

M&J VALVE

AN SPX BRAND

Installation, Operation & Maintenance Manual M-303 & RQ-8 Gate Valve



M&J VALVE

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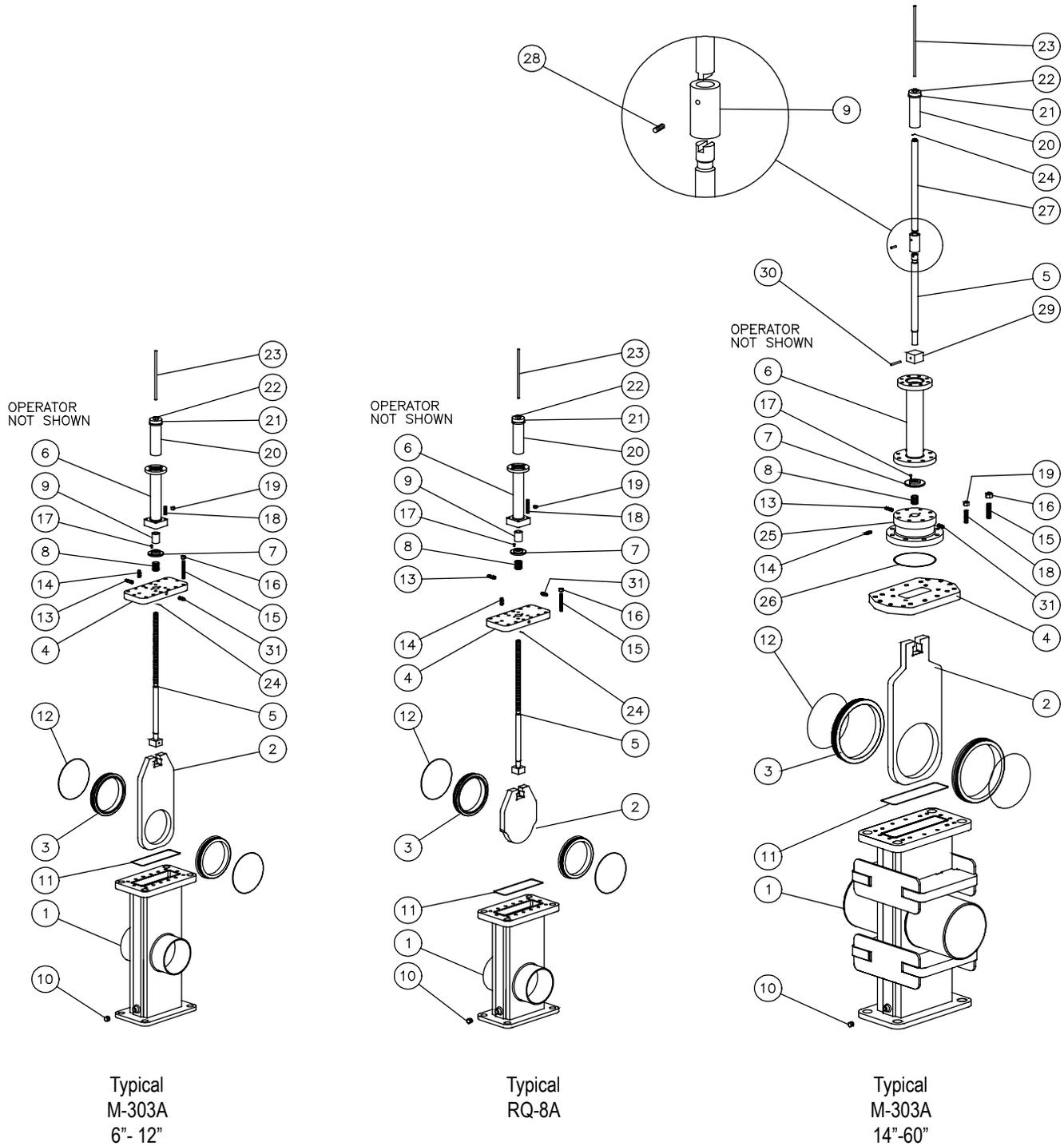
SPX Flow Control reserves the right to incorporate our latest design and material changes without notice or obligation. Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Certified drawings are available upon request.

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Model M-303A & RQ-8A Gate Valves

(NOTE: See following page for difference in original M-303 and M-303A)



NOTE: The Exploded Views shown on this page are for part identification only. M&J Valve reserves the right to change design, material, and/or specifications without notice. End connections may be flanged, weld end, or integral.

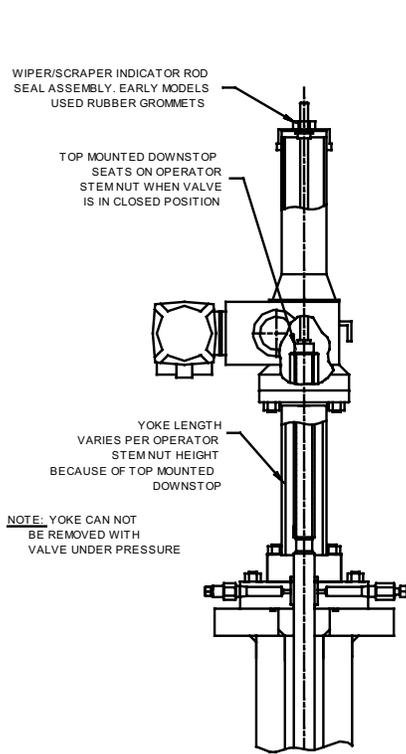
Part Identification

Part No.	Part Name	Part No.	Part Name
1.	Body	18.	Stud
2.	Gate	19.	Hex Nut
3.	Seat Ring Assembly	20.	Stem Protector
4.	Bonnet	21.	Stem Protector cap
5.	Stem	22.	Indicator Rod Sealing Device
6.	Yoke	23.	Indicator Rod
7.	Stem Packing Retainer	24.	Indicator Rod Retainer
8.	Stem Seal Assembly	25.	Cupola (14" and Larger M-303/M-303A)
9.	Downstop Collar/Coupling	26.	Cupola Seal
10.	Body Drain Plug	27.	Upper Stem (14" and larger M-303A)
11.	Bonnet Seal	28.	Set Screw
12.	Seat Ring tail Seal	29.	T-Bar
13.	Stem Seal Packing Injector	30.	Stem Retainer Pin
14.	Body Pressure Release Bleed Valve	31.	Stem Packing Pressure Release
15.	Stud		
16.	Hex Nut		
17.	Cap Screw		

Not Shown

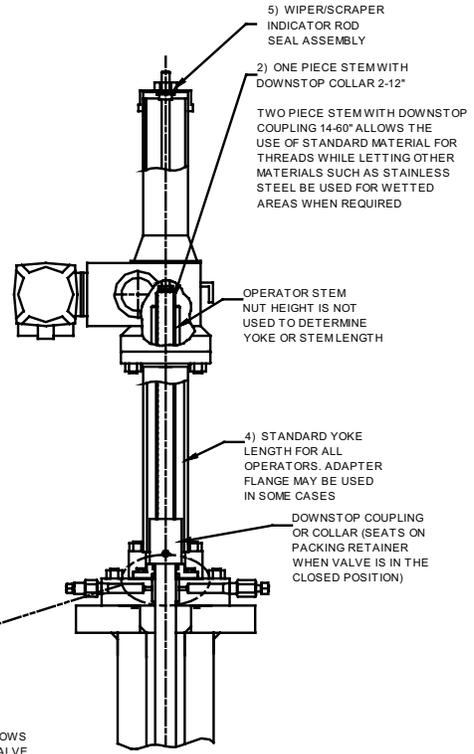
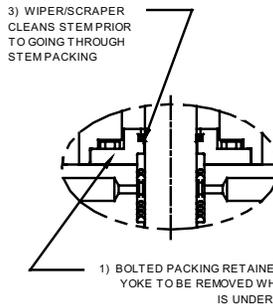
Optional Secondary Seat Seal Grease Fittings

Comparison of M-303 and M-303A Topwork Features Highlighting Improvements Made to the M-303A



M-303
1975-1996

- M303A IMPROVEMENTS
- 1) BOLTED PACKING RETAINER
 - 2) STEM DESIGN WITH COLLAR/COUPLING
 - 3) WIPER/SCRAPER IN PACKING RETAINER
 - 4) COMMON YOKE
 - 5) WIPER/SCRAPER INDICATOR ROD SEAL



M-303A
Starting 1996

Installation, Operation, and Maintenance Manual for M-303 and RQ-8 Fabricated Gate Valves

I. General Information

1. The M&J Valve Model M-303 is a thru-conduit slab type fabricated gate valve developed for service in oil, gas, and liquid applications. It is a position type valve designed to provide a tight shut-off using a floating slab gate and patented seat rings. These valves are bi-directional and can be used in horizontal or vertical pipelines. NOTE: Some stem horizontal positions may require modified seat rings. (Contact M&J Valve for information regarding your particular installation). M&J Valve does not recommend the valve to be used for throttling.

The Model RQ-8 is a short pattern non thru-conduit slab type fabricated gate valve that uses many of the same parts as the M-303.

2. All M&J gate valves are designed, manufactured, and tested in accordance to API-6D, unless otherwise specified. Valve sizes 2-4" are of cast body construction while 6" and larger valves are fabricated. M&J has supplied cast body designs for some valves through 20" for special applications. Face to face dimensions of valves that fall outside of the scope of API-6D are per M&J Valve standards, unless otherwise specified.

3. Flanges on flanged end valves are in accordance with ANSI B16.5 (24" and smaller, except 22") and MSS-SP-44 (22" and larger than 24").

4. The nameplate (see Figure 1), located on the valve body, provides applicable information including size, pressure class, materials, seals, pressure/temperature ratings and serial number. In addition to being on the nameplate, the serial number is also stamped on the top body flange. Valves with extended centerline bore to top of operator mounting flange also have a nameplate at the top of the yoke. Please reference the serial number when contacting M&J Valve in regards to your valve. This will expedite any request and insure that correct information is given.

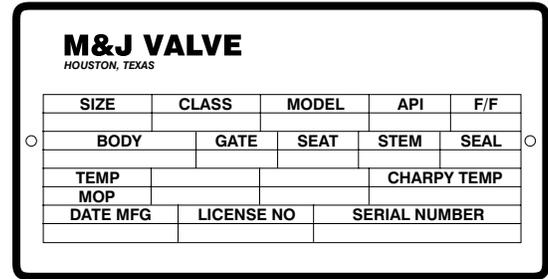


Figure 1

II. Installation

1. Unpacking

1.1 Upon receipt, all valves should be inspected for lost or damaged components. If necessary, claims should be submitted promptly to the carrier.

1.2 Valves may be shipped partially assembled. Protruding parts such as stem protectors, indicator rods, handwheels, etc. may be attached to the valve with tape and/or strapping. These parts should be located and installed as soon as possible to prevent loss or damage.

1.3 Remove end connection protectors and thoroughly inspect the interior of the valve for foreign material and damage to the gate.

2. Handling

2.1 Small valves may be lifted with slings, straps, or by hooking into end flanges. Large valves are furnished with lifting holes in the top bolting flange and bottom plate. Most handling of these valves can be accomplished by hooking diagonally into lifting holes on each side of the bolting flange or diagonally into the top bolting flange and bottom plate. (See Figure 2.)

