

HARNETT REGIONAL JETPORT NEW FUEL FARM

AV-GAS FUEL EQUIPMENT SUBMITTAL

BUILT BY: L & T, INC

JULY 2026

Telephone: (912) 526-0626
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Email: office@landtinc.net

This exploded view diagram illustrates the assembly of a water treatment system. The components are numbered as follows:

- 1**: Main vertical pipe assembly.
- 2a**, **2b**: Fittings or connectors for the vertical pipe.
- 3**: A horizontal pipe section.
- 4**, **53**: Small cylindrical components, likely filters or nozzles.
- 5**: A valve or connector on the left side.
- 6**: A small rectangular component, possibly a float valve.
- 8**: A circular component, likely a filter or a basin.
- 12**: A small component near the valve (5).
- 14**: A vertical pipe section.
- 31**: A square base or support structure.
- 36**: A long, thin component, possibly a float or a sensor.
- 47**: A valve or connector on the main vertical pipe.
- 53**: Two circular components, likely filters or basins.

The diagram shows the spatial arrangement of these parts, with lines indicating their relative positions and how they would be assembled into a functional water treatment unit.

TANK SYSTEM – ISOMETRIC VIEW

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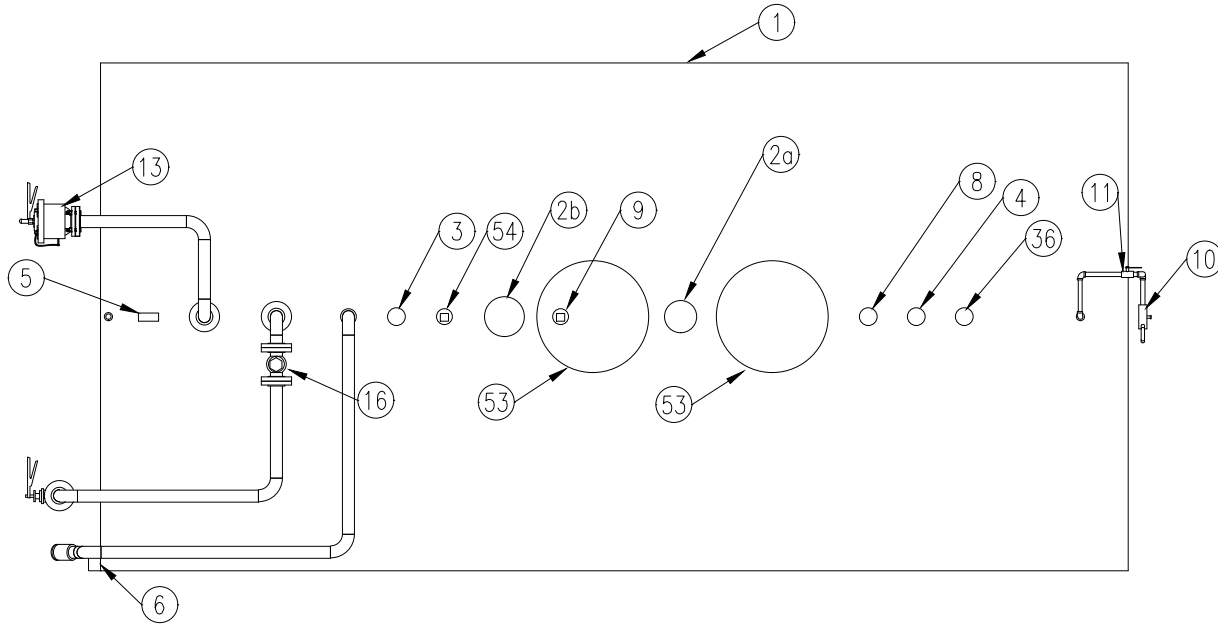
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606 Reidsville Road
Lyons, GA 30436

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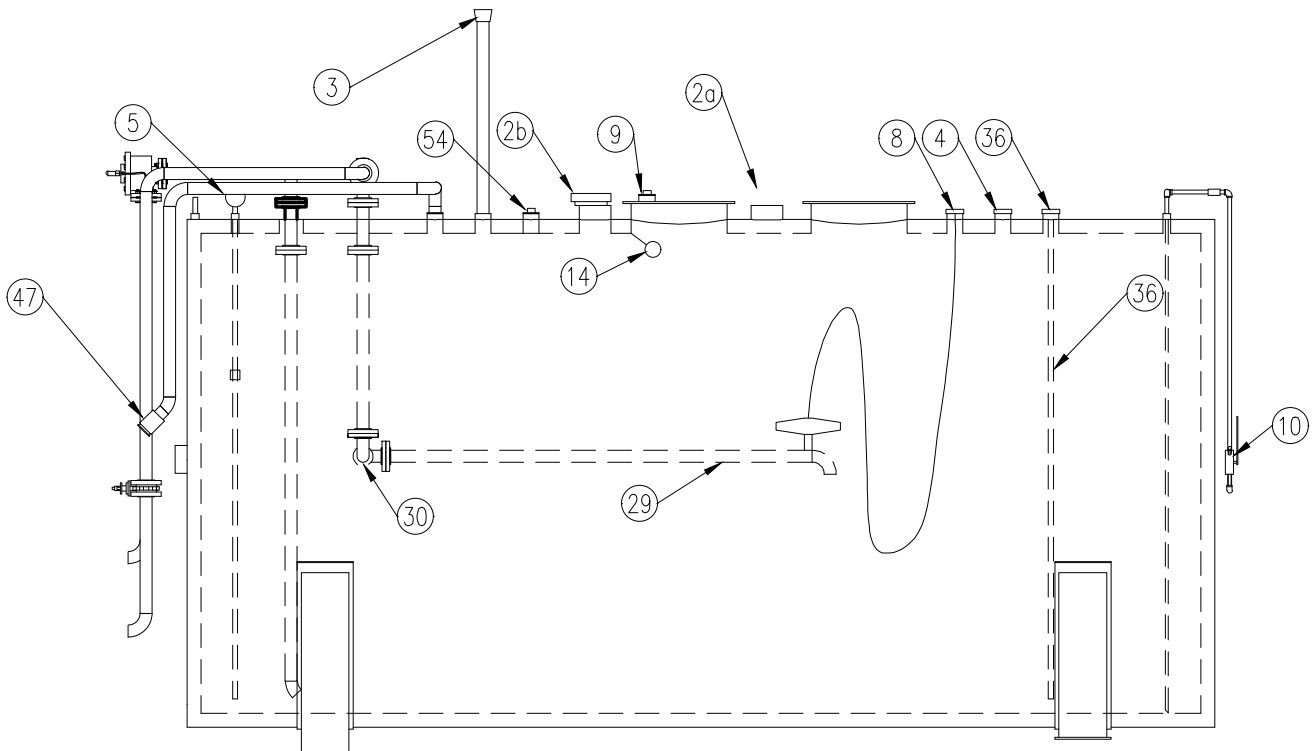
AVGAS TANK SYSTEM



$1/4" = 1' - 0"$



TANK SYSTEM – TOP VIEW



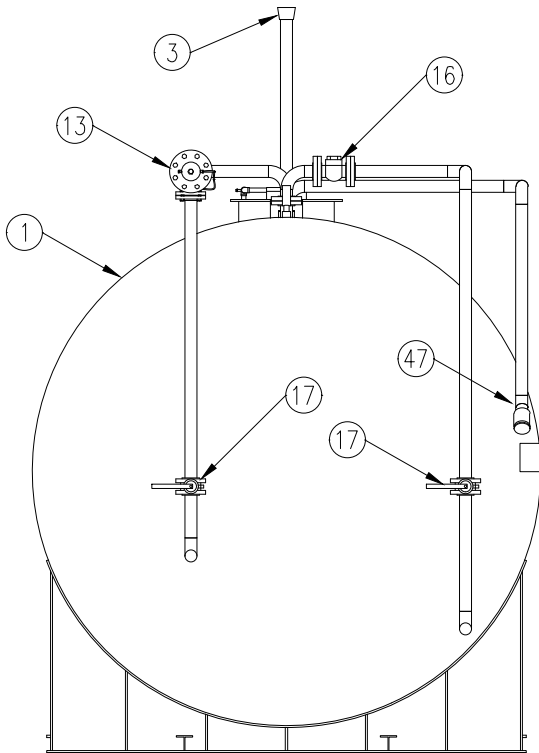
TANK SYSTEM – SIDE VIEW

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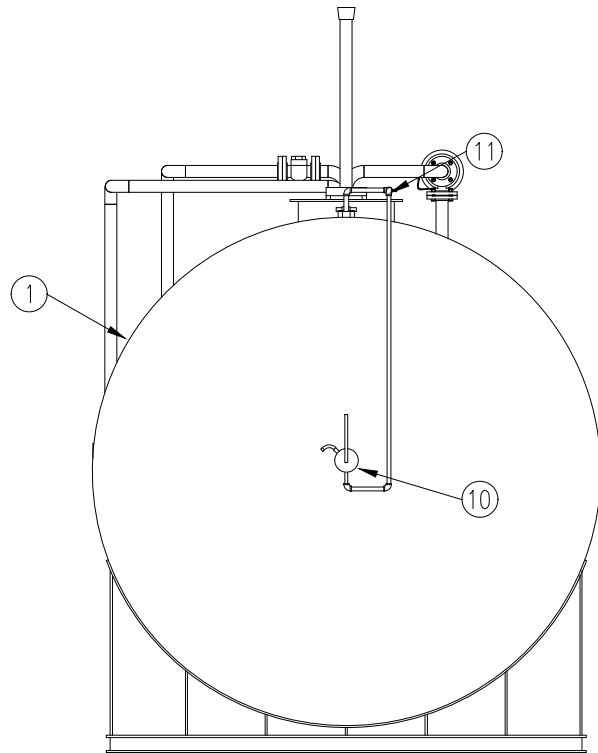
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AVGAS TANK SYSTEM



TANK SYSTEM – FRONT VIEW



TANK SYSTEM – REAR VIEW



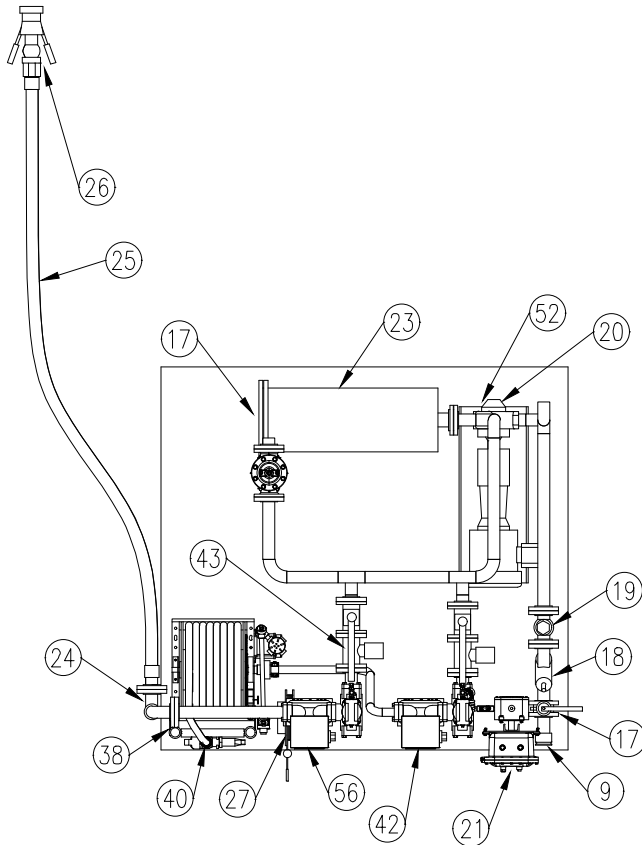
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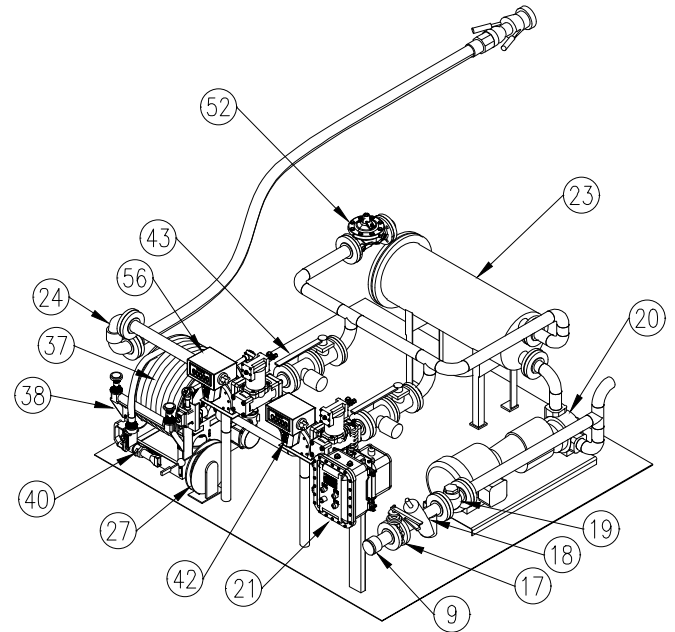
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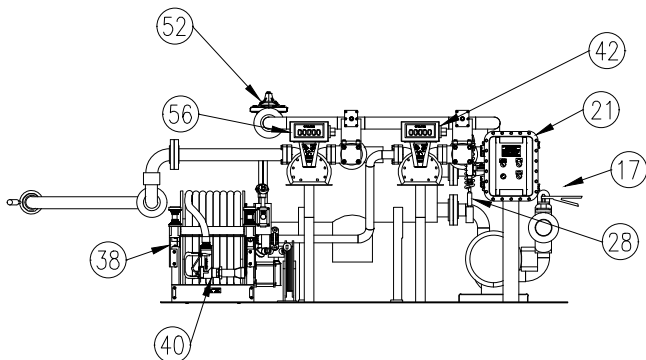
AVGAS TANK SYSTEM



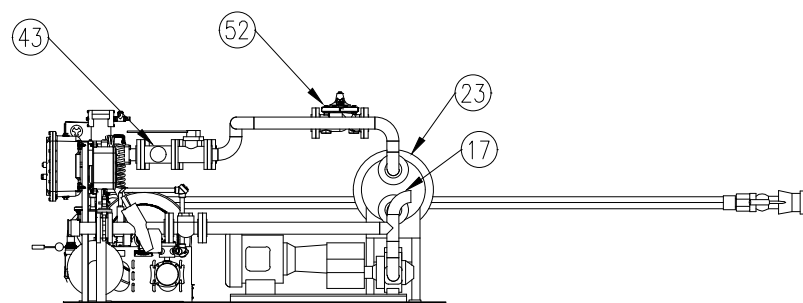
EQUIPMENT DECK – TOP VIEW



EQUIPMENT DECK – ISOMETRIC VIEW



EQUIPMENT DECK – FRONT VIEW



EQUIPMENT DECK – SIDE VIEW



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AVGAS TANK SYSTEM

200 GPM AV-GAS BULK LOADING & 75 GPM SINGLE POINT AND 25 GPM OVERWING SELF-SERVICE		
ITEM	QTY	DESCRIPTION
1	1	12,000 GALLON DOUBLE WALL FIREGUARD TANK (UL 2085) - 126" DIA X 21'-1" TYPE II CONSTRUCTION 360 DEGREE WRAP, SADDLE MOUNTED
2a	1	PRIMARY 8" EMERGENCY VENT (MORRISON 244) WITH FLANGE, GASKET & FASTENERS
2b	1	SECONDARY 8" EMERGENCY VENT (MORRISON 244) WITH FLANGE, GASKET & FASTENERS
3	1	3" PRESSURE VACUUM VENT (MORRISON 748A-3400-AV) ON STAINLESS STEEL RISER
4	1	2" GAUGE HATCH (MORRISON 178GSP-0100-AC) WITH STRICKER PLATE ON TANK BOTTOM
5	1	CLOCK GAUGE WITH ALARM AND DROP TUBE (MORRISON 918C-0100)
6	1	90% ALARM BOX WITH TEST BUTTON (PART OF MORRISON 918C-0100)
7	1	STEEL BODY ANTI-SIPHON SOLENOID VALVE, NORMALLY OPEN, 120V, EXPLOSION PROOF, WEATHER-TIGHT, W/ VITON SEALS
8	1	2" ALUMINUM ADAPTOR (MORRISON 800F W/ DUST CAP AND CHAIN (MORRISON 800DCA), MODIFIED FOR FLOATING SUCTION TEST CABLE
9	1	3" ALUMINUM ADAPTOR (MORRISON 800A W/ 3" CAP AND CHAIN (MORRISON 800DCA)
10	1	HAND SUMP PUMP AND CABLE, LOCKABLE 3/4" BALL VALVE AT PUMP, SS DISCHARGE PIPE, ADAPTOR AND CAP W/ CHAIN (MORRISON 800F & DCA)
11	1	1" SPRING RETURN BALL VALVE WITH LANYARD TO GRADE (ANTI-SIPHON)
12	1	2" INTERSTITIAL MONITOR (PNEUMERCATOR) WITH RISER MOUNTING KIT
13	1	3" HIGH LEVEL SHUT-OFF DIAPHRAGM VALVE, FAIL CLOSED, NORMALLY CLOSED W/ POSITION INDICATOR, TAMPERPROOF OPEN AND CLOSING SPEED CONTROL, IN-LINE STRAINER AND SPRING RETURN STAINLESS STEEL PRE-CHECK VALVE W/ LANYARD. PROVIDE S.S. CHECK VALVE AND TUBING FOR DIAPHRAGM CHAMBER VENT IN TANK.
14	1	95% LEVEL FLOAT TO ACTIVATE HIGH LEVEL SHUT OFF (CLA-VAL C9582C) W/ FLOAT TEST ASSEMBLY AND PRE-CHECK
15	1	3" CHECK VALVE W/ DUCTILE IRON BODY, STAINLESS STEEL DISC & VITON SEALS HORIZONTAL (MORRISON)
16	1	3" FLANGED FUSIBLE LINK VALVE - 165 DEGREE FAHRENHEIT (MORRISON 346FDI-0300 AV)
17	3	3" BUTTERFLY VALVE (NIBCO LD-3222-3, VITON), ANSI CLASS 150#
18	1	3" LINE STRAINER (MORRISON 286FDI-3400-AV)
19	2	3" SWING CHECK VALVE W/ DUCTILE IRON BODY, STAINLESS STEEL DISC & VITON SEALS
20	1	GNX3A 3" BLACKMER PUMP W/ STEEL BASE PLATE, GEAR REDUCER & MOTOR (EXPLOSION-PROOF, 10 HP, 208V, 3PH, 1800 RPM), 50 PSIG BYPASS PRESSURE
21	1	MOTOR STARTER (EXPLOSIONPROOF W/ KEYED ON-OFF SWITCH, START-STOP SWITCH
22	1	3" FLANGED BALL VALVE, FIRE SAFE, API 607 AND (1) 2" FLANGED BALL VALVE, FIRE SAFE, API 607
23	1	FILTER/SEPARATOR VESSEL, EI 1581 6TH EDITION, CATEGORY M, TYPE S, W/ GAMMON 1 CC WATER DEFENSE SYSTEM, SPRING LOADED DRAIN VALVE WITH ADAPTOR, CAP & CHAIN, SUMP HEATER WITH LIGHT, SWITCH, & WARNING SIGN, PRESSURE RELIEF VALVE AND AAV W/ CHECK VALVE, 1/2" SS TUBING. PROVIDE UNIONS AT CONNECTIONS.
	1	SEPARATOR & COALESCER CARTRIDGES EI 1581 6TH EDITION
	1	DIFFERENTIAL PRESSURE GAUGE (GAMMON GTP-534-PB-15A) W/ PRESSURE GAUGE
	2	MILLIPORE TEST CONNECTION (GAMMON KIT-5)
	1	PRESSURE RELIEF VALVE (TAYLOR 8200, 75PSI). PROVIDE SS CHECK VALVE AND SS PIPE. PROVIDE UNIONS AT CONNECTIONS FOR PRV AND AAV VENT IN TANK
	1	WATER DEFENSE PROBE (CROWN PRODUCTS)
	1	AIR ELIMINATOR W/ CHECK VALVE (GAMMON) AND SS PIPE. PROVIDE UNIONS AT CONNECTIONS
24	1	3" ALUMINUM SWIVEL (OPW 3640FO-0302)
25	1	LOADING HOSE, 2" X 15' (API 1529)
26	1	2" DRY BREAK COUPLER (MORRISON 928-0200 1C) W/ 100 MESH SCREEN & SWIVEL (BULK LOADING)

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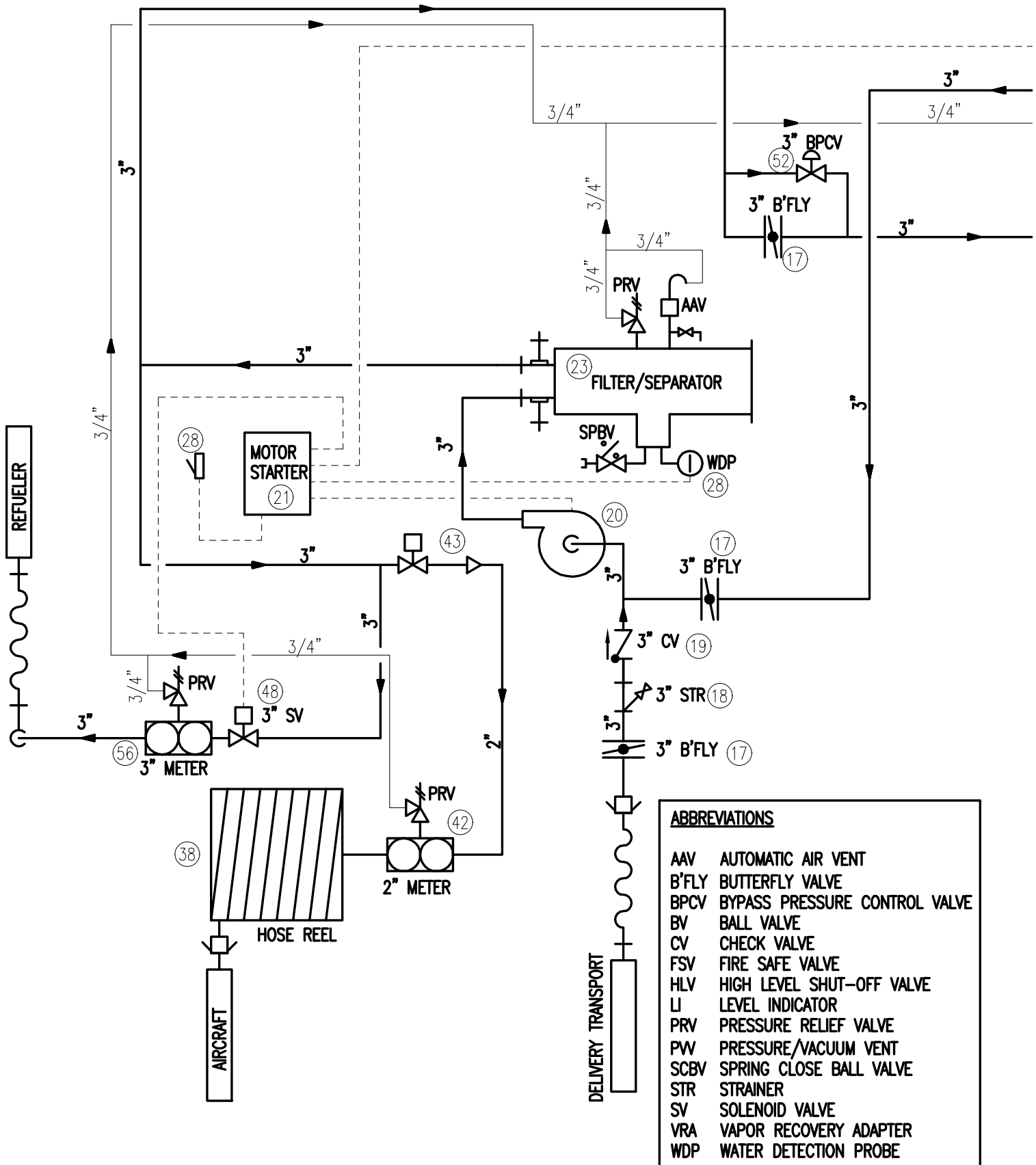
AVGAS TANK SYSTEM

27	1	75' STATIC GROUND REEL W/ SPRING REWIND (HANNAY HGR50)
	1	1/8" CLEAR VINYL SS GROUND CABLE (HANNAY), STOP BALL (HANNAY), STOP CLAMP (HANNAY), HEAVY DUTY GROUND CLAMP (HANNAY)
28	1	MINI-DEADMAN (GAMMON GTP-8392) , W/ 75' CABLE AND HEAVY DUTY REEL, EXPLOSION PROOF, 120V UL LISTED
29	1	3" FLOATING SUCTION WITH BAFFLE AND TEST CABLE (LTfSA3)
30	1	3" SUBMERGED SERVICE SWIVEL (OPW 3640FJ-0302)
31	1	15 GALLON FUEL SS RECOVERY UNIT W/ SS TUBING CONNECTING TO SUCTION PIPING WITH CHECK VALVE.
32	2	1/2" STAINLESS STEEL LOCKABLE BALL VALVE
33	0	NOT USED
34	0	NOT USED
35	1	CONTAINMENT DRAIN WITH SPRING RETURN BALL VALVE
36	1	PNEUMERCATOR FUEL/WATER LEVEL PROBE
37	1	HOSE FOR SELF-SERVICE, 1" X 75' (API 1529)
38	1	MOTOR OPERATED DRUM STYLE HOSE REEL FOR SELF-SERVICE HOSE WITH PUSH BUTTON STATION
39	-	NOT USED
40	1	OVERWING AV-GAS NOZZLE W/ SWIVEL, 1" & GROUNDING STRAP
41	-	NOT USED
42	1	2" SERIES CLASS 2 TOTAL CONTROL METER W/ 100:1 PULSER & MECHANICAL REGISTER. CONNECT TO QT POD
43	1	2-STAGE FLOW VALVE FOR QT POD SYSTEM
44	0	NOT USED
45	1	3" SINGLE STAGE SOLENOID VALVA FOR BULK METER/HOSE
46	1	ST-15 SINGLE POINT OVERFILL PREVENTION CONTROLLER, SCULCON J-BOX, PLUG & CABLE, W/ TRUCK SOCKET & SENSOR
47	1	4" VAPOR RECOVERY ADAPTER (MORRISON 323-0300-AA) W/ CAP (MORRISON 323C-0100-ACEVR)
48	-	SCH 10 304/304L STAINLESS STEEL PIPE, 150# FLANGES, NUTS, BOLTS. PROVIDE W/ FLEXITALLIC TYPE CG GASKETS W/ SS WINDING AND INSULATING FLANGE KITS. PROVIDE TAPE FOR THREADED SS JOINTS
49	-	NOT USED
50	-	NOT USED
51	1	14' MANUAL GAUGE STICK. PROVIDE PVC PIPE STORAGE ASSEMBLY BOLTED TO LADDER, PROVIDE STRAPPING CHART).
52	1	ADJUSTBALE SS BACK PRESSURE/BYPASS VALVE FOR FLOW CONTROL
53	1	24" MANHOLE W/ FLANGE GASKET & NUTS/BOLTS
54	1	4" SPARE W/ PLUG
55	-	NOT USED
56	1	3" SERIES CLASS 2 TOTAL CONTROLS METER W/ REGISTER

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AVGAS TANK SYSTEM

P & ID

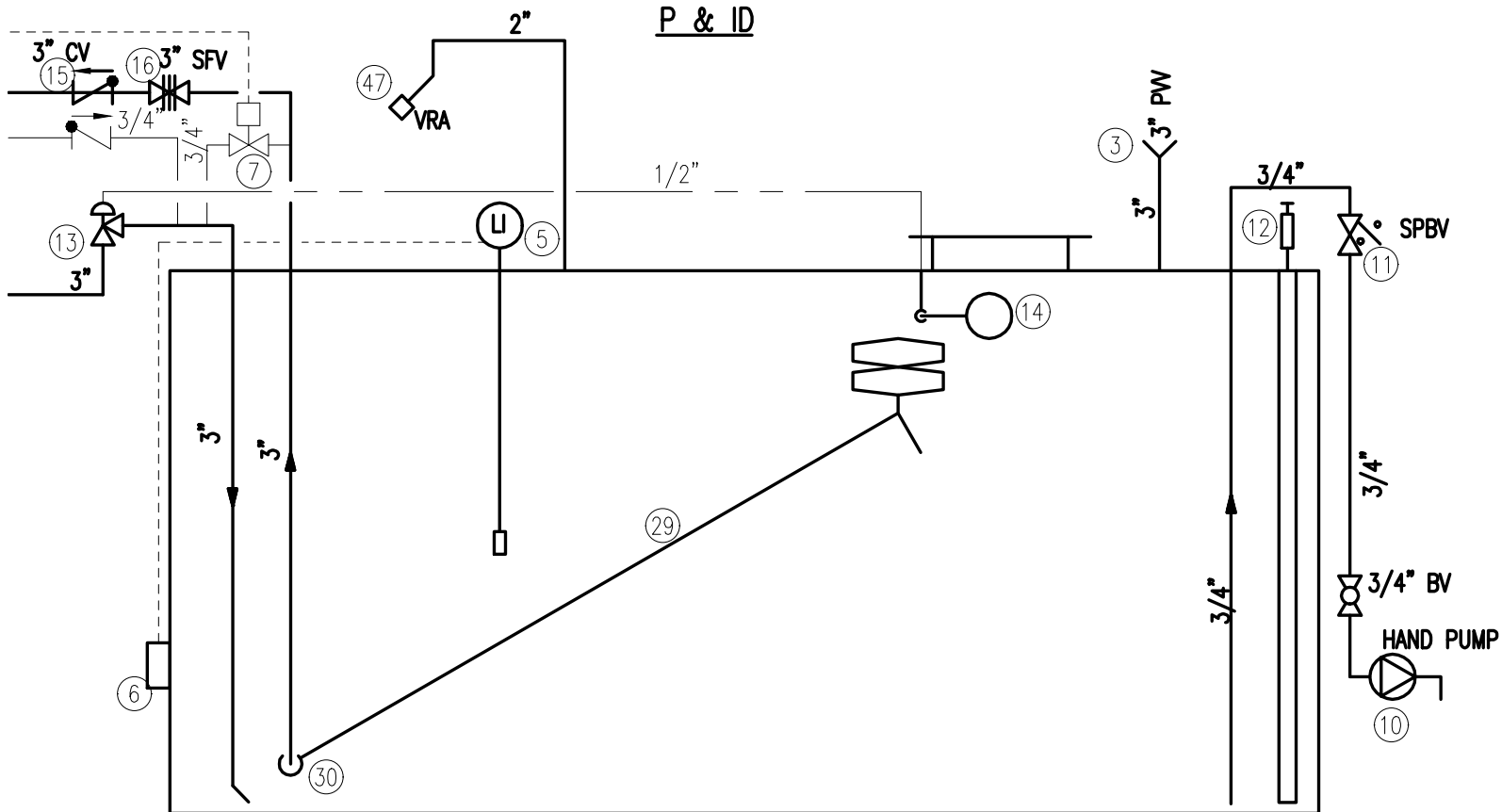


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AVGAS TANK SYSTEM



LEGEND

	FUEL PIPING		FUEL TESTING PORT
	THERMAL RELIEF PIPING		SPRING CLOSE VALVE
	ELECTRICAL SIGNAL		OVERFILL VALVE
	HYDRAULIC SIGNAL		OVERFILL FLOAT (95%)
	BUTTERFLY VALVE		FUEL HOSE
	BALL VALVE		DEADMAN CONTROL
	CHECK VALVE		AUTOMATIC AIR VENT
	SOLENOID VALVE		INTERSTITIAL MONITOR
	METER		
	FUEL PUMP		
	HAND PUMP		
	FIRE-SAFE VALVE		
	BY-PASS PRESSURE CONTROL VALVE		
	LEVEL INDICAOR		

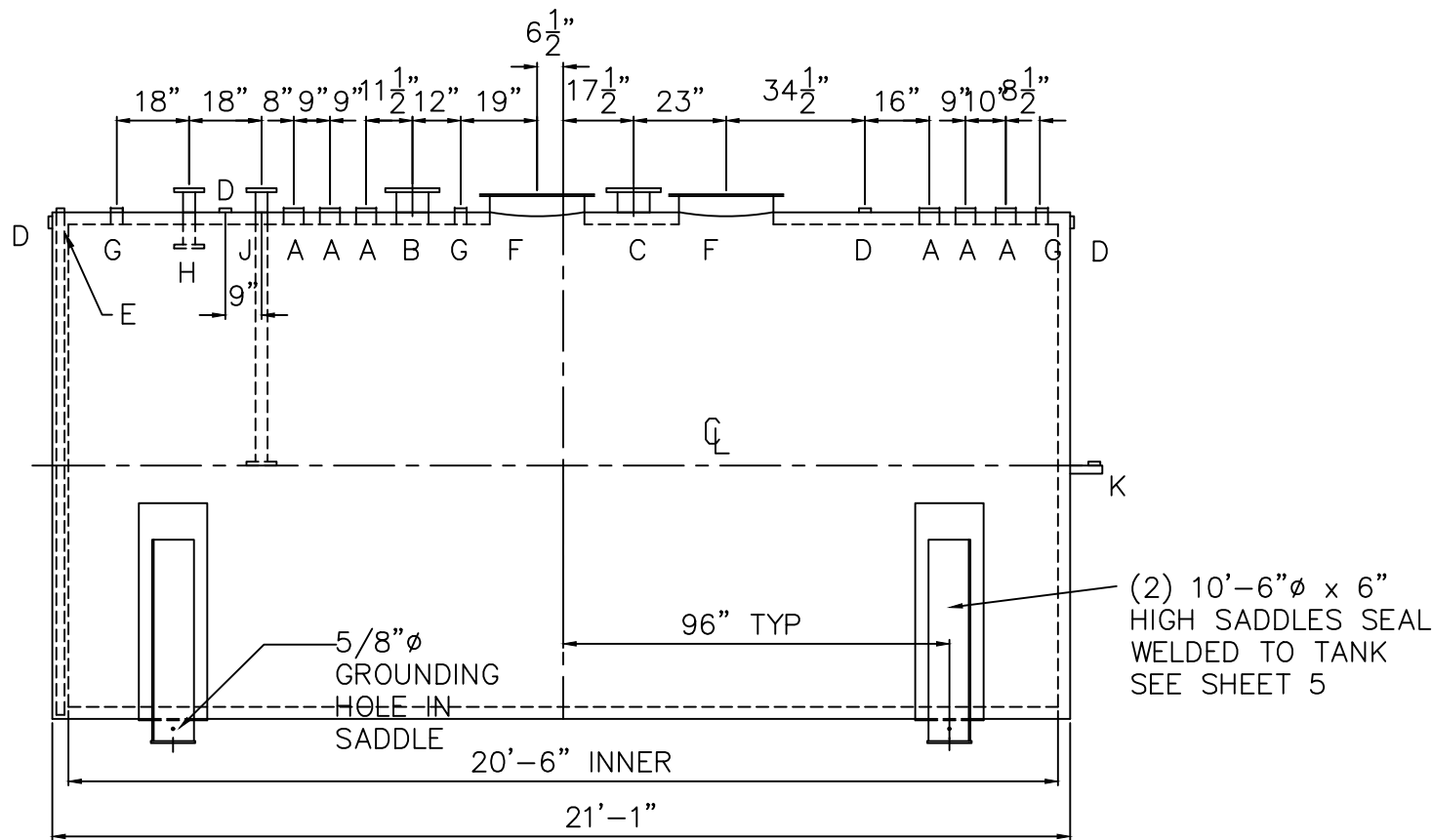
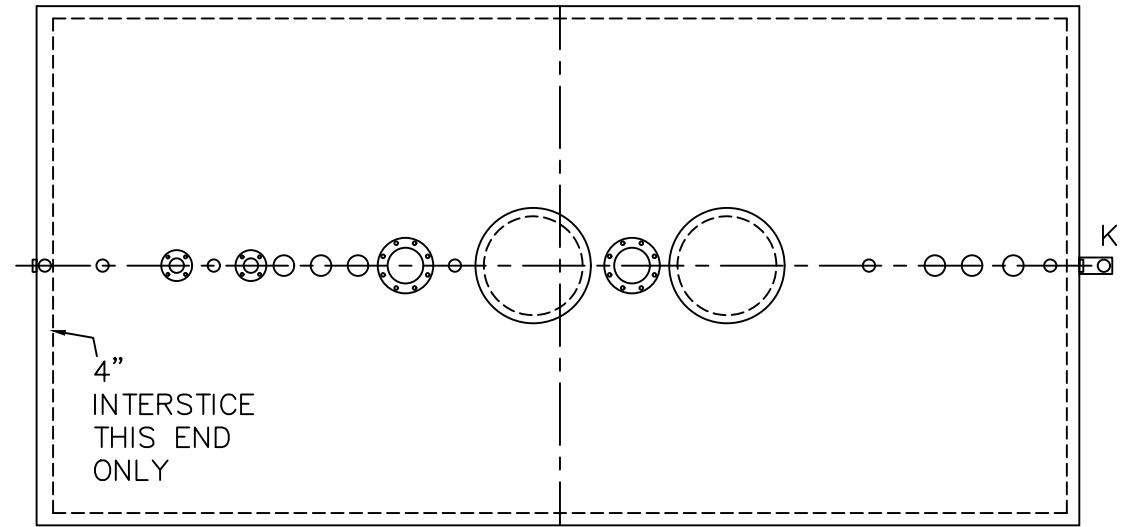
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TOUCH UP OF FINISHED PAINT IS REQUIRED BY INSTALLATION CONTRACTOR. TOUCH UP PAINT SHIPPED WITH TANK.

SHIPPING LUGS AS NEEDED

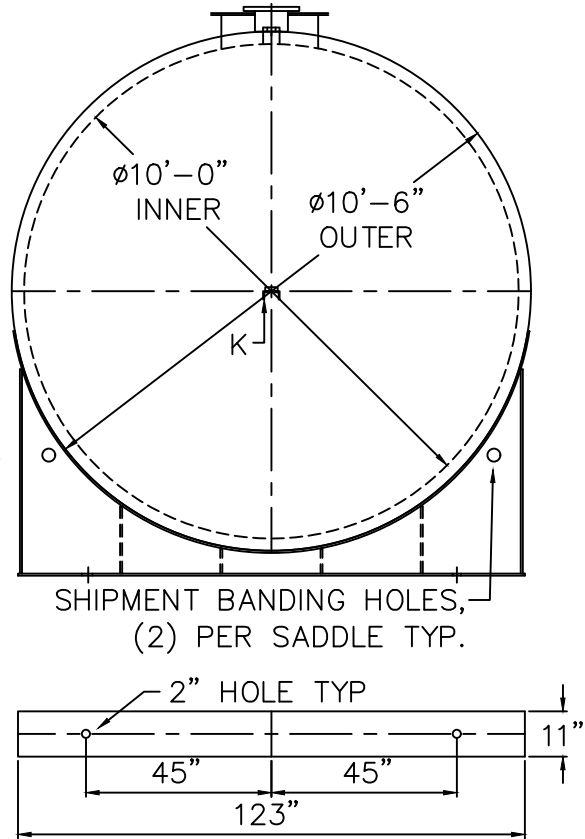
SHIP LOOSE PER TANK

(2) 8" FLANGED EMERGENCY VENTS 160Z



(2) 10'-6" ϕ x 6" HIGH SADDLES SEAL WELDED TO TANK SEE SHEET 5

NOTES:
STRIKER PLATES ARE NOT SUPPLIED ON FIREGUARDS® UNLESS SPECIFIED



DESIGN DATA

CAPACITY : 12,000 GALLONS
TYPE: FIREGUARD® CYLINDRICAL
FIREGUARD® IS A TRADEMARK OF THE STEEL TANK INSTITUTE
NO. REQ. – 2
OPERATING PRESSURE – ATMOSPHERIC
SPECIFIC GRAVITY = 1.0
TANK MATERIAL – MILD CARBON STEEL
THICKNESS – ALL – HEADS: 5/16", SHELL: 1/4"
CONSTRUCTION – INNER – LAP WELD IN AND OUT
CONSTRUCTION – OUTER – LAP WELD OUTSIDE ONLY
TANK TEST – INNER AND OUTER – 5 PSIG
INT. FINISH – SP10 BLAST, EPOXY NOVOLAC
EXT. FINISH – SP-6 BLAST, EPOXY PRIMER, WHITE URETHANE PAINT

LABEL– UL 2085 AND FIREGUARD® PER sti

LEGEND

A	4" FEMALE FIREGUARD COUPLING
B	8" FFSO 150# FLANGE – PRIMARY EMERGENCY VENT USE ONLY
C	8" FFSO 150# FLANGE THROUGH OUTER SHELL ONLY, MARK WITH SPECIAL WARNING LABEL INTERSTITIAL EMERGENCY VENT USE ONLY
D	2" FITTING THROUGH OUTER SHELL ONLY WITH CAST IRON PLUG– MFG USE ONLY
E	2" INTERSTITIAL MONITOR PIPE – MALE NPT END
F	24" x 1/4" PLATE TIGHT BOLT MANWAY WITH 1/8" THICK FIBREFLEX GASKET
G	2" FEMALE FIREGUARD COUPLING
H	3" X 150# RFSO FLANGE INSIDE & OUTSIDE 6" PROJECTION INSIDE AND OUTSIDE
J	3" X 150# RFSO FLANGE INSIDE & OUTSIDE 63" INTERNAL PROJECTION, 6" OUTSIDE PROJ.
K	C4 X 5.4# X 8" PROJECTION, SEAL WELDED TO TANK WITH WELDED 2" HALF COUPLING
L	142.5" STAIR, CATWALK, DOUBLE DOOR SAFETY GATE 1" THICK FIBERGLASS GRATING, PAINTED SAFETY YELLOW & SHIPPED LOOSE FOR INSTALLATION ON SITE BY OTHERS



Highland Tank

UNLESS NOTED, TOLERANCES ARE +/- 1"

12,000 GAL 120" ϕ CYL. FIREGUARD®

PATENT: 5,695,089 PATENT: 5,809,650

CUSTOMER: L & T INC

PROJECT: HARNETT COUNTY REGIONAL
JETPORT ERWIN NC

QUOTE NO: 572064

CHK'D BY:

SCALE: 1/4"=1'-0"

DATE: 04/24/26

DWG. BY: 001

DWG. NO:

200696-1



REDESIGNED ACCESS
EQUIPMENT MOVING FITTINGS
AS NEEDED,TANK CLS CHANGE

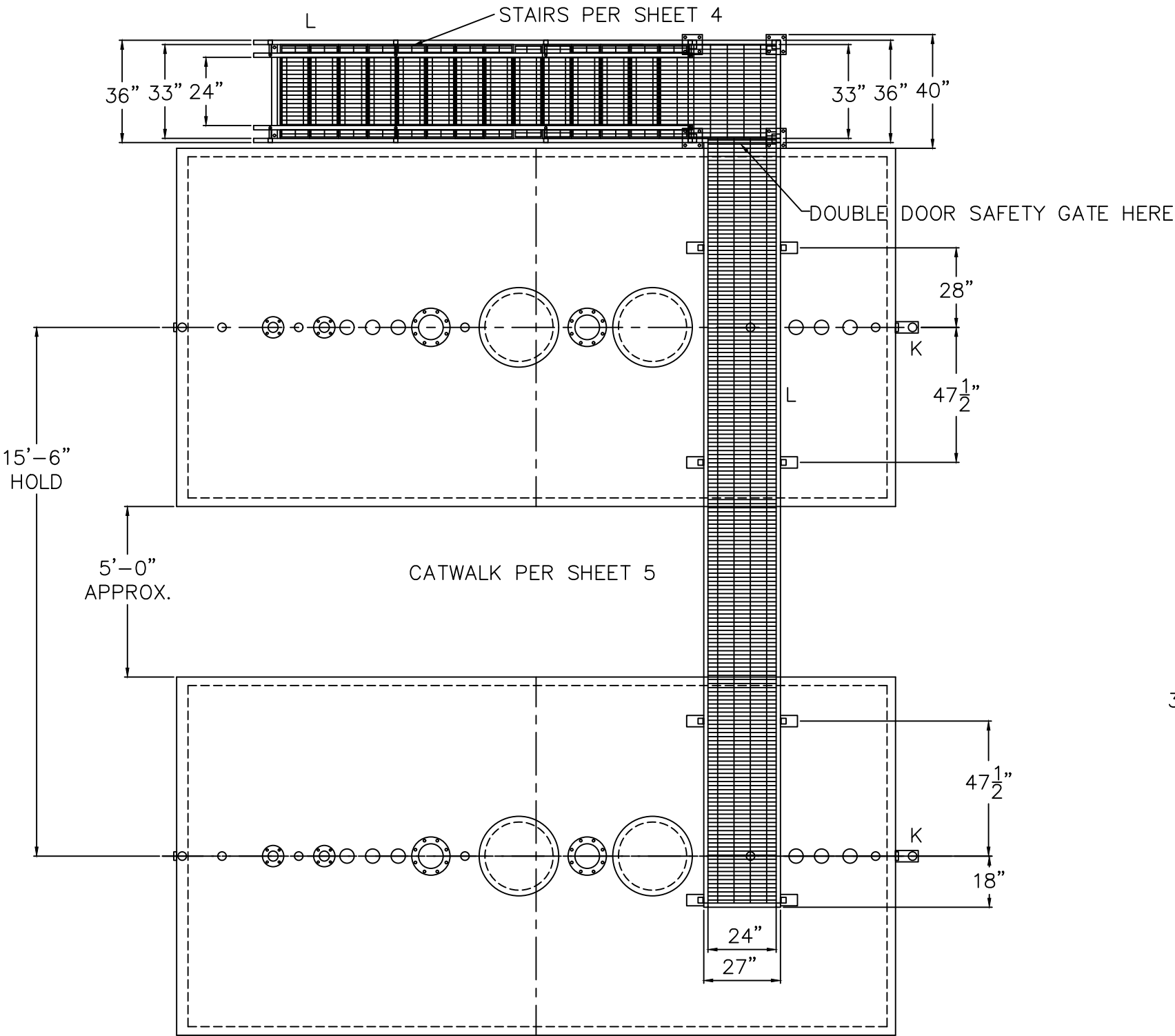
04/28/26

001

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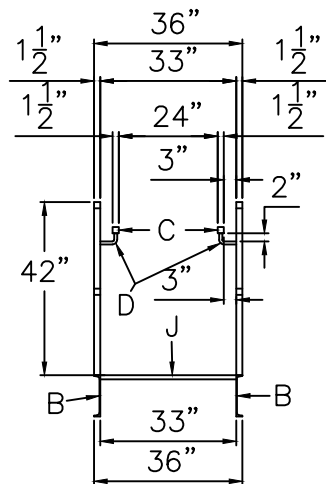
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SHIPPING LUGS AS NEEDED

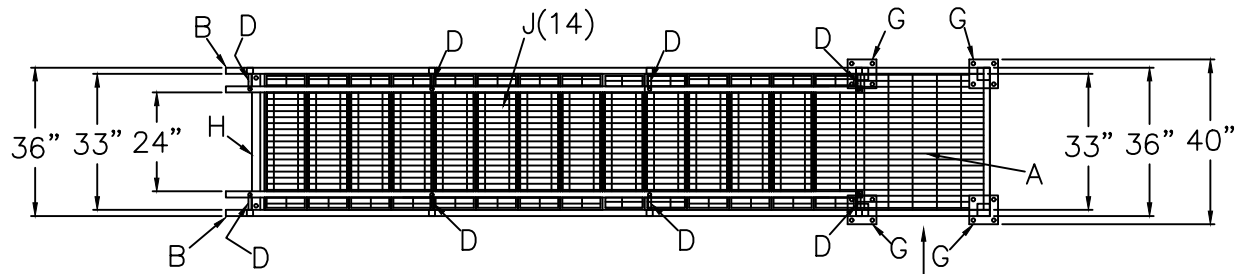


3" LIGHTWEIGHT INSULATION MATERIAL WITHIN INTERSTICE

		Highland Tank	
UNLESS NOTED, TOLERANCES ARE +/- 1"			
PLAN VIEW			
PATENT: 5,695,089 PATENT: 5,809,650			
CUSTOMER: L & T INC			
PROJECT: HARNETT COUNTY REGIONAL JETPORT ERWIN NC			
QUOTE NO: 572064		CHK'D BY:	
SCALE: 1/4"=1'-0"	DATE: 04/24/26	DWG. BY: 001	DWG. NO.: 200696-2

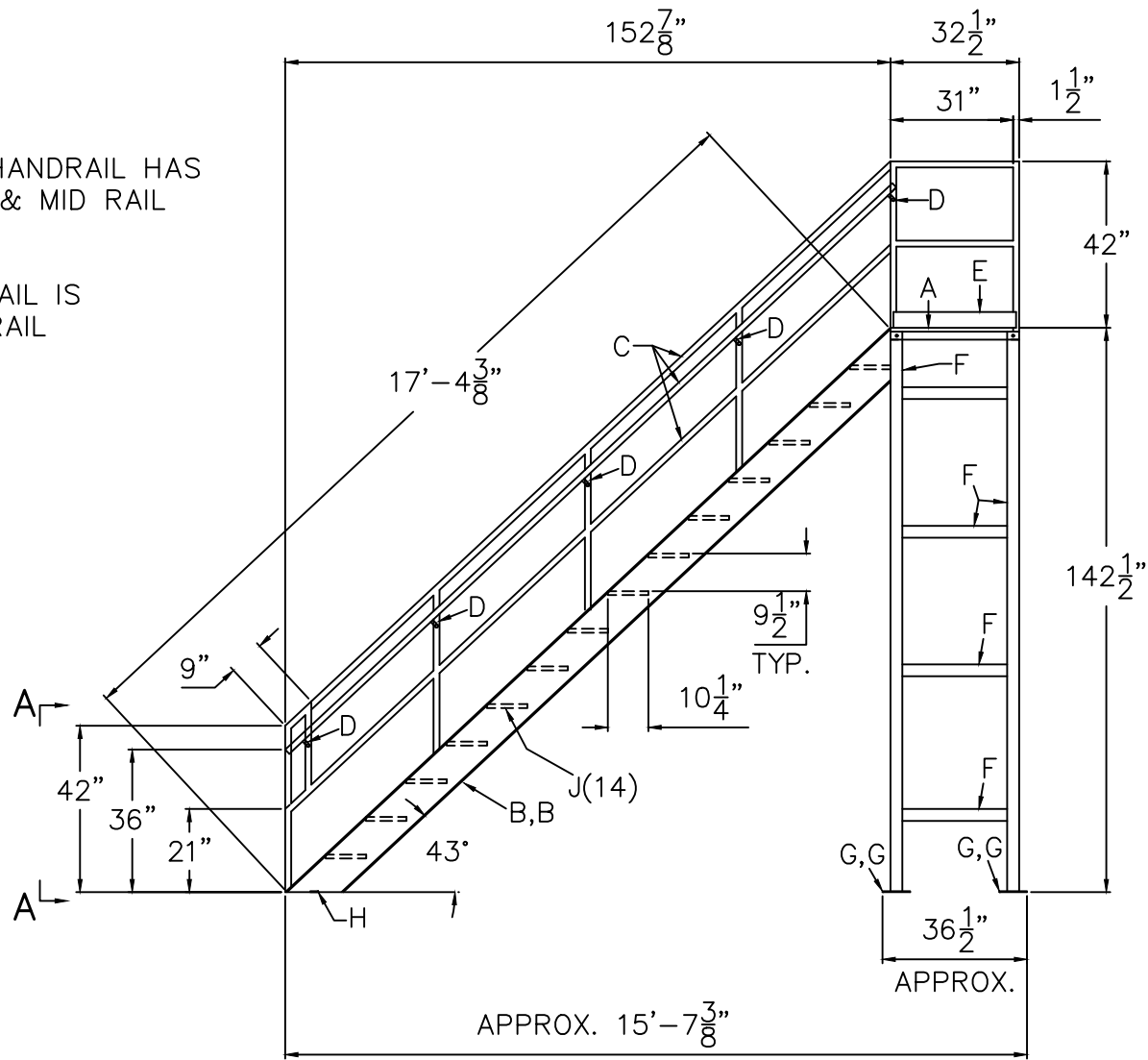
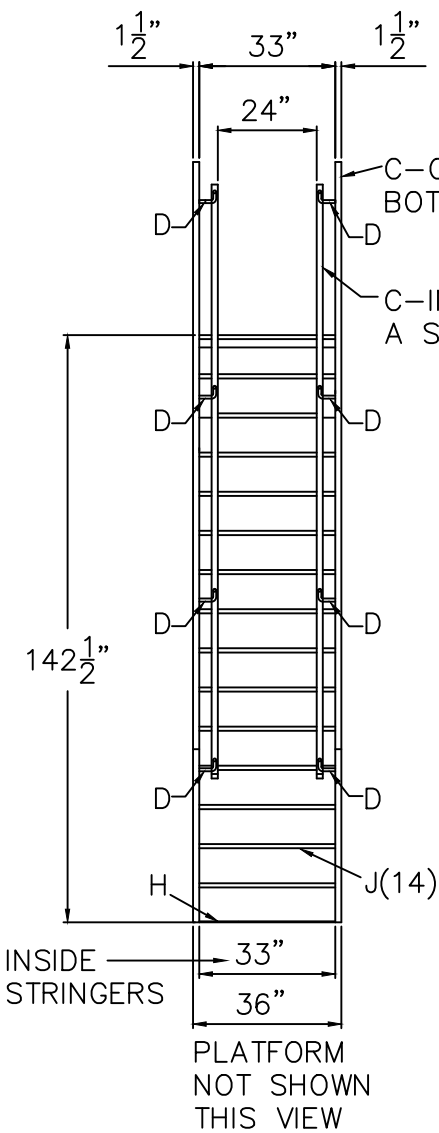


SECTION VIEW A-A

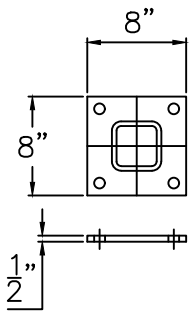
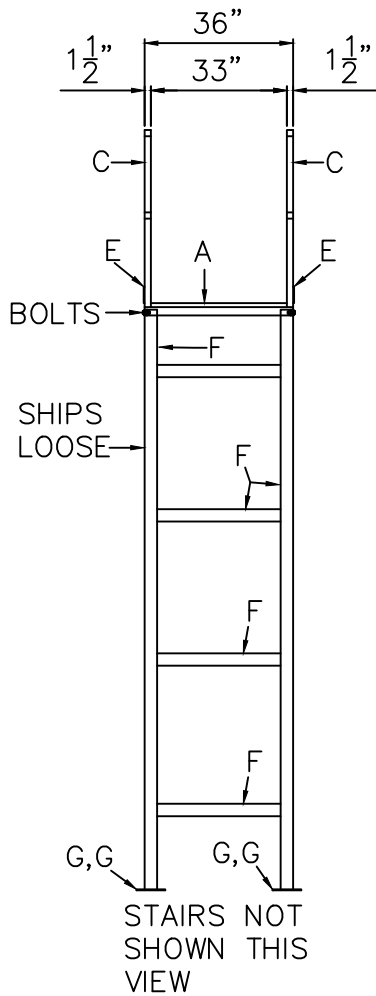


PLAN VIEW

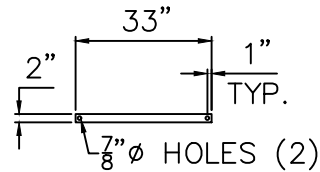
THIS SIDE OPEN TO CATWALK



ELEVATION VIEW



DETAIL ITEM "G"



DETAIL ITEM "H"
ONE REQ'D

DESIGN DATA

CONSTR. — FREE STANDING
NO. REQ. — 1
GRATING: 1" THK. FIBERGLASS
FINISH: ALL STEEL PARTS HOT DIPPED GALVANIZED

LEGEND

A	GRATING: 1" THK. W/ SUPPORTS AS NEEDED x 32 1/2" LG
B	10" CHANNEL STRINGER X 17'-4 3/8" LG. C10x8.4#
C	1-1/2" SQ. TUBING x 1/8" WALL (TOP, MID RAIL & POSTS)
D	3/4" Ø ROUND BAR (HR SUPPORT)
E	TOE PLATE — 1/4" THK. x 4"
F	4" SQ. TUBING X 3/8" THICK PLATFORM SUPPORT
G	PLATE— 1/2" THK. x 8" x 8" BASE PLATE, SEE DETAIL G
H	F.B.— 2" x 1/4" x 33" PER DETAIL "H"
J	1" THK GRATING w/ 10-1/4" x 33" SUPPORT PLATE — STAIR STEP (NOT SERRATED)

NOTE: HANDRAIL POST ARE WELDED TO SUPPORTS

CONFORMS TO 29 CFR PART 1910.25

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DESIGN CHANGE	04/28/26	001
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Highland Tank

UNLESS NOTED, TOLERANCES ARE +/- 1"

ACCESS STAIRS

CUSTOMER: L & T INC

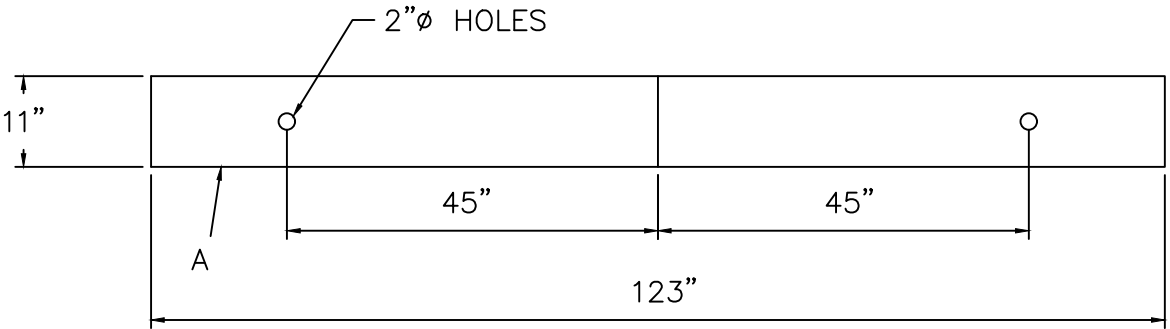
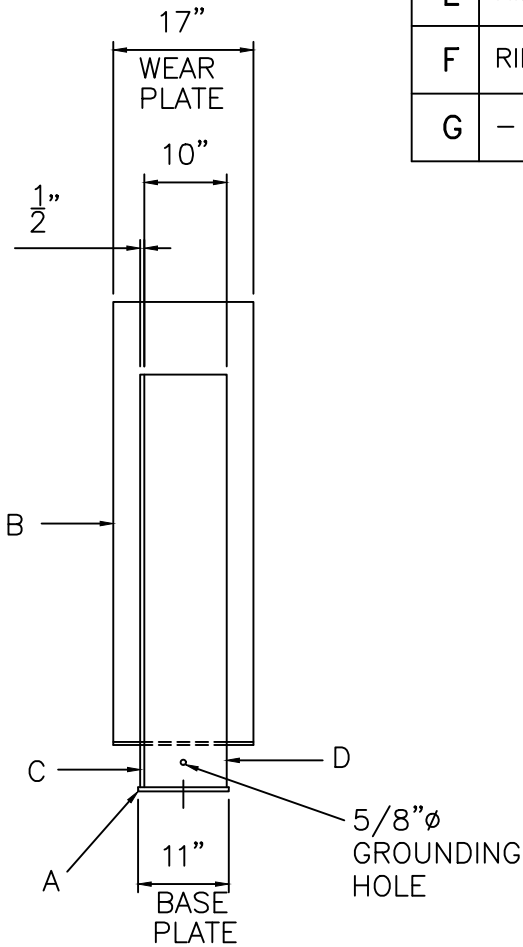
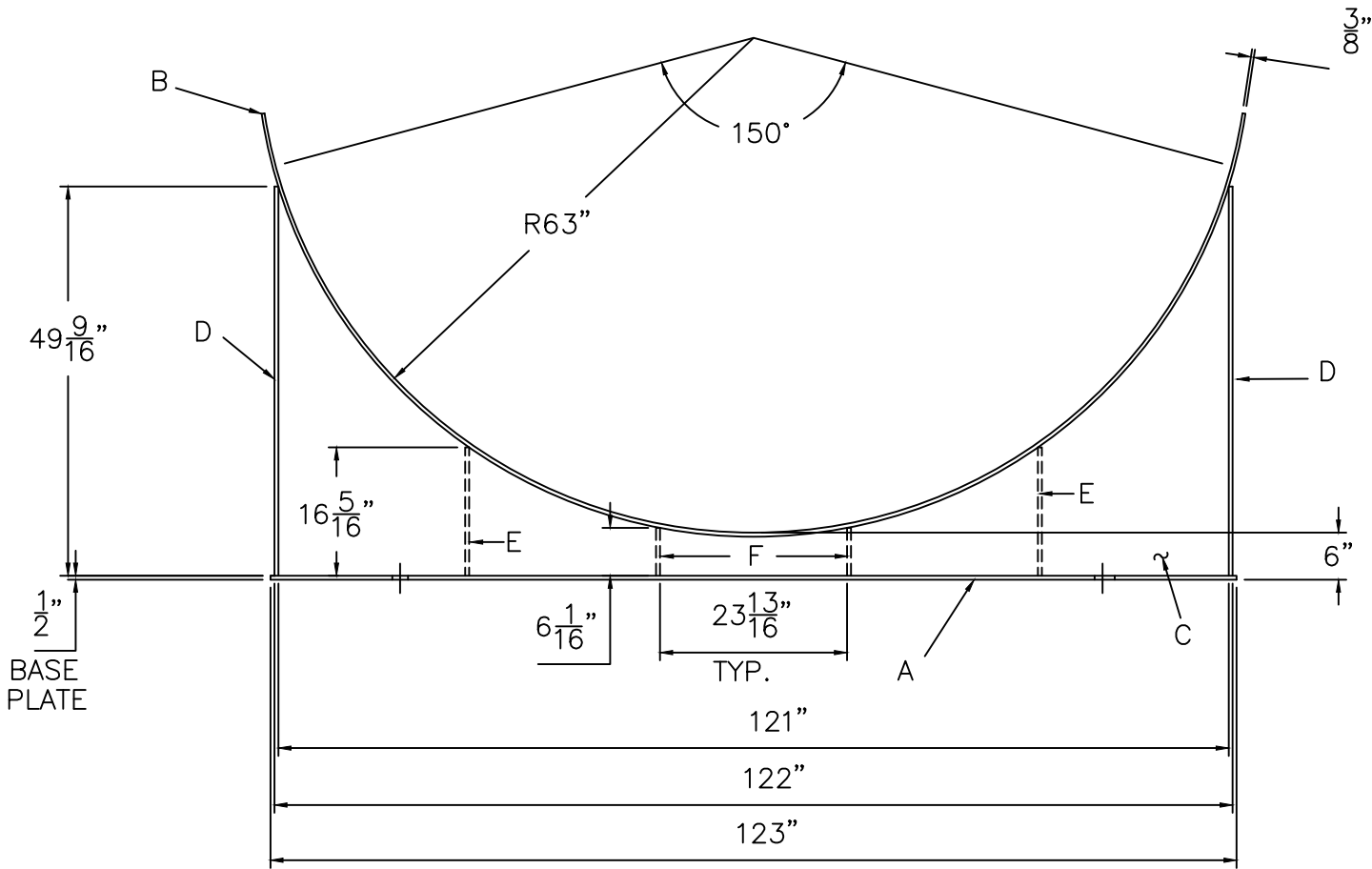
PROJECT: HARNETT COUNTY REGIONAL JETPORT ERWIN NC

QUOTE NO: 572064

CHK'D BY:

SCALE: 1/4"=1'-0"	DATE: 04/24/26	DWG. BY: 001	DWG. NO: 200696-3
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LEGEND		
A	BASE PLATE	PLATE- 1/2" THK x 11" x 123" LONG
B	WEAR PLATE	PLATE - 3/8" THK PLATE x 17" x 179-1/4" LONG
C	WEB PLATE	PLATE- 1/2" x 49-9/16" x 121"
D	RIB PLATE	PLATE- 1/2" x 10" x 49-9/16"
E	RIB PLATE	PLATE- 1/2" x 10" x 16-5/16"
F	RIB PLATE	PLATE- 1/2" x 10" x 6-1/16"
G	-	-



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Highland Tank
UNLESS NOTED, TOLERANCES ARE +/- 1"

TANK SADDLES

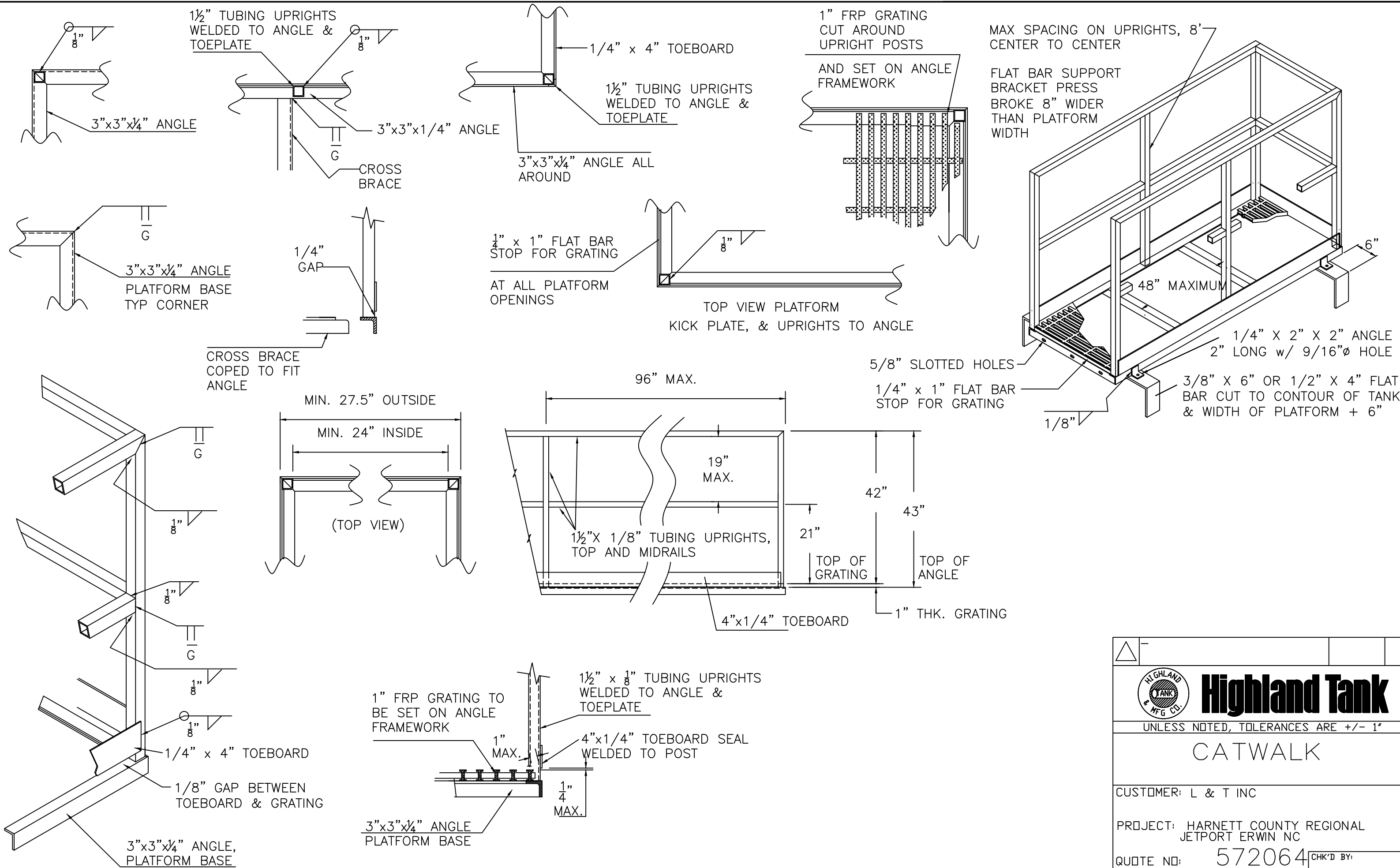
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JETPORT ERWIN NC

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SCALE: 1/2"=1'-0" | DATE: 04/24/26 | DWG. BY: 001 | DWG. NO: 200696-4

CHK'D BY:



	-		
	Highland Tank		
UNLESS NOTED, TOLERANCES ARE +/- 1"			
CATWALK			
CUSTOMER: L & T INC			
PROJECT: HARNETT COUNTY REGIONAL JETPORT ERWIN NC			
QUOTE NO:		572064	CHK'D BY:
SCALE:	DATE:	DWG. BY:	DWG. NO.:
1/2"=1'-0"	04/24/26	001	200696-5

Fig. 244 8" Emergency Vents

Specification Sheet

UL Listed Emergency vent (pressure relief only) used on aboveground storage tanks, as a code requirement, to help prevent the tank from becoming over-pressurized and possibly rupturing if ever exposed to fire. Vent must be used in conjunction with a "normal vent." Correct application of this vent requires proper vent size and selection for the tank system in order to meet the specific venting capacity.

