

# TI Series 5, 150# Flanged, 1" Port

## Transmitter Isolation Ball Valves

### Installation, Operation, and Maintenance Instructions



#### **WARNING:**

For your safety and protection it is important that the following precautions be taken prior to working on the valve.

1. **Depressurize and drain the line.**
2. **Cycle the valve to relieve any pressure trapped in the valve.**
3. **Disconnect any air and electrical connections to the valve assembly.**
4. **Know what the media is in the line and wear appropriate protective clothing and equipment. Obtain appropriate MSDS sheets.**
5. **To ensure safe product selection and operation, it is the responsibility of the process system designer and end user to determine the appropriate compatible materials of construction and adequate product ratings for the process system. Process system designer, installer, and end user are responsible for proper installation, operation, and maintenance.**
6. **When disposing of Teflon parts, do not incinerate or subject to open flames.**

#### **General**

This Installation, Operation, and Maintenance manual is for the safe use of PBM TI Series 5 transmitter isolation ball valves. Please read the instructions carefully and save them for future reference.

#### **Installation**

The Transmitter Isolation Valve is a ball valve that mounts to a 150# tapped flange on a tank, and a 150# flange attached to a pressure transmitter. Note: The tank flange may have unequal tapped holes that are needed for knife gate valve installation. The TIV has a bolt holes that accommodate this bolt pattern. PBM's TIV is a ball valve with four purge ports that can be used for purging the body cavity and the fluid volume between the valve and the pressure transmitter. They assist in preventing product from hardening and interfering with operation of the valve or the transmitter. These purge ports are sealed with pressure tight pipe plugs at shipment.

#### **Operation**

Operation consists of turning the handle 1/4 turn to close or open the valve. When handle is parallel with the flow line, the valve is in the open position. Good operating procedure requires periodic inspection of the valves and replacement of parts as required. Always use PBM factory authorized replacement parts.

#### **Installing the Valve**

1. Install four 5/8" studs in the tapped holes in the tank flange.
2. While installing a gasket between the TIV and the tank flange, push the TIV assembly up against the gasket to trap the gasket between the TIV and the tank flange. For 1" x 3" TIV valves only, allow the protruding 2-7/8" diameter pilot of the TIV to enter the bore of the tank flange and allow the four 5/8" studs to pass through mating 3/4" holes in the TIV.
3. Install 5/8" nuts on the four studs and tighten in a staggered sequence to compress the gasket trapped between the tank flange and the TIV.
4. Install four 5/8" studs in the tapped holes in the TIV.
5. Install the pressure transmitter and gasket on the open end of the TIV and secure with four 5/8" nuts. The nuts should be tightened in a staggered sequence.

#### **Connecting the Purge Piping**

Four 1/4" FNPT purge ports are located in the TIV. They are plugged and sealed at shipment with 1/4" MNPT pipe plugs. The four purge ports are identified as follows (when viewing the valve from the transmitter side, stem vertically up):

**1" X 3" TIV:** Tank side and Transmitter Side, 4 o'clock and 7 o'clock

**1" X 2" TIV:** Tank side 3 o'clock and 6 o'clock and transmitter side 5 o'clock and 7 o'clock

1. The tank side purge ports can be used to purge the body of the valve, using one as an inlet and one as an outlet.
2. The transmitter side purge ports can be used to purge the volume between the body of the valve and the transmitter, using one as an inlet and one as an outlet.

3. If the valve has a ball with flats milled on the transmitter side closed surface, one or both of the tank side purge ports can be used as purge inlet(s) and one of the transmitter side purge ports can be used as the purge outlet. Hence, the body cavity and the fluid volume at the transmitter can be purged with the valve closed.
4. One of the transmitter side purge ports can be used for calibration of the transmitter with a test pressure source with the TIV in the closed position.
5. Customer supplied piping and valves are needed if the purge ports are to be used. Purge ports not in use should be plugged.

