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I & M Mark ED & ET Series 8-Inch

Installation & Maintenance Instructions for the Mark ED & ET Series 8-Inch Globe Style Control Valve

Warning: Jordan Valve Control Valves must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

INTRODUCTION

Contained in this manual are installation instructions, maintenance and parts information for the Mark ED and ET Series 8-inch Globe Style Control Valves. Refer to the appropriate manuals for instructions for the accompanying actuator, positioner and additional accessories.

Only trained or experienced personnel should carry out the operation and installation of all pressure equipment. If you have any questions regarding the equipment, contact your Jordan Valve Controls representative.

INSTALLATION

The Mark ED and ET Series 8" valve should not be installed in systems that exceed the ANSI specified temperature and pressure ratings.

Inspect the valves for shipping damage and foreign debris when uncrating.

1. Ensure the pipe is free of welding slag, chips, and other debris by cleaning out the lines before installation.
2. Install approved gaskets between the valve body and the pipeline flanges.
3. Jordan Valve recommends a standard three-valve maintenance bypass be installed. This allows isolation of the valve body without shutting down the pipeline system.
4. Install the valve so that the flow direction arrow on the body coincides with the actual process flow through the valve.
5. Although the valve can be installed in any position, the typical installation has the actuator vertical above the valve body. Support for the actuator will be necessary if there is vibration in the line or if the valve body is positioned 45 degrees or more below vertical.

MAINTENANCE

Before beginning any maintenance, it is important to isolate the control valve and release all pressure contained in the valve body and the actuator. Disconnect any operating lines providing air pressure, control signals or electrical power to the actuator.

Note: Caution must be used in the disassembly. The seating surfaces and surface finish of the cage; seat ring, stem, and plug are critical for proper sealing. Nicks and scratches will affect the ability to seal the valve in the future.

Disassembly

1. Disconnect and remove the actuator from the body.
2. Remove the nuts or cap screws from the bonnet flange.
3. Thread one of the actuator stem locknuts onto the stem and continue threading it down to the bottom of the thread run out.
4. Remove the bonnet by lifting it straight up with a hoist. Attach the hoist by either a double cable hoisting sling under the bonnet or by the lifting rings attached to the packing flange stud bolts or on the 5" yoke bosses to two yoke stud bolts 180° apart.
5. Caution must be used when lifting the bonnet to ensure that it clears the body and stud bolts completely. Any damage to the seating surface will compromise future sealing ability.
6. To prevent damage to the seating surface, place the bonnet-valve plug assembly on a wooden or cushioned surface.

Replacing the Plug Stem or Load Ring

1. Unscrew the locknuts from the stem.
2. Loosen the packing flange nuts.
3. Lean the bonnet over.
4. Draw the plug and stem out of the bonnet.
5. If valve plug is damaged it will be necessary to replace both the valve plug and stem. If the stem is damaged, a new valve stem can be inserted in the original valve plug.

Replacing the Stem

1. Remove the old groove pin
2. Remove the old stem, and replace with new stem.
3. Tighten the new stem until the thread bottoms out against the plug.
4. Drill through the stem using the hole in the valve plug as guide. Remove any chips or burrs and drive in a new groove pin to lock the assembly. Refer to Table 1 for groove pin drill sizes.

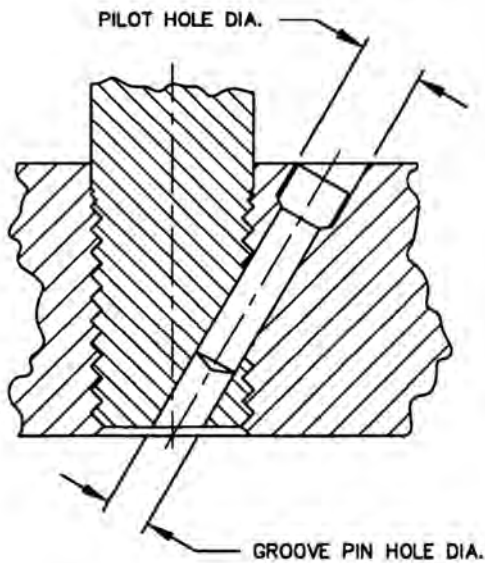


Figure 1: Groove Pin Pilot Holes

Valve Stem Connection (VSC)		Torque Min/Max Values		Groove Pin Drill Size
Inches	mm	Lbf•Ft	N•m	Inches
3/4	19.1	237-339	175-250	3/16
1	25.4	420-481	310-355	1/4

Table 1: Stem Torque and Groove Pin Drill Sizes

Assembly

1. Ensure all gasket surfaces are clean.
2. Replace the valve plug piston ring or seal ring with a new ring.
3. Assembly for design:
 - 3.1. Mark "ED" Design Bodies:
For valve bodies using a carbon filled TFE piston ring, at the split, slightly spread the ring and install it over the stem and into the piston ring groove on the valve plug.

