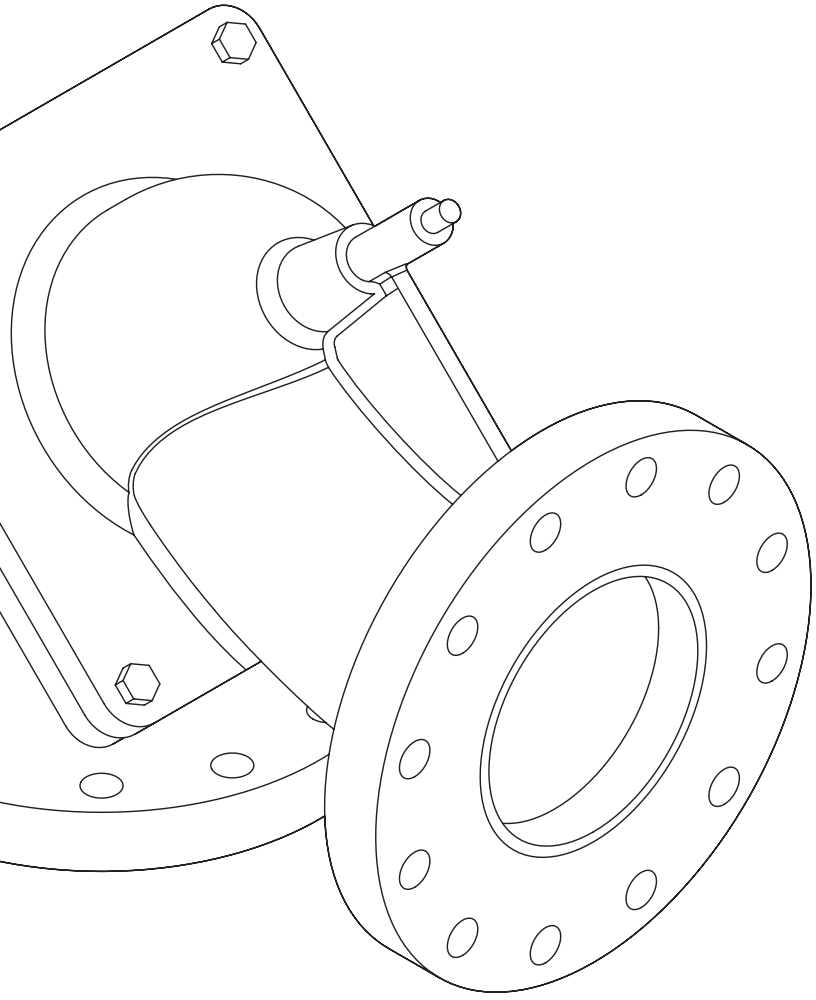
ARMSTRONG



Armstrong model FTV

Grooved end Flo-Trex combination valve

Installation and operating instructions

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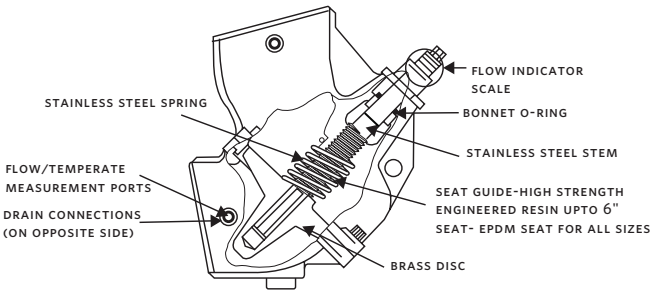
CONTENTS

1.0 INTRODUCTION

The model FTV 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



Armstrong model FTV-A Flo-trex combination valve

2.0 INSTALLATION

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 300mm for pump sizes 50 to 150 mm and 600 mm for pump sizes 200 to 300 mm diameter.

It is not recommended to mount a valve directly to the pump as this could cause undesirable noise in the system.

Sufficient clearance around the valve should be left for valve removal or repair.

Install valve in the direction of the flow arrows on the valve body.

The valve can be mounted to flanged equipment using Armgrip™. anti-rotation flange adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.

The Model FTV valve bodies have anti-rotation lugs on the inlet and outlet. These lugs, combined with the Armgrip™. flange adapters, provide a ridged rotation free installation.

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.