CAUTION: Always use handling equipment that is suitable for the valve weight. Follow good lifting practices. Be careful not to damage valve top work assemblies. DO NOT lift valves using lifting eyes/holes supplied on valve operators.



**Handling Methods
for M303 Gate Valves**

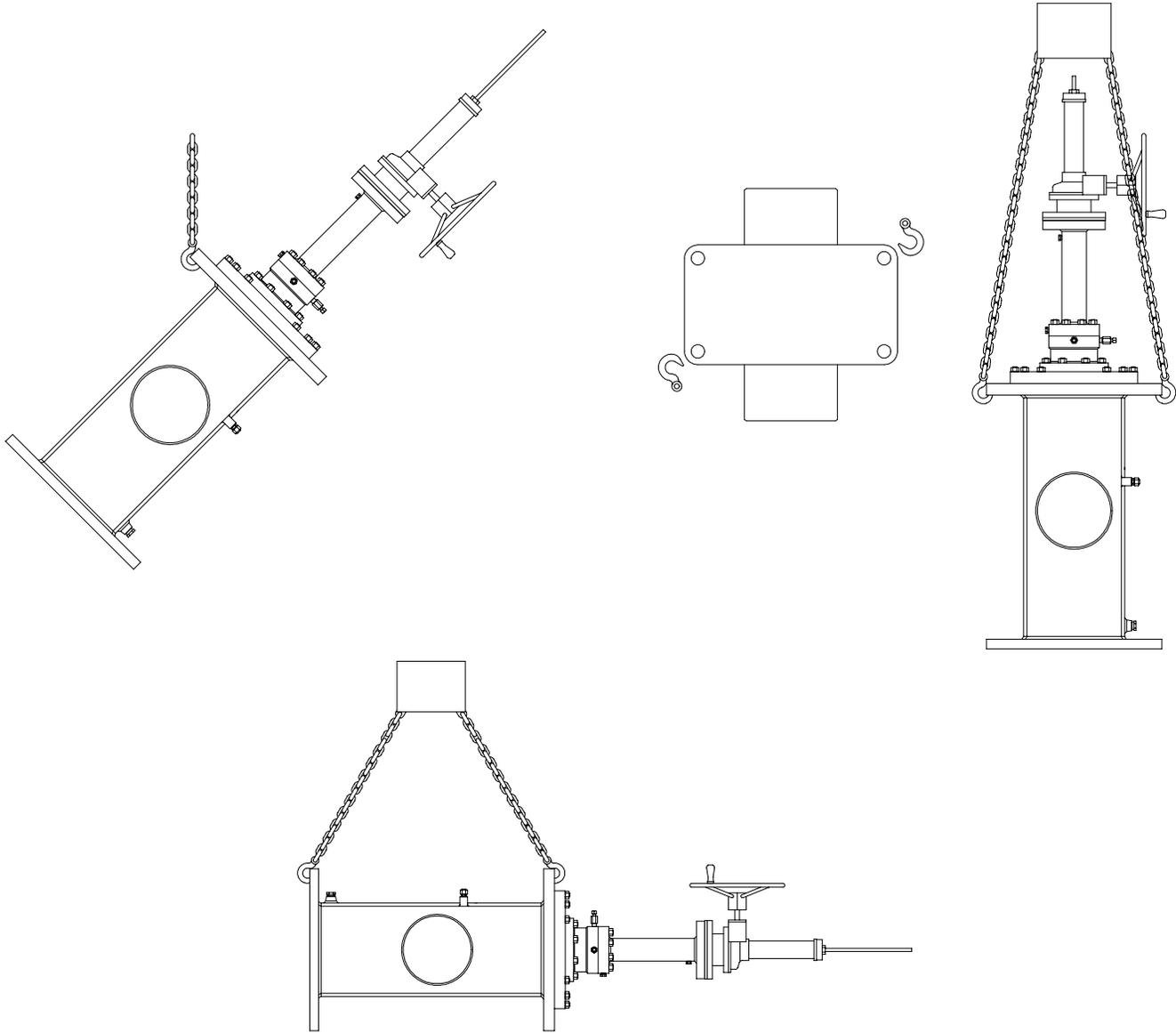


Figure 2

3. Storage

3.1 Standard M-303 and RQ-8 valves may be stored standing vertically on a hard surface or in a horizontal position with the bore parallel to grade (see Figure 3).

NOTE: Always use appropriate blocking material when storing in a horizontal position.

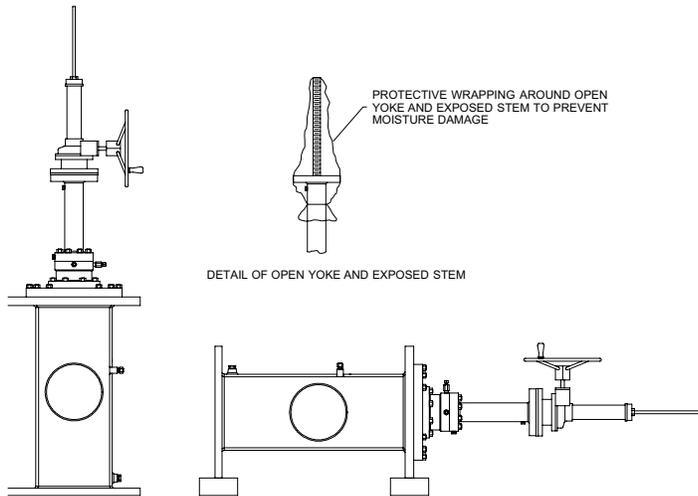


Figure 3

3.2 Valves stored for extended periods should be prepared in the following manner:

3.2.1 If at all possible, the gate should be moved to the open position. This will prevent foreign debris and water from damaging the closed gate.

3.2.2 If it is impossible to move the valve to the open position, a coating of grease should be applied to help protect the gate surface.

3.2.3 Flange protectors or end caps should be securely fastened in place.

3.2.4 If the valve is awaiting an operator or has an open yoke for any reason, wrap the exposed open areas and exposed stem with a protective cover to prevent moisture damage.

4. Structural Support of Valve

4.1 All pipeline gate valves should be properly supported in accordance with specifications established by piping design and engineering standards. Note: Valves should never be used to support or anchor the pipeline.

5. Installation

5.1 Prior to putting a M&J Gate Valve into service, remove the flange protectors from the end connections. Wipe off any protective grease that may have been applied to the gate for storage.

NOTE: Use a cloth wiper without solvent being careful not to damage the gate surface. Make sure that no trapped dirt or debris is left on the gate or in the port.

M&J Gate Valves should be installed with the gate in the open position. This will prevent foreign particles and weld slag from damaging the gate surface. Following installation and hydrostatic test, the valve should be thoroughly drained to remove water or test fluids from the body (see Section III, 4.1).

5.2 Orient valve piping to provide clearance and allow access to the operator and appendages.

5.3 Install flanged end valves using the appropriate gasket (not supplied). Follow standard flange installation procedures.

5.4 Weld end valves should be installed using qualified welders and weld procedures suitable for the mating materials. **NOTE: Install valve with the gate in the open position to prevent damage to the gate surface.**

III. Operation

1. Normal Operation

1.1 M&J Gate Valves are designed for full open to full closed operation. Throttling is not recommended and may result in seal damage and sediment build up in the body cavity.

2. Operation

M&J Gate Valves can be fitted to accept many different types of operators that include: bevel gears, handwheel operators (on 12" and smaller depending on pressure class), electric operators, gas/oil hydraulic operators, fail safe operators, straight hydraulic cylinders, etc. Standard operators supplied by M&J Valve include bevel gear and handwheel operators.

2.1 To open the valve: (handwheel/bevel gear operator)

Turn the hand wheel in a counter clockwise direction until the top of the gate contacts the bottom surface of the bonnet (valves without a cupola) or cupola. The position indicator should be fully extended when the valve is in the fully open position. **NOTE: The valve must be in the full open position to allow "pigs and scrapers" to pass through the valve.**

2.2 To close the valve: (hand wheel/bevel gear operator)

Turn the handwheel in a clockwise direction until the downstop contacts the stop. **NOTE: The model M-303 uses a downstop bolt installed in the top of the stem, the M-303A uses a downstop collar or coupling located below the upper yoke flange. The M-303 downstop bolt seats on the operator stem nut while the downstop collar of the M-303A seats on the stem packing retainer. See Section 5 for a detailed explanation of stem differences between the M-303 and M303A.**

CAUTION: All M-303 and RQ-8 valves are



position seated. Excessive torquing of the handwheel and/or operator could possibly cause damage to the stem or downstop.

The valve travel chart can be used to determine if the gate is in the full open or full closed position.

Port Size	Class 150-900 Gate Travel (in)	Class 1500 Gate Travel (in)
2	2-7/8	2-7/8
3	3-5/8	3-5/8
4	5-1/2	5-1/2
6	7	7
8	9-1/16	10
10	11-3/8	12-1/4
12	13-1/2	14
14	14-5/8	14-5/8
16	16-5/8	16-5/8
18	18-3/16	18-13/16
20	21	21
22	23	23
24	25-3/16	25-3/16
28	27-1/16	27-1/16
28	29	29
30	31-1/4	31-1/4
32	33-1/4	33-1/4
34	35-1/4	35-1/4
36	37-1/4	37-1/4
38	39-3/4	39-3/4
40	41-5/8	41-5/8
42	43-3/4	43-3/4
44	45-3/4	45-3/4
46	47-5/8	47-5/8
48	49-5/8	49-5/8
50	51-3/4	51-3/4
52	53-5/8	53-5/8
54	55-7/8	55-7/8
56	57-1/2	57-1/2
58	60-7/8	60-7/8
60	62-7/8	62-7/8

NOTE: If the valve fails to travel this distance, it usually indicates a problem such as debris build up in the bottom of the valve or interference with the closed position downstop.

3. Block and Bleed Venting

3.1 M&J M-303 Gate Valves provide block and bleed capability in either full open or full closed position. This feature allows body pressure to be vented while pressure is maintained in the pipeline. Block and bleed capability can be used to verify seat integrity and provide for draining and/or flushing of the valve cavity. All M-303 valves are equipped with a body pressure release valve (see Figure 5). This valve is located in the bonnet on 12" and smaller valves or in the cupola for 14" and larger valves. (See Figure 6.)

NOTE: Because of their short body design, M&J RQ-8 Gate Valves provide the block and bleed feature only in the closed position.

CAUTION: Always vent body pressure before performing any maintenance or service to pressure containing parts of the gate valve.