Graphite piston rings are supplied as a complete ring and must be broken into two sections. The piston ring can be broken in half by scoring, and then breaking over a hard surface i.e.) edge of a table. Ensure the broken ends are re-matched when the piston ring is installed in the piston ring groove.
 - 3.2. Mark "ET" Design Bodies:
Apply a lubricant to both back-up ring and seal rings. Install the back-up ring over the stem and into the piston ring groove. Place the seal ring over the top edge of the valve plug, so that it slips into the groove on one side of the valve plug.

Cautiously stretch the seal ring to work it over the top edge of the valve plug. Avoid jerking sharply on the seal, as the TFE in the seal ring needs time to cold flow during the stretching procedure. This stretching procedure may make the seal ring seem loose in the groove, however it will contract to its original size after installation of the cage.

Assembly Continued,

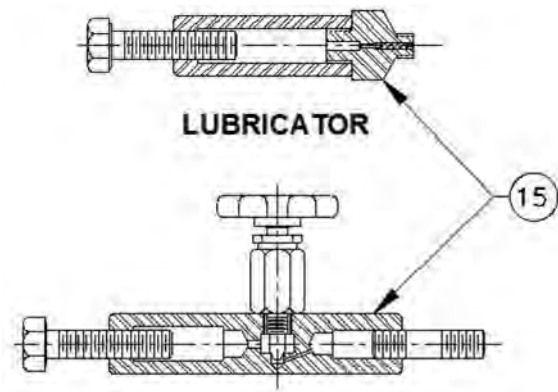
4. Replace the seat ring gasket, and install the seat ring. If using a composition seat (TFE), assemble it by placing the TFE disc onto the disc retainer and then sliding this assembly over the disc seat.
5. Place the cage onto the seat ring. Any rotational orientation of the cage with respect to the valve body is acceptable.
6. To ensure a good seal, clean all sealing surfaces and examine surfaces for nicks and scratches. Place the bonnet gasket in position.
7. Slide the valve plug assembly in the cage, and then position the load ring on top of the cage.
8. Place the bonnet on the body ensuring that the pipe plug (or lubricator) is on the downstream side of the body.
9. Using good bolting practices, bolt the bonnet to the body. Lubricate the studs and nuts using good quality lubrication. Tighten the bolts alternately. Correct tightening of the bonnet bolts accomplishes two objectives.
 - 9.1. To compress the bonnet gasket to form a seal with the body joint.
 - 9.2. Bolt loads are transmitted to the cage through the load ring, which creates a sealing load for the seat ring gasket.
10. Mount the actuator to the bonnet and make up the stem connection. Refer to "Making Up the Stem Connection" for proper procedure.

Packing Lubrication

The use of semi-metallic packing requires the use of a lubricator or lubricator/isolating valve (Figure 2). The lubricator or lubricator/isolating valve is mounted in place of pipe plug (Figure 2, Key 15). For standard service up to 450°F, use Dow Corning lubricant or equivalent. Do not lubricate packing used in oxygen service.

Lubricator -To add lubricant to the packing box, turn the cap screw in a clockwise direction.

Lubricator/Isolating Valve - Open the isolating valve, turn the cap screw in a clockwise direction, and then close the isolating valve.



LUBRICATOR/ISOLATING VALVE

Figure 2: Lubricator and Lubricator/Isolating Valve

Replacing TFE V-Ring Packing

1. After the stem and valve plug have been detached from the bonnet, the following parts can be removed:
 - 1.1. Packing nuts
 - 1.2. Packing flange
 - 1.3. Wiper ring
 - 1.4. Packing follower
2. The old packing can be removed by one of two methods:
 - 2.1. Remove the packing by pushing it out using a rod inserted through bottom of the bonnet.
 - 2.2. Use a packing hook to remove the packing. Note: To avoid damaging the packing box walls use caution.
3. Clean the packing box bore, and all metal parts. Complete all required maintenance.
4. Slide the valve plug into the cage already in the valve body, install the load ring on the cage, and use a new bonnet gasket. Mount the bonnet to the valve body.
5. Complete the installation of the packing as illustrated in Figure 3.

