PRATT

HENRY PRATT COMPANY

BFV-14-0402

TRITON: HP-250, XR-70, XL GROUNDHOG BUTTERFLY VALVE

INSTRUCTION MANUAL
6” AND LARGER BUTTERFLY VALVES
WITH E-LOK SEAT

CONTENTS:

INTRODUCTION

The 6" and larger butterfly valves feature the E-LOK Style Rubber Seat. A specially designed disc structure provides maximum strength with a minimal reduction in the free flow area of the valve and a patented 360° uninterrupted seat design which assures a leak tight seal. The construction of your Pratt Butterfly Valve is extremely rugged, but a reasonable amount of care in installation and handling is suggested to ensure long service life.

In some instances a flow direction is given for butterfly valves. It is a characteristic of the offset disc to have a different required operating torque for each of the two flow directions. If this is the case, your certified Henry Pratt general arrangement drawing will be marked: "OPERATOR SUITABLE FOR FLOW IN DIRECTION AS SHOWN ONLY (TOWARDS FLAT SIDE OF DISC)" Make certain that installation is in compliance with this drawing.

INSTALLATION

The following items must be performed during installation to ensure proper function.

Carefully place valves into position avoiding contact or impact with other equipment vault walls or trench walls.

Valves are to be installed in accordance with the General Arrangement Drawings furnished for the order. Valves with flow direction arrows are to be installed accordingly.

Foreign material in a valve can damage the rubber seat when valves are operated. Be sure valve interiors and adjacent piping are clear of foreign material prior to mating valve to pipe joint.

Prepare pipe ends and install valves in accordance with the pipe manufacturer's instructions for the joint used. Do not deflect pipe/valve joint. Do not use valve as jack to pull pipe into alignment.

In plant piping, install so as to minimize bending of valve connection with pipe loading.

In the case of wafer type butterfly valves, concentrically center the valve disc between the mating flanges.

Make sure valve disc, when opened will not contact pipe port. This is especially necessary on pipe with linings and when wafer valves are used. Check manufacturer for minimum pipe I.D. required for clearance.

WARNING:

IT IS RECOMMENDED THAT VALVES BE INSTALLED INTO PIPING SYSTEM IN ACCORDANCE WITH AWWA M-11 IN ORDER TO PREVENT ANY UNDUE PIPING STRESS, DEFLECTION, OR BENDING THAT MAY EFFECT THE PERFORMANCE OF THE VALVE.

WARNING:

Valve disc without actuator may open or close at any time and cause injury to persons or damage to valve and other property. The shaft/disc clamping device when furnished is intended for temporary use during shipping, handling and valve installation only. Do not subject valve to flow conditions before actuator is mounted and tested for performance.

Buried valves installed with valve boxes must be so installed that the valve box does not transmit shock or stress to the valve actuator as a result of shifting soil or traffic load.

When valves are installed in vaults, the vault design must provide space for purposes of repair. The valve operating nut should be accessible from the top opening of the vault with a tee wrench.

DISCUSSION OF OPERATION

Flow control is achieved by rotating the disc inside of the pipe line about a diametrical axis of the disc, hence changing the total free flow area of the valve. At fully closed, a leak tight seal is achieved by the disc mechanically compressing with the rubber seat causing a seal between the disc and the seat.

Positioning of the disc is achieved by the valve actuator which has been mounted, adjusted and tested at our plant. Your valve may be motor, cylinder or manually operated. Operation and maintenance of your specific type of actuator is discussed in another section of this manual.

DISCUSSION OF MAINTENANCE

Although the actuator may require periodic maintenance (depending upon which actuator is used), the valve itself requires no periodic maintenance. Pratt Rubber Seat Valves are supplied with self-lubricating type teflon lined fiberglass backed sleeve bearings. No maintenance attention to them is necessary.

However, after many years of continued service, the rubber components of your Pratt Butterfly Valve may show signs of wear. These parts are the valve stem packing and the rubber seat which are the only field replaceable components of your Rubber Seat Butterfly Valve. We do not recommend stocking spare seats. The rubber seat seldom wears out in service, but should a replacement be required, it can be shipped immediately upon receipt of your order. The seat and packing are designed for years of service. The service life is related to total number of operating cycles.

VALVE CONSTRUCTION

1. Corrosion Resistant Shafts. Shafts are corrosion resistant stainless steel.

2. Packing. Packing is self-adjusting V-type. Increase in line pressure automatically increases packing tightness.

3. Bearings. Liberally sized, low friction bearings are self-lubricating for a lifetime of service during normal operating conditions, without maintenance.

