LIQUIDPULSE

connect@liquidpulse.com
www.liquidpulse.com

SUBMITTAL

Date	
Quote #:	
Product Name:	SS Glycol Feeder
Customer:	

(1) Model D-1/3MT-S3-1/3SS-GLY, engineered packaged duplex glycol make-up system, consisting of:

Condition Point: 5 gpm @ 200' TDH

(2) MTH Model T-31H, regenerative turbine pump, stainless steel, graphite loaded silicon carbide mechanical seal, pump, close-coupled to a 1/3 hp, 3600 rpm, 120/1/60, ODP energy efficiency motor (EISA Chart 12-11)

Condition Point: 5 gpm @ 200' TDH

(1) 55 gallon polyethylene glycol tank with cover

(2) ¾" Stainless steel model Flomatic 100MSS

(4) ¾" Watts model S-FBV-1 stainless steel ball valves

(1) ¾" 25 micron filter and 5" housing

(1) ¾" Watts pressure reducing valve SS263AP

(1) 1/2" model SSRVN05-100 stainless steel relief valve

(1) 2-1/2" diameter glycerin filled pressure gauge with gauge cock

(1) UL/C-UL Listed, NEMA 4X, power and control panel with:
(•) UL 508 Label
-120VAC / 1ph / 60Hz power input; 24VDC control power supply
-Programmable start relay
-Pump run indicator
-Pump run alternator
-Pump failover timer
-Hand-off-auto selector
-Low level alarm with time delay relay and float switch
-Loss of power monitoring relay
(1) FVNR magnetic starter with 3-leg overload protection

(1 set) 3/4" Stainless steel tubing and fittings

(1) Aluminum extrusion frame with all necessary pipe supports, tubing and wiring for complete package.

Revision list		
Revision	Description	Date
1	For Record Submittal	April 4, 2025
2	Updated features and construction materials	Oct 17, 2025

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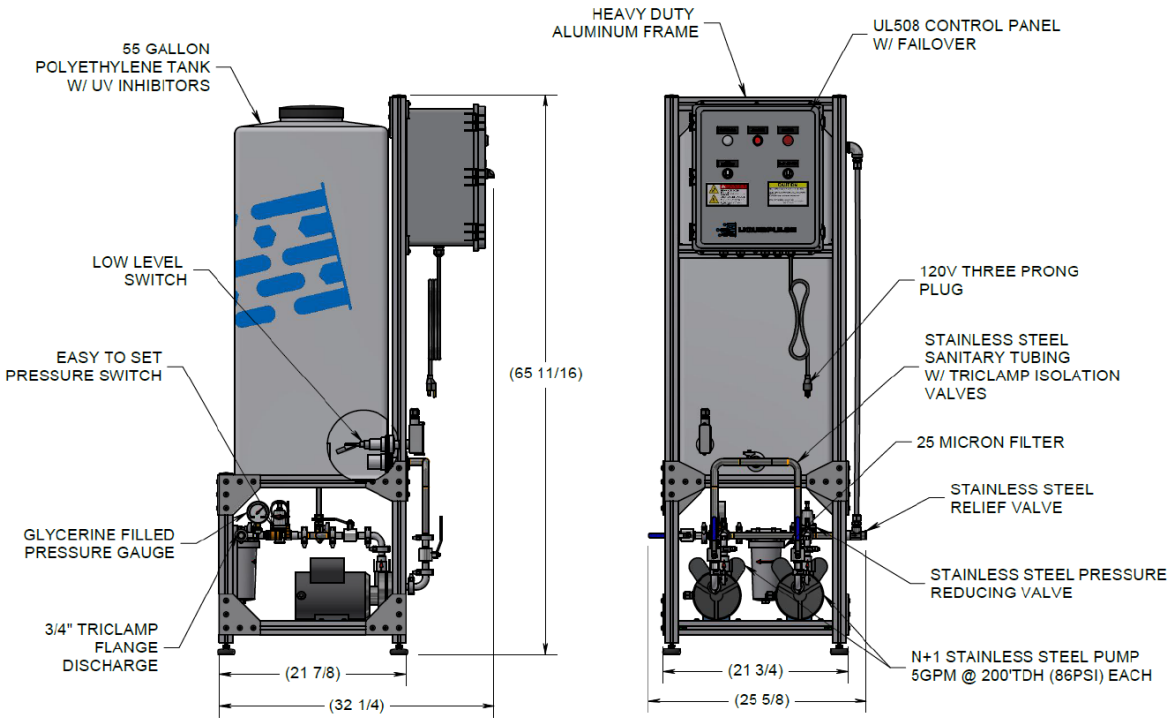
General Overview



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Sequence of operation

Auto Mode

1. **Low-Pressure Detection**
   When the system pressure decreases below the pressure switch “start” setpoint, the controller initiates a pump start command and activates the proof-of-run timer.
2. **Pump Operation**
   The selected pump operates continuously under one of the following conditions:
   - Pressure Recovery: The system pressure rises to or above the pressure switch “stop/reset” setpoint, indicating demand has been satisfied.
   - Proof-of-Run Timeout: The proof-of-run timer reaches its preset duration (typically 10 minutes) without achieving the reset pressure. This condition infers pump failure or insufficient pressure recovery.
   - Low-Level Condition: The low-level switch indicates the supply tank is empty, prompting immediate pump shutdown to prevent dry-running. The alarm will automatically reset when the tank is refilled.
3. **Failure Handling and Alarm Logic**
   If the proof-of-run timer expires before the pressure reset condition is met:
   - The controller will trigger the alarm indicator (light) and energize the alarm dry contacts for remote notification.
   - The current pump will be disabled, and the controller will automatically start the next available pump in the sequence to maintain system operation.

Hand Mode

1. **Pump Lead/Lag Rotation**
   Upon receiving a start command, the controller will energize the pump that was not the last to operate, thereby alternating lead and lag duty between pumps to balance runtime and wear.
2. **Motor Protection Features**
   Each pump motor is equipped with integral overload and thermal protection devices. These safeguards automatically interrupt power to the motor under excessive current or temperature conditions.
3. **Low-Flow Cycling Behavior**
   During periods of no or minimal system flow, pressure fluctuations may cause the pump to cycle on and off intermittently. If prolonged low-flow conditions lead to excessive motor temperature, the thermal protection device will trip, preventing motor damage until the unit cools and the thermal safety automatically resets.

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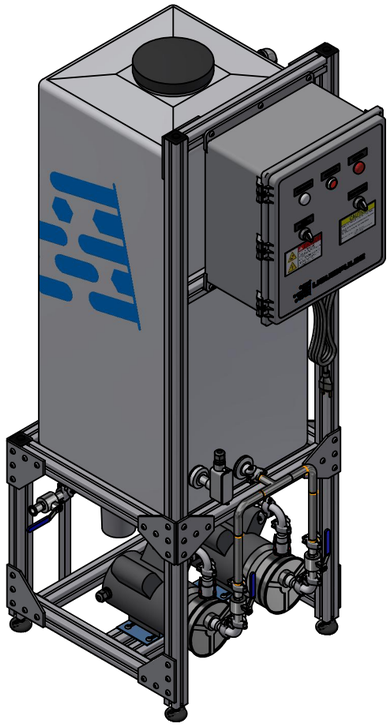
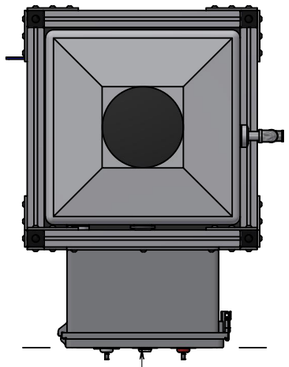
Specifications

Category	Description
Model	D-1/3MT-S3-1/3SS-GLY
Input power	120V/1ϕ/60Hz
Pump performance	5 gpm @ 200’ TDH
Fluid	PG25
Process connections	¾” Tri-clamp
Communication	Alarm dry contacts
Noise Level	< 60 dB
Temperature ratings	(Operational) -22°F - 140°F, 85% Relative humidity (Storage) -22°F - 140°F, 90% Relative humidity
Weight	250 lbs.

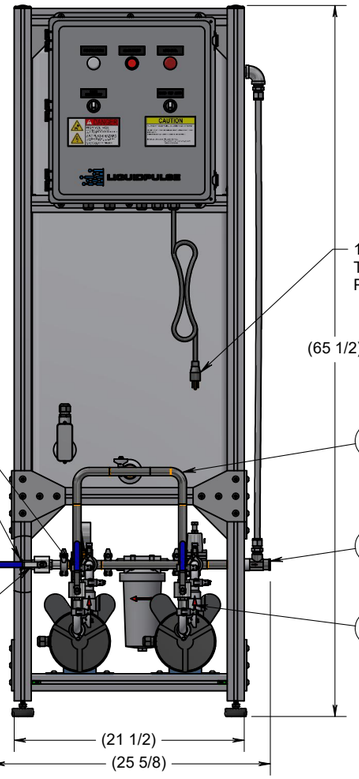
4034 Mint Way
Dallas, TX 75237
connect@liquidpulse.com

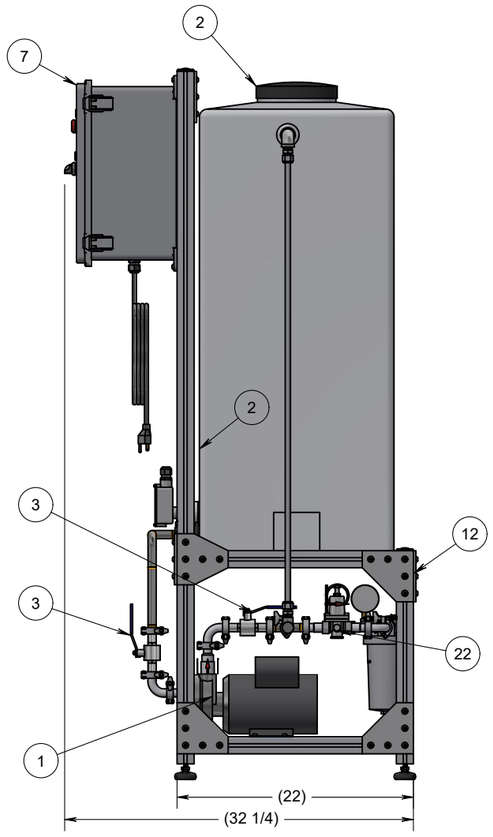
Mechanical

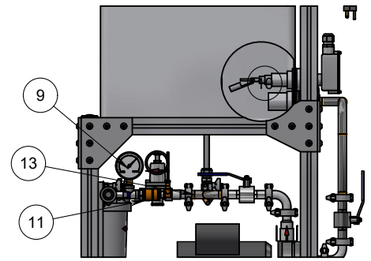




NOTES 1&2







VIEW A-A

SYM	QTY	DESCRIPTION
15	1	MANIFOLD, 304SS, 3/4", 003
14	1	MANIFOLD, 304SS, 3/4", 001
13	1	MANIFOLD, 304SS, 3/4", 002
12	1	FRAME
11	1	SWITCH, PRESSURE, IFM PK6224, 0-145PSI / CORDSET, EVC004
10	1	SWITCH, LEVEL, GEMS SERIES LS-7 (PN 160450)
9	1	GAUGE, PRESSURE,WINTERS PQF, 2-1/2", 0-160PSI
8	1	FILTER HOUSING / FILTER CARTRIDGE, 25 MICRON
7	1	CONTROL PANEL, GMU
6	1	VALVE, PRESSURE REDUCING, WATTS SS263AP-M1, 10-125PSI, 1/2"
5	1	VALVE, RELIEF, BOSHART, 1/2", 100 PSI
4	2	VALVE, CHECK, FLOMATIC 100MS, 3/4"
3	5	VALVE, BALL, 2 PIECE, 3/4" TC
2	1	TANK,POLYETHYLENE,18"x18"x44",55GALLONS
1	2	PUMP, MTH, T-31H, PUMP, 1/3HP, 3600RPM, 120/1/60 ODP ENERGY EFFICIENT MOTOR

PARTS LIST

NOTES:

1. 36" CLEARANCE (CLEAR TO GROUND) REQUIRED IN FRONT OF CONTROL PANELS PER 2020 NEC TABLE 110-26(A)(1) CONDITION 3; USER ASSUMES ALL RESPONSIBILITY FOR EVALUATION OF SITE CONDITIONS AND NEC CODE COMPLIANCE IF INSTALLING PER CONDITION 1 OR 2 CLEARANCES.
2. 30" CLEARANCE OR PANEL WIDTH MINIMUM REQUIRED FOR NEC CLEARANCE.
3. UNLESS OTHERWISE INDICATED, ALLOW 12" CLEARANCE AROUND SYSTEM FOR SERVICE.
4. CONNECTION CENTERLINE DIMENSIONS ARE REFERENCE ONLY. AS-BUILT MEASUREMENTS TO BE PROVIDED PRIOR TO SHIPMENT OF STATION UPON REQUEST.
5. NO TEFLON TAPE. PIPE DOPE ONLY STARTING FROM 2 THREADS BACK ON MALE NIPPLES.