Note: Extra caution should be taken not to damage the packing during the installation process.

6. Replace the packing flange (Key 27); tighten the packing flange nuts (Key 29) until shoulder of packing follower (Key 30) is approximately 5/8" from the top of the bonnet. If leakage is detected around the packing follower, tighten the packing flange nuts until leakage stops.
7. For graphite packing, tighten the packing flange nuts to the maximum torque value in Table 3. Then back off the nuts and retighten them to the minimum torque value in Table 3.

8. For other Packing Types, in small equal increments tighten the flange nuts until one of the nuts reach the minimum torque shown in Table 3. Then tighten the other nut until the packing flange is level.
9. Mount the actuator and set the stem connector to the required travel. Refer to "Making Up the Stem Connection" procedure.

Lapping Metal Seats

In any valve body, a certain amount of leakage should be expected with metal-to-metal seating. However, if the leakage becomes excessive, lapping can enhance the condition of the seating surfaces of the valve plug and seat ring.

Deep nicks in the seating surfaces should be removed by machining rather than lapping. There are many lapping compounds available commercially. Be sure to use one of high quality.

Apply lapping compound to bottom of plug. In order to position the cage and seat ring properly and to help align the valve plug with the seat ring, bolt the bonnet to the body with gaskets (the old gaskets can be used) in place during the lapping procedure. A simple handle can be made from a piece of metal secured to the valve stem with nuts.

Rotate the handle in opposite directions to lap the seating surfaces. Once lapping is complete, disconnect bonnet, clean the seating surfaces, reassemble, and then test for shutoff. If leakage is still excessive, repeat lapping procedure.

