

## **INSTALLATION – MAINTENANCE MANUAL**

### **SERIES MPF150, MPF300, MPT230, MPT240**

## **Valve Installation**

### **1. Handling**

To ensure safety, user must handle the valve with both hands so that the weight of the valve is equally distributed at both ends. If a hoist is used to lift a large valve, the user must make sure the hoist is strong enough to support the weight of the valve.

### **2. Cleaning**

To prevent damage to the seats and ball surface, the user must inspect the valve for dirt, burrs and welding residues prior to installation. Although all valves were cleaned and bagged prior to delivery, if for some unforeseen circumstances that the valves were soiled during transportation, the user must clean the valve prior to installation. The user may clean the valve by water, steam or pressurized air.

### **3. Flow Direction**

Our valves are bi-directional, meaning upstream or downstream could be at either end of the valve.

### **4. Position and Weight Support**

The weight of the valve must be properly supported by means other than the connected pipelines. The valve end connection and the pipeline forms an integral sealing zone. If the weight of the valve is entirely distributed to the joint area, the valve will defonn and cause leakage.

### **5. Installation of Threaded End Valve(MPT230)**

- a. Use conventional sealant, such as hemp core, Teflon, etc.
- b. Use wrench and apply force on the hexagon end of the valve only. Apply force to other area of valve may seriously damage the valve.
- c. For applications where threaded end valves are back-welded on site, the valves must be dismantled according to instructions for weld end valves.

### **6. Systems Hydrostatic Test**

Before delivery, our valves are tested to 1.5 times the allowable pressure at ambient temperature in the partial

open position. After installation, the pipeline may be subjected to system test pressure of no more than 1.5 times the rated pressure.

## **Valve Operation**

### **1. Ball Valve Flow Diagram**

Our multiport ball valve may be configured into many different options depending on customer's application. Refer to the last page of this IOM Manual for all the possible flow patterns.

### **2. Manual Operation**

- a. Valve Flow Path is indicated by markings on the top of ball valve stem.
- b. The illustration on the last page shows standard valve position at the time of shipment.

### **3. Automatic Operation**

- a. Prior to actuator installation, please check the flow path of the valve as indicated by marking on the top of ball valve stem as shown in the illustrations on the last page.
- b. After Actuator installation, valve should be check for valve stem alignment. Axial misalignment will result in high operational torque and unnecessary wear on the stem seal.

## **Maintenance**

### **1. Maintenance Frequency**

User should determine the maintenance frequency depending on specific application. If there is sign of leakage from the stem, it is time to replace the stem sealing components. If there is sign of internal leakage, it is time to replace the seats and gasket components. Life of the valve can be maximized if the valve is used within the rated range, in accordance with pressure, temperature, and corrosion data.

### **2. Disassembling and Cleaning the Valve**

Ball valve can trap fluids in ball cavity when it is in the closed position. If the valve has been used in hazardous media, it must be decontaminated before disassembly.

- a. Relieve the line pressure.
- b. Place valve in half-open position and flush the line to remove any hazardous material from valve cavity.
- c. All persons involved in the removal and disassembly of the valve should wear proper protective clothing, such as face shield, glove, apron, etc.

## **Delivery Condition and Storage**

- a. Valves are set to position 1;
- b. Upon delivery, customer's quality control must check the package to make sure that the valves are not damaged during the shipping process;
- c. Valves must also be checked for loosening of bolts due to shipment;
- d. Valves should be stored indoors and in its original package.

## **Short and Long-Term Storage**

### **Short-Term Storage:**

Short-term storage is defined as storage of products and equipment to be used in the construction of a project for periods of one to three months. Short-term storage must be carried out in a controlled manner as follows:

1. Valves must be stored in a closed, clean, and dry environment.
2. Ball valves should be stored in the fully open position to protect the ball and seats.
3. Ball valves should remain in the original shipping container and be placed on pallets of wood or other suitable materials. End protectors should remain on the valve ends to prevent the entrance of dirt, and removed only at time of installation.

