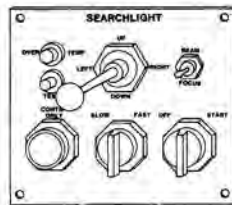


Control Station

- C5268 (without remote focus control)
- C5268-RF (with remote focus control)

For distant electric control (DEC) searchlights using only a single control station. See 9815X type stations and 8672X type control assembly for multi-station control. Single joystick controls all beam movements. Also contains off-on-start switch, over-temp indicator light and test switch, and remote focus control switch (if specified).

Mounted on bright stainless steel plate 6 x 8" (152 x 203 mm). Depth clearance 3-1/2" (89 mm). Fits enclosure 5288. Net weight 4.8 lb (2.18 kg).

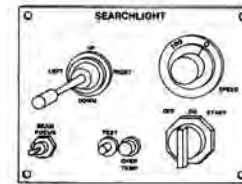


Control Station, Speed Control

- 9815X-RFS (with remote focus control)

Same as 9815X/9815X-RF except with addition of slow-fast switch to select speed of beam movements. As many stations as desired can be used with one 8672XS Control Assembly to control one DEC searchlight.

Mounted on bright stainless steel plate 6-1/4 x 7-1/4" (159 x 184 mm). Depth clearance 3" (76 mm). Fits enclosure 5079H. Net weight 5.0 lb (2.27 kg).

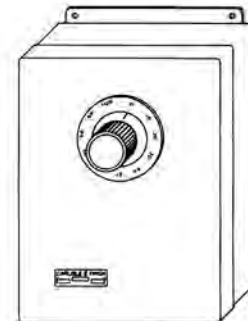


Control Station, Speed Control

- C5268-RFS (with remote focus control)

For DEC searchlights using only a single control station. See 9815X type stations and 8672X type control assembly for multi-station control. Similar to C5268/C5268-RF except with addition of a device allowing operator to adjust speed of beam movements.

Mounted on bright stainless steel plate 6 x 8" (152 x 203 mm). Depth clearance 3-1/2" (89 mm). Fits enclosure 5288. Net weight 4.8 lb (2.18 kg).



Control Assembly

- 8672X (without speed control)
- 8672XS (with speed control)

Used when DEC searchlights are controlled from more than one remote location. Only one required per searchlight regardless of quantity of 9815X type control stations used with the searchlight. Steel oiltight enclosure contains rectifier, relays, fuses, etc. In addition 8672XS contains beam speed control devices with external adjustment to preset the slow speed.

Enclosure size 12 x 10 x 5" (305 x 254 x 127 mm). Net weight 19.4 lb (8.80 kg).

PERKO

NAVIGATION LIGHTS

CERTIFIED FOR USE ON POWER DRIVEN VESSELS UNDER 20 METERS (65.6 FT.) IN LENGTH

**BLACK PLASTIC
FOR 12, 24 OR 32 VOLTS, BULB NOT INCLUDED.**

| Fig. | Ht. Overall Inches | Ht. Lens Inches | Tapped Pipe Size | Screw Size |
|------------|-----------------------|--------------------|---------------------|---------------|
| 108 | 6 | 5 | 1/2 | 10 |
| All Others | 5-1/4 | 4-1/4 | — | 10 |

ORDERING INFORMATION

| Description | Visibility Arc | Black Plastic Std. Pkg. - 1 Pc. | Visibility Miles | Ship Wt. Carton Lbs. Std. Pkg. |
|-------------------------|-------------------|------------------------------------|---------------------|--------------------------------------|
| Red Side Light | 112-1/2° | 109 R00 BLK | 2 | 1.0 |
| Green Side Light | 112-1/2° | 109 G00 BLK | 2 | 1.0 |
| White Masthead Light | 225° | 110 000 BLK | 3 | 1.0 |
| White Stern Light | 135° | 111 000 BLK | 2 | 1.0 |
| Yellow Towing Light | 135° | 111 M00 BLK | 2 | 1.0 |
| White All-Round Light** | 360° | 108 000 BLK | 2 | 1.0 |
| Red All-Round Light | 360° | 108 R00 BLK | 2 | 1.0 |
| Green All-Round Light | 360° | 108 G00 BLK | 2 | 1.0 |



Fig. 109



Fig. 110



Fig. 108



Fig. 111



Fig. 109

Spare Lenses:

112-1/2° Fig. No. 259 H02, Specify Color.
 135° Fig. No. 269 H02, Specify Color.
 225° Cat. No. 256 H02 WHT.
 360° Fig. No. 106 000, Specify Color.

Required Bulbs:

For 12 Volts (2 per card), Cat. No. 70 DP1 CLR.
 For 24 Volts (2 per card), Cat. No. 67 DP2 CLR.
 For 32 Volts (2 per card), Cat. No. 70 DP2 CLR.
 Spare Base and Gasket for Fig. No. 108, Cat. No. 222 DPBLK.

SPARE BULBS FOR NAVIGATION LIGHTS

PERKO®

FOR NAVIGATION LIGHTS ON VESSELS UNDER 20 METERS (65.6 FT.) IN LENGTH


FIG. 337
FIG. 337 - DOUBLE CONTACT BAYONET BASE BULB

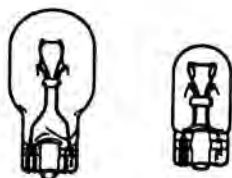
| Nominal Voltage | Wattage | Amps | Dealer Pkg. 5 cards | Bulbs per card | Bulb Diameter Inches | Mfr. Lamp No. |
|-----------------|---------|------|---------------------|----------------|----------------------|---------------|
| 12 | 7 | .58 | 337 011 DP | 2 | 3/4 | 90 |
| 12 | 11 | .94 | 337 012 DP | 2 | 3/4 | 1004 |
| 24 | 15 | .63 | 337 014 DP | 1 | 1 | 306 |
| 32 | 13 | .40 | 337 018 DP | 1 | 3/4 | 624 |


FIG. 375
FIG. 375 - DOUBLE CONTACT BAYONET INDEXING BASE BULB

| Nominal Voltage | Wattage | Amps | Standard Pkg. - 1 bulb |
|-----------------|---------|------|------------------------|
| 12 | 10 | .83 | 375 12V 10W |
| 12 | 25 | 2.08 | 375 12V 25W |
| 24 | 10 | .42 | 375 24V 10W |
| 24 | 25 | 1.04 | 375 24V 25W |
| 32 | 10 | .31 | 375 32V 10W |
| 32 | 25 | .78 | 375 32V 25W |


FIG. 340
FIG. 340 - MEDIUM SCREW BASE BULB

| Nominal Voltage | Wattage | Amps | Standard Pkg. - 6 bulbs | Type | L.C.L. Inches | Mfr. Lamp No. |
|-----------------|---------|------|-------------------------|------|---------------|---------------|
| 12 | 15 | 1.25 | 340 005 FRD | A-17 | 2-3/8 | 15-A |
| 12 | 25 | 2.08 | 340 006 FRD | A-19 | 2-9/16 | 25-A |
| 32 | 15 | .47 | 340 011 FRD | A-17 | 2-3/8 | 15-A |
| 32 | 25 | .78 | 340 012 FRD* | A-19 | 2-9/16 | 25-A |


FIG. 338 #2 FIG. 338 #1
FIG. 338 - WEDGE BASE BULB

| Nominal Voltage | Wattage | Amps | Dealer Pkg. - 5 cards 2 Bulbs per card | Bulb Diameter Inches | Bulb Length Inches |
|-----------------|---------|------|--|----------------------|--------------------|
| 12 | 5 | .35 | 338 DP1 CLR | 13/32 | 1-1/16 |
| 12 | 9 | .69 | 338 DP2 CLR | 5/8 | 1-1/2 |


FIG. 67
FIG. 69
FIG. 70
FIG. 71
FIG. 72
FIG. 67, 69, 70, 71 & 72 FESTOON BULBS - DOUBLE ENDED

| Nominal Voltage | Wattage | Amps | Dealer Pkg. - 5 cards 2 Bulbs per card | Bulb Diameter Inches | Bulb Length Inches |
|-----------------|---------|------|--|----------------------|--------------------|
| 12 | 8 | .70 | 71 DP8 CLR | 3/8 | 1-1/8 |
| 12 | 10 | .83 | 69 DP CLR | 3/8 | 1-5/8 |
| 12 | 10 | .74 | 70 DP0 CLR | 3/8 | 1-11/16 |
| 12 | 15 | .97 | 70 DP1 CLR | 9/16 | 1-11/16 |
| 12 | 10 | .80 | 71 DP CLR | 3/8 | 1-1/8 |
| 24 | 8 | .35 | 72 DP8 CLR | 3/8 | 1-1/8 |
| 24 | 10 | .42 | 67 DP1 CLR | 3/8 | 1-11/16 |
| 24 | 18 | .75 | 67 DP2 CLR | 9/16 | 1-11/16 |
| 24 | 10 | .40 | 72 DP1 CLR | 3/8 | 1-1/8 |
| 32 | 12 | .40 | 70 DP2 CLR | 3/8 | 1-5/8 |

SERIES 55 LIGHTS



FOR USE ON VESSELS 20 METERS (65.5 FT) TO 50 METERS (164.0 FT) IN LENGTH.
2 N.M. VISIBILITY, MAST HEAD LIGHT 5 N.M.

BLACK POLYCARBONATE HOUSING, ALL OTHER COMPONENTS OF NONCORROSIVE MATERIALS.
NON-MAGNETIC/SEAWATER RESISTANT.

Series 55 Deck Mount Navigation Lights

12 Volt/Bulb Not Included

| Model No. | New P/N | Product Description |
|-----------|---------|---------------------|
| 3535 150 | 55200-4 | Starboard |
| 3534 250 | 55300-4 | Portside |
| 3532 050 | 55400-4 | Masthead |
| 3533 750 | 55500-4 | Stern |
| 3533 450 | 55502-4 | Stern - Yellow |

Series 55 All-round Deck Mount

Navigation Lights 12 Volt/Bulb Not Included

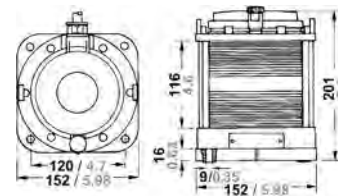
| Model No. | New P/N | Product Description |
|-----------|---------|----------------------------------|
| 3531 750 | 55000-4 | Allround Deck Mount Anchor |
| 3531 150 | 55002-4 | Allround Deck Mount w/Green Lens |
| 3531 250 | 55004-4 | Allround Deck Mount w/Red Lens |

Series 55 Replacement Bulbs

| Model No. | New P/N | Product Description |
|-----------|---------|--------------------------|
| 90400 002 | 90002-7 | 12 Volt/25 Watt Bayonet |
| 90400 284 | 90284-7 | 24 Volt/25 Watt Bayonet |
| 90400 285 | 90285-7 | 32 Volt/25 Watt Bayonet |
| 90400 286 | 90286-7 | 120 Volt/25 Watt Bayonet |

Series 55 Stainless Steel Mounting Brackets

| Model No. | New P/N | Product Description |
|-----------|---------|--|
| 83535 002 | 55901-5 | Side Light Bracket w/ Quickfit Latch |
| 83533 008 | 55902-5 | Masthead/Stern Bracket w/ Quickfit Latch |
| 2353-1010 | 55903-5 | Halyard Hooks |





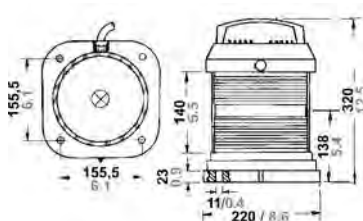
SERIES 70 LIGHTS

FOR USE ON VESSELS OVER 20 METERS (65.5 FT) IN LENGTH.

3 N.M. VISIBILITY, MAST HEAD LIGHT 6 N.M.

BLACK POLYCARBONATE HOUSING, ALL OTHER COMPONENTS OF NON-CORROSIVE MATERIALS.

NON-MAGNETIC/SEAWATER RESISTANT.



Series 70 Deck Mount Navigation Lights

24 Volt/Bulb Not Included

| Model No. | New P/N | Product Description |
|-----------|---------|---------------------|
| 3073 109 | 70200-4 | Starboard |
| 3074 209 | 70300-4 | Portside |
| 3071 009 | 70400-4 | Masthead |
| 3072 709 | 70500-4 | Stern |
| 3072 499 | 70502-4 | Stern - Yellow |

Series 70 All-round Deck Mount

Navigation Lights 24 Volt/Bulb Not Included

| Model No. | New P/N | Product Description |
|-----------|---------|------------------------------------|
| 3070 009 | 70000-4 | Allround Deck Mount Anchor |
| 3070 109 | 70002-4 | Allround Deck Mount w/ Green Lens |
| 3070 209 | 70004-4 | Allround Deck Mount w/ Red Lens |
| 3070 499 | 70006-4 | Allround Deck Mount w/ Yellow Lens |

Series 70D Deck Mount Navigation Lights

24 Volt/Bulb Not Included

| Model No. | New P/N | Product Description |
|-----------|---------|---------------------|
| 3079 109 | 71200-4 | Starboard |
| 3078 209 | 71300-4 | Portside |
| 3076 009 | 71400-4 | Masthead |
| 3077 709 | 71500-4 | Stern |
| 3077 499 | 71502-4 | Stern - Yellow |

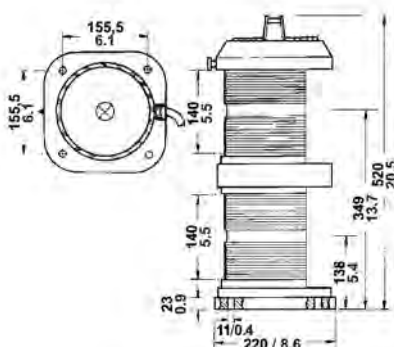
Series 70D All-round Deck Mount

Navigation Lights 24 Volt/Bulb Not Included

| Model No. | New P/N | Product Description |
|-----------|---------|------------------------------------|
| 3075 009 | 71000-4 | Allround Deck Mount Anchor |
| 3075 109 | 71002-4 | Allround Deck Mount w/ Green Lens |
| 3075 209 | 71004-4 | Allround Deck Mount w/ Red Lens |
| 3075 499 | 71006-4 | Allround Deck Mount w/ Yellow Lens |

Series 70/70D Replacement Bulbs

| Model No. | New P/N | Product Description |
|-----------|---------|--------------------------|
| 90400 171 | 90171-4 | 24 Volt/40 Watt Bayonet |
| 90400 172 | 90172-4 | 110 Volt/60 Watt Bayonet |
| 90400 173 | 90173-4 | 220 Volt/65 Watt Bayonet |



U.S. COAST GUARD REGULATIONS

PERKO®

FOR NAVIGATION LIGHTS ON VESSELS OVER 20 METERS (65.6 FT.) IN LENGTH

On March 31, 1977, the U.S. Coast Guard published in the Federal Register, an amendment to the navigation and navigable water regulations, which added a new subchapter DD, (33CFR87). This subchapter contains rules implementing and interpreting the International Regulations for Preventing Collisions at Sea, 1972 ('72 COLREGS). The International Regulations for Preventing Collisions at Sea, 1960, were replaced by the '72 COLREGS at 1200 hours, zone time on July 15, 1977. Therefore, all vessels on the high seas must comply with the '72 COLREGS at this time. In addition, with the enactment of the U.S. Inland Navigation Rules Act of 1980, the Inland Rules, Western Rules, and Great Lakes Rules were unified into a single set of requirements. The effective date for this legislation was December 24, 1981 (March 1, 1983 for Great Lakes). Therefore, all vessels must comply with these rules at this time.

Rules 21 and 22 of the '72 COLREGS and the U.S. Inland Navigation Rules give the color and range requirements for various navigation lights. Annex 1 to the '72 COLREGS and the U.S. Inland Navigation Rules gives positioning and technical details for these lights.

U.S. COAST GUARD ACCEPTANCE OF NAVIGATION LIGHTS

All U.S. Registered vessels are subject to either the '72 COLREGS or the U.S. Inland Rules. The U.S. Coast Guard is accepting lights that have passed the U.L. tests (U.L. Standard 1104) as meeting the '72 COLREGS and the U.S. Inland Rules for vessels over 20 meters (65.6 ft.) in length. U.S. requirements for smaller vessels are less strict. As the first domestic manufacturer to pass U.L. 1104, PERKO's lights can be installed on vessels over 20 meters (65.6 ft.) in length. Some models are designed for use on vessels over 20 meters (65.6 ft.) in length, while others are designed for use on vessels 20 meters (65.6 ft.) to 50 meters (164.0 ft.) in length.

A brass tag is permanently affixed to the light indicating the type of light, catalog no., voltage and bulb type to install to meet the visibility requirements. It also states that the light is classified by U.L. in accordance with the '72 COLREGS. This is the only documentation needed by a vessel for navigation lights to certify light construction compliance with the '72 COLREGS and the Inland Navigation Rules, and eliminates the former "Certificate of Compliance".



EACH LIGHT HAS ITS OWN SERIAL NO. FOR IDENTIFICATION.

The lights indicated for use on vessels over 20 meters (65.6 ft.) in length have passed U.L. 1104. The facsimile of the tag shown above is used on our cast bronze lights. Similar rectangular tags are used on other style lights.

Please note that any changes made to PERKO Navigation lights, including substitution of bulbs other than those shown in our catalog, instruction sheets, or metal tags (affixed to some lights) will void all certifications and U.S. Coast Guard acceptance.

For the present, the U.S. Coast Guard will not publish a list of U.L. classified lights. However, field offices have been notified. For more detailed information, consult the complete '72 COLREGS, the U.S. Inland Navigation Rules, and your local U.S. Coast Guard office.

SPECIAL PURPOSE LIGHTS

Other lights (not shown) for use where the vessel is subject to special local requirements are available. Contact TIMCO for further information.

PERKO

SINGLE LENS NAVIGATION LIGHTS

FIGS. 1169 - 1172 SERIES - CERTIFIED FOR US E ON VESSELS OVER 20 METERS (65.6 FT.) IN LENGTH

CONSTRUCTION:

- HEAVY DUTY CAST BRONZE
- PRE-WIRED MEDIUM PREFOCUS SOCKET
- 3 FEET OF 1 6/3-SO CABLE THROUGH A WATERTIGHT TERMINAL TUBE
- WATERTIGHT ACCESS CAP FOR REBULBING AND CLEANING 120 VOLT BULB NOT INCLUDED
- ROUGH SERVICE BULBS ARE AVAILABLE

| Description | Height Overall Inches | Height Lens Inches | Visibility Arc | Visibility Miles | Single Stack Cat. No. Std. Pkg. 1 Pc | Mounting Bolt Size Inches | Ship Wt. Carton Lbs. Standard Pkg. |
|--------------------------|-----------------------|--------------------|----------------|------------------|--------------------------------------|---------------------------|------------------------------------|
| Red Side Light | 9-1/4 | 6-3/4 | 112-1/2° | 3 | 1172 RE0 PLB | 3/8 | 12.4 |
| Green Side Light | 9-1/4 | 6-3/4 | 112-1/2° | 3 | 1172 GE0 PLB | 3/8 | 12.4 |
| White Masthead Light | 9-1/4 | 6-3/4 | 225° | 6 | 1173 E00 PLB | 3/8 | 12.4 |
| White Stern Light** | 9-1/4 | 6-3/4 | 135° | 3 | 1174 E00 PLB | 3/8 | 12.3 |
| Yellow Towing Light | 9-1/4 | 6-3/4 | 135° | 3 | 1174 ME0 PLB | 3/8 | 12.3 |
| White All-Round Light** | 9-1/4 | 6-3/4 | 360° | 3 | 1169 E00 PLB | 3/8 | 11.2 |
| White All-Round Light*** | 9-1/4 | 6-3/4 | 360° | 6 | 1169 HE0 PLB | 3/8 | 11.2 |
| Red All-Round Light | 9-1/4 | 6-3/4 | 360° | 3 | 1170 RE0 PLB | 3/8 | 11.2 |
| Green All-Round Light | 9-1/4 | 6-3/4 | 360° | 3 | 1170 GE0 PLB | 3/8 | 11.2 |
| Yellow All-Round Light | 9-1/4 | 6-3/4 | 360° | 3 | 1170 ME0 PLB | 3/8 | 11.2 |

Special lights to meet local requirements are available upon request. **These lights are supplied with a Gray Tinted Lens. ***For Great Lakes use.

IMPORTANT BULB DATA

TO COMPLY WITH U.L. STANDARD 1104, THE LIGHTS LISTED ON THIS PAGE MUST USE A PERKO CAT. NO. 342 004 CLR BULB OR 342 RS4 CLR BULB WHEN A "ROUGH SERVICE" BULB IS REQUIRED

SPARE PARTS ORDERING INFORMATION

Spare Lenses:

- Red, Cat. No. 261 001 RED
- Green, Cat. No. 261 001 GRN
- White, Cat. No. 261 001 CLR
- Gray, Cat. No. 261 001 GRY
- Yellow, Cat. No. 261 001 YLW

- Spare Lens Gasket, Cat. No. 1143.
- Spare O-Ring for Cap, Cat. No. 1119.
- Spare Medium Prefocus Socket, Cat. No. 367.
- Spare Lens Retaining Clip with Bolt, Cat. No. 1133.
- Spare Access Cap, O-Ring and Retainer, Cat. No. 1105 000 BLK.



**Fig. 1174
White Stern**

DOUBLE LENS NAVIGATION LIGHTS

PERKO®

FIGS. 1164 - 1168 SERIES - CERTIFIED FOR US E ON VESSELS OVER 20 METERS (65.6 FT.) IN LENGTH

CONSTRUCTION:

- HEAVY DUTY CAST BRONZE
- PRE-WIRED MEDIUM PREFOCUS SOCKET IN EACH COMPARTMENT
- TWO 3 FEET OF 1 6/3-SO CABLE THROUGH A WATERTIGHT TERMINAL TUBE
- WATERTIGHT ACCESS CAP FOR REBULBING AND CLEANING 120 VOLT BULB NOT INCLUDED
- ROUGH SERVICE BULBS ARE AVAILABLE

| Description | Height Overall Inches | Height Lens Inches | Visibility Arc | Visibility Miles | Single Stack Cat. No. Std. Pkg. 1 Pc | Mounting Bolt Size Inches | Ship Wt. Carton Lbs. Standard Pkg. |
|--------------------------|-----------------------|--------------------|----------------|------------------|--------------------------------------|---------------------------|------------------------------------|
| Red Side Light | 17-1/4 | 6-3/4 | 112-1/2° | 3 | 1164 REO PLB | 3/8 | 22.8 |
| Green Side Light | 17-1/4 | 6-3/4 | 112-1/2° | 3 | 1164 GEO PLB | 3/8 | 22.8 |
| White Masthead Light | 17-1/4 | 6-3/4 | 225° | 6 | 1165 E00 PLB | 3/8 | 21.5 |
| White Stern Light** | 17-1/4 | 6-3/4 | 135° | 3 | 1166 E00 PLB | 3/8 | 22.8 |
| Yellow Towing Light | 17-1/4 | 6-3/4 | 135° | 3 | 1166 ME0 PLB | 3/8 | 22.8 |
| White All-Round Light** | 17-1/4 | 6-3/4 | 360° | 3 | 1167 E00 PLB | 3/8 | 20.1 |
| White All-Round Light*** | 17-1/4 | 6-3/4 | 360° | 6 | 1167 HE0 PLB | 3/8 | 20.1 |
| Red All-Round Light | 17-1/4 | 6-3/4 | 360° | 3 | 1168 RE0 PLB | 3/8 | 20.1 |
| Green All-Round Light | 17-1/4 | 6-3/4 | 360° | 3 | 1168 GE0 PLB | 3/8 | 20.1 |
| Yellow All-Round Light | 17-1/4 | 6-3/4 | 360° | 3 | 1168 ME0 PLB | 3/8 | 20.1 |

Special lights to meet local requirements are available upon request. **These lights are supplied with a Gray Tinted Lens. ***For Great Lakes use.



Fig. 1364
Green Side Light



Fig. 1368
Red All-Round



Fig. 1366
Yellow Towing



Fig. 1367
White All-Round



Fig. 1364
Red Side Light

IMPORTANT BULB DATA TO COMPLY WITH U.L. STANDARD 1104, THE LIGHTS LISTED ON THIS PAGE MUST USE A PERKO CAT. NO. 342 004 CLR BULB OR 342 RS4 CLR BULB WHEN A "ROUGH SERVICE" BULB IS REQUIRED

SPARE PARTS ORDERING INFORMATION

Spare Lenses:

- Red, Cat. No. 261 001 RED
- Green, Cat. No. 261 001 GRN
- White, Cat. No. 261 001 CLR
- Gray, Cat. No. 261 001 GRY
- Yellow, Cat. No. 261 001 YLW

- Spare Lens Gasket, Cat. No. 1143.
- Spare O-Ring for Cap, Cat. No. 1119.
- Spare Dual Medium Prefocus Socket Assembly, Cat. No. 303.
- Spare Lens Retaining Clip with Bolt, Cat. No. 1133.
- Spare Plastic Cap, O-Ring and Retainer, Cat. No. 1105 000 BLK.

PERKO®

NAVIGATION LIGHTS

FIGS. 1150 - 1154 SERIES

CERTIFIED FOR USE ON VESSEL LENGTHS AS SPECIFIED BELOW

CONSTRUCTION:

- SHEET METAL, PREPRIMED GALVANIZED STEEL
 - MEDIUM PREFOCUS SOCKET
 - WATERTIGHT TERMINAL TUBE FOR 16/3-SO CABLE
 - WATERTIGHT ACCESS CAP FOR REBULBING AND CLEANING
- 120 VOLT BULB NOT INCLUDED

| Size No. | Height Overall Inches | Height Lens Inches |
|----------|-----------------------|--------------------|
| 1 | 11-1/2 | 6-3/4 |
| 2 | 13-1/2 | 7-1/2 |



Fig. 1150



Fig. 1151



Fig. 1152



Fig. 1153



Fig. 1154

**CERTIFIED FOR USE ON VESSELS
20 METERS (65.6 FT.) TO 50 METERS (164.0 FT.) IN LENGTH.**

| Description | Catalog No. Standard Pkg. 1 Pc. | Visibility Arc | Visibility Miles | Required Bulb | Ship Wt. Carton Lbs. Std. Pkg. |
|------------------------|---------------------------------------|-------------------|---------------------|------------------|--------------------------------------|
| Red Side Light | 1150 RE1 GAL | 112-1/2° | 2 | 342 002 CLR | 6.3 |
| Green Side Light | 1150 GE1 GAL | 112-1/2° | 2 | 342 002 CLR | 6.3 |
| White Masthead Light | 1151 E01 GAL | 225° | 5 | 342 003 CLR | 6.3 |
| White Stern Light | 1152 E01 GAL | 135° | 2 | 342 000 CLR | 6.1 |
| Yellow Towing Light | 1152 ME1 GAL | 135° | 2 | 342 000 CLR | 6.1 |
| White All-Round Light | 1153 E01 GAL | 360° | 2 | 342 001 CLR | 6.7 |
| Red All-Round Light | 1154 RE1 GAL | 360° | 2 | 342 004 CLR* | 6.7 |
| Green All-Round Light | 1154 GE1 GAL | 360° | 2 | 342 003 CLR | 6.7 |
| Yellow All-Round Light | 1154 ME1 GAL | 360° | 2 | 342 002 CLR | 6.7 |

CERTIFIED FOR USE ON VESSELS OVER 20 METERS (65.6 FT.) IN LENGTH.

| | | | | | |
|-----------------------|--------------|----------|---|--------------|------|
| Red Side Light | 1150 RE2 GAL | 112-1/2° | 3 | 342 004 CLR* | 10.9 |
| Green Side Light | 1150 GE2 GAL | 112-1/2° | 3 | 342 004 CLR* | 10.9 |
| White Masthead Light | 1151 E02 GAL | 225° | 6 | 342 004 CLR* | 10.0 |
| White Stern Light | 1152 E02 GAL | 135° | 3 | 342 002 CLR | 9.5 |
| White All-Round Light | 1153 E02 GAL | 360° | 3 | 342 003 CLR | 10.6 |
| Red All-Round Light | 1154 RE2 GAL | 360° | 3 | 342 006 CLR | 10.6 |
| Green All-Round Light | 1154 GE2 GAL | 360° | 3 | 342 004 CLR* | 10.6 |

*342 RS4 CLR Bulbs can be substituted for 342 004 CLR where "Rough Service" bulbs are required

NAVIGATION LIGHTS

PERKO®

FIGS. 1127 - 1130 SERIES - CERTIFIED FOR USE ON VESSELS 20 METERS (65.6 FT.) TO 50 METERS (164.0 FT.) IN LENGTH

CONSTRUCTION:

- **BLACK PLASTIC**
- **PRE-WIRED DOUBLE CONTACT SOCKET AND 3 FEET OF 16/3-SO CABLE**
 - **FOR 12, 24, 32 OR 120 VOLTS. BULB NOT INCLUDED**
- **WATERTIGHT ACCESS CAP FOR REBULBING AND CLEANING**

| Height Overall Inches | Height Lens Inches | Screw Size |
|-----------------------|--------------------|------------|
| 7-1/2 | 4-1/2 | 1/4 |

| Description | Visibility Arc | Visibility Miles | Catalog Number Std Pkg. 1 Pc. | Ship Wt. Carton Lbs. Standard Pkg. |
|-------------------------|----------------|------------------|-------------------------------|------------------------------------|
| Red Side Light | 112-1/2° | 2 | 1127 RAO BLK | 2.7 |
| Green Side Light | 112-1/2° | 2 | 1127 GAO BLK | 2.7 |
| White Masthead Light | 225° | 5 | 1128 A00 BLK | 2.6 |
| White Stern Light* | 135° | 2 | 1129 A00 BLK | 2.7 |
| Yellow Towing Light | 135° | 2 | 1129 MA0 BLK | 2.7 |
| White All-Round Light* | 360° | 2 | 1130 A00 BLK | 2.5 |
| White All-Round Light** | 360° | 5 | 1130 HAO BLK | 2.5 |
| Red All-Round Light | 360° | 2 | 1130 RAO BLK | 2.5 |
| Green All-Round Light | 360° | 2 | 1130 GAO BLK | 2.5 |
| Yellow All-Round Light | 360° | 2 | 1130 MA0 BLK | 2.5 |

*These lights are supplied with a Gray Tinted Lens. **For Great Lakes use.



FIG. 1127
RED & GREEN SIDE LIGHTS
112-1/2 DEGREES



FIG. 1128
MASTHEAD LIGHT
225 DEGREES



FIG. 1129
STERN OR TOWING LIGHT
135 DEGREES



FIG. 1130
ALL-ROUND LIGHT
360 DEGREES

IMPORTANT BULB DATA: To comply with U.L. Standard 1104, the lights listed on this page must use a PERKO Cat. No. 374 bulb.
SPARE PARTS ORDERING INFORMATION

Spare Lens Assemblies:

Red, Cat. No. 249 000 RED.
Green, Cat. No. 249 000 GRN.
White, Cat. No. 249 000 CLR.
Gray, Cat. No. 249 000 GRY.
Yellow, Cat. No. 249 000 YLW.

Spare Double Contact Socket, Cat. No. 134.
Spare Access Cap, O-Ring and Retainer, Cat. No. 1105 000 BLK.
Spare O-Ring for Cap, Cat. No. 1119.

Required Bulbs:

12 Volts, Cat. No. 374 001 CLR.
24 Volts, Cat. No. 374 002 CLR.
32 Volts, Cat. No. 374 003 CLR.
120 Volts, Cat. No. 374 004 CLR.

PERKO®

NAVIGATION LIGHTS

FIGS. 4, 5 & 7 - CERTIFIED FOR USE ON VESSELS 20 METERS (65.6 FT.) TO 50 METERS (164.0 FT.) IN LENGTH

CONSTRUCTION:

- SHEET METAL, PREPRIMED GALVANIZED STEEL, POLISHED OR CHROME PLATED BRASS
 - BOTTOM OPENING, COMPLETE WITH MOUNTING BRACKET
 - SINGLE CONTACT PREFOCUS SOCKET FOR 12 VOLT USE ONLY
 - 12 VOLT BULB NOT INCLUDED

**Height Overall
Inches**
8-1/2

**Height Lens
Inches**
5-3/16

| Description | Galvanized Steel | Polished Brass | Chrome Plated Brass | Visibility Arc | Visibility Miles | Required Bulb | Ship Wt. Carton Lbs. Std. Pkg. |
|----------------------|------------------|----------------|---------------------|----------------|------------------|---------------|--------------------------------|
| Red Side Light | 4 RD3 GAL | 4 RD3 POL | 4 RD3 CHR | 112-1/2° | 2 | 373 003 CLR | 2.7 |
| Green Side Light | 4 GD3 GAL | 4 GD3 POL | 4 GD3 CHR | 112-1/2° | 2 | 373 002 CLR | 2.7 |
| White Masthead Light | 5 D03 GAL | 5 D03 POL | 5 D03 CHR | 225° | 5 | 373 005 CLR | 2.9 |
| White Stern Light | 7 D03 GAL | 7 D03 POL | 7 D03 CHR | 135° | 2 | 373 001 CLR | 2.8 |
| Yellow Towing Light | 7 MD3 GAL | 7 MD3 POL | 7 MD3 CHR | 135° | 2 | 373 002 CLR | 2.8 |



FIG. 4



FIG. 5



FIG. 7 & 7M

IMPORTANT BULB DATA: To comply with U.L. Standard 1104, the lights listed on this page must use a PERKO Cat. No. 373 bulb.

SPARE PARTS ORDERING INFORMATION

Red, 112-1/2° Cat. No. 259 CL3 RED.
 Green, 112-1/2° Cat. No. 259 CL3 GRN.
 White, 135° Cat. No. 269 CL3 WHT.
 Yellow, 135° Cat. No. 269 CL3 YLW.
 Gray, 225° Cat. No. 256 CL3 WHT.

Spare Mounting Bracket; Cat. No. 131 000 GAL or PLB.
 Spare Single Contact Prefocus Socket Assembly, Complete with Stand, Bottom Plate and Gasket, Cat. No. 294 003 PLB.



ALL-ROUND LIGHTS

PERKO®

FIGS. 403 & 412 - CERTIFIED FOR USE ON VESSELS

OVER 20 METERS (65.6 FT.) IN LENGTH

CONSTRUCTION:

- CAST BRONZE • COMPLETE WITH MEDIUM PREFOCUS SOCKET
- 120 VOLT BULB NOT INCLUDED

| Fig. No. | Height Overall Inches | Height Lens Inches | Tapped Pipe Size Inches | Ship Wt. Carton Lbs. Std. Pkg. | Visibility Miles |
|----------|-----------------------|--------------------|-------------------------|--------------------------------|------------------|
| 403 | 11-1/2 | 6-3/4 | 1 | 8.8 | 3 |
| 412 | 14 | 6-3/4 | * | 9.1 | 3 |



Fig. 403-3



Fig. 412

ORDERING INFORMATION

| | WHITE | RED | GREEN | YELLOW |
|---------------------|---------------|-------------|-------------|-------------|
| FIG. NO. 403 | 403 E03 PLB** | 403 RE3 PLB | 403 GE3 PLB | 403 ME3 PLB |
| FIG. NO. 412 | 412 E00 PLB** | 412 RE0 PLB | 412 GE0 PLB | 412 ME0 PLB |

*SUPPLIED WITH WATERTIGHT TERMINAL TUBE FOR 16/3-SO CABLE.

**THESE LIGHTS ARE SUPPLIED WITH GRAY TINTED LENSES.

IMPORTANT BULB DATA: TO COMPLY WITH U.L. STANDARD 1104, THE LIGHTS LISTED ON THIS PAGE MUST USE A PERKO CAT. NO. 342 004 CLR BULB.

SPARE PARTS ORDERING INFORMATION

SPARE LENSES:

Gray, Cat. No. 261 001 GRY.

Red, Cat. No. 261 001 RED.

Green, Cat. No. 261 001 GRN.

Yellow, Cat. No. 261 001 YLW.

Spare Lens or Cover Gasket, Cat. No. 1143.

Spare Medium Prefocus Socket, Cat. No. 367.

FIG. 112 - CERTIFIED FOR USE ON VESSELS 20 METERS

(65.6 FT.) TO 50 METERS (164.0 FT.) IN LENGTH

CONSTRUCTION:

- CAST BRONZE, PLAIN OR CHROME PLATED
- COMPLETE WITH DOUBLE CONTACT ELECTRICAL SOCKET
- 12, 24, 32 OR 120 VOLTS. BULB NOT INCLUDED

| Fig. No. | Height Overall Inches | Diameter Base Inches | Tapped Pipe Size Inches | Ship Wt. Carton Lbs. Std. Pkg. | Visibility Miles |
|----------|-----------------------|----------------------|-------------------------|--------------------------------|------------------|
| 112 | 8-3/4 | 3-1/8 | ---- | 2.3 | 2 |
| 309 | 6-1/2 | ---- | 1/2 | 1.7 | 2 |



Fig. 112A

ORDERING INFORMATION

| Description | Plain Bronze | | Chrome Plated Bronze | |
|------------------|--------------|-------------|----------------------|-------------|
| | 112 A00 PLB | 112 A00 CHR | 309 A00 PLB | 309 A00 CHR |
| White All-Round | 112 A00 PLB | 112 A00 CHR | 309 A00 PLB | 309 A00 CHR |
| Red All-Round | 112 RA0 PLB | 112 RA0 CHR | 309 RA0 PLB | 309 RA0 CHR |
| Green All-Round | 112 GA0 PLB | 112 GA0 CHR | 309 GA0 PLB | 309 GA0 CHR |
| Yellow All-Round | 112 MA0 PLB | 112 MA0 CHR | 309 MA0 PLB | 309 MA0 CHR |

IMPORTANT BULB DATA:

To comply with U.L. Standard 1104, the lights listed on this page must use a PERKO Cat. No. 374 bulb.

SPARE PARTS ORDERING INFORMATION

Spare Lenses:

Red, Cat. No. 106 000 RED.

Green, Cat. No. 106 000 GRN.

White, Cat. No. 106 000 WHT.

Yellow, Cat. No. 106 000 YLW.

Spare Double Contact Bayonet Socket, Cat. No. 276 002.

Required Bulbs:

12 Volts, Cat. No. 374 001 CLR.

24 Volts, Cat. No. 374 002 CLR.

32 Volts, Cat. No. 374 003 CLR.

120 Volts, Cat. No. 374 004 CLR.



Fig. 309A

PERKO®

SPECIAL PURPOSE LIGHTS

FIG. 1111 - CERTIFIED FOR USE ON VESSELS OF ANY LENGTH



Fig. 1111ME

CONSTRUCTION:

- SHEET METAL, PREPRIMED GALVANIZED STEEL • COMPLETE WITH MEDIUM PREFOCUS SOCKET
- WATERTIGHT TERMINAL TUBE FOR 16/3-SO CABLE • SEALED FLASHER UNIT
- WATERTIGHT ACCESS CAP FOR REBULBING AND CLEANING • 120 VOLT BULB NOT INCLUDED

Designed to meet Federal Requirements for Flashing yellow 180° - 225° light for barges, canal boats, etc., that are being pushed ahead or towed along side of a tug boat. For use on 120 volts A.C. only. Federal Requirements for this light are applicable for: inland waters, the Atlantic, Pacific and Gulf coasts, intercoastal waterways and western rivers. Refer to the U.S. Inland Navigation Rules for application, configuration and technical details.

| Catalog No. Standard Pkg. 1 Pc. | Height Overall Inches | Height Lens Inches | Visibility Miles | Visibility Arc | Flashes Per Minute | Ship Wt. Carton Lbs. Std. Pkg. |
|---------------------------------------|-----------------------------|--------------------------|---------------------|-------------------|--------------------------|--------------------------------------|
| 1111 ME1 GAL | 11-1/2 | 6-3/4 | 2 | 225° | 50-70 | 6.1 |

IMPORTANT BULB DATA: To comply with Federal Requirements this light must use a PERKO Cat. No. 342 004 CLR bulb or 342 RS4 CLR Bulbs when "Rough Service" bulbs are required.

SPARE PARTS ORDERING INFORMATION: Spare Flasher, Cat. No. 133 - Spare Medium Prefocus Socket, Cat. No. 347 A00 - Spare O-Ring for Cap, Cat. No. 1119 - Spare Access Cap, O-Ring and Retainer, Cat. No. 1105 000 BLK - Spare Lens, Cat. No. 256 001 YLW.



Fig. 1129BA

FIG. 1129 - PANAMA CANAL BLUE STEERING LIGHT
CERTIFIED FOR USE ON VESSELS OF ANY LENGTH

CONSTRUCTION:

- BLACK PLASTIC • PRE-WIRED DOUBLE CONTACT SOCKET WITH 3 FEET OF 16/3-SJO CABLE
- FOR 12, 24, 32 OR 120 VOLTS, BULB NOT INCLUDED

| Catalog No. Std. Pkg. - 1 Pc. | Visibility Arc | Height Overall Inches | Height Lens Inches | Ship Wt. Carton Lbs. Standard Pkg. |
|----------------------------------|-------------------|--------------------------|-----------------------|---------------------------------------|
| 1129 BAO BLK | 135° | 7-1/2 | 4-1/2 | 2.9 |

IMPORTANT BULB DATA: To comply with Panama Canal Requirements this light must use a PERKO Fig. No. 374 bulb.

SPARE PARTS ORDERING INFORMATION: 12 Volts, Cat. No. 374 001 CLR - Spare Lens, Cat. No. 249 000 BLU. 24 Volts, Cat. No. 374 002 CLR - Spare O-Ring for Cap, Cat. No. 1119. 32 Volts, Cat. No. 374 003 CLR - Spare Double Contact Socket, Cat. No. 134. 120 Volts, Cat. No. 374 004 CLR - Spare Plastic Cap, O-Ring and Retainer, Cat. No. 1105 000 BLK.



Fig. 454E

FIG. 454 - ALL-ROUND WHITE WHISTLE LIGHT CERTIFIED FOR USE
ON VESSELS OVER 20 METERS (65.6 FT.) IN LENGTH

CONSTRUCTION:

- CAST BRONZE • COMPLETE WITH MEDIUM PREFOCUS SOCKET
- 120 VOLT BULB NOT INCLUDED

| Catalog No. Std. Pkg. - 1 Pc. | Ht. Overall Inches | Ht. Lens Inches | Tapped Pipe Size Inches | Ship Wt. Carton Lbs. Standard Pkg. | Visibility Miles |
|----------------------------------|-----------------------|--------------------|----------------------------|---------------------------------------|---------------------|
| 454 E00 PLB | 11-1/2 | 6-3/4 | 1 | 8.6 | 5 |

SPARE PARTS ORDERING INFORMATION: Spare Bulb, Cat. No. 342 004 CLR. Spare Lens or Cover Gasket, Cat. No. 1143. Spare Lens, Cat. No. 261 001 CLR. Spare Medium Prefocus Socket, Cat. No. 367.

SPARE PARTS

PERKO®

112-1/2° LENSES



| Color | Ht. Inches | Width Inches | Std. Pkg. - 1 Pc. |
|-------|------------|--------------|-------------------|
| Red | 4-1/4 | 3-1/16 | 259 CL2 RED |
| Green | 4-1/4 | 3-1/16 | 259 CL2 GRN |
| Red | 5-1/16 | 3-11/16 | 259 CL3 RED |
| Green | 5-1/16 | 3-11/16 | 259 CL3 GRN |

| | Height Overall Inches | Dia. Opening Inches | Catalog Number |
|-------|-----------------------|---------------------|----------------|
| Red | 6-3/4 | 6-1/8 | 259 001 RED |
| Green | 6-3/4 | 6-1/8 | 259 001 GRN |
| Red | 7-1/2 | 9-1/4 | 259 002 RED |
| Green | 7-1/2 | 9-1/4 | 259 002 GRN |

Weight Size 1, .5 Lbs. - Weight Size 2, 1.2 Lbs
Weight Size 3, 1.5 Lbs



135° LENSES



| Color | Height Inches | I.D. Inches | Std. Pkg. - 1 Pc. |
|--------|---------------|-------------|-------------------|
| White | 4-1/4 | 3-1/2 | 269 CL2 WHT |
| White | 5-1/8 | 3-5/8 | 269 CL3 WHT |
| Yellow | 4-1/4 | 3-1/2 | 269 CL2 YLW |
| Yellow | 5-1/8 | 3-5/8 | 269 CL3 YLW |

| | Height Overall Inches | Dia. Opening Inches | Catalog Number |
|--------|-----------------------|---------------------|----------------|
| White | 6-3/4 | 5-1/8 | 269 001 WHT |
| Red | 6-3/4 | 5-1/8 | 269 001 RED |
| Yellow | 6-3/4 | 5-1/8 | 269 001 YLW |
| White | 7-1/2 | 7-1/4 | 269 002 WHT |
| Red | 7-1/2 | 7-1/4 | 269 002 RED |

Weight Size 1, .9Lbs - Weight Size 2, 1.2 Lbs oz.
Weight Size 3, 1.5 Lbs

225° LENSES



| Color | Ht. Inches | I.D. Inches | Std. Pkg. - 1 Pc. |
|-------|------------|-------------|-------------------|
| White | 4-1/4 | 3-3/8 | 256 CL2 WHT |
| White | 5-1/8 | 3-1/4 | 256 CL3 WHT |

| | Ht. Overall Inches | Dia. Opening Inches | Catalog Number |
|--------|--------------------|---------------------|----------------|
| White | 6-3/4 | 4-1/2 | 256 001 WHT |
| Yellow | 6-3/4 | 4-1/2 | 256 001 YLW |
| White | 7-1/2 | 6-5/8 | 256 002 WHT |

Weight Size 1, 1.2 Lbs - Weight Size 2, 1.7 Lbs.,
Weight Size 3, 1.8 Lbs.

360° LENSES - With Top Assembly



| | Ht. Overall Inches | Dia. Opening Inches | Catalog Number |
|--------|--------------------|---------------------|----------------|
| White | 5-3/4 | 5-1/2 | 249 000 CLR |
| Red | 5-3/4 | 5-1/2 | 249 000 RED |
| Green | 5-3/4 | 5-1/2 | 249 000 GRN |
| Yellow | 5-3/4 | 5-1/2 | 249 000 YLW |
| Gray | 5-3/4 | 5-1/2 | 249 000 GRY |

Weight 17 oz.

SINGLE CONTACT PREFOCUS BULBS



C-8 Filament Clear - 12 Volts

| Cat. No. | Amperage | Mfg. No. |
|-------------|----------|-------------|
| 373 001 CLR | .25 | 25A/S8 |
| 373 002 CLR | .55 | 55A/S8 |
| 373 003 CLR | .77 | 77A/S8 |
| 373 004 CLR | 1.15 | 1.15A/S8 |
| 373 005 CLR | 2.03 | 2.03A/S8SCP |

Weight 1 oz. - Standard Pkg. - 1 pc.

DOUBLE CONTACT BAYONET BULBS



Clear - 12, 24, 32 or 120 Volts,

Type T-8, C-8, Filament - 1-3/8 Inch L.C.L.

| Cat. No. | Voltage | Wattage | Candella |
|-------------|---------|---------|----------|
| 374 001 CLR | 12 | 30 | 24 |
| 374 002 CLR | 24 | 30 | 24 |
| 374 003 CLR | 32 | 30 | 24 |
| 374 004 CLR | 120 | 30 | 24 |

Weight 1 oz. - Standard Pkg. - 1 pc.

MEDIUM PREFOCUS BULBS



Clear

| Cat. No. | Volts | Wattage |
|---------------|-------|---------|
| 342 000 CLR | 120 | 7.5 |
| 342 001 CLR** | 120 | 15 |
| 342 002 CLR** | 120 | 25 |
| 342 003 CLR** | 120 | 40 |
| 342 024 CLR | 245 | 5 |
| 342 004 CLR** | 120 | 60 |
| 342 RS4 CLR* | 120 | 60 |
| 342 006 CLR | 120 | 125 |
| 342 220 CLR | 220 | 65 |

Weight 1 oz. - *Designed for rough service.
Standard Pkg. - 1 pc. - **OEM - 25 pcs.

PERKO®

SEARCHLIGHTS



Fig. 534



Fig. 535



Fig. 538

FIGS. 534, 535 & 538 - SEARCHLIGHTS

CONSTRUCTION:

- CHROME PLATED BRASS HEAD • FOR 12, 24 OR 32 VOLTS
- TUNGSTEN OR HALOGEN • SWITCH IN HEAD

FIG. 534 - DECK CONTROL

- CHROME PLATED BRONZE BASE • 7 INCH SEALED BEAM BULB

FIG. 535 - PILOT HOUSE CONTROL SEARCHLIGHT

- CHROME PLATED BRONZE BASE
- 7 INCH SEALED BEAM BULB • LEVER HANDLE CONTROLS BOTH HORIZONTAL AND VERTICAL MOVEMENT • CONTROL LENGTH: 7-1/2 INCHES
- MAXIMUM CEILING THICKNESS: 4-1/2 INCHES

FIG. 538 - DECK CONTROL

- CHROME PLATED BRASS BASE • 4-1/2 INCH SEALED BEAM BULB

ORDERING INFORMATION

| Voltage | O.D. Bulb Inches | Approx. Range Miles | Beam Candlepower | Wattage | Height Overall Inches | Base Dimension Inches | Catalog No. | Ship Wt. Carton Lbs. Std. Pkg. |
|---------|------------------|---------------------|------------------|---------|-----------------------|-----------------------|--------------|--------------------------------|
| 12 | 7 | 5/8 | 250,000 | 100 | 12-1/2 | 4-7/8 x 3-1/8 | 534 003 12V | 8.1 |
| 24 | 7 | 3/4 | 470,000 | 450 | 12-1/2 | 4-7/8 x 3-1/8 | 534 003 24V | 7.8 |
| 32 | 7 | 5/8 | 260,000 | 200 | 12-1/2 | 4-7/8 x 3-1/8 | 534 003 32V | 8.0 |
| 12 | 7 | 5/8 | 250,000 | 100 | ----- | 4-7/8 x 3-1/8 | 535 003 12V | 8.8 |
| 24 | 7 | 3/4 | 470,000 | 450 | ----- | 4-7/8 x 3-1/8 | 535 003 24V | 8.8 |
| 32 | 7 | 5/8 | 260,000 | 200 | ----- | 4-7/8 x 3-1/8 | 535 003 32V | 8.7 |
| 12 | 4-1/2 | 1/4 | 50,000 | 30 | 7-1/2 | 3-1/2 O.D. | 538 000 CHR | 1.4 |
| 12 | 4-1/2 | 1/3 | 100,000 | 50 | 7-1/2 | 3-1/2 O.D. | 538 H00 CHR* | 1.4 |

*NOTE: "H" in the Catalog Number Designates a Halogen Bulb.

FIG. 440 - REMOVABLE DECK CONTROL SEARCHLIGHT

CONSTRUCTION:

- CHROME PLATED BRASS HEAD AND BASE
- FOR 12 OR 32 VOLTS • 4-1/2 OR 7 INCH SEALED BEAM BULB
- 8 FEET OF COILED CORD & CIGARETTE LIGHTER PLUG
- WATER TIGHT DECK CONNECTION. SWITCH IN HEAD



Fig. 440

ORDERING INFORMATION

| Voltage | O.D. Bulb Inches | Approx. Range Miles | Beam Candlepower | Wattage | Height Overall Inches | Catalog No. | Ship Wt. Carton Lbs. Std. Pkg. |
|---------|------------------|---------------------|------------------|---------|-----------------------|--------------|--------------------------------|
| 12 | 4-1/2 | 1/4 | 50,000 | 30 | 7-1/2 | 440 001 12V | 2.4 |
| 12 | 4-1/2 | 1/3 | 100,000 | 50 | 7-1/2 | 440 H01 12V* | 2.4 |
| 12 | 7 | 5/8 | 250,000 | 100 | 10 | 440 003 12V | 5.4 |
| 32 | 7 | 5/8 | 260,000 | 200 | 10 | 440 003 32V | 5.3 |

Base Diameter, 2-1/8 Inches.

*NOTE: "H" in the Catalog Number Designates a Halogen Bulb.

SPARE SEALED BEAM ORDERING INFORMATION

- Spare 4-1/2 Inch Sealed Beam Unit, Cat. No. 433 001 12V.
- Spare 4-1/2 Inch Halogen Sealed Beam Unit, Cat. No. 435 001 12V. 24V.
- Spare 7 Inch Sealed Beam Unit (12 Volt), Cat. No. 433 003 12V.
- Spare 7 Inch Sealed Beam Unit (24 Volt), Cat. No. 433 003 24V.
- Spare 7 Inch Sealed Beam Unit (32 Volt), Cat. No. 433 003 32V.

PERKO®

SEALED BEAM SEARCHLIGHTS

BRONZE BASE, BRASS BODY POLISHED CHROME PLATED
OR WHITE PERKO•KOTE POWDER COATING FOR 12, 24 OR 32 VOLTS

| DIMENSIONS (INCHES) | | | | | |
|---------------------------|---------|----------------------------|----------------------------|------------------------|-------|
| "A" | "B" | "C" | "D" | "G" | "H" |
| 8 | 8-1/2 | 10 | 7 | 2 | 2-1/8 |
| ELECTRICAL SPECIFICATIONS | | | | | |
| Voltage | Wattage | Approximate Candlepower | Sealed Beam Range Miles | Spare Bulb Cat. No. | |
| 12 | 100 | 250,000 | 5/8 | 433 003 12V | |
| 24 | 450 | 470,000 | 3/4 | 433 003 24V | |
| 32 | 200 | 260,000 | 5/8 | 433 003 32V | |

FIGS. 305 & 313 - SEARCHLIGHT HEADS

ORDERING INFORMATION

| Voltage | Head Only Polished Chrome For Lever Control Cat. No. | Head Only White PERKO•KOTE For Lever Control Cat. No. | Head Only Polished Chrome For Wheel or Lever/Gear Control Cat. No. | Head Only White PERKO•KOTE For Wheel or Lever/Gear Control Cat. No. |
|---------|--|--|--|---|
| 12 | 305 H12 CHR | 305 H12 WHT | 313 H12 CHR | 313 H12 WHT |
| 24 | 305 H24 CHR | 305 H24 WHT | 313 H24 CHR | 313 H24 WHT |
| 32 | 305 H32 CHR | 305 H32 WHT31 | 3 H32 CHR | 313 H32 WHT |

Nominal Weight - 20 lbs.

Fig. 354 Spare Front Bezel with Glass for Figs. 305 & 313, Specify Chrome or White.

Fig. 355 Spare Rear Cover for Figs. 305 & 313, Specify Chrome or White.



Fig. 313

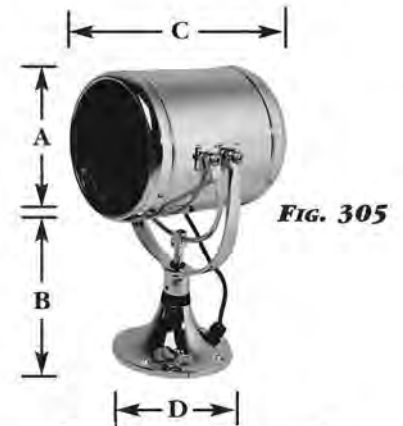


Fig. 305

FIGS. 851, 852 & 969 - CONTROL ASSEMBLIES

STAINLESS STEEL TUBES WITH CHROME PLATED FITTINGS

Note: Lever Control (Fig. 851) Fits Fig. 305 Head Assemblies.

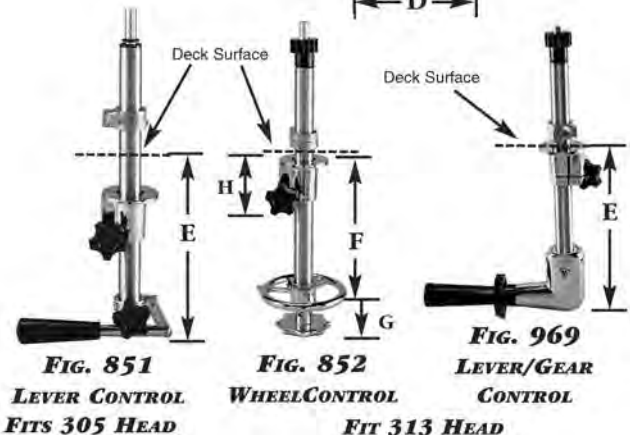
Wheel Control (Fig. 852) and Lever/Gear Control (Fig. 969) Fit Fig. 313 Head Assemblies.

ORDERING INFORMATION

| Control Length Inches | "E" | "E" | "F" | Nominal Weight Pounds | |
|-----------------------------|--------|------------------------------|-----------------------------------|------------------------------|----|
| "E" | "F" | Lever Control Cat. No. | Lever/Gear Control Cat. No. | Wheel Control Cat. No. | |
| 8-1/2 | 7-1/2 | 851 000* | 969 000** | 852 000*** | 6 |
| 15-1/2 | 14-1/2 | 851 0A0 | 969 0A0 | 852 0A0 | 9 |
| 22-1/2 | 21-1/2 | 851 0B0 | 969 0B0 | 852 0B0 | 12 |
| 29-1/2 | 28-1/2 | 851 0C0 | 969 0C0 | 852 0C0 | 15 |

*Maximum Ceiling Thickness, 4-1/2 Inches. **Maximum Ceiling Thickness, 3-1/2 Inches.

***Maximum Ceiling Thickness, 3 Inches. Custom Lengths Available by Special Order.



**FIG. 851
LEVER CONTROL
FITS 305 HEAD**

**FIG. 852
WHEEL CONTROL
FIT 313 HEAD**

**FIG. 969
LEVER/GEAR
CONTROL**

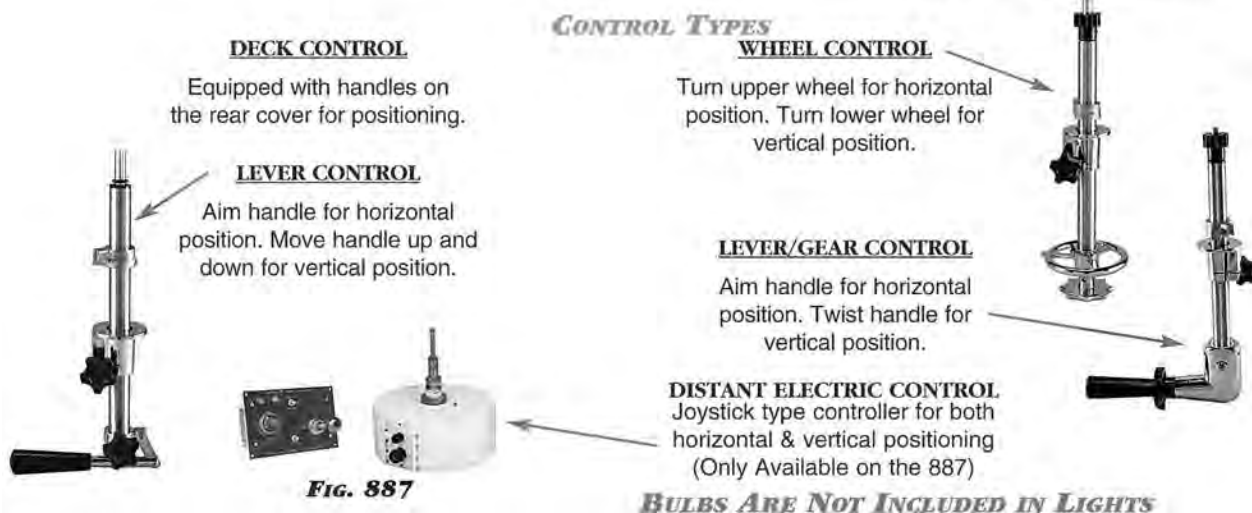
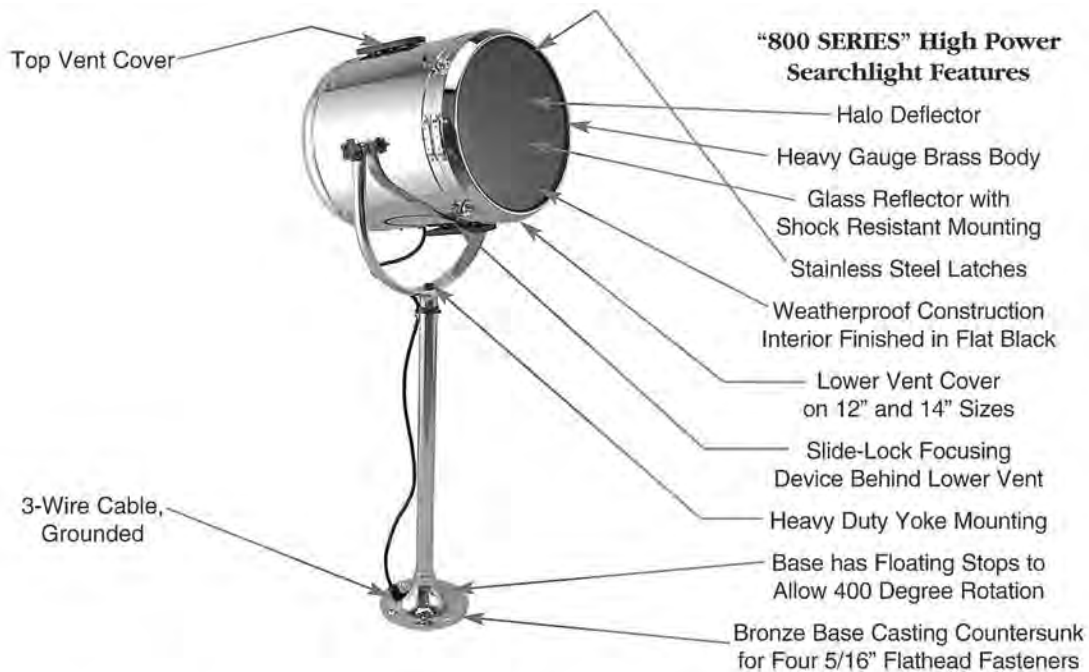
8

SOLAR RAY® SEARCHLIGHTS 800 SERIES

PERKO®

The 800 Series - Solar-Ray® Searchlights are available in 10", 12" and 14" sizes with your choice of Deck, Wheel, Lever/Gear Controls or DEC on 14 Inch Model. All models feature: halo deflectors, parabolic glass mirror reflectors for maximum light output and ventilation covers for quick dissipation of heat to help prolong bulb life. Hinged front doors have quick release stainless steel latches to provide easy access for bulb replacement. The 800 Series models are also available in our white PERKO•KOTE finish, an advanced powder coating process that eliminates the need for painting while providing a scratch resistant and chip-proof surface for painting when necessary to match the color of the vessel.

Bulbs are not included and must be ordered separately. PERKO offers a choice of the traditional incandescent or the brighter, more piercing quartz-halogen bulbs in a broad variety of voltages and wattages to fit every need. For complete information on bulbs and candle power output, see pages 72 & 73.



PERKO®

DECK CONTROL SOLAR RAY® SEARCHLIGHTS 883 SERIES

10", 12" OR 14" SEARCH LIGHT DIMENSIONS

| "A" Nominal Drum Diameter Inches | "C" Length Drum Inches | Nominal Weight Pounds |
|----------------------------------|------------------------|-----------------------|
| 10 | 13 | 28 |
| 12 | 15 | 38 |
| 14 | 17 | 45 |



**FIG. 883 - STANDARD PEDESTAL
CHROME**



**FIG. 883 - HIGH PEDESTAL
CHROME**



DECK CONTROL SOLAR RAY® SEARCHLIGHTS

883 SERIES

PERKO®

10", 12" OR 14"

ORDERING INFORMATION NOTES:

- 1) These Searchlights Cannot Be Fitted With Controls.
- 2) Bulbs Must be Ordered Separately.

STANDARD PEDESTAL SEARCHLIGHTS

| Nominal Reflector Size Inches | "J" Height Overall Inches | Polished Chrome Catalog No. | White PERKO•KOTE Catalog No. |
|-------------------------------|---------------------------|-----------------------------|------------------------------|
| 10 | 20-1/8 | 883 OP1 CHR | 883 OP1 WHT |
| 12 | 22-1/8 | 883 OP2 CHR | 883 OP2 WHT |
| 14 | 25-1/8 | 883 OP3 CHR | 883 OP3 WHT |

Standard Pedestal Base Diameter, 7 Inches.

MEDIUM PEDESTAL SEARCHLIGHTS

| Nominal Reflector Size Inches | "J" Height Overall Inches | Polished Chrome Catalog No. | White PERKO•KOTE Catalog No. |
|-------------------------------|---------------------------|-----------------------------|------------------------------|
| 10 | 27-1/2 | 883 MP1 CHR | 883 MP1 WHT |
| 12 | 29-1/2 | 883 MP2 CHR | 883 MP2 WHT |
| 14 | 32-1/2 | 883 MP3 CHR | 883 MP3 WHT |

Medium Pedestal Base Diameter, 8 Inches.

HIGH PEDESTAL SEARCHLIGHTS

| Nominal Reflector Size Inches | "J" Height Overall Inches | Polished Chrome Catalog No. | White PERKO•KOTE Catalog No. |
|-------------------------------|---------------------------|-----------------------------|------------------------------|
| 10 | 44 | 883 HP1 CHR | 883 HP1 WHT |
| 12 | 46 | 883 HP2 CHR | 883 HP2 WHT |
| 14 | 49 | 883 HP3 CHR | 883 HP3 WHT |

High Pedestal Base Diameter, 8 Inches.

NOTE: Custom Pedestal Heights are Available.
Price Upon Application.
Specify the "J" Dimension for Custom Pedestal Height.

PERKO®

DECK CONTROL SOLAR RAY® SEARCHLIGHTS 884 SERIES 10", 12" AND 14"

SEARCHLIGHT DIMENSIONS

| "A" NOMINAL DRUM DIAMETER INCHES | "C" LENGTH DRUM INCHES | NOMINAL WEIGHT POUNDS |
|---|---------------------------------|-----------------------------|
| 10 | 13 | 28 |
| 12 | 15 | 38 |
| 14 | 17 | 45 |



FIG. 884
STANDARD PEDESTAL



FIG. 884
MEDIUM PEDESTAL



FIG. 884
HIGH PEDESTAL

DECK CONTROL SOLAR RAY® SEARCHLIGHTS

884 SERIES

PERKO®

10", 12" AND 14"

ORDERING INFORMATION NOTES:
BULBS MUST BE ORDERED SEPARATELY.

STANDARD PEDESTAL SEARCHLIGHTS HEAD ASSEMBLIES

| Nominal Reflector Size Inches | "J" Height Overall Inches | Polished Chrome Catalog No. | White PERKO•KOTE Catalog No. |
|-------------------------------|---------------------------|-----------------------------|------------------------------|
| 10 | 20-1/8 | 884 OP1 CHR | 884 OP1 WHT |
| 12 | 22-1/8 | 884 OP2 CHR | 884 OP2 WHT |
| 14 | 25-1/8 | 884 OP3 CHR | 884 OP3 WHT |

Standard Pedestal Base Diameter, 7 Inches.

MEDIUM PEDESTAL SEARCHLIGHTS HEAD ASSEMBLIES

| Nominal Reflector Size Inches | "J" Height Overall Inches | Polished Chrome Catalog No. | White PERKO•KOTE Catalog No. |
|-------------------------------|---------------------------|-----------------------------|------------------------------|
| 10 | 28-1/4 | 884 MP1 CHR | 884 MP1 WHT |
| 12 | 30-1/4 | 884 MP2 CHR | 884 MP2 WHT |
| 14 | 33-1/4 | 884 MP3 CHR | 884 MP3 WHT |

Medium Pedestal Base Diameter, 8 Inches.

HIGH PEDESTAL SEARCHLIGHTS HEAD ASSEMBLIES

| Nominal Reflector Size Inches | "J" Height Overall Inches | Polished Chrome Catalog No. | White PERKO•KOTE Catalog No. |
|-------------------------------|---------------------------|-----------------------------|------------------------------|
| 10 | 44-3/4 | 884 HP1 CHR | 884 HP1 WHT |
| 12 | 46-3/4 | 884 HP2 CHR | 884 HP2 WHT |
| 14 | 49-3/4 | 884 HP3 CHR | 884 HP3 WHT |

High Pedestal Base Diameter, 8 Inches.

NOTE: Custom Pedestal Heights are Available.
Price Upon Application.
Specify the "J" Dimension for Custom Pedestal Height.

FIG. 851 - LEVER CONTROL ASSEMBLIES

Control assemblies of different lengths may be interchanged on Solar-Ray® searchlights (Fig. 884) of the same pedestal height. The following chart makes it possible to order and stock different lengths of these assemblies separately to offer a large variety of Solar-Ray® searchlights with a minimum of inventory.

ORDERING INFORMATION

| "E" Length Control Inches | For Standard Pedestal Cat. No. | For Medium Pedestal Cat. No. | For High Pedestal Cat. No. | Nominal Weight Pounds |
|---------------------------|--------------------------------|------------------------------|----------------------------|-----------------------|
| 8-1/2 | 851 000* | 851 M00* | 851 H00* | 6 |
| 15-1/2 | 851 0A0 | 851 MA0 | 851 HA0 | 9 |
| 22-1/2 | 851 0B0 | 851 MB0 | 851 HB0 | 12 |
| 29-1/2 | 851 0C0 | 851 MC0 | 851 HC0 | 15 |

* Maximum Ceiling Thickness, 4-1/2 Inches.

TIMCO INDUSTRIES, INC.