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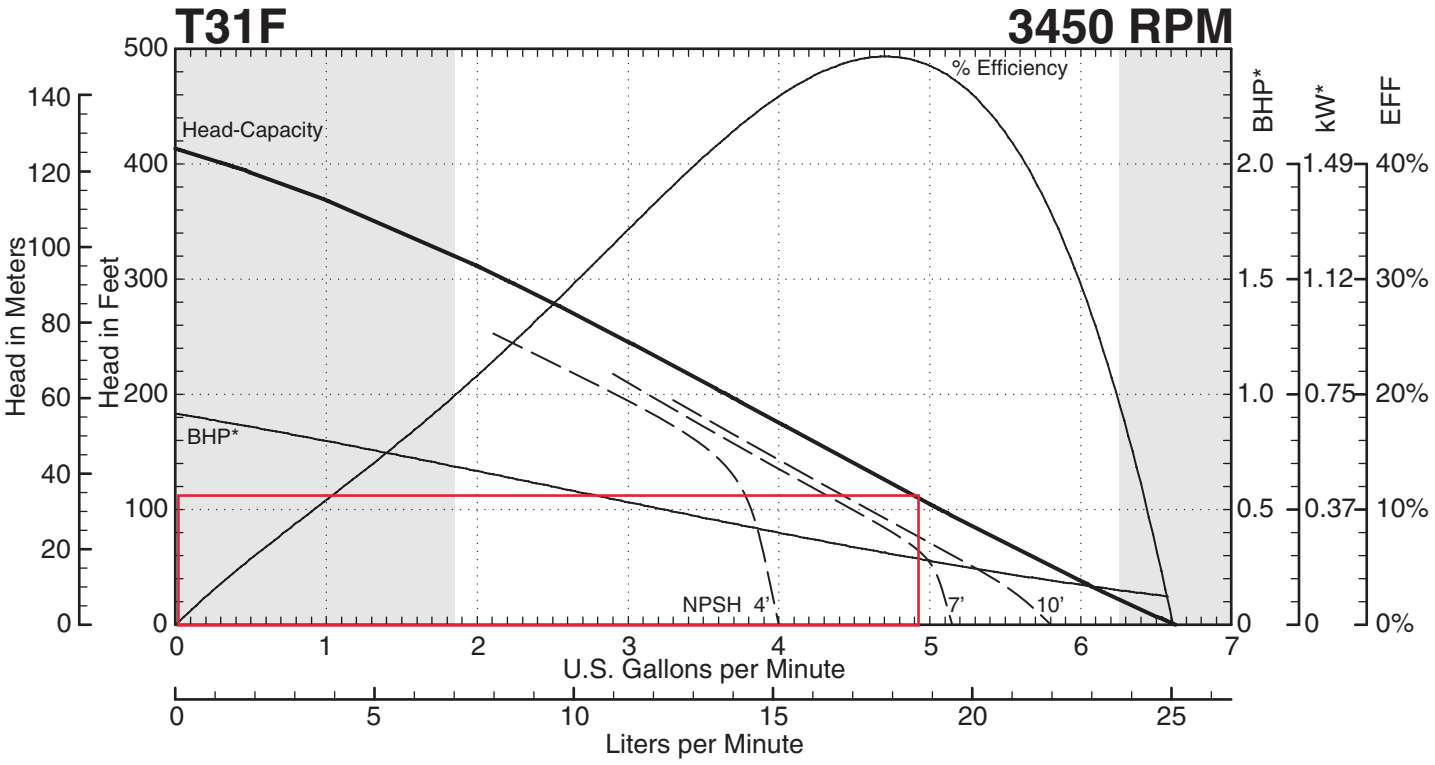
5320 PEACHTREE RD
BALCH SPRINGS, TX 75180
469.378.0004
CONNECT@LIQUIDPULSE.COM

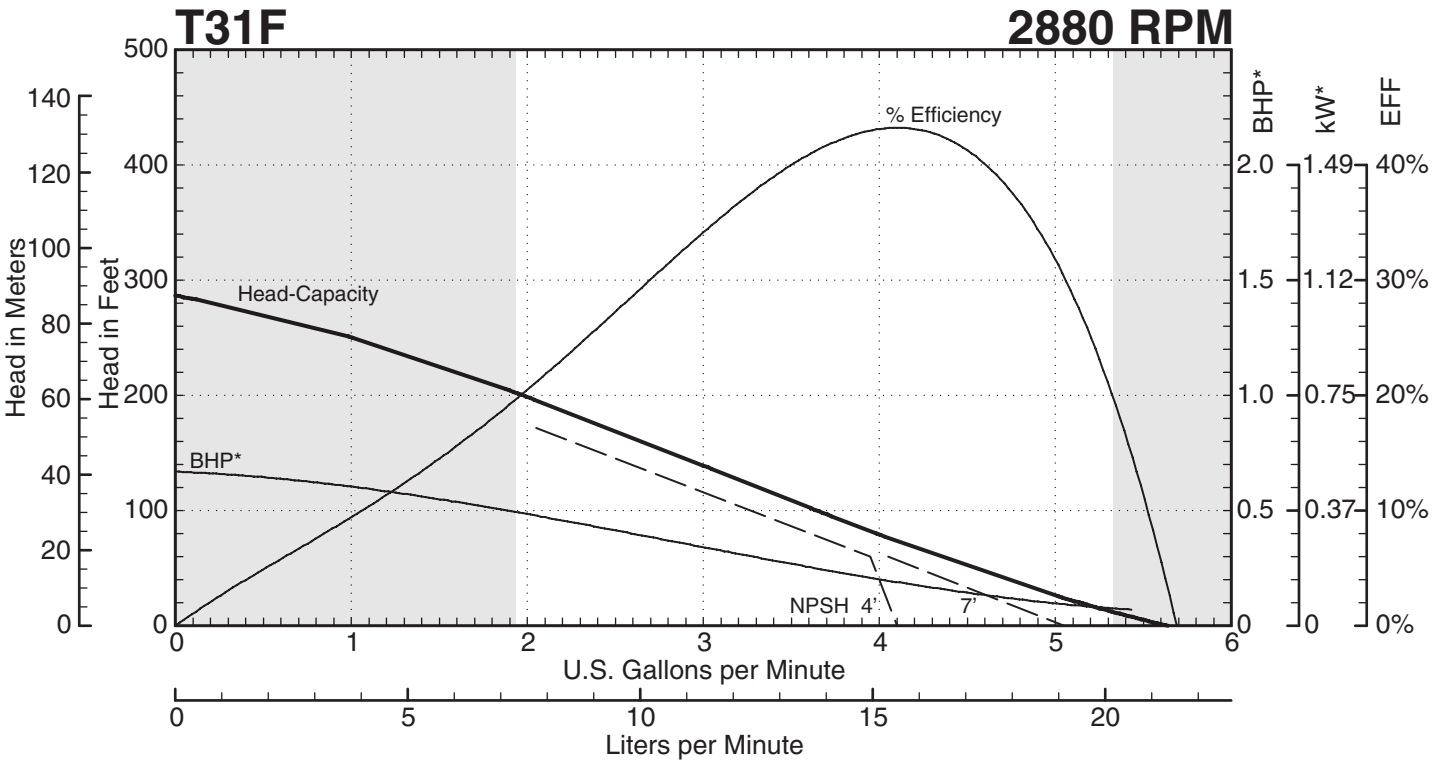
ENGR	M. MARTINEZ	DATE 8/1/2025
CHK	D. VELASCO	DATE 8/1/2025
DESCRIPTION	GLYCOL FEEDER II	
PROJECT		PAGE 1 /1 REV