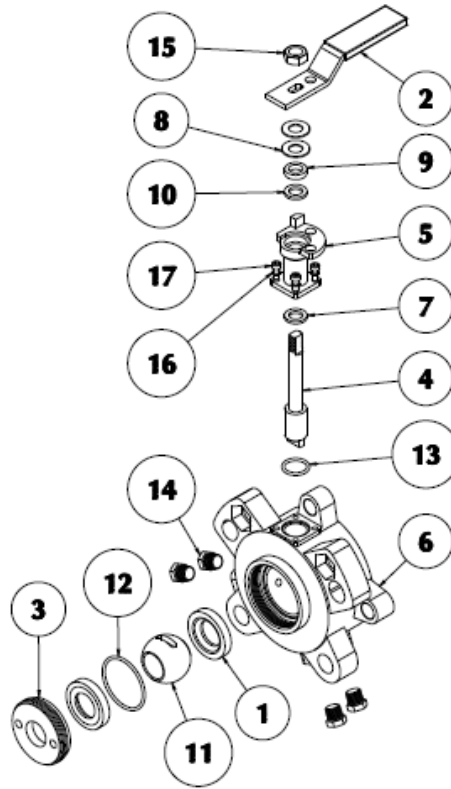
### Replacing the Stem Packings:

1. Drain the tank, then ensure valve is in the open position.
2. Loosen & remove the four cap screws w/ lock washers that secure the bonnet to the body.
3. Lift the bonnet free of the body and remove the O-ring between the bonnet and the body.
4. Loosen and remove the stem hex nut from the stem, then remove handle, spring washers, and follower from the stem.
5. Push the stem down through the bonnet and remove the stem, then remove the lower and upper packings from the stem and/or the valve bonnet.
6. Clean all metal parts using a suitable solvent and a non-abrasive cloth.
7. Install a new bonnet O-ring seal by sliding it onto the bottom of the bonnet until it rests on the ledge of the bonnet.
8. Install new lower packing by sliding it over the top of the stem and allowing it to rest on the ledge of the stem.
9. Slide the stem up into the bore of the bonnet until the lower packing rests on the bonnet.
10. Install the upper packing over the stem and into the counterbore of the bonnet.
11. Install the follower over the stem and allow it to rest on the upper packing.
12. Install the two spring washers, first one with the concave side facing upward and the second one with the concave side facing downward. Spring washers should not be "nested".
13. Install the handle down over the stem such that the locking holes in the handle are aligned over the locking holes in the bonnet in the open and closed positions.
14. Lubricate the stem threads with a non-galling lubricant then install the stem hex nut on the stem and tighten to completely compress the spring washers. Then loosen this nut 1/8 turn.
15. Place the bonnet on the body with the handle in the open position located over the transmitter side of the valve.
16. Allow the stem tang to enter the stem slot of the ball. The handle may have to be turned for the tang to enter the slot.
17. Lubricate the threads of the four cap screws with an anti-galling thread lubricant then install them, with lock washers, into the tapped holes in the body, then tighten the cap screws.