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PERKO®

DECK CONTROL SOLAR RAY® SEARCHLIGHTS 885 SERIES 10", 12" AND 14"

SEARCHLIGHT DIMENSIONS

| "A" NOMINAL DRUM DIAMETER INCHES | "C" LENGTH DRUM INCHES | NOMINAL WEIGHT POUNDS |
|---|---------------------------------|-----------------------------|
| 10 | 13 | 28 |
| 12 | 15 | 38 |
| 14 | 17 | 45 |



FIG. 885
STANDARD PEDESTAL
SHOWN WITH WHEEL CONTROL
"G" Distance Between Wheels, 2 Inches.



FIG. 885
MEDIUM PEDESTAL
SHOWN WITH
LEVER/GEAR CONTROL



FIG. 885
HIGH PEDESTAL
SHOWN WITH WHEEL CONTROL

8

DECK CONTROL SOLAR RAY® SEARCHLIGHTS

885 SERIES

10", 12" AND 14"

PERKO®

STANDARD PEDESTAL SEARCHLIGHTS HEAD ASSEMBLIES

| Nominal Reflector Size Inches | "J" Height Inches | Polished Chrome Cat. No. | White PERKO•KOTE Cat. No. |
|-------------------------------|-------------------|--------------------------|---------------------------|
| 10 | 20-1/8 | 885 OP1 CHR | 885 OP1 WHT |
| 12 | 22-1/8 | 885 OP2 CHR | 885 OP2 WHT |
| 14 | 25-1/8 | 885 OP3 CHR | 885 OP3 WHT |

Standard Pedestal Base Diameter, 7 Inches.

MEDIUM PEDESTAL SEARCHLIGHTS HEAD ASSEMBLIES

| Nominal Reflector Size Inches | "J" Height Inches | Polished Chrome Cat. No. | White PERKO•KOTE Cat. No. |
|-------------------------------|-------------------|--------------------------|---------------------------|
| 10 | 28-1/4 | 885 MP1 CHR | 885 MP1 WHT |
| 12 | 30-1/4 | 885 MP2 CHR | 885 MP2 WHT |
| 14 | 33-1/4 | 885 MP3 CHR | 885 MP3 WHT |

Medium Pedestal Base Diameter, 8 Inches.

HIGH PEDESTAL SEARCHLIGHTS HEAD ASSEMBLIES

| Nominal Reflector Size Inches | "J" Height Inches | Polished Chrome Cat. No. | White PERKO•KOTE Cat. No. |
|-------------------------------|-------------------|--------------------------|---------------------------|
| 10 | 44-3/4 | 885 HP1 CHR | 885 HP1 WHT |
| 12 | 46-3/4 | 885 HP2 CHR | 885 HP2 WHT |
| 14 | 49-3/4 | 885 HP3 CHR | 885 HP3 WHT |

High Pedestal Base Diameter, 8 Inches.

CONTROL ASSEMBLIES - FIGS. 852 & 969

Control Assemblies of different lengths may be interchanged on Solar-Ray® searchlights (Fig. 885) of the same pedestal height. The following chart makes it possible to order and stock different lengths of these assemblies separately to offer a large variety of Solar-Ray® Searchlights with a minimum of inventory.

WHEEL CONTROL - FIG. 852

LEVER/GEAR CONTROL - FIG. 969

ORDERING INFORMATION

| "F" Length Control Inches | For Standard Pedestal Cat. No. | For Medium Pedestal Cat. No. | For High Pedestal Cat. No. | Nominal Weight Pounds | "E" Length Control Inches | For Standard Pedestal Cat. No. | For Medium Pedestal Cat. No. | For High Pedestal Cat. No. | Nominal Weight Pounds |
|---------------------------|--------------------------------|------------------------------|----------------------------|-----------------------|---------------------------|--------------------------------|------------------------------|----------------------------|-----------------------|
| 7-1/2 | 852 000* | 852 M00* | 852 H00* | 6 | 8-1/2 | 969 000* | 969 M00* | 969 H00* | 6 |
| 14-1/2 | 852 0A0 | 852 MA0 | 852 HA0 | 9 | 15-1/2 | 969 0A0 | 969 MA0 | 969 HA0 | 9 |
| 21-1/2 | 852 0B0 | 852 MB0 | 852 HB0 | 12 | 22-1/2 | 969 0B0 | 969 MB0 | 969 HB0 | 12 |
| 28-1/2 | 852 0C0 | 852 MC0 | 852 HC0 | 15 | 29-1/2 | 969 0C0 | 969 MC0 | 969 HC0 | 15 |

* Maximum Ceiling Thickness, 3 Inches.

* Maximum Ceiling Thickness, 3-1/2 Inches.

PERKO® BULB & SOCKET FOR SOLAR-RAY® SEARCHLIGHTS

800 SERIES - 10", 12" AND 14"

BULBS ARE NOT INCLUDED IN LIGHTS AND MUST BE ORDERED SEPARATELY

To give good results, the bulb and reflector must be perfectly compatible; therefore be sure to specify the catalog number of the bulb desired. Peak candle power is exceedingly sensitive to many factors, (i.e., a light source out of focus by 1/32 inch, under-voltage of only 4%, or differences between bulb manufacturers) which can cause a variation in range of up to 20%.

INCANDESCENT BULB ORDERING INFORMATION

| Bulb Catalog Number | Voltage | Wattage | Socket Type | Socket Code Letter | For Searchlight Sizes Inches | Rated* Life Hours | Mfg. Bulb Code |
|---------------------|---------|---------|-----------------|--------------------|------------------------------|-------------------|----------------|
| 806 | 32 | 500 | Medium Screw | B | 10, 12, 14 | 50 | DLT |
| 807 | 120 | 500 | Medium Prefocus | E | 10, 12, 14 | 25 | CZX |
| 809 | 120 | 750 | Medium Prefocus | E | 12, 14 | 25 | DDB |
| 837 | 120 | 750 | Medium Prefocus | E | 12, 14 | 200 | DGH |
| 810 | 120 | 1000 | Medium Prefocus | E | 12, 14 | 25 | DRS |
| 811 | 120 | 1000 | Mogul Screw | D | 12, 14 | 50 | DPT |

For a More Concentrated Beam, Longer Range, Brighter Light and a Longer Life, We Recommend the Following Bulbs:

"QUARTZ" TUNGSTEN-HALOGEN BULB ORDERING INFORMATION

| Bulb Catalog Number | Voltage | Wattage | Socket Type | Socket Code Letter | For Searchlight Sizes Inches | Rated* Life Hours | Mfg. Bulb Code |
|---------------------|---------|---------|-----------------|--------------------|------------------------------|-------------------|----------------|
| 816 | 12 | 100 | 2-Pin Prefocus | F | 10, 12, 14 | 50 | FDT |
| 836 | 24 | 150 | 2-Pin Prefocus | G | 10, 12, 14 | 50 | DZE-FDS |
| 817 | 32 | 200 | 2-Pin Prefocus | H | 10, 12, 14 | 200 | G.E. 1945 |
| 844 | 120 | 500 | Medium Prefocus | E | 10, 12, 14 | 500 | BTL |
| 820 | 120 | 600 | 2-Pin Prefocus | I | 10, 12, 14 | 75 | DYS |
| 845 | 120 | 750 | Medium Prefocus | E | 12, 14 | 200 | BTP |
| 839 | 120 | 900 | 2-Pin Prefocus | K | 12, 14 | 75 | BVA |
| 846 | 120 | 1000 | Medium Prefocus | E | 12, 14 | 200 | BTR |

8602301000Medium PrefocusE12, 14950FKD

PLEASE ORDER CAREFULLY, BULBS ARE NOT RETURNABLE.

*NOTE: These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.

ELECTRIC SOCKET AND SUPPORT STAND ASSEMBLIES

Solar-Ray®Searchlights include a socket and support stand assembly based on the bulb or socket information given when ordering. The following chart makes it possible to order and stock different socket and stand assemblies for field conversion to meet a large variety of voltage and candlepower requirements with a minimum of inventory.

| Socket Type | Socket Code | For 10" Searchlights | | For 12" Searchlights | | For 14" Searchlights | |
|---------------------------|-------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|
| | | Catalog Number | Height Stand Inches | Catalog Number | Height Stand Inches | Catalog Number | Height Stand Inches |
| Medium Screw | B | 872 001 | 1-1/4 | 872 002 | 2-1/4 | 872 003 | 3-1/4 |
| Medium Prefocus | E | 873 001 | 1-5/16 | 873 002 | 1-15/16 | 873 003 | 2-15/16 |
| Mogul Screw | D | ----- | ----- | 874 002 | 7/16 | 874 003 | 1-1/4 |
| 2-Pin Prefocus (12 Volt) | F | 875 001 | 3-1/2 | 875 002 | 4-1/2 | 875 003 | 5-1/2 |
| 2-Pin Prefocus (24 Volt) | G | 876 001 | 3-1/4 | 876 002 | 4-1/4 | 876 003 | 5-1/4 |
| 2-Pin Prefocus (32 Volt) | H | 878 001 | 3-1/4 | 878 002 | 4-1/4 | 878 003 | 5-1/4 |
| 2-Pin Prefocus (600 Watt) | I | 879 001 | 3-1/8 | 879 002 | 4-1/8 | 879 003 | 5-1/8 |
| 2-Pin Prefocus (900 Watt) | K | ----- | ----- | 880 002 | 3-13/16 | 880 003 | 4-13/16 |

BULB TECHNICAL DATA FOR SOLAR-RAY® SEARCHLIGHTS / 800 SERIES

PERKO®

| Searchlight Size Inches | Voltage | Approximate Range Miles* | Bulb Cat. No. | Bulb Wattage | Rated Life Hours** | Maximum Candlepower Output | Horizontal Beam Spread Degrees | Vertical Beam Spread Degrees |
|-------------------------|---------|--------------------------|---------------|--------------|--------------------|----------------------------|--------------------------------|------------------------------|
| 10" | 12 | 1 | 816 | 100 | 50 | 1,168,000 | 1.7 | 1.4 |
| | 24 | 1 | 836 | 150 | 50 | 891,000 | 2.6 | 1.5 |
| | 32 | 3/4 | 817 | 200 | 200 | 571,000 | 2.6 | 1.7 |
| | 32 | 1 | 806 | 500 | 50 | 943,000 | 3.4 | 3.9 |
| | 120 | 1 | 820 | 600 | 75 | 908,000 | 4.4 | 2.2 |
| | 120 | 1-1/8 | 807 | 500 | 25 | 1,332,000 | 3.5 | 2.8 |
| | 120 | 1-1/8 | 844 | 500 | 500 | 1,260,000 | 3.1 | 3.4 |
| 12" | 12 | 1-1/4 | 816 | 100 | 50 | 1,617,000 | 1.5 | 1.2 |
| | 24 | 1-1/8 | 836 | 150 | 50 | 1,349,000 | 2.2 | 1.5 |
| | 32 | 7/8 | 817 | 200 | 200 | 865,000 | 2.4 | 1.6 |
| | 32 | 1-1/8 | 806 | 500 | 50 | 1,496,000 | 3.4 | 3.5 |
| | 120 | 1 | 837 | 750 | 200 | 977,000 | 4.1 | 3.7 |
| | 120 | 1 | 845 | 750 | 200 | 1,185,000 | 3.7 | 5.2 |
| | 120 | 1-1/8 | 820 | 600 | 75 | 1,410,000 | 4.3 | 1.9 |
| | 120 | 1-1/4 | 809 | 750 | 25 | 1,792,000 | 3.6 | 3.4 |
| | 120 | 1-1/4 | 844 | 500 | 500 | 1,641,000 | 3.2 | 3.4 |
| | 120 | 1-1/4 | 807 | 500 | 25 | 1,799,000 | 3.3 | 3.1 |
| | 120 | 1-1/4 | 811 | 1000 | 50 | 1,816,000 | 4.0 | 4.9 |
| | 120 | 1-3/8 | 810 | 1000 | 25 | 1,894,000 | 4.0 | 3.8 |
| | 120 | 1-3/8 | 846 | 1000 | 200 | 1,911,000 | 3.9 | 5.0 |
| | 120 | 1-1/2 | 839 | 900 | 75 | 2,482,000 | 4.5 | 5.5 |
| | 230 | 7/8 | 860 | 1000 | 950 | 865,000 | 6.9 | 5.9 |
| 14" | 12 | 1-1/4 | 816 | 100 | 50 | 1,756,000 | 1.5 | 1.0 |
| | 24 | 1-1/8 | 836 | 150 | 50 | 1,367,000 | 2.3 | 1.2 |
| | 32 | 1 | 817 | 200 | 200 | 943,000 | 2.2 | 1.5 |
| | 32 | 1-1/8 | 806 | 500 | 50 | 1,591,000 | 4.0 | 3.7 |
| | 120 | 1-1/8 | 837 | 750 | 200 | 1,254,000 | 3.9 | 4.5 |
| | 120 | 1-1/8 | 845 | 750 | 200 | 1,531,000 | 3.6 | 5.1 |
| | 120 | 1-1/4 | 820 | 600 | 75 | 1,626,000 | 4.5 | 1.9 |
| | 120 | 1-3/8 | 844 | 500 | 500 | 1,840,000 | 2.9 | 3.2 |
| | 120 | 1-3/8 | 811 | 1000 | 50 | 2,249,000 | 4.0 | 5.1 |
| | 120 | 1-1/2 | 807 | 500 | 25 | 2,353,000 | 3.2 | 3.2 |
| | 120 | 1-1/2 | 809 | 750 | 25 | 2,422,000 | 3.7 | 4.0 |
| | 120 | 1-1/2 | 846 | 1000 | 200 | 2,586,000 | 3.8 | 5.0 |
| | 120 | 1-1/2 | 810 | 1000 | 25 | 2,621,000 | 4.0 | 4.5 |
| | 120 | 1-5/8 | 839 | 900 | 75 | 2,889,000 | 4.5 | 5.2 |
| | 230 | 1 | 860 | 1000 | 950 | 1,021,000 | 7.7 | 6.2 |

*The approximate ranges listed above are based on photometric measurements of beam candlepower output under ideal conditions. Many factors such as atmospheric conditions, size and color of target, background, etc., may reduce effective range considerably; therefore, these figures are offered only as a guide to compare different bulb and voltage options.

**NOTE: These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing of groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.

**2-PIN PREFOCUS****MOGUL SCREW****MEDIUM PREFOCUS****MEDIUM SCREW**

PERKO®

SOLAR-RAY® SEARCHLIGHTS ORDERING WORKSHEET / 800 SERIES

1) **Head Assembly Type:** _____ }
 a) For deck control - 883
 b) For lever control - 884
 c) For wheel and lever/gear control - 885

2) **Pedestal (overall) Height (see catalog page for details):** _____ }
 a) Standard - O
 b) Medium - M
 c) High - H
For custom pedestal height see no. 10 below.

3) **Reflector Size:** _____ }
 a) 10 inch - 1
 b) 12 inch - 2
 c) 14 inch - 3

4) **Finish:** _____ }
 a) PERKOPLATE (polished chrome) - CHR
 b) PERKO*KOTE (white) - WHT

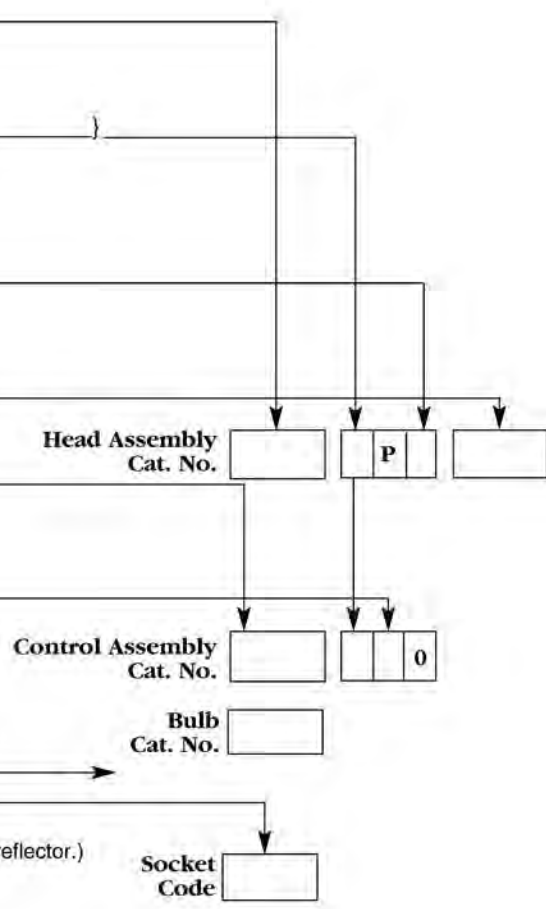
5) **Control Type:** _____ }
 a) Lever control (For 884 Head Assembly) - 851
 b) Wheel control (For 885 Head Assembly) - 852
 c) Lever/Gear control (For 885 Head Assembly) - 969

6) **Control Length (when necessary):** _____ }
 a) (8-1/2" for 851 & 969) or (7-1/2" for 852) - 0
 b) (15-1/2" for 851 & 969) or (14-1/2" for 852) - A
 c) (22-1/2" for 851 & 969) or (21-1/2" for 852) - B
 d) (29-1/2" for 851 & 969) or (28-1/2" for 852) - C

7) **Bulb Number (see pages 72 & 73 for details):** _____ }
 8) **Socket Type:** _____ Code: _____ }
 a) Medium Screw "B"
 b) Medium Prefocus..... "E"
 c) Mogul Screw..... "D" (Not for use with 10 inch reflector.)
 d) 2-Pin Prefocus (12 volt) "F"
 e) 2-Pin Prefocus (24 volt) "G"
 f) 2-Pin Prefocus (32 volt) "H"
 g) 2-Pin Prefocus (600 Watt) "I"
 h) 2-Pin Prefocus (900 watt) "K" (Not for use with 10 inch reflector.)

9) **Custom control length:** _____
 Specify control length desired as measured from pedestal base to lower end of control assembly ("E" or "F" dimension).

10) **Custom pedestal height:** _____
 Specify overall height of searchlight desired as measured from the top of the searchlight head to the bottom of the pedestal base ("J" dimension).



8

SPARE PARTS FOR 800 SERIES SOLAR-RAY® SEARCHLIGHTS

| Fig. | Size | Front Glass Cat. No. | Front Door with Glass Cat. No. | Rear Cover Cat. No. | Reflector* Cat. No. | Pinion Gear Cat. No. |
|------|------|----------------------|--------------------------------|---------------------|---------------------|----------------------|
| 883 | 10" | 889 001 CLR | 891 001 CHR | 908 001 CHR | 890 001 | ---- |
| | 12" | 889 002 CLR | 891 002 CHR | 908 002 CHR | 890 002 | ---- |
| | 14" | 889 003 CLR | 891 003 CHR | 908 003 CHR | 890 003 | ---- |
| 884 | 10" | 889 001 CLR | 891 001 CHR | 902 001 CHR | 890 001 | ---- |
| | 12" | 889 002 CLR | 891 002 CHR | 902 002 CHR | 890 002 | ---- |
| | 14" | 889 003 CLR | 891 003 CHR | 902 003 CHR | 890 003 | ---- |
| 885 | 10" | 889 001 CLR | 891 001 CHR | 902 001 CHR | 890 001 | 905 |
| | 12" | 889 002 CLR | 891 002 CHR | 902 002 CHR | 890 002 | 905 |
| | 14" | 889 003 CLR | 891 003 CHR | 902 003 CHR | 890 003 | 905 |

19" SOLAR-RAY® SEARCHLIGHTS

1900 SERIES

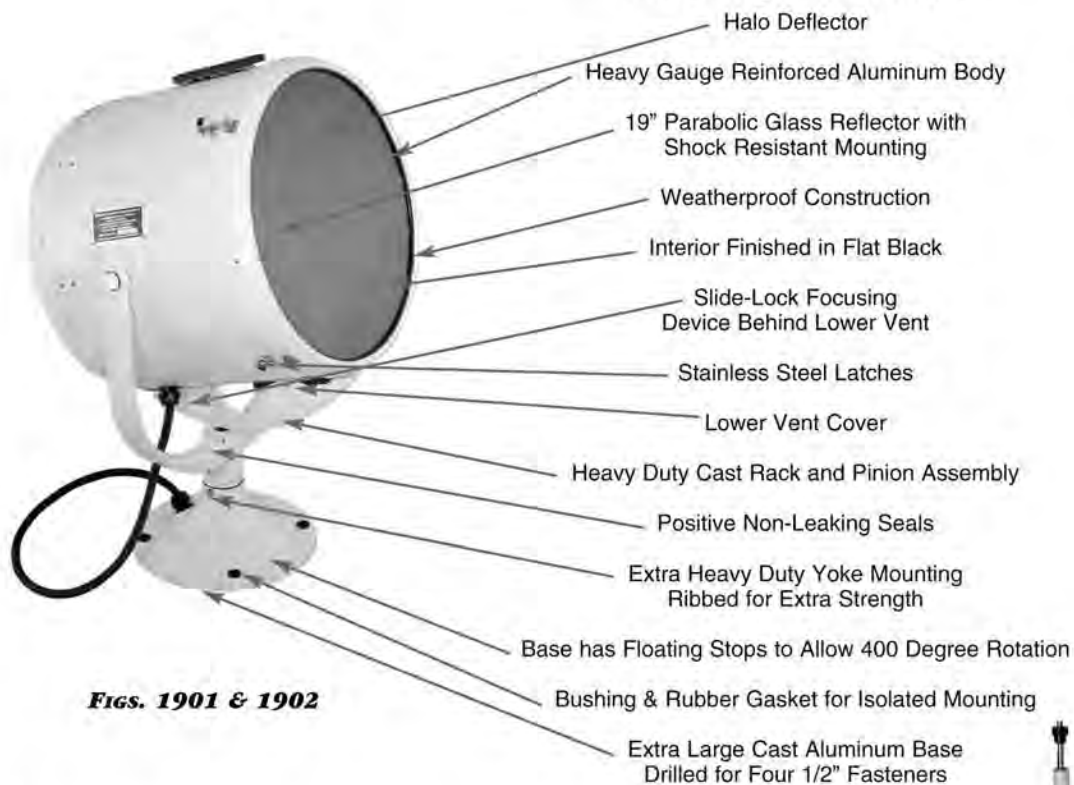
PERKO®

The 1900 Series - Solar-Ray® Searchlights are designed and built with the commercial user in mind where maximum size and brilliance counts. These units are constructed of marine aluminum with heavy duty castings and heavy gauge reinforced bodie for extra durability. They are finished in our white PERKO•KOTE finish; an advanced process that eliminates the need for painting while providing a scratch resistant and chip-proof surface for painting when necessary to match the color of the vessel.

The 1900 Series is available with Deck, Wheel, Lever/Gear or Distant Electric Remote Controls. All models feature halo deflectors, parabolic glass mirror reflectors for maximum light output and ventilation covers for quick dissipation of heat to help prolong bulb life. Hinged front doors have quick release stainless steel latches to provide easy access for bulb replacement.

Bulbs are not included and must be ordered separately. PERKO offers a choice of the traditional incandescent or the brighter, more piercing quartz-halogen bulbs in a variety of voltages and wattages. For complete information on bulbs and candlepower output.

"1900 Series" High Power Searchlights Features



Figs. 1901 & 1902



DECK CONTROL
Equipped with handles on the rear cover for positioning.

WHEEL CONTROL
Turn upper wheel for horizontal position. Turn Lower Wheel for vertical position.

CONTROL TYPES

DISTANT ELECTRIC CONTROL



LEVER/GEAR CONTROL

Aim handle for horizontal position. Twist handle for vertical position.



PERKO®

19" SOLAR-RAY® SEARCHLIGHTS

Nominal Drum
Diameter
Inches
19

SEARCHLIGHT DIMENSIONS
Nominal Drum
Weight
Pounds
68

Nominal Control
Weight
Pounds
22



**FIG. 1902 LIGHT
SHOWN WITH FIG. 1921
LEVER/GEAR CONTROL**



NEW
IMPROVED WATER-PROOF
SEAL FOR GEAR MECHANISM



**FIG. 1902 DE4 LIGHT
SHOWN WITH FIG. 1925
DISTANT ELECTRIC CONTROL**



**FIG. 1901
DECK CONTROL**
Base Diameter, 13 Inches.



**FIG. 1902 LIGHT
SHOWN WITH FIG. 1922
WHEEL CONTROL**

Distance Between Wheels,
2-1/2 Inches.

19" SOLAR-RAY® SEARCHLIGHTS HEAD & CONTROL ASSEMBLIES

PERKO®

| Description | Catalog No. |
|---|--------------|
| Deck Control Searchlight Head Assembly* | 1901 004 WHT |
| Wheel or Lever/Gear Control Searchlight Head Assembly (Requires Control Assembly Below) | 1902 004 WHT |
| Searchlight Head Assembly For Distant Electric Control Base | 1902 DE4 WHT |
| Wheel Control Assembly (For Above) | 1922 000 WHT |
| Lever/Gear Control Assembly (For Above) | 1921 000 WHT |
| Distant Electric Control Assembly (For Above) | 1925 000 WHT |

*Cannot Be Fitted With Controls.

Custom Control Lengths and Pedestal Heights Are Available. Price Upon Application. Specify Measurements.

BULBS ARE NOT INCLUDED IN LIGHTS (SEE BELOW)

BULB ORDERING INFORMATION FOR 19 INCH SEARCHLIGHTS

To give good results, the bulb and reflector must be perfectly compatible; therefore be sure to specify the catalog number of the bulb desired. Peak candlepower is exceedingly sensitive to many factors, (i.e., a light source out of focus by 1/32 inch, under-voltage of only 4%, or differences between bulb manufacturers can cause a reduction of range of up to 20%).

For a More Concentrated Beam, Longer Range, Brighter Light and a Longer Life, We Recommend the Quartz/Halogen Bulbs.

| Voltage | Approx. Range Miles* | Bulb Cat. No. | Bulb Type | Socket Type | Socket Code Letter | Wattage | Rated Life Hours** | Maximum Candlepower Output | Horizontal | Vertical | Mfg. Bulb Code |
|---------|----------------------|---------------|----------------|-----------------|--------------------|---------|--------------------|----------------------------|---------------------|---------------------|----------------|
| | | | | | | | | | Beam Spread Degrees | Beam Spread Degrees | |
| 32 | 1-2/3 | 806 | Incandescent | Medium Screw | B | 500 | 50 | 3,520,000 | 3.5 | 3.7 | DLT |
| 120 | 1-3/8 | 837 | Incandescent | Medium Prefocus | E | 750 | 200 | 2,076,000 | 3.6 | 4.2 | DDY |
| 120 | 1-5/8 | 845 | Quartz/Halogen | Medium Prefocus | E | 750 | 200 | 2,871,000 | 3.6 | 5.4 | BTP |
| 120 | 1-5/8 | 807 | Incandescent | Medium Prefocus | E | 500 | 25 | 3,191,000 | 3.5 | 4.0 | CZX |
| 120 | 1-2/3 | 859 | Quartz/Halogen | Mogul Prefocus | M | 2000 | 250 | 3,633,000 | 9.4 | 5.9 | BVW |
| 120 | 1-2/3 | 847 | Quartz/Halogen | Mogul Prefocus | M | 1000 | 200 | 3,659,000 | 4.5 | 5.4 | BVV |
| 120 | 1-3/4 | 844 | Quartz/Halogen | Medium Prefocus | E | 500 | 500 | 3,861,000 | 3.0 | 5.4 | BTL |
| 120 | 1-3/4 | 809 | Incandescent | Medium Prefocus | E | 750 | 25 | 4,569,000 | 3.6 | 4.5 | DDB |
| 120 | 1-7/8 | 846 | Quartz/Halogen | Medium Prefocus | E | 1000 | 200 | 4,601,000 | 4.5 | 5.4 | BTR |
| 120 | 2 | 848 | Quartz/Halogen | Mogul Prefocus | L | 1500 | 300 | 5,596,000 | 5.9 | 5.7 | DTA |
| 120 | 2 | 810 | Incandescent | Medium Prefocus | E | 1000 | 25 | 5,622,000 | 3.6 | 4.2 | DRS |
| 120 | 2 | 839 | Quartz/Halogen | 2-Pin Prefocus | K | 900 | 75 | 5,769,000 | 5.9 | 5.4 | BVA |
| 230 | 1-3/8 | 860 | Quartz/Halogen | Medium Prefocus | E | 1000 | 950 | 2,162,000 | 7.9 | 6.5 | FKD |

*The approximate ranges listed above are based on photometric measurements of beam candlepower output under ideal conditions. Many factors such as atmospheric conditions, size and color of target, background, etc., may reduce effective range considerably; therefore, these figures are offered only as a guide to compare different bulb and voltage options.

PLEASE ORDER CAREFULLY, BULBS ARE NOT RETURNABLE.

**NOTE: These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing of groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.

ELECTRIC SOCKET AND SUPPORT STAND ASSEMBLIES FOR 19 INCH SEARCHLIGHTS

Solar-Ray® Searchlights include a socket and support stand based on the bulb or socket information given when ordering. The following chart makes it possible to order and stock different assemblies for field conversion, to meet a large variety of voltage and candlepower requirements with a minimum of inventory.

| ORDERING INFORMATION | | Socket & Stand | Height |
|-----------------------------------|-------------|----------------|--------------|
| Socket Type | Socket Code | Cat. No. | Stand Inches |
| Medium Screw | B | 872 004 | 5-3/4 |
| Medium Prefocus | E | 873 004 | 5-7/16 |
| Mogul Prefocus (1500 Watt) | L | 1930 004 | 3-5/8 |
| Mogul Prefocus (1000 & 2000 Watt) | M | 1931 004 | 3-1/8 |
| 2-Pin Prefocus (900 Watt) | K | 880 004 | 7-5/16 |

PERKO®

SPARE PARTS FOR 1900 SERIES 19" SOLAR-RAY® SEARCHLIGHTS

| Fig. No. | Front Glass Cat. No. | Front Door with Glass Cat. No. | Rear Cover Cat. No. | Reflector* Cat. No. | Pinion Gear Cat. No. |
|----------|----------------------|--------------------------------|---------------------|---------------------|----------------------|
| 1901 | 889 004 CLR | 1936 000 WHT | 1932 000 WHT | 890 004 | --- |
| 1902 | 889 004 CLR | 1936 000 WHT | 1933 000 WHT | 890 004 | 905 |

*Replacement Retaining Clips (Cat. No. 911) for the Reflector Should Also Be Ordered When Ordering a Replacement Reflector to Assure a Proper Fit.

SPARE SOCKETS FOR 800 SERIES AND 1900 SERIES SOLAR-RAY® SEARCHLIGHTS

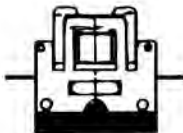
ORDERING INFORMATION



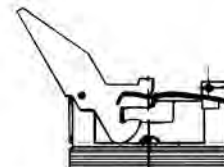
Medium Screw Socket
(Code "B")
Catalog No. 894.



Medium Prefocus Socket
(Code "E")
Catalog No. 895.



2-Pin Prefocus Socket
(Codes "F, G, H & I")
Catalog No. 899.



2-Pin Prefocus Socket
(Code "K")
Catalog No. 866.



Mogul Screw Socket
(Code "D")
Catalog No. 897.



Mogul Prefocus Socket
(Codes "L & M")
Catalog No. 893.

*For Use In 10", 12" and 14" Searchlights Except When Catalog No. 839, 900 Watt Bulb is Used.

**For Use In 12", 14" and 19" Searchlights Only When the Catalog No. 839, 900 Watt Bulb is Used.



**19" SOLAR-RAY® SEARCHLIGHTS
HEAD & CONTROL ASSEMBLIES**
ALL ALUMINUM - WHITE PERKO•KOTE FINISH

PERKO®

| Description | Cat. No. |
|---|--------------|
| Deck Control Searchlight Head Assembly* | 1901 004 WHT |
| Wheel or Lever/Gear Control Searchlight Head Assembly (Requires Control Assembly Below) | 1902 004 WHT |
| Searchlight Head Assembly For Distant Electric Control Base | 1902 DE4 WHT |
| Wheel Control Assembly (For Above) | 1922 000 WHT |
| Lever/Gear Control Assembly (For Above) | 1921 000 WHT |
| Distant Electric Control Assembly (For Above) | 1925 000 WHT |

*Cannot Be Fitted With Controls.

Custom Control Lengths and Pedestal Heights Are Available. Price Upon Application. Specify Measurements.

BULBS ARE NOT INCLUDED IN LIGHTS (SEE BELOW)

BULB ORDERING INFORMATION FOR 19 INCH SEARCHLIGHTS

To give good results, the bulb and reflector must be perfectly compatible; therefore be sure to specify the catalog number of the bulb desired. Peak candle power is exceedingly sensitive to many factors, (i.e., a light source out of focus by 1/32 inch, under voltage of only 4%, or differences between bulb manufacturers can cause a reduction of range of up to 20%).

For a More Concentrated Beam, Longer Range, Brighter Light and a Longer Life, We Recommend the Quartz/Halogen Bulbs.

| Voltage | Approx. Range Miles* | Bulb Cat. No. | Bulb Type | Socket Type | Socket Code Letter | Wattage | Rated Life Hours** | Maximum Candlepower Output | Horizontal Beam Spread Degrees | Vertical Beam Spread Degrees | Mfg. Bulb Code |
|---------|----------------------|---------------|----------------|-----------------|--------------------|---------|--------------------|----------------------------|--------------------------------|------------------------------|----------------|
| 32 | 1-2/3 | 806 | Incandescent | Medium Screw | B | 500 | 50 | 3,520,000 | 3.5 | 3.7 | DLT |
| 120 | 1-3/8 | 837 | Incandescent | Medium Prefocus | E | 750 | 200 | 2,076,000 | 3.6 | 4.2 | DDY |
| 120 | 1-5/8 | 845 | Quartz/Halogen | Medium Prefocus | E | 750 | 200 | 2,871,000 | 3.6 | 5.4 | BTP |
| 120 | 1-5/8 | 807 | Incandescent | Medium Prefocus | E | 500 | 25 | 3,191,000 | 3.5 | 4.0 | CZX |
| 120 | 1-2/3 | 859 | Quartz/Halogen | Mogul Prefocus | M | 2000 | 250 | 3,633,000 | 9.4 | 5.9 | BVW |
| 120 | 1-2/3 | 847 | Quartz/Halogen | Mogul Prefocus | M | 1000 | 200 | 3,659,000 | 4.5 | 5.4 | BVV |
| 120 | 1-3/4 | 844 | Quartz/Halogen | Medium Prefocus | E | 500 | 500 | 3,861,000 | 3.0 | 5.4 | BTL |
| 120 | 1-3/4 | 809 | Incandescent | Medium Prefocus | E | 750 | 25 | 4,569,000 | 3.6 | 4.5 | DDB |
| 120 | 1-7/8 | 846 | Quartz/Halogen | Medium Prefocus | E | 1000 | 200 | 4,601,000 | 4.5 | 5.4 | BTR |
| 120 | 2 | 848 | Quartz/Halogen | Mogul Prefocus | L | 1500 | 300 | 5,596,000 | 5.9 | 5.7 | DTA |
| 120 | 2 | 810 | Incandescent | Medium Prefocus | E | 1000 | 25 | 5,622,000 | 3.6 | 4.2 | DRS |
| 120 | 2 | 839 | Quartz/Halogen | 2-Pin Prefocus | K | 900 | 75 | 5,769,000 | 5.9 | 5.4 | BVA |
| 230 | 1-3/8 | 860 | Quartz/Halogen | Medium Prefocus | E | 1000 | 950 | 2,162,000 | 7.9 | 6.5 | FKD |

*The approximate ranges listed above are based on photometric measurements of beam candlepower output under ideal conditions. Many factors such as atmospheric conditions, size and color of target, background, etc., may reduce effective range considerably; therefore, these figures are offered only as a guide to compare different bulb and voltage options.

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**NOTE: These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing of groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.

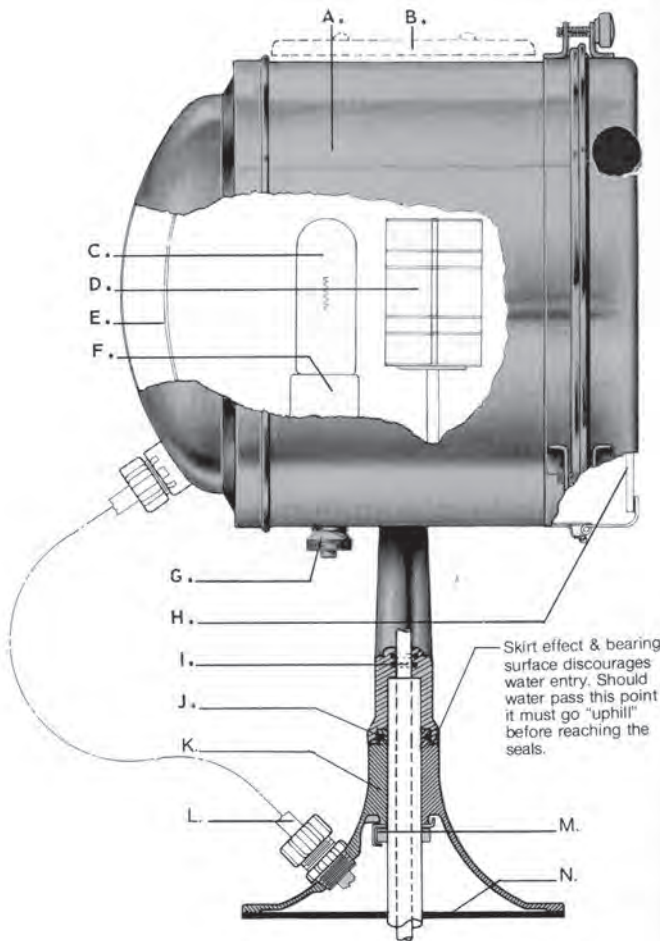
ELECTRIC SOCKET AND SUPPORT STAND ASSEMBLIES FOR 19 INCH SEARCHLIGHTS

Solar-Ray® Searchlights include a socket and support stand based on the bulb or socket information given when ordering. The following chart makes it possible to order and stock different assemblies for field conversion, to meet a large variety of voltage and candlepower requirements with a minimum of inventory.

| Socket Type | Socket Code | Socket & Stand Cat. No. | Height Stand Inches |
|-----------------------------------|-------------|-------------------------|---------------------|
| Medium Screw | B | 872 004 | 5-3/4 |
| Medium Prefocus | E | 873 004 | 5-7/16 |
| Mogul Prefocus (1500 Watt) | L | 1930 004 | 3-5/8 |
| Mogul Prefocus (1000 & 2000 Watt) | M | 1931 004 | 3-1/8 |
| 2-Pin Prefocus (900 Watt) | K | 880 004 | 7-5/16 |



10", 12", 15" INCANDESCENT SEARCHLIGHTS



- A. Available in Three Beautiful External Finishes: white enamel polished brass, or polished chrome. Interior finished with heat resistant flat lack paint.
- B. Vented Drum Available for 12" and 15" searchlights allowing use of 1000 watt lamps.
- C. Many Lamp Types accommodated. See listing on page 3.
- D. Metal Louvers eliminate front spill light.
- E. High Quality Silvered Glass Reflector efficiently concentrates light into a powerful beam.
- F. Choice of Lampholders

| | 10" | 12" | 15" |
|-------------------|------|------|------|
| 1 Medium Screw | Yes | Yes | Yes |
| 2 Medium Prefocus | *Yes | *Yes | *Yes |
| 3 Mogul Screw | No | Yes | Yes |
| 4 Mogul Bipost | No | No | Yes |
| 5 2-Pin Prefocus | Yes | Yes | Yes |

* Supplied as standard if lampholder not specified.
- G. External Focus Control permits changing beam from spot to flood with lamp operating, without the use of tools.
- H. Heat-Tempered Cover Glass and tight sealing door gasket provide maximum protection for drum interior.
- I. Double seals around control shaft prevent leakage to pilot house. Lubricated for life.
- J. Seal between base and yoke. Lubricated for life.
- K. Standard, High, or Pedestal Bases available with any control type except DMC which is available only with standard base. Special heights (measured from bottom of base to centerline of beam) for pedestal base searchlights may be specified at extra charge.
- L. Heavy Duty Three-Conductor Flexible Cable extends approximately two feet below water-tight stuffing tube in base. Third conductor grounded. Longer cable can be supplied at extra charge.
- M. Sliding Stop allows horizontal rotation in excess of 360°. Supplied on all models except Local Control and DMC.
- N. Base Gasket optional at extra charge.

NEW!

Medium Prefocus Lampholders on 12 and 15-inch searchlights have unique Shock Absorbing Base Design, which helps prevent lamp filament damage due to excess vibration and shock impact.

HOW TO ORDER

Specify size searchlight, type control, type base, type drum, type finish, type lampholder, and give code word or catalog number. Give ordering code and volts of lamp. Specify length of control (measured from bottom of base to centerline of lever or upper wheel) if other than the standard dimensions shown on the dimension drawings. Specify pedestal height (measured from bottom of base to centerline of drum) if different from the standard 48 inches.

Example: 12" searchlight, lever control, standard base, vented drum, enamel finish, medium prefocus lampholder, code RECITE-E2. Special length control 22" base to centerline lever. Two lamps code BTR 120 volts.

To designate the specific lampholder desired add one of the following suffixes to the code word or catalog number.

- Medium Screw Lampholder ---1
- Medium Prefocus Lampholder ---2
- Mogul Screw Lampholder ---3
- Mogul Bipost Lampholder ---4
- 2-Pin Prefocus Lampholder ---5

ACCESSORIES AND PARTS

| Description | Part No. For Size Scht. | | |
|-------------------------|-------------------------|----------|----------|
| | 10" | 12" | 15" |
| Cover, Protective | SL3322A | SL3322A | SL3322B |
| Cover Glass | SL62 | SL102 | SL1085 |
| Gasket, Base, DMC | SL3318B | SL3318B | SL3318B |
| Gasket, Base, High | SL3318B | SL3318B | SL3318B |
| Gasket, Base, Pedestal | SL3318C | SL3318C | SL3318C |
| Gasket, Base, Standard | SL3318A | SL3318B | SL3318B |
| Lampholder, Med. Pref. | SL1250C | SL1250C | SL1250C |
| Lampholder, Med. Screw | SL1087-1 | SL1087-1 | SL1087-1 |
| Lampholder, Mogul Bip. | --- | --- | FE132X |
| Lampholder, Mogul Screw | --- | SL96 | SL96 |
| Lampholder, 2-Pin Pref. | 8704 | 8704 | 8704 |
| Reflector | SL1083A | SL107 | SL1084 |



10", 12", 15" INCANDESCENT SEARCHLIGHTS

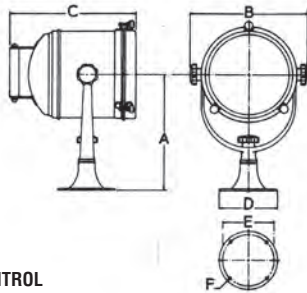


FIG. 1 LOCAL CONTROL STANDARD BASE

| SIZE | A | B | C | D | E | F |
|------|----------|--------|--------|-------|-------|-------|
| 10" | 12-3/4 | 13-1/8 | 12 | 6-3/8 | 5-5/8 | 11/32 |
| 12" | 15 15/16 | 15 5/8 | 15 1/2 | 8 1/4 | 7 3/8 | 13/32 |
| 15" | 19 7/8 | 18 7/8 | 16 7/8 | 8 1/4 | 7 3/8 | 13/32 |

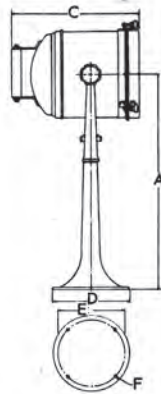


FIG. 2 LOCAL CONTROL HIGH BASE

| SIZE | A | C | D | E | F |
|------|----------|--------|-------|-------|-------|
| 10" | 23 5/8" | 12 | 8 3/8 | 7 3/8 | 13/32 |
| 12" | 25 9/16" | 15 1/2 | 8 3/8 | 7 3/8 | 13/32 |
| 15" | 29 1/2" | 16 7/8 | 8 3/8 | 7 3/8 | 13/32 |

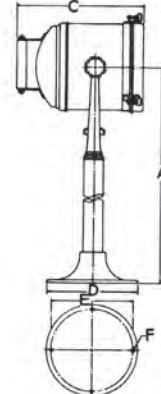


FIG. 3 LOCAL CONTROL PEDESTAL BASE

| SIZE | A | C | D | E | F |
|------|----|--------|----|-------|-------|
| 10" | 48 | 12 | 10 | 8 7/8 | 13/32 |
| 12" | 48 | 15 1/2 | 10 | 8 7/8 | 13/32 |
| 15" | 48 | 16 7/8 | 10 | 8 7/8 | 13/32 |

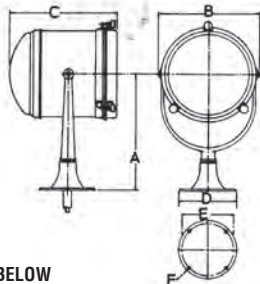


FIG. 4 MANUAL CONTROLS BELOW STANDARD BASE

| SIZE | A | B | C | D | E | F |
|------|----------|--------|--------|-------|-------|-------|
| 10" | 12 3/4 | 11 | 10 | 6 3/8 | 5 3/8 | 11/32 |
| 12" | 15 15/16 | 13 1/2 | 13 1/4 | 8 1/4 | 7 3/8 | 13/32 |
| 15" | 19 7/8 | 16 3/4 | 14 7/8 | 8 1/4 | 7 3/8 | 13/32 |



FIG. 5 HIGH BASE MANUAL CONTROLS BELOW

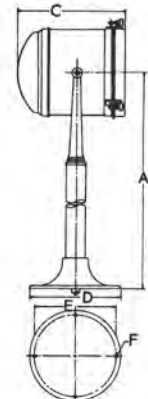


FIG. 6 PEDESTAL BASE MANUAL CONTROLS BELOW

| SIZE | A | C | D | E | F |
|------|---------|--------|-------|-------|-------|
| 10" | 23 5/8 | 10 | 8 3/8 | 7 3/8 | 13/32 |
| 12" | 25 9/16 | 13 1/4 | 8 3/8 | 7 3/8 | 13/32 |
| 15" | 29 1/2 | 14 7/8 | 8 3/8 | 7 3/8 | 13/32 |

| SIZE | A | C | D | E | F |
|------|----|--------|----|-------|-------|
| 10" | 48 | 10 | 10 | 8 7/8 | 13/32 |
| 12" | 48 | 13 1/4 | 10 | 8 7/8 | 13/32 |
| 15" | 48 | 14 7/8 | 10 | 8 7/8 | 13/32 |

FIG. 10 DISTANT MECHANICAL CONTROL (DMC)

| SIZE | A | B | C | D | E |
|------|---------|--------|--------|-------|-------|
| 10" | 14 3/16 | 11 | 10 | 8 1/2 | 7 3/8 |
| 12" | 16 1/8 | 13 1/2 | 13 1/4 | 8 1/2 | 7 3/8 |
| 15" | 20 1/16 | 16 3/4 | 14 7/8 | 8 1/2 | 7 3/8 |

(BELOW)

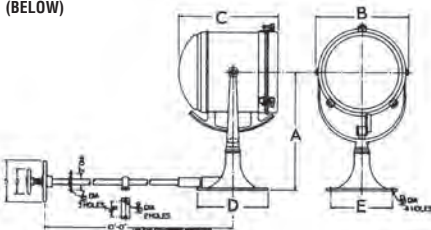


FIG. 7 LEVER CONTROL

| SIZE | G |
|------|--------|
| 10" | 11 3/8 |
| 12" | 10 7/8 |
| 15" | 10 7/8 |

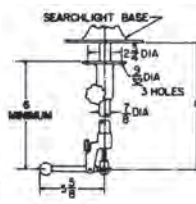


FIG. 8 LEVER-GEAR CONTROL

| SIZE | G |
|------|--------|
| 10" | 11 3/8 |
| 12" | 10 7/8 |
| 15" | 10 7/8 |

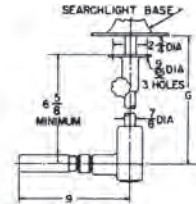
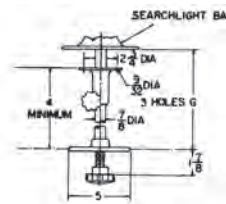


FIG. 9 WHEEL CONTROL

| SIZE | G |
|------|-------|
| 10" | 9 1/2 |
| 12" | 9 |
| 15" | 9 |





INCANDESCENT SEARCHLIGHT SELECTION TABLE

10 INCH

| Type Control | Type Base | | Searchlight Code Word or Cat. No. | | | Net Wt. Lbs. | Shipping Wt. Lbs. | |
|--------------|-----------|---------------|-----------------------------------|---------------|-----------------|--------------|-------------------|-----------------|
| | | | Type Drum | Enamel Finish | Polished Finish | | | Chromium Finish |
| Local | Standard | (Fig. 1) | Non Vented | RAIN-E | RAIN | CRAIN | 15 | 21 |
| | High | (Fig. 2) | Non Vented | ROSE-E | ROSE | CROSE | 22 | 28 |
| | Pedestal | (Fig. 3) | Non Vented | RAJAH-E | RAJAH | CRAJAH | 29 | 59 |
| Lever | Standard | (Figs. 4 & 7) | Non Vented | REDAN-E | REDAN | CREDAN | 19 | 25 |
| | High | (Figs. 5 & 7) | Non Vented | REFORM-E | REFORM | FREFORM | 27 | 33 |
| | Pedestal | (Figs. 6 & 7) | Non Vented | 10SL1624XE | 10SL1624X | 10SL1624XC | 34 | 55 |
| Lever-Gear | Standard | (Figs. 4 & 8) | Non Vented | 10SL8425E | 10SL8425P | 10SL8425C | 22 | 28 |
| | High | (Figs. 5 & 8) | Non Vented | 10SL8426E | 10SL8426P | 10SL8426C | 30 | 36 |
| | Pedestal | (Figs. 6 & 8) | Non Vented | 10SL8427E | 10SL8427P | 10SL8427P | 37 | 58 |
| Wheel | Standard | (Figs. 4 & 9) | Non Vented | RANK-E | RANK | CRANK | 19 | 25 |
| | High | (Figs. 5 & 9) | Non Vented | ROPE-E | ROPE | CROPE | 27 | 33 |
| | Pedestal | (Figs. 6 & 9) | Non Vented | 10SL1620XE | 10SL1620X | 10SL1620XC | 37 | 55 |
| DMC | Standard | (Fig. 10) | Not Vented | 10SL200E | 10SL200P | 10SL200C | 32 | 53 |

12 INCH

| | | | | | | | | |
|------------|---------------|---------------|------------|-------------|------------|-------------|----|----|
| Local | Standard | (Fig. 1) | Non Vented | RAKE-E | RAKE | CRAKE | 22 | 31 |
| | High | (Fig. 2) | Vented | RATE-E | RATE | CRATE | 22 | 31 |
| | Pedestal | (Fig. 3) | Non Vented | ROME-E | ROME | CROME | 27 | 36 |
| | | | Vented | RUN-E | RUN | CRUN | 27 | 36 |
| Lever | Standard | (Figs. 4 & 7) | Non Vented | RETARD-E | RETARD | CRETARD | 34 | 64 |
| | | | Vented | 12SL1648XE | 12SL1648X | 12SL1648XC | 34 | 64 |
| | High | (Figs. 5 & 7) | Non Vented | REDEEM-E | REDEEM | CREDEEM | 26 | 35 |
| | | | Vented | RECITE-E | RECITE | CRECITE | 26 | 35 |
| Pedestal | (Figs. 6 & 7) | Non Vented | REFUGE-E | REFUGE | CREFUGE | 32 | 41 | |
| | | Vented | RESIN-E | RESIN | CRESIN | 32 | 41 | |
| Lever-Gear | Standard | (Figs. 4 & 8) | Non Vented | 12SL1625XE | 12SL1625X | 12SL1625XC | 39 | 60 |
| | | | Vented | 12SL1650XE | 12SL1650X | 12SL1650XC | 39 | 60 |
| | High | (Figs. 5 & 8) | Non Vented | 12SL8186E | 12SL8186P | 12SL8186C | 29 | 38 |
| | | | Vented | 12SL8186VE | 12SL8186VP | 12SL8186VC | 29 | 38 |
| Pedestal | (Figs. 6 & 8) | Non Vented | 12SL8401E | 12SL8401P | 12SL8410C | 35 | 44 | |
| | | Vented | 12SL8410VE | 12SL8410VP | 12SL8410VC | 35 | 44 | |
| Wheel | Standard | (Figs. 4 & 9) | Non Vented | 12SL8428E | 12SL8428P | 12SL8428VC | 42 | 63 |
| | | | Vented | 12SL8428VE | 12SL8428VP | 12SL8428VC | 42 | 63 |
| | High | (Figs. 5 & 9) | Non Vented | RASP-E | RASP | CRASP | 26 | 35 |
| | | | Vented | REAR-E | REAR | CREAR | 26 | 35 |
| Pedestal | (Figs. 6 & 9) | Non Vented | RUSE-E | RUSE | CRUSE | 32 | 41 | |
| | | Vented | RIPE-E | RIPE | CRIFE | 32 | 41 | |
| DMC | Standard | (Fig. 10) | Non Vented | 12SL1621XE | 12SL1621X | 12SL1621XC | 39 | 60 |
| | | | Vented | 12SL1649XE | 12SL1649X | 12SL1649XC | 39 | 60 |
| Local | Standard | (Fig. 1) | Non Vented | 12SL201E | 12SL201P | 12SL201C | 37 | 58 |
| | | | Vented | 12SL203E | 12SL203P | 12SL203C | 37 | 58 |
| | High | (Fig. 2) | Non Vented | REDGUM-E | REDGUM | CREDGUM | 39 | 51 |
| | | | Vented | REDGUM-VE | REDGUM-V | CREDGUM-V | 39 | 51 |
| Pedestal | (Fig. 3) | Non Vented | REEL-E | REEL | CREEL | 44 | 56 | |
| | | Vented | REEL-VE | REEL-V | CREEL-V | 44 | 56 | |
| Lever | Standard | (Figs. 4 & 7) | Non Vented | RONTY-E | RONTY | CRONTY | 50 | 80 |
| | | | Vented | RONTY-VE | RONTY-V | CRONTY-V | 50 | 80 |
| | High | (Figs. 5 & 7) | Non Vented | RADIAL-E | RADIAL | CRADIAL | 43 | 55 |
| | | | Vented | RADIAL-VE | RADIAL-V | CRADIAL-V | 43 | 55 |
| Pedestal | (Figs. 6 & 7) | Non Vented | RAINBOW-E | RAINBOW | CRAINBOW | 49 | 61 | |
| | | Vented | RAINBOW-VE | RAINBOW-V | CRAINBOW-V | 49 | 61 | |
| Lever-Gear | Standard | (Figs. 4 & 8) | Non Vented | 15SL1626X | 15SL1626X | 15SL1626XC | 56 | 77 |
| | | | Vented | 15SL1626XV | 15SL1626XV | 15SL1626XVC | 56 | 77 |
| | High | (Figs. 5 & 8) | Non Vented | 15SL8184E | 15SL8184P | 15SL8184C | 46 | 58 |
| | | | Vented | 15SL8184VE | 15SL8184VP | 15SL8184VC | 46 | 58 |
| Pedestal | (Figs. 6 & 8) | Non Vented | 15SL8408E | 15SL8408P | 15SL8408C | 52 | 64 | |
| | | Vented | 15SL8408VE | 15SL8408VP | 15SL8408VC | 52 | 64 | |
| Wheel | Standard | (Figs. 4 & 9) | Non Vented | 15SL8429E | 15SL8429P | 15SL8429C | 59 | 80 |
| | | | Vented | 15SL8429VE | 15SL8429VP | 15SL8429VC | 59 | 80 |
| | High | (Figs. 5 & 9) | Non Vented | RACKET-E | RACKET | CRACKET | 43 | 55 |
| | | | Vented | RACKET-VE | RACKET-V | CRACKET-V | 43 | 55 |
| Pedestal | (Figs. 6 & 9) | Non Vented | RABBIT-E | RABBIT | CRABBIT | 49 | 61 | |
| | | Vented | RABBIT-VE | RABBIT-V | CRABBIT-V | 49 | 61 | |
| DMC | Standard | (Fig. 10) | Non Vented | 15SL1622XE | 15SL1622X | 15SL1622XC | 56 | 77 |
| | | | Vented | 15SL1622XVE | 15SL1622XV | 15SL1622XVC | 56 | 77 |

15 INCH

19" INCANDESCENT SELECTION TABLE



Base

Standard Base

Horizontal rotation in excess of 360° but limited by positive mechanical stops to prevent mechanical damage to cable by excessive rotation.

Pedestal Base

Horizontal rotation in excess of 360° but limited by positive mechanical stops to prevent mechanical damage to cable by excessive rotation.

| Control | Mogul Bipost | Searchlight Model or Cat. No. | | | 2-Pin Prefocus | Approx. Lbs. | |
|--------------------|--------------|-------------------------------|--------------|---------------|----------------|--------------|------|
| | | Mogul Prefocus | Mogul Screw | Med. Prefocus | | Net | Ship |
| Local | REDUNDANT | REDUNDANT-A | REDUNDANT-B | REDUNDANT-D | REDUNDANT-E | 51 | 76 |
| Lever-Gear | 10SL3794X | 19SL3794AX | 19SL3794BX | 19SL3794DX | 19SL3794EX | 65 | 90 |
| Wheel | REDCOAT | REDCOAT-A | REDCOAT-B | REDCOAT-D | REDCOAT-E | 65 | 90 |
| Lever Twist-Lock | RIOT | RIOT-A | RIOT-B | RIOT-D | RIOT-E | 65 | 90 |
| Distant Mechanical | | | | | | | |
| Lever-Gear | 19SL4590-LG | 19SL4590A-LG | 19SL4590B-LG | 19SL4590D-LG | 19SL4590E-LG | 85 | 115 |
| Distant Mechanical | | | | | | | |
| Lever-Gear | 19SL4590-W | 19SL1299AX | 19SL4590B-W | 19SL4590D-W | 19SL4590E-W | 85 | 115 |
| Local | 19SL1299X | 19SL3798AX | 19SL1299BX | 19SL1299DX | 19SL1299EX | 68 | 97 |
| Lever-Gear | 19SL3798X | 19SL3798AX | 19SL3798BX | 19SL3798DX | 19SL3798EX | 83 | 112 |
| Wheel | 19SL1302X | 19SL1302AX | 19SL1302BX | 19SL1302DX | 19SL1302EX | 83 | 112 |
| Lever Twist-Lock | 19SL1174X | 19SL1174AX | 19SL1174BX | 19SL1174DX | 19SL1174EX | 83 | 112 |

CONTROLS

Five styles of manual controls are constructed of all brass. O-ring seals prevent leakage around controls shaft.

- 1. Local Control.** No pilot house controls. Searchlight has training handle on drum and hand clamps to lock searchlight in any position.
- 2. Lever-Gear Control.** Operates conveniently with one hand. Horizontal movement controlled by pointing lever, vertical by twisting lever. Vertical lock conveniently located on control handle. Ceiling lock clamps horizontal movements.
- 3. Wheel Control.** Upper wheel controls horizontal movements, lower wheel vertical movements. Friction brake holds searchlight in any vertical position. Ceiling lock clamps horizontal movements.
- 4. Lever Twist-Lock Control.** Single lever controls all movements. Spring loaded friction brake holds searchlight in any vertical position which can be easily locked by twisting control handle. Ceiling lock clamps horizontal movements.
- 5. Distant Mechanical Control (DMC).** Similar to lever-gear or wheel control except that control shafts are at right angle to searchlight base.





19" INCANDESCENT SEARCHLIGHT

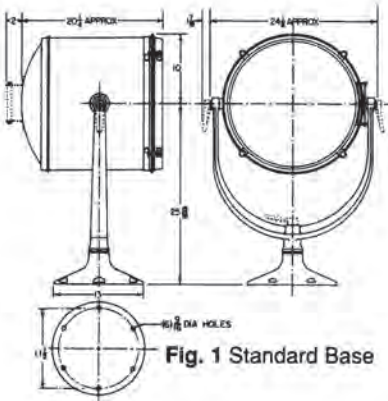


Fig. 1 Standard Base

Combine base and control figures for complete searchlight.

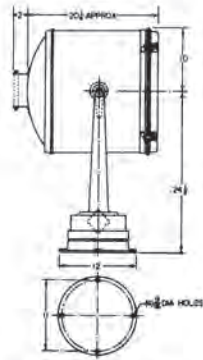


Fig. 2 Standard Turntable Base

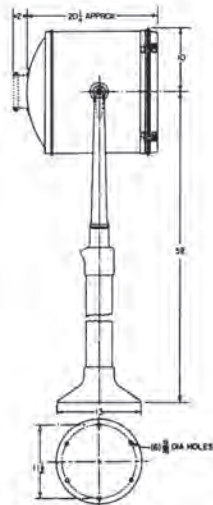


Fig. 3 Pedestal Base

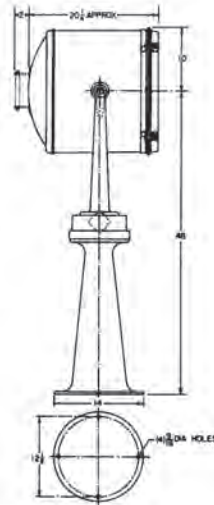


Fig. 4 Pedestal Turntable Base

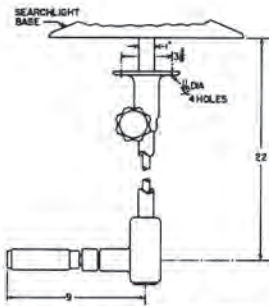


Fig. 5 Lever-Gear Control

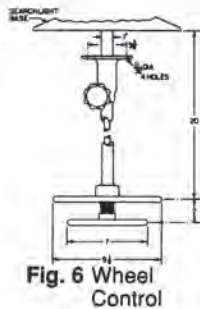


Fig. 6 Wheel Control

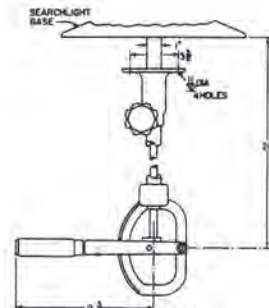


Fig. 7 Lever Twist-Lock Control

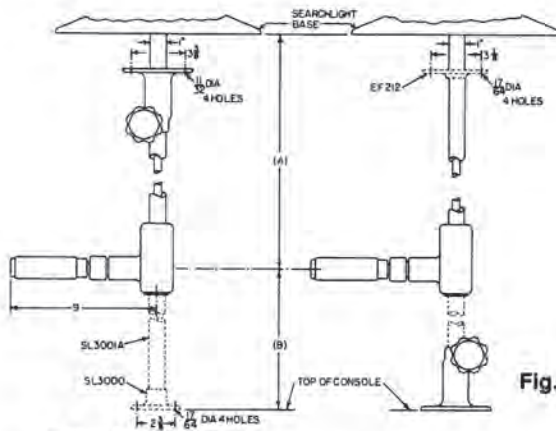


Fig. 9A
Alternate arrangements for lever-gear control with extra long control shafts. Parts shown as dashed lines priced separately.

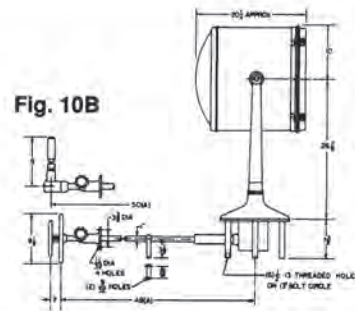


Fig. 10A Distant Mechanical Control (DMC)

NOTE: The specifications and details described by drawings and or text in this literature are subject to change without notice.

19" INCANDESCENT SEARCHLIGHT LAMP DATA



| Lamp Code | Watts | Volts | Base | Type | *Rated Life (Hrs.) | **Candlepower |
|-----------|-------|-------|-----------------|------------------|--------------------|---------------|
| BTM | 500 | 120 | Medium Prefocus | Tungsten Halogen | 100 | 2,971,000 |
| CZX | 500 | 120 | Medium Prefocus | Incandescent | 25 | 2,200,000 |
| BTP | 750 | 120 | Medium Prefocus | Tungsten Halogen | 200 | 3,981,000 |
| DPJ | 750 | 120 | Medium Prefocus | Incandescent | 25 | 4,260,000 |
| BVA | 900 | 120 | 2-Pin Prefocus | Tungsten Halogen | 75 | 4,600,000 |
| BTR | 1000 | 120 | Medium Prefocus | Tungsten Halogen | 250 | 4,300,000 |
| DRS | 1000 | 120 | Medium Prefocus | Incandescent | 25 | 4,410,000 |
| DWK | 1000 | 230 | Medium Prefocus | Incandescent | 50 | 1,600,000 |
| FKN | 1000 | 230 | Medium Prefocus | Tungsten Halogen | 200 | 1,800,000 |
| BVV | 1000 | 120 | Mogul Prefocus | Tungsten Halogen | 250 | 4,300,000 |
| DRW | 1000 | 120 | Mogul Screw | Incandescent | 25 | 4,410,000 |
| IM/T20BP | 1000 | 120 | Mogul Bipost | Aero | 500 | 2,381,000 |
| CWZ | 1500 | 120 | Mogul Prefocus | Tungsten Halogen | 325 | 3,614,000 |
| CXZ | 1500 | 120 | Mogul Bipost | Tungsten Halogen | 325 | 3,614,000 |
| ***BVW | 2000 | 120 | Mogul Prefocus | Tungsten Halogen | 300 | 3,000,000 |

* These lamp manufacturer's figures are relative only. Individual lamps may vary considerably.
 ** These figures provided to aid in lamp selection.
 *** Intermittent use only.

ACCESSORIES AND PARTS

| Description | Part No. | Description | Part No. | Description | Part No. |
|---------------------|----------|--|----------|----------------------------|----------|
| Brush, with pigtail | EF176 | Gasket, Standard | | Lampholder, Mogul Bipost | |
| Cover, Protective | 3L3322C | Turntable Base | 4093B | FE132X | |
| Cover Glass | EF239 | Gasket, Pedestal | | Lampholder, Mogul Prefocus | SL978 |
| Gasket, Standard | | Turntable Base | 4093C | Lampholder, Mogul Screw | SL96 |
| and Ped Base | SL3356 | Lampholder, Medium Prefocus with Special Shock Mount | 7540X | Lampholder, 2-Pin Prefocus | 8704 |
| | | | | Louver Assy | 9656X |
| | | | | Reflector | EF240 |

HOW TO ORDER

Specify 19-inch incandescent searchlight with a. Base, b. Controls, c. Lampholder, d. Catalog Numbers and describe Special Features e.

a. Bases

Standard
Standard Turntable
Pedestal
Pedestal Turntable

b. Controls

Local
Lever-Gear
Wheel
Lever Twist-Lock
Distant Mechanical Wheel
Distant Mechanical Lever-Gear

c. Lampholder

Mogul Bipost
Mogul Prefocus
Mogul Screw
Medium Prefocus
2-Pin Prefocus

d. Code or Cat. No.

Choose from Selection Table

e. Special features available at extra charge when specified on order.

Special control lengths. Longer or shorter than standard. Give dimension from bottom of base to center line of lever or large wheel. Order parts to anchor lower end of extra long lever-gear controls (Figs. 9A & 9B) by part no. and name and give dimensions A & B.

Special pedestal height. Higher or lower than standard. Specify height from bottom of base to center line of drum.

Special length electrical cable. Specify length from bottom of base to end of cable.

All Brass and Stainless Steel. Instead of Marine Aluminum.

Example. 19-inch Searchlight with Standard Base, Lever-Gear Control, Medium Prefocus Lampholder with Shock Mount Design, Catalog Number 19SL3794DX. Special control 32 inches from base to centerline of lever. Two lamps Code BTR.