C:\Users\Mark.Martinez\Documents\GMU_DATA_CENTER_II\GLYCOL_FEEDER_II.idw

T31 SERIES

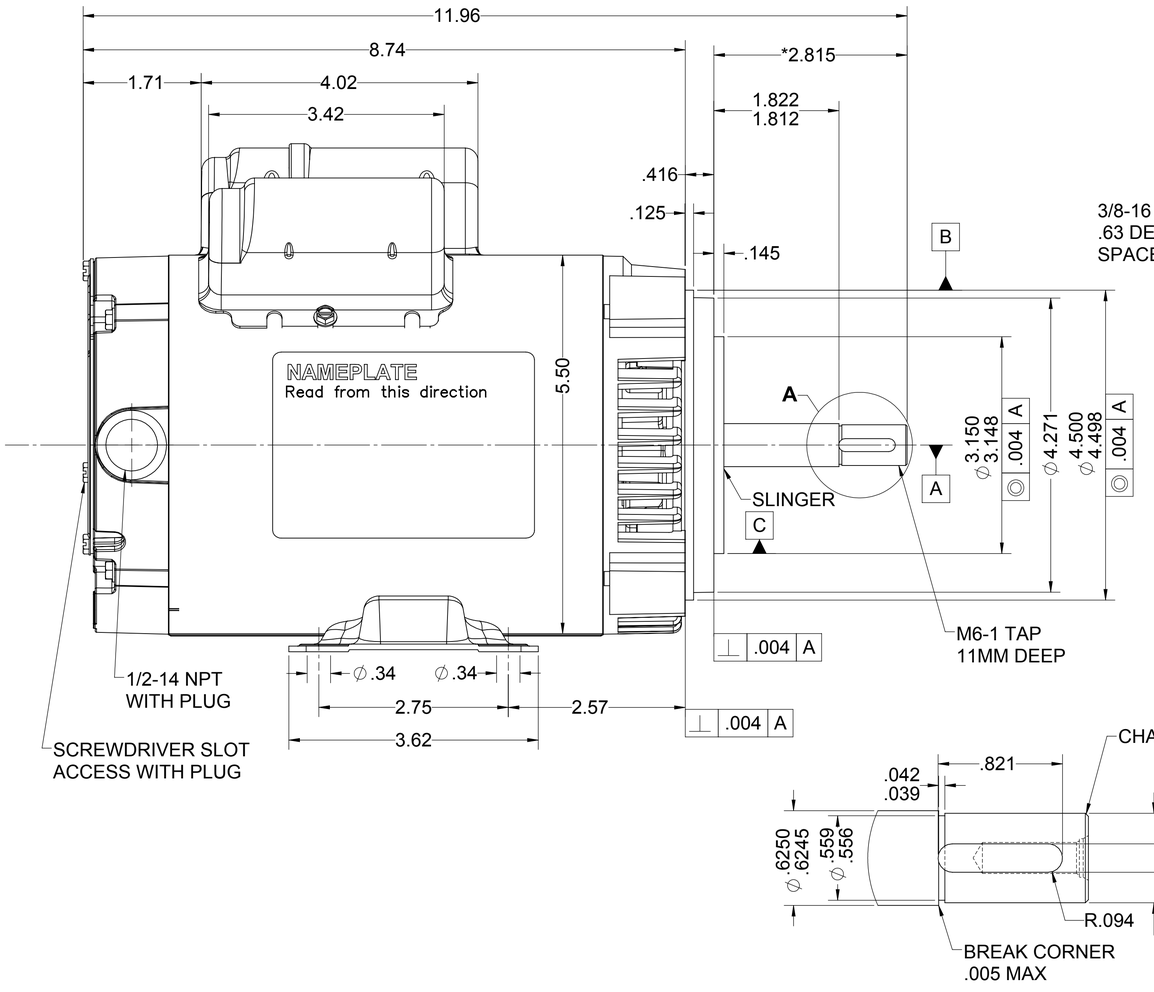
Performance Curves

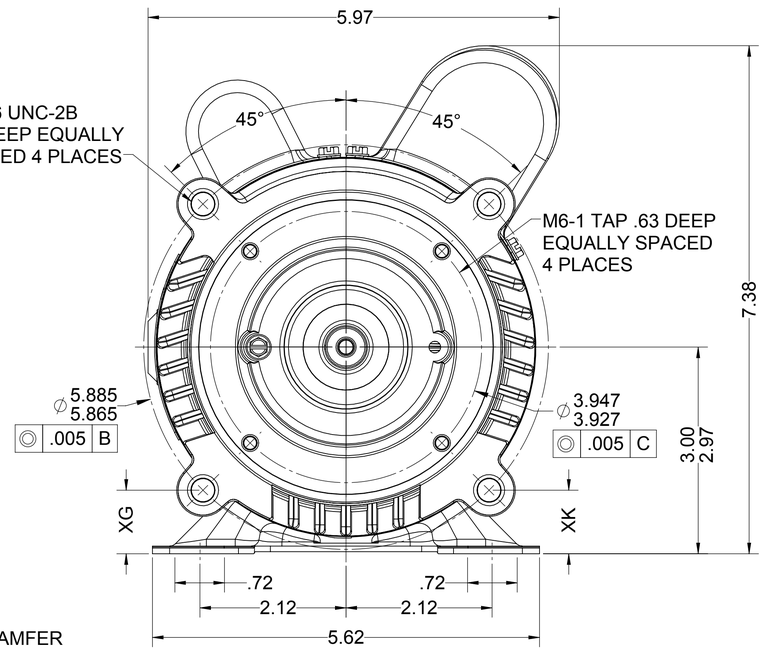




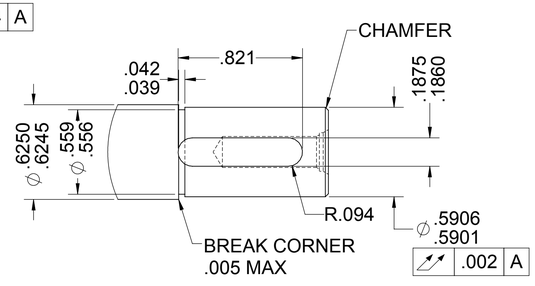
MTH PUMPS
401 West Main Street • Plano, IL 60545-1436
Phone: 630-552-4115 • Fax: 630-552-3688
Email: SALES@MTHPUMPS.COM
http://WWW.MTHPUMPS.COM

—— —— –Indicates altered performance at NPSH Available
* Horsepower data is valid for 1.0 specific gravity fluids only





DIFFERENCE BETWEEN XG
AND XK NOT TO EXCEED .03



UNLESS OTHERWISE SPECIFIED DIMENSIONS
WITHOUT TOLERANCES ARE REFERENCE ONLY

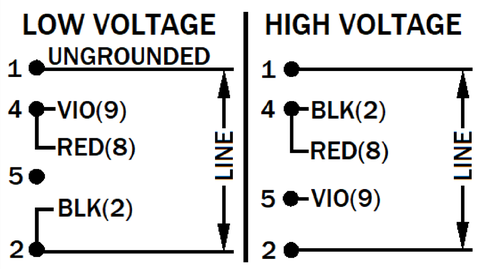
NOTES

1. *MAX EXTENSION BASED ON SHIMMING.

LEADS

TERMINAL BOARD

EXTERNAL CONNECTIONS



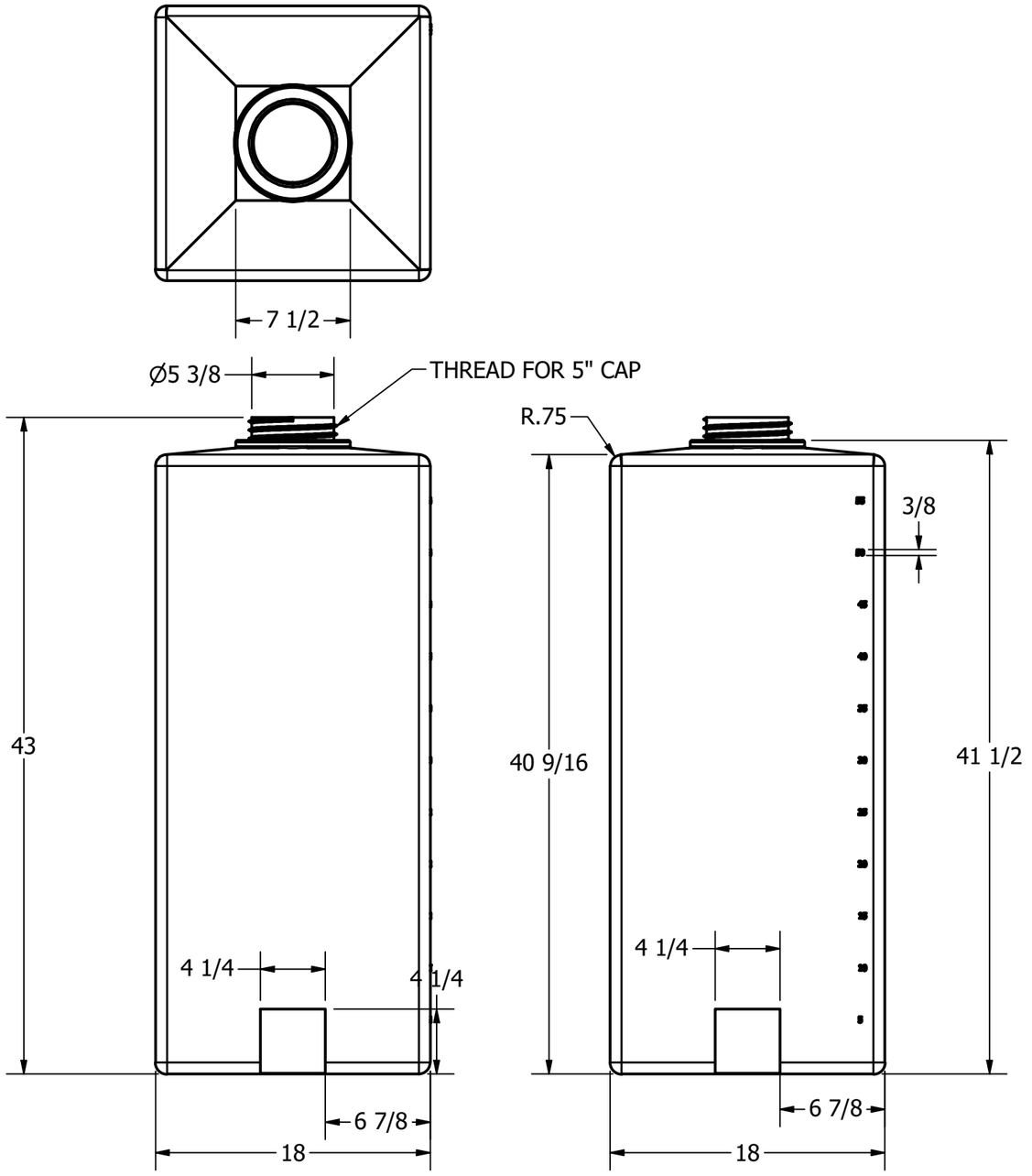
MOTOR DATA

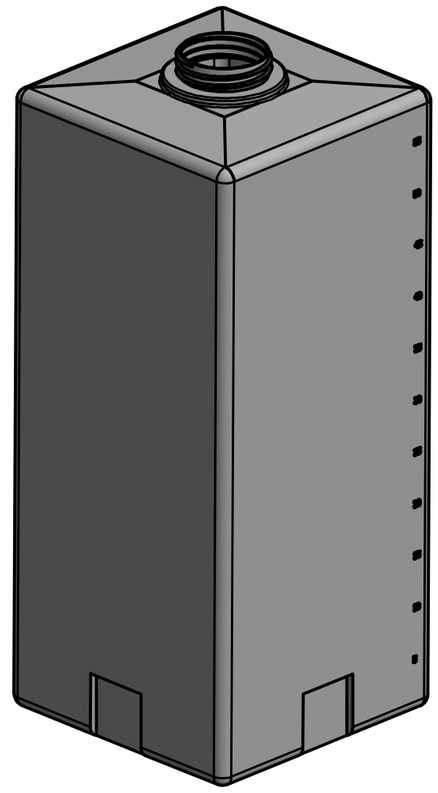
TYPE	CSCR			SHAFT MATERIAL	303 S.S. EXTENSION			CUSTOMER NAME	MTH TOOL
HZ	60	HZ	50	FRAME	48CZ	PHASE	1	CUSTOMER PART NUMBER	BLC-5000-03-ODP
VOLTS	115/208-230	VOLTS	100-120/200-240	ENCLOSURE	DP	PAINT	BLMW BLUE	VIEWING LEAD END / MOTOR ROTATION	CW
HP[kW] 0.33 [-]	SF 1.75	Hp[kW] 0.33 [-]	SF 1.0	ENVIRONMENT	NORMAL	BEARINGS	BALL	VIEWING LEAD END / ASSEMBLY ROTATION	CW
RPM	3450	RPM	2875	I.P.CODE	IP22	END CAP	ASSEMBLED	ASSEMBLY VOLTAGE	HIGH
F.L. AMPS	3.4/1.8-1.7	F.L. AMPS	4.0-4.8/2.0-2.4	NEMA NOM. EFF.	-%	IE3	-%	THERMAL PROTECTION TYPE	AUTOMATIC N
S.F. AMPS	5.8/3.0-2.9	S.F. AMPS	-					MOUNTING POSITION	HORIZONTAL
								WINDING AND TEST SPEC	-
TIME RATE	CONT	MAX AMB	50						
KVA CODE	P	INS CLASS	B					DRAWN: DGM 06/18/24	

ECN	REV	CHANGE DESCRIPTION	DATE/ INITIALS
-	05	NEW EXTERNAL CONNECTION DIAGRAM FIGURE.	04/02/2025 ZM

SIZE	DWG NO.	
D	10012160481	
SCALE: 1:1	DO NOT SCALE DRAWING	SHEET 1 OF 1

10012160481





DRAWN Liv Oltean	5-9-2016	NORWESCO, INC. SAINT BONIFACIUS, MN
CHECKED		TITLE: 55 GALLON FLAT BOTTOM UTILITY TANK
QA		
MFG		
APPROVED		
		SIZE B / DWG NO / REV
		SCALE: 1/16 / SHEET 1 OF 1

4034 Mint Way
Dallas, TX 75237
connect@liquidpulse.com

Ball Valve, 2-Piece, 3/4” TC

Category	Description
Model name	1762
Body Material	304SS
Ball Material	304SS
Seat Material	PTFE
MAWP WOG	232psi
Maximum Temperature:	300°F