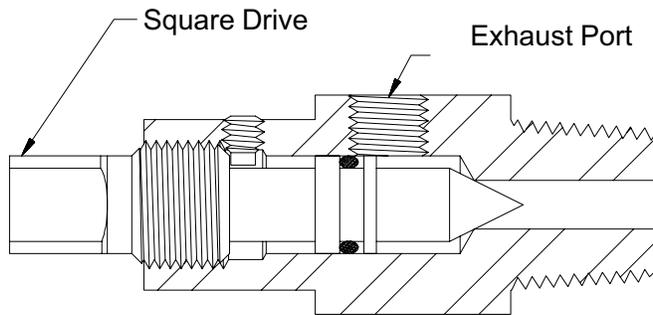


Figure 5. Body Pressure Relief Valve

3.2 Block and Bleed Procedure for M-303

3.2.1 Operate the valve to FULL OPEN or FULL CLOSED position as desired.

3.2.2 Using an appropriate wrench, turn the square drive on the vent fitting (see Figure 5) to release the body cavity pressure.

CAUTION: Direct the exhaust port on the vent fitting (see Figure 5) away from personnel.



NOTE: 1/8" N.P.T. piping can be installed in the exhaust port of the pressure release valve to divert exhaust to a remote location/area.

3.2.3 Continue to vent until body pressure reaches atmospheric pressure. (**NOTE: Length of time required to vent body pressure will be proportional to the pressure and compressibility of the flow medium and valve size**).

3.3 Block and Bleed Procedure for RQ-8

3.3.1 Operate the valve to the FULL CLOSED position.

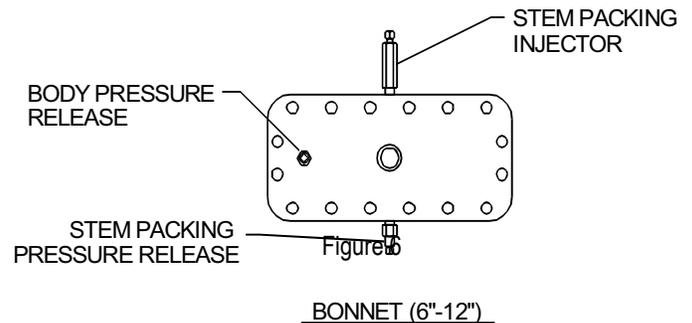
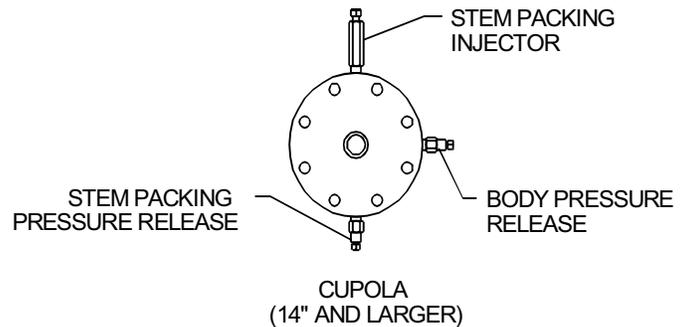
3.3.2 Using an appropriate wrench, turn the square drive on the vent fitting (see Figure 5) to release the body cavity pressure.

CAUTION: Direct the exhaust port on the vent fitting (see Figure 5) away from personnel.



NOTE: 1/8" N.P.T. piping can be installed in the exhaust port of the pressure release valve to divert exhaust to a remote location/area.

3.3.3 Continue to vent until body reaches atmospheric pressure. (**NOTE: Length of time required to vent body pressure will be proportional to the pressure and compressibility of the flow medium and to valve size**).



4. Body Draining and Flushing

Water, and occasionally sediment, may accumulate in the body of the valve. M&J Valve recommends draining the body following hydrostatic testing and prior to the onset of winter.

WARNING: Body pressure **MUST** be relieved before any attempt is made to drain the body cavity. Follow all safety procedures and appropriate regulations for handling the pipeline media in the valve.



4.1 Draining Procedure

4.1.1 Relieve body pressure per Section 3, of this manual.

4.1.2 Remove the body drain plug or open the drain valve to drain the body cavity. M&J Valve recommends that M-303 and RQ-8 gate valves be drained:

- Following any hydrostatic test.
- Prior to the onset of cold weather.

4.2 Flushing Procedure

4.2.1 For flushing, a valve should be installed on the drain. Utilize internal company procedures to flush water, etc. from the body.

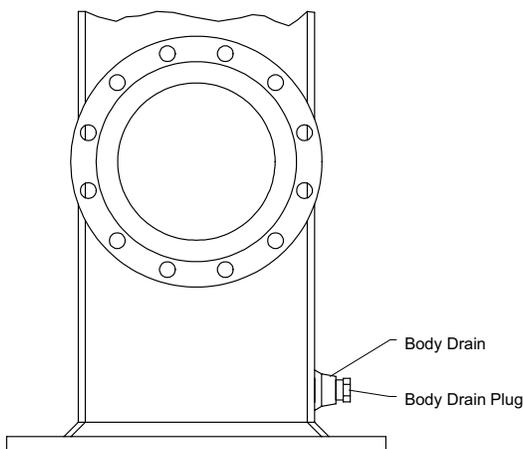
5. Secondary Seat Lubrication/Emergency Sealant Option

This option is provided when specified. When used as a seat lubrication feature, it provides a means to lubricate the gate/seat seal area. When used as an emergency secondary seat seal, a temporary seal can be obtained should either the gate or seat ring sealing surface become scored by foreign material introduced into the valve body.

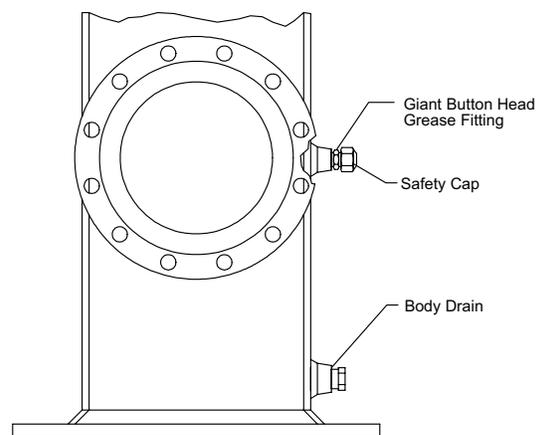
5.1 Secondary Seat Seal

5.1.1 Cycle the valve to either the full open or full closed position.

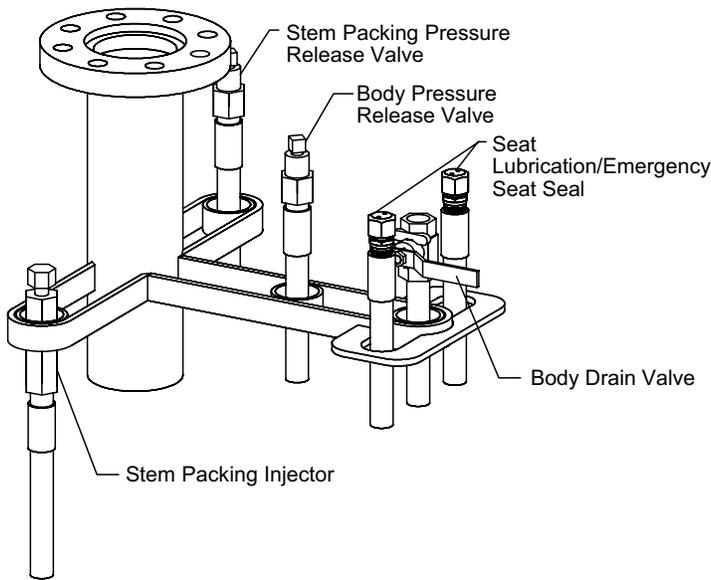
5.1.2 Remove the safety caps from the two giant button head grease fittings. For above ground service, these fittings are located on the side of the valve body near the centerline of the conduit. On buried valves, these fittings are extended with piping to a point above grade. They are located on either side of the extended body drain valve.



Standard Drain Configuration



Seat Lubrication/Emergency Seal Location for Above Ground



Seat Lubrication/Emergency Seal Location for Buried Service

5.1.3 When lubricating the seat and gate surfaces, operate the valve several times raising and lowering the gate approximately one inch to spread the grease evenly on both surfaces. Return the gate to either the full open or full closed position and inject an additional amount of grease to complete the process. See Section IV for M&J Valve recommended grease.

5.1.4 Generally, the pressure required to fully lubricate the valve seat and gate surfaces should not exceed 200 pounds over line pressure. It should be noted that some pressure is required just to pump grease through the hose and gun. In cold weather, this could amount to several thousand pounds of pressure.

The following example illustrates what the total pressure could be:

Pressure to pump grease	2000 psi
Line pressure	1000 psi
Amount required above <u>line pressure</u>	<u>+200 psi</u>
Total pressure required to lubricate the valve seat and gate surfaces in cold weather	3200 psi

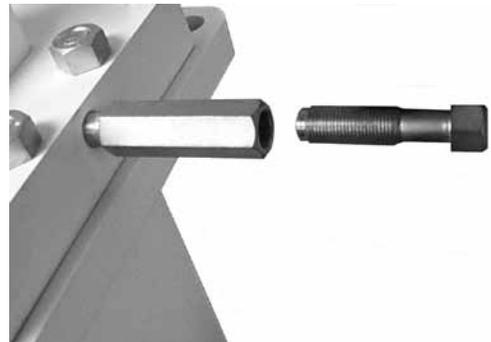
6. Stem Sealant Injector

M-303 and RQ-8 valves have been supplied with chevron type stem seals since 1973. A packing injector fitting and stem packing pressure release valve have been supplied to provide secondary stem seal capability. The injector fitting is used to inject stem sealant into the packing chamber in case of primary stem seal leakage. Stem sealant can be injected with the valve in either the open or closed position.

6.1 To inject stem sealant:

6.1.1 Open the stem packing pressure release valve.

6.1.2 Screw the stem packing injector hex



head stinger all the way in and then remove it from the injector housing. This will clear the injector body of existing sealant.

6.1.3 Load one stick of stem sealant at a time into the stem packing injector and screw in the stinger. Repeat as required until fresh sealant comes out of the stem packing pressure release valve.

6.1.4 Close the pressure release valve and screw in the injector stinger two or three additional turns.

CAUTION: The stem packing injector is not a lubrication feature. Excess injection of sealant with the stem packing pressure release valve closed will result in “hard” operating conditions and possible seal damage.



Recommended Stem Packing Grease:

M&J Valve TPF-77 Stem Lube
M&J Valve part no. 139907

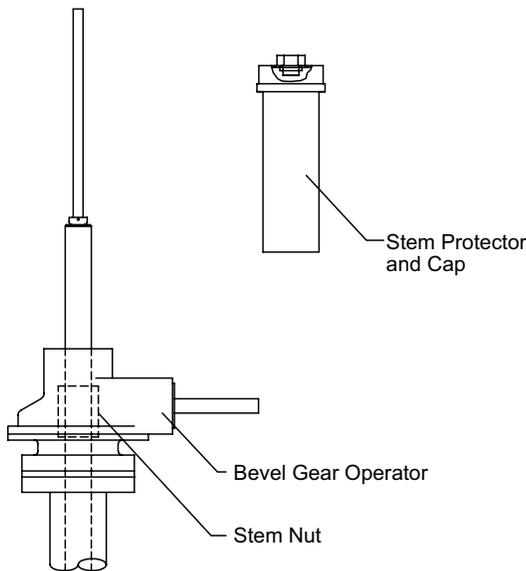
IV. Periodic Maintenance

M&J Gate Valves are designed to provide years of trouble free operation. By performing periodic maintenance as recommended, your valve will provide you with many years of service.