### **Long-Term Storage**

Long-term storage is defined as storage of products and/or equipment for periods longer than 3 months. Long-term storage must be carried out in a controlled manner as follows:

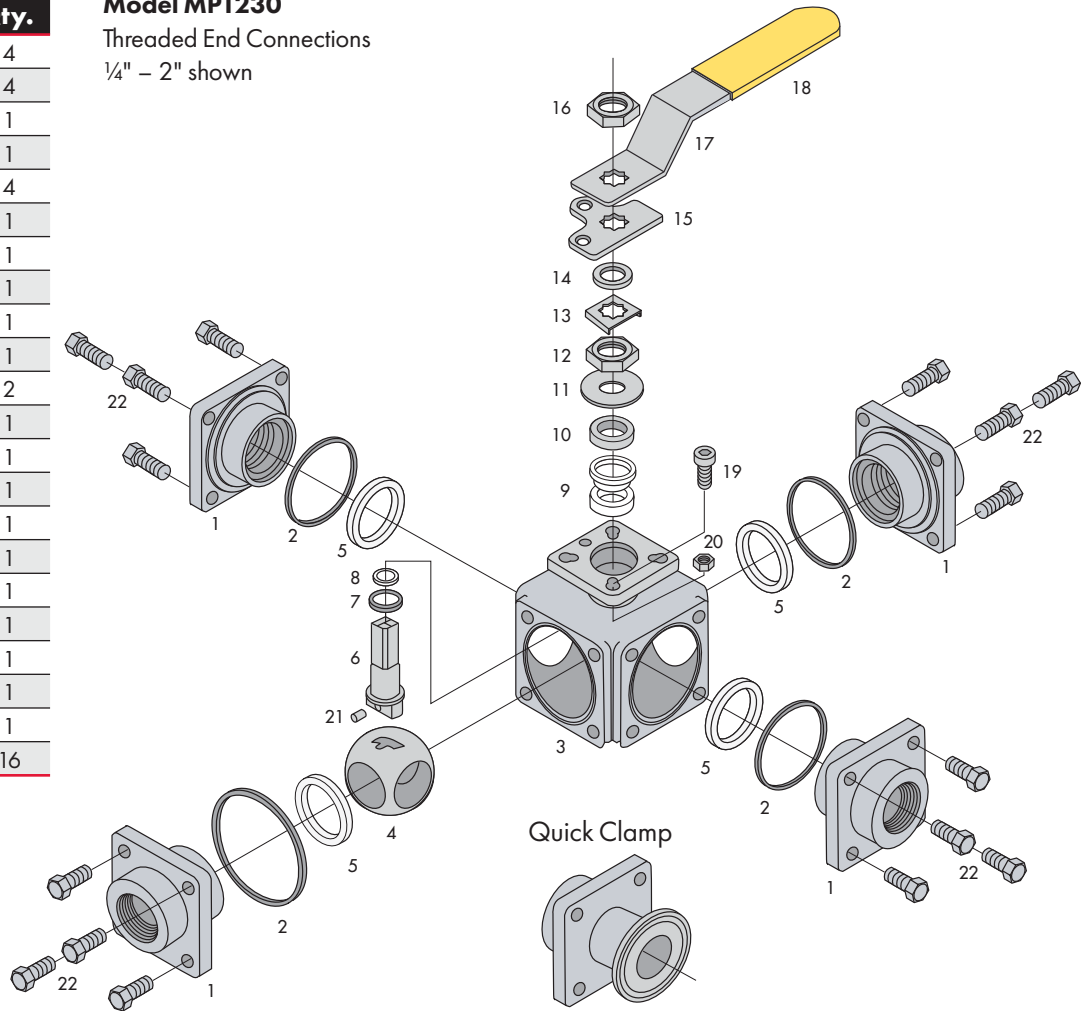
1. Valves must be stored in a closed, clean, and dry environment.
2. Ball valves should be stored in the fully open position to protect the ball and seats.
3. Ball valves should remain in the original shipping container and be placed on pallets of wood or other suitable materials. End protectors should remain on the valve ends to prevent the entrance of dirt, and removed only at time of installation.
4. Periodically, the valves should be checked to ensure the above conditions are maintained.