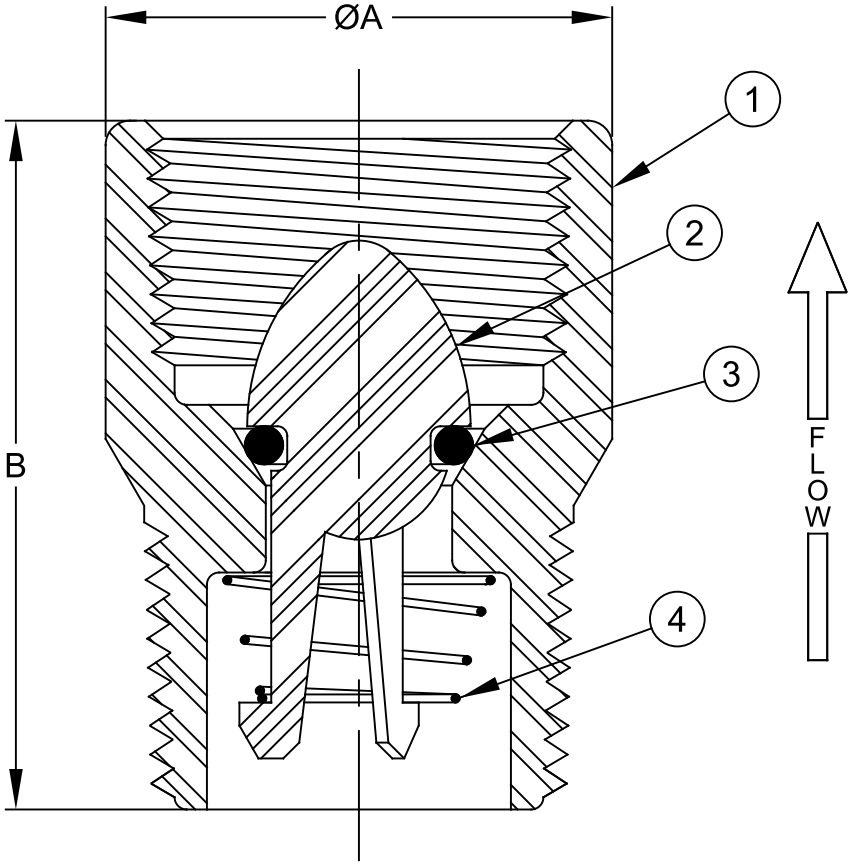
Stainless Steel Check Valve Model 100MSS

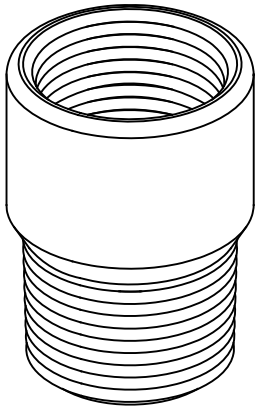
Sizes 3/4" / 20mm

Flomatic Corporation

LEAD FREE
NSF/ANSI 61

Materials





Max Temp 180°F (80°C)
Max Pressure 400psi (28bar)

Item #	Qty		Material	ASTM	Item #	Qty	Description	Material	ASTM
1	1	Body	Stainless Steel	304	3	1	O'Ring	Viton	------
2	1	Poppet	Celcon®	M90	4	1	Spring	Stainless Steel	302

Dimensions (MNPT X FNPT)

ANSI B1.20.1

Size		Part #	ØA		B		INLET NPT	OUTLET NPT	Weight	
inch	mm		inch	mm	inch	mm			lbs	kg
3/4	20	4218SS	1.22	31	1.70	43	3/4	3/4	.30	.14

FLOMATIC® VALVES

October 29,1993
Dwg No: S4218SS Rev: J (1/25)

FLOMATIC CORPORATION
GLENS FALLS, N.Y. 12801
PHONE (518) 761-9797
FAX (518) 761-9798

For Residential, Commercial and OEM Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

LEAD FREE*

Series SS263AP

Compact Stainless Steel Water Regulators

Sizes: 1/4" - 1/2" (8-15mm)

Series SS263AP Compact Stainless Steel Water Regulators are designed for use with deionized water, chemical solutions, and high purity water purification systems applications. Lead Free small pressure regulators shall comply with state codes and standards where applicable, requiring reduced lead content.

Features

- Rugged investment cast stainless steel body and cage
- Stainless steel adjusting screw
- Oversized orifice
- 1/4" (8mm) gauge port

Materials

Body:	Stainless steel ASTM-351-CF8M
Spring Cage:	Stainless steel ASTM-351-CF8M
Disc:	Buna-N (FDA) stainless steel stem
Diaphragm:	Reinforced Buna-N (FDA)
Bottom Plug:	Stainless steel
Bottom Spring:	Stainless steel
Trim:	Viton®*

*Viton® is a registered trademark of DuPont Dow Elastomers.

Options

Add suffix:

G	pressure gauge
X	slotted adjusting screw

See Pressure -Temperature section for reduced pressure range options

Specifications

A compact lead free* water regulator shall be installed on deionized water purification or chemical handling systems as indicated on the plans. Regulator shall have a stainless steel body and cage and oversized orifice. Regulator shall be a Watts Series SS263AP.

SS263AP
3-Way

Pressure – Temperature

Temperature Range: 0ºF–140ºF (18ºC – 60ºC)

Maximum Operating Pressure: 400psi (27.6 bar)

Reduced Pressure Range:

OPTION SUFFIX	RANGE		STD SET AT	
	psi	*bar*	*psi*	*bar*
A	1-25	0.1-1.8	10	0.7
B	3-50	0.2-3.5	15	1.0
C	10-125	0.7-8.8	25	1.8
D	20-175	1.38-12.07	50	3.5
E	100-300	7.0-21.0	125	8.8

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

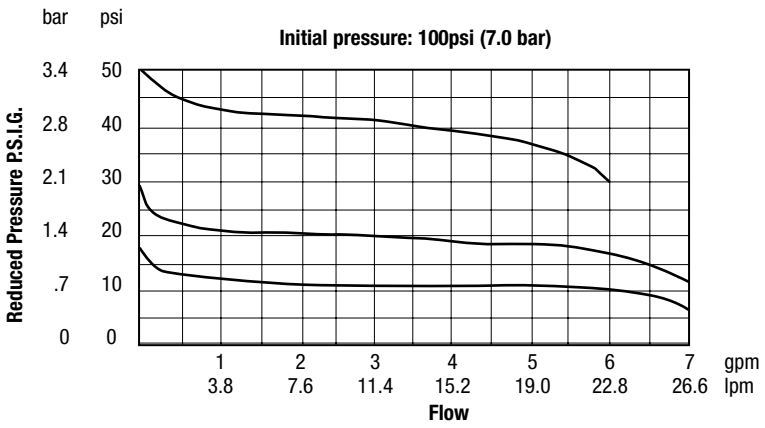
NOTICE

Inquire with governing authorities for local installation requirements

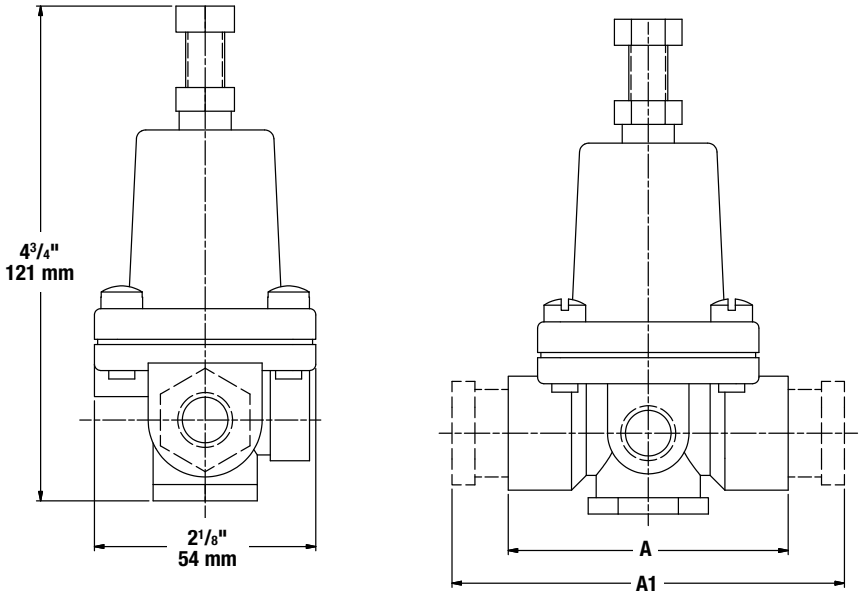
***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

WATTS®

Capacity



Notice: 1psi equals .07 bar
1gpm equals 3.785 liters per minute



Dimensions - Weights

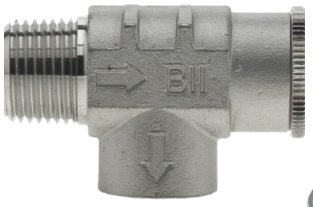
SIZE (DN)		DIMENSIONS				WEIGHT	
		A		A1			
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs*	*kg*
~~¼~~	~~8~~	~~NA~~	~~—~~	~~3¾~~	~~95~~	~~1.8~~	~~.82~~
~~⅜~~	~~10~~	~~NA~~	~~—~~	~~3¾~~	~~95~~	~~1.8~~	~~.82~~
½	15	2 11/16	68	NA	—	1.5	.68

Notice: ¼" and ⅜" valves are supplied with 2 reducing bushings to ½" NPT connection.

USA: T: (978) 689-6066 • F: (978) 975-8350 • Watts.com
Canada: T: (905) 332-4090 • F: (905) 332-7068 • Watts.ca
Latin America: T: (52) 81-1001-8600 • Watts.com

SSRVN SERIES
STAINLESS STEEL RELIEF VALVES

APPLICATIONS:
- Recommended for all cold water system installation tanks
- It is recommended to use both Polytetrafluoroethylene (PTFE) tape and pipe thread compound for joining stainless steel threaded connections



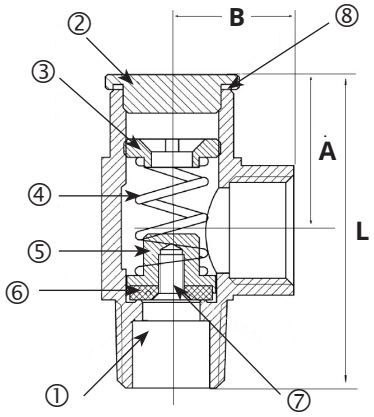
FEATURES:
- Provides high corrosion resistance
- Protects against damage to piping a pressure tanks
- (+/-) 15% setting accuracy, field adjustments are NOT recommended

SPECIFICATIONS:
- Threads conform to ANSI/ASME B1.20.1
- Stainless steel body
- Stainless steel spring

CERTIFICATION:
- NSF/ANSI Standard 372 Certified (Drinking Water System Components - Lead Content)

RATINGS:
- Max Operating Temperature: 160°F (73°C)

	MATERIAL LIST	
Number	**Description**	**Materials**
1	Body	304 Stainless Steel
2	Cap	304 Stainless Steel
3	Plug	304 Stainless Steel
4	Spring	304 Stainless Steel
5	Disc	304 Stainless Steel
6	Seat	Nitrile Butadiene (NBR)
7	Screw	304 Stainless Steel
8	Packing	Polytetrafluoroethylene (PTFE)



DIMENSIONS												
Part No.	**Description**		**Factory Pre-Set**	**A**		**B**		**L**		**D**		**Weight**
	Inlet	**Outlet**	**PSI**	**inches**	**mm**	**inches**	**mm**	**inches**	**mm**	**inches**	**mm**	**grams**
~~SSRVN05-075~~	~~1/2" MPT~~	~~1/2" FPT~~	~~75~~	~~1.20~~	~~30.50~~	~~0.94~~	~~23.80~~	~~2.39~~	~~60.58~~	~~0.94~~	~~24.00~~	~~150~~
SSRVN05-100	1/2" MPT	1/2" FPT	100	1.20	30.50	0.94	23.80	2.39	60.58	0.94	24.00	150
~~SSRVN07-075~~	~~3/4" MPT~~	~~1/2" FPT~~	75	1.20	30.50	0.94	23.80	2.45	62.27	~~0.94~~	~~24.00~~	~~165~~
~~SSRVN07-100~~	~~3/4" MPT~~	~~1/2" FPT~~	~~100~~	1.20	30.50	0.94	23.80	2.45	62.27	~~0.94~~	~~24.00~~	~~165~~

Pressure relief valves are recommended for all cold water system installations to protect against damage to piping and pressure tanks. Valves will be sold at factory pre-set PSI only. Accuracy +/- 15% of factory pre-set PSI. While field adjustments are not recommended the approximate operating range has been provided by the manufacturer. Any changes made to the pre-set pressure is entirely at the risk of the person/company who makes the adjustment. Any changes made should be thoroughly tested for accuracy at the time of installation. Neither the manufacturer or Boshart Industries will assume liability or responsibility caused as a result of adjusting the relief valve setting. If the pressure setting is adjusted, it will void any warranty or return of the product. Relief valves must be installed so that they drain to a floor drain, sump or other safe location with an air gap to eliminate the risk of back-siphonage. If an outlet pipe is used then it must be at least the same diameter as the relief valve outlet.