1. Lubrication

1.1 Stem lubrication for all handwheel, bevel gear, and electric actuators.

1.1.1 Remove the stem protector including cap and sealing device. **NOTE: If the valve has an old style rubber grommet indicator rod seal, M&J Valve recommends that it be replaced with the new indicator rod sealing device. Contact M&J Valve for a parts list and pricing information.**



1.1.2 Inspect valve stem threads for damage and lubrication.

1.1.3 Clean the stem threads accordingly. A wire brush will aid in removing any rust or dirt from the threads if required. Apply grease to the threads (See M&J Valve recommended grease).

1.1.4 Most handwheel and bevel gear operators are equipped with grease injection fittings. Locate the grease injection fitting on the operator and inject new grease (see M&J Valve recommended grease) until the old material has been completely replaced.

1.1.5 Run gate up and down as far as possible several times to distribute the grease on the stem and stem nut.

1.1.6 Clean any foreign particles or rust from the stem protector and apply pipe thread sealant such as Permatex to the threads before reinstalling into the operator. Install the pipe cap and clean up the valve as required.

NOTE: Handwheel and bevel gear housings are filled at the factory with grease that is considered best for average temperature environments. If handwheel or bevel gear operated valves become hard to cycle in cold temperatures due to stiff grease, operation may be improved by using a lighter weight grease. (See M&J Valve recommended grease.)

Recommended General Purpose Assembly and Seat Lubrication Grease		
Moderate Temperature	Low Temperature	High Temperature (or any Service Using EPR Seals)
Mobil Mobilux E.P. #1	Bardahl #87050	Desco #330
Shell Alvania E.P. #1		
Exxon Ronex M.P.		
Texaco Marfax A.P.		

2. Cleaning and Lubricating M&J Handwheel Operators (see exploded view on page 10)

Handwheel operators should work easily after the injection of new grease during periodic maintenance procedures. If the handwheel does not operate smoothly after lubrication, the operator bearings may require cleaning and/or replacing. To inspect, clean, or replace the handwheel operator bearings:

- 2.1 Cycle the gate to the full open position.
- 2.2 Remove the stem protector, including cap and sealing device.
- 2.3 Remove the indicator rod.

NOTE: If there is a downstop bolt on top of the valve stem, remove the indicator rod and downstop bolt.

2.4 Inspect valve stem threads for damage and lubrication. Apply a coat of light oil or a lubricant such as WD-40 to the stem threads and top of operator drive nut. This will make removing the operator easier.

2.5 Remove capscrews holding the handwheel operator to the valve yoke.

2.6 Remove the handwheel operator by screwing the assembly clockwise.

2.7 Inspect the bearings for dirt, rust, or other types of contamination.

2.8 If required, clean bearings using a brush with solvent. The bearings must turn freely. There may be a slight amount of drag, this is normal. If cleaning does not improve bearing performance, then the handwheel operator must be disassembled. See the exploded view of the handwheel operator (page 10) for an assembly overview.

2.8.1 To remove operator bearings:

NOTE: Some smaller handwheel operators use a roll pin driven between the bearing retainer threads and the handwheel hub threads. This pin will have to be drilled out before the bearing retainer can be removed. Use a 1/8" diameter drill bit.

2.8.1.1 Remove the set screw located in the side of the bearing retainer.

2.8.1.2 Unscrew the bearing retainer.

2.8.1.3 Remove the lower bearing set, bearing housing, upper bearing set, and the o-ring seal.

2.8.1.4 Thoroughly clean all bearings and races. Replace if required.

2.8.2 To assemble:

2.8.2.1 Pack all bearings with grease and lubricate the o-ring seal.

2.8.2.2 Install o-ring seal and upper bearing set (race, bearing, race) onto handwheel hub.

2.8.2.3 Install the bearing housing.

2.8.2.4 Install the lower bearing set.

2.8.2.5 Install the bearing retainer, screwing on until snug, then loosen 1/8 turn. Tighten the set screw located in the side of the bearing retainer.

2.9 Before reinstalling handwheel operator on valve, lubricate stem threads. (See M&J Valve recommended grease.)

2.10 Reinstall the handwheel operator

2.11 Replace indicator rod on valve stem.

NOTE: If a downstop bolt was used, reinstall it into the top of the valve stem and attach the indicator rod using the existing roll pin.

2.12 Reinstall the stem protector, stem protector cap, and indicator rod seal assembly. Use a pipe thread sealer on the stem protector threads.

NOTE: If the valve has an old style rubber grommet indicator rod seal, M&J Valve recommends that it be replaced with the new indicator rod sealing device. Contact M&J Valve for a parts list and pricing information.

2.13 Using the grease fitting located in the handwheel operator housing, inject grease into the bearing area.

2.14 Clean up as required.

For maximum life and performance, M&J Valve recommends the following:

Inspect, clean, and lubricate the valve including operator bearings and stem threads:

Manifold valves	every 3 months
Mainline valves	every 6 months

Partially test cycle the valve *:

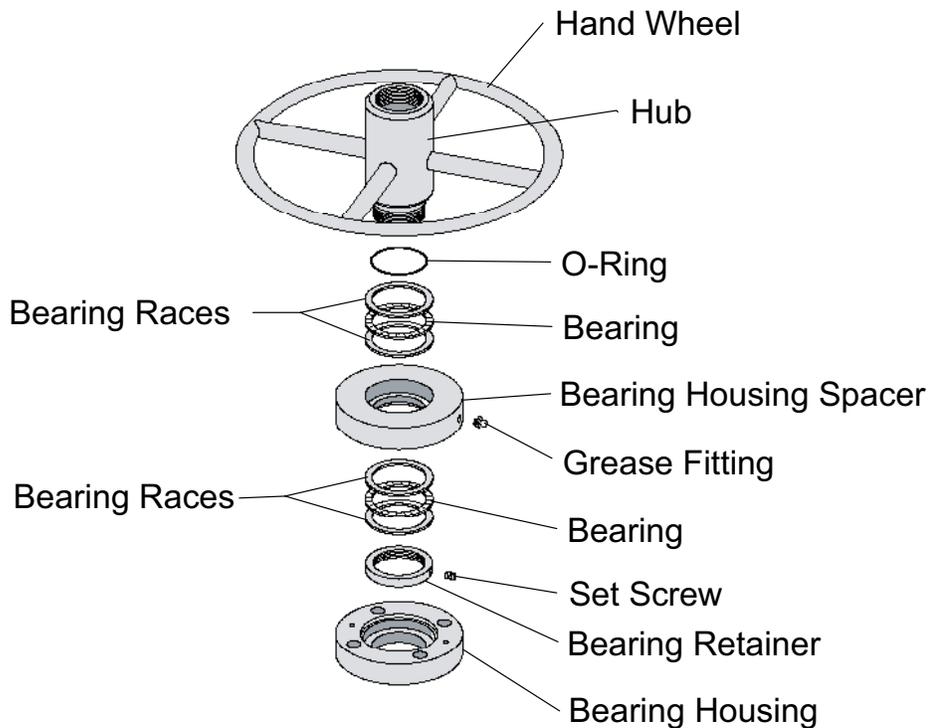
Manifold valves	every 3 months
Mainline valves	every 6 months

* Run the valve through a full cycle whenever field conditions allow.

3. Painting

3.1 To provide maximum service life and easier maintenance, valve exteriors should be maintained. Rust, grease, debris, etc. should be kept removed from the valve. The valve exterior should be painted as required.

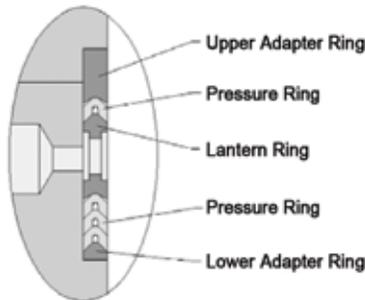
NOTE: When painting valve exterior, DO NOT paint over the valve nameplate, identification tags, or caution labels.



Exploded View of a Typical Handwheel Operator

4. Stem Seal Replacement M-303 and RQ-8

Unless otherwise specified, M&J Gate Valves use a chevron type stem seal assembly. This assembly consist of several components including upper and lower adapter rings, pressure rings, and a lantern ring (see detail). The upper and lower adapter rings are used for stem seal alignment and support. A lantern ring placed between the upper and lower set of pressure rings provides for uniform distribution of stem packing grease.



For M303, M303A and RQ-8A valves, the stem seal is located in either the bonnet (12" and smaller M303, M-303A and all RQ-8A's) or in the cupola (14" and larger M-303 and M303A). On RQ-8 style valves, the stem seal is located in the spacer between the bonnet and yoke. For M-303 and RQ-8 valves, it is retained by either the lower yoke flange or lower yoke flange and bushing. For M-303A and RQ-8A, a bolted packing retainer flange holds the stem seal in place. **NOTE: Before servicing the stem seal, determine the method of seal retention. If you are unsure, call M&J Valve. Be sure to refer to your valve by serial number when making any inquiries.**

4.1 Stem Seal Replacement

CAUTION: Stem seal replacement should only be done by qualified personnel. The use of improper procedures can cause bodily injury and/or damage to the valve and surroundings.



4.1.1 Remove the stem protector and stem protector cap.

4.1.2 Remove the indicator rod. NOTE: For valves that have a downstop bolt, position the valve so that the downstop bolt is above the operator. Remove the downstop bolt.

4.1.3 For M-303 valves, cycle the valve to either the full open or full closed position. RQ-8 valves must be in the full closed position.

4.1.4 Vent body pressure using the body pressure relief valve located on the bonnet (12" and smaller) or the cupola (14" and larger). For extended valves, the pressure relief valve will be located near the top of the yoke at the end of the extended appendage piping.

CAUTION: Body pressure must be fully relieved to  continue. If body pressure cannot be relieved, check valve position to insure full open or full closed (full closed for RQ-8 valves). If valve is in the correct position, then seat rings may not be fully pressure energized seals may be damaged. Isolate the valve from line pressure.

or

4.1.5 Remove the valve operator.

4.1.5.1 Oil stem threads.

4.1.5.2 Attach a swivel hook and sling to the operator and use a properly rated hoist to support and lift the operator.

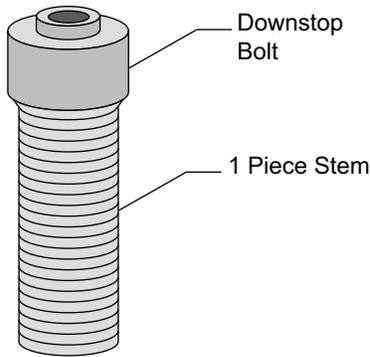
4.1.5.3 Loosen and remove bolts holding operator to yoke.

4.1.5.4 Turn operator clockwise to remove from the threaded stem.

4.1.6 Loosen and remove the nuts holding the yoke to the bonnet (12" and smaller) or cupola (14" and larger).

4.1.7 Remove the yoke. Be careful not to damage the stem seal area of the stem.

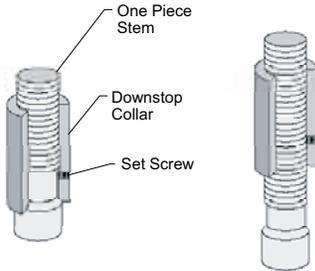
**For 1-piece stem with downstop bolt
M-303**



Proceed to step 4.1.8.