Morrison Bros emergency vents conform to the following codes and standards: API 2000, International Fire Code, National Fire Code of Canada, NFPA 1, 30, 30A, 31, 37, 110, PEI RP200, PEI RP800, Underwriters Laboratories Inc., UL-142 UL-2085 UL- 2244, Underwriters Laboratories of Canada CAN/ULC S601-07, CAN/ULC S602-07, CAN/ULC S652-08.

Additional References: NFPA 30, UL 142, Morrison Venting Guide.



(1) PRIMARY & (1)
SECONDARY

I.D. Number	A	B	C	D	E	F	G	Diameter	Height	Weight
244O--0600 AV	8	504,818		8	I	A	AL	11	4.6	33
244O--0600 AVEVR	8	504,818		8	I	B	AL	11	4.6	33
244O--0700 AV	8	504,818		16	I	A	AL	11	5.8	62
244O--0700 AVEVR	8	504,818		16	I	B	AL	11	5.8	62
244OI-0600 AV	8	504,818		8	I	A	I	11	4.6	39
244OF-0100 AV	8	504,818	F	8	I	A	AL	11	3.3	33
244OF-0100 AVE	8	504,818	F	8	I	B	AL	11	3.3	33
244OF-0200 AV	8	504,818	F	16	I	A	AL	11	4.5	67
244OF-0200 AVE	8	504,818	F	16	I	B	AL	11	4.5	67
244OM-0600 AV	8	504,818	M	8	I	A	AL	11	5.8	34
244OM-0600 AVEVR	8	504,818	M	8	I	B	AL	11	5.8	34
244OM-0700 AV	8	504,818	M	16	I	A	AL	11	6.9	63
244OM-0700 AVEVR	8	504,818	M	16	I	B	AL	11	6.9	63
244OMB0700 AV	8	504,818	M	16	I	A	AL	11	6.9	63
244OMBSPO600 AV	8	504,818	M	8	I	B	AL	11	5.8	34
244OMIO600 AV	8	504,818	M	8	I	A	I	11	5.8	42
244OMIO700 AV	8	504,818	M	16	I	A	I	11	6.9	71

Flange = 14" OD ; eight (8) .88" Diameter holes on 11.75" diameter B.C.

CHART KEY:

A—Size: 8"

B—Venting Capacity/CFH (in 1000's)

C—Mounting Connection: Female N.P.T. (BLANK); Male N.P.T.(M); Flanged (F);

D—Pressure Settings: 8, 16 oz/in². Pressure Required to Open Vent.

E—Cover: Cast Iron Powder Coated (I)

F—Seat Material: O-Ring Viton A (A) or Viton B (B)

G—Body Material: Aluminum (AL) or Iron (I)

Diameter—Dimension Across Vent

Height—Dimension From Base to Top When Closed

Weight—Shipping Weight

Bolt—Zinc plated steel

WARNING: DO NOT FILL OR UNLOAD FUEL FROM A STORAGE TANK UNLESS IT IS CERTAIN THAT THE TANK VENTS WILL OPERATE PROPERLY. Morrison tank vents are designed only for use on shop fabricated atmospheric tanks which have been built and tested in accordance with UL 142, NFPA 30 & 30A, and API 650 and in accordance with all applicable local, state, and federal laws. In normal operation, dust and debris can accumulate in vent openings and block air passages. Certain atmospheric conditions such as a sudden drop in temperature, below freezing temperatures, and freezing rain can cause moisture to enter the vent and freeze which can restrict internal movement of vent mechanisms and block air passages. All storage tank vent air passages must be completely free of restriction and all vent mechanisms must have free movement in order to insure proper operation. Any restriction of airflow can cause excessive pressure or vacuum to build up in the storage tank, which can result in structural damage to the tank, fuel spillage, property damage, fire, injury, and death. Monthly inspection, and immediate inspection during freezing conditions, by someone familiar with the proper operation of storage tank vents, is required to insure venting devices are functioning properly before filling or unloading a tank.



Model 748A & 748ALT Pressure Vacuum Vents

SPECIFICATION SHEET

Pressure vacuum vent designed for installation on top of the vent pipe of an aboveground or underground storage tank. Poppets seal vapors in the tank when pressure is equalized. The vent allows the tank to “breathe” during filling and dispensing operations. This vent must be used in conjunction with an emergency vent. It is recommended that the opening pressure setting is set below that of the emergency vent so the normal vent operates first. Settings are approximate.

Features

- Vents outward and upward in compliance with NFPA 30
- Tri-polar mounting screws for mounting exhaust hood in any of three positions
- Optional dryer connections accommodate the installation of desiccant dryers on vacuum connection
- Optional pressure discharge hood facilitates piping pressure relief to desired discharge point

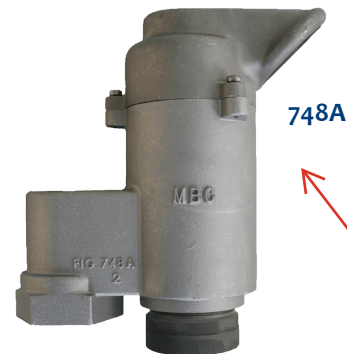
Construction Details

748A

- Aluminum body and hood
- Brass poppets
- Passivated aluminum seats
- Stainless steel screens

748ALT

- Aluminum body and hood
- Teflon® coated aluminum poppets and seats
- Stainless steel screens



NOTE

Normal vents such as pressure vacuum and updraft vents for aboveground storage tanks should be sized according to NFPA 30 (2012) 21.4.3.

Item numbers, dimensions, and warnings on next page...



MORRISON BROS. CO.

Model 748A & 748ALT Pressure Vacuum Vents (continued)

I.D. Number	A	B	C	D	E	F	G	H	I	J	K
748A--0100 AV	2"	2	20.2	1	BR	PA	AL	NO	10.37"	9.68"	6.50
748A--0200 AV	2"	4	20.2	1	BR	PA	AL	NO	10.37"	9.68"	7.15
748A--0300 AV	2"	6	20.2	1	BR	PA	AL	NO	10.37"	9.68"	7.55
748A--0400 AV	2"	8	20.0	1	BR	PA	AL	NO	10.37"	9.68"	8.15
748A--0500 AV	2"	12	18.6	1	BR	PA	AL	NO	10.37"	9.68"	9.30
748A--0600 AV	2"	16	18.0	1	BR	PA	AL	NO	10.37"	9.68"	10.35
748A--0700 AV	2"	2	20.2	1	BR	PA	AL	M	13.0"	9.68"	6.80
748A--0800 AV	2"	4	20.2	1	BR	PA	AL	M	13.0"	9.68"	7.45
748A--0900 AV	2"	6	20.2	1	BR	PA	AL	M	13.0"	9.68"	7.85
748A--1000 AV	2"	8	20.0	1	BR	PA	AL	M	13.0"	9.68"	8.45
748A--1100 AV	2"	12	18.6	1	BR	PA	AL	M	13.0"	9.68"	9.60
748A--1200 AV	2"	16	18	1	BR	PA	AL	M	13.0"	9.68"	10.65
748A--1500 AV	2"	8	20.0	1	BR	PA	AL	P	11.0"	8.19"	8.15
748A-3100 AV	3"	2	43.0	1	BR	PA	AL	NO	14.37"	13.37"	9.75
748A-3200 AV	3"	4	43.0	1	BR	PA	AL	NO	14.37"	13.37"	11.15
748A-3300 AV	3"	6	43.0	1	BR	PA	AL	NO	14.37"	13.37"	12.15
748A-3400 AV	3"	8	43.0	1	BR	PA	AL	NO	14.37"	13.37"	13.10
748A-3500 AV	3"	12	40.0	1	BR	PA	AL	NO	14.37"	13.37"	15.30
748A-3600 AV	3"	16	40.0	1	BR	PA	AL	NO	14.37"	13.37"	17.75
748A-4100 AV	3"	2	43.0	1	BR	PA	AL	F	14.37"	13.37"	9.75
748A-4200 AV	3"	4	43.0	1	BR	PA	AL	F	14.37"	13.37"	11.15
748A-4300 AV	3"	6	43.0	1	BR	PA	AL	F	14.37"	13.37"	12.15
748A-4400 AV	3"	8	43.0	1	BR	PA	AL	F	14.37"	13.37"	13.10
748A-4500 AV	3"	12	40.0	1	BR	PA	AL	F	14.37"	13.37"	15.30
748A-4600 AV	3"	16	40.0	1	BR	PA	AL	F	14.37"	13.37"	17.75
748ALT0100 AV	2"	8	20.2	1	ALT	ALT	AL	NO	10.37"	9.68"	5.75
748ALT0200 AV	2"	16	18.0	1	ALT	ALT	AL	NO	10.37"	9.68"	5.75
748ALT0300 AV	2"	32	NA	1	ALT	ALT	AL	NO	10.37"	9.68"	5.75
748ALT0800 AV	2"	8	20.2	1	ALT	ALT	AL	M	13.0"	9.68"	6.0
748ALT0900 AV	2"	16	18	1	ALT	ALT	AL	M	13.0"	9.68"	6.0
748ALT1400 AV	2"	8	NA	1	ALT	ALT	AL	NO	11.0"	8.19"	6.25
748ALT1500 AV	2"	16	NA	1	ALT	ALT	AL	NO	11.0"	8.19"	6.25
748ALT2000 AV	2"	8	NA	1	ALT	ALT	AL	M	13.62"	8.19"	6.25
748ALT2100 AV	2"	16	NA	1	ALT	ALT	AL	M	13.62"	8.19"	6.25

SPECIFICATION OPTIONS:

- A**—Size: N.P.T. threads
B—Pressure setting in oz. /sq. in.
C—Venting capacity / CFH in 1000's at 2.5 P.S.I.
D—Vacuum setting in oz. / sq. in.
E—Poppet material: Brass (BR) or Teflon® coated aluminum (ALT)
F—Seat material: Passivated aluminum (PA) or Teflon® coated aluminum (ALT)
G—Body/Hood material: Aluminum (AL)
H—Dryer connection: Male (M), Female (F), No connection (NO), Pressure discharge hood (P)
I—Height of vent (inches)
J—Width of vent (inches)
K—Shipping weight (lbs.)

WARNING: DO NOT FILL OR UNLOAD FUEL FROM A STORAGE TANK UNLESS IT IS CERTAIN THAT THE TANK VENTS WILL OPERATE PROPERLY.

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MORRISON BROS. CO.

www.morbro.com



Model 178 Threaded Style Fill Cap

SPECIFICATION SHEET

Application

The 178 series tight seal threaded style fill cap is used for the fill port of small storage tanks. It is lockable with a padlock. The 178 iron caps are powder coated for a more durable finish.

The 178DT is made for a drop tube with 2" straight pipe threads and Buna-N gasket. The 178GSP is labeled "Gauge Stick Port."

Item Number	A	B	C	Weight
178---0100 AC	2"	IR	IR	2.0
178---0200 AC	2"	IR	BR	2.0
178---0300 AC	2"	BR	IR	2.0
178---0400 AC	2"	BR	BR	2.25
178---1200 AC	3"	BR	BR	4.25
178---1600 AC	4"	BR	BR	7.0
178AL-0900 AC	3"	AL	AL	1.54
178AL-1300 AC	4"	AL	AL	2.44
178DT-0300 AC	2"	BR	IR	2.0
178DT-0400 AC	2"	BR	BR	2.25
178GSP0100 AC	2"	BR	AL	1.0

SPECIFICATION OPTIONS:

A—Size (inches)

B—Body: Brass (BR), Iron (IR), AL (Aluminum)

C—Cap: Brass (BR), Iron (IR), AL (Aluminum)

Weight—Shipping weight (lbs)



Fig. 178 (2")



Fig. 178 (2")



Fig. 178AL (4")



MORRISON BROS. CO.

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Model 184 Series Bushings & Plugs

SPECIFICATION SHEET

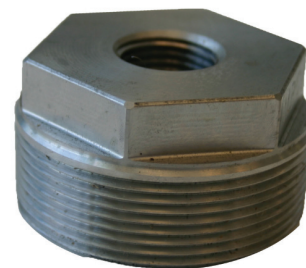
Application

Double Tapped Bushings are used in pipe and tank fittings to reduce or adapt connections. The outside threads are male. The inside threads (threaded from the top and from the bottom) are female.

The 184S Double Tapped Bushings are the same as the 184 except they are constructed of stainless steel.



184



184S (2'')



184S (4'')

SPECIFICATION OPTIONS:

A—Size: Male NPT x Female NPT x Female NPT
B—Zinc plated cast iron (Z), cast iron (CI), steel (S), or stainless steel (SS)
C—Brass tubing connectors:
 Yes (Y)
 No (N)
 Not applicable (N/A)
Weight—Shipping weight (lbs)

Item Number	Description	A	B	C	Weight
184---0000 1B	Double Tapped Bushing	1½" x ¾" x ¾"	CI	N/A	0.60
184---0100 1B	Double Tapped Bushing	2"x¾"x¾"	CI	N/A	1.0
184---0110 1B	Double Tapped Bushing	1½"x½"x½"	CI	N/A	0.50
184---0120 1B	Double Tapped Bushing	1¼"x1"	CI	N/A	0.40
184---0130 1B	Double Tapped Bushing	1½"x1"x1"	CI	N/A	0.70
184---0200 1B	Double Tapped Bushing	2"x½"x½"	CI	N/A	0.80
184---0300 1B	Double Tapped Bushing	2"x¾"x¾"	CI	N/A	0.80
184---0400 1B	Double Tapped Bushing	2"x1"x1"	CI	N/A	1.20
184---0500 1B	Double Tapped Bushing	2"x1¼"x1¼"	CI	N/A	1.10
184---0600 1B	Double Tapped Bushing	2"x1½"x1½"	CI	N/A	0.90
184---0800 1B	Double Tapped Bushing	2½"x1¼"x1¼"	CI	N/A	1.60
184---0900 1B	Double Tapped Bushing	2½"x1½"x1½"	CI	N/A	1.80
184---1000 1B	Double Tapped Bushing	2½"x2"x2"	CI	N/A	1.0
184---1100 1B	Double Tapped Bushing	3"x1"x1"	CI	N/A	1.60
184---1200 1B	Double Tapped Bushing	3"x1¼"x2½"	CI	N/A	2.30
184---1300 1B	Double Tapped Bushing	3"x1½"x1½"	CI	N/A	2.20
184---1400 MB	Double Tapped Bushing	3"x2"x2"	CI	N/A	2.20
184---1500 1B	Double Tapped Bushing	3"x2½"x2½"	S	N/A	1.90
184---1800 1B	Double Tapped Bushing	3½"x1½"x1½"	CI	N/A	2.0
184---1900 1B	Double Tapped Bushing	3½"x2"x2"	CI	N/A	2.10
184---2100 1B	Double Tapped Bushing	3½"x3"x3"	S	N/A	2.40
184---2200 MB	Double Tapped Bushing	4"x1"x1"	CI	N/A	4.30
184---2300 MB	Double Tapped Bushing	4"x1¼"x1¼"	CI	N/A	4.0
184---2400 MB	Double Tapped Bushing	4"x1½"x1½"	CI	N/A	3.80
184---2500 MB	Double Tapped Bushing	4"x2"x2"	CI	N/A	3.60
184---2600 1B	Double Tapped Bushing	4"x2½"x2½"	CI	N/A	4.80
184---2700 MB	Double Tapped Bushing	4"x3"x3"	CI	N/A	3.70
184---2800 MB	Double Tapped Bushing	6"x3"x3"	CI	N/A	8.35
184---2900 1B	Double Tapped Bushing	6"x4"x4"	CI	N/A	8.50
184S--0200 MB	Double Tapped Bushing	2"x½"x.5"	SS	N/A	0.75
184S--0300 MB	Double Tapped Bushing	2"x¾"x¾"	SS	N/A	0.75
184S--0400 MB	Double Tapped Bushing	2"x1"x1"	SS	N/A	0.75
184S--0500 MB	Double Tapped Bushing	2"x1½"x1½"	SS	N/A	0.75
184S--2100 MB	Double Tapped Bushing	4"x¾"x¾"	SS	N/A	4.25
184S--2200 MB	Double Tapped Bushing	4"x1"x1"	SS	N/A	4.25
184S--2400 MB	Double Tapped Bushing	4"x1½"x1½"	SS	N/A	4.25
184S--2500 MB	Double Tapped Bushing	4"x2"x2"	SS	N/A	4.25
184S--2700 MB	Double Tapped Bushing	4"x3"x3"	SS	N/A	4.25

184D and 184Q on next page...



Application

The Duplex Bushings (184D) are used to convert a single tank opening to dual threaded openings. One opening is single tapped and the other is double tapped.

The Quad Tapped Bushings (184Q) are similar to the Duplex Bushings except both female openings are threaded from the top and threaded from the bottom.

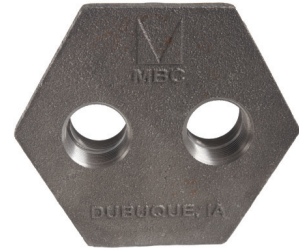
Item Number	Description	A	B	C	Weight
184D--0100 1B	Duplex Bushing	2"x $\frac{3}{8}$ "x $\frac{3}{8}$ "	Z	Y	0.80
184D--0200 1B	Duplex Bushing	2"x $\frac{1}{2}$ "x $\frac{1}{2}$ "	Z	Y	0.70
184D--0300 AB	Duplex Bushing	4"x $\frac{3}{4}$ "x $\frac{3}{4}$ "	CI	Y	4.60
184D--0301 MB	Duplex Bushing	4"x $\frac{3}{4}$ "x $\frac{3}{4}$ "	CI	N	4.10
184D--0401 MB	Duplex Bushing	4"x1"x1"	CI	N	3.60
184Q--4075 MB	Quad Tapped Bushing	4x $\frac{3}{4}$ "x $\frac{3}{4}$ "	CI	N	5.25
184Q--4100 MB	Quad Tapped Bushing	4"x1"x1"	CI	N	5.25
184---2900 1P	Pipe Plug	6"	CI	N/A	8.0
184---3000 1P	Pipe Plug	4"	CI	N/A	3.0
184---3100 1P	Pipe Plug	3"	CI	N/A	1.90
184---3200 1P	Pipe Plug	2"	CI	N/A	0.80
184---3300 1P	Pipe Plug	1 $\frac{1}{2}$ "	CI	N/A	0.50
184---3400 1P	Pipe Plug	1"	CI	N/A	0.30
184---3500 1P	Pipe Plug	$\frac{3}{4}$ "	CI	N/A	0.20
184S--3000 MP	Pipe Plug	4"	SS	N/A	3.40
184S--3200 MP	Pipe Plug	2"	SS	N/A	5.0
912-070512 MP	Pipe Plug	$\frac{3}{4}$ "	SS	N/A	0.50
912-100512 MP	Pipe Plug	1"	SS	N/A	0.80
912B070512 MP	Pipe Plug	$\frac{3}{4}$ " (BSP)	SS	N/A	0.50
912B100512 MP	Pipe Plug	1" (BSP)	SS	N/A	0.80

SPECIFICATION OPTIONS:

A—Size: Male NPT x Female NPT x Female NPT
B—Zinc plated cast iron (Z), cast iron (CI), steel (S), or stainless steel (SS)
C—Brass tubing connectors:
 Yes (Y)
 No (N)
 Not applicable (N/A)
Weight—Shipping weight (lbs)



184D (2")



184Q



184 Pipe Plugs



818C & 918C Gallon Gauges



Standard float



Drop tube float

Features

- Easy to install on a 2" male or female threaded tank opening
- Vapor tight up to 5 PSI
- Swivel base rotates 360° for optimum viewing angle
- Measures liquid levels up to 12 feet (3.6 meters)
- Proven anti-fog design
- High level indicated by red zone indicator
- Stainless steel float and cable
- Drop tube float and drop tube available for tanks with higher-than-normal turbulence
- Compatible with Ethanol blends up to 85%
- Compatible with Biodiesel blends up to 100%
- Intrinsically safe alarm is battery powered
- Liter reading gauges available
- **918C** includes field adjustable 90 decibel high level audible alarm

The 818C & 918C gallon gauge is used to measure the liquid level in an aboveground storage tank. The gallon gauge provides an approximate read out clearly displayed in gallons and can easily be read from 20 feet away. It also eliminates the need to convert feet and inch gauge readings to gallons.

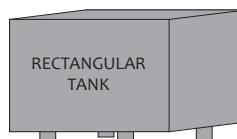
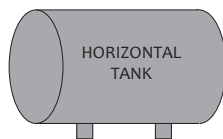
STEP 1: Select gauge.



818 Models		
818C--0100AGEVR	2"	Clock gauge, male threads, standard float, no face, EVR
818C--0400AGEVR	2"	Clock gauge, male threads, drop tube float, no face, EVR
818CF-0100AGEVR	2"	Clock gauge, female threads, standard float, no face, EVR
818CF-0400AGEVR	2"	Clock gauge, female threads, drop tube float, no face, EVR

918 Models		
918C--0000AGEVR	2"	Clock gauge less alarm, male threads, standard float, no face, EVR
918C--2000AGEVR	2"	Clock gauge less alarm, male threads, drop tube float, no face, EVR
918C--0100 AG	2"	Clock gauge with alarm, male threads, standard float, no face
918C--0400 AG	2"	Clock gauge with alarm, male threads, drop tube float, no face
918CF-0000AGEVR	2"	Clock gauge less alarm, female threads, standard float, no face, EVR
918CF-0100 AG	2"	Clock gauge with alarm, female threads, standard float, no face
918CF-0400 AG	2"	Clock gauge with alarm, female threads, drop tube float, no face
918CF-2000AGEVR	2"	Clock gauge less alarm, female threads, drop tube float, no face, EVR

STEP 2: Determine tank shape.



STEP 3: Select clock face based on tank size.

Notes:

- Clock Face labels cannot be retrofitted to existing gauges in the field.
- For complete listing of custom face options, please reference the Price List or [click here](#).
- If the tank size you need is not listed, please contact our Customer Service Department. Custom faces can be provided in 2-4 weeks.
- These items are manufactured to the customer's specifications and, therefore, are non-returnable and non-cancellable once in production.



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Model 711 Solenoid Valves (Normally Open)

SPECIFICATION SHEET

The 711 solenoid valve is a high flow pilot operated piston valve that is “normally open.” This general purpose valve is for applications such as pressure systems, machine tools, water processing, and steam applications. The valve closes upon the receipt of an electronic signal.

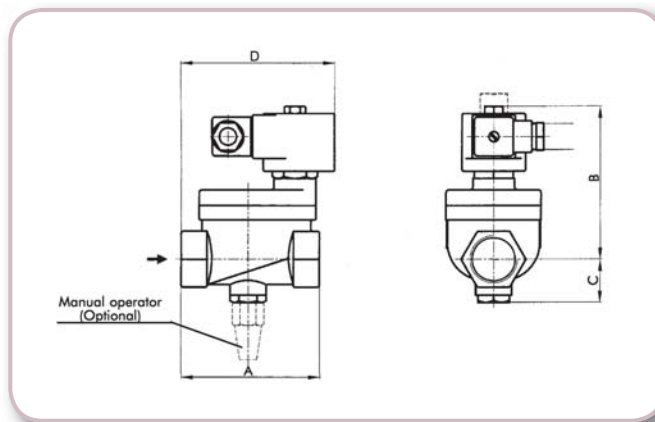
Features

- 3 PSI pressure differential required to keep the valve open
- Explosion and weather proof coil and housing
- 120V/60HZ standard; several optional coil voltages available
- Must be installed in a horizontal pipeline with the coil in the upright and vertical position
- Recommended for use with liquids having a maximum viscosity of 60 centistokes
- A strainer with a 100 mesh screen is recommended at the valve inlet

Construction Details

- ~~Forged brass body and cover~~
- Viton® seals

STAINLESS STEEL
BODY AND COVER



PRESSURE RELIEF /
ANTI SIPHON



I.D. Number	Size (NPT)	Orifice Size (inches)	CV	Operating Pressure Differential Max. (P.S.I.)		Fluid Temp.	Power Consumption (Watt) (Deg. F.)	Weight (lbs)	Gen. Dimensions (inches)			
				Min.	Max.				A	B	C	D
711---0075 1V	.75"	.75"	6	3	150	220	13	2.6	2.80	4.45	1.02	3.23
711---0100 1V	1"	1"	13	3	150	220	13	3.75	3.78	4.57	1.18	3.23
711---0150 1V	1.5"	1.25"	30	3	150	220	13	6.75	4.49	5.11	1.42	3.23
711---0200 1V	2"	1.50"	47	3	150	220	13	9.47	5.04	5.18	1.73	3.23
711---0300 1V	3"	3"	99	3	150	220	13	44	8.82	8.71	3.50	3.23



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Model 800 Cam-and-Groove-Fittings

SPECIFICATION SHEET

Application

Cam-and-groove adaptors and couplers are used in specialized applications where it is necessary to be able to connect and disconnect components quickly.

Features and Details

- **Part A**, female threads to male quick disconnect adaptor
- **Part B**, male threads to female quick disconnect coupler
- **Part C**, hose shank to female quick disconnect coupler
- **Part D**, female threads to female quick disconnect coupler
- **Part E**, hose shank to male quick disconnect adaptor
- **Part F**, male threads to male quick disconnect adaptor
- **Part DC**, dust caps
- **Part DP**, dust plugs

Materials of Construction

Standard couplings... Aluminum (brass and stainless steel are available)

Handles... Brass or stainless steel

Gaskets... Buna-N



Item numbers on next page...



MORRISON BROS. CO.



Model 800 Cam-and-Groove-Fittings (continued)

SPECIFICATION SHEET

FILL

Item Number	Size	Weight (lbs)
800A-A0000 1C	¾"	0.10
800A-A0100 1C	1"	0.14
800A-A0200 1C	1¼"	0.26
800A-A0300 1C	1½"	0.30
800A-A0400 1C	2"	0.30
800A-A0500 1C	2½"	0.64
800A-A0600 1C	3"	0.60
800A-A0700 1C	4"	1.36
800B-A0000 1C	¾"	0.30
800B-A0100 1C	1"	0.38
800B-A0200 1C	1¼"	0.68
800B-A0300 1C	1½"	0.78
800B-A0400 1C	2"	1.02
800B-A0500 1C	2½"	2.0
800B-A0600 1C	3"	2.0
800B-A0700 1C	4"	2.0
800C-A0000 1C	¾"	0.47
800C-A0100 1C	1"	0.52
800C-A0200 1C	1¼"	0.86
800C-A0300 1C	1½"	0.80
800C-A0400 1C	2"	1.14
800C-A0500 1C	2½"	2.0
800C-A0600 1C	3"	2.50
800C-A0700 1C	4"	4.0
800D-A0000 1C	¾"	0.25
800D-A0100 1C	1"	0.44
800D-A0200 1C	1¼"	0.76
800D-A0300 1C	1½"	0.84
800D-A0400 1C	2"	0.80
800D-A0500 1C	2½"	2.0
800D-A0600 1C	3"	2.0
800D-A0700 1C	4"	2.80

*Items listed above are all aluminum.

Consult Price List for brass, carbon steel, and stainless steel options.

Item Number	Size	Weight (lbs)
800E-A0000 1C	¾"	0.26
800E-A0100 1C	1"	0.26
800E-A0200 1C	1¼"	0.39
800E-A0300 1C	1½"	0.54
800E-A0400 1C	2"	0.82
800E-A0500 1C	2½"	1.50
800E-A0600 1C	3"	1.66
800E-A0700 1C	4"	2.50
800F-A0000 1C	¾"	0.15
800F-A0100 1C	1"	0.24
800F-A0200 1C	1¼"	0.48
800F-A0300 1C	1½"	0.52
800F-A0400 1C	2"	0.60
800F-A0500 1C	2½"	0.86
800F-A0600 1C	3"	1.36
800F-A0700 1C	4"	2.50
800DCA0000 1C	¾"	0.20
800DCA0100 1C	1"	0.42
800DCA0200 1C	1¼"	2.0
800DCA0300 1C	1½"	0.74
800DCA0400 1C	2"	0.70
800DCA0500 1C	2½"	1.24
800DCA0600 1C	3"	1.40
800DCA0700 1C	4"	2.40
800DPA0000 1C	¾"	0.12
800DPA0100 1C	1"	0.16
800DPA0200 1C	1¼"	0.16
800DPA0300 1C	1½"	0.25
800DPA0400 1C	2"	0.38
800DPA0500 1C	2½"	0.59
800DPA0600 1C	3"	1.0
800DPA0700 1C	4"	2.0

800A- **A** 0000 1C

Letter in this location indicates material of construction

- A** = Aluminum
- B** = Brass
- S** = Stainless steel
- C** = Carbon steel

FLOATING SUCTION TEST CABLE

FLOATING SUCTION TEST CABLE

FILL

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PORTABLE HAND PUMP



MODEL	HP-100-NUL or HP-100-UL	HP-90
PART NUMBER	114000-5 is non-U.L. Listed Model 114000-10 is U.L. Listed Model	131000-1
PUMP TYPE	Piston	Piston
FLOWRATE	25 gallons (95 litre) or 50 gallon (189 litre) settings per 100 strokes.	Up to 25 gallons (95 litres) per 100 strokes.
NOZZLE TYPE	114000-5 is Thermoplastic 114000-10 is Metal	Thermoplastic
HOSE TYPE	114000-5 Buna-N® without static wire 114000-10 with static wire	Buna-N® without static wire
HOSE SIZE	8 ft. (2.5 m) x 3/4 in.	8 ft. (2.5 m) x 3/4 in.
TANK FITTING	2 in. NPT	2 in. NPT
INLET/OUTLET SIZE	1 in. / 3/4 in.	1 in. / 3/4 in.
SUCTION PIPE	Adjustable to 40 in.	Two-piece, Trim-to-fit
UNIQUE FEATURE	Premium pump moves fluid on both push and pull strokes. Lockable.	Dual action economy pump.
USE WITH	Gasoline (up to 15% alcohol blends such as E15), diesel fuel (up to 20% biodiesel blends such as B20) and kerosene. Petroleum products such as medium oil (up to 30W) and hydraulic fluid	Gasoline (up to 15% alcohol blends such as E15), diesel fuel (up to 20% biodiesel blends such as B20) and kerosene. Petroleum products such as light oil (up to 10W) and hydraulic fluid
APPROVALS	U.L. Listed for HP-100-UL Model	None
WARRANTY	2 Year	2 Year



Model 691BSS Full Port Locking Ball Valve

SPECIFICATION SHEET

Application

Ball valves are used throughout fuel piping systems where a shut-off is required or desired.

Features and Details

- Female NPT threaded inlet and outlet
- Quarter turn operation
- Full port for maximum flow and minimum pressure drop
- Can be operated in partial open position for flow control
- Double seal allows the valve to be operated in both directions
- Blowout-proof stem
- 1000 PSIG non-shock cold working pressure
- Can be used for air service
- Lockable with a padlock

Materials of Construction

- Body and ball... CF8M stainless steel
- Seal... pure PTFE

Code Compliance

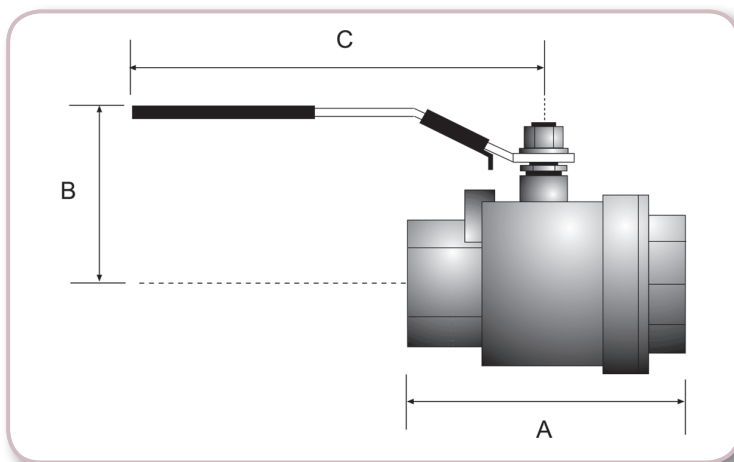
Test standard API 598; NACE compliance MR-01-75



691BSS (1")

Item Number	Size	Weight (lbs)
691BSS0200 1V	3/8"	0.50
691BSS0300 1V	1/2"	0.70
691BSS0400 1V	3/4"	1.16
691BSS0500 1V	1"	1.62
691BSS0700 1V	1 1/2"	3.38
691BSS0800 1V	2"	6.11
691BSS1000 1V	3"	19.60

HAND PUMP OUTLET



Size	Dimension A	Dimension B	Dimension C	Port Size
3/8"	2.28"	2.24"	4.06"	.49"
1/2"	2.44"	2.24"	3.78"	.63"
3/4"	2.80"	2.70"	4.96"	.79"
1"	3.27"	2.85"	4.96"	.98"
1 1/2"	4.04"	3.74"	7.01"	1.50"
2"	4.92"	4.11"	7.01"	2.01"
3"	7.55"	5.46"	11.26"	3.15"



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76-500 Series

Stainless Steel Ball Valve with Spring Return Handle

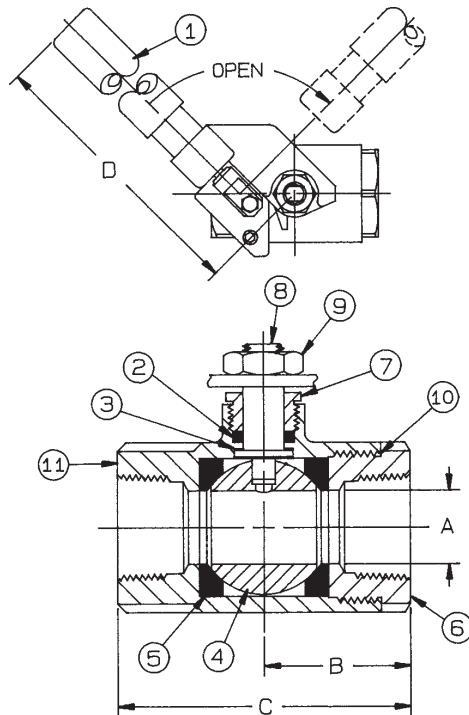
Threaded, 1/4" to 1" 2000 psig WOG, 1-1/4" to 2" 1500 psig WOG
 Cold Non-Shock. 150 psig Saturated Steam, Vacuum Service to 29 inches Hg.
 Federal Specification: WW-V-35C, Type: II, Composition: SS, Style: 3.
 MSS SP-110; Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

FEATURES

- Spring return to close (-01)
- Spring return to open (-08)
- Reinforced seats
- All components of lever are stainless steel
- Operating torque is approximately three times standard valve torque
- Blow-out-proof stem design
- Adjustable packing gland
- Meets NACE MR-01-75
- Investment cast components

STANDARD MATERIAL LIST

1. Handle	SS w/vinyl	6. Retainer	A276-316 (1/4" to 1")
2. Stem packing	Multifill PTFE		A351-CF8M (1-1/4" to 2")
3. Stem bearing	RPTFE	7. Gland nut	A276-316
4. Ball	A276-316	8. Stem	A276-316
5. Seat (2)	Multifill PTFE	9. Lever nut	18-8 SS
		10. Body seal	PTFE (1-1/4" to 2")
		11. Body	A351-CF8M



STAINLESS STEEL BALL VALVE WITH
 SPRING RETURN HANDLE

NUMBER	SIZE	A	B	C	D	Wt.
76-501-01	1/4"	.37	1.03	2.06	7.00	1.26
76-502-01	3/8"	.37	1.03	2.06	7.00	1.25
76-503-01	1/2"	.50	1.12	2.25	7.00	1.31
76-504-01	3/4"	.68	1.50	3.00	7.00	1.98
76-505-01	1"	.87	1.68	3.37	7.00	2.35
76-506-01	1-1/4"	1.00	2.00	4.00	9.00	3.96
76-507-01	1-1/2"	1.25	2.18	4.37	9.00	4.78
76-508-01	2"	1.50	2.75	5.50	9.00	6.66

OPTIONS AVAILABLE:

(SUFFIX)	OPTION	SIZES
-08-	90° Reversed Stem	1/4" to 2"
-14-	Side Vented Ball (Uni-Directional)	1/4" to 2"
-21-	UHMWPE Seats (Non-PTFE)	1/4" to 2"
-24-	Graphite Packing	1/4" to 2"
-35-	VTPE Trim	1/4" to 2"
-49-	Assembled Dry	1/4" to 2"
-57-	Oxygen Cleaned	1/4" to 2"
-60-	Grounded Ball & Stem	1/4" to 2"
-P01-	BSPP (Parallel) Thread Connection	1/4" to 2"
-T01-	BSPT (Tapered) Thread Connection	1/4" to 2"

HAND SUMP PUMP
 DEADMAN VALVE

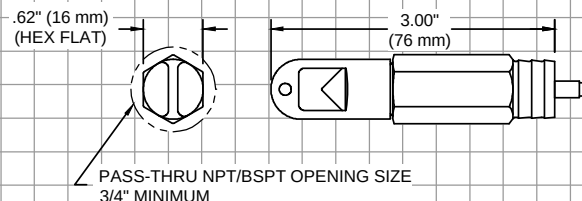
For Pressure/Temperature Ratings,
Refer to Page M-12, Graph No. 14
(1/4" to 1")
Refer to Page M-11, Graph No. 12
(1-1/4" to 2")

Solid-State, Electro-Optic Secondary Containment Leak Sensor with Fault Detection

INTERSTITIAL
SENSOR -
CONNECTED TO
TMS4000 CONSOLE



Outline Specifications



Product Description

The Model ES825-100 Series is a solid-state, electronic leak sensor utilizing electro-optic technology to detect the presence of liquids in secondary containment applications. The sensor contains no moving parts, is unaffected by vapors, and due to its compact size is ideal for interstitial spaces. When connected with a LC2000 or TMS2000/3000/4000 controller, the ES825-100 Series supports Pneumercator's FAULT-DETECT supervised wiring technology, which automatically detects sensor or field wiring faults.

Applications

- Dry Annular Space in Double-Wall Tanks
- Containment, Manway and Piping Sumps
- Dispenser Pan
- Turbine Enclosures

Specifications

- | | |
|------------------------------------|---|
| • Technology: | Electro-optic, no moving parts |
| • Wetted Materials: | TPU, PVC (F), FEP Teflon (XF), Epoxy, and Polypropylene |
| • Operating Temperature: | -5 °F to 165 °F (-20 °C to 75 °C) (F); -65 °F to 185 °F (-55 °C to 85 °C) (XF) |
| • Cable: | 22 AWG, 3-Conductor, PVC-jacketed, (FEP Teflon-jacketed for XF), 25' (7.6 m) Length |
| • Pass-thru NPT/BSPT Opening Size: | Minimum 3/4" |
| • Location Approval*: | UL Class I, Div 1, Groups C and D; cUL Class I, Zone 0, Group IIB |
| • Compatible With: | LC2000, TMS2000, TMS3000, TMS4000 |

Installation

Sensor may be suspended by its cable, placed on the containment or sump floor, or thru-wall mounted via a 1/4" FNPT opening. For dry annular applications, sensor may be pulled through using fish tape attached to sensor pull ring, or pushed through with a section of 1/2" ENT (not included) attached to the back end of the sensor.

Certifications/Approvals

- UL/cUL Approved, File #E139464
- Third-Party EPA Listed*

Ordering

- | | |
|---------------------|---|
| • ES825-100F | PVC-Jacketed Cable |
| • ES825-100XF | FEP Teflon-Jacketed Cable, Extended Temperature Range |

*When used in conjunction with the LC2000/TMS2000/TMS3000/TMS4000 controllers

Note: Specifications subject to change without notice. 10-07-2022



Pneumercator Company, Inc.
1785 Expressway Drive North
Hauppauge, New York 11788

Tel: 631-293-8450
Fax: 631-293-8533

<http://www.pneumercator.com>

OVERFILL PREVENTION
VALVE WITH FLOAT AND
PRE-CHECK, 3", MODEL:
181A016-0301282P

modulating float valve with check feature

installation, operating,
and
maintenance instructions

model 8101-6

GENERAL DESCRIPTION

The OCV Model 8101-6 is designed to maintain a constant level in a tank or reservoir by modulating the flow into the tank via the 812 Rotary Float Pilot, and acting as a check valve in the event of reverse flow. It can also be used for on-off service where it is acceptable or advantageous to throttle the valve over the last few inches of level change.

INSTALLATION

The main valve and pilots are installed as shown on the attached schematic. **NOTE:** For proper operation, the modulating float valve requires an inlet pressure at least 5 psi greater than tank head.

The Model 812 is easily installed in the tank, usually simply suspended by its 3/8" NPT supply connection. For modulating applications, the float pilot is located so the centerline of the float is at the desired liquid level with the float arm rotated to its mid-travel position. For shutoff applications, the float pilot is located so the float is at the desired high level with the float arm rotated to its full "up" position.

Finally a single, customer-supplied sense line is installed between the 7B ball valve and the float pilot, as shown. For proper operation, this line should have an I.D. of 3/8" or larger.

THEORY OF OPERATION

Operation of the 8101-6 and may be seen by referring to the schematic diagram.

The positioning (modulation) of the main valve (1) is

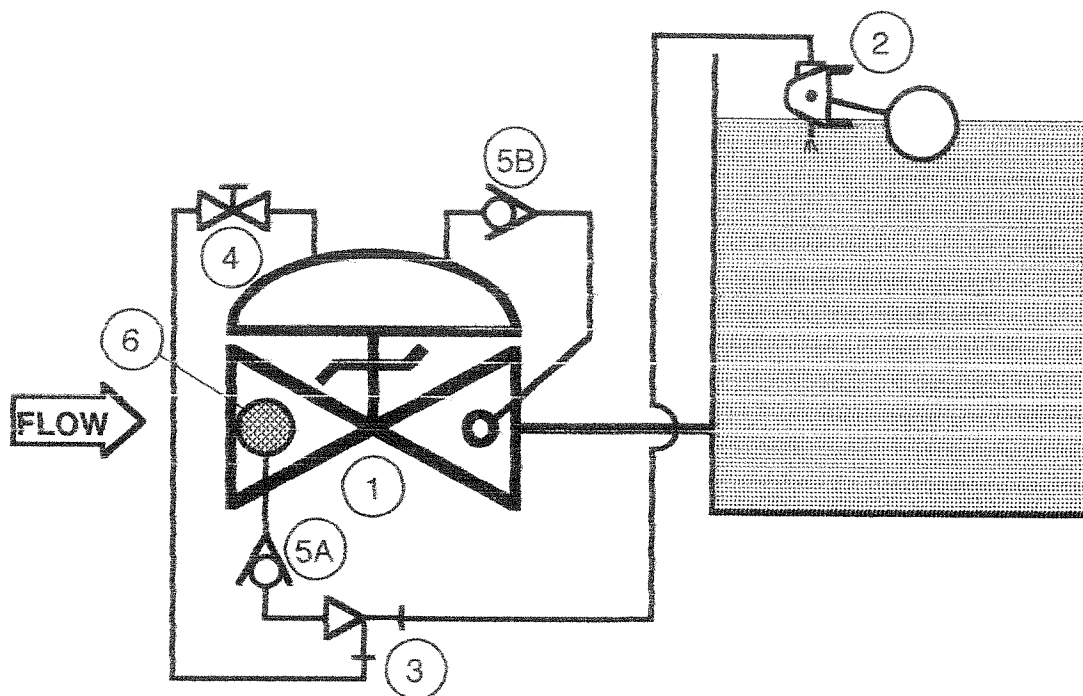
governed by the amount of pressure applied to the upper side of its diaphragm. The amount of pressure is, in turn, determined by the balance of flows on and off the main valve bonnet. A fixed supply is provided to the bonnet from the ejector (3). A variable exhaust from the bonnet is provided by the float pilot (2). A movement of the float toward the "open" position increases the exhaust relative to the supply, and allows main line pressure acting under the seat of the main valve (1) to open the valve wider. Conversely, movement of the float toward the "closed" position restricts the exhaust relative to the supply, which forces the main valve further closed. In most applications the actual modulation will be over a narrow range in order to hold the tank level constant. The float pilot is built so that increasing level tends to **close** the valve.

CONTROLS ADJUSTMENT

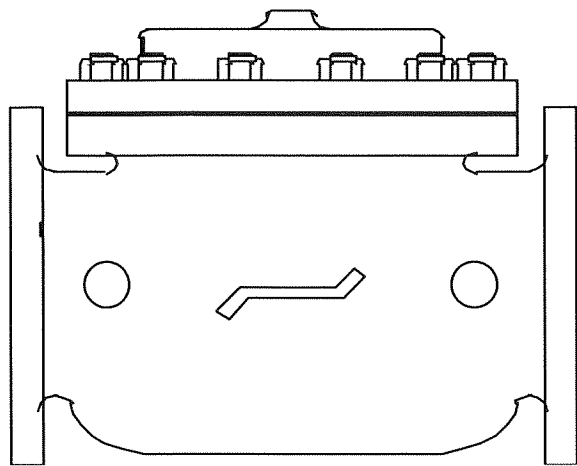
The adjustable controls on the 8101-6 are the two flow control valves (4A & 4B) if so equipped, or needle valve (4). Turning the needle valve counterclockwise will allow the valve to open and close faster. Turning the needle valve clockwise will slow down both the closing and opening speeds. If the valve is equipped with separate opening and closing speed controls, see the schematic for adjustment directions. **CAUTION:** Never close the needle valve or flow control valves all the way, lest the main valve be rendered inoperative.

MODEL 8101-6

HIGH LEVEL SHUTOFF VALVE WITH REVERSE FLOW CHECK (Fuel Service)



ITEM	PART NO.	QTY	DESCRIPTION
1	65	1	BASIC VALVE ASSEMBLY (Fail Closed)
2	812	1	FLOAT PILOT
3	126	1	EJECTOR
4	141-2	1	NEEDLE VALVE
5	141-1	2	CHECK VALVE
6	123	1	INLINE STRAINER



installation, operating, and maintenance instructions

series 65

basic control valve

GENERAL DESCRIPTION

The OCV Series 65 is a hydraulically-operated, diaphragm-actuated valve. It is available in either a globe (Model 65) or angle (Model 65A) configuration. The diaphragm is nylon-fabric bonded with synthetic rubber and forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. An elastomeric seat disc forms a tight seal with the valve seat when pressure is applied above the diaphragm.

FUNCTIONAL DESCRIPTION

Because the Series 65 is a hydraulically operated valve, it requires a minimum line pressure of approximately 5 psig in order to function. The valve functions on a simple principle of pressure differential. The line pressure at the inlet of the valve is bypassed through the pilot control piping to the diaphragm chamber of the valve. This pressure, together with the valve spring, works against the pressure under the valve seat. Because the effective area of the diaphragm is greater than that of the seat, the valve is held tightly closed. As the controlling pilot(s) allow the pressure to bleed off the diaphragm chamber, the two opposing pressures begin to balance and the valve will begin to open. The valve can be used to perform a simple on-off function, or with the proper pilot system, a modulating, or regulating function.

In cases where the line fluid is unusually dirty, or is otherwise unsuitable for operating the valve, an independent operating pressure source may be employed. The pressure available from such a source must be equal to, or greater than, line pressure.

INSTALLATION

In order to insure safe, accurate and efficient operation of the OCV control valve, the following list of checkpoints and procedures should be followed when installing the

valve.

1. Make a careful visual inspection of the valve to insure that there has been no damage to the external piping, fittings or controls. Check that all fittings are tight.
2. Thoroughly flush all interconnecting piping of chips, scale and foreign matter prior to mounting the valve.
3. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.
4. Allow sufficient room around the valve for ease of adjustment and maintenance service.

In addition, it is highly recommended that:

1. Isolation valves (eg., gate or butterfly) be installed on the inlet and discharge sides of the valve to facilitate isolating the valve for maintenance.
2. Pressure gauges be installed at the inlet and outlet sides of the valve to provide monitoring of the valve during initial start-up and during operation. The body side ports, if unused by the pilot system, provide a convenient connection for the gauges.
3. All valves larger than 6" be installed horizontally, i.e., with the bonnet pointed up, for ease of adjustment and maintenance servicing.

MAINTENANCE

The OCV control valve requires no lubrication and a minimum of maintenance. However, a periodic inspection should be established to determine how the fluid being handled is affecting the efficiency of the valve. In a water system, for example, the fluid velocity as well as the substances occurring in natural waters, such as dissolved minerals and suspended particles, vary in every installation. The effect of these actions or substances must be determined by inspection. It is recommended that an annual inspection, which includes ex-

amination of the valve interior, be conducted. Particular attention should be paid to the elastomeric parts, i.e., the diaphragm and seat disc. Any obviously worn parts should be replaced.

REPAIR PROCEDURES

In the event of malfunction of the OCV control valve, troubleshooting should be conducted according to the procedures outlined for the specific model of valve. Then, if those steps indicate a problem with the main valve, this section will outline the procedures necessary to correct the problem.

Problems with the main valve can be classed in three basic categories:

1. VALVE FAILS TO OPEN
 - a. Diaphragm damaged* - See Procedure A
 - b. Stem binding - See Procedure B
2. VALVE FAILS TO CLOSE
 - a. Diaphragm damaged* - See Procedure A
 - b. Stem binding - See Procedure B
 - c. Object lodged in valve - See Procedure B
3. VALVE OPENS AND CLOSES BUT LEAKS WHEN CLOSED

a. Seat disc damaged - See Procedure C
b. Seat ring damaged - See Procedure D

**A diaphragm failure can prevent the valve from either opening or closing, depending on the flow direction. Most water service valves flow "under the seat", in which case a diaphragm failure will keep the valve from closing. On the other hand, most fuel service valves flow "over the seat", in which case a diaphragm failure will keep the valve from opening. To determine which you have, examine the bridge mark cast into the side of the valve body, then compare it with the figures below.*

PROCEDURE A : DIAPHRAGM REPLACEMENT

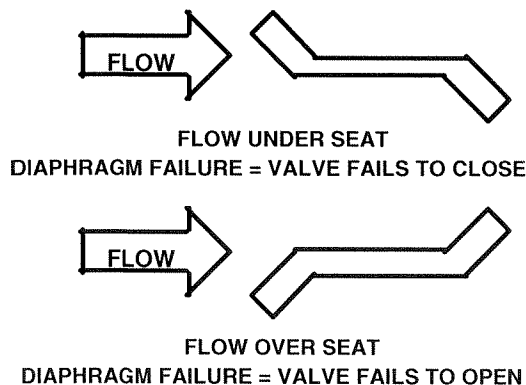
1. Isolate the valve from the system by closing upstream and downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in place, it may be loosened by rapping sharply around its edge with a rubber-headed mallet. *NOTE: 8" and larger valves are equipped with eye bolts through which a chain can be fastened to aid in*

lifting the bonnet.

6. Remove the spring.
7. Remove the diaphragm plate capscrews and the diaphragm plate.
8. Remove the old diaphragm.
9. Making sure the dowel pin holes are in the proper location, place the new diaphragm over the studs and press down until it is flat against the body and spool.
10. Replace the diaphragm plate and the diaphragm plate capscrews.
11. Tighten all diaphragm plate capscrews snugly.
12. Replace the spring.
13. Replace the bonnet and reinstall the bonnet nuts.
14. Tighten the bonnet nuts snugly using a criss-cross tightening pattern.
15. Reinstall the control tubing.
16. Reopen the upstream and downstream block valves.
17. Before placing the valve back in service, perform the air bleed procedure described in the first section of this manual.

PROCEDURE B: CORRECTION OF BINDING STEM

1. Perform Steps 1 thru 6 of Procedure A, above.
2. Remove the spool assembly from the valve. *NOTE:*



On smaller valves, this can be accomplished simply by grasping the stem and pulling upward. Valves 6" and larger have the top of the stem threaded to accept an eyebolt to aid in lifting the spool out of the body. 6" thru 12" valves are threaded 3/8-16. 14" and 16" valves are threaded 5/8-11.

3. Carefully examine both ends of the stem for deep scratches, scoring or buildup of mineral deposits.

Polish the stem if necessary using a fine grade of emery cloth.

4. Similarly, examine and polish the upper bushing (in the bonnet) and the lower guide (in the seat ring).
5. Reinstall the spool assembly.
6. Reassemble the valve, following Steps 12 thru 17 in Procedure A.

PROCEDURE C: SEAT DISC REPLACEMENT

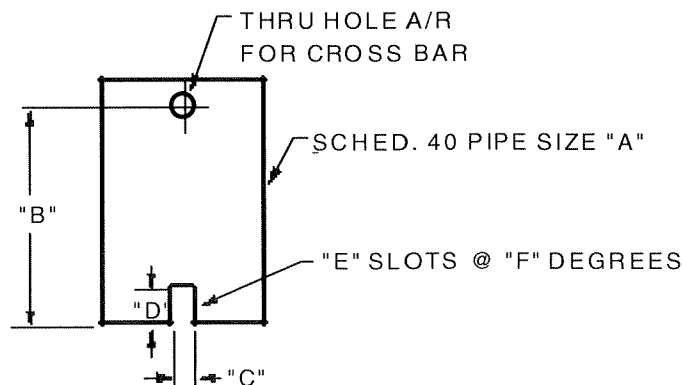
1. Perform Steps 1 and 2 of Procedure B, above.
2. With the spool assembly removed from the body, remove the seat retainer screws.
3. Slide the seat retainer off the lower end of the stem.
4. Remove the seat disc from its groove in the spool.
NOTE: The seat disc may fit quite tightly in the groove. If necessary, it may be pried out using a thin-bladed screwdriver or similar tool.
5. Install the new seat disc in the groove.
6. Reinstall the seat retainer and tighten the seat retainer screws.
7. Reassemble the valve, following Steps 5 and 6 of Procedure B.

PROCEDURE D: SEAT RING REPLACEMENT

NOTE: It is rare for a seat ring to require replacement. Minor nicks and scratches in the seating surface can usually be smoothed out with emery cloth.

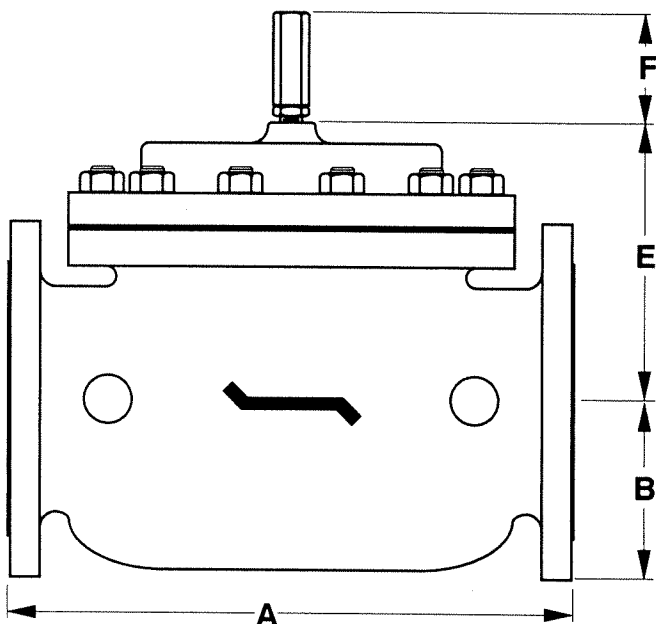
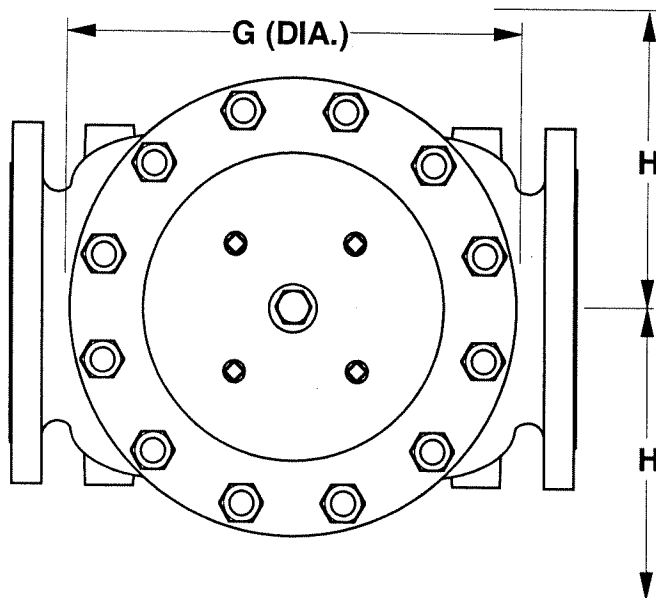
1. Perform Steps 1 and 2 of Procedure B, above.
2. If you are working on a 4" or smaller valve, follow Steps 3 thru 9, below.
3. If you are working on a 6" or larger valve, follow Steps 10 thru 16, below.

4. Seat rings in valves 4" and smaller are threaded into the valve body. To remove, you will need a special seat ring tool. You may fabricate one using standard pipe as shown in the sketch below, or one may be purchased from OCV.
5. Using the seat ring tool, unthread the seat ring from the body.
6. Remove the old o-ring from the counterbore in the body.
7. Install the new o-ring in the counterbore.
8. Using the seat ring tool, install the new seat ring.
9. Reassemble the valve, following Steps 5 & 6 of Procedure B.
10. Seat rings in valves 6" and larger are bolted into the body with socket head capscrews. In addition you will note that the seat ring is equipped with additional threaded holes that may be used for "jacking" the seat ring out of the body.
11. Remove the socket head capscrews.
12. Remove the old seat ring from the body by temporarily installing two or more of the capscrews in the "jacking" holes.
13. Install a new o-ring in the groove of the new seat ring. Lubricate the o-ring and outer seat ring wall with Vaseline® or similar lubricant.
14. Install the new seat ring in the body, making sure that the capscrew holes line up.
15. Replace and tighten all the capscrews.
16. Reassemble the valve, following Steps 5 and 6 of Procedure B.

