

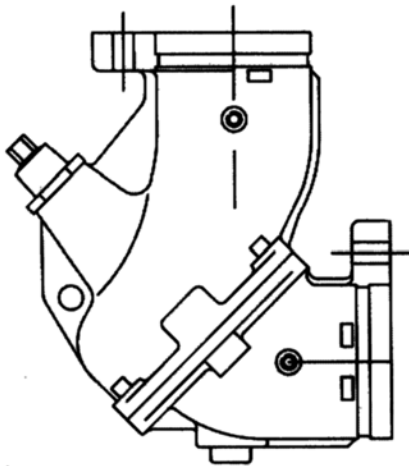


INSTALLATION AND OPERATING INSTRUCTIONS

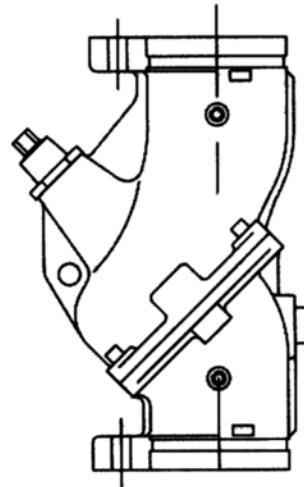
Tri-Service Valve

FTV-A Angle Pattern

FTV-S Straight Pattern



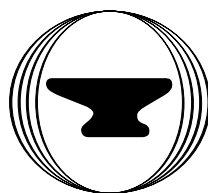
Angle Pattern Model FTV-A



Straight Pattern Model FTV-S

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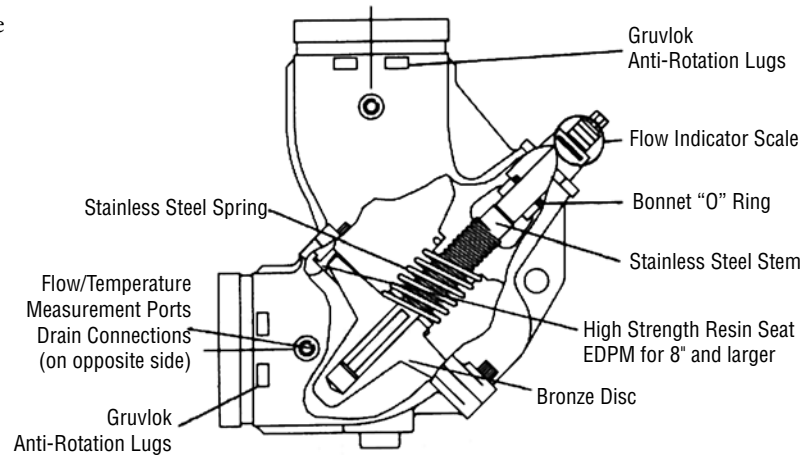
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1.0 INTRODUCTION

1.1 The Gruvlok Model FTV straight and angle pattern valves are designed for installation on the discharge side of centrifugal pumps. These valves incorporate three functions in one valve,

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

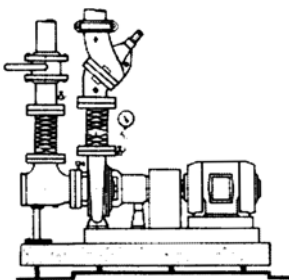


**Gruvlok Model FTV-A
Tri-Service Combination Valve**

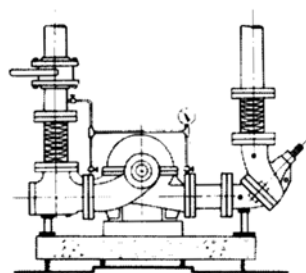
2.0 INSTALLATION

- 2.1 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 12" for pump sizes 2" x 2" to 6" x 6" and 24" for pump sizes 8" x 8" to 12" x 12".
- 2.2 It is not recommended to mount a valve directly to the pump as this could cause undesirable noise in the system.
- 2.3 Sufficient clearance around the valve should be left for valve removal or repair.
- 2.4 Install valve in the direction of the flow arrows on the valve body.
- 2.5 The valve can be mounted to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
- 2.6 The Gruvlok Tri-Service valve bodies have anti-rotation lugs on the inlet and outlet. These lugs, combined with the Flange Adapters, provide a ridged rotation free installation.
- 2.7 The valve body has been designed to handle the weight of the pump on vertical in-line 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.