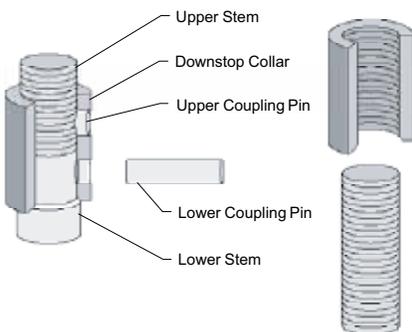
**For 1-piece stem with downstop collar
M-303A (sizes 6" - 12")**

4.1.7.1 Loosen set screw in downstop collar.



4.1.7.2 Unscrew collar clockwise to remove from threaded stem. Proceed to step 4.1.8.

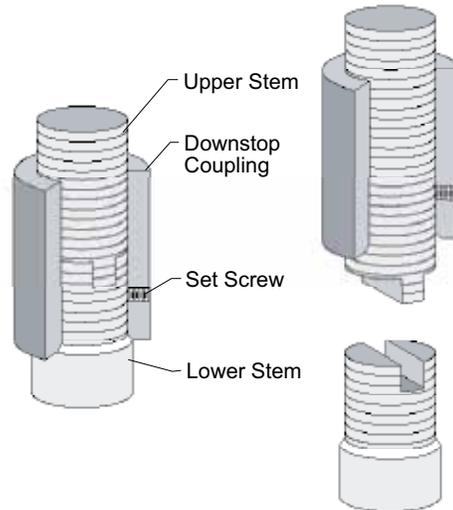
**For 2-piece stem with pinned coupling joint
M-303A (sizes 14" - 60" limited supply)**



4.1.7.1 Drive lower coupling pin located closest to stem seal area of valve stem) out of coupling.

4.1.7.2 Remove upper stem from lower stem. Proceed to step 4.1.8.

**For 2-piece stem with integral key
M-303A (sizes 14" - 60")**



4.1.7.1 Loosen set screw in downstop coupling.

4.1.7.2 Screw downstop coupling onto upper stem until upper stem can be removed from lower stem. Proceed to step 4.1.8.

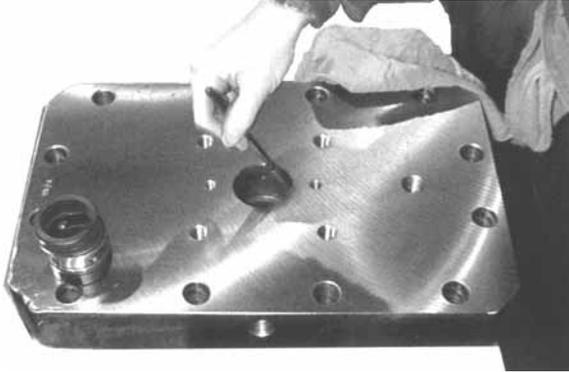
4.1.8 Inspect the stem seal area of the stem for excessive pitting or scratches. Repair or replace as required (see section on stem replacement).

4.1.9 Remove the stem seal assembly.

NOTE: If the valve has a stem packing bushing for extended topworks or downstop coupling, remove it to expose the stem seal assembly. If the valve has a bolted stem packing retainer, remove bolts and retainer to expose the stem seal assembly.

4.1.10 Clean the stem seal chamber thoroughly. Insure that injection and bleed ports are free of buildup and debris.

4.1.11 Lightly oil new stem seal components and slide over stem installing into stem seal chamber.



4.1.12 Clean the stem packing counterbore in the lower yoke flange, bushing, or packing retainer, whichever applies to your valve.

4.1.13 If the valve is equipped with either a stem packing retainer bushing (used on extended M-303's), packing retainer (M-303, RQ-8) or bolted stem packing retainer (M-303A, RQ-8A), install it now. **NOTE: Be careful not to damage the stem seal area during installation.**

4.1.14 For valves that are equipped with a two piece stem, attach upper stem reversing procedure used to remove. **NOTE: Do not forget to tighten set screw in downstop collar or coupling.**

4.1.15 Assemble yoke to bonnet (12" and smaller) or cupola (14" and larger). **NOTE: Be careful not to damage the stem seal area of the stem when lowering yoke over stem.**

4.1.16 Mount operator on valve yoke. Limit switches **MUST BE RESET** on electric operators. (See Section 7.3.)

4.1.17 For valves requiring the use of a downstop bolt (M-303, RQ-8), reinstall downstop bolt.

4.1.18 Attach indicator rod to stem or downstop bolt as required.

4.1.19 Replace the stem protector, stem protector cap, and indicator rod seal device.

4.1.20 Check all bolting to insure they are fastened securely. Close body pressure relief valve.

5. Stem Replacement

CAUTION: DO NOT, under any circumstances, attempt stem maintenance on valves while exposed to line pressure.

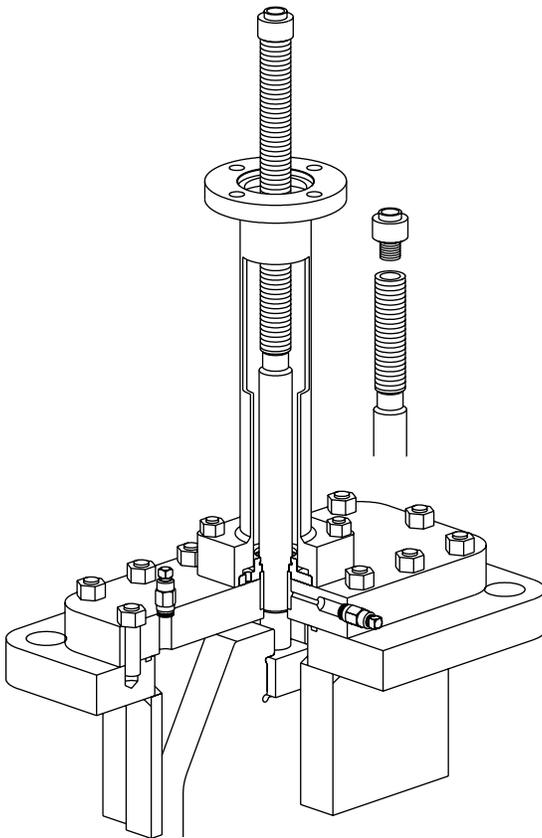


Over the years, M&J Valve has continually improved the M-303 gate valve. One area that has been improved to provide increased customer versatility is the stem. The original stem for all M-303 and RQ-8 gate valves consisted of a one piece stem, threaded T-bar, and a downstop that threaded into the top of the stem. Beginning in mid 1982, the 2"-12" valves began to be shipped with an integral stem and T-bar. Elimination of the T-bar pin and threaded T-bar connection helped to provide faster stem change-out. The next major stem

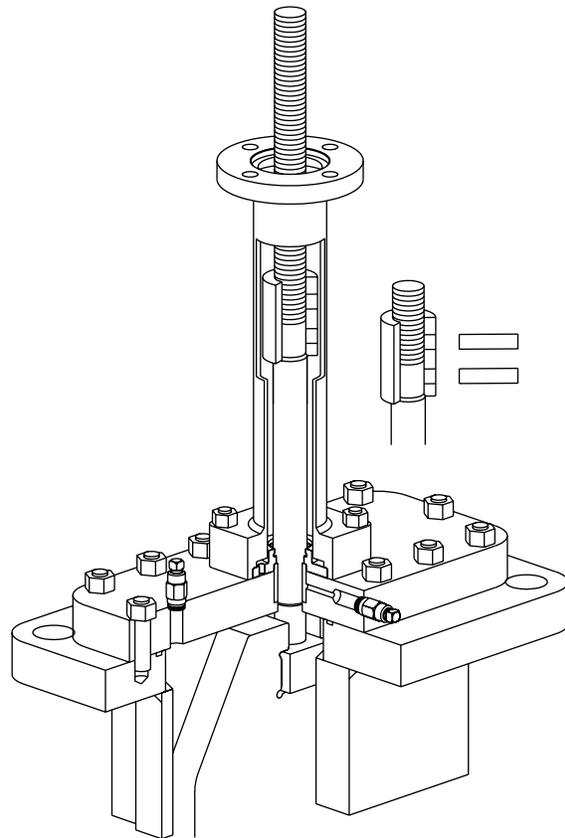
improvement came in 1996 when the downstop location was moved below the operator mounting flange. This improvement eliminates the need for valve stem and yoke lengths to be dependent upon electric motor and bevel gear operator stem nut heights.

The threaded/pinned two piece stem was the first M&J stem design that moved the downstop below the operator mounting flange.

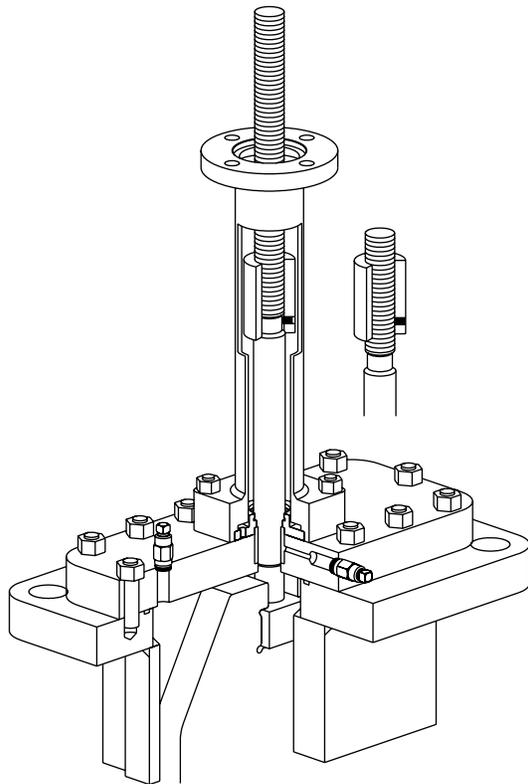
Beginning in 1997, stem designs vary per valve size. Valve sizes 6"- 12" use a one piece forged stem with a threaded downstop collar. Valves 14" and larger use a two piece stem design with an integral key joint. This joint is held together using a threaded coupling which also acts as the downstop.



