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I.O.M.

Installation
Operation
Maintenance
Manual

Disclaimer:

The attached information is to be used in conjunction with the standard applicable unit IOM. Failure to follow the proper procedures in this addendum and the factory IOM could result in additional technician startup time not covered by Fisen Corporation. The IOM included with the unit is treated as a part. If the IOM is removed the customer will be charged for another IOM if needed.

Safety Warnings:

General industry recognized safety standards and practices must be observed at all times. General industry knowledge and experience are required to assure technician safety. It is the responsibility of the technician in accessing all potential dangers and, prior to beginning any work, taking all steps warranted to perform the work in a safe manner by addressing those potential dangers with minimal risk of injury.

Test and Balance:

A certified test and balance should be performed on site before the unit arrives (if replacing existing unit) and after the new unit is installed. Proper testing before the unit assures that proper airflows are actually being delivered, and the new unit can be designed accordingly. All instruments used for the test and balance shall be periodically calibrated for optimal results. A proper test and balance may reveal that new sheaves and belts are required, which are not covered by the unit manufacturer.

IOM Literature:

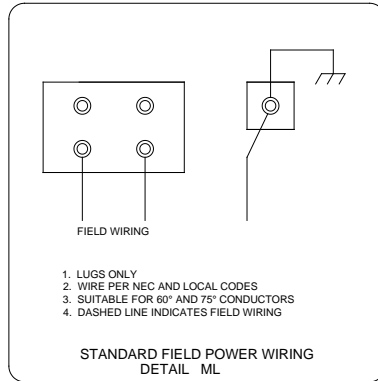
The information contained in this IOM supplement is meant to be used in conjunction with the standard applicable unit IOM. All aspects of the units operation may not be covered in the following IOM supplement. Areas which are not covered are covered in the standard unit IOM, therefore the standard unit IOM should be consulted for proper startup and operation.

Safety Warnings:

The skid has been provided with lifting lugs. All lifting lugs must be used with an appropriate spreader bar to avoid damage to the skid, property, or personnel.

Field Connections:

HV Electric Connection(s):



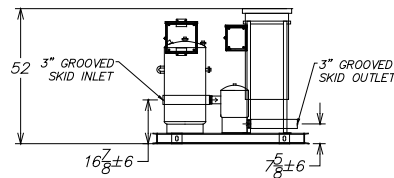
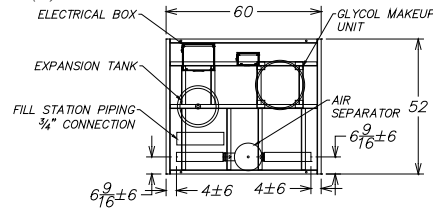
Controls Connection(s):

n/a

Gas Connection(s):

n/a

Hydronic Connection(s):



Steam Connection(s):

n/a

Condensate Connection(s):

n/a

Duct Connection(s):

n/a

System Components:

Pumping Skid - The pumping package skid shall be fabricated as shown in the drawings accompanying this submittal to include a stable platform for the hydronic system pumping and piping package.

Pumping Skid – Base – Structural Steel - The pumping skid shall be engineered and fabricated using structural steel base with a minimum of 4” high main beams and 4” cross members. Plates, when present, shall be a minimum of 3/16” plate steel and welded to the frame for a secure anchoring of equipment. The frame shall be primed and painted. Lifting lugs shall be provided for rigging the unit into place on the job site. Lifting lugs shall be welded or bolted to the structural steel base depending on specific design requirements. Additional holes shall be provided for the installation of field provided and installed isolators. Refer to rigging and weight diagram for details on hole location.

Pumping Skid – Lifting Lugs – The pump package skid shall incorporate lifting lugs to rig, position, and set skid in place on the job site. Lugs are located and provided as shown in the accompanying rigging diagram. Lugs are designed to accept a “corky” style lifting device commonly used in container rigging. The holes are designed to accept a 1.7x3.0 inch “corky”. The pump skid must be rigged using all provided lifting lugs and only rigged dry and empty.

Pumping Skid – Base – Finish – Painted - The pumping skid base shall be primed with an exterior grade corrosion inhibiting primer following preparation for finish. Preparation includes wash down of all surfaces with a paint-prep solution, removal of weld slag, and sanding of any fine surface corrosion that may be present when materials are delivered from the mill. After primer has dried and cured, the steel base shall be painted a neutral color similar machine dark grey, champagne brown, or black. Slight variations in dye lots may change final appearance of the pumping skid color. The underside of the pumping skid is provided primed and painted in a similar fashion to the top side. The pumping skid base is provided uninsulated.

Piping Package - A Fisen installed piping package shall be provided for the unit. Piping shall be as indicated on the enclosed drawings. No components not specifically identified in this document or upon the enclosed Fisen drawings shall be included. Construction and material for piping shall be as indicated below.

Piping Package – Pipe and Fittings Construction - Fisen will provide at our option one or a mixture of the following:

1. Schedule 40 black steel pipe, welded and 150 pound flanges.
2. Type L hard drawn copper with wrought copper fittings or copper grooved mechanical couplings and standard copper grooved fittings.

Piping Package – Single Entering / Leaving Fluid Connection – The unit shall be equipped with a single entering fluid connection and a single leaving fluid connection. The connection type shall be as indicated on the included submittal drawings elsewhere in this document. When unit is assembled using C-606 style grooved fittings and couplings and the connection type is shown as flanged, the unit shall ship with flange adapters. These items ship loose and require field installation. The flange adapters are not typically listed in the field installed items section.

Piping Package - Air Separator with Manual Air Vent - The package shall be equipped with an air separator with a manual air vent. ASME air separators are designed according to the ASME CODE Section VIII. Div 1. Intended for use in hydraulic / chilled water systems. The air separator shall have a maximum working pressure of at least 125psi and a maximum working temperature of 375°F. Construction shall be of carbon steel. These air separators are intended for removal of entrapped air in hydronic and plumbing systems.

Air Separator Air Vent – Brass Isolation Ball Valve – The unit shall utilize a two piece body, full port, blowout proof stem PTFE seat ball valves as isolation valves on components indicated on the hydronic diagram in this document. Valves under 2” shall have a 600 PSI working pressure and valves 2-1/2” to 4” shall have a 400 PSI

Air Separator – Drain Plug – The air separator shall be equipped with a port in the bottom of the tank for the draining of the system fluid. The port ships with a plug or in the case of an insulated vessel, a nipple and cap. The cap or plug is provided uninsulated in all circumstances. If a nipple is installed it shall be insulated if the vessel is provided insulated. The cap, plug, and nipple assembly shall be schedule 40 black pipe.

Piping Package – Liquid in Glass Thermometer – The package shall be equipped with 9” liquid in glass thermometers in the locations shown in the hydronic schematic. The thermometers are installed in

temperature wells and packed with thermal conductive compound. The thermometer is a liquid in glass design and features a cast aluminum case to provide weather tight sealing. The thermometer shall have +/- 1.0% full scale accuracy IAW ASME B40.3 Grade A

Piping Package – Thermo Well – The skid shall be equipped with brass thermo wells for use with standard thermistors, temperature sensors and thermometers. The brass well is compatible with noncorrosive liquids and have a maximum withstand temperature of 400°F and a static pressure of 1000 psi.

Piping Package – Pressure Gauge – The pipes leaving and entering the heat exchanger shall be equipped with a pressure gauge. The gauge shall be capable of reading the system pressure. The pressure gauge shall be a 4-1/2” gauge with a 1/4” connection size. Gauge units of measure shall be in psi unless specifically stated otherwise. The wetted parts are bronze tube and socket. Freeze protection of the gauge assembly and associated piping is the responsibility of the installing contractor, unless a freeze protection / heat trace package has been specifically identified elsewhere in this document. Some applications, particularly those subject to severe pressure fluctuations, pulsations, or line shock, require the installation of field provided and installed snubbers or dampeners. If excessive pulsations are present snubbers or orifice pulsation dampeners are recommended.