### Replacing the Seats:

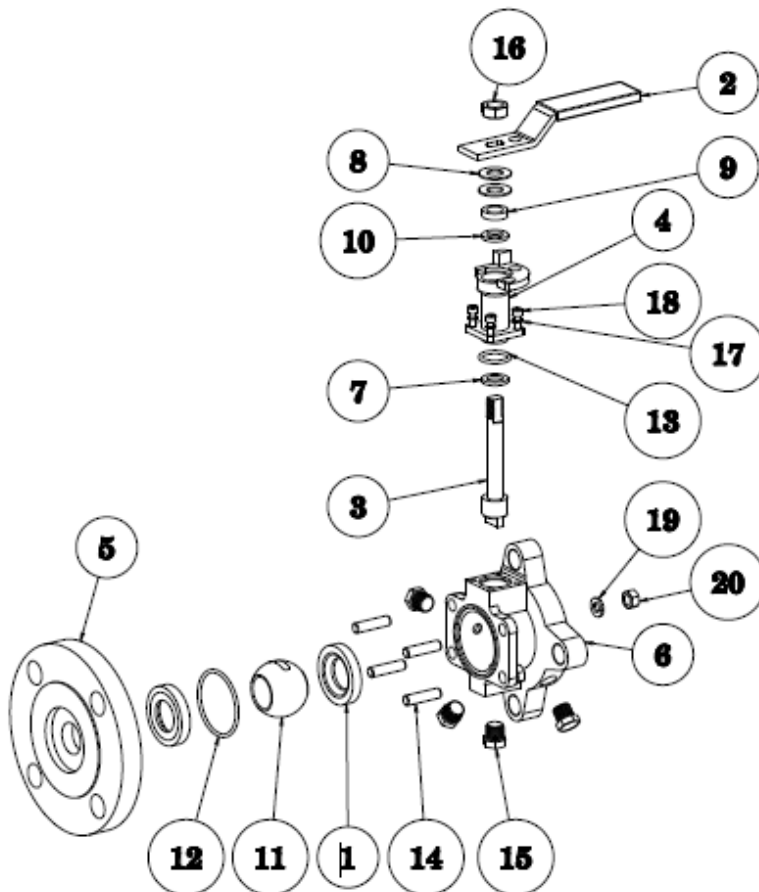
1. Drain the tank, then loosen and remove the four 5/8" nuts connecting the transmitter to the TIV and remove the transmitter and gasket.
2. Loosen and remove the remaining four 5/8" nuts and pull the TIV away from the tank flange. Remove the gasket.
3. Loosen and remove the four cap screws with lock washers that secure the bonnet to the body and lift the bonnet free of the body, then remove the O-ring between the bonnet and the body.
4. **1" X 3" TIV ONLY:** Using a spanner wrench, loosen and remove the seat retainer from the body.
5. **1" X 2" TIV ONLY:** Loosen and remove the nuts w/ lock washers that secure the seat retainer to the body.
6. Remove the body O-ring, seats, and ball from the body. Take care not to nick or scratch the ball.
7. Clean all metal parts using a suitable solvent and a non-abrasive cloth.
8. Set the body on a horizontal surface with the transmitter side resting down.
9. Install a new seat in the body then install the ball with the stem tang facing the bonnet hole in the body. For valves with a milled flat on the closed surface of the ball, the milled flat should face the installed seat with the valve (transmitter side) in the closed position. Take care not to nick or scratch the ball.
10. Install a new bonnet seal O-ring by sliding it onto the bonnet until it rests on the ledge of the bonnet.
11. Install the bonnet on the body, allowing the tang on the stem to engage the slot in the ball. The ball or stem may have to be turned to allow this to occur. The handle should be over the transmitter side of the valve when the valve is open.
12. Place the body O-ring seal into the groove in the body and place the remaining seat into the recess in the seat retainer.
13. Turn the valve handle to position the ball in the closed position.
14. **1" X 3" TIV ONLY:** Lubricate the threads of the seat retainer with an anti-vibration locking compound. Install the seat retainer into the body until it bottoms. Using a spanner wrench, tighten the retainer until it firmly seats on the body.
15. **1" X 2" TIV ONLY:** Install the seat retainer onto the body until it bottoms. Assemble and tighten the nuts w/ lock washers that secure the seat retainer to the body.
16. The valve is now assembled. Complete assembly to the tank using the installation instructions provided above.

PARTS LIST	
ITEM	DESCRIPTION
1	Seat
2	Handle
3	Seat Retainer
4	Stem
5	Bonnet
6	Body
7	Lower Stem Packing
8	Spring Washers
9	Follower
10	Upper Stem Packing
11	Ball
12	Body O-Ring
13	Stem O-Ring
14	Purge Pipe Plugs
15	Stem Hex Nut
16	Bonnet Cap Screw
17	Bonnet Lock Washer



**1" PORT X 3" 150# FLANGE**

PARTS LIST	
ITEM	DESCRIPTION
1	Seat
2	Handle
3	Stem
4	Bonnet
5	Seat Retainer
6	Body
7	Lower Stem Packing
8	Spring Washers
9	Follower
10	Upper Stem Packing
11	Ball
12	Body O-Ring
13	Stem O-Ring
14	Body Bolts
15	Purge Pipe Plugs
16	Stem Nut
17	Bonnet Lock Washer
18	Bonnet Cap Screw
19	Body Lock Washer
20	Body Nut



## 1" PORT X 2" 150# FLANGE

Replacement Kits and Parts				
Valve Size	Repair Kit (V-TEF™)	Repair Kit (S-TEF®)	Ball (316L S/S)	Stem (316L S/S)
1" Port	TITFE5 -- G -- 1	TIHTE5 -- H -- 1	SPHLE102	TIHLE505

### Notes for Table above:

1. Standard repair kits include 2 V-TEF™ seats, 1 V-TEF™ stem packing, 2 o-rings, and 1 S-TEF® (gray) stem packing. S-TEF® repair kits use 2 S-TEF® seats, 2 S-TEF® stem packings and 2 o-rings.
2. Standard repair kits and replacement parts are V-TEF™.
3. Replacement parts are one each per part number.

### Material Definitions:

TF V-TEF™ Chemically modified polytetrafluoroethylene  
HT S-TEF® Stainless steel reinforced polytetrafluoroethylene



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