3.0 ARMGRIP™ FLANGE ADAPTER INSTALLATION

Position the two halves of ArmgripTM Flange adapter on the valve body (**FIG. 1**) ensuring that the lugs on each half of the flange adapters are located between the anti-rotation lugs on the valve body. Insert two bolts of specified size (**TABLE 1**) to secure the halves of the flange adapter to the valve body (**FIG. 2**). The gasket cavity should face out to the adjoining flange.

FIG. 1

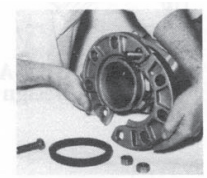


FIG. 2

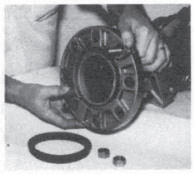


FIG. 3

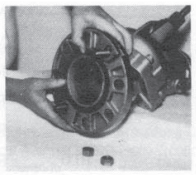


TABLE 1

ARMGRIP™ FLANGE ADAPTER DETAILS				
VALVE SIZE mm (inches)	PN16 DUCTILE IRON		PN25 DUCTILE IRON	
	BOLT NO.	BOLT SIZE	BOLT NO.	BOLT SIZE
65 (2.5)	4	M16	8	M16
80 (3)	4	M16	8	M16
100 (4)	8	M16	8	M20
125 (5)	8	M16	8	M24
150 (6)	8	M20	8	M24
200 (8)	12	M20	12	M24
250 (10)	12	M24	12	M27
300 (12)	12	M24	16	M27

Lubricate the inner and outer diameter of the gasket with the lubricant provided or a similar non-petroleum base water soluble grease.

Press the gasket firmly into the flange cavity ensuring that the sealing lip is pointed outward. When in place, the gasket should not extend beyond the end of the pipe (**FIG. 3**).

Position the adjoining flange or the pipe to the Armgrip™ flange adapter and install the remaining bolts. The two locking bolts should be tightened first in order to position the flanges correctly as shown in **FIG. 1**.

Note: Care should be taken to ensure that the gasket is not pinched or bent between flanges.

Tighten remaining nuts evenly, following bolting instructions (**FIG. 4**), 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.

Flange gaskets are not interchangeable with other mechanical pipe couplings or flange gaskets.

Recommended bolt tightening procedure

FIG: 4

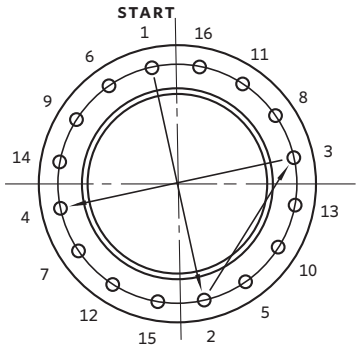
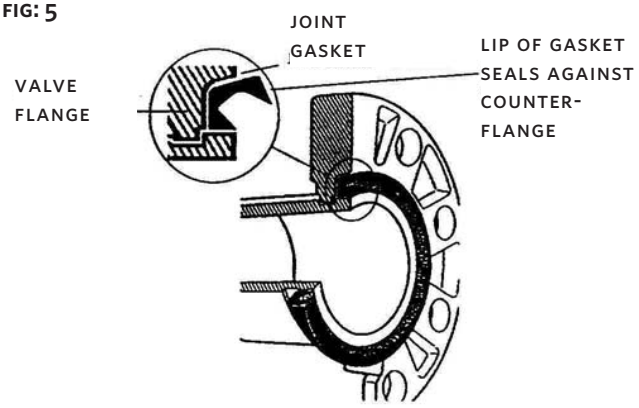
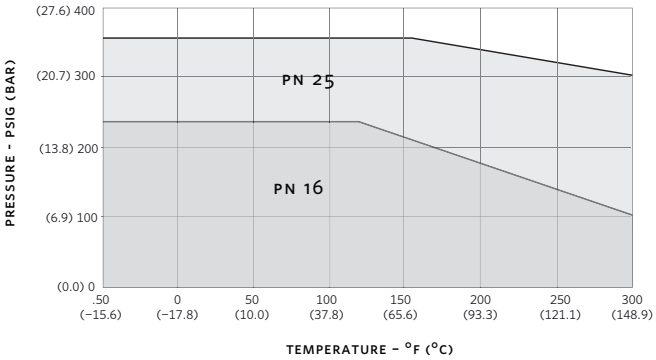


FIG: 5



4.0 PRESSURE-TEMPERATURE LIMITS



5.0 FIELD CONVERSION (straight to angle pattern valve)

Open valve at least one complete turn.