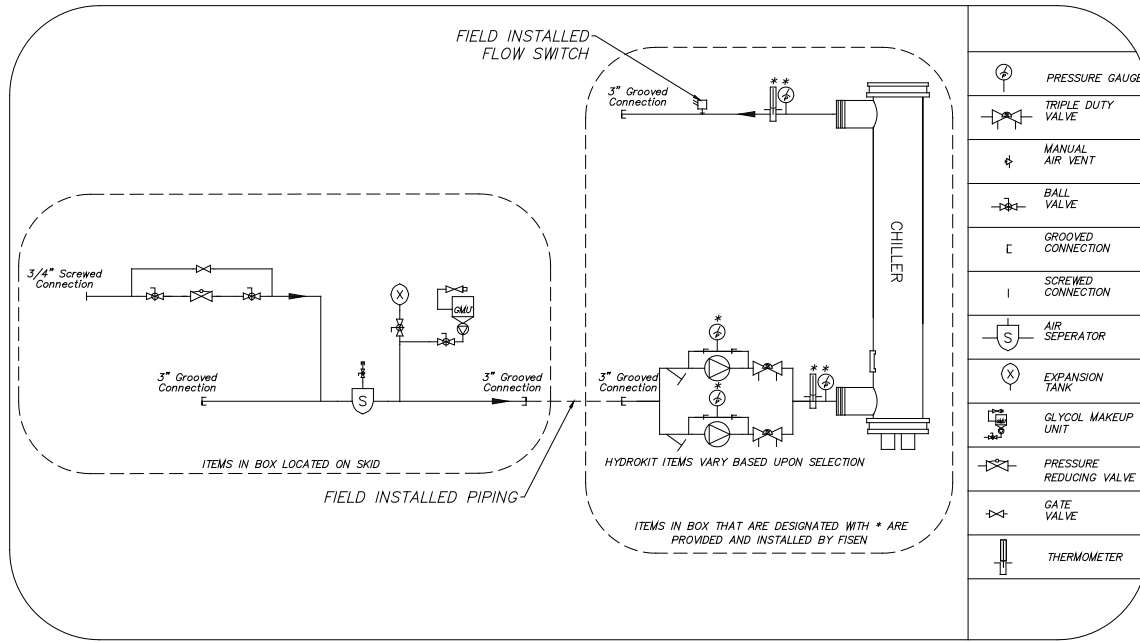
Piping Package - Expansion Tank - The piping package shall be equipped with a thermal expansion tank. The tank shall be constructed in accordance with ASME Code section VIII, Div.1 and bear a UM stamp. The maximum working pressure of the tank shall be at least 150 psi and the maximum operating temperature shall be 240°F. Construction is based upon a two shell or two shell and body design depending upon total capacity. A removable butyl bladder is used to isolate water from the tank to mitigate corrosion. The tank utilizes a carbon steel water connection and is equipped with a protective nipple for the air valve. The tank ships precharged to 12 psi. The installing contractor must charge to specific job site conditions at the time of system startup.

Pump Package – Expansion Tank – Brass Isolation Ball Valve - The unit shall utilize a two piece body, full port, blowout proof stem PTFE seat ball valves as isolation valves on components indicated on the hydronic diagram in this document. Valves under 2” shall have a 600 PSI working pressure and valves 2-1/2” to 4” shall have a 400 PSI working pressure. Valve connections may be threaded or sweat depending upon system requirements.

Piping Package – 30 Gallon Glycol Make-up Unit - Pumping package shall be equipped with a glycol makeup unit. Glycol Make-up Unit (GMU) shall be a packaged, automatic glycol solution make up unit. The unit shall have a 30 gallon mixing tank capacity configured in a space saving design to minimize floor space requirement. The package shall monitor and maintain the minimum system pressure at all times. The pressurization assembly shall consist of a pressurization pump with pressure controls, a PRV, and a pressure gauge to continuously monitor PRV outlet pressure. The pressurization assembly shall be mounted on the translucent polyethylene solution container, complete with cover. Discharge pressure shall be factory preset to 12 psig and adjustable from 10-60 psi.

Piping Package – Pipe and Fittings Insulation – 3/4” Elastomeric - All non-economizing chilled water piping, fittings and hydronic specialties are provided with 3/4” elastomeric insulation. Insulation shall be UV resistant without the application of covering paint. Depending upon material availability at the time of fabrication, standard elastomeric insulation may be provided and coated with an ultraviolet resistant finish. Components and piping provided on the base unit shall retain factory provided insulation type and size unless specifically noted elsewhere in this document.

Insulation is installed using a contact adhesive. As a contact adhesive, in all cases, both surfaces to be joined are coated with adhesive. For application to large, flat or curved metal surfaces such as ducts, very large pipes, tanks and vessels, full adhesive coverage is used. For application as pipe insulation and fitting covers, only the seams and joints are adhered with contact adhesive.



HYDRONIC SCHEMATIC

Sequence of Operation:

All controls and programming required for proper operation shall be provided by others.

Field Adjustment(s):

n/a

PM Requirements:

None of the installed components require any special preventative maintenance procedures unless listed below. Please use generally accepted industry standards for routine maintenance to this unit.

Vortex Air Separators - Models VA / VAS: 2" to 3"

SUBMITTAL

JOB: _____	REPRESENTATIVE: _____
ENGINEER: _____	ORDER NO: _____ DATE: _____
CONTRACTOR: _____	SUBMITTED BY: _____ DATE: _____
	APPROVED BY: _____ DATE: _____

MODEL NO. ORDERED: _____ QTY.: _____
 TAG NO.: _____
 ASME CONSTRUCTION: YES NO

TECHNICAL DATA

Max. Working Temperature	350°F (176°C)
Max. Working Pressure	160 psi (1105 kPa)
Connection Type	Threaded NPT

MATERIALS OF CONSTRUCTION

Shell	Cast Iron
Strainer	Stainless Steel Mesh (1/4" x 3/4")
Gasket	Non-Asbestos

TYPICAL SPECIFICATION

ASME Coded Units

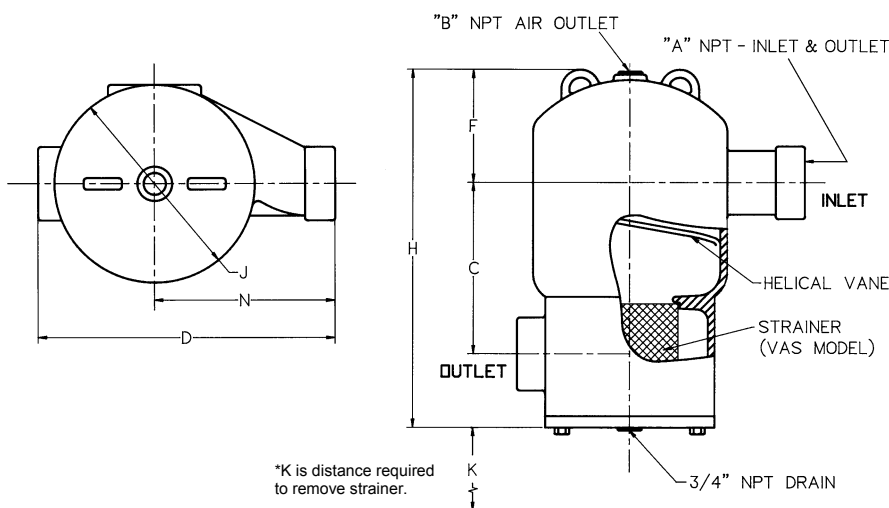
Furnish & install an Armstrong Vortex® Air Separator, Model ____ VA or Model ____ VAS (with strainer) with NPT tangential connections as shown on plans. The unit shall be designed and built in accordance with the latest revisions of ASME Pressure Vessel Code, Section VIII, Division 1. A blowdown connection is provided for routine cleaning of the unit.

Non-ASME Coded Units

Furnish & install an Armstrong Vortex^a Air Separator, Model ____ VA or Model ____ VAS (with strainer) with NPT tangential connections as shown on plans. The unit is considered as "part of the piping" and no Code Inspection applies. A blowdown connection is provided for routine cleaning of the unit.

MODEL		DIMENSIONS inches (mm)									FLOW RATE in USgpm (L/s) for LINE VELOCITY ft/s (m/s)			WEIGHT lbs. (kg)		STRAINER SCREEN FREE AREA
LESS STRAINER	WITH STRAINER	A	B	C	D	F	H	J	K	N	4 (1.22)	6 (1.83)	8 (2.44)	VA	VAS	Sq. in. (Sq. cm)
VA-2	VAS-2	2.00 (51)	0.75 (19)	7.50 (191)	12.75 (324)	4.75 (121)	15.75 (400)	8.63 (219)	7.00 (178)	7.75 (197)	42 (2.6)	63 (4.0)	84 (5.3)	70 (32)	70 (32)	40 (258)
VA-2-1/2	VAS-2-1/2	2.50 (64)	0.75 (19)	9.25 (235)	15.50 (394)	6.15 (156)	19.00 (483)	10.70 (272)	7.88 (200)	9.50 (241)	60 (3.8)	90 (5.7)	120 (7.6)	100 (45)	100 (45)	67 (432)
VA-3	VAS-3	3.00 (76)	0.75 (19)	9.25 (235)	15.50 (394)	6.15 (156)	19.00 (483)	10.70 (272)	7.88 (200)	9.50 (241)	93 (5.9)	140 (8.8)	185 (11.7)	100 (45)	100 (45)	67 (432)

Note: Dimension "K" applies to only VAS Models.