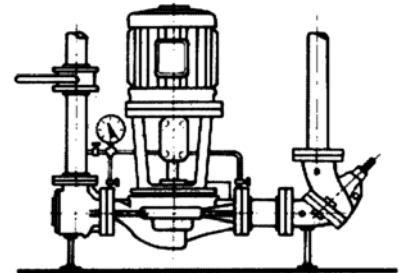
Typical Installations



Base-Mounted Single Suction



Base-Mounted Double Suction



Vertical In-Line

3.0 FLANGE ADAPTER INSTALLATION

3.1 The Fig. 7012 Gruzlok Flange Adapter can be used with the FTV Tri-Service Valve. Installation is similar to the installation of the Figure 7012 with grooved pipe.



3.2 Loosen the nut on the latch bolt to the end of the bolt thread. (It is not necessary to remove the nut from the latch bolt.) Swing the latch bolt out of the slot. Open the Gruzlok Flange and place it around the grooved pipe with the key section fitting into the groove. The flange gasket cavity must face the pipe end.



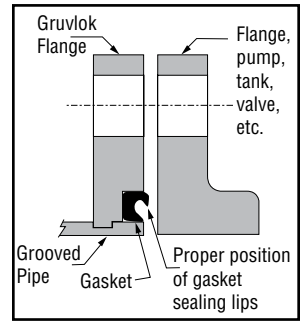
3.3 Swing the latch bolt back into the slotted hole. Tighten the nut until the flange halves make solid contact.



3.4 Check the gasket grade to verify that it is properly suited for the intended service. Lubricate the entire surface of the gasket and the flange gasket cavity using Gruzlok lubricant. Position the Gruzlok Flange Gasket around the pipe end and press the gasket into the cavity between the pipe O.D. and the flange recess. The gasket must be properly positioned as shown in Step 3.5. Be careful that foreign particles do not adhere to lubricated surfaces.



3.5 The correct positioning and relationship of all components comprising a Gruzlok Flange joint. The Fig. 7012 Gruzlok Flange gasket must be inserted so that the sealing lips face toward the pipe end and the mating flange face and away from the Gruzlok Flange itself.



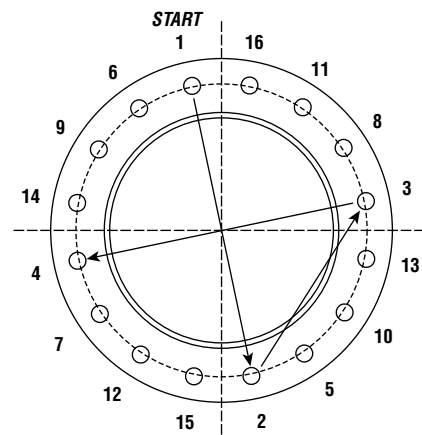
NOTE: Design of the Gruzlok Flange provides sealing only with the special Gruzlok Flange gasket. Only Gruzlok Flange gaskets may be used with Fig. 7012 Gruzlok Flanges.

3.6 Align the Gruzlok Flange bolt holes with the mating flange bolt holes. Insert a standard bolt or stud through the bolt hole, and thread a nut on hand tight. Insert the next bolt or stud opposite the first and again thread the nut on hand tight. Continue this procedure until all holes have been fitted. (See illustration below)



