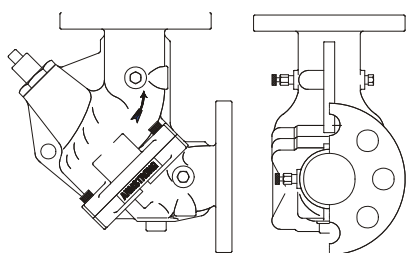
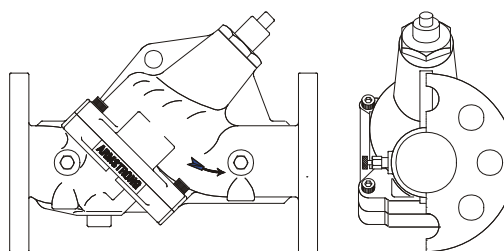


## Installation and Operating Instructions

### Armstrong Model FTV Hard Flanged Flo-Trex Combination Valve



Angle Pattern Model FTV-AF



Straight Pattern Model FTV-SF

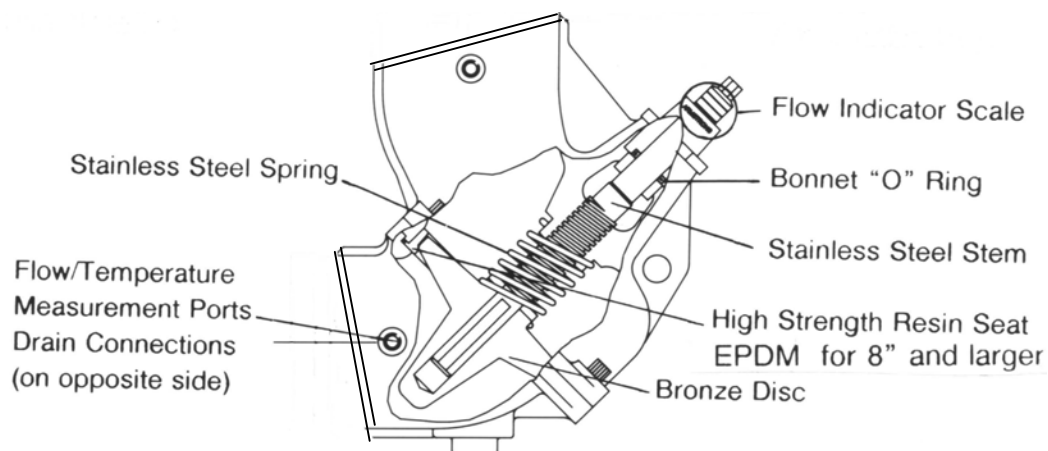
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## 1.0 INTRODUCTION

1.1 The Armstrong Model FTV Flo-Trex Combination Valves are designed for installation on the discharge side of centrifugal pumps. The Armstrong Combination Valve incorporates three functions in one valve:

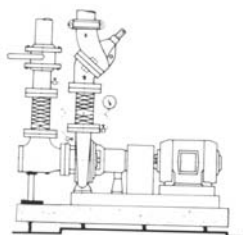
- Drip-tight, shut-off valve •
- Spring closure design. Non-slam check valve •
- Flow throttling valve



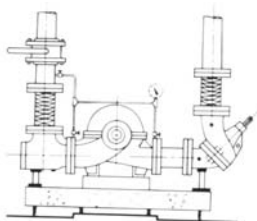
**Armstrong Model FTV-AF Flo-Trex Combination Valve**

## 2.0 INSTALLATION

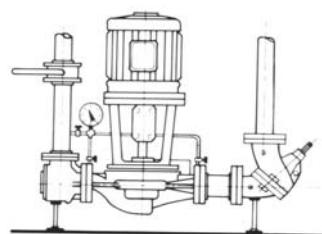
- 2.1 The valve should be mounted to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12" for pump sizes 2 x 2 to 6 x 6 and 24" for pump sizes 8 x 8 to 12 X 12.
- 2.2 It is not recommended to mount a valve directly to the pump as this could 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 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 are not required under the valve and strainer bodies but may be used if desired.
- 2.6 Ensure that the FTV is installed with the valve stem in the upright position. Valve slam may occur if installed in any other configuration.