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INSTALLATION AND OPERATING INSTRUCTIONS

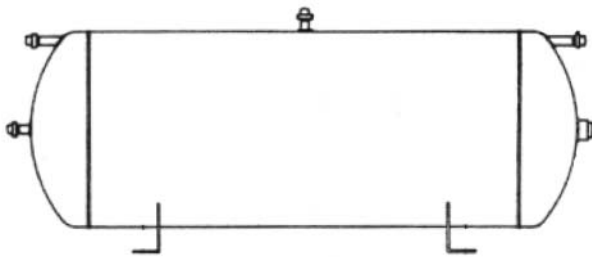
AX (Horizontal) and AX-V Series

ASME PRE-PRESSURIZED DIAPHRAGM EXPANSION TANKS FOR HEATING & COOLING SYSTEMS

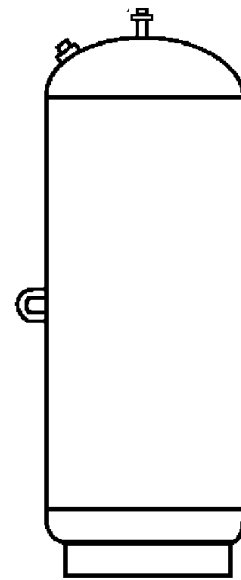
VESSEL DESCRIPTION

Armstrong AX Series Tanks are ASME constructed, pre-charged expansion tanks. They are designed to absorb the expansion forces and control the pressure in heating/cooling systems. The system's expanded water (is contained behind a heavy-duty diaphragm fully compatible with water/glycol mixtures) preventing tank corrosion and waterlogging problems.

The factory set pre-charge for these tanks is **12 psig (83 kPa)**.



**AX Series –
Fixed Diaphragm**



**AX-V Series –
Fixed Diaphragm**

CONSTRUCTION DETAILS

MATERIALS OF CONSTRUCTION	
Shell	Carbon Steel
Diaphragm	Heavy Duty Butyl

MAXIMUM OPERATING CONDITIONS	
Working Temperature	240°F (115°C)
Working Pressure	125 psi (862 kPa)

STEPS & PROCEDURE

- Visually inspect tank for damage, which may occur during transit.
 - Factory pre-charge pressure may not be correct for the installation. Tank **MUST** be pre-charged to system design fill pressure **BEFORE** placing into operation. Remove pipe plug covering the valve enclosure. Check and adjust the charge pressure by adding or releasing air for each application.
- If the system has been filled, the tank must be isolated from the system and the tank emptied before charging. This ensures all fluid has exited the diaphragm area and proper charging will occur.
- If the pre-charge adjustment is necessary, oil and water free compressed air or nitrogen gas may be used. Check the pre-charge using an accurate pressure gauge at the charging valve and adjust as required. Check air valve for leakage. If evident, replace the Schrader-type tire valve core. Do not depend on the valve cap to seal the leak. After making sure air charge is correct, replace pipe plug over the charging valve for protection.
 - Set tank in place and pipe system connection to system. Be sure to include isolation valve(s) and drain.
 - Purge air from system **BEFORE** placing tank into operation. All models have system water contained behind diaphragm.
 - When filling the system with water, open valves to tank to ensure that any residual air in the tank is displaced by water.
 - It is recommended that the pre-charge be checked annually to ensure proper system protection and long life for the vessel.

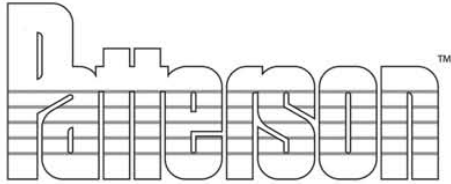
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AUTOMATIC FAST FILL VALVES

Models 10F & 11F

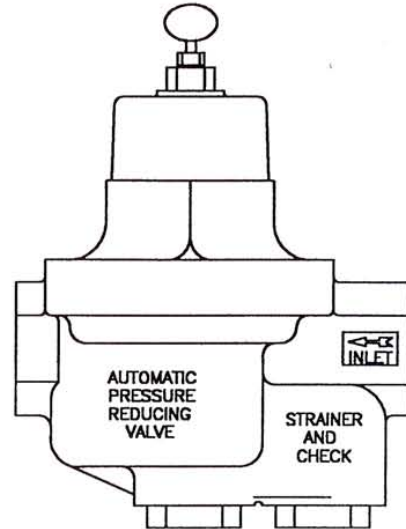
AUTOMATIC FAST FILL VALVES

The Patterson Automatic Fill Valves are low pressure reducing valves designed to maintain proper water pressure in closed loop heating systems or any closed piping system.

Standard factory setting is 12 PSIG delivery pressure with incoming pressure of 45 PSIG. The adjusting screw permits field adjustments from 2 PSIG (min) to 25 PSIG (max) pressures.

All Fast Fill Valves feature a clean able strainer, removable seat, brass working parts, heat resistant seat and diaphragm and a built in check valve.

The thumb screw adjustment feature in all Fast Fill Valves allow for fast filling and positive purging of air from hot water systems without a separate by pass line. Turning the thumbscrew clockwise overrides the operating setting and opens the valve for system filling. Turning the thumbscrew counterclockwise closes the valve and restores the valve to factory setting.



Model	Part Number	Size Conn.	Built In Check	Material Body	Wt. Lb.	Height	Width
10F	418-2	1/2"	Yes	Bronze	3	6 1/2"	4 1/2"
11F	418-3	3/4"	Yes	Bronze	4	6 3/4"	5"

Job Name: _____
 Location: _____
 Engineer: _____
 Contractor: _____

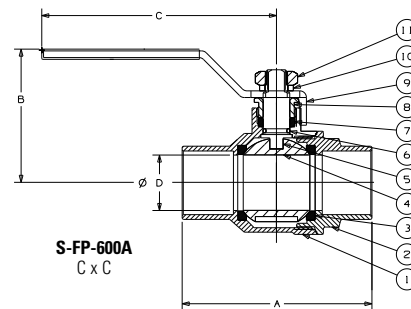
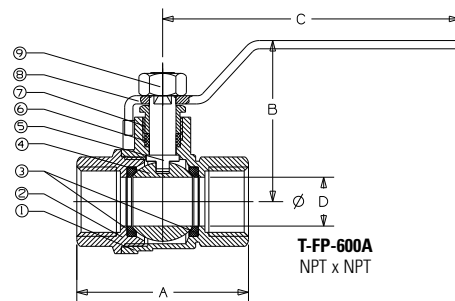
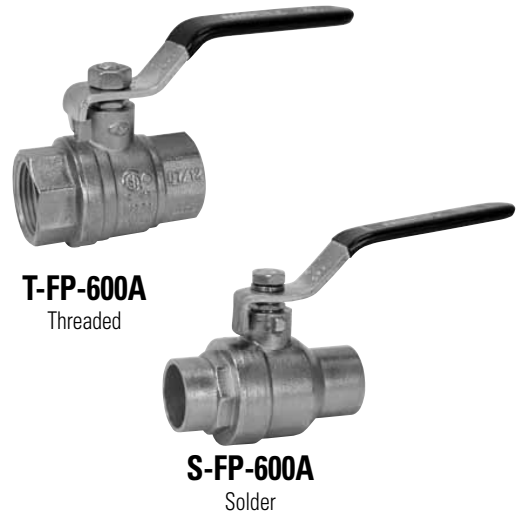
Representative: _____
 Model No: _____
 Notes: _____

Brass Ball Valves

Two-Piece Body • Full Port • Blowout-Proof Stem • PTFE Seats

1/4"-2" 600 PSI/41.4 Bar Non-Shock Cold Working Pressure
2 1/2"-4" 400 PSI/27.6 Bar Non-Shock Cold Working Pressure

<p>CSA CERTIFIED TO ASME B16.44 AND CR91-002 (THREADED 1/4"-4") • UL LISTED (THREADED 1/4"-4")</p> <ul style="list-style-type: none"> • IAPMO LISTED TO NSF/ANSI 61-8 • FM APPROVED (THREADED 1/4"-2")
<p>CSA (1/4" - 4"):</p> <ul style="list-style-type: none"> • CR91-002: 1/2 psig, 2 psig, and 5 psig (these are specific approved categories) • ASME B16.44: 125 psig (maximum) • Temperature is -4° F to 194° F <p>FM (1/4" - 2"):</p> <ul style="list-style-type: none"> • 175wwp (both SFP600A and TFP600A) <p>UL, Gas and Oil (1/4" - 4"):</p> <ul style="list-style-type: none"> • YQNZ, Compressed Gas Shutoff Valves: 250 psi • YRBX, Flammable Liquid Shutoff Valves: 250 psi • YRPV, Gas Shutoff Valves: 250 psi • YSDT, LP-Gas Shutoff Valves: 250 psi • MHKZ, Manual Valves: 250 psi



MATERIAL LIST

PART	SPECIFICATION
1. Body	Forged Brass ² CU > 57%
2. End Cap	Forged Brass ² CU > 57%
3. Ball Seat	PTFE
4. Ball	Brass, Chrome Plated
5. Stem	Brass
6. O-Ring (Stem Seal)*	Fluorocarbon (FKM)
7. Stem Packing	PTFE
8. Packing Nut	Brass
9. Lever Handle ¹	Steel, Plated
10. Lock Washer*	Stainless Steel
11. Handle Nut ¹	Stainless Steel

Note: * Parts 6 and 10 are applicable of S-FP-600A only.