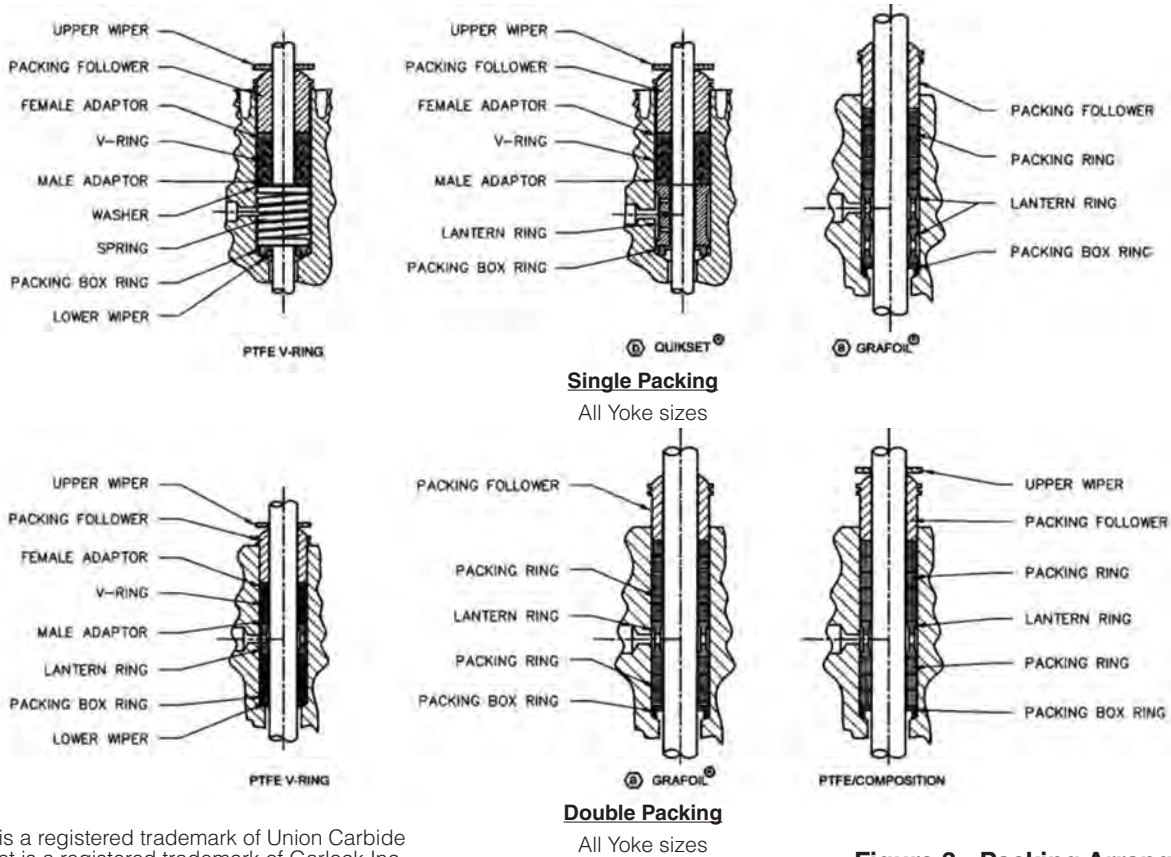
Table 2: Body to Bonnet Torque

Valve Size	Bolt Torques			
	SA 193-B7, B8M ^a		SA-193-B8M ^b	
	N•m	Lbf•Ft	N•m	Lbf•Ft
8	746	550	529	390
a- Strain Hardened; b- Annealed				

Table 3: Torque Values for Packing Flange Nuts

Valve Stem Diameter		ANSI Rating	PTFE Type Packing				Graphite Type Packing			
Inches	Mm		Min. Torque		Max. Torque		Min. Torque		Max. Torque	
			Lbf•in	N•m	Lbf•in	N•m	Lbf•in	N•m	Lbf•in	N•m
3/4	19.1	150	47	5	70	8	99	11	149	17
		300	64	7	95	11	133	15	199	23
		600	87	10	131	15	182	21	274	31
1	25.4	300	108	12	162	18	226	26	339	38
		600	149	17	223	25	310	35	466	53

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Notes:

- a.) Grafoil is a registered trademark of Union Carbide
- b.) Quickset is a registered trademark of Garlock Inc.

Figure 3: Packing Arrangements

Making Up the Stem Connection

Direct-Acting Actuators

1. Move the valve plug to the closed position.
 2. Thread the actuator stem locknuts to the bottom of the plug stem threads. Position the travel indicator disc, cupped edge downward, over the stem. Apply enough spring force to the actuator stem to ensure the actuator is in the "full up" position.
 3. Move the actuator stem to the full downward position by applying full loading pressure to the diaphragm case. Measure the distance between the lower end of the actuator stem and the travel indicator disc on the stem locknuts.
 4. Slowly decrease the load on the actuator, allowing the stem to rise up approximately by 1/8". Using the two-piece stem connector and cap screws, secure the actuator stem and valve plug stem together.
 5. Place the travel indicator disc against the bottom of the stem connector. Secure the disc in place with the upper locknut. Adjust the travel indicator scale so it reads "closed."
 6. Relieve the diaphragm loading pressure and check for sufficient travel. i.e.) Movement of valve plug to the fully "Open" position. Tighten the lower stem locknut against the upper locknut. The connection is now complete.
- To increase desired length of travel:
- a. Loosen both stem locknuts away from the stem connector by approximately 1/4" and then tighten them together.
 - b. This adjustment will allow a wrench to be used on the locknuts to screw the valve plug stem to the desired position.
 - c. Caution: ensure that the valve plug is not seated while being rotated. Do not exceed the 1/8" adjustment made in Step 4.
 - d. Retighten the stem connector and locknuts after adjustment.
 - e. Reposition the travel indicator scale to reflect the change.

Making Up the Stem Connection Cont.,

Reverse-Acting Actuators

1. Close the valve plug ensuring the valve plug is on the seat.
2. Supply enough spring force to the actuator stem to ensure the actuator is in full "Down" position. Increase the loading pressure to the diaphragm case to allow the actuator stem to rise sufficiently so the locknuts can be screwed onto the valve plug stem. Thread the locknuts down on the valve plug stem as far as possible. Set the travel indicator on the locknuts, "cupped" edge downward.
3. Slowly release the pressure in the diaphragm case, allowing the actuator to return to the full down position. Measure the distance between the lower end of the actuator stem and the travel indicator disc.
4. Increase the load on the actuator, causing the stem to rise up by approximately 1/8". Using the two-piece stem connector and cap screws, secure the actuator stem and valve plug stem together.
5. Move the travel indicator disc against the bottom of the stem connector.
6. Secure the disc with the upper locknut. Change the travel indicator scale so that it reads closed.
7. Open the valve plug by increasing the diaphragm loading pressure. Secure the lower stem locknut against the upper locknut. The connection is now complete.
8. To increase travel see "To increase desired length of travel" instructions.

