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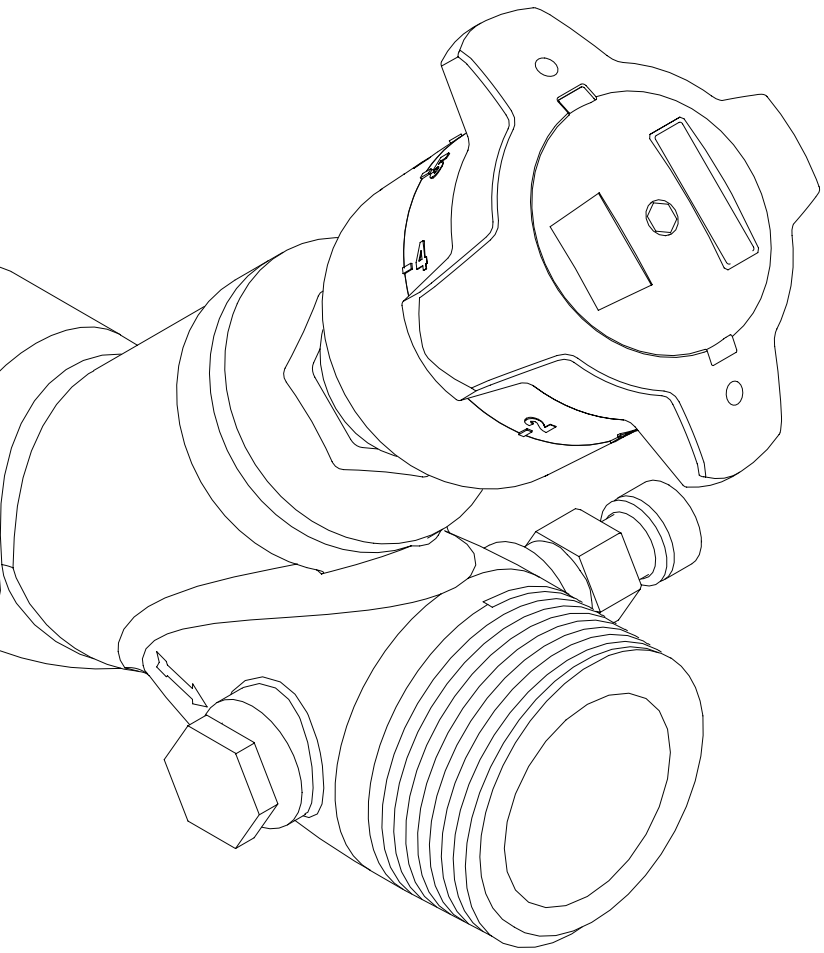

Grooved and Threaded Flo-Trex valves

1¼" - 2"

Installation and operating instructions

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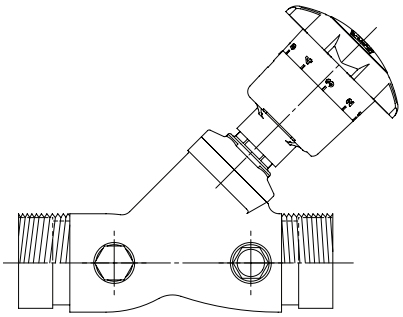

FIG. 1

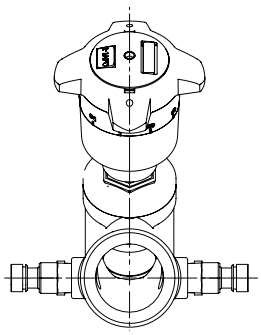

FIG. 2

1.0 INTRODUCTION

The Flo-trex combination valves are designed for installation on the discharge side of centrifugal pumps.

The combination valve incorporates three functions in one valve:

- Drip-tight, shut-off valve
- Spring closure design, non-slam check valve
- Flow throttling valve

For applications or liquids other than those listed, please call Armstrong technical support for recommendations.