¹ Due to Standard Approvals, Lever Handles and Nuts are not interchangeable between Solder and Threaded. There are no handle options at this time.

² For Material Certification, contact NIBCO Technical Services.

DIMENSIONS—WEIGHTS—QUANTITIES

Dimensions

Size	T-FP-600A		S-FP-600A		T-FP-600A		S-FP-600A		T-FP-600A		S-FP-600A		Port		T-FP-600A		S-FP-600A		T-FP-600A		S-FP-600A		
	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.	Lbs.	Kg.	Ctn.	Qty.	Ctn.	Qty.	
1/4	8	1.76	45	—	—	1.73	44	—	—	3.54	90	—	—	.39	10	.33	.15	—	—	18	—	—	—
3/8	10	1.76	45	1.75	44	1.73	44	1.58	40	3.54	90	3.78	96	.39	10	.30	.14	.38	.17	18	18	18	18
1/2	15	2.05	52	2.01	51	1.92	49	1.78	45	3.54	90	3.78	96	.59	15	.44	.20	.40	.18	18	18	18	18
3/4	20	2.36	60	2.74	70	2.09	53	2.13	54	3.78	96	3.98	101	.75	19	.66	.30	.67	.30	12	12	12	12
1	25	2.76	70	3.35	85	2.56	65	2.52	64	4.53	115	4.41	112	.98	25	1.10	.50	1.12	.51	6	6	6	6
1 1/4	32	3.31	84	3.78	96	2.95	75	2.65	67	4.53	115	5.04	128	1.26	32	1.57	.71	1.49	.67	4	4	4	4
1 1/2	40	3.66	93	4.42	112	3.35	85	3.12	79	5.51	140	6.22	158	1.57	40	2.40	1.09	2.38	1.08	2	2	2	2
2	50	4.18	106	5.34	136	3.68	93	3.41	87	5.51	140	6.22	158	1.97	50	3.37	1.53	3.62	1.64	2	2	2	2
2 1/2	65	5.38	137	6.28	160	4.76	121	4.76	121	8.66	220	8.66	220	2.56	65	7.60	3.45	6.36	2.88	3	3	3	3
3	75	6.04	153	7.15	182	5.08	129	5.08	129	8.66	220	8.66	220	2.95	75	9.36	4.24	8.32	3.77	2	2	2	2
4	100	7.39	188	—	—	5.87	149	—	—	9.61	244	—	—	3.89	99	16.85	7.64	—	—	1	—	—	—



Class 150 Bronze Globe Valves

Union Bonnet • Integral Seat • Renewable Seat Disc

150 PSI/10.3 Bar Saturated Steam to 366° F/185° C
300 PSI/20.7 Bar Non-Shock Cold Working Pressure

CONFORMS TO MSS SP-80

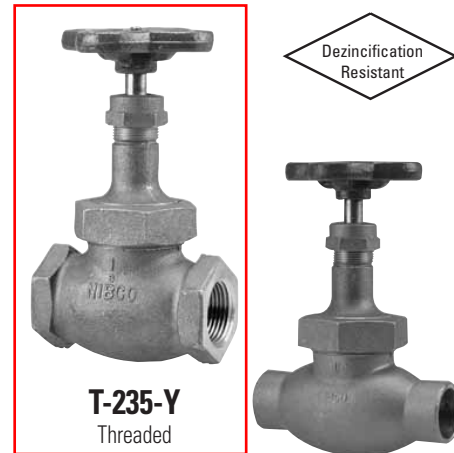
MATERIAL LIST

PART	SPECIFICATION
1. Handwheel Nut	300 Series Stainless Steel
2. Identification Plate	Aluminum
3. Handwheel	Malleable Iron ASTM A 47
4. Stem	Silicon Bronze ASTM B 371 Alloy C69400/C69430
5. Packing Gland	Bronze ASTM B 62 or ASTM B 584 Alloy C84400 or Brass ASTM B 16
6. Packing Nut	Bronze ASTM B 62 or ASTM B 584 Alloy C84400 or Brass ASTM B 16
7. Packing	Aramid Fibers with Graphite
8. Bonnet	Bronze ASTM B 62
9. Union Nut	Bronze ASTM B 62
10. Body	Bronze ASTM B 62
11. Disc Holder	Bronze ASTM B 62
12. Disc	Steam (PTFE) (Y)
13. Disc Nut	Bronze ASTM B 62/ASTM B 98 Alloy C65100 w/SS Washer

DIMENSIONS—WEIGHTS—QUANTITIES

Size	Dimensions						Weights				Master Ctn. Qty.		
	In.	mm.	A		B		C		T-235-Y		S-235-Y		T-235-Y
		In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.	Lbs.	Kg.		
† 1/8	6	2.31	59	3.88	99	2.00	51	1.21	0.55	1.06	0.48	50	50
† 1/4	8	2.31	59	3.88	99	1.88	48	1.19	0.54	1.05	0.48	50	50
† 3/8	10	2.38	60	3.88	99	1.75	45	1.17	0.53	1.03	0.47	50	50
1/2	15	2.69	68	4.63	118	1.88	48	1.60	0.73	1.38	0.62	40	50
3/4	20	3.19	81	5.38	137	2.31	59	2.34	1.06	2.21	1.00	20	20
1	25	3.75	95	6.00	153	2.88	73	3.56	1.61	3.35	1.52	10	20
1 1/4	32	4.25	108	6.56	167	3.13	79	5.76	2.61	4.93	2.23	10	10
1 1/2	40	4.75	121	7.38	187	3.75	95	7.59	3.44	7.17	3.25	6	10
2	50	5.75	146	8.31	211	4.50	114	12.56	5.70	11.02	5.00	4	4
2 1/2	65	6.63	168	10.19	259	5.38	137	17.44	7.91	17.16	7.79	2	2
3	80	7.75	197	11.13	283	6.50	165	23.87	10.83	22.82	10.35	2	2

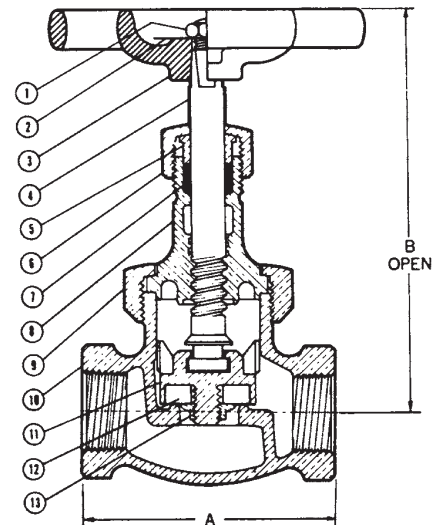
† No packing gland, packing only in these sizes.



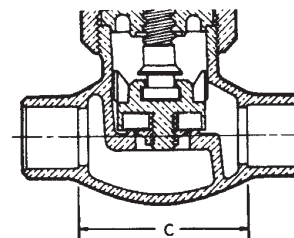
T-235-Y
Threaded



S-235-Y
Solder



T-235-Y
NPT x NPT



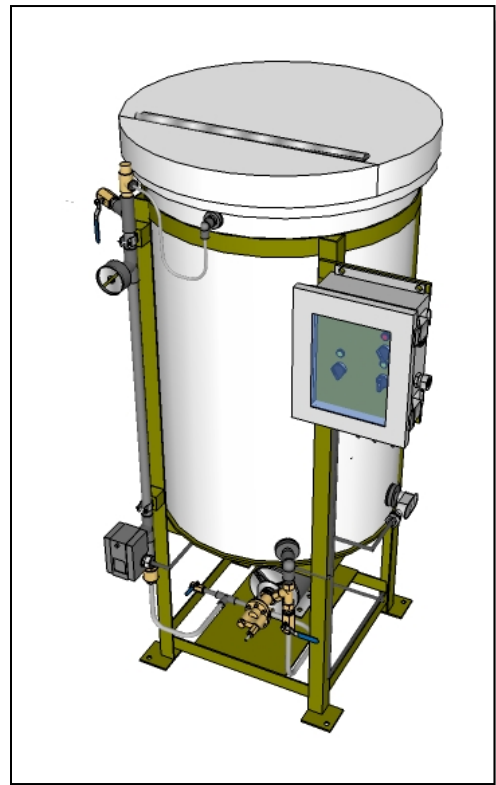
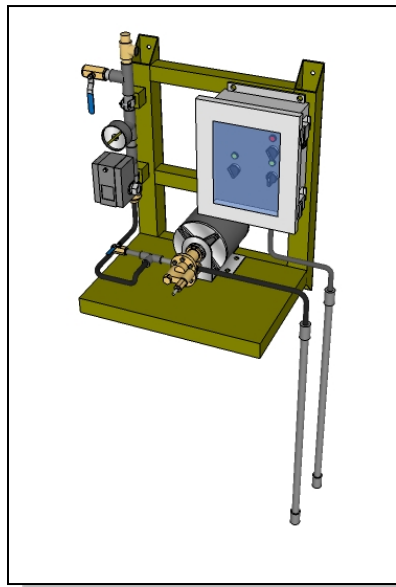
S-235-Y
C x C

FREEZING WEATHER PRECAUTION: Subsequent to testing a piping system, valves should be left in an open position to allow complete drainage.