PARTS ORDERING

A serial number identifies every Mark E Series valve body-bonnet assembly, which can be found on the front of the valve. Please refer to this number when contacting your Jordan Valve representative.

MARK E SERIES 8-INCH GLOBE VALVES

Parts Reference

Key	Part Name	Key	Part Name	Key	Part Name
1	Valve Plug Stem	14	Seat Ring Gasket	26	Upper Wiper
2	Body	15	Pipe Plug	27	Packing Flange
3	Bonnet Gasket	16	Drive Screw	28	Stud
4	Load Ring	17	Disc Retainer (Soft Seat Only)	29	Nut
5	Groove Pin	18	Disc Seat (Soft Seat Only)	30	Packing Follower
6	Valve Plug	19	Seal Ring (Design ET Only)	31	Locknut (3-9/16" Yoke Boss Only)
7	Seat Ring	20	Disc (Soft Seat Only)	32	Packing Set
8	Flow Arrow	21	Packing Ring	33	Pipe Plug
9	Hex Nut	22	Bonnet	34	Packing Box Ring
10	Stud Bolt or Cap Screw	23	Pipe Plug	35	Bolt
11	Piston Ring (Design ED Only)	24	Packing Spring / Lantern Ring	36	Nut (5" Yoke Boss Only)
13	Cage	25	Special Washer		