These are general guidelines for valve storage. Please consult the factory for information regarding specific requirements.

Item	Name	Qty.
1	End Cap	4
2	Gasket**	4
3	Body	1
4	Ball*	1
5	Seat*	4
6	Stem*	1
7	Thrust Washer*	1
8	O-ring*	1
9	Stem Packing*	1
10	Gland	1
11	Belleville Washer	2
12	Stem Nut	1
13	Lock Saddle	1
14	Space Washer	1
15	Stop Plate	1
16	Handle Nut	1
17	Handle	1
18	Handle Sleeve	1
19	Stop Pin Bolt	1
20	Stop Pin Nut	1
21	Pin Insert	1
22	Bolt	16

### Model MPT230

Threaded End Connections  
 1/4" – 2" shown



## 1/4"-2" Model MPT230

### Valve Disassembly Procedures:

1. Unscrew handle nut (16) off stem (6), and take the handle (17) away from the stem;
2. Remove the Stop Plate(15), Spacer Washer (14) and Lock Saddle (13); unscrew stem nut(12); remove belleville washer (11) from the stem; To assist in unscrewing the stem nut(12), a rod with diameter smaller than the ball orifice may be placed into the ball orifice.
3. Remove four body bolts (22) from each side of the valve and separate end caps(1A,1B) from the valve body; 4 Remove the all the gaskets(2) and seats from end caps or valve body; 5 Turn stem until ball slot or stem flat is parallel to the port centerline, then the ball will be easily removed from the valve body; 6 Press the stem into the inside of the valve body, and remove the stem, thrust washer(7) and O-Ring(8); 7 On top of the valve, remove the packing gland(10) and stem packing (9);

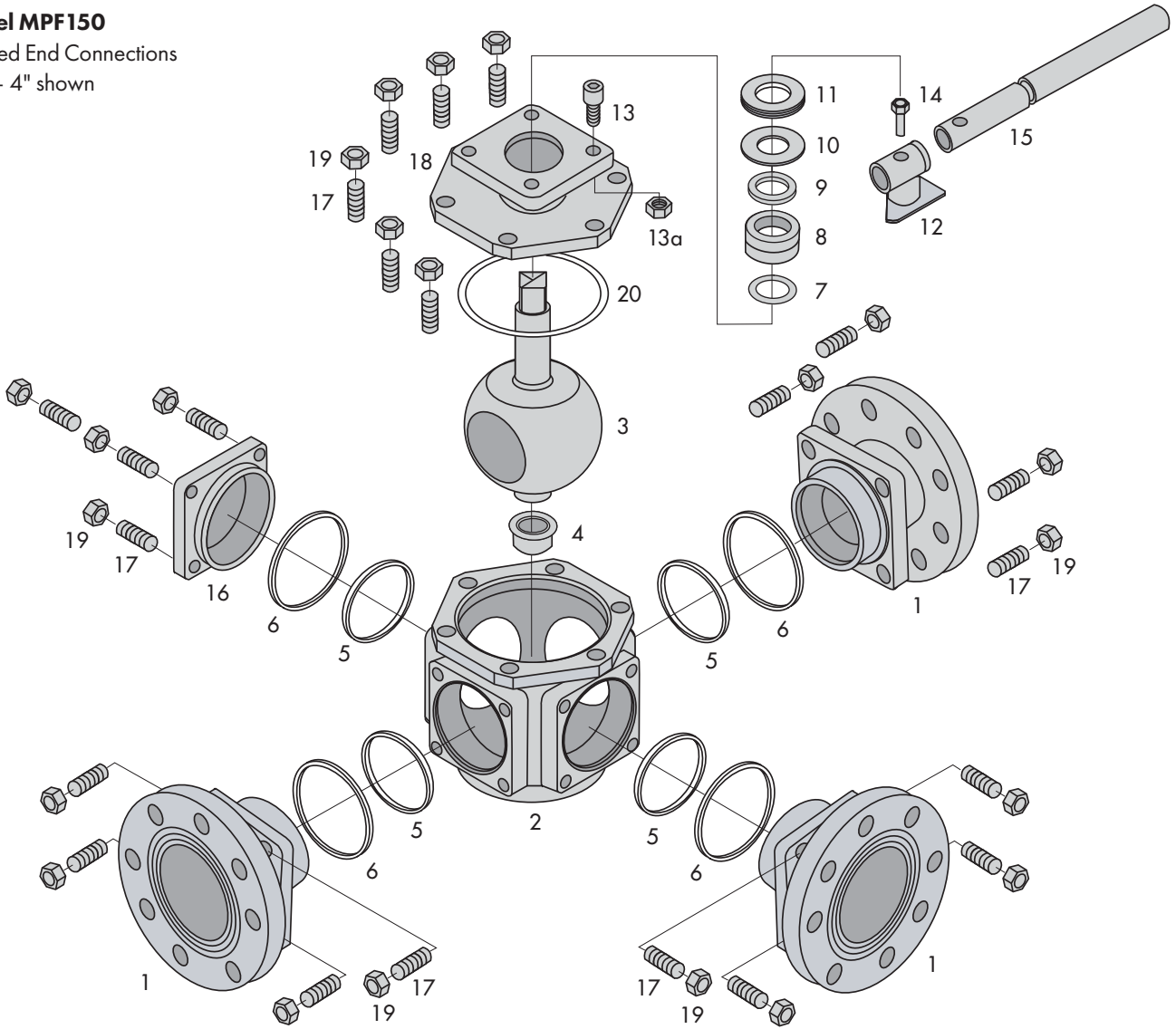
### Valve Assembly Procedures:

1. Put O-Ring(8) and Thrust Washer (7) on valve stem (6) and slide the stem into the stem hole on valve body (3);
2. Slide the stem packing (9) onto the stem until it is seated against the bottom of the stem hole;
3. Put packing gland (10) onto the stem, on top of the stem packing;
4. Turn the stem until the stem flat is parallel to the port centerline (so that the ball can fit onto the stem);
5. Install each seat (5) inside the seat pocket of the 4 end caps, make sure the spherical curvature side of the seat will face the ball;
6. Put the ball (4) inside the valve body, the stem flat will fit into the slot on top of the ball and the side slot near the stem slot will fit into the Pin Insert (21);
7. Turn the stem so that the ball opening is parallel to the port centerline;
8. Place each body gasket (2) onto the 4 end caps; Push the gasket all the way down to the sealing surface of each end cap;
9. Assemble the end cap (1A, 1B) onto the valve body, loosely tighten Body Bolts(22) and line up end flange.

Because the body flange bolt pattern is different from the line flange bolt pattern, it is possible to assemble the valve such that the bolt holes in the line flanges don't line up. Be certain to align end flanges bolt holes to straddle valve center lines. **NOTE: Be careful not to damage gasket when putting end cap into body.**

10. Tighten nuts in a "star" pattern to the torque specified in the chart; Tighten one end piece in a similar fashion as tightening the opposite end piece. Do not tighten one end piece fully until the opposite end piece were fully tightened. **NOTE: Valve must be in the 100% full open position.**
11. Put Belleville washer (13) together in series mode (bottom Belleville washer curve facing up, the top Belleville washer curve facing down), and then place them onto the stem, on top of the packing gland; Screw stem nut(12) onto stem, on top of the belleville washer; Tighten the stem nut to the required stem gland nut torque value as specified in the chart. **NOTE: The use of a bore alignment tool, about 1.0 mm [0.04 inch] less than the internal diameter of the end cap and ball, inserted through the end cap and ball will prevent the ball from turning as the stem gland nut is tightened on the stem. Material for the bore alignment tool should be made from a material softer than 300 Series S.S. so that it will not inadvertently scratch the valve end cap or ball. Suggested materials: aluminum T6061, Acetal or other suitable hard polymer/plastic material.**
12. Install Lock Saddle(13) on top of the stem nut; Put Space Washer(14) on top of the lock saddle, then put Stop Plate(15) onto stem, make sure the orientation of the stop plate is correct in relation to Stop Pin Bolt(19);
13. Install handle(17) onto the stem, on top of the stop plate;
14. Secure the handle with the handle nut (16)
15. Cycle the valve slowly with a gentle back and forth motion, to build gradually to the full quarter turn. By cycling slowly, the seat lips will assure a permanent seal shape against the ball. A fast turning motion, at this point, may cut the seats before they have a chance to form the proper seal.