♦ For detailed Operating Pressure, refer to Pressure Temperature Chart on page 113.



Industrial Gly-Pack Feed Systems Operations & Maintenance Manual



**Record Your Model, Serial Number and
Other Information on the back of this document.**

Manufacturing: Bypass & Filter Feeders, Glycol Feed Packages, Separators & Separator Systems, Tanks, Tank Stands, Chemical Batch Mixers, Corrosion Coupon Racks, Packaged Feed Systems and Custom Systems

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General Treatment Products Inc., Brea, CA 92821,
O&M Manual 01500010 Rev. 0115, Page 1 of 10

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***** WARNING – BEFORE YOU GET STARTED *****

- 1) All fasteners & fittings should be inspected and secured before operation as they may be loosened in transit
- 2) Personnel safety practices should apply at all times
- 3) Safety glasses or face shields and gloves should be worn
- 4) Do not service glycol feed package with out disconnecting power
- 5) Close isolation valve and release pressure before servicing any components on the system
- 6) All liquids in system should be drained before servicing

1.0 INTRODUCTION Thank you for choosing General Treatment Products Industrial “Gly-Pack” Glycol Feed Package. This industrial, automated package comes complete and ready to install. In this document we explain the basics for locating, installing, adjusting and operating this glycol fed system. For further information, please contact us at customerservice@gtpcompany.com or call us at the phone number on the cover.

2.0 WARRANTY General Treatment Products Gly-Pack Feed Systems are guaranteed for two years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed. We will repair or replace a defective part of this system when returned to our factory with freight prepaid; providing that the part is found to be defective upon inspection. We assume no liability for labor and/or other expenses in making repairs or adjustments.

3.0 UNPACKING **Upon receipt of order, inspect package thoroughly.** In the event there was damage incurred in transit you must notify the freight company within **3-5 days of receipt of order**. Once system is inspected for damage and received in good condition, and store indoors in safe place until installing. Damaged incurred before installation is not covered under warranty.



3.1 PRODUCT/ORDER VERIFICATION

MODEL			
GP	55	-E4	-1 -HM
OPTIONS			
-HM	High Temperature Discharge Manifold		
-DGL	Digital Glycol Control Panel		
-SC	Surge Suppression Chamber		
-AL	Audible Alarm & Silence Switch		
-DC	Remote Dry Contact on Low Level		
-MX	Mixer & Control Switch		
-HL	High Level Indicator		
Note: See pricing for complete options list			
PRESSURE RANGE			
	CUT-IN	CUT-OUT	PSID
1	10-45 (20*)	20-50 (40*)	10-30 (20*)
2	40-80 (60*)	65-100 (90*)	20-40 (30*)
3	3-10 (8*)	9-30 (15*)	6-20 (7*)
CST	Custom (See back of manual and inside of pressure switch cover to verify).		
PUMP			
D	Dual Pump System		
E	Standard Model		
H	High Temp Model		
4	1.3GPM at 100PSI gear pump		
5	3.0GPM at 100PSI gear pump		
SIZE (GALLONS)			
15	15 gallon PE tank and hinged cover		
30	30 gallon PE tank and hinged cover		
55	55 gallon PE tank and hinged cover		
100	100 gallon PE tank and hinged cover		
BASE MODEL			
GP	Glycol industrial package, tank, hinge lid, stand, low level, pressure switch, pump, pressure gauge and pressure relief.		
GX	Glycol industrial wall mount package, low level wand, pressure switch, pump, pressure gauge and pressure relief.		
GDW	Glycol industrial double wall tank package, low level wand, pressure switch, pump, pressure gauge and pressure relief.		

Note: Not all options and sizes available on all systems. See pricing for standard models.

4.0 LOCATION AND ENVIRONMENT Although the control panel is rated for outdoor use the gear pump, pressure switch and power cord should not be exposed to direct elements. In most cases, there will not be a dry indoor location that is convenient to install the glycol feed system. Some shelter, awning or shed needs to be installed to validate warranty.

5.0 INSTALLATION Once location is decided on, system need to be securely mounted to concrete base. **Be sure that mounting pad and anchoring bolts comply with local building codes.**

Glycol feed packages come standard with an 8FT power cord. Power supply with no less than 15 amps should be within 8FT of glycol feed package. **Extension cords should not be used at anytime.** Systems can be hardwired, if need. Have only an experienced electrician hardwire system. Wiring diagrams are provided in section 9.0.

5.1 CONNECTING TO THE SYSTEM Glycol feed package should be installed within 10 to 30 feet of system. If system is to close, it is difficult to set low pressure systems. If system is to far, pump outputs will very based on pipe size, elbows and other fittings.

Glycol feed package is supplied with ½" isolation valve and should be connected to system using a minimum pipe size of ½". **DO NOT INSTALL CHECK VALVES OR PRESSURE REDUCING VALVES BETWEEN GLYCOL FEED PACKAGE AND SYSTEM.** The installation of check valve or pressure reducing valves will cause problems with reading system pressure accurately.



5.2 ADJUSTING THE PRESSURE RELIEF VALVE Turning the pressure valve counter-clockwise will decrease the system pressure relief setting and turning the valve handle clockwise will increase the pressure setting. If an engineer or system designer has not set the system pressure relief for you, you should have the glycol system setting above 3% to 5% higher than the main system pressure relief valve. That way in the case of system over pressure, the contents of the system will not over flow the glycol package.

5.3 ADJUSTING THE PUMP INTERNAL PRESSURE RELIEF (Bronze gear pumps only) Turning the set screw and lock nut counter-clockwise will decrease the pump internal pressure relief setting and turning it clockwise will increase the internal pressure relief setting. This feature is a pump standard, and on our system is only needed when setting the pump in low pressure systems. Over adjustment may cause harm to the operations of the pump. It's normally best to leave this alone. If you have a pump that is not performing, give us a call and we'll be glad to help.

5.4 SETTING THE PRESSURE SWITCH GTP Glycol Feed Packages, when specified, can be factory pre-set to your system requirements. When requested, your factory settings will be listed on label on back of instruction manual and on packing slip. If you are setting the pressure switch on site, please follow the steps below.

STEP 1) close isolation valve and open pressure relief valve.

STEP 2) Start systems in manual and adjust pressure relief valve to cut-in pressure desired. (This should be the low pressure setting)

STEP 3) Turn large nut on pressure switch out (counter-clockwise) until pressure switch is off.

STEP 4) now, turn same nut on pressure switch in (clockwise) until pressure switch is on.

STEP 5) Adjust pressure relief valve to cut-out pressure determined. (This will be the high pressure setting)

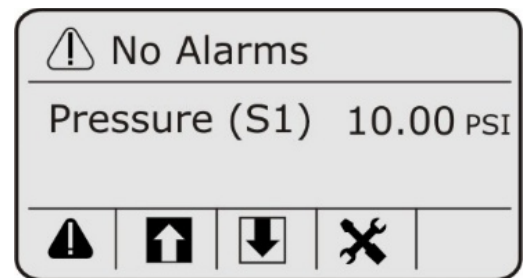
STEP 6) If pressure switch has not turned off, turn small nut (counter-clockwise) until pressure switch turns off.

STEP 7) If pressure turn off before you could set it, turn small nut clockwise 2 or 3 revolutions and repeat STEP 6.

STEP 8) Test setting by adjusting pressure relief valve in and out of range before returning system to automatic position.

5.3 SETTING THE DIGITAL CONTROLLER

GTP Economy Digital Glycol Feed Controller is a back lit custom LCD and should not be exposed to direct sunlight. The screen and key image to the right is the home screen. Understanding the Icon based menus will allow you to navigate the system. The buttons below the screen execute the symbols along the lower portion of the screen.