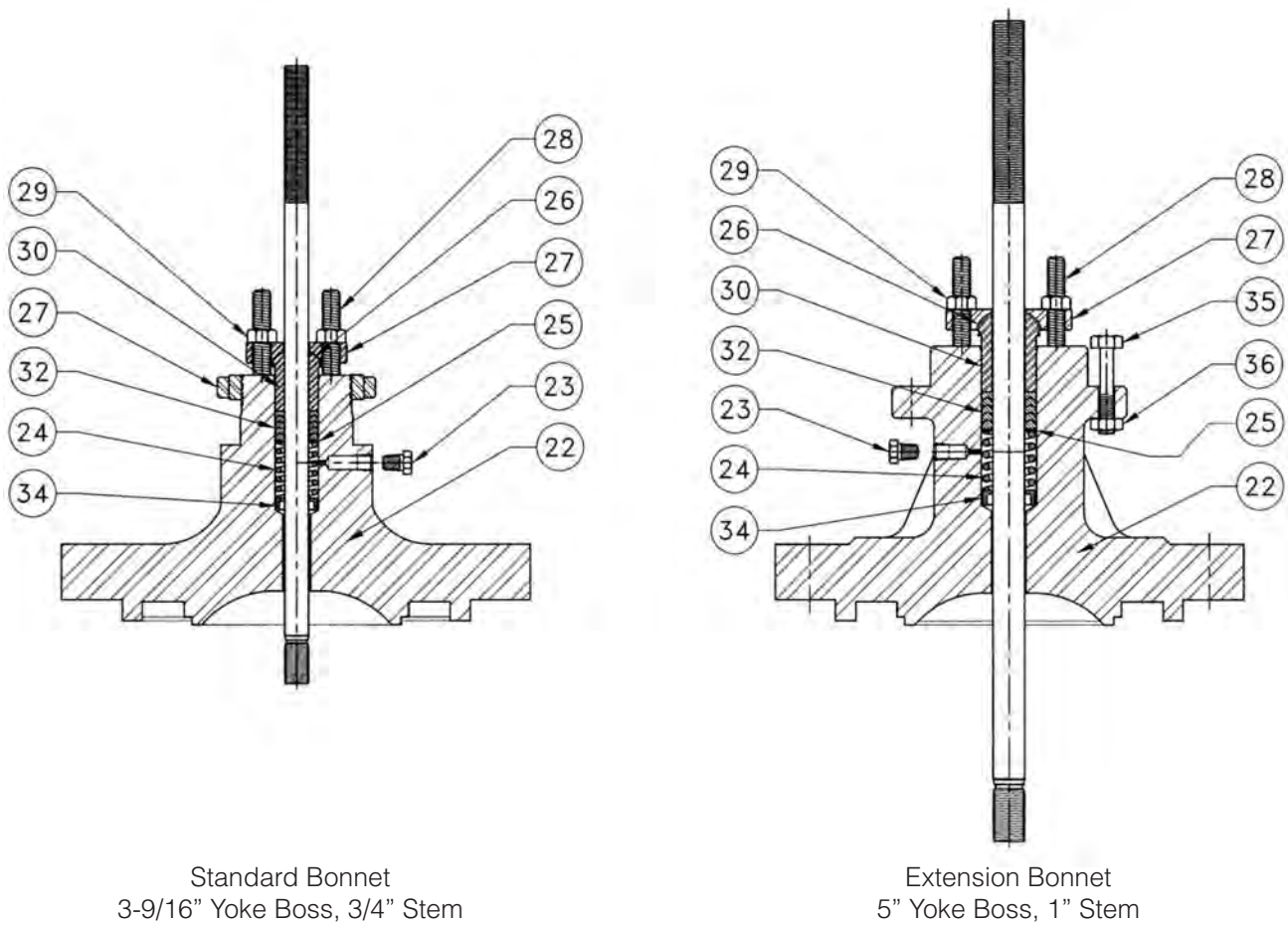


Figure 4: Bonnet Assemblies, Mark E Series 8" Globe Valves

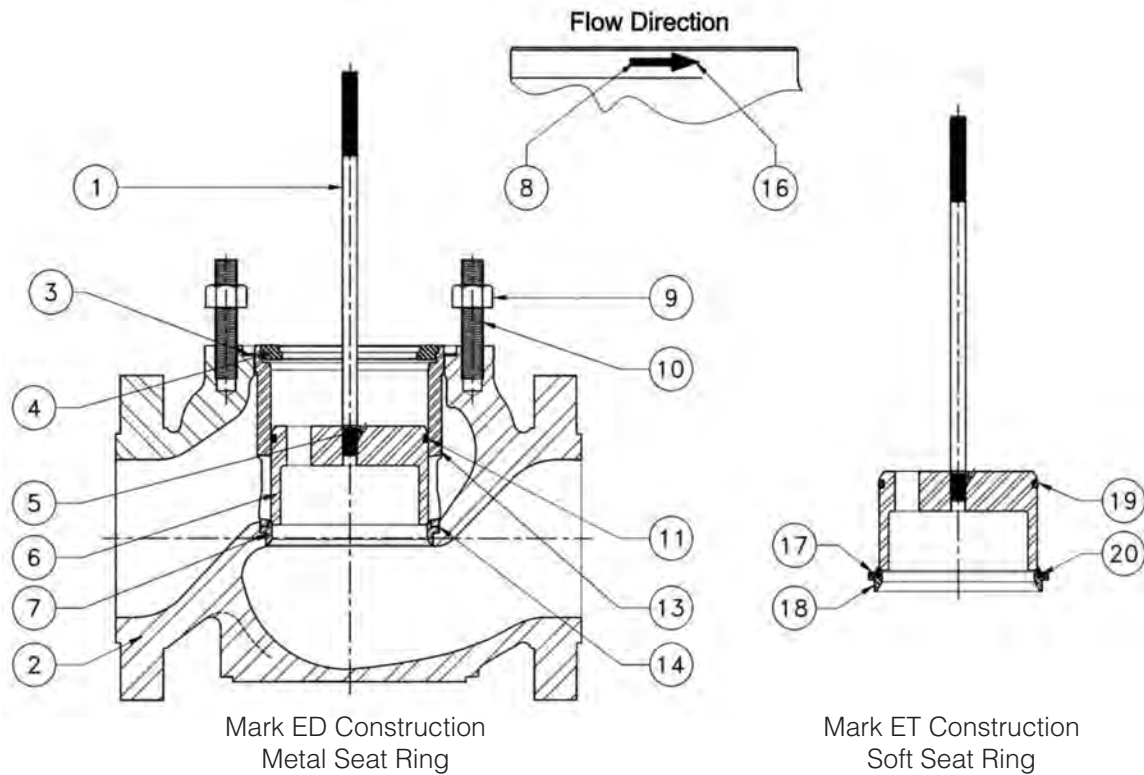


Figure 5: Body Assemblies, Mark E Series 8" Globe Valves

MARK E SERIES 8-INCH GLOBE VALVES

Parts Reference

Key	Description	Part Number	
1	Valve Plug Stem, 316 SST	See Following Table	
2	Valve Body	See Following Table	
3	Bonnet Gasket	Metal Seat -425°F to 800°F (-254°C to 427°C), material	10A3265X012
		Over 800°F (427°C), Laminated Graphite	10A3265X022
		Composition Seat, Nitrile	10A3265X032
4	Load Ring	-150°F to 600°F (-101°C to 316°C), 17-4PH SST	20A3267X012
		-425°F to 1100°F (-254°C to 593°C), Inconel 718	20A3267X022
		-400°F to 500°F (-240°C to 260°C), Corrosive Service, K Monel	20A3268X012
5	Groove Pin, 316 SST	3/4" VSC (19.1 mm)	1V326035072
		1" VSC (25.4 mm)	1V334035072
6	Valve Plug	See Following Table	
7	Seat Ring	416 SST	20A3260X012
		Alloy 6	20A3260X152
8	Flow Arrow, SST	1V106038982	
9	Hex Nut, Steel (16 req'd), Steel Bodies Only	1A445224072	
10	Stud Bolt, Steel (16 req'd)	1D945231012	

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Parts Reference

Key	Description		Part Number	
11	Piston Ring, Graphite, Design ED Only	Non-Oxidizing Service	10A3262X012	
		Oxidizing Service	10A3262X022	
13	Cage	Equal Percent- age	17-PH SST	20A3245X012
			316 SST Ni Coated	20A5467X012
			316 SST CR PL	20A4348X012
		Linear	17-PH SST	20A3247X012
			316 SST Ni Coated	20A5468X012
			316 SST CR PL	20A4349X012
		Quick Opening	17-PH SST	20A3249X012