**Base-Mounted Single Suction**



**Typical Installations**  
**Base-Mounted Double Suction**



**Vertical In-Line**

For additional information on Armstrong Model SG Suction Guides, request File 35.10.

## 3.0 FLANGE BOLT TIGHTENING

Recommended Bolt Tightening Procedure

Valve Size	125 psi/150 psi Cast Iron	
	Bolt	
	No.	Size
2-1/2	4	5/8
3	4	5/8
4	8	5/8
5	8	3/4
6	8	3/4

Table 1

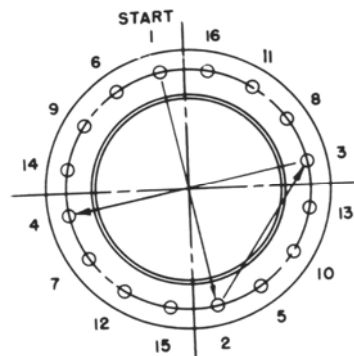
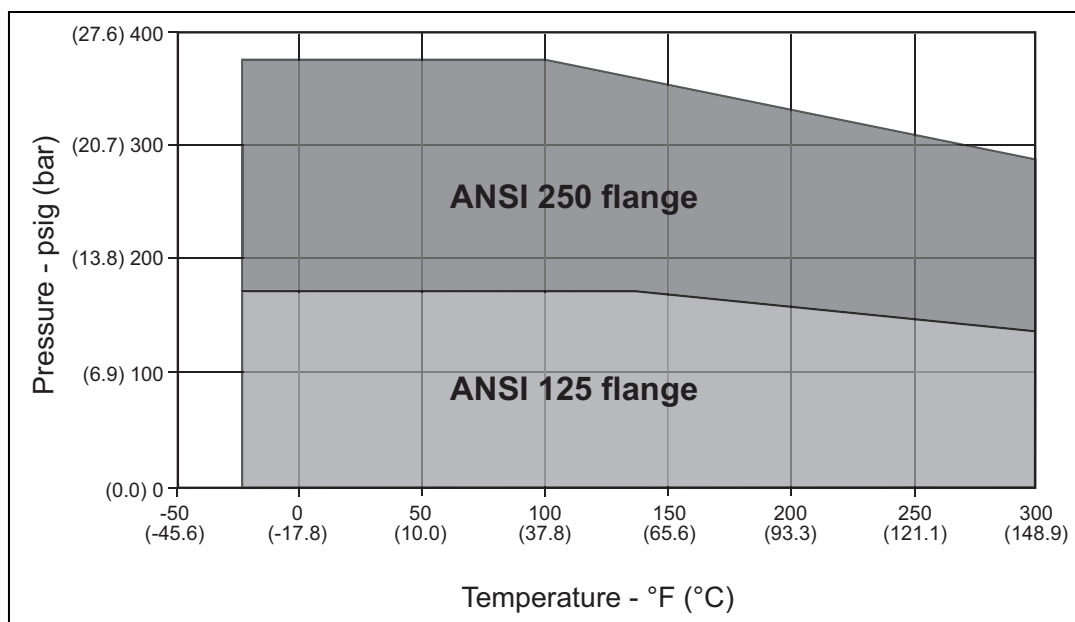


Fig. 1

- 3.1 Tighten nuts evenly, following bolting instructions (fig.1) so that the flange faces remain parallel. Flange bolts should be tightened to 70 ft/lbs. Torque minimum to assure firm metal-to-metal contact. When raised face flanges are used, there will be a gap between the faces of the outer diameter.

## 4.0 PRESSURE TEMPERATURE LIMITS



## 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 Armstrong Flo-Trex valve can be used.

### 6.2 FLOW MEASUREMENT VALVE IN WIDE OPEN POSITION

6.22 Measure and record the differential pressure across the valve using an Armstrong CompuFlo with high pressure range transducer, or CBDM- 135/60 meter, 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.