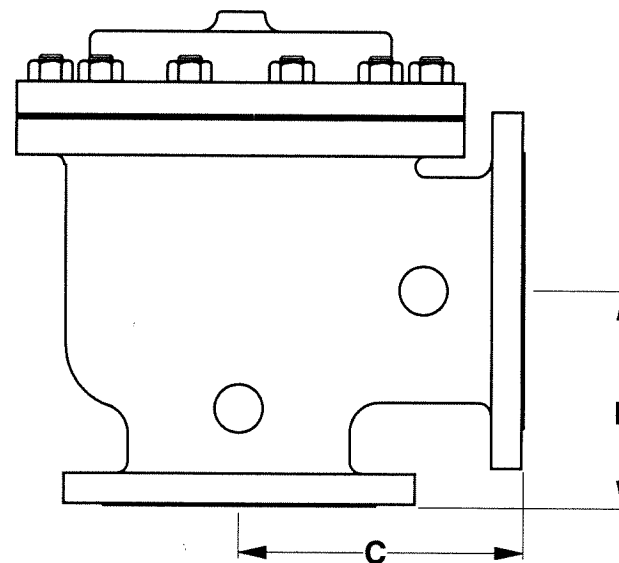


VALVE SIZE	"A" PIPE SIZE	"B" MIN. LENGTH	"C" SLOT WIDTH	"D" SLOT DEPTH	"E" NO. OF SLOTS	"F" SLOT SPACING
1-1/4"	3/4"	6"	3/8"	3/8"	2	180°
1-1/2"	3/4"	6"	3/8"	3/8"	2	180°
2"	1-1/2"	7"	3/8"	3/8"	2	180°
2-1/2"	2"	8"	1/2"	1/2"	3	120°
3"	2-1/2"	9"	5/8"	5/8"	2	180°
4"	3"	10"	5/8"	5/8"	2	180°

REVISED 3-17-97



DIM	ANSI CLASS	VALVE SIZE												
		1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	24
A	S.E	8.75	8.75	9.88	10.50	13.00	—	—	—	—	—	—	—	—
	150	8.50	8.50	9.38	10.50	12.00	15.00	17.75	25.38	29.75	34.00	39.00	40.38	62.00
	300	8.75	8.75	9.88	11.12	12.75	15.62	18.62	26.38	31.12	35.50	40.50	42.00	63.75
B	SE	1.44	1.44	1.69	1.88	2.25	—	—	—	—	—	—	—	—
	150	2.31	2.50	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.62	11.75	16.00
	300	2.62	3.06	3.25	3.75	4.12	5.00	6.25	7.50	8.75	10.25	11.50	12.75	18.00
C	SE	4.38	4.38	4.75	6.00	6.50	—	—	—	—	—	—	—	—
	150	4.25	4.25	4.75	6.00	6.00	7.50	10.00	12.69	14.88	17.00	—	20.81	—
	300	4 3/8	4.38	5.00	6.38	6.38	7.81	10.50	13.19	15.56	17.75	—	21.62	—
D	SE	3.12	3.12	3.88	4.00	4.50	—	—	—	—	—	—	—	—
	150	3.00	3.00	3.88	4.00	4.00	5.50	6.00	8.00	11.38	11.00	—	15.69	—
	300	3.25	3.25	4.12	4.38	4.38	5.81	6.50	8.50	12.06	11.75	—	16.50	—
E	ALL	6.00	6.00	6.00	7.00	6.50	7.92	10.00	11.88	15.38	17.00	18.00	19.00	27.00
F	ALL	3.88	3.88	3.88	3.88	3.88	3.88	3.88	6.38	6.38	6.38	6.38	6.38	8.00
G	ALL	6.00	6.00	6.75	7.69	8.75	11.75	14.00	21.00	24.50	28.00	31.25	34.50	52.00
H	ALL	10.00	10.00	11.00	11.00	11.00	12.00	13.00	14.00	17.00	18.00	20.00	20.00	28.50



NOTE: 3" VALVE DIMENSIONS
ARE FOR NEW MODEL 3100

4" VALVE DIMENSIONS ARE FOR
NEW MODEL 4400

REV. A SDJ 6-6-02
REV. B SDJ 2-3-03

TOLERANCES		 OCV Control Valves TULSA, OKLAHOMA U.S.A.		
UNLESS NOTED				
FRACTIONAL $\pm 1/64$				
DECIMAL $\pm .005$				
MACH. FINISH 125/ ANGULAR $\pm 1/2^\circ$		GENERAL VALVE DIMENSIONS		
DRAWN BY SDJ				
DATE 10-6-97		A	65D	B
CHKD. BY				
DATE				

installation, operating, and maintenance instructions

rotary float pilot

model 812

GENERAL DESCRIPTION

The OCV Model 812 Rotary Float Pilot is a float-actuated, two-port pilot valve designed for use as the primary control device for the OCV Series 8100 float-controlled valves. It can be used for modulating service where it is desired to balance tank input and output, thus holding level constant, or as a high level shutoff device where it is permissible or desirable to throttle the main valve slowly closed over the last few inches of level change.

INSTALLATION

The 812 can be most conveniently mounted in the tank by suspending it by its 3/8" NPT supply connection. The other end of the supply line is connected as follows:

1. For valve models 8101, 8111, 8121, 8131, 8141 and 8151, the supply line is connected to the downstream end of the ejector. (Note: These models are typically 8" and smaller valves.)
2. For valve models 8104, 8114, 8124, 8134, 8144 and 8154, the supply line is connected to the bonnet sense tap of the Model 1356 Differential Control Pilot. (Note: These models are typically 10" and larger valves.) Minimum recommended supply line size is as follows:
 1. 1/4" pipe or 3/8" tubing for runs up to 20 ft.
 2. 3/8" pipe or 1/2" tubing for runs over 20 ft.

The proper vertical location of the pilot in the tank depends on the intended usage:

1. For the modulating float valve application, the 812 should be installed so that when the float arm is horizontal (i.e., at the midpoint of its travel), the centerline of the float is at the desired level which is to be maintained.
2. For the high-level shutoff application, the 812 should be installed so that the float is at the desired high level point when rotated to its uppermost position.

Regardless of the application, the 812 should be installed inside a stilling well if there is any significant wave action on the liquid surface.

THEORY OF OPERATION

The basic principle of operation of the 812 pilot is quite simple and straightforward. There are three flow passages in the pilot disc, and a matching set of flow passages in the pilot body. The pilot disc is connected to the float arm by means of an arbor. At one extreme of rotation of the float arm, the flow passages in the disc and body are aligned, and full flow is allowed through the pilot from the supply port to the exhaust port. At the other extreme of rotation, the flow passages in the disc and body are not aligned, and flow through the pilot is blocked.

Due to the size and geometry of the flow passages in the disc and body, there is a considerable portion of the float

arm rotation period where the flow passages are partially aligned. Thus, there is a "variable orifice" effect as rotation takes place between full open and full closed. This effect is used as a variable sense on the Modulating Float Valve.

MAINTENANCE

Because of the simplicity of design of the 812 pilot, as well as its general inaccessibility in the tank, required maintenance is minimal. Most malfunctions of the pilot are caused by grit and particulate matter in the flow stream; therefore, the best preventative maintenance for the pilot is a clean and full-functioning line strainer on the main valve.

TROUBLESHOOTING

There are basically only two ways the 812 pilot can malfunction:

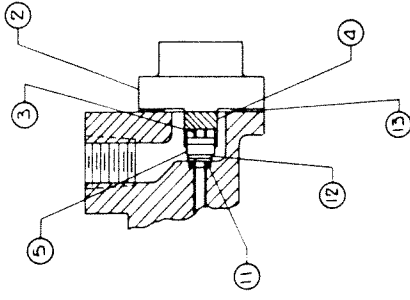
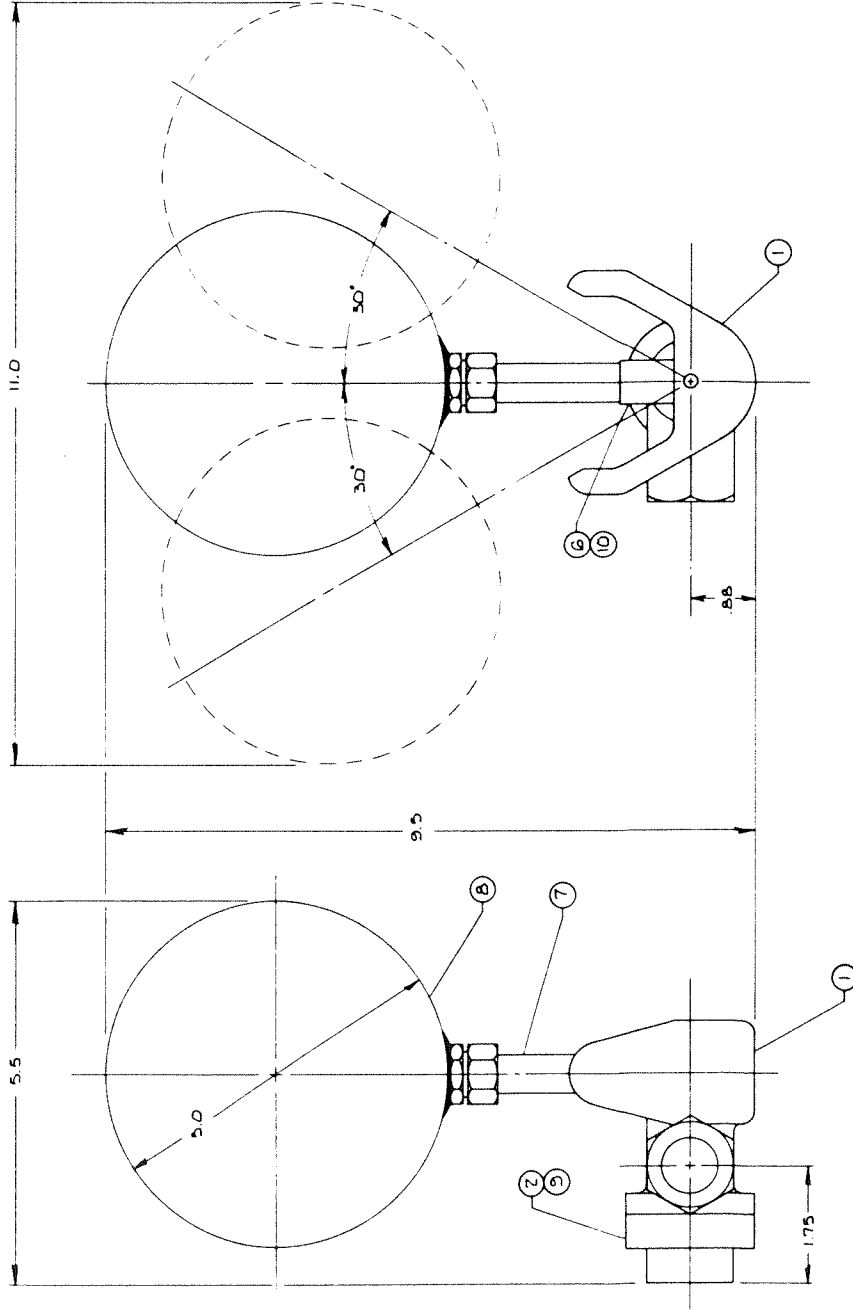
1. Clogged flow passages which restrict flow through the pilot. This will generally be evident in failure to open the main valve. Often, the clog can be cleared without disassembling the pilot by rotating the float arm until the flow passages line up, then blowing through the exhaust port with compressed air.
2. Inability of the pilot to shut off properly due to foreign matter trapped between the disc and body,

or scoring of the mating surfaces of the disc and body. This will generally be evident in failure to close the main valve. Here the pilot must be disassembled in order to clear the malfunction.

If the pilot must be disassembled, it is important that the following steps be rigidly followed:

1. As the pilot is disassembled, mark the following sets of parts so that proper orientation can be maintained on reassembly.
 - (a) Bonnet in relation to body
 - (b) Disc in relation to body
 - (c) Arbor in relation to disc
2. Carefully separate the disc and body and examine the mating surfaces. Any buildup of foreign material should be carefully removed using a clean, soft cloth. If excessive scoring of the mating surfaces is evident, the body and disc should be replaced.
3. Apply a light coating of Dow Corning Valve Seal* to the mating surfaces of disc and body. Place the disc against the body using the orientation marks applied in Step 1.
4. Reassemble the pilot, taking special care to observe proper orientation of parts.

*NOTE: Dow Corning Valve Seal is the only lubricant approved for use in this pilot.

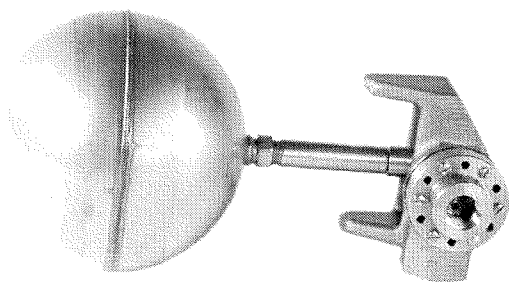


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DESCRIPTION

MODEL 812 MODULATING PILOT

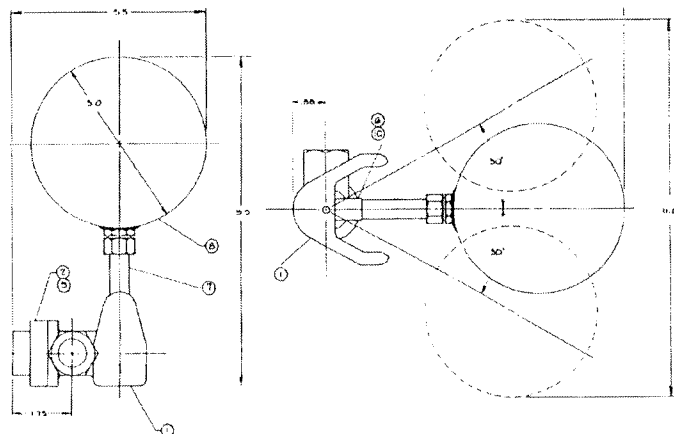
- Two port, rotary disc design
- Remote mounted
- Simple installation
- Optional manual tester available



The Model 812 Float Pilot is two-way, rotary-disc design suitable for both modulating and on-off service. In modulating service, the 812 can be configured for either flow into the tank (rising float closes main valve) or out of the tank (rising float opens main valve). In either, the valve maintains a constant level. Positive shut-off of the main valve is accomplished if the level raises the float to its highest position.

The 812 pilot operates the main valve directly on OCV Series 8101 and 8111 Float Valves, and operates main valve through the 1356 Differential Pilot on OCV Series 8104 and 8114 Float Valves.

MODEL 812 MATRIX



- | | | | |
|-----------------------------|----------------------|-----------------------|--------------------|
| Model 812 Modulating Pilot: | 4. Disc | 8. Float | 12. Washer, Thrust |
| 1. Body | 5. Arbor | 9. Screw, Filler Head | 13. Gasket |
| 2. Bonnet | 6. Float Arm Adapter | 10. Screw, Flat Head | |
| 3. Spring | 7. Float Arm | 11. O-Ring | |

MATERIAL	PART NUMBER	PORT SIZE (NPT)
Bronze, Buna-N	230115	3/8
Stn. Steel, Buna-N	230715	3/8

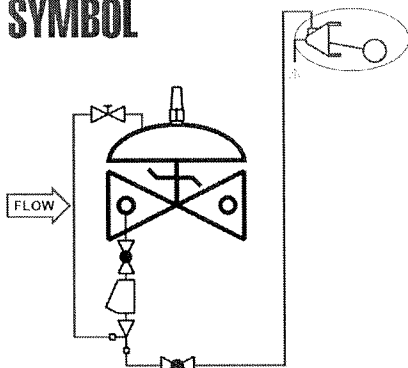
INSTALLATION

The 812 is easily installed in the tank. The supply piping from the main valve connected to the 3/8" NPT inlet port holds the pilot at the desired level. Minimum recommended size for this line is 1/2" OD tubing or 3/8" pipe. The 3/8" exhaust port may be left open to flow into the tank, or piped back to the discharge of the main valve. The latter should be done to avoid cross-connection or with flammable liquids.

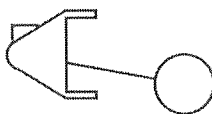
MATERIALS

- Body, disc, arbor: Type 303 Stainless Steel
- Bonnet: B61 Bronze (standard), CF8-M Stainless Steel (optional)
- Float: Type 304 Stainless Steel, 5" diameter
- Body gasket: Buna-N standard, Viton®, EPDM optional

SCHEMATIC SYMBOL

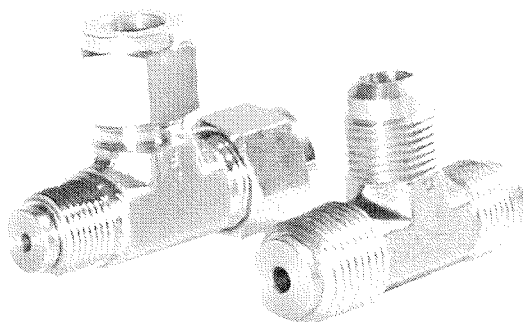


The Model 812 is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 8101 Modulating Float Valve.

DESCRIPTION



MODEL 126 EJECTOR

The Model 126 ejector is a simple tee fitting with a fixed orifice in its inlet port. It provides the proper supply pressure to the main valve diaphragm chamber, allowing various two-way control pilots to control the valve position.

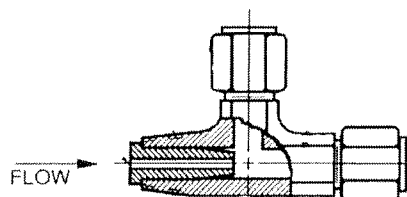
MODEL 126 EJECTOR DIAGRAM

Brass Construction / Stainless Steel Construction

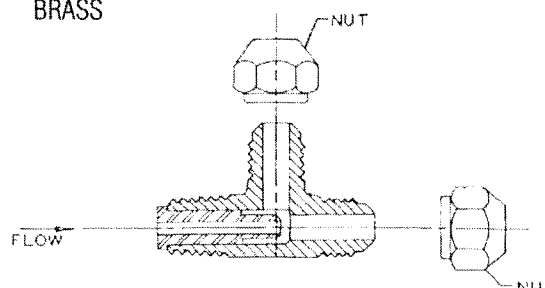
MATERIAL	PART NUMBER	P (NPT)	T-TUBE O.D.	STD. ORIFICE	USED ON VALVE SIZES
Brass	213100	3/8"	3/8"	.125"	1 1/4"-6"
Brass	214100	1/2"	1/2"	.188"	8"-10"
Brass	215100	3/4"	3/4"	.188"	12"-16"
316 Stn. Steel	213700	1/4"	3/8"	.090"	1 1/4"-6"
316 Stn. Steel	214700	3/8"	1/2"	.125"	8"-10"
316 Stn. Steel	215700	1/2"	3/4"	.188"	12"-16"

Orifice bushings are stainless steel.

STAINLESS



BRASS

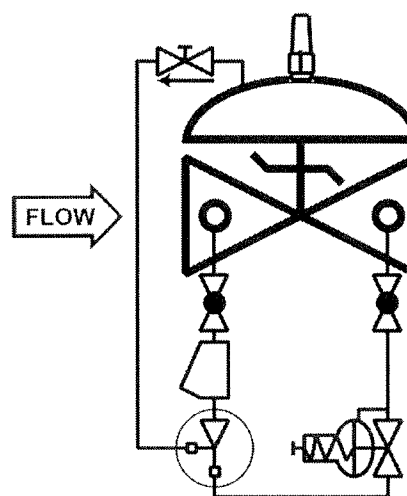


SCHEMATIC SYMBOL

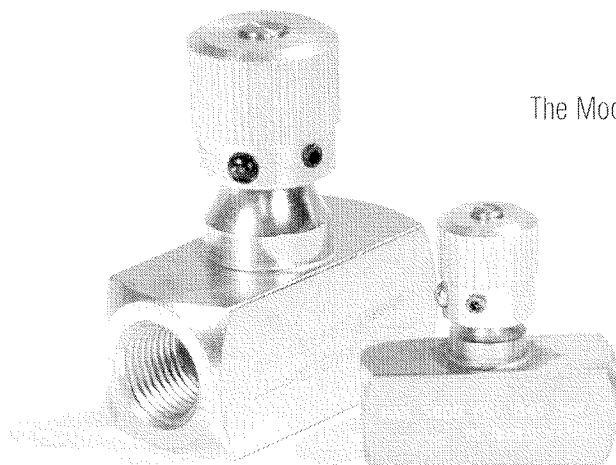
The Model 126 Ejector is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 127-3 Pressure Reducing Valve



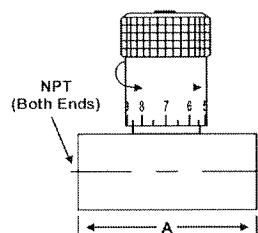
DESCRIPTION



The Model 141-2 Needle Valve is an adjustable restriction device installed in the control circuit tubing. The setting of the needle valve meters the flow into and out of the main valve diaphragm chamber, thus controlling the response speed of the main valve. Depending on the application, the needle valve may be used as a closing speed control, opening speed control, or both simultaneously.

◀ Needle Valves shown
Sizes: 3/4" & 1/4"

MODEL 141-2 MATRIX

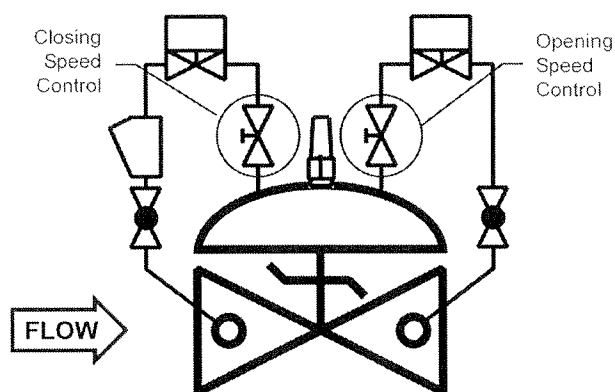


MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	A	USED ON VALVE SIZE*
Brass	683100	1/4	2	1 1/4"-2"
Brass	683101	3/8	2 1/4	2 1/2"-6"
Brass	683102	1/2	2 5/8	8"-10"
Brass	683103	3/4	3 1/4	12"-16"
Stn. Steel	683700	1/4	2	1 1/4"-2"
Stn. Steel	683702	3/8	2 1/4	2 1/2"-6"
Stn. Steel	682704	1/2	2 5/8	8"-10"
Stn. Steel	683703	3/4	3 5/8	12"-16"

Note: Needle valve size may vary on valve application. Consult factory.

SCHEMATIC SYMBOL

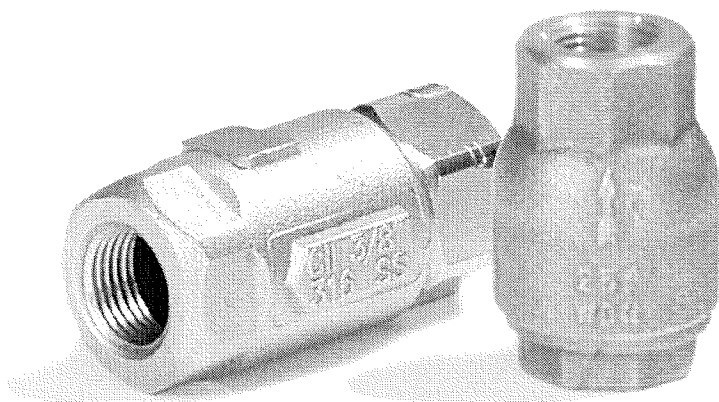
The Model 141-2 Needle Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 115-3 DIGITAL VALVE as separate opening and closing speed controls.

DESCRIPTION

The Model 141-1 Check Valve uses a spring-loaded poppet that will allow flow in one direction only. It is the primary component used on valves with a reverse flow check function. Flow is in the direction of the arrow on the check valve body.



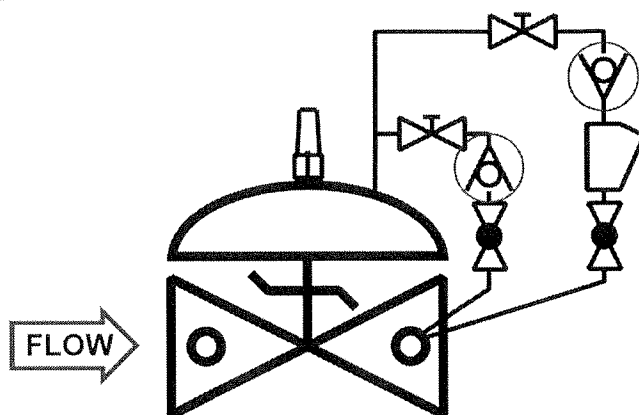
Check Valves shown
Stainless Steel & Brass

MODEL 141-1 MATRIX

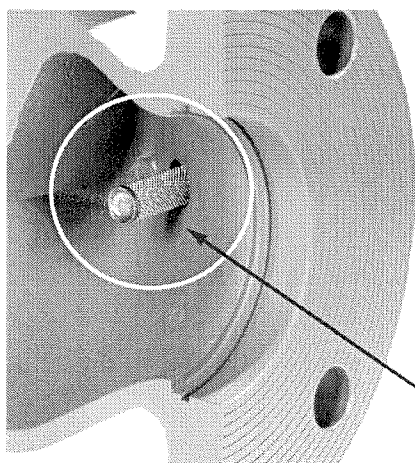
MATERIAL	PART NUMBER	INLET/OUTLET (NPT)	LENGTH	USED ON VALVE SIZE
Bronze	681100	3/8	2	1 1/4"-6"
Bronze	681101	1/2	2 1/8	8"-10"
Bronze	681102	3/4	2 1/4	12"-16"
Stn. Steel	681700	3/8	2 5/16	1 1/4"-6"
Stn. Steel	681701	1/2	2 5/16	8"-10"
Stn. Steel	681702	3/4	2 7/8	12"-16"

SCHEMATIC SYMBOL

The Model 141-1 Check Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a
MODEL 94-3 Check Valve.



Strainer Shown Installed

DESCRIPTION

The 123 Inline Strainer installs in the inlet side port of the main valve, and protects the pilot system from solid contaminants in the line fluid. The screen prevents the entrance of particles into the pilot system piping while flow through the main valve washes the screen clean. Recommended use on petroleum valve applications where flushing or removal of the screen for cleaning is not practical or may be considered hazardous.

DIMENSIONS

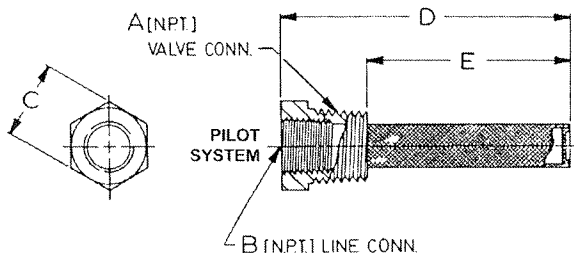
PART NUMBER	A	B	C	D	E	USED ON VALVE SIZE
660704	3/8	1/4	11/16	2 3/16	1 1/2	1 1/4"-6"
660705	1/2	3/8	7/8	2 1/4	1 1/2	8"-10"
660706	3/4	1/2	1 1/8	2 3/8	1 1/2	12"-16"

MATERIALS

Inline strainers are all-stainless steel construction.

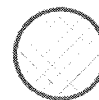
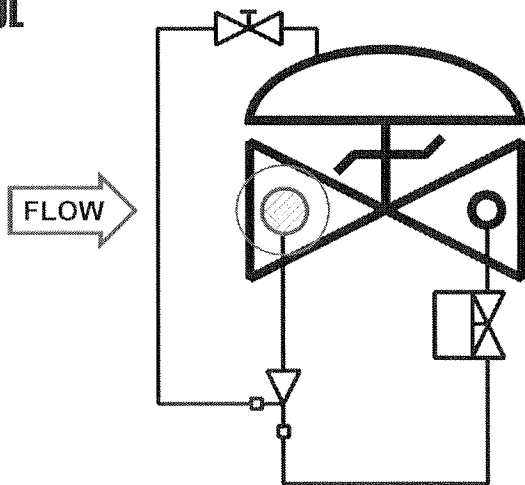
SCREEN SIZE

Standard screen is 40 mesh. Other mesh sizes are available.



SCHEMATIC SYMBOL

The Model 123 Inline Strainer is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 115-2 Solenoid Valve.



Model 246 Series Swing Check Valve

SPECIFICATION SHEET

Application

Designed to prevent backflow in horizontal piping systems. Swing check valves allow liquid to flow in a single direction.

Features and Details

- Durable metal-to-metal seats
- Thermal expansion relief available in 25 or 50 PSI settings
- 200 PSI cold non-shock pressure limit
- **246DRF** has 150# raised face flange connections

Materials of Construction

246A

- Body and cap... Brass
- Internal components... Brass
- Gasket... Nitrile composite
- Expansion relief valve... Brass and Viton®

246ADI & 246DRF

- Body and cap... ductile iron
- Internal components... ductile and stainless steel
- Gasket... Teflon®
- Expansion relief valve... Stainless steel and Viton®

Item Number	A	B	C	D	E	F	G	H	Weight
246A--0100 AV	1½"	THD		BR	N/A	N/A	3⅞"	4⅞"	3.50
246A--0200 AV	2"	THD		BR	N/A	N/A	4⅞"	5⅜"	6.0
246A--0400 AV	3"	THD		BR	N/A	N/A	6½"	7¼"	13.20
246A--0500 AV	1½"	THD		BR	N/A	25	3⅞"	4⅞"	3.50
246A--0600 AV	2"	THD		BR	N/A	25	4⅞"	5⅜"	6.0
246A--0800 AV	3"	THD		BR	N/A	25	6½"	7¼"	13.20
246A--2100 AV	1½"	THD		BR	N/A	50	3⅞"	4⅞"	3.50
246A--2200 AV	2"	THD		BR	N/A	50	4⅞"	5⅜"	6.0
246A--2400 AV	3"	THD		BR	N/A	50	6½"	7¼"	13.20
246ADI0150 AV	1½"	THD		DI	TEF	N/A			5.50
246ADI0200 AV	1½"	THD		DI	TEF	25			5.50
246ADI0250 AV	1½"	THD		DI	TEF	50			5.20
246ADI0500 AV	2"	THD		DI	TEF	N/A	4⅞"	5⅜"	5.50
246ADI0600 AV	3"	THD		DI	TEF	N/A	6½"	7¼"	12.50
246ADI0300 AV	2"	THD		DI	TEF	25	4⅞"	5⅜"	5.50
246ADI0400 AV	3"	THD		DI	TEF	25	6½"	7¼"	12.50
246ADI0900 AV	2"	THD		DI	TEF	50	4⅞"	5⅜"	5.20
246ADI0800 AV	3"	THD		DI	TEF	50	6½"	7¼"	12.50
246DRF0100 AV	3"	FL	4	DI	TEF	N/A	8⅞"	8⅞"	26.75
246DRF0200 AV	3"	FL	4	DI	TEF	25	8⅞"	8⅞"	26.75
246DRF0300 AV	3"	FL	4	DI	TEF	50	8⅞"	8⅞"	26.75
246DRF0400 AV	4"	FL	8	DI	TEF	N/A	11¼"	11½"	71.0
246DRF0500 AV	4"	FL	8	DI	TEF	25	11¼"	11½"	71.0
246DRF0600 AV	4"	FL	8	DI	TEF	50	11¼"	11½"	71.0



SPECIFICATION OPTIONS:

- A—Size (inches)
- B—Threaded (THD), Flanged (FL)
- C—Number of bolt holes
- D—Brass (Brass), Ductile iron (DI), Aluminum (AL)
- E—Teflon (TEF)
- F—Expansion relief setting (PSI)
- G—Height of valve (inches)
- H—Length of valve (inches) face to face
- Weight—Shipping weight (lbs)

Flange gaskets, nuts, bolts and washer available.

3" 246DRF: 4 – ¾" Diameter holes on a 6.00" B.C.
4" 246DRF: 8 – ¾" Diameter holes on a 7.5" B.C.

(1) FILL LINE & (1)
SUCTION LINE



MORRISON BROS. CO.

570 E. 7th Street, P.O. Box 238 | Dubuque, IA 52004-0238

t. 563.583.5701 | 800.553.4840 | f. 563.583.5028

www.morbros.com

Model 346 Series External Emergency Valves

SPECIFICATION SHEET

Application

The Morrison Fig. 346 Series External Emergency Valve is designed for installation at the outlet of an AST or in a liquid transfer line where product flow must be stopped in the event of a fire. The flanges on the 346FDI models conform to ANSI B16.42 specifications for class 150 raised face ductile iron flanges.

Operational Criteria

- 346DI/SS models: cold, non-shock maximum operating pressure 200 psi W.O.G.
- 346FDI models: cold, non-shock maximum operating pressure 250 psi W.O.G.

Materials of Construction

- O-ring... Teflon® encapsulated fluoroelastomer
- Spring... 302 stainless steel
- Seal nut/plug... 303 stainless steel
- Handle... Brass
- Fulcrum shaft... 303 stainless steel
- Groove pin... Steel
- Hold open hook... Stainless steel

Certifications and Listings

Fuse link is UL listed



Fig. 346FDI



Fig. 346DI



Fig. 346DI (1" with bushing)



Fig. 346SS

Item Number	A	B	C	D	E	F	G	H	I	J	K	L
346FDI0200 AV	2"	F	DI	TFE	DI	DI	165°	4	6.25	6.5		15.0
346FDI0300 AV	3"	F	DI	TFE	DI	DI	165°	4	8.53	8.63		29.40
346FDI0400 AV	4"	F	DI	TFE	DI	DI	165°	8	11.75	11.5		72.0
346DI-1000 AV*	¾"		DI	TFE	DI	DI	165°		5"	6.94	I	7.30
346DI-1100 AV*	1"		DI	TFE	DI	DI	165°		5"	6.94	I	7.30
346DI-1200 AV*	1¼"		DI	TFE	DI	DI	165°		5"	6.94	I	7.0
346DI-0400 AV	1½"		DI	TFE	DI	DI	165°		5"	5.44		6.80
346DI-0500 AV	2"		DI	TFE	DI	DI	165°		5"	5.44		6.20
346DI-0600 AV	3"		DI	TFE	DI	DI	165°		7"	8.32		15.50
346SS-1000 AV	This model no longer available. Refer to 446---0075 AV for equivalent.											
346SS-1100 AV	This model no longer available. Refer to 446---0100 AV for equivalent.											
346SS-0100 AV	1½"		SS	TFE	SS	SS	165°		5"	5.44		8.0
346SS-0200 AV	2"		SS	TFE	SS	SS	165°		5"	5.44		7.0

*1½" valve with factory-installed reducer bushing.

SPECIFICATION OPTIONS:

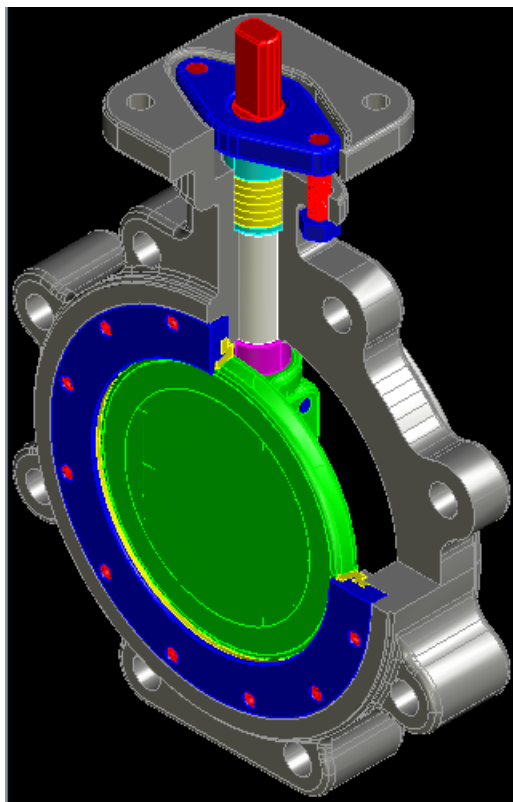
- A—Size (inches)
- B—Mounting connection: Flanged (F) or Female NPT (Blank)
- C—Body/cap material: Ductile iron (DI) or 316 stainless steel (SS)
- D—Gasket material: Teflon® (TFE)
- E—Poppet: Ductile iron (DI) or 316 stainless steel (SS)
- F—Lever arm: Ductile iron (DI) or 316 stainless steel (SS)
- G—Fuse link: 165°F STD. (212°F Optional); Fuse link is UL Listed
- H—Number of bolt holes
- I—Height of valve (inches)
- J—Length of valve (inches)
- K—Reducing bushings: Iron (I) or 316 stainless steel (SS)
- L—Shipping weight (lbs)

Companion flanges, flange gaskets, nuts, bolts and washers available.

API 609 HIGH PERFORMANCE DOUBLE OFFSET BUTTERFLY VALVES

ASME CLASSES 150 TO 600

CAST CARBON, STAINLESS STEEL OR ALLOY STEEL



Class	Fig. No.
150	1572
300	3072

DESIGN FEATURES:

- Upper and Lower Bearings to maximize valve life
- Integral ISO mounting pad for easy valve operation no bracket needed
- Each valve is shell and seat pressure tested per industry standard API 598
- Available in Wafer and Lug styles
- Each valve has a unique certification number that is traceable to the valve certification sheet which includes MTR data, pressure test report, inspection report and certificate of conformance.
- Seat Materials: Multiple seat materials available.

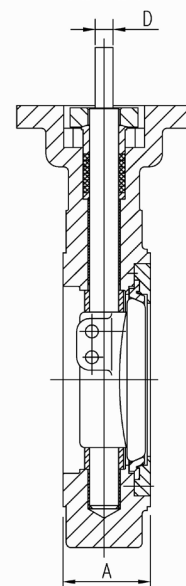
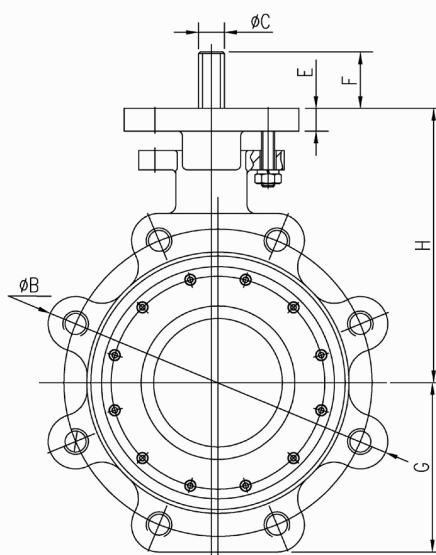
Item	Applicable Specification
Wall Thickness	API 609
Pressure - Temperature Ratings	ASME B16.34 & API 609
General Valve Design	API 609 (Cat. B) & ASME B16.34
End to End Dimensions	ASME 609
Flange Design	ASME B16.5
Materials	ASTM

PART	COMMON MATERIAL COMBINATIONS	
Body	A216 WCB	A351 CF8M
Seat Ring	PTFE/RTFE/UHMWPE	PTFE/RTFE/UHMWPE
Disc	A351 CF8M	A351 CF8M
Stem	17-4 PH	17-4 PH
Seat Retainer	Carbon Steel	316 SST
Seat Bolts	A193 B8	A193 B8M
Lower Bearing	316 SST + PTFE	316 SST + PTFE
Disc Spacers	304 SST	316 SST
Disc Pins	17-4 PH	17-4 PH
Upper Bearing	316 SS + PTFE	316 SS + PTFE
Packing Washer	304 SST	316 SST
Packing	PTFE	PTFE
Gland	304 SST	316 SS
Gland Flange	A216 WCB	A351 CF8
Gland Bolts	A193 B8	A193 B8
Gland Nuts	A194 8	A194 8
Retainer Plate*	Carbon Steel	316 SST
Gasket*	316 SST + PTFE	316 SST + PTFE
Bolts*	A193 B8	A193 B8

*Sizes 8" and above only

NOTE: Other materials and trims available.

HIGH PERFORMANCE DOUBLE OFFSET BUTTERFLY VALVE (LUG STYLE) DIMENSIONS



Class 150

Size	A	B	C	D	E	F	G	H	M.F.L.	Cv	Weight
NPS	In	In	In	In	In	In	In	In	ISO		lbs
DN	mm	mm	mm	mm	mm	mm	mm	mm			Kg
3	1.88	7.40	0.63	0.43	0.55	1.38	3.40	5.31	F10	200	15
80	48	187	16	11	14	35	86	135	F10	390	6.8
4	2.12	8.90	0.63	0.43	0.55	1.38	4.13	6.70			26
100	54	225	16	11	14	35	105	170	F10	960	11.8
6	2.25	11.00	0.79	0.55	0.63	1.50	5.14	7.88			42
150	57	280	20	14	16	38	130.5	200	F12	1600	19.1
8	2.50	13.30	0.94	0.67	0.70	2.28	6.18	9.21			67
200	64	337	24	17	18	58	157	234	F12	3130	30.4
10	2.81	16.00	1.10	0.79	0.70	2.28	8.40	11.10			105
250	71	406	28	20	18	58	213	282	F14	4280	48
12	3.19	18.70	1.42	0.98	0.87	2.36	9.90	12.72			160
300	81	476	36	25	22	60	251	323	F14	5250	72.5
14	3.62	20.70	1.57	1.10	0.95	2.36	10.90	14.00			225
350	92	527	40	28	24	60	277	355	F16	8150	102
16	4.00	23.20	1.77	0.47x0.31*	1.10	3.00	12.75	15.75			345
400	102	590	45	12x8*	28	76	324	400	F16	10900	156.5
18	4.50	25.10	1.97	0.63x0.39*	1.10	3.35	13.30	16.70			460
450	114	638	50	16x10*	28	85	338	424	F25	13350	209
20	5.00	27.40	2.17	0.71x0.43*	1.26	3.75	14.50	18.43			640
500	127	695	55	18x11*	32	95	369	468	F25	20150	290
24	6.06	32.00	2.56	0.78x0.47*	1.34	3.95	17.00	21.50			960
600	154	814	65	20x12*	34	100	432	546	F30	32550	435
30	7.50	38.50	3.39	0.87x0.55*	1.65	4.75	22.45	31.10			1890
750	191	978	86	22x14*	42	120	570	790	F30	45200	857
36	8.00	45.70	3.94	1.10x0.63*	1.50	5.90	27.10	35.35			2970
900	203	1161	100	28x16*	38	150	688	898			1347

* Denotes key stem

ADDITIONAL SIZES, MATERIALS AND CLASSES AVAILABLE UPON REQUEST.

200 PSI Butterfly Valves

Ductile Iron Body • Extended Neck • Geometric Drive • Molded-In Seat Liner • Lug and Wafer Style

Sizes 2" through 12"

Install between Std. ASME Class 125/150 flanges.

Lug Style 200 PSI bi-directional dead end service rating without a downstream flange required.

THIRD PARTY CERTIFIED BY QAI TO MEET MSS SP-67 STANDARD • U.S. COAST GUARD "CATEGORY A" • CERTIFIED LEAD-FREE* BY TRUESDAIL LABS TO ANSI 372

MATERIAL LIST

PART	SPECIFICATION
1. Stem	Stainless Steel ASTM A582 Type 416
2. Collar Bushing	Brass ASTM B16
3. Stem Seal	Buna-N Rubber Nitrile
4. Body Seal	Buna-N Rubber Nitrile
5. Nameplate	Aluminum
6. Upper Bushing	Copper CDA 122
7. Liner	Buna-N Rubber Nitrile
8. Disc	Alum. Brz. ASTM B148 Alloy 954/955
9. Lower Bushing	Copper CDA 122
10. Body Wafer	Ductile Iron ASTM A536
11. Body Lug	Ductile Iron ASTM A536

DIMENSIONS — WEIGHTS

Size												
In.	mm.	A	B	C	D	E	F	Flat G	Metal H	Rubber I	Square J	Dia. N
2	50	2.53	4.00	1.25	5.38	2.88	.38	.312	1.688	1.812	3.25	.500
2 1/2	65	2.90	4.69	1.25	5.88	3.27	.38	.370	1.812	1.938	3.25	.562
3	80	3.15	5.12	1.25	6.12	3.40	.38	.370	1.812	1.938	3.25	.562
4	100	4.09	6.12	1.25	6.88	4.00	.38	.403	2.062	2.188	3.25	.625
5	125	5.13	7.25	1.25	7.38	4.75	.38	.496	2.188	2.312	3.25	.750
6	150	6.13	8.25	1.25	8.00	5.29	.38	.496	2.188	2.312	3.25	.750
8	200	8.13	10.41	1.25	9.25	6.50	.50	.560	2.375	2.500	3.25	.875
10	250	10.13	12.52	1.25	10.50	8.00	.50	.686	2.688	2.812	4.75	1.125
12	300	12.13	15.00	1.25	12.00	9.25	.50	.748	3.000	3.125	4.75	1.250

Size		Capscrew/Stud Data				Lug Weight		Wafer Weight	
In.	mm.	O B.C.	P Dia.	R Dia.	K No.	L Dia.	M B.C.	Lbs.	Kg.
2	50	3.25	.437	.437	4	5/8-11unc	4 3/4	7	3.2
2 1/2	65	3.25	.437	.500	4	5/8-11unc	5 1/2	9	4.1
3	80	3.25	.437	.500	4	5/8-11unc	6	9.5	4.3
4	100	3.25	.437	.562	8	5/8-11unc	7 1/2	15	6.8
5	125	3.25	.437	.656	8	3/4-10unc	8 1/2	21	9.5
6	150	3.25	.437	.656	8	3/4-10unc	9 1/2	24	10.9
8	200	3.25	.437	.781	8	3/4-10unc	11 3/4	34	15.4
10	250	5.00	.562	1.000	12	7/8-9unc	14 1/4	62	28.1
12	300	5.00	.562	1.062	12	7/8-9unc	17	90	40.9

For actuated service where a lower torque is required use NIBCO Fig. No. WDLXXX-0 or LDLXXX-0 series, sizes 2" thru 12" only. Maximum pressure rating of 100 PSI for wet application and 50 PSI for dry application

*Weighted average lead content ≤ 0.25%



WD-2100

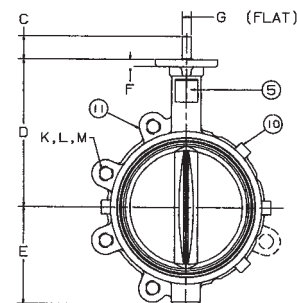
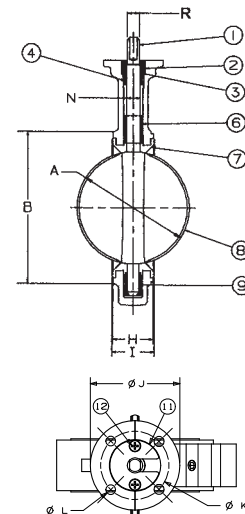
Wafer Style
Buna-N Liner
and Aluminum
Bronze Disc



LD-2100

Lug Style
Buna-N Liner
and Aluminum
Bronze Disc

NOT RECOMMENDED
FOR STEAM SERVICE



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Visit our website for the most current information.

Model 286 Series Line Strainers

SPECIFICATION SHEET

Application

Top clean-out Y-type line strainers are used in horizontal pipelines to filter debris and protect downstream equipment.

Features and Details

- 50 PSI operating pressure
- Strainer basket is easily removable and accessible from the top for cleaning or replacement
- **286FDI**—NPT female threaded connection
- **286U** with 14 mesh strainer...UL listed model for No. 4, 5, and 6 fuel oil
- **286U** with 24 mesh strainer...UL listed model for No. 1 and 2 fuel oil

Materials of Construction

- Body and cap... cast iron
- Yoke... malleable iron
- Strainer basket... 304 stainless steel
- Gasket...Nitrile composite, Buna-N, PTFE



Item Number	A	B	C	D	E	F	Length	Height	Weight
6 Mesh									
286---0100 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---0300 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI2200 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0
10 Mesh									
286---0400 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---0600 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI2500 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0
14 Mesh									
286U---0100 AS	2"	CI	B	T	Y		9 1/8"	11 3/16"	17.25
20 Mesh									
286---0700 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---0900 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI2800 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0
24 Mesh									
286U---0200 AS	2"	CI	B	T	Y		9 1/8"	11 3/16"	17.25.0
40 Mesh									
286---1000 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---1200 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI3100 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0
60 Mesh									
286---1300 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---1500 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI3400 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0

Item Number	A	B	C	D	E	F	Length	Height	Weight
80 Mesh									
286---1600 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---1800 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI3700 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0
100 Mesh									
286---1900 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---2100 AS	3"	CI	N	T	N		12"	14 3/16"	38.0
286FDI4000 AS	3"	DI	P	F	N	4	14 1/4"	16 5/8"	45.0
No Screen									
286---8300 AS	2"	CI	N	T	N		9 1/8"	11 3/16"	17.0
286---8500 AS	3"	CI	N	T	N		12"	14 3/16"	37.25

SPECIFICATION OPTIONS:

- A**—Size (inches)
B—Body and cap material: Cast iron (CI); ductile iron (DI)
C—Gasket: Nitrile (N) PTFE (P), Buna-N (B)
D—Flanged (F); Threaded (T)
E—UL listed: Yes (Y); No (N)
F—Number of bolt holes
Length—Dimension across strainer face to face (inches)
Height—Dimension from base to top (inches)
Weight—Shipping weight (lbs)
- Flange gaskets, nuts, bolts and washers available.

GNX Series

SLIDING VANE PUMPS | PRODUCT BROCHURE



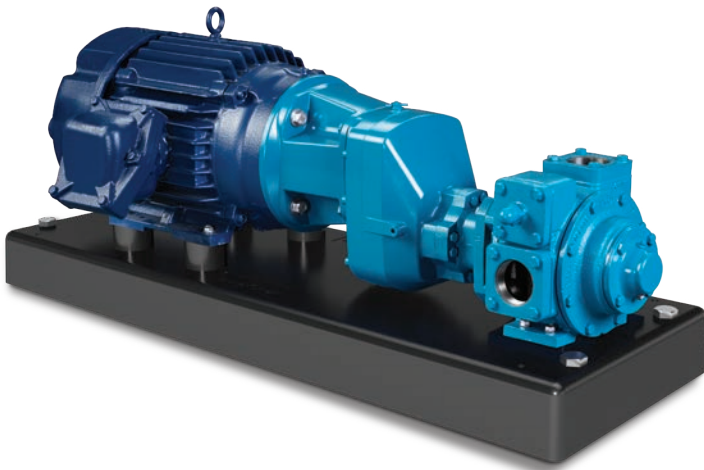
Blackmer

Where Innovation Flows



The Blackmer® GNX Series sliding vane pumps are the market's only alignment-free, reduced-speed positive displacement pumps, suited for both portable and stationary applications. By eliminating couplings and by providing a true ZERO-alignment design, Blackmer, with the GNX Series, has combined all the benefits of an "alignment-free" pump like delivering maximum reliability and uptime, with the numerous advantages of sliding vane technology such as self-priming, line-stripping, product recovery, dry-run capability, solids handling, thin/thick viscosity flexibility and 70% to 90% pump efficiencies.

ALIGNMENT-FREE SOLUTIONS



Blackmer® GNX Series Alignment-Free Reduced-Speed Heavy Duty Sliding Vane Pumps

Part of the Iron Line of sliding vane pumps, GNX Series pumps include the proven features of Blackmer legacy GX Series pumps but take them to the next level with the incorporation of a commercial-grade, single-stage gearbox, motor, and baseplate. This innovative new gearbox fits between the motor and pump and is permanently held in alignment by machined dowelled interfaces. The set forms a single structural unit, completely linked between the high-speed and low-speed sides. The result is unmatched ease of installation and maintenance and improved peace of mind for plant operators. It eliminates the possibility of unexpected coupling failure and simplifies every planned maintenance activity.

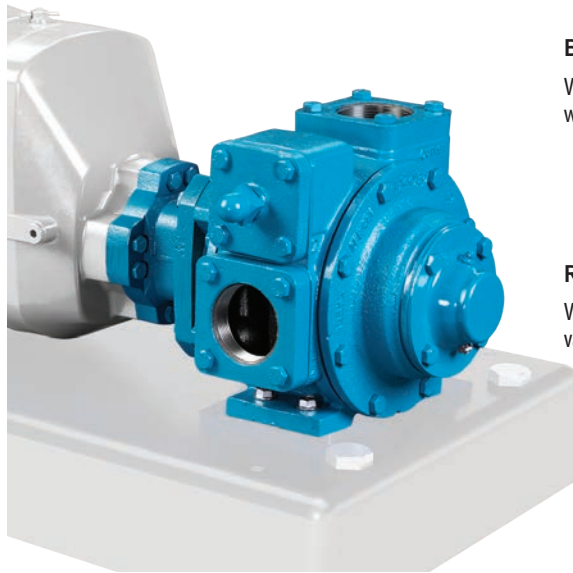
The GNX Series pumps are available in 2-, 2.5-, 3-, and 4-in sizes and are designed to handle a wide range of non-corrosive industrial liquids and petroleum products. The GNX Series pumps are highly configurable by providing two different porting options (traditional 90-degree ported option on the GNX and the 180-degree porting option for the GNXH), by offering a wide range of motor options, and two different baseplate options (steel and a composite polymer concrete base). These options enable operators to find the best pumping solution for their application.

Components of the GNX Series Assembly

PUMP

Sliding Vane Action

- Unique sliding vane pump design self-adjusts for wear to maintain flow rates
- Sliding vane design provides sustained performance and trouble-free operation
- Excellent self-priming and dry-run capabilities
- High suction lift and line-stripping capabilities
- Viscosity flexibility: 0.2 cP to 4,250 cP using same pump
- Pressure flexibility: 0 psi – 125 psi (0 ft TDH to 290 ft TDH) without sensitivity to BEP operation
- Easy maintenance: vanes can be easily replaced without removing the pump from the piping system
- Low maintenance and low life-cycle costs



Between Bearing Design

Vane pumps use symmetrical bearing support, which supports shaft loading on both sides:

- Results in negligible shaft deflection
- Extends seal, bearing, and shaft reliability and increases pump life

Relief Valve Design

Vane pumps offer a full port, quick opening trim valve design.

- Cracking pressure equals full recirculation pressure
- Optimizes motor sizing
- Prevents derate of pump pressure (i.e., usable range is same as pump's capacity)

MOTOR

Full Range of NEMA C-face Motors in Inventory

- Rating: 1 HP – 50 HP (0.7 kW – 40 kW)
- Power Supply: 1-phase or 3-phase, 190/240/380/460/575 volt, 60 Hz or 50 Hz
- Inverter duty (VFD rated) for 2:1 to 10:1 constant torque turndown
- Ratings: TEFC or Hazardous Explosion Proof Division 1

Full Range of IEC B5 Motors Available

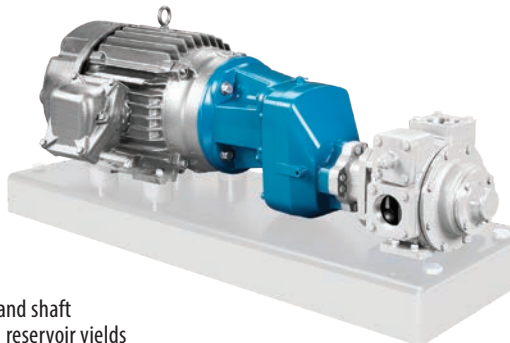
- Local sourcing recommended, however if purchasing from Blackmer:
 - 3-phase, 380 volt, 50 Hz
 - Ratings: ATEX Ex d or Ex nA



GEARBOX

Motor Flange

- C-face or D-flange interface between gearbox and motor holds position and eliminates need for shaft alignment



Gearbox Housing

- Heavy duty bearings and shaft and oversized lube oil reservoir yields >4.0 service factor on full rated torque
- Single-stage speed reduction is ideal for desired speed ranges (200-815 rpm output speeds)
- Numerous ratio options yield speed flexibility to peg desired flow rate

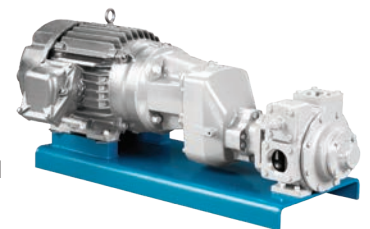
Pump Adapter

- Oversized adapter attaches the gearbox to the pump head
- Proprietary hollow bore gearbox accepts standard pump shaft without a coupling
- Position held by doweled connection between pump and gearbox, eliminating need for shaft alignment. Pump will not lose alignment during operation, during maintenance, or during unit install/relocation

BASEPLATE

Steel Baseplate

- Upgraded bent steel with full length welded motor pads
- Built-in anchor holes
- Flatness tolerance ensures level anchoring point



Composite Polymer Concrete Baseplate

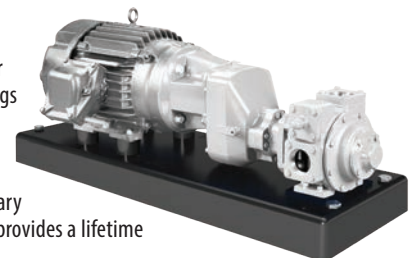
Pre-grouted to reduce installation costs

Corrosion Resistant:

- Will not rust or corrode
- Eliminates need for paint or expensive protective coatings

Maximum Reliability:

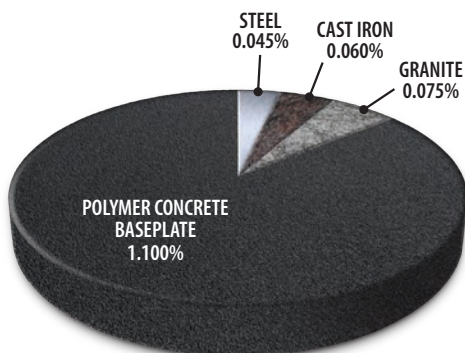
- 0.002" per foot flatness eliminates need for secondary machining operations and provides a lifetime level mounting surface
- 24x better vibration damping provides reduced fatigue on rotating elements (motor, gearbox, and pump)



ALIGNMENT-FREE SOLUTIONS

Features & Benefits:

- Alignment-free, reduced-speed pumps
- Robust commercial-grade gearbox with expanded ratio options
- Eliminates traditional couplings
- Retained rotor between bearing design extends mechanical seal life
- Compact footprint utilizing close coupled, inline design
- Alignment-free design reduces downtime and simplifies maintenance:
 - Eliminates premature mechanical-seal failures, frequent downtime and increased costs
 - Increases uptime, reliability, productivity, and longer life for seals, shafts and bearings
 - Simplifies startup/installation and maintenance tasks due to the a drop-in replacement design
- Flexible 90° and 180° porting options, for use whenever horizontal discharge piping or vertical pump mounts are desired
- GNX Series pumps conform with ATEX directives, as outlined in Form 559. ATEX conformance is also available for GNX gearboxes and motors.
- Available corrosion-resistant composite polymer concrete baseplate with pre-grouted build, flatness of 0.002" per foot, and 24 times increased vibration damping of steel.