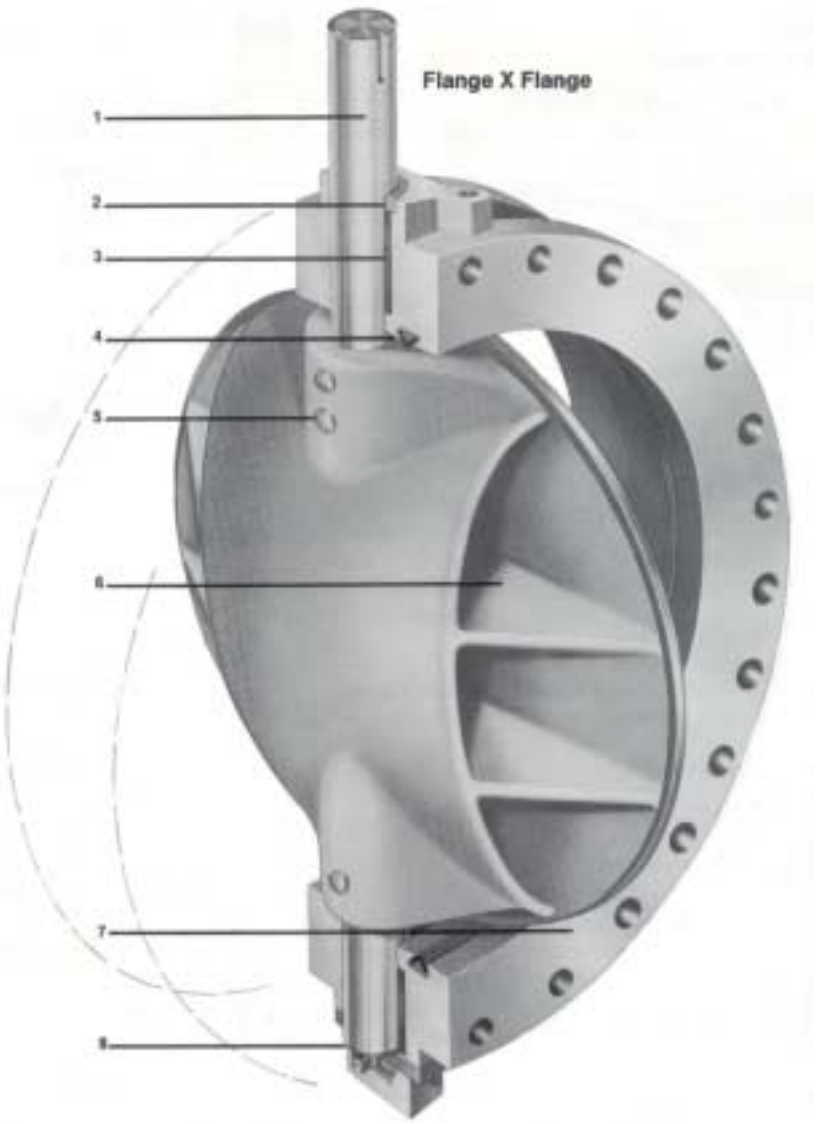
4. Rubber Seat. Retained in the body by means of an exclusive patented process. Liquid epoxy is injected under pressure behind seat to provide precise sealing contact between the rubber seat and the disc edge. Quick setting material then hardens to provide strong, permanent retention – yet is adjustable or replaceable in the field.

5. Pins. Disc-shaft connection is by means of conservatively sized squeeze pins or taper pins, mounted through the center of the shaft for full metal-to-metal contact.

6. Flow Through Disc. Highest strength vs. weight ratio available. Greater free-flow area provides less pressure drop than lens shaped discs. Three hundred sixty degree seating ensures longer leak-tight life. Valves less than 24" will have domed discs.

7. Body. Cast iron flanged end.

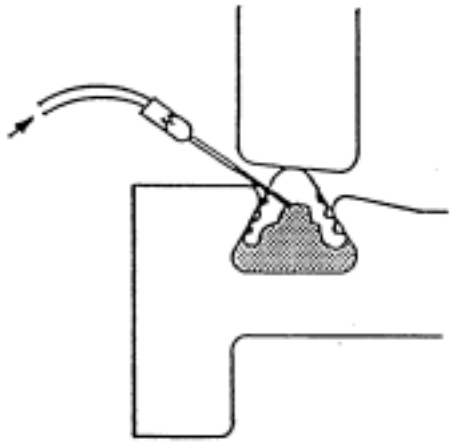
8. Two-Way Thrust Bearing. Bronze thrust bearing accurately centers disc in valve body and holds this alignment in any position. Factory adjusted for the life of the valve.