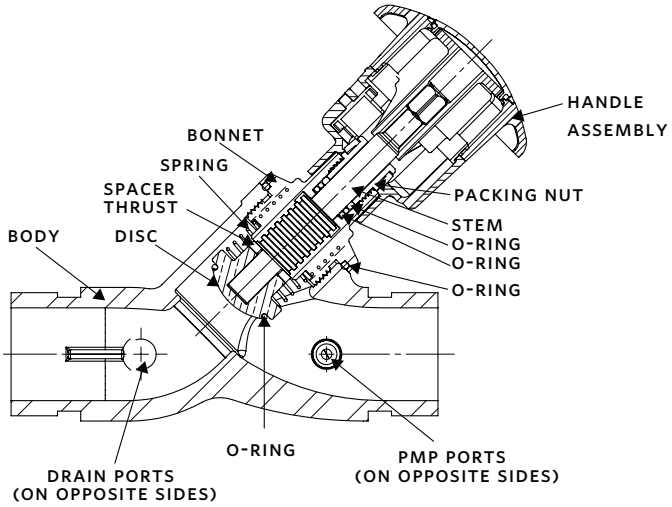

FIG. 3: Model Grooved FTV

2.0 TECHNICAL DATA

Product is in compliance with lead free pipe, pipe fittings, plumbing fittings or fixtures, as defined by the U.S. Safe Water Drinking Act.

NSF
Certified to NSF/ANSI 372

Connection: Model FTV -TS: I Threaded NPT (male thread)
II Threaded BSPT (male thread)
Model FTV- GS: Grooved
Maximum working pressure: 385 PSI (26.5 BAR)
Operating Temperature Range: 300 F (149°C)

MATERIALS OF CONSTRUCTION

Body: CF-8 (AISI SS 304) A351
CF-8M (AISI SS 316) A351
CF-3M (AISI SS 316L) A351
Bonnet/Disc/Stem: BRASS C46500
Spring: SST Spring wire (ASTM A-313 TYPE 302-(18-8)
Packing nut: BRASS C46500
O-rings: EPDM
Metering ports : Qty 2 – Brass C46500 PT ports with caps, EPDM check and gaskets
Drain ports: Qty 2¼" with SST plug
Thrust spacer: SST 416 Annealed and smooth turned
Handle: Reinforced nylon; abs
Gruvlock coupling : Cast stainless steel (Type 316) - ASTM A743 CF8M with SST bolts & nuts & EPDM gaskets

3.0 INSTALLATION

1. The valve should be mounted to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 150mm. Clean debris and other contaminants from the system piping (pipe scale, rust, welding slag). As with any water system it is important to make provisions to keep the system clean. For optimum operation air trapped in the fluid must be removed.
2. It is not recommended to mount a valve directly to the pump as this could cause undesirable noise in the system.
3. Sufficient clearance around the valve should be left for valve removal or repair.
4. The operation of the valve is dependent on the fluid's characteristics (such as specific gravity and viscosity) which vary with the fluid temperature. For installations using fluids other than 100% water, flow rates must be corrected for the changes created by the fluid medium. See www.armstrong-fluidtechnology.com for appropriate correction factors, or call your local Armstrong representative .
5. All FTV's are marked with an arrow on the valve body to indicate direction of flow. The arrow must point in the direction of flow for proper operation.

6 The valve can be mounted to flanged equipment using Gruvlock coupling or industry standard grooved coupling, suitable for system pressure and temperatures encountered.

7 The valve body has been designed to handle the weight on vertical Inline installations. The body is not designed to support the piping weight. It is recommended that the piping be supported by hangers. Pipe supports should be provided under the valve and strainer bodies.

8 The FTV's may be installed in horizontal or vertical piping (as illustrated in **FIG. 5**). Provisions must be made for easy access to the probe metering ports (PMP's), reading scale, and memory stop.

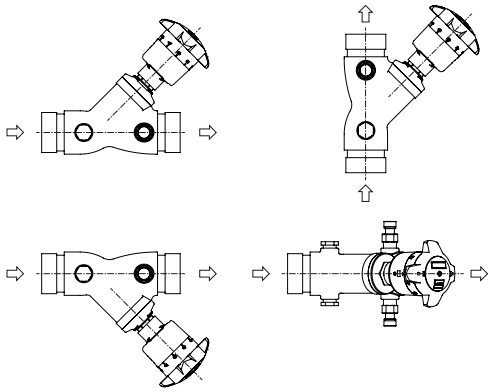

FIG. 5

4.0 GROOVED CONNECTIONS

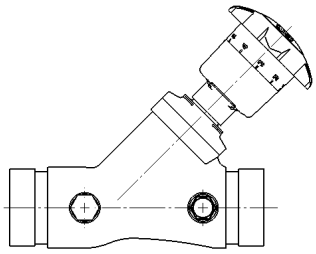

FIG. 6

The model FTV-G is provided with Grooved connections at both ends.