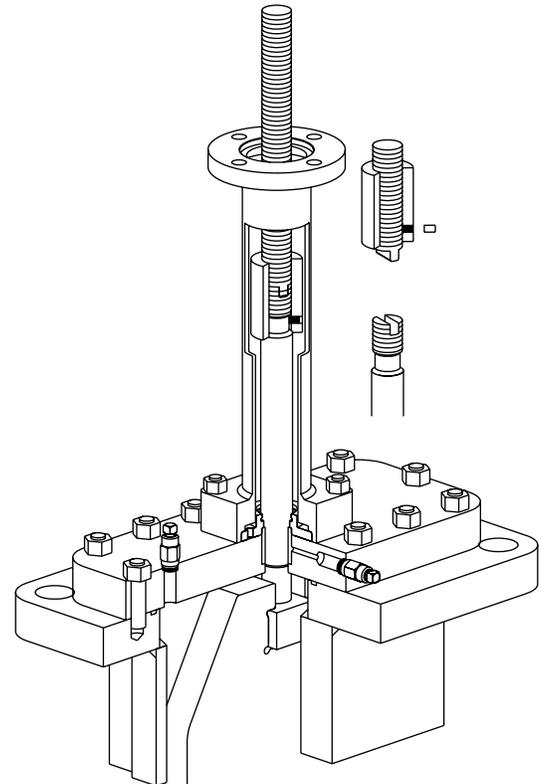
Original One Piece Stem with Downstop Bolt
used on
M-303 and RQ-8 Gate Valves



Two Piece Pinned Joint Stem
for M303 and RQ-8 Gate Valves



One Piece Stem with Downstop Collar
for 12" and Smaller
M-303 and RQ-8 Gate Valves



Two Piece Integral Key Stem with Downstop Coupling
for M-303 and RQ-8 Gate Valves Larger than 12"

5.1 Stem Replacement for valves with screw on T-bar, with or without slip-on stem packing bushing, and without cupola

CAUTION: DO NOT, under any circumstances, attempt stem maintenance on valves WITHOUT cupola, while exposed to line pressure.



NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field inventory, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and o-rings whenever the valve is dis-assembled. Always include the valve serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

- 5.1.1** Isolate pressure source from pipeline and valve.
- 5.1.2** Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.
- 5.1.3** Open the valve body pressure relief valve to vent trapped body/line pressure.
- 5.1.4** When venting is complete, cycle valve to the full open position.

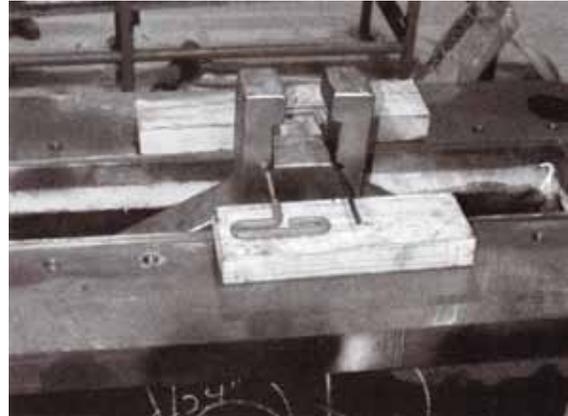
5.1.5 Remove the stem protector cap, stem protector, indicator rod, and downstop bolt if supplied.



5.1.6 Remove bonnet nuts. Studs may also be removed if desired to allow more work clearance.



5.1.7 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, and gate high enough to clear the T-bar slot in the gate neck. Insert customer supplied drift pins in the holes provided in the bottom of the gate neck T-bar slot.



5.1.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the top works assembly. Remove the bonnet o-ring.

5.1.9 Drive out the T-bar retainer pin and unscrew the T-bar from the stem. **NOTE: If it is planned to keep this stem after the new stem is installed, perform the following: Match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during reassembly.**

5.1.10 Loosen and remove the nuts that hold the bonnet to the yoke. Remove the bonnet. Remove the stem packing bushing if supplied.

5.1.11 Screw the stem out of the operator stem nut and remove from the topworks assembly.

5.1.12 Remove stem packing from the bonnet. Clean the stem packing chamber thoroughly. Clean and inspect the stem packing. Replace if required. **NOTE: M&J Valve recommends stem packing be replaced whenever it is removed from the stem packing chamber.**

5.1.13 Install stem packing into bonnet.



NOTE: Be careful not to damage the stem seal area of the stem when sliding the bonnet over the stem.

5.1.17 Tighten the bonnet to yoke bolts.

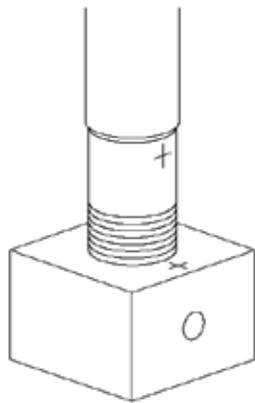
5.1.18 Reinstall new T-bar onto new stem. Be sure to align match marks to insure proper installation. Replace the stem retainer pin and stake T-bar to lock in place.

5.1.19 Clean bonnet o-ring groove. Install new bonnet o-ring. Replace bolting, if removed.



To Replace Stem

5.1.14 Remove the T-bar from the new stem.



5.1.20 Using proper equipment and lifting procedures, lift the entire top works assembly, including the bonnet, and place over the valve body.

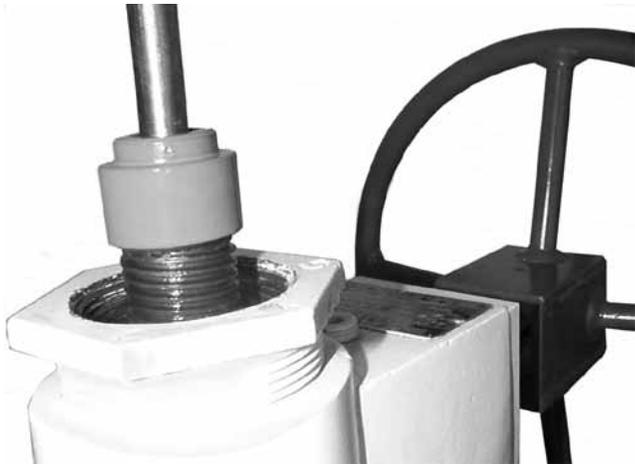
5.1.21 Slide the T-bar into the T-bar slot on the top of the gate. Remove drift pins if used and lower complete topworks assembly and gate into place with bonnet resting on the body bolting flange.

5.1.22 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.1.15 Apply grease to the new stem threads. Carefully insert stem through yoke and into the operator stem nut. Thread stem through nut. DO NOT damage the stem seal area. Leave enough stem extending past the yoke to allow bonnet installation and sliding of the T-bar into the T-bar slot of the gate.

5.1.16 Clean the stem packing area in the lower yoke flange. If the valve has a stem packing bushing, install it now and seat it in the counterbore located in the lower yoke flange. Reassemble the yoke to the bonnet.

5.1.23 Install the downstop bolt if supplied.



5.1.24 Install the indicator rod.

5.1.25 Reset limit switches for electric operators. See operator section for instructions.

5.1.26 Replace the stem protector and stem protector cap.

5.1.27 Check all bolting to insure they are fastened securely.

5.1.28 Test cycle the valve to insure proper operation. Pressurize valve and check for leaks.

5.2 Stem Replacement for valves with integral T-bar, with or without slip-on stem packing retainer bushing, and without cupola

CAUTION: DO NOT, under any circumstances, attempt stem maintenance on valves WITHOUT cupola while exposed to line pressure.



NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field inventory, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and o-rings whenever the valve is disassembled. Always include the valve serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

5.2.1 Isolate pressure source from pipeline and valve.

5.2.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.

5.2.3 Open the valve body pressure relief valve to vent trapped body/line pressure.

5.2.4 When venting is complete, cycle valve to the full open position.

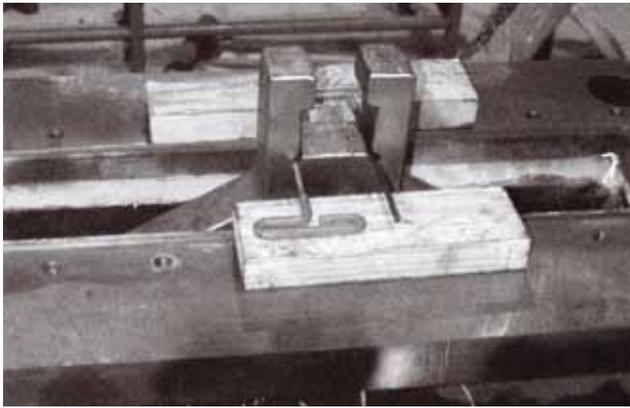
5.2.5 Remove the stem protector cap, stem protector, indicator rod, and downstop bolt if supplied.



5.2.6 Remove bonnet nuts. Studs may also be removed, if desired, to allow more work clearance.



5.2.7 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, and gate high enough to clear the T-bar slot in the gate neck. Insert customer supplied drift pins in the holes provided in the bottom of the gate neck T-bar slot.



5.2.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the top works assembly. Remove the bonnet o-ring.

5.2.9 Screw the stem out of the operator stem nut and remove from the topworks assembly.

5.2.10 Loosen and remove the nuts that hold the bonnet to the yoke. Remove the bonnet.

5.2.11 Remove the stem packing from the bonnet. Clean and inspect the stem packing. Replace if required. Note: M&J Valve recommends replacing the stem packing whenever it is removed from the stem packing chamber. Clean the stem packing chamber thoroughly.

To Replace Stem:

5.2.12 Install stem packing into bonnet.



5.2.13 Clean the stem packing area in the lower yoke flange. If the valve has a stem bushing, install it now and seat it in the counterbore located in the lower yoke flange. Reassemble the yoke to the bonnet. **DO NOT TIGHTEN BOLTS AT THIS TIME.**

5.2.14 Carefully insert the threaded end of the new integral stem/T-bar assembly through the bottom of the bonnet. Slide the stem through the stem packing. Be careful not to damage the stem seal area of the stem or the stem packing when installing the stem. Thread the stem into the operator. Leave enough clearance between the bonnet and T-bar to allow the T-bar to slide into the gate neck. Insure that stem and bonnet are centered and not binding.

5.2.15 Tighten bonnet to yoke bolts.

5.2.16 Clean bonnet o-ring groove. Install new bonnet o-ring.

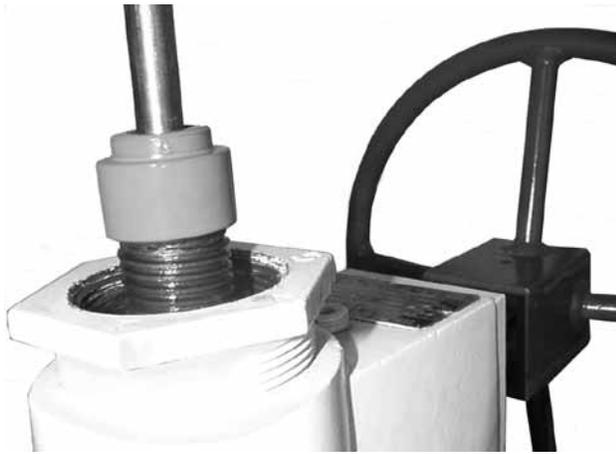


5.2.17 Using proper equipment and lifting procedures, lift the entire top works assembly, including the bonnet, and place over the valve body.

5.2.18 Slide the T-bar into the T-bar slot on the top of the gate. Remove drift pins if used and lower complete topworks assembly and gate into place with bonnet resting on the body bolting flange.

5.2.19 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.2.20 Install the downstop bolt if supplied.



5.2.21 Install the indicator rod.

5.2.22 Reset limit switches for electric operators. See operator section for instructions.

5.2.23 Replace the stem protector and stem protector cap.

5.2.24 Check all bolting to insure they are fastened securely.

5.2.25 Test cycle the valve to insure proper operation. Pressurize valve and check for leaks.

5.3 Stem Replacement for valves with screw on T-bar, with or without slip-on stem packing bushing, and with cupola



CAUTION: DO NOT, under any circumstances, attempt stem maintenance on valves WITH cupola while exposed to line pressure.