PERKO®

DOME LIGHTS



Fig. 300

FIG. 300 - SURFACE MOUNT DOME LIGHT

DOUBLE CONTACT BAYONET SOCKET
 PUSH SWITCH WITH WATER RESISTANT BOOT
 COMPLETE WITH 12 VOLT BULB
 CHROME PLATED ZINC
 BLACK VINYL MOUNTING GASKET

| O.D. GLOBE INCHES | O.D. BASE INCHES | DEPTH OVERALL INCHES | WATTAGE OF BULB SUPPLIED | MAXIMUM WATTAGE | DEALER PKG. - 5 CARDS 1 PC. PER CARD | OEM BULK PKG. 10 PCS. | SCREW SIZE | SHIP WT. CARTON LBS. DP/OEM BULK |
|-------------------|------------------|----------------------|--------------------------|-----------------|--------------------------------------|-----------------------|------------|----------------------------------|
| 3 | 3-3/4 | 1-1/2 | 7 | 11 | 300 DP0 CHR | 300 000 CHR* | 10 R.H. | 3.1/10.5 |
| 4 | 5 | 1-7/8 | 11 | 17 | 300 DP1 CHR | 300 001 CHR | 10 R.H. | 4.8/8.3 |
| 5 | 6 | 2 | 17 | 17 | 300 DP2 CHR | 300 002 CHR | 12 R.H. | 6.7/11.4 |



Fig. 1253

FIG. 1253 - EXTERIOR DOME LIGHT

DOUBLE CONTACT BAYONET SOCKET
 PUSH SWITCH WITH WATER RESISTANT BOOT
 COMPLETE WITH 12 VOLT BULB
 IVORY PERKO•KOTE POWDER COATING
 BLACK VINYL MOUNTING GASKET

| O.D. GLOBE INCHES | O.D. BASE INCHES | DEPTH OVERALL INCHES | WATTAGE OF BULB SUPPLIED | MAXIMUM WATTAGE | DEALER PKG. - 5 CARDS 1 PC. PER CARD | OEM BULK PKG. 10 PCS. | SCREW SIZE | SHIP WT. CARTON LBS. DP/OEM BULK |
|-------------------|------------------|----------------------|--------------------------|-----------------|--------------------------------------|-----------------------|------------|----------------------------------|
| 4.5 | | 1-7/8 | 11 | 17 | 1253 DP1 WHT | 1253 001 WHT | 10 R.H. | 4.8/8.4 |
| 5 | 6 | 2 | 17 | 17 | 1253 DP2 WHT | 1253 002 WHT | 12 R.H. | 6.6/11.6 |
| 4 | 5 | 1-7/8 | 11 | 17 | 1263 DP1 WHT | 1263 001 WHT | 10 R.H. | 4.8/8.4 |

8



Fig. 1258

FIG. 1258 - SURFACE MOUNT DOME LIGHT

PUSH SWITCH WITH WATER RESISTANT BOOT
 COMPLETE WITH 12 VOLT, 10 VOLT BULB
 WHITE TRANSLUCENT PLASTIC GLOBE
 CHROME PLATED ZINC

| O.D. BASE INCHES | DEPTH OVERALL INCHES | MAXIMUM WATTAGE | DEALER PKG. - 5 CARDS 1 PC. PER CARD | OEM BULK PKG. 10 PCS. | SCREW SIZE | SHIP WT. CARTON LBS. DP/OEM BULK |
|------------------|----------------------|-----------------|--------------------------------------|-----------------------|------------|----------------------------------|
| 3-3/4 | 1-1/4 | 10 | 1258 DP2 CHR | 1258 002 CHR | 8 R.H. | 3.0/5.1 |

DOME LIGHTS

PERKO®

FIG. 555 - SURFACE MOUNT DOME LIGHT
 CHROME PLATED BRONZE
 FOR SYSTEMS UP TO 50 VOLTS
 TWIN DOUBLE CONTACT BAYONET SOCKETS
 TOGGLE SWITCH. BULBS NOT INCLUDED
 WILL ACCOMMODATE BULBS UP TO 20 WATTS EACH



Fig. 555

| O.D. GLOBE INCHES | O.D. BASE INCHES | DEPTH INCHES | STANDARD PKG. - 1 PC. | SCREW SIZE | SHIP WT. CARTON LBS. STANDARD PKG. |
|-------------------------|------------------------|-----------------|--------------------------|---------------|--|
| 6 | 7-7/8 | 3-1/8 | 555 000 CHR | 8 | 4.2 |

Spare Switch, Cat. No. 514 DP.
 Spare Socket, Cat. No. 276 000.

Spare Globe, Cat. No. 257 DP6.

NAVIGATION STATION DOME LENSES



NAVIGATION STATION DOME LIGHTS

The heavy duty clear patterned glass lenses are designed to flood your area of work for proper illumination. Both red and clear bulbs are included - choose between bright white for daylight running or dockside, and red light for nighttime navigating. The lights are completely wired with two switches and 12-volt double contact stainless bayonet sockets. The 10-watt lamps draw 3.5 amps. Base diameter is 6-3/4"; lens diameter is 4-3/8".

#24018 Stainless Steel

#24019 Solid Brass

DOME LIGHTS

Dome lights are useful in a wide variety of applications aboard - companionways, storage lockers and cabins. The glass dome lens diffuses the light, making them ideal for moderate illumination throughout the boat's interior. Our stainless steel dome lights feature built in toggle switches and include a clear bulb. Sized to suit your boat's lighting needs



SPECIFICATIONS

| Model | Base Dia. | Watts | Amp Draw | Lens Dia. | Wt. |
|-------|-----------|-------|----------|-----------|-------|
| 14006 | 4-3/8" | 5 | 0.4 | 3.0" | 7oz. |
| 24010 | 5-1/2" | 10 | 1.5 | 4.0" | 10oz. |
| 24014 | 6-3/4" | 10 | 1.5 | 5.0" | 11oz. |

PROMAX INTREPID/NM



FEATURES

- Fluorescent system provides energy savings up to 50% when compared to HID.
- Third party certified for operation in high ambient temperatures, up to 65°C (149°F).
- Multi voltage electronic ballast resistant to brownouts or voltage and frequency fluctuations.
- Stainless steel latches, mounting feet and lens retainers.
- Impact resistant, UV stabilized polycarbonate lens.
- Shoc♦Loc™ Bi-Pin spring loaded lamp holders for T5, T8 and T12 lamp types, provide superior resistance to shock and vibration.
- USDA compliant materials.
- Meets Canadian Processed Products Regulations C.R.C. c291.
- Neoprene gasket resists petroleum.
- Three lamp models are provided with (1) single lamp ballast and (1) two lamp ballast for independent switching or filter tube options.
- Optional self contained emergency battery backup ballasts.
- Optional long life T5 lamps available upon request (consult factory).

| Lamp Wattage | Ballast/Socket Type | ANSI Lamp Code | Starting Temp | Maximum Ambient* | Supply Wire |
|--------------|---------------------|----------------|---------------|------------------|-------------|
| 17 | T8 Bi-Pin G13 | F17-T8 | 0°F / -18°C | 55°C | 90°C |
| 32 | T8 Bi-Pin G13 | F32-T8 | -20°F / -29°C | 55°C | 90°C |
| 40 | 4 Pin 2G11 | FT40 CF | 0°F / -18°C | 40°C | 90°C |
| 24/54 | T5HO Mini Bi-Pin G5 | F24/F54-T5HO | -20°F / -29°C | 55°C | 90°C |
| 14/28 | T5 Mini Bi-Pin G5 | F14/F28-T5 | 0°F / -18°C | 55°C | 90°C |
| 35/60 | T12HO RDC R17d | F24/F48-T12HO | -20°F / -29°C | 40°C | 90°C |

*Consult factory for optional higher ambient models.

EMERGENCY BATTERY BACKUP BALLAST

Optional, self contained 90 minute minimum for all lamp types. 120 minutes minimum for F32T8 one lamp. Starting temperature 32°F/0°C.

APPLICATIONS

- Marine and watertight requirements
- Dusttight requirements
- Waste water treatment plants
- Food & beverage processing facilities
- Pulp and paper production plants
- Corrosive environments

APPROVALS

- Type 4X
- IP66
- Marine Outside Type Saltwater
- ABS
- NSF

STANDARDS

- UL 1598A - Luminaires for Marine Vessels
- UL 924 - Emergency Lighting Equipment
- EN 60529 - Ingress Protection
- Canadian Processed Products Regulations C.R.C. c291
- CSA - C22.2 250 04
- CSA - C22.2 141
- NSF/ANSI 2-2007 Splash Zone

TECHNICAL SPECIFICATIONS

HOUSING

.080 inch thick minimum, fiberglass reinforced polyester.

LENS

0.090 inch thick, matte polycarbonate. Optional clear polycarbonate.

REFLECTOR

Type 5052H32 aluminum with an electrostatically applied white polyester powder coat finish. Minimum 90% reflectance.

GASKET

One piece neoprene.

MOUNTING

Stainless steel vibration dampening feet for ceiling, wall or chain mount. Kits available for uni-strut/rod and pole mount.

LATCHES

Stainless steel over the center cam.

LAMP HOLDERS

Spring loaded on one end for linear lamp types.

ENTRIES

Feed-through, one nonmetallic cable gland and one end plugged. See Special Options for other entries.

LAMP TYPES

See ORDERING REFERENCES. Lamps not provided.

BALLAST

120 to 277 volt 50/60Hz electronic, except F20 & F40 T12 Bi-Pin which are 120V 60Hz.

PROMAX INTREPID/NM

ORDERING REFERENCES

FPS

2

32

**

1. Series
FPS

2. Number of Lamps

- 1 - 1 lamp
- 2 - 2 lamps
- C2 - 2 lamps, 2 ft unit, CF only
- 3 - 3 lamps, not for 35w or 60w
- C4 - 4 lamps, 4 ft unit, CF only

3. Lamp Types

- 14 - 2 ft F14 T5 Mini Bi-Pin
- 17 - 2 ft F17 T8 Bi-Pin
- 20 - 2 ft F20 T12 Bi-Pin
- 24 - 2 ft F24 T5HO Mini Bi-Pin
- 28 - 4 ft F28 T5 Mini Bi-Pin
- 32 - 4 ft F32 T8 Bi-Pin
- 35 - 2 ft F24 T12HO RDC
- 40 - 4 ft F40/F34 T12 Bi-Pin
- 54 - 4 ft F54 T5HO Mini Bi-Pin
- 60 - 4 ft F48 T12HO RDC
- 40 - 2 ft FT40 CF 2G11

4. Special Options

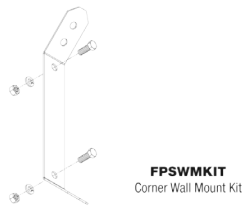
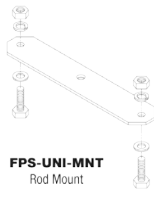
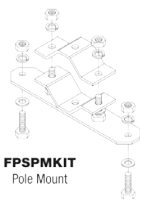
- EM2* - Emergency Battery Backup Ballast, 1 lamp, 277v max
- EM3* - Emergency Battery Backup Ballast, high lumen, 1 lamp, 277v max
- EMT2* - Emergency Battery Backup Ballast, 1 lamp, 277v max, test switch
- EMT3* - Emergency Battery Backup Ballast, high lumen, 1 lamp, 277v max, test switch
- L** - Lamps
- LL** - Long Life Lamps (F54T5HO only)
- XC - Optional Clear Polycarbonate Lens
- T - Multi Point Terminal Block
- TWC - Access Plate with 4 pole terminal block
- RV-1*** - Red Filter Tube with separate ballast (1 lamp)
- BV-1*** - Blue Filter Tube with separate ballast (1 lamp)
- YV-1*** - Yellow Filter Tube with separate ballast (1 lamp)
- 225 - 220v 50 Hz (T12 Bi-Pin only)
- 226 - 220v 60 Hz (T12 Bi-Pin only)
- 276 - 277v 60 Hz (T12 Bi-Pin only)
- G2 - Feed-through Nonmetallic Cable Glands
- H1 - 3/4" Single Ended NPT Hub
- H2 - 3/4" Feed-through NPT Hubs

*For T5 & T5HO, EM Ballast is fixed voltage, 120 or 277v, 50/60Hz.
 **Lamps are not included unless option "L" or "LL" is specified.
 ***Not available in 24w, 35w, 54w or 60w.

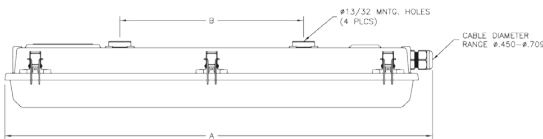
Notes:
 1. Consult factory for options not listed.

MOUNTING OPTIONS

MOUNTING KITS



DIMENSIONS



| Nominal Length | Dimensions in Inches / Centimeters | | | Carton W x D x L Inches | Nominal Weight | |
|----------------|------------------------------------|---------------|--------------|-------------------------|----------------|-----|
| | A | B | C | | Lbs | Kg |
| 2 Foot | 28.8 / 73.7 | 12.44 / 31.59 | 7.625 / 19.4 | 8 1/2 x 6 1/4 x 3 1/2 | 9 | 4.0 |
| 4 Foot | 52.8 / 134.6 | 36.56 / 92.87 | 7.625 / 19.4 | 8 1/2 x 6 x 5 5/8 | 17 | 7.7 |

COMMONLY ORDERED LUMINAIRES

| Part No. | Description | Weight | |
|----------|--|--------|------|
| | | Lbs | Kg |
| FPS217 | Fiberglass reinforced polyester 2 foot fixture 2 x F17 120-277v 50/60 Hz | 9.0 | 4.0 |
| FPS220 | Fiberglass reinforced polyester 2 foot fixture 2 x F20 120v 60 Hz | 10.1 | 4.6 |
| FPS232 | Fiberglass reinforced polyester 4 foot fixture 2 x F32 120-277v 50/60 Hz | 17.0 | 7.7 |
| FPS240 | Fiberglass reinforced polyester 4 foot fixture 2 x F40/F34 120v 60 Hz | 18.0 | 8.2 |
| FPS260 | Fiberglass reinforced polyester 4 foot fixture 2 x F48 120-277v 50/60 Hz | 18.5 | 8.4 |
| FPS317 | Fiberglass reinforced polyester 2 foot fixture 3 x F17 120-277v 50/60 Hz | 11.8 | 5.4 |
| FPS320 | Fiberglass reinforced polyester 2 foot fixture 3 x F20 120v 60 Hz | 13.9 | 6.3 |
| FPS332 | Fiberglass reinforced polyester 4 foot fixture 3 x F32 120-277v 50/60 Hz | 19.8 | 9.0 |
| FPS340 | Fiberglass reinforced polyester 4 foot fixture 3 x F40/F34 120v 60 Hz | 21.8 | 9.9 |
| FX2175 | Matte Polycarbonate Lens with Gasket 2 foot | 1.5 | .68 |
| FX2177 | Matte Polycarbonate Lens with Gasket 4 foot | 2.7 | 1.22 |
| FX2163 | Clear Polycarbonate Lens with Gasket 2 foot | 1.5 | .68 |
| FX2165 | Clear Polycarbonate Lens with Gasket 4 foot | 2.7 | 1.22 |
| FX8014A | Latches | .1 | .05 |

PROBERTH FBN/FMN



FEATURES

- Compact design.
- Clear fluted lens allows even light distribution.
- Wrap around lens design, 180° light dispersion, mirror type.
- Tool-less entry for easy relamping.
- Switch and convenience outlet provided.
- Optional gold and silver architectural finishes.
- Lamps provided.

APPLICATIONS

- Berth and mirror
- Marine interior
- State room
- Head

APPROVALS

- Conforms to IP40
- Marine Inside Type
- ABS

STANDARDS

- UL 1598A - Luminaires for Marine Vessels

TECHNICAL SPECIFICATIONS

HOUSING

Type 5052H32 aluminum.

COVER

Acrylonitrile Butadiene Styrene (ABS), gloss white. Optional gold and silver architectural finishes, see SPECIAL OPTIONS.

LENS

Clear fluted DR acrylic.

REFLECTOR

Type 5052H32 aluminum with an electrostatically applied white polyester power coat finish. Minimum 90% reflectance.

ENTRIES

One 1/2" and one 3/4" NPT knockouts provided.

LAMP HOLDER

Polycarbonate, Mini Bi-Pin.

MOUNTING

Wall type, through luminaire interior, see DIMENSIONS for details.

CONVENIENCE OUTLET

125v 3 wire 2 pole "U" ground. Optional "No Convenience Outlet". Not provided on 220v models.

SWITCH

Push type momentary contact. Optional double pole toggle.

BALLAST

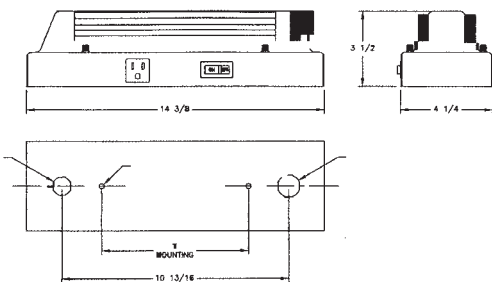
120v 60Hz. See SPECIAL OPTIONS for other voltages.

| Ballast/Socket Type | Starting Temp |
|---------------------|---------------|
| T5 Mini Bi-Pin G5 | 50°F/10°C |

*Consult factory for optional higher ambient models.

| LAMP TYPE | WEIGHT LBS |
|-------------|------------|
| Berth Type | 2.2 |
| Berth Type | 2.8 |
| Mirror Type | 2.2 |
| Mirror Type | 2.8 |

DIMENSIONS



PROXCHANG 862



FEATURES

- Cast marine brass or copper free aluminum construction available.
- Neoprene gasket resists petroleum and provides a watertight seal.
- Silicone lubricant provided for cover screws and flange.
- Round or Square box types in surface or flush mounting.
- Double pole rotary switch rated at 20 amps.

APPLICATIONS

- Marine and watertight requirements

APPROVALS

- Conforms to IP66
- ABS

TECHNICAL SPECIFICATIONS

BOX/COVER/KNOB

Cast marine brass or copper free aluminum.

HARDWARE

Stainless steel.

GASKET

One piece neoprene.

ENTRIES

Standard undrilled. Up to 3/4" NPT through feed. 862 up to 3/4" NPT four way. See ENTRY OPTIONS for selections.

VOLTAGE AND CURRENT

20 Amp 120/240v AC
1 HP at 120v AC or 2 HP at 240v AC

MOUNTING

862/1869/1871

Surface, via two 1/4" mounting bolts (not included).

862F

Flush, via two 1/4" mounting bolts (not included).

ORDERING REFERENCES

| PART NUMBER | DESCRIPTION | WEIGHT LBS |
|-------------|------------------------------------|------------|
| 862B | BRASS, Surface Mount Round Box | 2.1 |
| 862BF | BRASS, Flush Mount Round Box | 3.0 |
| 1869B | BRASS, Surface Mount Two Gang Box | 4.5 |
| 1871B | BRASS, Surface Mount Square Box | 3.2 |
| 862A | ALUMINUM, Surface Mount Round Box | 0.9 |
| 1871A | ALUMINUM, Surface Mount Square Box | 1.2 |

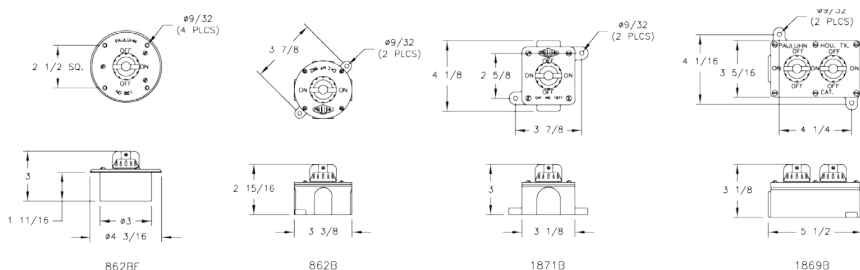
ENTRY OPTIONS

862 Version

| NPT Trade Size | Dead End | Thru Feed | 90 Degree | X-Positions |
|----------------|----------|-----------|-----------|-------------|
| 1/2" | E1 | C1 | L1 | X1 |
| 3/4" | E2 | C2 | L2 | X2 |

1869 & 1871 Versions

| NPT Trade Size | Dead End | Thru Feed |
|----------------|----------|-----------|
| 1/2" | E1 | C1 |
| 3/4" | E2 | C2 |



PROJ-BX-504



FEATURES

- Surface mounted round junction boxes.
- Heavy wall construction.
- Cast marine brass or copper free aluminum construction.
- One piece gasket provides a watertight seal.
- Two heavy duty mounting pads.
- Suitable for field drilling and tapping.
- Internal grounding lug with cup washer for stranded wiring.

| ALUMINUM | DIMENSIONS | WEIGHT LBS |
|----------|------------|------------|
| 504A | 3" Ø x 1½" | 0.7 |
| 527A | 4" Ø x 2" | 1.4 |
| 545A | 4" Ø x 3" | 2.2 |

ORDERING REFERENCES

| BRASS | DIMENSIONS | WEIGHT LBS |
|-------|-------------|------------|
| 504B | 3" Ø x 1½" | 1.8 |
| 518B | 2½" Ø x 1½" | 1.3 |
| 527B | 4" Ø x 2" | 3.5 |
| 545B | 4" Ø x 3" | 5.3 |

ENTRY OPTIONS

| Versions | NPT Trade Size | Dead End | Thru Feed | 90 Degree | X-Positions |
|-----------------|----------------|----------|-----------|-----------|-------------|
| 504/518/527/545 | 1/2" | E1 | C1 | L1 | X1 |
| 504/527/545 | 3/4" | E2 | C2 | L2 | X2 |
| 527/545 | 1" | E3 | C3 | L3 | X3 |
| 545 | 1 1/2" | E5 | C5 | L5 | X5 |

APPLICATIONS

- Marine and watertight requirements

APPROVALS

- Conforms to IP66
- ABS

TECHNICAL SPECIFICATIONS

BOX/COVER

| Box | Cover |
|----------------------|------------------------|
| Cast marine brass | Half hard yellow brass |
| Copper free aluminum | 5052H32 aluminum |

HARDWARE

Stainless steel.

ENTRIES

Standard units undrilled. Up to 1½" NPT. See ENTRY OPTIONS for selections.

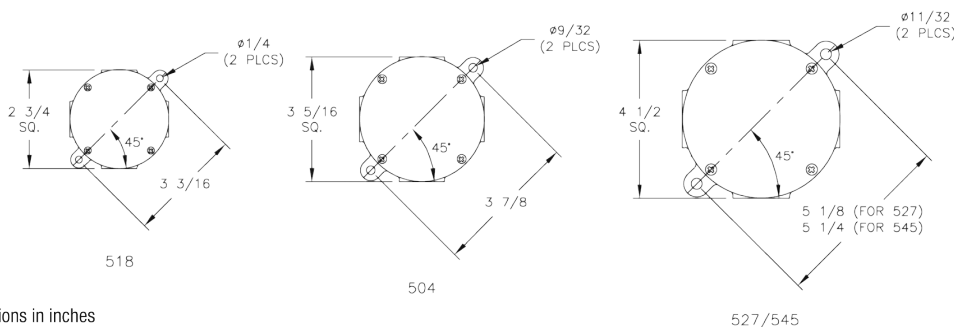
MOUNTING

Surface, via two mounting bolts (not included).
518 & 504 ¼" maximum
527 & 545 ⅝" maximum

GASKET

518 & 504 one piece neoprene
527 & 545 one piece silicone

DIMENSIONS



Dimensions in inches

PROCONNECT 420/FC/PP/MW



FEATURES

- Unique pin and sleeve design prevents accidental mating of non-marine rated devices.
- Voltage specific keyed ground pin assures proper mating.
- Non-metallic plugs with integral threaded ring maintain a watertight seal.
- Engineered plastic version of the Pauluhn brass 420 Series.
- Compatible with Pauluhn 20 Amp pin and sleeve devices
- Plugs, female connectors and sets of each are available.

ORDERING REFERENCES

| DESCRIPTION | PART NUMBER | | | | | | WEIGHT LBS |
|-----------------------|-------------|-------------|-------------|-----------|-------------|-------------|---------------|
| | 125 VOLT | 208 VOLT | 250 VOLT | 277 VOLT | 480 VOLT | 600 VOLT | |
| 2P3W Plug | 420PP-125 | N/A | 420PP-250 | 420PP-277 | 420PP-480 | N/A | 0.3 |
| 2P3W Female Connector | 422FC-125 | N/A | 422FC-250 | 422FC-277 | 422FC-480 | N/A | 0.3 |
| 2P3W Plug & Connector | 426PC-125 | N/A | 426PC-250 | 426PC-277 | 426PC-480 | N/A | 0.6 |
| 3P4W Plug | 420-4PP-125 | 420-4PP-208 | 420-4PP-250 | N/A | 420-4PP-480 | 420-4PP-600 | 0.3 |
| 3P4W Female Connector | 423FC-125 | 423FC-208 | 423FC-250 | N/A | 423FC-480 | 423FC-600 | 0.3 |
| 3P4W Plug & Connector | 426-4PC-125 | 426-4PC-208 | 426-4PC-250 | N/A | 426-4PC-480 | 426-4PC-600 | 0.6 |

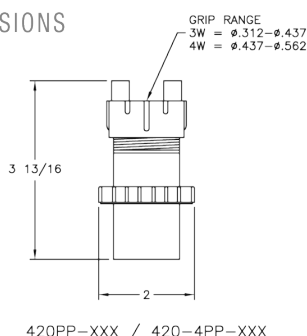
APPLICATIONS

- Wharfs and docking facilities
- Marine and watertight requirements
- Ship to shore power
- Dry dock temporary power usage

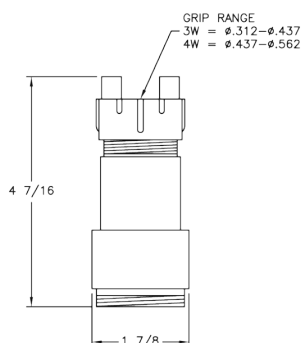
APPROVALS

- Conforms to IP66
- ABS

DIMENSIONS



Dimensions in inches



422FC-XXX / 423FC-XXX

TECHNICAL SPECIFICATIONS

BODY/CAP/RING

Acrylonitrile Butadiene Styrene/Polycarbonate blend (ABS+PC).

PINS AND SLEEVES

Free machining brass.

CORD GRIP GROMMET

One piece neoprene.

CABLE RANGES

2P3W - .437 - .312

3P4W - .563 - .437

VOLTAGE AND CURRENT

125v AC, 20 Amp max

208v AC, 20 Amp max

250v AC, 20 Amp max

277v AC, 20 Amp max

480v AC, 20 Amp max

600v AC, 20 Amp max

PROCONNECT 25B/MW



FEATURES

- Watertight straight blade ANSI NEMA type receptacle.
- Wall or surface mount.
- Accepts standard ANSI NEMA type plugs.
- Optional double pole rotary switch combinations.
- Available mating metal or nylon plugs with integral threaded ring maintain a watertight seal.
- Neoprene gasket resists petroleum.
- Cast marine brass or copper free aluminum construction available.
- Captive threaded receptacle cap.
- Heavy duty mounting pads.
- Silicone lubricant provided for cover screws and flange.
- Available in 125v AC and 250v AC.
- Receptacles will accept 15 or 20 Amp plugs.

APPLICATIONS

- Marine and watertight requirements

APPROVALS

- Conforms to IP66
- ABS

TECHNICAL SPECIFICATION

BOX/COVER

Cast marine brass or copper free aluminum.

CAPS/RING

Marine brass or zinc plated brass.

HARDWARE

Stainless steel.

GASKET

One piece neoprene.

ENTRIES

Standard units undrilled. Up to 3/4" NPT through feed available. See ENTRY OPTIONS for selections.

VOLTAGE AND CURRENT RECEPTACLE

15/20 Amp 125v AC ANSI NEMA 5-15/20R
15/20 Amp 250v AC ANSI NEMA 6-15/20R

VOLTAGE AND CURRENT SWITCH

20 Amp 120/240v AC
1 HP at 120v AC or 2 HP at 240v AC

VOLTAGE AND CURRENT PLUG

15 Amp 125v AC ANSI NEMA 5-15P
20 Amp 125v AC ANSI NEMA 5-20P
15 Amp 250v AC ANSI NEMA 6-15P
20 Amp 250v AC ANSI NEMA 6-20P

PLUG BODY

A Series: Zinc plated brass with a PBT enclosure
B Series: Brass with a PBT enclosure
N Series: Nylon

MOUNTING

Surface, via two maximum 1/4" mounting bolts (not included).

PROCONNECT 25B/MV

ORDERING REFERENCES

| PART NUMBER | DESCRIPTION | WEIGHT LBS |
|-------------|-----------------------------------|------------|
| 2583B-125 | BRASS, One Receptacle | 3.0 |
| 2584B-125 | BRASS, Two Receptacles | 4.0 |
| 2587B-125 | BRASS, One Receptacle with Switch | 4.0 |
| 2503B-125 | BRASS, 15 Amp Plug | 0.8 |
| 2506B-125 | BRASS, 20 Amp Plug | 0.8 |
| 2583A-125 | ALUMINUM, One Receptacle | 1.0 |
| 2584A-125 | ALUMINUM, Two Receptacles | 1.5 |
| 2503A-125 | ALUMINUM, 15 Amp Plug | 0.8 |
| 2506A-125 | ALUMINUM, 20 Amp Plug | 0.8 |

SPECIAL OPTIONS

-250* - 250v AC

*Replace -125 part number.

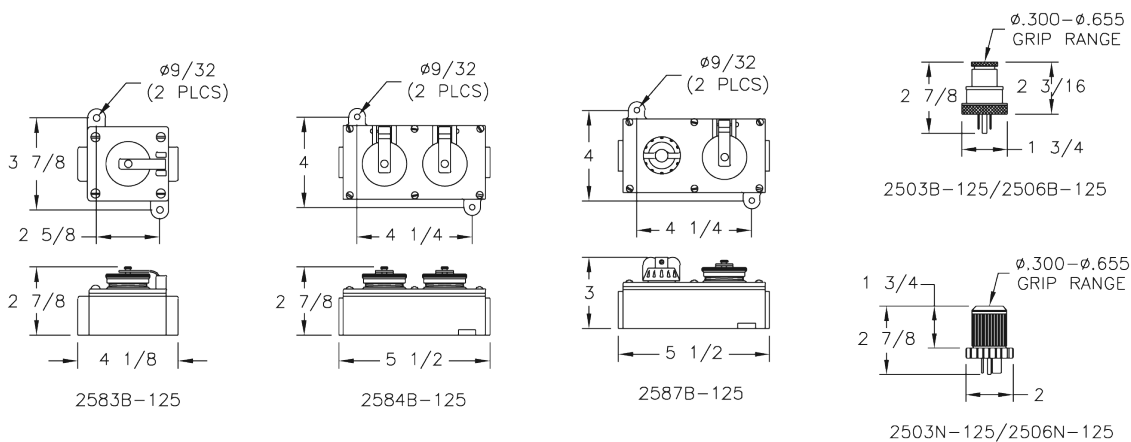
ENTRY OPTIONS

| NPT Trade Size | Dead End | Thru Feed |
|----------------|----------|-----------|
| 1/2" | E1 | C1 |
| 3/4" | E2 | C2 |

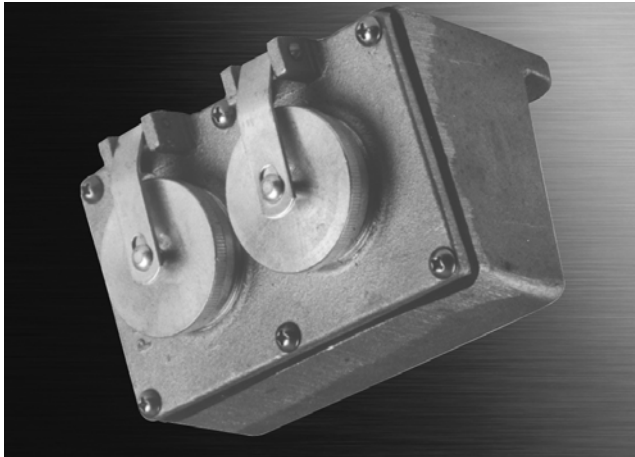
SPARE PARTS

| Part No. | Description | Part No. | Description |
|----------|---|------------|--|
| INX6526B | COVER, One Receptacle, BRASS | GKT4000 | GASKET, One Receptacle |
| INX6526A | COVER, One Receptacle, ALUMINUM | GKT5001 | GASKET, Two Receptacles or One with Switch |
| INX6527B | COVER, Two Receptacles, BRASS | INX3192 | SWITCH |
| INX6527A | COVER, Two Receptacles, ALUMINUM | INX3396 | INTERIOR, 15 AMP, Metal Plug 125V |
| INX6529B | COVER, One Receptacle with Switch, BRASS | INX3397 | INTERIOR, 15 AMP, Metal Plug 250V |
| INX6002B | BOX, One Receptacle, BRASS | INX3398 | INTERIOR, 20 AMP, Metal Plug 125V |
| INX6002A | BOX, One Receptacle, ALUMINUM | INX3399 | INTERIOR, 20 AMP, Metal Plug 250V |
| INX6003B | BOX, Two Receptacles or One with Switch, BRASS | 2506NR-125 | INTERIOR, 20 AMP, Nylon Plug 125V |
| INX6003A | BOX, Two Receptacles or One with Switch, ALUMINUM | 2506NR-250 | INTERIOR, 20 AMP, Nylon Plug 250V |
| INX8002B | KNOB AND SHAFT ASSEMBLY, BRASS | INX3181 | INTERIOR, Receptacle 125V |
| INX8002A | KNOB AND SHAFT ASSEMBLY, ALUMINUM | INX3182 | INTERIOR, Receptacle 250V |
| INX8008B | CAPS, BRASS | | |
| INX8008A | CAPS, ALUMINUM | | |

DIMENSIONS



PROCONNECT 25/MW



FEATURES

- Watertight straight blade ANSI NEMA type receptacle.
- Water shedding wall mount design.
- Accepts standard ANSI NEMA type plugs.
- Optional double pole rotary switch combinations.
- Available mating metal or nylon plugs with integral threaded ring maintain a watertight seal.
- Cast marine brass or copper free aluminum construction available.
- Captive threaded receptacle cap.
- Neoprene gasket resists petroleum.
- Heavy duty mounting pads.
- Silicone lubricant provided for cover screws and flange.
- Available in 125v AC and 250v AC.
- Receptacles will accept 15 or 20 Amp plugs.

APPLICATIONS

- Marine and watertight requirements

APPROVALS

- Conforms to IP66
- ABS

TECHNICAL SPECIFICATION

BOX/COVER

Cast marine brass or copper free aluminum.

CAPS/RING

Marine brass or zinc plated brass.

HARDWARE

Stainless steel.

GASKET

One piece neoprene.

ENTRIES

Standard units undrilled. Up to 3/4" NPT through feed available. See ENTRY OPTIONS for selections.

VOLTAGE AND CURRENT

RECEPTACLE

15/20 Amp 125v AC ANSI NEMA 5-15/20R
15/20 Amp 250v AC ANSI NEMA 6-15/20R

VOLTAGE AND CURRENT

SWITCH

20 Amp 120/240v AC
1 HP at 120v AC or 2 HP at 240v AC

VOLTAGE AND CURRENT

PLUG

15 Amp 125v AC ANSI NEMA 5-15P
20 Amp 125v AC ANSI NEMA 5-20P
15 Amp 250v AC ANSI NEMA 6-15P
20 AMP 250v AC ANSI NEMA 6-20P

PLUG BODY

A Series: Zinc plated brass with a PBT enclosure
B Series: Brass with a PBT enclosure
N Series: Nylon

MOUNTING

Surface, via two maximum 1/4" mounting bolts (not included).

PROCONNECT 25/MW

ORDERING REFERENCES

| PART NUMBER | DESCRIPTION | WEIGHT LBS |
|-------------|-----------------------------------|------------|
| 2590B-125 | BRASS, One Receptacle | 3.0 |
| 2592B-125 | BRASS, Two Receptacles | 5.0 |
| 2597B-125 | BRASS, One Receptacle with Switch | 4.0 |
| 2503B-125 | BRASS, 15 Amp Plug | 0.8 |
| 2506B-125 | BRASS, 20 Amp Plug | 0.8 |
| 2590A-125 | ALUMINUM, One Receptacle | 1.0 |
| 2592A-125 | ALUMINUM, Two Receptacles | 1.8 |
| 2503A-125 | ALUMINUM, 15 Amp Plug | 0.8 |
| 2506A-125 | ALUMINUM, 20 Amp Plug | 0.8 |
| 2503N-125 | NYLON, 15 Amp Plug | 0.5 |
| 2506N-125 | NYLON, 20 Amp Plug | 0.5 |

SPECIAL OPTIONS

-250* - 250v AC

*Replace -125 part number.

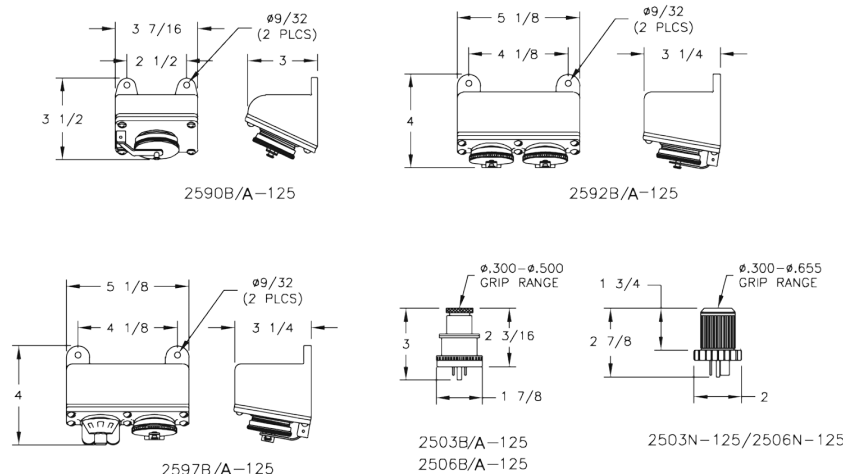
ENTRY OPTIONS

| NPT Trade Size | Dead End | Thru Feed |
|----------------|----------|-----------|
| 1/2" | E1 | C1 |
| 3/4" | E2 | C2 |

SPARE PARTS

| Part No. | Description |
|------------|---|
| INX6526B | COVER, One Receptacle, BRASS |
| INX6526A | COVER, One Receptacle, ALUMINUM |
| INX6527B | COVER, Two Receptacles, BRASS |
| INX6527A | COVER, Two Receptacles, ALUMINUM |
| INX6529B | COVER, One Receptacle with Switch, BRASS |
| INX6011B | BOX, One Receptacle, BRASS |
| INX6011A | BOX, One Receptacle, ALUMINUM |
| INX6012B | BOX, Two Receptacles or One with Switch, BRASS |
| INX6012A | BOX, Two Receptacles or One with Switch, ALUMINUM |
| INX8002B | KNOB AND SHAFT ASSEMBLY, BRASS |
| INX8002A | KNOB AND SHAFT ASSEMBLY, ALUMINUM |
| INX8008B | CAP, BRASS |
| INX8008A | CAP, ALUMINUM |
| GKT4000 | GASKET, One Receptacle |
| GKT5001 | GASKET, Two Receptacles or One with Switch |
| INX3192 | SWITCH |
| INX3396 | INTERIOR, 15 AMP, Metal Plug 125V |
| INX3397 | INTERIOR, 15 AMP, Metal Plug 250V |
| 2503NR-125 | INTERIOR, 15 AMP, Nylon Plug 125V |
| 2503NR-250 | INTERIOR, 15 AMP, Nylon Plug 250V |
| INX3398 | INTERIOR, 20 AMP, Metal Plug 125V |
| INX3399 | INTERIOR, 20 AMP, Metal Plug 250V |
| 2506NR-125 | INTERIOR, 20 AMP, Nylon Plug 125V |
| 2506NR-250 | INTERIOR, 20 AMP, Nylon Plug 250V |
| INX3181 | INTERIOR, Receptacle 125V |
| INX3182 | INTERIOR, Receptacle 250V |

DIMENSIONS



PROGUARD 717/718/BR/AL



FEATURES

- Available in 100w, 150w, and 300w incandescent or 18w, 26w and 32w compact fluorescent.
- High temperature silicone gaskets provide a watertight seal.
- Protective guard provided.
- A wide variety of globe materials and colors.

APPLICATIONS

- Ceiling mount type
- Marine and watertight requirements
- Dusttight requirements
- Freezer and refrigeration
- Pharmaceutical & additives formulation & processing
- Waste water treatment plants
- Bridge & pier lighting

APPROVALS

- Conforms to IP 66
- Marine Outside Type Saltwater
- ABS

STANDARDS

- UL 1598A - Luminaires for Marine Vessels

TECHNICAL SPECIFICATIONS

HOUSING

Cast copper free aluminum.

GUARD

Cast copper free aluminum.

HARDWARE

Stainless steel.

ENTRIES

Standard units undrilled. Up to 1" NPT four way available. See ENTRY OPTIONS for selections.

GASKETS

One piece silicone.

MOUNTING

Ceiling type.

LAMP HOLDER

Medium base, high temperature PBT. Nickel plated copper screw shell. Porcelain and shockproof optional. Compact fluorescent polycarbonate.

GLOBE

Glass, tempered glass or polycarbonate.

LAMP TYPE

Incandescent or 4 Pin compact fluorescent. Lamp not provided.

VOLTAGE

Incandescent rated to 300v.

Fluorescent rated to 120v 50/60Hz, optional 277v 50/60Hz.

TERMINAL BLOCK

Four pole or six pole optional for incandescent models only.

PROGUARD 717/718/BR/AL

ORDERING REFERENCES

| PART NUMBER | DESCRIPTION | LAMP MAX | WEIGHT LBS |
|-------------|---------------|------------|------------|
| 717A | Ceiling Mount | A-19 100w | 3.0 |
| 717A7 | Ceiling Mount | A-21 150w | 3.4 |
| F717A7-# | Ceiling Mount | CF | 3.7 |
| 718A | Ceiling Mount | PS-25 300w | 4.2 |

Enter compact fluorescent (CF) wattage desired: 18, 26 or 32.

SPECIAL OPTIONS

- K - Double Pole Toggle Switch
- P* - Porcelain Lamp Holder
- SP - Shockproof Lamp Holder
- T* - Terminal Block (4 pole)
- T6* - Terminal Block (6 pole)
- HR - Heat Resistant Clear Glass Globe
- FST - Frosted Globe
- PG** - Polycarbonate Clear Globe (Guard not provided)
- RG - Red Globe
- BLU - Blue Globe
- GRN - Green Globe
- YEL - Yellow Globe
- L - Shallow Dome Reflector
- N - Angle Dome Reflector
- 276 - 277V 60Hz (Compact fluorescent only)

*Not available with compact fluorescent.

**100w incandescent or compact fluorescent only.

ENTRY OPTIONS

| NPT Trade Size | Dead End | Thru Feed | 90 Degree | X-Positions |
|----------------|----------|-----------|-----------|-------------|
| 1/2" | E1 | C1 | L1 | X1 |
| 3/4" | E2 | C2 | L2 | X2 |
| 1" | E3 | C3 | L3 | X3 |

SPARE PARTS

| Part No. | Description | | |
|------------|---|------------|------------------------------------|
| FX5206 | BALLAST, 120VAC 50/60Hz | GKT2002SIL | GASKET, Globe 150w |
| FX5242 | BALLAST, 277VAC 50/60Hz | GKT1149SIL | GASKET, Globe 300w |
| INX3528 | LAMP, 100w Incandescent | GKT3000SIL | GASKET, Junction Box |
| INX3543 | LAMP, 150w Incandescent | INX1036A | GUARD, 100w 6" |
| INX3678 | LAMP, 200w Incandescent | INX1037A | GUARD, 150w 7" |
| INX3559 | LAMP, 300w Incandescent | INX1020A | GUARD, 300w 9" |
| FX3552 | LAMP, 18w Compact Fluorescent | INX6037A | JUNCTION BOX |
| FX3553 | LAMP, 26w Compact Fluorescent | CX3070 | TERMINAL BLOCK, 4 pole |
| FX3554 | LAMP, 32w Compact Fluorescent | CX3076 | TERMINAL BLOCK, 6 pole |
| INX4000 | LAMP HOLDER, Incandescent, Standard PBT | INX3012 | DOUBLE POLE TOGGLE SWITCH |
| INX4000P | LAMP HOLDER, Incandescent, Porcelain | GKT8000 | SWITCH BOOT |
| INX4000SP | LAMP HOLDER, Incandescent, Shockproof | INX4544 | REFLECTOR, Shallow Dome, 100w/150w |
| FX4030 | LAMP HOLDER, Compact Fluorescent, 18w | INX4546A | REFLECTOR, Shallow Dome, 300w |
| FX4034 | LAMP HOLDER, Compact Fluorescent, 26w & 32w | INX4539A | REFLECTOR, Angle Dome, 100w/150w |
| INX2006* | GLASS GLOBE, 100w 6" | INX4542A | REFLECTOR, Angle Dome, 300w |
| INX2007* | GLASS GLOBE, 150w 7" | | |
| INX2009* | GLASS GLOBE, 300w 9" | | |
| GKT2002SIL | GASKET, Globe 100w | | |

*Add one of the following suffix to the above part number to obtain the globe.

Clear Heat Resistant - HR Clear - CLR Green - GRN

Frosted - FST Red - RED Yellow - YEL Blue - BLU

PROGUARD 717/718/BR/AL



FEATURES

- Available in 100w, 150w and 300w incandescent or 18w, 26w and 32w compact fluorescent.
- High temperature silicone gaskets provide a watertight seal.
- Protective guard provided.
- A wide variety of globe materials and colors.

APPLICATIONS

- Ceiling mount type
- Marine and watertight requirements
- Dusttight requirements
- Military ships
- Coast guard rescue vessels
- Bridge & pier lighting

APPROVALS

- Conforms to IP66
- Marine Outside Type Saltwater
- ABS

STANDARDS

- UL 1598A - Luminaires for Marine Vessels

TECHNICAL SPECIFICATIONS

HOUSING

Cast marine brass.

GUARD

Cast marine brass.

HARDWARE

Stainless steel.

ENTRIES

Standard units undrilled. Up to 1" NPT four way available. See ENTRY OPTIONS for selections.

GASKETS

One piece silicone.

MOUNTING

Ceiling type.

LAMP HOLDER

Medium base, high temperature PBT. Nickel plated copper screw shell. Porcelain or shockproof optional. Compact fluorescent polycarbonate.

GLOBE

Glass, tempered glass or polycarbonate.

LAMP TYPE

Incandescent or 4-pin compact fluorescent. Lamp not provided.

VOLTAGE

Incandescent rated to 300v.
Compact fluorescent rated to 120v 50/60Hz, optional 277v 50/60Hz.

TERMINAL BLOCK

Four pole or six pole optional for incandescent models only.

PROGUARD 717/718/BR/AL

ORDERING REFERENCES

| PART NUMBER | DESCRIPTION | LAMP MAX | WEIGHT LBS |
|-------------|---------------|------------|------------|
| 717B | Ceiling Mount | A-19 100w | 6.5 |
| 717B7 | Ceiling Mount | A-21 150w | 7.0 |
| F717B7-# | Ceiling Mount | CF | 9.5 |
| 718B | Ceiling Mount | PS-25 300w | 9.5 |

Enter compact fluorescent (CF) wattage desired: 18, 26 or 32.

SPECIAL OPTIONS

| | |
|------|--|
| K | - Double Pole Toggle Switch |
| P* | - Porcelain Lamp Holder |
| SP | - Shockproof Lamp Holder |
| T* | - Terminal Block (4 pole) |
| T6* | - Terminal Block (6 pole) |
| HR | - Heat Resistant Clear Glass Globe |
| FST | - Frosted Globe |
| PG** | - Polycarbonate Clear Globe (Guard not provided) |
| RG | - Red Globe |
| BLU | - Blue Globe |
| GRN | - Green Globe |
| YEL | - Yellow Globe |
| L | - Shallow Dome Reflector |
| N | - Angle Dome Reflector |
| -276 | - 277v 60Hz (Compact fluorescent only) |

*Not available with compact fluorescent.

**100w incandescent or compact fluorescent only.

ENTRY OPTIONS

| NPT Trade Size | Dead End | Thru Feed | 90 Degree | X-Positions |
|----------------|----------|-----------|-----------|-------------|
| 1/2" | E1 | C1 | L1 | X1 |
| 3/4" | E2 | C2 | L2 | X2 |
| 1" | E3 | C3 | L3 | X3 |

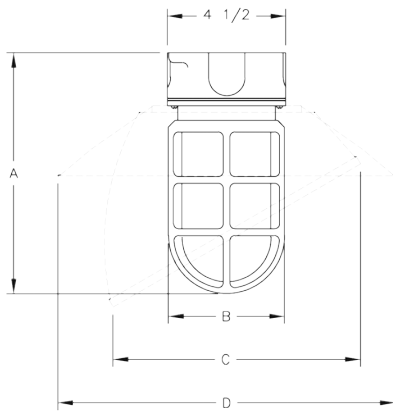
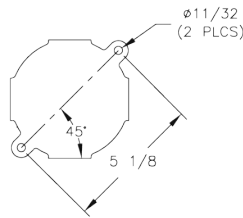
SPARE PARTS

| Part No. | Description | Part No. | Description |
|------------|---|----------|------------------------------------|
| INX1036B | GUARD, 100w 6" | INX3528 | LAMP, 100w Incandescent |
| INX1037B | GUARD, 150w 7" | INX3543 | LAMP, 150w Incandescent |
| INX1020B | GUARD, 300w 9" | INX3559 | LAMP, 300w Incandescent |
| FX5206 | BALLAST, 120VAC 50/60Hz | FX3552 | LAMP, 18w Compact Fluorescent |
| FX5242 | BALLAST, 277VAC 50/60Hz | FX3553 | LAMP, 26w Compact Fluorescent |
| GKT2002SIL | GASKET, Globe 100w | FX3554 | LAMP, 32w Compact Fluorescent |
| GKT2002SIL | GASKET, Globe 150w | INX4544 | REFLECTOR, Shallow Dome, 100w/150w |
| GKT1149SIL | GASKET, Globe 300w | INX4546B | REFLECTOR, Shallow Dome, 300w |
| GKT3000SIL | GASKET, Junction Box | INX4539B | REFLECTOR, Angle Dome, 100w/150w |
| INX4000 | LAMP HOLDER, Incandescent, Standard PBT | INX4542B | REFLECTOR, Angle Dome, 300w |
| INX4000P | LAMP HOLDER, Incandescent, Porcelain | INX3012 | DOUBLE POLE TOGGLE SWITCH |
| INX4000SP | LAMP HOLDER, Incandescent, Shockproof | GKT8000 | SWITCH BOOT |
| FX4030 | LAMP HOLDER, Compact Fluorescent, 18w | INX6037B | JUNCTION BOX |
| FX4034 | LAMP HOLDER, Compact Fluorescent, 26w & 32w | INX2006* | GLASS GLOBE, 100w 6" |
| CX3070 | TERMINAL BLOCK, 4 pole | INX2007* | GLASS GLOBE, 150w 7" |
| CX3076 | TERMINAL BLOCK, 6 pole | INX2009* | GLASS GLOBE, 300w 9" |

*Add one of the following suffix to the above part number to obtain the globe.
 Clear Heat Resistant - HR Clear - CLR Green - GRN
 Frosted - FST Red - RED Yellow - YEL Blue - BLU

PROGUARD 717/718/BR/AL

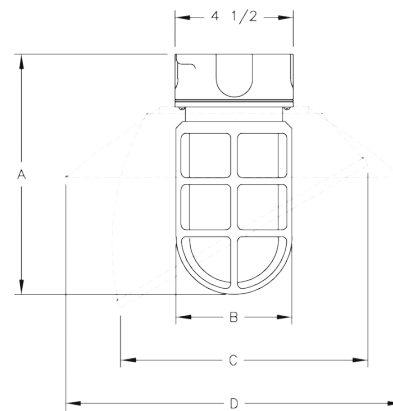
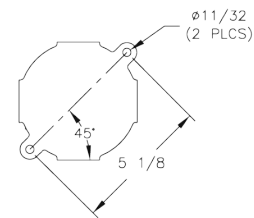
DIMENSIONS



Dimensions in inches

| Part No. | Dim A | Dim B | Option | |
|----------|---------|--------|---------|---------|
| | | | "N" | "L" |
| | | | Dim C | Dim D |
| 717A | 9 1/8" | 4 1/4" | 9 1/4" | 12 1/2" |
| 717A7 | 9 7/8" | 4 1/4" | 9 1/4" | 12 1/2" |
| 718A | 12 1/2" | 6" | 10 3/4" | 15 3/4" |

DIMENSIONS



Dimensions in inches

| Part No. | Dim A | Dim B | Option | |
|----------|---------|--------|---------|---------|
| | | | "N" | "L" |
| | | | Dim C | Dim D |
| 717B | 9 1/8" | 4 1/4" | 9 1/4" | 12 1/2" |
| 717B7 | 9 7/8" | 4 1/4" | 9 1/4" | 12 1/2" |
| 718B | 12 1/2" | 6" | 10 3/4" | 15 3/4" |

PROXCHANGE 833-834



FEATURES

- Single throw double pole snap switch.
- Cast marine brass construction.
- Neoprene gasket resists petroleum and provides a watertight seal.
- Heavy duty mounting pads.
- Silicone lubricant provided for cover screws and flange.
- Available in 15 or 20 Amp units.

APPLICATIONS

- Alarm/warning indication
- Marine and watertight requirements

APPROVALS

- Conforms to IP66
- ABS

TECHNICAL SPECIFICATIONS

BOX/COVER

Cast marine brass.

SWITCH STEM

Free machining brass.

HARDWARE

Stainless steel.

GASKET

One piece neoprene.

ENTRIES

Standard units undrilled. Up to four 3/4" NPT outlets available. See ENTRY OPTIONS for selections.

SWITCHES

Spring loaded double pole single throw.

VOLTAGE AND CURRENT

833:

- 15 Amp 125v AC
- 10 Amp 24v DC
- 2 Amp 125v DC

834:

- 20 Amp 600v AC
- 15 Amp 24v DC
- 5 Amp 125v DC

MOUNTING

833/834

Surface, via two 1/2" mounting bolts (not included).

833F/834F

Flush, via four 5/16" mounting bolts (not included).

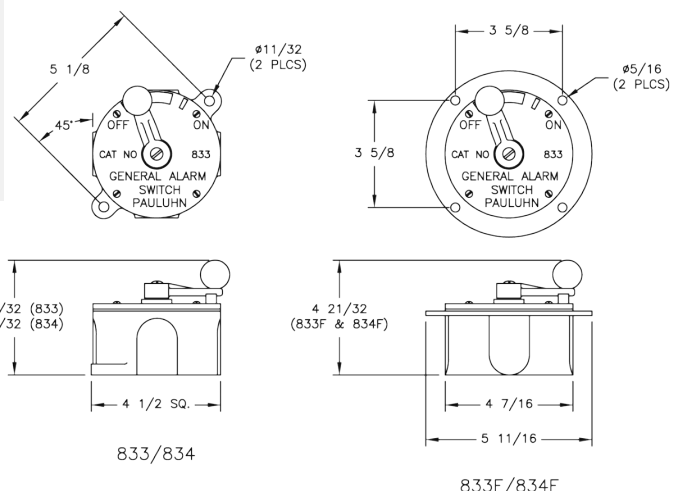
ORDERING REFERENCES

| PART NUMBER | DESCRIPTION | WEIGHT LBS |
|-------------|------------------------------|------------|
| 833 | 15 Amp 120v AC Surface Mount | 5.0 |
| 834 | 20 Amp 600v AC Surface Mount | 6.0 |
| 833F | 15 Amp 120v AC Flush Mount | 5.0 |
| 834F | 20 Amp 600v AC Flush Mount | 6.0 |

ENTRY OPTIONS

| NPT Trade Size | Dead End | Thru Feed | 90 Degree | X-Positions |
|----------------|----------|-----------|-----------|-------------|
| 1/2" | E1 | C1 | L1 | X1 |
| 3/4" | E2 | C2 | L2 | X2 |

DIMENSIONS



Dimensions in inches

BARRICADE WARNING LIGHTS



MODEL 100D6
5" diameter 360°
Lexan lens,
6" height.

**ALL BATTERY HOUSINGS ARE UV STABILIZED
FOR OUTDOOR DURABILITY.**

**SOLID-STATE CIRCUITRY PROVIDES EXTENDED BATTERY LIFE
AND IMPROVED TROUBLE FREE PERFORMANCE.**

WHEN ORDERING SPECIFIC –

AMBER, RED OR GREEN, LENS COLOR.

VOLTAGE 6 OR 12 VDC

“F” – FOR FLASHING

“C” – FOR CONSTANT BURNING LIGHT

“PC” – FOR PHOTOCELL ON/OFF SWITCH

“MAG” – FOR MAGNETIC BASE

Does not meet UL 1104

L.E.D. FLOODLIGHT



TBFLOOD-10W-LED-12VDC

This 10 Watt Medium Beam (130 degrees) LED Flood Light provides an excellent light source for industrial applications replacing high maintenance incandescent and expensive High Pressure Sodium & Metal Halide sources.

Because LED does not contain toxic Mercury, your lighting is much safer. These LED lamps have an average lifetime of 50,000 hours, giving you many years of maintenance-free usage.

SPECIFICATIONS:

Body Material: Aluminum die casting
Dimensions: 4 1/2" w x 3 1/2" h x 3 1/4" d
Color: White
Average Life: 50,000 Hours
Wattage: 10 Watts
Lumens: 700 lm
Viewing Angle: 130 Degrees
Voltage: 12 VDC
DC model polarity Protected
IP Degree: IP65 = Dust and water jet protection
Ambient Temperature Range: -40 + 60C



TBFLOOD-30W-LED-12VDC

This 30 Watt Medium Beam (130 degrees) LED Flood Light provides an excellent light source for industrial applications replacing high maintenance incandescent and expensive High Pressure Sodium & Metal Halide sources.

Because LED does not contain toxic Mercury, your lighting is much safer. These LED lamps have an average lifetime of 50,000 hours, giving you many years of maintenance-free usage.

SPECIFICATIONS:

Body Material: Aluminum die casting
Dimensions: 9" w x 7 1/2" h x 5 1/2" d
Color: White
Average Life: 50,000 Hours
Wattage: 30 Watts
Lumens: 2100 lm
Viewing Angle: 130 Degrees
Voltage: 12 VDC
DC model polarity Protected
IP Degree: IP65 = Dust and water jet protection
Ambient Temperature Range: -40 + 60C



TBFLOOD-50W-LED-12VDC

This 50 Watt Medium Beam (130 degrees) LED Flood Light provides an excellent light source for industrial applications replacing high maintenance incandescent and expensive High Pressure Sodium & Metal Halide sources.

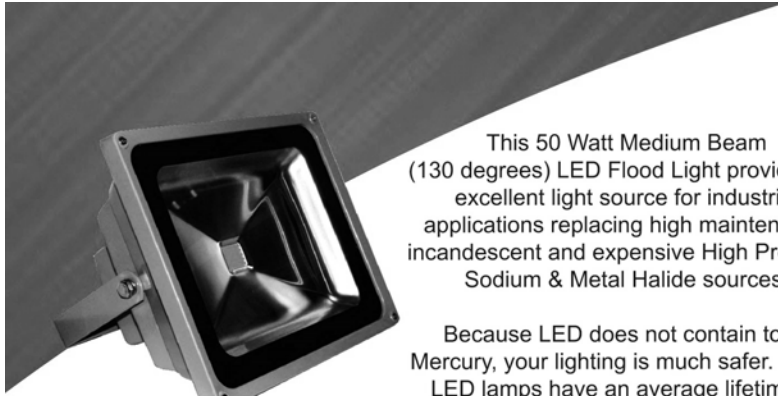
Because LED does not contain toxic Mercury, your lighting is much safer. These LED lamps have an average lifetime of 50,000 hours, giving you many years of maintenance-free usage.

SPECIFICATIONS:

Body Material: Aluminum die casting
Dimensions: 11 1/2" w x 9 1/2" h x 6 1/2" d
Color: White
Average Life: 50,000 Hours
Wattage: 50 Watts
Lumens: 3500 lm
Viewing Angle: 130 Degrees
Voltage: 12 VDC
DC model polarity Protected
IP Degree: IP65 = Dust and water jet protection
Ambient Temperature Range: -40 + 60C



L.E.D. FLOODLIGHT



TBFLOOD-50W-LED-120VAC

This 50 Watt Medium Beam (130 degrees) LED Flood Light provides an excellent light source for industrial applications replacing high maintenance incandescent and expensive High Pressure Sodium & Metal Halide sources.

Because LED does not contain toxic Mercury, your lighting is much safer. These LED lamps have an average lifetime of 50,000 hours, giving you many years of maintenance-free usage.

SPECIFICATIONS:

Body Material: Aluminum die casting
Dimensions: 11 1/2" w x 9 1/2" h x 6 1/2" d
Color: White
Average Life: 50,000 Hours
Wattage: 50 Watts
Lumens: 3800 lm
Viewing Angle: 130 Degrees
Voltage: 85 to 260 VAC
DC model polarity Protected
IP Degree: IP65 = Dust and water jet protection
Ambient Temperature Range: -40 + 60C



TBFLOOD-80W-LED-120VAC

This 80 Watt Medium Beam (130 degrees) LED Flood Light provides an excellent light source for industrial applications replacing high maintenance incandescent and expensive High Pressure Sodium & Metal Halide sources.

Because LED does not contain toxic Mercury, your lighting is much safer. These LED lamps have an average lifetime of 50,000 hours, giving you many years of maintenance-free usage.

SPECIFICATIONS:

Body Material: Aluminum die casting
Dimensions: 14" w x 11" h x 5" d
Color: White
Average Life: 50,000 Hours
Wattage: 80 Watts
Lumens: 5800 lm
Viewing Angle: 130 Degrees
Voltage: 85 to 260 VAC
DC model polarity Protected
IP Degree: IP65 = Dust and water jet protection
Ambient Temperature Range: -40 + 60C



TBFLOOD-100W-LED-120VAC

This 100 Watt Medium Beam (130 degrees) LED Flood Light provides a VERY BRIGHT light source for industrial applications replacing high maintenance incandescent and expensive High Pressure Sodium & Metal Halide sources.

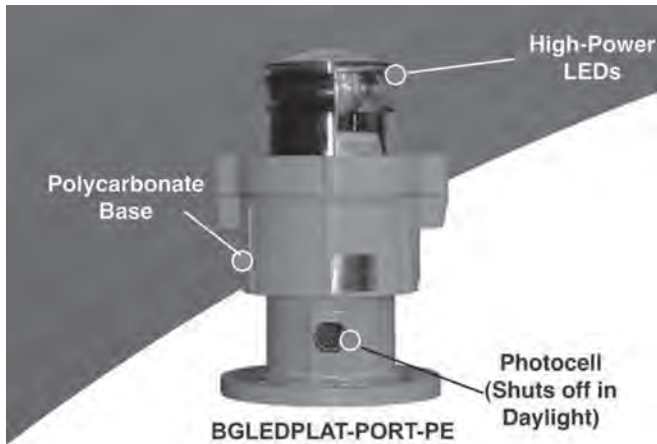
Because LED does not contain toxic Mercury, your lighting is much safer. These LED lamps have an average lifetime of 50,000 hours, giving you many years of maintenance-free usage.

SPECIFICATIONS:

Body Material: Aluminum die casting
Dimensions: 14" w x 11" h x 5" d
Color: White
Average Life: 50,000 Hours
Wattage: 100 Watts
Lumens: 7000 lm
Viewing Angle: 130 Degrees
Voltage: 85 to 260 VAC
DC model polarity Protected
IP Degree: IP65 = Dust and water jet protection
Ambient Temperature Range: -40 + 60C



BGLEDPLAT LED BARGE NAVIGATION LIGHTS



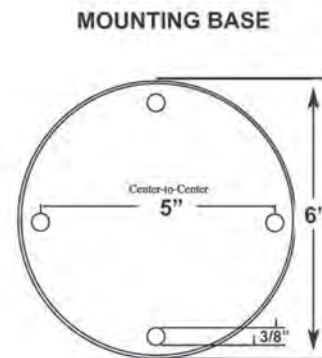
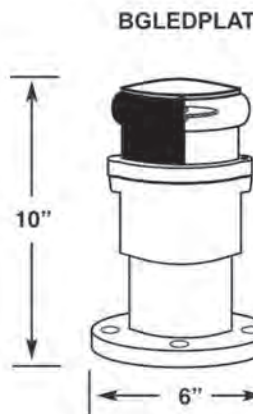
Platform-mounted barge navigation lights enable you to use your own power source.

Get 18 months of light on one 12 volt air alkaline battery.



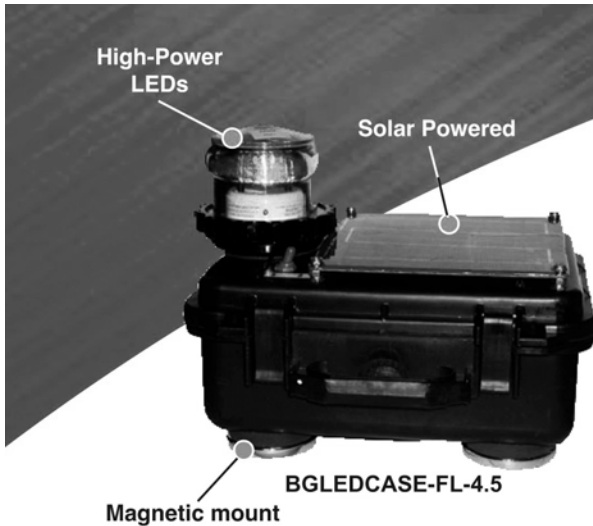
SPECIFICATIONS:

| | |
|----------------------|---------------------------------------|
| Range: | 3 nautical miles |
| Mount: | Magnetic or Flat Mount |
| Light Source: | High-power LEDs |
| Material: | High-impact polycarbonate |
| Battery Life: | 18 months on 12V air alkaline battery |
| Power Source: | 12, 24 VDC; 120, 220 VAC |
| Weight: | 5 lbs. |
| Dimensions: | 10"h x 6" dia. |





BGLEDCASE SOLAR LED BARGE NAVIGATION LIGHTS



Certified to meet requirements for unmanned barges per UL 1104

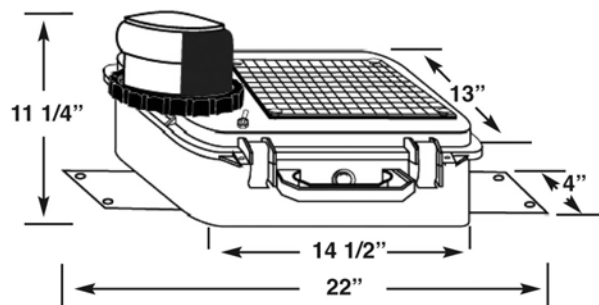
The most advanced solar barge navigation light available. Enjoy years of service with no maintenance and get the power of the sun.

SPECIFICATIONS:

| | |
|----------------------|---|
| Range: | 3 nautical miles |
| Mount: | Magnetic or Flat Mount |
| Light Source: | LEDs rated up to 20,000 hrs. |
| Material: | High-impact polycarbonate |
| Battery Life: | Rechargeable, 2 - 4 years |
| Autonomy: | 25 sunless days |
| Weight: | 22 lbs. |
| Dimensions: | 11 1/4" h x 13" w x 14 1/2" l - Mag 11 1/4" h x 13" w x 22" l - Flat |



BGLEDCASE-4.5





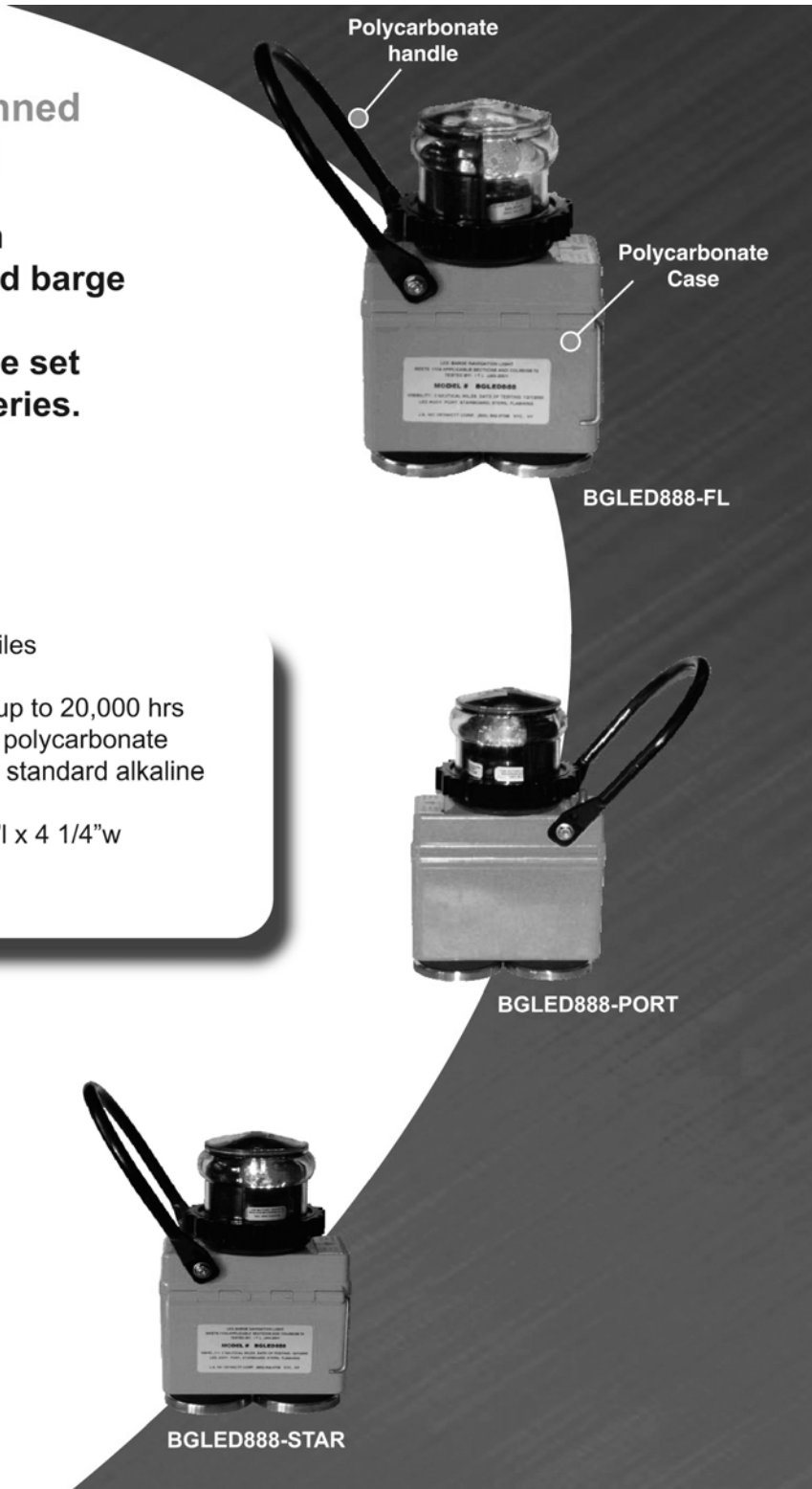
BGLED888 LED BARGE NAVIGATION LIGHTS

Certified to meet requirements for unmanned barges per UL 1104

The market leader in lightweight, rugged, certified barge navigation lights.
Runs for 30 nights on one set of standard alkaline batteries.