The grooved connections are coupled with Gruvlok couplings or industry standard grooved coupling whose installation is explained in the below section.

5.0 GRUVLOK COUPLING INSTALLATION

1 Check the gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok Xtreme Lubricant or any other Armstrong approved lubricant to the entire surface, both internal and external, of the gasket (As illustrated in **FIG. 7A**). Be careful that foreign particles do not adhere to lubricated surfaces. It is not recommended to mount a valve directly to the pump as this could cause undesirable noise in the system.

2 Slip the gasket over the one pipe, making sure the gasket lip does not overhang the pipe end. **(FIG. 7B)**

3 After aligning the two pipe ends together, pull the gasket into position, centering it between the grooves on each pipe. The gasket should not extend into the groove on either pipe. **(FIG. 7C)**

4 Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the pipe grooves. Swing the other housing over the gasket and into the grooves on both pipes, making sure the tongue and recess of each housing is properly mated. Reinsert the bolt and run-up both nuts finger tight. **(FIG. 7D)**

5 Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced. **(FIG. 7E)**

CAUTION

Uneven tightening may cause the gasket to pinch. Gasket should not be visible

6 Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

FIG. 7A, 7B

FIG. 7C, 7D

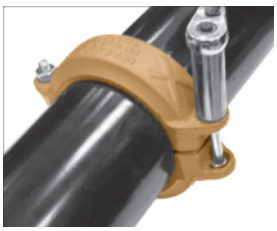

FIG. 7E

FIGURE 7400SS - RIGIDLITE STAINLESS STEEL COUPLING

NOMINAL SIZE	O.D.	MAX. WK. PRESSURE*	MAX. END LOAD*	RANGE OF PIPE END SEPARATION	COUPLING DIMENSIONS			COUPLING BOLTS*	APPROX. WT. EA.
					X	Y	Z	SIZE	
inch (mm)		PSI (BAR)	LBS. (KN)	inch (mm)	inch (mm)				Lbs. (Kg)
1¼ (32)	1.66 (42)	300 (20.7)	649 (2.89)	0-0.03 (0-0.79)	2.88 (73)	4.13 (105)	1.75 (45)	0.38 × 2.25 (M10 × 57)	1.6 (0.7)
1½ (40)	1.90 (48)	300 (20.7)	851 (3.78)	0-0.03 (0-0.79)	3.13 (79)	4.63 (117)	1.75 (45)	0.38 × 2.25 (M10 × 57)	1.7 (0.8)
2 (50)	2.38 (60)	300 (20.7)	1,329 (5.91)	0-0.03 (0-0.79)	3.63 (92)	5.38 (137)	1.75 (45)	0.38 × 2.25 (M10 × 57)	2.1 (1.0)

*Ratings apply when used with Schedule 40 ASTM A 312 Type 304 stainless steel pipe for all sizes.
Refer to ratings chart for additional data.

6.0 THREADED CONNECTIONS

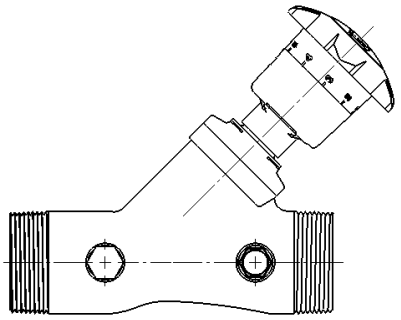

FIG. 8

1 The threaded models are available in NPT & BSPT (male threaded) connections

2 All threaded connections should be sealed using an approved pipe sealant per industry standards. Employ piping best practice when engaging pipe to threaded valves. Overtightening when installing valves may result in fracturing of the valve body at the threads.