6.23 Refer to Flo-Trex Performance Curves with valve in full open position (Fig 2).

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

**Flo-Trex Performance Curve  
with Valve in Full Position**

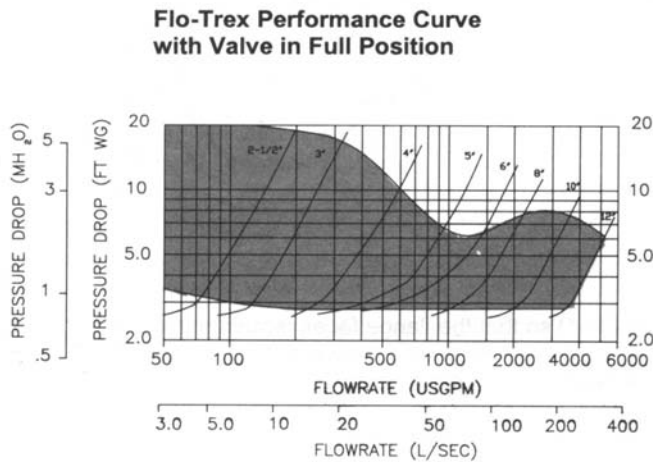


Fig. 2

**Inherent Flow Characteristic Curve  
with Valve in Throttled Position**

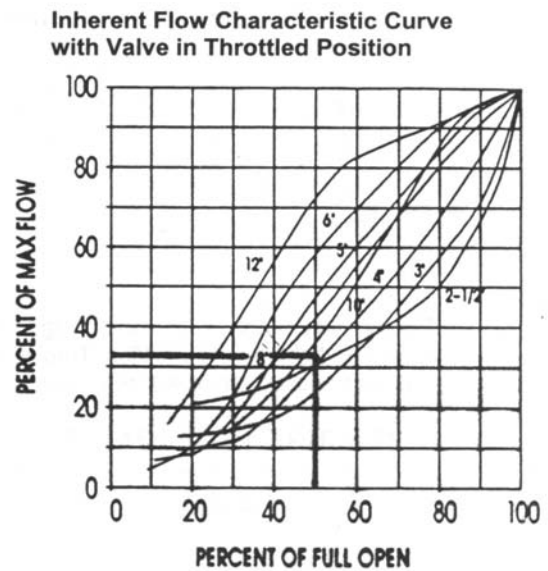


Fig. 3

6.3.1 Record the size of the valve and stem position using the Flow Indicator Scale (page 5). 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 3). Project line vertically up to intersects 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 Flo-Trex Performance Curve (fig. 2) 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 inch.

Differential Pressure is 5.4 ft. (1.65 m).

Number of rings open = 3. Therefore: 3 rings ÷ 6 rings x 100 = 50% throttled.

From the Flo-Trex Performance Curve (fig 2), a 4 inch, 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 3), a 4 inch valve 50% open, represents 34% of maximum flow.

Approximate flow of a 4 inch valve, with a 5.4 ft. (1.65 m) pressure drop when 50% throttled is:

$$\frac{400 \times 34}{100} = 136 \text{USgpm or in metric } \frac{25.2 \times 34}{100} = 8.57 \text{l/s}$$

**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 located elsewhere in the system be used 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 turns graduations on the sleeve, with the scribed line on the stem provides 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 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 counter-clockwise 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 back seating 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 2-1/2" and 3", full open position of valve is 5 turns. However valve will open to 5-1/2 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.

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 8.

S. A. Armstrong Limited  
23 Bertrand Avenue  
Toronto, Ontario  
Canada, M1L 2P3  
T: 416-755-2291  
F: 416-759-9101

Armstrong Pumps Inc.  
93 East Avenue  
North Tonawanda, New York  
U.S.A. 14120-6594  
T: 716-693-8813  
F: 716-693-8970

Armstrong Integrated Limited  
Wenlock Way  
Manchester  
United Kingdom, M12 5JL  
T: +44 (0) 8444 145 145  
F: +44 (0) 8444 145 146



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