For cold water use only. These valves are not T & P valves that are required with water heaters.

For more information on installation, adjustment, repair & operation, visit Boshart Knowledge Base at
SUPPORT.BOSHART.COM

BOSHART INDUSTRIES

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Tel: 800-561-3164

boshart.com • blog.boshart.com

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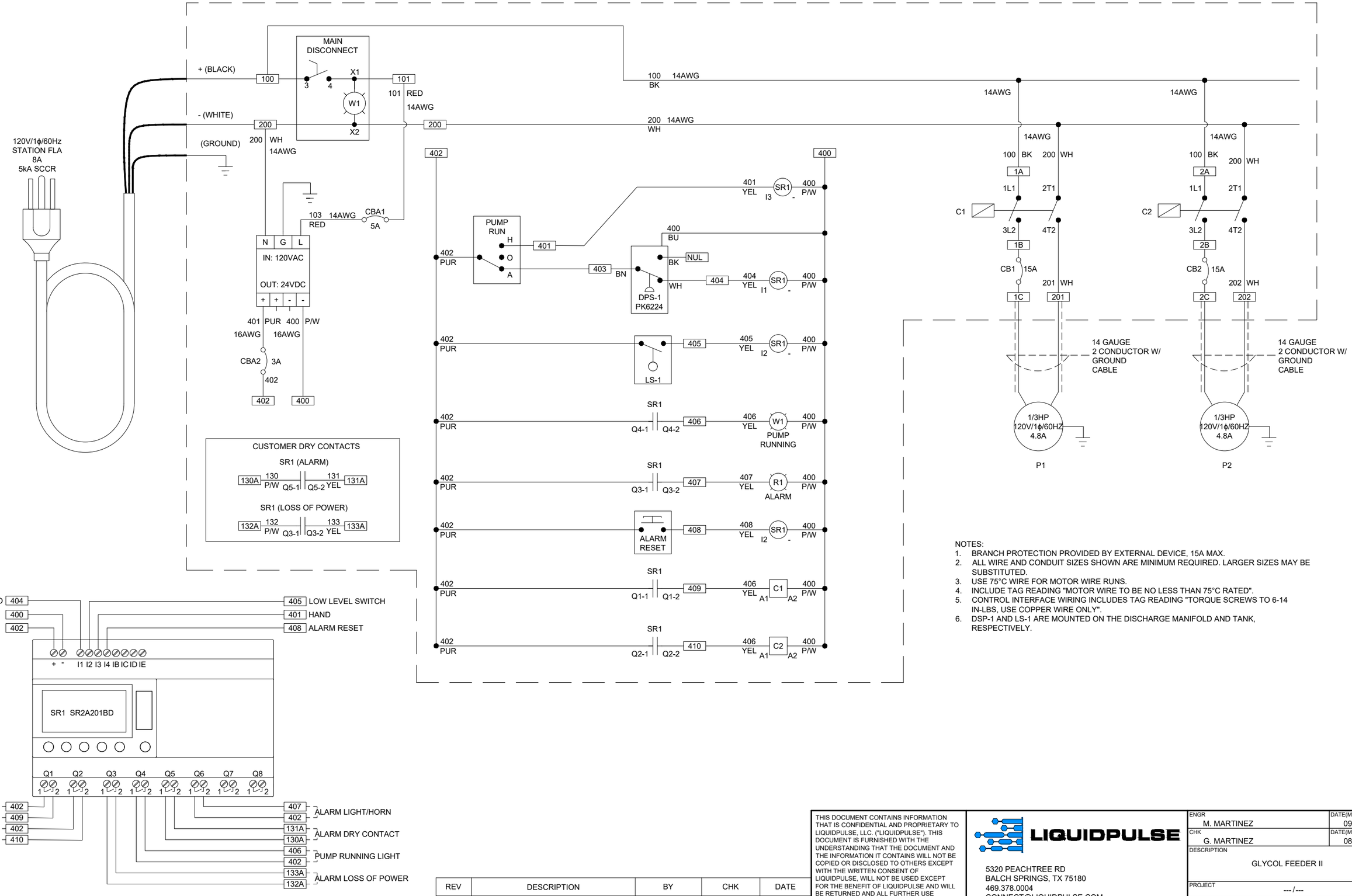
Dallas, TX 75237
connect@liquidpulse.com

Electrical



NOTES:
1. BRANCH PROTECTION PROVIDED BY EXTERNAL DEVICE, 15A MAX.
2. ALL WIRE AND CONDUIT SIZES SHOWN ARE MINIMUM REQUIRED. LARGER SIZES MAY BE SUBSTITUTED.
3. USE 75°C WIRE FOR MOTOR WIRE RUNS.
4. INCLUDE TAG READING "MOTOR WIRE TO BE NO LESS THAN 75°C RATED".
5. CONTROL INTERFACE WIRING INCLUDES TAG READING "TORQUE SCREWS TO 6-14 IN-LBS, USE COPPER WIRE ONLY".
6. DSP-1 AND LS-1 ARE MOUNTED ON THE DISCHARGE MANIFOLD AND TANK, RESPECTIVELY.

REV	DESCRIPTION	BY	CHK	DATE
1	ADDED CONTACTORS TO PUMPS.	M. MARTINEZ	D. VELASCO	09/26/2025

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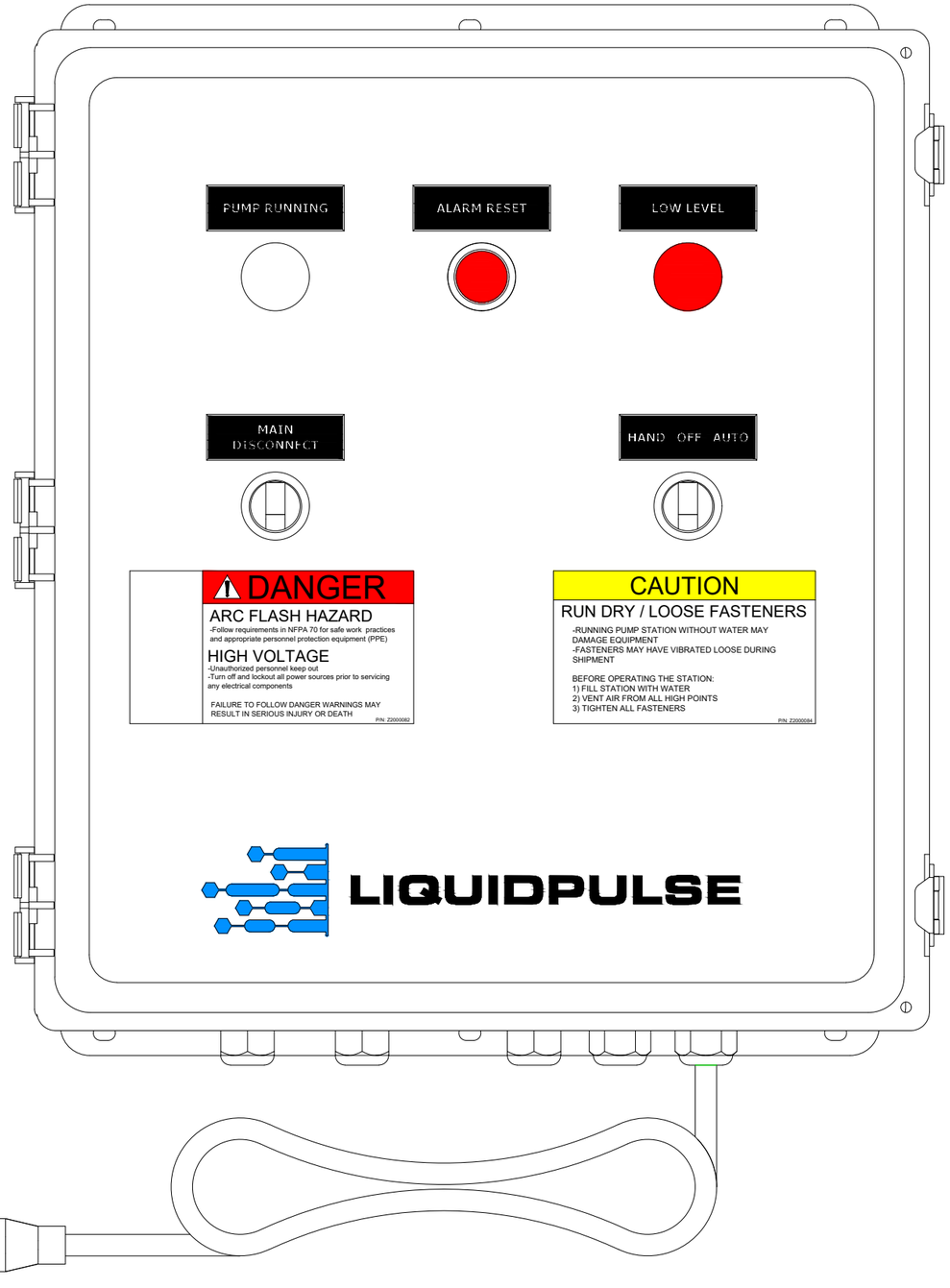
5320 PEACHTREE RD
BALCH SPRINGS, TX 75180
469.378.0004
CONNECT@LIQUIDPULSE.COM

ENGR	M. MARTINEZ	DATE(MM/DD/YYYY)	09/08/2025
CHK	G. MARTINEZ	DATE(MM/DD/YYYY)	08/29/2025
DESCRIPTION	GLYCOL FEEDER II		
PROJECT	---/---		
DRAWING NUMBER		PAGE	1/1
		REV	0



REV	DESCRIPTION	BY	CHK	DATE
1	ADDED CONTACTORS TO PUMPS.	M. MARTINEZ	D. VELASCO	09/26/2025

LIQUIDPULSE
5320 PEACHTREE RD
BALCH SPRINGS, TX 75180
469.378.0004
CONNECT@LIQUIDPULSE.COM

ENGR: M. MARTINEZ	DATE(MM/DD/YYYY): 09/08/2025
CHK: G. MARTINEZ	DATE(MM/DD/YYYY): 08/29/2025
DESCRIPTION: GLYCOL FEEDER II	
PROJECT: ---/---	
DRAWING NUMBER	PAGE: 1/1 — REV: 0

LIQUIDPULSE

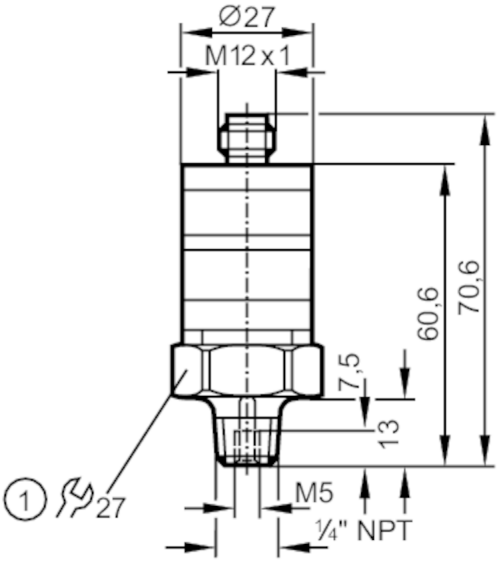
4034 Mint Way
Dallas, TX 75237
connect@liquidpulse.com

Instrumentation

PK6224

Pressure switch with intuitive switch point setting

PK-010-RFN14-HCPKG/US/ /W



1 Tightening torque 25 Nm

Product characteristics			
Number of inputs and outputs	Number of digital outputs: 2		
Measuring range	0...10 bar	0...145 psi	
Process connection	threaded connection 1/4" NPT external thread internal thread:M5		
Application			
Application	for industrial applications		
Media	liquids and gases		
Medium temperature [°C]	-25...80		
Min. bursting pressure	300 bar	4350 psi	30 MPa
Pressure rating	25 bar	362 psi	2.5 MPa
Type of pressure	relative pressure		
MAWP for applications according to CRN	25 bar	362 psi	
Electrical data			
Operating voltage [V]	9.6...32 DC		
Current consumption [mA]	< 25		
Min. insulation resistance [MΩ]	100; (500 V DC)		
Protection class	III		
Reverse polarity protection	yes		
Inputs / outputs			
Number of inputs and outputs	Number of digital outputs: 2		
Outputs			
Total number of outputs	2		
Output signal	switching signal		
Electrical design	PNP		
Number of digital outputs	2		