7.0 HAND WHEEL

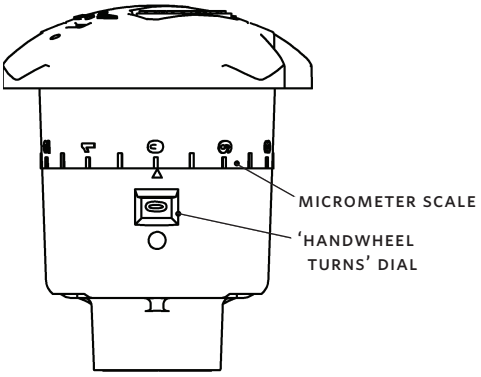

FIG. 9

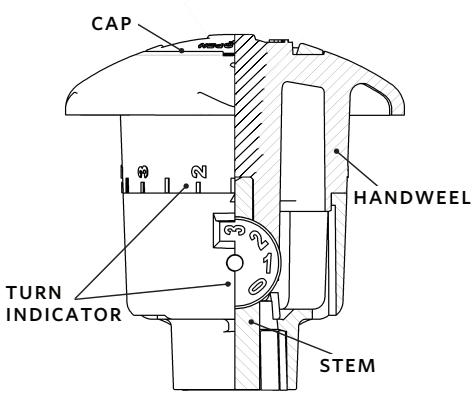

FIG. 10

1 The valve operates from fully open to close by a clockwise rotation of the red handwheel using five 360° turns. Two indicators describe the position of the valve: the handwheel turns dial and the micrometer scale.

2 **Handwheel turns dial:** This dial is printed on the outer surface of a gearing mechanism located inside the lower half of the handle assembly **(FIG. 9)**. Each complete 360° revolution of the handwheel is visible through a display window and is scaled 0 - 5 to indicate the valve position In terms of the number of full turns. **(FIG. 9)**

3 **Micrometer scale:** This scale is marked 0 - 9 and is located on the upper half of the handle assembly. Each mark represents an act of a full, 360° turn of opening when lined up with an arrowhead symbol, located above the handwheel turns display window **(FIG. 9)**

4 The valve is considered 'zeroed' when fully closed hand tight. The '0' on the micrometer scale should be within one half of of a turn of the arrowhead symbol when the valve is closed hand tight. **Do not use a wrench on these valves - they should be opened and closed by hand only!**

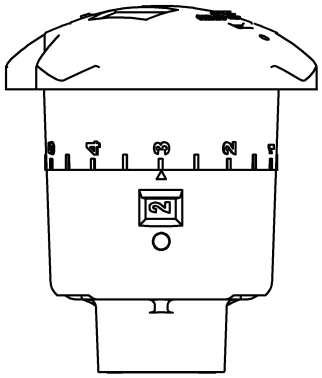

FIG. 11

5 FTV setting of 2.3 indicates that the valve is partially open (2.3 turns open). **(FIG. 11)**

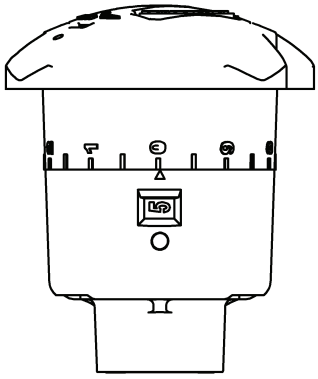

FIG. 12

6 FTV setting of 5.0 indicates that the valve is fully opened. In some cases, the valve may open as much as 5.3 turns, due to the depth of the stem threads. This is not a problem with the valve; however, the performance curves for these FTVs are calibrated only to 5.0 turns. **(FIG. 12)**

7 Handle replacement/removal: The handle shall be smashed in order to remove/replace it, if it is damaged or it is not functioning as per the requirement.

8.0 PMP PORTS

Connect pressure measuring device to the FTV metering ports as follows:

1 Remove protective cap from metering ports (¼" npt connection). Insert the meter probe into the metering ports.

CAUTION

- Hot water leakage can occur from metering ports (PMP's) during probe insertion and hookup of metering device. Wear protective eyewear and clothing to prevent personal injury when measuring pressure.
- When inserting probe, do not bend, as this will cause permanent damage to the probe, adversely affecting the pressure measurement. Do not use any lubrication on the probes when inserting them. If necessary, simply wet the probes with clean water.

2 The probe should not be left inserted into the fitting for prolonged periods of time, overnight, etc., as leakage of the pmp may occur when the probe is removed.

3 The locking nut on the probe is designed to hold it in the PMP when taking readings. As sealing is accomplished internally on the probe stem, it is only necessary to tighten the locking nut finger-tight. Over-tightening may cause damage to the pmp or locking nut threads.