SPECIFICATIONS:

| | |
|----------------------|--------------------------------|
| Range: | 3 nautical miles |
| Mount: | Magnetic |
| Light Source: | LEDs rated up to 20,000 hrs |
| Material: | High-impact polycarbonate |
| Battery Life: | 30 nights on standard alkaline |
| Weight: | 7 lbs. |
| Dimensions: | 11 1/2" h x 7" l x 4 1/4" w |



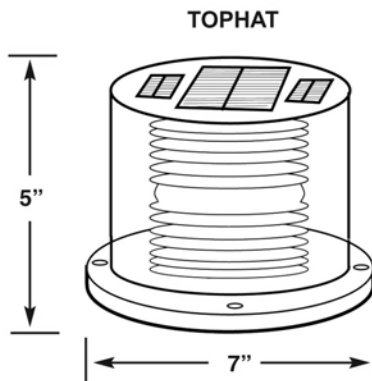


TOPHAT SERIES SOLAR LIGHTS

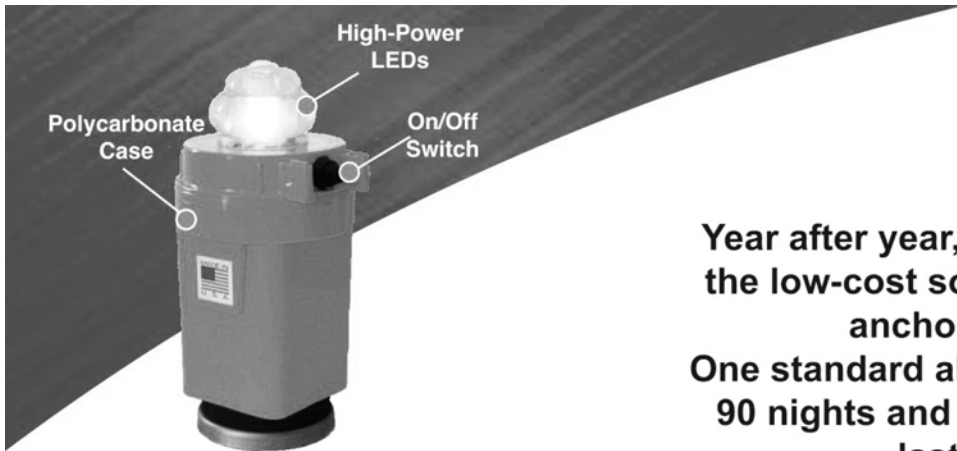
The most versatile, low-cost, solar solution for stand-alone locations. McDermott Tophats combine solar power with LED technology to provide years of maintenance-free operation.

SPECIFICATIONS:

- Range:** 1-3 miles available
- Mount:** Magnetic, Flat or Pipe Mount
- Lamp Source:** High-power LEDs
- Material:** High-impact polycarbonate
- Power Supply:** NI-MH
- Autonomy:** 10 nights with no sun
- Flash Rates:** 15, 24, 30, 60 flashes per minute
- Weight:** 2 lbs.
- Dimensions:** 5" h x 7" dia.

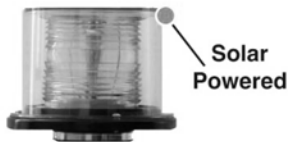


ANCHOR LIGHTS LED ANCHOR LIGHTS



ANCHOR-266-DELUX

Year after year, McDermott has been the low-cost solution for your barge anchor light needs. One standard alkaline battery will last 90 nights and our solar Tophat will last for years.



ANCHOR-TOPHAT

ANCHOR-266 SPECIFICATIONS:

| | |
|----------------------|------------------------------|
| Range: | 1 nautical mile |
| Mount: | Magnetic, Stand-alone |
| Light Source: | High-powered LEDs |
| Material: | High-impact polycarbonate |
| Battery Life: | 3 months, 6 months available |
| Weight: | 4 lbs. |



ANCHOR-888

Solar Bilge Alarm

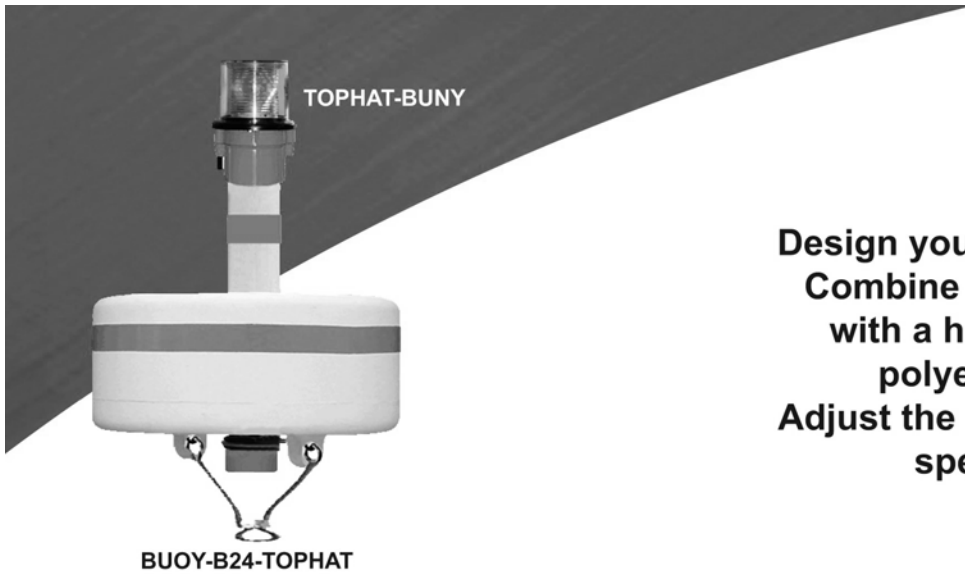
- Instant notification of emergency conditions
- High-decibel Siren
- High-intensity LED Strobe
- Can accept normally open or normally closed input circuits



ANCHOR-266



LIGHTED BUOYS



Design your own lighted buoy. Combine a McDermott light with a high-performance polyethylene base. Adjust the height to meet your specifications.



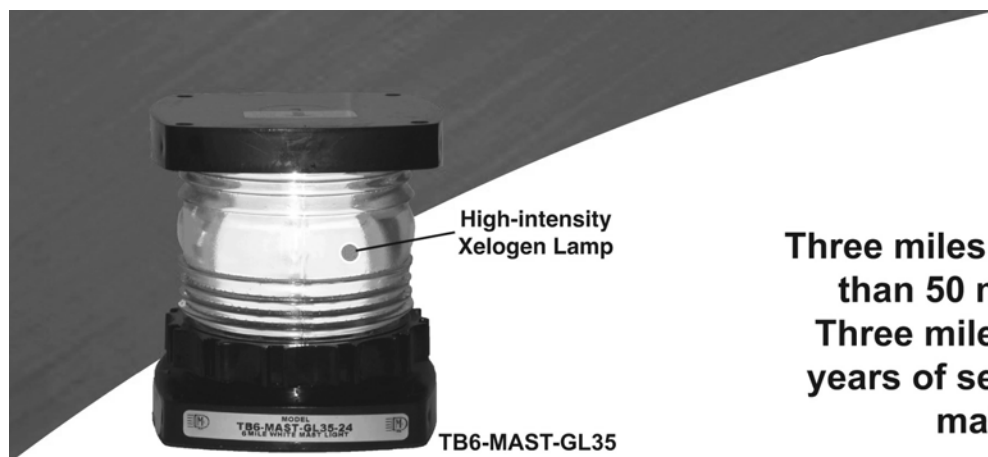
BUOY BASE SPECIFICATIONS:

- Material:** Polyethylene - Meets ASTM D4976 Group 2, Class 2, Grade 3
- Dimensions:** 10" h x 24" dia.
- Weight:** 20 lbs.
- Options:** Reflectorized tape, Foam-filled, Extension Collar
- Shipping:** Can be shipped via standard parcel services for low-cost, fast delivery.

Making Your Own Buoy Light Combination:



TB3/TB6 LED NAVIGATION LIGHTS



**Three miles for vessels greater than 50 meters in length.
Three miles of LED light for years of service and no bulb maintenance.**



TB3-TOW



TB3-PORT



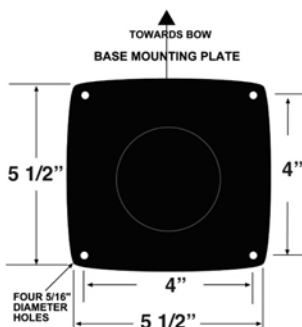
TB3-78-WHITE

TB6-MAST-GL35 SPECIFICATIONS:

Range: 5 or 6 nautical miles available
Mount: 5 1/2" x 5 1/2" Base; 4" x 4" holes on center
Light Source: High-intensity Xelogen Lamps
Material: High-impact polycarbonate
Visibility Arc: 225 degrees
Power Sources: 12, 24, 32 VDC; 120, 220 VAC
Weight: 6 lbs.
Dimensions: 6"h x 5 1/2"l x 5 1/2"w

TB3 SPECIFICATIONS:

Range: 3 nautical miles
Mount: 5 1/2" x 5 1/2" Base; 4" x 4" holes on center
Light Source: High-power LEDs
Material: High-impact polycarbonate
Visibility Arc: 112.5, 135, 360 degrees
Power Sources: 12, 24, 32 VDC; 120, 220 VAC
Weight: 2 lbs.
Dimensions: 6"h x 5 1/2"l x 5 1/2"w





TB2/TB5 LED NAVIGATION LIGHTS

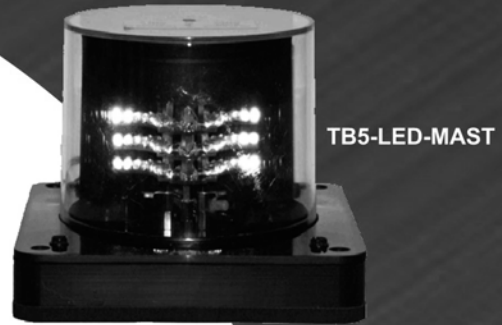
Switch to McDermott LED Navigation Lights and stop wasting money on light bulbs. Our LED lights can be used with most existing alarm panels making them a perfect option for retrofits.

LED MASTHEAD LIGHT SPECIFICATIONS:

Range: 5 or 6 miles available
Mount: 7" x 7" Base; 6" x 6" holes on center
Lamp Source: High-power LEDs
Material: High-impact polycarbonate
Visibility Arc: 225 degrees
Power Sources: 12, 24, 32 VDC; 120, 220 VAC
Weight: 4 lbs.
Dimensions: 6"h x 7"l x 7"w

TB2 SPECIFICATIONS:

Range: 2 nautical miles
Mount: 5 1/2" x 5 1/2" Base; 4" x 4" holes on center
Lamp Source: High-power LEDs
Material: High-impact polycarbonate
Visibility Arc: 112.5, 135, 360 degrees
Power Sources: 12, 24, 32 VDC; 120, 220 VAC
Weight: 3 lbs.
Dimensions: 5"h x 5 1/2"l x 5 1/2"w



LED FLOOD LIGHTS



LED Floodlights operate efficiently and save power but also reduce maintenance and service costs as a result of their long life. Conventional floodlights require frequent lamp replacement and routinely need service during critical work periods. LED Floodlights will help save costs and increase efficiency by ensuring that work will never be stopped due to missing, broken, or burned out bulbs.

Since LED Floodlights are not vibration sensitive nor do they have a light source that requires replacement, an extremely long life cycle is guaranteed. Additionally, LED Floodlights operate at a fraction of the temperature that conventional floodlights do and, therefore, are much safer to work with.

Our Floodlights are manufactured using the newest and most up to date components available. The LED Floodlights use ceramic base and chip technology. The drivers are rubber mounted to vibration resistant housings. All fasteners, rings, and nuts, including the bracket, are made of high-quality marine grade A4 316 stainless steel. Floodlights are available in a variety of wattages from 10-80 watts, the halogen equivalent of 50-700 watts.

A special ventilating gland is used in our manufacturing process to ensure that the air pressure inside the LED Floodlight housing will always be the same as the surrounding environment. This prevents fogging on both the inside and outside of the glass due to temperature differences.

The attractive grey or white finish is achieved by using a double powder coat polyester urethane finish, which eliminates the potential for corrosion from saltwater environments. All gaskets are specially designed and manufactured for use in harsh environments, and are saltwater, oil, and lubricant resistant. The high quality components used in the construction of our LED Floodlights ensures a lifetime of maintenance free performance.

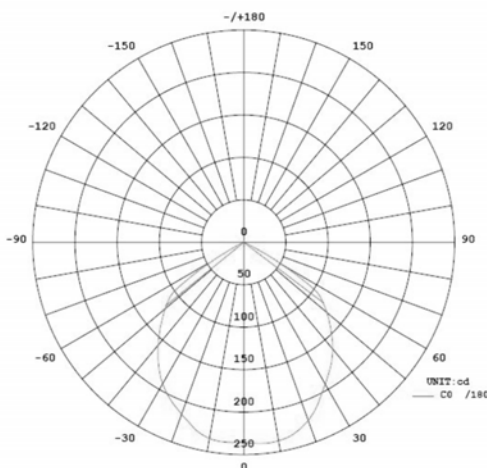
10 WATT LED FLOOD LIGHT



Specifications:

| | | |
|--------------------------------|---|-----------------------|
| Light Source: | 1x 10 Watt Ceramic LED | |
| Power Consumption: | 10 Watts | |
| Efficiency: | >90% | |
| Lumens per Watt: | 70 Lms/ Watt | |
| Beam Angle: | 80° | |
| LED Colors: | 3200K Warm White or 3900K Soft White | |
| Color Rendering Index: | >80 CRI | |
| Operating Voltage: | 10V-30V/DC Low Power Version - 85V~265V 50~60Hz / AC High Power Version | |
| Housing Material: | Aluminium: ZL102 Mn0.2~0.5, mg<=0.25, Si<=0.65 | |
| Hardware and Mounting Bracket: | A4 316 Stainless steel | |
| IP Rating: | IP67 | |
| Finish: | Double Powder Coated Grey or White | |
| Dimensions: | 114,5mm x 86 mm x 89mm (W x H x D) | |
| Certifications: | CE Certificate Number: B-E09110908 | Compliant with: |
| | EMC Directive 204/108/EC | UL1993 |
| | EN 55015: 2006+A1: 2007 | NMX-J-578/1 |
| | EN 61000-3-2: 2006/A2: 2009 | CSA C22.2 No. 1993-09 |
| | EN 61000-3-3: 2008 | |
| | EN 61547: 1995+A1: 2000 | |

Luminous Intensity Light Distribution Diagram 80°



Grey or White Finish

30 WATT LED FLOOD LIGHT

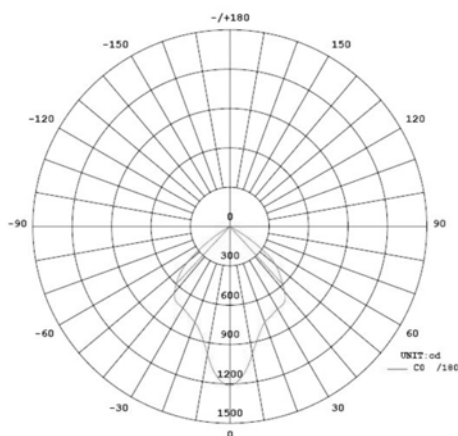


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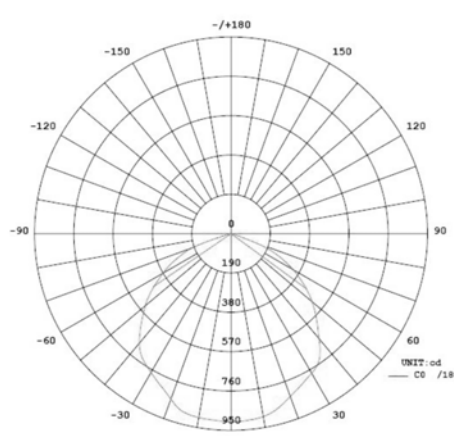
| | |
|--------------------------------|---|
| Light Source: | 1x 30 Watt Ceramic LED |
| Power Consumption: | 30 Watt |
| Efficiency: | >90% |
| Lumens per Watt: | 70 Lms/ Watt |
| Beam Angle: | 50° or 100° |
| LED Colors: | 3900K Soft White |
| Color Rendering Index: | >80 CRI |
| Operating Voltage: | AC85V~265V 50~60Hz |
| Housing Material: | Aluminium: ZL102 Mn0.2~0.5, mg<=0.25, Si<=0.65 |
| Hardware and Mounting Bracket: | A4 316 Stainless steel |
| IP Rating: | IP67 |
| Finish: | Double Powder Coated Grey or White |
| Dimensions: | 225mm x 185mm x135mm (W x H x D) |
| Certifications: | CE Certificate Number: B-E09110908 EMC Directive 204/108/EC EN 55015: 2006+A1: 2007 EN 61000-3-2: 2006/A2: 2009 EN 61000-3-3: 2008 EN 61547: 1995+A1: 2000 |

Compliant with:
UL1993
NMX-J-578/1
CSA C22.2 No. 1993-09

Luminous Intensity Light Distribution Diagram 50°



Luminous Intensity Light Distribution Diagram 100°



Grey or White Finish



50 WATT LED FLOOD LIGHT

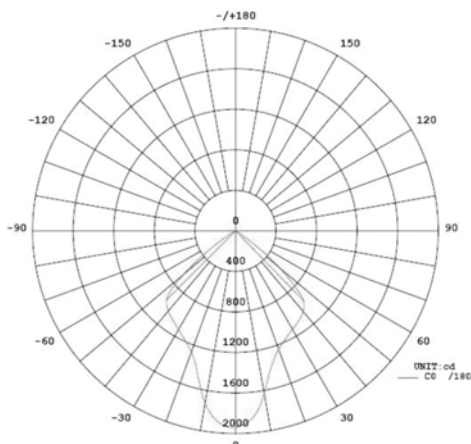


Specifications:

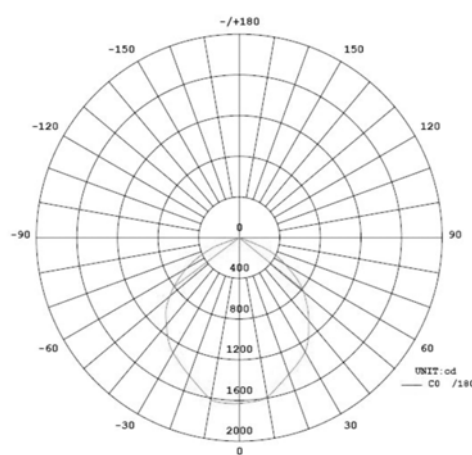
| | |
|--------------------------------|---|
| Light Source: | 1x 50 Watt Ceramic LED |
| Power Consumption: | 50 Watt |
| Efficiency: | >90% |
| Lumens per Watt: | 70 Lms/ Watt |
| Beam Angle: | 50° or 100° |
| LED Colors: | 3900K Soft White |
| Color Rendering Index: | >80 CRI |
| Operating Voltage: | AC85V~265V 50~60Hz |
| Housing Material: | Aluminium: ZL102 Mn0.2~0.5, mg<=0.25, Si<=0.65 |
| Hardware and Mounting Bracket: | A4 316 Stainless steel |
| IP Rating: | IP67 |
| Finish: | Double Powder Coated Grey or White |
| Dimensions: | 290mm x 236mm x160mm (W x H x D) |
| Certifications: | CE Certificate Number: B-E09110908 EMC Directive 204/108/EC EN 55015: 2006+A1: 2007 EN 61000-3-2: 2006/A2: 2009 EN 61000-3-3: 2008 EN 61547: 1995+A1: 2000 |

Compliant with:
UL1993
NMX-J-578/1
CSA C22.2 No. 1993-09

Luminous Intensity Light Distribution Diagram 50°



Luminous Intensity Light Distribution Diagram 100°



Grey or White Finish

80 WATT LED FLOOD LIGHT

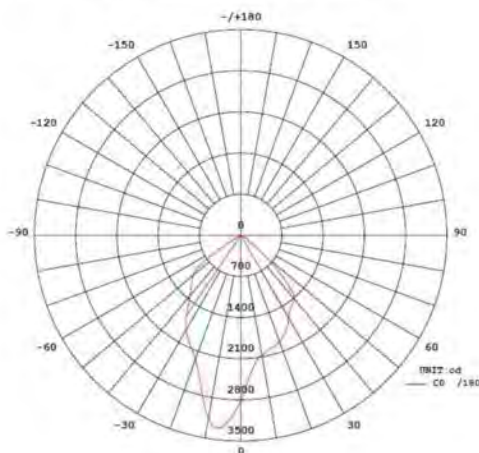


Specifications:

| | |
|--------------------------------|---|
| Light Source: | 1x 80 Watt Ceramic LED |
| Power Consumption: | 80 Watt |
| Efficiency: | >90% |
| Lumens per Watt: | 70 Lms/ Watt |
| Beam Angle: | 80° |
| LED Colors: | 3900K Soft White |
| Color Rendering Index: | >80 CRI |
| Operating Voltage: | AC85V~265V 50~60Hz |
| Housing Material: | Aluminium: ZL102 Mn0.2~0.5, mg<=0.25, Si<=0.65 |
| Hardware and Mounting Bracket: | A4 316 Stainless steel |
| IP Rating: | IP67 |
| Finish: | Double Powder Coated Grey or White |
| Dimensions: | 285mm x 360mm x115mm (W x H x D) |
| Certifications: | CE Certificate Number: B-E09110908 EMC Directive 204/108/EC EN 55015: 2006+A1: 2007 EN 61000-3-2: 2006/A2: 2009 EN 61000-3-3: 2008 EN 61547: 1995+A1: 2000 |

Compliant with:
UL1993
NMX-J-578/1
CSA C22.2 No. 1993-09

Luminous Intensity Light Distribution Diagram 80°



Grey or White Finish

LED FLOOD LIGHTS



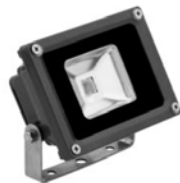
**80 Watt - 80°
11.2" x 14.2" x 4.5"**



**50 Watt - 50°/100°
11.4" x 9.3" x 6.3"**



**30 Watt - 50°/100°
8.9" x 7.3" x 5.3"**



**10 Watt - 80°
4.5" x 3.6" x 3.5"**

- Maintenance Free-
- 50,000 Hrs LED Life equal to 30 Yrs Service-
- 80-90% less Power Compared to Halogen-
- Vibration & Shock Mounted LED-
- Cool Running -

- Grey or White Finish-
- Aluminum Double Powder Coated Housing-
- Designed for Commercial Marine Use-
- Marine 316 Stainless Hardware and Bracket-
- Waterproof IP67 Rated • -1 Year Warranty-

- 50°/80°/100° Beam Angles-
- 3900 Kelvin Soft White Color Temperature-
- 85V to 265V AC - 50/60Hz Power Input-
- 10w also available in 12-30v ac/dc
- 70 Lumens per Watt-
- No UV Output = No Bugs-

- 10 Watt LED = 80 Watt Halogen-
- 30 Watt LED = 300 Watt Halogen-
- 50 Watt LED = 500 Watt Halogen-
- 80 Watt LED = 750 Watt Halogen-

These commercial LED Floodlights are attractive, cost-effective, green generation lights designed for the workboat and commercial marine industries. A lifetime of dependable and maintenance free performance can be expected.

With their 80-90% reduction in power consumption and expected 30 year life cycle, these lights provide green-generation, leading-edge technology over old fashioned flood lights.

Their instant-on, cool-running operation provides an efficient and dependable alternative to conventional filament style fixtures.

**Compliant with
UL 1993
NMX-J-578/1
CSA C22.2 No. 1993-09
CE B-E09110908**

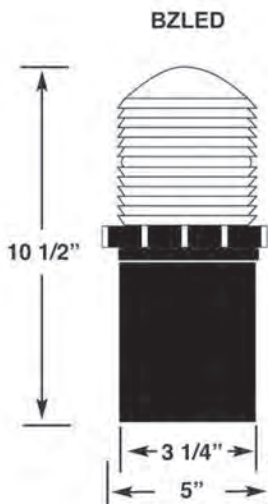
**DREDGE LIGHTS
DREDGE LINE LIGHTS**



Long-lasting, high-visibility dredge line marker lights. Whether your project spans two months or two years, we have the right light for you.

BZLED-DREDGE SPECIFICATIONS:

| | |
|----------------------|---------------------------------|
| Range: | 2 nautical miles |
| Mount: | Magnetic, Pipe or Flat Mount |
| Light Source: | High-power LEDs |
| Material: | High-impact polycarbonate |
| Battery Life: | 4 months on 6V alkaline battery |
| Flashrates: | 60 flashes per minute |
| Weight: | 3 lbs. |
| Dimensions: | 10 1/2" h x 3 1/4" dia. |





WORK VESTS



I223
The Force II™

Rugged work vest for all-around industrial use. Aquafoam™ flotation foam retains buoyancy even when punctured. Coated with strong, durable PVC.

- NEW! – Now with additional chest strap.
- Heavy-duty construction.
- Encircling belts with snag resistant buckles.
- SOLAS-grade reflective panels.
- Easy to clean.

Size: Adult Universal
Color: International Orange
Approval: USCG Type V Work Vest



NEW!

I223PKT
Pocket for The Force II™

- Set of two removable pockets to fit most models of vinyl-dip work vests.
- Front pocket made to hold a knife, snacks, etc.
- Made from tough 600D polyester with reflective tape.
- Large back pockets to accommodate radio and battery equipment, etc.

Color: International Orange



I110/I111
Ocean Mate I™

Type I flotation device complying with SOLAS 74/83 requirements. Features a minimum of 35 lbs. (150 Newtons) of buoyancy.

- Reversible offshore life jacket.
- Designed for quick donning.
- SOLAS-grade reflective panels.
- Stackable for easy storage.
- Heavy-duty stainless steel hardware.
- Attached SOLAS whistle.

Sizes: Adult I110 over 75 lbs. (34kg); Child I111 less than 90 lbs. (41 kg) provides minimum of 18 lbs. (80 Newtons) of buoyancy.
Color: International Orange
Approval: USCG Type I, complies with SOLAS 74/83 (I110 SOL and I111 SOL model non-reversible life jackets comply with SOLAS 74/83 only). Contact TIMCO for specific country approvals.



I310
The Work Force II™

Economical Type V commercial work vest features lightweight flotation foam encased in a heavy-duty nylon shell.

- Three-piece construction.
- Two quick-release Delrin® buckles.
- Lightweight, comfortable.
- SOLAS-grade reflective panels.

Size: Adult Universal
Color: International Orange
Approval: USCG Type V Work Vest

SEE PAGE 602 FOR SIZE CHART.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

WORK VESTS



I100/I102
Merchant Mate I™

Type I flotation designed to keep most unconscious wearers face-upward. Provides a minimum of 22 lbs. (98 Newtons) of buoyancy (adult).

- Offshore life jacket.
- Reversible for quick donning.
- SOLAS-grade reflective panels.
- Stackable for easy storage.
- Heavy-duty stainless steel hardware.

Sizes: Adult I100 over 90 lbs. (41 kg); Child I102 less than 90 lbs. (41 kg) provides minimum of 18 lbs. (80 Newtons) of buoyancy.

Color: International Orange

Approval: USCG Type I



I600
Merchant Mate II™ Vest

Non-reversible vest-style PFD designed for comfort and performance. Aquafoam™ flotation foam provides a minimum of 22 lbs. (98 Newtons) of buoy-

ancy.

- Offshore life jacket with encircling body belt.
- Foam-filled collar for additional head support.
- Hinged back panel.
- Heavy-duty 210 Denier nylon shell and lining.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective panels.
- Two chest adjusters for improving flotation angle.
- Special opening on back to accommodate most brands of fall protection harnesses.
- Velcro® patch on shoulder of vest to mount light for best visibility.
- Features a USCG-accepted whistle, with pocket for whistle and light storage.

Size: Adult Universal

Color: International Orange

Approval: USCG Type I

Also available without pocket and fall protection.



I222
The Work Master™

Our finest work vest that includes soft, comfortable closed-cell foam and encircling body belt with snag-resistant buckle for quick adjustment. Maximum comfort in a work vest.

- Hinged back panel.
- Marine mesh lining for breathability.
- Heavy-duty nylon shell.
- Flotation collar for added protection.
- 62 sq. in. (400-sq. cm.) of SOLAS-grade reflective tape.

Sizes: Adult Universal and Oversize

Color: International Orange

Approval: USCG Type III/V Work Vest



I404
The Ship Mate II™

Economical heavy-duty flotation vest with tough nylon shell and Vislon® zipper. Features side adjustments for secure fit.

- Aquafoam™ flotation foam.
- Marine mesh lining and roomy armholes.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective panels.

Size: Adult Universal

Color: International Orange

Approval: USCG Type III

SEE PAGE 602 FOR SIZE CHART.

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WORK VESTS



I405
Welder's Vest

Economical heavy-duty flotation vest with tough fiberglass shell and Vislon® zipper. Features side adjustments for secure fit.

- Aquafoam™ flotation foam.
- Marine mesh lining.
- Adjustable sides and roomy armholes.
- Features fiberglass front for marine welding.

Size: Adult Universal
Color: International Orange
Approval: USCG Type III



4185
Type III "SAR" Vest

Security and comfort for water rescue personnel. Fleece-lined handwarmer pockets with zippered and pleated gear storage compartments.

- Leg strap with storage pocket, three 2" wide adjustable belts, emergency whistle.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective panels.

Sizes: S, M, L, XL, XXL, XXXL, 4XL/7XL
Color: International Orange
Approval: USCG Type III



I460
The Work Boat™

Heavy-duty flotation vest features two adjustable belts for secure and comfortable fit.

- Oversize armholes for extra working freedom.
- Leg straps that tuck away in back pockets for added safety and improved in-water performance.
- Durable nylon shell.
- Marine mesh lining.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective tape.

Sizes: S, M, L, XL, XXL, XXXL
Color: International Orange
Approval: USCG Type III



I416
The Deck Hand II™

Heavy-duty flotation vests feature 10 flotation panels for a flexible, contoured fit. Rustproof Vislon® zipper and heavy-duty encircling body belt.

- Side adjustments.
- Tough nylon shell.
- Sized for a comfortable fit.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective panels.

Sizes: S, M, L, XL, XXL, XXXL; Foam design differs on 4XL/7XL
Color: International Orange
Approval: USCG Type III

SEE PAGE 602 FOR SIZE CHART.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

WORK VESTS



I465 The Versatile™

Stearns best selling, most versatile industrial flotation vest. Tough nylon shell with seven-piece foam design for all-day comfort. Features four roomy pockets with full hook-and-loop closures and rustproof Vislon® zipper.

- Multiple foam inserts for exceptional flexibility and freedom.
- Quick-adjust side tabs and rustproof zipper for secure fit and comfort.
- SOLAS-grade reflective panels.
- Eyelets for attaching lights, badge, etc.

Sizes: S, M, L, XL, XXL, XXXL

Color: International Orange

Approval: USCG Type III



4165 Professional Series™ Sportsvest

- Two adjustable belts on each side with Delrin® slides for secure fit.
- Mesh lining, seven-piece hinged foam design.
- Gusseted chest pockets with flap and hook-and-loop closure for convenient storage.
- Lower gusseted pockets with flap and hook-and-loop closures over side-entry handwarmer pocket.
- D-ring.

Sizes: S, M, L, XL, XXL, XXXL

Color: Forest Green

Approval: USCG Type III



I422 First Mate™

Quality and value in a popular, four-pocket style flotation vest.

- Soft, comfortable flotation foam for all-day wear.
- Adjustable side tabs for a quick, contoured fit.
- Hook-and-loop closure on pockets.
- Contoured foam cut.
- Sturdy D-ring.
- Strong, Vislon® zipper.

Sizes: S/M, L/XL, XXL, XXXL, 4XL/7XL

Color: International Orange

Approval: USCG Type III

SEE PAGE 602 FOR SIZE CHART.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



WORK VESTS



I624
The Deck Hand™

Heavy-duty flotation vest with soft, lightweight mesh designed for comfort and ventilation. Has rustproof Vislon® zipper and heavy-duty encircling body belt.

- Tough, nylon oxford outershell material.
- One 1" encircling body belt and side adjusters for secure fit.
- Light, durable Crosstech™ flotation foam
- SOLAS-grade reflective tape.

Sizes: S, M, L, XL, XXL, XXXL

Color: International Orange

Approval: USCG Type III



I426
“SAR” Flotation Vest

We took our Search and Rescue (SAR) vest and added a soft, lightweight mesh design for comfort and ventilation. Soft Aquafoam™ combined with durable Crosstech® foam adds extra comfort.

- Two 1-1/2" encircling belts, adjustable chest strap and zipper front for optimal fit and security.
- Two pockets with hook-and-loop closure.
- Rolled, stand-up collar.
- D-rings for attaching gear.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective tape.

Sizes: S, M, L, XL, XXL, XXXL

Color: International Orange

Approval: USCG Type III



4260
Comfort Series™ Collared Angler's Vest

- Two adjustable belts, zipper-front.
- Soft Aquafoam™ and durable Crosstech® flotation foam.
- Unique open shoulder design with the comfort and flexibility of a neoprene collar.
- Soft, lightweight mesh for ventilation.
- Mesh pleated pockets with flap, and hook-and-loop closures over side-entry hand warmer pockets.
- D-ring.

Sizes: S, M, L, XL, XXL, XXXL

Color: Royal Blue, Forest Green

Approval: USCG Type III

SEE PAGE 602 FOR SIZE CHART.

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WORK VESTS



I424 Utility Flotation Vest

The Comfort Series™ utility vest is specially designed with soft, lightweight mesh on the upper half of the vest for comfort and ventilation.

- Tough, nylon oxford outershell material.
- Two 1" encircling body straps with zipper front for a secure fit.
- Two pockets with hook-and-loop closure.
- Light, durable Crosstech® flotation foam.
- D-rings for attaching gear.
- SOLAS-grade reflective tape.

Sizes: S, M, L, XL, XXL, XXXL
Color: International Orange
Approval: USCG Type III



I424 with USCG markings



I424 with USCG Auxiliary markings

SEE PAGE 602 FOR SIZE CHART.

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INFLATABLES

1339 Ultra™ 3000 Inflatable Manual/Automatic

- Lightweight, comfortable design for improved range of motion
- Secumar® 3001 inflator
- Automatic inflation when submerged in water
- Manual inflation by pulling lanyard or by oral tube
- Minimum 33.7 lb. (150 Newton) buoyancy
- Tri-fold design for quick and easy repacking
- 2" encircling body belt and reflective tape
- Mesh bag included for easy storage
- USCG Approved Type V for use as a Type II

Universal Sizes
Colors: Royal Blue (BLU), Orange (ORG)
Order 0923 Re-arming Kit



0340 INFLATA-BELT™ Lite - Manual

- Compact design allows for increased comfort
- Halkey-Roberts 6F inflator
- Quick and reliable CO₂ inflation by pulling lanyard or by oral tube
- 15.5 lb. buoyancy (22.5 lb. with oral inflation)
- Turns most wearers face up when inflated
- Adjustable neck strap provided for second staged onning
- 1-1/2" adjustable belt
- Clear window to view arming status of inflator
- USCG Approved Type V for use as a Type III

Universal Sizes **Colors:** Navy (NVY)
DU Advantage® Max-4 HD™ (MX4)
Order 0925 Re-arming Kit



0575 INFLATA-BELT™ Max - Manual/Automatic

- Secumar® 3001 inflator
- Automatic inflation when submerged in water
- Manual inflation by pulling lanyard or by oral tube
- Minimum of 32 lb. buoyancy when fully inflated
- 1-1/2" heavy-duty adjustable waist belt and torso slide strap for a custom fit
- D-ring
- Second stage donning required
- USCG Approved Type V for use as a Type III

Universal Sizes **Colors:** Navy (NVY)
Order 0923 Re-arming Kit



SEE PAGE 602 FOR SIZE CHART.

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EHP® (Extended Hypothermia Protection®) JACKETS



I077 The Powerboat™

- The original bomber-style flotation jacket with increased comfort and mobility.
- Cut waist-length for freedom of movement.
- Sealed seams for wind and rain protection.
- Soft Suisse Aire™ foam with a coated nylon shell for stain resistance.
- Four roomy outer pockets, a sleeve utility pocket and an inside chest pocket all with hook-and-loop closure.
- Rib knit waistband and wristbands.
- SOLAS-grade reflective tape.
- Waterproof construction and design.
- Internal adjustable belt for secure fit.

Sizes: XS, S, M, L, XL, XXL, XXXL

Color: International Orange, Orange/Navy, Navy, Green

Approval: USCG Type III

I055 The Windward™

Flotation jacket features concealed hood, storm cuffs and sealed seams to keep out wind and water.

- Mid-thigh length for added foul weather protection.
- Comfortable Suisse Aire™ foam for flotation and insulation.
- Two-way Vislon® zipper with storm flap.
- Handwarmer and cargo pockets.
- Waterproof construction and design.

Sizes: S, M, L, XL, XXL, XXXL

Color: Forest Green

Approval: USCG Type III

CONVENIENT SAFE VFH RADIO CARRY POUCHES ARE ALSO AVAILABLE FROM TIMCO

SEE PAGE 602 FOR SIZE CHART.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



EHP® (Extended Hypothermia Protection®) Coveralls



I580 The Challenger™ Anti-Exposure Work Suit

- The most comfortable, anti-exposure, flotation coverall available.
- Features sealed seams for 100% seam integrity and a full range of motion.
- Provides all-day comfort in the world's most demanding sea environments.
- Wrist closures for a comfortable, watertight fit.
- Insulated hood to keep wind and rain out.
- Inflatable head support.
- Generous roomy pockets plus hand warmer pockets.
- Adjustable waist belt.
- Leg zippers for easy on and off over work boots.
- Double layer of durable nylon fabric in seat and knees.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective tape.

Sizes: XS, S, M, L, XL, XXL, XXXL
Color: International Orange, Orange/Navy
Approval: USCG Accepted Type III/V (Anti-Exposure Coverall)

9

Available with special USCG markings.

Color: Available in Orange and Orange/Black



I580CGS available with special USCG markings.

Colors: Orange and Orange/Black

SEE PAGE 602 FOR SIZE CHART.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

BUOYS AND ACCESSORIES



I030

I030
30" Type IV Ring Buoy

I030REF
30" Type IV Ring Buoy
with Reflective Tape

I024
24" Type IV Ring Buoy

Industrial ring buoy. Molded from tough polyurethane plastic, this heavy-duty buoy resists common chemicals, marine oils and UV rays.

- Encircling rope is replaceable.
- Models I030 OOC and I030 RFC also available in softer polyethylene foam design.

Sizes: I030 and I030REF – 30" (76.2 cm); I024 – 24" (61 cm)

Color: I030 & I030REF – Orange; I024 – Orange & White

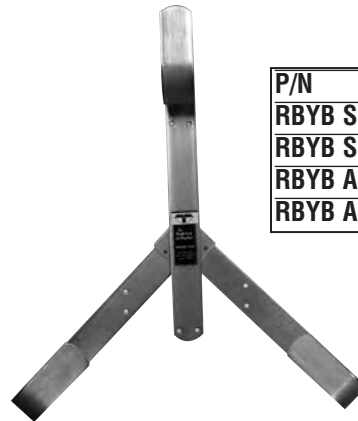
Approval: I030 and I024 – USCG Type IV.

I030REF - USCG Type IV and complies with SOLAS 74/83.

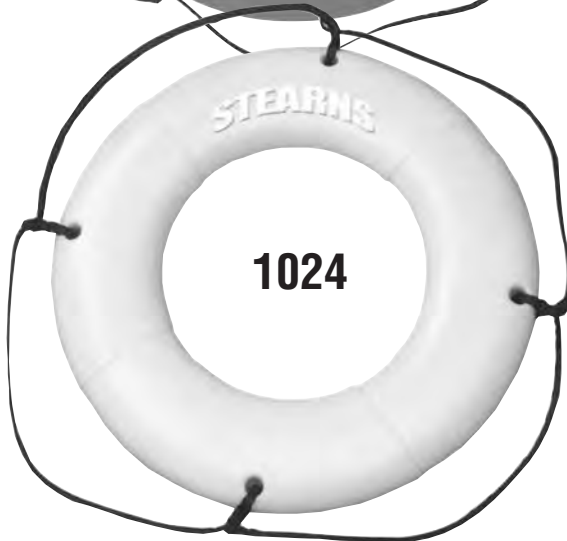


**I030
REF**

RING BUOY MOUNTING BRACKETS STAINLESS STEEL or ALUMINUM



| P/N | Description |
|------------|----------------------|
| RBYB SS 24 | Stainless Steel, 24" |
| RBYB SS 30 | Stainless Steel, 30" |
| RBYB AL 24 | Aluminum, 24" |
| RBYB AL 30 | Aluminum, 30" |



I024



REFLECTIVE TAPE
SOLD BY
THE ROLL OR
BY THE YARD

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IMMERSION SUITS



ITP1 Thermal Protective Aid™

Designed for hypothermia protection during prolonged exposure in life rafts or lifeboats. Waterproof polymer coated fabric has very low thermal conductivity to reduce heat loss in cold, wet conditions.

- Attached sleeves.
- Taped seams for added strength.
- Extra large sizing to fit over all clothing.
- 62 sq. in. (400 sq. cm.) of SOLAS-grade reflective tape.

Size: Adult Universal
Color: International Orange
Approval: USCG Type IV; Complies with SOLAS 74/83; UK (DOT).



Adult: Oversize
220-375 lbs.
(100-170 kg.)
Over 75" (191 cm) tall
Bag Color: Green



Adult: Universal
110-330 lbs.
(50-150 kg.)
From 59" to 75"
(150-191 cm) tall
Bag Color: Orange



I590 Cold Water Immersion Suit

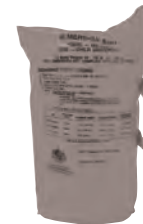
When lives are at stake, more maritime professionals worldwide rely on the Stearns® 1590 Cold Water Immersion Suit than any other immersion suit brand. Made with 5mm stretchable, flame-retardant Neoprene, the Stearns® 1590 provides quality anti-hypothermia protection.

- Face shield for spray protection.
- Insulated, attached five-finger gloves for dexterity.
- Inflatable head support.
- Light pocket to fit most brands of approved lights.
- Exceeds specifications for hypothermia protection.
- Features face seal and flap, five-finger attached gloves, water proof zipper and neoprene light pocket.
- Wrist and ankle adjustments.
- SOLAS-grade reflective tape and SOLAS whistle.
- Durable non-slip soles.
- All sizes provide a generous fit for easy donning.

Size: Child, Adult Small, Adult Universal, Oversize, each in their own color-coded storage bag.
Color: International Orange
Approval: I590 - USCG Type V; I590-MED (without inflatable head support) - European MED and complies with SOLAS 74/96 (contact TIMCO for specific country approvals).



Adult: Small
110-250 lbs.
(50-113 kg.)
From 58" to 68"
(147-173 cm) tall
Bag Color: Red



Child: Universal
44 to 110 lbs.
(20-50 kg.)
39" to 59"
(99-150 cm) tall
Bag Color: Yellow



RESCUE EQUIPMENT



I921 ACR Strobe Light

- High-intensity xenon strobe.
- Operates for 8 hours on 2 replaceable AA batteries.
- Durable polycarbonate case with manual switch.
- Includes 30-inch tether line and Velcro® backing.

Color: Orange
Approval: USCG/FAA (TSO-C85)



I915/I916 ACR Hemi Manual Switch/ Water Activated

- I916 – ACR Hemilight™ Water Activated**
- Bright, steady .75cd light.
 - Compact size.
 - Operates in either fresh or salt water.
 - Operating life exceeds 8 hours at -1°C (30°F).

Color: Yellow
Approval: USCG; Complies with SOLAS

THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



RESCUE EQUIPMENT



1020/1021/1022 Rescue Mate™ Rescue Bags

- 1020 – 50 feet of rope
- 1021 – 70 feet of rope
- 1022 – 100 feet of rope
- 1" reflective tape.
- 1000D Cordura® bag for durability.
- 3/8" braided, floating polypropylene rope.
- Repackable for multiple uses



1595 The Ice Rescue Suit™

- One-piece suit of 100% closed-cell neoprene provides optimum buoyancy and insulation.
- Designed for rescue operations in extreme cold water and ice conditions.
- Features face seal and flap, attached gloves, waterproof zipper and sealed seams.
- Reinforced knees and elbows for long-lasting durability.
- Integral chest harness with stainless steel D-rings, front and back.
- Thick-soled boot with tread.
- SOLAS-grade reflective panels, front and back, for high visibility.
- Individual bag for convenient storage.

Size: Small Adult, Adult Universal, Adult Oversize
Color: International Orange

SEE PAGE 602 FOR SIZE CHART.

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WV-9C WORK VEST

Model No: WV-9C

U.S.C.G. App# 160.053/95/0

Manufacturer: Taylortec, Inc.
 16152 East Club Deluxe Rd
 Hammond, LA 70403 USA + 1 985 542 6266

Description: Type V, flame resistant, inherently buoyant, 3 piece fabric covered foam work vest.

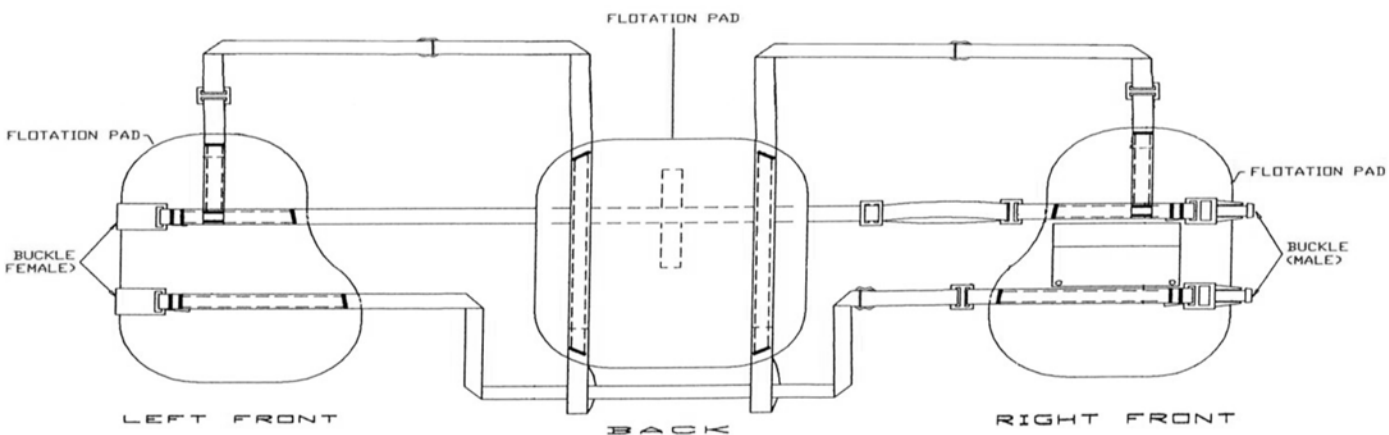
Packing: 15 work vests per box.

Materials: Polyethylene plastic foam, polyester cotton fiber pigmented with flame resistant acrylic top coating, 1" olive green cotton webbing with fire retardant sizing, aluminum slides, stainless steel buckles. Reflective tape is optional. All materials are U.S.C.G. and U.L. approved.

Color: International Orange

Buoyancy: Minimum required 17.5 lbs ± ½ lbs, our design exceeds this minimum requirement.

Weight: 1.2 lbs



Pads: 1 5/8" thick (± 1/4")

| Vest Size: | Regular | XL | XXL | XXXL |
|------------|---------|-----|-----|------|
| Shoulder | 9" | 13" | 16" | 18" |
| Chest | 62" | 68" | 74" | 80" |
| waist | 55" | 61" | 67" | 73" |

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PERSONAL FLOATATION TYPE I

| Flotation Device Classification | Use | Advantages |
|---------------------------------|---|---|
| Type I | Inherently buoyant PFDs | Off-shore, open or rough waters, coastal cruising, general boating |
| Type II | Inherently buoyant and inflatable type II PFDs | Inland waters or calm waters where fast rescue is likely; also suitable for open and rough waters |
| Type III | Inherently buoyant and inflatable type III PFDs | Inland waters or calm waters where fast rescue is likely |
| Type IV | Throwable device | Throwable in inland waters up to 40 feet |
| Type V | Inherent and inflatable type V PFDs | Special use - see PFD label |

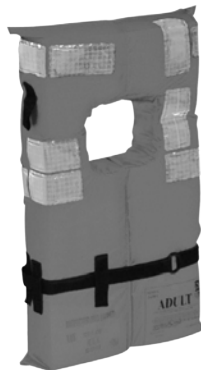
| PFD Sizes | |
|----------------|-----------------|
| <i>XS/S</i> | 28" - 32" chest |
| <i>S</i> | 32" - 36" chest |
| <i>S/M</i> | 32" - 40" chest |
| <i>M</i> | 36" - 40" chest |
| <i>M/L</i> | 32" - 42" chest |
| <i>L/XL</i> | 40" - 50" chest |
| <i>XL</i> | 45" - 50" chest |
| <i>XL-2XL</i> | 42" - 58" chest |
| <i>2XL</i> | 50" - 55" chest |
| <i>2XL/3XL</i> | 50" - 60" chest |
| <i>3XL</i> | 55" - 60" chest |

| | |
|-------------------------|-----------------|
| <i>Infant</i> | 0 - 50 lb |
| <i>Child</i> | 30 - 50 lb |
| <i>Youth</i> | 50 - 90 lb |
| <i>Workvest</i> | 32" - 54" chest |
| <i>Adult Universal</i> | 30" - 52" chest |
| <i>Adult Jumbo</i> | 38" - 60" chest |
| <i>Adult Magnum</i> | 48" - 65" chest |
| <i>Commercial Adult</i> | Over 90lb |
| <i>Commercial Child</i> | Under 90lb |

• 22"L x 12"W x 13"H Hassock Bag with Four 160RT Type I PFDs Part #: 69-1024

160RT/161RT Basic Ferry Boat PFD

- Designed to turn an unconscious person face-up
- Reversible yoke-style flotation device
- Min. 11 to 22 lb. of buoyancy and 110 square inches of SOLAS-grade reflective tape
- Stackable for easy storage
- Light loop and whistle attachments
- 160RT Adult Part #: 61-160RT-001
- 161RT Infant Part #: 61-161RT-001



230RT/2010

- Designed to turn an unconscious person face-up
- Ideal for ferries and cruise ships
- Foldable and stackable for easy storage
- Min. 40 lb. of buoyancy and fitted with a whistle
- USCG / SOLAS 230RT Part #: 61-230RT-001
- SOLAS / MED Premier 2010 Part #: 61-10572



198RT/199RT Type I Offshore PFD

- The most comfortable type I PFD on the market
- Min. 16 to 24 lbs. of buoyancy and 126 square inches of SOLAS-grade reflective tape
- 198RT Commercial Adult Part #: 61-198RT-001
- 199RT Commercial Child Part #: 61-199RT-001



PERSONAL FLOATATION TYPE II



320RT/321RT Industrial Economy Vest

- No body belts... perfect for snag-hazard environments
- Large armholes, open sides, side adjustment tabs
- Min. 15.5 lbs of buoyancy and heavy duty #10 YKK zipper
- 320RT: L/XL
Part #: 63-320RT-001-LX
- 321RT: S/M
Part #: 63-321RT-001-SM
- 320RT-4: L/XL with 4 front gusseted pockets
Part #: 63-320RT4-01-07
- 321RT-4: S/M with 4 front gusseted pockets
Part #: 63-321RT4-01-03



775RT/778RT General Purpose Industrial Vest

- 200 Denier polyester shell resists oil and UV deterioration
- Large armholes and open sides for maximum comfort
- Min. 15.5 lbs. of buoyancy
- Two encircling body belts and one chest strap
- 775RT Adult Universal
Part #: 63-775RT-001-AU
- 778RT: Adult X-Large
Part #: 63-778RT-001-AM



370ERV Emergency Response Vest

- 100MPH impact test rated
- Two gusseted storage pockets
- Flotation-filled comfort collar
- Min. 15.5 lbs of buoyancy
- Adjustable leg straps
- S/M Part #: 63-370ERV-01-SM
- L/XL Part #: 63-370ERV-01-LX
- 2XL/3XL Part #: 63-370ERV-01-23

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PERSONAL FLOATATION TYPE III

280RT/285RT Vinyl-Dipped Workvest

- Smooth, durable vinyl coating over Armacell™ contoured flotation foam panels
- Adjustable chest and shoulder straps
- Opening on back accomodates most harnesses
- SOLAS-grade reflective tape
- Min. 17.5 lbs of buoyancy
- Self-extinguishing
- 280RT Part #: 65-280RT-001
- 285RT (Heavy-duty metal buckles) Part #: 65-285RT-001



290RT Rigger I / 290EFRT Rigger II

- Both vests feature lightweight construction for wearer comfort
- Soft cotton twill covering draws sweat away from worker in Rigger I
- Durable 200 Denier polyester covering resists UV deterioration in Rigger II
- Two encircling belts with snag resistant buckles
- SOLAS-grade reflective tape
- Min. 17.5 lbs of buoyancy
- 280RT Rigger I Part #: 65-290RT-001
- 290EFRT Rigger II Part #: 65-290EFRT-001



300RT/305RT Versatile Workvest

- Collar design protects workers' shoulders while carrying items
- Two 1" body belts and one chest strap
- Min. 17.5 lbs of buoyancy
- Heavy-duty type V buckles
- SOLAS-grade reflective tape
- 300RT Adult Universal Part #: 65-300RT-001
- 305RT: Adult Magnum Part #: 65-305RT-001



310RT/315RT Deluxe Workvest

- SOLAS-grade reflective tape
- Collar design protects workers' shoulders while carrying items
- Four gusseted pockets reduce entanglement by hiding body belts
- Two 1" body belts and one chest strap
- Heavy-duty type V buckles
- Min. 17.5 lbs of buoyancy
- 310RT Adult Universal Part #: 65-310RT-001
- 315RT: Adult Magnum Part #: 65-315RT-001



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INDUSTRIAL INFLATABLES



DELUXE INFLATABLE PFD

GSA MD3085 (manual) / MD3087 (auto)

Our line of Deluxe Inflatable PFDs combine the advanced safety of inflatable technology with product enhancements, improved comfort features and a safety inspection window that easily shows if the inflator is ready for use.

FEATURES

- 35 lb (150 N) buoyancy when inflated
- Upgraded to 500D Cordura® for improved durability
- Zippered, splash-proof pocket for your phone, keys or license
- Bright yellow inflation cell with SOLAS reflective tape, safety whistle, and strobe light attachment
- D-ring
- Available in automatic or manual inflation
- **Order vLE for agency identification back flap**

OPTIONAL ACCESSORIES:

Accessory Pouch: MA6000
 Belt Extender: MA7637
 Leg Strap: MA3032

| BETTER FEATURES FOR 2012 | | | | | | | | | |
|--------------------------|---|--|-------------------|--|-------------------|--|----------------------------|--|------------------|
| SIZE | Adult Universal Age: 16 yrs+ Weight: 80 lbs+ (36.3 kg+) Chest: 30-52" (76-132 cm) | | | | | | | | |
| COLORS | <table border="0"> <tr> <td></td> <td>Navy/Carbon/Black</td> </tr> <tr> <td></td> <td>Pink/Carbon/Black</td> </tr> <tr> <td></td> <td>Royal/Carbon/Black (shown)</td> </tr> <tr> <td></td> <td>Red/Carbon/Black</td> </tr> </table> | | Navy/Carbon/Black | | Pink/Carbon/Black | | Royal/Carbon/Black (shown) | | Red/Carbon/Black |
| | Navy/Carbon/Black | | | | | | | | |
| | Pink/Carbon/Black | | | | | | | | |
| | Royal/Carbon/Black (shown) | | | | | | | | |
| | Red/Carbon/Black | | | | | | | | |
| APPROVAL | USCG Type II (MD3087) USCG Type III (MD3085) USCG Type V Commercial (MD3085 & MD3087) | | | | | | | | |
| RE-ARM KIT | Manual: MA7203 Auto: MA7202 | | | | | | | | |

www.mustangsurvival.com | 1.800.526.0532 | 4

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INDUSTRIAL INFLATABLES



HIT™ WORK VEST
AUTO HYDROSTATIC
GSA MD3188 (auto)

The first and only approved inflatable work vest on the market. Pioneering the standards and available exclusively from Mustang Survival, the Inflatable Work Vest is built with exclusive technology for serious users.

FEATURES

- 50 mph dynamic strength-tested construction
- The FIRST and ONLY USCG approved inflatable WORK VEST on the market
- Approved for use on inspected and uninspected vessels of any size
- Ideal for constant wear situations, hot humid conditions and high-mobility requirements
- 35 lb (150 N) buoyancy when inflated, twice the flotation of foam work vests
- Offers greater mobility than foam work vests
- New easy-to-clean Comfort Collar™ improves comfort and durability
- Recessed zipper protects teeth from oil, grease and other contaminants
- PU-coated nylon shell improves puncture and abrasion resistance
- Custom-molded inflator cover reduces wear and protects inflator
- SOLAS tape on front and back outer shell
- Inflator is maintenance free for 5 years from date of manufacture (unless inflated)*
- Easy to clean components
- Lightweight and comfortable design

| | |
|------------|--|
| SIZE | Adult Universal Age: 16 yrs+ Weight: 80 lbs+ (36.3 kg+) Chest: 30–52" (76–132 cm) |
| COLORS | ■ Orange |
| APPROVAL | USCG Type V Work Vest with Type II Performance |
| RE-ARM KIT | MA7214 |

OPTIONAL ACCESSORIES:

Accessory Pouch: MA6000
 Belt Extender: MA7637
 Leg Strap: MA3032



HIT™ INFLATABLE PFD
AUTO HYDROSTATIC
GSA MD3183 (auto) / MD3184 (auto with harness)

This PFD provides excellent safety and is designed for use in severe weather.

FEATURES

- The only USCG approved inflatable PFD with Hydrostatic Inflator Technology
- 35 lb (150 N) buoyancy when inflated
- Zippered, splash-proof pocket for your phone, keys or license
- New easy-to-clean Comfort Collar™ improves comfort and durability
- Bright yellow inflation cell with SOLAS reflective tape, safety whistle and strobe light attachment
- D-ring
- Inflator is maintenance free for 5 years from date of manufacture (unless inflated)*

OPTIONAL ACCESSORIES:

Accessory Pouch: MA6000
 Belt Extender: MA7637
 Leg Strap: MA3032

| BETTER FEATURES FOR 2012 | |
|--------------------------|--|
| SIZE | Adult Universal Age: 16 yrs+ Weight: 80 lbs+ (36.3 kg+) Chest: 30–52" (76–132 cm) |
| COLORS | ■ Black/Carbon ■ Orange/Black (MD3183 only) ■ Red/Black (shown) ■ Tan/Black (MD3183 only) |
| APPROVAL | USCG Type II USCG Type V Commercial with Type II Performance |
| PATENTS | US Patent no. 6,832,415 CDN Patent Pending |
| RE-ARM KIT | MA7214 |

WATER RESCUE KITS & ACCESSORIES



INFLATED

INFLATABLE BELT PACK PFD

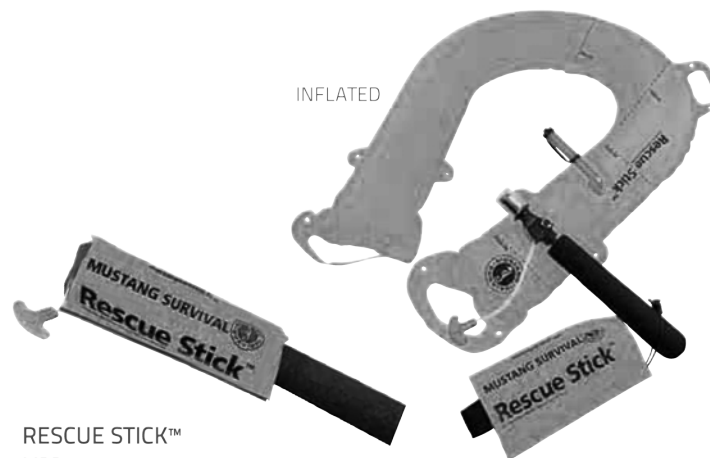
GSA MD3075 (manual)

Conveniently fits like a waist belt providing the wearer with full mobility. Manually inflates to provide 35 lb (150N) of buoyancy when needed.

FEATURES

- 35 lb (150 N) buoyancy when inflated
- Lightweight, ergonomic fit
- Manual inflation inflates by pulling activation cord
- Oral inflation tube included on product as secondary inflation option
- Safety whistle
- Reflective piping on outer shell

| | |
|------------|--|
| SIZE | Adult Universal Age: 16 yrs+ Weight: 80 lbs+ (36.3 kg+) Chest: 30-52" (76-132 cm) |
| COLOURS | Black/Carbon |
| APPROVAL | USCG Type III |
| RE-ARM KIT | MA7203 |



INFLATED

RESCUE STICK™

MRD100

Incredibly easy to use, the Rescue Stick™ provides rapid flotation assistance to a person at risk of drowning. Simply remove the baton shaped Rescue Stick™ from its bag and throw near the person. Once contact is made with the water it automatically inflates in seconds to a large horseshoe shape that can keep the victim's head above water and afloat until help arrives.

FEATURES

- Can be thrown accurately 100 feet or further
- Automatically inflates in seconds when immersed in water providing rapid emergency flotation
- Provides 35 lbs (150 N) of buoyancy – more flotation than typical ring buoys
- Can provide emergency flotation for multiple victims
- Easy to re-arm and repack

| | |
|------------|-------------------------|
| PATENT | US Patent No. 7,004,807 |
| RE-ARM KIT | MA7206 |

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WATER RESCUE KITS & ACCESSORIES

Water Rescue Kits MRK110 contains everything the first responder needs to conduct a basic emergency water rescue.



WATER RESCUE KITS

A variety of water rescue kits are available for every first responder's needs. All rescue kits come in a protective storage case, dimensions 18.2" x 8.4" x 6.7".



MRK110

- 1 Belt Pack inflatable PFD
- 1 Rescue Stick™
- 1 Throw Bag
- Quick reference instruction sheet



MRK120

- 4 Rescue Sticks™
- 1 Throw Bag
- Quick reference instruction sheet



MRK130

- 4 Rescue Sticks™
- Quick reference instruction sheet

ACCESSORIES



RESCUE TRAINING STICK

MRD050

Training only replication of the Rescue Stick™ designed for throwing practice at a target.



THROW BAG

MRD075

FEATURES

- 75' of 9mm multi-filament floating polypropylene rope
- Mesh top for quick drying
- Retro-reflective tape
- Light stick holder
- Quick release buckles

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FOAM FLOTATION



INDUSTRIAL MESH VEST

GSA MV1254 T1 / MV1254 T3

Our Industrial Mesh Flotation Vests offer maximum visibility, mobility and comfort.

FEATURES

- 50 mph dynamic strength-tested construction
- MV1254 T1 provides 62 sq. in. SOLAS reflective tape on front and back
- MV1254 T3 provides a minimum of 155 sq. in. of reflective material – meets ANSI 107-2010 Class 1*
- Mesh shoulders offer mobility and comfort
- Large front pockets with Velcro® closure
- Side adjustments for dual sizing
- High waist reduces interference with tools and duty belts

| | |
|----------|---|
| SIZE | S/M, L/XL, XXL/XXXL, 4XL/5XL |
| COLORS | <ul style="list-style-type: none"> Orange (MV1254 T1) ANSI Yellow-Green (MV1254 T3) |
| APPROVAL | USCG Type III |

*ANSI fabrics are more UV sensitive, and the fabric's visibility can decrease after extended exposure to UV rays.



4-POCKET FLOTATION VEST

GSA MV3128 T2

A functional PFD ideal for industrial applications.

FEATURES

- 62 sq. in. reflective tape on the shoulders
- Large armholes for mobility
- Tug-Tite® side adjustments for exact sizing
- Four large Velcro® secured front pockets conveniently store tools
- Four D-rings can be used for lanyard attachments
- 50 mph dynamic strength-tested construction
- Short-waisted for use with sidearms

| | |
|----------|----------------|
| SIZE | S-XXL, 3XL/7XL |
| COLOURS | Orange |
| APPROVAL | USCG Type III |



UNIVERSAL FIT PFD

MV3104 T1

Offers functional and economical industrial flotation in a universal size vest. Great for boat crews.

FEATURES

- Three adjustable belts
- Large arm holes for mobility
- SOLAS tape on shoulders for added night visibility

| | |
|----------|--|
| SIZE | Universal Weight: 80 lbs+ (36.3 kg+) Chest: 30-52" (76-132 cm) |
| COLORS | Orange |
| APPROVAL | USCG Type III |

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FOAM FLOTATION



CLASSIC INDUSTRIAL FLOTATION VEST

MV3106 T2

Stay safe on the job with this classic PFD perfect for a variety of industrial applications.

FEATURES

- Large arm holes for mobility
- 62 sq. in. SOLAS tape on shoulders for added night visibility
- Tug-Tite® adjustments offer an almost custom fit
- Non-corrosive zipper

| | |
|----------|----------------|
| SIZE | S-XXL, 3XL/7XL |
| COLORS | ■ Orange |
| APPROVAL | USCG Type III |



TYPE III/V WORK VEST

MV3192

For construction, enforcement and other personnel working on or near the water requiring an approved work vest. Designed to be safe, functional and comfortable.

FEATURES

- SOLAS reflective tape on the front collar and back for enhanced visibility
- Fast tab attachment point for a radio or other equipment
- Comfortable mesh lining
- Side adjustments create a customized fit in a functional universal size

| | |
|----------|--|
| SIZE | Universal Weight: 90 lbs+ (41 kg+) Chest: 30-52" (76-132 cm) |
| COLORS | ■ Orange |
| APPROVAL | USCG Type III/V WORK VEST |



FOAM FLOTATION



VINYL DIPPED WORK VEST


MV3092 / MV3092 SS

Stay safe on the job with this classic PFD perfect for a variety of industrial applications.

FEATURES

- Easy to clean vinyl exterior
- Reflective tape on front & back
- Delrin front closure buckles
- Fall protection slot on back
- Order part number CS4500 to have US-ACE required 62 sq. inches of reflective added to vest. (Minimum order of 24 pcs.)

| | |
|----------|--|
| SIZE | Universal Weight: 80 lbs+ (36.3 kg+) Chest: 30-52" (76-132 cm) |
| COLORS | ■ Orange |
| APPROVAL | USCG Type V WORK VEST |

 MV3092 SS comes with stainless steel fasteners in lieu of standard plastic clips.



TYPE I VESTS

GSA MV8020 (adult) / MV8022 (child)

Standard Type I Lifejacket for offshore vessels.

FEATURES

- Reflective tape
- Constructed with nylon fabric with buoyant PE foam

| | |
|----------|---|
| SIZE | Adult (MV8020) – Weight: 75 lbs+ Child (MV8022) – Weight: Less than 90 lbs |
| COLOURS | ■ Orange |
| APPROVAL | USCG Type I |



SHORE BASED WATER RESCUE VEST

MRV050 WR

The Mustang Survival Shore Based Water Rescue Vest delivers a more compact, lightweight solution for shore-based rescue professionals.

FEATURES

- Shoulder adjustments and short-waist cut for maximum torso mobility
- Reflective tape on front and back
- Fast tab and D-ring for radio and light attachment
- Two front storage pockets with zipper closures
- 50 mph dynamic strength-tested construction

| | |
|----------|-------------------|
| SIZE | XS/S, M/L, XL/XXL |
| COLORS | ■ Orange/Black |
| APPROVAL | USCG Type III |



HIGH IMPACT SAR VEST

GSA MV5600

The MV5600 SAR Vest is strength-tested to 100 mph meaning it has been designed, tested and approved to hold up to rigorous activities.

FEATURES

- 100 mph dynamic strength-tested construction
- 62 sq.in. of SOLAS reflective tape for high visibility
- Neoprene-lined fitted collar provides comfort and impact protection
- Two large cargo pockets with easy-to-use pull tabs for extra storage
- 3-Belt system for a custom fit
- Large cutaway armholes for maximum range of motion
- Fast-tab radio clip

| | |
|----------|---------------|
| SIZE | S-XXXX |
| COLORS | ■ Orange |
| APPROVAL | USCG Type III |

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FOAM FLOTATION



SWIFT WATER RESCUER VEST

GSA MRV100 SR

The MRV100 SR is a high buoyancy (26 lbs) vest for rescue professionals involved in boat and shore operations or medium to high risk swift water environments. Designed to meet the Personal Protective Equipment (PPE) needs of rescuers that face the challenges of moving water, these IRIA Certified vests are made of rugged, high visibility nylon and contain extra flotation to combat the reduced buoyancy effects of turbulent water. Our Search and Rescue Vest is strength-tested to 100 mph meaning it has been designed, tested and approved to hold up to rigorous activities.