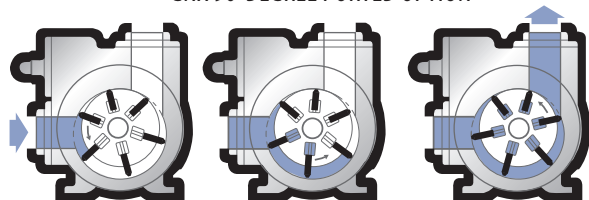
BASEPLATE DAMPING RATIO



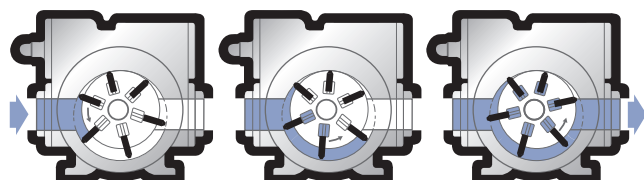
ADVANTAGES OF SLIDING VANE TECHNOLOGY:

- Unique sliding vane pump design self-adjusts for wear to maintain flow rates
- Excellent self-priming and dry-run capabilities
- Sliding vane design provides sustained performance and trouble-free operation
- Easy maintenance: vanes can be easily replaced without removing the pump from the piping system
- High suction lift and line-stripping capabilities
- Low maintenance and low life-cycle costs

GNX 90-DEGREE PORTED OPTION



GNXH 180-DEGREE PORTED OPTION





Applications

NON-CORROSIVE, INDUSTRIAL LIQUIDS:

- Fuel Oils
- Lube Oils
- Jet Fuels
- Gasoline
- Edible Oils

SOLVENTS & THINNERS:

- Esters
- Ketones
- Naphthas
- Ethers
- Amines
- Aromatics
- Alcohols
- Terpenes
- Glycols

SERVICES:

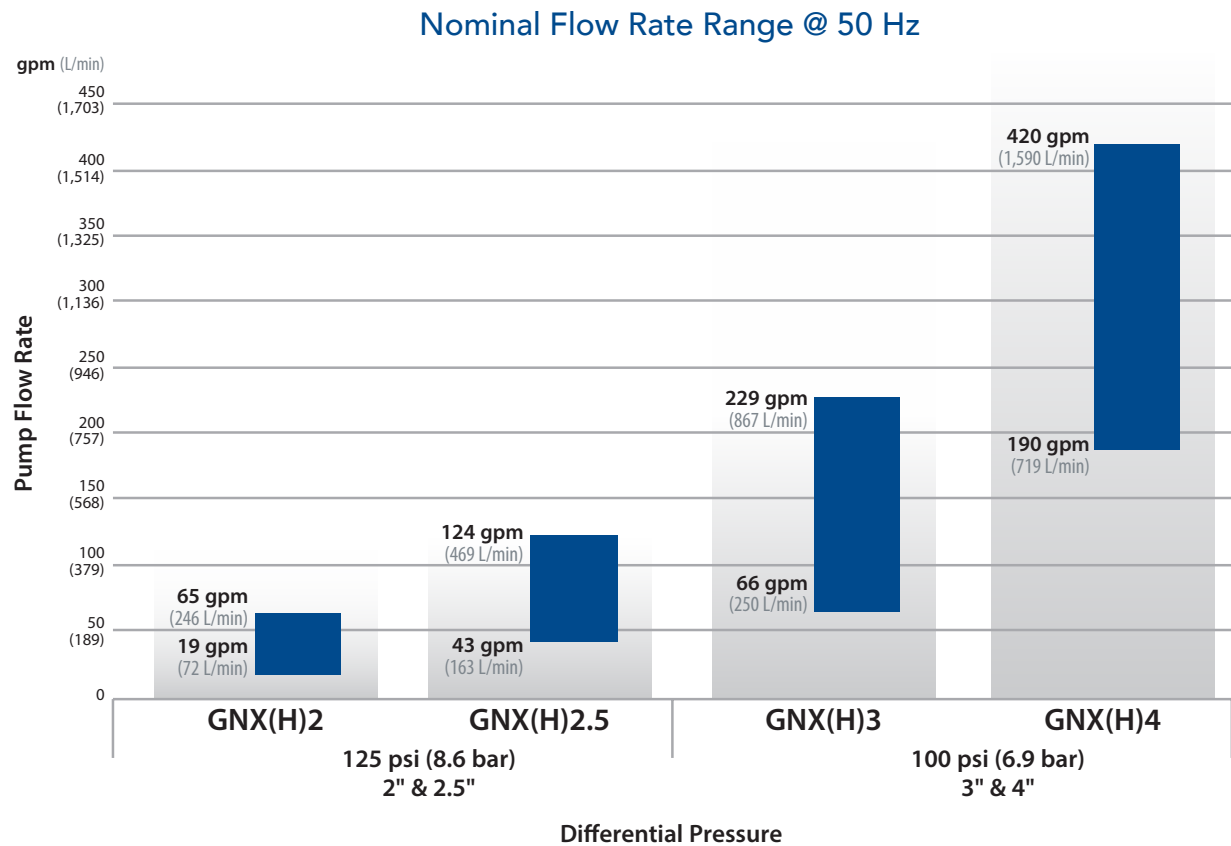
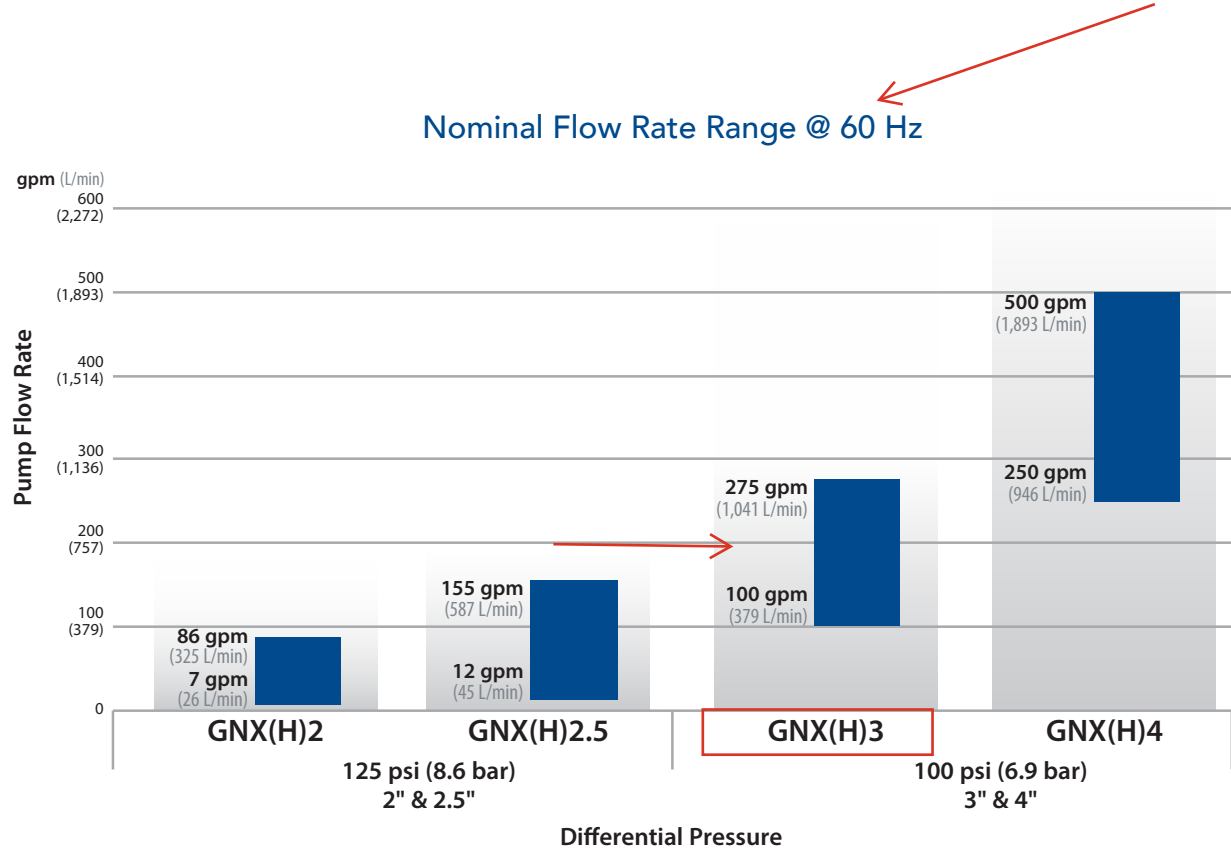
- Batch Blending
- Loading & Unloading
- Pressure Boosting Stations
- Priming Systems
- Aviation Fuel Skids
- Portable Transfer Skids

GNX Series PERFORMANCE & SPECIFICATIONS

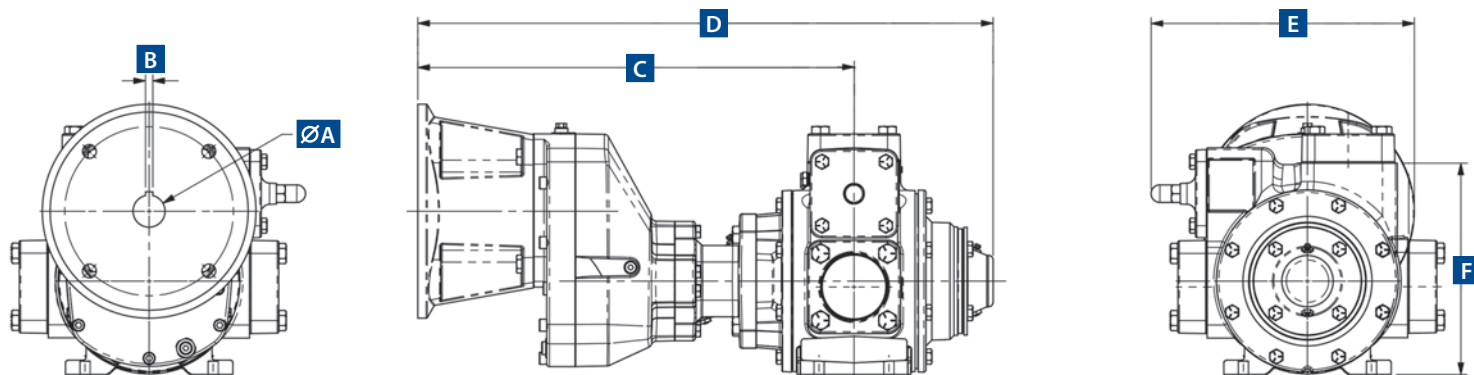
Maximum Operating Limits

Pump Model	Nominal Flow Rate Range	Viscosity	Maximum Operating Temperature	Min./Max. Speed	Maximum Working Pressure	Maximum Differential Pressure
GNX2, GNXH2	7 - 86 gpm (26 - 325 L/min)	0.2 - 4,250 cP	-25°F to 300°F (-32°C to 149°C)	200 - 814 rpm	175 psi (12.1 bar)	125 psi (8.6 bar)
GNX2.5, GNXH2.5	12 - 155 gpm (45 - 587 L/min)	0.2 - 4,250 cP	-25°F to 300°F (-32°C to 149°C)	200 - 814 rpm	175 psi (12.1 bar)	125 psi (8.6 bar)
GNX3, GNXH3	100 - 275 gpm (379 - 1,041 L/min)	0.2 - 4,250 cP	-25°F to 300°F (-32°C to 149°C)	200 - 700 rpm	175 psi (12.1 bar)	100 psi (6.9 bar)
GNX4, GNXH4	250 - 500 gpm (946 - 1,893 L/min)	0.2 - 4,250 cP	-25°F to 300°F (-32°C to 149°C)	200 - 563 rpm	175 psi (12.1 bar)	100 psi (6.9 bar)

GNX Series PERFORMANCE & SPECIFICATIONS



GNX Series DIMENSIONS¹



Pump Model	Length (D)	Width (E)	Height (F)	Max. Weight Pump System (Pump, gearbox, motor, & baseplate)
GNX2	22 ¹ / ₅ " (563.9 mm)	10 ⁷ / ₁₆ " (265.1 mm)	8 ⁴ / ₅ " (223.5 mm)	556 lb (252 kg)
GNX2.5	24" (609.6 mm)	11 ³ / ₈ " (288.9 mm)	9 ⁵ / ₈ " (244.5 mm)	768 lb (348 kg)
GNX3	28" (711.2 mm)	13 ⁵ / ₈ " (346.1 mm)	12 ³ / ₈ " (314.3 mm)	1,345 lb (610 kg)
GNX4	34 ³ / ₈ " (873.1 mm)	15 ⁵ / ₈ " (396.9 mm)	15 ⁴ / ₇ " (395.3 mm)	1,852 lb (840 kg)
GNXH2	22 ¹ / ₅ " (563.9 mm)	10 ⁷ / ₁₆ " (265.1 mm)	8 ⁷ / ₈ " (225.4 mm)	556 lb (252 kg)
GNXH2.5	24" (609.6 mm)	11 ³ / ₈ " (288.9 mm)	9 ⁴ / ₅ " (249.2 mm)	768 lb (348 kg)
GNXH3	28" (711.2 mm)	13 ¹ / ₂ " (342.9 mm)	12 ³ / ₈ " (314.3 mm)	1,345 lb (610 kg)
GNXH4	34 ³ / ₈ " (873.1 mm)	15 ⁵ / ₈ " (396.9 mm)	15 ⁴ / ₇ " (395.3 mm)	1,852 lb (840 kg)

¹ All dimensions and weights approximate. Please refer to Parts Lists for precise dimensions.

Motor Size	Ø A	B	C			
			GNX(H)2	GNX(H)2.5	GNX(H)3	GNX(H)4
NEMA 140TC	7/8"	3/16"	16 ¹⁵ / ₁₆ "	—	—	—
NEMA 180TC	1 1/8"	1/4"	17 1/4"	18"	21 5/8"	—
NEMA 210TC	1 3/8"	5/16"	18"	18 3/4"	23 7/8"	26 ¹⁵ / ₁₆ "
NEMA 250TC	1 5/8"	3/8"	—	20 1/2"	23 7/8"	26 ⁵ / ₁₆ "
NEMA 280TC	1 7/8"	1/2"	—	—	24 1/2"	26 ¹⁵ / ₁₆ "
NEMA 320TC	2 1/8"	1/2"	—	—	27	29 3/8"
IEC 100/112	28 mm	8 mm	17 7/8"	18 5/8"	—	—

NEMA MOTORS

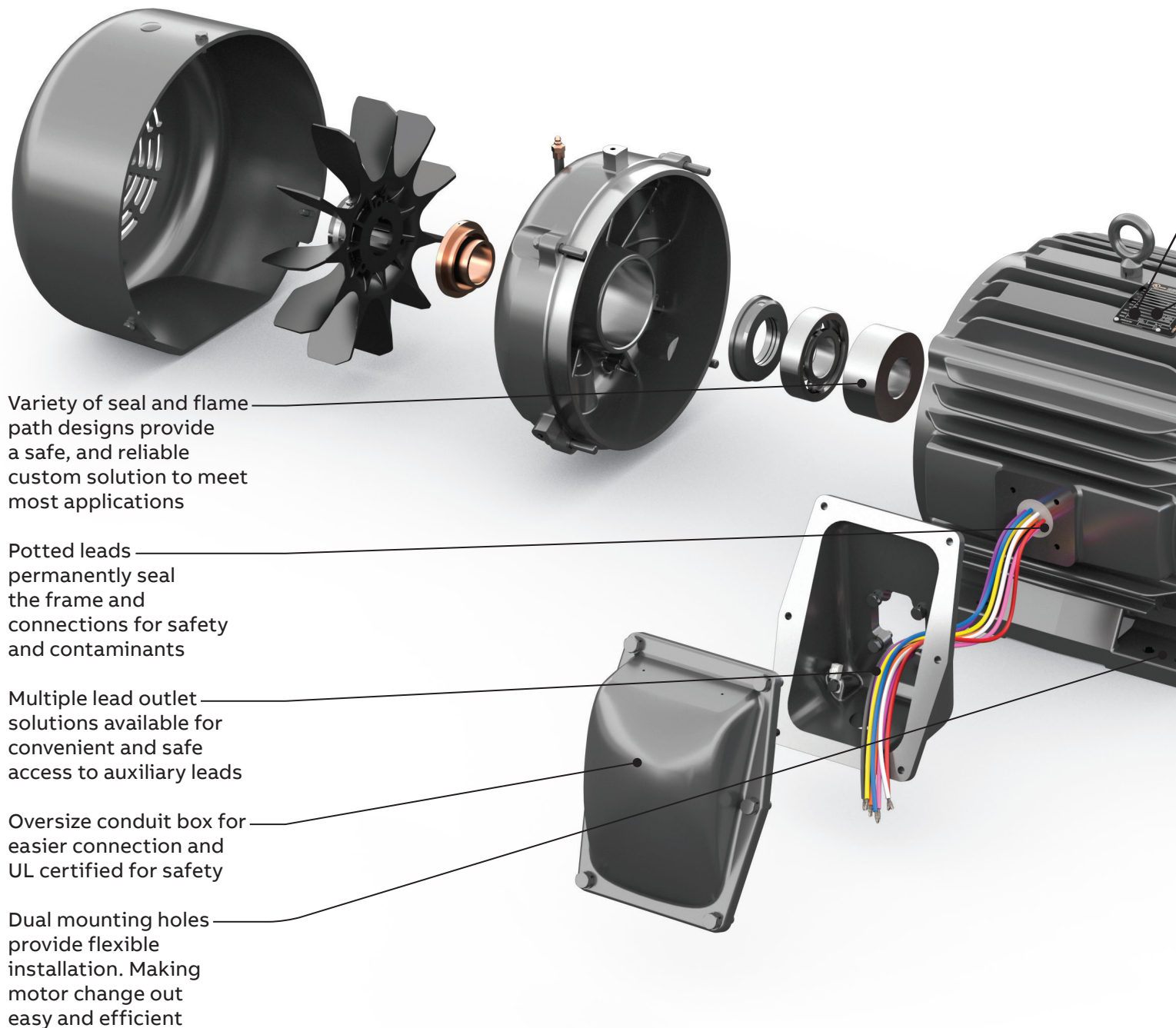
Explosion proof

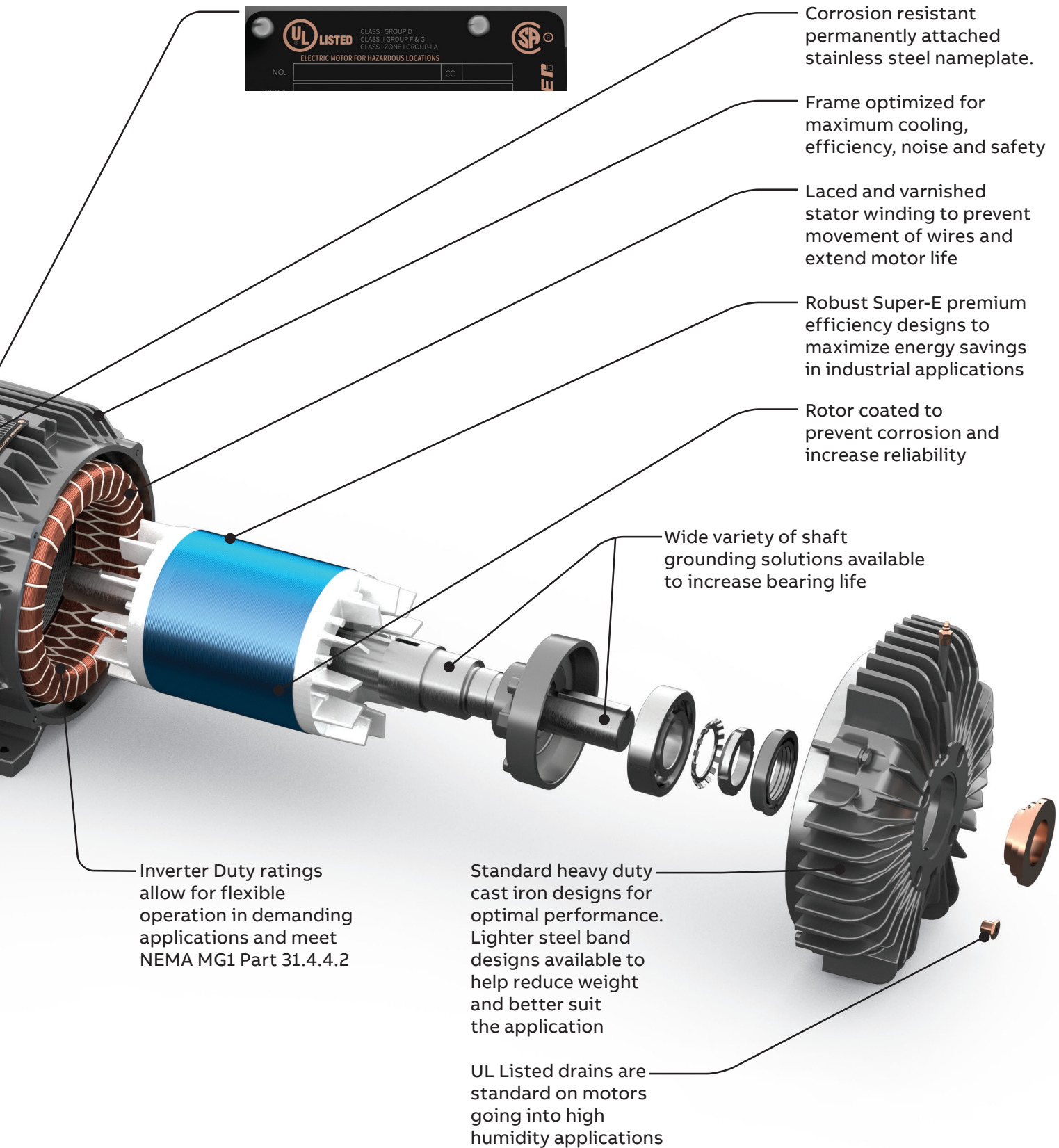
AC and DC motors



Safety and quality you require

Performance and flexibility you need





Severe duty

Explosion proof motors

10 HP, 3 PHASE,
230 V, 215TC
FRAME MOTOR

Suitable to stand up against the most demanding industrial environments where protection against the elements and condensation is needed. Motors come equipped with UL Breather Drains that protect against condensation build up. These motors are designed to protect against hazardous gases, vapors and dusts that have explosive properties. Our highly engineered shaft sealing system protects against all three hazardous dust groups.

**Class I Group C&D, Class II Group E, F&G
Inverter Duty**

Typical industries:

- Chemical, oil and gas
- Pulp and paper
- Water/waste water
- Metals

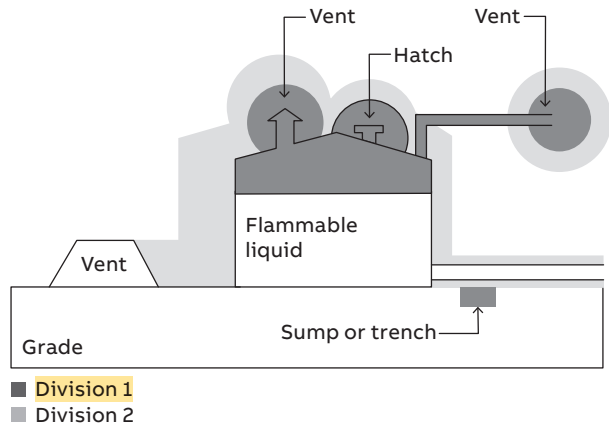
Target applications:

- Pumps
- Compressors
- Fans and blowers
- Conveyors



Safety in hazardous locations

Controlling your risks



Division

Defines how often the potentially explosive materials are present during normal operating conditions.

- Division 1: Ignitable concentrations are present all or most of the time.
- Division 2: Ignitable concentrations are not likely to be present during normal operation.

Temperature codes

Identifies the maximum absolute motor surface temperature that will be developed under all conditions of operation.

Classes

Defines the physical properties hazardous material.

Groups

Designations assigned to combustible substances based on their behavior after ignition.

T code	Maximum motor surface temperature	
	°C	°F
T1	450	842
T2	300	572
T2A	280	536
T2B	260	500
T2C	230	446
T2D	215	419
T3	200	392
T3A	180	356
T3B	165	329
T3C	160	320
T4	135	275
T4A	120	248
T5	100	212
T6	85	185

Hazard class	Groups per NEC 500	Substance
Class I Flammable gases / vapors / liquids	Group A	Acetylene
	Group B	Hydrogen
	Group C	Ethylene
	Group D	Propane
Class II Combustible dusts	Group E	Metal dust
	Group F	Coal dust
	Group G	Grain dust
Class III Ignitable fibers & flyings	Not divided into Groups. 165°C maximum temperature limit for all Class III equipment not subject to overloading. 120°C maximum temperature limit for all equipment subject to overloading	

CAUTION

Motors misapplied in hazardous environments can cause a fire or explosion resulting in destruction of property, serious injury or death. Only the end user or a qualified underwriter is to identify and select the proper class, group, division, and temperature code motor to meet the requirements of each installation. ABB personnel, agents and distributors can advise what listings and approvals Baldor-Reliance motors carry, but cannot evaluate nor recommend what motors may be suitable for use in hazardous environments.

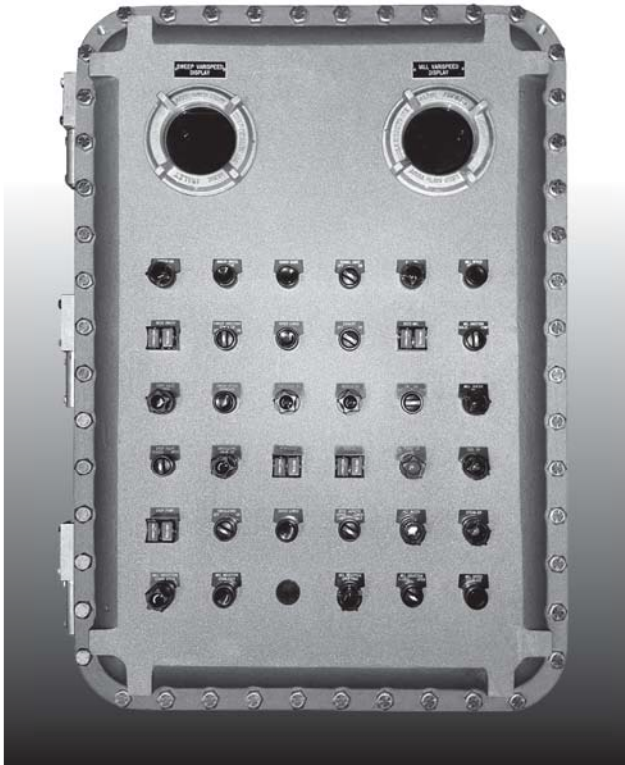
MOTOR STARTER
CONTROL BOX

XCE: Explosionproof Control Enclosures

XCEX: Flameproof Control Enclosures

XCEQ: Explosionproof Quad-Lead Control Enclosures

XJF: Explosionproof Junction Boxes



STANDARD FEATURES

- 80 standard sizes available
- Corrosion resistant, copper free aluminum
- Pre-drilled hinge holes (hinge optional)
- Pre-drilled mounting panel bosses (mounting panel optional)
- Type 4 watertight Nitrile gasket
- High strength steel cover bolts (zinc plated and coated)
- Internal grounding screws. External earthing provided on XCEX
- Removable lifting eye bolts (18x24 and larger)
- Lid-lifter cover alignment device (1824 and larger)
- Cast-on mounting lugs / feet
- Tumblast, natural aluminum finish

DESIGN OPTIONS

- Stainless steel cover bolts for Type 4X orrosion protection
- Mounting panels - Available in galvanized steel (XSM), aluminum (XSA), or phenolic (XSB)
- Aluminum hinge kits with stainless steel hardware
- Conduit (NPT & metric) and device (NPSM) drilling & tapping
- Operators and auxiliary devices such as breather / drains and flame arrestors
- Quad lead, quick thread cover bolts (designate XCEQ when ordering, not available on XCEX)
- Window kits - Round (up to 8" viewing diameter or square / rectangular (up to 13" x 13"))
- Custom machining - Milling, counter-boring, spot-facing, blind drilled holes entries, chamfers

CONSTRUCTION MATERIAL

- Enclosure - Copper free aluminum (3/10 of 1%)
- Cover bolts - Steel, zinc plated and coated
- Hinge kits - Copper free aluminum with stainless steel hardware

CERTIFICATIONS

XCE Series:

Class I, Division 1, Gas Groups BCD	UL 1203
Class II, Division 1, Gas Groups EFG	CSA C22.2 No. 30
Class III	
Type 4, 7, 9	UL 50
Type 4X (w/ SS cover bolts)	

XCEX Series:

Class I, Division 1, Gas Groups BCD	UL 1203
Class II, Division 1, Gas Groups EFG	CSA C22.2 No. 30
Class III	
Type 4, 7, 9	UL 50
Type 4X (w/ SS cover bolts)	
Class I, Zone 1, AExd IIB	UL 60079-0 / UL 60079-1
Exd IIB	CSA 60079-0 / CSA 60079-1
0539  II 2 GD Ex d II B+H ₂ (Optional)	EN 60079-0 / EN 60079-1
IP66	IECEX UL 10.0046U

NOTE: Where reference is made to Class I and Class II hazardous locations, the equipment is suitable for both Division 1 and Division 2 locations.

XCE SERIES & XJF

CERTIFICATIONS

XJF SERIES

CERTIFICATIONS

Class I, Division 1 Groups B*,C,D

Class II, Groups E,F,G

TYPE 4 (w/N4 suffix)

IP 66

*N4 suffix may affect Group B approval, consult factory.



LISTED 437S



XCE/XCEQ SERIES

CERTIFICATIONS

Class I, Division 1, Groups B*,C,D

Class II, Groups E,F,G

Class III

TYPE 4, (w/N4 suffix)

TYPE 4X (w/SS cover bolts)

*Specify Group B if required w/N4 suffix



XCEX SERIES

CERTIFICATIONS

Class I, Division 1, Groups B, C,D

Class II, Groups E,F,G

Class III

Class I, Zone 1, AEx d IIB

Ex d IIB

Epsilon 07 ATEX 2251U

0539 ⚡ II 2GD Ex d II B (Optional)*

Ex d IIB+H₂ (Optional)*

Ex tD A21: IP 66

*Specify ATEX if required

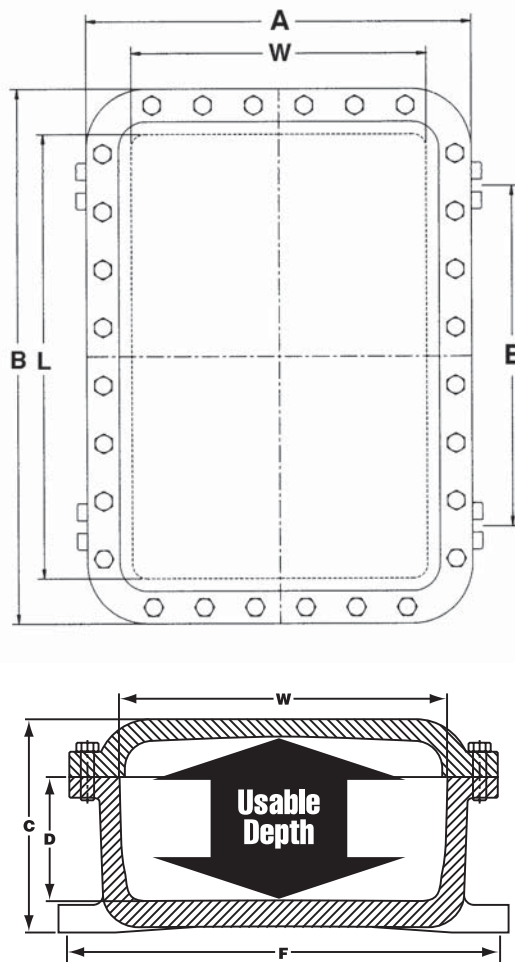
TYPE 4, (w/N4 suffix)

TYPE 4X (w/SS cover bolts)

IECEx UL 10.0046U



NOTE: Where reference is made to Class I and Class II hazardous locations, the equipment is suitable for both Division 1 and Division 2 locations.



DESIGN OPTIONS

MOUNTING PANS Three Materials Available:

Steel: (XSM) Galvanized 12 gauge steel plate. The catalog number includes the steel mounting pan complete with 1/4" high spacers and stainless steel mounting screws.

Aluminum: (XSA) Consult factory for availability.

Phenolic: (XSB) A special phenolic laminated material that has high mechanical and dielectric strength. It is excellent for mounting and wiring control equipment. The catalog number includes the phenolic board, 3/8" thick, complete with 1/4" high spacers and stainless steel mounting screws.

- NOTES**
1. No installation charge when customer specifies factory installation of mounting pan.
 2. Enclosures are pre-drilled for mounting panel unless otherwise specified.

HINGE SETS

Made of extruded aluminum alloy consisting of two sections, female and male (with stainless steel pin) and four stainless steel hex head bolts. Designed to allow right or left hand removable or non-removable installation. Unless specified, left hand removable hinge installation will be furnished by factory when hinged enclosures are ordered.

- NOTES**
1. Catalog numbers represent complete hinge sets necessary for enclosure assembly.
 2. Enclosures are pre-drilled for hinge kit unless otherwise specified.

XCE SERIES & XJF

ENCLOSURE												PANS AND HINGES						
XCE/XJF Catalog #	Inside Nom. Dimensions			Usable Depth	Overall Dimensions			Mounting Lug CL to CL		Mtg. Bolt Size	Ship Weight	Pan Catalog #			Nom. Dimensions		Steel Pan Weight	Hinge Cat #
	W	L	D		A	B	C	E	F			Steel	Alum.	Phen	W	H		
041604	4	16	4	4 ¾	7 ¼	19 ¼	6	12 ½	6 ¾	¾	25	XSM0416	XSA0416	XSB0416	3 ¼	15 ¼	1 ½	XHB-2
060804	6	8	4	4 ¾	9 ¼	11 ¼	5 ½	4 ½	9 ½	¾	21	XSM0608	XSA0608	XSB0608	5 ½	7 ½	1	XHB-2
060805	6	8	5	5 ¾	9 ¼	11 ¼	6 ½	4 ½	9 ½	¾	23	XSM0608	XSA0608	XSB0608	5 ½	7 ½	1	XHB-2
060806	6	8	6	6 ¾	9 ¼	11 ¼	7 ½	4 ½	9 ½	¾	25	XSM0608	XSA0608	XSB0608	5 ½	7 ½	1	XHB-2
061105	6	11	5	5 ¾	9 ¼	14 ¼	7 ¾	7 ½	9 ½	¾	24	XSM0611	XSA0611	XSB 0611	5 ½	10 ½	1 ½	XHB-2
061204	6	12	4	4 ¾	9 ¼	15 ¼	6 ½	8 ½	9 ½	¾	24	XSM0612	XSA0612	XSB 0612	5 ½	11 ½	1 ¾	XHB-2
061206	6	12	6	6 ¾	9 ¼	15 ¼	8 ½	8 ½	9 ½	¾	29	XSM0612	XSA0612	XSB 0612	5 ½	11 ½	1 ¾	XHB-2
061305	6	13	5	5 ¾	9 ¼	16 ¼	7 ¾	9 ½	9 ½	¾	26	XSM0613	XSA0613	XSB0613	5 ½	12 ½	2	XHB-2
071004	7	10	4	4 ¾	10 ¾	13 ¾	6 ¾	6 ½	9 ¾	¾	27	XSM0710	XSA0710	XSB0710	6 ½	9 ¾	1 ¼	XHB-2
071006	7	10	6 ½	6 ¾	10 ¾	13 ¾	8 ¾	6 ½	9 ¾	¾	31	XSM0710	XSA0710	XSB0710	6 ½	9 ¾	1 ¼	XHB-2
071805	7	18 ¼	5	5 ¾	10 ¾	21 ¾	7 ¾	14 ½	9 ¾	¾	55	XSM0718	XSA0718	XSB0718	6 ½	17 ¾	2 ½	XHB-2
080804	8	8	4	4 ½	11 ¾	11 ¾	6 ¾	4 ¼	11	¾	24	XSM0808	XSA0808	XSB0808	7	7	1 ¼	XHB-2
080806	8	8	6	6 ½	11 ¾	11 ¾	8 ¾	4 ¼	11	¾	28	XSM0808	XSA0808	XSB0808	7	7	1 ¼	XHB-2
080808	8	8	8	8 ½	11 ¾	11 ¾	10 ¾	4 ¼	11	¾	35	XSM0808	XSA0808	XSB0808	7	7	1 ¼	XHB-2
081004	8	10	4	4 ¾	11 ¾	13 ¾	6 ¼	6 ½	10 ¾	¾	30	XSM0810	XSA0810	XSB0810	7	9 ¾	1 ½	XHB-2
081006	8	10	6	6 ¾	11 ¾	13 ¾	8 ¼	6 ½	10 ¾	¾	34	XSM0810	XSA0810	XSB0810	7	9 ¾	1 ½	XHB-2
081008	8	10	8	8 ¾	11 ¾	13 ¾	10 ¼	6 ½	10 ¾	¾	39	XSM0810	XSA0810	XSB0810	7	9 ¾	1 ½	XHB-2
081204	8	12	4	4 ¾	11 ¾	15 ¾	6 ¼	8 ½	10 ¾	¾	34	XSM0812	XSA0812	XSB0812	6 ¾	10 ¾	2 ¼	XHB-2
081206	8	12	6	6 ¾	11 ¾	15 ¾	8 ¼	8 ½	10 ¾	¾	42	XSM0812	XSA0812	XSB0812	6 ¾	10 ¾	2 ¼	XHB-2
081208	8	12	8	8 ¾	11 ¾	15 ¾	10 ¼	8 ½	10 ¾	¾	48	XSM0812	XSA0812	XSB0812	6 ¾	10 ¾	2 ¼	XHB-2
091105	9	11	5	5 ¾	12 ¾	14 ¾	7 ¾	7 ½	12	¾	41	XSM0911	XSA0911	XSB0911	8	10	2 ½	XHB-2
101004	10	10	4	4 ¾	13 ¾	13 ¾	6 ¾	6 ½	13	¾	34	XSM1010	XSA1010	XSB1010	8 ¾	8 ¾	2 ½	XHB-2
101006	10	10	6	6 ¾	13 ¾	13 ¾	8 ¾	6 ½	13	¾	44	XSM1010	XSA1010	XSB1010	8 ¾	8 ¾	2 ½	XHB-2
101008	10	10	8	8 ¾	13 ¾	13 ¾	10 ¾	6 ½	13	¾	50	XSM1010	XSA1010	XSB1010	8 ¾	8 ¾	2 ½	XHB-2
101206	10	12	6 ¼	7 ¼	13 ¾	15 ¾	8 ¾	8 ½	13	¾	46	XSM1012	XSA1012	XSB1012	10 ¾	8 ¾	3	XHB-2
101404	10	14	4	4 ¾	13 ¾	17 ¾	6 ¾	10 ¾	13	¾	42	XSM1014	XSA1014	XSB1014	8 ¾	12 ¾	3 ½	XHB-2
101406	10	14	6	6 ¾	13 ¾	17 ¾	8 ¾	10 ¾	13	¾	49	XSM1014	XSA1014	XSB1014	8 ¾	12 ¾	3 ½	XHB-2
101408	10	14	8	8 ¾	13 ¾	17 ¾	10 ½	10 ¾	13	¾	57	XSM1014	XSA1014	XSB1014	8 ¾	12 ¾	3 ½	XHB-2
101410	10	14	10	10 ¾	13 ¾	17 ¾	12 ½	10 ¾	13	¾	62	XSM1014	XSA1014	XSB1014	8 ¾	12 ¾	3 ½	XHB-2
121204	12	12	4	5	16 ¼	16 ¼	6 ½	8 ¾	16	½	60	XSM1212	XSA1212	XSB1212	10 ¾	10 ¾	3 ¾	XHC-2
121206	12	12	6	7	16 ¼	16 ¼	8 ½	8 ¾	16	½	68	XSM1212	XSA1212	XSB1212	10 ¾	10 ¾	3 ¾	XHC-2
121208	12	12	8	9	16 ¼	16 ¼	10 ½	8 ¾	16	½	80	XSM1212	XSA1212	XSB1212	10 ¾	10 ¾	3 ¾	XHC-2
121804	12	18	4	4 ¾	16 ¼	22 ¼	6 ¾	14 ½	16	½	85	XSM1218	XSA1218	XSB1218	10 ½	16 ½	5 ½	XHC-2
121806	12	18	6	6 ¾	16 ¼	22 ¼	8 ¾	14 ½	16	½	93	XSM1218	XSA1218	XSB1218	10 ½	16 ½	5 ½	XHC-2
121808	12	18	8	8 ¾	16 ¼	22 ¼	10 ¾	14 ½	16	½	101	XSM1218	XSA1218	XSB1218	10 ½	16 ½	5 ½	XHC-2
122005	12	20	5	5 ¾	16 ¼	24 ¼	8 ¾	14 ¾	16	½	104	XSM1220	XSA1220	XSB1220	11	19	6 ½	XHC-2
122404	12	24	4	4 ¾	16 ¼	24 ¼	7 ¼	18 ¾	16	½	115	XSM1224	XSA1224	XSB1224	11	23	8	XHC-2
122406	12	24	6	6 ½	16 ¼	28 ¼	9 ¼	18 ¾	16	½	127	XSM1224	XSA1224	XSB1224	11	23	8	XHC-2
122408	12	24	8	8 ½	16 ¼	28 ¼	11 ¼	18 ¾	16	½	142	XSM1224	XSA1224	XSB1224	11	23	8	XHC-2
122410	12	24	10	10 ½	16 ¼	28 ¼	13 ¼	18 ¾	16	½	154	XSM1224	XSA1224	XSB1224	11	23	8	XHC-2

NOTES

- To indicate Quad-Lead bolt option, add suffix "Q" after XCE. (Not available on XCEX models.)
- Operators, windows and hinges are ordered separately.
- XCEX Ex d approval optional.
- To indicate Type 4 / IP66 option, add suffix "N4" after size (catalog number).
- Where reference is made to Class I and Class II hazardous locations, the equipment is suitable for both Division 1 and Division 2 locations.
- Enclosures are pre-drilled for mounting panel and hinge kit unless otherwise specified.

NEMA Full Voltage Power Devices

NEMA Rated Full Voltage Starters - Magnetic

CR306, CR386 Magnetic Starters

Section 1

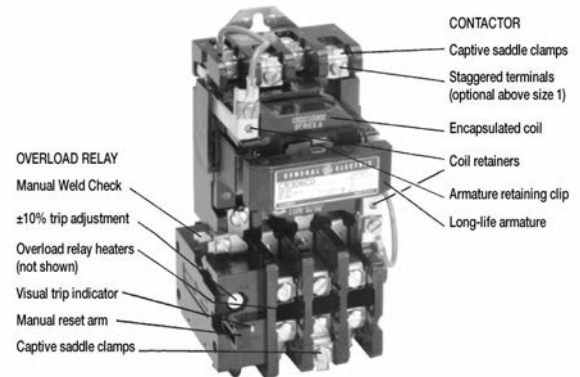
Nonreversing
1600 Horsepower Maximum
NEMA Sizes 00-9
600 Volts Maximum
50/60 Hertz

Basic 300-Line Features

GE's full voltage (600-Volt maximum) magnetic motor starter has an encapsulated coil and a 3-leg overload relay to protect against overloads in all phases. It is on standard specifications of major manufacturers. The line offers features and benefits most asked for by users.

Forms available include reversing and nonreversing, two-speed, and combination, sizes 00-9.

- Toolless contactor disassembly (Sizes 00-4)**—allows quick access for inspection and maintenance. Just release two retainers and pull a clip to get at magnet, coil, and contacts.
- Saddle clamp terminals (Sizes 00-1)**—accommodate ring, spade, and stripped wire leads and carry permanent stamped-in identification. Staggered arrangement makes wiring easier and helps prevent shorting between phases.
- Current-carrying components**—contact tips are weld-resistant silver cadmium oxide (fine silver on sizes 00 and 0 only). Contacts are installed in a wedge configuration for positive make with minimum bounce.
- Optional PF capacitor terminals**—permit easy connection of power factor correction capacitors between contactor and overload relay for energy conservation.
- Class 20 overload protection.**
- Visual trip indicator with manual reset**—to avoid surprise restarts. Reset occurs on arm upstroke so a tripped condition can't be overridden by holding the arm down.
- Manual weld check**—provides a convenient test against welding of overload relay contacts. Just depress the weld check operator to trip the relay, run a simple continuity test across the relay contacts, then depress the manual reset to return the starter to service.
- Optional Isolated NO contact on the overload relay**—provides means of direct interface with programmable controller or computer to monitor performance and diagnose faults.
- Dual bimetals**—anticipate overloads, responding to rising current and temperature with faster tripping on severe overloads for better motor protection. Trip points are factory-calibrated for accuracy.
- ±10% trip adjustment**—by turning a dial in the overload relay face allows "tuning" the protection to the motor on the spot.
- Largest selection of modifications and accessory kits**—includes auxiliary contacts, coils, fifth-pole addition, vertical and horizontal mechanical interlocks, surge suppressors, control circuit fusing, NEMA Type enclosures, push buttons, selector switches, indicating lights, control transformers, space heaters, and more.



Typical Size 1 Motor Starter



CR306 Size 1 Motor Starter with Solid-State Overload Relay installed

Technical Features — Solid-State Overload

- 2:1 Adjustable full load amps with tactile feedback dial
- Selectable 10/20/30 protection class
- Ambient insensitive within the stated operating temperature range of -20° to +70°C
- Built-in thermal memory to prevent hot motor restarts
- Protection against complete phase current loss
- Manual reset (standard) and remote reset (optional) 120 VAC
- Accuracy: ± 2%
- Repeatability: ± 2%
- Self-powered @ 50% of minimum current range
- Size: 1-6 (0.40A-540A, 600V, 50/60 Hz)
- Unbalance trip signal for PLC operation
- Manual trip
- Visual trip indication
- Standard isolated 1 NO and 1 NC aux. contact (A600, Q600)
- Built-in line/load straps
- Fits with existing 300-Line Starters
- Power factor correction terminals (sizes 1-4)
- DIN rail mountable sizes 1 & 2



Nonreversing, Non-combination

NEMA Sizes 00-9 with Thermal Overload Relay

600 Volts Maximum 50/60 Hertz

Application

GE's magnetic motor starters listed here may be used for starting full-voltage, nonreversing, single-speed ac motors up to 1600 horsepower, 600 Volts maximum, providing protection to the motor against running or stalled overloads.

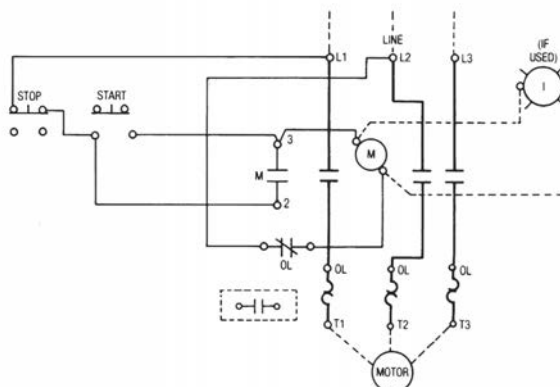
Their compact size and ease of wiring make them especially suitable for motor control centers, custom-type control panels, and switchgear equipment. Refer to page 1-7 for features of basic starter.



Typical CR306 Size 4 magnetic motor starter

Product Number Selection Instructions

1. Specify starter by complete Product Number.
Example: CR306C103 is a Size 1 starter with 230-240-Volt, 60-Hertz coil and in Type 1 general-purpose enclosure @ **\$246.00, GO-10G.**
2. The final letter of the Product Number denotes extra auxiliary contacts (sometimes referred to as auxiliary interlocks). Order the desired extra auxiliary contacts by replacing the final letter with one from first column of auxiliary interlock table (see page 1-134).
Example: CR306C103AAB is Size 1 starter with one extra normally open, auxiliary contact @ **\$312.00, GO-10G.**
3. Starter forms are available with coils of other ratings than those shown on pages 1-9 to 1-10. Refer to coil suffix table, page 1-8 for information. To order forms with other coil ratings, insert suffix from coil table in place of fifth and sixth **numbers** of listed starter Product Number shown on pages 1-9 to 1-10. (Contact your nearest GE Representative for other available starter coils not shown in table.) Example: A CR306C102 NEMA Size 1, three-pole starter in Type 1 enclosure with 24-Volt, 60-Hertz coil becomes a CR306C124 Product Number.
4. For continuous rated motors with a service factor of 1.15 to 1.25 select the heater with maximum motor Amperes equal to or immediately greater than the actual full-load current taken directly from the nameplate of motor. Order heaters by complete Product Number from appropriate heater tables on pages 1-151 to 1-157. **List Price \$9.00 each, GO-10H.** Packaged in quantities of three; must be ordered in multiples of three.
5. Order special modifications or forms not listed by complete description using a listed Product Number as reference.
Example: Similar to CR306C104 except with 480/120-Volt control transformer and red indicating light in cover.
Total **List Price \$483.00, GO-10G.**
6. Two-phase, four-wire forms are available. Contact nearest GE Representative for pricing and ordering information.
7. **Standard Coil Ratings**
Standard Voltages (60 Hertz): 24, 115-120, 200-208, 230-240, 265-277, 460-480 and 575-600
Standard Voltages (50 Hertz): 110, 220, 380, 440 and 550
For price adders on special voltage and/or frequency coils, refer to page 1-126.
8. **50-Hertz Starters**
Pricing of starters for use on 50 Hertz at standard voltages is the same as shown in table for 60 Hertz. Refer to page 1-4 for three-phase horsepower ratings at 380 Volts, 50 Hertz.



Typical Schematic Diagram for CR306 Starter (NEMA Sizes 00-6)

9. Product Notes

Motor full-load current should not exceed continuous ampere rating of starter.

Reference Publications

Instructions	
NEMA Size	Publication Number
00, 0, 1	GEH-5190
2	GEH-4774
3	GEH-4806
4	GEH-4807
5	GEH-4839
6	GEH-5198
7-9	GEH-5108

CR306, CR386 Magnetic Starters – Contents

Basic Features (300-Line) and Technical Features (CR306, CR386).....	1-7
Non-combination, NEMA Sizes 00-9 with Thermal Overload Relays — Application Information and Selection Instructions (CR306, CR386).....	1-8
Non-combination, NEMA Sizes 00-9 with Thermal Overload Relays (CR306, CR386).....	1-9
Outlines and Dimensions (CR306, CR386).....	1-13



Other Coil Voltages: See page 1-6
Factory Installed Modifications: See pages 1-124 to 1-131

Field Installed Modifications: See pages 1-132 to 1-138
Extra Auxiliary Contacts: See pages 1-132 to 1-134
Heater Selection Tables: See pages 1-151 to 1-157

NEMA Full Voltage Power Devices

NEMA Rated Full Voltage Starters - Magnetic

CR306, CR386 Magnetic Starters

Section 1

Nonreversing, Non-combination, Open, NEMA Type 1, 3R, 12, 4/4X
NEMA Sizes 00-9 with Thermal Overload Relay
600 Volts Maximum 50/60 Hertz

Three-Phase

List Price includes a holding interlock, pressure terminals for the line and load connections, plus a 3-leg block type overload relay (manual reset). All enclosures include external reset. One NO isolated contact on the overload relay is available as an option at **\$24.00, GO-10G**. To order add suffix LAA to Product Numbers (Size 00-5) listed in table.

Three heaters should be ordered as separate items. See pages 1-151 to 1-157 for selection. **List price \$9.00 each, GO-10H.**

CR306, Three-Phase Magnetic Starters

NEMA Size	Continuous Ampere Rating ¹	Voltage	Horsepower	Open Type		NEMA Type 1		NEMA Type 3R		NEMA Type 12		NEMA Type 4/4X	
				Product Number CR306	List Price GO-10G	Product Number CR306	List Price GO-10G	Product Number CR306	List Price GO-10G	Product Number CR306	List Price GO-10G	Product Number CR306	List Price GO-10G
00	9	Separate Control—115-120 V		A002	\$162.00	A102	\$174.00	Use NEMA Size 0		Use NEMA Size 0		Use NEMA Size 0	
00	9	200-208	1 1/2	A023	\$162.00	A123	\$174.00	Use NEMA Size 0		Use NEMA Size 0		Use NEMA Size 0	
00	9	230-240	1 1/2	A003	\$162.00	A103	\$174.00	Use NEMA Size 0		Use NEMA Size 0		Use NEMA Size 0	
00	9	460-480	2	A004	\$162.00	A104	\$174.00	Use NEMA Size 0		Use NEMA Size 0		Use NEMA Size 0	
00	9	575-600	2	A005	\$162.00	A105	\$174.00	Use NEMA Size 0		Use NEMA Size 0		Use NEMA Size 0	
0	18	Separate Control—115-120 V		B002	\$204.00	B102	\$216.00	B602	\$288.00	B202	\$288.00	B402	\$426.00
0	18	200-208	3	B023	\$204.00	B123	\$216.00	B623	\$288.00	B223	\$288.00	B423	\$426.00
0	18	230-240	3	B003	\$204.00	B103	\$216.00	B603	\$288.00	B203	\$288.00	B403	\$426.00
0	18	460-480	5	B004	\$204.00	B104	\$216.00	B604	\$288.00	B204	\$288.00	B404	\$426.00
0	18	575-600	5	B005	\$204.00	B105	\$216.00	B605	\$288.00	B205	\$288.00	B405	\$426.00
1	27	Separate Control—115-120 V		C002	\$234.00	C102	\$246.00	C602	\$318.00	C202	\$318.00	C402	\$462.00
1	27	200-208	7 1/2	C023	\$234.00	C123	\$246.00	C623	\$318.00	C223	\$318.00	C423	\$462.00
1	27	230-240	7 1/2	C003	\$234.00	C103 ²	\$246.00	C603	\$318.00	C203	\$318.00	C403	\$462.00
1	27	460-480	10	C004	\$234.00	C104	\$246.00	C604	\$318.00	C204	\$318.00	C404	\$462.00
1	27	575-600	10	C005	\$234.00	C105	\$246.00	C605	\$318.00	C205	\$318.00	C405	\$462.00
2	45	Separate Control—115-120 V		D002	\$426.00	D102	\$486.00	D602	\$618.00	D202	\$618.00	D402	\$918.00
2	45	200-208	10	D023	\$426.00	D123	\$486.00	D623	\$618.00	D223	\$618.00	D423	\$918.00
2	45	230-240	15	D003	\$426.00	D103	\$486.00	D603	\$618.00	D203	\$618.00	D403	\$918.00
2	45	460-480	25	D004	\$426.00	D104	\$486.00	D604	\$618.00	D204	\$618.00	D404	\$918.00
2	45	575-600	25	D005	\$426.00	D105	\$486.00	D605	\$618.00	D205	\$618.00	D405	\$918.00
3	90	Separate Control—115-120 V		E002	\$690.00	E102	\$810.00	E602	\$966.00	E202	\$966.00	E402	\$1422.00
3	90	200-208	25	E023	\$690.00	E123	\$810.00	E623	\$966.00	E223	\$966.00	E423	\$1422.00
3	90	230-240	30	E003	\$690.00	E103	\$810.00	E603	\$966.00	E203	\$966.00	E403	\$1422.00
3	90	460-480	50	E004	\$690.00	E104	\$810.00	E604	\$966.00	E204	\$966.00	E404	\$1422.00
3	90	575-600	50	E005	\$690.00	E105	\$810.00	E605	\$966.00	E205	\$966.00	E405	\$1422.00
4	135	Separate Control—115-120 V		F002	\$1578.00	F102	\$1830.00	F602	\$2346.00	F202	\$2346.00	F402	\$2874.00
4	135	200-208	40	F023	\$1578.00	F123	\$1830.00	F623	\$2346.00	F223	\$2346.00	F423	\$2874.00
4	135	230-240	50	F003	\$1578.00	F103	\$1830.00	F603	\$2346.00	F203	\$2346.00	F403	\$2874.00
4	135	460-480	100	F004	\$1578.00	F104	\$1830.00	F604	\$2346.00	F204	\$2346.00	F404	\$2874.00
4	135	575-600	100	F005	\$1578.00	F105	\$1830.00	F605	\$2346.00	F205	\$2346.00	F405	\$2874.00
5	270	Separate Control—115-120 V		G002	\$3855.00	G102	\$4317.00	G602	\$5637.00	G202	\$5637.00	G402	\$5637.00
5	270	200-208	75	G023	\$3855.00	G123	\$4317.00	G623	\$5637.00	G223	\$5637.00	G423	\$5637.00
5	270	230-240	100	G003	\$3855.00	G103	\$4317.00	G603	\$5637.00	G203	\$5637.00	G403	\$5637.00
5	270	460-480	200	G004	\$3855.00	G104	\$4317.00	G604	\$5637.00	G204	\$5637.00	G404	\$5637.00
5	270	575-600	200	G005	\$3855.00	G105	\$4317.00	G605	\$5637.00	G205	\$5637.00	G405	\$5637.00
6	540	Separate Control—115-120 V		HH002	\$9165.00	HH102	\$12165.00	HH602	\$13785.00	HH202	\$13785.00	HH402	\$15165.00
6	540	200-208	150	HH023	\$9165.00	HH123	\$12165.00	HH623	\$13785.00	HH223	\$13785.00	HH423	\$15165.00
6	540	230-240	200	HH003	\$9165.00	HH103	\$12165.00	HH603	\$13785.00	HH203	\$13785.00	HH403	\$15165.00
6	540	460-480	400	HH004	\$9165.00	HH104	\$12165.00	HH604	\$13785.00	HH204	\$13785.00	HH404	\$15165.00
6	540	575-600	400	HH005	\$9165.00	HH105	\$12165.00	HH605	\$13785.00	HH205	\$13785.00	HH405	\$15165.00

CR386 Three-Phase Magnetic Starters

NEMA Size	Continuous Ampere Rating ¹	Voltage	Horsepower	Control Circuit Voltage	Open Type	
					Product Number CR386	List Price GO-10G
7	810	Separate Control—115-120 V			J002AA1A	\$13167.00
7	810	220-240	300	230	J003AA1A	\$13167.00
7	810	440-480	600	460	J004AA1A	\$13167.00
7	810	550-600	600	575	J005AA1A	\$13167.00
8	1215	Separate Control—115-120 V			K002AA1A	\$19455.00
8	1215	220-240	450	230	K003AA1A	\$19455.00
8	1215	440-480	900	460	K004AA1A	\$19455.00
8	1215	550-600	900	575	K005AA1A	\$19455.00
9	2250	Separate Control—115-120 V			L002AA1A	\$31983.00
9	2250	220-240	800	230	L003AA1A	\$31983.00
9	2250	440-480	1600	460	L004AA1A	\$31983.00
9	2250	550-600	1600	575	L005AA1A	\$31983.00

¹Motor full load current should not exceed continuous ampere rating of the starter.

²Units are individually boxed and "Poly-Packed" six per carton as standard.



Enclosure Descriptions: See Section 12

NEMA Full Voltage Power Devices

NEMA Rated Full Voltage Starters - Magnetic

CR306, CR386 Magnetic Starters

Section 1

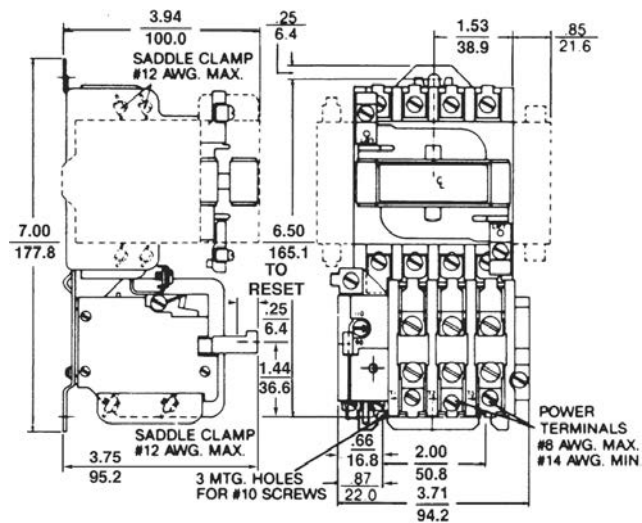
Nonreversing, Non-combination

200 Horsepower Maximum

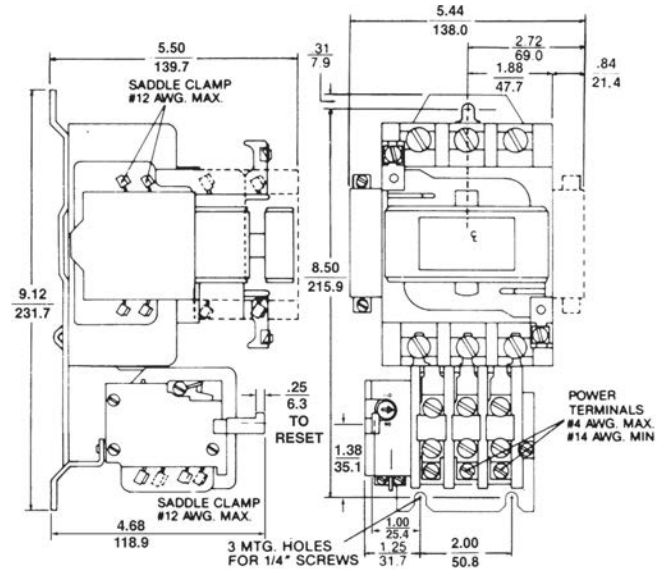
NEMA Sizes 00-5

600 Volts Maximum

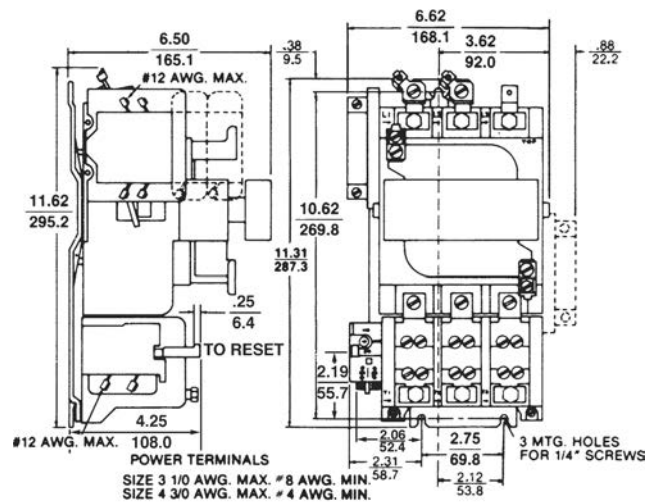
Outlines, Dimensions (^{in.}_{mm}) and Weights (For Estimating Only)



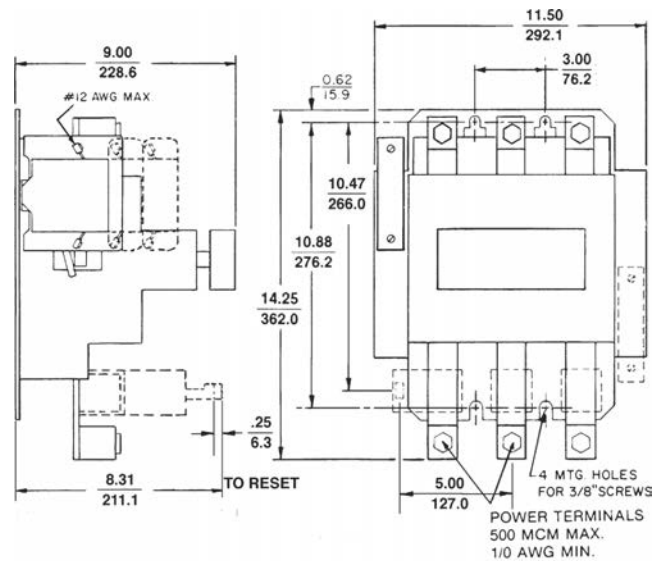
Open Type, NEMA Sizes 00-1 (3 3/4 lbs.)



Open Type, NEMA Size 2 (8 lbs.)



Open Type, NEMA Sizes 3 (19 lbs.) and 4 (20 lbs.)



Open Type, NEMA Size 5 (55 lbs.)



Enclosure Descriptions: See Section 12
Product Number Selection Instructions: See page 1-8



Two Piece Reduced Bore Flanged End Ball Valve



BULK LOADING
PRODUCT LINE

EZ Series

Easy Maintenance Design

Features a Two Piece Bolted Body

Models:

RF15 - Short Pattern
RF150 - Long Pattern
V-RF15 & V-RF150
 - Control Ball Valve
 Size Range 3" - 14"
 ANSI Class 150

Models:

RF30 - Short Pattern
V-RF30
 - Control Ball Valve
 Size Range 3" - 6"
 ANSI Class 300

EZ Series

STANDARD PRODUCT NUMBER

RF15-SS-FFG-L (150# SS Standard FFG)
RF15-SS-FGG-L (150# SS Fire-Safe FGG)
RF15-CS-FFG-L (150# CS Standard FFG)
RF15-CS-FGG-L (150# CS Fire-Safe FGG)
RF30-SS-FFG-L (300# SS Standard FFG)
RF30-SS-FGG-L (300# SS Fire-Safe FGG)
RF30-CS-FFG-L (300# CS Standard FFG)
RF30-CS-FGG-L (300# CS Fire-Safe FGG)

ANSI Reduced Bore
Short Take-out



10" Model RF15 - Short



10" Model RF150 - Long

ANSI Full Bore Take-out

Versatile Design Offers:

- Ease of Seat Replacement or Seat Change-Outs
- Ease of Maintenance
- Custom V-Port Control Options
- Improved Flow Control
- Lighter Weight than Full Port
- Lower Cost than Full Port
- Lower Operating Torques
- Fire Safe Design
- Comply with API & ANSI Standards

Simplicity & Performance, an ideal choice for applications that require easy to repair, reduced port flanged-end ball valves.

DESIGN FEATURES AND STANDARDS

RF15/RF30

Standards and Specifications

Valves mentioned in this bulletin are available to conform to the following industry standards and specifications:

All valves are manufactured to ISO 9001 quality standards

WW-V-35C	Federal specification: valve, ball
ANSI/ASME B16.10	Face-to-face / end-to-end dimensions of ferrous valves
ANSI/ASME B16.5	Steel pipe flanges and flange fittings
ANSI/ASME B16.34	Steel valves - flanged and butt welded end
ANSI/ASME B31.1	Power piping
ANSI/ASME B31.3	Chemical plant & petroleum refinery piping
ANSI/FCI70-2-1976	For control valve leakage
BS 6755, Part 2	Testing of valves-specification for fire type testing
ISA 5752:1982	Metal valves for use in flange piping systems
ISA 75.02	Valve sizing coefficient Cv, piping geometry factor Fp & pressure drop limitation XT
ISA 575.19	Hydrostatic testing of control valves
ISO 5211	Dimensions for attachment of actuators/ gear boxes to valves (ISO mounting)
MSS-SP-25	Standard marking systems for valves
MSS-SP-55	Quality standards for steel casting

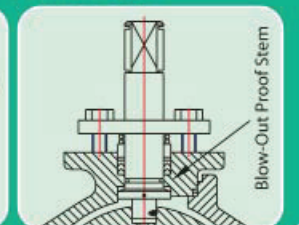
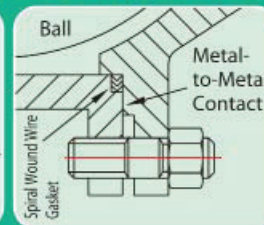
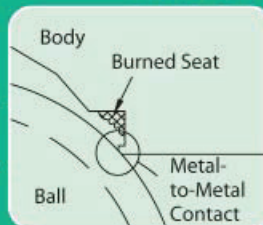
MSS-SP-6	Standard finishes for contact faces of pipe flanges and connecting-end flanges of valve and fittings
MSS-SP-44	Steel pipe line flanges
MSS-SP-61	Pressure testing of steel valves
MSS-SP-72	Ball valves with flanged or butt welded ends for general service
MSS-SP-96	Terminology for valves and fittings
NACE MR0175	Sulfide stress cracking resistant materials for oilfield equipment

Optional Standard & Specifications

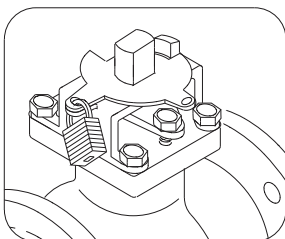
API 608	Metal ball valves - Flanged, Threaded, and Welding End
API 6D	Specifications for pipeline valves
API 598	Valve inspection and testing
MSS-SP-53	Quality standard for steel casting and forging for valves, flanges and fittings and other piping component - magnetic particle examination method
MSS-SP-93	Quality standard for steel casting and forging for valves, flanges, fittings or other piping components - liquid penetrant examination method
ISO 15848-1	Industrial valves - measurements, test & qualification procedures for fugitive emissions

Flo-Tite's Flanged series valves with graphite stem packing meet the highest fire safety standards under extreme conditions. In the event of a fire, after heat destroys the primary resilient seat, the ball makes contact with the secondary metal seat, forming a secure seal. The body seal, composed of stainless steel and graphite wound into a spiral, prevents external leakage. The graphite stem rings prevent stem leakage.

Fire Safe: API607-4 & 5 Certified



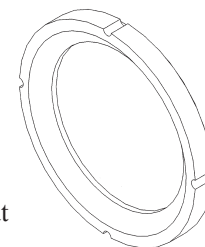
Tamper-Proof Locking Device Standard



Valve topworks incorporate a tamper-proof locking device, which locks in open or closed positions. When the valve stop housing is removed, four bolts remain to mount actuator bracket. Size: 6" - 14"

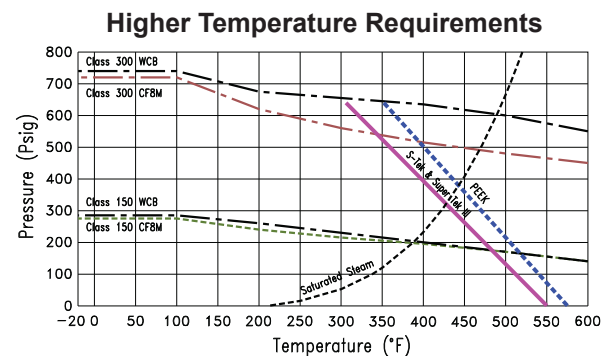
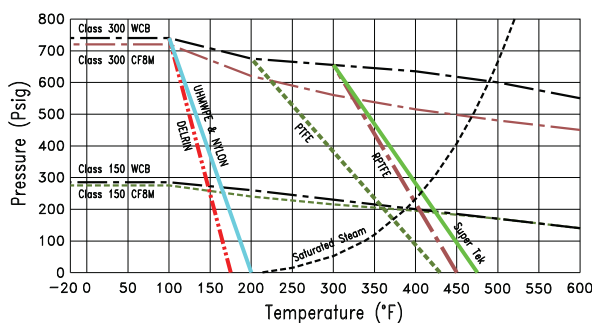
Pressure Relieving & Equalizing Seat Design

Specially Designed Seats allow equalization of pressure in the ball cavity which reduces operating torque and increases seat life.