Remove the body bolts from valve body using allen key.

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.

Replace body bolts and torque evenly to 95Nm.

6.0 FLOW MEASUREMENT

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

Flow measurement valve in wideopen position.

1. Measure and record the differential pressure across the valve using an Armstrong CompuFlo 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. Refer to Flo-Trex performance curves with valve in full open position (**FIG.6**).

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.

Determining flow rate with valve in throttled position

FIG: 6

FLO-TREX PERFORMANCE CURVE WITH VALVE IN FULL OPEN POSITION

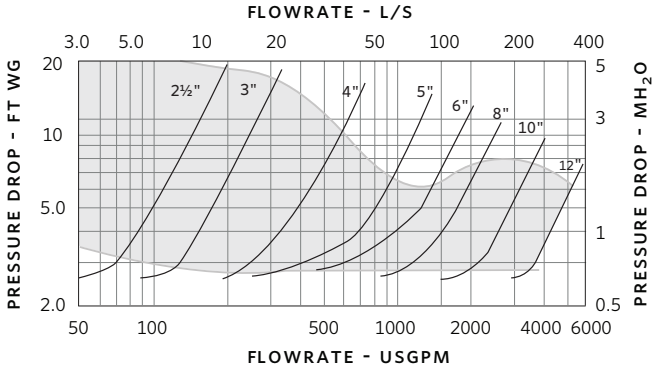
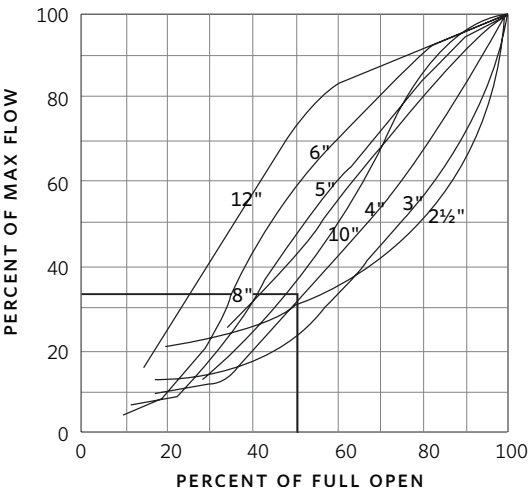


FIG: 7

INHERENT FLOW CHARACTERISTIC CURVE WITH VALVE IN THROTTLED POSITION



1 Record the size of valve and stem position using the Flow indicator scale (page 7). Calculate percentage of valve opening referring to table below:

VALVE SIZE	NUMBER OF RINGS (VALVE FULL OPEN)
2½	5
3	5
4	6
5	9
6	10
8	12
10	18
12	28

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

3 Locate percentage of valve opening on the bottom scale of Flow characteristic curve (**FIG. 7**). 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.

4 On the Flo-Trex performance curve (**FIG. 6**) locate the differential pressure obtained in **STEP 3** 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.

5 To calculate flow rate of valve in the throttled position, multiply the flow rate from **STEP 4** by the percentage flow rate from **STEP 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% throttled

From the Flo-Trex performance curve (**FIG.6**), 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 7**), 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:

$$\frac{400\times34}{100} = 136\text{USgpm} \quad \left(\frac{25.2\times34}{100} = 8.57\text{L/s}\right)$$

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

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

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

1 Should it be necessary, stem o-ring can be changed under full system pressure.
Caution: Safety glasses should be worn.

2 Record the valve setting.

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.

4 The valve bonnet may now be removed. There may be slight leakage, as the metal-to-metal back seating does not provide a drip-tight seal.

5 Clean exposed portion of valve stem (do not scratch).

6 Remove and replace the o-ring and gasket.

7 Install the valve bonnet.

8 Tightening valve bonnet is necessary to stop any leaks.

9 Open valve to balance set point as recorded in **STEP 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

1. Drain system and remove valve from piping.
2. Remove the body bolts from the body using an allen key.
3. Remove seat and o-ring. O-ring is not used on valves 8" and larger.
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 **8.0**.

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