NOTE: While it may be possible to perform stem maintenance on M-303 gate valves under pressure, M&J Valve does not recommend this practice. Contact M&J Valve field service personnel if this is a consideration.

NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field inventory, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and o-rings whenever the valve is dis-assembled. Always include the valve serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

5.3.1 Isolate pressure source from pipeline and valve.

5.3.2 Cycle the valve to the mid-travel position. This position will allow venting of both the valve body and pipeline.

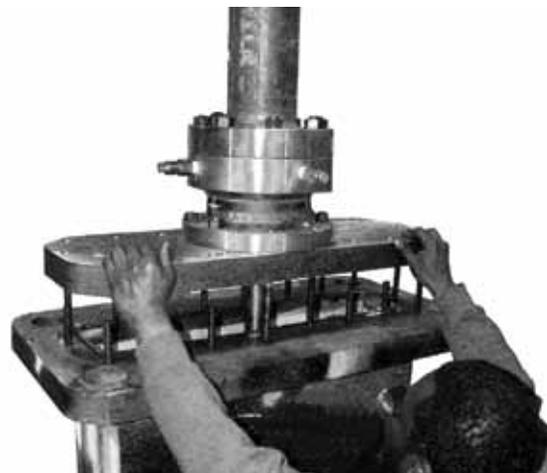
5.3.3 Open the valve body pressure relief valve to vent trapped body/line pressure.

5.3.4 When venting is complete, cycle valve to the full open position.

5.3.5 Remove the stem protector cap, stem protector, indicator rod, and downstop bolt if supplied.

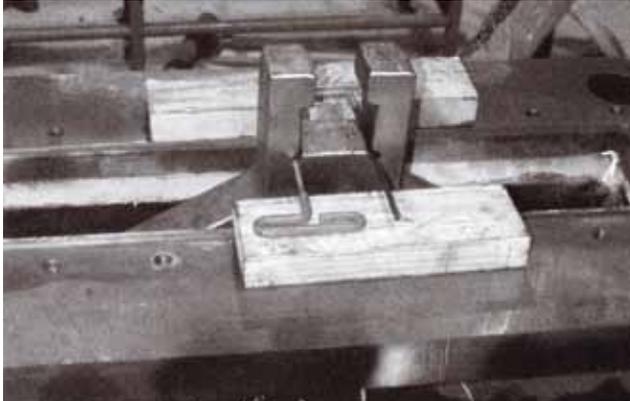


5.3.6 Remove bonnet nuts. Studs may also be removed, if desired, to allow more work clearance.

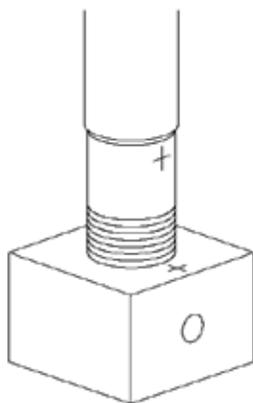


5.3.7 Using proper equipment and lifting procedures, lift the entire top works assembly, cupola, bonnet, and gate high enough to clear the T-bar slot in the gate neck. Insert customer supplied drift pins in the holes provided in the bottom of the gate T-bar slot.

5.3.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the top works assembly. Remove the bonnet o-ring.



5.3.9 Drive out the T-bar retainer pin and unscrew the T-bar from the stem. **NOTE: If it is planned to keep this stem after the new stem is installed, perform the following: match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during reassembly.**



5.3.10 Loosen and remove the nuts that hold the bonnet to the cupola. Remove the bonnet.

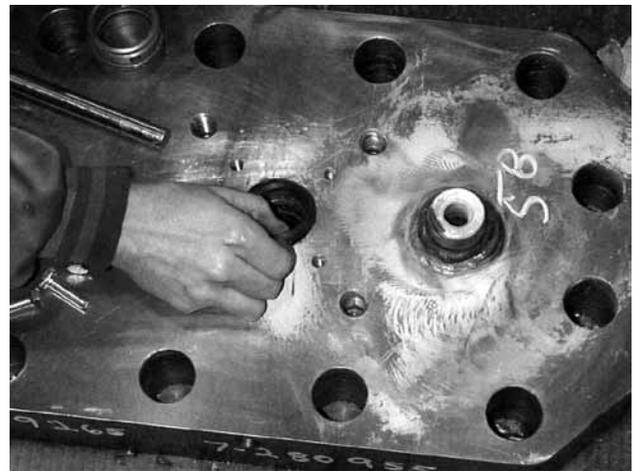
5.3.11 Loosen and remove the nuts that hold the yoke to the cupola. Remove the cupola and cupola o-ring. Remove the stem packing retainer if supplied.

5.3.12 Screw the stem out of the operator stem nut and remove from the topworks assembly.

5.3.13 Remove stem packing from the cupola. Clean and inspect the stem packing. Replace if required. M&J Valve recommends replacing the stem packing whenever it is removed from the stem packing chamber. Clean the stem packing chamber and cupola "O"-ring groove thoroughly.

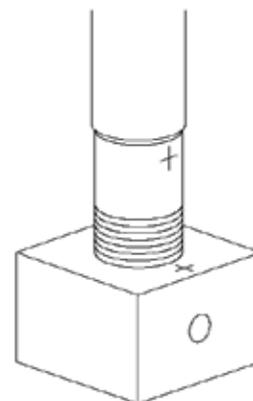
To Replace Stem:

5.3.14 Install stem packing into cupola.



5.3.15 Remove the T-bar from the new stem.

IMPORTANT: Match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during reassembly.



5.3.16 Apply grease to the new stem threads. Carefully insert stem through yoke and into the operator stem nut. Thread stem through nut. DO NOT damage the stem seal area. Leave enough stem extending past the yoke to allow cupola and bonnet installation and sliding of the T-bar into the T-bar slot of the gate.

5.3.17 Clean the stem packing area in the lower yoke flange. If the valve has a stem packing retainer, install it now and seat it in the counterbore located in the lower yoke flange. Reassemble the yoke to the cupola. **NOTE: Be careful not to damage the stem seal area of the stem when sliding the cupola over the stem.**

5.3.18 Tighten yoke to cupola bolts.

5.3.19 Install new cupola o-ring into groove in cupola. **NOTE: Grease may be used to temporarily hold o-ring in position.**

5.3.20 Reassemble bonnet to cupola.

5.3.21 Install bonnet to cupola bolts and tighten to the recommended torque.

5.3.22 Reinstall new T-bar onto new stem. Be sure to align match marks to insure proper installation. Replace the stem retainer pin and stake T-bar to lock in place.

5.3.23 Clean bonnet o-ring groove. Install new bonnet o-ring.



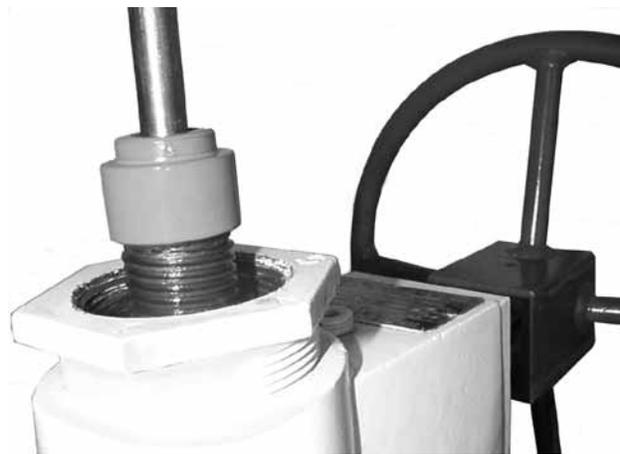
5.3.24 Using proper equipment and lifting procedures, lift the entire top works assembly, including the cupola and bonnet, and place over the valve body.

5.3.25 Slide the T-bar into the T-bar slot on the top of the gate. Remove drift pins, if used, and lower complete topworks assembly and gate into place with bonnet resting on the body bolting flange.

5.3.26 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.3.27 Install the downstop bolt if supplied.

5.3.28 Install the indicator rod.



5.3.29 Reset limit switches for electric operators. See operator section for instructions.

5.3.30 Replace the stem protector and stem protector cap.

5.3.31 Check all bolting to insure they are fastened securely.

5.3.32 Test cycle the valve to insure proper operation. Pressurize valve and check for leaks.

5.4 Stem Replacement for valves with integral T-bar, with or without slip-on stem packing bushing, and with cupola

CAUTION: DO NOT, under any circumstances, attempt stem maintenance on valves WITH cupola while exposed to line pressure.



NOTE: While it may be possible to perform stem maintenance on M-303 gate valves under pressure, M&J Valve does not recommend this practice. Contact M&J Valve field service personnel if this is a consideration.

NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field stock, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and o-rings whenever the valve is dis-assembled. Always include the valve serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

- 5.4.1 Isolate pressure source from pipeline and valve.
- 5.4.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.
- 5.4.3 Open the valve body pressure relief valve to vent trapped body/line pressure.
- 5.4.4 When venting is complete, cycle valve to the full open position.
- 5.4.5 Remove the stem protector cap, stem protector, indicator rod, and downstop bolt if supplied.
- 5.4.6 Remove bonnet nuts. Studs may also be removed, if desired, to allow additional work clearance.



5.4.7 Using proper equipment and lifting procedures, lift the entire top works assembly, cupola, bonnet, and gate high enough to clear the T-bar slot in the gate neck. Insert customer supplied drift pins in the holes provided in the bottom of the gate T-bar slot.

5.4.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the top works assembly. Remove the bonnet o-ring.

5.4.9 Screw the stem out of the operator stem nut and remove from the topworks assembly.

5.4.10 Loosen and remove the nuts that hold the bonnet to the cupola. Remove the bonnet.

5.4.11 Loosen and remove the nuts that hold the yoke to the cupola. Remove the cupola and cupola o-ring. Remove the stem packing retainer if supplied.

5.4.12 Remove stem packing from the cupola. Clean and inspect the stem packing. Replace if required. M&J Valve recommends replacing the stem packing whenever it is removed from the stem packing gland. Clean the stem packing gland and cupola o-ring groove.

To Replace Stem:

- 5.4.13 Install stem packing into cupola.



5.4.14 Clean the stem packing area in the lower yoke flange. If the valve has a stem retainer, install it now and seat it in the counterbore located in the lower yoke flange. Reassemble the yoke to the cupola. **NOTE: Be careful not to damage the stem seal area of the stem when sliding the cupola over the stem.**

5.4.15 Install yoke to cupola bolts but do not tighten at this time.

5.4.16 Install new cupola o-ring into groove in cupola. **NOTE: Grease may be used to temporarily hold o-ring in position.**

5.4.17 Reassemble bonnet to cupola. Tighten the bonnet to cupola bolts to the recommended torque.

5.4.18 Apply grease to the new stem threads. Carefully insert stem through bonnet, cupola, and yoke into the operator stem nut. Thread stem through nut. **DO NOT** damage the stem seal area. Leave enough stem extending past the bonnet to allow sliding the T-bar into the T-bar slot of the gate.