Ball Design Added Safety Feature

All balls are provided with a 1/8" hole drilled into the stem slot of each ball to prevent excessive pressure build up in the cavity from trapped liquid when the valve is in the open position.



Pressure Temperature Rating

DIMENSIONS AND TECHNICAL DATA

No.	Name	Stainless Steel	Carbon Steel	Qty
1	Body	ASTM A351 CF8M	ASTM A216 WCB	1
2	Cap	ASTM A351 CF8M	ASTM A216 WCB	1
3	Ball	SS316	SS316 / SS304	1
4	Seats	# TFM	TFM	2
5	Stem	SS316 / 17-4PH	SS316 / 17-4PH	1
6	Gasket	# RPTFE / Graphite	RPTFE / Graphite	1
7	Thrust Washer	# 25% Carbon + TFM	25% Carbon + TFM	1
8	Stem Packing	# TFM / Graphite	TFM / Graphite	1
9	Packing Protector	# 50% PTFE + SS316	50% PTFE + SS316	1
10	O-Ring	# Viton	Viton	1
11	Anti-Static Devices	SS304	SS304	2
12	Body Studs	ASTM A193 B8	ASTM A193 B7	set
13	Body Nuts	ASTM A194 Gr. 8	ASTM A194 2H	set
14	Packing Follower	SS304	SS304	1
15	Packing Gland	SS304 / 17-4PH	SS304 / 17-4PH	1
16	Gland Bolts	SS304	Steel	2
17	Travel Stop	SS304	Steel	1
18	Junction Head	Ductile Iron	Ductile Iron	1
19	Pipe Grip	Carbon Steel	Carbon Steel	1
20	Housing Bolts	SS304	SS304	4
21	Stop Housing	SS304	SS304	1
22	Snap Ring	Plated Steel	Plated Steel	1
23	Seat O-Rings	# Viton	Viton	2
24	Belleville Washers	SS301	SS301	2

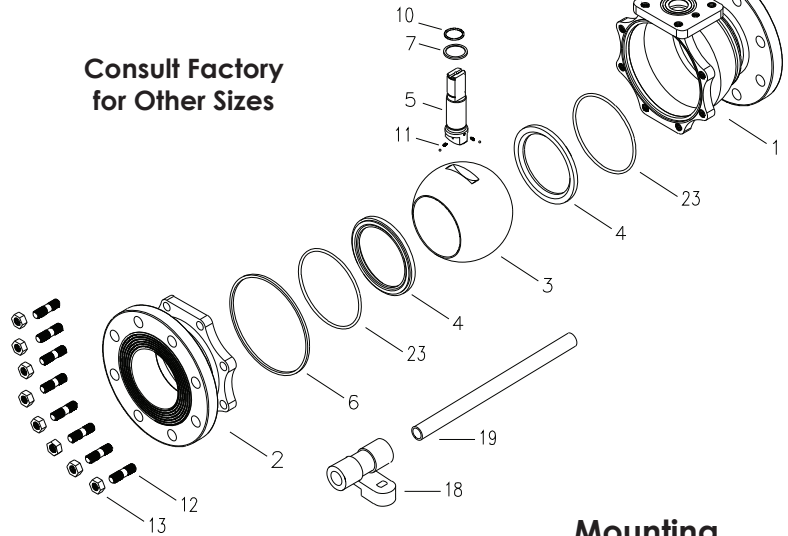
Parts included in repair kits

For 6" size, packing gland is live-loaded, and handle is one piece design;
For size 12" & 14", packing gland serves as stop housing.

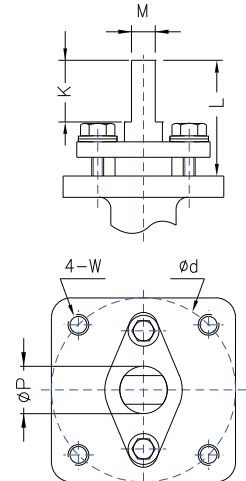
Sizes 1 1/2" through 4" are available in our standard one piece body design
SF150 Series, consult factory.

Model:
RF15 Series 3" - 14"
RF150 Series 3" - 12"
Exploded View

Consult Factory
for Other Sizes



Mounting Dimensions



Note:
Verify Mounting Dimensions
prior to making hardware.

RF15 / Short

RF150 / Long

(Reduced Port Valve with Full
Port Face to Face)

Dimensions and Weights

Size	RF15		RF150		B1	C	C1	D	d	F	K	L	M	N	P	S	T	W	Cv	Torque in-lb	Weight Lbs	
	A	B	A	B																	RF15	RF150
3"	8.0	2.56	8.0	2.56	3.00	6.63	3.35	15.4	4.02	7.5	1.75	3.07	0.669	4	1.10	6.00	0.75	1/2-13unc	340	620	C/F	C/F
4"	9.0	2.99	9.0	2.56	3.94	6.92	3.62	15.4	4.02	9.0	1.75	3.07	0.669	8	1.10	7.50	0.75	1/2-13unc	800	800	C/F	C/F
6"	10.5	4.02	15.5	4.02	5.98	7.68	4.47	15.4	4.02	11.0	1.75	3.07	0.669	8	1.10	9.50	0.88	1/2-13unc	1090	1700	82.5	C/F
8"	11.5	5.98	18.0	5.98	7.87	11.31	7.17	25.4	4.92	13.5	1.65	3.58	1.024	12	1.71	11.75	0.88	1/2-13unc	2300	4600	186	C/F
10"	13.0	7.87	21.0	7.87	9.84	12.10	7.60	25.4	4.92	16.0	1.65	3.58	1.024	12	1.71	14.25	1.00	1/2-13unc	4000	9900	279.5	310
12"	14.0	9.53	24.0	9.84	11.81	13.22	9.88	43.1	5.51	19.0	2.13	3.86	1.378	12	1.97	17.00	1.00	5/8-11unc	7700	17000	426.5	C/F
14"	15.0	9.84	-	-	14.00	13.22	9.88	43.1	5.51	21.0	2.13	3.86	1.378	12	1.97	18.75	1.12	5/8-11unc	11550	23000	C/F	C/F



Flanged End Floating Ball Valves

Ideal Design for Process and Petrochemical Applications



SELF-SERVE
PRODUCT LINE

FULL-FLO SERIES

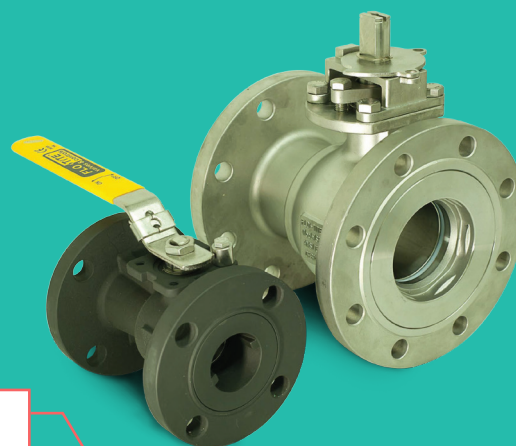
Models

F150 Class 150 / F300 Class 300

Full Port: 1/2" - 12"

Standard Steam Working Pressure:

150 SWP, optional 300 psig



UNI-FLO SERIES

Models

SF150 Class 150 / SF300 Class 300

Reduced Port: 1" - 12"

Standard Steam Working Pressure:

150 SWP, optional 300 psig

Full Flo Series

STANDARD PRODUCT NUMBER

F150-SS-FFG-L (150# SS - Standard FFG)
 F150-SS-FGG-L (150# SS - Fire Safe FGG)
 F150-SS-FFGN-L (150# SS - Standard FFGN Viton Free)
 F150-SS-FGGN-L (150# SS - Fire Safe FGGN Viton Free)
 F150-CS-FFG-L (150# CS - Standard FFG)
 F150-CS-FGG-L (150# CS - Fire Safe FGG)
 F150-CS-FFGN-L (150# CS - Standard FFGN Viton Free)
 F150-CS-FGGN-L (150# CS - Fire Safe FGGN Viton Free) *C/
 F price may vary on viton free items according to stock*
 F150-SS-RRG-L (150# SS - Standard RRG)
 F150-CS-RRG-L (150# CS - Standard RRG)

F300-SS-FFG-L (300# SS - Standard FFG)
 F300-SS-FGG-L (300# SS - Fire Safe FGG)
 F300-SS-FFGN-L (300# SS - Standard FFGN Viton Free)
 F300-SS-FGGN-L (300# SS - Fire Safe FGGN Viton Free)
 F300-CS-FFG-L (300# CS - Standard FFG)
 F300-CS-FGG-L (300# CS - Fire Safe FGG)
 F300-CS-FFGN-L (300# CS - Standard FFGN Viton Free)
 F300-CS-FGGN-L (300# CS - Fire Safe FGGN Viton Free)



Scan me

Design Features

- Floating Ball Design
- Protected Seat Design
- O-Ring Backed Seat
- Fire Safe Designed to API 607-5
- Spiral Wound Body Gasket with Secondary Metal to Metal Seal
- Open and Close Locking Device for Position Safety Lockout
- O-Ring Reinforced Stem Packing
- Cryogenic Design • Option



- I-SO-Mount, Actuator
Mounting Pad Standard
- Super-Tek Seating
- Live Loaded Stem Design
- Anti-Static Grounding Device
- Secondary Containment Option
- Flatted Shaft - Positive Flow Indication
- Ball Cavity Relief
- V-Ball Control • Option
- **Metal Seats Option, Class V & VI**

Valves for other flanged standards, such as DIN, JIS, BS, NFE and GB are also available.

Consult Factory for CE valve designs.

www.flotite.com

Design Specifications

Standards of Compliance

Travel stop incorporates Locking Device, can also be used as actuator lock out device

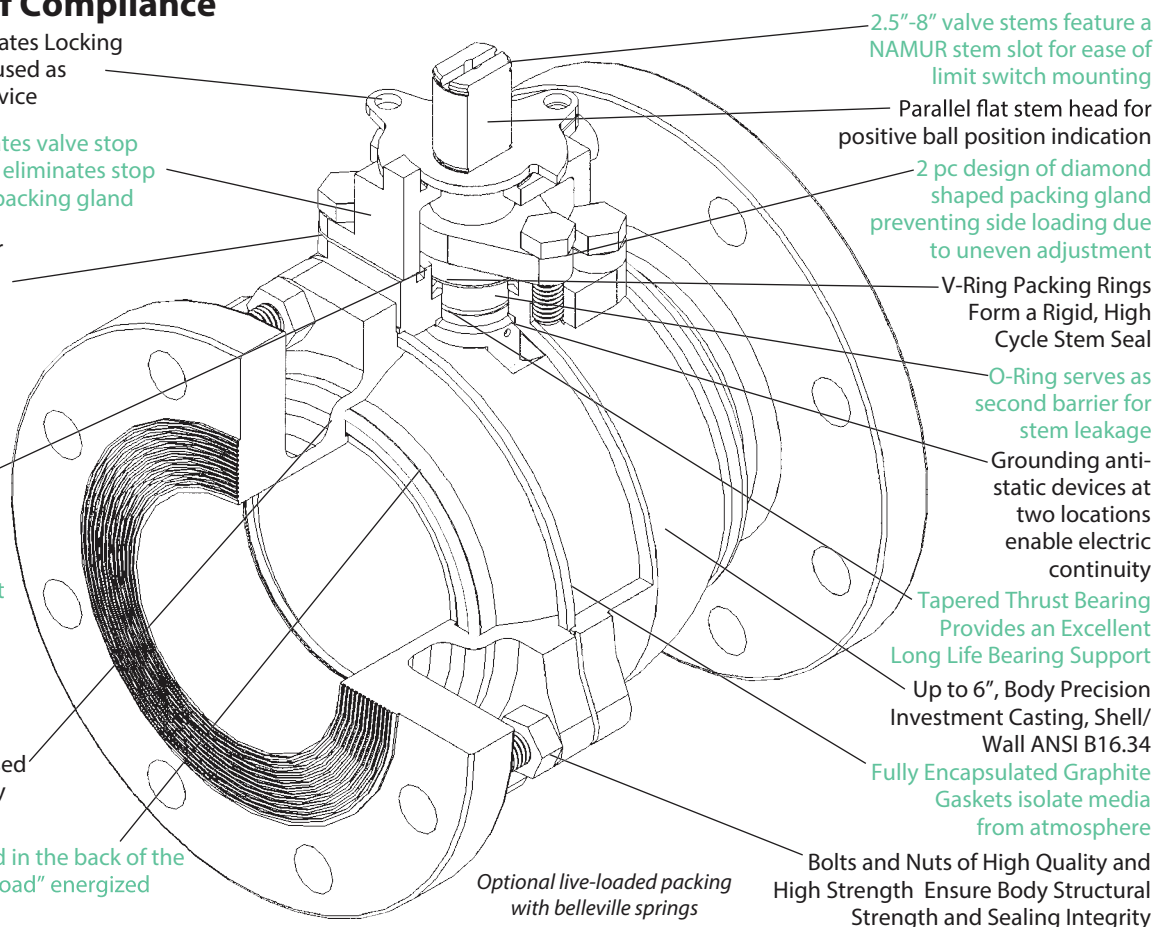
Stop housing separates valve stop from packing gland, eliminates stop plate impacting on packing gland

I-SO Mount Actuator Mounting, 4 bolt design eliminates torsional stress, actuator can be removed while valve is under full pressure

Recessed groove enables top flange to be adapted with a secondary containment bonnet for fugitive emission, cryogenic service and other critical applications

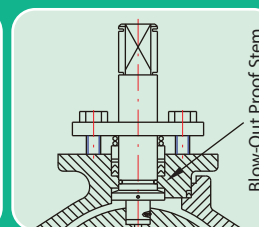
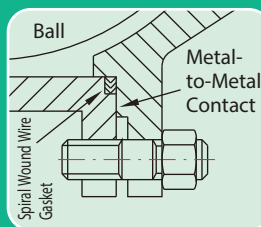
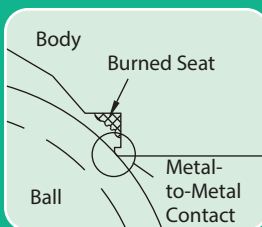
Pocketed and recessed seats with secondary metal backup seal.

O-Ring encapsulated in the back of the seat, a unique "flex-load" energized seat design



Flo-Tite's Flanged series valves with graphite stem packing meet the highest fire safety standards under extreme conditions. In the event of a fire, after heat destroys the primary resilient seat, the ball makes contact with the secondary metal seat, forming a secure seal. The body seal, composed of stainless steel and graphite wound into a spiral, prevents external leakage. The graphite stem rings prevent stem leakage.

Fire Safe: API607-4 & 5 Certified



Standards and Specifications

Valves covered in this bulletin are available to conform to the following industry standards and specifications

All valves are manufactured to ISO 9001 quality standards.

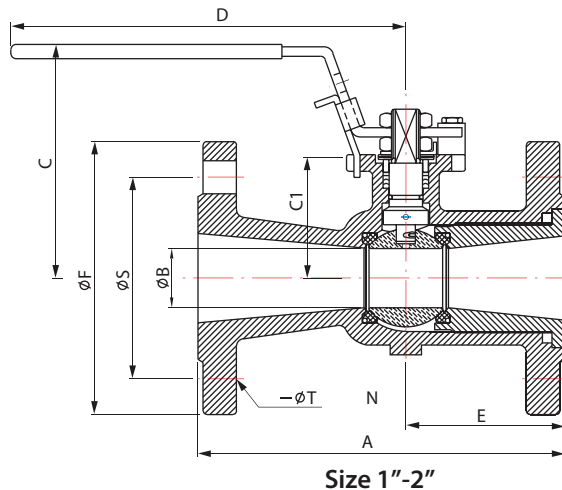
WW-V-35C	Federal Specification: Valve, Ball
ANSI/ASME B16.10	Face-to-Face / End-to-End Dimensions of Ferrous Valves
ANSI/ASME B16.5	Steel Pipe Flanges and Flange Fittings
ANSI/ASME B16.34	Steel Valves - Flanged and Buttwelded End
ANSI/ASME B31.1	Power Piping
ANSI/ASME B31.3	Chemical Plant & Petroleum Refinery Piping
ANSI/FCI 70-2-1976	For Control Valve Leakage
BS 6755, Part 2	Testing of Valves - Specification for Fire Type Testing
ISO 5752:1982	Metal Valves for use in Flanged Piping Systems
ISA 75.02	Valve Sizing Coefficient Cv, Piping Geometry Factor Fp and Pressure Drop Limitation XT
ISA 575.19	Hydrostatic Testing of Control Valves
ISO 5211	Dimensions for Attachment of Actuators/Gear Boxes to Valves (ISO Mounting)
MSS-SP-25	Standard Marking Systems for Valves
MSS-SP-55	Quality Standards for Steel Castings

MSS-SP-6	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings
MSS-SP-44	Steel Pipe Line Flanges
MSS-SP-61	Pressure Testing of Steel Valves
MSS-SP-72	Flanged or Butt and Weld End Ball Valves Having Full or Reduced Bores for General Liquid and Gas Service
MSS-SP-96	Terminology for Valves and Fittings
SIL 11/ABS	Consult Factory for these models Available as Standard in Certain Models Please Specify
NACE MR01-75	Sulfide Stress Cracking Resistant Materials for Oilfield Equipment. Available as standard in certain models. Please specify.
API 608	Metal Ball valves Used in On-Off Service that have Buttwelded or Flanged Ends for Size 1/2"NPS - 12"NPS
API 6D	Specifications for Pipeline Valves
API 598	Valve Inspection and Testing
MSS-SP-53	Quality Standard for Steel Casting and Forging for Valves, Flanges and Fittings and Other Piping Components-Magnetic Particle Examination Method
ISO 15848-1	Industrial valves - Measurement, test and qualification procedures for fugitive emissions

API 641 standard specifies the requirements and acceptance criteria for fugitive emission type testing of quarter-turn valves.

Dimensions - Reduced Bore

Technical Submittal



Uni-Flo Series

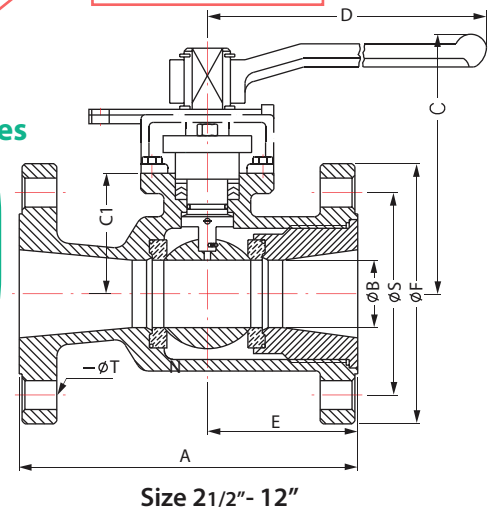
1 pc body

SF150/SF300 Series

New 2 pc body design
RF15/30 EZ Series
Consult Factory

New 2 pc body design -
RF15/RF30 EZ Series
Consult Factory

SELF-SERVE
PRODUCT LINE



Model SF150 - ANSI Class 150

Size	A	B	C	C1	D	E	F	N	S	T	Cv	Torque in-lb	Est. Weight Lbs
1"	5.00	0.79	2.91	1.67	6.50	2.0	4.25	4	3.13	0.63	33	95	7
1 1/2"	6.50	1.26	3.62	2.20	7.87	2.17	5.00	4	3.88	0.63	85	252	12
2"	7.00	1.50	4.20	2.61	10.4	2.56	6.00	4	4.75	0.75	160	284	17
3"	8.00	2.56	6.22	3.78	15.4	3.0	7.50	4	6.00	0.75	340	651	38
4"	9.00	3.00	6.38	4.69	15.4	3.35	9.00	8	7.50	0.75	800	840	55
6"	10.5	4.00	.52	4.33	15.4	4.61	11.0	8	9.50	0.87	1090	1785	80
8"	11.5	5.98	10.1	6.85	25.6	5.85	13.5	8	11.75	0.87	2300	4830	191
10"	13.0	7.87	11.6	7.62	37.4	6.85	16.0	12	14.25	1.00	4000	10395	315
12"	14.0	9.84	12.8	8.92	38.0	7.00	19.0	12	17.0	1.00	7700	17850	518

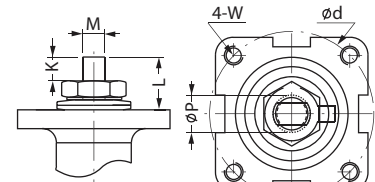
Model SF300 - ANSI Class 300

Size	A	B	C	C1	D	E	F	N	S	T	Cv	Torque in-lb	Est. Weight Lbs
1"	6.50	0.79	2.91	1.67	6.50	2.18	4.88	4	3.50	0.75	33	100	9
1 1/2"	7.50	1.26	3.62	2.20	7.87	2.60	6.14	4	4.50	0.87	85	265	18
2"	8.50	1.50	4.13	2.61	10.4	2.92	6.50	8	5.00	0.75	160	298	25
3"	11.14	2.24	6.77	3.78	15.4	3.75	8.27	8	6.62	0.87	340	684	56
4"	12.0	3.15	7.68	4.69	15.4	3.86	10.0	8	7.87	0.87	800	882	75
6"	15.87	3.94	7.52	4.33	15.4	4.61	12.5	12	10.63	0.87	1090	1874	133
8"	16.5	5.91	10.1	6.85	25.6	5.85	15.0	12	13.0	1.00	2300	5072	303
10"	18.0	7.87	11.6	7.62	37.4	6.85	17.5	16	15.25	1.14	4000	10915	464
12"	19.75	9.53	13.7	8.92	38.0	7.00	20.5	16	17.75	1.25	7700	18743	818

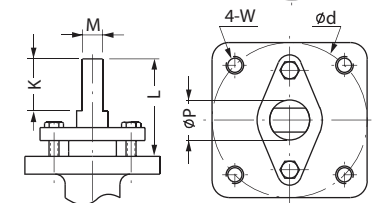
Mounting Dimensions (SF150/SF300)

Size	d	K	L	M	P	W	ISO
1"	1.65	0.43	0.59	0.250	0.37	#10-24UNC	F04
1 1/2"	1.97	0.43	0.75	0.315	0.43	1/4-20UNC	F05
2"	2.76	0.55	0.91	0.374	0.62	5/16-18UNC	F07
3"	4.02	1.31	2.59	0.669	1.10	1/2-13UNC	F10
4",6"	4.02	1.75	3.07	0.669	1.10	1/2-13UNC	F10
8",10"	4.92	1.65	3.58	1.024	1.71	1/2-13UNC	F12
12"	5.51	2.13	3.86	1.378	1.97	5/8-11UNC	F14

Size
1"-2"



Size
2 1/2"- 12"

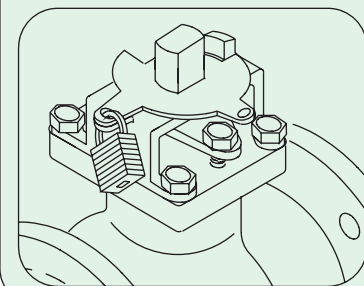


*Verify mounting dimensions before
manufacturing mounting hardware



Unique Design Feature

Tamper Proof Locking Device Standard



Valve topworks incorporates a tamper proof locking device, locks in open or closed positions. When valve stop housing is removed, four bolts remain to mount actuator bracket. Size: 2 1/2"-12"

Pressure Relieving & Equalizing Seat Design

Specially designed seats allow equalization of pressure in the ball cavity which reduces operating torque and increases seat life.



Ball Design Added Safety Feature

All balls are provided with a 1/8" hole drilled into the stem slot of each ball to prevent excessive pressure build up in the cavity from trapped liquid when the valve is in the open position.

Due to continuous development & improvement of our product range, we reserve the right to alter the dimensions & technical data included in this brochure.

Flo-Tite's Van Guard Stem Sealing System, designed to minimize fugitive emissions. Increases safety and provide an immediate ball valve solution to the newer EPA performance requirements, for valves meeting with a leak rate of 500ppm.

Flo-Tite's Van Guard Seal, state of the art stem sealing system. Incorporating a triple set of valve stem seals. This unique system eliminates the possibility of valve stem leaks in most all media applications.

STAGE I - FRONT LINE

Stage I provides a front line defense against leakage. The blow-out proof stem shoulder has a 45 degree bell shaped slope. The bell shaped design offers more sealing surface, effectively blocking all leak paths during rotation. The wedging action of the portion of the stem is far superior to the common small flat stem shoulder design.

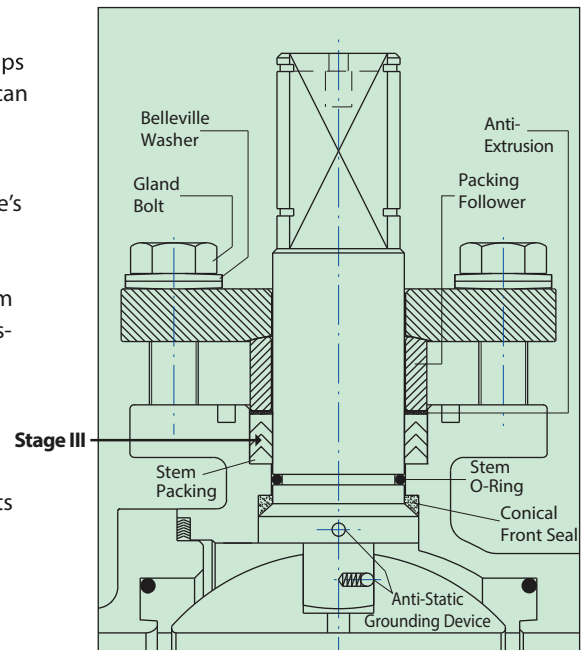
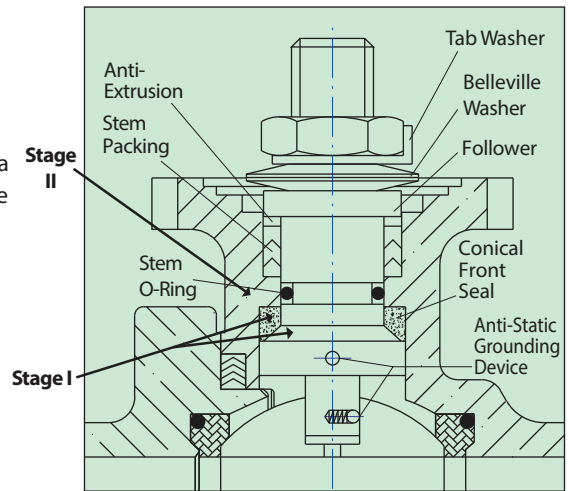
STAGE II - GUIDE-SEAL

The O-ring originated early in valve design and has been a proven performer in high cycle applications. Its basic function reduces the potential of machining imperfections and provides a low torque flexible seal. This center guide also helps to maintain a perfect stem alignment, by eliminating side loading stress which can cause stem leaks.

STAGE III - LIVE-LOADED SEAL

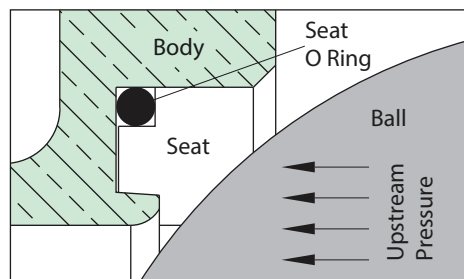
Live-seal is considered the intellectual component and the workhorse of Flo-Tite's Van Guard stem sealing system. Working in unison with stages I and II, stage III calls upon the use of V-Ring packing sets which expand sideways as they are compressed and pressurized blocking all air pockets. The Van-Guard stem system is energized by disk or coil springs which continuously adjusts packing compression to compensate for wear, pressure or temperature changes.

Whether your service involves volatile organic compounds, volatile hazardous chemicals, or air pollutants, Flo-Tite's ball valves are by design dependable, long lasting and fully maintainable. Flo-Tite has various valve solutions and designs that provide end-users freedom of choice for the toughest requirements imposed by the industry and by international standards.



Flex-Load Energized Seat Design

Flo-Tite's unique Flex-Loaded Design is standard in our API 6D valves.



Viton O Rings are inserted behind valve seats. The O Ring exerts only a minimum amount of pressure on the seats that in turn helps seal on both upstream and downstream sides of the ball. Also, helps provide additional seat memory.

Ideal for high cycle, very low pressure & vacuum service applications.

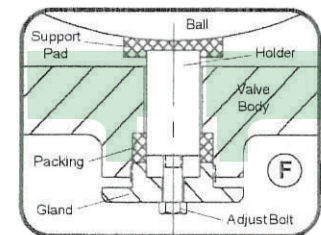
* Standard offered with Viton material, consult factory if other material is required.

Vacuum Service Suitable to 20 Micron

Specially cleaned and lubricated valves can handle services of 10^{-3} mm of Hg (1 micron)

Ball Support

Trunnion Style Ball Support



Flo-Tite's ball support is a valuable design feature found on our larger sized valves. It maintains a constant ball seat profile which dramatically improves valve performance resulting in smooth, more efficient valve operation with lower operating torques, less seat damage, reduced seat wear, and longer service. Features in Model F150 /F300 6", 8", 10" and 12", and our standard Port Models SF150 sizes 10" - 12".

Product Identification Code for Complete Valve Model Numbers

Model	Body Material		Valve - Soft Parts						Operator			Size		
			Seat		Stem Seals		Body Seal					O - Rings		inch
Flanged End Full Bore F150 F300 F600	316SS	SS	TFM	F	TFM	F	TFM	F	VITON	V	Lever Locking	L	1/2	15
	WCB	CS	CTFM	Y	CTFM	Y	CTFM	Y	EPDM	E	Oval Locking	O	3/4	20
	Alloy 20	A2	PTFE	T	RTFM	X	PTFE	T	PTFE	T	Gear	G	1	25
	Duplex	DP	RPTFE	R	PTFE	T	RPTFE	R	BUNA	B	Deadman	S	1 1/4	32
Flanged End Standard Bore RF15 SF150 RF30 SF300 SF600			50/50	S	RPTFE	R	50/50	S	NONE	N	Actuator	A	1 1/2	40
			UHMWPE	U	50/50	S	UHMWPE	U			Bare Stem	N	2	50
			PEEK	P	UHMWPE	U	PEEK	P			Special	X	2/12	65
			Cavity Filled	C	PEEK	P	Graphite	G					3	80
			Metal	M	Graphite	G	Kel-F	K					4	100
			Kel-F	K									5	125
													6	150
													8	200
													10	250
													12	300

*Standard O Ring is Viton in 6D valve design.

Ordering Information

when placing an order or requesting a quotation, please provide as many details on the application as possible such as media type, temperature, pressure, pipe size and etc.

Material Identification

Flo-Tite's marking system follows MSS SP-25-1998 guidelines. In addition to the cast body information, we have decided to add metal name plates that identify all valve soft parts.

Valve users worldwide will be able to contact Flo-Tite quickly for any installation or service requirements as the company website address will be on all valves.

Example:

Model # F150				
TRIM	F	F	G	V
Special				
www.flotite.com		CE d48 +200°C -30°C		

Ordering Examples by Part Numbers

Flanged Full	316SS	TFM	Graphite	TFM	Viton	LEVER	2"	3/8" GAUGE Taps
Model	Body Material	Seat	Stem Seal	O-rings	Body Seal	Operator	Size	Special Feature
F150	SS	- F	G	G	V	- L	- 50	- G1

Flanged Valves with Media Containment Caps

The I-SO-Mount platform is ideal for the addition of our secondary containment units. Flo-Tite's media containment cap offers in-line maintenance for stem repair, protection for high temperature service, fugitive emission monitoring for early leak detection, positive displacement. It also can be used as a high-tech stem extension. See Tech Bulletin Page 140.

Optional - Special Design Valves

Flanged Valve with Cryogenic Extension



Flo-tite offers Cryogenic Flanged valves.
See Tech Bulletin 138

Stem Extensions
Flanged Valve with
Cast stem extensions or
Media Containment Units
available from 1/2" - 12"

6" stem extension



Flanged Valves in Control Valve Service

Flo-Tite offers modulating V-port control valves. The V-ball is characterized to meet all custom flow requirements. See Tech Bulletin page 120.

Stocking V Ball Sizes 1/2" - 12"



V-ports 15, 30, 60, 90 deg V & slotted balls.

Flo-Tite Ball Valves, serving multi-national end users in a wide range of applications in many industries including:

- Chemical & petrochemical
- Power generation plants
- Ship building industries
- Fiber industries
- Food industries
- LNG, HRSG industries
- Oil refinery industries
- Desalination industries
- Steel & iron industries
- Pulp & paper plants
- Coal & mining industries
- Higher Pressure HVAC Applications

Specific descriptions, dimensions and construction details illustrated may vary slightly from this bulletin. They are for general use only. We reserve the right to revise or modify product design without prior notice.

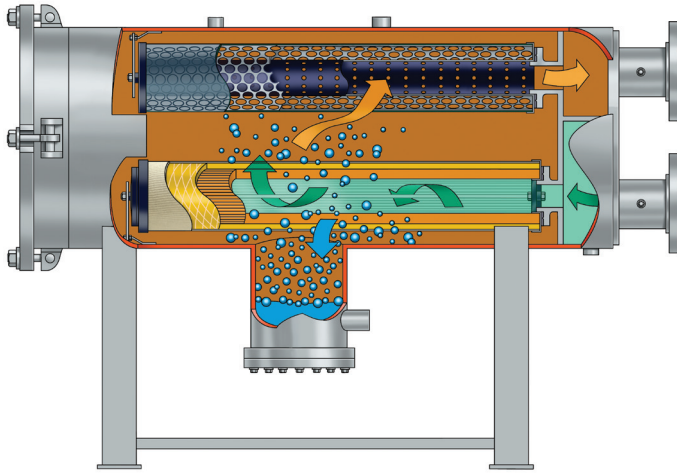


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This brochure is general in nature and manufacturer reserves the right to alter dimensions, materials or to make design improvements.



Category C Coalescer Separator housings are for commercial aviation fuel. Type S qualifications can be used at all filtration points in an aviation fueling system. Type S is meant to be used at filtration points where significant levels of water and dirt in the product can be expected. Facet HCS Series Horizontal Coalescer Separator housings fully comply with El 1581, Category C, Type S requirements.

RELIABLE PERFORMANCE

Facet coalescer separators are a result of over 50 years of continuous research and development to meet the ever demanding performance requirements in the aviation fuel handling industry. This, along with proven field performance, demonstrates Facet's ability to provide quality products that meet current specifications as well as specific customer requirements for installations in refineries, bulk storage, terminals, heliports, airports, etc.

STANDARD HOUSING DESIGN

- El 1596 Design & Construction
- Welded carbon steel construction—other materials available on request
- ASME Code, Section VIII construction, stamped and certified
- Design pressure: 150 psi @ 250°F—other design pressures available on request
- Inlet, outlet and drain connections permanently marked
- Interior: Epoxy coated (MIL-PRF-4556)
- Exterior: Prime coated
- Swing bolt head closures
- Hinged end opening cover
- Flanged inlet and outlet connections
- Buna-N o-ring closure seal
- Choice of rod or screw base coalescer cartridge mounting styles
- 4" inlet/outlet cleanout/inspection connections (when permitted by design)
- Knife edge cartridge mounting seals
- Spider plate attached to vessel wall

OPTIONS

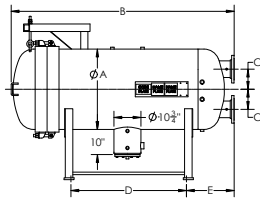
- Automatic air eliminator with check valve*
- Pressure relief valve*
- Differential pressure gauge*
- Pilot control valve
- Pilot tester
- Water slug control valve
- Electrical water-level alarm
- Water drain valves
- Liquid level gauge
- Blind cover for pilot control mounting flange
- Immersion heaters
- Sampling probes

(* Mandatory for 5th Edition)

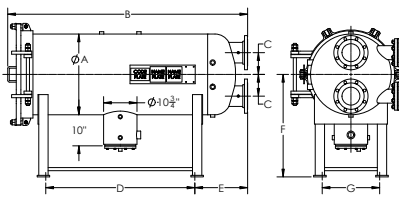
Horizontal Coalescer Separators for Fixed Installations

EI1581, 5th Edition, Category C, Type S

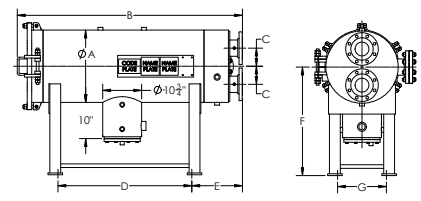
HCS Series (End Opening)



STYLE A



STYLE B



STYLE C

DATA

MODEL NUMBER ⁽¹⁾	FLOW RATE		REQUIRED CARTRIDGES				HOUSING LIQUID VOLUME		HOUSING DRY WEIGHT		HOUSING TYPE
	AVIATION FUEL EI 1581, CATEGORY C, TYPE S	COALESCER		SEPARATOR*							
		gpm	lpm	qty.	model	qty.	model	gals.	ltrs.	lbs.	
HCS-222-1324	105	397	2	CAA22-5SB	1	SS324FA-5	24	91	425	193	Style C - Flat
HCS-322-1424	157	594	3	CAA22-5SB	1	SS424FB-5	29	110	500	227	Style C - Flat
HCS-333-1436	244	924	3	CAA33-5SB	1	SS436FB-5	38	144	550	249	Style C - Flat
HCS-343-133	334	1264	3	CAA43-5SB	1	SS633FB-5	60	227	700	318	Style C - Flat
HCS-443-143	445	1685	4	CAA43-5SB	1	SS643FF-5	72	273	775	352	Style C - Flat
HCS-556-233	686	2597	5	CAA56-5SB	2	SS633FF-5	107	405	950	431	Style B - Dished
HCS-756-248	1000	3785	7	CAA56-5SB	2	SS648FF-5	151	572	1325	601	Style B - Dished
HCS-856-340	1234	4671	8	CAA56-5SB	3	SS640FF-5	270	1022	1700	771	Style A - Dished
HCS-1056-348	1543	5841	10	CAA56-5SB	3	SS648FF-5	350	1325	1975	896	Style A - Dished

Other sizes available on request.

* Separators: If preferred, Teflon® separator cartridges can be used in place of Synthetic. The separator cartridge model number's prefix would change from SS to ST. Example: SS324FA-5 would change to ST324FA-5

DIMENSIONS

MODEL NUMBER ⁽¹⁾	INLET/OUTLET DIAMETER		DIMENSIONS ⁽²⁾													
			A		B		C		D		E		F		G	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
HCS-222-1324	2	51	14	356	41½	1054	4	102	18	457	13½	343	25	635	9½	241
HCS-322-1424	3	76	16	406	39¾	1010	5	127	16	406	13½	343	28	711	10	254
HCS-333-1436	3	76	16	406	50½	1283	5	127	26	660	14	356	28	711	10	254
HCS-343-133	4	102	18	457	62½	1588	5	127	38	965	14	356	29	737	12	305
HCS-443-143	4	102	20	508	62¼	1581	5	127	37	940	14	356	30	762	13½	343
HCS-556-233	6	152	22	559	76	1930	6	152	49	1245	15	381	31	787	15½	394
HCS-756-248	6	152	26	660	77½	1969	7	178	49	1245	16½	419	33	838	18½	470
HCS-856-340	6	152	32	813	89	2261	8	203	48	1219	18	457	36	914	24	610
HCS-1056-348	8	203	36	914	91	2311	8	203	48	1219	19	483	38	965	27	686

REFERENCE NOTES:

- (1) Model numbers include housing style and required cartridge mounting.
- (2) Dimensions are approximate and should not be used for installation purposes.

NOTES:

- a. All elements are mounted against knife edge seals.
- b. Nameplate to be stamped with EI classified data.
- c. Inlet chamber to be hydrostatic tested at 115 psi (793 kPa).
- d. Coalescer cartridges are offered with a choice of rod or screw base mounting. The suffix "SB" will be added to the coalescer model number when screw base is required.
Example: CAA33-5 = Rod Mount
CAA33-5SB = Screw Base

CM Series Coalescer Cartridges

Qualified to EI 1581, 6th Edition, Category M



For Maximum Water Coalescing Efficiency And Solids Holding Capacity

Facet CM Series coalescer cartridges offer the finest performance available. This line of high flow coalescer cartridges removes ultra-fine solids and enhances separation of water from aviation fuel.

The Facet coalescer separator housings equipped with CM Series coalescer and companion separator cartridges have been tested and fully qualified to EI 1581, 6th Edition, for category "M", in both vertical and horizontal orientations.

Built for balanced fluid flow-thru and structural strength, each CM Series coalescer cartridge is a single piece construction of various combined media, precisely arranged in many layers and pleats, wrapped around a coated, perforated metal center tube- all encased in an outer sock material. All are 6" OD (152 mm) by 3½" ID (89 mm) and available in standard interchangeable nominal lengths in increments from 11¼" (290 mm) to 57¼" (1450 mm).

The CM Series 6 coalescer cartridges are available in two cartridge mounting styles; self-centering rod mount and screw base. The rod mount style has treated metal end caps, while the screw base ends are injection molded, glass-filled nylon. This screw base material offers superior strength and ease of maintenance -uniform threads, no shrinkage, no galling and no gasket to recover.

A permanently affixed Buna gasket seals against the V-type knife edge mounting adaptor to provide a positive seal. It will not separate from the cartridge during installation or change out.

Standard Design Features

- Qualified to the 6th Edition of EI 1581 for all category "M"
- Multi-layered media for increased solids holding capacity
- Ultra-fine solids removal
- Maximum water coalescence
- Balanced cartridge flow characteristics
- Recommended maximum operating temperature: 240 °F (115 °C)
- Withstands excess of 75 psi (5.17 bar) differential pressure
- pH range from 5 to 9
- Choice of self-centering rod or screw base coalescer cartridge mounting styles

Materials

- All metal components are treated against corrosion
- Screw base ends are injection molded, glass-filled nylon with locked-in gaskets
- Buna-N gaskets-other materials are available upon request

CM Series
Coalescer Cartridges
Qualified to EI 1581, 6th Edition, Category M

DATA

MODEL NUMBER	NOMINAL LENGTH		OUTSIDE DIAMETER		INSIDE DIAMETER		MOUNTING STYLE
	in	mm	in	mm	in	mm	
CM-11-5	11¼	290	6	152	3½	89	Rod
CM-14-5	14½	370	6	152	3½	89	Rod
CM-14SB-5	15	380	6	152	3½	89	Screw Base
CM-22-5	22¼	560	6	152	3½	89	Rod
CM-22SB-5	23	580	6	152	3½	89	Screw Base
CM-28-5	28¾	730	6	152	3½	89	Rod
CM-28SB-5	29	740	6	152	3½	89	Screw Base
CM-33-5	33¼	840	6	152	3½	89	Rod
CM-33SB-5	34	860	6	152	3½	89	Screw Base
CM-38-5	38	960	6	152	3½	89	Rod
CM-38SB-5	39	990	6	152	3½	89	Screw Base
CM-43-5	43¼	1100	6	152	3½	89	Rod
CM-43SB-5	45	1140	6	152	3½	89	Screw Base
CM-56-5	56¼	1430	6	152	3½	89	Rod
CM-56SB-5	57	1450	6	152	3½	89	Screw Base

NOTE: The Facet screw base adaptor part number is 677453A-AM

QTY: 3

SM Series
Separator Cartridges
Qualified to EI 1581, 6th Edition, Category M



Standard Design Features

- Cleanable and reusable
- Superior water barrier
- Recommended maximum operating temperature: 240 °F (115 °C)
- pH range from 5 to 9
- Designed for balanced flow through cartridge
- Flow direction: Outside to in

Materials

- Synthetic mesh coated screen
- Treated metal components for corrosion protection
- Buna-N gaskets-other gasket, adhesive and metal materials are available upon request

Facet's SM Series synthetic separator cartridges feature a specially developed treated hydrophobic media. This media provides improved separation of fine water drops compared to standard Teflon screen. An ultrasonically seamed double tube of the synthetic screen is placed around an epoxy coated metal shell, then adhesive bonded to metal end caps with gaskets.

Facet SM Series separators have the distinctive Facet Velocigard which provides balanced flow of product throughout the cartridge. All metal components are treated to resist corrosion. Maximum recommended operating temperature is 240 °F (115 °C). For compatibility in extreme operating conditions, other gasket, adhesive and metal materials are available.

SM Series
Separator Cartridges
Qualified to EI 1581, 6th Edition, Category M

QTY: 1

DATA

MODEL NUMBER	NOMINAL LENGTH		OUTSIDE DIAMETER		INSIDE DIAMETER SEALING END		INSIDE DIAMETER MOUNTING END	
	in	mm	in	mm	in	mm	in	mm
SM-318FA-5	18	460	3	76	BLIND	13	2	51
SM-324FA-5	24	610	3	76	BLIND	13	2	51
SM-412FC-5	11½	290	4¼	105	1⅞	48	1⅞	48
SM-415FB-5	15	380	4½	114	BLIND	13	3½	89
SM-417FB-5	17	430	4½	114	BLIND	13	3½	89
SM-422FC-5	22½	570	4⅞	105	1⅞	48	1⅞	48
SM-424FB-5	24	610	4½	114	BLIND	13	3½	89
SM-430FB-5	30	760	4½	114	BLIND	13	3½	89
SM-432FC-5	31½	800	4⅞	105	1⅞	48	1⅞	48
SM-436FB-5	36	910	4½	114	BLIND	13	3½	89
SM-09FB-5	9	230	6	152	BLIND	13	3½	89
SM-09FF-5	9	230	6	152	BLIND	13	4½	114
SM-11FD-5	11¼	290	6	152	3½	89	3½	89
SM-12FB-5	12⅞	310	6	152	BLIND	13	3½	89
SM-14FD-5	14½	370	6	152	3½	89	3½	89
SM-16FD-5	16¼	410	6	152	3½	89	3½	89
SM-18FB-5	18	460	6	152	BLIND	13	3½	89
SM-22FD-5	22¼	560	6	152	3½	89	3½	89
SM-24FB-5	24	610	6	152	BLIND	13	3½	89
SM-24FE-5	24	610	6	152	BLIND	13	4⅞	105
SM-24FF-5	24	610	6	152	BLIND	13	4½	114
SM-29FD-5	28¾	730	6	152	3½	89	3½	89
SM-30FB-5	30	760	6	152	BLIND	13	3½	89
SM-30FD-5	30	760	6	152	3½	89	3½	89
SM-30FE-5	30	760	6	152	BLIND	13	4⅞	105
SM-30FF-5	30	760	6	152	BLIND	13	4½	114
SM-33FB-5	33¼	840	6	152	BLIND	13	3½	89
SM-33FD-5	33¼	840	6	152	3½	89	3½	89
SM-36FB-5	36	910	6	152	BLIND	13	3½	89
SM-36FD-5	36	910	6	152	3½	89	3½	89
SM-36FE-5	36	910	6	152	BLIND	13	4⅞	105
SM-36FF-5	36	910	6	152	BLIND	13	4½	114
SM-38FD-5	38	965	6	152	3½	89	3½	89
SM-40FD-5	40	1020	6	152	3½	89	3½	89
SM-40FE-5	40	1020	6	152	BLIND	13	4⅞	105
SM-40FF-5	40	1020	6	152	BLIND	13	4½	114
SM-43FB-5	43	1090	6	152	BLIND	13	3½	89
SM-43FD-5	43	1090	6	152	3½	89	3½	89
SM-44FB-5	44	1120	6	152	BLIND	13	3½	89
SM-44FD-5	44	1120	6	152	3½	89	3½	89
SM-44FE-5	44	1120	6	152	BLIND	13	4⅞	105
SM-44FF-5	44	1120	6	152	BLIND	13	4½	114
SM-48FD-5	48	1220	6	152	3½	89	3½	89
SM-48FF-5	48	1220	6	152	BLIND	13	4½	114
SM-56FB-5	56	1420	6	152	BLIND	13	3½	89
SM-56FF-5	56	1420	6	152	BLIND	13	4½	114



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EMAIL gammontech@gammontech.com

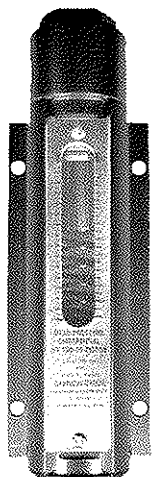
**GAMMON
GAUGE**

**BULLETIN
25 (3-13)**

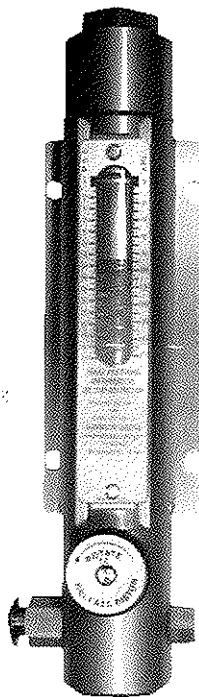
GAMMON GAUGE™

Direct Reading Differential Pressure Gauge
Why settle for less when you can have the tried and true **Original**

Designed and Manufactured in the U.S.A.



**ORIGINAL
MODEL
GTP-534**

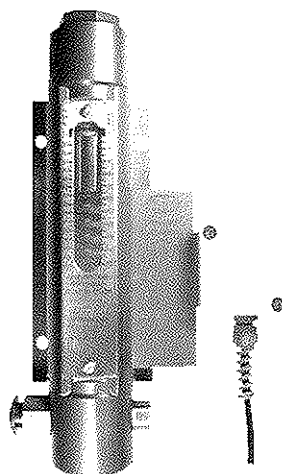


**PEAK-HOLD
With Push Button
TEST VALVE
GTP-534-PB-PH**



**PUSH BUTTON
IN FRONT
GTP-534 PBF**

OPTIONAL
Button
Position



**GAMMON GAUGE
CONTROL
SYSTEM**

The PEAK-HOLD feature registers the highest reading, locking the piston so the operator can see maximum differential pressure for the most recent fueling operation. Turning the large knob releases the piston so that it can return to zero.



**PUSH BUTTON
3-WAY TEST VALVE
GTP-534 PB**

UNIQUE FEATURES

Peak-Hold Reading - The maximum differential pressure that is measured during an operation automatically locks the piston so that the operator will have that information without actually having watched the gauge at the time. After the reading has been seen, the operator releases the piston by turning a knob. It is usually impossible for the operator to see the gauge while refueling an aircraft so the highest differential pressure reading is rarely seen. This feature eliminates that problem just as in the case of an unmanned facility such as a pipeline or hydrant system. Patent applied for.

Push Button Test Valve - Hold the button in to relieve pressure under the piston. System pressure will force the piston down so operator can observe motion. Erratic movement of the piston indicates contamination of piston and glass cylinder, requiring cleaning. Note: The test releases about 50ml of fuel which can be collected in a cup or directed to recovery systems.

Pressure Relief Feature - Incorporated in all Push Button models is a thermal expansion relief valve set at 300psi to protect the gauge from excessive pressure if isolation valves have been closed.

COMMON FEATURES OF ALL MODELS OF THE GAMMON GAUGE

Read differential pressure directly at top of piston

Accurate within ½ psi at system pressure to 300 psi

No subtraction calculation required

All models available in aluminum or stainless steel

Positive and Negative Surge Pressures will not influence calibration

Multiple calibrations - Front face - PSI and Kpa
Back face - Bar and KG/cm²

Every cylinder tested at 1200 psi

Rugged construction - Suitable for vehicle or stationary use

Built-in Gauge Protection Filter, 10 microns

Maximum Operating Pressure - 300 psi

Fittings: ¼" NPT female, ¼" BSP available

Temperature Range - Standard Viton Seals: -30°F to +160°F, -34°C to +71°C

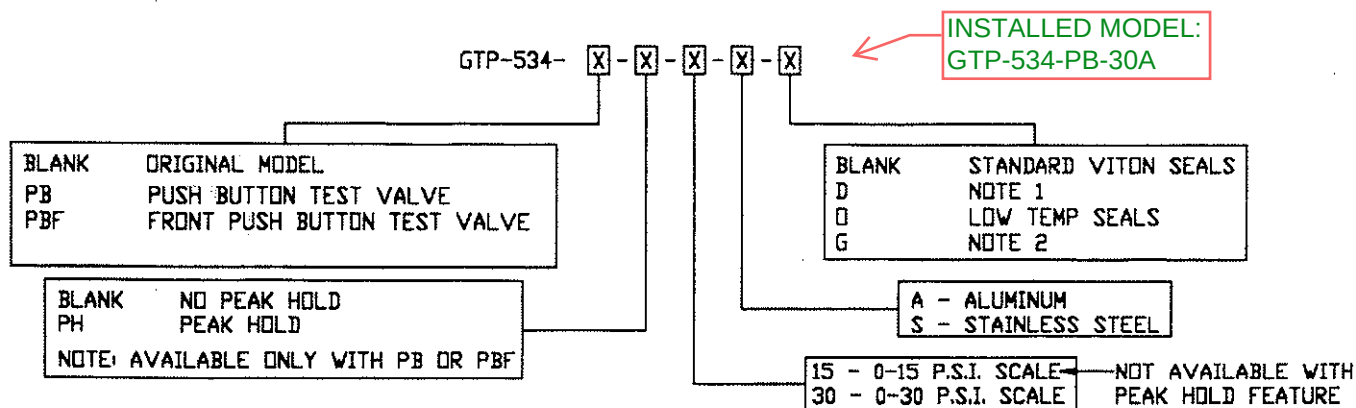
Ultra Violet Light Protection - film face cover prevents rays from degrading fuel in the glass tube

Note: The GTP-279 filter is obsolete. We offer a conversion assembly GTP-9515 (S/S) or GTP-9515-2 (AL). This is a complete replacement for the upper flange.

REPLACEMENT PARTS

GTP-686A Pressure Gauge - Range: 0- 60 psi, 2" face diameter
GTP-686B Pressure Gauge - Range: 0-100 psi, 2" face diameter
GTP-686C Pressure Gauge - Range: 0-160 psi, 2" face diameter
GTP-686D Pressure Gauge - Range: 0-300 psi, 2" face diameter

Filter Element	GTP-2233
Scale: 0-15 psi	GTP-672-1
0-30 psi	GTP-690-1
Glass Cylinder	GTP-547
Cylinder O-rings	GTP-2200-023V



EXAMPLES:

1. GTP-534-30-A-O IS AN ORIGINAL MODEL WITH 0-30 P.S.I. SCALE, ALUMINUM CONSTRUCTION AND LOW TEMPERATURE SEALS.
2. GTP-534-PB-15-S IS A MODEL WITH PUSH BUTTON TEST VALVE WITH , 0-15 P.S.I. SCALE, STAINLESS STEEL CONSTRUCTION AND STANDARD VITON SEALS.
3. GTP-534-PBF-PH-30-A-O IS A MODEL WITH PUSH BUTTON AT THE FRONT, PEAK HOLD FEATURE, 0-30 P.S.I. SCALE, ALUMINUM CONSTRUCTION AND LOW TEMPERATURE SEALS.

NOTE 1 - A SUFFIX D PROVIDES 2 SELECTOR VALVES, ONE AT EACH CONNECTION. THE PORTS ON EACH VALVE ARE LABELED A AND B SO THAT THE GAUGE CAN BE CONNECTED TO MEASURE DIFFERENTIAL PRESSURE ALTERNATELY ON TWO DIFFERENT FILTERS OR ON A FILTER HAVING TWO STAGES.

NOTE 2 - SAME AS NOTE 1 BUT SUFFIX G DENOTES 1/4 B.S.P THREADS

CALIBRATION TESTING

To meet API-1581, you should have a 3-way valve. Our 3-way valve (GTP-2305) and Push Button Gammon Gauge meets this requirement and is used to check calibration as well as to check free movement of the piston

1. Establish flow in the system. The gauge should indicate a pressure drop.
2. Push the test button. The piston should travel to the bottom of the scale.
3. Release the button and stop flow in the system. The piston should return to zero.

If the piston returns to zero, you have not only calibrated the gauge, you have checked it for free movement across it's entire range. If the piston moves slowly, the filter (located in the top of the gauge) may be clogged and need replacement. This calibration technique is accepted by all major oil companies, all major airlines and military services world-wide. Gammon Gauges have been in service in virtually every major airport in the world for as long as 30 years and we have never heard of, or seen a single gauge go out of calibration. Occasionally a piston will stick after many years in service, but hand cleaning them with "Scotch Bright" plastic abrasive will make it as good as new. (Do not use sand paper or steel wool). Replace "O" rings and reassemble.

CONVERSION OF EXISTING GAMMON GAUGES

An existing Gammon Gauge can be converted to have the PEAK-HOLD and the Push Button Test Valve by replacing the lower flange of the gauge. Order as follows:

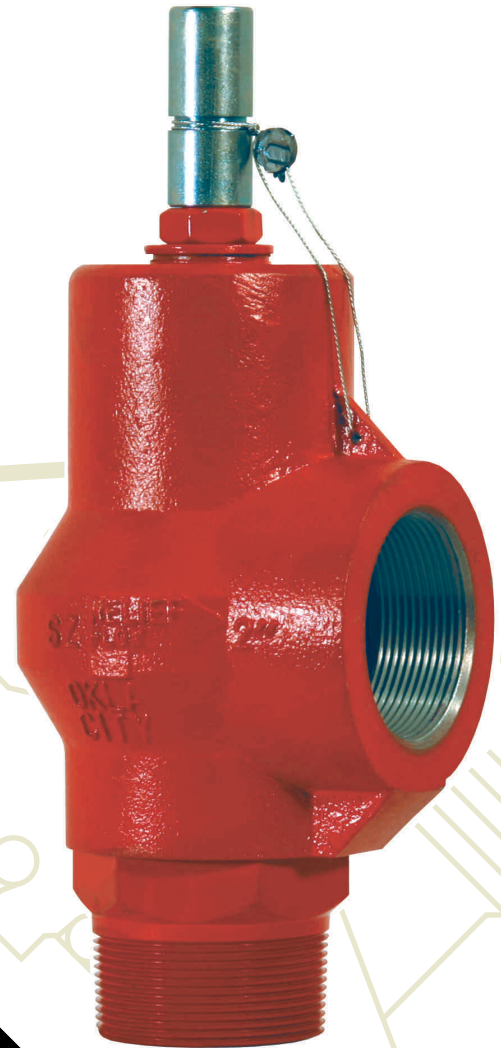
<u>Standard GTP-534</u>	<u>add Push Button</u>	<u>add Push Button and Peak Hold</u>
Aluminum	GTP-552-8PB	GTP-552-40
Aluminum with Front Push Button	GTP-552-8PBF	GTP-552-40F
Stainless Steel	GTP-552-9PB	GTP-552-40SS
Stainless Steel with Front Push Button	GTP-552-9PBF	GTP-552-40FS

On Gammon Gauges without a Push Button, a GTP-2305 3-way ball valve can be installed.



TAYLOR VALVE TECHNOLOGY

SERIES 8200/8300 SAFETY RELIEF VALVES



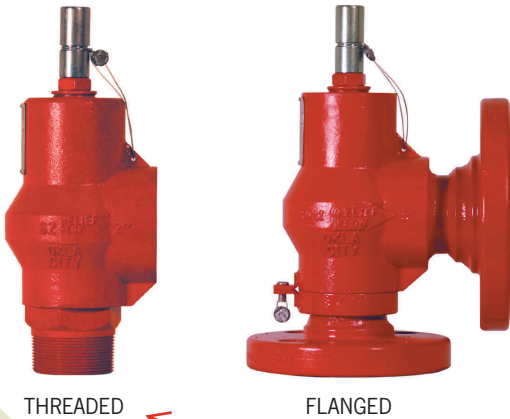
ASME
SETTING THE STANDARD

TAYLOR VALVE HAS BEEN
PROTECTING THE ENVIRONMENT
WITH WORLD CLASS PRODUCTS
AND PROVIDING EXCELLENT
CUSTOMER SERVICE SINCE 1958

SERIES 8200/8300 SAFETY RELIEF VALVES

Taylor Valve 8200/8300 Safety Relief Valves are engineered and manufactured to the highest standards and feature a “state-of-the-art” soft seat which gives you a bubble-tight seal for hundreds of “pops”. Our unique patented radius disc design assures a reliable reseal even under the most difficult conditions.

USES: Air, Gas, or Liquid relief applications, including compressors, separators, heater treaters, free water knockouts, scrubbers, dehydrators, thermal relief, gas production units, transmission and gathering lines, chemical plants, refineries, meter runs, gas plants, and other industrial applications.



FEATURES

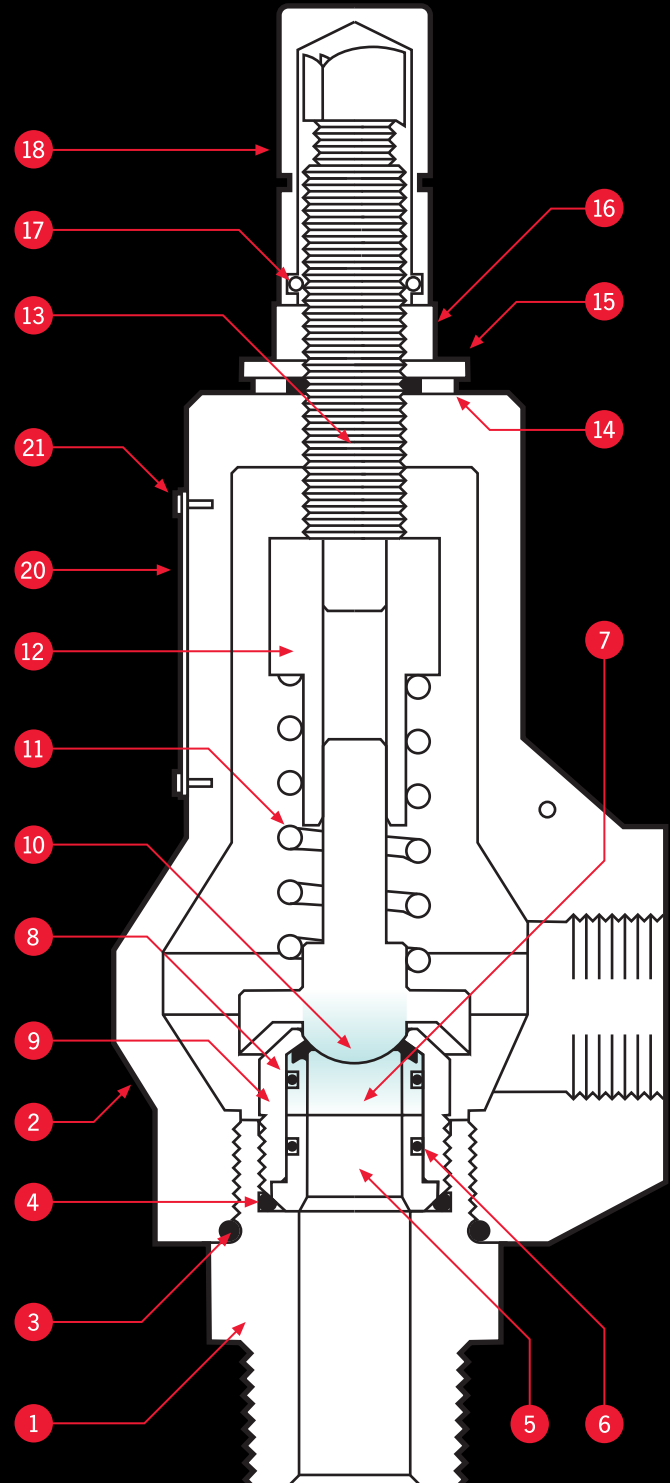
- **ASME Section VIII Div 1 code rated for Air, Liquid and Gas**
- **Zero Leakage** up to 90% of set point (API 527)
- **Extremely Adjustable**
- **Superior Spring Design and Material** enhance the performance of the product and provide consistent opening and closing pressures.