			316 SST Ni Coated	20A5469X012
			316 SST CR PL	20A4350X012
14	Seat Ring, Gasket, Metal Seat	Metal Seat	-425°F to 800°F (-254°C to 427°C), material	10A3266X012
			-425°F to 800°F (-254°C to 427°C), material	10A3266X022
		Composition Seat, Nitrile	10A3266X032	
15	Pipe Plug	Steel (LCC & WCB Bodies)	1A771528992	
		316 SST (316 SST Bodies)	1A771535072	
16	Drive Screw (2 req'd), CD PL Steel		1A368228982	
17	Disc Retainer, 316 SST, Composition Seats Only		10A4466X012	
18	Disc Seat, 316, Composition Seats Only		20A4467X012	
19	Seal Ring, TFE, Spring Loaded, -100°F to 450°F (-73°C to 232°C), Design ET Only		10A3261X012	
20	Disc, TFE, -70°F to 400°F (-57°C to 204°C), Composition Seats Only		20A4468X012	
21	Packing Ring	Graphite (2 req'd)	3/4" Stem (19.1 mm)	1D749001052
			1" Stem (25.4 mm)	1D751801052
		TFE (8 req'd)	3/4" Stem (19.1 mm)	1E319101042
			1" Stem (25.4 mm)	1D7518X0012
		Laminated Graphite (4 req'd)	3/4" Stem (19.1 mm)	1V239601652
			1" Stem (25.4 mm)	1U676801652
22	Bonnet		See Following Table	
23	Pipe Plug (Tapped Extension Bonnet Only)	Steel (Steel Bonnets)	1A767524662	
		316 SST (316 SST Bonnets)	1A767535072	
24	Spring, 316 SST (TFE V-Ring Packing Only)	3/4" Stem (19.1 mm)	1F125637012	
		1" Stem (25.4 mm)	1D582937012	
	Lantern Ring, 316 SST (Laminated Graphite Pack- ing, 2 req'd, Other Packing, 1 req'd)	3/4" Stem (19.1 mm)	0N028435072	
		1" Stem (25.4 mm)	0U099735072	
25	Special Washer, 316 SST (TFE V-Ring Packing Only)	3/4" Stem (19.1 mm)	1F125036042	
		1" Stem (25.4 mm)	1H982236042	