SEAT ADJUSTMENT

LOCAL INJECTIONS

The sketches below show the general method of adjusting the interference between the rubber seat and the disc edge of the E-LOK style valves. Epoxy is injected through a needle to the base of the seat moving the rubber seat toward the disc edge thus creating a tighter seal.



Equipment List For
Local Injection Kit

Item	Quantity	Description
1	1	Alemite Grease Gun
2	3	Hypo Needles with Couplings
3	1	Extension Tube (Rubber Hose)
4	1 quart	Part "A" Resin
5	1 bottle	Par "B" Epoxy Catalyst
6	1 tube	Silicone Grease
7	1	Reducing Coupling
8	1	Hypo Needle Adapter

Procedure:

1. Take gun apart.
2. Retract piston.
3. Attach extension and hypo needle.
4. Thoroughly mix one quart part "A" epoxy resin with one bottle part "B" epoxy catalyst.
5. Pour in gun.
6. Replace gun assembly.
7. Release piston.
8. Squeeze out some epoxy to purge the unit of air.
9. Grease needle with silicone grease.
10. Insert needle into seat at 45° angle in center of leak area. Observe seat movement while pumping epoxy. (NOTE: Pump epoxy while inserting and retracting needle.)
11. If leakage spot is over 6" long, re-inject every 6".
12. Check temperature of gun and discard if over 120°F.
13. Use second gun as above if necessary.

NOTE: In most instances it is not wise to clean the gun; consider it disposable, one-use equipment

SEAT REPLACEMENT PROCEDURE

1. With the valve disc in the closed position, set the valve horizontally on its flange with the seat side up so that there is sufficient clearance to rotate the disc. CAUTION: When the valve is horizontal with the seat side up, the valve disc is in an unstable condition and has a tendency to rotate 180° when the actuator or the valve shaft key is removed. Care must be taken to keep everything out of the path of the rotating disc edge.

2. Rotate the disc ½ turn form the closed position. To accomplish this usually requires the removal of either the actuator or the valve shaft key.

3. Cut and pull out old rubber seat from valve body.

4. Carefully chip and remove the epoxy and remaining seat from the seat groove so as not to damage the side walls or outer radius of the seat groove. Small nicks on the bottom of the groove will cause no harm.

5. Drill out the two injection holes (at 90° and 270° from the center line of shaft) being careful not to damage the pipe tap connections.

6. Using the correct pipe tap to fit the above injection ports retap the ports to clean up the threads.

7. Remove burrs and hand sand any rough spots on seat groove wall or outer radius, nicks on bottom of groove can be ignored. Clean groove with a rag dipped in Methylene Chloride and spray the base of the body seat groove with an approved release agent.

8. Insert seat in the following manner:

   A. Wipe seat clean with a dry rag.

   B. Position seat splice 45° to shaft bore in body.

   C. Squeeze seat together and insert at beginning point 45° to shaft bore in body, using a sheet metal vise grip (jaws are flat 2-1/2”-3” wide).

   D. Using a rubber mallet, locate and tap the seat into place for approximately 8 to 12 inches.

   E. Repeat Steps 8C and 8D at a point 180° from the starting point.

   F. Squeeze and insert seat from starting point counterclockwise for 180° stuffing seat back towards starting point.

   G. Squeeze and insert second half of seat from starting point clockwise for 180° stuffing seat back towards starting point.

   H. Inspect seat installation making sure seat is in straight. The serrations in the seat must be parallel with the machined edge. This can be checked by measuring distance from the serrations to the edge on the machined groove.

9. Close disc and remount actuator or replace valve shaft key.

10. Position disc parallel to body flange with 1/32" by using a combination square.

11. Inject epoxy behind seat in accordance with the epoxy injection procedure below.

12. After completion of at least the required time limit, release the back pressure and cut the injection tubing flush with the face of the flange.