FEATURES

- Integrated structural harness
- Polymer panels for impact protection
- Quick release tether
- Fast Tabs on both shoulders for easy attachment of accessories such as knives, scissors or strobe lights
- Inside quick drainage mesh
- Two quick-drain front pockets for storing extra gear
- One piece over the shoulder foam provides extra strength, structural integrity and body protection
- Multiple adjustment points provide a secure fit that prevent ride up
- Three-part waistbelt for fit
- International Rescue Instructors Association certified

NEW COLOR FOR 2012

| | |
|----------|---|
| SIZE | M/L – 26 lbs (116 N) of buoyancy XL – 30 lbs (133 N) of buoyancy |
| COLORS | ■ Red |
| APPROVAL | CAN/CGSB 65.11-M88 IRIA-Certified |



SWIFT WATER RESCUER INSTRUCTOR'S VEST

GSA MRV200 SR

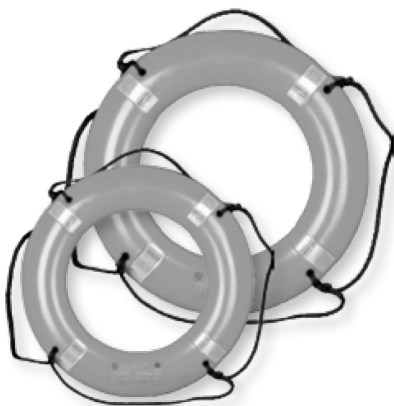
The IRIA Certified MRV200 SR is designed to meet the Personal Protective Equipment (PPE) needs of rescuers operating in high risk swift water environments. A high visibility and close fitting vest made of rugged nylon, the MRV200 SR contains extra flotation (26 lbs) to combat reduced buoyancy in turbulent water. Large, removable front and back pockets create a flat surface allowing rescue swimmers to safely and quickly reach victims in moving water and the included over the shoulder leash (cowtail) aids in self rescue.

FEATURES

- Removable front and back pockets
- Extrication leash (cowtail) included
- Integrated structural harness
- Polymer panels for impact protection
- Quick release tether
- Fast Tabs on both shoulders for easy attachment of accessories such as knives, scissors or strobe lights
- Reflective tape over the shoulders and on both pockets
- Inside quick drainage mesh
- One piece over the shoulder foam provides extra strength, structural integrity and body protection
- Multiple adjustment points provide a secure fit that prevent ride up
- Three-part waistbelt for fit
- One-handed extraction leash
- International Rescue Instructors Association certified

NEW COLOR FOR 2012

| | |
|----------|---|
| SIZE | M/L – 26 lbs (116 N) of buoyancy XL – 30 lbs (133 N) of buoyancy |
| COLORS | ■ Red |
| APPROVAL | CAN/CGSB 65.11-M88 IRIA-Certified |



RING BUOYS

GSA MRD024 (24") / MRD030 (30") / MRD031 (30")

Heavy-duty ring buoys for ship-board rescue operations. All buoys are molded from high-impact linear, low-density polyethylene for superior life expectancy in the most harsh environments.

FEATURES

- Reflective SOLAS reflective tape for enhanced visibility
- Polypropylene rope with UV stabilizer
- The MRD031 can be used with a quick release ring buoy bracket for quick release from the bridge

| | |
|----------|---|
| COLORS | ■ Orange |
| APPROVAL | MRD024: USCG Approved (for use on vessels not required to carry 30" ring) MRD030: USCG Approved to SOLAS MRD031: USCG Approved to SOLAS |

ACCESSORIES:
Ring Buoy Bag with Rope: MRD190



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FLOTATION CLOTHING



HIGH VISIBILITY FLOTATION COAT AND BOMBER JACKET

GSA MC1504 T3 (coat) / MJ6214 T3 (jacket)

Based on the original Mustang Floater Coat, the ANSI High Visibility Flotation Coat and Bomber Jacket are engineered to provide comfort, warmth, and durability.

FEATURES

- ANSI 107-2010 Class 2 compliance*
- Hypothermia and flotation protection
- Full length storm flap
- Neoprene wrist closures
- Attachable hood can be purchased separately
- Provide a minimum of 201 sq. inches of ANSI reflective material
- Fast tab attachment point on left chest (MJ6214 T3 only)
- Mic attachment points on both shoulders (MJ6214 T3 only)

| NEW COLOR FOR 2012 | |
|--------------------|-------------------------|
| SIZE | S-XXXL |
| COLORS | ANSI Yellow-Green/Black |
| APPROVAL | USCG Type III |

*ANSI fabrics are more UV sensitive, and the fabric's visibility can decrease after extended exposure to UV rays.

CLASSIC FLOTATION BOMBER JACKET

GSA MJ6214 T1

Designed to deliver comfort, warmth, and durability during marine operations, the MJ6214 T1 Classic Flotation Bomber Jacket's closed-cell foam insulation will provide flotation and in-water insulation to delay the onset of hypothermia in the event of water immersion. Coupled with functional design elements such as fleece-lined pockets and a storm flap, this jacket offers great value.

FEATURES

- Enhanced water-proofing
- Relaxed fit for mobility and comfort
- Neoprene cuffs
- Full-length storm flap and an internal waist belt reduces ride-up
- Warm, fleece-lined front pockets
- 62 sq. in. SOLAS reflective tape on chest, sleeves & back

- 50 mph dynamic strength-tested construction
- Attachable hood can be purchased separately (see p.14)

| | |
|----------|--|
| SIZE | S-XXXL |
| COLORS | <ul style="list-style-type: none"> ■ Navy Blue ■ Orange (shown) ■ Orange/Black Red and olive available by special order |
| APPROVAL | USCG Type III |



INTEGRITY™ FLOTATION BOMBER JACKET

GSA MJ6224 GS

The Integrity™ Flotation Bomber Jacket will keep you warm, comfortable and protected while on the water.

FEATURES

- Hypothermia and flotation protection
- Full length storm flap
- Fleece-lined collar
- Under arm zipper vents
- Water-resistant Comfort-Cuff™ technology

| | |
|----------|---|
| SIZE | S-XXXL |
| COLORS | <ul style="list-style-type: none"> ■ Black/Carbon ■ Orange/Carbon |
| APPROVAL | USCG Type III |



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FLOTATION CLOTHING



MC5444

MJ5244

CATALYST FLOTATION COAT & BOMBER JACKET

MC5444 (coat) / MJ5244 (jacket)

We set out to make the traditional Floater Coat™ more comfortable, better looking and overall more wearable. The result? Mustang's NEW Catalyst coat & jacket with the all-new M-Tech Comfort System™.

FEATURES

- M-Tech Comfort System™ provides unparalleled range of motion and mobility
- Waterproof, breathable, tri-laminate outer shell
- Outer shell is waterproof to 10,000mm with vapor transmission rate of 5,000 g/m² per 24 hrs
- Protection from rain and spray without the clammy feeling of traditional flotation jackets
- Field tested by Coast Guard training crews, fishing lodges and Mustang PRO-staff
- Interior pocket, zippered chest pocket and front slash hand-warmer pockets
- Underarm ventilation zippers
- Front cargo pockets (MC5444 only)
- Reflective accents for enhanced visibility
- Integrated hood with reflective trim
- ComfortCuff™ technology
- D-ring

| NEW FOR 2012 | |
|--------------|---|
| SIZE | S-XXXL |
| COLORS | <ul style="list-style-type: none"> ■ Black ■ Navy/Black (shown) ■ Red/Black ■ Olive/Black ■ Orange with Black Bottom (shown) |
| APPROVAL | USCG Type III |

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FLOTATION CLOTHING



COVERALL/WORKSUIT

GSA MS2175

Our rugged worksuits are constructed of Mustang Airsoft™ closed cell foam for greatest mobility. Provides protection from foul weather and offer emergency flotation and insulation in the event of accidental immersion.

FEATURES

- Hypothermia and flotation protection
- Inflatable head support pillow for additional buoyancy
- Insulated hood
- Velcro® closures at wrists and ankles
- SOLAS reflective tape
- Neoprene wrist closures
- Inflatable head pillow
- Chest and thigh pockets

| | |
|----------|--|
| SIZE | XS-XXXL |
| COLORS | <ul style="list-style-type: none"> ■ Orange ■ Orange/Black |
| APPROVAL | USCG Type V Worksuit & Type III PFD when worn |
| CLO | Immersed Clo 0.420 (see p.13) |



MP4212

MP4225 HX

CLASSIC FLOTATION PANT / INTEGRITY HX BIB PANT

GSA MP4212 / MP4225 HX

Designed to be worn with the Classic Flotation Coat, our Classic Flotation Bib Pant provides foam insulation that will not only keep you warm during regular marine activities but will also increase your hypothermia protection in the event of cold water immersion. The Integrity HX bib pant is ideal for those seeking more warmth and weather protection. A great pant to have when the weather turns for the worse.

FEATURES

MP4212/MP4225 HX

- Provides additional flotation and hypothermia protection
- Adjustable elasticized suspenders
- Leg zippers allow ease of entry and donning over boots

| | |
|--------|---|
| SIZE | S-XXL |
| COLORS | <ul style="list-style-type: none"> ■ Black (MP4212 only) ■ Black/Carbon (MP4225 HX only – shown) ■ Navy Blue (MP4212 only – shown) ■ Orange (MP4212 only) |

ADDED FEATURES

MP4225 HX Only

- HX design is fully seam-taped and uses only fabrics that are hydrostatically tested to surpass water pressures caused by storms
- Ripstop nylon knee and seat reinforcements
- Fleece-lined hand-warmer pockets
- Zippered stash pocket

ACCESSORIES



WEATHERPROOF HOOD

MA7112

FEATURES

- Seam-taped
- 1 handed tightening
- Volume adjustable
- For MC1504, MC1524, MJ6214 & MJ6224

| | |
|--------|---------------------|
| SIZE | Universal |
| COLORS | ■ ANSI Yellow-Green |



INSULATED HOOD

GSA MA7136

FEATURES

- 1 handed tightening
- Reflective tape
- Water resistant
- For MC1504, MC1524, MJ6214 & MJ6224

| | |
|--------|---|
| SIZE | Universal |
| COLORS | <ul style="list-style-type: none"> ■ NavyBlue ■ Orange ■ Red |

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FLOTATION CLOTHING



THERMOSYSTEM PLUS COAT

GSA MC1534

Based on our award-winning technology, the ThermoSystem Plus Coat delivers flotation with enhanced hypothermia protection.

FEATURES

- Neoprene beavertail provides enhanced hypothermia protection
- Neoprene wrist closures for weather protection
- Insulated hood easily folds into collar
- Slash hand-warmer pockets and extra large pockets at hips
- Underarm ventilation
- 62 sq. in. SOLAS reflective tape enhances visibility
- Interior radio pocket

| | |
|----------|--|
| SIZE | S-XXXL |
| COLORS | ■ Orange |
| APPROVAL | USCG Type III |
| CLO | Immersed Clo 0.185 (see sidebar) |
| PATENTS | US Patent no. 5,694,644 CDN no. 173,111 |



CLASSIC FLOTATION COAT

MC1504

Based on the original Mustang Floater Coat™, the Classic Flotation Coat is engineered to provide comfort, warmth, and durability.

FEATURES

- Hypothermia and flotation protection
- Full-length storm flap
- Zippered closures on front pockets
- Adjustable wrist seals
- Adjustable waist belt
- Attachable hood can be purchased separately (see facing page)

| | |
|----------|-------------------------|
| SIZE | S-XXXL |
| COLORS | ■ Orange ■ Navy Blue |
| APPROVAL | USCG Type III |

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SENTINEL SERIES DRY SUITS



MOBILITY BASED SIZING™ – MEASUREMENT GUIDE

EXCLUSIVE INNOVATIVE SIZING PLATFORM FOR SEMI-CUSTOM FIT

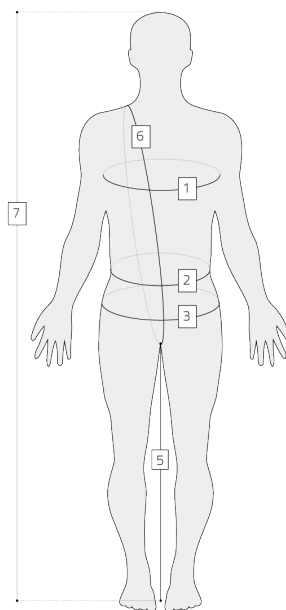
Based on more than two years of extensive anthropometric research, range of motion testing and user evaluations, we introduce the industry's newest improved fitting platform designed specifically for dry suit users for tactical, rescue or special operations.

Mobility Based Sizing™ offers users a semi-custom suit that reduces bulk and increases range of motion without the expensive custom price tags or long lead times.

The Mobility Based Sizing platform:

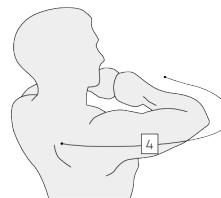
- Was developed based on anthropometric data from 2,500 North American 3-D body scans, ensuring the sizing and patterns of the suits fit the greatest number of individuals
- Immensely improves range of motion while decreasing bulk
- Offers standard expanded sizing (such as short and tall sizing) for all sizes so users can order a semi-custom suit without the expensive price or long lead times

| | LOCATION | XS | S | M | L1 | L2 | XL | XXL | 3XL | SHORT | LONG |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1 | Chest | 35-38 | 37-40 | 39-42 | 41-44 | 43-46 | 45-48 | 49-52 | 53-56 | n/a | n/a |
| 2 | Waist | 29-32 | 31-34 | 34-37 | 35-38 | 37-40 | 41-44 | 46-49 | 51-54 | n/a | n/a |
| 3 | Hips | 37-40 | 38-41 | 39-42 | 40-43 | 41-44 | 43-46 | 47-50 | 53-56 | n/a | n/a |
| 4 | Sleeve | 29-31 | 31-33 | 33-35 | 34-36 | 35-37 | 36-38 | 37-39 | 38-40 | -1 | +1 1/2 |
| 5 | Inseam | 28-30 | 30-32 | 32-34 | 33-35 | 34-36 | 34-36 | 34-36 | 34-36 | -2 | +2 |
| 6 | Torso Hoop | 59-62 | 62-65 | 65-68 | 67-70 | 69-72 | 71-74 | 76-79 | 78-81 | -2 | +3 |
| 7 | Height | 60-63 | 64-67 | 68-71 | 69-72 | 71-74 | 73-76 | 75-78 | 75-78 | -3 | +3 1/2 |



The Mobility Based Sizing platform is like none other currently in the industry. To order a suit that fits you best, follow our detailed measuring instructions online at:

www.mustangsurvival.com/mobility



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SENTINEL SERIES DRY SUITS



SENTINEL™ SERIES – LIGHTWEIGHT BOAT CREW DRY SUIT

GSA MSD634 (MSD635 Female)

The MSD634/635 are waterproof & breathable constant wear boat crew dry suits ideal for Law Enforcement and Search and Rescue (SAR) small boat operations where crew members don't intend to enter the water but require hypothermia protection in case of accidental immersion.


ADDITIONAL FEATURES

The MSD634/635 includes all the Sentinel™ features above and the following:

- Military grade GORE-TEX® BD6.5 waterproof & breathable dry suit fabric
- Multi-position fleece lined storm collar for improved protection and comfort
- 2 chest hand warmer pockets (accessible even while wearing a PFD)
- 1 calf pocket with neoprene survival hood attachment (MA7348 Survival Hood sold separately – see p.20)
- 2 arm pockets and 2 thigh cargo pockets
- Large leg and wrist over cuffs have Velcro® closures for adjustability
- 62 square inches of SOLAS retro-reflective tape for increased visibility
- Duty belt keepers at the waist

Heavy Duty 2-layer version also available (MSD644/MSD645) and includes:

- Inner: GORE-TEX® immersion layer
- Outer: Heavy Duty fabric protection layer
- Either layer can be replaced independently
- Designed for fast and easy repair

| NEW FOR 2012 | |
|--------------|---|
| SIZE | New Mobility Based Sizing Visit www.mustangsurvival.com/mobility |
| COLORS |  Orange/Black Other colors available by special order |
| CLO | Estimated Immersed Clo 0.68 when worn with a Mustang Survival dry suit liner |



SENTINEL™ SERIES – WATER RESCUE DRY SUIT

GSA MSD624 (MSD625 Female)

The MSD624/625 are waterproof & breathable constant wear water rescue dry suits ideal for flood, swiftwater & ice rescue. By reducing bulk and increasing range of motion, the Sentinel™ Water Rescue Dry Suit makes an excellent dry suit for the most demanding water rescue technicians.

ADDITIONAL FEATURES

The MSD624/25 includes all the Sentinel™ features above and the following:

- GORE-TEX® waterproof & breathable dry suit fabric
- Neck seal protective collar
- 5mm neoprene elbow pads
- Leg and wrist over cuffs have Velcro® closures for adjustability
- SOLAS retro-reflective tape on the arms for increased visibility
- Adjustable elastic waist cord

| NEW FOR 2012 | |
|--------------|---|
| SIZE | New Mobility Based Sizing Visit www.mustangsurvival.com/mobility |
| COLORS |  Yellow/Black Other colors available by special order |
| CLO | Estimated Immersed Clo 0.68 when worn with a Mustang Survival dry suit liner |

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DRY SUITS



SWIFT WATER RESCUE DRY SUIT

GSA MSD577 SR

Designed for the increasingly technical and hazardous operations faced by swift water rescuers, this suit combines the comfort needed for constant wear, the close fit that is essential for mobility during aggressive swimming and the durability needed for the most challenging conditions. Patented Closed Comfort System (CCS™) adjustable neck seal can be worn loose to provide comfort out of the water and can be drawn tight to keep the water out.

FEATURES

- 4-point adjustment system provides a better fit for increased mobility
- Kevlar® reinforced abrasion patches on hips, knees, arms and cuffs
- Removable tailbone protector, padded elbows and molded foam kneepads help prevent injury
- Engineered to minimize in-water drag, thereby reducing fatigue and improving rescuer safety and effectiveness
- Abrasion resistant stretch overlay covers the lower half of the suit and a portion of the arms, increasing suit durability and reducing in-water drag

| | |
|---------|---|
| SIZE | 5-XXXL (Note: Suit fits snugly, refer to size chart at www.mustangsurvival.com for best fit) |
| COLORS | Yellow/Black |
| CLO | Estimated Immersed Clo 0.68 when worn with MSL351 |
| PATENTS | US Patent no. 6,668,386 CDN Patent no. 2,381,720 |

DRY SUIT FEATURES



CCS™ CLOSED COMFORT SYSTEM
Can be loosened for comfort out of the water and quickly drawn tight to keep water out. More comfortable and durable than traditional trim-to-fit seals.



TRIM-TO-FIT NEOPRENE WRIST SEALS
Provide customizable fit with increased comfort and durability compared to traditional seals.



STAND-BY/WADING CONFIGURATION
Top stowage feature allows partial doffing to stay cool during extended out of water activity. (MSD577 SR only)



SOLAS TAPE
SOLAS retro-reflective tape for increased visibility

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DRY SUITS



TACTICAL OPERATIONS DRY SUIT

GSA MSD575

Designed for over-water and waterborne special operations such as Vertical Insertion of team members from a helicopter (i.e. Fast Roping), Swift-Water Rescue, or any other tactical operation where the environment requires hypothermia protection. This dry suit offers the highest level of abrasion resistance and durability. Patented Closed Comfort System (CCS™) adjustable neck seal can be worn loose to provide comfort out of the water and can be drawn tight to keep the water out.

FEATURES

- Breathable laminate and adjustable neck seal for reduced thermal burden in high stress operations
- Extreme-duty abrasion patches on legs, arms and seat ensure integrity of the dry suit in the most demanding environments
- Internal elastic suspender system ensures proper fit through each size range
- Diagonal cross-chest waterproof entry zipper for quick donning and doffing
- Waterproof relief zipper

- MSD575 NV is available for those that require pockets

| | |
|---------|---|
| SIZE | XS-XXL |
| COLORS | <ul style="list-style-type: none"> ■ Black (shown) ■ USCG Blue Shade 3362 |
| CLO | Estimated Immersed Clo 0.68 when worn with MSL351 |
| PATENTS | US Patent No. 6,668,386 CDN Patent No. 2,381,720 |



BREATHABLE INDUSTRIAL DRY SUIT

GSA MSD901

A 3-layer modular system that combines the protection of an immersion suit with the mobility and durability of a work suit. The layers are integrated into one unit to provide optimal protection and offer convenient repair or replacement of parts. Patented Closed Comfort System (CCS™) adjustable neck seal can be worn loose to provide comfort out of the water and can be drawn tight to keep the water out.

FEATURES

- Breathable inner liner provides thermal protection and flotation using ultra soft closed cell foam
- Immersion module uses GORE-TEX® waterproof breathable fabric
- Outer shell protects against normal wear and tear and is reinforced on the seat and knees for increased abrasion resistance
- Trim to fit neoprene wrist seals and removable internal suspenders allow users to customize the suit to their exact needs
- Wide leg construction and side zippers accommodate a 16" boot and makes the suit even easier to don
- Included closed-cell neoprene survival hood provides thermal protection in extreme cold weather environments and includes Velcro® for light attachment

- Thigh and chest pockets as well as calf pocket for survival hood
- Waterproof male/female relief zipper
- Inflatable head pillow for additional buoyancy
- 62 sq. in. SOLAS reflective tape enhances visibility
- Special operations version in all black available as a special order

| | |
|--------|---|
| SIZE | S-XXL |
| COLORS | <ul style="list-style-type: none"> ■ Orange/Black |
| CLO | Immersed Clo 0.74 |
| PATENT | US Patent nos. 5,267,519 & 6,668,386 CDN Patent nos. 2,082,793 & 2,381,720 |



DRY SUIT LINER

GSA MSL600 / MSL601 (Female)

Designed with a combination Polartec® classic 200 fleece and Polartec® Power Stretch fleece, this dry suit liner provides extra insulation protection when in cold water and also helps reduce the thermal burden out of the water. The wicking fabric and thread move excess moisture away from the body to evaporate and diffuse through the outer layers of the dry suit.

FEATURES

- **NEW** Polartec® Power Stretch 4-way stretch with a durable, smooth outer layer that is wind and abrasion resistant, and a soft inner layer that pulls moisture away from the skin
- **NEW** Less bulky fit as a result of stretch fleece integration in lower back, arms and legs
- **NEW** Compatible with the Sentinel™ Series of lightweight and heavy duty dry suits
- Vertical front entry zipper with dual sliders for quick donning and relief

- Fitting straps at the thumbs and ankles
- Machine washable

| NEW FOR 2012 | |
|--------------|---|
| SIZE | XS-L1, L2-XXXL (See Sentinel Dry Suit Sizing Chart p.15) |
| COLORS | <ul style="list-style-type: none"> ■ Black |
| CLO | TBD - Clo will be similar to MSD351* |

*MSL351 GS Liner available. For more information, visit www.mustangs survival.com

THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

DRYSUITS & IMMERSION SUITS



ICE COMMANDER™

THE MOST PROVEN & RELIABLE ICE RESCUE SUIT ON THE MARKET

GSA IC9001 02 / IC9002 02

Cold water kills. When you have to send your rescuers into harm's way, you can rest assured that the ICE COMMANDER and proper training will keep them safe. For over 10 years, the Ice Commander™ has set the industry standard in Personal Protective Equipment (PPE) for cold water & ice rescue. Plus, Ice Commanders are now supported by a brand new nationwide network of Inspection & Maintenance facilities (see p. 17). Both suits are reinforced in high abrasion areas and are 45% lighter than neoprene suits. The IC9002-02 accommodates a wider range of body types and can be easily size- adjusted to individual rescuers, which provides a better fit & range of motion than traditional Ice Rescue Suits.

FEATURES (IC9001 02 / IC9002 02)

- Designed for quick donning in emergency situations
- Provides over 35 lbs of buoyancy
- Neoprene face guard reduces risk of water entry protecting your airway. Can be folded back over itself to stay out of the way
- Welded Nylon Outer Shell is waterproof and durable
- High performance urethane-coated nylon exterior makes cleaning and repairs easier
- Detachable closed-cell AirSoft™ foam Inner Buoyancy Liner provides maximum flotation and thermal insulation. Liner can be removed for easy cleaning and repair
- Ergonomic ice awl sleeve pockets customized to attach and stow ice awls
- Integrated self-adjusting safety harness
- Integrated insulated gloves with textured palms provide abrasion resistance and superior grip
- Neoprene knee reinforcement and padding improves protection and grip

ADDED FEATURES (IC9002 02 only)

The IC 9002 02 includes these additional features:

- Adjustment straps on torso, legs and wrist for near custom fit and increased range of motion
- The only suit on the market that fits a wider range of sizes compared to other existing ice rescue suits
- Covered and watertight heavy duty diagonal entry zipper improves rescuer mobility, comfort and prevents water intrusion at the face opening
- Hood designed with back zipper adjustment for secure fit, with SOLAS reflective tape and Velcro™ patch for light attachment
- Fast Tab for easy attachment of accessories like a knife or strobe light
- Neoprene face guard double as handle to burp air out of the suit

| | |
|--------|---|
| SIZE | Universal Adult: 110–300 lb, 4'11"–6'7" |
| COLORS | ■ Gold |

ACCESSORIES:
Ice Commander Repair Kit: MA2290
Zipper Lubricant: MA2292

THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



DRYSUITS & IMMERSION SUITS



NEOPRENE COLD WATER IMMERSION SUIT

- MIS210 HR (child) / MIS220 HR (adult small)
- MIS230 HR (adult universal) / MIS240 HR (adult oversized)

Designed for use in commercial operations, this immersion suit from Mustang Survival is the ideal ship abandonment suit for workboats, transport vessels, drilling rigs, supply ships, steamships and commercial fishermen. The HR version meets new IMO/SOLAS immersion suit standard IMO RES.MSC.207(B1). Standard version without lifting harness and buddy line are still available for use on non-SOLAS vessels. **NOTE: A declaration of conformity (DOC) is available upon written request for all users requiring the DOC to fulfill MED requirements.**

FEATURES

- Easy to don in stormy conditions
- Five-fingered insulated gloves for warmth and dexterity
- Water-tight face seal
- Includes buddy line
- Includes lifting harness
- Wrist and ankle adjustments for a better fit
- 5mm fire retardant neoprene provides flotation and hypothermia protection
- Triple-sealed seam construction
- Non-slip, durable soles

| | |
|----------|---|
| SIZE | Child (MIS210 HR) Adult Small (MIS220 HR) Adult Universal (MIS230 HR) Adult Oversize (MIS240 HR) |
| COLORS | ■ Red |
| APPROVAL | USCG/MED/SOLAS (Version Null USCG Only) |



Each size comes in a color coded bag for easy reference:



OCEAN COMMANDER®

- GSA OC8000 HR

When lives are at stake, having an immersion suit with the quality and performance of the Mustang Survival Ocean Commander is essential. The OC8000 HR is lighter than conventional neoprene suits, is easy to get into and so flexible that it's ideal for abandonment procedures. **NOTE: A declaration of conformity (DOC) is available upon written request for all users requiring the DOC to fulfill MED requirements.**

FEATURES

- Meets IMO RES. MSC.207 (B1)
- 45% lighter than conventional neoprene suits
- Removable gloves for improved dexterity
- Increased mobility and dexterity to improve functionality in emergency situations
- Detachable inner buoyancy liner
- Welded nylon outer shell
- Water-tight zipper and seams
- Buddy line for tethering
- SOLAS grade reflective tape
- Neoprene wrist seals
- Includes lifting harness

| | |
|----------|---|
| SIZE | Universal Adult: 110-300lb, 4'11"-6'7" |
| COLORS | ■ Orange |
| CLO | Immersed Clo 0.960 (see p.13) |
| APPROVAL | USCG/MED/SOLAS |

ACCESSORIES:

- Replacement Liner: MA2281
- Replacement Carry Bag: MA2001

ACCESSORIES



NEOPRENE SURVIVAL HOOD

- GSA MA7348

FEATURES

- Increased protection from the elements
- Includes stowable face shield

| | |
|--------|-----------|
| SIZE | Universal |
| COLORS | ■ Red |



ACR HEMILIGHT™ 2

- MI5732

FEATURES

- Activates when in contact with salt or fresh water (deactivated by sliding the switch to the off position)
- Meets USCG and SOLAS requirements
- Integrates with Mustang Survival Immersion Suits to increase in-water visibility

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TACTICAL FLOTATION



ICE COMMANDER™

THE MOST PROVEN & RELIABLE ICE RESCUE SUIT ON THE MARKET

GSA IC9001 02 / IC9002 02

Cold water kills. When you have to send your rescuers into harm's way, you can rest assured that the ICE COMMANDER and proper training will keep them safe. For over 10 years, the Ice Commander™ has set the industry standard in Personal Protective Equipment (PPE) for cold water & ice rescue. Plus, Ice Commanders are now supported by a brand new nationwide network of Inspection & Maintenance facilities (see p. 17). Both suits are reinforced in high abrasion areas and are 45% lighter than neoprene suits. The IC9002-02 accommodates a wider range of body types and can be easily size-adjusted to individual rescuers, which provides a better fit & range of motion than traditional Ice Rescue Suits.

FEATURES (IC9001 02 / IC9002 02)

- Designed for quick donning in emergency situations
- Provides over 35 lbs of buoyancy
- Neoprene face guard reduces risk of water entry protecting your airway. Can be folded back over itself to stay out of the way
- Welded Nylon Outer Shell is waterproof and durable
- High performance urethane-coated nylon exterior makes cleaning and repairs easier
- Detachable closed-cell AirSoft™ foam Inner Buoyancy Liner provides maximum flotation and thermal insulation. Liner can be removed for easy cleaning and repair
- Ergonomic ice awl sleeve pockets customized to attach and stow ice awls
- Integrated self-adjusting safety harness
- Integrated insulated gloves with textured palms provide abrasion resistance and superior grip
- Neoprene knee reinforcement and padding improves protection and grip

ADDED FEATURES (IC9002 02 only)

The IC 9002 02 includes these additional features:

- Adjustment straps on torso, legs and wrist for near custom fit and increased range of motion
- The only suit on the market that fits a wider range of sizes compared to other existing ice rescue suits
- Covered and watertight heavy duty diagonal entry zipper improves rescuer mobility, comfort and prevents water intrusion at the face opening
- Hood designed with back zipper adjustment for secure fit, with SOLAS reflective tape and Velcro™ patch for light attachment
- Fast Tab for easy attachment of accessories like a knife or strobe light
- Neoprene face guard double as handle to burp air out of the suit

| | |
|--------|---|
| SIZE | Universal Adult: 110–300 lb, 4'11"–6'7" |
| COLORS | ■ Gold |

ACCESSORIES:

Ice Commander Repair Kit: MA2290
Zipper Lubricant: MA2292



THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.



TACTICAL FLOTATION



NEOPRENE COLD WATER IMMERSION SUIT

- MIS210 HR (child) / MIS220 HR (adult small)
- MIS230 HR (adult universal) / MIS240 HR (adult oversize)

Designed for use in commercial operations, this immersion suit from Mustang Survival is the ideal ship abandonment suit for workboats, transport vessels, drilling rigs, supply ships, steamships and commercial fishermen. The HR version meets new IMO/SOLAS immersion suit standard IMO RES.MSC.207(81). Standard version without lifting harness and buddy line are still available for use on non-SOLAS vessels. **NOTE: A declaration of conformity (DOC) is available upon written request for all users requiring the DOC to fulfill MED requirements.**

FEATURES

- Easy to don in stormy conditions
- Five-fingered insulated gloves for warmth and dexterity
- Water-tight face seal
- Includes buddy line
- Includes lifting harness
- Wrist and ankle adjustments for a better fit
- 5mm fire retardant neoprene provides flotation and hypothermia protection
- Triple-sealed seam construction
- Non-slip, durable soles

| | |
|----------|---|
| SIZE | Child (MIS210 HR) Adult Small (MIS220 HR) Adult Universal (MIS230 HR) Adult Oversize (MIS240 HR) |
| COLORS | ■ Red |
| APPROVAL | USCG/MED/SOLAS (Version Null USCG Only) |



Each size comes in a color coded bag for easy reference:



OCEAN COMMANDER®

- GSA OC8000 HR

When lives are at stake, having an immersion suit with the quality and performance of the Mustang Survival Ocean Commander is essential. The OC8000 HR is lighter than conventional neoprene suits, is easy to get into and so flexible that it's ideal for abandonment procedures. **NOTE: A declaration of conformity (DOC) is available upon written request for all users requiring the DOC to fulfill MED requirements.**

FEATURES

- Meets IMO RES. MSC.207 (81)
- 45% lighter than conventional neoprene suits
- Removable gloves for improved dexterity
- Increased mobility and dexterity to improve functionality in emergency situations
- Detachable inner buoyancy liner
- Welded nylon outer shell
- Water-tight zipper and seams
- Buddy line for tethering
- SOLAS grade reflective tape
- Neoprene wrist seals
- Includes lifting harness

| | |
|----------|--|
| SIZE | Universal Adult 110-300lb, 4'11"-6'7" |
| COLORS | ■ Orange |
| CLO | Immersed Clo 0.960 (see p.13) |
| APPROVAL | USCG/MED/SOLAS |

ACCESSORIES:
Replacement Liner: MA2281
Replacement Carry Bag: MA2001

9

ACCESSORIES



NEOPRENE SURVIVAL HOOD

- GSA MA7348

FEATURES

- Increased protection from the elements
- Includes stowable face shield

| | |
|--------|-----------|
| SIZE | Universal |
| COLORS | ■ Red |



ACR HEMILIGHT™ 2

- MIS732

FEATURES

- Activates when in contact with salt or fresh water (deactivated by sliding the switch to the off position)
- Meets USCG and SOLAS requirements
- Integrates with Mustang Survival Immersion Suits to increase in-water visibility

THE SPECIFICATIONS AND DETAILS DESCRIBED BY ILLUSTRATION OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

JIM-BUOY

LIFE RING RACKS AUTOMATIC SAFETY LIGHTS

MAN OVERBOARD STROBE LIGHT

USCG APPROVED
(#161.010/12/0)



#1821 Stainless Steel Rack
– ideal for handy lights to
rage at a very nominal cost.
Model #1821 – 6 per ctn.;
ship. wt. 6 lbs.

Toughest construction - yet relatively small and lightweight! Made from injection molded plastic that is almost indestructible.

#1820 Man Overboard Light - Merely pick it up and point; it starts automatically - When the Man Overboard Light is thrown overboard the light automatically commences to flash a bright, flashing strobe light visible for miles! Not only a great aid for the searcher, but aids the person overboard to find a life ring or horseshoe buoy. Features the most advanced solid state circuit technology available today to provide years of reliable service. Extensively tested to with stand 90-ft. drops into the ocean and 3-ft. drops directly on the lens case onto cement! Additional tests were conducted by subjecting it to the most extreme conditions of humidity, temperature and exposure. In all tests the light continued to function perfectly. Simplified system uses just four Alkaline 'D' batteries that are available everywhere and are as easy to change as flashlight batteries (batteries not included).

Model #1820 --- Available in orange only.
Boxed individually in a 6-pack master carton;
ship. wt. 13 lbs.

IMPORTANT: Latest Coast Guard regulations require that almost all vessels carry either a fire flare or S.O.S. battery light with an S.O.S. flag.



#1851 S.O.S. Flag – Made of plastic, complete with zip lock storage bag, has full U.S.C.G. approval.



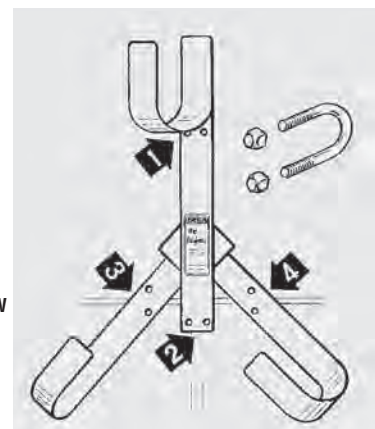
THE ROUGHNECK Premium Life Ring Rack!

- #1123-20 - 20" dia., ship. wt. 4 lbs., 1/ctn.
- #1123-24 - 24" dia., Ship Wt. 10 lbs., 2/ctn.
- #1123-30 - 30" dia., Ship Wt. 14 lbs., 2/ctn.

The ROUGHNECK offers both vertical and horizontal mounting!

ORDER #1123-X STAINLESS STEEL "U"- BOLTS BELOW FOR STANCHION LINE MOUNTING:

Model #1123-X - Stainless steel U Bolts and nuts for stanchion and life line mounting. 4 per skin pkg. card, 10 per master ctn., ship. Wt. 1 lb.



SOMBRERO BUOYS

JIM-BUOY

- **HUGE FLOATATION BASE** – 12" high x 30" diameter size assures upright floatation under severe conditions!
- **2" WIDE ALUMINUM BAND** – Protects base of buoy from jet-skis and boat crashes (optional*).
- **CJ-37 ROCK HARD OUTER SHELL** – Resists the hardest blows – almost indestructible!
- **SYSTEM #10 VINYL DAYMARKS** – Available in a multitude of shapes and daymarks and guaranteed a full five years!

Jim Buoy's all new Sombrero Buoy is designed to be used where maximum stability and buoy strength are of prime importance. With the addition of the 2" wide aluminum protection band (optional*) on the top edge of the jumbo flotation base, the Sombrero Buoy can withstand \ jet-skis and boat crashes that might otherwise permanently damage or tip over a standard buoy. In addition to positive, upright floatation, the large 12" high x 30" diameter base provides greater visibility because it naturally floats higher in the water! A galvanized external ballast** may be ordered for some models – other ballasts are internal, however (some weights may be necessary to add to the chains if a shallow condition exists). All colors are impregnated and molded into the tough CJ-37 Rock Hard outer shell for years of rugged maintenance free service. Eye bolts and metal components are galvanized steel for greater strength and resistance to rust and corrosion.



No. 2022-Riser 10" x 39"
Above Water Line 45"

*OPTIONAL, 2" ALUMINUM PROTECTION BAND -- Easily installed to the top edge of the flotation base. Add the letter "E" to model number when ordering – may also be purchased and added at later date.



No. 2020-Riser 9" x 74"
Above Water Line 80"



No. 2025-Riser 12" x 50"
Above Water Line 56"



No. 2024-Riser 12" x 50"
Above Water Line 56"



No. 2019-Riser 12" x 24"
Above Water Line 30"



Red Nun No. 2026-
Riser 12" x 50"
Above Water Line 56"



No. 2027-Riser 18" x 50"
Above Water Line 56"



Red Nun No. 2018-
Riser 12" x 24" Above
Water Line 30"



No. 2028-Riser 15" x 50"
Above Water Line 56"



No. 2021-Riser 10" x 39"
Above Water Line 45"



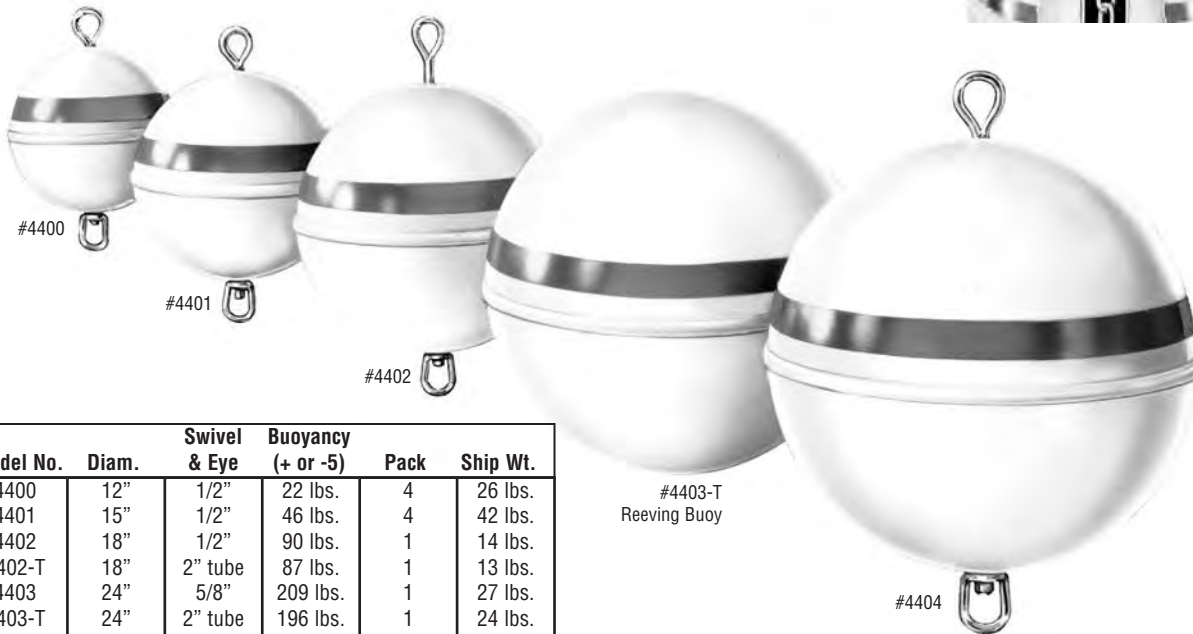
Red Nun No. 2023-Riser 10" x 39"
Above Water Line 45"

NOTE THE LARGE ASSORTMENT OF SHAPES AND DAYMARKS AVAILABLE --
Please use designated Model Numbers on each illustration when ordering.

JIM-BUOY

MOORING BUOYS

**TWO DISTINCTIVE
LINE DESIGN
FEATURES!**



| Model No. | Diam. | Swivel & Eye | Buoyancy (+ or -) | Pack | Ship Wt. |
|-----------|-------|--------------|-------------------|------|----------|
| 4400 | 12" | 1/2" | 22 lbs. | 4 | 26 lbs. |
| 4401 | 15" | 1/2" | 46 lbs. | 4 | 42 lbs. |
| 4402 | 18" | 1/2" | 90 lbs. | 1 | 14 lbs. |
| 4402-T | 18" | 2" tube | 87 lbs. | 1 | 13 lbs. |
| 4403 | 24" | 5/8" | 209 lbs. | 1 | 27 lbs. |
| 4403-T | 24" | 2" tube | 196 lbs. | 1 | 24 lbs. |
| 4404 | 30" | 5/8" | 400 lbs. | 1 | 47 lbs. |
| 4404-T | 30" | 2" tube | 396 lbs. | 1 | 47 lbs. |

U.S. COAST GUARD APPROVED LIFE RINGS



Model #G-3030"
dia., 6 per ctn.
Ship. wt. 33 lbs.
CG #160.050/107/1



Model #GW-24CG
#160.050/50/2
Model #GO-24CG
#160.050/106/124" dia.,
6 per ctn. Ship. wt. 21 lbs.



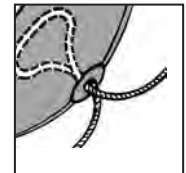
Model #GW-20CG
#160.050/48/2
Model #GO-20CG
#160.050/105/1
20" dia., 6 per ctn.
Ship. wt. 18 lbs.



Hard Shell 30's Series - DESIGNED FOR EXTREME ROUGH USAGE - Features an orange, rock hard, cross-linked polyethylene outer shell with molded-in rope holes. Will not rot or mildew and is unaffected by harsh weather extremes and carries a limited five year warranty! Complete with black, vinyl coated polypropylene rope; easily replaced if necessary. Available in SOLAS and USCG Approved models, 30" diameter size only.

Model # HS-30 USCG - Approval #160.050/154/0
Model # HSO-30 SOLAS - Approval #160.050/155/0 and #160.150/11/0
6 per ctn., shpg. wt. 35 lbs. - Both models available in bright, International Orange only.

'NO-STRAP MODEL' USCG-APPROVED
Model #GO-X-30: 30" dia., 6 per ctn., wt. 33 lbs., CG #160.050/104/1
Model #GW-X-30: 30" dia., 6 per ctn., wt. 33 lbs., CG #160.050/104/1
Model #GW-X-24: 24" dia., 6 per ctn., wt. 21 lbs., CG #160.050/60/2
Model #GO-X-24: 24" dia., 6 per ctn., wt. 21 lbs., CG #160.050/103/1
Model #GW-X-20: 20" dia., 6 per ctn., wt. 18 lbs., CG #160.050/61/2
Model #GO-X-20: 20" dia., 6 per ctn., wt. 18 lbs., CG #160.050/102/1



MOORING BUOYS

JIM-BUOY



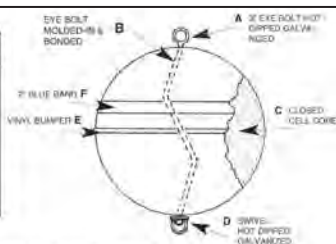
DELUXE SERIES

The high density foam assures lasting durability. All hardware is hot-dipped galvanized medium carbon steel. Eye bolts are molded into buoy, resulting in no loss of floatation. Rubber bumpers give added protection in contact, (not available on models #420 and #421). All buoys are coated with CJ-19, an exterior coating that resists extreme weathering, most chemicals and fuels.



IMPORTANT: For proper installation length of anchor chain or cable is of critical importance. High tide plus 6 feet for each 5 feet of depth. Always use equal metal in contact to prevent excessive abrasion. Always use swivel to prevent fouling of anchor line. Use 5/8" swivel for 5/8" anchor line. Anchor blocks should weigh approximately one half the buoyancy of the buoy.

| Model | Diam. | Ht. | Swivel & Eye | Buoyancy | Pack | Ship. Wt. |
|--------|-------|-----|--------------|----------|------|-----------|
| #420 | 10" | 16" | 3/8" * | 25 lbs. | 6 | 14 lbs. |
| #421 | 12" | 12" | 1/2" | 30 lbs. | 6 | 30 lbs. |
| #422 | 12" | 24" | 1/2" | 62 lbs. | 6 | 42 lbs. |
| #423 | 12" | 36" | 1/2" | 126 lbs. | 3 | 38 lbs. |
| #424 | 22" | 44" | 5/8" | 414 lbs. | 1 | 18 lbs. |
| #424-T | 22" | 44" | 2" tube | 414 lbs. | 1 | 21 lbs. |



*Furnished with shackle and swivel combination.
Mooring symbol information: Blue vinyl band complies with uniform state waterway marking system. ReflectORIZED white bands permissible—available on special request.
Deep water usage: Models #424 and #424-T both have a diameter of 22" and a length of 44" which assures adequate buoyancy in high tide swings or deep anchorage.

Jim Buoy Racing Pylon

A strikingly beautiful deep water buoy extending 12 feet above the water line for maximum visibility. Multi-colored flags measure 8'x 18". Utilizes the 22" x 44" "Fatboy" jumbo buoy. 2-piece fiberglass flag pole collapses for convenient storage. **Model #424-P-1 per double carton. Shipping weight 21 lbs.**

JIM-BUOY

REGULATORY BUOYS

AVAILABLE IN A WIDE RANGE OF SIZES AND STYLES FOR ALMOST ANY MARINE APPLICATION!

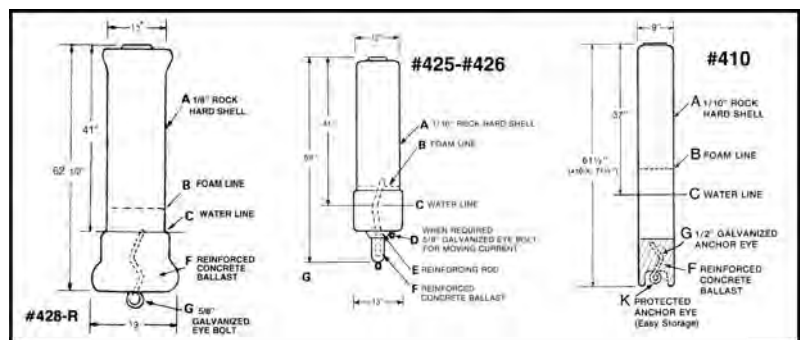


#506 Dredge Buoy— Complies with U.S.C.G. Reg. 88.15. 3 mile visibility with bright, white light. One set (3) Alkaline D-cell batteries warranted to last 1 year of continuous use without change. Easy part assy. **Size:** Buoy, 18" diam. x 24" ht., Lightholder, 22" light priced separately).

#428-R—Where **HUGE EXPOSURE** is required! Giant 15" diameter cylinder rises more than 40" above the water line with jumbo 19" diameter base providing utmost stability. Overall height is 62-1/2". Features proportionately large day marks for maximum visibility. Designed to float upright with 35-40 lbs. of chain or equivalent weight. If more internal ballast is required, please advise. The 5/8" galvanized steel anchor eye bolt is securely bonded in. 2.3 lb. density polyurethane foam extends 8" above water line to insure permanent floatation.
Model #428-R, Shipping wt. 65 lbs., single pack.
#425, #425-R, #426 Series Buoys – Designed to float upright with 35-40 lbs. of chain or equivalent weight. If more internal ballast is required, please advise. Full 12" diameter cylinder rises 40" plus above the water line for excellent visibility. The 13" diameter base assures complete stability under all conditions. Closed cell polyurethane foam extends 8" above the water line. Features 5/8" galvanized steel eye bolt at extreme bottom of the buoy; a larger diameter through hole is provided for near surface anchor use.
#425-R, Regulatory Buoy – All white impregnated, molded in color. May be ordered with standard Jim Buoy Vinyl Daymarks. Ship. wt. 25 lbs., single pack.
Model #425, Can Green impregnated, molded in color, Ship. wt. 25 lbs., single pack. **Model #426**, Nun Available in red only, impregnated, molded in color. Ship. wt. 25 lbs. single pack.

#410, Jim Buoy's economy model – With 9" diameter x 61-1/2" height has excess of 37" above the waterline for good visibility. Designed to float upright with 35-40 lbs. of chain or equivalent weight. If more internal ballast is required, please advise. The 1/2" galvanized eye bolt is totally recessed in the base. Tough CJ-37 Rock hard outer shell assures greatest strength and durability. The polyurethane foam extends 8" above base for positive upright floatation. Jim Buoy's Daymarks are available for this great new model.
Model #410 – Ship wt. 50 lbs., single pack, UPS O.K.
#410-X, For deep water requirements – Same construction and favorable pricing as the #410 but features a 71-1/2" height for use in extremely deep

water anchor-ing where lengthy (heavy) anchor chains are required.
Model #410-X – Ship wt. 58 lbs., single pack. **#4408, #4409, #4410, Jim Buoy's "Fat Buoys"** – Requires 8 lbs. of chain or equivalent, urethane foam filled. Hot-dipped 1/2" galvanized hardware. Same rugged construction as all Jim Buoy channel markers. 12" diam. X 23" height, buoyancy 30 lbs.
Model #4408, Can – White, ship wt. 16 lbs., 1 per ctn.
Model #4409, Can – Green molded-in color. Ship wt. 16lbs., 1 per ctn.
#4410, Nun – Red, molded-in color. Ship wt. 16 lbs., 1 per carton.



CHANNEL MARKERS & RIVER BUOYS

JIM-BUOY

Feature for feature, you'll agree Jim Buoy offers more...
CJ-37 ROCK HARD OUTER SHELL – Almost indestructible!
TOTALLY INTERNAL BALLAST – No exposed concrete!
SYSTEM #10 VINYL DAYMARKS – Guaranteed 5 years!
GALVANIZED STEEL EYE BOLT – resists rust!
JIM BUOY #9000 LIGHT AVAILABLE ON ALL MODELS
 (except #505 & #423-0)



#4408



#427-D



#427



#427-N

#427-River Buoy



#3000
Fast Water Buoy

Features tough CJ-37 Rock Hard outer shell with solid urethane foam core. Large 24" diam. base is 10" high. Riser is 12-1/2" diam. riser height is 27". Overall height of 37". All standard daymarks at no charge. *Options available:*

1. Pickup eye
2. Extended 24" ballast
3. Regular dropped forged swivel
4. Radar Reflector
5. Lights

single pack, options determine ship. wt., 40 lbs. please inquire for complete info.



#505



#423-0

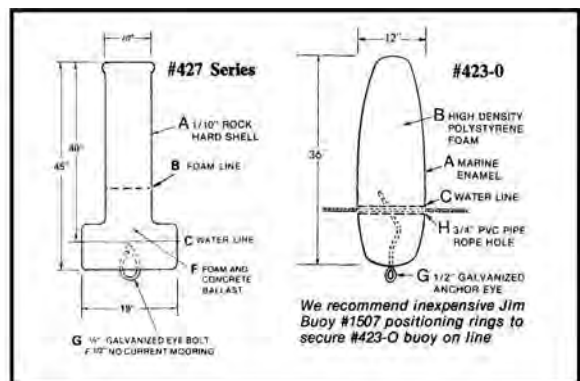
#427 Series – Featuring the finest quality at super prices! All models provide outstanding visibility with their large 10" diameter cylinder rising 40" above the water line! The huge 19" diameter base assures maximum stability in the most turbulent waters. All models are designed to float upright with 35-40 lbs. of chain or equivalent weight. If more internal ballast is required please advise. The unit utilizes Jim-Buoy's tough 1/10" CJ-37 Rock Hard outer shell for years of rugged service.
#427, River Buoy – Readily adapts for use in swiftest waters when equipped with the special offset galvanized steel eye bolt.

#427, Can – Green only, impregnated, molded-in color. Ship wt. 38 lbs., single pack.
#427-R Regulatory Buoy – All white, impregnated, molded in color. May be ordered with Jim Buoy Vinyl Daymarks listed below. Ship wt. 38 lbs., single pack.
#427-N, Nun – Red only, impregnated, molded in color. Ship wt. 38 lbs., single pack.
#427, River Buoy – May be ordered with Jim Buoy vinyl Daymarks listed below. Ship wt. 38 lbs., single pack.
Note: All #427 series buoys will ship UPS!

#505, Spar Buoy – Usually used where many buoys are required and price a prime consideration. Features the Jim Buoy CJ-37 Rock Hard outer shell and solid urethane foam core. Size: 6-1/2x 31".
Model #505 – spar Buoy, ship wt. 6 lbs., single pack, UPS O.K.
#423-0, Barrier Float – Solid high density polystyrene foam body coated with white marine enamel. Available with orange vinyl bands and "SWIM AREA" decal only. Features 1/2" galvanized steel eye bolt securely molded in. Rope hole is reinforced with PVC pipe passing through at water line.
#423-0 – Ship wt. 38 lbs., 3 per pack.

| REGULATORY BUOYS, MODELS #410, #410X, #425R, #427R, #428R, #3000 | | | CHANNEL MARKERS | | | |
|--|---|--|-------------------------------------|-----------------------|--|---------------------------------------|
| CONTROLLED AREA SLOW 5 MPH NO WAKE IDLE SPEED SLOW NO WAKE | EXCLUSION AREA KEEP OUT NO BOATS NO SWIMMING SWIM AREA SKI AREA DAM FISHING NO FISHING NO SKIING | DANGER-HAZARD REEF DANGER ROCKS STUMP HAZARD SHOALS DANGER DAM AHEAD | ROCKS OR UNDERWATER OBSTRUCTION | RESTRICTED TRAVEL | #425 CAN UPSTREAM GREEN ON LEFT | #426 NUN UPSTREAM RED ON RIGHT |

OVER 200 ADDITIONAL SYMBOLS AVAILABLE - NO CHARGE



JIM-BUOY

FLOAT-FREE LINK / PAINTER & CAGE

USCG APPROVED



#501

COMPLIES WITH
U.S.C.G.
REQUIREMENTS
EFF. 9/20/83
Contact your local
U.S.C.G. office for
complete information



#504

Model #501 – Available in 6-10 man, 11-20 man and 21 or more man size. Each unit contains 1 stainless steel cage, 100 ft. of black 5/16” polypropylene rope (1,600 lb. test) and wire link. All wire links tagged to identify raft size it is legal for. Rope ends tagged as to their use. When ordering, specify sizes: 6-10 man, 11-20 man, or 21 or more man.

#501-12 per case, ship. wt. 38 lbs. UPS OK.

Model #504 – Fits any stack of four rafts or any stack which equals a capacity of 21 man or more. Each unit contains 1 stainless steel cage, 100 ft. of black 7/16” polypropylene rope (3,000 lb. test) and 1 wire link.

Model #504-6 per case, ship. wt. 38 lbs. UPS OK.

DAY MARK SIGNALS

#1903



#1901



#1902



#1900



All units manufactured from heavy-duty vinyl coated nylon fabric with galvanized framing. Fully collapsible when stored. Simplicity of design offers rapid and rigid display when required.

#1900 – Ball shape, 24” dia., 6/pack, ship. wt. 9 lbs.

#1901 – Cone shape, 24” x 24”, 6/pack, ship. wt. 9 lbs.

#1902 – Double cone shape, 24” x 48”, 6/pack, ship. wt. 9 lbs.

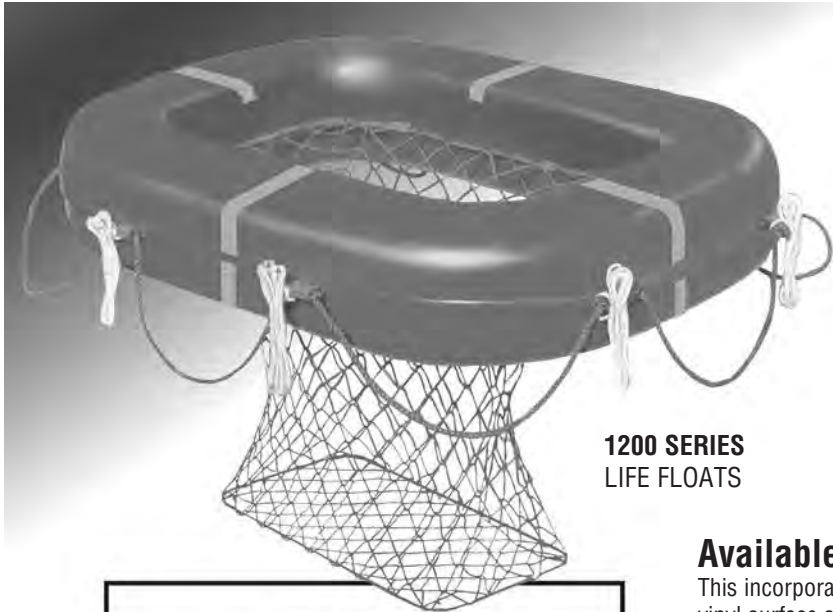
#1903 – Cylinder shape, 24” x 48”, 6/pack, ship. wt. 9 lbs.

All models available in Black only.

LIFE FLOATS & BUOYANT APPARATUSES

JIM-BUOY

USCG APPROVED



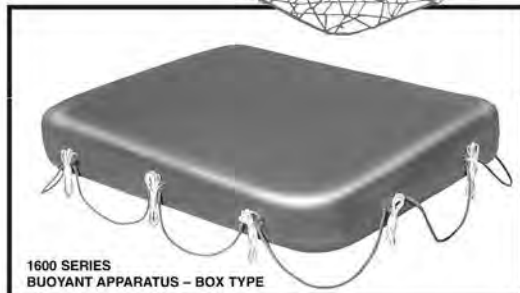
**1200 SERIES
LIFE FLOATS**

- Tough resilient vinyl surface—easily boarded, comfortable in the water – no hard surfaces.
- Lightweight yet easily exceeds the most severe U.S.C.G. tests. Ease of handling is one of our most valued features.
- Less storage space required for equal raft capacity; compare dimensions...you'll be amazed!
- No exposed metal hardware – all beackets secured inside the float body.
- Double webbing, sunlight or weather never reaches supporting beackets.
- Solid closed-cell plastic throughout; bullet holes would have only a minimal effect on buoyancy. Will not rot or mildew.

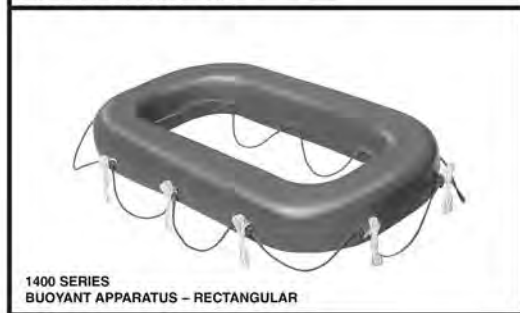
Available with GRS!

This incorporates a Glass Reinforced Surface into the regular vinyl surface and produces an almost impenetrable skin yet remains slightly resilient. When ordering simply add GRS to the model No., i.e. No. 1208-GRS.

IMPORTANT: All rafts are now required to have retroreflective tape per U.S.C.G. Requirement.



**1600 SERIES
BUOYANT APPARATUS - BOX TYPE**



**1400 SERIES
BUOYANT APPARATUS - RECTANGULAR**



**1300 SERIES
BUOYANT APPARATUS - RECTANGULAR W/NET PLATFORM**

| | MODEL NO. | PERSON CAPACITY | APP. LENGTH | APP. WIDTH | SEC. DIAM. | SHIP WT. | U.S.C.G APPROVAL# |
|---|-----------------------------------|-----------------|-------------|------------|------------|----------|-------------------|
| LIFE FLOATS | 1206 | 6 | 50-1/2" | 36-1/2" | 8-1/2" | 23 | 160.027/79/2 |
| | 1208 | 8 | 51" | 37" | 9" | 25 | 160.027/75/2 |
| | 1210 | 10 | 63" | 37" | 9" | 30 | 160.027/76/2 |
| | 1212 | 12 | 78" | 37" | 9" | 38 | 160.027/80/2 |
| | 1215 | 15 | 64" | 48" | 12-1/2" | 50 | 160.027/77/2 |
| | 1222 | 22 | 100" | 48" | 12-1/2" | 70 | 160.027/78/2 |
| | BUOYANT APPARATUS BOX TYPE | 1612 | 12 | 48" | 48" | 9" | 35 |
| 1618 | | 18 | 62" | 48" | 9" | 45 | 160.010/71/2 |
| 1620 | | 20 | 84" | 48" | 9" | 55 | 160.010/72/2 |
| BUOYANT APPARATUS RECTANGULAR | 1410 | 10 | 51" | 37" | 9" | 23 | 160.010/73/2 |
| | 1412 | 12 | 63" | 37" | 9" | 28 | 160.010/74/2 |
| | 1418 | 18 | 64" | 48" | 12-1/2" | 48 | 160.010/75/2 |
| | 1422 | 22 | 100" | 48" | 12-1/2" | 68 | 160.010/76/2 |
| BUOYANT APPARATUS RECTANGULAR W/NET PLATFORM | 1308 | 8 | 51" | 37" | 9" | 23 | 160.010/77/2 |
| | 1310 | 10 | 63" | 37" | 9" | 28 | 160.010/78/2 |
| | 1315 | 15 | 64" | 48" | 12-1/2" | 48 | 160.010/79/2 |
| | 1322 | 22 | 100" | 48" | 12-1/2" | 68 | 160.010/80/2 |

OFFICIAL U.S. COAST GUARD REQUIREMENTS

180.10-5 Requirements for vessels in ocean or coast wise service

180.10-5 (a) Except as otherwise provided in this section, vessels in ocean service shall carry sufficient life floats for all persons on board, and vessels in coastwise service shall carry sufficient lifefloats or buoyant apparatus for all person on board.

180.10-5 (a) (1) Vessels whose routes are restricted to 20 miles from a harbor of safe refuge shall carry lifefloats or buoyant apparatus for not less than 50 percent of all person on board.

180.10-5 (a) (2) For vessels operation not more than one mile from land, the Officer in Charge, Marine Inspection. May permit operation with reduced amounts of life floats or buoyant apparatus when in his opinion it is safe to do so. In permitting such reduction the Officer in Charge, Marine Inspection, shall consider the vessel, its scope of operation and the hazards of the route.

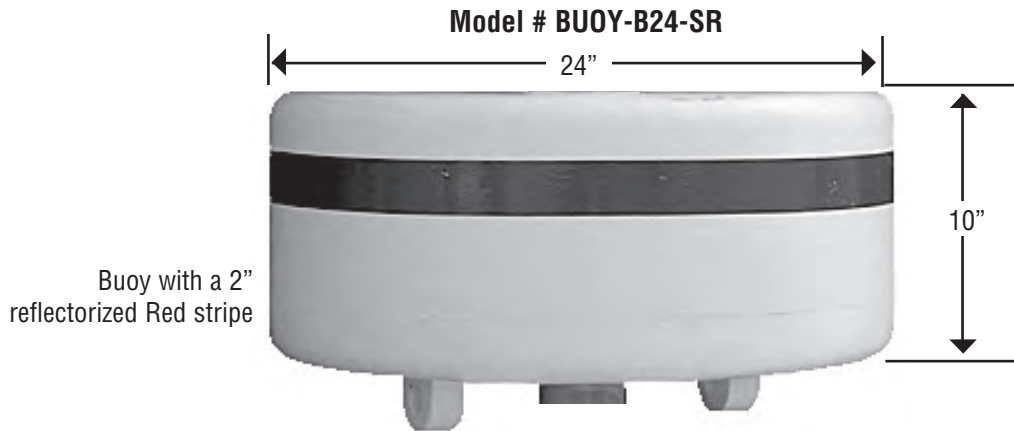
180-105 (b) After July 1, 1968, all lifefloats and buoyant apparatus shall be international orange in color.

Jim Buoy Vinyl Repair Kits

A2 part patch with solvent for the careful handyman. Use for minor repairs on all Jim Buoy life rafts and ring buoys. Complete with patches, solvent and brush. #500 Repair Kit, 6 per carton.



BUOYS & BUOYS WITH LIGHTS



Size: 24" x 10" Donut Buoy
Hole in Center: 3-1/2" and has two Hubs on bottom for tying a rope to pipeline.

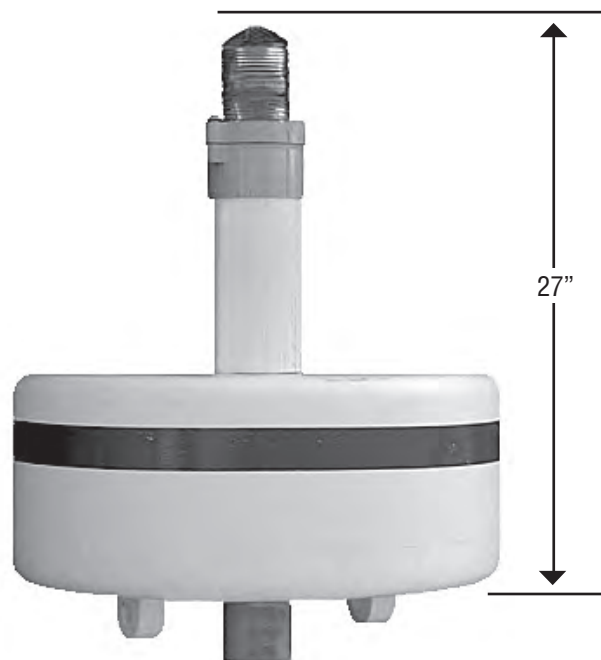
Material: Medium density polyethylene
Meets ASTM D4976 Group 2, Class 2, Grade 3
Color: White (with or without 2" reflectorized striping)

Model # BUOY-B24-SRC

Lights must use a 23" or 31" tube where it is required to be 2ft. out of the water.

Lights are sold Separately.

General lighted marker buoys.
Light must use a 15" tube.



BUOY LIGHTS



Housing: Polycarbonate
Batteries: Rechargeable
Lens: Polycarbonate
Range: 1-1/2 miles

The Lamp Assembly on these Buoy Lights are guaranteed 3 Years!

Colors Available for Buoy Lights:
Red, Amber, Green, Clear, Blue

Flashrates Available: For Red, Amber, Green, & Clear:
10, 15, 24, 30 FPM. For Red & Amber: 60 FPM



MODEL #
TOPHAT-BUNY-(COLOR)-(RATE)

Uses 6 volt lantern pin plug battery

1 year on set of 6 pin plug 2744N batteries
2 years on Alkaline Pack

Steady state drain -
.18 amp hours per night based on 10 hour night

MODEL # BUNY-

Rugged hermetically sealed buoy lights for both channel marking and obstructions. Standard lights use six - NEDA920 batteries, supplied. These units are made with single lamp and with automatic spare lamps. They turn off in the daytime automatically and come in standard flash rates of 15, 30, and 60 flashes per minute. Every unit is supplied with tamper proof locking bolts. Low intensity has range of 1 - 2 miles and high intensity 2 - 5 miles.

(A) MODEL: SERIES BUNY

As shown, this unit is a six battery standard type.

(B) SERIES: BUNY-OIL

As shown, in a single battery unit with a built in mercury switch. Self floating - needs no buoy and has a stainless steel eye bolt on the bottom for tying to nets. Automatic day switch. Has a standard flash rate of 30 FPM and uses one six volt NEDA 920 battery.

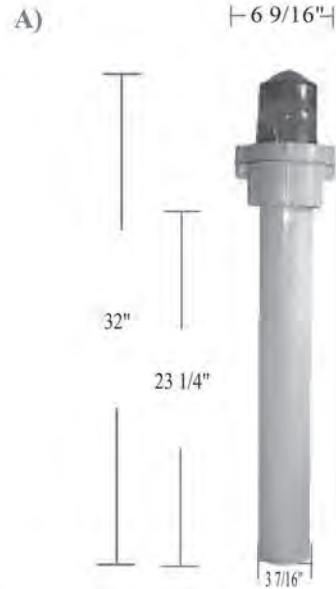
(C) SERIES: BUNYBZ-1850-(COLOR)-(RATE)

This is a self contained marker light. Available in flashing or steady modes. Will operate for three months on one alkaline six volt spring battery NEDA 908A.