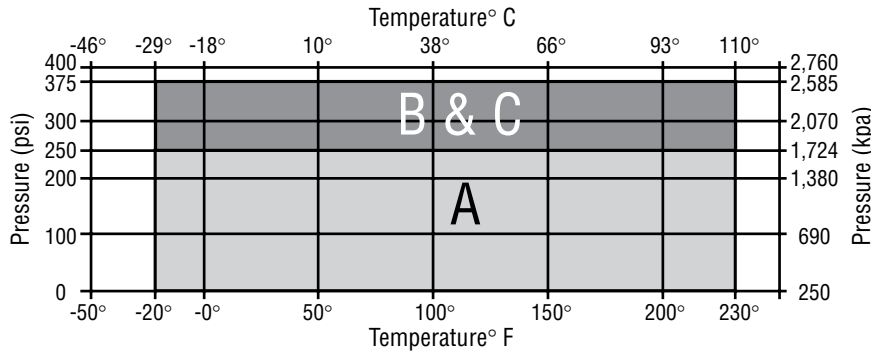
NOTE: Take care to assure that the gasket lip is not bent backwards or pinched between the two flanges.

3.7 Tighten the nuts evenly so that the flange faces remain parallel and make firm even contact around the entire flange. Torque all bolts to required flange joint torque levels.



Recommended Bolt Tightening Sequence

4.0 PRESSURE – TEMPERATURE LIMITS



Note: for temperatures between 230°F and 300°F (110°C and 149°C) specify Viton Elastomers.

LEGEND	
A	Gruvlok ductile iron flange adapters for ANSI 150# flanges
B	Gruvlok ductile iron flange adapters for ANSI 300# flanges
C	Grooved end with 375 psi rated pipe coupling

5.0 FIELD CONVERSION (Straight to Angle pattern valve)

- 5.1 Open valve at least one complete turn,
- 5.2 Remove the body bolts from valve body using Allen Key.
- 5.3 Rotate one half of the valve body 180° making sure the lower valve seat and “O” Ring stay in position. Inspect the “O” Ring for any cuts or nicks and replace if necessary.
- 5.4 Replace body bolts and torque evenly to 70 ft./lbs.

6.0 FLOW MEASUREMENT

- 6.1 Where approximate indication of flow is acceptable the Gruvlok Tri-Service valve can be used.

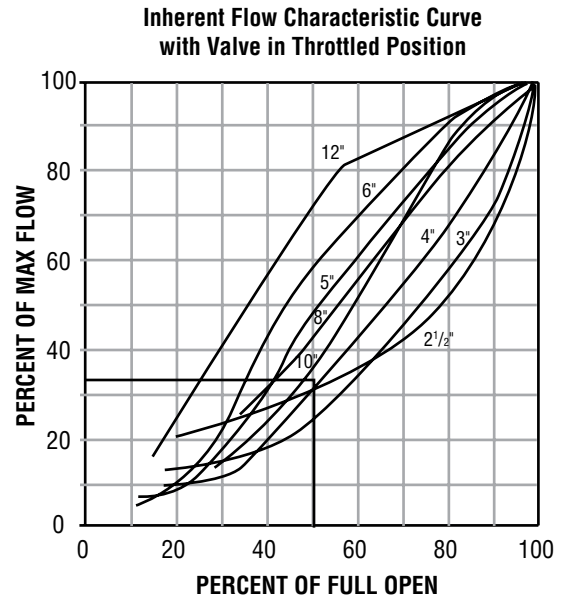
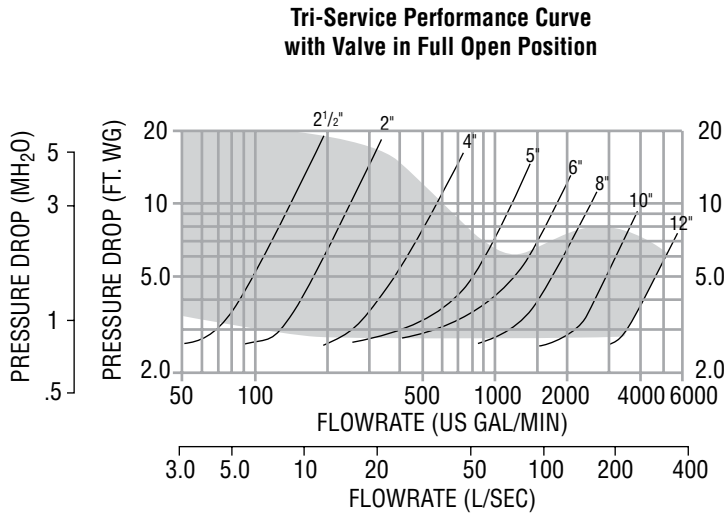
6.2 FLOW MEASUREMENT VALVE IN WIDE OPEN POSITION

- 6.2.1 Measure and record the differential pressure across the valve using a Flow 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.

