



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

ECCENTRIC PLUG VALVES (80% Port)

General

Inspect all valves and actuators at time of delivery for shipping damage and confirm compliance with specifications. Valves are fully tested per the appropriate standards and properly packaged by the manufacturer. The valves should be stored in such a manner to protect them from the weather. Water and debris should not be allowed to collect in or on the valve. Valve should be stored with plug partly open. Flange protectors and other packaging materials removed for inspections should be replaced. Proper slinging and handling methods should be used when moving the valves. Do not place slings or other devices around operating shaft, or through the flow way. Do not use attached actuators for lifting.

I. Installation

1. Check that valve and end joints are clean. Again check for damage to the valve. Open and close the valve to ensure proper operation. Close the valve before placing in trench.
2. Handle valve carefully. Do not drop into position. Do not use attached actuators or other mechanisms as lifting devices. Do not place slings or chains through the port opening.
3. Prepare pipe ends according to pipe manufacturer's instructions. Install valve per proper method according to end joint type. All piping should be properly supported to avoid line stress on the valve. Do not use the valves as a jack to force a pipeline into position.
4. Valves should be positioned for orientation for flow and any attached actuators. The valve is designed to operate with flow in two directions. The valve is normally used in the "standard flow" direction (arrow on body), with flow against the back of the plug.
5. In buried installations, any valve boxes should be installed such that no load is transferred to the valve.
6. In buried installations, do not backfill before the system is tested. Leave valves exposed while the pipeline is being pressurized.
7. Do not test systems to greater than the valves' rated working pressure.
8. With the valve in the open position, the entire system should be thoroughly flushed to prevent the valve closing on debris and damaging the seat.

II. Operation

1. Do not operate valves in systems that exceed the rated working pressure of the valve (3"-12" 175 psi, 14"-24" 150 psi).
2. System should be completely flushed before valve is actuated in normal cycle.
3. The Eccentric Plug Valve opens and closes through 90 degree of travel. The manual actuator has mechanical stops for fully open or closed position. Excessive force will improve seating or closing, but could damage the actuator or the seat (if debris in line is holding plug open). The Eccentric plug valve closes by rotating the rubber covered plug into the seat.

Size	Manual	Geared	# Turns
3"-12"	X		1/4
4"-8"		X	10
10"-12"		X	13
14"-24"		X	52

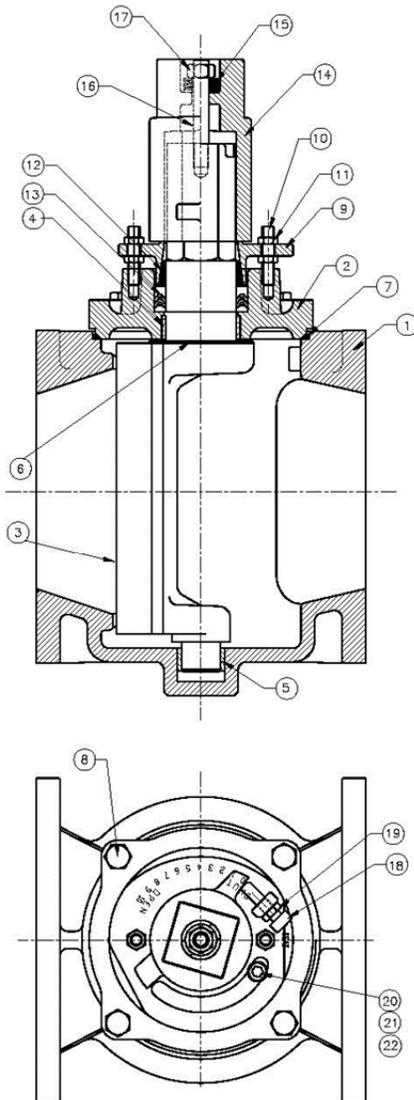
Note: for valves with electric actuators, see actuator O&M.