13. Open the valve and clean both the seat and the disc with a clean rag.

14. Close the valve.

15. Leak test the valve from both sides at the pressure specified for that job.

THRUST BEARING ADJUSTMENT

The tight seal of your Pratt Rubber Seat Butterfly Valve is achieved by making the disc diameter somewhat larger than the inside of the rubber seat. To ensure equal interference of disc and rubber in the areas adjacent to the disc hubs, a double acting thrust bearing is provided at the lower end of the shaft. The thrust bearing has been properly set at the factory, and further adjustments will not be necessary.

SEAT INJECTION PROCEDURE

Materials: (See Figure 1 on Page 7)

A. One – two-way valve – inlet side

B. One – pressure regular – inlet side (0 to 100 psig)

C. One – pressure gauge 0-100 psig – inlet side

D. One – two-way valve – inlet side – air exhaust

E. One – epoxy reservoir and pressure pot – 2 or 5 gal. capacity for epoxy – 100 psi rating

F. Three – 1/2" NPT X 1/2" I.D. tube or 1/4" NPT X 3/8" I.D. tube disposable plastic adapters to fit tapped holes in valve body and injection pot

G. Varying lengths – 1/2" I.D. X 5/8" O.D. or 3/8" I.D. X 1/2" O.D. low density Polyethylene tubing – disposable – to match adapters