- 6.2.2 Refer to Tri-Service Performance Curves with valve in full open position (See section 6.3). Locate Pressure Differential on left hand side of chart and extend line horizontally across to valve size being used. Drop line vertically down and read flow rate from bottom of chart.

6.3 DETERMINING FLOW RATE WITH VALVE IN THROTTLED POSITION



6.3.1 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	2 1/2	3	4	5	6	8	10	12
Number of Rings (valve full open)	5	5	6	9	10	12	18	28

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

6.3.3 Locate percentage of valve opening on the bottom scale of Flow Characteristic Curve (fig. 6). 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.

6.3.4 On the Tri-Service Performance Curve (See Section 6.3) locate the differential pressure obtained in Step 6.3.2 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.

6.3.5 To calculate flow rate of valve in the throttled position, multiply the flow rate from Step 6.3.4 by the percentage flow rate from Step 6.3.2 divided by 100.

Example: Valve size 4 in.
Differential Pressure in 5.4 ft. (1.65 m)
Number of rings open 3, (3 rings / 6 rings X 100) = 50% throttle

Solution:

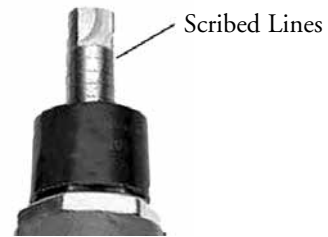
- From the Tri-Service Performance Curve (fig. 5), a 4 in. valve with 5.4 ft. pressure drop (1.65 m) represents a flow of 400 USgpm (25.2 L/s).
- From Flow Characteristic Curve (fig. 6), a 4 in. valve, 50% open, represents 34% of maximum flow.
- Approximate flow of a 4 in. valve, with a 5.4 ft. (1.65 m) pressure drop when 50% throttled is:
 $(400 \times 34)/100 = 136$ USgpm
 $(25.2 \times 34)/100 = 8.57$ L/sec.

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 located elsewhere in the system to partially throttle the flow.

Flow Indicator Scale

The valve stem with its grooved rings and positioning sleeve indicates the throttled position of the valve. The quarter turn graduations on the sleeve, with the scribed line on the stem, provide for approximate flow measurement.

Note: The valve is shipped in the closed position. The indicator on the plastic sleeve is aligned with the vertical scribed line on the stem.



7.0 OPERATION

- 7.1 To assure tight shut off the valve must be closed using a wrench with 25 to 30 ft./lbs of torque.
- 7.2 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.

8.0 REPACKING OF FTV VALVE UNDER FULL SYSTEM PRESSURE

- 8.1 Should it be necessary, stem "O" Ring can be changed under full system pressure.

Caution: Safety glasses should be worn.

- 8.2 Record the valve setting.
- 8.3 Turn the valve stem counterclockwise until the valve is fully open and will not turn any further. Torque to a maximum force of 45 ft./lbs. This will ensure good metal-to-metal contact and minimum leakage.
- 8.4 The valve bonnet may now be removed. There may be a slight leakage, as the metal-to-metal backseating does not provide a drip-tight seal.
- 8.5 Clean exposed portion of valve stem (Do not scratch).
- 8.6 Remove and replace the "O" Ring and gasket.
- 8.7 Install the valve bonnet.
- 8.8 Tightening valve bonnet is necessary to stop any leaks.
- 8.9 Open valve to balance set point as recorded in 8.2.