III. Maintenance

1. Semi-annual inspections are the minimum recommended. Valves should not be dis-assembled unless a break down has occurred.
2. The eccentric plug valve and actuator should not be opened, disassembled, or adjusted unless a breakdown in normal operation occurs.
3. Inspections should include checking gasketed joints for leakage.
4. During regular inspection, the valve should be opened and closed with pressure in the pipeline. The valve should function freely without vibration.
5. With the valve closed and pressure against the plug, a check for leakage is possible by "listening" to the valve for flow. A stethoscope will help in this procedure.
6. Attached actuators should be inspected per manufacturer's recommendations provided with those units.
7. A permanent record of the period inspections should be maintained for each valve.

*** There are no lubrication requirements. (Unless disassembling)**

IV. Disassembly of manually operated valves 3” through 12” (1/4 turn)



NO.	QTY.	DESCRIPTION	MATERIAL
1	1	BODY	CAST IRON ASTM A-126 CLASS B
2	1	COVER	CAST IRON ASTM A-126 CLASS B
3	1	PLUG	DUCTILE IRON ASTM A-536-65-45-12 BUNA N
4	1	TOP BEARING	316 STAINLESS STEEL
5	1	BOTTOM BEARING	316 STAINLESS STEEL
6	1	THRUST WASHER	NYLATRON
7	1	COVER O-RING	BUNA-N
8		COVER CAPSCREWS	304 STAINLESS STEEL
9	1	GLAND / BRAKE FOLLOWER	CAST IRON ASTM A-126 CLASS B
10	2	FOLLOWER STUD	304 STAINLESS STEEL
11	4	FOLLOWER NUTS	304 STAINLESS STEEL
12	1	BRAKE	GLASS REINFORCED PPS
13	1-SET	" V " PACKING	BUNA-N
14	1	OPERATING NUT	CAST IRON ASTM A-126 CLASS B
15	1-SET	BELLEVILLE WASHER	304 STAINLESS STEEL
16	1	ADJUSTING STUD	304 STAINLESS STEEL
17	1	LOCK NUT	304 STAINLESS STEEL
18	1	SQUARE HEAD SET SCREW	304 STAINLESS STEEL
19	1	JAM NUT	304 STAINLESS STEEL
20	1	SOCKET HEAD CAPSCREW	304 STAINLESS STEEL
21	1	FLAT WASHER	304 STAINLESS STEEL
22	1	JAM NUT	304 STAINLESS STEEL

Note: Line pressure must be 0 psi and the line drained if possible.

1. Operate the valve to the full open position.
2. Remove (item #17) lock nut.
3. Remove (item #15) Belleville washers.
4. Remove (item #14) operating nut.
5. Loosen and remove (2) follower nuts (item #11)

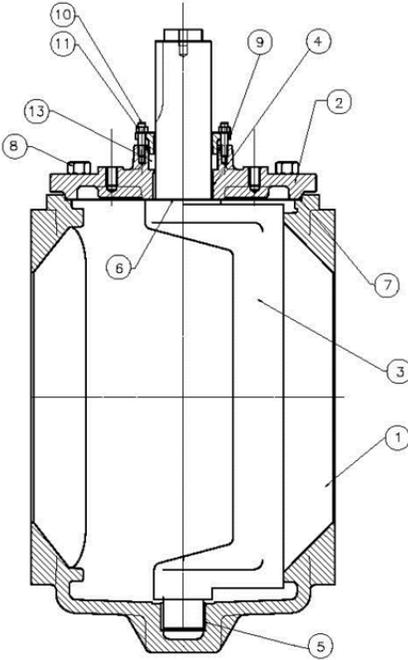
6. Remove gland/brake follower (item #9). This will relieve the sealing pressure on the V-Packing (item #13).
7. Loosen and remove the cover cap screws (item #8). Mark the position of the cover to body with a scribe or other markers.
8. Using (2) pry bars, one on each side of the cover (item #2) break the cover loose from the body (item #1). Remove the cover by sliding straight up over end of shaft.

Note: A suitable lubricant should be applied to the plug shaft to allow the packing to slide smoothly and prevent damage.