H. One – tubing clamp – on/off, inlet side.

I. One – 1/2" X 1/2" X 1/2" I.D. tube or 3/8" X 3/8" X 3/8" I.D. tube plastic disposable tee to match tubing

J. One – tubing clamp – on/off – outlet side

K. One – tubing clamp – on/off – outlet side

L. One – one gal. Waste bucket – outlet side

M. One – pressure regulator – outlet side (0 to 100 psi)

N. One – pressure gauge – outlet side (0 to 100 psi)

O. One – two-way valve – outlet side

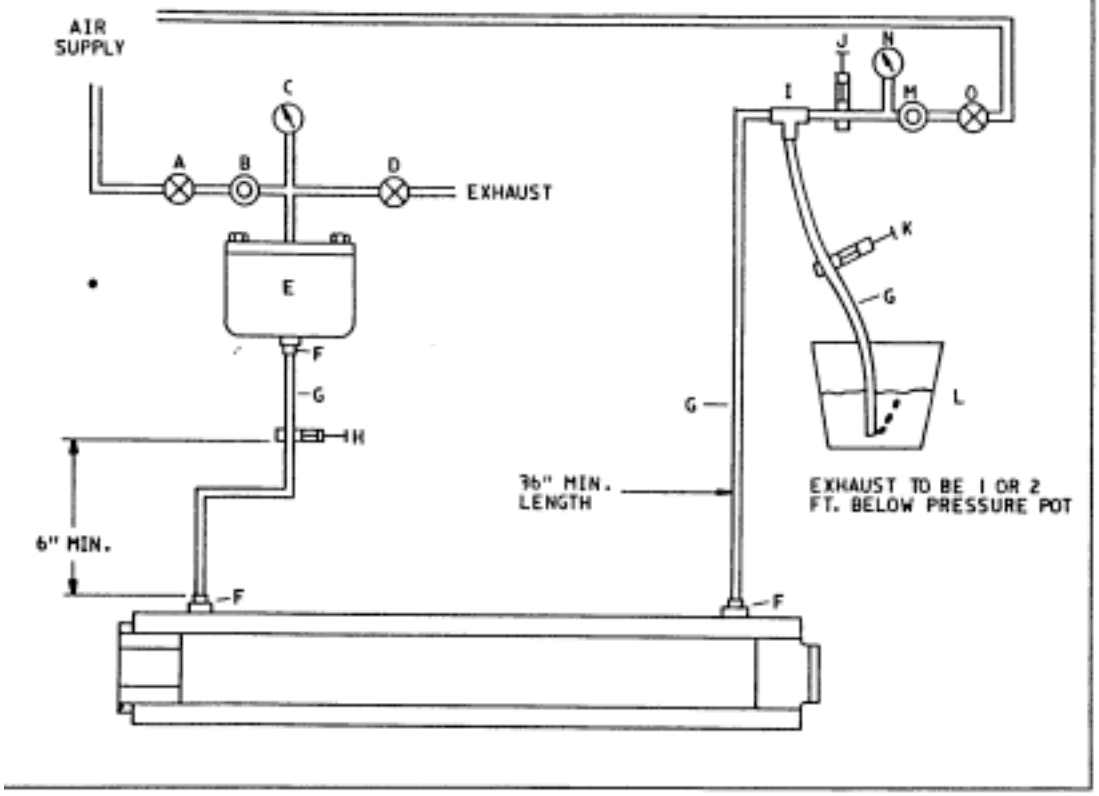


Figure 1. Epoxy Injection Schematic

Sufficient quantity of pre-weighed two-component epoxy resin and hardner (catalyst). Resin component to specification HPCO XR-70 – EC-3. Packaged one gallon kits. Approximately 10-1/2 lbs. pre-mixed gallon (available form Henry Pratt Company). Sufficient quantity of approved release agent (available from Henry Pratt Company). Disposable towels or rags for clean up. Spatula or paint stirrer for epoxy materials transfer.

Stirring rod (propeller type) for mixing epoxy for 3/8" or 1/2" electric or pneumatic drill.

Several one-gallon slop buckets – cardboard okay.

Methylene Chloride or Chlorothene NU safety solvent for clean up. CAUTION: Concentrate solvent fumes could be toxic – should be used in well ventilated area.

Tubing pinch-on clamps (or screw type) at least 7 per valve.

Tube Fitting for Epoxy Injections

1. Pipe and fit as per Figure 1
2. Valve (A) and (O) to be closed
3. Regulators (B) and (M) to be off
4. Valve (D) to be open
5. Close tubing clamps (H), (J), and (K)
6. Remove pressure pot lid

Seat Air Pressure Test
Prior to Epoxy Injection

1. On outlet side, open valve (O)
2. Adjust regulator (M) to 80 psig as shown on gauge (N)
3. Snap open clamp (J) quickly. This will snap seat out to disc edge and seal in seat groove. Air leaks can be heard. If not properly sealed, adjust seat using blunt edge screwdriver or shut off air and readjust seat in groove. Seat must be air-tight before injection.
4. Adjust regulator (M) to specified injection pressures as shown on gauge (N). (See Table "A")
5. Close clamp (J)
6. Open clamp (K) to exhaust air

Preparation of Epoxy Material

1. Sit pre-weighed resin component in original container – gallon can.
2. Step "3" thru "6" must be done as quickly as possible – no longer than five minutes to allow maximum pot life.
3. Add pre-weighed hardener component to resin component in original resin component container, mix thoroughly**.**
4. While mixing additional gallon as specified, pour each container into epoxy reservoir and pressure pot (E) as quickly as possible and add each additional container as soon as they are mixed.
5. Check to confirm that the lid seal is in its' proper position.
6. Attach pressure pot lid.

Injecting the Valve

Steps 1 thru 20 should be completed within 20 minutes.

1. Clamp (H) open
2. Clamp (K) open
3. Clamp (J) closed
4. Close valve (D)
5. Open valve (A) and adjust regulator to approximately 20 psi. This pressure will move the epoxy through the system with a certain rate of flow. However, larger valves may require more volume and a

faster rate of flow. The main idea is to push the epoxy through the valve slow enough as not to entrap air in the epoxy and fast enough so that the epoxy will not start to set up during the injection process.

6. Epoxy will come out of exhaust tube at waste bucket (L) in several minutes. Allow epoxy to exhaust with end of tube under liquid to check for air bubbles. Exhaust no more than 1/2 of slop bucket.

7. Close clamp (K)

8. Adjust pressure regulator (B) to show exact specified holding pressure on gauge (c). (See Table A)

9. Close clamp (H)

10. Valve (O) open

11. Adjust pressure regulator (M) to show specified holding pressure on gauge (N). (See Table A)

12. Open clamp (J)

13. Close valve (A)

14. Open valve (D) to release the pressure in the pot.

15. Cut tubing between pressure pot (E) and clamp (H).

16. Close valve (D)

17. Using 10 to 15 psig pressure on pot, exhaust remaining epoxy from pressure port. Shut-off valve (A), open Valve (D), open lid and clean pot with safety solvent.

VALVE SIZE (INCHES)	BUBBLE TEST PRESSURE (PSIG)	EPOXY HOLDING PRESSURE (PSIG)
6 TO 24	**0 – 200** **201 – 300**	**60** **70**
30 AND LARGER	**0 – 50** **51 – 75** **76 – 200** **201 – 300**	**40** **50** **60** **70**

Table A

HOW TO ORDER PARTS AND SERVICE

To obtain further information or order parts for your Pratt valve, contact your local representative or the factory.