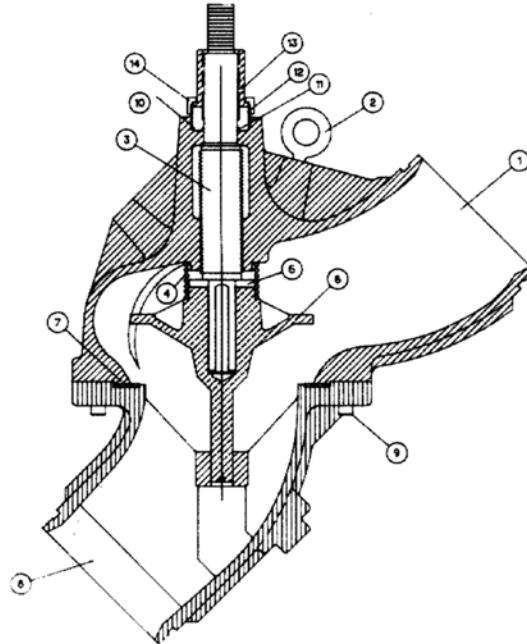
9.0 MAXIMUM NUMBER OF TURNS FULL OPEN VALVE

Note: On valve sizes 2½" and 3", full open position of valve is 5 turns. However valve will open to 5½ turns which is just back of seating of valve.

10.0 SEAT REPLACEMENT

- 10.1 Drain system and remove valve from piping.
- 10.2 Remove the body bolts from the body using an Allen Key.
- 10.3 Remove seat and "O" Ring. "O" Ring is not used on valves 8" and larger.
- 10.4 Inspect and clean "O" Ring cavity and install new "O" Ring and seat. Valve disc stem also should be inspected and replaced if worn. Valve stem "O" Ring should be replaced at this time. Refer to section 11.0.

11.0 REPLACEMENT PARTS



Replacement Parts List — FTV-A and FTV-S									
Part	Item No.	2 1/2"	3"	4"	5"	6"	8"	10"	12"
Shaft	3	570202-006	570202-006	570202-006	570202-007	570202-007	570202-008	570202-010	570202-012
Spring	4	570203-002	570203-003	570203-004	570203-005	570203-006	570203-008	570203-010	570203-012
Bushing	–	570223-001	570223-001	570223-002	570223-001	570223-002	N/A	N/A	N/A
Bonnet	13	570201-006	570201-006	570201-006	570201-006	570201-006	570151-008	570201-008	570201-008
Eye Bolt	2	N/A	N/A	N/A	N/A	N/A	911900-124	911900-124	911900-124
Cap-Sleeve	15	N/A	N/A	N/A	N/A	N/A	570274-012	570274-012	570274-012
"O" Ring**	12	961131-210	961131-210	961131-210	961131-210	961131-210	961131-137	961131-327	961131-327
Sleeve	14	570216-000	570216-000	570216-000	570216-000	570216-000	570216-008	570216-012	570216-012
Spacer	5	570198-006	570198-006	570198-006	570198-006	570198-006	570278-012	570278-012	570278-012
Disc	6	570232-041	570233-041	570234-041	570235-041	570236-041	570237-041	570238-041	570239-041
Body Main	1	570178-031	570181-031	570184-031	570187-031	570190-031	570261-031	570264-031	570267-031
Seat**	7	570196-000	570196-001	570196-002	570196-003	570196-004	570196-008	570196-010	570196-012
"O" Ring Body	8	961131-238	961131-242	961131-250	961131-259	961131-263	961131-450	961131-454	961131-458
Body Suction	9	570163-031	570166-031	570169-031	570172-031	570175-031	570252-031	570255-031	570258-031
Capscrew	10	911821-112	911821-112	911825-112	911829-114	911829-114	911829-118	911829-120	911829-124
Preformed Insulation (Straight)		570225-386	570225-387	570225-388	570225-389	570225-390	N/A	N/A	N/A
Preformed Insulation (Angle)		570225-486	570225-487	570225-488	570225-498	570225-490	N/A	N/A	N/A
Gasket		570217-006 (All Sizes)							
Brass Pipe Plug		935105-001 (All Sizes)							
Brass Metering Ports		570148-001 (All Sizes)							

* Part numbers are for a flange half - 2 are required for a complete flange.

** Recommended spare parts.



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