PK6224

Pressure switch with intuitive switch point setting

PK-010-RFN14-HCPKG/US/ /W

Output function	complementary	
Max. voltage drop switching output DC [V]	2	
Permanent current rating of switching output DC [mA]	500	
Switching frequency DC [Hz]	100	
Short-circuit protection	yes	
Type of short-circuit protection	pulsed	
Overload protection	yes	
Measuring/setting range		
Measuring range	0...10 bar	0...145 psi
Set point SP	0.5...10 bar	7.5...145 psi
Reset point rP	0.3...9.8 bar	5...142 psi
Accuracy / deviations		
Switch point accuracy [% of the final value]	< ± 2,5; (Setting accuracy)	
Repeatability [% of the final value]	< ± 0,5; (with temperature fluctuations < 10 K)	
Characteristics deviation [% of the final value]	< ± 1,5 (BFSL) / < ± 2,5 (LS); (BFSL = Best Fit Straight Line; LS = limit value setting)	
Temperature drift per 10 K	< ± 0.5	
Software / programming		
Adjustment of the switch point	setting rings	
Operating conditions		
Ambient temperature [°C]	-25...80	
Storage temperature [°C]	-40...100	
Protection	IP 67	
Tests / approvals		
EMC	DIN EN 61000-6-2	
	DIN EN 61000-6-3	
Shock resistance	DIN EN 60068-2-27	50 g (11 ms)
Vibration resistance	DIN EN 60068-2-6	20 g (10...2000 Hz)
MTTF [years]	500	
Pressure Equipment Directive	Sound engineering practice; can be used for group 2 fluids; group 1 fluids on request	
Mechanical data		
Weight [g]	92.5	
Housing	cylindrical	
Dimensions [mm]	Ø 27 / L = 70.6	
Materials	PBT; PC; FKM; stainless steel (316L/1.4404)	
Materials (wetted parts)	stainless steel (316L/1.4404)	
Min. pressure cycles	50 million	
Process connection	threaded connection 1/4" NPT external thread internal thread:M5	
Restrictor element integrated	no (can be retrofitted)	

PK6224

Pressure switch with intuitive switch point setting

PK-010-RFN14-HCPKG/US/ /W

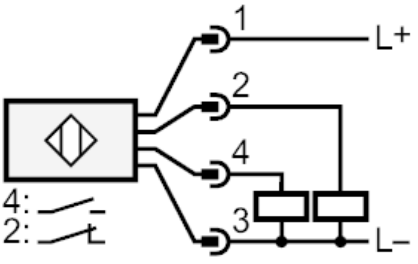
Displays / operating elements		
Display	operation	LED, green
	switching status	LED, yellow
With scale	yes	

Remarks	
Pack quantity	1 pcs.

Electrical connection

Connector: 1 x M12; coding: A

Connection



LS-7 Series (Plastic)
Compact, Side-Mounted Level Switches

Specifications

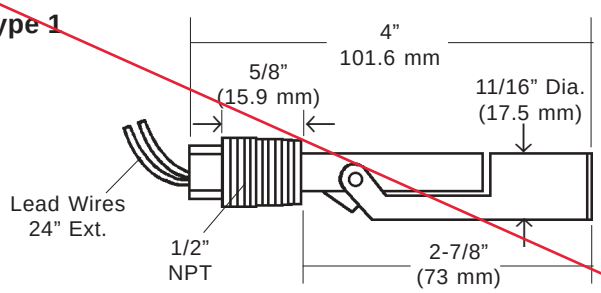
Part Number	Mounting Type	Materials		Min. Liquid Sp. Gr.	Operating Temperature	Oper. Pres. Max. @ 70° F	Switch* SPST	Lead Wire Gauge
		Stem, Mounting and Float	Lead Wire Jacket					
76141	1	Polysulfone	PVC	.75	-40°F to +225°F(-40°C to +107.2°C)	150 psig	20 VA	#22 AWG
76142		Ryton® R-4	Teflon®	.98	-40°F to +300°F(-40°C to +148.9°C)			
76145	2	Ryton® R-4		.80	-40°F to +300°F(-40°C to +148.9°C)			
76147	3	Polysulfone	PVC	.75	-40°F to +225°F(-40°C to +107.2°C)			
76148		Ryton® R-4	Teflon®	.98	-40°F to +300°F(-40°C to +148.9°C)			
165570	3N	Nylon	TPE***	.65	-40°F to +250°F(-40°C to +121.1°C)	100 psig		
†164520	3P	Polypropylene		.55	-40°F to +225°F(-40°C to +107.2°C)			
182600	3V	Versaplast™		.80	-40°F to +250°F(-40°C to +121.1°C)			
76151	4	Ryton® R-4	Teflon®	.80	-40°F to +300°F(-40°C to +148.9°C)			
†131100	5	Polypropylene	TPE***	.55	-40°F to +225°F(-40°C to +107.2°C)			
**140620		Nylon	PVC	.65	-40°F to +250°F(-40°C to +121.1°C)			#18 AWG
177100		Versaplast™	Teflon®	.80	-40°F to +300°F(-40°C to +148.9°C)	100 psig		#22 AWG
155100	7	Polysulfone	TPE***	.75	-40°F to +225°F(-40°C to +107.2°C)	150 psig		
†160450		Polypropylene		.55	-40°F to +225°F(-40°C to +107.2°C)	100 psig		
160460		Nylon		.65	-40°F to +250°F(-40°C to +121.1°C)			
†165800	10	Polypropylene	TPE***	.55	-40°F to +225°F(-40°C to +107.2°C)	50 psig		
165900		Nylon		.65	-40°F to +250°F(-40°C to +121.1°C)			
182700		Versaplast™		.80	-40°F to +250°F(-40°C to +121.1°C)			
191080	12	Noryl	TPE***	.80	-40°F to +225°F(-40°C to +107.2°C)	100 psig		

* See Electrical Data on back page for more information ** 18 AWG, 24" L., PVC Wires *** Thermoplastic Elastomer Zip Cord

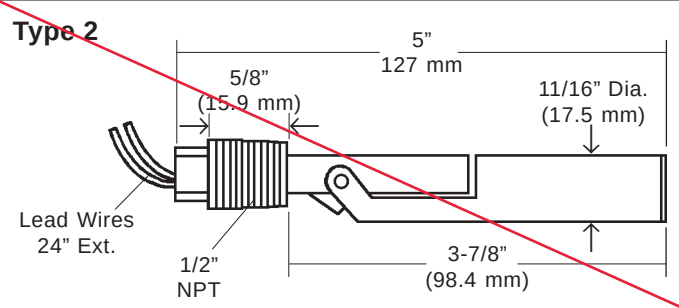
†The hydrolytically stable, glass-reinforced polypropylene is UL-recognized to UL 746B, at a relative temperature index of 65 degrees C

Dimensional Data . . . (Mounting Attitude is Horizontal)

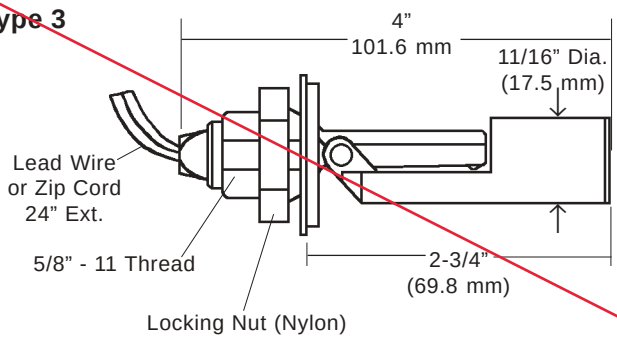
Type 1



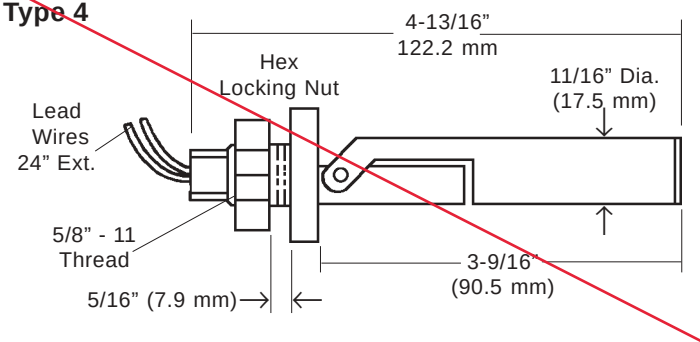
Type 2



Type 3

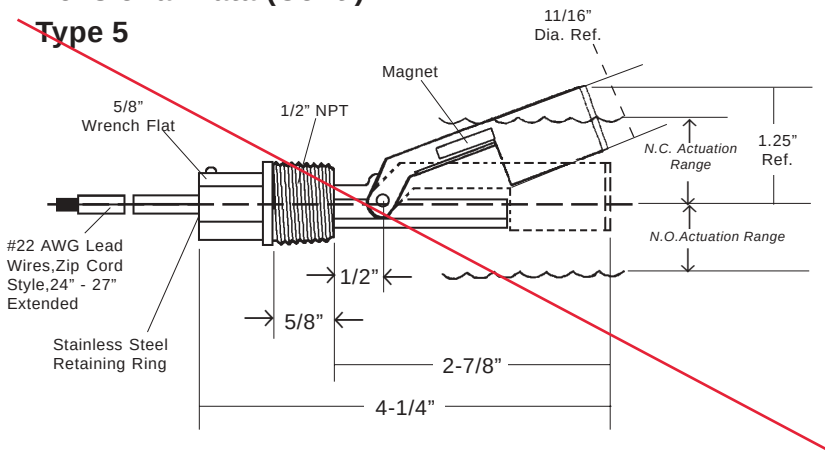


Type 4

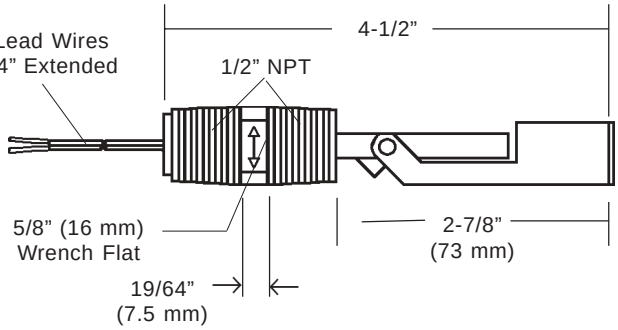


Dimensional Data (Cont.)