**Model MPF150**  
**Flanged End Connections**  
 2½" – 4" shown



Item	Name	Qty.
1	End Cap	3
2	Body	1
3	Ball & Stem**	1
4	Stem Bushing**	1
5	Seat*	4
6	Gasket**	4
7	O-ring*	1

Item	Name	Qty.
8	Stem Packing*	1
9	Gland	1
10	Belleville Washer	2
11	Packing Nut	1
12	Handle T-Bar	1
13	Stop Pin Bolt	1
13a	Stop Pin Nut	1

Item	Name	Qty.
14	Handle Bolt	1
15	Handle	1
16	Blank Cover	1
17	Threaded Stud	22/24
18	Bonnet	1
19	Hex Nut	22/24
20	Bonnet Gasket	1

## 2½"-4" Model MPF150/300

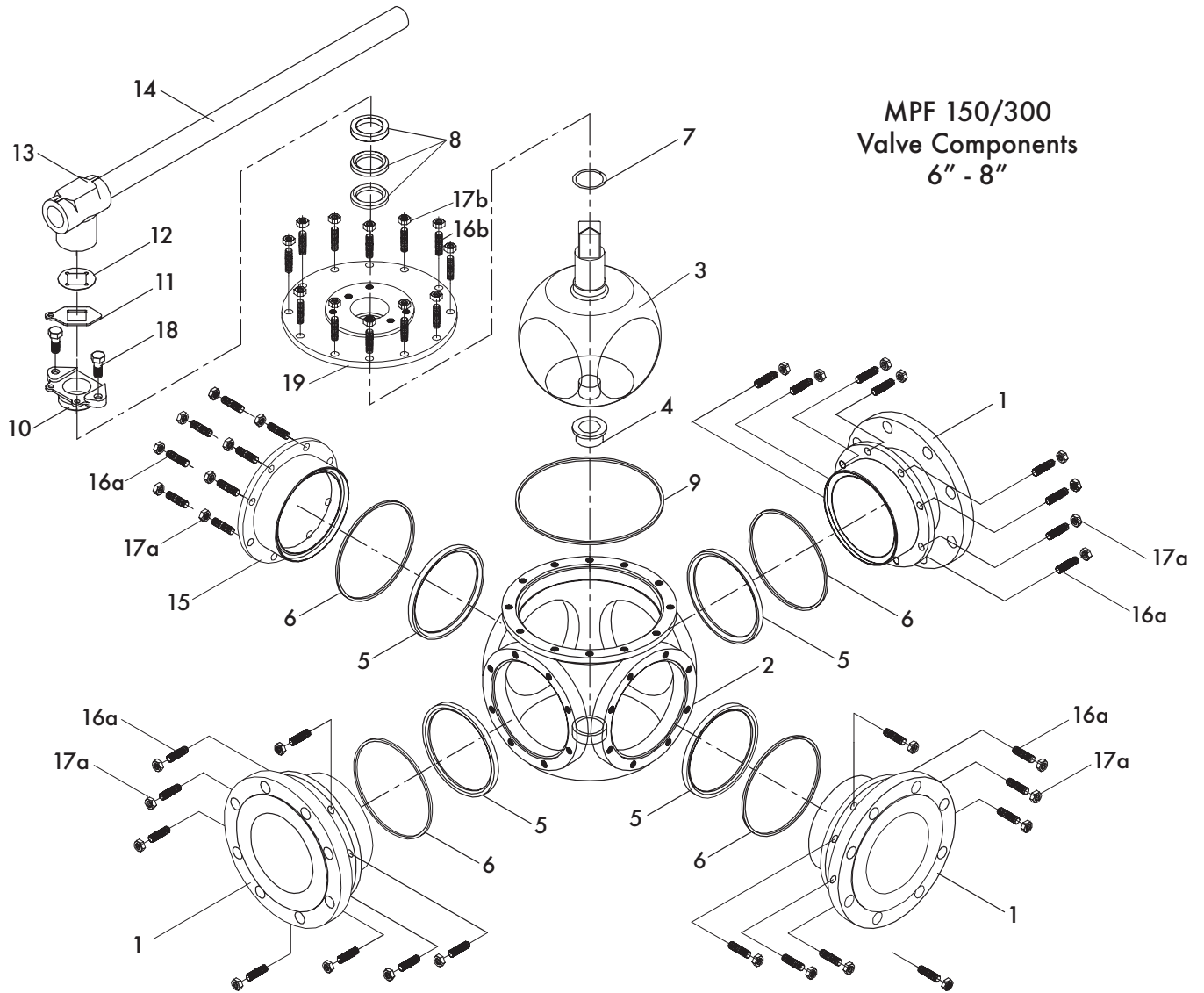
### Valve Disassembly Procedures:

1. Unscrew handle bolt (14);
2. Remove Lever(15) from Handle T-Bar (12);
3. Take handle T-bar off the Ball & Stem(3);
4. Unscrew off the Packing Nut(11), Belleville Washer(10) and Gland Sleeve (9);
5. Unscrew Flanged End Cap Bolts(17), and separate End Caps(1, 16) from the valve body;
6. Remove Seats(5) and Gaskets(6). Use caution to prevent damage to metal parts;
7. Unscrew Bonnet Bolts(19), and Bonnet(18) will be loose;
8. Separate bonnet away from valve body, and remove Bonnet Gasket(20). Use caution to prevent damage to metal parts;
9. Take O-Ring(7) and Stem Packing(8) out of packing chamber on the bonnet;
10. Take ball & stem out of valve body, remove Stem Bushing(4).

### Valve Assembly Procedures:

1. Install Stem Bushing (4) in the bottom center hole inside valve Body (2);
2. Slide the trunnion of the Ball & Stem (3) into the stem bushing;
3. Place the Bonnet Gasket(9) onto the gasket groove on top of the body;
4. Install Bonnet (18) onto the valve body, using Bonnet Bolts(19); **NOTE: Be careful not to damage bonnet gasket when putting bonnet into body.**
5. Tighten bolts in a "star" pattern to the torque specified in the chart;
6. Place gasket (6) onto each of the 4 end caps(1, 16); Push the gasket all the way down to the sealing surface of each end cap;
7. Install the seats (5) inside each seat pocket of the end caps(1, 16), make sure the spherical curvature side of the seat will face the ball;

8. Turn the ball so that the ball opening is parallel to the port centerline;
9. Assemble the end cap (1, 16) onto the valve body, loosely tighten End Cap Bolts(17) and line up end flange. Because the body flange bolt pattern is different from the line flange bolt pattern, it is possible to assemble the valve such that the bolt holes in the line flanges don't line up. Be certain to align end flanges bolt holes to straddle valve center lines. **NOTE: Be careful not to damage gasket when putting end cap into body.**
10. Tighten bolts in a "star" pattern to the torque specified in the chart; Tighten one end piece in a similar fashion as tightening the opposite end piece. Do not tighten one end piece fully until the opposite end piece were fully tightened. **NOTE: Valve must be in the 100% full open position.**
11. Install O-Ring(7), and then slide the Stem Packing (8) onto the stem until it is seated against the upper bottom of the stem hole;
12. Put Gland Sleeve (9) onto the stem, on top of the stem packing;
13. Put Belleville washer (13) together in series mode (bottom Belleville washer curve facing up, the top Belleville washer curve facing down), and then place them onto the stem, on top of the gland sleeve;
14. Install Packing Nut(11) onto stem, on top of the belleville washer; Screw packing nut onto valve body; Tighten the packing nut to a snug tight secure firm fit;
15. Install Handle T-Bar(12) and Lever(15);
16. Secure lever by Screwing and tightening Handle Bolt(14);
17. Cycle the valve slowly with a gentle back and forth motion, to build gradually to the full quarter turn. By cycling slowly, the seat lips will assure a permanent seal shape against the ball. A fast turning motion, at this point, may cut the seats before they have a chance to form the proper seal.