BENEFITS

- **Our Patented Radius Disc** reduces the amount of interference required to seal and assures a reliable reseal even under the most difficult conditions - up to hundreds of “pops”.
- **High Endurance Soft Seat** supports repeated operation and a bubble-tight shutoff everytime
- **Radius Disc and Seat Design** supports the spring alignment and promotes proper seating
- **Low Simmer Rate**
- **Consistent Blowdown**

GENERAL OPERATION

Taylor's 8200/8300 Series Safety Relief Valve actuates when the pressure under the valve overcomes the spring force on the disc causing the valve to open, releasing overpressure from the system before re-closing.





8200/8300 Series Valves meet the requirements of the ASME Boiler and Pressure Vessel Code Sec VIII, Div. 1. Capacity ratings were established by testing performed at the National Board of Boiler and Pressure Vessel Inspectors, Columbus, Ohio.

BILL OF MATERIALS

ITEM NO	PART	STANDARD APPLICATION		NACE APPLICATION	
		CARBON STEEL	STAINLESS STEEL	CARBON STEEL	STAINLESS STEEL
1	Seat Frame	1018/1020 CS A108*/A105	316 SS SA479/SA 182	1018/1020 CS A108*/A105	316 SS SA479/SA 182
2	Body	SA216 GR WCB	SA351 CF8M	SA216 GR WCB	SA351 CF8M
3	O-Ring	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart
4	O-Ring	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart
5	Insert Holder	304 SS SA479	304 SS SA479	316 SS SA479	316 SS SA479
6	O-Ring	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart
7	Seat Insert	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart
8	O-Ring	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart	see Elastomers Chart
9	Seat Body	17-4 SS H900 SA564	17-4 SS H900 SA564	316SS SA479 / 17-4 SS SA564 H1150M	316SS SA479 / 17-4 SA564 H1150M
10 ¹	Disc	17-4 SS H900 SA564	17-4 SS H900 SA564	316SS SA479 / 17-4 SS H1150M SA564	316SS SA479 / 17-4 SS H1150M SA564
11	Spring	17-7 SS	17-7 SS	see Elastomers Chart	see Elastomers Chart
12	Spring Keeper	303 SS SA479	303 SS SA479	303 SS SA479	303 SS SA479
13 ¹	Adjustment Screw	12L14 CS	304SS SA240	12L 14 CS	304SS SA240
14	Thread Seal	BUNA STEEL	BUNA STEEL	BUNA/STEEL	BUNA/STEEL
15	Flat Washer	CS ANSI B18.22.1	CS ANSI B18.22.1	CS ANSI B18.22.1	CS ANSI B18.22.1
16	Jam Nut	CS ANSI B18.22.2	CS ANSI B18.22.2	CS ANSI B18.22.2	CS ANSI B18.22.2
17 ¹	O-Ring	PC BUNA	PC BUNA	PC BUNA	PC BUNA
18 ¹	CAP	ZINC PLATED CS	ZINC PLATED CS	ZINC PLATED CS	ZINC PLATED CS
19 ²	Lead Seal Wire	SS	SS	SS	SS
20	Data Label	18-8 SS	18-8 SS	18-8 SS	18-8 SS
21	Drive Screws	18-8 SS	18-8 SS	18-8 SS	18-8 SS

*Alternate CS to SA105 used for pressure above 1440 PSIG ¹ These parts are replaced with Lift Lever option ² These parts are not shown

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ELASTOMERS CHART

MATERIAL	DUROMETER	TEMP.		PRESSURE		APPLICATIONS
		MIN	MAX	MIN	MAX	
Viton (FKM)		-15	400	50		Hydrocarbons, H ₂ S, Mineral Oil/Grease, Silicone Oil/Grease, Chlorinated Hydrocarbons, Fuels
HNBR		-25	325	15		Hydrocarbons, CO ₂ , Dilute Acids, Water and Steam Less than 300°F
EPDM		-70	250	15		Glycols, Organic Acids, Inorganic Acids, Hydraulic Fluids, Solvents
TEFLON		-420	450	250		Cryogenics, Strong Acids, Amines
PC BUNA		-30	250	15		Hydrocarbons, CO ₂ , Dilute Acids, Water,

CONTACT INFO

Toll-Free (800) 654-4196 Website www.taylorvalve.com
 Phone (405) 787-0145 Email info@taylorvalve.com
 Fax (405) 789-8198
 Address 8300 S.W. 8th, Oklahoma City, OK 73128

1" 8200 VALVE FLANGED & THREADED

The Taylor 1" 8200 Safety Relief Valve is an excellent choice for Air, Gas or Liquid relief applications, including Compressors, Separators, Heater Treaters, Free Water Knockouts, Scrubbers, Dehydrators, Thermal Relief, Gas Production Units, Transmission and Gathering Lines, Chemical Plants, Refineries, Meter Runs, Gas Plants and other Industrial Applications.

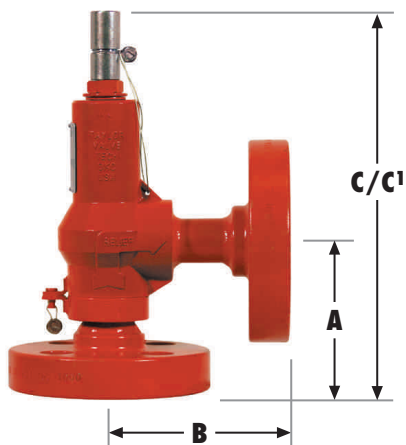
CONTACT TAYLOR VALVE TO ORDER TODAY!

NOTE: All flange combinations are as per API 526.
Other flange combinations are available upon request.

1" FLANGED CONNECTIONS

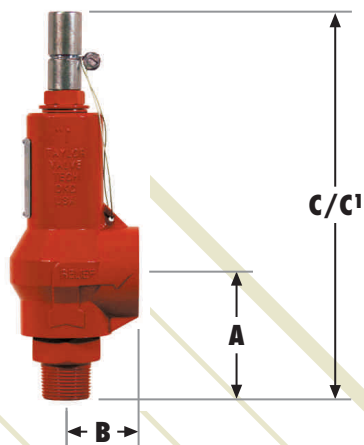
1" FLANGED VALVE

Flanges are Locked in place



1" THREADED VALVE

SET @ 100 PSI



ORIFICE	INLET x OUTLET (inches)	AVAILABLE FLANGE CLASSES INLET x OUTLET	DIMENSIONS (in)			C ¹ (EXT. BODY)
			A	B	C	
D & E	1/2 x 1	150 x 150	4.13	4.50	10.70	12.23
		300 x 150	4.13	4.50	10.70	12.23
		600 x 150	4.13	4.50	10.70	12.23
		900 / 1500 x 300	4.13	4.50	10.70	12.23
	3/4 x 1	150 x 150	4.13	4.50	10.70	12.23
		300 x 150	4.13	4.50	10.70	12.23
		600 x 150	4.13	4.50	10.70	12.23
		900 / 1500 x 300	4.13	4.50	10.70	12.23
	1 x 1	150 x 150	4.13	4.50	10.70	12.23
		300 x 150	4.13	4.50	10.70	12.23
		600 x 150	4.13	4.50	10.70	12.23
		900 / 1500 x 300	4.50	4.50	11.07	12.60
	1 x 1-1/2	150 x 150	4.13	4.75	10.70	12.23
		300 x 150	4.13	4.75	10.70	12.23
		600 x 150	4.13	4.75	10.70	12.23
		900 / 1500 x 300	4.50	4.75	11.07	12.60
	1 x 2	150 x 150	4.13	4.50	10.70	12.23
		300 x 150	4.13	4.50	10.70	12.23
		600 x 150	4.13	4.50	10.70	12.23
		900 / 1500 x 300	4.50	4.50	11.07	12.60
	1-1/2 x 2	150 x 150	4.88	4.75	11.45	12.98
		300 x 150	4.88	4.75	11.45	12.98
		600 x 150	4.88	5.50	11.45	12.98
		900 / 1500 x 300	4.88	6.00	11.45	12.98
F	1 x 1-1/2	150 x 150	4.13	4.75	11.32	12.85
		300 x 150	4.13	4.75	10.70	12.23
		600 x 150	4.13	4.75	10.70	12.23
		900 / 1500 x 300	4.50	4.75	11.07	12.60
	1 x 2	150 x 150	4.13	4.50	10.70	12.23
		300 x 150	4.13	4.50	10.70	12.23
		600 x 150	4.13	4.50	10.70	12.23
		900 / 1500 x 300	4.50	4.50	11.07	12.60
	1-1/2 x 2	150 x 150	4.88	4.75	11.45	12.98
		300 x 150	4.88	4.75	11.45	12.98
		600 x 150	4.88	5.50	11.45	12.98
		900 x 300	4.88	6.00	11.45	12.98

*1/2 x 1 Flanged Connection is for D Orifice and the reduced capacity E Orifice
*C¹ (Extended Body) used on D orifice w/set pressure of 4001 and over & F orifice w/set pressure of 446 and over.

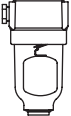
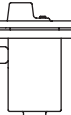
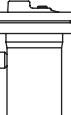
1" THREADED CONNECTIONS

ORIFICE	ORIFICE AREA (sq. in)	PRESSURE RANGES (psig)	Kd		CONNECTIONS (inches)		DIMENSIONS (inches)			C ¹ (EXTENDED BODY)	WEIGHT (lbs)
			GAS	LIQUID	INLET (MALE)	OUTLET (FEMALE)	A	B	C		
D	0.128	15 - 5500	0.838	0.62	1/2	1	3.53	1.87	10.10	11.63	6
E	0.212	15 - 2500	0.832	0.656	3/4, 1	1, 1-1/2	3.25	1.87	9.82	11.35	
F	0.357	15 - 1500	0.836	0.62	1/2	1	3.53	1.87	10.10	11.63	6
	0.674				3/4, 1	1, 1-1/2	3.25	1.87	9.82	11.35	6
					1	1-1/2, 2	3.25	1.87	9.82	11.35	6

NOTE: Female Inlet Connections Available Upon Request *C¹ (Extended Body) used on D orifice w/set pressure of 4001 and over & F orifice w/set pressure of 446 and over.



Armstrong® Air Vent ID Charts

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. psig	TMA °F	Body Material	Model	Max. Oper. Press. psig	Connection Size							Located on Page
									1/8"	1/4"	1/2"	3/4"	1"	1-1/2"	2"	
	Series 1-AVCW See-Thru Free Floating Lever Air Vents for Ozone Applications		Screwed	150	150	PBT Cap (Polybutylene Terephthalate) Polysulfone Body	1-AVCW	150			▲	★★				455
	Series 1-AVC See-Thru Free Floating Lever Air/Gas Vents		Screwed	150	150	Nylon Cap Polysulfone Body	1-AVC	150				★★				454
	Series 21-AR Fixed Pivot Ball Float Air/Gas Vents		Screwed	250	450	ASTM A48 Class 30 Cast Iron	21-AR	250				●	●			469
	Series 21-312 Fixed Pivot Ball Float Air/Gas Vents		Screwed Socketweld Flanged †††	600 or 500	100 or 750	ASTM A105 Forged Steel	21-312AR 21-312VAR	68 600				●	●			469
	Series 1, 2, 3, 6 Free Floating Lever Air/Gas Vents		Screwed	300 250	200 450	ASTM A48 Class 30 Cast Iron	1-AV† 2-AV 3-AV 6-AV	300 250 250 250			★ ●	★ ●			● ●	456
	Series 30 Free Floating Lever Air/Gas Vents		Screwed Socketweld Flanged †††	600 or 500 1,000 or 600 1,000 or 600	100 or 750 100 or 750 100 or 750	ASTM A105 Forged Steel	32-AV 33-AV 36-AV	600 900 1000				● ● ●	● ● ●		● ●	458
	Series 10 Free Floating Lever Air/Gas Vents		Screwed Socketweld (22 and 13 only)	500 or 440 555 or 475 570 or 490	100 or 500 100 or 500 100 or 500	304-L Stainless Steel	11-AV †† 22-AV 13-AV	400 555 570				● ● ●	★★ ●			460
	Series HLAR High Leverage Air/Gas Vents		Screwed Socketweld Flanged †††	100 or 600	100 or 750	ASTM A105 Forged Steel	2313 HLAR 2315 HLAR 2316 HLAR	1,000				● ● ●	● ● ●	1-1/4 ● 1-1/2 ●	● ●	462
	Series HLAR High Leverage Air/Gas Vents		Screwed Socketweld Flanged †††	1,500 or 900 1,800 or 900	100 or 850 100 or 900	ASTM A182 Gr. F22 Forged Steel	2413 HLAR 2415 HLAR 2416 HLAR	1,500 1,800 1,500				● ● ●	● ● ●	1-1/4 ● 1-1/2 ●	● ●	462

★ 1/4" outlet connection ★★ 1/2" outlet connection † Side connection available ▲ Alternate inlet 1/2"
†† Side connection not available ††† Flange selection may limit pressure and temperature rating.

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for up-to-date information.



Air Guard Check Valve - SC-9650

USED WITH ARMSTRONG 11-AV
AIR ELIMINATOR VALVE



In the event of primary system check valve leakage, the Schultz Air Guard check valve will prevent air from entering the filter vessel via the air eliminator. Introducing air into the filter separator increases risk of internal fire as well as contributing to microbiological growth. This check valve is easily installed above the air eliminator.

Check valve body, poppet and spring are constructed of stainless steel. O-Rings are Viton.

Technical Specifications

Max Operating Pressure:	500 PSI
Max Differential Pressure:	100 PSI
Min Operating Pressure:	1.5 PSI
Max Operating Temperature:	400F
Spring:	300 Series Stainless Steel
Body & Poppet:	300 Series Stainless Steel
O-Ring:	Viton
SKU:	SC-9650

Schultz Engineered Products
435 S. Airpark Road
Edgewater, FL 32132



GAMMON TECHNICAL PRODUCTS, INC.
P.O. BOX 400 - 2300 HWY 34
MANASQUAN, N.J. 08736

PHONE 732-223-4600
FAX 732-223-5778
EMAIL gammontech@gammontech.com

**HEATERS FOR
SUMPS AND
DRAINS**

**BULLETIN 62
(11-10)**

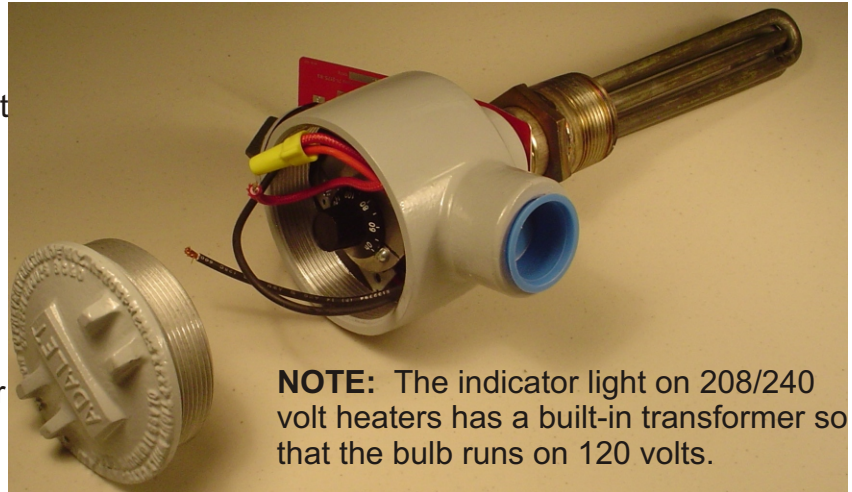
HEATERS FOR FILTER SEPARATORS

Rated "Explosion Proof" - NEMA 7 Class 1, Groups B,C,D, Division1,

FEATURES:

- ◆ Stainless steel sheathing will not rust
- ◆ Adjustable thermostats 0-100° F
- ◆ 240 volts, 50/60 Hz, single phase*
- ◆ Watt density: 20 watts per sq. In.
- ◆ 150 psi working pressure
- ◆ Conduit connections 1"npt
- ◆ Made in USA

NOTE: These heaters are designed for Use on gasoline, kerosene, jet fuel, diesel or No 2 fuel oil.



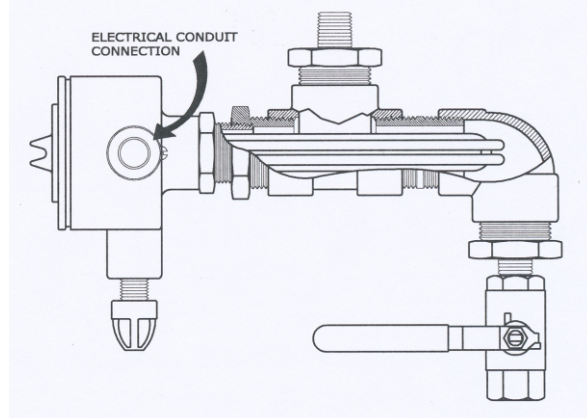
NOTE: The indicator light on 208/240 volt heaters has a built-in transformer so that the bulb runs on 120 volts.

CAUTION: Use only in closed, pressurized systems. Do not operate unless the filter vessel is full and the cover is secured.

WATT RATING	PROBE LENGTH Inch	THREAD NPT Inch	MODEL NUMBER	
			No Light	With Optional Light
300*	6.0	1¼	GTP-1756*	GTP-1756L *
750	7.0	1¼	GTP-1757	GTP-1757L
1000	9.7	1¼	GTP-1758	GTP-1758L
1500	12.5	1¼	GTP-1759	GTP-1759L
300	12.5	1	GTP-1760	GTP-1760L
750	18.5	1	GTP-1761	GTP-1761L
1000	24.7	1	GTP-1762	GTP-1762L
1500	38.5	1	GTP-1763	GTP-1763L

* **NOTE:** GTP-1756 is also available in 120 VAC version. Add "120" to the end of the part number.

Typical pipe and fitting arrangement for 300 watt heater installation in drain system. Nipple at upper left screws into sump drain valve at bottom. Optional indicator light is in foreground. Electrical conduit enters on opposite side of heater.



GENERAL DISCUSSION

Our heaters are made specially for us by a highly qualified manufacturer with many years of experience. The purpose of a heater in a filter separator is to prevent the formation of ice in the water drain system. This makes it possible to drain water that has collected. Attempts have been made in the past to heat the entire filter separator by applying insulation but this has been found impractical because there are too many ways that heat can be lost. Furthermore, when insulation has been soaked by rain water, which is nearly impossible to prevent, heat loss is increased and severe corrosion develops.

The usual approach is to have one heater for the sump and a second one for the drain piping. The sump heater should be carefully located so that it is as close as possible to the surface on which water collects. However, it should also cross over the drain port and under the float if a float operated pilot valve is used. If the vessel is exceptionally large, a second sump heater may be installed in the drain piping only.

Most of the heaters covered by this bulletin are used as replacements for heaters that have failed. If you intend to install a heater in a filter separator that was not designed with a proper fitting, be advised that the welding must be done by an ASME qualified shop if the vessel was originally built to Section VII of the ASME code.

The most common failure of a heater is rusting of steel sheaths. The frequent result of such a failure is that fuel will leak into the electrical housing and it sometimes will fill up the electrical conduit that carries power to the heater. When replacing a heater under such circumstances, we recommend that the conduit be thoroughly dried and new wires installed. The reason for this is that ignition could occur from the arcing of the thermostat. Although a fire in the conduit is "safe", shorting could occur because of burned insulation.

CAUTION: Heaters must be turned off before a filter separator is drained in preparation for changing elements. The reason for this is that a heater in air will become much hotter than in fuel before the thermostat senses the rise in temperature. This is not only dangerous, but the heater may be damaged beyond repair.

- NOTE:**
1. When installing on of our heaters, the thermostat must be adjusted. Remove the cover and not a black dial knob that is calibrated from 0 to 100°F. Turn this knob until the preferred temperature is set next to the indicating button. We recommend 35°F.
 2. You can easily check the thermostat for accuracy at any time if you know the temperature of the contents of the filter. Turn off the power first. Then turn the knob slowly from a higher setting. You will note an audible "click" when you read the temperature that causes the thermostat to engage the circuit. If you now turn the knob in the other direction, there will be another "click" when the thermostat disengages. The temperature spread is about 5°F.



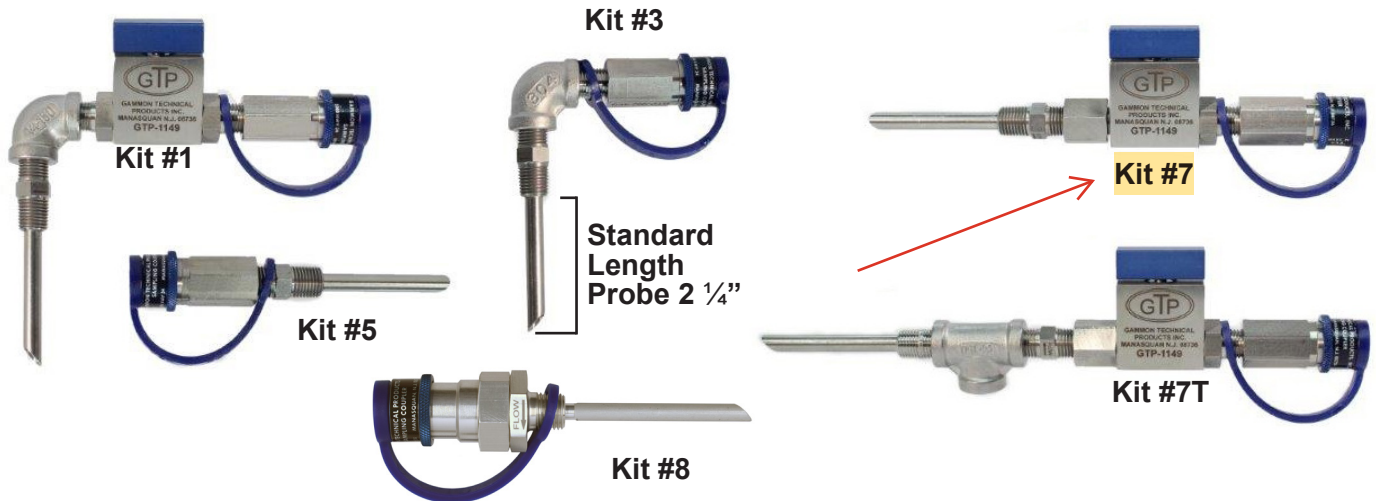
GAMMON TECHNICAL PRODUCTS, INC.
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STORE www.gammontechstore.com

**FUEL
SAMPLING
KITS**

**BULLETIN 3
(03-20)**

FUEL SAMPLING KITS



Our fuel sampling kits have become standard in the industry for obtaining test samples of jet fuel. With more than a million in service, they have proved to pay for themselves by saving countless hours of downtime because accurate contamination test results are obtained the first time.

In the past, thousands of work hours have been wasted and fueling facilities have been shut down simply because the sampling tap was contributing dirt during the sampling period. Rusty pipe threads, steel gate valves and collections of reducing bushings that never are subjected to fuel flow, except when a contamination test is to be run, have been found to be a prime cause of poor color results when tests are performed to ASTM D2276. Flushing does not clean normally stagnant steel fittings.

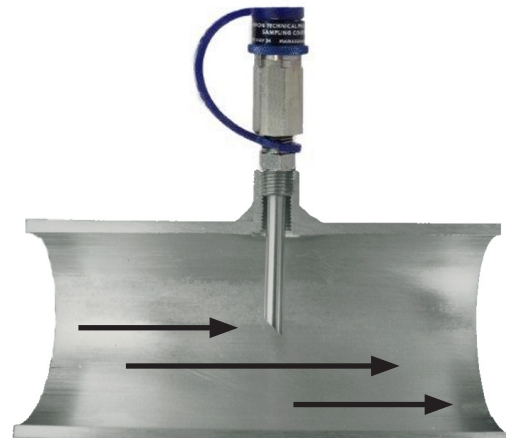
The probe penetrates through the pipe coupling that is welded to the pipe. There is no possibility of rust and dirt, that usually collects in stagnant pockets (such as welded couplings), reaching the test membrane.

Non-ferrous materials are used in our kits, All passages are small ($\frac{1}{4}$ " pipe size) to insure that there will be enough velocity during the flushing cycle to carry away any sediment that may have collected.

Kit No. 7T allows pressure sensing and sampling independently through one pipe connection. Probe penetrates all the way through the tee. Sample never contacts the tee. Branch on tee is for pressure gauge connection; it senses pressure on the outside of probe tube.

Kit No. 8 features our Self-Flushing QD, which eliminates the need to flush the connection before every test. It will only allow fuel from the center of the pipe to read the QD. This reduces the amount of time spent and the volume of fuel that has to be handled. For panel mounting, Kit No. 8RM includes Kit 8 plus a remote mount (standard probe sizes only).

The GTP-144 Probe is made to reach the center of a 4" pipe but can be used in any pipe of 2" or more. The threads on the probe are both $\frac{1}{4}$ " NPT male (use reducing bushing to come down to this size). We can also supply special probes of any specified length.



STAINLESS STEEL BALL VALVES MAXIMUM PRESSURE 300 PSI

TWO-WAY



GTP-1149-4F 1/4" Female
GTP-1149-4M 1/4" Male
GTP-1149-4MF 1/4" Male x Female

THREE-WAY:
GTP-2305
1/4" NPT



QUICK DISCONNECT COUPLER



GTP-992-2FA 1/8" Female NPT Aluminum
GTP-992-2FS 1/8" Female NPT Stainless Steel
GTP-992-4FA 1/4" Female NPT Aluminum
GTP-992-4FS 1/4" Female NPT Stainless Steel
GTP-992-2MA 1/8" Male NPT Aluminum
GTP-992-2MS 1/8" Male NPT Stainless Steel
GTP-992-4MA 1/4" Male NPT Aluminum
GTP-992-4MS 1/4" Male NPT Stainless Steel

ACTUATOR NIPPLES

Stainless Steel



GTP-722 1/4" Female NPT
GTP-722-2 1/8" Female NPT



GTP-150-15 Dust Plug for quick disconnect coupler.

GTP-1232

Dust Cap
for actuator
nipple, AL.



GTP-144
GTP-144-X



Sampling Probe, 1/4" Male NPT, Stainless Steel, standard 2 1/4" long tube.
Same as above, indicate desired TUBE length at "X," up to 6"

INSTRUCTIONS FOR SAMPLING PROBE KITS

1. INSTALLATION

1. Screw the GTP-144 probe in a 1/4" NPT female thread using 1 1/2 wraps of PTFE pipe thread sealant as a sealant and thread lube. Use reducing bushings if necessary. Wrap the tape tightly, so that it forms itself into the male thread. Do not let the tape extend beyond the open end of the fitting or fragments of the tape will get into the flow stream. *NEVER* screw stainless steel threads together without PTFE tape - they will gall.
2. Adjust the position of the probe by tightening until the arrow on the flat of the hex is pointing downstream - in the direction of flow in the pipe.
3. Install other components of the kit using PTFE pipe thread dope for each connection. Be certain that sample flow is in the direction of the arrow shaped handle of the ball valve.
4. The sampling coupler is supplied with a dust plug that has a ball chain for attachment. Place the ring on the ball chain over the threaded end of the coupler before assembling.

2. **FLUSHING** - A new sampling connection requires extensive flushing. For best results, use the GTP-1110 Bonding and Grounding Hose (see Bull. #8) to obtain high velocity in the passages of the sampling kit components.

3. **CONTAMINATION TESTING** - Use Gammon MiniMonitor® Kit model GTP-172. Follow detailed instructions for best results. The sampling coupler can be connected without the risk of spraying fuel, if this procedure is followed:

1. Slide the collar of the coupler as far as it will go toward its threaded end. Remember, the collar does not open the internal valve.
2. Insert the connecting nipple in the open port of the coupler as far as it will go without depressing the internal valve, but continue to hold the collar.
3. Then quickly press the nipple straight in with a force of about 25 lbs. and pull the collar back to its original position. This 25 lb. force causes the internal valve to open.
4. A dry disconnection can be made simply by depressing the collar.

See also: GamGram #6.

STAINLESS STEEL PIPE FITTINGS



ELBOW

E-4 1/4" NPT
E-6 3/8" NPT
E-8 1/2" NPT



STREET ELBOW

SE-4 1/4" NPT
SE-6 3/8" NPT
SE-8 1/2" NPT



TEE

T-4 1/4" NPT
T-6 3/8" NPT
T-8 1/2" NPT



COUPLING

C-2 1/8" NPT
C-4 1/4" NPT
C-6 3/8" NPT
C-8 1/2" NPT



HEX NIPPLE

HN-2 1/8" NPT
HN-4 1/4" NPT
HN-6 3/8" NPT
HN-8 1/2" NPT



REDUCING BUSHING

RB4-2 1/4 to 1/8 NPT
RB6-4 3/8 to 1/4 NPT
RB8-4 1/2 to 1/4 NPT
RB12-4 3/4 to 1/4 NPT



REDUCING COUPLING

RC4-2 1/4 to 1/8 NPT
RC6-4 3/8 to 1/4 NPT
RC8-4 1/2 to 1/4 NPT



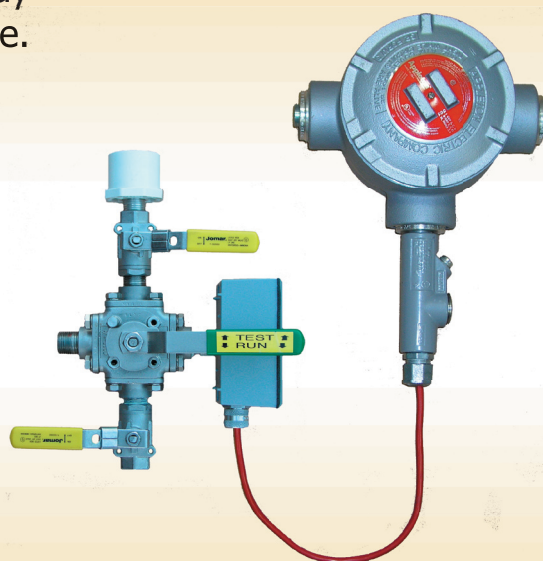
Crown Products, Inc.

WATER DETECTION PROBE SYSTEMS

Water Detection Probe Systems detect the presence of water in a filter-separator sump by utilizing a conductivity probe attached to the vessel and an intrinsically safe relay to control fuel flow by stopping a pump or closing a valve.

Full Functional Test Feature -

Allows water to be introduced into the probe assembly without introducing water into the vessel sump or the fuel stream. This is not an indirect test of the inside of the probe or an electrical test of the relay - the probe is tested under the same conditions as which it will operate.



Crown Water Detection Probe Systems feature:

- All stainless steel and aluminum metal parts
- Buna and Viton Seals- 1/2" NPT Vessel Connection
- Full Functional Test Ability
- Available with 12 Volt or 24 Volt AC or DC Relays or 120 Volt AC Relay
- Available with Weatherproof or Explosion Proof Relay Enclosures
- Components rated for 150 PSI pressure

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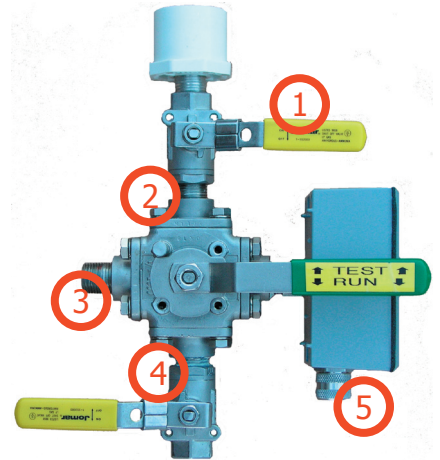
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Crown Products, Inc.

WATER DETECTION PROBE SYSTEMS

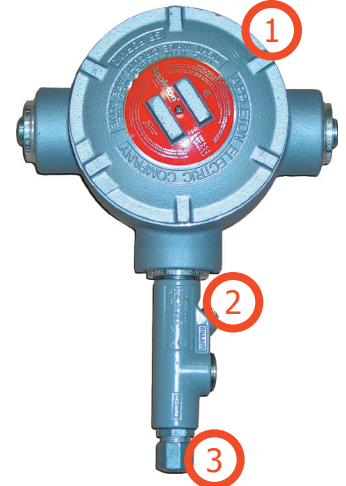
Water Probe Assembly *

- 1 Fill Valve - used when adding water to the probe assembly during testing
- 2 Test Valve - shown in 'RUN' position
Rotate 90 deg. CCW to test
- 3 Vessel connection - 1/2" NPT
- 4 Drain Valve - drains fuel from probe assembly prior to testing and drains water after testing
- 5 Weatherproof enclosure covering probe and probe connections



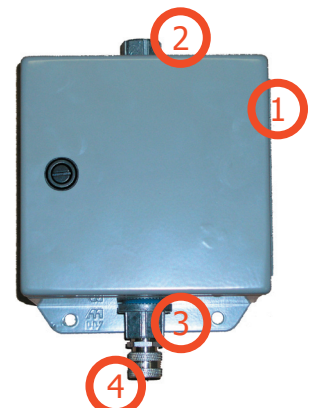
Hazardous Area Enclosure

- Enclosure For Hazardous Areas
Relay Options:
- 1 12 Volt AC or DC Powered
24 Volt AC or DC Powered
120 Volt AC Powered
 - 2 1/2" Seal-off
 - 3 Cable Clamp/Strain Relief



Weatherproof Enclosure

- 1 Enclosure For Non-Hazardous Areas
- 2 1/2" Conduit Hub
- 3 1/2" Conduit Hub
- 4 Cable Clamp/Strain Relief





76-500 Series

Stainless Steel Ball Valve with Spring Return Handle

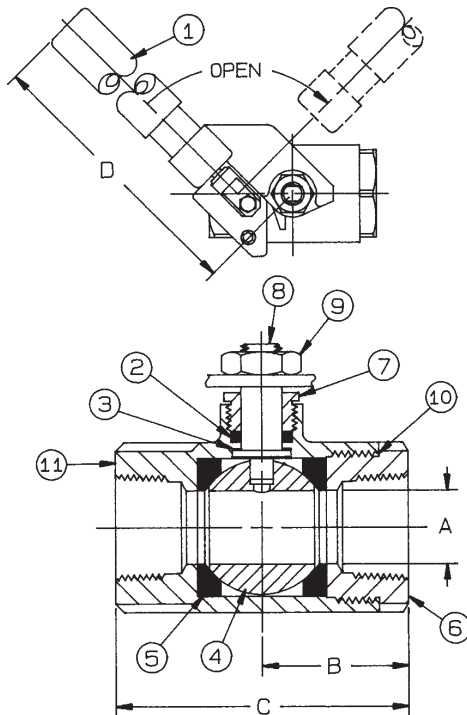
Threaded, 1/4" to 1" 2000 psig WOG, 1-1/4" to 2" 1500 psig WOG
 Cold Non-Shock. 150 psig Saturated Steam, Vacuum Service to 29 inches Hg.
 Federal Specification: WW-V-35C, Type: II, Composition: SS, Style: 3.
 MSS SP-110; Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

FEATURES

- Spring return to close (-01)
- Spring return to open (-08)
- Reinforced seats
- All components of lever are stainless steel
- Operating torque is approximately three times standard valve torque
- Blow-out-proof stem design
- Adjustable packing gland
- Meets NACE MR-01-75
- Investment cast components

STANDARD MATERIAL LIST

1. Handle	SS w/vinyl	6. Retainer	A276-316 (1/4" to 1")
2. Stem packing	Multifill PTFE		A351-CF8M (1-1/4" to 2")
3. Stem bearing	RPTFE	7. Gland nut	A276-316
4. Ball	A276-316	8. Stem	A276-316
5. Seat (2)	Multifill PTFE	9. Lever nut	18-8 SS
		10. Body seal	PTFE (1-1/4" to 2")
		11. Body	A351-CF8M



STAINLESS STEEL BALL VALVE WITH
 SPRING RETURN HANDLE

NUMBER	SIZE	A	B	C	D	Wt.
76-501-01	1/4"	.37	1.03	2.06	7.00	1.26
76-502-01	3/8"	.37	1.03	2.06	7.00	1.25
76-503-01	1/2"	.50	1.12	2.25	7.00	1.31
76-504-01	3/4"	.68	1.50	3.00	7.00	1.98
76-505-01	1"	.87	1.68	3.37	7.00	2.35
76-506-01	1-1/4"	1.00	2.00	4.00	9.00	3.96
76-507-01	1-1/2"	1.25	2.18	4.37	9.00	4.78
76-508-01	2"	1.50	2.75	5.50	9.00	6.66

OPTIONS AVAILABLE:

(SUFFIX)	OPTION	SIZES
-08-	90° Reversed Stem	1/4" to 2"
-14-	Side Vented Ball (Uni-Directional)	1/4" to 2"
-21-	UHMWPE Seats (Non-PTFE)	1/4" to 2"
-24-	Graphite Packing	1/4" to 2"
-35-	VTPE Trim	1/4" to 2"
-49-	Assembled Dry	1/4" to 2"
-57-	Oxygen Cleaned	1/4" to 2"
-60-	Grounded Ball & Stem	1/4" to 2"
-P01-	BSPP (Parallel) Thread Connection	1/4" to 2"
-T01-	BSPT (Tapered) Thread Connection	1/4" to 2"

FILTER VESSEL DRAIN

**For Pressure/Temperature Ratings,
 Refer to Page M-12, Graph No. 14
 (1/4" to 1")
 Refer to Page M-11, Graph No. 12
 (1-1/4" to 2")**

3000 Series Swivel Manual

1) Tight Seals

- O-Rings provide a tight seal without hindering swivel action
- Accurately machined and micro-finished grooves provide for minimal seal wear
- Available in Buna-N, Fluorocarbon, PTFE Encapsulated Silicone, EPDM, Neoprene, Kalrez® and other seal materials as required

2) True Ball Bearing Race Alignment

- Body and tail sections are locked together by a double row of ball bearings
- Raceways are machined to precise tolerances
- Double raceway design assures proper alignment and prevents binding caused by temperature changes and heavy radial loads
- Carbon steel swivels have hardened races to maximize load-carrying capability

3) Protected Bearing Chamber

- Protective inner O-ring seal prevents product from entering bearing chamber
- Outer seal keeps rain, dirt, and other contaminants out
- Both seals hold in lubrication

4) Long-Life Bearings

- Ball bearings are hardened, precision-ground steel
- Stainless steel swivels have stainless steel bearings
- All OPW swivels are available with stainless steel bearings on special order

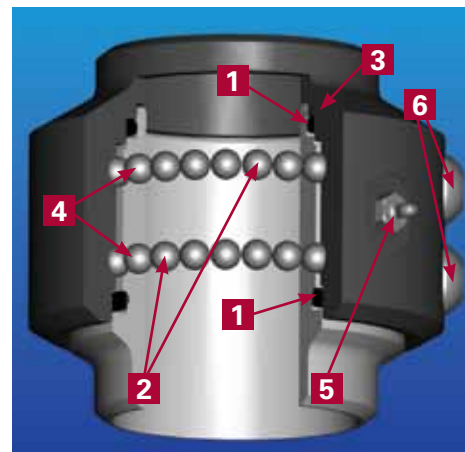
5) Easy Lubrication

- All OPW swivels are pre-lubricated at the factory
- All 3/4", 1", and submerged swivels are permanently lubricated

- A grease fitting between races that accepts a standard grease gun is available for swivels that require field lubrication
- Non-lubricating swivels are available on special order
- Most styles come with a grease relief to prevent over-greasing

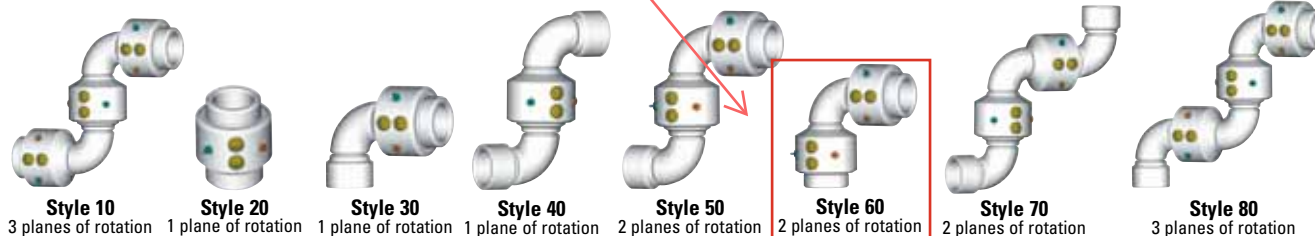
6) No Field Adjustment Necessary

- Balls are held in place by factory-installed plugs that never need to be adjusted to maintain bearing performance



BULK LOADING HOSE

ORDERING GUIDE



Style (Planes of Rotation)

Construction

Conventional Hose Reel Swivels	26 - Aluminum Hose Reel
	28 - Ductile Iron Hose Reel
Conventional Swivels	32 - Steel, High Pressure Cast
	33 - Bronze
	34 - Steel, Fabricated
	36 - Aluminum
	37 - 316 Stainless Steel, Cast
	38 - Ductile Iron
	39 - 316 Stainless Steel, Fab.
Endura Split Flange Swivels	74 - Steel Endura LPG Hose Reel
	79 - 316 SST Endura LPG Hose Reel
	82 - Steel Endura DSF Single Race
	84 - Steel Endura DSF Dual Race
	87 - 316 SST Endura DSF Single Race
	89 - 316 SST Endura DSF Dual Race Alloy 20, Hastelloy®, Monel®, Duplex, and other materials available

3420F - 0403

End Connections

F	- 150 lb. ANSI flange both ends
F3	- 300 lb. ANSI flange both ends
FFT	- 150 lb. ANSI flanged inlet x TTMA tank truck flange outlet
FJ	- For submerged use, 150 Lb. ANSI flange both ends
FO	- 150 lb. flange x female NPT threads
FSB	- 150 lb. flange both ends, with spring balance attachment lugs
FT	- TTMA tank truck flange both ends
FTH	- TTMA tank truck flange both ends, with handle
VO	- Victaulic® x female NPT threads
FTO	- TTMA tank truck flange inlet x female NPT threaded outlet
J	- For submerged use
LFT	- Long swivel joint with TTMA tank truck flanges
TFT	- Female NPT threaded inlet x TTMA tank truck flange outlet
VOG	- Female NPT threads x Victaulic® groove, hard coat anodized aluminum
W	- Beveled for welding both ends

NO SUFFIX LETTER indicates Female NPT threads both ends. 300 lb. flanges available on some models. BSPT threads available.

Seal Materials

1	- Buna-N (Standard)
2	- Fluorocarbon
3	- PTFE Silicone (FDA Approved)
4	- EPDM
9	- Kalrez®

Kalrez®, Chemraz® and other seal materials available

Size

007	- 3/4"
010	- 1"
012	- 1-1/4"
015	- 1-1/2"
020	- 2"
030	- 3"
040	- 4"
060	- 6"
080	- 8"
100	- 10"
120	- 12"

Availability of styles, sizes and materials may vary depending upon swivel configuration. Consult OPW Customer Service regarding your exact requirements.

MATERIALS

(unless listed below, see seal material for temperature ranges)

	Aluminum 3600	Bronze 3300	Cast HP 3700	CST 3400	Ductile Iron 3800	SST 3900
Body and Tail	ASTM B26 A356 T6	ASTM B62-83600	ASTM A351- CF3M/CF8M	ASTM A105	ASTM A-536	ASTM A351- CF3M/CF8M
Seals	See Chart	See Chart	See Chart	See Chart	See Chart	See Chart
Balls	Grade 200 CST	Grade 200 CST	Grade 200 CST	Grade 200 CST	Grade 200 CST	Grade 400 SST
Flanges (150/300 lb)	6061-T6	N/A	N/A	ASTM A105	N/A	B16 A182 316/316L
Elbows	6061-T6	N/A	N/A	ASTM A234 WPB	N/A	ASTM A351-CF3M
Piping	6061-T6	N/A	N/A	ASTM A53 Grade B	N/A	ASTM A312 TP 316L

Seal Material	Min Temp C	Max Temp C	Min Temp F	Max Temp F
Buna	-29	100	-20	212
Fluorocarbon	-29	204	-20	400
(PFA) PTFE/Silicone (standard) (FDA Approved)	-46	260	-50	500
EPDM	-46	121	-50	250
(PFA) PTFE/Fluorocarbon (special order) (FDA Approved)	-18	204	0	400
Kalrez®	-18	260	0	500

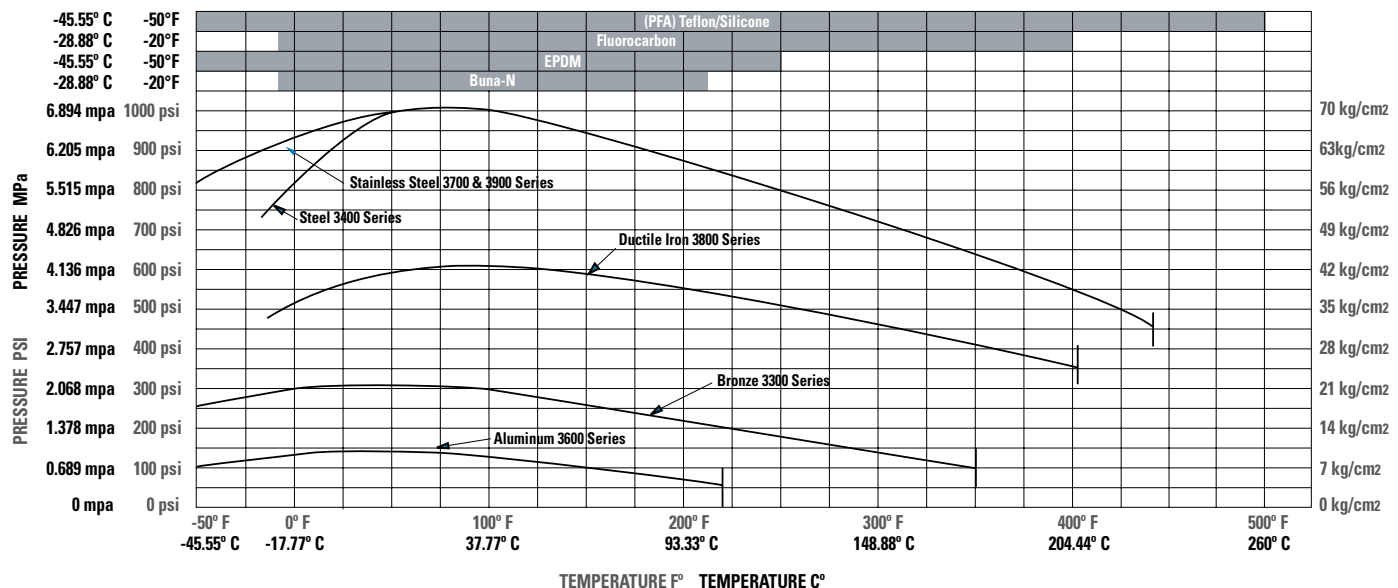
LUBRICATION

OPW swivel joints should be lubricated periodically, depending on service and operating conditions. **For normal operation, annually is sufficient.** Lubricating more frequently may be required when service is severe such as high temperatures, heavy loads, or constant rotation.

Part #	Description
880-0089	High Performance Synthetic Lubricant 14 oz. (400 grams) cartridge • Specially formulated to reduce friction and wear • Requires only annual lubrication • Not for use with EPT/EPDM seals • Will not drip, melt or carbonize • Complies with FDA regulation 21CFR178.3570 • Temperature range -40°F - 750°F (-40°C - 398.8°C)
885-0085	• High Performance Synthetic Lubricant for EPT Seals

Warning: EPT/EPDM Seals require the use of a OPW 885-0085 or a non-petroleum based lubricant.

PRESSURE/TEMPERATURE GUIDE



AVAILABILITY BY MATERIAL, SIZE AND PRESSURE RATING

Material	3/4" 20mm	1" 25mm	1-1/4" 32mm	1-1/2" 40mm	2" 50mm	3" 80mm	4" 100mm	6" 150mm	8" 200mm	10" 250mm	Pressure Rating* 8" & 10" 500 psi max
Steel, Cast, High-Pressure 3200 Series	■	■	■	■							3000 psi 210 kg/cm ² 20.68 mpa
Steel, Fabricated 3400 Series					■	■	■	■	■	■	1000 psi 70 kg/cm ² 6.89 mpa
316 Stainless Steel 3700 & 3900 Series	■	■		■	■	■	■	■	■	■	1000 psi 70 kg/cm ² 6.89 mpa
Aluminum 3600 Series		■		■	■	■	■	■			125 psi 9 kg/cm ² 0.86 mpa
Ductile Iron 3800 Series		■		■	■	■	■				600 psi 42 kg/cm ² 4.13 mpa
Bronze 3300 Series		■		■	■	■					300 psi 21 kg/cm ² 2.06 mpa

*Maximum pressure rating of OPW swivel joints is as shown, or is determined by the flange/end connection rating, whichever is lower. Buna-N seals are standard in all of the above swivel joints, but each is available with seals made of Fluorocarbon GFLT, FEP PTFE/Silicone EPDM, or Kalrez® 6375, depending on the pressures and temperatures of your operation.

SURFACE TREATMENT(S)

Treatments	Carbon Steel, Carburized to Rc 45-60 Anodizing for Aluminum
Painting	All Steel and Ductile Iron Swivel Joints are Painted with a Rust-Inhibiting Day Primer Finish Paint (Watson Coatings, INC. Water Reducible Enamel Coating, Aqua-Shile High Gloss Blue (WAC - 2569) at -6 to 1 mls Dry Film Thickness.)

MAINTENANCE

Tools Needed:

- Socket Wrench Set
- Degreaser
- Small Magnet
- Manual Grease Gun
- OPW 885 Lubricant
- Hex Key Set



Consider the following when servicing the Swivel:

- When the Swivel is overloaded / installed, it must be inspected thoroughly
- After maintenance is performed, it must be tested before the next use
- Periodic inspection (every 3 months) for leakages (especially with toxic or hazardous mediums)
- Maintenance must be performed by authorized personnel
- Periodic maintenance (once a year) is required according to the maintenance instructions

- In case of (parts of) Swivels being redirected, the initiator must provide information about the mediums, which have been in contact with (parts of) the Swivel
- During maintenance (partial) dismantling could be necessary, the same risks and procedures apply
- Before maintenance the full installation must be shut down/off before proceeding

SEAL KIT PART NUMBERS

3 0 0 1 K - 1 2 0 0	
Seal Materials	Size
1 - Buna-N	10 - 3/4" & 1"
2 - Fluorocarbon	15 - 1-1/4" & 1-1/2"
3 - PTFE/Silicone	24 - 2"
4 - EPDM	30 - 3"
5 - FDA Nitrile	40 - 4"
9 - Kalrez®	60 - 6"
	80 - 8"

IMPORTANT: OPW products should be used in compliance with applicable federal, state, provincial, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and materials to be handled. OPW MAKES NO WARRANTY OF FITNESS FOR A PARTICULAR USE. All illustrations and specifications in this literature are based on the latest product information available at the time of publication. OPW reserves the right to make changes at any time in prices, materials, specifications and models and to discontinue models without notice or obligation.

Jet Ranger™



Applications

Used in the fueling and defueling* of commercial and private aircraft. Resistant to jet fuel and higher aromatic aviation gasolines. Also for use on hydrant service. Hose meets EI 1529-7th edition, 2014, ISO 1825:2010/C/OMEGA, and N.F.P.A. Bulletin #407 (2017 revision).

Specifications

Construction Tube: Black Nitrile synthetic rubber

Cover: Black Wingprene® (ORS) static dissipating/static conductive synthetic rubber (wrapped finish)

Reinforcement: Spiral-plied (4) synthetic fabric and one nylon br

Coupling: Contact fitting manufacturer for proper fitting recommendation and coupling procedure.

Non Stock / Sizes: For special production run minimum requirements, see Appendix D.

Temperature Range: -35°F to 200°F (-37°C to 93°C)

Order Codes: 543-742 (1" to 3"), 541-742 (4")

Packaging: Cut lengths, coiled and polywrapped

BULK LOADING HOSE,
15' LONG

Technical Data Imperial

Part Number	InnerØ (in)	OuterØ (in)	Weight (lbs/ft)	Working Pressure (PSI)
20018250	1-1/2	2.06	0.86	300
20046710	1-31/32	2.57	1.14	300
20099968	2-1/2	3.16	1.53	300
20018276	3	3.64	1.79	300
20016044	4	5.00	3.70	300

Technical Data Metric

Part Number	InnerØ (mm)	OuterØ (mm)	Weight (kg/m)	Working Pressure (MPa)
20018250	38.10	52.30	1.28	2.07
20046710	50.00	65.30	1.70	2.07
20099968	63.50	80.30	2.28	2.07
20018276	76.20	92.50	2.66	2.07
20016044	101.60	127.00	5.51	2.07

Model 927/928/735DC Series

Application

The Morrison 927 dry disconnect adaptor is installed at the fill point in the fill line of a fuel storage tank system. The internal spring loaded poppet assembly remains closed providing a liquid-tight seal when not connected to a dry disconnect coupler.

The Morrison 928 dry disconnect coupler is installed on the end of delivery vehicle hose. When coupled, the 927 and 928 provide a liquid-tight connection enabling a dry connection and a dry disconnection.

The 735DC dust cap serves as a protective cover for the 927 adaptor when not in use.

927 models mate with PT Maxi-Dry® and OPW Kamvalok® couplers.

Code Compliance

735DC models meet California EVR VR-402 and US Military CID A-A-59326D; some 927 and 928 models meet CARB Phase 1 EVR VR-402

SPECIFICATION SHEET



927 (2")



928 (2")



735DC (4")

Item Number	Size	Description	A	B	C	D	E	Cap Size	Weight (lbs)
927---0150 1A	1½"	Dry disconnect adaptor	1N	2"	A	V	N	2"	1.63
927---0200AAEVR	2"	Dry disconnect adaptor	2N	2½"	A	V	Y	2½"	1.98
927---0300AAEVR	3"	Dry disconnect adaptor	3N	4"	A	V	Y	4"	3.50
927---0400AAEVR	4"	Dry disconnect adaptor	4N	4"	A	V	Y	4"	3.50
9095A5201AAEVR	4" x 2"	Dry disconnect adaptor	4N	2½"	A	V	Y	2½"	2.50
927B--0200 AA	2"	Dry disconnect adaptor	2N	2½"	B	V	N	2½"	3.05
927S--0150 1A	1½"	Dry disconnect adaptor	1N	2"	SS	V	N	2"	3.80
927S--0200 1A	2"	Dry disconnect adaptor	2N	2½"	SS	V	N	2½"	5.90
927S--0300 1A	3"	Dry disconnect adaptor	3N	4"	SS	V	N	4"	18.25
928---0150 1C	1½"	Dry disconnect coupler	1N	2"	A	V	N	N/A	4.40
928---0150ACEVR	1½"	Dry disconnect coupler	1N	2"	A	V	Y	N/A	4.40
928---0200 1C	2"	Dry disconnect coupler	2N	2½"	A	V	N	N/A	6.0
928---0200ACEVR	2"	Dry disconnect coupler	2N	2½"	A	V	Y	N/A	6.0
928---0300 1C	3"	Dry disconnect coupler	3N	4"	A	V	N	N/A	12.60
928---0300ACEVR	3"	Dry disconnect coupler	3N	4"	A	V	Y	N/A	12.60
928S--0150 1C	1½"	Dry disconnect coupler	1N	2"	SS	V	N	N/A	--
928S--0200 1C	2"	Dry disconnect coupler	2N	2½"	SS	V	N	N/A	--
928S--0300 1C	3"	Dry disconnect coupler	3N	4"	SS	V	N	N/A	--
735DC-2000ACEVR	2"	Dust cap, use w/ 1½" 927 adaptors	N/A	N/A	A	B	Y	N/A	1.0
735DCA2000ACEVR	2"	Dust cap, use w/ 1½" 927 adaptors	N/A	N/A	AA	B	Y	N/A	1.0
735DC-2500ACEVR	2½"	Dust cap, use w/ 2" 927 adaptors	N/A	N/A	A	B	Y	N/A	1.25
735DCA2500ACEVR	2½"	Dust cap, use w/ 2" 927 adaptors	N/A	N/A	AA	B	Y	N/A	1.25
735DC-3000ACEVR	3"	Dust cap, use w/ 3" adaptors	N/A	N/A	A	B	Y	N/A	1.50
735DCA3000ACEVR	3"	Dust cap, use w/ 3" adaptors	N/A	N/A	AA	B	Y	N/A	1.50
735DC-4000ACEVR	4"	Dust cap, use w/ 3" & 4" 927 adaptors	N/A	N/A	A	B	Y	N/A	2.50
735DCA4000ACEVR	4"	Dust cap, use w/ 3" & 4" 927 adaptors	N/A	N/A	AA	B	Y	N/A	2.50

SPECIFICATION OPTIONS:

- A**—Female threads: 1½" NPT (1N); 2" NPT (2N); 2" NPS (2S); 3" NPT (3N); 4" NPT (4N)
B—Coupler size
C—Body: Hard coated aluminum (A); Anodized aluminum (AA); Brass (B); Stainless steel (SS)
D—Seals: Viton® (V); Buna-N (B)
E—EVR: Yes (Y); No (N)
Cap size—In inches
Weight—Shipping weight

BULK LOADING HOSE

570 E. 7th Street, P.O. Box 238 | Dubuque, IA 52004-0238

t. 563.583.5701 | 800.553.4840 | f. 563.583.5028

www.morbros.com



Model 800 Cam-and-Groove-Fittings

SPECIFICATION SHEET

Application

Cam-and-groove adaptors and couplers are used in specialized applications where it is necessary to be able to connect and disconnect components quickly.

Features and Details

- **Part A**, female threads to male quick disconnect adaptor
- **Part B**, male threads to female quick disconnect coupler
- **Part C**, hose shank to female quick disconnect coupler
- **Part D**, female threads to female quick disconnect coupler
- **Part E**, hose shank to male quick disconnect adaptor
- **Part F**, male threads to male quick disconnect adaptor
- **Part DC**, dust caps
- **Part DP**, dust plugs

Materials of Construction

Standard couplings... Aluminum (brass and stainless steel are available)

Handles... Brass or stainless steel

Gaskets... Buna-N



Item numbers on next page...



MORRISON BROS. CO.



Model 800 Cam-and-Groove-Fittings (continued)

SPECIFICATION SHEET

Item Number	Size	Weight (lbs)
800A-A0000 1C	¾"	0.10
800A-A0100 1C	1"	0.14
800A-A0200 1C	1¼"	0.26
800A-A0300 1C	1½"	0.30
800A-A0400 1C	2"	0.30
800A-A0500 1C	2½"	0.64
800A-A0600 1C	3"	0.60
800A-A0700 1C	4"	1.36
800B-A0000 1C	¾"	0.30
800B-A0100 1C	1"	0.38
800B-A0200 1C	1¼"	0.68
800B-A0300 1C	1½"	0.78
800B-A0400 1C	2"	1.02
800B-A0500 1C	2½"	2.0
800B-A0600 1C	3"	2.0
800B-A0700 1C	4"	2.0
800C-A0000 1C	¾"	0.47
800C-A0100 1C	1"	0.52
800C-A0200 1C	1¼"	0.86
800C-A0300 1C	1½"	0.80
800C-A0400 1C	2"	1.14
800C-A0500 1C	2½"	2.0
800C-A0600 1C	3"	2.50
800C-A0700 1C	4"	4.0
800D-A0000 1C	¾"	0.25
800D-A0100 1C	1"	0.44
800D-A0200 1C	1¼"	0.76
800D-A0300 1C	1½"	0.84
800D-A0400 1C	2"	0.80
800D-A0500 1C	2½"	2.0
800D-A0600 1C	3"	2.0
800D-A0700 1C	4"	2.80

Item Number	Size	Weight (lbs)
800E-A0000 1C	¾"	0.26
800E-A0100 1C	1"	0.26
800E-A0200 1C	1¼"	0.39
800E-A0300 1C	1½"	0.54
800E-A0400 1C	2"	0.82
800E-A0500 1C	2½"	1.50
800E-A0600 1C	3"	1.66
800E-A0700 1C	4"	2.50
800F-A0000 1C	¾"	0.15
800F-A0100 1C	1"	0.24
800F-A0200 1C	1¼"	0.48
800F-A0300 1C	1½"	0.52
800F-A0400 1C	2"	0.60
800F-A0500 1C	2½"	0.86
800F-A0600 1C	3"	1.36
800F-A0700 1C	4"	2.50
800DCA0000 1C	¾"	0.20
800DCA0100 1C	1"	0.42
800DCA0200 1C	1¼"	2.0
800DCA0300 1C	1½"	0.74
800DCA0400 1C	2"	0.70
800DCA0500 1C	2½"	1.24
800DCA0600 1C	3"	1.40
800DCA0700 1C	4"	2.40
800DPA0000 1C	¾"	0.12
800DPA0100 1C	1"	0.16
800DPA0200 1C	1¼"	0.16
800DPA0300 1C	1½"	0.25
800DPA0400 1C	2"	0.38
800DPA0500 1C	2½"	0.59
800DPA0600 1C	3"	1.0
800DPA0700 1C	4"	2.0

800A-A 0000 1C

Letter in this location indicates material of construction

- A** = Aluminum
- B** = Brass
- S** = Stainless steel
- C** = Carbon steel

BULK LOADING COUPLER

*Items listed above are all aluminum.

Consult Price List for brass, carbon steel, and stainless steel options.

570 E. 7th Street, P.O. Box 238 | Dubuque, IA 52004-0238

t. 563.583.5701 | 800.553.4840 | f. 563.583.5028

www.morbro.com



MORRISON BROS. CO.

Static Grounding Reels

WARNING

These reels are for static grounding ONLY.
NOT intended for lightning protection!

- Aircraft Refueling • Chemical Plants • Grain Elevators
- Rescue and HazMat Operations

For refueling or hazardous areas.

- These reels bond and/or ground aircraft, fuel trucks, and other equipment.
- Provide smooth operation and require minimum cable pull.
- Declutching arbor and adjustable guide arm with cable guide.
- Optional stainless steel construction of spool, frame, and ratchet system available on HGR Series.
- Standard finish is oven-cured enamel.
- Also available, manual rewind version. All shown with optional cable and/or "Y" branch.



Model HGR50
(Shown with optional "Y" branch)



Model SSHGR50
(Optional unpolished stainless steel HGR50)



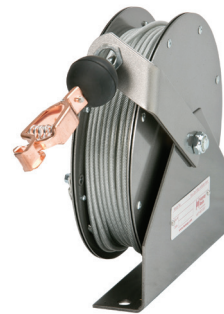
Model MHGR50



Model HGR100



Model MHGR100



Model GR75



Model MGR75

You Can't Buy A Better Reel.

- Available with 1/8", 7 x 19 galvanized carbon steel cable.
- 100 amp alligator clamp.
- Stainless steel or plastic-covered cable and "Y" branches are available at an additional charge.
- Cable guide arm of cast aluminum and ZA-12 aluminum zinc alloy.

Series GR75

- Sealed spring is a good economical choice that's compact and lightweight.

Series HGR

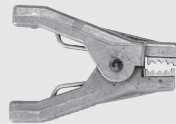
- A non-sparking ratchet assembly.
- Reels are repairable and parts are readily available.
- Supplied with 18" long grounding strap with eyelet connectors on both ends.