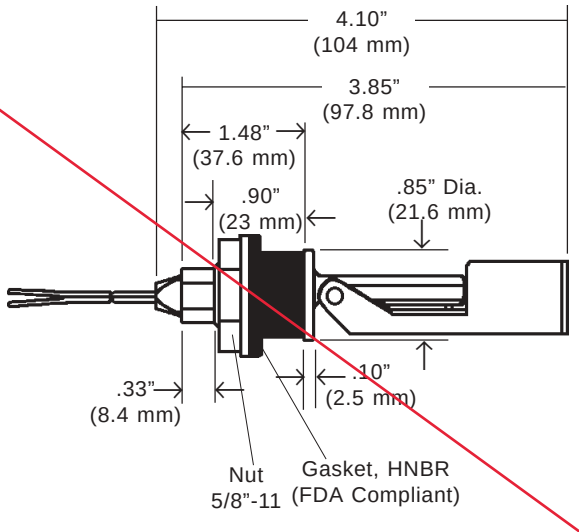
Type 5



Type 7

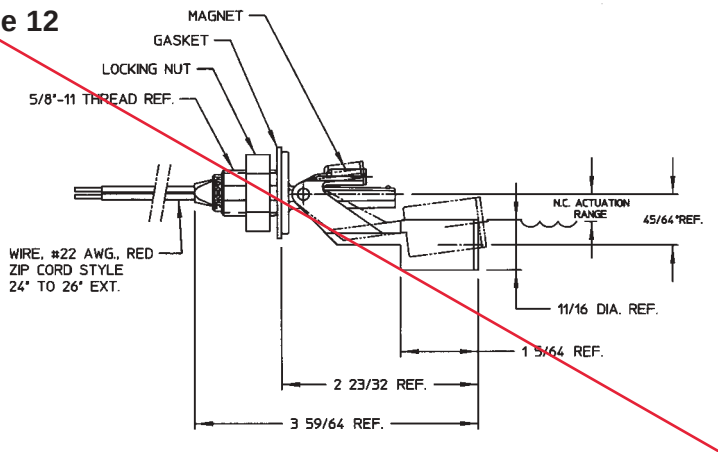


Type 10



Note: Recommended hole size = 7/8" thick panel

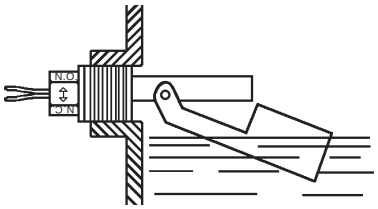
Type 12



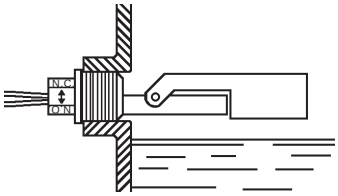
Installation

All LS-7 Units: Install with float positioned as shown for the required switch operation. Be sure that markings on wrench flats are as follows: (1) Arrow Vertical, (2) N.O. at top for N.O. operations, (3) N.C. at top for N.C. operations

Units Shown Installed "Float Down" for N.O. (Dry) Operation

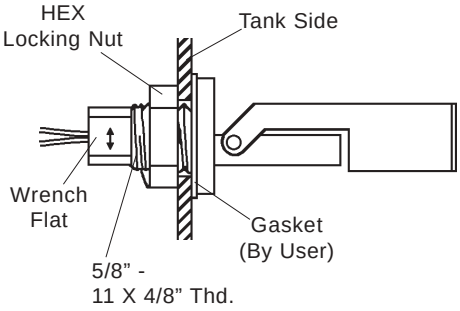


Units Shown Installed "Float Up" for N.C. (Dry) Operation



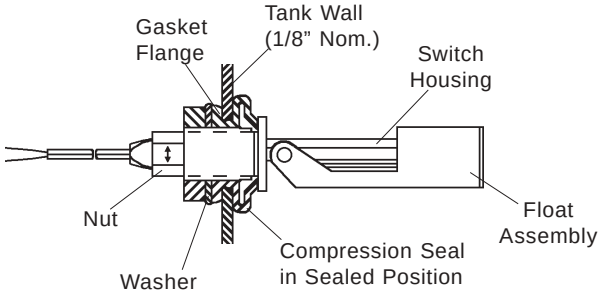
Types 3 and 4 Units

Assemble gasket (by user) on 5/8" - 11 threaded mounting and install unit through clear hole in tank side, from inside of tank. Lock in place with HEX nut (supplied). ***Tighten to15 in./lb., Max. Do not overtighten.***



Type 10 Units

Install unit in 7/8" diameter hole in tank. Gasket flange must rest firmly against tank wall. Turn nut to compress seal. Tighten one-quarter turn past hand-tight. Use wrench flat to hold housing, if required.

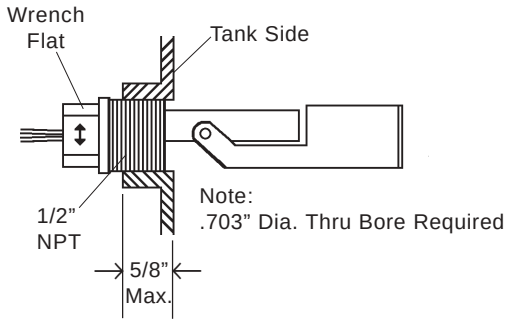


LS-7 with Compression Seal (Type 10)

Thread Treatment

Sealing: When threading metal threads into a metal coupling, pipe sealant or Teflon tape is recommended. Due to potential compatibility problems, when sealing plastic threaded units, a compatible pipe sealant such as *No More Leaks* from Permatex is recommended.

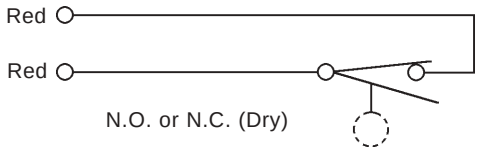
Tightening (Plastic to Metal): When threading a plastic level switch into a metal coupling, the installer should use a suitable wrench and tighten the threads 1 to 1-1/2 additional turns past hand-tight. Over-torquing of the threads will result in damage to the plastic mounting plug.



Electrical Connection

See Typical Wiring Diagram. Connect lead wires to load circuit, using approved method. ***Caution: See "Specifications" (front page) and "Switch Ratings" (below) before connecting power.***

Typical Wiring Diagram

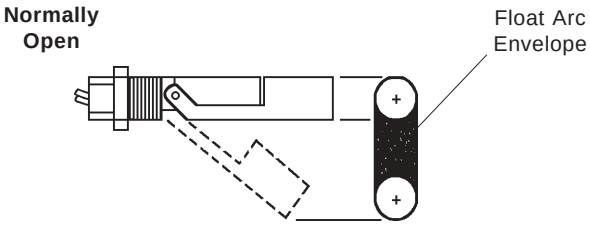


Switch Ratings
- Maximum Resistive Load -

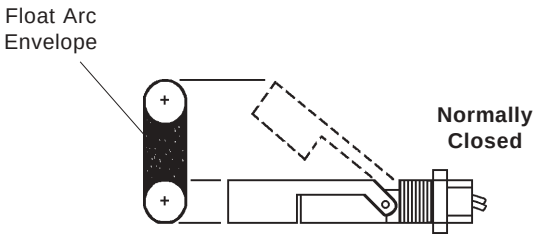
VA	Volts	Amps AC	Amps DC
20 Pilot Duty	0-30	.4	.3
	120	.17	.13
	240	.080	.06

Switch Operation

Depending on the mounting position, the float on these switches caneither rise or lower with the liquid level. By rotating the switch 180°, the switch operation can be Normally Open or Normally Closed. Arrows on exterior of mounting indicate N.O. when point up.



The switch is mounted so that the ***float lowers*** with the liquid level. **The switch is N.O.**



The switch is mounted so that the ***float rises*** with the liquid level. **The switch is N.C.**

Maintenance

Normally, no maintenance of any kind is required. When excessive contamination is present in the liquid, an occasional wipe-down cleaning is all that is needed.

CE

This product is suitable for Class I and Class II applications only, per the requirements of standard EN60730 and any additional specific requirements for a particular application or medium being sensed. Class I compliance of metal bodied units requires a ground connection between the metal body and the earthing system of the installation. Class I compliance of plastic bodied units in contact with a conductive medium requires that the medium be effectively earthed so as to provide an earthed barrier between the unit and accessible areas. For Class III compliance, a supply at safety extra-low voltage (SELV) must be provided. Please consult the Factory for compliance information on specific part numbers.

Important Points:

- Gems products must be maintained and installed in strict accordance with the National Electrical Code and the applicable Gems product instruction Bulletin that covers installation, operation and proper maintenance. Failure to observe this information may result in serious injury or damages.
- For hazardous area applications involving such things as, but not limited to, ignitable mixtures, combustible dust and flammable materials, use an appropriate explosionproof enclosure or intrinsically safe interface device.
- Please adhere to the pressure and temperature limitations shown throughout this catalog for our level and flow sensors. These limitations must not be exceeded. These pressures and temperatures take into consideration possible system surge pressures/ temperatures and their frequencies.
- Selection of materials for compatibility with the media is critical to the life and operation of Gems products. Take care in the proper selection of materials of construction, testing is required.
- NSF-approved sensors are made of materials approved for potable water applications according to Standard 61.
- Stainless steel is generally regarded as safe by NSF and FDA.
- Life expectancy of switch contacts varies with application. Contact Gems if life cycle testing is required.
- Ambient temperature changes do affect switch set points, since the gravity of a liquid can vary with temperature.
- Our sensors have been designed to resist shock and vibration. However, shock and vibration should be minimized.
- Filter liquid media containing particulate and/or debris to ensure the proper operation of our products.
- Electrical entries and mounting points in an enclosed tank may require liquid/vapor sealing.
- Our sensors must not be field-repaired.
- Physical damage sustained by product may render it unserviceable.

Return Policy

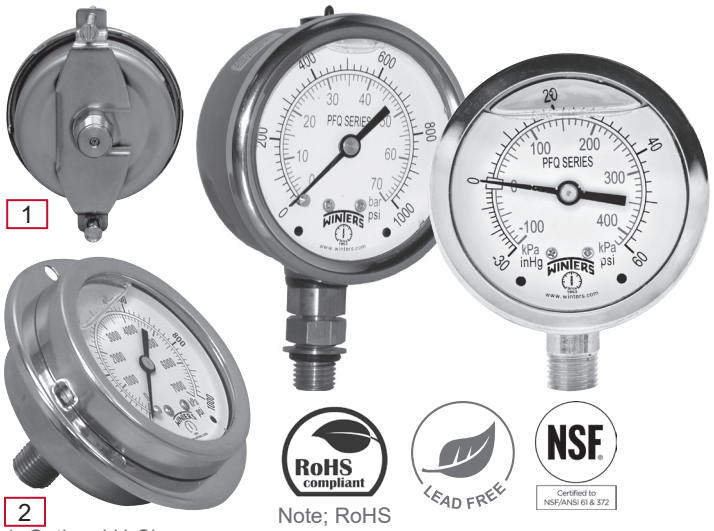
Returns are accepted on stock items up to 30 days from date of order. You must contact our Returns Department for a Return Authorization (RA) number. Return the goods - freight prepaid - in the original container and include original packing slip. C. O. D. returns are not accepted. Gems reserves the right to apply restocking charges.

Tel: 860-793-4357
Fax: 860-793-4563

Gems Sensors Inc.
One Cowles Road
Plainville, CT 06062-1198
Toll-Free: 1-800-378-1600

Stainless Steel Liquid Filled Gauge, Lead Free Stainless Steel Liquid Filled Gauge

PFQ, PFQ-LF



1. Optional U-Clamp
2. Optional Front Flange

Note; RoHS applies SS internals only

Description & Features:

- Pulsation resistant, liquid filled stainless steel case
- Glycerin filled standard
- Brass or stainless steel internals
- Restricted orifice standard on dual scale
- Ventable plug on 2.5” (63mm) and 4” (100mm)
- Crimp-On bezel
- Single (psi) or dual scale (psi/kPa)/(psi/bar) available
- Optional U-Clamps and front flanges
- Dry case available
- ASME B40.100 compliant (EN837-1 available on 2” (50mm) dial and up)
- CRN registered
- Lead free version NSF-61-372 certified
- 5 year warranty

Applications:

- Ideal for pumps, compressors, hydraulic presses, machinery, pneumatic equipment and motors in harsh environments
- Use where harmful vibration and pulsation are present

Specifications	Stainless Steel Internals	Brass/Lead Free Brass Internals
Dial	1.5” (40mm), 2” (50mm), 2.5” (63mm), 4” (100mm), white aluminum with black and red markings	1.5” (40mm), 2” (50mm), 2.5” (63mm), 4” (100mm), white aluminum with black and red markings
Case	AISI 304 SS	AISI 304 SS
Lens	Polycarbonate	Polycarbonate
Ring	AISI 304 SS, Crimp-On	AISI 304 SS, Crimp-On
Socket	AISI 316 SS with restrictor screw (dual scale only)	OT 58 brass with restricted orifice (dual scale only) or lead free brass with restricted orifice (dual scale only), NSF-61-372 certified
Connection	1/8”, 1/4” or 1/2” NPT	1/8”, 1/4” or 1/2” NPT or 7/16-20 SAE standard with restricted orifice
Fill Liquid	Glycerin	Glycerin
Bourdon Tube	1.5” (40mm), 2” (50mm): SS C or coil shaped 2.5” (63mm), 4” (100mm): AISI 316 SS C or coil shaped	Phosphor bronze C or coil shaped
Movement	SS	PFQ: OT 59 brass PFQ-LF : Lead free brass, NSF-61-372 certified
Pointer	Aluminum, anodized black	Aluminum, anodized black
Welding	TIG	Silver alloy
Over-pressure Limit	25% for pressures up to 1,450 psi (9,998 kPa), 15% for pressures over 1,450 psi (9,998 kPa)	25% for pressures up to 1,450 psi (9,998 kPa), 15% for pressures over 1,450 psi (9,998 kPa)
Socket Gasket	Welded socket	Buna N for two-piece internal socket seal
Fill Plug	Buna N	Buna N
Lens Ring Gasket	Silicone rubber	Silicone rubber
Working Pressure	Maximum 75% of full scale value	Maximum 75% of full scale value
Ambient/Process Temperature	Dry: -40°F to 200°F (-40°C to 93°C) Glycerin Filled: -4°F to 150°F (-20°C to 65°C)	Dry: -40°F to 200°F (-40°C to 93°C) Glycerin Filled: -4°F to 150°F (-20°C to 65°C)
Accuracy	1.5” (40mm), 2” (50mm): ±2.5% of full scale value 2.5” (63mm), 4” (100mm): ±1.5% of full scale value	1.5” (40mm), 2” (50mm): ±2.5% of full scale value 2.5” (63mm), 4” (100mm): ±1.5% of full scale value
Enclosure Rating	IP65	IP65
Warning (brass and lead free brass internals only)	N/A	⚠ **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.