The symbols across the bottom of the screen are:

⚠ Alarms ↑ Inputs ↓ Outputs 🛠 Maintenance

Other icon's include:

↶ Back One 🏠 Calibration ✕ Cancel ✓ Check

⏏ Enter ➡ Scroll Left ▼ Scroll Down ▲ Scroll Up

⬇ Value Down ⬆ Value Up



Main/Home Screen Menus



⚠ Alarms
Shows Alarms

↑ Inputs
Pressure (S1)
Unassigned (S2)
Low Level (D1)
Flow Meter (D2)

↓ Outputs
Glycol Pump (R1)
Mixer Timer (R2)
Alarms (R3)

🛠 Maintenance
Global Settings
Security Settings
Display Settings
File Utilities
Controller Details



5.3A  ADJUSTING INPUTS: This is to maintain the pressure sensor, changing the settings for the low level switch or adding the setting for a output flow meter. Press the button below the  input icon. The input menu will have all available inputs. Pressure sensor input (S1), Low Level sensor input (D1) and optional flowmeter input (D2).

5.3a1 PRESSURE SENSOR INPUT (S1) MENU: () Sensor input menu includes alarms for low and high pressure and allows you to change values such as name and pressure units.

Prompt	Response/Value:
LoLo Alarm	0.00
Low Alarm	0.00
Hi Alarm	100.00
HiHi Alarm	100.00
Deadband	0.50
Cable/Length	3FT
Gauge Wire	22GA/.35MM2
Units	PSI
Sensor Slope	2.0
Sensor Offset	0.0
Low Range	0.0
Hi Range	100.0
Name	Pressure
Type	Generic

5.3a2 2 POINT CALIBRATION MENU: The glycol feed package is factory calibrated, to recalibrate the pressure sensor, always best to do a 2 point. Calibrating to two points allow the sensor to be accurate at low range and at the high range. While the glycol feed system is in the hand mode, get the system to recirculate glycol at a moderately low pressure. Go to the pressure input and press the calibration button under the sensor maintenance menu. Scroll down to the two point calibration and press the enter key. Use these next few steps to recalibrate the system:

Prompt:	Response:
Ok to disable controls?	Y
First buffer value	(enter the current low pressure of the system)
Please remove sensor	(do not remove sensor)
Stabilization	(will take a few moments)
Second buffer value	(increase system pressure and let it stabilize and enter the value)
Place sensor in second value	(do not remove sensor)
Stabilization	(will take a few moments)

Next the controller will show the gain and offset, press "Y" to accept and return to the home screen. If the controller fails to calibrate, please contact the factory for assistance.

5.3a3 LOW LEVEL INPUT MENU (D1): () Low level input ment lets you adjust and change settings such as change switch logic and name.

Prompt	Response/Value:
Open Message	LowLevel
Closed Message	Level
Interlock	When Open
Alarm	When Open
Name	Levelswtch
Type	DI State



5.3a4 OPTIONAL FLOW METER INPUT (D2): (✕ maintenance) Optional flow meter input allows you to track and monitor your glycol usage, change your volume units and change the flow meter name and type. Flow meter can be added to the front display, contact factory for assistance.

Prompt	Response/Value:
Totalizer Alarm	0g
Reset Flow Total	
Volume/Contact	1gal
Flow Units	Gallons
Name	Flowmeter
Type	Contacting FM

5.3B ⏴ ADJUSTING OUTPUTS: Adjusting the outputs includes changing the set points and monitoring/changing the alarm relay. Setting the cut in (set point) and the cut out (deadband) is available in the R1 (relay 1) menu. From the home screen press the output menu. Enter the R1 menu and press maintenance button.

5.3b1 GLYCOL FEED OUTPUT (R1) MENU: (✕ maintenance)

Prompt:	Response/Value:
HOA Setting	(current) ** Make sure the relay is in auto by pressing enter
Set Point	20.00 PSI
Dead Band	10.00 PSI
Output Time Limit	20:00:00 (HH:MM:SS)
Reset Time Limit	
Interlock Channels	(none)
Activate With Channels	(none)
Hand Time Limit	00:10:00 (HH:MM:SS)
Input	Pressure S1
Direction	Force Higher
Name	Glycol
Mode	On/Off

When changing any of the values, scroll down to the setting you wish to change, press enter **⏴** and use the arrows to change the setting. Press the check mark **✓** to accept the new setting. Contact factory for assistance with making changes or calibrating your controller.

6.0 PRESSURE AND TEMPERATURE LIMITATIONS: Industrial Glycol Feeders maximum operating perimeters are 150PSI @ 85F. High Temp designated glycol feeders have a maximum rating of 150PSI @ 150F. Some optional fittings, as noted in descriptions, may change limitations, contact factory for assistance.

MATERIAL	MAXIMUM SHORT TERM TEMPERATURE	MAXIMUM OPERATING TEMPERATURE	MAXIMUM OPERATING PRESSURE
Polyethylene (PE)	160°F/69°C	85°F/36°C	N/A
Polyvinylchloride (PVC)	140°F/60°C	85°F/36°C	100PSI/6.9BAR
Chlorinated Polyvinylchloride (CPVC)	180°F/77°C	120°F/49°C	100PSI/6.9BAR
Polypropylene (PP)	180°F/77°C	100°F/49°C	100PSI/6.9BAR
Carbon Steel (CS)	200°F/93°C	200°F/93°C	150PSI/10.3BAR
Cast Iron (CI)	200°F/93°C	200°F/93°C	150PSI/10.3BAR
Brass (BR)	200°F/93°C	200°F/93°C	150PSI/10.3BAR
Stainless Steel (SS)	200°F/93°C	200°F/93°C	150PSI/10.3BAR

Note: Minimum Fluid Temperature is 50°F/10°C.

7.0 ROUTINE MAINTENANCE Routine maintenance in this section is referred to as checking a system once a month until a maintenance schedule can be determined. **All fasteners should be checked for proper operations.** Maintenance and care will depend upon the usage and environment in which the glycol feed package is subject to. The following is the suggested regular maintenance checks required to keep the glycol feed system operating properly.



7.1 TANK AND PLUMBING Periodically check piping, hoses and tank fittings for leaks. Y-strainers and check valves need to be free from debris. Tank should be checked for signs of bulging and cracking.

7.2 GEAR PUMP The pump should be inspected for proper operation and output. Unusual noises and leaks need to be corrected immediately. Pump assembly and disassembly should only be done by qualified personnel. Wear items, like seal, carbon bearings and gears need to be inspected and replaced when needed. Contact us for assembly and disassembly.

Carbon bearing pumps do not need lubrication. Check the motor for lubrication instructions. Our standard motor does not need lubrication, but some custom motors do. Be sure to check lubrication instructions in pump manual. **DO NOT OVER LUBRICATE.** Oil is conductive and can cause harm or electric shock.

7.3 PRESSURE SWITCH The only wear item is the contacts. Make sure there are no shorts or wire connections problems.

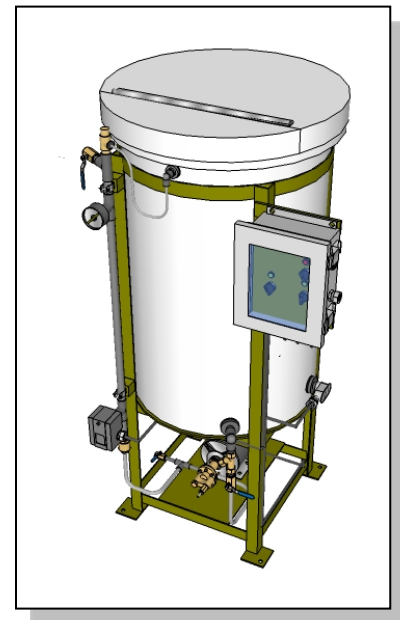
7.4 PRESSURE RELIEF VALVE Pressure relief valves need to be free from debris. Disassembling and checking the seating surface for tears and abrasion is all that needed. Improper seating of diaphragm and seal can cause valve leaks.

8.0 PARTS LISTING In the following diagrams, the systems are shown with tables itemizing parts that may be replaced in the field. If further breakdown is needed, consult manufacturer's operations manual or call us for assistance.