Parts Drawings: HGR Series – ISO 10 and MHGR Series – ISO 234

Model Number	Cable Capacity of Reel feet m	Approx. Weight lb. kg		Reel Dimensions*** in. mm									
		Without Cable	With Cable	A	B	C	D	E	F	G	H	X	Y
GR75	75 23	11 5	14* 6	2 51	2 51	7 178	9 229	9.25 235	3.5 89	9.88 251	5.06 129	1 25	7.88 200
† MGR75	75† 23†	11 5	13* 6	2 51	2 51	7 178	9 229	9.25 235	5.25 133	9.88 251	5.06 129	1 25	7.88 200
HGR50	75 23	28 13	30* 14	4 102	1.25 32	10.75 273	11.5 292	14.25 362	5.5 159	16.75 425	8.88 226	2.38 60	7.5 191
† MHGR50	125† 38†	19 9	23* 10	4 102	1.25 32	10.75 273	11.5 292	14.25 362	6.25 159	16.75 425	8.88 226	2.38 60	7.5 191
HGR100	100 30	37 17	41* 19	4 102	1.25 32	13.25 337	11.5 292	16.75 425	5.5 140	17.75 451	8.88 226	2.38 60	7.5 191
† MHGR100	175† 53†	25 11	31* 14	4 102	1.25 32	13.25 337	11.5 292	16.75 425	6.25 159	17.75 451	8.88 226	2.38 60	7.5 191



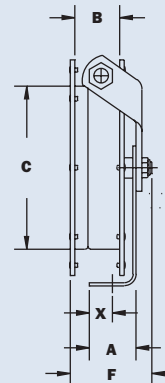
Optional Grounding Jack
per MIL-C-8341D/4
Part No. 9951.0033



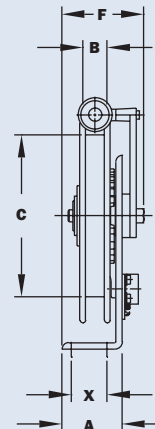
Optional Browne Clamp
(ALS-10)
Part No. 9951.0031

Notes:

1. Specifications subject to change.
 2. When ordering, specify model number, gauge, O.D., length, and coating if required.
 3. Specify "Y" branch if required.
 4. Specify finish if other than standard.
- *Reels can be shipped as a parcel package (via FedEx or UPS Ground).
*** X, Y indicate mounting holes.
† Capacities shown are for PCC (plastic coated cable). Capacities may be higher for uncoated cable; consult factory.



Model GR75/MGR75
GR75 shown



Model HGR50/HGR100/MHGR50
HGR shown



All Hannay reels are constructed of quality heavy gauge steel (optional aluminum or stainless steel also available on most models).

Hannay Reels®
The reel leader.

553 State Route 143 | Westerlo, New York 12193
Email: reels@hannay.com | hannay.com

Phone: 518-797-3791
Toll Free: 1-877-467-3357

Domestic FAX: 1-800-733-5464
International FAX: 518-797-3259

Form H-0606-SG REV1 HP 1M 9-13





GAMMON TECHNICAL PRODUCTS, INC.
P.O. BOX 400 - 2300 HWY 34
MANASQUAN, N.J. 08736

PHONE 732-223-4600
FAX 732-223-5778
WEBSITE www.gammontech.com
STORE www.gammontechstore.com

**DEADMAN
AND WATER
CONTROLS**

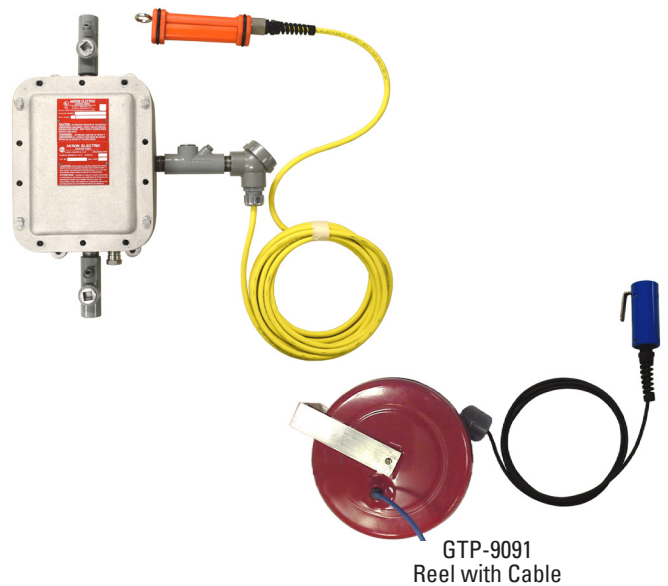
**BULLETIN 67
(08-22)**

DEADMAN AND WATER CONTROL SYSTEMS

DEADMAN HANDLE AND CORD



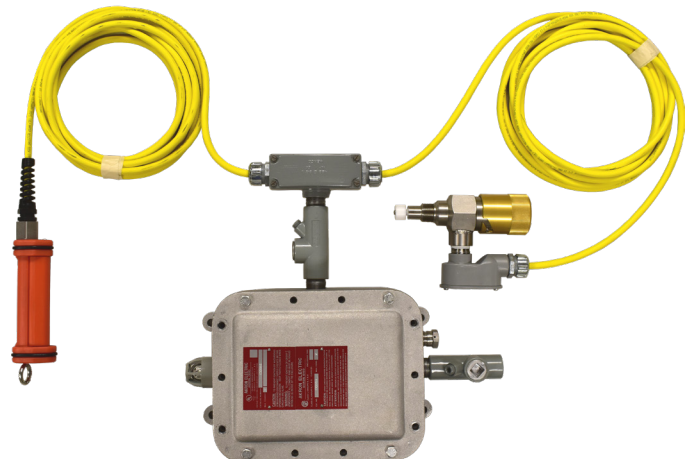
DEADMAN CONTROL SYSTEM



WATER CONTROL SYSTEM



COMBINATION DEADMAN AND WATER CONTROL SYSTEM



MINI-DEADMAN™

- Made in USA
- Material: urethane
- Dimensions: 4" x 1 3/4"
- Weight: 6 oz.
- Durable
- Compact
- Inexpensive
- Easy to repair
- Wear resistant
- Stainless steel trigger
- Good from -55° to 180°F
- Low operating force required
- Easy to assemble/disassemble
- Can be hung on trigger for storage
- Designed for the aviation environment
- Compatible with any deadman system
- Body screws are recessed to prevent damage



HOW TO ORDER

GTP-8392B Electric Mini-Deadman Handle
GTP-8676 Pneumatic Mini-Deadman Handle
GTP-8676-H Hydraulic Mini-Deadman Handle

NOTE: These handles are not suitable for AC applications unless an intrinsically safe barrier/relay is used.

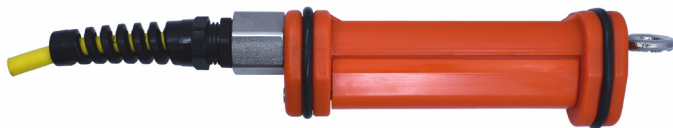
The heart of any deadman is the switch. The switch in this deadman has a built-in rolling diaphragm seal, aluminum body (not glass, rubber, or plastic), and an 8 amp contact rating. It is hermetically sealed, yet is easily replaceable, incorporating "push on" type electrical connections, eliminating troubles with wire nuts or soldering. In addition, the housing is o-ring sealed and has an anodized aluminum switch carrier and cable base fitting. The strain relief is a spiral type with a watertight seal.

DURA-DEADMAN HANDLE

Solid, super durable, cold molded, and virtually unbreakable, this handle is made of pure polyurethane. This new Dura-Deadman handle is the strongest and most reliable deadman we offer. It was tested for over half a million cycles, we've driven over it with trucks, and it's been dragged on pavement - all without failure. It features replaceable polyurethane drag bosses for even longer life. Made in USA.

ELECTRIC

GTP-9720-E Handle only - no cable
GTP-9720-11E Replacement switch
GTP-9720-21 Replacement pair of drag bosses



These handles are weather-tight sealed. They are not suitable for AC applications unless an intrinsically safe barrier/relay is used.

Switch data: Normally open switches are standard. Add "-NC" to the part number for normally closed.

PNEUMATIC/HYDRAULIC

GTP-9720-A Pneumatic 3-way valves
GTP-9720-H Hydraulic 2-way valves
GTP-9720-21 Replacement pair of drag bosses



These handles each contain two valves to provide fast reaction time. Seals are Buna/Nitrile.

HOW TO ORDER CABLE WITH ANY ELECTRIC DEADMAN HANDLE

Suffix number for the handle you want - "X" is for straight cable - length in feet (up to 500 ft)
"Z" is for coil cable - length in feet (25 ft or 50 ft)

Example: If you want a Mini Deadman handle with 50' of straight cable, you order a GTP-8392B-X-50.

HOW TO ORDER CABLE SEPARATELY



Yellow straight cable
Sold by the foot
GTP-8521



25' length
GTP-8523

Orange coil cable
50' length
GTP-8522-1



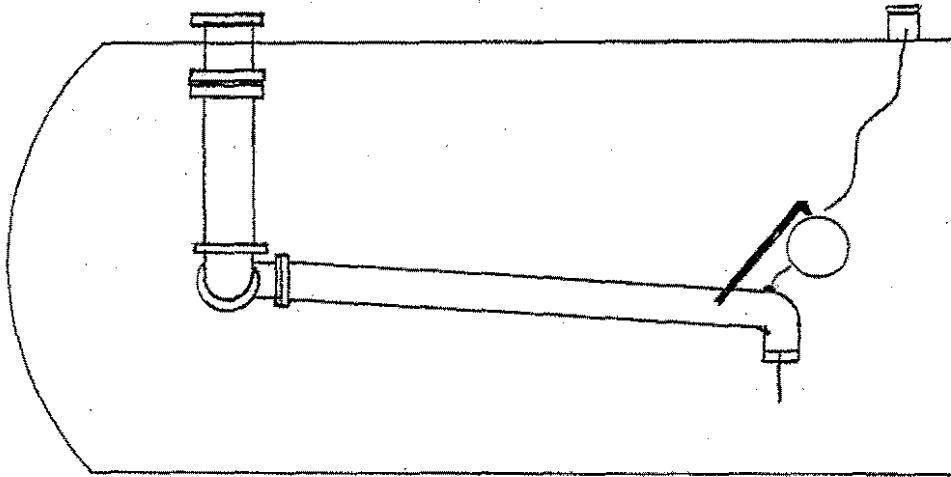
PART # GTP-9091

DEADMAN CABLE REEL (W/ 50' CABLE FOR GTP-1750 (HANDLE & SWITCH NOT INCLUDED))

L & T, INC

INTERNAL TANK FLOATING SUCTION ASSEMBLIES

L & T, Inc. manufactures floating suction assemblies for use in horizontal or vertical, above or below ground storage tanks where little or no contamination can be tolerated, such as aviation fuels. Since the fuel near the top is least likely to contain water or foreign particles, these assemblies are designed to float near the top of the liquid surface and draw from this near-surface, contamination-free liquid.



Features

- Available in 2" and 3" configurations
- Permanently lubricated dual race swivel joints
- Triple sealed swivel joints for submerged service
- Suction baffle and stop lag maintains minimum intake level of 7" above tank bottom (or as specified)
- Stainless Steel 150 lb. flat-faced flanges are standard

Benefits

- Maintenance free
- Easy movement in the liquid
- Increases efficiency
- Decreases maintenance of filter separators

3000 Series Swivel Manual

1) Tight Seals

- O-Rings provide a tight seal without hindering swivel action
- Accurately machined and micro-finished grooves provide for minimal seal wear
- Available in Buna-N, Fluorocarbon, PTFE Encapsulated Silicone, EPDM, Neoprene, Kalrez® and other seal materials as required

2) True Ball Bearing Race Alignment

- Body and tail sections are locked together by a double row of ball bearings
- Raceways are machined to precise tolerances
- Double raceway design assures proper alignment and prevents damage caused by temperature changes and heavy radial loads
- Carbon steel swivels have hardened races to maximize load-carrying capability

3) Protected Bearing Chamber

- Protective inner O-ring seal prevents product from entering bearing chamber
- Outer seal keeps rain, dirt, and other contaminants out
- Both seals hold in lubrication

4) Long-Life Bearings

- Ball bearings are hardened, precision-ground steel
- Stainless steel swivels have stainless steel bearings
- All OPW swivels are available with stainless steel bearings on special order

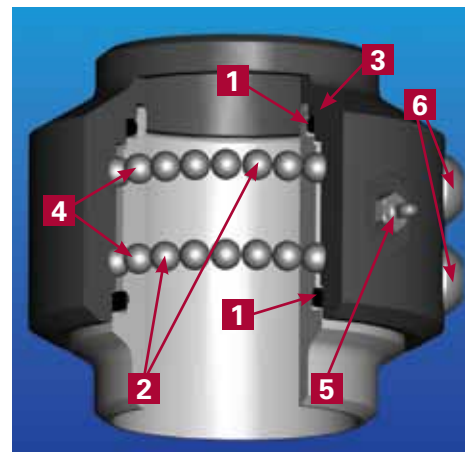
5) Easy Lubrication

- All OPW swivels are pre-lubricated at the factory
- All 3/4", 1", and submerged swivels are permanently lubricated

- A grease fitting between races that accepts a standard grease gun is available for swivels that require field lubrication
- Non-lubricating swivels are available on special order
- Most styles come with a grease relief to prevent over-greasing

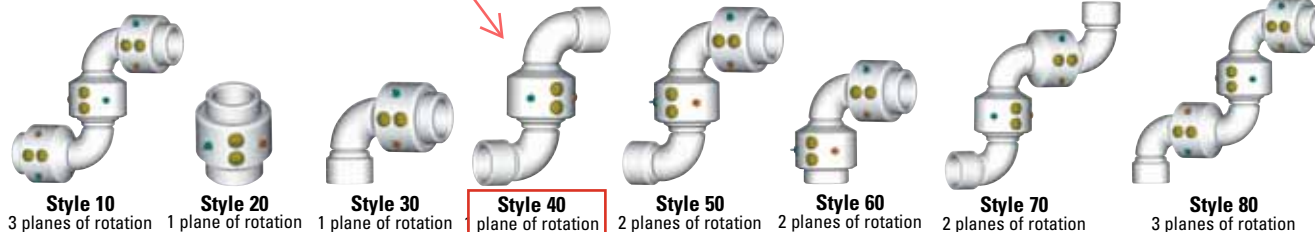
6) No Field Adjustment Necessary

- Balls are held in place by factory-installed plugs that never need to be adjusted to maintain bearing performance



FLOATING SUCTION

ORDERING GUIDE



Style (Planes of Rotation)

Construction

Conventional Hose Reel Swivels	26 - Aluminum Hose Reel
	28 - Ductile Iron Hose Reel
Conventional Swivels	32 - Steel, High Pressure Cast
	33 - Bronze
	34 - Steel, Fabricated
	36 - Aluminum
	37 - 316 Stainless Steel, Cast
	38 - Ductile Iron
	39 - 316 Stainless Steel, Fab.
Endura Split Flange Swivels	74 - Steel Endura LPG Hose Reel
	79 - 316 SST Endura LPG Hose Reel
	82 - Steel Endura DSF Single Race
	84 - Steel Endura DSF Dual Race
	87 - 316 SST Endura DSF Single Race
	89 - 316 SST Endura DSF Dual Race Alloy 20, Hastelloy®, Monel®, Duplex, and other materials available

3420F - 0403

End Connections

F	- 150 lb. ANSI flange both ends
F3	- 300 lb. ANSI flange both ends
FFT	- 150 lb. ANSI flanged inlet x TTMA tank truck flange outlet
FJ	- For submerged use, 150 lb. ANSI flange both ends
FO	- 150 lb. flange x female NPT threads
FSB	- 150 lb. flange both ends, with spring balance attachment lugs
FT	- TTMA tank truck flange both ends
FTH	- TTMA tank truck flange both ends, with handle
VO	- Victaulic® x female NPT threads
FTO	- TTMA tank truck flange inlet x female NPT threaded outlet
J	- For submerged use
LFT	- Long swivel joint with TTMA tank truck flanges
TFT	- Female NPT threaded inlet x TTMA tank truck flange outlet
VOG	- Female NPT threads x Victaulic® groove, hard coat anodized aluminum
W	- Beveled for welding both ends

NO SUFFIX LETTER indicates Female NPT threads both ends. 300 lb. flanges available on some models. BSPT threads available.

Seal Materials

1	- Buna-N (Standard)
2	- Fluorocarbon
3	- PTFE Silicone (FDA Approved)
4	- EPDM
9	- Kalrez®

Kalrez®, Chemraz® and other seal materials available

Size

007	- 3/4"
010	- 1"
012	- 1-1/4"
015	- 1-1/2"
020	- 2"
030	- 3"
040	- 4"
060	- 6"
080	- 8"
100	- 10"
120	- 12"

Availability of styles, sizes and materials may vary depending upon swivel configuration. Consult OPW Customer Service regarding your exact requirements.

MATERIALS

(unless listed below, see seal material for temperature ranges)

	Aluminum 3600	Bronze 3300	Cast HP 3700	CST 3400	Ductile Iron 3800	SST 3900
Body and Tail	ASTM B26 A356 T6	ASTM B62-83600	ASTM A351- CF3M/CF8M	ASTM A105	ASTM A-536	ASTM A351- CF3M/CF8M
Seals	See Chart	See Chart	See Chart	See Chart	See Chart	See Chart
Balls	Grade 200 CST	Grade 200 CST	Grade 200 CST	Grade 200 CST	Grade 200 CST	Grade 400 SST
Flanges (150/300 lb)	6061-T6	N/A	N/A	ASTM A105	N/A	B16 A182 316/316L
Elbows	6061-T6	N/A	N/A	ASTM A234 WPB	N/A	ASTM A351-CF3M
Piping	6061-T6	N/A	N/A	ASTM A53 Grade B	N/A	ASTM A312 TP 316L

Seal Material	Min Temp C	Max Temp C	Min Temp F	Max Temp F
Buna	-29	100	-20	212
Fluorocarbon	-29	204	-20	400
(PFA) PTFE/Silicone (standard) (FDA Approved)	-46	260	-50	500
EPDM	-46	121	-50	250
(PFA) PTFE/Fluorocarbon (special order) (FDA Approved)	-18	204	0	400
Kalrez®	-18	260	0	500

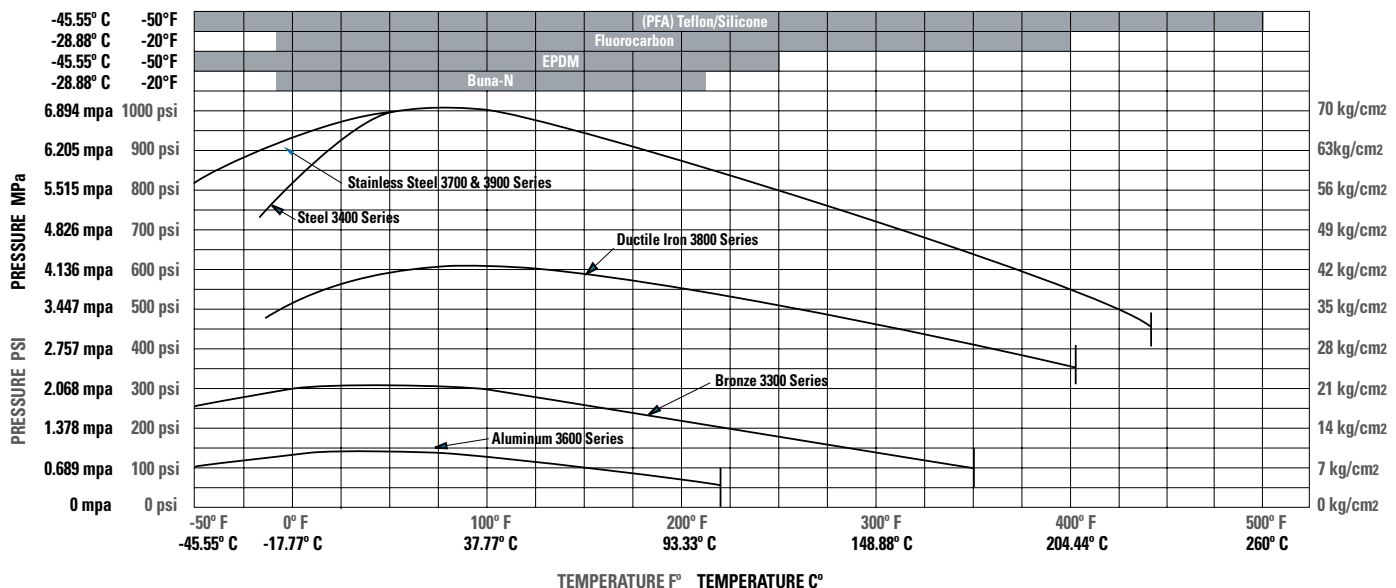
LUBRICATION

OPW swivel joints should be lubricated periodically, depending on service and operating conditions. **For normal operation, annually is sufficient.** Lubricating more frequently may be required when service is severe such as high temperatures, heavy loads, or constant rotation.

Part #	Description
880-0089	High Performance Synthetic Lubricant 14 oz. (400 grams) cartridge • Specially formulated to reduce friction and wear • Requires only annual lubrication • Not for use with EPT/EPDM seals • Will not drip, melt or carbonize • Complies with FDA regulation 21CFR178.3570 • Temperature range -40°F - 750°F (-40°C - 398.8°C)
885-0085	High Performance Synthetic Lubricant for EPT Seals

Warning: EPT/EPDM Seals require the use of a OPW 885-0085 or a non-petroleum based lubricant.

PRESSURE/TEMPERATURE GUIDE



AVAILABILITY BY MATERIAL, SIZE AND PRESSURE RATING

Material	3/4" 20mm	1" 25mm	1-1/4" 32mm	1-1/2" 40mm	2" 50mm	3" 80mm	4" 100mm	6" 150mm	8" 200mm	10" 250mm	Pressure Rating* 8" & 10" 500 psi max
Steel, Cast, High-Pressure 3200 Series	■	■	■	■							3000 psi 210 kg/cm ² 20.68 mpa
Steel, Fabricated 3400 Series					■	■	■	■	■	■	1000 psi 70 kg/cm ² 6.89 mpa
316 Stainless Steel 3700 & 3900 Series	■	■		■	■	■	■	■	■	■	1000 psi 70 kg/cm ² 6.89 mpa
Aluminum 3600 Series		■		■	■	■	■	■			125 psi 9 kg/cm ² 0.86 mpa
Ductile Iron 3800 Series		■		■	■	■	■				600 psi 42 kg/cm ² 4.13 mpa
Bronze 3300 Series		■		■	■	■					300 psi 21 kg/cm ² 2.06 mpa

*Maximum pressure rating of OPW swivel joints is as shown, or is determined by the flange/end connection rating, whichever is lower. Buna-N seals are standard in all of the above swivel joints, but each is available with seals made of Fluorocarbon GFLT, FEP PTFE/Silicone EPDM, or Kalrez® 6375, depending on the pressures and temperatures of your operation.

SURFACE TREATMENT(S)

Treatments	Carbon Steel, Carburized to Rc 45-60 Anodizing for Aluminum
Painting	All Steel and Ductile Iron Swivel Joints are Painted with a Rust-Inhibiting Day Primer Finish Paint (Watson Coatings, INC. Water Reducible Enamel Coating, Aqua-Shile High Gloss Blue (WAC - 2569) at -6 to 1 mls Dry Film Thickness.)

MAINTENANCE

Tools Needed:

- Socket Wrench Set
- Degreaser
- Small Magnet
- Manual Grease Gun
- OPW 885 Lubricant
- Hex Key Set



Consider the following when servicing the Swivel:

- When the Swivel is overloaded / installed, it must be inspected thoroughly
- After maintenance is performed, it must be tested before the next use
- Periodic inspection (every 3 months) for leakages (especially with toxic or hazardous mediums)
- Maintenance must be performed by authorized personnel
- Periodic maintenance (once a year) is required according to the maintenance instructions

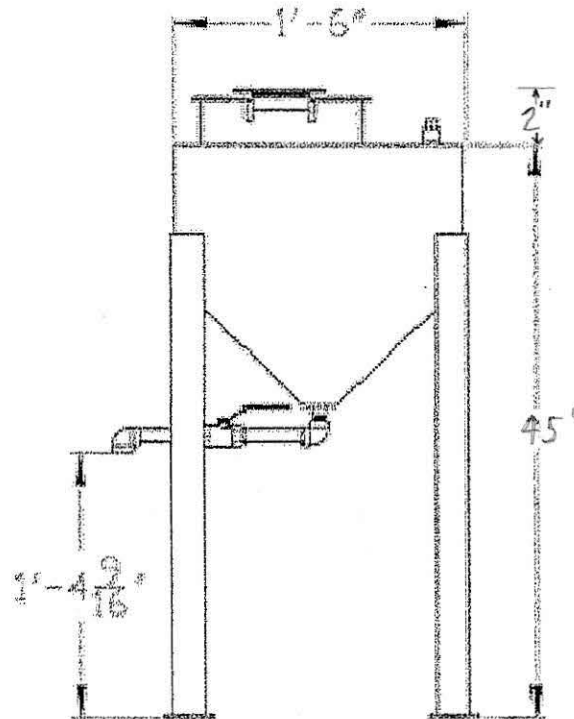
- In case of (parts of) Swivels being redirected, the initiator must provide information about the mediums, which have been in contact with (parts of) the Swivel
- During maintenance (partial) dismantling could be necessary, the same risks and procedures apply
- Before maintenance the full installation must be shut down/off before proceeding

SEAL KIT PART NUMBERS

3 0 0 1 K - 1 2 0 0	
Seal Materials	Size
1 - Buna-N	10 - 3/4" & 1"
2 - Fluorocarbon	15 - 1-1/4" & 1-1/2"
3 - PTFE/Silicone	24 - 2"
4 - EPDM	30 - 3"
5 - FDA Nitrile	40 - 4"
9 - Kalrez®	60 - 6"
	80 - 8"

IMPORTANT: OPW products should be used in compliance with applicable federal, state, provincial, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and materials to be handled. OPW MAKES NO WARRANTY OF FITNESS FOR A PARTICULAR USE. All illustrations and specifications in this literature are based on the latest product information available at the time of publication. OPW reserves the right to make changes at any time in prices, materials, specifications and models and to discontinue models without notice or obligation.

SUMP RECOVERY TANKS ease the process of daily sumping and will pay for themselves in a few months. The sumped fuel is poured into the 15 or 20 gallon tank and left to settle. Water is drawn off from the bottom valve and the remaining fuel is suctioned directly back into the system using the tank or cabinet pump. Handling is minimized and there are no barrels or waste tanks.



Models

	SRT15-1	15 Gallon Stainless Steel Sump Saver, No Pump, Unpainted
	SRT15-2	15 Gallon Stainless Steel Sump Saver, No Pump, White Powder Coat
	SRT15-3	15 Gallon Stainless Steel Sump Saver, Electric Pump, Unpainted
	SRT15-4	15 Gallon Stainless Steel Sump Saver, Electric Pump, White Powder Coat
	SRT20-1	20 Gallon Stainless Steel Sump Saver, No Pump, Unpainted
	SRT20-2	20 Gallon Stainless Steel Sump Saver, No Pump, White Powder Coat
	SRT20-3	20 Gallon Stainless Steel Sump Saver, Electric Pump, Unpainted
	SRT20-4	20 Gallon Stainless Steel Sump Saver, Electric Pump, White Powder Coat



Model 691BSS Full Port Locking Ball Valve

SPECIFICATION SHEET

Application

Ball valves are used throughout fuel piping systems where a shut-off is required or desired.

Features and Details

- Female NPT threaded inlet and outlet
- Quarter turn operation
- Full port for maximum flow and minimum pressure drop
- Can be operated in partial open position for flow control
- Double seal allows the valve to be operated in both directions
- Blowout-proof stem
- 1000 PSIG non-shock cold working pressure
- Can be used for air service
- Lockable with a padlock

Materials of Construction

- Body and ball... CF8M stainless steel
- Seal... pure PTFE

Code Compliance

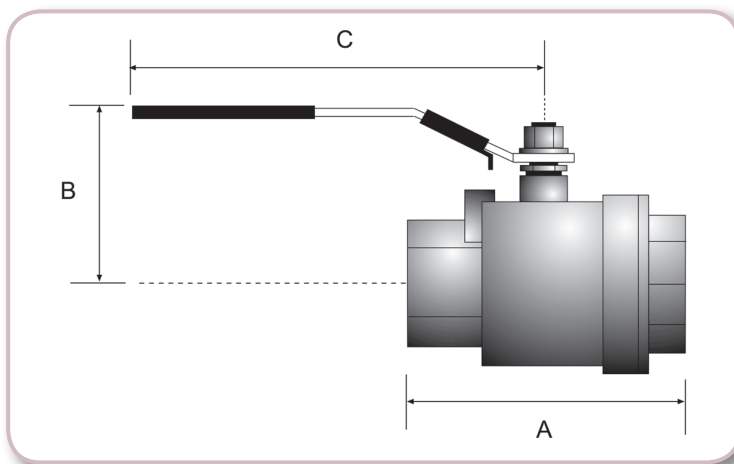
Test standard API 598; NACE compliance MR-01-75



691BSS (1")

Item Number	Size	Weight (lbs)
691BSS0200 1V	3/8"	0.50
691BSS0300 1V	1/2"	0.70
691BSS0400 1V	3/4"	1.16
691BSS0500 1V	1"	1.62
691BSS0700 1V	1 1/2"	3.38
691BSS0800 1V	2"	6.11
691BSS1000 1V	3"	19.60

SUMP RECOVERY DRAIN



Size	Dimension A	Dimension B	Dimension C	Port Size
3/8"	2.28"	2.24"	4.06"	.49"
1/2"	2.44"	2.24"	3.78"	.63"
3/4"	2.80"	2.70"	4.96"	.79"
1"	3.27"	2.85"	4.96"	.98"
1 1/2"	4.04"	3.74"	7.01"	1.50"
2"	4.92"	4.11"	7.01"	2.01"
3"	7.55"	5.46"	11.26"	3.15"



MORRISON BROS. CO.

570 E. 7th Street, P.O. Box 238 | Dubuque, IA 52004-0238

t. 563.583.5701 | 800.553.4840 | f. 563.583.5028

www.morbros.com

May 2020

Model 691 & 691B Full Port Brass Ball Valve

SPECIFICATION SHEET

Ball valves are used throughout fuel piping systems where a shut-off is required or desired.

Features

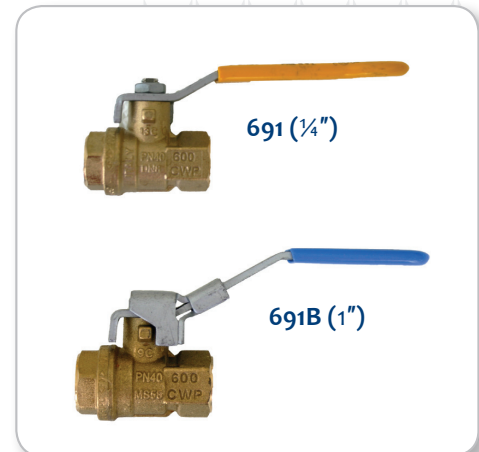
- Quarter turn operation
- Full port for maximum flow and minimum pressure drop
- Can be operated in partial open position for flow control
- Double seal allows the valve to be operated in both directions
- Blowout proof stem
- 600 PSIG non-shock cold working pressure rating for 1/4" to 2" size
- 450 PSIG non-shock cold working pressure rating for 2 1/2" to 4" size
- Can be used for air service
- **691B** is lockable with a padlock

Construction Details

- Forged brass body
- Hard chrome plated ball
- PTFE seal

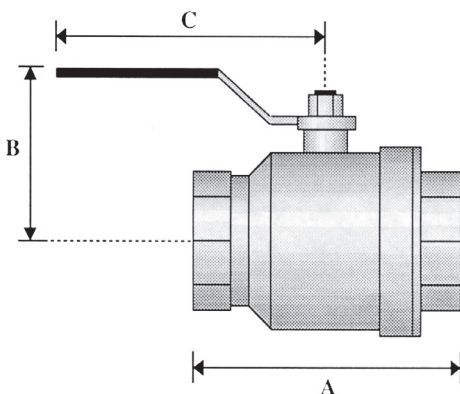
Certifications & Listings

UL 842 listed for flammable liquids,
UL 125 listed for LP gas shut-off,
CSA listed (File No. 112439, Model S.95),
ULC listed (ULC/ORD-C125-1992,
ULC/ORD-C842-M1984 and
ULC/ORD-C258-03)



I.D. Number	Size	A	B	C	Port Size	Weight (lbs)
691---0100 1V	1/4"	1.771	1.496	3.228	0.314	0.30
691---0200 1V	3/8"	1.771	1.496	3.228	0.393	0.30
691---0300 1V	1/2"	2.32	1.69	3.94	0.59	0.50
691---0400 1V	3/4"	2.519	1.968	4.724	0.787	0.80
691---0500 1V	1"	3.188	2.125	4.724	0.984	1.17
691---0600 1V	1 1/4"	3.661	2.874	6.22	1.259	1.93
691---0700 1V	1 1/2"	4.015	3.11	6.22	1.574	2.40
691---0800 1V	2"	4.763	3.385	6.22	1.968	4.02
691---0900 1V	2 1/2"	6.141	5.196	10.04	2.559	10.0
691---1000 1V	3"	6.968	5.551	10.04	3.149	13.65
691---1100 1V	4"	8.504	6.062	10.04	3.937	22.0
691B--0100 1V	1/4"	1.771	1.496	3.228	0.314	0.30
691B--0200 1V	3/8"	1.771	1.496	3.228	0.393	0.30
691B--0300 1V	1/2"	2.32	1.69	3.94	0.59	0.50
691B--0400 1V	3/4"	2.519	1.968	4.724	0.787	0.80
691B--0500 1V	1"	3.188	2.125	4.724	0.984	1.17
691B--0600 1V	1 1/4"	3.661	2.874	6.22	1.259	1.93
691B--0700 1V	1 1/2"	4.015	3.11	6.22	1.574	2.40
691B--0800 1V	2"	4.763	3.385	6.22	1.968	4.02
691B--0900 1V	2 1/2"	6.141	5.196	10.04	2.559	10.0
691B--1000 1V	3"	6.968	5.551	10.04	3.149	13.65
691B--1100 1V	4"	8.504	6.062	10.04	3.937	22.0

NOTE: All dimensions are in inches.



CONTAINMENT
PAN DRAIN

570 E. 7th Street, P.O. Box 238 | Dubuque, IA 52004-0238
t. 563.583.5701 | 800.553.4840 | f. 563.583.5028

www.morbro.com

MORRISON BROS. CO.

Wingcraft™



1" X 75' LONG FOR OVERWING NOZZLE

Marking: CONTINENTAL CONTITECH WINGCRAFT AIRCRAFT FUELING HOSE NFPA-407 EI 1529/2014 TYPE C GRADE 2 2000 KPA 300 PSI MAX WP

Applications

For fueling or defueling* commercial and private aircraft. It handles jet fuel and the higher aromatic aviation gasolines. Its high working pressure permits use in fuel cart hydrant service. Hose meets EI 1529-7th edition, 2014 and N.F.P.A. Bulletin #407 (2017 revision).

Specifications

Construction Tube: Black Nitrile Synthetic Rubber

Cover: Black Wingprene® (ORS) Static Dissipating/Static Conductive Synthetic Rubber

Reinforcement: Spiral-plied Synthetic Fabric

Coupling: Contact fitting manufacturer for proper fitting recommendation and coupling procedures.

Non Stock / Sizes: Custom lengths and fitting configurations available.

Temperature Range: -35°F to 200°F (-37°C to 93°C)

Order Codes: 543-738 (1" to 3"), 541-738 (4")

Packaging: Cut lengths, coiled and polywrapped

Technical Data Imperial

OVERWING

Part Number	Color	InnerØ (in)	OuterØ (in)	Weight (lbs/ft)	Working Pressure (PSI)	Length (ft)
20018118	Black	1	1.58	0.65	300	200
20018142	Black	1-1/4	1.89	0.85	300	200
20018159	Black	1-1/2	2.13	0.99	300	200
20018180	Black	2	2.67	1.35	300	100
20018181	Black	2	2.67	1.35	300	200
20018204	Black	2-1/2	3.22	1.72	300	100
20018205	Black	2-1/2	3.22	1.78	300	200
20018222	Black	3	3.72	2.09	300	200
20016776	Black	4	4.80	2.89	300	400

Technical Data Metric

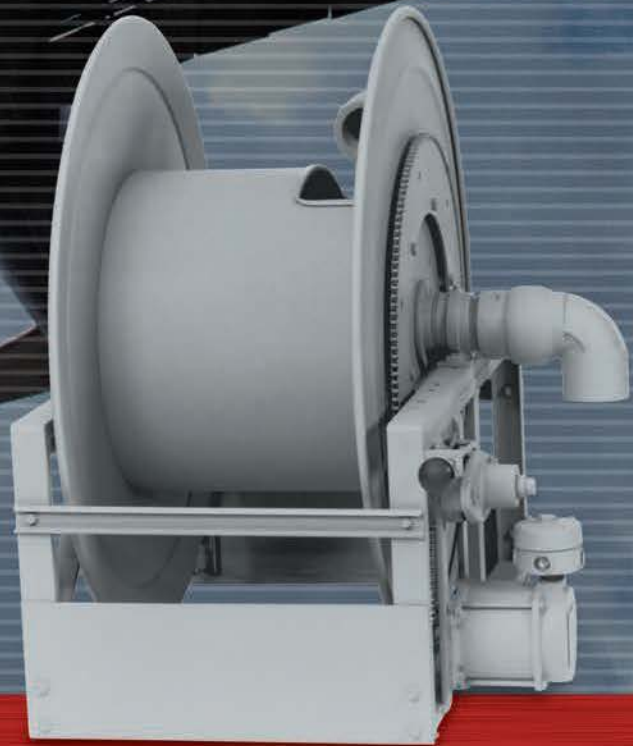
Part Number	Color	InnerØ (mm)	OuterØ (mm)	Weight (kg/m)	Working Pressure (MPa)
20018118	Black	25.40	40.00	0.970	2.07
20018142	Black	31.80	47.90	1.260	2.07
20018159	Black	38.10	54.20	1.470	2.07

FAMILY OWNED AND OPERATED SINCE 1933



Hannay Reels®
The reel leader.

Aviation Reels



**You
Can't Buy
A Better
Reel**

Refueling • Airport Hydrant Fueling Operations
Sensing • Static Grounding

www.hannay.com

Pride in workmanship • Reels built to order • Consistent quality • Service with integrity • Value for your dollar

Note to Designers and Engineers:

The reels shown in this catalog are the standard of the industry. These models reflect various installation and performance requirements.

The high quality of our standard steel construction is only the beginning.

Hannay Reels offers any size configuration to fit a defined space, and we construct many models of reels of aluminum or stainless steel. Specifically, we use 5000 and 6000 Series aluminum and 304 stainless steel in the manufacture of frames, discs, drums and internals as well as other structural components. This type of construction eliminates the need for maintenance repainting and part replacement due to rust or corrosion.

The drum diameters of the reel models listed have been used successfully for many years. However if your application requires a larger drum diameter to meet **API hose standards**, please remember it will also *increase the envelope dimensions* for the reel and *may incur an extra cost*.

Please note: Jet fuels require non-ferrous internal piping. Hannay Reels offers aluminum or stainless steel internals for 1" to 4" I.D. hose reels.

Please consult factory on any fuel handling questions.

For the many accessories and components available on our standard reel models such as roller guides, switches, brakes and locks, etc., please refer to our Ordering & Accessory Guide H-0415-OA.

Paint Notice

To meet the requirements and performance of vehicle and OEM apparatus paints we recommend our reels be painted with the same or equal paint as used on the specific apparatus the reel is being mounted on.

Hannay Reels will supply any model or custom reel or part with an automotive primer upon request, allowing application of final coating at your facility. Or at additional cost Hannay can prime / pre-paint all material before final assembly.

Consult factory for other optional finishes

Standard finish is oven cured enamel. High performance finishes for demanding and corrosive environments are available at an additional cost. Consult factory for specific requirements.

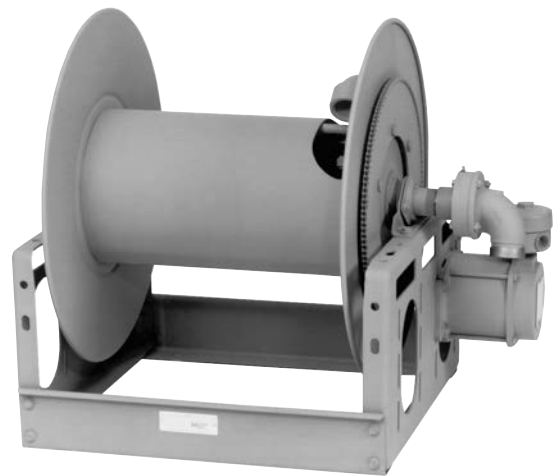
S E R I E S

1 1/2"

MANUAL OR POWER REWIND REELS

To handle single 1" through 1-1/2" I.D. hose.

- A strong, heavy-duty reel.
- Gear-driven crank rewind or **chain and sprocket drive powered by an electric, hydraulic or compressed air motor.**
- Optional auxiliary crank rewind for power rewind reels.
- Crank rewind reels supplied with pinion brake and power rewind reels with a comet brake.
- 90° ball bearing swivel joint with 1-1/2" female NPT threads and 2" victaulic groove.
- Flanged riser with 1-1/2" female NPT threads.
- Other sizes and/or threads can be furnished and must be specified.
- Standard inlet, outlet riser, hub assembly are aluminum for jet fuels.
- Stainless steel, at extra cost.
- **Rollers and roller mounting brackets** are accessory items. Specify roller position.
- Pressures to 600 psi (41 bar)
- Temperatures from -40°F to +175°F (-40° C to +79° C).
- Consult factory for other pressures & temps.
- Chainguards are available upon request, must be specified.



Standard Configuration
Shown

Hannay Reels, Inc. Phone 518-797-3791 Toll Free 1-877-GO REELS (467-3357)

FAX 1-800-REELING (733-5464) USA or FAX 518-797-3259 (International) www.hannay.com reels@hannay.com

1 1/2"

Parts Drawing – ISO 18

OVERWING NOZZLE

Model Number	Hose Capacity of Reel feet m.					Approx. Weight Crank Rewind lb. kg. See Note 4		Reel Dimensions*** inches mm.									
	I.D. (in) I.D. (mm)	1" 25	1-1/4" 32	1-3/8" 35	1-1/2" 38	NET	SHIP	A	B	D	E	F CRANK	F POWER	G	H	X	Y
	O.D. (in) O.D. (mm)	1.58" 40	1.89" 48	2" 51	2.06" 52												
26-19-21		70 21	60 18	50 15	50 15	99 45	141 64	23 584	17.5 445	20.5 521	18.75 476	29.5 749	31.88 810	21.5 546	12.12 308	15 381	16.75 425
32-19-21		100 30	90 27	85 26	75 23	112 51	154 70	29.5 749	24 610	20.5 521	18.75 476	36.0 914	38.38 975	21.5 546	12.12 308	21.5 546	16.75 425
40-19-21		125 38	100 30	100 30	100 30	128 58	170 77	37.5 953	32 813	20.5 521	18.75 476	44.0 1118	46.38 1178	21.5 546	12.12 308	29.5 749	16.75 425
24-23-24		100 30	90 27	80 24	50 15	102 46	144 65	21 533	15.5 394	20.5 521	22.75 578	27.5 699	29.88 759	23.5 597	12.12 308	13 330	16.75 425
32-23-24		150 46	150 46	125 38	75 23	119 54	161 73	29.5 749	24 610	20.5 521	22.75 578	36.0 914	38.38 975	23.5 597	12.12 308	21.5 546	16.75 425
38-23-24		200 61	190 58	170 52	100 30	130 59	172 78	35 889	29.5 749	20.5 521	22.75 578	41.5 1054	43.88 1115	23.5 597	12.12 308	27 686	16.75 425
20-25-26		110 34	70 21	60 18	50 15	106 48	148 67	17 432	11.5 292	25.5 648	24.75 629	23.5 597	25.88 657	27.88 708	15.5 394	9 229	21.75 552
24-25-26		140 43	95 29	85 26	75 23	114 52	156 71	21 533	15.5 394	25.5 648	24.75 629	27.5 699	29.88 759	27.88 708	15.5 394	13 330	21.75 552
28-25-26		200 61	130 40	120 37	100 30	123 56	165 75	25.5 648	20.0 508	25.5 648	24.75 629	32.0 813	34.38 873	27.88 708	15.5 394	17.5 445	21.75 552
16-30-31		90 27	50 15	50 15	50 15	106 48	156 71	13 330	7.5 191	25.5 648	28.75 730	19.5 495	21.88 556	29.88 759	15.5 394	7.75 197	21.75 552
20-30-31		155 47	140 43	80 24	75 23	114 52	164 74	17 432	11.5 292	25.5 648	28.75 730	23.5 597	25.88 657	29.88 759	15.5 394	9 229	21.75 552
*22-30-31		185 56	160 49	100 30	100 30	118 54	168 76	19 483	13.5 343	25.5 648	28.75 730	25.5 648	27.88 708	29.88 759	15.5 394	11 279	21.75 552
*28-30-31		275 84	250 76	175 53	150 46	131 59	181 82	25.5 648	20.0 508	25.5 648	28.75 730	32.0 813	34.38 873	29.88 759	15.5 394	17.5 445	21.75 552
*24-33-34		275 84	190 58	175 53	175 53	129 59	179 81	20.5 521	15.5 394	31.5 800	31.75 806	27.25 692	29.63 753	33.62 854	17.75 451	13 330	27.75 705

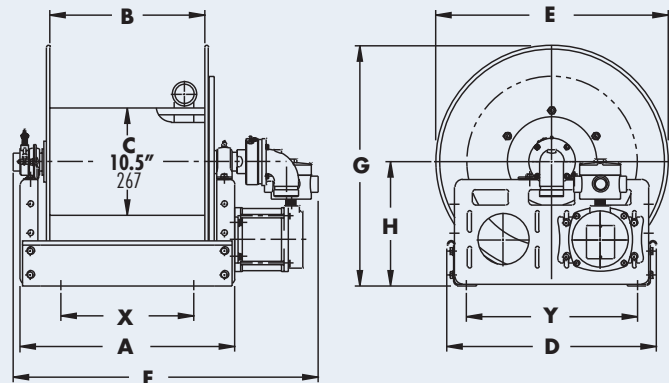
Notes:

- Specifications subject to change.
- Upon request, reels can be supplied with drum lengths other than shown and with disc sizes in other diameters.
- Dimensions shown for reels up to and including 30-31 disc size reflect pressed frames. All others are rollformed channel frames.
- Weights shown in chart are for crank rewind models. ADD these amounts for power rewind models:

	Net (lbs.)/(kg.)	Ship (lbs.)/(kg.)
Electric	40/18.1	40/18.1
Hydraulic	20/9.1	20/9.1
Air	20/9.1	20/9.1
- When ordering power rewind models, prefix model number with:
A = Air Rewind–Supplied with control valve and 18 " air hose.
EPJ = Explosion Proof Electric Rewind (1/2 HP)–Supplied with explosion proof switch, solenoid, and junction box.
HD = Hydraulic Rewind–Not supplied with control valve.
- For Air Rewind on models over 100 ft. of 1-1/2" consult factory.

7. Be sure to check dimensions and weights prior to ordering.

NOTICE: A Flexible Connector must be used between the inlet pipe and the inlet swivel joint.



* Some applications may require a different motor and/or a clutch/reduction unit.

***x,y indicate mounting holes.

Victaulic® Rigid Coupling

Style 89



BOTH HOSE REEL
PIPE CONNECTIONS

1.0 PRODUCT DESCRIPTION

Available Sizes

- 2 – 12"/DN50 – DN300

Maximum Working Pressure

- Up to 1200 psi/8274 kPa

Application

- Provides a rigid pipe joint designed to restrict axial or angular movement
- Joins standard roll grooved and cut grooved pipe, as well as grooved fittings, valves and accessories

Pipe Material

- **Stainless steel**
 - Austenitic: 304, 316
 - Super Austenitic: 254SMO, AL6XN
 - Duplex: 2205
 - Super Duplex: 2507, Zeron 100

2.0 CERTIFICATION/LISTINGS

Product designed and manufactured under the Victaulic Quality Management System, as certified by LPCB in accordance with ISO-9001:2008

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

3.0 SPECIFICATIONS – MATERIAL

Housing: Ductile iron conforming to ASTM A536, Grade 65-45-12. Ductile iron conforming to ASTM A395, Grade 65-45-15, is available upon special request.

Housing Coating:

Standard: Hot dipped galvanized per ASTM A123.

Optional: Contact Victaulic with your requirements for other coatings.

Gasket: (specify choice)¹

Victaulic Grade “E” EPDM

EPDM (Green color code). Temperature range –30°F to +230°F/–34°C to +110°C. May be specified for hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL Classified in accordance with ANSI/NSF 61 for cold +73°F/+23°C and hot +180°F/+82°C potable water service and ANSI/NSF 372. **NOT COMPATIBLE FOR USE WITH PETROLEUM SERVICES OR STEAM SERVICES.**

Victaulic Grade “EF” EPDM²

EPDM (Green “X” color code). Temperature range –30°F to +230°F/–34°C to +110°C. May be specified for hot and cold water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. Also meets hot and cold potable water requirements per DVGW W270, UBA Elastomer Guideline, ÖVGW, SVGW, and French ACS approved for EN681-1 Type WA cold potable, and Type WB hot potable water service. WRAS approved material to BS 6920:2014 for cold and hot potable water service up to +149°F/+65°C. **NOT COMPATIBLE FOR USE WITH PETROLEUM SERVICES OR STEAM SERVICES.**

Victaulic Grade “T” Nitrile

Nitrile (Orange color code). Temperature range –20°F to +180°F/–29°C to +82°C. May be specified for oil related services, including air with oil vapor, this gasket may be specified for temperatures rated up to +180°F/+82°C. For water related services, this gasket may be specified for temperatures rated up to +150°F/+66°C. For oil free, dry air services, this gasket may be specified for temperatures rated up to +140°F/+60°C. **NOT COMPATIBLE FOR USE WITH HOT WATER SERVICES OR STEAM SERVICES.**

Victaulic Grade “O” Fluoroelastomer

Fluoroelastomer (Blue color code). Temperature range +20°F to +300°F/–7°C to +149°C. May be specified for many oxidizing acids, petroleum oils, halogenated hydrocarbons, lubricants, hydraulic fluids, organic liquids and air with hydrocarbons. **NOT COMPATIBLE FOR USE WITH HOT WATER SERVICES OR STEAM SERVICES.**

Victaulic Grade “A” White Nitrile

White nitrile (White gasket). Temperature range +20°F to +180°F/–7°C to +82 °C. No carbon black content. Meets FDA requirements. Conforms to CFR Title 21 Part 177.2600. Not compatible for hot water services over +150°F/+66°C or for hot, dry air over +140°F/+60°C. **NOT COMPATIBLE FOR USE WITH HOT WATER SERVICES.**

Others

For alternate gasket selection, reference [publication 05.01](#): Victaulic Seal Selection Guide.

¹ Services listed are General Service Guidelines only. It should be noted that there are services for which these gaskets are not compatible. Reference should always be made to the latest [Victaulic Seal Selection Guide](#) for specific gasket service guidelines and for a listing of services which are not compatible.

² Available exclusively in Europe.

Bolts/Nuts: (specify choice)³

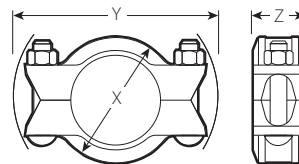
Standard: Carbon steel oval neck track bolts meeting the mechanical property requirements of ASTM A449 Carbon steel heavy hex nuts meeting the mechanical property requirements of ASTM A563 Grade B. Track bolts and heavy hex nuts are zinc electroplated per ASTM B633 ZN/FE5, finish Type III (imperial) or Type II (metric).

Optional: Stainless steel oval neck track bolts meeting the mechanical property requirements of ASTM A193 Grade B8M, Class 2 (316 stainless steel). Stainless steel heavy hex nuts meeting the mechanical property requirements of ASTM A194 Grade 8M (316 stainless steel), condition CW, with galling reducing coating.

³ Optional bolts/nuts in imperial size only.

4.0 DIMENSIONS

Style 89



Typical for all sizes

Size		Pipe End Separation ⁴	Bolt/Nut ⁵		Nut Torque ft-lbs N·m	Dimensions			Weight
Nominal inches DN	Actual Outside Diameter inches mm	Allowable inches mm	Qty.	Size inches		X inches mm	Y inches mm	Z inches mm	Approximate (Each) lb kg
2 DN50	2.375 60.3	0.14 3.6	2	$\frac{5}{8} \times 2 \frac{3}{4}$	60 – 90 80 – 120	3.50 89	6.68 168	2.00 51	3.1 1.4
2 ½	2.875 73.0	0.14 3.6	2	$\frac{5}{8} \times 3 \frac{1}{2}$	60 – 90 80 – 120	4.13 105	7.13 181	2.00 51	4.0 1.8
DN65	3.000 76.1	0.14 3.6	2	$\frac{5}{8} \times 3 \frac{1}{2}$	60 – 90 80 – 120	4.13 105	7.25 184	2.00 51	4.1 1.9
3 DN80	3.500 88.9	0.14 3.6	2	$\frac{5}{8} \times 3 \frac{1}{2}$	60 – 90 80 – 120	4.75 121	7.75 197	2.00 51	4.3 2.0
4 DN100	4.500 114.3	0.25 6.4	2	$\frac{3}{4} \times 4 \frac{1}{4}$	85 – 125 115 – 170	6.00 152	9.63 245	2.13 54	7.5 3.4
DN125 ²	5.500 139.7	0.25 6.4	2	$\frac{3}{4} \times 4 \frac{1}{4}$	85 – 125 115 – 170	7.13 181	10.63 270	2.38 60	12.5 5.7
5	5.563 141.3	0.25 6.4	2	$\frac{3}{4} \times 4 \frac{1}{4}$	85 – 125 115 – 170	7.13 181	10.63 270	2.38 60	12.5 5.7
	6.500 165.1	0.25 6.4	2	$\frac{7}{8} \times 5 \frac{1}{2}$	175 – 250 237 – 339	8.63 219	12.38 314	2.38 60	15.8 7.2
6 DN150	6.625 168.3	0.25 6.4	2	$\frac{7}{8} \times 5 \frac{1}{2}$	175 – 250 237 – 339	8.63 219	12.68 321	2.50 64	16.0 7.3
	8.515 216.3	0.25 6.4	2	1 x 5 ½	200 – 300 271 – 407	11.00 279	15.25 387	2.63 67	25.2 11.4
8 DN200	8.625 219.1	0.25 6.4	2	1 x 5 ½	200 – 300 271 – 407	11.00 279	15.25 387	2.75 70	26.1 11.8
	10.528 267.4	0.25 6.4	2	1 x 6 ½	250 – 350 339 – 475	13.38 340	17.00 432	2.75 70	32.5 14.7
10 DN250	10.750 273.0	0.25 6.4	2	1 x 6 ½	250 – 350 339 – 475	13.50 343	17.25 438	2.75 70	32.8 14.9
	12.539 318.5	0.25 6.4	2	1 x 6 ½	250 – 350 339 – 475	15.63 397	19.63 499	2.88 73	42.0 19.1
12 DN300	12.750 323.9	0.25 6.4	2	1 x 6 ½	250 – 350 339 – 475	15.63 397	19.63 499	2.88 73	46.0 20.9

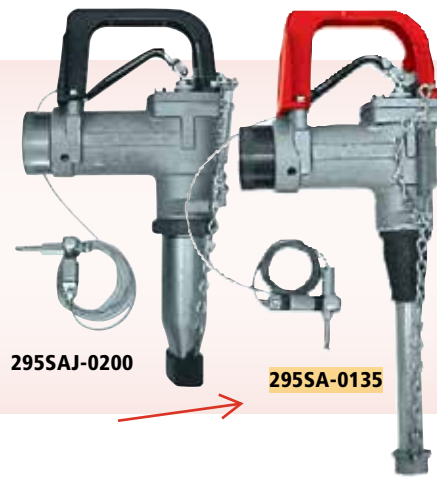
² Available exclusively in Europe.

⁴ For field installation only. Style 89 couplings when sufficiently pressurized, will allow pipe ends to separate to maximum point shown before joint acts in a fully restrained manner.

⁵ Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.

Materials

Body: Cast aluminum
Main Stem: Stainless steel
Stem Seal: Buna-N O-Ring
Disc: Viton®
Spout: Aluminum



Features

- ◆ Aluminum Body – lighter weight, easier to maneuver.
- ◆ Dual Poppets – easy-to-open nozzle against high inlet pressures.
- ◆ Color-Coded Composite Lever Guards – helps distinguish between AVGAS and Jet A. Easily replaced in lever guard kit.
- ◆ Right Angle Design – provides larger lever area for better grip and easier control.
- ◆ Vinyl-Coated Lever – insulates fingers against cold.
- ◆ 100 Mesh Strainer – prevents foreign matter from entering fuel tank; easy to remove and clean.
- ◆ Dust Cap – keeps spout free from dirt and stops fuel drippage when connected.
- ◆ Adjustable Dash Pot – permits adjusting the main poppet closure rate over a wide range of flows to overcome line shock with minimum afterflow.
- ◆ Easily replaced spout – the spout is easily threaded into the body. Replacement spouts are readily available from OPW.
- ◆ Built-In Swivel – eliminates twisting and kinking of the hose. This swivel is electroless nickel-plated and has full-bearing surfaces.
- ◆ NPT Female Threads at Inlet End of 295SA – accepts all 1", 1-1/4" or 1-1/2" male connections.
- ◆ NPT Female Threads At Inlet End Of 295SAJ – accepts all 1-1/2" male connections.
- ◆ Unique Jet Aircraft Spout Design of 295SAJ – to help prevent inadvertent fueling of piston engine aircraft with turbine fuel.
- ◆ Ground Wire Assembly – included on all aviation nozzles.

Design working pressure

- ◆ 110 psi (7.58 bar) maximum pressure

Level Guard Replacement Kits

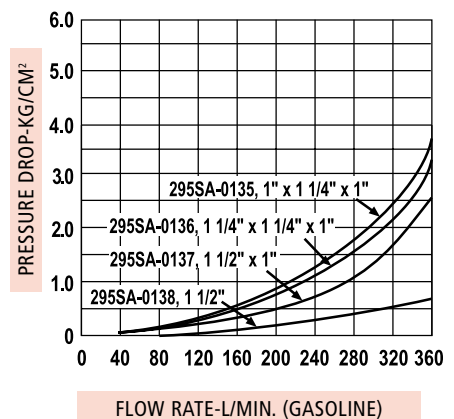
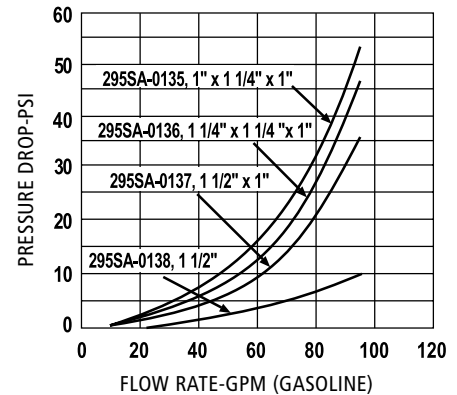
Product #	Nozzle
295KLG-0300	295SA-0135, 0136, 0137, 295SAC-0156, 0157 Red
295KLG-0350	295SA-0138, 275SAC-0158 Red
295KLG-0400	295SAJ-0200, 295SACJ-0200 Black

All lever guard kits include new lever sub-assembly.
 295 Series Instruction Sheet Order Number: **H09237PA**

Manual Overwing Aircraft Nozzles

295SA – AVGAS

295SAJ – Jet Fuel



Ordering Specifications

Product #	Inlet Thread				Spout O.D	
	in.	mm	lbs.	kg	in.	mm
295SA-0135	1	25	4.60	2.10	1	25
295SA-0136	1 1/4	32	4.50	2.00	1	25
295SA-0137	1 1/2	38	4.50	2.00	1	25
295SA-0138	1 1/2	38	5.10	2.30	1 5/8	41
295SAJ-0200	1 1/2	38	5.60	2.50	2 2/3	54
295SAC-0156*	1 1/4	32	4.50	2.00	1	25
295SAC-0157*	1 1/2	38	4.50	2.00	1	25
295SAC-0158*	1 1/2	38	5.15	2.30	1 5/8	41
295SACJ-0200*	1 1/2	38	5.65	2.60	2 2/3	54

* Check Valve

NOTE: See OPW's Website at www.opwglobal.com for product instruction sheets, trouble-shooting guides, how-to-use guide and to view the Do's & Don'ts at the Gas Pump video.

700 Series

Rotary Positive Displacement Flow Meter



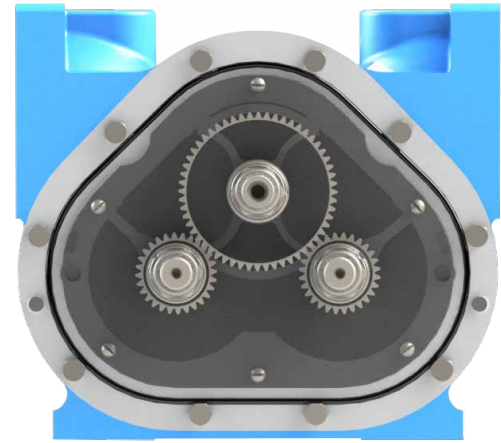
The Standard of Measurement



www.TCSmeters.com

Design Principle

The TCS 700 series rotary flow meter has a simple and efficient meter design consisting of a housing and three rotors that rotate in unison within the measuring chamber. The absence of wear, from no metal-to-metal contact within the chamber, eliminates any deterioration in accuracy and provides a long service life. The rotors are supported by bearings inserted into two bearing plates, where at the end of each rotor shaft is a timing gear. The timed rotation between each rotor is then transferred through the calibration adjuster to the register, giving a consistent and superior measurement of accuracy.



Performance Features

The TCS 700 rotary flow meter combines excellent accuracy with low pressure drop. The TCS 700 rotary flow meter has a compact size and lightweight design that offers minimal maintenance and long service life. This meter is built with advanced materials of construction for a broad range of measurement applications and is accompanied by a full selection of accessories and electronic registration.

FLOW:	Capable of up to 1,000 GPM (3,785 LPM); Bi-directional flow
LINEAR ACCURACY:	Capable of $\pm 0.15\%$ over the full flow range
REPEATABILITY:	Capable of 0.02% (constant operation conditions with 700SP meters & mechanical registration, using 1 CPS test fluid)
VISCOSITY:	Will accurately measure liquids up to 1,500,000 SSU (325,000 CPS)
REGULATORY:	Meets a wide range of global weights and measures requirements. (Contact factory for information on specific approvals.)