NOTE: When ordering Buoy Lights: Rate, Color and Intensity (low - high) must be specified.

SUFFIXES:

- 1949 - Lamp
- 1317 - Lamp
- 1850 - Lamp
- SB - Spare Bulb
- L.E.D - Light Emitting Diodes



BUNY SERIES



BUNY-OIL



BUNYBZ

Spare Bulb System, upon primary lamp failure, automatically switches to backup lamp.

****ALL MODELS ARE WATERPROOF**

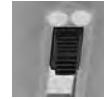
**Also these are now available in L.E.D. Lamps. Colors available RED, GREEN, BLUE, & AMBER

RESCUE STROBE LIGHT

Firefly®2/Waterbug™/Doublefly™



- Size:** 4.4 x 2.2 x 1.1 in (11.0 x 5.6 x 2.5 cm)
 - Weight:** 4.0 oz (113 g)
 - Material:** Polycarbonate
 - Waterproof:** Up to 200 ft (61 m)
 - Beam Angle:** Omni-directional 360°
 - Accessories:** A6-04-0087- Orange pouch with lanyard
 - Visibility:** Visible up to 3 mi (5 km)
 - Flash Rate:** 60 ± 10 flashes per minute
 - Lamp:** High intensity Xenon strobe
 - Battery Type:** 2 "AA" alkaline or 1.5V lithium (5 year replacement life) not included
 - Certification:** 3900.1, 3995, 3996.1, 3996 - USCG 161.012/29/0 (excluding Waterbug); FAA (TSO-C85) approved; CE 3999.1, 3999 - CE only
 - Limited Warranty:** 1 year
 - Operational Life:** Strobe - Minimum 8 hours; DoubleFly incandescent - 2 hours continuous
- Waterbug Sensor**



STROBE AND FLASHLIGHT COMBO



- Ideal for boaters, hunters, campers, skiers or diver's BC pocket; includes wrist lanyard and velcro strap
- Omni-directional strobe visible up to 2 miles (3.2 km)
- Waterproof to 328 ft (100 m); for diving, use non-petroleum based lubricant on O Ring seal to ensure maximum waterproof integrity
- Floats if dropped overboard
- Operates on 2 "AA" alkaline or 2 "AA" lithium batteries
- Operating life - Strobe - 10 hours; flashlight - 2 hours continuous

NAVY SPECIFICATION LIGHTING

HANDLANTERN

SYM 100.2
NSN 6230-00-781-3189

SYM 101.2
NSN 6230-00-781-3188
(shown)



Construction: Glass reinforced polyester thermoset housing. Yellow conforming to color No. 13655 of FED-STD-595.

Operation: Portable model uses only one 6 volt DC lamp, two 6 volt dry cell batteries. Relay operated model connects to shipboard power. When power goes off relay switches over to the dry cell and the lantern comes on. Intended for hallways, exits, lifeboats stations, etc.

| Description | Catalog Number |
|-------------------------|------------------|
| Portable (w/hand assy.) | SYM100.2 |
| 115VAC (Relay Operated) | SYM101.2 (shown) |

EMERGENCY SIGNALING STROBE



C-STROBE Product NO. 3959

- Intense strobe light visible up to 2 miles (3.2 km)
- Waterproof and corrosion resistant case
- Slim, lightweight design
- Comes with an adjustable Velcro strap; can be mounted on bicycle frame or pole, etc.
- Operates on 2 "AA" alkaline or 2 "AA" 1.5V lithium batteries (5-year replacement life when using lithium batteries; 1-year replacement life when using alkaline batteries)
- Operating life - More than 8 hours continuous @ -1°C (30°F)

Size: 6.0 x 1.6 in (15.3 x 4.0 cm)
Weight: 2.6 oz (74 g)
Material: Rugged, impact and temperature resistant ABS
Color: International orange
Operation: Twist "ON-OFF" control can be operated by gloved hands and in adverse conditions
Waterproof: Up to 10 ft (3.1 m)
Accessories: 1083-Dated lithium/sulfide batteries
Beam Angle: Omni-directional 360°
Visibility: High intensity strobe light is visible up to 2 miles (3.2 km)
Flash Rate: 60 ± 10 flashes per minute nominal
Lamp: Xenon flash tube
Battery Type: 2 "AA" alkaline or 1.5V lithium (not included)
Certification: USCG 161.012/41/0 approved with 2 "AA" lithium or alkaline batteries; CE
Limited Warranty: 1 year
Carton Dimensions: 3958 - 7.0 x 12.0 x 5.0 in (18.0 x 30.0 x 13.0 cm)
 3959 - 13.5 x 13.5 x 9.0 in (34.0 x 34.0 x 23.0 cm)
Units Per Carton: 3958 - 24 / 3959 - 12
Carton Weight: 3958 - 4.8 lbs (2.2 kg) / 3959 - 4.5 lbs (2.0 kg)
Operational Life: More than 8 hours continuous @ -1°C (30°F)

AUTOMATIC CREW-OVERBOARD MARKER LIGHT WITH BULKHEAD BRACKET - SM-2

- Brighter light in all directions
- Upgraded polycarbonate blend case
- Improved impact rating; UV, temperature and chemical resistant
- Automatically rights itself and activates when in the water
- Extremely durable; withstands vigorous use
- Application: Perfect for commercial marine, petro-marine, cruisers, and any application needing a reliable COB light
- High intensity Xenon strobe



COMMERCIAL & STEEL BOAT COMPASSES



HB-845 - Helmsman (Steel Boat Bracket Mount)



Helmsman Steel Boat Compass Features

- 3 3/4" PowerDamp Dial
- Special Reinforced Bracket with Quadrantal Correctors
- Hardened Steel Pivot and Sapphire Jewel Movement
- 45 Degree Lubber Lines
- Full Internal Gimbals
- Exclusive Built-in Green NiteVu Lighting
- Built-in Standard Compensators and Booster Magnets on Base
- Movable Sun Shield
- 100% Repairable

Exclusive 5-Year Ritchie Warranty

GLOBEMASTER® Part # 453 SHOCK MOUNTED BINNACLE FEATURES

- Special Anti-vibration Mount Isolates Pivot and Jewel
- PowerDamp High Performance Dials on All 5" Models
- Choice of 2° or 5° Cord with 5" and 6" Dials
- Hardened Steel Pivot and Sapphire Jewel Movement
- Built-in Semi-Circular Compensators
- Special Binnacle for Steel Hulled Vessels
- Choice of 12, 24 or 32 Volt Night Lighting
- Extra 90° Lubber Lines for Easy Reading of Reciprocal Headings
- 100% Repairability
- Exclusive three-year Ritchie Warranty

Shock Mount Models

- 5 Inch Dials **Part # C-453**
- 6 Inch Dials **Part # C-463**

Shock Mount Models/Steel Hulled Vessels

- 5 Inch Dials **Part # B-453**
- 6 Inch Dials **Part # B-463**

PROTECTIVE COVER Part # H-71-C



NOTE: Shock Mounted binnacles should be installed in enclosed bridge decks or pilot houses. When ordering a Globemaster Shock Mounted Binnacle it is important to specify your choice 2° or 5° dial and your choice of 12, 24 or 32 volt night lighting. 3-1/2" spheres on 5" models/4" spheres on 6" models. Larger spheres available on special order.





SINGLE AIR HORNS



| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | S-1 | 5" | 111 | Spun | 9 lbs. | 12 7/8" | 8 3/4" |
| | | | 111C | Cast | 13 lbs. | 18 7/8" | 9 1/8" |
| Super | S-2 | 6 3/8" | 112 | Spun | 19 lbs. | 22" | 11 1/2" |
| | | | 112C | Cast | 25 lbs. | 22" | 11 1/2" |
| Commander | S-3 | 8" | 113 | Spun | 27 lbs. | 25 1/4" | 12 1/2" |
| | | | 113C | Cast | 37 lbs. | 25 1/4" | 12 1/2" |
| Challenger | S-4 | 10" | 114C | Cast | 66 lbs. | 30 1/4" | 13 1/2" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | S-1 | 5" | 121 | Spun | 17 lbs. | 19" | 11 3/8" |
| | | | 121C | Cast | 21 lbs. | 19" | 11 3/4" |
| Super | S-2 | 6 3/8" | 122 | Spun | 22 lbs. | 21" | 12 1/4" |
| | | | 122C | Cast | 28 lbs. | 21" | 12 1/4" |
| Commander | S-3 | 8" | 123 | Spun | 31 lbs. | 24 3/8" | 14 1/8" |
| | | | 123C | Cast | 41 lbs. | 24 3/8" | 14 1/8" |
| Challenger | S-4 | 10" | 124C | Cast | 77 lbs. | 30 1/4" | 16 1/4" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|-----------------|-------------|---------|
| Standard | S-1 | 5" | | | *NOT AVAILABLE* | | |
| Super | S-2 | 6 3/8" | 132 | Spun | 38 lbs. | 22" | 23 3/4" |
| | | | 132C | Cast | 44 lbs. | 22" | 23 3/4" |
| Commander | S-3 | 8" | 133 | Spun | 47 lbs. | 25 1/4" | 23 3/4" |
| | | | 133C | Cast | 57 lbs. | 25 1/4" | 23 3/4" |
| Challenger | S-4 | 10" | 134C | Cast | 100 lbs. | 30 1/4" | 24 3/4" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | S-1 | 5" | 141 | Spun | 40 lbs. | 19" | 14 3/8" |
| | | | 141C | Cast | 44 lbs. | 19" | 14 3/4" |
| Super | S-2 | 6 3/8" | 142 | Spun | 45 lbs. | 21" | 15 1/4" |
| | | | 142C | Cast | 51 lbs. | 21" | 15 1/4" |
| Commander | S-3 | 8" | 143 | Spun | 54 lbs. | 24 3/8" | 17 1/8" |
| | | | 143C | Cast | 64 lbs. | 24 3/8" | 17 1/8" |
| Challenger | S-4 | 10" | 144C | Cast | 100 lbs. | 32 1/8" | 19 1/4" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | S-1 | 5" | 151 | Spun | 50 lbs. | 19" | 26 3/8" |
| | | | 151C | Cast | 54 lbs. | 19" | 26 3/8" |
| Super | S-2 | 6 3/8" | 152 | Spun | 55 lbs. | 21" | 27 1/2" |
| | | | 152C | Cast | 61 lbs. | 21" | 27 1/2" |
| Commander | S-3 | 8" | 153 | Spun | 64 lbs. | 24 3/8" | 28 1/4" |
| | | | 153C | Cast | 74 lbs. | 24 3/8" | 28 1/4" |
| Challenger | S-4 | 10" | 154C | Cast | 110 lbs. | 32 1/8" | 30 1/2" |

DOUBLE AIR HORNS



| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | D-1 | 5" | 211 | Spun | 17 lbs. | 15 3/8" | 8 3/4" |
| | | | 211C | Cast | 23 lbs. | 18 7/8" | 9 1/8" |
| Super | D-2 | 6 3/8" | 212 | Spun | 33 lbs. | 22" | 11 1/2" |
| | | | 212C | Cast | 44 lbs. | 22" | 11 1/2" |
| Commander | D-3 | 8" | 213 | Spun | 48 lbs. | 25 1/4" | 12 1/2" |
| | | | 213C | Cast | 67 lbs. | 25 1/4" | 12 1/2" |
| Challenger | D-4 | 10" | 214C | Cast | 127 lbs. | 30 1/4" | 13 1/2" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | D-1 | 5" | 221 | Spun | 30 lbs. | 15 3/8" | 11 1/8" |
| | | | 221C | Cast | 36 lbs. | 19" | 11 1/8" |
| Super | D-2 | 6 3/8" | 222 | Spun | 38 lbs. | 21" | 13" |
| | | | 222C | Cast | 47 lbs. | 21" | 13" |
| Commander | D-3 | 8" | 223 | Spun | 55 lbs. | 24 3/8" | 14" |
| | | | 223C | Cast | 74 lbs. | 24 3/8" | 14" |
| Challenger | D-4 | 10" | 224C | Cast | 168 lbs. | 30 1/4" | 16 7/8" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | D-1 | 5" | 231 | Spun | 29 lbs. | 15 3/8" | 20" |
| | | | 231C | Cast | 35 lbs. | 18 3/8" | 20" |
| Super | D-2 | 6 3/8" | 232 | Spun | 50 lbs. | 22" | 23 3/4" |
| | | | 232C | Cast | 63 lbs. | 22" | 23 3/4" |
| Commander | D-3 | 8" | 233 | Spun | 68 lbs. | 25 1/4" | 23 3/4" |
| | | | 233C | Cast | 87 lbs. | 25 1/4" | 23 3/4" |
| Challenger | D-4 | 10" | 234C | Cast | 161 lbs. | 30 1/4" | 24 3/4" |

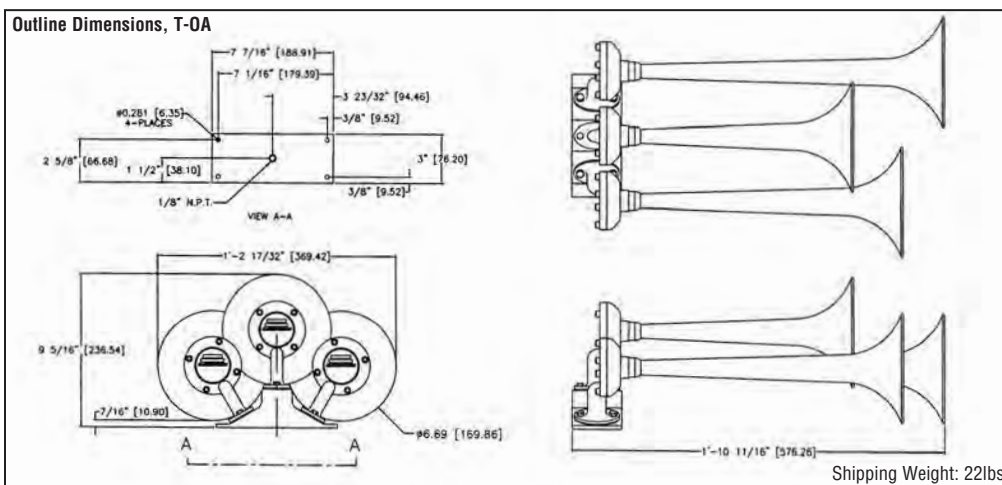
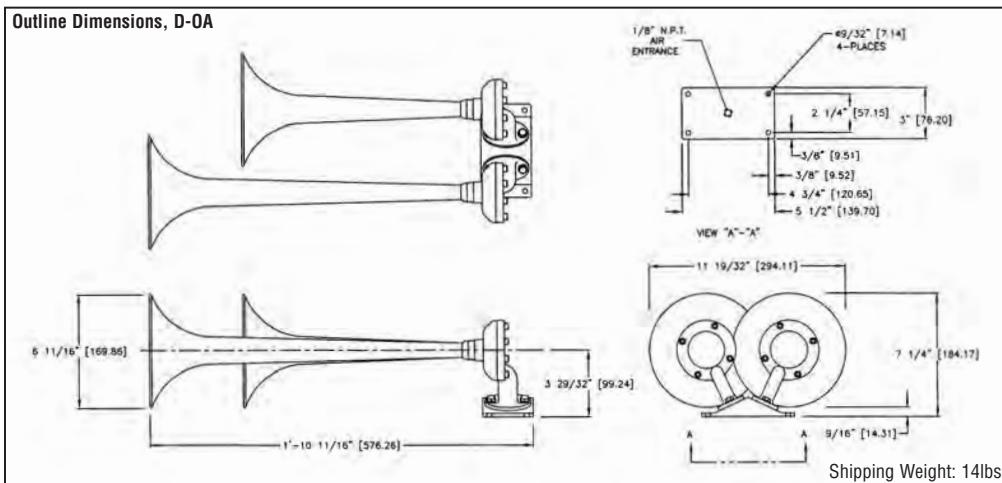
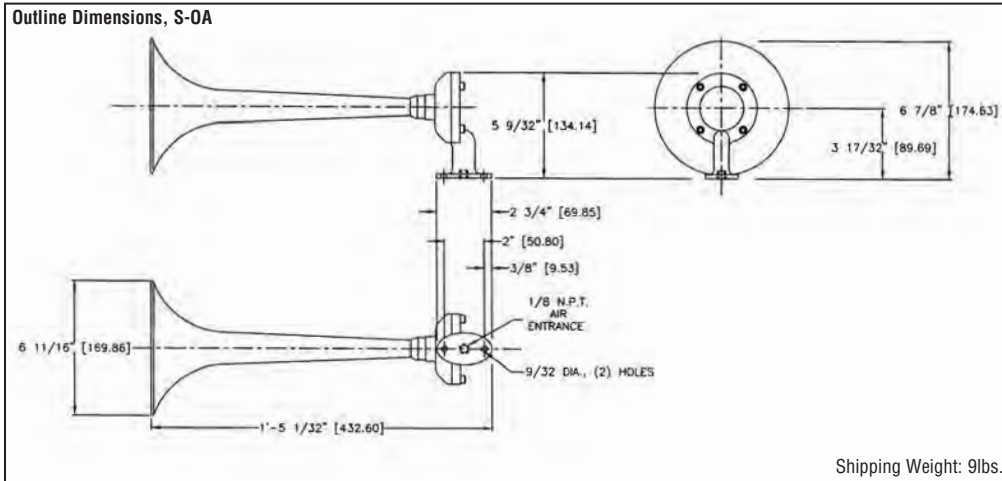
| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | D-1 | 5" | 241 | Spun | 53 lbs. | 15 3/8" | 14 1/8" |
| | | | 241C | Cast | 59 lbs. | 19" | 14 1/8" |
| Super | D-2 | 6 3/8" | 242 | Spun | 66 lbs. | 21" | 16" |
| | | | 242C | Cast | 74 lbs. | 21" | 16" |
| Commander | D-3 | 8" | 243 | Spun | 83 lbs. | 24 3/8" | 17" |
| | | | 243C | Cast | 102 lbs. | 24 3/8" | 17" |
| Challenger | D-4 | 10" | 244C | Cast | 191 lbs. | 32 1/8" | 20 5/8" |

| Horn | Model No. | Diaphragm Diameter | Figure Number | Projectors | Net Weight | O.A. Length | Height |
|------------|-----------|--------------------|---------------|------------|------------|-------------|---------|
| Standard | D-1 | 5" | 251 | Spun | 63 lbs. | 15 3/8" | 25 3/8" |
| | | | 251C | Cast | 69 lbs. | 19" | 25 3/8" |
| Super | D-2 | 6 3/8" | 252 | Spun | 76 lbs. | 21" | 27 1/4" |
| | | | 252C | Cast | 84 lbs. | 21" | 27 1/4" |
| Commander | D-3 | 8" | 253 | Spun | 93 lbs. | 24 3/8" | 28 1/4" |
| | | | 253C | Cast | 112 lbs. | 24 3/8" | 28 1/4" |
| Challenger | D-4 | 10" | 254 | Cast | 201 lbs. | 32 1/8" | 33 3/4" |

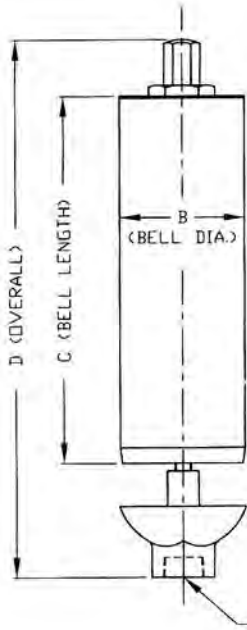




SPECIFICATIONS



AIR WHISTLE SPECIFICATIONS



Whistles are of cast bronze construction with one piece polished brass bell. Chrome plating available at additional cost.

Installation – For best results whistle must be installed as high as practical.

SPECIFICATIONS/DIMENSIONS W/O MANUAL VALVE

| Figure No. | | Dimensions | | | | C.F.S. Air Consumption At 100 P.S.I. | Net Weight Less Valve |
|------------|-----------|------------|--------|--------|---------|--------------------------------------|-----------------------|
| Air | Steam | A | B | C | D | | |
| 115 AMP | 115 SMP | 1/4" | 1" | 2 1/8" | 4 1/2" | 0.93 | 3/4 lb. |
| 116 AMP | 116 SMP | 3/8" | 1 1/2" | 4 3/4" | 9" | 1.37 | 2 3/4 lbs. |
| 117 AMP | 117 SMP | 1/2" | 2" | 5 7/8" | 11 1/4" | 4.18 | 3 1/2 lbs. |
| 118 AMP | 118 SMP | 3/4" | 2 1/2" | 6 3/4" | 12 1/4" | 3.65 | 4 1/2 lbs. |
| 119 AMP | 119 SMP | 3/4" | 3" | 7 3/4" | 13" | 4.58 | 8 1/2 lbs. |
| * 120 ACP | * 120 SMP | 1" | 4" | 12" | 17 3/4" | 7.03 | 18 1/2 lbs. |
| 121 AMP | 121 SMP | 1 1/4" | 5" | 14" | 20" | 10.75 | 29 lbs. |
| 122 AMP | 122 SMP | 1 1/2" | 6" | 18" | 25" | 13.98 | 38 lbs. |

Larger size whistles available on request.

Code: A – Air C – Chimetone M – Monotone P – Plain S – Steam
 * Chimetone unless otherwise specified.

Note: Pipe sizes shown in table are standard. Whistles ordered not to standard will have suitable adapter installed.

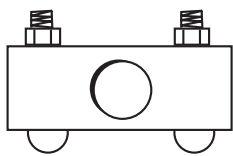
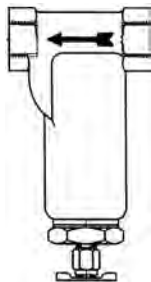


FIG. V-100
Pneumatic Switch

This simple pneumatic pressure switch placed in the air line between whistle valve and AIRHORN is an economical means for actuating a whistle light whenever the AIRHORN blows. Weight, 1/2 lb. Not considered weatherproof.

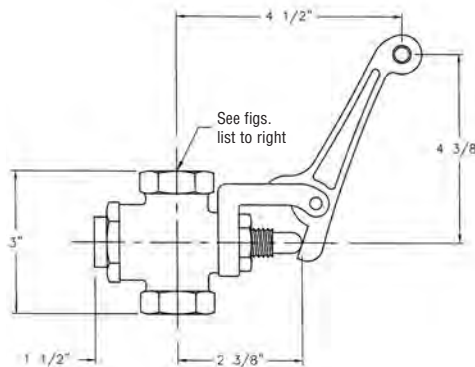
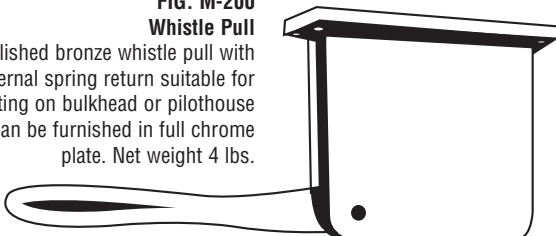


This KAHLBERG AIR STRAINER is also a moisture trap, and is used between air supply and whistle valve to catch dirt, chips, oil and water from the air line. Solid cast bronze.

Fig. M-100, 1/2" NPT, 3 Lbs.
Fig. M-101, 1/2" NPT, 3 Lbs.

FIG. M-200
Whistle Pull

Polished bronze whistle pull with internal spring return suitable for mounting on bulkhead or pilothouse ceiling. Can be furnished in full chrome plate. Net weight 4 lbs.



FIGS. V-11A TO V-15A
MANUAL VALVE

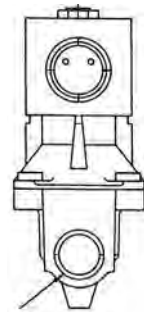
Screwed thread type bronze manual whistle valve with renewable disc suitable for 250 psi air pressure. Valve has packed stem. Available in full chrome plate.

SIZES & WEIGHTS

- Fig. V-11A, 1/4" NPT, Net Wt., 1/2 Lb.
- Fig. V-12A, 3/8" NPT, Net Wt., 1 Lb.
- Fig. V-13A, 1/2" NPT, Net Wt., 1-1/2 Lb.
- Fig. V-14A, 3/4" NPT, Net Wt., 2-1/2 Lbs.
- Fig. V-15A, 1" NPT, Net Wt., 3-1/4 Lbs.

FIGS. V-150, 3/8" N.P.T. Solenoid **FIGS. V-151**, 1/2" N.P.T. Solenoid

The V-70 and V-130 series vertical solenoids are low cost units with screwed threads for use where valve is installed in a protected location. The V-70 to V-74 except that a manual operating lever is added for emergency manual control. The units with letter "E", added to Figure No. indicate a water, weather and explosion proof unit. These valves have moisture resistant solenoid coil, stainless pilot, renewable piston valve and disc, and all bronze body. Sized are 3/8" to 1" NPT in standard voltages, suitable for pressures to 300 PSI. Brass finish or full chrome plate. Weights 5 to 11 lbs. depending on size.



PERKO®

FOG BELLS

THE EIGHT AND TWELVE INCH BELLS LISTED ON THIS PAGE HAVE BEEN REVIEWED BY THE U.S. COAST GUARD AND COMPLY WITH C.G. 169 REGULATIONS FOR SOUND SIGNAL APPLIANCES AS REQUIRED BY ANNEX III PARAGRAPH 2 OF THE '72 COLREGS. THE EIGHT INCH SIZE IS FOR USE ON VESSELS UNDER 20 METERS (65.6 FT.) IN LENGTH. THE 12 INCH SIZE IS FOR USE ON VESSELS OF ANY LENGTH.

FIG. 158 - FOGBELL

CONSTRUCTION OPTIONS:
PLAIN, POLISHED OR CHROME PLATED CAST BRONZE
HEAVYWEIGHT
FIXED MOUNTING

ORDERING INFORMATION

| Bottom Diameter Inches | Height Overall Inches | Plain Bronze | | Polished Bronze | | Chrome Plated | | Ship Wt. Std. Pkg. PLB/POL/CHR |
|------------------------|-----------------------|--------------|---------|-----------------|---------|---------------|---------|--------------------------------|
| | | Std. Pkg. | 1 Pc. | Std. Pkg. | 1 Pc. | Std. Pkg. | 1 Pc. | |
| 12 | 12 | 158 | 012 PLB | 158 | 012 POL | 158 | 012 CHR | 34.4/33.0/33.2 |

Screw Size 1/4" R.H.



FIG. 158 POLISHED

FIG. 179 - FOGBELL

CONSTRUCTION OPTIONS:
WROUGHT BRASS
PLAIN BRASS FINISH
LIGHTWEIGHT
FIXED MOUNTING

ORDERING INFORMATION

| Bottom Diameter Inches | Height Overall Inches | Standard Pkg. - 1 Pc. | Ship Wt. Carton Lbs. Std. Pkg. |
|------------------------|-----------------------|-----------------------|--------------------------------|
| 12 | 8 | 179 012 PLB | 7.6 |

Screw Size #12 R.H.



FIG. 179

FIG. 159 - FOGBELL

CONSTRUCTION OPTIONS:
STAMPED BRASS
PLAIN OR CHROME PLATED BRASS FINISH
LIGHTWEIGHT

ORDERING INFORMATION

| Bottom Diameter Inches | Height Overall Inches | Chrome Plated | | Plain Brass | | Ship Wt. Carton Lbs. DP CHR/PLB |
|------------------------|-----------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---------------------------------|
| | | Dealer Pkg. - 2 Pcs. 1 Pc. per Pkg. | Dealer Pkg. - 2 Pcs. 1 Pc. per Pkg. | Dealer Pkg. - 2 Pcs. 1 Pc. per Pkg. | Dealer Pkg. - 2 Pcs. 1 Pc. per Pkg. | |
| 6 | 4 | 159 DP6 CHR | 159 DP6 CHR | 159 DP6 PLB | 159 DP6 PLB | 3.7/3.7 |
| 8 | 5 | 159 DP8 CHR | 159 DP8 CHR | 159 DP8 PLB | 159 DP8 PLB | 6.2/6.0 |

Screw Size #4 F.H.



FIG. 159 CHROME



FIG. 159 PLAIN

FOG BELLS

PERKO®

THE EIGHT AND TWELVE INCH BELLS LISTED ON THIS PAGE HAVE BEEN REVIEWED BY THE U.S. COAST GUARD AND COMPLY WITH C.G. 169 REGULATIONS FOR SOUND SIGNAL APPLIANCES AS REQUIRED BY ANNEX III PARAGRAPH 2 OF THE '72 COLREGS. THE EIGHT INCH SIZE IS FOR USE ON VESSELS UNDER 20 METERS (65.6FT.) IN LENGTH. THE 12 INCH SIZE IS FOR USE ON VESSELS OF ANY LENGTH.



FIG. 420 POLISHED



FIG. 420 CHROME



FIG. 150

FIG. 420 - FOGBELL
 CONSTRUCTION OPTIONS:
 POLISHED CAST BRONZE
 CHROME PLATED CAST BRONZE
 MEDIUM WEIGHT
 REMOVABLE

ORDERING INFORMATION

| Bottom Diameter Inches | Height Overall Inches | Polished Bronze Std. Pkg. - 1 Pc. | Chrome Plated Bronze Std. Pkg. - 1 Pc. | Ship Wt. Carton Lbs. Std Pkg POL/CHR |
|------------------------|-----------------------|-----------------------------------|--|--------------------------------------|
| 6 | 5 | 420 006 POL | 420 006 CHR | 4.0/4.0 |
| 8 | 6-1/8 | 420 008 POL | 420 008 CHR | 8.1/8.1 |

Screw Size #8 F.H.

FIG. 150 - FOGBELL
 CONSTRUCTION OPTIONS:
 CASTBRONZE
 CHROMEPLATED, PLAINORPOLISHED
 HEAVYWEIGHT
 REMOVABLE

ORDERING INFORMATION

| Bottom Diameter Inches | Height Overall Inches | Plain Bronze Std. Pkg. 1 Pc. | Polished Bronze Std. Pkg. 1 Pc. | Chrome Plated Bronze Std. Pkg. 1 Pc. | Ship Wt. Carton Lbs. Std Pkg. PLB/POL/CHR |
|------------------------|-----------------------|------------------------------|---------------------------------|--------------------------------------|---|
| 8 | 8 | 150 008 PLB | 150 008 POL | 150 008 CHR | 9.9/9.3/9.6 |
| 12 | 12 | 150 012 PLB | 150 012 POL | 150 012 CHR | 32.0/30.9/30.9 |

Screw Size 1/4" F.H.

For complete Spare Part No. Insert Finish Code: P or PLB, for Plain Bronze or Brass Finish (i.e. 420 P06 99A or 127 000 PLB). B or POL, for Polished Bronze or Brass Finish (i.e. 420 B06 99A or 127 000 POL). C or CHR, for Chrome Plated Finish (i.e. 420 C06 99A or 127 000 CHR).

| ARMS | | WALL PLATES | | CLAPPERS | | EYE BOLTS | | ACORN NUTS | |
|------------------------|----------------|---------------|----------------|--------------------|----------------|-------------------|----------------|------------|----------------|
| Figure No. | Spare Part No. | Figure No. | Spare Part No. | Figure No. | Spare Part No. | Figure No. | Spare Part No. | Figure No. | Spare Part No. |
| 420-6" | 420-99A-6" | 420-6" | 127 | 420-6" | 153 | 420-6" | 113 | 420-6" | 465 004 |
| 420-8" | 171 | 420-8" | 127 | 420-8" | 144 | 420-8" | 123 | 420-8" | 465 008 |
| 150-8" | 171 | 150-8" | 127 | 150-8" | 144 | 150-8" | 123 | 150-8" | 465 008 |
| 150-12" | 150-99A-12" | 150-12" | 150-99B-12" | 150-12" | 172 | 150-12" | 172 | 150-12" | 465 009 |
| *158-12" | 158-99A-12" | *158-12" | 158-99A-12" | *158-12" | 172 | *158-12" | 172 | 158-12" | 465 009 |
| 179 | 179-000-99A | 179 | 179-000-99A | 179 | 144 | 179 | 179-99B | 179 | 465 008 |
| 159-6" | 159-99A | 159-6" | 166 | 159-6" | 159-99B | 159-6" | 113 | 159-6" | 465 004 |
| 159-8" | 159-99A | 159-8" | 166 | 159-8" | 153 | 159-8" | 113 | 159-8" | 465 004 |
| *Includes Wall Bracket | | *Includes Arm | | *Includes Eye Bolt | | *Includes Clapper | | | |



FOG SIGNAL TIMERS



• AUTOMATICALLY SOUNDS THE BOAT'S HORN

The BG-3 is pre-set to sound your boat's horn at the prescribed intervals required by the USCG in COMDTINST, M16672.2, Page 119, Inland Sound and Light Signals, Rule 35. The three most commonly used low visibility codes are pre-programmed into the BG-3 so that the pilot can focus his full attention on handling the boat and its tow

• COMPLIES FULLY WITH RULE 35

During restricted visibility, whether you are layed to or proceeding cautiously, you are required bylaw to sound your horn at prescribed intervals. With the BG-3, you can legally and SAFELY lay to or proceed with caution. The BG-3 eliminates the manual operation of the horn providing your crew, equipment and cargo with an extra margin of safety.

• EASY TO INSTALL

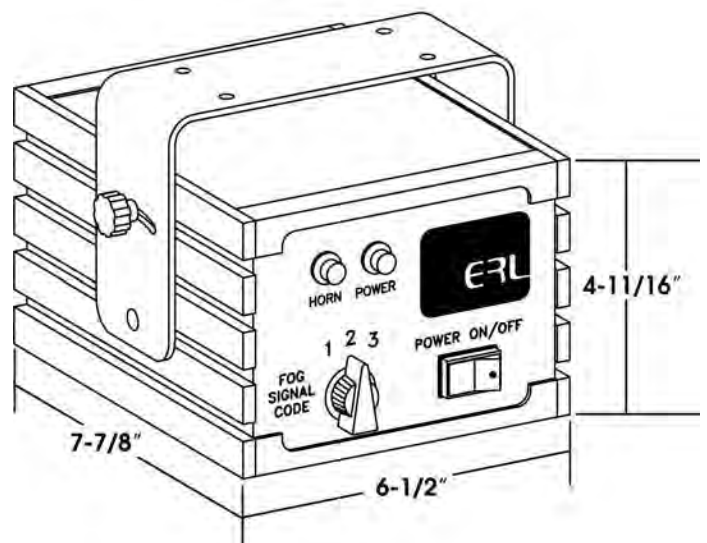
The BG-3 is contained in a rugged, yet attractive, self-contained unit. The universal swivel bracket allows for easy mounting on the console, bulkhead or overhead. A 3/8" NPT 120 VAC air solenoid is supplied along with easy-to-follow instructions. When properly installed, the BG-3 will not interfere with the normal operation of the boat's air horn.

**Reprinted from:
COMDTINST, M16672.2, Inland Sound and Light Signals
RULE 35**

Sound Signals in Restricted Visibility

In or near an area of restricted visibility, whether day or night, the signals prescribed in this rule shall be used as follows:

1. A power-driven vessel making way through the water shall sound, at regular intervals of not more than two minutes, one prolonged blast.
2. A power-driven vessel underway, but stopped and making no way through the water shall sound, at intervals of not more than two minutes, two prolonged blasts in succession with an interval of about two seconds between them.
3. A vessel not under command; a vessel restricted in her ability to maneuver, whether underway or at anchor; a sailing vessel; a vessel engaged in fishing, whether underway or at anchor; and a vessel engaged in towing or pushing another vessel shall, instead of the signals prescribed in paragraphs one or two of this Rule, sound at intervals of not more than two minutes, three blasts in succession; namely one long blast followed by two short blasts.



FIRE AXE



MANN'S "LITTLE FIREMAN"

The personal safety tool for every fireman. Sheath-protected, it is easy to carry, easily accessible. A fast-working tool in tight spots where the precision-balanced 15-inch handle permits easy swinging. Weighs only 1 1/2 lbs.; full polished, furnished in Indian Chief Red with gold trim. Snap sheath is high quality, hand stitched leather.

MANN'S PICKHEAD FIRE AXE (Shown Above)

Demanded for breaking and entering – FAST! Precision-balanced for safe handling in all three weights; 2 3/4, 4 1/2, and 6-lb. heads. 36-inch white No. 1 hickory handle (2 3/4 lb. size furnished with 24-inch or 28-inch handle of identical quality); handles furnished red if specified. This is the popular type for Chief's Car, Bus, Squad Car or Ambulance.

MANN'S FLAT HEAD FIRE AXE

Leads all others in constant demand from municipal fire companies, transportation companies, forest services, hotels and institutions; the six-pound head carries plenty of authority, is perfectly balanced for fast-cutting or hard driving. Full polished, and finished in Indian Chief Red. 36-inch clear lacquered No. 1 hickory handle.

BRACKET & HOOK

For mounting on walls, in buses, trucks, etc. This simple device permits storing fire axes out of the way with maximum attention to safety and security. The head fits into the tapered bracket, while the handle rests in the properly proportioned hook. Three sizes:

6" bracket for 4 1/2 lb. or 6 lb. axe

4 1/2" bracket for 2 3/4 lb. axe

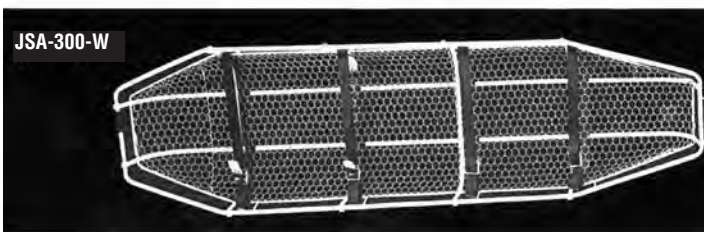
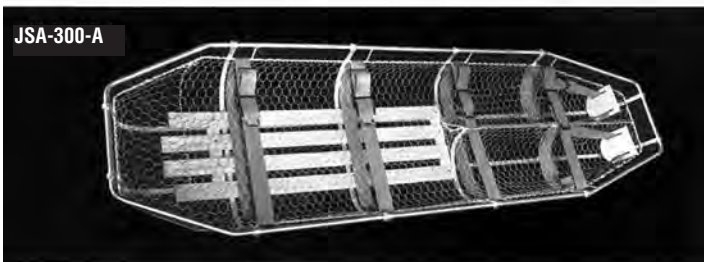
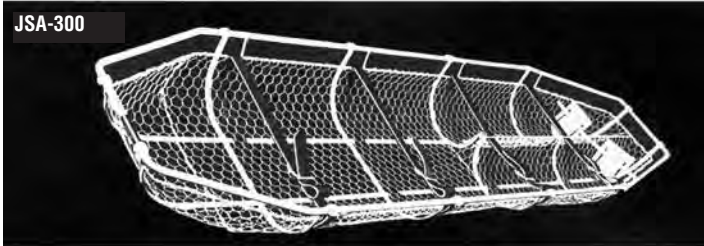
3 3/4" bracket for 1 1/2 lb. axe

Set includes bracket and hook; easily installed by six screws.

Specify bracket size when ordering.

JUNKIN

STRETCHERS



BASKET TYPE STRETCHERS

Junkin pioneered the development of the Splint Type-Basket Stretcher which led to the outstanding Series 300 Stretchers, the most efficient and practical products of their kind on the market. Made of steel, all welded rigid construction which does not rely on injured person to attain form or rigidity. Light in weight and ample in size. Available in six models with supplemental accessories to facilitate special handling needs.

JSA-300 Lightweight Basket Type Stretcher

Nylon web straps at chest, abdomen, thigh, and calf. Adjustable footrests for vertical lifting. Frame is 5/8" steel tubing; cross braces and runners 3/16" x 3/4" flat steel. Basket is 18 gauge, 1" hexagon mesh netting.

DIMENSIONS: 80-1/2" L; 8" H

JSA-300A Lightweight Basket Type Stretcher

Same as the JSA-300 with the addition of a wood rack through back of trunk section and a strap adjusted foot rest.

DIMENSIONS: 80-1/2" L; 8" H

JSA-300-B Break Away Stretcher

Designed to rescue injured persons from locations where lengthy foot travel is mandatory. The stretcher breaks into two halves which can be back-packed to the point of rescue and assembled in seconds. It can be secured to a standard back-pack for carrying. Three positive lock clamps secure two halves together. Four 60" web straps are standard. Stores in space 44" x 12" x 24".

WEIGHT: 34lbs.

Can Ship via UPS

Without Leg Divider: JSA-300-W

Designed to accommodate most standard 16" x 72" full length backboards.

ALSO AVAILABLE WITH PLASTISOL COATING (JSA-300-W PC).

MIL-8131-W Military Basket Stretcher

Constructed of lightweight 3/4" stainless steel tubing. Built to U.S. Military Spec. RR-L-1997 and MIL-L-37957. Available with or without leg divider, Plastisol coated or breakapart.

DIMENSIONS: 84" L x 24" W x 7 1/2" H

STRETCHERS

JUNKIN

PLASTIC STRETCHERS

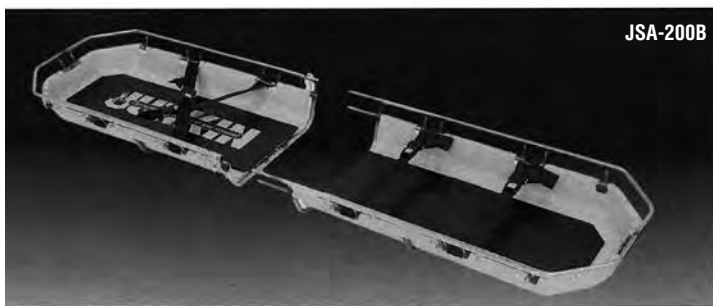


JSA-200

JSA-200 Plastic Stretcher

Yellow high-density polyethylene shell, supported by a stainless steel outer rail, permanently attached with stainless steel semi-tubular rivets. Features molded runners, fully exposed outer rail, non-absorbent foam pad secured to stretcher and four patient restraint straps. Ideal for unusually rugged rescue situations such as industrial, mining or construction. Patent Pending.

DIMENSIONS: 84 1/2" L; 24" W; 7 1/2"

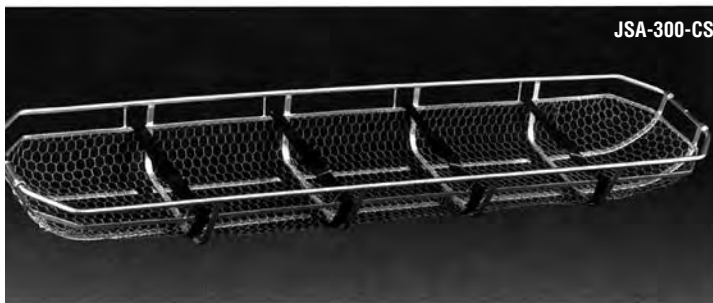


JSA-200B

JSA-200B Break-Away Plastic Stretcher

The same construction as JSA-200. Designed to rescue injured persons from locations where lengthy foot travel is mandatory. The stretcher breaks into two halves which can be back-packed to the point of rescue and assembled in seconds. Positive-locking quick-release pins secure two halves together. Four straps are standard.

DIMENSIONS: 84 1/2" L; 24" W; 7 1/2"

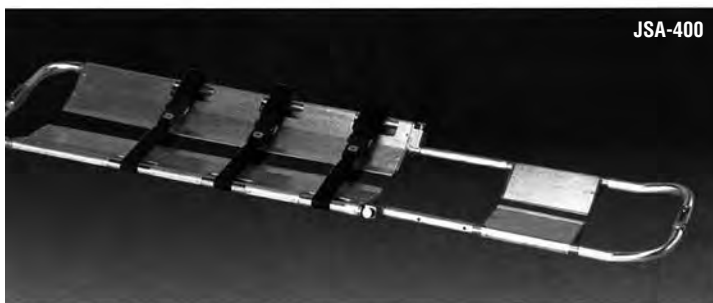


JSA-300-CS

JSA-300CS Confined Space Stretchers

The new 19" width Confined Space Splint Rescue Stretcher has been designed for rescues where space is confined. With steel, all-welded rigid construction, which does not rely on the injured person to attain form or rigidity. Light in weight and ample in size. The basket is 18 gauge, 1" hexagon mesh netting. Nylon web straps for securing at chest, abdomen, thigh and calf. Supplemental accessories to facilitate special handling needs are available.

DIMENSIONS: 81 1/2" L; 18 3/8" W; 7 3/4" H



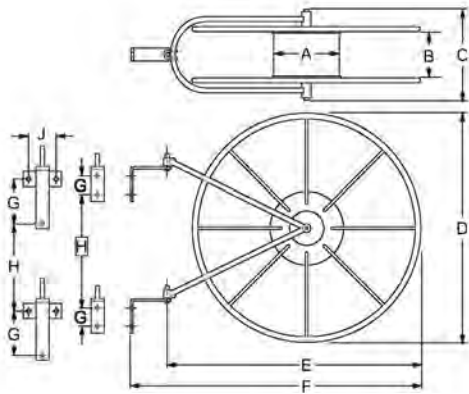
JSA-400

JSA-400 Aluminum Break Apart Stretchers

Designed to gently maneuver stretcher under patient without rolling or lifting. The immobilization of the patient in the position found, minimizes the risk of complicating the existing injuries. The center of the stretcher can be opened to allow the patient to be X-rayed while secured on the stretcher. Features include sturdy, lightweight aluminum construction with an adjustable length and three patient restraint straps. Folds for easy storing and separates in half during application and removal.

DIMENSIONS: 66 1/4" L; 17 1/2" W; 2 5/8" D;
Folded: 49 1/2" L; 3 1/2" D; Adjustable to 80"

SWINGING WALL MOUNTED HOSE REEL



Description

The Style V swinging hose reels are an efficient, compact package providing fast, easy deployment of collapsible hose. The pivoted mounting allows the reel to store out of the way and swing to the proper angle preventing twists and kinks as the hose unwinds.

Whether used for fire protection standpipes, or industrial wash-down applications, the rugged all-steel construction has provided the industry standard for service and reliability in thousands of installations. Tubular steel rims with solid steel spokes form a strong stiff side assembly not found on reels with pressed sheet metal sides. The open design also affords faster hose drying after use to prevent mold and mildew.

Unparalleled selection from nine different sizes means you are sure to find just the right size for the application. There is no reason to settle for a reel that's oversized or worse, undersized.

For quality, durability, and service, the real solution is Wirt & Knox.

Features

- Drum storage of collapsible hose avoids damaging kinks for longer hose life.
- Pivoted mounting permits the reel to swing to the proper angle preventing twists and kinks.
- Rugged all-steel construction for long, dependable service life.
- Open sides allow faster hose drying to prevent mold and mildew.
- Red enamel finish for protection and appearance.
- Nine different sizes insures just the right size for your requirements.
- "Double Row" design of V5, V7, V8, and V9 accommodates two rows of hose for maximum capacity in minimum space.
- Wall mounting is standard.
- Optional pipe mounting brackets are available.
- Hose reel covers are available for all sizes.

Ordering Information

| Model | Part Number |
|-----------|-------------|
| V-1 | 1212-1010-4 |
| V-3 1/2 | 1212-1030-4 |
| V-2 | 1212-1020-4 |
| V-5 | 1212-1050-4 |
| V-7 | 1212-1070-4 |
| V-8 1 1/2 | 1212-1080-4 |
| V-8 2 1/2 | 1212-1090-4 |
| V-9 1 1/2 | 1212-1100-4 |

Materials of Construction

Carbon Steel
Finish – High Glass Red Polyester

| Weight Model | Hose Size Inches | | Hose Capacity Feet (m) | | | Dimensions Inches (mm) | | | | | | | | Shipping | |
|--------------|------------------|------------|------------------------|---------------|---------------|------------------------|-------------|--------------|----------|--------------|---------------|----------|--------------|-----------|-----------|
| | (mm) | (mm) | Synthetic Lined | Single Jacket | Double Jacket | A | B | C | D | E | F | G | H | J | LBS (Kg) |
| V-1 | 1 1/2 (38) | 1 3/4 (45) | 100 (30.5) | 75 (22.9) | 50 (15.2) | 8 (203) | 3 (76) | 7 1/2 (191) | 21 (533) | 23 (584) | 27 (686) | 2 (51) | 11 3/8 (289) | --- | 20 (9.1) |
| V-3 1/2 | 2 (51) | 2 1/2 (64) | 100 (30.5) | 75 (22.9) | 50 (15.2) | 8 (203) | 5 (127) | 9 (229) | 21 (533) | 23 (584) | 27 (686) | 2 (51) | 11 1/4 (286) | --- | 23 (10.5) |
| V-2* | 1 1/2 (38) | 1 3/4 (45) | 150 (45.7) | 100 (30.5) | 75 (22.9) | 8 (203) | 3 (76) | 7 1/2 (191) | 26 (660) | 29 (737) | 33 (838) | 2 (51) | 15 (381) | --- | 23 (10.5) |
| V-5* | 2 (51) | 2 1/2 (64) | 150 (45.7) | 100 (30.5) | 75 (22.9) | 8 (203) | 5 1/2 (140) | 9 1/2 (241) | 26 (660) | 30 (762) | 34 (864) | 2 (51) | 13 (330) | --- | 26 (11.8) |
| | 1 1/2 (38) | 300 (91.4) | 200 (61) | 150 (45.7) | 8 (203) | 5 1/2 (140) | 9 1/2 (241) | 26 (660) | 30 (762) | 34 (864) | 2 (51) | 13 (330) | --- | 26 (11.8) | |
| V-7 | 2 (51) | 2 1/2 (64) | --- | 200 (61) | 150 (45.7) | 8 (203) | 9 (229) | 13 (330) | 26 (660) | 31 (787) | 37 1/2 (953) | 5 (127) | 13 1/4 (337) | 3 (76) | 32 (14.6) |
| V-8-1 1/2 | 1 1/2 (38) | 1 3/4 (45) | --- | 300 (91.4) | 200 (61) | 7 1/2 (191) | 6 (152) | 11 1/2 (292) | 32 (813) | 33 1/2 (851) | 40 (1016) | 5 (127) | 13 1/2 (343) | 3 (76) | 49 (22.3) |
| V-8-2 1/2 | 2 (51) | 2 1/2 (64) | --- | 300 (91.4) | 200 (61) | 7 1/2 (191) | 9 (229) | 14 1/2 (368) | 32 (813) | 33 1/2 (851) | 40 (1016) | 5 (127) | 13 1/2 (343) | 3 (76) | 53 (24.1) |
| V-9-1 1/2 | 1 1/2 (38) | 1 3/4 (45) | --- | --- | 250 (76.2) | 7 1/2 (191) | 6 (152) | 11 1/2 (292) | 37 (940) | 39 (991) | 45 1/2 (1156) | 5 (127) | 15 3/4 (400) | 3 (76) | 55 (25) |
| V-9-2 1/2 | 2 (51) | 2 1/2 (64) | --- | --- | 250 (76.2) | 7 1/2 (191) | 9 (229) | 14 1/2 (368) | 37 (940) | 39 (991) | 45 1/2 (1156) | 5 (127) | 15 3/4 (400) | 3 (76) | 57 (25.9) |

Note: Hose capacities are based on polyester jacket. Capacities for other jacket materials may vary.
*V-2 will hold one single 100' length of 1-1/2" or 1-3/4" double jacket hose.
**V-5 will hold one single 100' length of 2" or 2-1/2" double jacket hose.

W-STYLE HOSE RACK

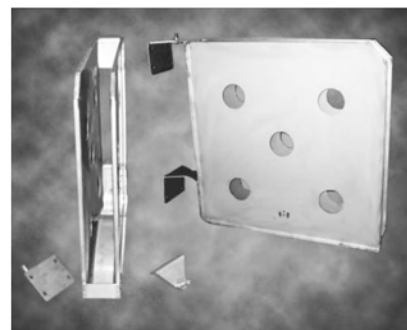
The ERL W-Style Hose Rack provides a convenient and compact storage system for a collapsible hose. It is constructed from 300 series Stainless Steel which ensures extended product life as well as durability for continuous use in the field. Each W-Style Hose rack comes with stainless steel mounting brackets which allow the product to pivot out of the way when not in use.

- ERL offers two different sizes and models:

- 2.5" style
- 1.5" style



W-Style



Standard Style

- 2.5" style
- 1.5" style

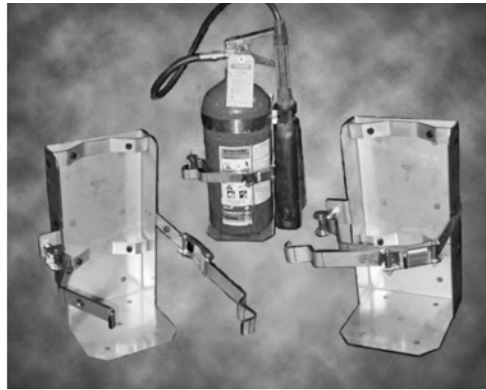
SADDLE TYPE HOSE RACK

The ERL Saddle Type Hose Rack provides convenient packaging and storage for all types of hoses. Each ERL Saddle Type Hose Rack is constructed from 300 series Stainless Steel to ensure extended product life and its welded construction provides durability for continuous use in the field.

ERL Saddle racks are designed to hold 50' of 1.5" hose and the stainless steel mounting bracket allows for easy installation.



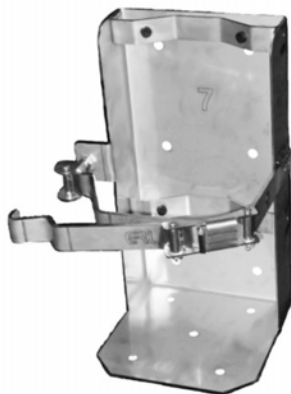
FIRE EXTINGUISHER HOLDER



The ERL Fire Extinguisher Holder allows for safe and secure storage for on deck fire extinguishers. Each holder is constructed from 300 series stainless steel, is welded and bolted for easy installation. It contains a stainless steel latch across the front of the holder ensuring a secure fit while allowing for easy access when needed. Across the back of the holder ERL added two formed brackets eliminating movement while the unit is in motion.

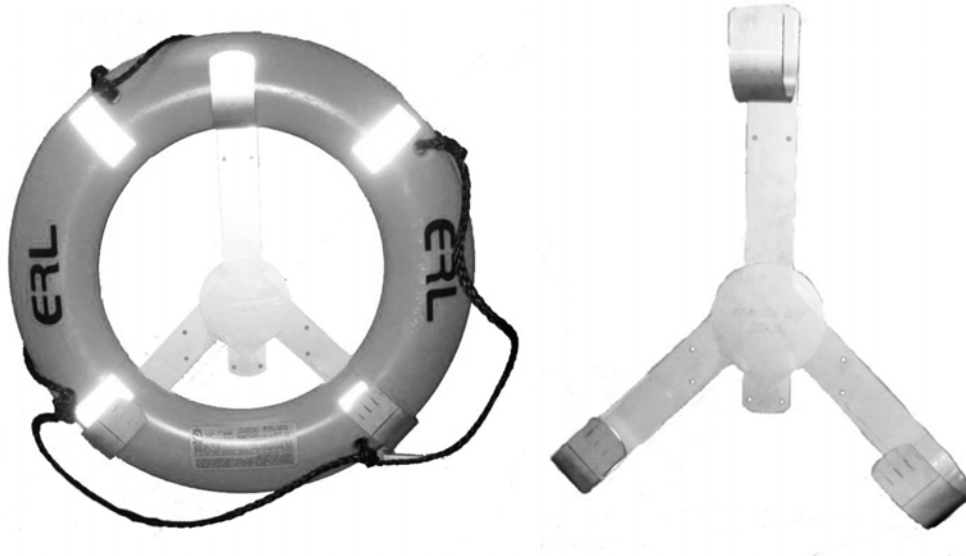
ERL offers two different sizes:

| Item number | Extinguisher Size |
|-------------|-------------------|
| - FEH #5 | 10lbs |
| - FEH #7 | 20lbs |



RING BOUY BRACKETS

Rings are secure and in proper location. The bracket is constructed from 300 series stainless steel which ensures extended product life for continuous use in the field. ERL stocks a bracket for a 30" diameter Life Ring, the most commonly used ring, but can also customize it according to the customers needs.



BRASS GOODS & HOSE HOUSE EQUIPMENT



BRASS FIRE HOSE NOZZLES

Industrial BRASS FOG NOZZLES that are precision machined with a satin brass finish. They are U.L. Listed for non electrical fires. The 1-1/2" and 2-1/2" size are also FM Approved.

| P/N | Description |
|------|----------------------------------|
| 111N | 1" Adjustable (NTS) |
| 111I | 1" Adjustable (NPSH) |
| 117N | 1-1/2" Adjustable (NTS) |
| 117I | 1-1/2" Adjustable (NPSH) |
| 114N | 2-1/2" Adjustable (NTS) |
| 113N | 1-1/2" Adjustable Economy (NTS) |
| 113I | 1-1/2" Adjustable Economy (NPSH) |



Industrial BRASS FOG ONLY NOZZLE that is precision machined with a satin brass finish. From shut-off to 30° thru 90° fog. U.L. Listed for Class A, B and C (electrical fires).

| P/N | Description |
|------|-------------------------|
| 115N | 1-1/2" Adjustable (NTS) |

Rack BRASS ADJUSTABLE FOG NOZZLE (shut off, straight stream, fog) that are precision machined with a satin brass finish. U.L. Listed and FM Approved for non electrical fires.

| P/N | Description |
|-------|--------------------------|
| 116N | 1" Adjustable (NTS) |
| 116ID | 1-1/2" Adjustable (NPSH) |



Cast brass 1-1/2" STRAIGHT STREAM NOZZLE with satin finish. This nozzle is very popular for industrial washdown applications. Remember to use double jacket fire hose for washdown.

| P/N | Description |
|------|------------------------------|
| 211N | Straight Stream Nozzle (NTS) |

FIRST AID STATIONS

INDUSTRIAL UNIT FIRST AID KITS

Provide a practical solution to industrial first aid. Kits stocked with medical supplies in sterile, waterproof poly-sealed containers. Color coded for easy identification of materials. Unit Packs for easy selection and re-ordering. Heavy metal case is water tight with hanger for wall mounting.

FIRE HOSE/ROPE LADDERS

Single Jacket Fire Hose

Single Jacket Fire Hose has a burst pressure of 750 PSI, an acceptance test pressure of 500 PSI, a service test of 250 PSI and is FM Labeled. Made of 100% polyester, rubber lined material for strength and flexibility. Recommended for industrial fire protection.



Weight

| P/N | Description | Bowl Size | Coupled Weight |
|-------------------|---------------------|-----------|----------------|
| SJ50NST or NPSH | 50' x 1 1/2" Brass | 1 13/16" | 15 lbs. |
| SJ50ANST | 50' x 1 1/2" Alum | 1 13/16" | 13 lbs. |
| SJ75NST or NPSH | 75' x 1 1/2" Brass | 1 13/16" | 20 lbs. |
| SJ75ANST | 75' x 1 1/2" Alum | 1 13/16" | 18 lbs. |
| SJ100NST or NPSH | 100' x 1 1/2" Brass | 1 13/16" | 27 lbs. |
| SJ100ANST | 100' x 1 1/2" Alum | 1 13/16" | 25 lbs. |
| SJ2550NST or NPSH | 50' x 2 1/2" Brass | 2 13/16" | 27 lbs. |
| SJ2550ANST | 50' x 2 1/2" Alum | 2 13/16" | 25 lbs. |
| SJ25100NST | 100' x 2 1/2" Brass | 2 13/16" | 51 lbs. |

Polycarbonate Fire Hose Nozzles

Our high impact Polycarbonate Nozzles are ideal for use with pin racks and single jacket hose, especially in areas where brass nozzles are likely to be stolen.



| P/N | UL Rating |
|--------|--|
| 15NST | U.L. Listing for Class A, B Fires Only. |
| 15IPT | U.L. Listing for Class A, B Fires Only. |
| E15IPT | U.L. Listed for Class A, B and C (Electrical) Fires. |
| E15NST | U.L. Listed for Class A, B and C (Electrical) Fires. |

| P/N | Description |
|--------|--------------------------------------|
| 10NST | 1" Adjustable Fog/Steam/Shut-off |
| 10IPT | 1" Adjustable Fog/Steam/Shut-off |
| 15NST | 1 1/2" Adjustable Fog/Steam/Shut-off |
| 15IPT | 1 1/2" Adjustable Fog/Steam/Shut-off |
| E15IPT | 1 1/2" Adjustable Fog/Shut-off only |
| E15NST | 1 1/2" Adjustable Fog/Shut-off only |
| 25NST | 2 1/2" Adjustable Fog/Shut-off |
| B250G | Nozzle Gasket for 2 1/2" Nozzles |
| GIPT | Nozzle Gasket for 1 1/2" IPT Nozzles |
| GNST | Nozzle Gasket for 1 1/2" NST Nozzles |

FLEXIBLE LADDERS



| MODEL: | Chain, Rope or Wire |
|-----------|--|
| R-10R | Oval Rung, 3/4" Manila |
| R1-N | 1" x 4 1/2" x 20" Rung-oak, 3/4" Nylon |
| WRN-18-14 | Oakwood Rungs - 2" x 2" x 18", 3/4" Double Braid Nylon |
| W-1 | 1 1/2" x 20" Alum. Pipe w/ nonskid 3/8" Galv. Cable |

ERL REGULATORY SIGNS FOR TANK BARGES



To lay the sign down simply loosen the "T" nuts and lift.

- Simple design allows the sign to be laid down in seconds and without tools.
- 100% Stainless Steel Hardware and Frame.
- Lantern hook is built onto pennant pole.
- Tough polyester powder finish.
- Weld-down or Bolt-down mounting feet.



DCA-001
Dangerous Cargo Sign Package
(sign only - DCA-002)



BNZ-001
Danger - Benzene Sign Package
(sign only - BNZ-002)



EMS-001
Emergency Shutdown Sign



PILOT HOUSE CHAIRS



Available with Casters, Glides or Weld-Down Pedestal

All-Steel Construction

- Provides years of comfortable, safe wheelhouse use
- Built tough for continuous-duty marine use
- 5-leg base provides excellent stability
- Heavy, 3" diameter vertical post
- 2-1/2" solid trunion bearing
- 11-gauge steel seat pan

Durable Molded Armrests

- Each injection-molded armrest rotates upward and out of the way
- Replacement armrests may be installed easily, in minutes

Comfortable Seat Cushions

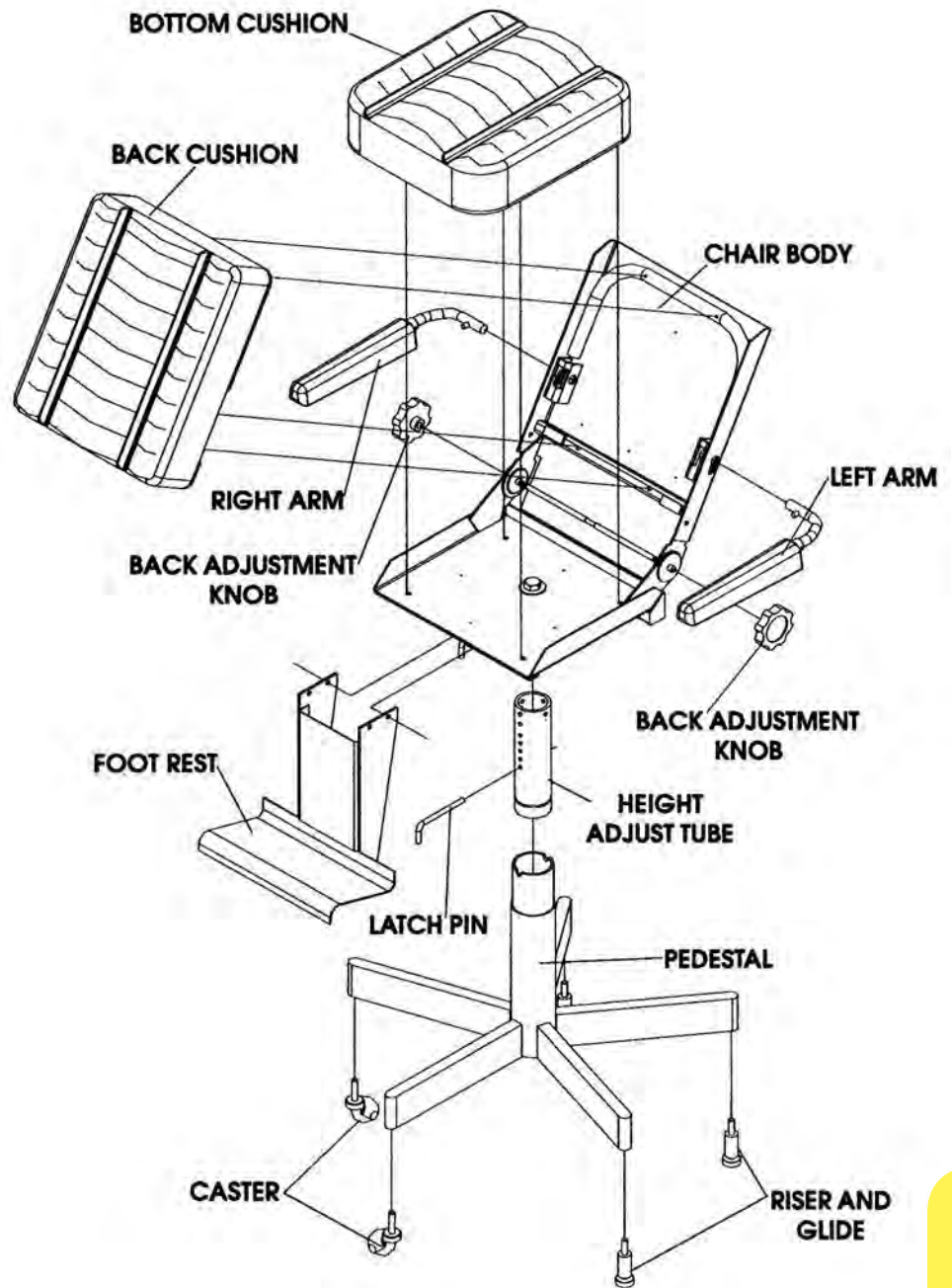
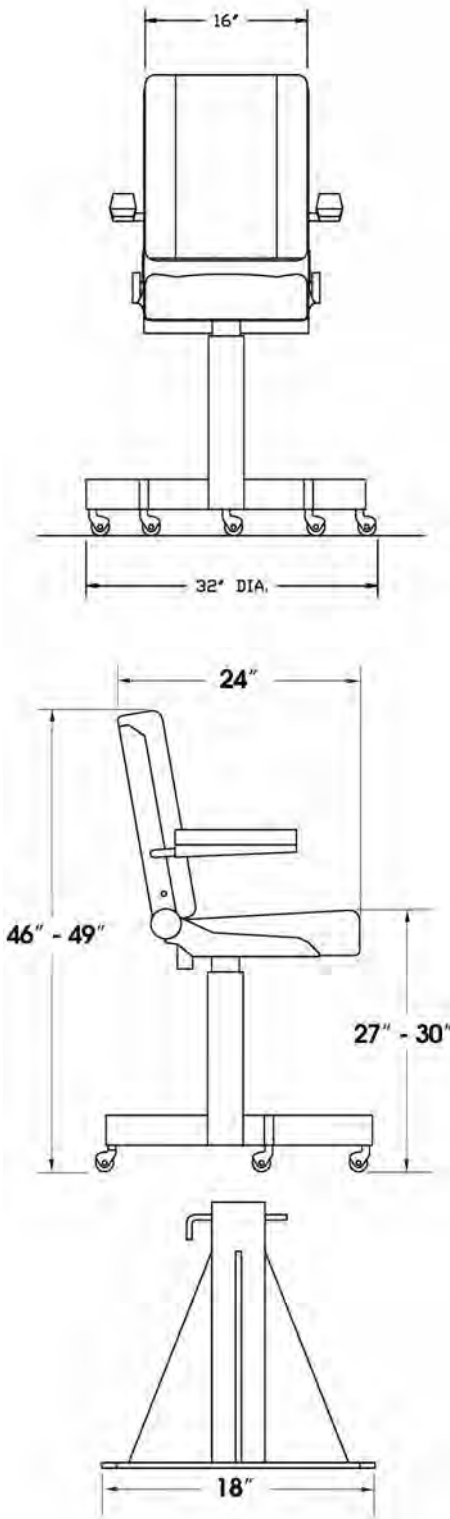
- Seat and back cushions utilize premium-grade, dense foam for comfort and long life
- Seat cushion covers combine heavy fabric and naugahyde
- Replacement cushions may be easily installed in minutes

Designed For Comfort And Safety

- Ergonomic design adjusts to provide optimum safety and seating comfort
- Vertical post adjusts up or down 5" to offer the safest viewing height
- Back angle adjusts to enhance pilot's view and reduce fatigue
- Armrests adjust individually
- Optional lumbar support adjustment enhances comfort of back rest
- 5-legged base accepts either flat nylon gliders or casters.
- Optional weld-down base enhances stability

Shipping Weight: 105 Lbs.