4 Before taking a measurement reading, set the valve to its fully open position (5.0) or at a preset position. Read the

5 Pressure drop across the venturi with an Armstrong cbdm or digital meter. Using the FTV rule, turn the wheel of the slide rule until the measured pressure drop appears in window. Read the flow for the particular size of valve installed.

6 The handle of the Armflo FTV is not designed to be removable. If, for any reason, the handle is damaged and requires replacement, please order replacement handle kit 871159-092.

9.0 TROUBLESHOOTING

SYMPTOM	LIKELY CAUSE	SOLUTION
1 Valve is leaking:		
• At the bonnet/ body joint	Bonnet O-ring has been damaged	Remove the handle/stem assembly
• At the pipe connection	and replace with the appropriate	Re-solder the connection and recheck for leakage
	replacement part	Tighten and recheck for leakage
	If solder joint - the joint has failed, or was not soldered properly	Re-solder the connection and recheck
2 Valve does not shut off completely when closed (hand tight)	The seat O-ring has been deformed due to overheating during soldering	Remove the handle/stem assembly and replace with the appropriate replacement part indicated in the table below

10.0 PRESSURE TEMPERATURE LIMITS

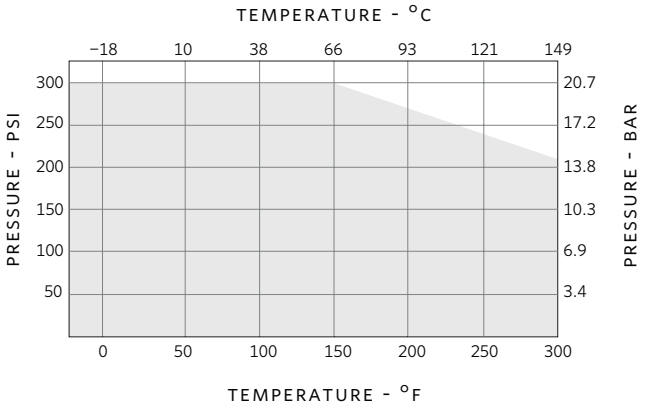

FIG. 13

11.0 FLOW MEASUREMENT

FTV PERFORMANCE CURVES

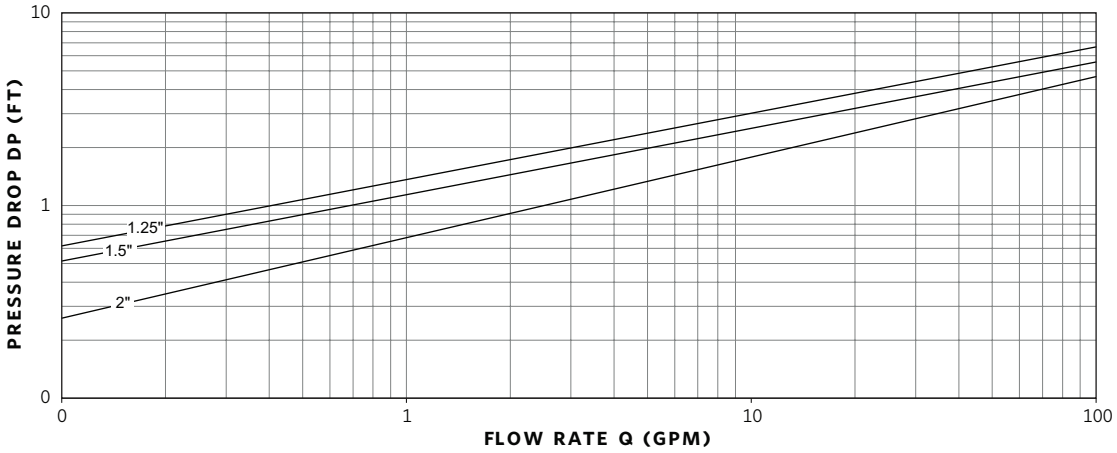

FIG. 14

FTV INHERENT FLOW CHARACTERISTIC CURVE WITH VALVE IN THROTTLED POSITION

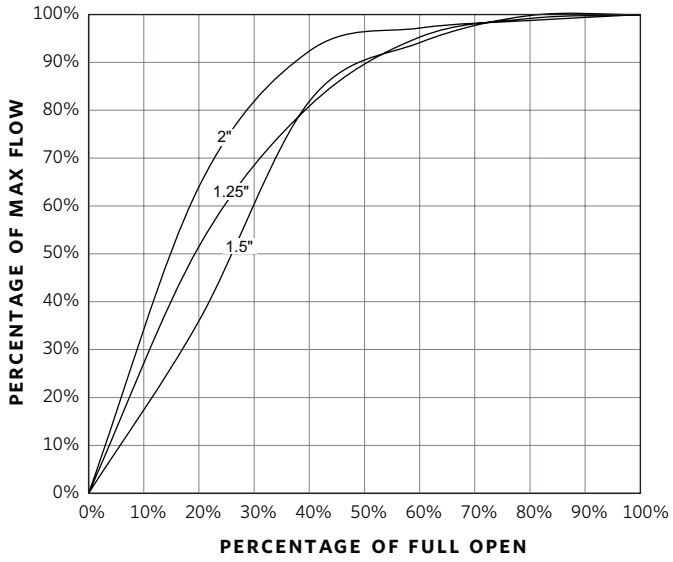

FIG. 15

1 Where approximate indication of flow is acceptable the Flo-trex valve can be used.

2 Flow measurement valve in wideopen position.

2.1 Measure and record the differential pressure across the valve using a meter with high pressure range transducer or pressure gauges with PMP adapters.

CAUTION

Safety glasses should be used and the probe should not be left inserted into fittings for prolonged periods of time (overnight, etc) as leakage from the PMP may occur when probe is removed.

2.2 Refer to Flo-trex performance curves with valve in full open position **(FIG. 14 &15)**
Locate pressure differential on left hand side of chart and extend line horizontally across the valve size being used. Drop line vertically down and read flow rate from bottom of chart.

3 Determining flow rate with valve in throttled position