9. The plug (item #3) can now be removed by turning and lifting out of the body.
10. Inspect top (item #4) and bottom bearings (item #5) for damage and replace if necessary.
11. Clean and inspect the nickel seating surface in the body (item #1). If seating surface is damaged, body should be replaced.
12. Inspect plug (item #3) sealing surface for damage and wear. Replace if necessary.
13. Insert plug (item #3) into body (item #1) and orient in the open position.
14. Slide nylatron thrust washer (item #6) onto shaft of the plug.
15. Inspect cover O-ring (item #7), and place in recess of body.
16. Remove old V-Packing (item #13) from (item #2) recess.
17. Slide cover onto plug shaft. Align cover with scribe mark.
18. Install cover cap screws and tighten
19. Slide packing set (item #13) over plug shaft and into packing recess in cover. The gland/break follower (item #9) can be used to drive the packing into the cover.
20. Install brake (item #12) onto top of packing. Narrowest end of brake should point downward.
21. Install gland/brake follower (item #9).
22. Install follower nuts and tighten to seal packing.
23. Replace operating nut (item #14) with (item #16) adjusting stud installed in top of plug.
24. Replace Belleville washers (item #15) and lock nut (item #17).

*Mystic FG-2 food grade grease or equivalent. (Mystic part # MY560781)

V. Disassembly of 4" through 24" Eccentric Plug Valves (With Actuators)



NO.	DESCRIPTION	MATERIAL	ASTM DESIGNATION
1	BODY	CAST IRON	A126 CLASS B
2	COVER	CAST IRON	A126 CLASS B
3	PLUG	DUCTILE IRON & BUNA-N	A536 GRADE 65-45-12
4	TOP SLEEVE BEARING	316SS OIL IMPREGNATED	
5	BOTTOM SLEEVE BEARING	316SS OIL IMPREGNATED	
6	THRUST WASHER	PTFE	
7	COVER O-RING	BUNA-N	
8	HEX HEAD CAPSCREW	STAINLESS STEEL	TYPE 304
9	FOLLOWER GLAND	CAST IRON	A126 CLASS B
10	STUD	STAINLESS STEEL	TYPE 304
11	HEX NUTS	STAINLESS STEEL	TYPE 304
13	"V" RING SEALS	BUNA-N	

Note: Line pressure must be 0 psi and the line drained if possible.

1. Operate the valve to the full open position.
2. Remove cap screws securing the actuator (worm gear, motor operator, cylinder actuator, etc.), then lift off the actuator. Retain keys, couplings, etc. for reassembly of the actuator.
3. Loosen and remove (2) follower nuts (item #11).
4. Remove gland/brake follower (item #9). This will relieve the sealing pressure on the V-Packing (item #13).
5. Loosen and remove the cover cap screws (item #8). Mark the position of the cover to body with a scribe or other markers.
6. Using (2) pry bars, one on each side of the cover (item #2) break the cover loose from the body (item #1). Remove the cover by sliding straight up over end of shaft.

Note: A suitable lubricant should be applied to the plug shaft to allow the packing to slide smoothly and prevent damage.

7. The plug (item #3) can now be removed by turning and lifting out of the body.
8. Inspect top (item #4) and bottom bearings (item #5) for damage and replace if necessary.
9. Clean and inspect the nickel seating surface in the body (item #1). If seating surface is damaged, body should be replaced.

10. Inspect plug (item #3) sealing surface for damage and wear. Replace if necessary.
11. Insert plug (item #3) into body (item #1) and orient in the open position.
12. Slide nylatron thrust washer (item #6) onto shaft of the plug.
13. Inspect cover O-ring (item #7), and place in recess of body.
14. Remove old V-Packing (item #13) from recess.
15. Slide cover (item #2) onto plug shaft. Align cover with scribe mark.
16. Install cover cap screws (item #8) and tighten.
17. Slide packing set (item #13) over plug shaft and into packing recess in cover. The follower gland (item #9) can be used to drive the packing into the cover.
18. Install follower nuts (item #11) and tighten to seal packing.
19. Actuator can be reinstalled.

*Mystic FG-2 food grade grease or equivalent. (Mystic part # MY560781)

VI. Instructions to Rotate Gear Box on 4” through 12”

1. Completely close the valve against the closed stop.
2. Back off operating nut approximately (1) turn to relieve closing torque on internals of gear (relieves gear lash).
3. Remove position indicator plate or buried service cover if equipped.
4. Loosen and remove cap screw, lock washer, and large flat washer under the indicator plate (or cap on buried service).
5. Loosen and remove the (4) cap screws retaining the worm gear to the gear mounting stand. (Do not remove gear mounting stand from valve cover).
6. Lift worm gear off of flange adapter and rotate to the desired position.