8.1 GLYCOL SYSTEM OVERVIEW

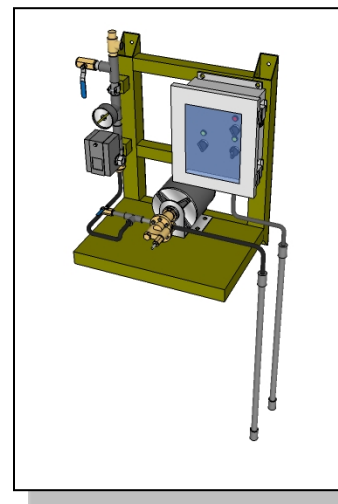
PART	GP__E	GP__H	30	55	100
TANK & COVER	P30C-H	C30C-H	X		
	P55C-H	C55C-H		X	
	P100C-H	C100C-H			X
STAND	TS30B	Included	X		
	TS55B	in tank		X	
	TS100B	above.			X
DISC. MANIFOLD	0122001	0122010	X		
	0122002	0122011		X	
	0122003	0122012			X
SUCT. MANIFOLD	0122020	0122025	X	X	X
PUMP, 1/3HP	GP1.3E		X	X	X
PUMP, 1/2HP	GP3.0E		X	X	X
SUCT. HOSE	0122030		X	X	X
DISC. HOSE	0122035		X	X	X
RELIEF HOSE	0122040		X	X	X
CONTROL PANEL	CPE		X	X	X
RELIEF ADAPTR	0122050	N/A	X	X	X
		PS-1	X	X	X
		PS-2	X	X	X
PRESSURE SWITCH		PS-3	X	X	X
BALL VALVE	BV05P	BV05B	X	X	X
Y-STRAINER	YS05B		X	X	X
CHECK VALVE	CV05C		X	X	X
RELIEF VALVE	RV05B		x	x	X

Dual models use similar items.



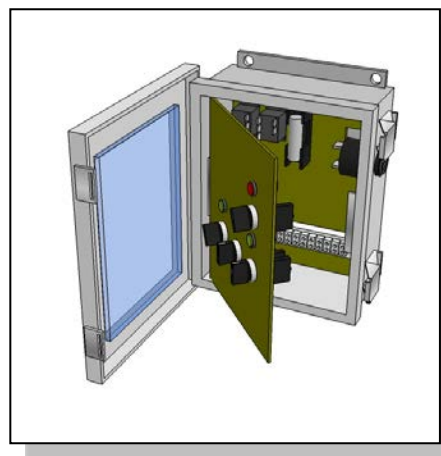
PART	GP__X
FRAME	MBGX
DISC. MANIFOLD	0122005
SUCT. MANIFOLD	0122021
PUMP, 1/3HP	GP1.3E
PUMP, 1/2HP	GP3.0E
CONTROL PANEL	CPE
RELIEF ADAPTR	0122050
PRESSURE SWITCH	PS-1
BALL VALVE	BV05P
Y-STRAINER	YS05B
CHECK VALVE	CV05B
RELIEF VALVE	RV05B

Dual models use similar items.

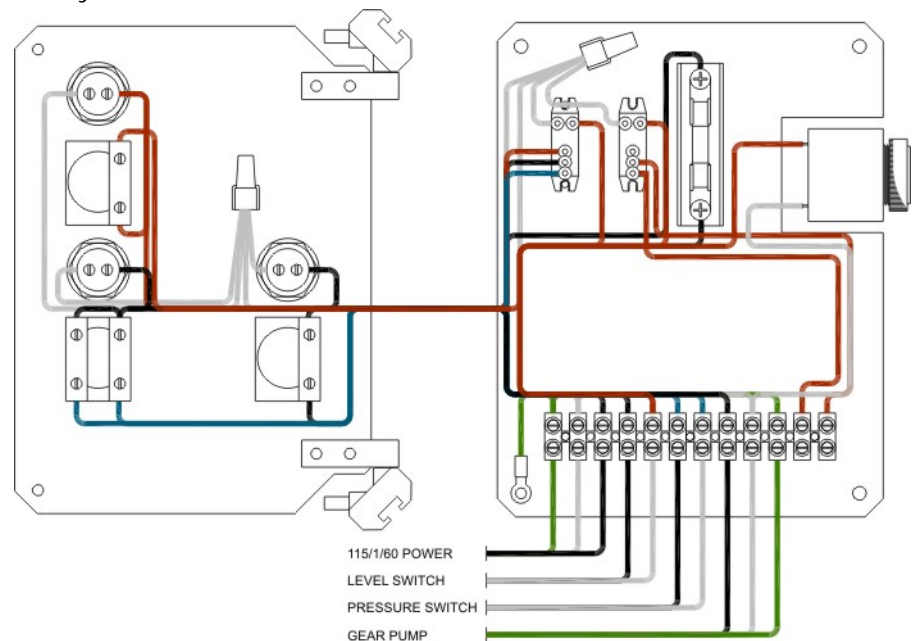


8.2 CONTROL PANEL

PART	INDUSTRIAL
ENCLOSURE	NE-P
POWER SWITCH	SW-2P
PUMP SWITCH	SW-3P
GREEN LIGHT	LGT-G
RED LIGHT	LGT-R
RELAY	RL-1
FUSE	FS-1



9.0 WIRING The following wiring diagram is for standard model with audible alarm and dry contact. Custom model may follow similar diagrams, but can be different. If you need assistance, contact us and have model number and serial number information ready.



Note: All standard and optional feature diagrams are available through our website, www.gtpcompany.com or you can e-mail us at literature@gtpcompany.com.



9.1 WIRING The following wiring diagram is for economy digital model with audible alarm, motor starter and dry contact. Custom model may follow similar diagrams, but can be different. If you need assistance, contact us and have model number and serial number information ready.

Inputs:

Sensor:

Red = TB2 #6
 Black = TB2 #4
 Shield = TB1 #3
 Green = TB1 #7
 White = TB1 #11

Low Level:

Black = TB2 #8
 Red = TB2 #9

Flow Meter: (optional)

White = TB2 #4
 Red = TB2 #5
 Blue = Not used

Outputs:

Glycol Pump:

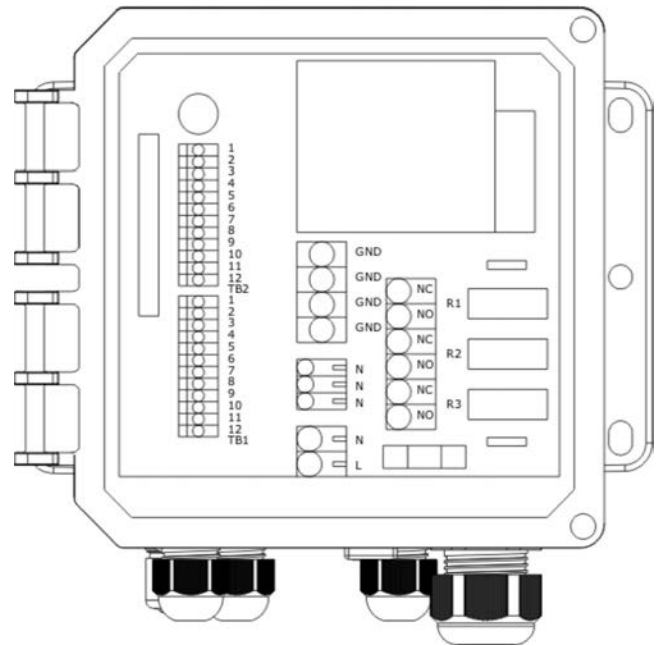
White = Neutral
 Black = R1 NO

Mixer: (optional)

White = Neutral
 Black = R2 NO

Alarm:

White = Neutral
 Black = R3 NO



10.0 TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE / ACTION
Low flow rate	Piping / equipment is dirty or fouled
	Discharge is restricted or undersized
	Gears are worn
Pump runs, but no fluid	Suction piping is restricted or plugged
	Pump suction valve is closed
	Pump is rotating in the wrong direction
Pressure is low	Line is restricted
	Gears are worn
Excessive noise while pump is in operation	Pump head and gear may be misaligned
	Pump mounting hardware is loose
	System pressure is excessive
Pump does not shut off at low level	Float switch is faulty, defective or damaged
	Low level relay is faulty, defective or damaged
	Wiring is incorrect or shorted
System does not relieve pressure properly	Pressure relief valve is clogged
	Pressure relief valve is set improperly
Pump cycles on and off repetitively	Piping leak on discharge side
	Pressure settings are not adequate for system size pressure

If you are still having trouble, contact us at technical@gtpproducts.com, or you can call us at the number on the front of the Instruction manual.