**MPF 150/300**  
**Valve Components**  
**6" - 8"**

Item	Name	Qty
1	End Cap	3
2	Body	1
3	Ball & Stem	1
4	Stem Bushing	1
5	Seat	4
6	Gasket	4
7	O-Ring	1

Item	Name	Qty
8	Stem Packing	1
9	Bonnet Gasket	1
10	Gland	1
11	Stop Plate	1
12	Stop Ring	1
13	Handle Head	1
14	Lever	1

Item	Name	Qty
15	Blank End	1
16a	Flanged End Studs	32
16b	Bonnet Studs	12
17a	Flanged End Nuts	32
17b	Bonnet Nuts	12
18	Gland Bolts	2
19	Bonnet	1

## 6"-8" Model MPF150/300

### Valve Disassembly Procedures:

1. Remove Lever(14) from Handle Head (13);
2. Take handle head off the Ball & Stem(3), remove Stop Ring(12) and Stop Plate(11);
3. Unscrew off the Gland Bolts(18), remove Gland(10);
4. Unscrew Flanged End Nuts(17a), and separate End Caps(1, 15) from the valve body;
5. Remove Seats(5) and Gaskets(6). Use caution to prevent damage to metal parts;
6. Unscrew Bonnet Nuts(17b), and Bonnet(19) will be loose;
7. Separate bonnet away from valve body, and remove Bonnet Gasket(9). Use caution to prevent damage to metal parts;
8. Take O-Ring(7) and Stem Packing(8) out of packing chamber on the bonnet;
9. Take ball & stem out of valve body, remove Stem Bushing(4);
10. If necessary, all studs(16a,16b) may be unscrewed at this time.

### Valve Assembly Procedures:

1. Install Stem Bushing (4) in the bottom center hole inside valve Body (2);
2. Slide the trunnion of the Ball & Stem (3) into the stem bushing;
3. Screw the Bonnet Studs (16b) into the threaded holes on top of the valve body;
4. Place the Bonnet Gasket(9) onto the gasket groove on top of the body;
5. Install Bonnet (19) onto the valve body, using Bonnet Nuts(17b); **NOTE: Be careful not to damage bonnet gasket when putting bonnet into body.**
6. Tighten nuts in a "star" pattern to the torque specified in the chart. **WARNING:There should be at least one stud thread exposed; 7 Screw the End Cap Studs (16a) into the threaded holes on side of the valve body; 8 Place gasket (6) onto each of the 4 end caps(1, 15); Push the gasket all the**

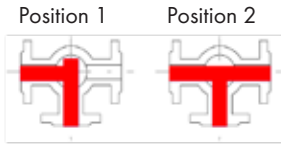
**way down to the sealing surface of each end cap;**