NOTE:

- Gear operators with a (6) sided output sleeve can only be rotated in 180° increments.
 - Gear operators with a (12) sided output sleeve can only be rotated in 90° increments.
7. Reassemble in reverse order.
 8. Operate valve and check for correct closure. Re-adjust closed stop if necessary. (Refer to stop adjustment procedures.)

VII. Troubleshooting – Eccentric Plug Valves

Problem	Symptom	Solution
Joint Leak	Loose fasteners	Re-tighten fasteners
Leak at shaft	Loose Gland or worn Packing	Evenly tighten Gland and/or replace Packing
Leakage past Seat	Debris on Seating surface	Flush valve
	Damage Seat	Inspect and/or replace Plug
	If none of the above	** Adjust closed position stops
Difficult to operate	Gland/Brake too tight	*Loosen Gland

* At a minimum, the above inspection items should be performed annual. There are no lubrication requirements.

*Instructions for loosening Gland/Brake Follower

For manual quarter turn op nut / lever operated valves:

1. Loosen upper gland follower nuts (item #11). Adjust lower follower nut (item #11) counterclockwise to raise the follower gland.
2. Operate the valve several times to relax the packing (item #13) and brake (item #12).

Note: Addition of a penetrating oil or lubricant to the packing area may aid in freeing up the operation.

3. Repeat adjustments as necessary.
4. When valve operates freely, tighten upper follower nut (item #11) to secure the gland/brake follower. (Assure the gland/brake follower is level and not binding the brake/packing when operated).

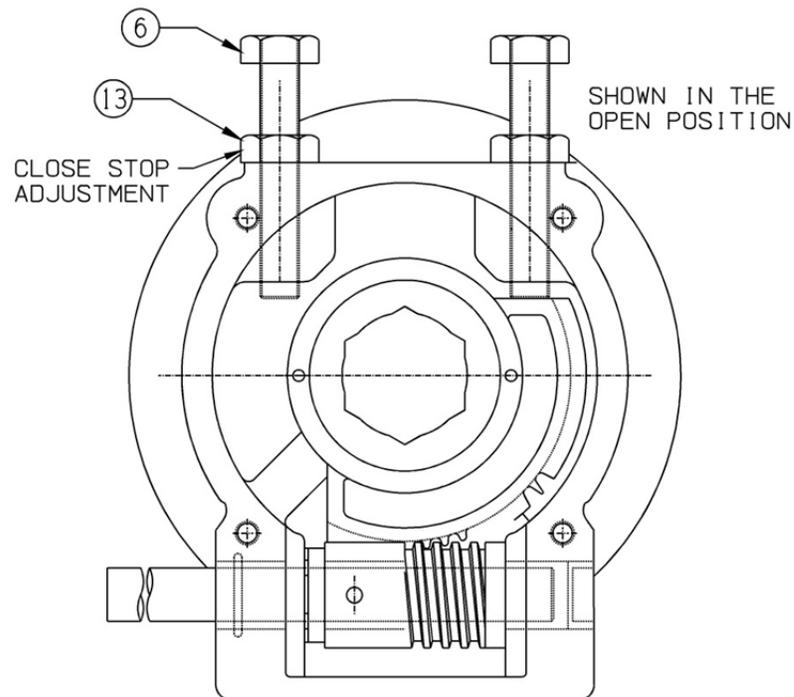
**Instructions for adjusting stops:

For manual quarter-turn op nut / lever operated valves:

1. Loosen jam nut (item #19). To allow for additional closing travel, loosen square head cap screw (Item #18).
2. Close valve. Repeat if necessary until valve seals.

For gear operated valves:

Note: The CLOSE STOP adjustment bolt is located closest to input shaft of worm gear.



1. Loosen lock nut (item #13). Loosen stop screw (item #6) ½ turn at a time.
2. Close valve. Repeat as needed to attain adequate seal.

VIII. Eccentric Plug Valve Spare Parts

(There are no recommended spare parts to keep on hand.)