PFQ, PFQ-LF | Stainless Steel Liquid Filled Gauge, Lead Free Stainless Steel Liquid Filled Gauge

Dual Scale Order Codes (products in bold are normally stock in North America)

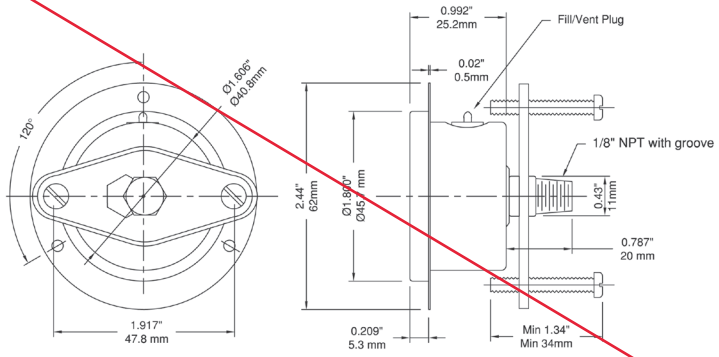
Dial Size	2.5" (63mm)			
Connection	1/4" Bottom	1/4" Back (CB)	1/4" Bottom	1/4" Back (CB)
Movement, Socket, Tube	Brass		SS	
30" Hg Vac/kPa	**PFQ801**	**PFQ900**	**PFQ106**	PFQ147
30"/0/15 psi/kPa	**PFQ790**	PFQ890	PFQ107	PFQ148
30"/0/30 psi/kPa	**PFQ798**	**PFQ898**	**PFQ108**	PFQ149
30"/0/60 psi/kPa	**PFQ799**	**PFQ899**	**PFQ109**	PFQ151
30"/0/100 psi/kPa	**PFQ791**	PFQ891	PFQ110	PFQ156
30"/0/150 psi/kPa	**PFQ792**	**PFQ892**	PFQ111	PFQ157
30"/0/200 psi/kPa	**PFQ794**	**PFQ894**	PFQ112	PFQ158
30"/0/300 psi/kPa	**PFQ795**	PFQ895	PFQ113	PFQ159
0/15 psi/kPa	**PFQ800**	**PFQ901**	**PFQ118**	PFQ162
0/30 psi/kPa	**PFQ802**	**PFQ902**	**PFQ119**	**PFQ163**
0/60 psi/kPa	**PFQ803**	**PFQ903**	**PFQ120**	**PFQ164**
0/100 psi/kPa	**PFQ804**	**PFQ904**	**PFQ121**	**PFQ169**
0/160 psi/kPa	**PFQ805**	**PFQ905**	**PFQ122**	**PFQ170**
0/200 psi/kPa	**PFQ806**	**PFQ906**	**PFQ123**	**PFQ171**
0/300 psi/kPa	**PFQ807**	**PFQ907**	**PFQ124**	**PFQ175**
0/400 psi/kPa	**PFQ817**	PFQ917	**PFQ125**	PFQ177
0/600 psi/kPa	**PFQ808**	**PFQ908**	**PFQ126**	**PFQ178**
0/1,000 psi/kPa	**PFQ809**	**PFQ909**	**PFQ127**	PFQ179
0/1,500 psi/kPa	**PFQ816**	**PFQ914**	**PFQ128**	PFQ180
0/2,000 psi/kPa	**PFQ810**	**PFQ910**	**PFQ129**	PFQ181
0/3,000 psi/kPa	**PFQ811**	**PFQ911**	**PFQ137**	**PFQ182**
0/4,000 psi/kPa	PFQ819	PFQ919	PFQ130	-
0/5,000 psi/kPa	**PFQ812**	**PFQ912**	**PFQ138**	**PFQ183**
0/6,000 psi/kPa	**PFQ814**	**PFQ915**	**PFQ139**	PFQ184
0/7,500 psi/kPa	**PFQ818**	PFQ918	PFQ144	PFQ186
0/10,000 psi/kPa	**PFQ813**	**PFQ913**	**PFQ145**	PFQ190
0/15,000 psi/kPa	-	-	PFQ146	PFQ191

Dial Size	2.5" (63mm)	
Connection	1/4" Bottom	1/4" Back (CB)
Movement, Socket, Tube	Brass	
30" Hg Vac/bar	PFQ801R1R11	PFQ900R1R11
30"/0/15 psi/bar	PFQ790R1R11	PFQ890R1R11
30"/0/30 psi/bar	PFQ798R1R11	PFQ898R1R11
30"/0/60 psi/bar	PFQ799R1R11	PFQ899R1R11
30"/0/100 psi/bar	PFQ791R1R11	PFQ891R1R11
30"/0/160 psi/bar	PFQ792R1R11	PFQ892R1R11
30"/0/200 psi/bar	PFQ794R1R11	PFQ894R1R11
30"/0/300 psi/bar	PFQ795R1R11	PFQ895R1R11
0/15 psi/bar	PFQ800R1R11	PFQ901R1R11
0/30 psi/bar	PFQ802R1R11	PFQ902R1R11
0/60 psi/bar	PFQ803R1R11	PFQ903R1R11
0/100 psi/bar	PFQ804R1R11	PFQ904R1R11
0/160 psi/bar	PFQ805R1R11	PFQ905R1R11
0/200 psi/bar	PFQ806R1R11	PFQ906R1R11
0/300 psi/bar	PFQ807R1R11	PFQ907R1R11
0/400 psi/bar	PFQ817R1R11	PFQ917R1R11
0/600 psi/bar	PFQ808R1R11	PFQ908R1R11
0/1,000 psi/bar	PFQ809R1R11	PFQ909R1R11
0/1,500 psi/bar	PFQ816R1R11	PFQ914R1R11
0/2,000 psi/bar	PFQ810R1R11	PFQ910R1R11
0/3,000 psi/bar	PFQ811R1R11	PFQ911R1R11
0/4,000 psi/bar	PFQ819R1R11	PFQ919R1R11
0/5,000 psi/bar	PFQ812R1R11	PFQ912R1R11
0/6,000 psi/bar	PFQ814R1R11	PFQ915R1R11
0/7,500 psi/bar	PFQ818R1R11	PFQ918R1R11
0/10,000 psi/bar	PFQ813R1R11	PFQ913R1R11

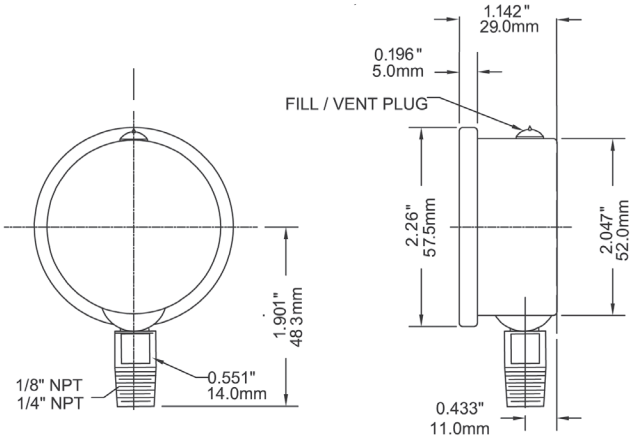
Other ranges and connection sizes available upon request. For scale change, refer to How to Order Guide for scale codes.
For options, attach suffix to end of order code: i.e. PFQ801-25DRY for DRY CASE

Option suffix:
25BF = 2.5" (63mm) Back flange
25DRY = Supply 2.5" (63mm) gauge dry
25FF = 2.5" (63mm) Front flange
25UC = 2.5" (63mm) U-Clamp
EN = EN837-1 compliant
SF25 = 2.5" (63mm) Silicone filled

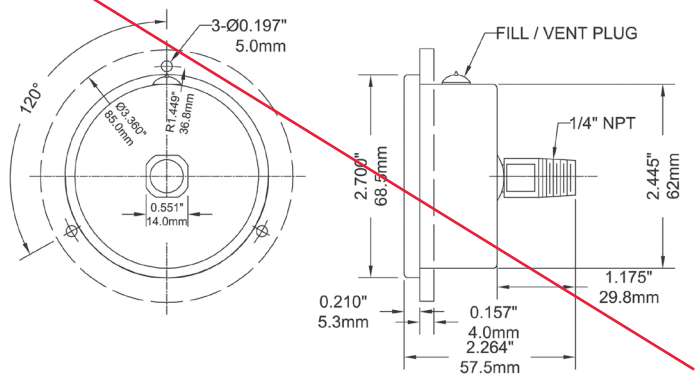
1.5” Back Connection with Front Flange and U-Clamp



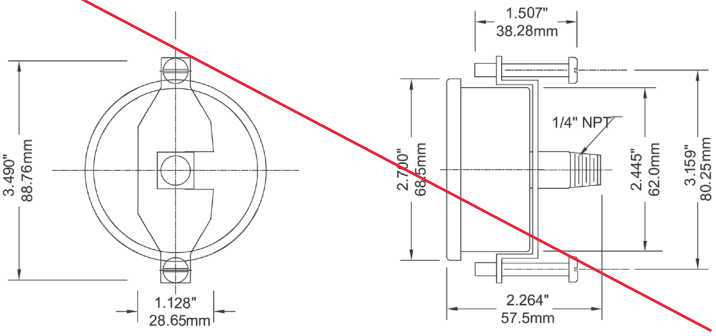
2” Bottom Connection



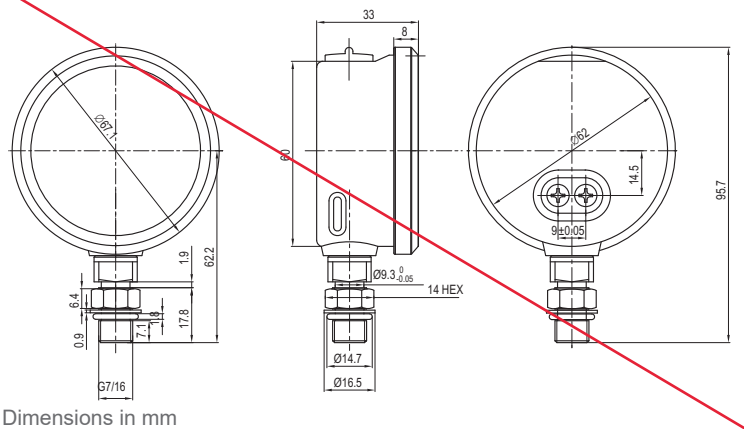
2.5” Back Connection with Front Flange



2.5” Back Connection with U-Clamp



2.5” Bottom Connection SAE



Dimensions in mm

4” Back Connection with Front Flange