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Parts Reference

Key	Description		Part Number
26	Upper Wiper, Felt (Not req'd for Laminated Graphite Packing)	3/4" Stem (19.1 mm)	1J872806332
		1" Stem (25.4 mm)	1J872906332
27	Packing Flange, Steel	3/4" Stem (19.1 mm)	1E944823072
		1" Stem (25.4 mm)	0V002425052
28	Stud, Steel (2 req'd)	3/4" Stem (19.1 mm)	1E944931032
		1" Stem (25.4 mm)	0V002531032
29	Nut, Steel (2 req'd)	3/4" Stem (19.1 mm)	1E944624112
		1" Stem (25.4 mm)	1L692124112
30	Packing Follower, 316 SST	3/4" Stem (19.1 mm)	1E944735072
		1" Stem (25.4 mm)	1H982335072
31	Locknut, Steel (3-9/16" Yoke Boss Only)		1E832723062
32	Packing Set, TFE V-Ring (Includes male adaptor, female adaptor, lower wiper and three packing rings)	3/4" Stem (19.1 mm)	1R290401012
		1" Stem (25.4 mm)	1R290601012
33	Pipe Plug	Steel (Steel Bonnets)	1A767524662
		316 SST (316 SST Bonnets)	1A767535072
34	Packing Box Ring, 17-4PH SST	3/4" Stem (19.1 mm)	1J873335012
		1" Stem (25.4 mm)	1J873435012
35	Cap Screw, Steel (8 req'd) (5" Yoke Boss only)		1A936224052
36	Nut, Steel (8 req'd) (5" Yoke Boss only)		1A343324122

Key 1: Valve Plug Stem

Stem Size		Valve Stem Connection		Specifications	Part Number	
in	mm	in	mm			
3/4	19.1	3/4	19.1	Plain Bonnet, 19-3/8" Stem	1K588035162	
				Style 1 Extension Bonnet, 21" Stem	1U928235162	
1	25.4	1	25.4	Style 1 Extension Bonnet	657 Actuator 2" Travel, 24-3/16" Stem	1K7891X0012
					3" Travel, 23-3/16" Stem	10A3282X012
				667 Actuator, 2" – 3" Travel, 23-3/16" Stem	10A3282X012	

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Key 2: Valve Body

End Connection		Steel (LCC)	Steel (WCB)	316 SST
Without Drain Plug Tapping				
RF Flg	150 lb	30A3224LX012	30A3224WX012	30A3224X062
	300 lb	30A3225LX012	30A3225WX012	30A3225X062
	600 lb	30A3226LX012	30A3226WX012	30A3226X062
RTJ Flg	150 lb	30A3227LX012	30A3227WX012	30A3227X062
	300 lb	30A3228LX012	30A3228WX012	30A3228X062
	600 lb	30A3229LX012	30A3229WX012	30A3229X062
Butt Weld	Sch 40	30A3222LX012	30A3222WX012	30A3222X062
	Sch 80	30A3223LX012	30A3223WX012	30A3223X062
With Drain Plug Tapping				
RF Flg	150 lb	30A3232LX012	30A3232WX012	30A3232X062
	300 lb	30A3233LX012	30A3233WX012	30A3233X062
	600 lb	30A3234LX012	30A3234WX012	30A3234X062
RTJ Flg	150 lb	30A3235LX012	30A3235WX012	30A3235X062
	300 lb	30A3236LX012	30A3236WX012	30A3236X062
	600 lb	30A3237LX012	30A3237WX012	30A3237X062
Butt Weld	Sch 40	30A3230LX012	30A3230WX012	30A3230X062
	Sch 80	30A3231LX012	30A3231WX012	30A3231X062

Key 2: Valve Body

Stem Size		Valve Stem Connection		Material		
in	mm	in	mm	416 SST Hardened	316 SST	316 SST Hard Faced Seat & Guide
3/4	19.1	3/4	19.1	21A5356X012	21A5356X022	21A5362X012
1	25.4	1	25.4	21A5356X012	21A5357X022	21A5363X012

Key 22 Bonnet, Same material as body

Material	Style		3-9/16" Yoke Boss 3/4" Stem	5" Yoke Boss 1" Stem
Steel	Plain		30A5471X012	---
	Style 1 Extension	Tapped	30A3279X012	30A3280X012
		Untapped	30A3270X012	30A3274X012
316 SST	Style 1 Extension	Tapped	30A3279X062	30A3280X062
		Untapped	30A3270X062	30A3274X062