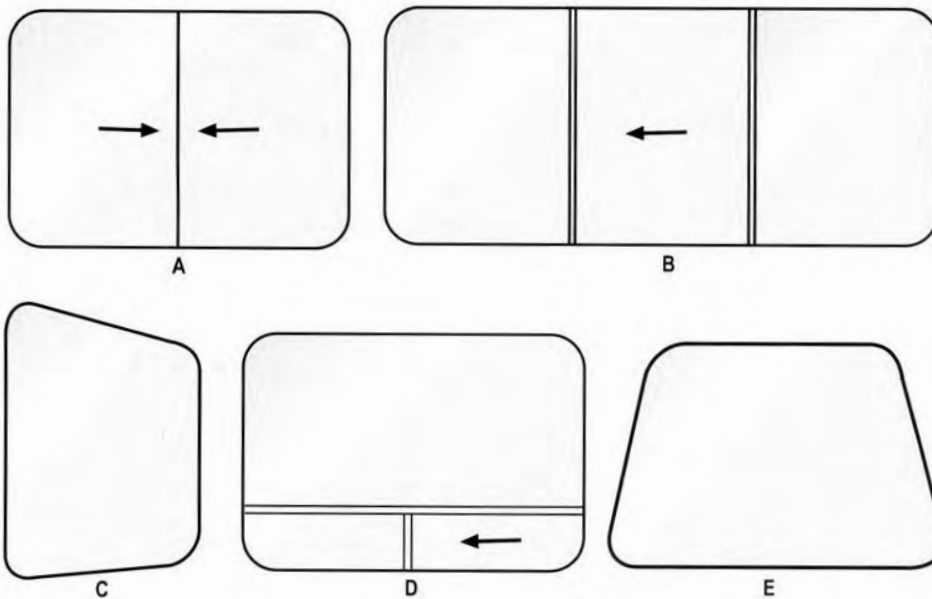
PILOT HOUSE CHAIRS



THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

WINDSHIELDS & SIDE WINDOWS

Choose from the basic designs shown here, or let us quote you on your own design.
Swing-out windows are available in a limited number of designs.



Available Features

- Stationary or removable sliding screens.
- Heavy-duty, satin-finish anodized aluminum frames.
- 7/32" laminated safety glass.
- 7/32", 1/4", 3/8" or 1/2" tempered safety glass.
- Clear or tinted glass.
- 3" radius corners or mitered corners.
- Positive locking handle.

Glazing Options:

- Laminated safety glass.
- Tempered safety glass.
- Polycarbonate.
- Acrylic.

- No-tint (clear).
- Blue-green tint.
- Solar bronze tint.
- Solar gray tint.

Ordering Information

Please supply the following information:

- Type of window (fixes, sliding, swing-out).
- Dimensions of rough opening.
- Type of glazing (see "Glazing Options").
- Mounting method (clamp ring or flange bolted).
- Overall bulkhead thickness (for clamp ring mount).
- Screens (none, fixed, sliding).
- Mitered corners or 3" radius corners.

INSTALLATION

Installation is fast and simple. Windows have a two-piece construction: the main frame retains the glass and the inner clamp ring secures the main frame. The two-part window installs by inserting the main frame from the outside into the proper bedding; then screw the clamp ring to the main frame from the inside. This compresses the bulkhead between the inner and outer frames. Both frames are flanged, permitting fast installation in fiberglass, wood or metal bulkheads. Window installation does not require bulkhead drilling. The inner clamp ring also serves as a trim ring and is available for bulkheads 1/8" through 2-1/2" thick.

WINDOW SHADES



STOP DAMAGING RAYS CONTROL FADE AND GLARE REDUCE ENERGY CONSUMPTION

80% of electrical energy used for cooling and heating is wasted! Substantial energy is literally thrown out the window through summer heat gain or winter heat radiation loss.

Summer – Kool Vue Shades reject solar energy, eliminating hot spots and providing balanced comfort throughout the area.

Winter – Kool Vue Shades' reflective qualities make interiors more comfortable by reflecting back into the room much of the radiant heat that would be lost through windows.

Free Heating – Raise your shades to take advantage of solar energy.

Immediate Protection On Demand – Lower your Kool Vue Shades during hot periods for instant relief from the sun's intense heat, blinding glare and costly fade.

WINDOW SHADE MEASUREMENTS

Accurate measurements are important in order to get Kool Vue Shades that are right for your application. To assure accurate fit, please follow these instructions carefully.

1. Specify Bracket Placement

Specify whether the shades will be mounted inside frame, outside frame or on the ceiling. (See illustrations.)

2. Allow for Overlap

Ideally, the shade should overlap the window opening onto the frame by two inches on either side. (May not be possible with inside frame mounting.)

3. Safety Margin

A safety margin of 10" to 12" will be automatically added to the specified length to allow for "rollover" and avoid tearing.

WIDTH MEASUREMENT

Inside Mount – Measure the width from one inside frame to the other.

Outside Mount – Mark the position where brackets will be placed and measure the distance between marks.

Ceiling Mount – Mark position where brackets will be placed and measure the distance between marks.

LENGTH MEASUREMENT

Inside or Outside Mount – Measure the window opening from the top frame to lower sill.

Ceiling Mount – Measure the length between the ceiling and the lower sill.

DESTROYER/SAILBOAT STYLE WHEELS



Model 150

| Model 150 Destroyer 6 Spoke Hub Size: 1"/ft. Taper (3/4" Shaft) | | |
|---|------------|-------------|
| Wheel Diameter | Spoke Size | Part No. |
| 11" | 3/8" | 152-11-1-1 |
| 15-1/2" | 3/8" | 152-16-1-1 |
| 15-1/2" | 3/8" | 152-16-2-1* |
| 18" | 3/8" | 152-18-1-1 |
| 20" | 3/8" | 152-20-1-1 |
| 22" | 3/8" | 152-22-1-1 |
| 24" | 3/8" | 152-24-1-1 |
| 28" | 1/2" | 153-28-1-1 |
| 30" | 1/2" | 153-30-1-1 |

*Degree of dish is 22°, all others are 10°

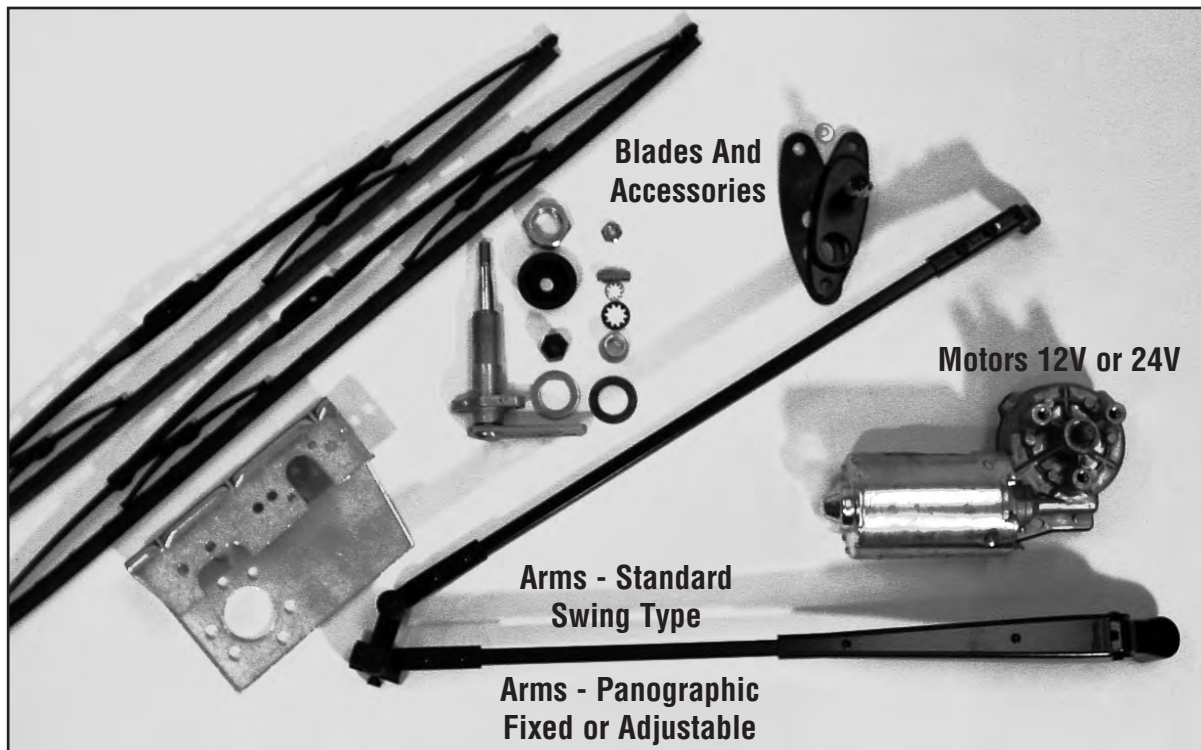


Model 530

| Model 530 6 Spoke 2 1/4" Dia. Hub | | |
|--------------------------------------|------------|------------|
| Wheel Diameter | Spoke Size | Part No. * |
| 20" | 3/8" | 532-20-9-0 |
| 22" | 3/8" | 532-22-9-0 |
| 24" | 3/8" | 532-24-9-0 |
| 26" | 1/2" | 533-26-9-0 |
| 28" | 1/2" | 533-28-9-0 |
| 30" | 1/2" | 533-30-9-0 |
| 32" | 1/2" | 533-32-9-0 |
| 36" | 1/2" | 533-36-9-0 |

* Spacers Available for 2-1/4" and 2-3/8"

MARINE WIPER SYSTEMS



WHEN ORDERING, PLEASE GIVE YOUR WINDOW HEIGHT, WIDTH AND BULKHEAD THICKNESS SO WE CAN PROVIDE YOU WITH THE PROPER SYSTEM FOR YOUR APPLICATION.

*ALSO AVAILABLE
SWITCH KITS, NOZZLE KITS AND RESERVOIR KITS.*

| COMPLETE WIPER SYSTEM CONSISTS OF THE FOLLOWING: | |
|--|---|
| WW-UE-WJ 65775 | WINDSHIELD WIPER MOTOR WITH MOUNTING BRACKET, 12 VOLT DC (# 65776 FOR 24 VOLT DC) |
| WW-UE-SW 13984 | ON / OFF SWITCH |
| WW-UE-KT 48519 | PANTOGRAPH ADAPTER KIT |
| WW-UE-LE 62111 | DRIVE ARM |
| WW-UE-LE 67023 | 14" LONG PANTOGRAPH ARM / # 67024 FOR 16" LONG ARM / # 67025 FOR 18" LONG ARM |
| WW-UE-SH 62711 | 1.25" LONG PIVOT SHAFT / # 62712 FOR 2" LONG SHAFT / # 62714 FOR 3" LONG SHAFT |
| WW-UE-BD 51916 | 22" LONG WIPER BLADE / # 52147 FOR 24" LONG BLADE |

MS-2 FIRE ALARM CONTROL PANEL

GENERAL

The **Fire•Lite MS-2** Fire Alarm Control Panel brings the latest in microprocessor technology to conventional fire controls. The MS-2 is compatible with the new I³ smoke detectors from System Sensor, and provides such advanced features as drift compensation, maintenance alert, and freeze warning. Automatic synchronization of audio/visual devices is provided, using three selections for manufacturer protocol. The NAC protocol includes the ability to silence audible devices while strobes continue to flash, using only a single pair of wires.

The MS-2 also is compatible with conventional input devices such as two- and four-wire smoke detectors, pull stations, waterflow devices, tamper switches and other normally-open contact devices. See the Fire•Lite Device Compatibility Document (*Doc. No. 15384*) for a complete list of compatible devices.

FEATURES

- Two Style B (Class B) IDCs (Initiating Device Circuits) .
- One Style Y (Class B) NAC (Notification Appliance Circuit).
- 24VDC.
- I³ Technology features:
 - Drift compensation automatically adjusts detector sensitivity and increases resistance to false alarms caused by dust accumulation.
 - Maintenance Alert LEDs (per zone) warn of excessive dirt accumulation, preventing false alarms (meets NFPA 72, 7-3.2.1).
 - Detector sensitivity is automatically measured by the detector, which automatically adjusts its sensitivity back to the factory settings when it becomes more sensitive due to contaminants settling in the chamber.
 - Wireless handheld sensitivity meter eliminates the need for voltmeters, magnets and a physical connection to the detector. The reader displays sensitivity in terms of percent per foot obscuration and provides text status indication.
 - Supervisory LED (per zone) provides warning if a detector senses temperature approaching freezing.
 - Special test protocol and LED indication allows quick test of all detectors without need for a ladder.
- NAC synchronization features:



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MS2.jpg

MS-2

- Selective Silence feature allows manual silence of horns while strobes continue to flash on the same NAC.
- Silent or Audible Walk Test operation mode commanded from the front keypad, with automatic return to normal after 1 hour of inactivity.
- Alarm verification selectable per zone.
- Each zone may be programmed for supervisory or fire, with separate red and yellow LEDs.
- Disable switches provided per zone.
- NACs programmable for:
 - Silence Inhibit
 - Auto Silence
 - Strobe Synchronization

MS-2 FIRE ALARM CONTROL PANEL

- Control buttons:
 - ACK (Acknowledge)
 - Alarm Silence
 - Reset
 - Walktest
 - Zone Enable/Disable (one per zone)
- LED indicators:
 - Fire Alarm (one per zone)
 - Supervisory (one per zone)
 - Trouble (one per zone)
 - Maintenance (one per zone)
 - AC Power
 - NAC Disable
 - Zone Disable
 - NAC Fault
 - System Trouble
 - Power Trouble
 - Walktest
 - Alarm Silence
 - Earth Fault (on circuit board)
 - Battery Fault (on circuit board)
 - Charger Fault (on circuit board)
- Piezo sounder for alarm, trouble, supervisory and maintenance.

OPERATION

Activation of a compatible smoke detector or any normally-open fire alarm initiating device activates audible and visual signaling devices, illuminates an indicating LED, sounds the piezo sounder at the FACP, activates the FACP alarm relay and operates an optional module used to notify a remote station or initiate an auxiliary control function.

SPECIFICATIONS

AC Power - TB8: 120 VAC, 50/60 Hz, 2.3 amps. Wire size: minimum 14 AWG (2.0 mm²) with 600 V insulation.

Battery (Sealed Lead Acid Only) - J8: Maximum Charging Circuit: Normal flat charge - 27.6 VDC @ 0.8 amp. Maximum Battery Charger Capacity: 18 amp hour battery (two 7 amp hour batteries can be housed in the FACP cabinet. Larger batteries require a separate battery box such as the Fire•Lite BB-17F).

Initiating Device Circuits - TB3: Alarm Zones 1 & 2. Power-limited circuitry. Operation: All zones Style B (Class B). Normal Operating Voltage: Nominal 22 VDC. Alarm Current: 15 mA minimum. Short Circuit Current: 40 mA maximum. Maximum Loop Resistance: 100 ohms. End-of-Line Resistor: 4.7 k OHM, 1/2 watt (P/N 71252). Standby Current: 4 mA. Refer to Fire•Lite Device Compatibility Document (*Doc. No. 51384*) for listed compatible devices.

Notification Appliance Circuits - TB2: One NAC on MS-2. Power-limited circuitry. Normal Operating Voltage: Nominal 24 VDC. Maximum Signaling Current: 2.5 amps total with standard transform. End-of-Line Resistor: 4.7 k OHM, 1/2 watt (P/N 71252). Refer to Fire•Lite Device Compatibility Document for listed compatible devices.

Form-C Relays: Trouble Relay TB5 (fail-safe). Alarm Relay TB 6. Relay Contact Ratings: 2.0 amps @ 30 VAC (resistive).

AUXILIARY OUTPUTS

Resettable Power - TB1: Operating Voltage: Nominal 24 VDC. Maximum Available Current: 500 mA - appropriate for powering 4-wire smoke detectors (see NOTES below). Power-limited circuitry.

NOTES: 1) See the Device Compatibility Document (*Doc. No. 15384*) for listed compatible devices .

2) Total current for resettable power and one NAC must not exceed 3 amps for the MS-2.

CABINET SPECIFICATIONS

Door: 15.342" (38.97 cm) high x 14.677" (37.28 cm) wide x 0.375" (0.95 cm) deep. **Backbox:** 15.0" (38.10 cm) high x 14.5" (36.83 cm) wide x 3.0" (7.62 cm) deep.

BACKBOX MOUNTING

The cabinet can be surface mounted. The door is removable during installation by opening and lifting it off the hinges. The cabinet mounts using two key slots at the top of the backbox and two additional 0.250" diameter holes at the bottom.

PRODUCT LINE INFORMATION

- MS-2** Two zone conventional addressable FACP.
- BB-17F** Battery box, required to house two (2) batteries greater than 7 Amp Hour to a maximum of 18 Amp Hour.
- DP-MS2/4** Dress panel.

MS-4 FIRE ALARM CONTROL PANEL

GENERAL

The **Fire•Lite MS-4** Fire Alarm Control Panel brings the latest in microprocessor technology to conventional fire controls. The MS-4 is compatible with the new I³ smoke detectors from System Sensor, and provide such advanced features as drift compensation, maintenance alert, and freeze warning. Automatic synchronization of audio/visual devices is provided, using three selections for manufacturer protocol. The NAC protocol includes the ability to silence audible devices while strobes continue to flash, using only a single pair of wires.

The MS-4 also is compatible with conventional input devices such as two- and four-wire smoke detectors, pull stations, waterflow devices, tamper switches and other normally-open contact devices. See the Fire•Lite Device Compatibility Document (*Doc. No. 15384*) for a complete list of compatible devices.

FEATURES

- Four Style B (Class B) IDCs (Initiating Device Circuits).
- Two Style Y (Class B) NACs (Notification Appliance Circuits).
- Optional module that converts all 4 IDCs and 2 NACs to Class A.
- 24VDC.
- I³ Technology features:
 - Drift compensation automatically adjusts detector sensitivity and increases resistance to false alarms caused by dust accumulation.
 - Maintenance Alert LEDs (per zone) warn of excessive dirt accumulation, preventing false alarms (meets NFPA 72, 7-3.2.1).
 - Detector sensitivity is automatically measured by the detector, which automatically adjusts its sensitivity back to the factory settings when it becomes more sensitive due to contaminants settling in the chamber.
 - Wireless handheld sensitivity meter eliminates the need for voltmeters, magnets and a physical connection to the detector. The reader displays sensitivity in terms of percent per foot obscuration and provides text status indication.
 - Supervisory LED (per zone) provides warning if a detector senses temperature approaching freezing.
 - Special test protocol and LED indication allows quick
 - Selectable for System Sensor, Wheelock and Gentex protocols.
 - Selective Silence feature allows manual silence of horns while strobes continue to flash on the same NAC.
- Silent or Audible Walk Test operation mode commanded from the front keypad, with automatic return to normal after 1 hour of inactivity.
- Programmable for combination tamper supervisory monitor and waterflow alarm on one zone.
- Alarm verification selectable per zone.
- Each zone may be programmed for supervisory or fire, with separate red and yellow LEDs.
- Disable switches provided per zone.
- NACs programmable for:



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MS-4

MS4.jpg

MS-4 FIRE ALARM CONTROL PANEL

- Form-C Alarm, Trouble and Supervisory relays.
- 3.0 amps total useable current .
- 6.0 amps total useable current available with optional second transformer.
- Optional dress panel (part no. DP-MS2/4).
- Control buttons:
 - ACK (Acknowledge)
 - Alarm Silence
 - Reset
 - Walktest
 - Zone Enable/Disable (one per zone)
- LED indicators:
 - Fire Alarm (one per zone)
 - Supervisory (one per zone)
 - Trouble (one per zone)
 - Maintenance (one per zone)
 - AC Power
 - NAC Disable
 - Zone Disable
 - NAC Fault
 - System Trouble
 - Power Trouble
 - Walktest
 - Alarm Silence
 - Earth Fault (on circuit board)
 - Battery Fault (on circuit board)
 - Charger Fault (on circuit board)
- Piezo sounder for alarm, trouble, supervisory and maintenance.
- Optional plug-in 4XTMF Transmitter module.
- Optional plug-in 4XZMF Zone relay module.
- Optional 4XLMF Transmitter module for RZA-4XF remote LED annunciator.

OPERATION

Activation of a compatible smoke detector or any normally-open fire alarm initiating device activates audible and visual signaling devices, illuminates an indicating LED, sounds the piezo sounder at the FACP, activates the FACP alarm relay and operates an optional module used to notify a remote station or initiate an auxiliary control function.

SPECIFICATIONS

AC Power - TB8: 120 VAC₃ 50/60 Hz, 2.3 amps. Wire size: minimum 14 AWG (2.0 mm²) with 600 V insulation.

Battery (Sealed Lead Acid Only) - J8: Maximum Charging Circuit: Normal flat charge - 27.6 VDC @ 0.8 amp. Maximum Battery Charger Capacity: 18 amp hour battery (two 7 amp hour batteries can be housed in the FACP cabinet. Larger batteries require a separate battery box such as the Fire•Lite BB-17F).

Initiating Device Circuits - TB3: Alarm Zones 1 - 4. Power-limited circuitry. Operation: All zones Style B (Class B). Normal Operating Voltage: Nominal 22 VDC. Alarm Current: 15 mA minimum. Short Circuit Current: 40 mA maxi-

mum. Maximum Loop Resistance: 100 ohms. End-of-Line Resistor: 4.7 k OHM, 1/2 watt (P/N 71252). Standby Current: 4 mA. Refer to Fire•Lite Device Compatibility Document (*Doc. No. 51384*) for listed compatible devices.

Notification Appliance Circuits - TB2: Two NACs on MS-4. Power-limited circuitry. Normal Operating Voltage: Nominal 24 VDC. Maximum Signaling Current: 2.5 amps total with standard transform. 5.0 amps total (2.5 maximum per NAC) with optional transformer. End-of-Line Resistor: 4.7 k OHM, 1/2 watt (P/N 71252). Refer to Fire•Lite Device Compatibility Document for listed compatible devices.

Form-C Relays: Trouble Relay TB5 (fail-safe). Alarm Relay TB 6. Supervisory Relay TB7. Relay Contact Ratings: 2.0 amps @ 30 VAC (resistive).

AUXILIARY OUTPUTS

Resettable Power - TB1: Operating Voltage: Nominal 24 VDC. Maximum Available Current: 500 mA - appropriate for powering 4-wire smoke detectors (see NOTES below). Power-limited circuitry.

Nonresettable Power - TB1: Operating Voltage: Nominal 24 VDC. Maximum Available Current: 500 mA (see NOTES below). Power-limited circuitry.

NOTES: 1) See the Device Compatibility Document (*Doc. No. 15384*) for listed compatible devices .

2) Total current for nonresettable power, resettable power and two NACs must not exceed 6 amps for the MS-4 (requires optional second transformer).

CABINET SPECIFICATIONS

Door: 15.342" (38.97 cm) high x 14.677" (37.28 cm) wide x 0.375" (0.95 cm) deep. **Backbox:** 15.0" (38.10 cm) high x 14.5" (36.83 cm) wide x 3.0" (7.62 cm) deep.

BACKBOX MOUNTING

The cabinet can be surface mounted. The door is removable during installation by opening and lifting it off the hinges. The cabinet mounts using two key slots at the top of the backbox and two additional 0.250" diameter holes at the bottom.

PRODUCT LINE INFORMATION

| | |
|------------------|---|
| MS-4 | Four zone conventional addressable FACP. |
| CAC-4 | Class A converter module. Used to convert Style B (Class B) IDC to Style D (Class A) and Style Y (Class B) NAC to Style Z (Class A). The module connects to J1 on the MS-4 circuit board. |
| 4XTMF | Transmitter module. |
| 4XLMF | LED Interface module. |
| XRM-24 | Transformer assembly increases power from 3 amps to 6 amps. |
| RZA-4XF | Remote annunciator - mounts in a single-gang box. |
| 4XZMF | Zone relay module. |
| BB-17F | Battery box, required to house two (2) batteries greater than 7 Amp Hour to a maximum of 18 Amp Hour. |
| 411/411UD | Three input (channel) 411 and four input (channel) 411UD dual line Digital Alarm Communicator/Transmitters, which can be used as slave communicators with the MS-4 FACP. |
| DP-MS2/4 | Dress panel. |

5600 SERIES MECHANICAL HEAT DETECTORS

Models Available

Single-circuit Models

| | |
|------|--|
| 5601 | 135°F Fixed Temperature / Rate-of-Rise |
| 5602 | 194°F Fixed Temperature / Rate-of-Rise |
| 5603 | 135°F Fixed Temperature |
| 5604 | 194°F Fixed Temperature |

Dual-circuit Models

| | |
|------|--|
| 5621 | 135°F Fixed Temperature / Rate-of-Rise |
| 5622 | 194°F Fixed Temperature / Rate-of-Rise |
| 5623 | 135°F Fixed Temperature |
| 5624 | 194°F Fixed Temperature |



Product Overview

Multiple configurations available to satisfy a broad range of installations:

- Single- and dual-circuit models
- Fixed temp and combination fixed- temp/rate-of-rise
- 135°F or 194°F ratings.

Simple to read alphanumeric text on the exterior of the detector indicates activation method and temperature rating

Easy to use terminal screws that provide a more positive wiring connection

A broader range of back box mounting options:

- Single gang
- 3.5" and 4" Octagonal
- 4" square with square to round plaster ring

Reversible mounting bracket for flush and surface mount installations

System Sensor's 5600 series mechanical heat detectors offer a low-cost means for property protection against fire, and for non-life-safety installations where smoke detectors are inappropriate.

Multiple configurations. The 5600 series offers a full-line of configurations to accommodate a broad range of applications. Both single- and dual-circuit models are offered, each available for low- and high-temperature ratings with either fixed temperature or combination fixed temperature/rate-of-rise (ROR) activation. The ROR element of the fixed/ROR models is restorable, to accommodate field-testing the unit.

Installation flexibility. To satisfy a variety of installations, the 5600 series easily mounts to single-gang and octagonal back boxes. These models also accommodate four-square back boxes, when used with a square to round plaster ring. The mounting bracket is reversible to allow for flush- and surface-mount back box installations.

Visual identification. The 5600 series provides clear markings on the exterior of the unit to ensure that the proper detector is being used. Alphanumeric characters identify the activation method, as well as the temperature rating, in degrees Fahrenheit and Celsius. Fixed temperature models are identified "FX", while combination fixed/rate-of-rise units are marked "FX/ROR". The 5600 series also provides a post-activation indicator in the form of a collector. Once the detector has been activated, the collector drops from the unit, to easily identify the specific unit in alarm.



5600 SERIES MECHANICAL HEAT DETECTORS

Engineering Specification

Mechanical heat detector shall be a System Sensor 5600 series model number _____, listed to Underwriters Laboratories UL 521 for Heat Detectors for Fire Protective Signaling Systems. The detector shall be either a single-circuit or a dual-circuit type, normally open. The detector shall be rated for activation at either 135°F (57°C) or 194°F (90°C), and shall activate by means of a fixed temperature thermal sensor, or a combination fixed temperature/rate-of-rise thermal sensor. The rate-of-rise element shall be activated by a rapid rise in temperature, approximately 15°F (8.3°C) per minute. The detector shall include a reversible mounting bracket for mounting to 3½-inch and 4-inch octagonal, single gang, and 4-inch square back boxes with a square to round plaster ring. Wiring connections shall be made by means of SEMS screws that shall accommodate 14-22AWG wire. The detector shall contain alphanumeric markings on the exterior of the housing to identify its temperature rating and activation method. The rate-of-rise element of combination fixed temperature/rate-of-rise models shall be restorable, to allow for field-testing. The detectors shall include an external collector that shall drop upon activation to identify the unit in alarm.

Electrical Specifications

Operating Voltage / Contact Ratings

6 – 125 VAC / 3A
 6 – 28 VDC / 1A
 125 VDC / 0.3A
 250 VDC / 0.1A

Physical Specifications

| | | |
|--|---|---|
| Maximum Installation Temperature 5601, 5603, 5621, and 5623: 100°F (38°C) 5602, 5604, 5622, and 5624: 150°F (65.6°C) | Alarm Temperature 5601, 5603, 5621, and 5623: 135°F (57°C) 5602, 5604, 5622, and 5624: 194°F (90°C) | Rate-of-Rise Threshold 15°F (8.3°C) rise per minute (models 5601, 5602, 5621, and 5622 only) |
| Operating Humidity Range 5 to 95% RH non-condensing | Input Terminals 14–22 AWG | Mounting 3½-inch octagonal back box 4-inch octagonal back box Single gang back box 4-inch square back box with a square to round plaster ring |
| Dimensions with mounting bracket Diameter: 4.57 inches (11.6cm) Height: 1.69 inches (4.3cm) | Weight 6 oz. (170 grams) | |

Ordering Information

| Model | Circuit | Temperature Rating | Activation | UL Protected Spacing – 10 Foot Ceiling* |
|-------|---------|--------------------|----------------------------------|---|
| 5601 | Single | 135°F (57°C) | Fixed Temperature / Rate-of-Rise | 50 feet x 50 feet (15.24m x 15.2m) |
| 5602 | Single | 194°F (90°C) | Fixed Temperature / Rate-of-Rise | 50 feet x 50 feet (15.24m x 15.2m) |
| 5603 | Single | 135°F (57°C) | Fixed Temperature | 25 feet x 25 feet (7.62m x 7.62m) |
| 5604 | Single | 194°F (90°C) | Fixed Temperature | 25 feet x 25 feet (7.62m x 7.62m) |
| 5621 | Dual | 135°F (57°C) | Fixed Temperature / Rate-of-Rise | 50 feet x 50 feet (15.24m x 15.2m) |
| 5622 | Dual | 194°F (90°C) | Fixed Temperature / Rate-of-Rise | 50 feet x 50 feet (15.24m x 15.2m) |
| 5623 | Dual | 135°F (57°C) | Fixed Temperature | 25 feet x 25 feet (7.62m x 7.62m) |
| 5624 | Dual | 194°F (90°C) | Fixed Temperature | 25 feet x 25 feet (7.62m x 7.62m) |

*NOTE: Refer to NFPA72 guidelines for spacing reductions when ceiling heights exceed 10 feet.

System Sensor Sales and Service

| | | | | |
|---|--|--|---|--|
| System Sensor Headquarters 3825 Ohio Avenue St. Charles, IL 60174 Ph: 800/SENSOR2 Fx: 630/377-6495 Documents-on-Demand 800/736-7672 x3 www.systemsensor.com | System Sensor Canada Ph: 905.812.0767 Fx: 905.812.0771 System Sensor Europe Ph: 44.1403.891920 Fx: 44.1403.891921 | System Sensor in China Ph: 86.29.524.6253 Fx: 86.29.524.6259 System Sensor in Singapore Ph: 65.6273.2230 Fx: 65.6273.2610 | System Sensor – Far East Ph: 85.22.191.9003 Fx: 85.22.736.6580 System Sensor – Australia Ph: 613.54.281.142 Fx: 613.54.281.172 | System Sensor – India Ph: 91.124.237.1770 x.2700 Fx: 91.124.237.3118 System Sensor – Russia Ph: 70.95.937.7982 Fx: 70.95.937.7983 |
|---|--|--|---|--|

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A05-0351-000*2/04*#994

SERIES PHOTOELECTRIC SMOKE DETECTORS

Models Available

Two-Wire Models

| | |
|-------|------------------------------|
| 2W-B | 2-wire standard |
| 2WT-B | 2-wire standard with thermal |

Four-Wire Models

| | |
|-------|------------------------------|
| 4W-B | 4-wire standard |
| 4WT-B | 4-wire standard with thermal |

Accessories

| | |
|----------|-------------------------------------|
| 2W-MOD2 | 2-wire loop test/maintenance module |
| SENS-RDR | Sensitivity reader |
| RT | Removal/replacement tool |
| A77-AB2 | Retrofit adapter bracket |



Product Overview

Plug-in detector line – mounting base included

Large wire entry port

In-line terminals with SEMS screws

Mounts to octagonal and single-gang backboxes, 4-square backboxes, or direct to ceiling

Stop-Drop 'N Lock™ attachment to base

Removable detector cover and chamber for easy cleaning

Built-in remote maintenance signaling

Drift compensation and smoothing algorithms

Simplified sensitivity measurement

Wide angle, dual color LED indication

Loop testing via EZ Walk feature

Built-in test switch

System Sensor's i³™ series smoke detectors represent a significant advancement in conventional detection. The i³ family is founded on three principles: Installation ease, Intelligence, and Instant inspection.

Installation ease. The i³ line redefines installation ease with its plug-in design. This allows an installer to pre-wire the bases included with the heads. The large wire entry port and in-line terminals provide ample room for neatly routing the wiring inside the base. The base accommodates a variety of back box mounting methods as well as direct mounting with drywall anchors. To complete the installation, i³ heads plug-in to the base with a simple Stop-Drop 'N Lock action.

Intelligence. i³ detectors offer a number of intelligent features to simplify testing and maintenance. Drift compensation and smoothing algorithms are standard with the i³ line, to minimize nuisance alarms. When connected to the 2W-MOD2 loop test/maintenance module, or a panel equipped with the i³ protocol, 2-wire i³ detectors are capable of generating a remote maintenance signal when they are in need of cleaning. This signal is indicated via an LED located at the module and the panel. To read the sensitivity of i³ detectors, the SENS-RDR is a wireless device that displays the sensitivity in terms of percent per foot obscuration.

Instant inspection. The i³ series provides wide angle red and green LED indicators for instant inspection of the detector condition, indicating: normal standby, out-of-sensitivity, alarm, or freeze trouble conditions. When connected to the 2W-MOD2 loop test/maintenance module or a panel with the i³ protocol, the EZ Walk loop test feature is available on 2-wire i³ detectors. This feature verifies the initiating loop wiring by providing LED status indication at each detector.



SERIES PHOTOELECTRIC SMOKE DETECTORS

Architect/Engineer Specifications

Smoke detector shall be a System Sensor i³ Series model number _____, listed to Underwriters Laboratories UL 268 for Fire Protection Signaling Systems. The detector shall be a photoelectric type (model 2W-B, 4W-B) or a combination photoelectric/thermal (model 2WT-B, 4WT-B) with thermal sensor rated at 135°F (57.2°C). The detector shall include a mounting base for mounting to 3½-inch and 4-inch octagonal, single gang, and 4-inch square back boxes

with a plaster ring, or direct mount to the ceiling using drywall anchors. Wiring connections shall be made by means of SEMS screws. The detector shall allow pre-wiring of the base and the head shall be a plug-in type. The detector shall have a nominal sensitivity of 2.5% per foot nominal as measured in the UL smoke box. The detector shall be capable of automatically adjusting its sensitivity by means of drift compensation and smoothing algorithms.

The detector shall provide dual color LED indication which blinks to indicate power up, normal standby, out of sensitivity, alarm, and freeze trouble (model 2WT-B, 4WT-B) conditions. When used in conjunction with the 2W-MOD2 module, 2-wire models shall include a maintenance signal to indicate the need for maintenance at the alarm control panel, and shall provide a loop testing capability to verify the circuit without testing each detector individually.

Electrical Specifications

| | | |
|---|--|---|
| Operating Voltage Nominal: 12/24V non-polarized Min.: 8.5V Max.: 35V | Standby Current 2-wire: 50 µA maximum average 4-wire: 50 µA maximum average | Peak Standby Current 2-wire: 100 µA 4-wire: n/a |
| Maximum Ripple Voltage 30% peak to peak of applied voltage | Maximum Alarm Current 2-wire: 130 mA limited by control panel 4-wire: 20 mA @12V, 23mA @ 24V | Alarm Contact Ratings 2-wire: n/a 4-wire: 0.5 A @ 30V AC/DC |

LED Modes

| LED Mode | Green LED | Red LED |
|--------------------|------------------------|------------------------|
| Power up | Blink every 10 seconds | Blink every 10 seconds |
| Normal (standby) | Blink every 5 seconds | off |
| Out of sensitivity | off | Blink every 5 seconds |
| Freeze trouble | off | Blink every 10 seconds |
| Alarm | off | Solid |

Power Up Sequence for LED Indication

| Condition | Duration |
|-------------------------------|------------|
| Initial LED status indication | 80 seconds |

Physical Specifications

| | | |
|---|--|--|
| Operating Temperature Range 2W-B and 4W-B: 32°F–120°F (0°C–49°C) 2WT-B and 4WT-B: 32°F–100°F (0°C–37.8°C) | Sensitivity 2.5%/ft. nominal | Mounting 3½-inch octagonal back box 4-inch octagonal back box Single gang back box 4-inch square back box with a plaster ring Direct mount to ceiling |
| Operating Humidity Range 0 to 95% RH non-condensing | Input Terminals 14–22 AWG | |
| Thermal Sensor 135°F (57.2°C) fixed | Dimensions (including base) 5.3 inches (127 mm) diameter 2.0 inches (51 mm) height | |
| Freeze Trouble 2WT-B and 4WT-B only: 41°F (5°C) | Weight 6.3 oz. (178 grams) | |

Ordering Information

| Model | Thermal | Wiring | Alarm Current |
|-------|---------|--------|--------------------------------------|
| 2W-B | No | 2-wire | 130 mA max. limited by control panel |
| 2WT-B | Yes | 2-wire | 130 mA max. limited by control panel |
| 4W-B | No | 4-wire | 20 mA @ 12V, 23mA @ 24V |
| 4WT-B | Yes | 4-wire | 20 mA @ 12V, 23mA @ 24V |

| Model | Description |
|----------|--|
| 2W-MOD2 | 2-wire loop test / maintenance module |
| SENS-RDR | Sensitivity reader |
| RT | Removal / replacement tool |
| A77-AB2 | Retrofit adapter bracket, 6.6 in. (16.76cm) diameter |

System Sensor Sales and Service

| | | | | |
|---|---|---|--|---|
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| | System Sensor Europe Ph: 44.1403.891920 Fx: 44.1403.891921 | System Sensor in Singapore Ph: 65.6273.2230 Fx: 65.6273.2610 | System Sensor – Australia Ph: 613.54.281.142 Fx: 613.54.281.172 | System Sensor – Russia Ph: 70.95.937.7982 Fx: 70.95.937.7983 |

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A05-0318-005•6/04•#1280

SSM/SSV SERIES ALARM BELLS

System Sensor's SSM and SSV series bells are low current, high decibel notification appliances for use in fire and burglary systems or other signaling applications.



Features

- Approved for indoor and outdoor use
- Low current draw
- High dB output
- Available in six-inch, eight-inch, and ten-inch sizes
- AC and DC models
- DC models polarized for use with supervision circuitry
- Mount directly to standard four-inch square electrical box indoors
- SSM and SSV series pre-wired

Reliable Performance. The SSM and SSV series provide loud resonant tones. The SSM series operates on 24VDC and are motor driven, while the SSV series operates on 120VAC utilizing a vibrating mechanism.

Simplified Installation. For indoor use, the SSM and SSV series mount to a standard four-inch square electrical box. For outdoor applications, weatherproof back box, model number WBB, is used.

The SSM and SSV series come pre-wired, to reduce installation time. The SSM series incorporates a polarized electrical design for use with supervision circuitry.

SSM/SSV SERIES ALARM BELLS

SSM/SSV Specifications

Architectural/Engineering Specifications

Model shall be a SSM or SSV Series alarm bell. Bells shall have underdome strikers and operating mechanisms. Gongs on said bells shall be no smaller than nominal 6⁷/₈”/10” (specify size) with an operating voltage of 24VDC or 120VAC (specify by part number). Bells shall be suitable for surface or semi-flush mounting. Outdoor surface mounted installations shall be weatherproof (using optional WBB weatherproof electrical box). Otherwise bells shall mount to a standard 4” square electrical box having a maximum projection of 2¹/₂”. Bells shall be located as shown on the drawings or as determined by the Authority Having Jurisdiction. Bells shall be listed for indoor/outdoor use by Underwriters Laboratories and the California State Fire Marshal, and approved by Factory Mutual and MEA.

Physical/Operating Specifications

| | |
|-----------------------------|---|
| Operating Temperature Range | -31°F to 140°F |
| Operating Voltage | SSM series: 24 VDC SSV series: 120 VAC |
| Termination | Provided with 2 sets of leads for in/out wiring |
| Service Use | Fire Alarm, General Signaling, Burglar Alarm |
| Warranty | 3 years |

Electrical Specifications

| Model | Gong Diameter (inches) | Nominal Voltage | Operating Voltage Limit | Maximum Current | Sound Output (dBA) |
|-----------|------------------------|------------------|-------------------------|-----------------------|--------------------|
| SSM24-6 | 6 | Regulated 24VDC | 16 to 33VDC | DC-31.1mA/ FWR-53.5mA | 82 |
| SSM24-8 | 8 | Regulated 24VDC | 16 to 33VDC | DC-31.1mA/ FWR-53.5mA | 80 |
| SSM24-10 | 10 | Regulated 24VDC | 16 to 33VDC | DC-31.1mA/ FWR-53.5mA | 81 |
| SSV120-6 | 6 | Regulated 120VAC | 96 to 132VAC | 53mA | 85 |
| SSV120-8 | 8 | Regulated 120VAC | 96 to 132VAC | 53mA | 82 |
| SSV120-10 | 10 | Regulated 120VAC | 96 to 132VAC | 53mA | 82 |

* Sound output measured at Underwriter Laboratories, as specified in UL464

Ordering Information

| UL/FM Model No. | ULC/Canadian Model No. | Description |
|-----------------|------------------------|---|
| SSM24-6 | SSM24-6A | Bell, 6”, 24VDC, Polarized, 82dBA |
| SSM24-8 | SSM24-8A | Bell, 8”, 24VDC, Polarized, 80dBA |
| SSM24-10 | SSM24-10A | Bell, 10”, 24VDC, Polarized, 81dBA |
| SSV120-6 | SSV120-6A | Bell, 6”, 120VAC, 85dBA |
| SSV120-8 | SSV120-8A | Bell, 8”, 120VAC, 82dBA |
| SSV120-10 | SSV120-10A | Bell, 10”, 120VAC, 82dBA |
| WBB | | Weatherproof back box for SSM and SSV series, when installed outdoors |

P2RHK-120 OUTDOOR 120V SELECTABLE OUTPUT HORN/STROBE



SPECTRAlert
ADVANCE
from System Sensor

The SpectrAlert® Advance selectable-output outdoor 120V horn/strobe is rich with features guaranteed to cut installation times and maximize profits.

Features

- Plug-in design
- Field selectable candela settings: 135, 150, 177, 185
- Tamper resistant construction
- Outdoor products rated from -40°F to 151°F
- Regulated 120VAC
- Rotary switch for horn tone and three volume selections
- Outdoor products listed to UL 1638 (strobe) and UL 464 (horn) outdoor requirements
- Outdoor products rainproof per UL 50 (NEMA 3R)
- Weatherproof back box included
- Single screw attachment
- Horn/strobe, 120VAC adapter mounting plate, and weatherproof back box included

The SpectrAlert Advance series of notification appliances is designed to simplify installations, with features such as plug in designs, instant feedback messages to ensure correct installation of individual devices, and field-selectable candela settings.

When installing the P2RHK-120, first attach the 120V mounting plate to the outdoor back box provided with each unit.

Next, connect the notification appliance circuit wiring to the SEMS terminals on the mounting plate.

Finally, attach the horn/strobe to the mounting plate by inserting the product's tabs in the mounting plate's grooves. The device will rotate into position, locking the product's pins into the mounting plate's terminals. The device will temporarily hold in place with a catch until it is secured with a captured mounting screw.

The SpectrAlert Advance series outdoor notification appliances are rated between minus 40 degrees Fahrenheit and 151 degrees Fahrenheit in wet or dry applications.

P2RHK-120 OUTDOOR 120V SELECTABLE OUTPUT HORN/STROBE

SpectrAlert Advance Specifications

Architect/Engineer Specifications

The horn/strobe shall be a System Sensor SpectrAlert Advance Model _____ listed to UL 1971 and UL 464 and shall be approved for fire protective service. The horn/strobe shall be wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. The horn shall have three audibility options and an option to switch between a temporal three-pattern and a non-temporal (continuous) pattern. These options are set by a multiple position switch. On four-wire products, the strobe shall be powered independently of the sounder. The horn on horn/strobe models shall operate on a coded or non-coded power supply.

Outdoor Products

SpectrAlert Advance outdoor horn/strobe shall be listed for outdoor use by UL and shall operate between minus 40 degrees and 151 degrees Fahrenheit. The products shall be listed for use with a System Sensor outdoor/weatherproof back box with half inch and three-fourths inch conduit entries.

Physical/Electrical Specifications

| | |
|---------------------------|---|
| Operating Temperature | -40°F to 151°F (-40°C to 66°C) |
| Strobe Flash Rate | 1 flash per second |
| Nominal Voltage | Regulated 120VAC |
| Operating Voltage Range | 96 – 132VAC |
| Input terminal wire gauge | 12 to 18 AWG |
| Dimensions | 5.7"L x 5.1"W x 2.0"D (145 mm L x 130 mm W x 51 mm D) |

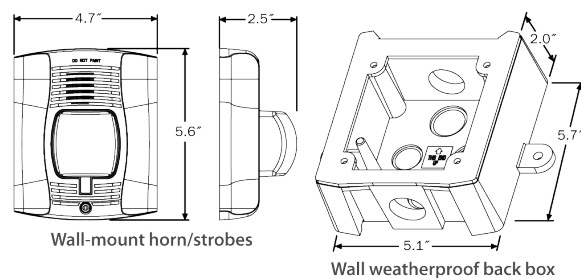
Candela Derating

For K series products used at low temperatures, listed candela ratings must be reduced in accordance with this table.

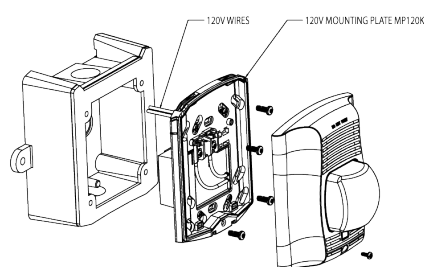
Strobe Output (cd)

| Listed Candela | Candela rating at -40°F |
|----------------|-------------------------|
| 135 | 135 |
| 150 | 150 |
| 177 | 177 |
| 185 | 185 |

P2RHK-120 Dimensions



P2RHK-120 Mounting



SpectrAlert Advance Ordering Information

| Model | Description |
|------------|---|
| P2RHK-120* | 2-wire Horn/Strobe, High cd, Red, Outdoor, 120VAC |

Notes:

*Includes P2RHK 2-wire horn/strobe, MP120K 120VAC adapter mounting plate, and weatherproof back box.

"High cd" refers to strobes that include 135, 150, 177, and 185 candela settings.

All outdoor units ending in "K" include a weatherproof back box.

SELECTABLE-OUTPUT HORNS, STROBES, & HORN STROBES



SpectrAlert® Advance selectable-output horns, strobes, and horn strobes are rich with features guaranteed to cut installation times and maximize profits.



Features

- Plug-in design with minimal intrusion into the back box
- Tamper-resistant construction
- Automatic selection of 12- or 24-volt operation at 15 and 15/75 candela
- Field-selectable candela settings on wall and ceiling units: 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, and 185
- Horn rated at 88+ dBA at 16 volts
- Rotary switch for horn tone and three volume selections
- Universal mounting plate for wall and ceiling units
- Mounting plate shorting spring checks wiring continuity before device installation
- Electrically compatible with existing SpectrAlert products
- Compatible with MDL sync module

The SpectrAlert Advance series offers the most versatile and easy-to-use line of horns, strobes, and horn strobes in the industry. With white and red plastic housings, wall and ceiling mounting options, and plain and FIRE-printed devices, SpectrAlert Advance can meet virtually any application requirement.

Like the entire SpectrAlert Advance product line, horns, strobes, and horn strobes include a variety of features that increase their application versatility while simplifying installation. All devices feature plug-in designs with minimal intrusion into the back box, which make installations fast and foolproof while virtually eliminating costly and time-consuming ground faults. Furthermore, a universal mounting plate with an onboard shorting spring tests wiring continuity before the device is installed, protecting devices from damage.

In addition, field-selectable candela settings, automatic selection of 12- or 24-volt operation, and a rotary switch for horn tones with

SELECTABLE-OUTPUT HORNS, STROBES, & HORN STROBES

SpectrAlert Advance Specifications

Architect/Engineer Specifications

General

SpectrAlert Advance horns, strobes, and horn strobes shall mount to a standard 4 × 4 × 1½-inch back box, 4-inch octagon back box, or double-gang back box. Two-wire products shall also mount to a single-gang 2 × 4 × 1½-inch back box. A universal mounting plate shall be used for mounting ceiling and wall products. The notification appliance circuit wiring shall terminate at the universal mounting plate. Also, SpectrAlert Advance products, when used with the Sync-Circuit™ Module accessory, shall be powered from a non-coded notification appliance circuit output and shall operate on a nominal 12 or 24 volts. When used with the Sync-Circuit Module, 12-volt-rated notification appliance circuit outputs shall operate between 9 and 17.5 volts; 24-volt-rated notification appliance circuit outputs shall operate between 17 and 33 volts. Indoor SpectrAlert Advance products shall operate between 32 and 120 degrees Fahrenheit from a regulated DC or full-wave rectified unfiltered power supply. Strobes and horn strobes shall have field-selectable candela settings including 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, and 185.

Strobe

The strobe shall be a System Sensor SpectrAlert Advance Model _____ listed to UL 1971 and shall be approved for fire protective service. The strobe shall be wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1 Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system.

Horn Strobe Combination

The horn strobe shall be a System Sensor SpectrAlert Advance Model _____ listed to UL 1971 and UL 464 and shall be approved for fire protective service. The horn strobe shall be wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1 Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. The horn shall have three audibility options and an option to switch between a temporal three-pattern and a non-temporal (continuous) pattern. These options are set by a multiple position switch. On four-wire products, the strobe shall be powered independently of the sounder. The horn on horn strobe models shall operate on a coded or non-coded power supply.

Synchronization Module

The module shall be a System Sensor Sync-Circuit model MDL listed to UL 464 and shall be approved for fire protective service. The module shall synchronize SpectrAlert strobes at 1 Hz and horns at temporal three. Also, while operating the strobes, the module shall silence the horns on horn strobe models over a single pair of wires. The module shall mount to a 4½ × 4½ × 2½-inch back box. The module shall also control two Style Y (class B) circuits or one Style Z (class A) circuit. The module shall synchronize multiple zones. Daisy chaining two or more synchronization modules together will synchronize all the zones they control. The module shall not operate on a coded power supply.

Physical/Electrical Specifications

| | |
|---|--|
| Standard Operating Temperature | 32°F to 120°F (0°C to 49°C) |
| Humidity Range | 10 to 93% non-condensing |
| Strobe Flash Rate | 1 flash per second |
| Nominal Voltage | Regulated 12 DC/FWR or regulated 24 DC/FWR ¹ |
| Operating Voltage Range ² | 8 to 17.5 V (12 V nominal) or 16 to 33 V (24 V nominal) |
| Input Terminal Wire Gauge | 12 to 18 AWG |
| Ceiling-Mount Dimensions (including lens) | 6.8" diameter × 2.5" high (173 mm diameter × 64 mm high) |
| Wall-Mount Dimensions (including lens) | 5.6" L × 4.7" W × 2.5" D (142 mm L × 119 mm W × 64 mm D) |
| Horn Dimensions | 5.6" L × 4.7" W × 1.3" D (142 mm L × 119 mm W × 33 mm D) |
| Wall-Mount Back Box Skirt Dimensions (BBS-2, BBSW-2) | 5.9" L × 5.0" W × 2.2" D (151 mm L × 128 mm W × 56 mm D) |
| Ceiling-Mount Back Box Skirt Dimensions (BBSC-2, BBSCW-2) | 7.1" diameter × 2.2" high (180 mm diameter × 57 mm high) |
| Wall-Mount Trim Ring Dimensions (sold as a 5 pack) (TR-HS, TRW-HS) | 5.7" L × 4.8" W × 0.35" D (145 mm L × 122 mm W × 9 mm D) |
| Ceiling-Mount Trim Ring Dimensions (sold as a 5 pack) (TRC-HS, TRCW-HS) | 6.9" diameter × 0.35" high (175 mm diameter × 9 mm high) |

Notes:

1. Full Wave Rectified (FWR) voltage is a non-regulated, time-varying power source that is used on some power supply and panel outputs.
2. P, S, PC, and SC products will operate at 12 V nominal only for 15 and 15/75 cd.

SELECTABLE-OUTPUT HORNS, STROBES, & HORN STROBES

UL Current Draw Data

| UL Max. Strobe Current Draw (mA RMS) | | | | | | UL Max. Horn Current Draw (mA RMS) | | | | | |
|--------------------------------------|---------|--------------|-----|-------------|-----|------------------------------------|--------|--------------|-----|-------------|-----|
| | Candela | 8-17.5 Volts | | 16-33 Volts | | Sound Pattern | dB | 8-17.5 Volts | | 16-33 Volts | |
| | | DC | FWR | DC | FWR | | | DC | FWR | DC | FWR |
| Standard | 15 | 123 | 128 | 66 | 71 | Temporal | High | 57 | 55 | 69 | 75 |
| Candela Range | 15/75 | 142 | 148 | 77 | 81 | Temporal | Medium | 44 | 49 | 58 | 69 |
| | 30 | NA | NA | 94 | 96 | Temporal | Low | 38 | 44 | 44 | 48 |
| | 75 | NA | NA | 158 | 153 | Non-temporal | High | 57 | 56 | 69 | 75 |
| | 95 | NA | NA | 181 | 176 | Non-temporal | Medium | 42 | 50 | 60 | 69 |
| | 110 | NA | NA | 202 | 195 | Non-temporal | Low | 41 | 44 | 50 | 50 |
| High | 115 | NA | NA | 210 | 205 | Coded | High | 57 | 55 | 69 | 75 |
| | 135 | NA | NA | 228 | 207 | Coded | Medium | 44 | 51 | 56 | 69 |
| | 150 | NA | NA | 246 | 220 | Coded | Low | 40 | 46 | 52 | 50 |
| | 177 | NA | NA | 281 | 251 | | | | | | |
| | 185 | NA | NA | 286 | 258 | | | | | | |

| UL Max. Current Draw (mA RMS), 2-Wire Horn Strobe, Standard Candela Range (15-115 cd) | | | | | | | | | | |
|---|--------------|-------|-----|-------------|-----|-----|-----------|-------------|-----|-----|
| DC Input | 8-17.5 Volts | | | 16-33 Volts | | | FWR Input | 16-33 Volts | | |
| | 15 | 15/75 | 15 | 15/75 | 30 | 75 | | 95 | 110 | 115 |
| Temporal High | 137 | 147 | 79 | 90 | 107 | 176 | 194 | 212 | 218 | |
| Temporal Medium | 132 | 144 | 69 | 80 | 97 | 157 | 182 | 201 | 210 | |
| Temporal Low | 132 | 143 | 66 | 77 | 93 | 154 | 179 | 198 | 207 | |
| Non-Temporal High | 141 | 152 | 91 | 100 | 116 | 176 | 201 | 221 | 229 | |
| Non-Temporal Medium | 133 | 145 | 75 | 85 | 102 | 163 | 187 | 207 | 216 | |
| Non-Temporal Low | 131 | 144 | 68 | 79 | 96 | 156 | 182 | 201 | 210 | |
| FWR Input | | | | | | | | | | |
| Temporal High | 136 | 155 | 88 | 97 | 112 | 168 | 190 | 210 | 218 | |
| Temporal Medium | 129 | 152 | 78 | 88 | 103 | 160 | 184 | 202 | 206 | |
| Temporal Low | 129 | 151 | 76 | 86 | 101 | 160 | 184 | 194 | 201 | |
| Non-Temporal High | 142 | 161 | 103 | 112 | 126 | 181 | 203 | 221 | 229 | |
| Non-Temporal Medium | 134 | 155 | 85 | 95 | 110 | 166 | 189 | 208 | 216 | |
| Non-Temporal Low | 132 | 154 | 80 | 90 | 105 | 161 | 184 | 202 | 211 | |

| UL Max. Current Draw (mA RMS), 2-Wire Horn Strobe, High Candela Range (135-185 cd) | | | | | | | | | | |
|--|-------------|-----|-----|-----|---------------------|-------------|-----|-----|-----|--|
| DC Input | 16-33 Volts | | | | FWR Input | 16-33 Volts | | | | |
| | 135 | 150 | 177 | 185 | | 135 | 150 | 177 | 185 | |
| Temporal High | 245 | 259 | 290 | 297 | Temporal High | 215 | 231 | 258 | 265 | |
| Temporal Medium | 235 | 253 | 288 | 297 | Temporal Medium | 209 | 224 | 250 | 258 | |
| Temporal Low | 232 | 251 | 282 | 292 | Temporal Low | 207 | 221 | 248 | 256 | |
| Non-Temporal High | 255 | 270 | 303 | 309 | Non-Temporal High | 233 | 248 | 275 | 281 | |
| Non-Temporal Medium | 242 | 259 | 293 | 299 | Non-Temporal Medium | 219 | 232 | 262 | 267 | |
| Non-Temporal Low | 238 | 254 | 291 | 295 | Non-Temporal Low | 214 | 229 | 256 | 262 | |

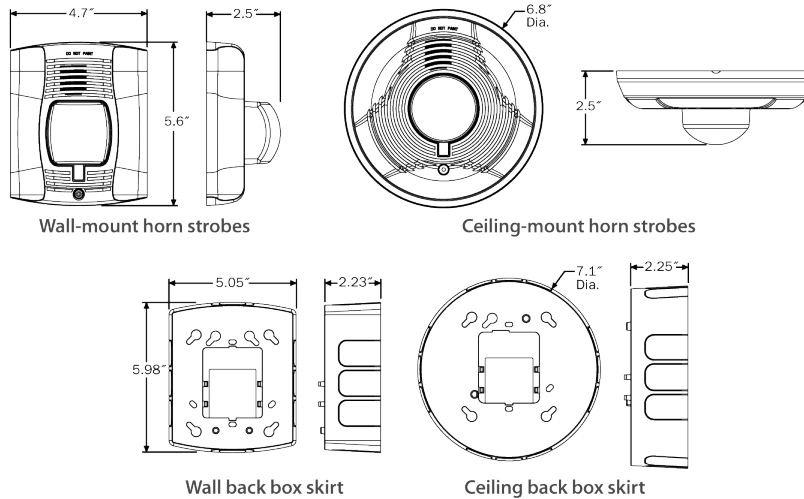
Horn Tones and Sound Output Data

| Horn and Horn Strobe Output (dBA) | | | | | | | | | | | |
|-----------------------------------|---------------|--------|--------------|-----|-------------|-----|-----------------|-----|-----|-----|--|
| Switch Position | Sound Pattern | dB | 8-17.5 Volts | | 16-33 Volts | | 24-Volt Nominal | | | | |
| | | | DC | FWR | DC | FWR | DC | FWR | DC | FWR | |
| 1 | Temporal | High | 78 | 78 | 84 | 84 | 88 | 88 | 99 | 98 | |
| 2 | Temporal | Medium | 74 | 74 | 80 | 80 | 86 | 86 | 96 | 96 | |
| 3 | Temporal | Low | 71 | 73 | 76 | 76 | 83 | 80 | 94 | 89 | |
| 4 | Non-Temporal | High | 82 | 82 | 88 | 88 | 93 | 92 | 100 | 100 | |
| 5 | Non-Temporal | Medium | 78 | 78 | 85 | 85 | 90 | 90 | 98 | 98 | |
| 6 | Non-Temporal | Low | 75 | 75 | 81 | 81 | 88 | 84 | 96 | 92 | |
| 7 [†] | Coded | High | 82 | 82 | 88 | 88 | 93 | 92 | 101 | 101 | |
| 8 [†] | Coded | Medium | 78 | 78 | 85 | 85 | 90 | 90 | 97 | 98 | |
| 9 [†] | Coded | Low | 75 | 75 | 81 | 81 | 88 | 85 | 96 | 92 | |

[†]Settings 7, 8, and 9 are not available on 2-wire horn strobe.

SELECTABLE-OUTPUT HORNS, STROBES, & HORN STROBES

SpectrAlert Advance Dimensions



SpectrAlert Advance Ordering Information

| Model | Description |
|-----------------------------|--|
| Wall Horn Strobes | |
| P2R*† | 2-Wire Horn Strobe, Standard cd†, Red |
| P2RH* | 2-Wire Horn Strobe, High cd, Red |
| P2W* | 2-Wire Horn Strobe, Standard cd, White |
| P2WH* | 2-Wire Horn Strobe, High cd, White |
| P4R* | 4-Wire Horn Strobe, Standard cd, Red |
| P4RH | 4-Wire Horn Strobe, High cd, Red |
| P4W | 4-Wire Horn Strobe, Standard cd, White |
| Wall Strobes | |
| SR*† | Strobe, Standard cd, Red |
| SRH*† | Strobe, High cd, Red |
| SW* | Strobe, Standard cd, White |
| SWH* | Strobe, High cd, White |
| Ceiling Horn Strobes | |
| PC2R* | 2-Wire Horn Strobe, Standard cd, Red |
| PC2RH | 2-Wire Horn Strobe, High cd, Red |
| PC2W*† | 2-Wire Horn Strobe, Standard cd, White |
| PC2WH* | 2-Wire Horn Strobe, High cd, White |
| PC4R | 4-Wire Horn Strobe, Standard cd, Red |
| PC4RH | 4-Wire Horn Strobe, High cd, Red |
| PC4W | 4-Wire Horn Strobe, Standard cd, White |

| Model | Description |
|------------------------|--------------------------------|
| Ceiling Strobes | |
| SCR | Strobe, Standard cd, Red |
| SCRH | Strobe, High cd, Red |
| SCW* | Strobe, Standard cd, White |
| SCWH | Strobe, High cd, White |
| Horns | |
| HR | Horn, Red |
| HW | Horn, White |
| Accessories | |
| BBS-2 | Back Box Skirt, Wall, Red |
| BBSW-2 | Back Box Skirt, Wall, White |
| BBSC-2 | Back Box Skirt, Ceiling, Red |
| BBSCW-2 | Back Box Skirt, Ceiling, White |
| TR-HS | Trim Ring, Wall, Red |
| TRW-HS | Trim Ring, Wall White |
| TRC-HS | Trim Ring, Ceiling, Red |
| TRCW-HS | Trim Ring, Ceiling, White |

Notes:

* Add "-P" to model number for plain housing (no "FIRE" marking on cover), e.g., P2R-P.

† Add "-SP" to model number for "FUEGO" marking on cover, e.g., P2R-SP.

‡ "Standard cd" refers to strobes that include 15, 15/75, 30, 75, 95, 110, and 115 candela settings. "High cd" refers to strobes that include 135, 150, 177, and 185 candela settings.

VHF ANTENNA CENTER-FED 1/2-WAVE COAXIAL SLEEVE



Style 420 VHF 3dB

Shakespeare's most economical 5' antenna package. The 420 is a great, basic 3dB antenna for day-to-day cruising in calm to moderate seas. The antenna has an integral polycarbonate Lift N Lay mount for deck mounting, and comes with a leveling plate and installation hardware. Use a Style 4000 Angle Bracket (sold separately) for side mounting.

- Brass and copper elements
- Includes 15' RG-58 cable and a PL-259 connector
- Integral deck mount
- One section

Technical Specifications:

- **Frequency:** VHF Marine band
- **Bandwidth** (within 2.0:1 SWR): 5 MHz
- **SWR:** 1.5:1 at 156.8 MHz
- **Impedance** (Ohms): 50
- **Gain:** 3 dB
- **Max. Input** (Watts): 50
- **DC Ground:** NO
- **Termination:** 15' RG-58 cable
- **Height** (feet): 5
- **Polarization:** Vertical
- **Radiation pattern:** Omni-directional

**HAND HELD PORTABLE AND FIXED BASE MARINE VHS RADIOS ARE AVAILABLE
CONTACT TIMCO FOR MOST CURRENT MODELS WITH ADVANCED FEATURES**

**GENERAL ALARM SYSTEMS AND FIRE DETECTION SYSTEMS
PER 46 CFR, PART 27 TOWING VESSELS SUBPARTS A & B ARE AVAILABLE FROM TIMCO**

PITTING & CORROSION PREVENTING ANODES



Zinc Hull Anodes –

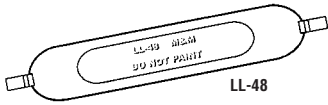
Zinc marine anodes from Thermal are manufactured from Special High Grade Zinc, 99.995% pure, the highest grade of zinc available. Our customized blending system provides even distribution throughout of all critical additives required to meet Military Specification – MIL-A-18001J. This careful attention to alloying and

casting procedures results in a full line of products that provides maximum long life protection for steel in seawater and saline mud. In addition, Thermal fills custom orders to your exact specifications. With on-time delivery in any quantity.

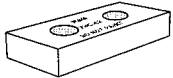
| Cat. No. | Size | Current Amp-Yr. Rating | Method of | No. of Cast-in Galvanized Steel Straps | Type |
|-------------------|-----------------------|------------------------|--------------------|--|--------|
| TRC-48 | 4 1/2" x 24" x 2 1/4" | 2 | Welding | 1* | --- |
| TRC-26 | 4 1/4" x 14" x 2 1/4" | 1 | Welding or Bolting | 1* | --- |
| TRC-23 | 6" x 12" x 1 1/4" | 1 | Welding | 2* | ZHS-23 |
| TRC-42 | 6" x 12" x 2 1/2" | 1 | Welding | 2 | ZHS-42 |
| TRC-23B | 6" x 12" x 1 1/4" | 1 | Welding | 2*** | ZHB-23 |
| TRC-23C | 6" x 12" x 1 1/4" | 1 | Bolting | 1 | ZHC-23 |
| TRC-12C | 3" x 12" x 1 1/4" | 1/2 | Bolting | 1 | --- |
| TRC-23T Tapered | 6 1/2" X 14" X 1 1/4" | 1 | Welding | 2* | --- |
| TRC-11-W | 6" x 6" x 1 1/4" | 1/2 | Welding | 1 | |
| TRC-12 | 3" x 12" x 1 1/4" | 1/2 | Welding | 1* | ZSS-12 |
| TRC-24 | 3 1/2" x 12" x 2 1/2" | 1/2 | Welding | 1* | ZSS-24 |
| TRC-6-W | 3" x 6" x 1 1/4" | | Welding | 1* | |
| TRC-TD6 Tear Drop | 3" x 9" x 1 1/4" | 1/4 | Welding or Bolting | 1* | ZTS |
| TRC-5C | 2 1/2" x 9" x 1 1/2" | 1/4 | Bolting | 1 | |

* Strap holes optional
 ** Also available in 3-section plate
 *** Phosphor Bronze Strap

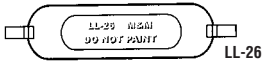
PITTING & CORROSION PREVENTING ANODES



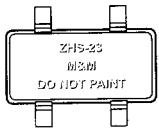
LL-48



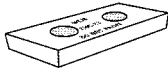
ZHC-42



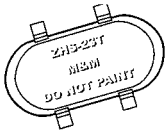
LL-26



ZHS-23



ZHC-23



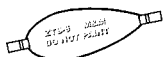
ZHS-23T



ZSS-12



M-10



ZTS-6

HULL TYPE ANODES

| Aluminum Indium - Activated ACS 4 | | | | | Zinc Mil*A*180001 (latest rev.) | | | | | Magnesium Grade H - 1 | | | | |
|--------------------------------------|-----|---|----|------|------------------------------------|-----|---|----|------|--------------------------|-----|---|----|------|
| Mil. No. | Wt. | W | L | H | Mil. No. | Wt. | W | L | H | Part No. | Wt. | W | L | H |
| AHS - 10 | 9 | 6 | 12 | 1.25 | ZHS - 23 (M - 24) | 22 | 6 | 12 | 1.25 | H - 6 C | 6 | 6 | 12 | 1.25 |
| AHC - 10 | 9 | 6 | 12 | 1.25 | ZHC - 26 (N - 23 C) | 21 | 6 | 12 | 1.25 | H - 11 | 11 | 6 | 12 | 2.50 |
| AHS - 20 | 17 | 6 | 12 | 2.50 | ZHS - 42 (M - 42) | 41 | 6 | 12 | 2.50 | H - 11 C | 11 | 6 | 12 | 2.50 |
| AHC - 20 | 16 | 6 | 12 | 2.50 | ZHC - 42 (M - 42 C) | 39 | 6 | 12 | 2.50 | H - 24 | 24 | 9 | 18 | 2 |
| | | | | | | | | | | H - 44 | 44 | 9 | 18 | 4 |

These anodes are equipped with two cast - in mounting straps or two cast - in cored holes on 6" centers.

| Aluminum Indium Activated ACS4 | | | | | Zinc Mil*A*180001 (latest rev.) | | | | | Magnesium Grade H - 1 | | | | |
|-----------------------------------|-----|---|----|------|------------------------------------|-----|---|----|------|--------------------------|-----|---|----|------|
| Mil. No. | Wt. | W | L | H | Mil. No. | Wt. | W | L | H | Part No. | Wt. | W | L | H |
| ASS - 5 | 5 | 3 | 12 | 1.25 | ZSS - 12 (M - 12) | 11 | 3 | 12 | 1.25 | H - 3 | 3 | 3 | 12 | 1.25 |
| ASS - 10 | 9 | 3 | 12 | 2.50 | ZSS - 24 (M - 22) | 22 | 3 | 12 | 2.50 | H - 6 L | 6 | 3 | 12 | 2.50 |

These anodes are equipped with a single cast - in mounting strap.

| Aluminum Indium Activated ACS4 | | | | | Zinc Mil*A*180001 (latest rev.) | | | | | Magnesium Grade H - 1 | | | | |
|-----------------------------------|-----|---|----|------|------------------------------------|-----|---|----|------|--------------------------|------|---|----|------|
| Mil. Spec. | Wt. | W | L | H | Mil. Spec. | Wt. | W | L | H | Part No. | Wt. | W | L | H |
| STS | 2 | 3 | 9 | 1.38 | ZTS | 5 | 3 | 9 | 1.38 | H - 1 | 1.25 | 3 | 9 | 1.38 |
| ATS - 4 | 4 | 3 | 9 | 2.50 | (M - 6) | | | | | H - 2.5 | 2.5 | 3 | 9 | 2.50 |
| ATS | 8 | 5 | 10 | 2.50 | ZTS - 10 | 10 | 3 | 9 | 2.50 | H - 5 | 5 | 5 | 10 | 2.50 |
| | | | | | ZTS - 20 | 20 | 5 | 10 | 2.50 | | | | | |

A tear drop shaped anode equipped with a single cast - in mounting strap.

| Aluminum Indium Activated ACS4 | | | | | Zinc Mil*A*180001 (latest rev.) | | | | | Magnesium Grade H - 1 | | | | |
|-----------------------------------|-----|---|----|------|------------------------------------|-----|---|----|------|--------------------------|-----|---|----|------|
| Part No. | Wt. | W | L | H | Part No. | Wt. | W | L | H | Part No. | Wt. | W | L | H |
| ACS - 12 | 12 | 4 | 14 | 2.25 | LL - 26 | 26 | 4 | 14 | 2.25 | H - 8 | 8 | 4 | 14 | 2.25 |
| ACS - 20 | 20 | 4 | 24 | 2.25 | LL - 48 | 48 | 4 | 24 | 2.25 | H - 13 | 13 | 4 | 24 | 2.25 |
| ACS - 23 | 23 | 5 | 24 | 2.00 | LL - 58 | 58 | 5 | 24 | 2.00 | H - 15 | 15 | 5 | 24 | 2.00 |
| ACS - 29 | 29 | 5 | 24 | 2.50 | LL - 73 | 73 | 5 | 24 | 2.25 | H - 18 | 18 | 5 | 24 | 2.50 |

Includes single longitudinal mounting strap.