11.0 NOTES

12.0 PRODUCT LABEL

Model:

Serial Number:



Brass Ball Valves

Two-Piece Body • Full Port • Blowout-Proof Stem • PTFE Seats

1/4"-2" 600 PSI/41.4 Bar Non-Shock Cold Working Pressure
2 1/2"-4" 400 PSI/27.6 Bar Non-Shock Cold Working Pressure

CSA CERTIFIED TO ASME B16.44
AND CR91-002 (THREADED 1/4"-4") • UL LISTED (THREADED 1/4"-4")
• IAPMO LISTED TO NSF/ANSI 61-8
• FM APPROVED (THREADED 1/4"-2")

CSA (1/4" - 4"):

- CR91-002: 1/2 psig, 2 psig, and 5 psig (these are specific approved categories)
- ASME B13.44: 125 psig (maximum)
- Temperature is -4° F to 194° F

FM (1/4" - 2"):

- 175wvp (both SFP600A and TFP600A)

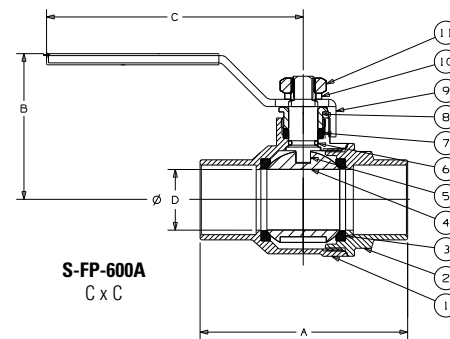
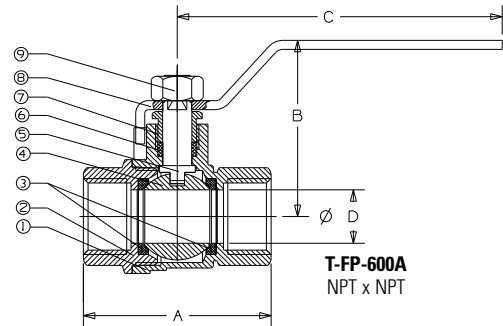
UL, Gas and Oil (1/4" - 4"):

- YQNZ, Compressed Gas Shutoff Valves: 250 psi
- YRBX, Flammable Liquid Shutoff Valves: 250 psi
- YRPV, Gas Shutoff Valves: 250 psi
- YSDT, LP-Gas Shutoff Valves: 250 psi
- MHKZ, Manual Valves: 250 psi



T-FP-600A
Threaded

S-FP-600A
Solder



MATERIAL LIST

PART	SPECIFICATION
1. Body	Forged Brass ² CU > 57%
2. End Cap	Forged Brass ² CU > 57%
3. Ball Seat	PTFE
4. Ball	Brass, Chrome Plated
5. Stem	Brass
6. O-Ring (Stem Seal)*	Fluorocarbon (FKM)
7. Stem Packing	PTFE
8. Packing Nut	Brass
9. Lever Handle ¹	Steel, Plated
10. Lock Washer*	Stainless Steel
11. Handle Nut ¹	Stainless Steel

Note: * Parts 6 and 10 are applicable of S-FP-600A only.

¹ Due to Standard Approvals, Lever Handles and Nuts are not interchangeable between Solder and Threaded. There are no handle options at this time.

² For Material Certification, contact NIBCO Technical Services.

DIMENSIONS—WEIGHTS—QUANTITIES

Dimensions															
Size	T-FP-600A		S-FP-600A		T-FP-600A		S-FP-600A		T-FP-600A		S-FP-600A		Port		
	A	A	B	B	C	C	D	D	D	D	D	D	D	D	
In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.
1/4	8	1.76	45	—	—	1.73	44	—	—	3.54	90	—	—	.39	10
3/8	10	1.76	45	1.75	44	1.73	44	1.58	40	3.54	90	3.78	96	.39	10
1/2	15	2.05	52	2.01	51	1.92	49	1.78	45	3.54	90	3.78	96	.59	15
3/4	20	2.36	60	2.74	70	2.09	53	2.13	54	3.78	96	3.98	101	.75	19
1	25	2.76	70	3.35	85	2.56	65	2.52	64	4.53	115	4.41	112	.98	25
1 1/4	32	3.31	84	3.78	96	2.95	75	2.65	67	4.53	115	5.04	128	1.26	32
1 1/2	40	3.66	93	4.42	112	3.35	85	3.12	79	5.51	140	6.22	158	1.57	40
2	50	4.18	106	5.34	136	3.68	93	3.41	87	5.51	140	6.22	158	1.97	50
2 1/2	65	5.38	137	6.28	160	4.76	121	4.76	121	8.66	220	8.66	220	2.56	65
3	75	6.04	153	7.15	182	5.08	129	5.08	129	8.66	220	8.66	220	2.95	75
4	100	7.39	188	—	—	5.87	149	—	—	9.61	244	—	—	3.89	99



Class 150 Bronze Globe Valves

Union Bonnet • Integral Seat • Renewable Seat Disc

150 PSI/10.3 Bar Saturated Steam to 366° F/185° C
300 PSI/20.7 Bar Non-Shock Cold Working Pressure

CONFORMS TO MSS SP-80

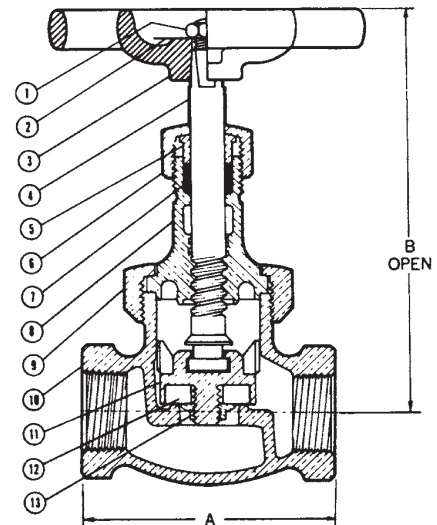
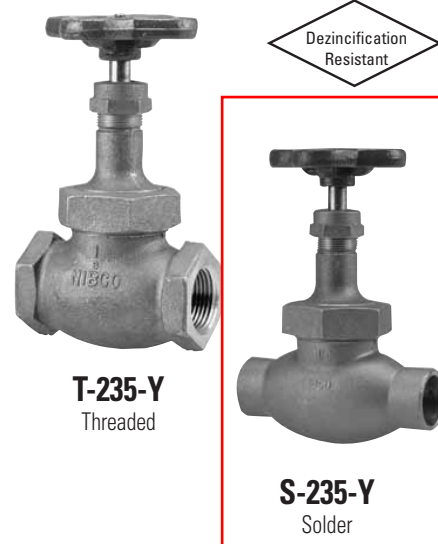
MATERIAL LIST

PART	SPECIFICATION
1. Handwheel Nut	300 Series Stainless Steel
2. Identification Plate	Aluminum
3. Handwheel	Malleable Iron ASTM A 47
4. Stem	Silicon Bronze ASTM B 371 Alloy C69400/C69430
5. Packing Gland	Bronze ASTM B 62 or ASTM B 584 Alloy C84400 or Brass ASTM B 16
6. Packing Nut	Bronze ASTM B 62 or ASTM B 584 Alloy C84400 or Brass ASTM B 16
7. Packing	Aramid Fibers with Graphite
8. Bonnet	Bronze ASTM B 62
9. Union Nut	Bronze ASTM B 62
10. Body	Bronze ASTM B 62
11. Disc Holder	Bronze ASTM B 62
12. Disc	Steam (PTFE) (Y)
13. Disc Nut	Bronze ASTM B 62/ASTM B 98 Alloy C65100 w/SS Washer

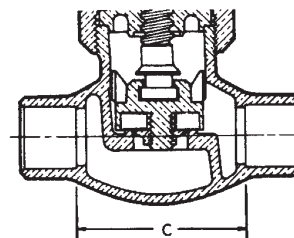
DIMENSIONS—WEIGHTS—QUANTITIES

Size	Dimensions						Weights				Master Ctn. Qty.		
	In.	mm.	A		B		C		T-235-Y		S-235-Y		T-235-Y
		In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.	Lbs.	Kg.		
† 1/8	6	2.31	59	3.88	99	2.00	51	1.21	0.55	1.06	0.48	50	50
† 1/4	8	2.31	59	3.88	99	1.88	48	1.19	0.54	1.05	0.48	50	50
† 3/8	10	2.38	60	3.88	99	1.75	45	1.17	0.53	1.03	0.47	50	50
1/2	15	2.69	68	4.63	118	1.88	48	1.60	0.73	1.38	0.62	40	50
3/4	20	3.19	81	5.38	137	2.31	59	2.34	1.06	2.21	1.00	20	20
1	25	3.75	95	6.00	153	2.88	73	3.56	1.61	3.35	1.52	10	20
1 1/4	32	4.25	108	6.56	167	3.13	79	5.76	2.61	4.93	2.23	10	10
1 1/2	40	4.75	121	7.38	187	3.75	95	7.59	3.44	7.17	3.25	6	10
2	50	5.75	146	8.31	211	4.50	114	12.56	5.70	11.02	5.00	4	4
2 1/2	65	6.63	168	10.19	259	5.38	137	17.44	7.91	17.16	7.79	2	2
3	80	7.75	197	11.13	283	6.50	165	23.87	10.83	22.82	10.35	2	2

† No packing gland, packing only in these sizes.



T-235-Y
NPT x NPT



S-235-Y
C x C

FREEZING WEATHER PRECAUTION: Subsequent to testing a piping system, valves should be left in an open position to allow complete drainage.

♦ For detailed Operating Pressure, refer to Pressure Temperature Chart on page 113.