Henry Pratt Company
401 S. Highland Avenue
Aurora, IL 60506-5563
630-844-4000
FAX 630-844-4124

To assist in providing prompt assistance, please provide the following items or information (see nameplate or submittal drawings).

Valve Size and Type
Serial No.
Pratt Order No.

SAFETY INSTRUCTIONS

WARNING

This valve assembly is a pressure vessel and can release pressure and flow during operation. All personnel and equipment must be removed from flow area before operation.

WARNING

Removal of the actuator while the valve is under pressure or flow may cause the valve to rapidly rotate and cause bodily damage.

CAUTION

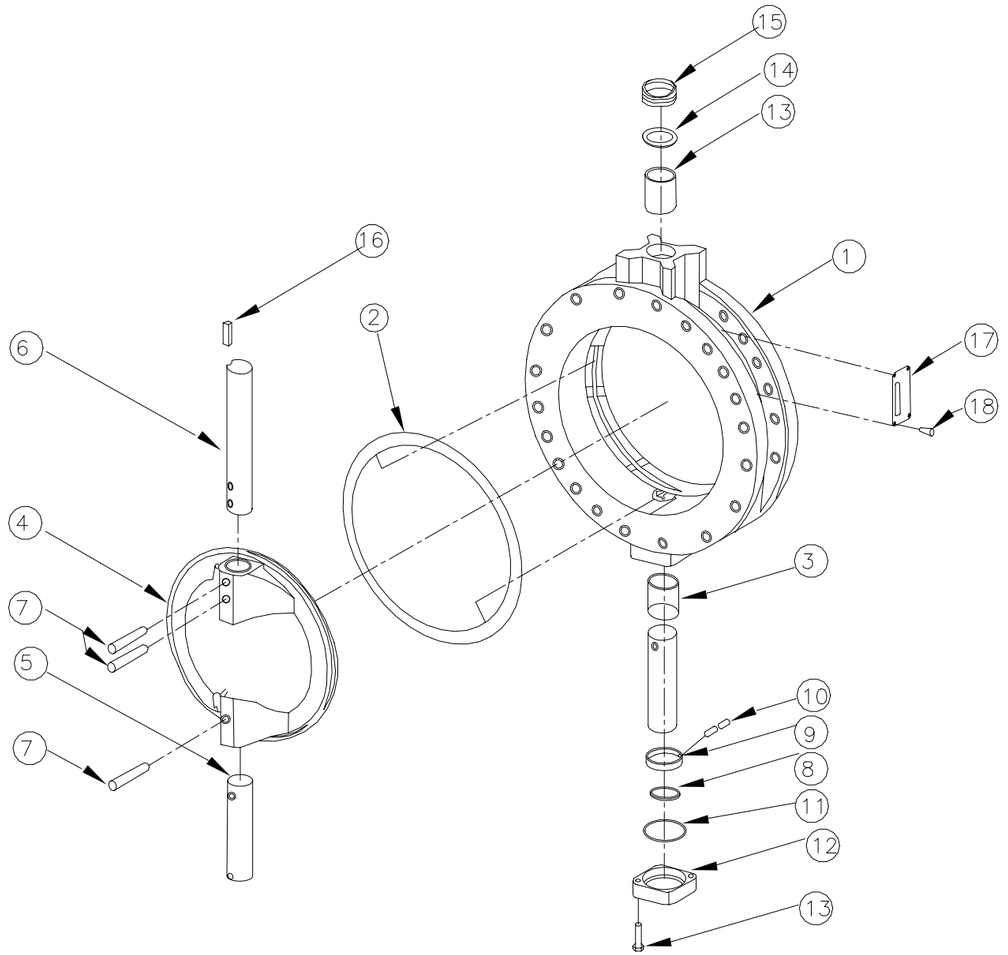
The actuator is sized for the operating conditions shown on the valve nameplate. Do not exceed listed conditions or damage may occur.