3.1 Record the size of valve and stem position using the Flow Indicator Scale (Page 6). Calculate percentage of valve opening referring to table below.

VALVE SIZE	1.25	1.5	2
NO. OF RINGS (VALVE FULL OPEN)	6	6	6

3.2 Measure and record the differential pressure across the valve in the throttled position.

3.3 Locate percentage of valve opening at the bottom scale of Flow Characteristic curve **(FIG. 15)**. Project line vertically up to intersect with the Valve Characteristic Curve and from this point project line horizontally across to the left of the chart and record the percentage of maximum flow rate.

3.4 On the Flo-trex performance curve **(FIG. 13)** locate the differential pressure obtained in step 3.2 and project line horizontally across to intercept with Valve Performance Curve. Drop a line vertically down to read the flow rate at the bottom of the chart.

3.5 To calculate flow rate of valve in the throttled position, multiply the flow rate from step 3.4 by the percentage flow rate from step 3.2 divided by 100.

Example: Valve size 2 inches

Differential pressure in 3.5 ft (1.06m)

Number of rings open 2.5, 2.5 rings ÷ 6 rings x 100 = 40% throttled

From the Flo-trex performance curve **(FIG. 14)**, a 2" valve with 3.5 ft pressure drop (1.06m) represents a flow of 55.05Usgpm (3.47 L/s).

From Flow Characteristic curve **(FIG. 15)**, a 2" valve, 60% open, represents 95% of maximum flow.

Approximate flow of a 2" valve, with a 3.5 ft (1.06m) pressure drop when 40% throttled is:

$\frac{55.05 \times 95}{100}$ = 52.29 Usgpm ($\frac{3.47 \times 95}{100}$ = 3.29 l/s)

Note: To prevent premature valve failure it is not recommended that the valve operate in the throttled position with more than 25 ft. pressure differential. Instead, the pump impeller should be trimmed or valves locked elsewhere in the system to partially throttle the flow.

12.0 OPERATION

To assure trouble free check valve operation and shut off operation, the valve should be periodically opened and closed to keep valve seat and valve disc guide stem free of build up of system contaminants.

13.0 MAINTAINANCE

1. Drain system and remove valve from piping.
2. Remove the body bolts from the body using an Allen Key.
3. Remove "O" ring.
4. Inspect and clean "O" ring cavity and install new "O" ring. Valve disc stem also should be inspected and replaced if worn. Valve stem "O" ring should be replaced at this time.

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