7. Install the seats (4) inside each seat pocket of the end caps(1, 15), make sure the spherical curvature side of the seat will face the ball;
8. Turn the ball so that the ball opening is parallel to the port centerline;
9. Assemble the end cap (1, 15) onto the valve body, loosely tighten End Cap Nuts(17a) and line up end flange. Because the body flange bolt pattern is different from the line flange bolt pattern, it is possible to assemble the valve such that the bolt holes in the line flanges don't line up. Be certain to align end flanges bolt holes to straddle valve center lines. **NOTE: Be careful not to damage gasket when putting end cap into body.**
10. Tighten nuts in a "star" pattern to the torque specified in the chart; Tighten one end piece in a similar fashion as tightening the opposite end piece. Do not tighten one end piece fully until the opposite end piece were fully tightened. Note: Valve must be in the 100% full open position. **WARNING:There should be at least one stud thread exposed;**
11. Install O-Ring(7), and then slide the Stem Packing (8) onto the stem until it is seated against the upper bottom of the stem hole;
12. Put packing gland(10) onto the stem, on top of the stem packing; lightly tighten gland bolt (18) to secure the gland;
13. Install Stop Plate(11) and Stop Ring (12);
14. Install Handle Head(13) and Lever(14);
15. Cycle the valve slowly with a gentle back and forth motion, to build gradually to the full quarter turn. By cycling slowly, the seat lips will assure a permanent seal shape against the ball. A fast turning motion, at this point, may cut the seats before they have a chance to form the proper seal;
16. Tighten the gland bolts to a snug tight secure firm fit.

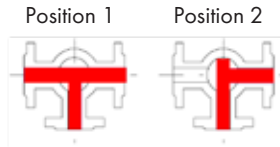


## Flow Patterns

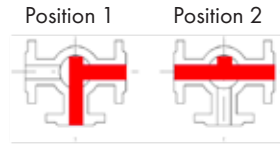
### T-Port: 90°



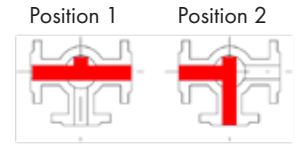
**FLOWPLAN D** (standard)



**FLOWPLAN E**



**FLOWPLAN F**

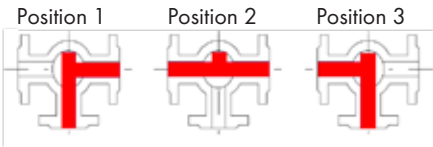


**FLOWPLAN G**

### T-Port: 180°



**FLOWPLAN H**



**FLOWPLAN I**



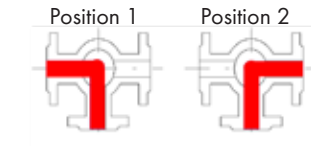
**FLOWPLAN K**



**FLOWPLAN J**

Optional Plans  
Available Consult  
Factory

### L-PORT: 90°



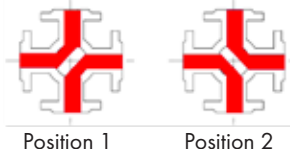
**FLOWPLAN A** (standard)

### L-PORT: 180°



**FLOWPLAN B**

**FLOWPLAN M** (standard) - 4 Way LL Port 90° Turn



Position 1 Position 2

**FLOWPLAN N** - 4 Way L Port 180° Turn

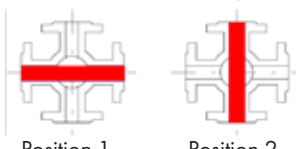


Position 1 Position 2 Position 3

### 4-WAY VALVES

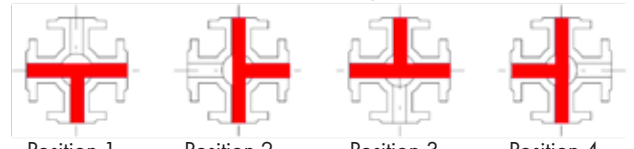
Directional Control  
and Shut Off  
Combined in One  
Valve

**FLOWPLAN O** - 4 Way 90° Turn



Position 1 Position 2

**FLOWPLAN P** - 4 Way 270° Turn



Position 1 Position 2 Position 3 Position 4

### Valve Design Flexibility

Flow-Tek's unique valve design offers excellent flexibility, allowing easy in field rearrangement of all flow plans without disassembly. In many cases it can be accomplished as easy as travel stop orientation or repositioning of the valve ball. Please contact factory for detailed additional information on this valuable design feature.