TROUBLESHOOTING GUIDE

PROBLEM	CAUSES	REMEDIES
Leakage between valve and actuator	Packing leak	Clean packing bore and replace packing
Bottom trunnion leaks	Packing or gasket leak	Replace bottom shaft packing, o-ring or gasket
Valve leaks when closed	• Disc not fully closed or past fully closed • Disc edge wear or damage • Rubber seat wear or damage • Loose debris in valve	• Adjust actuator closed position stop • Clean and/or repair disc edge • Adjust or replace valve seat • Cycle valve five times to flush out debris
Valve hard to operate	• Foreign material in valve • Corroded operator parts • Loose actuator	• Remove obstructions • Clean and grease actuator • Apply Loctite or Omni-fit locking compound and tighten bolts

BASIC VALVE ASSEMBLY

1. BODY
2. SEAT (E–LOK STYLE)
3. BEARING
4. DISC
5. BOTTOM STUB SHAFT
6. TOP STUB SHAFT
7. SQUEEZE PIN
8. SHIM
9. THRUST COLLAR
10. SPRING PIN (2 PER ASSEMBLY)
11. O–RING
12. BOTTOM COVER
13. HEX HEAD CAP SCREW
14. PACKING RETAINER
15. V–TYPE PACKING
16. KEY
17. NAME PLATE
18. DRIVE SCREW



BASIC VALVE ASSEMBLY

TRITON H.P. 250 & XR.70
24" & SMALLER

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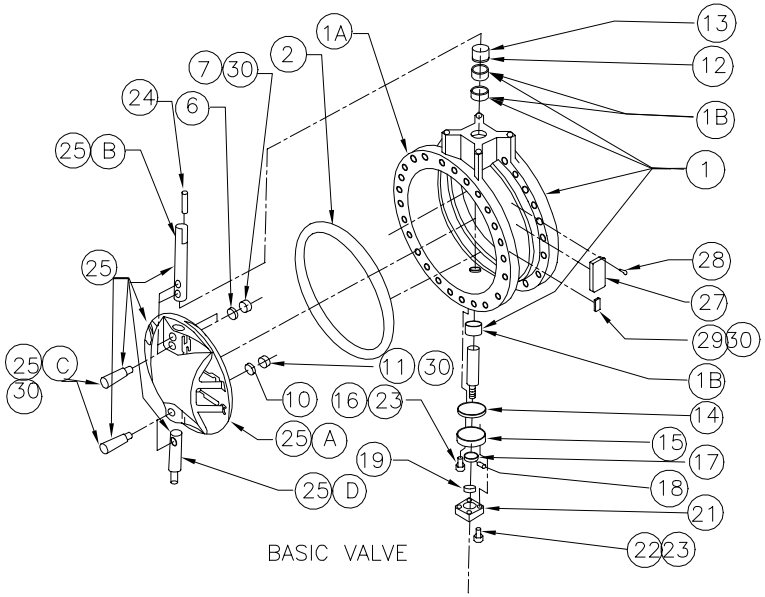
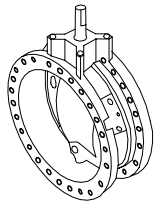


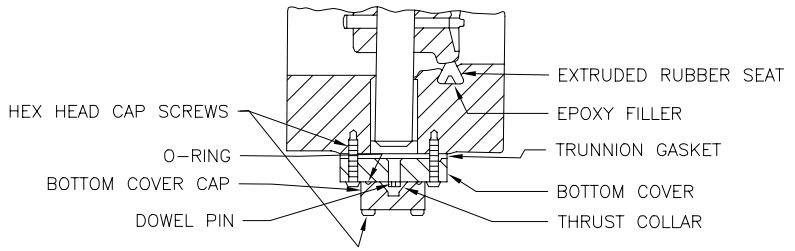
BASIC VALVE



TRITON HP–250, XR–70 & XL
30" & LARGER VALVE ASSEMBLY

BASIC VALVE

1. BODY ASSEMBLY
   - 1A. BODY
   - 1B. BEARING
2. RUBBER SEAT (E–LOK STYLE)
6. LOCKWASHER
7. HEX NUT
10. LOCKWASHER
11. HEX NUT
12. PACKING RETAINER RING
13. PACKING
14. GASKET
15. COVER
16. HEX HEAD CAP SCREW
17. THRUST COLLAR
18. DOWEL PIN
19. O–RING
20. GREASE
21. COVER CAP
22. HEX HEAD CAP SCREW
23. LOCTITE–GRADE CV
24. KEY
25. DISC ASSEMBLY
    - 25A. DISC
    - 25B. SHAFT
    - 25C. TAPER PIN
    - 25D. SHAFT
27. TAG
28. DRIVE SCREW
29. TAG
30. RTV



SEAT AND
TRUNNION DETAIL

	Date: 08/30/00	Parts and Construction Drawing	Drawing No.	
	Scale: NONE	TRITON BUTTERFLY VALVE	E–126	PRATT