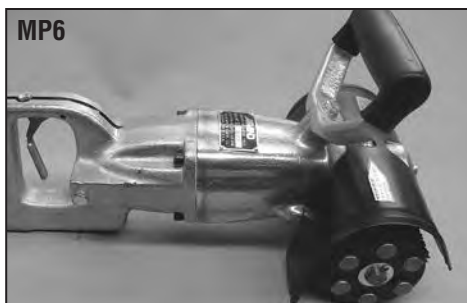
- Notes:1. Zinc and magnesium anode strap core are galvanized, brass straps available for zinc anodes.
- 2. All magnesium anodes available with plastisol coating.
- 3. Other alloys available: aluminum, tin, mercury activated; Mil-A-24779 (S H); zinc - high purity; magnesium - high potential.
- 4. Other core configurations available.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

RUST, SCALE & PAINT REMOVER



| Model No. | Cleaning Area | Power Supply | Horse Power | Wt. |
|-----------|---------------|--------------|-------------|---------|
| K7 | 5" Wide | 115V, 230V | 1/8 | 9 lbs. |
| KP5 | 5" Wide | Air | 1/2 | 7 lbs. |
| K7E | 8" Wide | 115V, 230V | 1/8 | 11 lbs. |
| KP5E | 8" Wide | Air | 1/2 | 9 lbs. |
| M5 | 8" Wide | 115V, 230V | 1/2 | 21 lbs. |
| MP6 | 8" Wide | Air | 2 1/2 | 21 lbs. |
| MP6E | 12" Wide | Air | 2 1/2 | 24 lbs. |
| WE1 | 5 1/4" Wide | 115V, 230V | 2 | 97 lbs. |
| WG1 | 5 1/4" Wide | Gasoline | 5 | 90 lbs. |



ANTI-SLIP/PAINT/PRESS-DOWN TREADS

EPOXY WP-70

Abrasive Anti-Slip Safety Coating

A 2-part system, squeegees on 1/16" thick. Cures in 8 to 10 hours to an extremely hard surface that will not crack or separate under flexing, heavy impact or thermal shock. Diamond hard aluminum oxide grit provides permanent anti-slip protection and wear resistance. Resists weather, chemicals, gasoline, oil and grease.

Coverage: approximately 30 square feet per gallon. Ideal for ramps with lift truck traffic.

Colors Available: Black, Gray, Brown, Green, Safety Yellow, Safety Orange, Seafoam White, Blue. Black is standard color and will be furnished unless another color is specified



SAFE-STRIDE

Anti-Slip Safety Paint

Safe-Stride is a newly improved and specially formulated anti-slip safety paint, which contains grit to help provide a tough, sure-footed, safe traction surface. The new formula is water based acrylic so there are no shipping restrictions, such as those associated with shipping hazardous materials. Safe-Stride coatings have been formulated for use on concrete, wood and primed metal surfaces. When used properly, Safe-Stride products provide a tough, abrasive, anti-slip coating for walkways, steps, ramps, boat decks, locker room floors and a variety of other uses.

Safe-Stride is shipped ready to use. One gallon (12.5 lbs.) covers approximately 100-125 sq. ft. in one coat. It can be applied by roller, brush or trowel. Easy application by your own maintenance crew. Easy clean-up with soap and water.

Safe-Stride is shipped from stock in our standard colors: black, gray and safety yellow. Other colors available on special orders (100 gallon minimum).



FLEX-TRED

Anti-Slip Safety Rolls, Cleats & Strips

Flex-Tred heavy-duty safety surface is quick to install and provides durable pedestrian safety on slippery surfaces. Uses: ramps, light traffic stairs, kitchens, showers, aisles, entrances.

Black is standard color and will be furnished unless another color is specified.

Flex-Tred is also available in the following colors. Write for complete texture color chart.

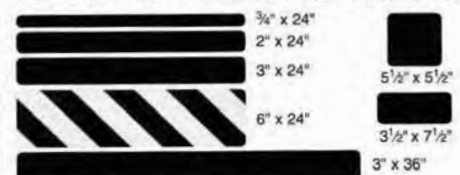
Blacks and Standard Colors: Sparkle Black, Flat Black Fine, Flat Black Medium, Flat Black Coarse, Pebble White, Industrial Red, Industrial Brown, Ocean Gray, Safety Yellow.

Marine Colors: Clear Fine, Galley Red, Pebble White, Boardwalk Blue, Seafoam Green, Marine Black, Teak Brown, Ocean Gray, Coral Red.

Skateboard Colors: Clear Coarse, Regular Pink, Scarlet Red, Carib Blue and these fluorescent colors: Fire Orange, Aurora Pink, Horizon Blue, Purple Dusk, Signal Green, Saturn Yellow.



STANDARD DIE-CUT SIZES PACKED 50 PIECES PER CARTON



STANDARD ROLL SIZES:

60 foot rolls in 3/4", 1", 2", 3", 4", 6", 8", 12", 18" and 24" widths



CUSTOM SIZES FOR DIE CUTS OR ROLLS ARE OUR BUSINESS, WE WELCOME THE OPPORTUNITY TO QUOTE.

THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

IDENTIFICATION PLAQUES

MOLDED PLASTIC IDENTI-PLATES

Choose from different plated molded in plastic with white letters and bevel on black background, except as noted. Note: Blank plates are available that can be custom engraved at most trophy or sign companies, for your special needs.



BLACK

RED



P 201 1-1/8" x 3-1/4"
Yellow Background



P 203 1-3/8" x 4-3/8"
Red Background

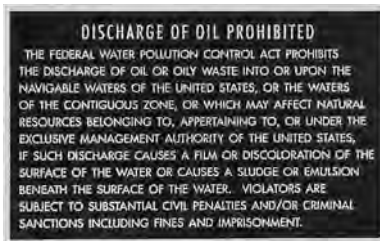
DOOR PLAQUES

Door Plaques add a touch of elegance for identification to your boat, travel trailers, home, office and other places. They are attractive and practical. 1 1/2 " x 5" actual size. Pressure sensitive backing.

TIMCO CAN ALSO PRODUCE CUSTOM VINYL LETTER SIGNS PROMPTLY ON REQUEST

| | | | | |
|-----------------------|------------------------|---------------------|------------------------|------------------------------|
| 1. Anchor Light | 32. Aft | 63. Misc. | 94. Water Pressure | 125. Aux. Tank |
| 2. Bilge Pump | 33. Automatic | 64. Navigation | 95. 24 volt | 126. Cross Over |
| 3. Blower | 34. Baitpump | 65. Negative | 96. 110 D.C. | 127. Port Tank |
| 4. Choke | 35. Bailwell | 66. Oil Pressure | 97. Blank | 128. Stbd. Tank |
| 5. Compass | 36. Bilge Blower | 67. Oil Temp. | 98. Strobe Light | 129. Return |
| 6. Deck Light | 37. Bow Light | 68. Open | 99. Vapor Detector | 130. Supply |
| 7. Depth Sounder | 38. Cabin Light | 69. Pilot | 100. Shift | 131. Fresh Water |
| 8. Forward | 39. Chlorinator | 70. Pilot Light | 101. High | 132. Engine |
| 9. Horn | 40. Closed | 71. Port | 102. Low | 133. Feed |
| 10. Life Jacket (Red) | 41. Control | 72. Port Light | 103. Battery Parallel | 134. Fish Tank |
| 11. Light | 42. Controller | 73. Positive | 104. Emergency (Red) | 135. 220 Vac |
| 12. Master | 43. Courtesy Lights | 74. Power | 105. Alarm | 136. Tank 4 |
| 13. Masthead Light | 44. Docking Lights | 75. Power Tilt | 106. Alternator | 137. Battery 3 |
| 14. Neutral | 45. Dome Lights | 76. Power Winch | 107. Amp Meter | 138. Raw Water Washdown |
| 15. Off | 46. Electric Toilet | 77. Radar | 108. Sling | 139. Fresh Water Washdown |
| 16. On | 47. Engine Room | 78. Radio Telephone | 109. Icebox | 140. Main Tank |
| 17. Panel Lights | 48. Engine Shutoff | 79. Range Light | 110. Salt Water | 141. Center Engine |
| 18. Radio | 49. Fan | 80. Record | 111. Tachometer | 142. Starboard Engine |
| 19. Reverse | 50. Flares (Red) | 81. Refrigerator | 112. Battery 1 | 143. Port Engine |
| 20. Running Lights | 51. Flood Light | 82. Shower | 113. Battery 2 | 144. Starboard Auxiliary |
| 21. Search Light | 52. Fresh Water System | 83. Siren | 114. Cockpit Drain | 145. Port Auxiliary |
| 22. Starter | 53. Fuel | 84. Spreader Lights | 115. Engine Intake | 146. Transom Shower |
| 23. Stern Light | 54. Fuel Pump | 85. Starboard | 116. Exhaust | 147. Live Well |
| 24. Throttle | 55. Gas | 86. Stbd. Light | 117. Galley Sink Drain | 148. GPS |
| 25. Water Temperature | 56. Generator | 87. Switch | 118. Head Discharge | 149. V.H.F. |
| 26. Wiper | 57. Heater | 88. Tank 1 | 119. Head Intake | 150. Fire Extinguisher (Red) |
| 27. 6 volt | 58. Holding Tank | 89. Tank 2 | 120. Head Sink Drain | 151. Plotter |
| 28. 12 volt | 59. Ignition | 90. Tank 3 | 121. Ice Box Drain | 152. Forward Head |
| 29. 32 volt | 60. Instrument | 91. Towing Lights | 122. Knot Meter | 153. Aft Head |
| 30. 110 A.C. | 61. Loran | 92. Tilt | 123. Overboard | |
| 31. Aerator | 62. Manual | 93. Trim | 124. Scupper | |

PLAQUES



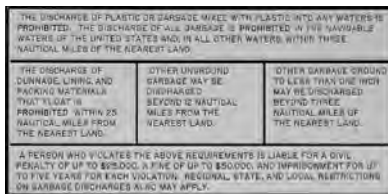
Oil Discharge Plaque

Meets federal standards...
Adhesive backing...easy to apply.
Required on all boats 26' and over with enclosed engine compartment. Black background. 5" x 8".



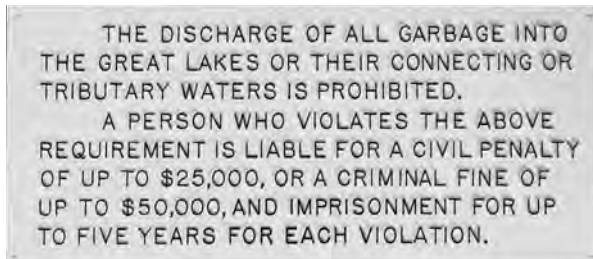
Drug Plaque

Avoid the risk of arrest and seizure.
The United States Coast Guard maintains a zero tolerance drug policy. Avoid the risk of arrest and seizure with Bernard's 6-3/4" x 4" self-



Pollution Prevention Plaque

Do your part to prevent pollution from boats!
Bernard offers 9-1/4" x 4-1/2" plaques that comply with federal rules now requiring all boats over 26 feet to display overboard discharge laws. Don't risk potential criminal and civil fines! Bernard plaques have adhesive backing and are easy to apply.



No Dumping Plaque

Keep your boat in compliance.
Federal rules require all boats on the Great Lakes over 26' in length to display an adequate number of "No Dumping" plaques. Bernard plaques are made of durable, self-adhering, molded plastic. 9" x 4".



adhering plaque. It's recommended for all commercial vessels!

Injury Report Plaque

Now required on some fishing boats by the United States Coast Guard, these plaques offered by Bernard are 8-5/8" x 5-7/8". Black on white background.



General Alarm Plaque

Required on some commercial vessels by the United States Coast Guard, these non-corrosive, molded plastic plaques are easy to mount on almost any surface with convenient "peel-and-stick" pressure-sensitive backing. Available as shown – red letters on a 4" x 13" white background.

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SHAFT & VALVE PACKING



TIMCO OFFERS ALL STYLES OF MARINE PACKING. GARLOCK PACKMASTER, NON-ASBESTOS FIBERS WITH TFE OR GRAPHITE IMPREGNATION, FLAX TALLO, VEGETABLE FIBER, GRAFOIL AND MANY MORE.

DIE CUT
PAKING SETS
AVAILABLE
UPON REQUEST!

PACKING KNIFE
Stainless Steel Blade
with Leather Sheath



PACKING REMOVERS
Part no. Description

| | |
|---------|-------------|
| Small | 3/16" x 8" |
| Medium | 3/16" x 11" |
| Large | 1/4" x 13" |
| X-Large | 5/16" x 13" |

FLEXIBLE PACKING PULLERS

| Part no. | Description |
|----------|-------------------|
| F1 | 7" Removable Tip |
| F2 | 11" Removable Tip |
| F3 | 14" Removable Tip |

INDUSTRIAL SORBENTS

YELLOW DRUM SPILL KIT



- SNAKES
- BOOMS
- PADS
- PILLOWS
- SPILL KITS



D-9003
YELLOW DRUM SPILL KIT

D-6006
4" DIAMETER BY 10' LONG

3 SNAKE BOOMS PER CASE. SNAKE BOOMS CONTAIN AND ABSORB WATER, OIL, AND OTHER NON AGGRESSIVE FLUIDS. FOR USE ON DECK OR SHOP FLOOR TO CONTAIN LEAKS AND SPILLS.

D-6008
5" DIAMETER BY 10' LONG

4 OIL BOOMS PER BALE FOR ABSORBING & CONTAINING OIL ON WATER

D-6009
5" DIAMETER BY 20' LONG

2 OIL BOOMS PER BALE FOR ABSORBING & CONTAINING OIL ON WATER. OIL BOOMS WILL ABSORB UP TO 20 TIMES THEIR HEIGHT. THEY HAVE END TO END CONNECTORS AND WILL FLOAT INDEFINITELY EVEN WHEN FULLY SATURATED.



D-7301
17" BY 19" OIL ABSORBING PADS

200 PADS PER BALE FOR ABSORBING OIL ANYWHERE. OIL ABSORBING PADS ABSORB OIL ON WATER, ON DECK OR IN THE ENGINE ROOM

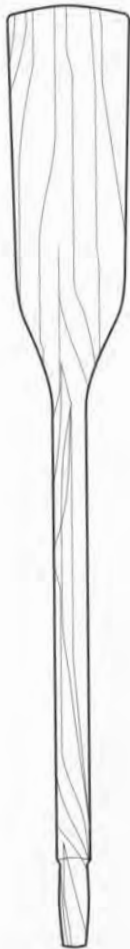
Customized spill kits can be provided to meet specific needs. Priced upon request.

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MISCELLANEOUS



10', 12', 16', 20'
Pike Poles
Anodized Aluminum
Handle



Oars/Paddles

5' & 6' in length, varnished choice of wood or laminated plastic.



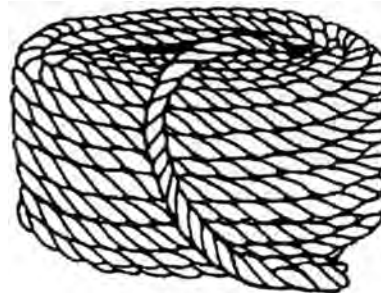
Rowlock Horns

Chrome plated zinc.
1/2" O.D., 1-3/4" L.
One pair per skin packed card.
Standard pack 10 pair.

| | | |
|-------------|---------------|--------------------|
| 1227 | DP CHR | NORTH RIVER |
| 1267 | DP CHR | ROUND |
| 1262 | DP CHR | OPEN |

Hi-Tensile Anchors
Weights Holding Power

| | |
|---------|----------|
| 12lbs. | 960lbs. |
| 20lbs. | 1500lbs. |
| 35lbs. | 1800lbs. |
| 60lbs. | 3100lbs. |
| 90lbs. | 3600lbs. |
| 150lbs. | 4000lbs. |
| 190lbs. | 4400lbs. |



ROPE FOR EVERY NEED!

- Lock Line
- Leaving Line
- Poly Pro
- Nylon
- Manila

FIDS

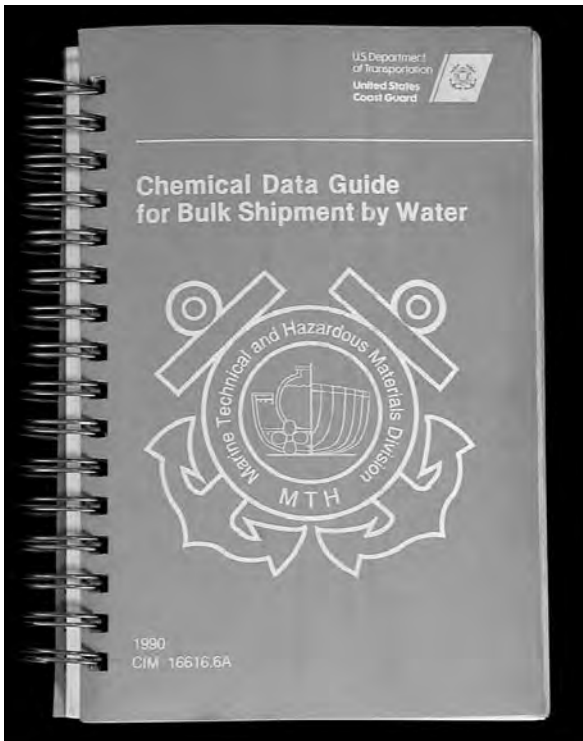
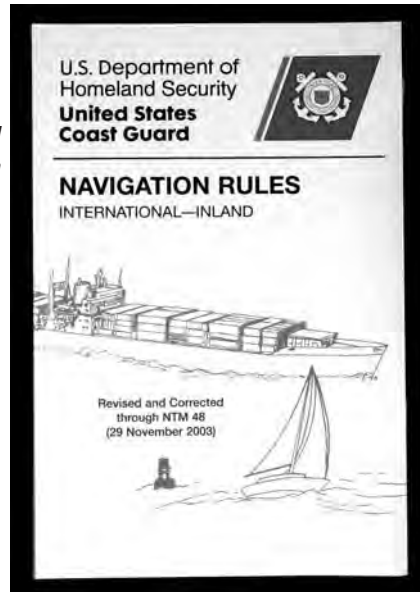


BOOKS FOR INFORMATION, EDUCATION & REFERENCE

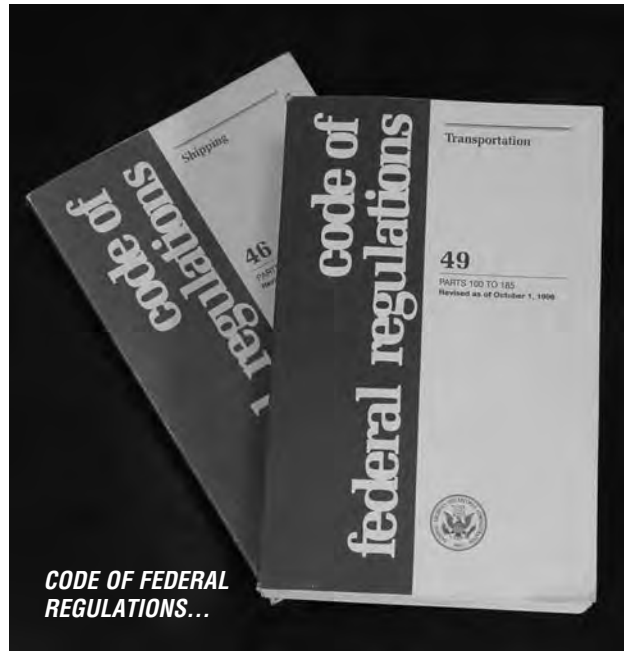
**U.S. Department of Transportation
United States Coast Guard
NAVIGATION RULES**
International – Inland

**U.S. Coast Guard
Navigation
Rules...**

**CHEMICAL DATA
GUIDE FOR BULK
SHIPMENT BY
WATER...**



46 CFR PARTS
1 - 0
41 - 69
70 - 89
90 - 139
140 - 155
156 - 165



LIGHT LIST (Also Available)
Mississippi River System
(Not Shown)

Call for Additional Volumes Also Available...

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FULL VIEW MODEL SGM-1™



- **FULL COMPLIANCE WITH 46 CFR PART 39, Para. 39-20-3 (a)**
The FULL VIEW MODEL SGM-1 Marine Sight Glass is the tank barge industry standard for vessel operators complying with U.S. Coast Guard Regulations 46 CFR PART 39, Paragraph 39.20-3(a) and is suitable for use on ABS classed vessels.

- **FULL 59 SQ. IN. OF VIEWING AREA**
Mounted adjacent to each cargo compartment control valve, the FULL VIEW MODEL SGM-1 provides the largest and clearest view into your cargo compartment available with a full 59 square inches of viewing area, without exposing personnel to hazardous vapors.

- **EASILY REPLACED WIPER BLADES**
Dual wipers clean the cargo side of the PYREX™ glass. The wiper blades are easily replaced in the field, and are available in a variety of materials for maximum cargo compatibility. The FULLVIEW MODEL SGM-1 is available with Teflon™, EPDM and Viton wiper blade refills.

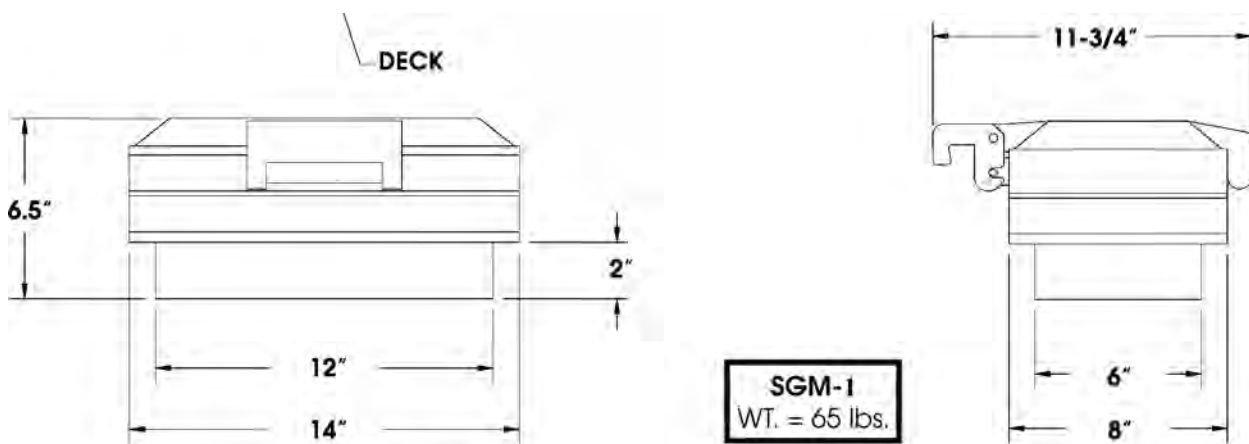
- **3/4" THICK GROUND AND POLISHED PYREX™**

GLASSPYREX™ is a name you know and trust. Each glass is fully stress relieved with ground edges and radiused corners. Four built-in drain ports in the top glass flange prevent water pooling on the glass when the full weather cover is open.

- **SOLID CONSTRUCTION AND EASY MOUNTING**

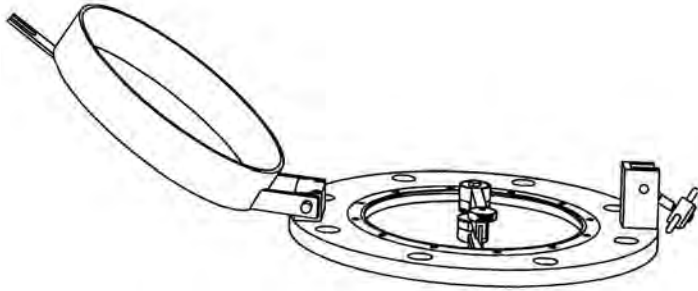
The upper and lower glass flanges are made of 1-1/2" thick stainless steel. The weather cover is made of cast aluminum and the standard deck mounting flange is made of carbon steel for easy weld-down to your deck. Both the deck mounting flange and the weather cover can be replaced by optional stainless steel components.

Mounting Options



ERL MODEL SGMRD-8™

ERL



- **FULL REGULATORY COMPLIANCE WITH 46 CFR PART 39 PARAGRAPH 39-20-3(a)**

The ERL Model SGMRD-8, 8" round marine sight glass complies with U.S. Coast Guard regulations and is suitable for use on all liquid cargo vessels.

- **ROUND 56 SQUARE INCH VIEWING AREA**

Mounted adjacent to each cargo valve control handwheel, the ERL Model SGMRD-8 gives the tankerman a 56 square inch round viewing port into the compartment without exposure to potentially hazardous vapors.

- **RADIAL GLASS WIPER**

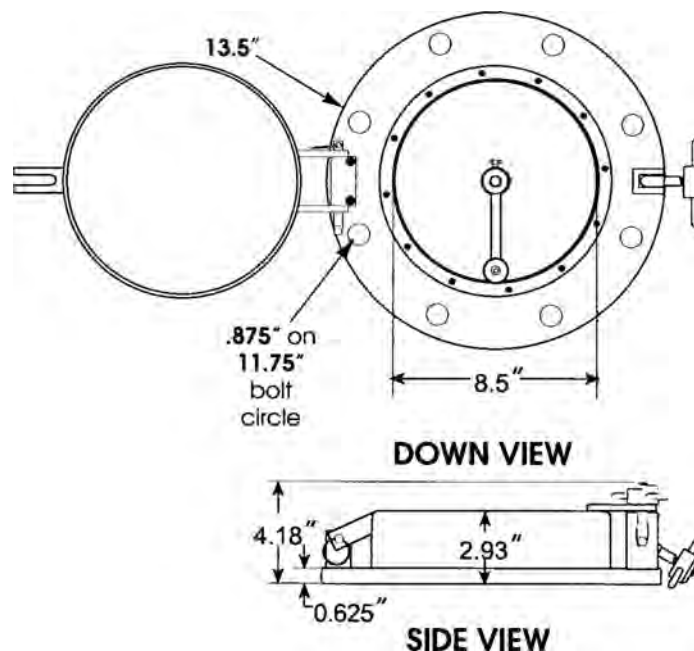
Radial wiper cleans both top and bottom of the PYREX™ glass for an unobstructed view into the cargo compartment. The easily replaced wiper blades are available in Viton, EPDM or Butyl.

- **1/2 INCH THICK GROUND AND POLISHED PYREX™ GLASS**

Each 8.5" diameter Pyrex™ glass is fully stress relieved with ground edges. The top face of the glass is above the stainless steel frame to prevent water pooling when used during rain.

- **SOLID CONSTRUCTION AND EASY MOUNTING**

All construction is 100% 300 series stainless steel. The SGMRD-8 mounts to any standard 8" 150 lb. class mounting flange, having (8) 0.88" diameter holes on a 11.75" diameter bolt circle.



1700 SERIES INVERTED VENT CHECK VALVE



Model 1700 (shown)

Available in Steel, Stainless Steel, Aluminum, Bronze or Iron

Connections: Welded, Flanged, Threaded, Socket Weld, or Sil Brazed

Float Materials: Copper, Stainless Steel, Polyethylene, and Monel

Available Sizes: 0.5", 0.75", 1, 1.5", 2", 2.5", 3", 4", 5", 6", 7", 8", 9", 10", 12", 16"

Model 1750

Available in Steel, Stainless Steel, Aluminum, Bronze or Iron

Connections: Welded, Flanged, Threaded, Socket Weld, or Sil-Brazed

Float Materials: Copper, Stainless Steel, Polyethylene, and Monel

Available Sizes: 0.5", 0.75", 1, 1.5", 2", 2.5", 3", 4", 5", 6", 7", 8", 9", 10", 12", 16"



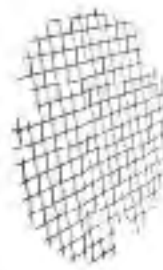
BODY



FLAME SCREEN



SPACER RING

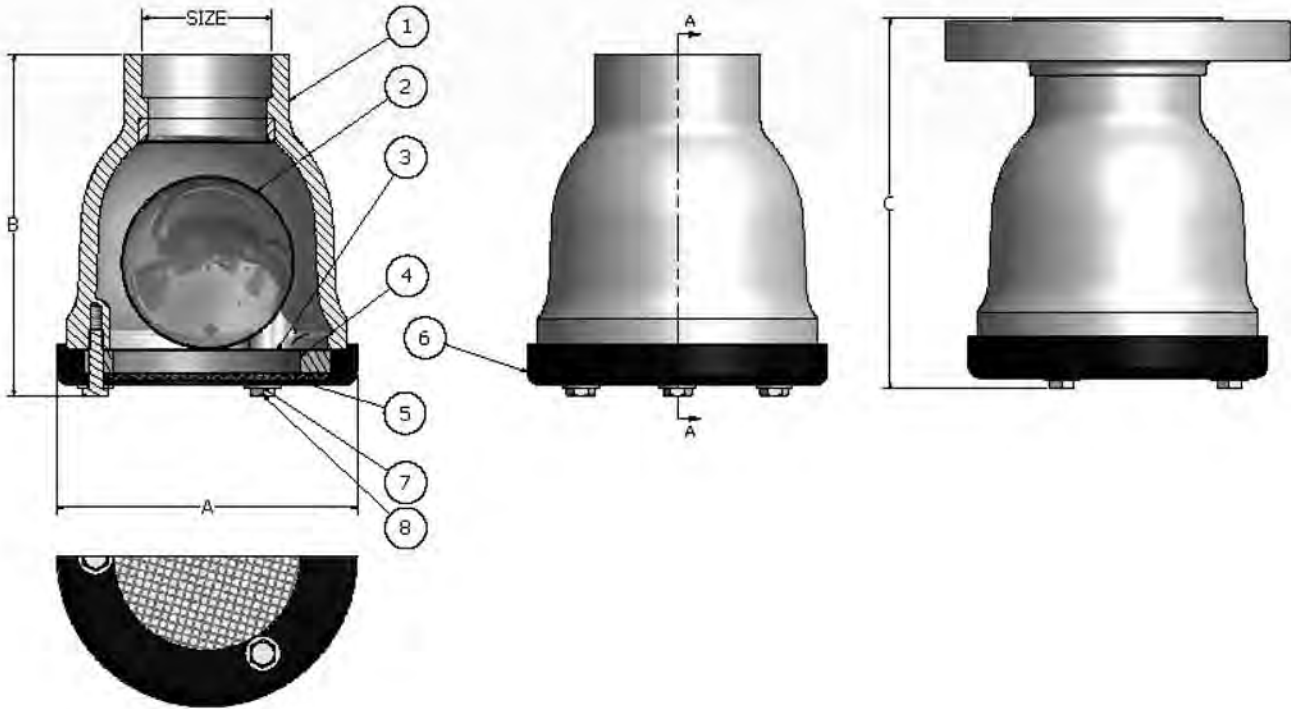


PROTECTIVE MESH



CAP

1700 SERIES INVERTED VENT CHECK VALVE



| Parts List | | |
|------------|------|--------------------|
| Item | Qty. | Name of Part |
| 1 | 1 | Body |
| 2 | 1 | Float |
| 3 | 1 | Flame Screen |
| 4 | 1 | Spacer Ring |
| 5 | 1 | Protective Screen |
| 6 | 1 | Retainer Cap |
| 7 | 3* | Cap Washers |
| 8 | 3* | Cap Mounting Bolts |

| Size Chart | | | | | | | |
|------------|-------|-------|--------|--------|-----------|------------|-----------|
| Size | A | B | C | Weight | W/ Flange | # of Holes | Hole Size |
| 1.5 | 4.500 | 4.875 | 5.2500 | 5 (LB) | 8 (LB) | 4 | 0.625 |
| 2 | 5.375 | 5.937 | 6.4370 | 8 | 12 | 4 | 0.750 |
| 2.5 | 6.250 | 6.375 | 7.0000 | 10 | 17 | 4 | 0.750 |
| 3 | 7.125 | 7.250 | 7.9370 | 15 | 24 | 4 | 0.750 |
| 4 | 7.813 | 8.750 | 9.5625 | 20 | 31 | 8 | 0.750 |

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MODEL DS-39 RISING STICK GAUGE™ FOR TANK TOP LIQUID LEVEL INDICATION



• **FULL REGULATORY COMPLIANCE**

The Model DS-39 is U.S. Coast Guard accepted. It satisfies 46 CFR 39.20 3 (b) as well as OPA 90 regulations for overfill devices and is suitable for use on ABS classed vessels.

• **SAFETY**

Personnel are not exposed to hazardous cargo vapors on the tank top when using the reliable Model DS-39 Liquid Level Gauge. The hazard of overfill spills is greatly reduced when properly using the DS-39.

• **EASY INSTALLATION**

Simply bolt the DS-39 to an 8" flanged pipe stand located at or near the geometric center of the cargo compartment. The deck opening must be large enough for the 7" dia. float to pass through. ERL can provide optional prefabricated mounting standpipes, flange gaskets and mounting hardware upon request.

• **HEAVY DUTY CONSTRUCTION**

All welded components are 300 series stainless steel. Powerful NEODYMIUM No. 38 rod magnets are used to insure superior coupling strength between the CERAMIN #8 float magnet and the tri-colored gauge rod. The tri-colored gauge rod, color coded to industry standards, is hermetically sealed by design, to provide extended service life.

**Excerpted from Federal Register, 21 Oct "94" 33 CFR Part 155
Minimum Standards For Overfill Devices; Barges**

The Coast Guard will allow the owners and operators of tank barges to select one of three alternatives: (1) an overfill alarm on each tank which includes circuitry to sufficiently identify which individual tanks' overfill system is alarming, (2) an automatic shutdown system for the entire barge and transfer facility or (3) a high level indicating device installed on each tank, such as a stick gauge.

DESCRIPTION

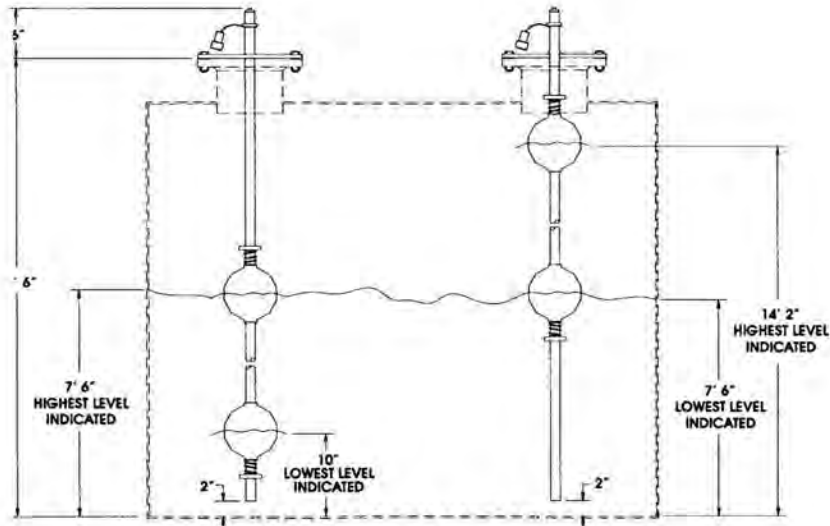
ERL's magnetically coupled rising stick gauge is designed to provide continuous visual liquid level indication on the cargo tank top. The length of indication is specified when ordering and can include full compartment depth configurations. One meter of indication reflecting the liquid level in the upper one meter of the cargo compartment is typical and fulfills the minimum requirements set forth in 46 CFR 39.20-3 (b) as well as OPA 90 requirements for overfill devices. The tri-colored gauge rod with a powerful magnet at its base is positioned inside a stainless steel pipe extending down from the tank top. A 7" diameter float with powerful magnets inside floats up and down the sealed pipe with changes in the liquid level. Due to the powerful magnetic coupling between the float and the internal gauge rod, they move together providing a continuous visual indication of

liquid level on the tank top. When not in use, and with the tri-colored gauge rod lowered within the stainless steel tube, a protective weathercap, with tether, is screwed in place. The operation is fully automatic, but the user must remove the weather cap prior to each use and replace the cap after each use.

DS-39 SPECIAL RISING STICK GAUGE

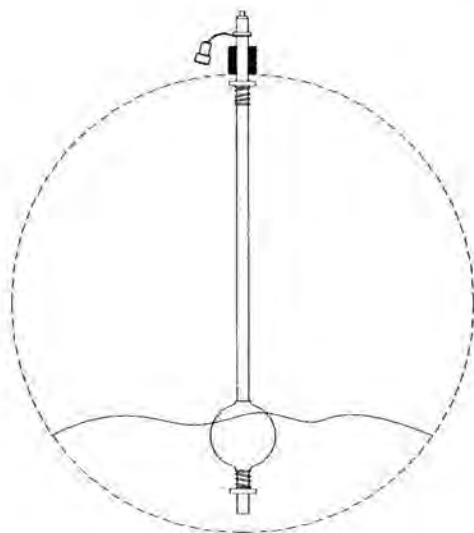


Dual sticks can show full tank depth.

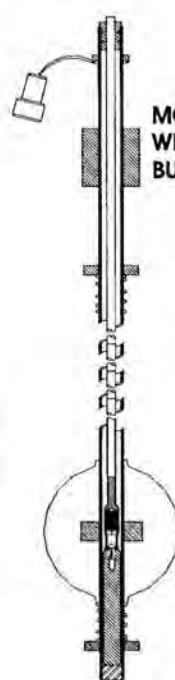


MODEL DS-39 DUAL RISING STICK GAUGE SET UP

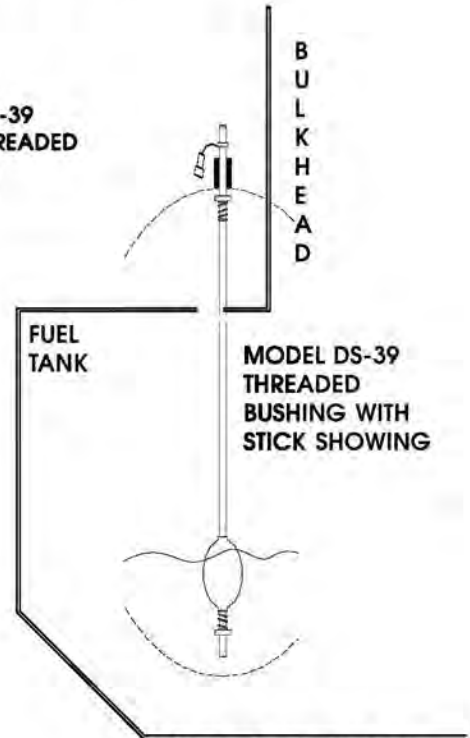
Threaded mounting bushings, special flanges and hatch cover mounting arrangements are available.



MODEL DS-39 CAN BE USED ON SLOP TANKS OR FUEL TANKS



MODEL DS-39 WITH A THREADED BUSHING



MODEL DS-39 THREADED BUSHING WITH STICK SHOWING

MODEL DS-39 USED ON TOWBOAT FUEL TANK

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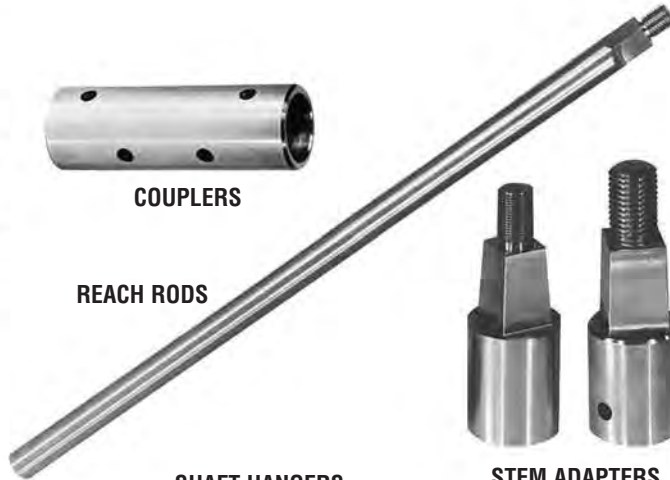
**REACH RODS / STEM ADAPTERS / HANDWHEELS
COUPLERS / YOKES**



HANDWHEELS



COUPLERS



REACH RODS



SHAFT HANGERS
Also Available
(Not Shown)

STEM ADAPTERS

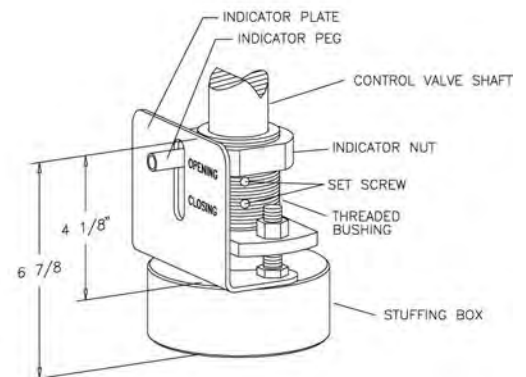


YOKES

**SUPERSEAL®
REACH ROD
STUFFING BOX**



**CARGO VALVE POSITION
INDICATOR**



GAUGES



VACUUM & PRESSURE GAUGE



(4-0-4 PSI)
VACUUM PRESSURE GAUGE
(MODEL 505)

PRESSURE GAUGE



(0-200 PSI)
PRESSURE GAUGE
(MODEL 200)

VENTS



153-B

Barge and Tanker Vent

U.S. Coast Guard Approved No. 162.017/63/0

Construction Details - Brass

153-B-SS (Not Shown)

Barge and Tanker Vent

DIAL TEMP THERMOMETER

DialTemp™, Bi-Metal Stem Thermometers, 2.37" Head



All Stainless Steel
(except dial)

• Head 2.37" O.D.

**Wood Back Thermometers
Also Available**

Ranges and °Divisions

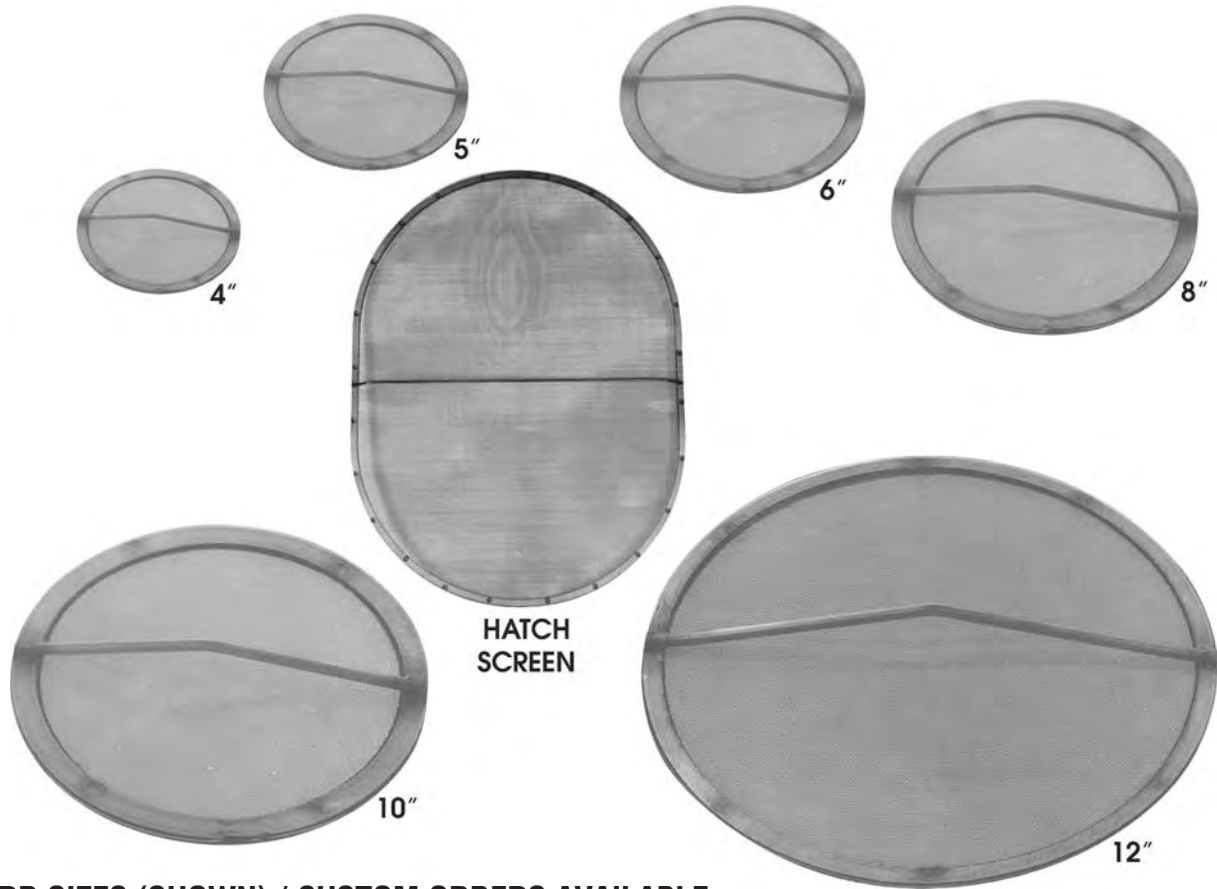
| Fahrenheit | |
|------------|------|
| Range | Div. |
| *25-125°F | 1° |
| -100-100° | 2° |
| -80-120°F | 2° |
| -40-160°F | 2° |
| 0-200°F | 2° |
| 0-250°F | 2° |
| 20-240°F | 2° |
| 50-300°F | 2° |
| 50-500°F | 5° |
| 100-800°F | 10° |
| 150-750°F | 10° |
| 200-1000°F | 10° |
| -50-300°F | 10° |
| 0-220°F | 10° |
| 50-550°F | 10° |
| 50-650°F | 10° |

* Minimum Stem Length - 4"

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FLAME SCREENS

FULL COMPLIANCE WITH 46 CFR PART 151, PARA. 151.03-25
100% STAINLESSS STEEL

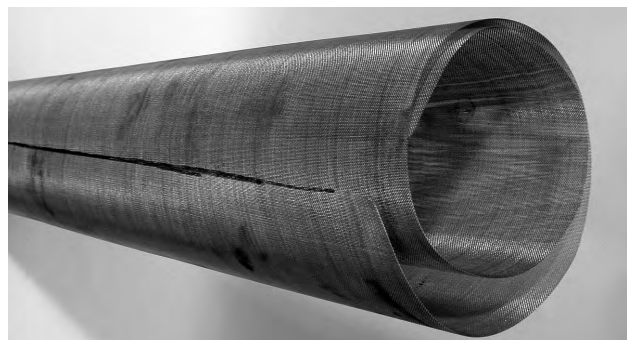


STANDARD SIZES (SHOWN) / CUSTOM ORDERS AVAILABLE
HEAVY DUTY BRONZE FRAME SCREENS ALSO AVAILABLE

ROLL FLAME SCREENS

SOLD BY THE SQUARE FT.

BRONZE &
MONEL
SCREEN
ALSO
AVAILABLE



Stainless Steel .030"
Wire 30/30 Mesh Roll
36" Tall (shown)

**2-1/2" Valve
Now Available**

EQUATE™ SERIES PRESSURE VACUUM RELIEF VALVE

EQUATE™ PV-4 & PV-8



PV-4



PV-8



• AUTOMATIC OPERATION

The Equate PV-4, 4" P-V Valve is designed to automatically maintain safe design working pressure and vacuum levels within your barge. Your barge remains closed vapor tight until set point pressure or vacuum overcomes the force of each respective set point spring, allowing vapor flow out or airflow in, at a rate sufficient to maintain safe levels within your barge.

• SIMPLE DESIGN

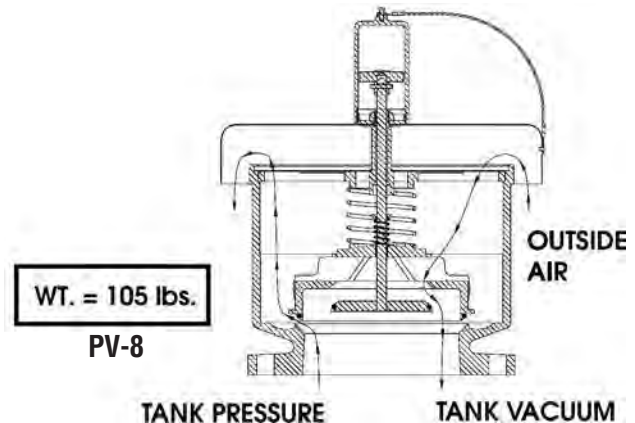
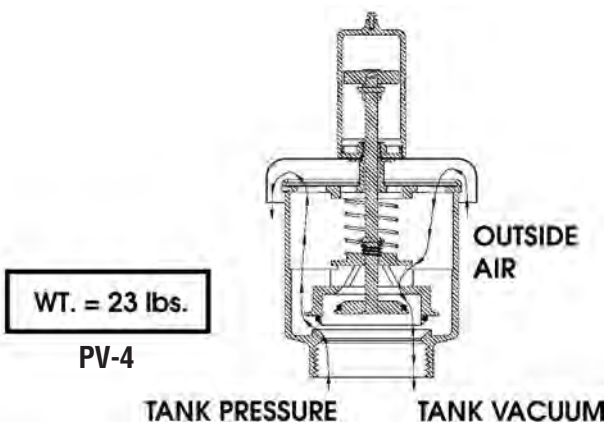
Having very few parts, the Equate P-V valve is spring operated with one spring to determine the pressure set opening point and the second spring to determine the vacuum set opening point. A manual test handle allows the tankerman to check operation of both the pressure and vacuum sides of the valve. Both the test handle and valve weather covers are easily removed allowing complete valve inspection in minutes. Easy to replace elastomer seals, one pressure and one vacuum seal, insure vapor tightness.

• 100% STAINLESS STEEL

All components are 300 series stainless steel for extended service life and reduce need for maintenance. The resilient pressure and vacuum seals are the only parts that are not stainless steel.

• CERTIFIED TO MEET ALL USCG REQUIREMENTS

Every Equate P-V Valve is 100% factory tested prior to shipment and is USCG Approved.



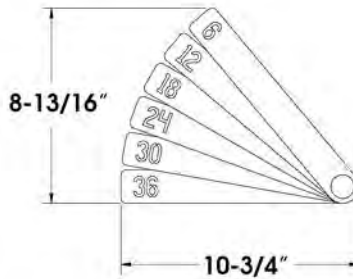
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RADIAL ARM GAUGE TREE™



**UPPER LEVEL
RADIAL ARM GAUGE TREE
WITH FLOAT**



**DOWN VIEW, UPPER LEVEL
RADIAL ARM GAUGE TREE
(Outage shown)**



**UPPER LEVEL
RADIAL ARM GAUGE TREE**

• FULL REGULATORY COMPLIANCE

ERL's Radial Arm Gauge Tree is USCG accepted. When used in conjunction with the Full-View SGM-1 Marine Sight Glass, the full-length Radial Arm Gauge Tree fully satisfies 46 CFR 39.20-3.2.

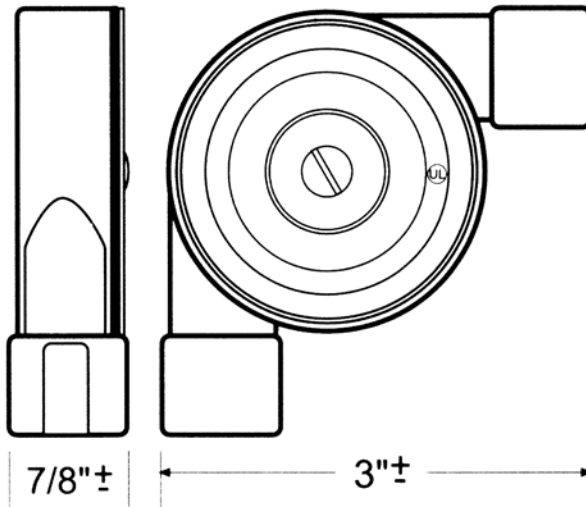
• IMPROVED DEPTH PERCEPTION

The Radial Arm Gauge Tree improves the tankerman's depth perception relative to the liquid level, helping prevent overfill spill during topping off of cargo tanks. An optional float marker is available and is recommended for white water products.

• EASY INSTALLATION AND HEAVY-DUTY CONSTRUCTION

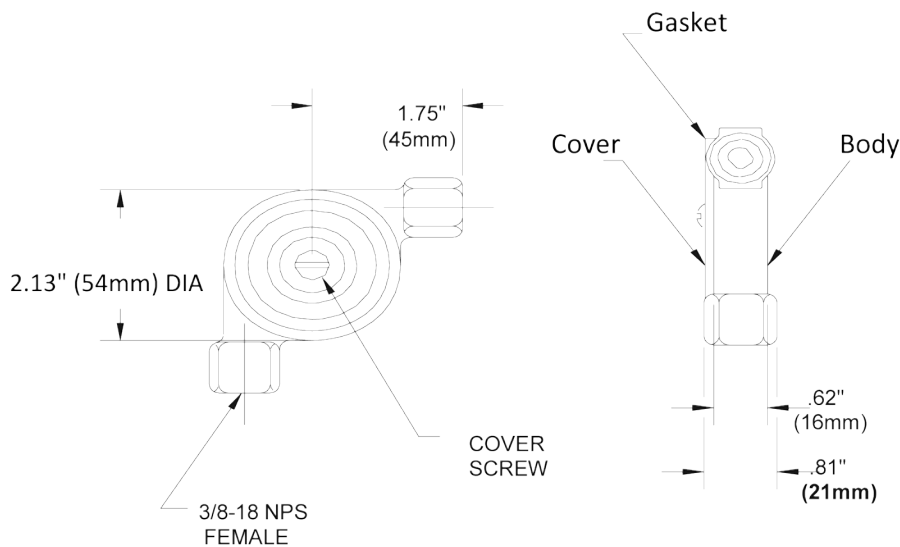
Constructed of 300 series stainless steel for extended service life, the Radial Arm Gauge Tree is as easily installed during barge construction or as a retro-fit installation to an existing vessel. The shipyard can easily bracket the Gauge Tree off of the bulkhead, the ladder or from the underside of the deck.

BARGE PULLEY



90° Barge Corner Pulley
(Watertight)
3/8" F.I.P.T for 1/8" Wire Rope

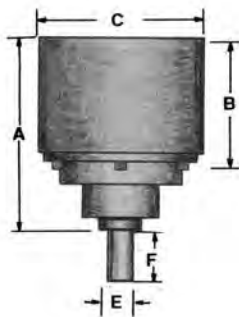
P/N: 803808: WATERTIGHT CORNER PULLEY



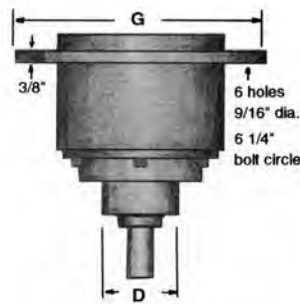
THE SPECIFICATIONS AND DETAILS DESCRIBED BY DRAWINGS OR TEXT IN THIS LITERATURE ARE SUBJECT TO CHANGE WITHOUT NOTICE.

DECK BOX

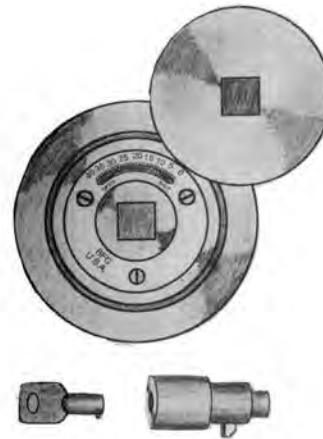
This deck box is a watertight operator designed to provide a flush mounted point of operation for valves through floors, walls, bulkheads and decks. The indicator mechanism is protected from the environment even with the cover removed. Multi-Turn w/ Turn-Specific Indication (40 turn max.), 360° or 90° Open/Closed indication is available. Both weld-in and bolt-on models are offered (bolt-on flange is supplied unattached for easy adaptation to specific conditions). A locking device is available which can make the deck box tamper proof.



1000, 3000 & 5000 Series



2000, 4000 & 6000 Series

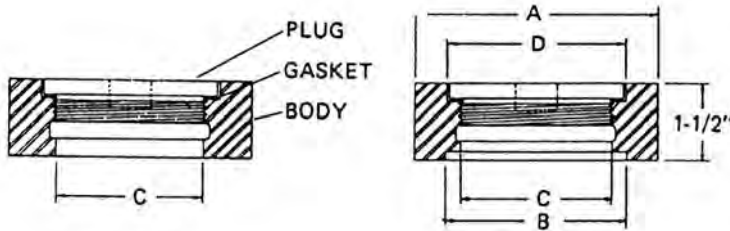


Locking Device Available
Part No. VCDB-1000-L

| Multi-Turn Part No. † | 360 Ind. Part No. | 90° Ind. Part No. | Weld Type Size | A | B | C | D | E | F |
|--------------------------|----------------------|----------------------|-------------------|-----------|-----------|-----------|----------|------|------|
| | | | | VCDB-1110 | VCDB-3110 | VCDB-5110 | 5/8" Rod | 5.72 | 3.38 |
| VCDB-1200 | VCDB-3200 | VCDB-5200 | 3/4" Rod | 5.72 | 3.38 | 4.88 | 2.25 | .75 | 1.50 |
| VCDB-1300 | VCDB-3300 | VCDB-5300 | 1" Rod | 5.72 | 3.38 | 4.88 | 2.25 | 1.00 | 1.50 |
| VCDB-1400 | VCDB-3400 | VCDB-5400 | 1-1/4" Rod | 5.72 | 3.38 | 4.88 | 2.25 | 1.25 | 1.88 |

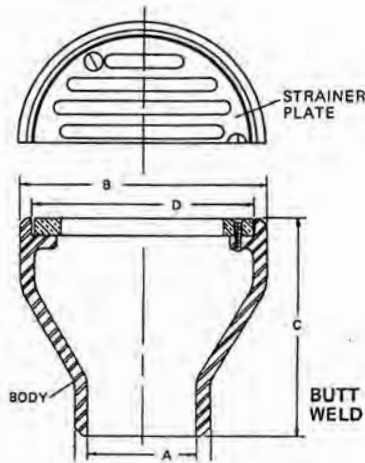
| Multi-Turn Part No. † | 360 Ind. Part No. | 90° Ind. Part No. | Weld Type Size | A | B | C | D | E | F | G |
|--------------------------|----------------------|----------------------|-------------------|-----------|-----------|-----------|----------|------|------|------|
| | | | | VCDB-2110 | VCDB-4110 | VCDB-6110 | 5/8" Rod | 5.72 | 3.38 | 4.88 |
| VCDB-2200 | VCDB-4200 | VCDB-6200 | 3/4" Rod | 5.72 | 3.38 | 4.88 | 2.25 | .75 | 1.50 | 7.25 |
| VCDB-2300 | VCDB-4300 | VCDB-6300 | 1" Rod | 5.72 | 3.38 | 4.88 | 2.25 | 1.00 | 1.50 | 7.25 |
| VCDB-2400 | VCDB-4400 | VCDB-6400 | 1-1/4" Rod | 5.72 | 3.38 | 4.88 | 2.25 | 1.25 | 1.88 | 7.25 |

DECK PLUGS, DRAINS & SCUPPERS



WELD TYPE DECK PLUG
304 stainless steel body, bronze plug & neoprene gasket.
Note: 1-1/2" & 2" do NOT use pipe size deck plugs.

| PART NO. | SIZE/TYPE | A | B | C | D |
|------------|--------------------|-------|------|------|-------|
| DK-4015-BW | 1-1/2" BUTT WELD | 3-3/4 | - | 1.68 | 2-5/8 |
| DK-4015-SW | 1-1/2" SOCKET WELD | - | 1.95 | - | - |
| DK-4020-BW | 2" BUTT WELD | 3-3/4 | - | 2.07 | 2-5/8 |
| DK-4020-SW | 2" SOCKET WELD | - | 2.44 | - | - |
| DK-4025-BW | 2-1/2" BUTT WELD | 4-3/4 | - | 2.47 | 3-1/2 |
| DK-4025-SW | 2-1/2" SOCKET WELD | - | 2.94 | - | - |
| DK-4030-BW | 3" BUTT WELD | 4-3/4 | - | 3.07 | 3-1/2 |

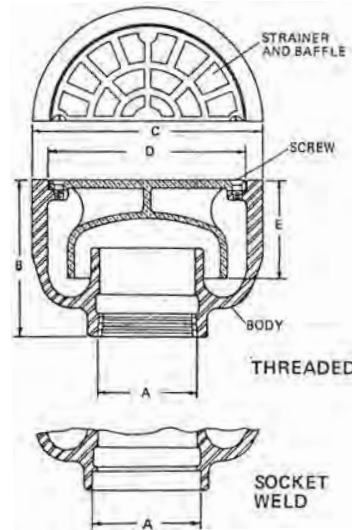


DECK SOUNDING PLUG
Straight pipe threads, w/ 3/4" square socket.

| PART NO. | PIPE SIZE | | |
|----------|-----------|----------|---------|
| | BRONZE | ALUM. | PLASTIC |
| DK-4515B | DK-4515A | DK-4515P | 1-1/2 |
| DK-4520B | DK-4520A | DK-4520P | 2 |
| DK-4525B | DK-4525A | DK-4525P | 2-1/2 |
| DK-4530B | DK-4530A | DK-4530P | 3 |

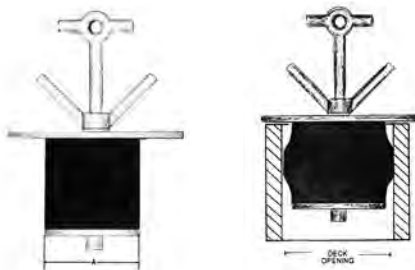
BUTT WELD DECK DRAIN
Galvanized steel body with bronze strainer plate

| PART NO. | A PIPE | B | C | D | CLEAR AREA RATIO |
|----------|-----------|-------|-------|---|---------------------|
| DK-5015 | 1-1/2 | 4-1/2 | 4 | 4 | 2.5:1 |
| DK-5020 | 2 | 4-1/2 | 4 | 4 | 1.5:1 |
| DK-5025 | 2-1/2 | 4-1/2 | 4 | 4 | 1:1 |
| DK-5030 | 3 | 5-1/2 | 4-1/2 | 5 | 1:1 |



DECK DRAIN WITH TRAP & BAFFLE
Threaded or Socket Weld connection.
Galvanized steel body with bronze strainer plate.

| PART NO. | SIZE | A | B | C | D | E |
|----------|-------|------------|-------|-------|-------|--------|
| DK-5515 | 1-1/2 | 1-1/2"-NPT | 3-7/8 | 4-7/8 | 4-3/8 | 2-9/16 |
| DK-5520 | 2 | 2"-NPT | 4 | 5-3/4 | 5 | 2-5/8 |
| DK-5615 | 1-1/2 | 1.95 | 3-7/8 | 4-7/8 | 4-3/8 | 2-9/16 |
| DK-5620 | 2 | 2.44 | 4 | 5-3/4 | 5 | 2-5/8 |



EXPANDABLE SCUPPER PLUGS

| PART NO. | SC-1150 | SC-1200 | SC-1250 | SC-1300 | SC-1350 | SC-1400 | SC-1450 | SC-1500 | SC-1550 | SC-1800† |
|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------|
| PLUG SIZE (A) | 1-1/2" | 2" | 2-1/2" | 3" | 3-1/2" | 4" | 4-1/2" | 5" | 5-1/2" | 7-3/4" |
| DECK OPENING | 2" | 2-1/2" | 3" | 3-1/2" | 4" | 4-1/2" | 5" | 5-1/2" | 6" | 8" TO 8-1/2" |
| SLEEVE PART NO. | SC-1150R | SC-1200R | SC-1250R | SC-1300R | SC-1350R | SC-1400R | SC-1450R | SC-1500R | SC-1550R | SC-1800R† |

BRONZE WITH NEOPRENE EXPANSION SLEEVES, SPARE SLEEVES ARE AVAILABLE.

† Special Order



Marine Equipment

TERMS AND CONDITIONS

PAYMENT TERMS

Payment terms are Net 25 days to qualified customers who have OPEN ACCOUNT STATUS. To open an account with Timco we require that you provide Timco with both a completed credit application including bank and three trade references as well as a State Sale Tax Resale Certificate to avoid being charged applicable sales tax on your purchases. Timco also accepts American Express, Visa and MasterCard for purchases. Wire transfers are also accepted. Failure to pay invoices within net 25 day terms will result in loss of open account status, and may result in finance charges assessed at 1.5 per month on past due balances.

FREIGHT POLICY

All shipments are FOB shipping point and freight will be invoiced to the customer along with the merchandise. Materials may be drop shipped from the manufacturer of Timco's warehouse, in either case, the shipping cost will be invoiced to the customer. Any arrangement other than this must be made at time of quotation and order placement.

DAMAGED DELIVERIES

If you receive a shipment that appears to be damaged, do not accept the shipment without making note of the damage immediately on the delivery paperwork at time of receiving the freight. Damage must be noted immediately with the freight carrier and a claim must be initiated by you.

SHORTAGE CLAIMS

Always check the materials you receive against the packing slip and /or your purchase order. Contact Timco immediately regarding any shortages. Advise if there is any damages to the shipping carton, if yes you will need to file a claim with the carrier. Failure to bring shortages to our attention immediately will limit our ability to trace and properly deliver your order.

WARRANTY

Merchandise is only covered to the extent of the original manufacturers warranty. Timco offers no guarantee or warranty on any product implied or expressed. A copy of the manufacturers warranty for any products can be requested.





Marine Equipment

TIMCO APPLICATION FOR CREDIT

Date: ___/___/___

Company Name: _____
 Billing Address: _____ City: _____ State: _____ Zip Code: _____
 Shipping Address: _____ City: _____ State: _____ Zip Code: _____
 Phone: (____) _____ - _____ Fax: (____) _____ - _____
 Accounts Payable Contact: _____
 Accounting E-Mail Address: _____
 Is a Purchase Order number or Job number required? Yes _____ No _____ (Please Check One)
 Principal Owners/Officers: _____

Type of Ownership:

Partnership Individual Corporation-State Of _____
 Number of Years in Business _____ D & B Number: _____

Bank References:

Name of Bank: _____ Account Type: _____
 Bank Contact: _____ Phone: (____) _____ - _____ Fax: (____) _____ - _____
 Name of Bank: _____ Account Type: _____
 Bank Contact: _____ Phone: (____) _____ - _____ Fax: (____) _____ - _____

Trade References:

Company Name: _____ Contact Name: _____
 Phone: (____) _____ - _____ Fax: (____) _____ - _____ E-Mail: _____
 Address: _____ City: _____ State: _____ Zip Code: _____
 Company Name: _____ Contact Name: _____
 Phone: (____) _____ - _____ Fax: (____) _____ - _____ E-Mail: _____
 Address: _____ City: _____ State: _____ Zip Code: _____
 Company Name: _____ Contact Name: _____
 Phone: (____) _____ - _____ Fax: (____) _____ - _____ E-Mail: _____
 Address: _____ City: _____ State: _____ Zip Code: _____

I/We the undersigned, acknowledge the information supplied is true, accurate and complete. We authorize TIMCO to contact any of the above references and authorize each of them to release all credit information necessary. The undersigned hereby releases TIMCO and the above references from any responsibility or liability for the release of said information. We agree to pay all invoices in accordance with the terms of sale. **Payment terms are net in 20 days.** We agree to pay later charges on balances which become past due at the legal rate set by law and any reasonable attorney's fees and other costs of collection incurred by seller.

Name: _____ Title: _____ Signature: _____

Trade References:

TID#: _____ Blanket or Single Purchase: _____ Description of articles: _____

Please Check One:

- Sale to retailer, wholesale or manufacturer for resale only. Sales of manufacturing machinery, tools, and equipment to be used in direct production.
- Sales to non-profit organizations, claiming exempt purchases pursuant to bulletin #10. Sales to Governmental units Other (please explain)

I hereby certify under penalty of perjury that the property purchased by the use of this certificate is to be used for an exempt purpose pursuant to The State Gross Retail Sales Tax Act.

Name: _____ Title: _____ Signature: _____