SELF-SERVE NOZZLE

Meter Operating Specifications

Meter	Type(s) Available	Flange Connection(s)*	Max. Capacity	Working Pressure**	Working Temperature***
700-15	SP, SPA, IP & IC	1 1/2" NPT Flange; 1" & 2" Options	60 GPM (227 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-20	SP, SPA, SPD, IP, IC, AF, SS, SSD & LP	2" NPT Flange; 1 1/2" Option	100 GPM (380 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-25	SPA & SPD	2" NPT Flange	150 GPM (567 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-30	SP, SPA, SPD, IP, IC & AF	3" NPT Flange; 2" Option	200 GPM (760 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-35	SPA & SPD	3" NPT Flange	300 GPM (1,135 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-40	SP, SPA, SPD, IP, IC & AF	4" NPT Flange; 3" Option	500 GPM (1,893 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-45	SPA & SPD	4" NPT Flange	600 GPM (2,271 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-60	SPA	6" ANSI Flange	800 GPM (3,040 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-65	SPA	6" ANSI Flange	1000 GPM (3,800 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)

* Flanged NPT is standard; BSPT, Slip Weld, ANSI & others are available upon request

** Higher working pressures are available. (Consult factory for more information.)

*** Higher working temperatures can be achieved at reduced pressures. (Consult factory for more information.)

BULK LOADING HOSE

Meter Types

SP	Standard Petroleum	For metering refined petroleum products such as Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
SPA	Standard Petroleum (Aviation)	For metering refined petroleum products such as Aviation Gasoline, Jet Fuels, Ethanol, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
SPD	Standard Petroleum (Ductile Iron)	For metering refined petroleum products such as Ethanol, Methanol, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Aviation Gasoline, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
AF	All-Ferrous	For metering Pesticides, Fertilizers, Food Processing Liquids, Industrial Chemicals, Solvents, Paints, Inks, Alcohols and many other liquids; such as Liquid Sugars, Liquid Feeds, MEK, Ethanol, Corn Syrup, Soy Bean Oil, Shortenings, Latex Products, Adhesives, Naptha, etc.
IP	Industrial Products	For Food Processing, Chemicals, General Solvents and many other liquids such as Corn Syrup, Soy Bean Oil, Liquid Sugars, Shortenings, Latex Products, Adhesives, etc.
IC	Industrial Chemicals	For metering Alcohols, Chemicals, Solvents, Water and many other Non-Lubricating Liquids such as Acetones, Ethanol, Naphta, Xylene, MEK, Toluene, Resins, etc.
SS	Stainless Steel	For metering the same products as the SP, SPA, SPD, IP, IC and AF meter types, but includes special handling liquids; such as Acids, Anti-Icing Fluids, Vinegar, Fruit Juices, Corn Syrup, Micro-Nutrients, etc.
SSD	Stainless Steel (DEF)	For metering Diesel Exhaust Fluid (DEF), AdBlue, ARLA and AUS32
LP	Liquefied Petroleum	For metering Liquefied Petroleum Gas (LPG), NH3

Meter Materials of Construction

Description	SP	SPA	SPD	AF	IP	IC	SS	SSD	LP
Housing	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Ductile Iron	Ductile Iron	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Stainless Steel	Stainless Steel	Hardcoat Anodized Aluminum
Rotors	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Ni-Resist	Ni-Resist	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Stainless Steel	Stainless Steel	Hardcoat Anodized Aluminum
Rotor Journals	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel
Bearing Plates	Ni-Resist	Ni-Resist	Ni-Resist	Ni-Resist	Ni-Resist	Ni-Resist	Stainless Steel	Ryton	Ni-Resist
Bearing Sleeves	Ni-Resist	Carbon Graphite	Carbon Graphite	Carbon Graphite	Ni-Resist	Carbon Graphite	Carbon Graphite	Ryton	Ni-Resist
Timing Gears	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Packing Seal	FKM	FKM	Simriz®	Simriz®	Simriz®	Simriz®	Simriz®	EPDM	Buna
Body O-ring	FKM	FKM	FKM	PTFE	PTFE	PTFE	PTFE	EPDM	Buna

*Simriz is a registered trademark of Freudenberg-NOK

Check out our other solutions online at
www.TCSmeters.com!

Meter Accessories



Electronic Registration

TCS 3000 electronic register is a fully integrated flow computer that will control all delivery operations. The modular design and open software architecture provide you with a tailored system that is expandable for future needs.



TCS HUB Delivery Software

TCS HUB is a SQL-based software designed to capture truck delivery information wirelessly to be electronically collected at locations and/or the home office. The TCS HUB software supports both line of sight wireless modems and/or cellular modems for real-time delivery tracking.



Pulse Transmission

The DMP pulse transmitters provide accurate signals for remote indication, totalizers and data monitoring systems by transferring the mechanical rotation of the flow meter into an electronic pulse. This pulse can be used by the TCS 3000 or a flow computer of your choice.



Air/Vapor Elimination

Mechanical and electronic air eliminators are devices designed to extract free or accumulated volumes of air or vapor from a liquid dispensing system to achieve accurate measurement results.



Control Valves

Mechanical, pneumatic and electronic actuated piston and diaphragm control valves designed to meet the variety of needs in the fluid process industry. Such valves include preset flow control valves, air differential control valves, pressure relief and safety valves.



Mechanical Registration

Mechanical 5 wheel register V/R 7887 or 6 wheel register V/R 7886 with optional preset, ticket printer, swivel, micro switch and register mounted pulser.



Miscellaneous

Miscellaneous product accessories were developed to increase functionality of your metering solution. Such items as flow indication, RTD temperature probes, clutch assemblies, insulation jackets, protective covers and various flange connections.

Authorized Distributor



2515 Charleston Place
Fort Wayne, Indiana 46808
United States of America

www.TCSmeters.com
sales@tcsmeters.com
(800) 348-4753
(260) 484-0382

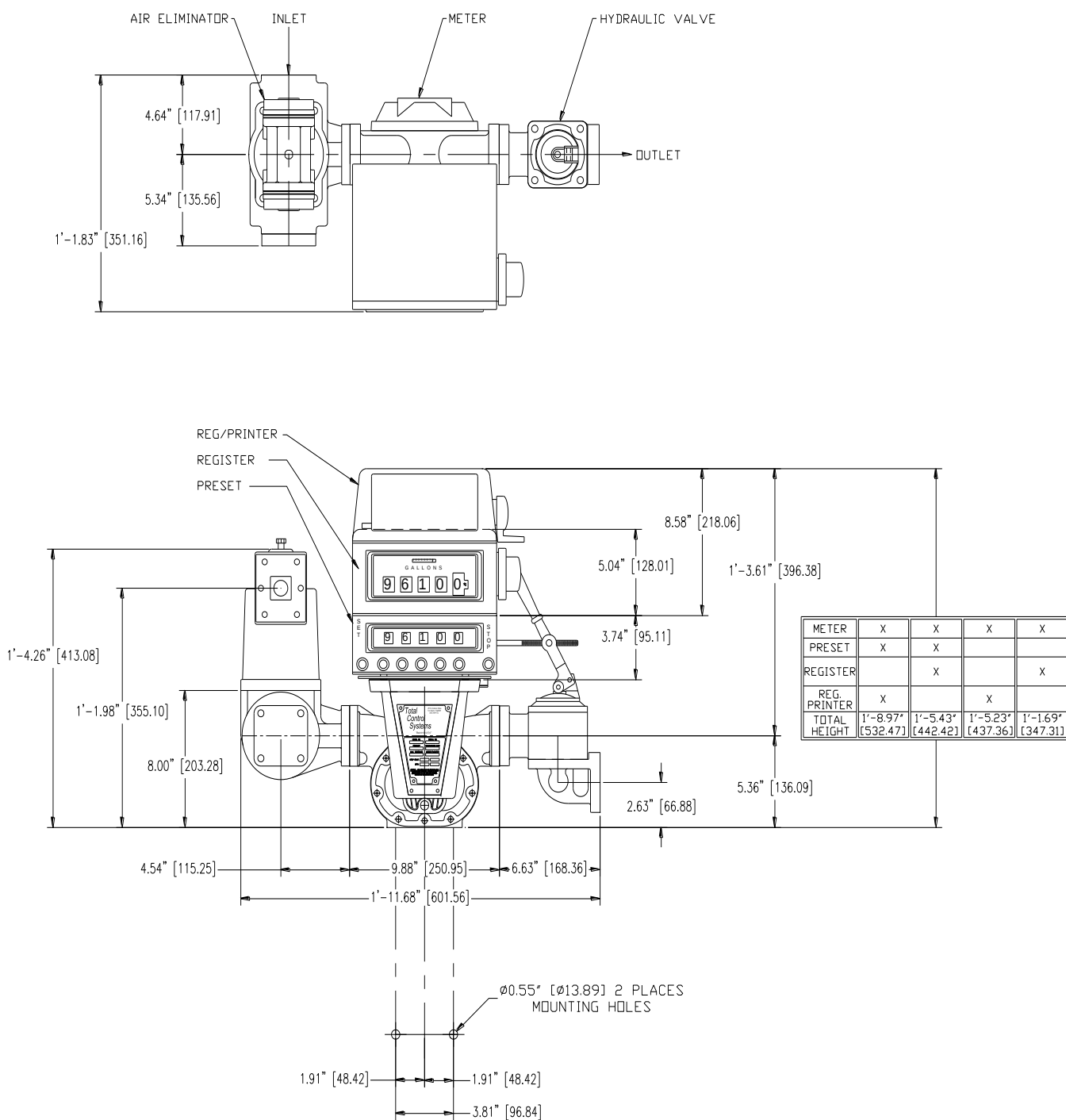


Made in U.S.A.

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TCS 910000.003

700-15 Dimensions

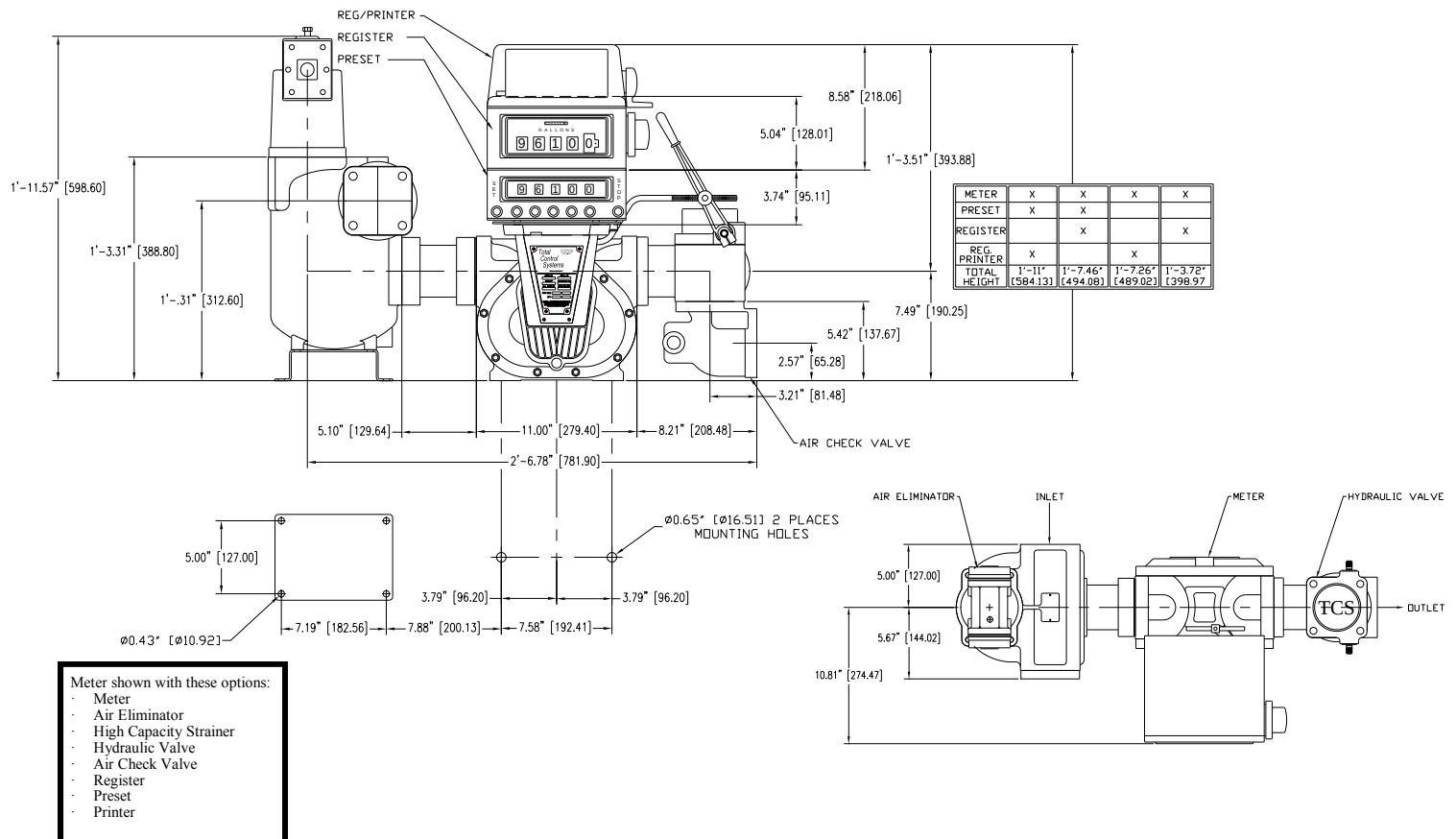
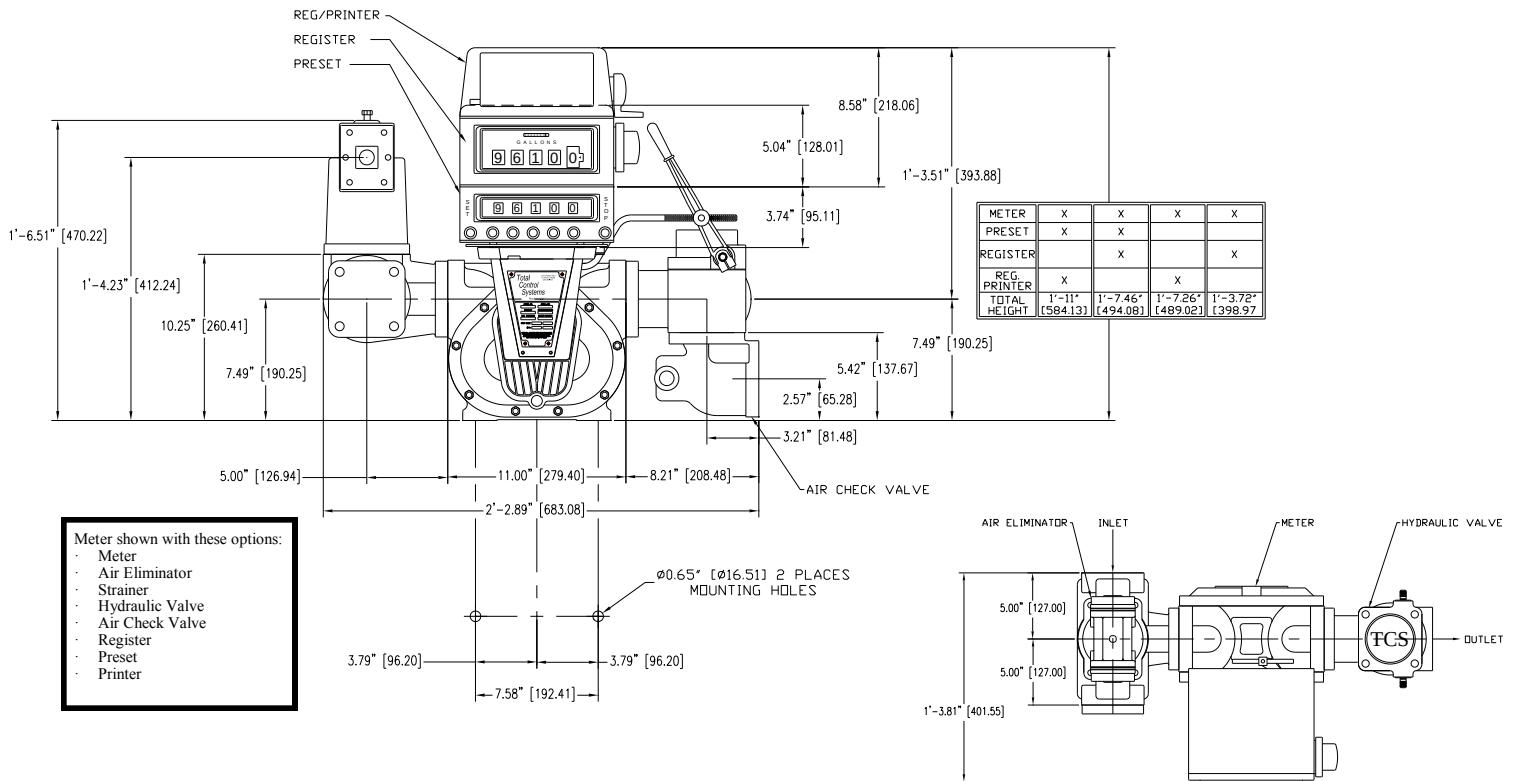
SELF-SERVE



All measurements are in inches (millimeters).

BULK LOADING

700-30 / 700-35 Dimensions





Model 711NC Solenoid Valve (Normally Closed)

SPECIFICATION SHEET

Application

The 711NC solenoid valve is a high flow pilot operated piston valve that is “normally closed.” This general purpose valve is for applications such as pressure systems, machine tools, water processing, and steam applications. The valve opens upon the receipt of an electronic signal such as when a dispenser or pump is switched to the on position.

Features and Details

- 7.5 PSI pressure differential required to keep the valve open
- Explosion and weather proof coil and housing
- 120V/60HZ standard, several optional coil voltages available
- Must be installed in a horizontal pipeline with the coil in the upright and vertical position
- Recommended for use with liquids having a maximum viscosity of 60 centistokes
- A strainer with a 100 mesh screen is recommended at the valve inlet

Materials of Construction

- Body and cover... ~~Forged brass~~
- Seals...Viton®

STAINLESS STEEL

Code Compliance

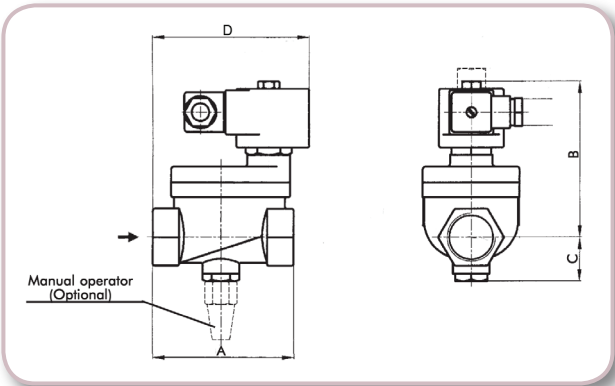
UL listed

TWO STAGE FOR SELF-SERVE



Item Number	Size (NPT)	Seal Material	Orifice Size (inches)	CV	Operating Pressure Differential MAX. (P.S.I.)		Fluid Temp.	Power Consumption (Watt) (Deg. F)	Weight (lbs.)	Gen. Dimensions (inches)			
					Min.	Max.				A	B	C	D
711NC-0075 1V	3/4"	Viton®	3/4"	5.9	7.5	225	311	13	2.60	2.8	4.09	1.02	3.31
711NC-0100 1V	1"	Viton®	1"	13	7.5	225	311	13	3.75	3.78	4.25	1.18	4.09
711NC-0150 1V	1 1/2"	Viton®	1 1/2"	29	7.5	225	311	13	6.75	4.49	4.69	1.42	4.80
711NC-0200 1V	2"	Viton®	2"	47	7.5	225	311	13	9.47	5.04	4.92	1.73	5.43

* Contact Morrison Customer Service for features and options not shown.



MORRISON BROS. CO.

570 E. 7th Street, P.O. Box 238 | Dubuque, IA 52004-0238
t. 563.583.5701 | 800.553.4840 | f. 563.583.5028

www.morbros.com

878 X
Flange

Series

Zero Differential 2 Way Normally Closed Petroleum Solenoid Valves

3/4" to 3" Class 150 Flange Connections



Main Characteristics

BULK LOADING METER

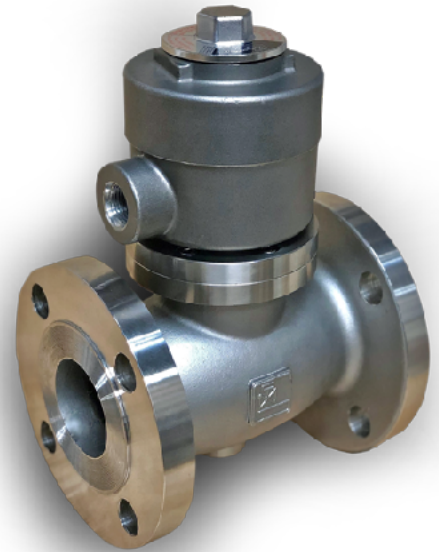
The 878X Series is a **Heavy Duty** two way normally closed, one directional flow, **direct lift solenoid valve** with **Class 150 Flange Connections**.

The valve opens when energized such as when a dispenser or pump is switched on. It does not need pressure to operate, the valve fully opens with zero pressure on the line. Ideal for **anti-siphon control on Aboveground Storage Tanks** applications. The piston assembly makes it possible to have high flow compared to lower flow diaphragm valves.

Compatible for use with a number of fluids, like **fuel, diesel, gasoline, Jet Fuel, bio-fuels, ethanol, methanol, oil, gasoil**, and any other petroleum derivatives.

Features

- Zero Differential - Direct Lift
- Industrial Grade Piston/Disc with Viton Seats
- Investment Cast Stainless Steel 316 or Bronze Body
- Higher Flow than Diaphragm Valves
- Longer service life than Diaphragm Valves
- Explosion Proof Housing meets UL, CSA and ATEX directives
- Minimum Ambient Temperature -42F
- Class 150# Flange Connections
- Internal pressure relief to help absorb thermal expansion in the fuel supply or transfer line.



Flange Valve Specifications

Pipe Size (ins.)	Bronze Valve Part Number	Stainless Steel Valve Part Number	Orifice Size (mm)	Cv Flow Factor	Operating Pressure Differential (psi)		Max Fluid Temp. (F)	Watt Rating / Insulation	
					Min.	Max.		AC	DC
3/4"	2CF-06XXRVZ-878X	2CF-06XXSVZ-878X	19	7	0	100	180	30/H	48/H
1"	2CF-08XXRVZ-878X	2CF-08XXSVZ-878X	25	12	0	100	180	30/H	48/H
1 1/2"	2CF-12XXRVZ-878X	2CF-12XXSVZ-878X	38	19	0	100	180	30/H	48/H
2"	2CF-16XXRVZ-878X	2CF-16XXSVZ-878X	38	27	0	100	180	30/H	48/H
3"	2CF-24XXRVZ-878X	2CF-24XXSVZ-878X	76	91	0	45	180	48/H	

Standard Voltage:

24, 120, 208, 240 and 480 volts AC60Hz or 110 and 220 AC50Hz

12, 24, 48, 110 volts DC (3" DC not available)

Must be specified when ordering. Add voltage to the end of the Catalog Number. For example: 2CF-16XXRVZ-878X-120/60

Current Draw for frequently used voltages (amps):

Volt/Hz	120/60	208/60	240/60	220/50 240/50	12V/DC	24/DC
Holding	0.66	0.38	0.33	0.31/0.28	4.0	2.0
Inrush	2.23	1.28	1.11	1.09/1.0	4.0	2.0

Table is for 3/4" to 2" valves (3" Valves draw approx. 60% more amps)



www.ranchovalves.com | sales@ranchovalves.com

Rancho Factory, Inc. - 135 Aviation Way #4 - Watsonville, CA 95076

Tel.: 831-536-5313

878XFlangev1_4

878 X

Series

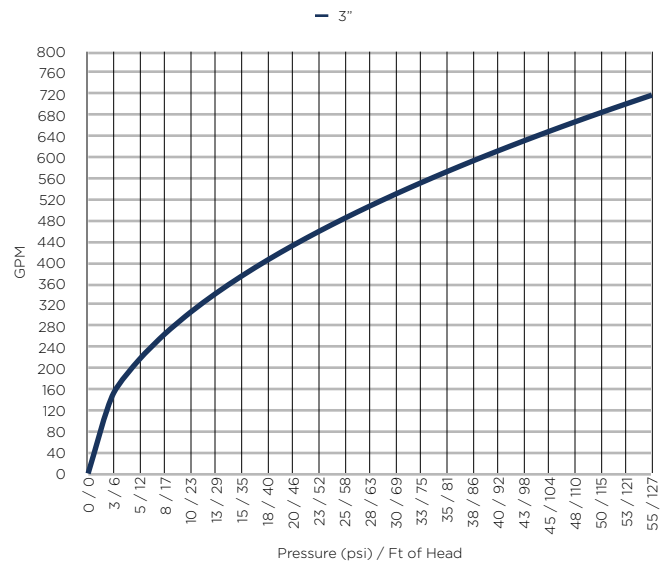
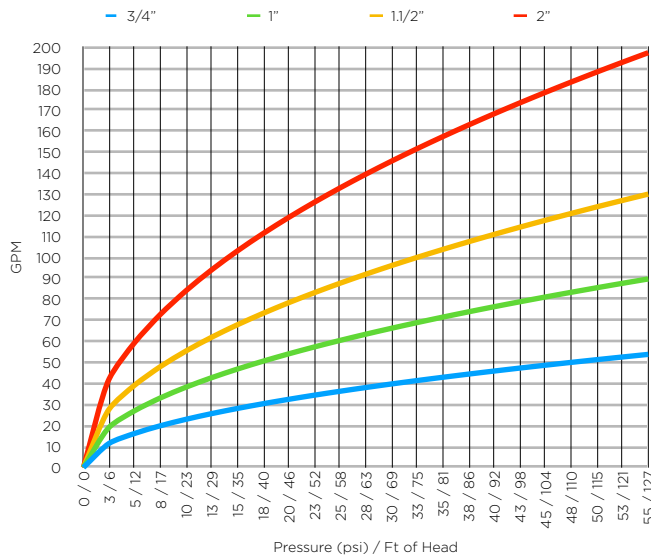
Zero Differential 2 Way Normally Closed

Petroleum Solenoid Valves

3/4" to 3" NPT Threaded Connections



Flow Chart



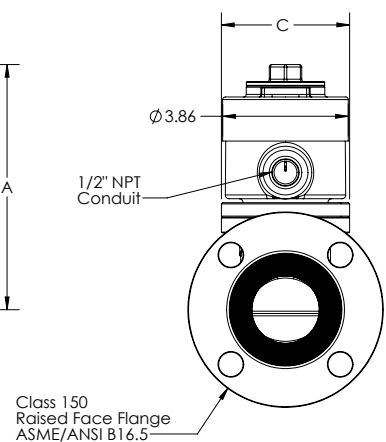
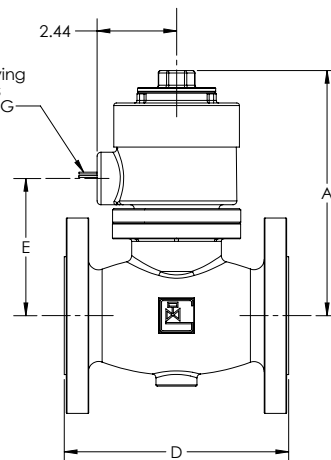
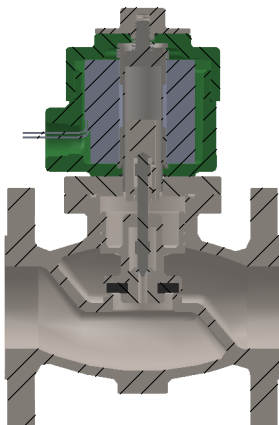
Wetted Parts

Part	Stainless Steel Valve	Bronze Valve
Body	Stainless Steel 316	Brass
Piston	Stainless Steel 316	Brass (*)
Seat	FKM	FKM
Seals	FKM	FKM
Core Tube	SS 316L	SS 316L
Core	SS 430	SS 430

(*) 3" Aluminum

Valve Dimensions (in.)

Pipe Size	3/4"	1"	1 1/2"	2"	3"
(A) Height	6.39	6.81	7.53	7.53	9.29
(C) Width	3.00	3.54	3.94	3.94	6.42
(D) Face to Face	5.75	5.87	6.89	6.89	8.66
(E) Center to Center	3.12	3.27	4.21	4.21	5.98
Flying Leads	18"	18"	18"	18"	18"



Important Installation Instructions

A strainer or filter (100 microns) should always be installed as close as possible to the inlet of the solenoid valve.

Valve must be mounted on a horizontal pipe with coil vertical and upright.


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Rancho Factory, Inc. - 135 Aviation Way #4 - Watsonville, CA 95076

Tel.: 831-536-5313

878XFlangev1_4



ST-15

Single Point Overfill Prevention Controller

Featuring Dynacheck® – Automatic and Continuous Self-Checking Circuitry



ST-15

DESCRIPTION

The Scully single point overfill prevention controllers feature two-wire optic or thermistor sensing. They are mounted at a loading rack or fill station for connection to a single compartment tank vehicle.

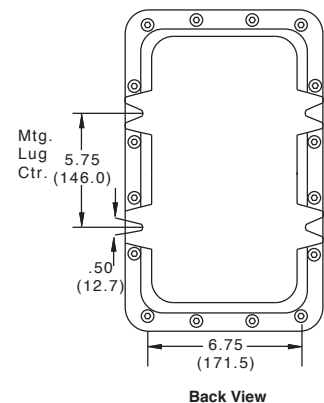
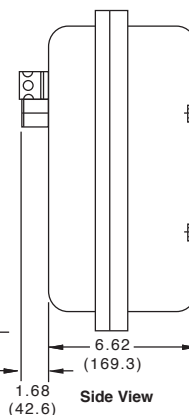
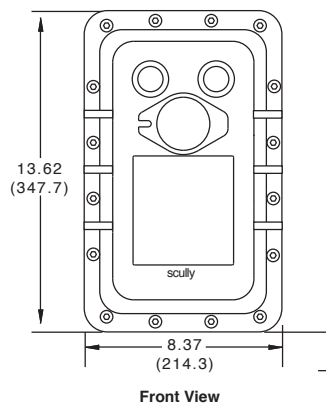
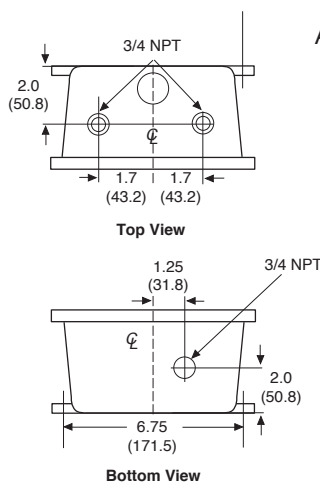
The ST-15 provides the vehicle with an adequate static ground path to the rack provided the vehicle overfill equipment is wired and maintained to factory specifications. For additional ground proving options, the system works in conjunction with the Scully Groundhog Self-Proving Ground Verification System.

FEATURES AND BENEFITS

- Maximum safety with Dynacheck® automatic and continuous self-checking circuitry.
- Will not permit loading under any fault or wet sensor conditions.
- Signals for automatic shut-off of product flow within a half-second of detecting an overfill condition.
- Ideal overfill prevention for refuelers, rail tank cars, tank trucks, chemical trailers and other one compartment vehicles.
- 30 years of proven, dependable performance.
- Easy connection to vehicles with versatile high impact plug and cable units.
- Approved by Factory Mutual



Technical Diagram of Model ST-15 ELK
All Dimensions in Inches (Millimeters in Parenthesis)



60629 Rev C

Single Point Overfill Prevention Controller

TECHNICAL SPECIFICATIONS

FM & CSA Approved Versions of:

Thermistor Sensors
SP-BL, SP-BLU, SP-BLH
Two-wire Optic Sensors
SP-TO, SP-TOM, SP-IO, SP-IR,
SP-TO(SS), SP-TO(SS)HP

Enclosures:

Explosion-proof, weathertight.
Corrosion inhibiting epoxy paint optional.

Indicator Lamps:

Red = Power On/Non-Permit
Green = Permit

Approvals:

XP-AIS / I / 1 / CD / T6 Ta = -40°C
to 60°C; Entity – 61654;

XP-AIS/ I / 1 / IIB/ T6 Ta = -40°C
to 60°C; Entity 61654

Class I Zone 1 Group IIB

Turn on response time: 6 – 30 seconds (typical) for thermistors. Two-wire optics turn on instantly.

Shutdown

Response Time: 0.5 seconds maximum

Power Requirements:

105 - 130 VAC, 50-60 Hz, 20 watts maximum, 210 - 250 VAC nominal, 50-60 Hz, 20 Watts maximum

Connections:

Provided by internal terminal strips

Output Control:

One normally open volt free contact, rated 250 VAC, 5A resistive, energized when the sensor is dry.

Output Control Fuse:

Internal 5 Amperes.

Size:

Refer to Diagram for EL & ELK models.

Weight:

28 lbs. (12.7 kg) EL & ELK Units

NOTE: The Scully ST-15 is an intrinsically safe system. For maximum safety, it should be used only in conjunction with sensors manufactured by Scully not to jeopardize the conditions of the approvals.



ORDERING INFORMATION

Model	Description	Part Number
ST-15-115-EL	Single Point Controller with Explosion-proof Housing and Indicator Lamps, 115VAC	07528
ST-15-115-ELK	Single Point Controller with Explosion-proof Housing, Indicator Lamps, Lockable Bypass Switch, 115VAC	07677
ST-15-240-EL	Single Point Controller with Explosion-proof Housing and Indicator Lamps, 240VAC	07640
ST-15-240-ELK	Single Point Controller with Explosion-proof Housing, Indicator Lamps, Lockable Bypass Switch, 240VAC	07547

REPLACEMENT PARTS

115 VAC	Control circuit module only, ST-15-115H	08756
240 VAC	Control circuit module only, ST-15-240H	08656

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Specifications are subject to change without notice.

60629 Rev C
October 2013



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Plug & Cable Assembly w/Sculcon Series Junction Box

For Safe and Reliable Rack to Vehicle Connection

Featuring Dynacheck® – Automatic and Continuous Self-Checking Circuitry



*Sculcon Junction Box
with Cable Assembly*



Plug and Cable Assemblies

DESCRIPTION

Scully plugs are made of heavy duty molded polyurethane with stainless steel contacts. The fuel resistant cables are available in 30' coiled or 20' straight styles. Scully plugs and cables are the product of years of industry experience and offer durable, efficient operation. They are designed for use only with the intrinsically safe output circuits of Scully's ST-35, ST-15 and Intellitrol®.

Scully Plugs and Cables are used to connect the Scully loading rack control monitor to the vehicle mounted socket. The plugs and cables are the pathway for the control unit/sensor signals which monitor the status of overfill prevention, electro-static grounding and vehicle identification during loading operations.

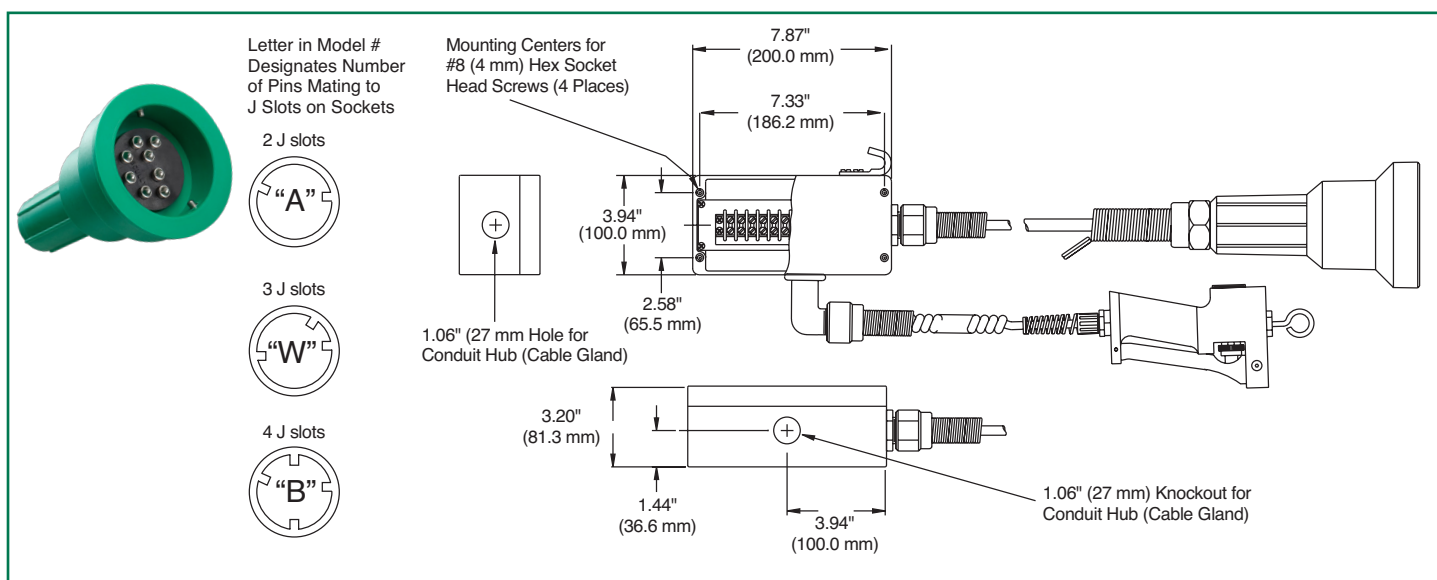
FEATURES AND BENEFITS

- Extremely rugged design which can withstand harsh environments and mishandling.
- Non-removable socket locator pins fitted directly into the plug housing.
- Permanent socket locator pins that won't loosen or back out.
- Internal cable retention clamp to prevent cable pull-out or twisting.
- Molded glass-reinforced, polycarbonate contact block with positive locator keyways for easy disassembly and/or reassembly.
- Molded arrow on plug housing for easy visual alignment with socket.
- Stainless steel electrical contact, spring loaded to insure proper contact with the truck socket pins.
- Virtually indestructible polyurethane plug shell, color coded to match Scully truck sockets.
- Compression strain relief spring prevents the cable from bending or crimping.
- Heavy-duty petroleum resistant cable with higher visibility and cold weather flexibility.



60614 Rev F

For Safe and Reliable Rack to Vehicle Connection



TECHNICAL SPECIFICATIONS

Environmental Temperature: -40°F to +140°F (-40°C to +60°C)
10 Conductor Cable: White- 16 Gauge
 All Other- 18 Gauge
 Straight- 20 feet (6m)
 Coiled- 30 feet (9m)

The cables working length is enclosed in a fuel-resistant jacket. The cable is oil and gas resistant. Other lengths are available upon request.

Materials:
 Plug Body: Polyurethane
 Insulator: Polycarbonate
 Contact Pins: Stainless Steel
 Junction Box: Aluminum

Approvals: These devices are part of an intrinsically safe system certified by FM.



ORDERING INFORMATION

<i>Sculcon Model</i>	<i>Applicable Controllers</i>	<i>Plug Style</i>	<i># of Pins/Slots in Mating Area</i>	<i>Plug and Coiled Cable</i>	<i>Plug and Straight Cable</i>	<i>Coiled Cable w/J.Box</i>	<i>Straight Cable w/J.Box</i>
SC-6A	Intellitrol, ST-15	Green	8 pins, 2 J slots ¹	21818	20830	08156	07582
SC-6A/D	Intellitrol, ST-15	Green	8 pins, 2 J slots	—	—	08248	—
SC-6W	Intellitrol, ST-35, ST-35C	Blue	6 pins, 3 J slots ²	21831	21764	08159	08139
SC-6W/D	Intellitrol, ST-35	Blue	6 pins, 3 J slots	—	—	08674	—
SC-6AO	Intellitrol, ST-35	Blue	6 pins, 2 J slots	21821	21820	08161	08160
SC-6OB	Intellitrol, ST-35	Blue	6 pins, 4 J slots	—	—	08689	—
SC-8A	Intellitrol	Green	10 pins, 2 J slots	31092	20831	08729	07581
SC-8BI	Intellitrol, ST-15	Green	10 pins, 4 J slots¹	31494	32679		
SC-6	Intellitrol, ST-35	SAE J560-metal		20403	31107	07628	08603

Sculcon Junction Box for General Purpose Part #32319

WOGA: Western States Petroleum Association; API: American Petroleum Institute. 1-API RP1004 Thermistor Standard, 2-API RP1004 WOGA Optic Standard.

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60614 Rev F
July 2016



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Model 323 & 323C Series

SPECIFICATION SHEET

The Morrison 323 Series Adaptors are designed for installation on aboveground and underground storage tanks to mate with vapor recovery couplers & elbows. This connection allows the fuel vapors to be returned to the tank truck during the fuel delivery operation. The 323SA model has a built in swivel. The 323B model is equipped to accept brake interlock devices which lock the transport brakes while connected.

The Morrison 323C Caps provide a lockable vapor tight cover which protects the adaptor from dirt and debris.



I.D. Number	Description	A	B	C	D	E	F	G	OAH	Weight
323---0100AA	Vapor Recovery Adaptor (4" Vapor, 3" Riser Thread)	3N	N/A	4"	B	A	N	N	5.44	3.34
323---0200 AA	Vapor Recovery Adaptor	4S	B	4"	B	A	N	N	5.88	4
323---0300 AA	Vapor Recovery Adaptor (Viton) (4" Vapor, 3" Riser Thread)	3S	B	4"	V	A	N	N	5.63	3.34
323---0300AAEVR	Vapor Recovery Adaptor (4" Vapor, 3" Riser Thread) EVR	3S	B	4"	V	A	Y	N	5.48	3.5
323---0400 AA	Vapor Recovery Adaptor (Viton)	4S	B	4"	V	A	N	N	5.94	4
323---0400AAEVR	Vapor Recovery Adaptor (4" Vapor, 4" Riser Thread) EVR	4S	B	4"	V	A	Y	N	5.94	4.4
323BSP0100 AA	Vapor Recovery Adaptor w/Brake Int. - Alum (Viton) BSP Threads	4S	N/A	4"	V	A	N	N	5.88	3.34
323BSP0200 AA	Vapor Recovery Adaptor w/Brake Int. - Alum (Viton) BSP Threads	4S	N/A	4"	V	A	N	N	5.88	4
323B--0050 AA	Vapor Recovery Adaptor w/Brake Interlock - Aluminum	3N	N/A	4"	B	A	N	Y	5.88	4
323B--0100 AA	Vapor Recovery Adaptor w/Brake Interlock - Aluminum	4S	B	4"	B	A	N	Y	5.88	4
323B--0200 AA	Vapor Recovery Adaptor w/Brake Interlock - Aluminum (Viton)	4S	B	4"	V	A	N	Y	5.88	4
323B--0300 AA	Vapor Recovery Adaptor-w/o Internal Poppet Assy - Aluminum	4S	B	4"		A	N	Y	5.88	4
323SA-0200 AA	Vapor Recovery Adaptor - Swivel Type, Brass	4S	B	4"	V	B	N	N	5.63	10.9
323C--0100 AC	Vapor Recovery Cap		B	4"		AE	N			1.75
323C--0100ACEVR	Vapor Recovery Cap - CARB EVR Approved		B	4"		AE	Y			1.8

SPECIFICATION OPTIONS:

A—Threads: 3" NPT (3N); 3" NPS (3S); 4" NPT (4N); 4" NPS (4S); 3" BSP (3B)
 B—Gasket: Buna (B); Viton (V)
 C—Adaptor Size
 D—Disc: Buna (B); Viton (V)
 E—Body: Hard coated aluminum (A); Brass (B); Epoxy Coated Aluminum (AE)

F—EVR: Yes (Y); No (N)
 G—Brake: Yes (Y); No (N)
 OAH—Overall Height (in inches)
 WT.—Shipping Weight (in pounds)



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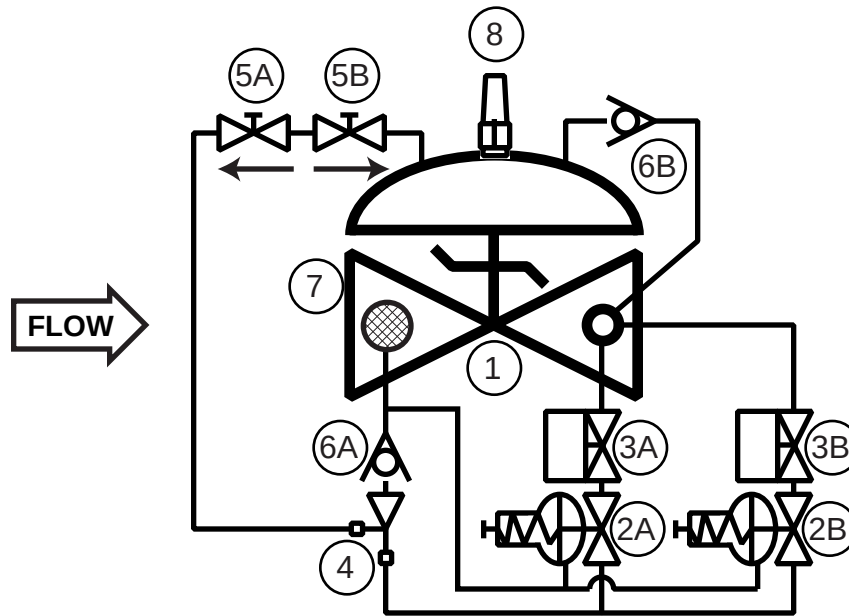
www.morbros.com

MODEL 108-34X2

SDJ 7-30-07

2", 50 PSI BACKPRESSURE
CONTROL VALVE, MANUAL
MODEL: 108G034-0201282P

TRUCK UNLOADING VALVE



ITEM	PART NO.	QTY	DESCRIPTION
1	65	1	BASIC VALVE ASSEMBLY
2	1330	2	PRESSURE RELIEF PILOT
3	451	2	TWO-WAY SOLENOID PILOT, N.C.
4	126	1	EJECTOR
5	141-3	2	FLOW CONTROL VALVE (Opening Speed Control)
6	141-1	2	CHECK VALVE
7	123	1	INLINE STRAINER
8	155L	1	VISUAL INDICATOR

GENERAL SPECIFICATIONS

Model 108-4

Pressure Relief/Pressure Sustaining & Solenoid Shut-off Valve

1.1 General

The pressure relief/pressure sustaining valve shall function to prevent main line pressure from exceeding a predetermined maximum and prevent the upstream pressure from falling below a predetermined minimum. The valve shall be equipped with a two-way solenoid valve that will allow the valve to open when <energized, deenergized>. The pressure relief/pressure sustaining valve shall be a <size> Model 108-4, <globe pattern, angle pattern>, with <150# flanged, 300# flanged, threaded, grooved> end connections, as manufactured by OCV Control Valves, Tulsa, Oklahoma, USA.

1.2 Design

The pressure relief/pressure sustaining valve shall be a single-seated, line pressure operated, diaphragm actuated, pilot controlled globe valve. The valve shall seal by means of a corrosion-resistant seat and a resilient, rectangular seat disc. These, and other parts, shall be replaceable without removing the valve from the line. The stem of the main valve shall be guided top and bottom by integral bushings. Alignment of the body, bonnet and diaphragm assembly shall be by precision dowel pins. The diaphragm shall not be used as a seating surface, nor shall the pistons be used as an operating means. The pilot system shall be furnished complete and installed on the main valve. It shall include a closing speed control, Y-strainer, solenoid valve and isolation ball valves. The pressure relief/pressure sustaining valve shall be operationally and hydrostatically tested prior to shipment.

1.3 Materials of Construction

The main valve body and bonnet shall be ductile iron per ASTM A536, Grade 65-45-12. End connections shall be <ANSI B16.42 Class 150# flange > <ANSI B16.42 Class 300# flange, > <ANSI B1.20.1 threaded > <grooved ends >. All ferrous surfaces shall be coated with a minimum of 4 mils of an NSF-61 approved epoxy. The main valve seat ring shall be bronze. Elastomers (diaphragms, resilient seats and O-rings) shall be Buna-N. The control pilot shall be bronze. The closing speed control and isolation ball valves shall be brass, and control line tubing shall be copper. The solenoid shall have a brass body, weatherproof enclosure per NEMA 4, and be suitable for operation on <voltage>.

1.4 Operating Conditions

The pressure relief/pressure sustaining valve shall be suitable for controlling the inlet pressure to a maximum/minimum of <X> psi at flow rates ranging from <X to X> gpm.



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ISSUE DATE
10/28/2010

Modular, Multi-Tank Gauging System w/Color Touch Screen Suitable for Indoor and Outdoor Applications, EPA-Compliant In-Tank and Secondary Containment Leak Detection

ONE CONSOLE FOR BOTH TANKS



Product Description

The TMS4000 Tank Management System is the latest generation of the TMS family, and the first touchscreen-based system in the industry available for both indoor and outdoor use without requiring a secondary enclosure, supplemental heating or cooling. The large, 10.4" color, SVGA display provides an extremely easy-to-use graphical interface with real-time tank measurement data presented in three distinct formats; easy-to-read meters, detailed spreadsheet and quick-view bar graphs. Each format is user-configurable, and the spreadsheet display prioritizes active or alarming tanks to the top of the window. Standard communications interfaces include Ethernet TCP/IP (e-mail/SMS alerts included), USB host and client, RS232 (2 standard, expandable to 6) and RS485. Single, dual or quad ModBus, 4-20ma and other industrial protocols are supported. Web-ready for PCO CloudView access via Ethernet or internal cellular modem. Hardcopy reports are provided via optional internal thermal or impact printer in portrait and 116-character landscape modes, Ethernet-connected printer, or PDF to flash drive via front-panel weatherproof USB port. Extensive system security settings allow the administrator to assign users with widely varying degrees of accessibility. Localization features include operation in English, Spanish or French, with Metric(LT/mm) or English(Gal/in) units of measure, and an auto-switching universal power supply that will operate with any line voltage between 95-250VAC, 50/60Hz.

Console

- Dimensions (W x H x D): 14.3" x 11.8" x 7.9" (363 mm x 300 mm x 200 mm)
- Weight: 21 lb (9.6 kg) (4-Tank w/ Printer), 23.5 lb (10.7 kg) (12-Tank w/ Printer)
- Operating Temperature: -22 °F to 160 °F (-30 °C to 70 °C) w/o Printer (Consult factory for applications below -22 °F)
-5 °F to 140 °F (-20 °C to 60 °C) w/ Printer
- Humidity: 95% Non-condensing
- Enclosure Rating: Locking NEMA 12 (IP52) or NEMA 4X (IP56) (304 SS)
- Enclosure Mount Options: Wall-Mount (Standard) or Panel-Mount (Optional)
- Power Requirements: 115/230 VAC ±15% Autoswitching, 50-60 Hz, 30 W Max.
10-60 VDC Optional
- Memory: Configuration/Setup Data – SD Card, 50 year data retention, no batteries
Log Reports – Removable SD Card, 50 year data retention, no batteries
Real-Time Clock – Lithium Battery-Backed
- Audible Alarm: 85 db

- Display: 10.4" (264 mm) Diagonal SVGA LCD w/Integral 7H Hardness Touch Panel – Glove Touchable
Dedicated High Brightness POWER, NORMAL, ALARM LEDS, Visible from 75' (22.9 m)
- Communications: Two (2) RS-232 Included Standard, RJ-13 Jack, Optional Expansion to six(6), four of which are field-selectable for RS232 or RS485
Single RS485 Included Standard, RJ-13 Jack (For Pneumercator Peripherals)
Ethernet TCP/IP Port Included Standard
USB Host and Client Included Standard
Internal, Secured Cellular or Landline Modem, Single/Dual/Quad-Channel ModBus Optional
- Probe/Sensor Capacities: Probe/Sensor Card Options (3 slots available) All Sensor Inputs Supervised-Wiring-Ready
4 Probe/8 Sensor, 16 Probe, 16 Sensor (Max 48 Tanks)
- I/O, Non-Haz.: Expansion Options (2 slots available):
4 Relays, 1 Form C, Rated 10 A@120 VAC, 6 A@240 VAC, w/ 4 Opto-Isolated Inputs
8 Relays, 1 Form A, Rated 5 A@120 VAC, 5 A@240 VAC, w/ 8 Opto-Isolated Inputs
16 Relays, 1 Form A, Rated 5 A@120 VAC, 5 A@240 VAC
32 Relays, 1 Form A, Rated 1 A@24 VDC
6 or 12-Ch. Programmable Analog Outputs: 0-1 mA, 0-20 mA, 0-24 mA, 4-20 mA, 0-5 VDC, 1-5 VDC

Probes

- Technology: Magnetostrictive, Dual Float, w/ reflection resolution doubling
- Accuracy (Minimum): MP45xS: Product Level: 0.0005" (0.013 mm)
Water Level: 0.001" (0.025 mm)
Temperature: 0.001 °F (0.0006 °C)
MP46x: Product Level: 0.01" (0.25 mm)
Water Level: 0.01" (0.25 mm)
Temperature: 0.001 °F (0.0006 °C)
- Materials: Shaft: 316 SS or PVDF
Floats: 316 SS, Buna-N, Urethane, or PVDF
- Mounting: In-Tank Leak Testing: 4" (102mm) diameter riser
Inventory Only: 2" (51 mm) minimum riser or direct bushing / flange mount
- Temperature Sensing: 5 Thermistors in shaft, 1 in probe head
- Location Approval: UL Class I, Div 1, Groups C and D; cUL Class I, Zone 0, Group IIB
- Operating Temperature: -40 °F to 175 °F (-40 °C to 80 °C)
- Operating Pressure: 150 PSIG (1034 kPa) 316SS, 50 PSIG (345 kPa) PVDF
- Field Wiring: 22AWG, 2-Conductor twisted pair w/ shield
Belden 8441, 8761, Alpha 1736C or equiv., max. length 3000' to 4600' (914 m to 1402 m)
- Models: MP45xS Series rigid SS max. length 24' (7.3 m)
MP46xS Series flex. PVDF max. length 70' (21.3 m)

AV-GAS FLOAT KIT

MP450S-124-21

Sensors

- ES825-200F Electronic, Discriminating - Containment, Manway and Piping Sumps, Dispenser Pan, Dry Annular, Includes Fault Detection Feature as Standard
- ES825-100F Electronic, Non-Discriminating - Containment, Manway and Piping Sumps, Dispenser Pan, Dry Annular, Includes Fault Detection Feature as Standard
- LLP-203 3GPH Catastrophic Line Leak Detector
- LS600LD Float, Containment, Manway and Piping Sumps, Dispenser Pan
- LS600xx Multi-Float, High / Low Level and Pump Control
- RSU800 Float, Wet Annular / Reservoir
- LS610 Float, Dry Annular
- HS100D Polymer / Float – Wet Well, 10' to 20' (3.1 m to 6.1 m) depth
- HS100ND Polymer – Dry Containment, 1' to 45' (0.3 m to 13.7 m) length

INTERSTITIAL SENSOR

WILL ALSO INCLUDE REMOTE AUDIBLE/VISIBLE ALARM

Most sensors are available with Fault-Detect Supervised sensor and wiring option. Add "F" Suffix to Model Number

Remote Displays

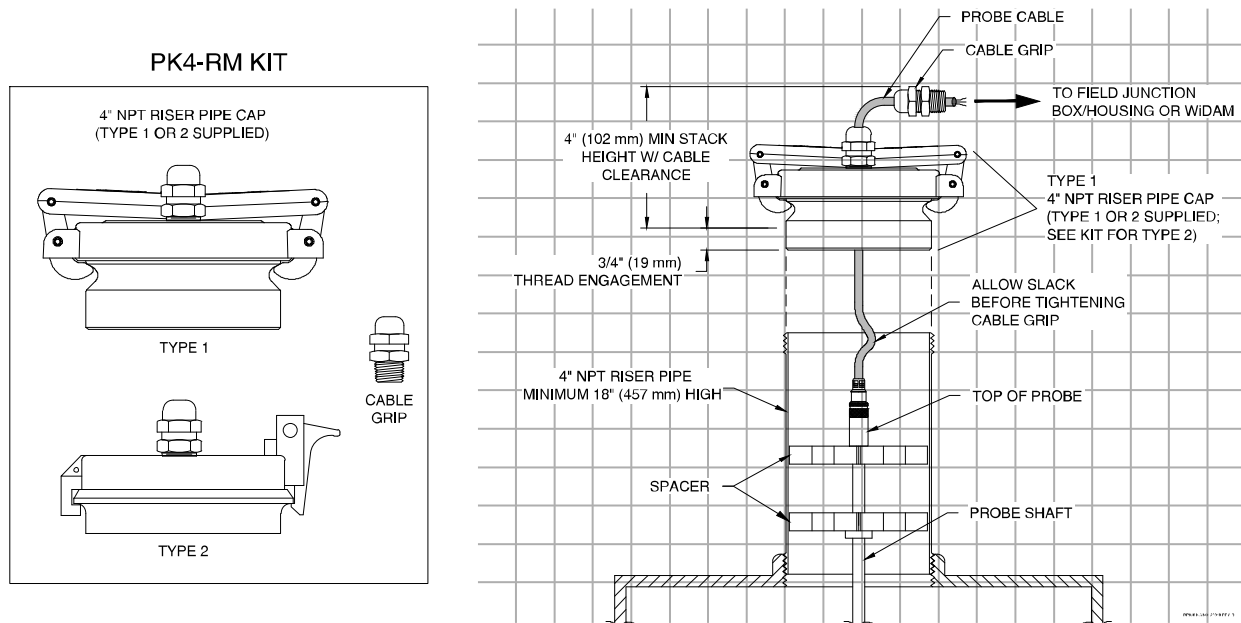
- ETD1000 Addressable (up to 16), Multi-Drop, Remote Electronic Tank Display Panel
 - RA400 Addressable (up to 16), Multi-Drop, Programmable Remote Audible/Visual Alarm Panel
 - ETD1000W Wireless Remote Electronic Tank Display Panel*
 - RA400W Wireless Programmable Remote Audible/Visual Alarm Panel*
- *Note: MPX200 Master Peripheral Expansion Module required.

Certifications / Approvals

- UL/cUL Approved, File #E139464
- Third-party approved, NWGLDE-listed

Note: Specifications subject to change without notice. 12-16-2020

4" (102 mm) Riser Mounting Kit with Quick-Release Cap for MP45xS/MP55xS Magnetostrictive Tank Gauging Probes



Product Description

The PK4-RM Riser Mount Probe Kit provides a “soft-mount” method of installation by allowing the probe to rest on the tank bottom and be stabilized within the tank riser without attachment. This method may be used for MP45xS/MP55xS series probe lengths up to 15 feet (4.6 m), providing easy installation and servicing by simply removing quick-release cap and lowering or raising probe by its cable. The cap accepts a padlock to prevent unauthorized access. The standard kit includes a 4” (102 mm) cap assembly with integral cable compression fitting, brass ferrule quick-release adapter, and cable compression fitting for field junction box.

IMPORTANT: Use PK2-DM Direct Mount Kit for probe lengths exceeding 15 feet (4.6 m). The riser mount should **not** be used in chemical or high heat applications without consulting factory.

Applications

- Underground Storage Tanks
- Vertical Storage Tanks up to 15 Feet (4.6 m)

Specifications

- **Materials:** Cap: Aluminum
Ferrule: Brass w/Buna-N gasket
Cable Compression Fitting: Nylon Body w/TPE Compression Rings
- **Mount:** 4” NPT riser pipe, minimum 18” (457 mm) height.
- **Operating Pressure:** less than 1 PSIG (7 kPa)

Model Numbers

- **PK4-RM** Aluminum Cap, Brass Ferrule Adapter, Nylon Cable Compression Fitting

Note: Specifications subject to change without notice. 01-12-2018

Rigid Magnetostrictive Probe, EPA Compliant*

MODEL: MP450S-124-21



Product Description

The MP450S Level Gauging Probe utilizes proven Magnetostrictive technology for accuracy and reliability. When used in conjunction with the TMS2000/3000/4000, it provides the ability to perform EPA compliant in-tank leak tests in underground storage tanks. The probe is available in lengths up to eighteen feet.

Applications

- Above and Below Ground Storage Tanks
- Bulk Storage Tanks
- Generator Sub Base Tanks
- Oil / Water Separators (See MP452S Series spec)
- All Petroleum Products
- Most Chemical Solvents

Specifications

- Technology: Magnetostrictive, Dual Float, w/ reflection resolution doubling
- Accuracy (Minimum):
 - Product Level: 0.0005" (0.013 mm)
 - Water Level: 0.001" (0.025 mm)
 - Temperature: 0.001 °F (0.0006 °C)
- Materials:
 - Shaft: 316 SS
 - Floats: Buna-N (Optional 316 SS or Urethane)
- Riser Mount: Minimum 2" (51 mm) dia. riser, 4" (102 mm) dia. riser required for in-tank leak
- Direct Mount: Minimum 2" (51 mm) opening with bushing or flange mount
- Probe Lengths: 1' – 18' (305 mm – 5486 mm)
- Temperature Sensing: 6 Thermistors; 5 in shaft, 1 in probe head
- Location Approval: UL Class I, Div 1, Groups C and D; cUL Class I, Zone 0, Group IIB
- Operating Temperature: -40 °F to 175 °F (-40 °C to 80 °C)
- Operating Pressure: 150 PSIG (1034 kPa)
- Field Wiring: 22AWG, 2-Conductor twisted pair w/ shield
Belden 8441, 8761, Alpha 1736C or equiv., maximum length 3000' to 4600' (914 m to 1402 m)
- Compatible With: TMS2000, TMS3000, **TMS4000**

Installation

Probes 15' (4.6 m) or less in length can be installed into a vertical riser pipe with the probe foot contacting the tank bottom, or direct-mounted at the tank top via a 3/4" NPT compression fitting kit. Probes greater than 15' (4.6 m) must be direct-mounted.

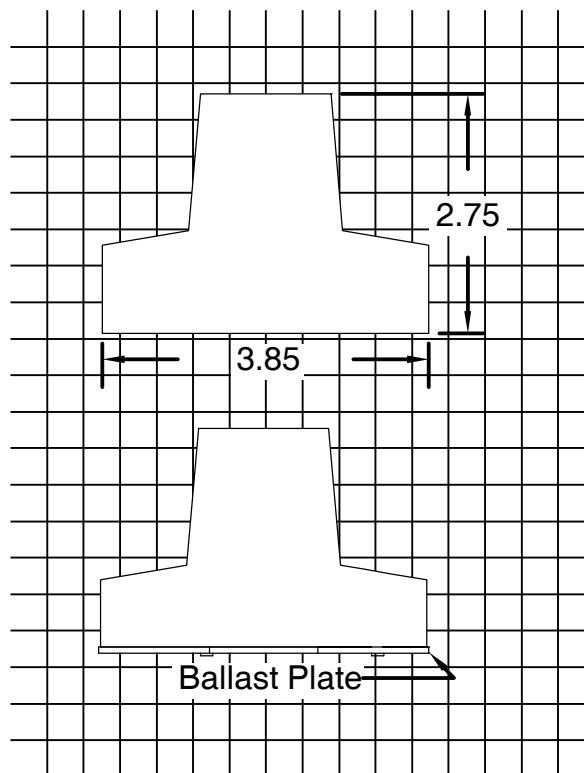
Certifications/Approvals

- UL/cUL Approved*, File #E139464
- Third-Party Approved, EPA-Compliant for In-Tank Leak Testing:*

* When used in conjunction with the TMS2000/3000/4000 series controllers

Note: Specifications subject to change without notice. 10-07-2022

4" Buna Nitrile Product and Interface Floats for all MP-series Magnetostrictive Liquid Level Probes



Product Description

The B4-series 4" Buna Nitrile floats are designed for use with all Pneumercator MP-series magnetostrictive liquid level probes, and are specially formulated to provide the highest accuracy and repeatability critical for volumetric in-tank leak detection requirements. This series is offered as a dual-float kit for measuring both product and bottom water levels, but is also available for product-only applications. The closed-cell construction of the B4-series provides compatibility with all ethanol-blended gasolines, and the low specific gravity combined with a large float base provides enhanced early water detection compared with stainless steel floats.

Applications

- In-Tank Volumetric Leak Testing (Also requires riser-mounted, 5-temperature sensor mag probe)
- Enhanced bottom water detection
- High accuracy and repeatability

Specifications

- Materials of Construction: Product Float - Closed-Cell Buna Nitrile Foam
Interface Float - Closed-Cell Buna Nitrile Foam, Stainless Steel Ballast Plate
- Chemical Compatibility: Most automotive and aviation gasolines, including ethanol blends, most unheated kerosene-based fuels
- Minimum Tank Opening: 4" (102 mm) diameter
- Operating Temperature: -40 °F to 140 °F (-40 °C to 60 °C)
- Operating Pressure: Unpressurized tanks only.

Ordering Information

- B4K1: Gasolines and Water Floats
- B4K2: Diesel, Kerosene, #2-#4 Heating Oil and Water Floats
- B4X: Product Float only



Pneumercator Company, Inc.
1785 Expressway Drive North
Hauppauge, New York 11788

70012 - B4Kx Float Kit Spec Sheet - 9-29-2023
Note: Specifications subject to change without notice.

Tel: (631) 293-8450
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<http://www.pneumercator.com>

MultiDisplay™



NEW! High Visibility Display for Self-Service Fueling

Using integrated circuit technology with no moving parts, this reliable display can be seen from long distances.

Allows customers to monitor their fueling transaction from their aircraft or boat without having to continually walk to fueling equipment!

Features:

- Rugged Aluminum Case with Powder Coated Finish
- Overall Dimensions: 20" High, 16" Wide, 4" Deep
- Temperature: - 30°C to 70°C
- Solid State 3" Bright Red LED Digits - Visible from up to 100 Feet Away
- Flexible Mounting Arrangements - Communicates up to 2000 Feet Away from Self-Service Terminal
- Will Display Readouts for any Active Dispenser
- Multiple Dispensers Supported (Each Display Supports One Dispenser)
- Modular Design for Easy Installation and Maintenance
- Complete Installation Instructions