5.4.19 Clean bonnet o-ring groove. Install new bonnet o-ring.



5.4.20 Using proper equipment and lifting procedures, lift the entire top works assembly, including the cupola and bonnet, and place over the valve body.

5.4.21 Slide the T-bar into the T-bar slot on the top of the gate. Remove drift pins if used and lower complete topworks assembly and gate into place with bonnet resting on the body bolting flange.

5.4.22 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.4.23 Install the downstop bolt if supplied.

5.4.24 Install the indicator rod.

5.4.25 Reset limit switches for electric operator. See operator section for instructions.



5.4.26 Replace the stem protector and stem protector cap.

5.4.27 Check all bolting to insure they are fastened securely.

5.4.28 Test cycle the valve to insure proper operation. Pressurize valve and check for leaks.

5.5 Stem Replacement for valves with screw on T-bar, with bolted stem packing retainer, and without cupola

CAUTION: DO NOT under any circumstances, attempt stem maintenance on valves **WITHOUT** cupola while exposed to line pressure.



NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field stock, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and O-rings whenever the valve is disassembled. Always include the serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

5.5.1 Isolate pressure source from the pipeline and valve.

5.5.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.

5.5.3 Open body pressure relief valve to vent trapped body/line pressure.

5.5.4 When venting is complete, cycle the valve to the full open position.

5.5.5 Remove the stem protector cap, stem protector, and indicator rod.



5.5.6 Remove bonnet nuts. Studs may also be removed if desired to allow additional work clearance.



5.5.7 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, and gate high enough to clear the T-bar slot in the gate. Insert customer supplied drift pins in the holes provided in the bottom of the gate T-bar slot.



5.5.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the bonnet O-ring.

5.5.9 Place removed top works assembly upright on blocks letting stem protrude from bottom of bonnet. Insure blocks are stable to avoid accidents.

5.5.10 Remove the screws/bolts holding the operator to the yoke. Remove the operator from the valve stem.

5.5.11 Remove nuts from yoke bolts. Remove yoke. Be careful not to damage the seal area of the stem. Studs may also be removed to allow more work clearance. Support stem as required.

5.5.12 Loosen set screw located in the downstop collar and remove the collar from the stem.

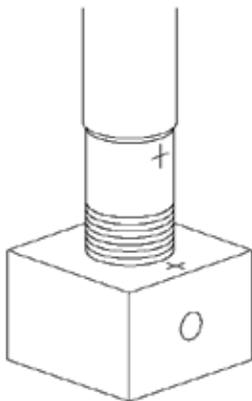
5.5.13 Remove the capscrews holding the bolted stem packing retainer to the bonnet.

5.5.14 Remove the bolted stem packing retainer.

5.5.15 Drive out the T-bar retainer pin and unscrew the T-bar from the stem.

NOTE: If it is planned to keep this stem after the new stem is installed, perform the following:

Match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during reassembly.



5.5.16 Remove stem from bonnet.

5.5.17 Remove stem packing from the bonnet. Clean and inspect the stem packing gland thoroughly. Clean and inspect the stem packing. Replace if required.

NOTE: M&J Valve recommends stem packing be replaced whenever it is removed from the stem packing gland.

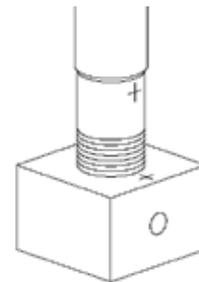
5.5.18 Install the stem packing into the bonnet.



To Replace Stem:

5.5.19 Remove the T-bar from the new stem.

IMPORTANT: Match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during assembly.



5.5.20 Clean, inspect, and install the bolted stem packing retainer. The upper adapter ring of the stem packing should seat in the counterbore located in the bottom of the bolted stem packing retainer. Fasten to the bonnet using capscrews. Do not tighten.



5.5.21 Approaching from the top of the bonnet, insert the new stem through the stem packing. Be careful not to damage the stem packing. Let the stem protrude from the bottom of the bonnet approximately the same amount as the old stem. Tighten the capscrews holding the bolted stem packing retainer to bonnet.

5.5.22 Install downstop collar. Thread on to stem until it contacts the thread relief shoulder on the stem. Tighten the set screw.

5.5.23 Install yoke bolting if removed and install yoke. Be careful not to damage seal area on stem. Tighten bonnet to yoke bolts.

5.5.24 Install operator on stem and fasten to yoke using screws/bolts.

5.5.25 Reinstall new T-bar onto new stem. Be careful to align match marks to insure proper installation. Replace the stem retainer pin and stake the T-bar to lock in place.

5.5.26 Clean the bonnet O-ring groove. Install the bonnet O-ring. Replace bolting if removed.

5.5.27 Using proper equipment and lifting procedures, lift the entire top works assembly, including the bonnet, and place over the valve body.



5.5.28 Slide the T-bar into the T-bar slot on the top of the gate. Remove the drift pins if used and lower the complete topworks assembly and gate into the place with the bonnet resting on the body bolting flange.

5.5.29 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.5.30 Reset limit switches for electric operators. See operator section for instructions.

5.5.31 Install the indicator rod.

5.5.32 Replace the stem protector, and stem protector cap.

5.5.33 Check all bolting to insure they are secure.

5.5.34 Test cycle the valve to insure proper operation. Close pressure relief valves if open. Pressurize valve and check for leaks.

5.6 Stem Replacement for valves with integral T-bar, with bolted stem packing retainer, and without cupola.

CAUTION: DO NOT, Under any circumstances, attempt stem maintenance on valves WITHOUT cupola while exposed to line pressure.



NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field stock, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and O-rings whenever the valve is disassembled. Always include the serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

5.6.1 Isolate pressure source from the pipeline and valve.

5.6.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.

5.6.3 Open body pressure relief valve to vent trapped body/line pressure.

5.6.4 When venting is complete, cycle the valve to the full open position.

5.6.5 Remove the stem protector cap, stem protector, and indicator rod.



5.6.6 Remove bonnet nuts. Studs may also be removed if desired to allow additional work clearance.



5.6.7 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, and gate high enough to clear the T-bar slot in the gate. Insert customer supplied drift pins in the holes provided in the bottom of the gate T-bar slot.



5.6.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the bonnet O-ring.

5.6.9 Place removed top works assembly upright on blocks letting stem protrude from bottom of bonnet. Insure blocks are stable to avoid accidents.

5.6.10 Remove the screws/bolts holding the operator to the yoke. Remove the operator from the valve stem.

5.6.11 Remove nuts from yoke bolts. Remove yoke. Be careful not to damage the seal area of the stem. Studs may also be removed to allow more work clearance. Support stem as required.

5.6.12 Loosen set screw located in the downstop collar and remove the collar from the stem.

5.6.13 Remove the capscrews holding the bolted stem packing retainer to the bonnet.

5.6.14 Remove the bolted stem packing retainer.

5.6.15 Remove stem from bonnet.

5.6.16 Remove stem packing from the bonnet. Clean and inspect the stem packing chamber thoroughly. Clean and inspect the stem packing. Replace if required. **NOTE: M&J Valve recommends stem packing be replaced whenever it is removed from the stem packing chamber.**

5.6.17 Install the stem packing into the bonnet.

To Replace Stem:



5.6.18 Clean, inspect, and install the bolted stem packing retainer. The upper adapter ring of the stem packing should seat in the counterbore located in the bottom of the bolted stem packing retainer. Fasten to the bonnet using capscrews. **DO NOT** tighten capscrews at this time.



5.6.19 Approaching from the bottom of the bonnet, insert the new stem through the stem packing. Be careful not to damage the stem packing. Let the stem protrude from the bottom of the bonnet approximately the same amount as the old stem. Tighten the capscrews holding the bolted stem packing retainer to bonnet.

5.6.20 Install downstop collar. Thread on to stem until it contacts the thread relief shoulder on the stem. Tighten the set screw.

5.6.21 Install yoke bolting if removed and install yoke. Be careful not to damage seal area on stem. Tighten bonnet to yoke bolts.

5.6.22 Install operator on stem and fasten to yoke using screws/bolts.

5.6.23 Clean the bonnet O-ring groove. Install the bonnet O-ring. Replace bolting if removed.

5.6.24 Using proper equipment and lifting procedures, lift the entire top works assembly, including the bonnet, and place over the valve body.

5.6.25 Slide the T-bar into the T-bar slot on the top of the gate. Remove the drift pins if used and lower the complete topworks assembly and gate into the place with the bonnet resting on the body bolting flange.

5.6.26 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.6.27 Reset limit switches for electric operators. See operator section for instructions.

5.6.28 Install the indicator rod.

5.6.29 Replace the stem protector, and stem protector cap.

5.6.30 Check all bolting to insure they are secure.

5.6.31 Test cycle the valve to insure proper operation. Close pressure relief valves if open. Pressurize valve and check for leaks.

5.7 Stem Replacement for valves with screw on T-bar, with bolted stem packing retainer, and with cupola.

CAUTION: DO NOT, Under any circumstances, attempt stem maintenance on valves WITH cupola while exposed to line pressure.



NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field stock, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and O-rings whenever the valve is disassembled. Always include the serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

- 5.7.1 Isolate pressure source from the pipeline and valve.
- 5.7.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.
- 5.7.3 Open body pressure relief valve to vent trapped body/line pressure.
- 5.7.4 When venting is complete, cycle the valve to the full open position.
- 5.7.5 Remove the stem protector cap, stem protector, and indicator rod.



5.7.6 Remove bonnet nuts. Studs may also be removed if desired to allow more work clearance. **NOTE: Some bolts holding the bonnet may go through the lower cupola flange. Insure that these nuts are also removed.**



5.7.7 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, cupola, and gate high enough to clear the T-bar slot in the gate. Insert customer supplied drift pins in the holes provided in the bottom of the gate T-bar slot.

5.7.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the bonnet O-ring.

5.7.9 Place removed top works assembly upright on blocks letting stem protrude from bottom of bonnet. Insure blocks are stable to avoid accidents.

5.7.10 Remove the screws/bolts holding the operator to the yoke. Remove the operator from the valve stem.

5.7.11 Remove nuts from yoke bolts. Remove yoke. Be careful not to damage the seal area of the stem. Studs may also be removed to allow additional work clearance. Support stem as required.

5.7.12 Loosen set screw located in the downstop coupling. While holding the upper threaded portion of the stem, screw the coupling onto the upper stem until the upper and lower stem can be separated. Remove the upper stem.

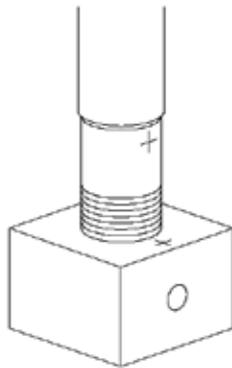
5.7.13 Remove the capscrews holding the bolted stem packing retainer to the bonnet.

5.7.14 Remove the bolted stem packing retainer.

5.7.15 Drive out the T-bar retainer pin and unscrew the T-bar from the stem. **NOTE: If it is planned to keep this stem after the new stem is installed, perform the following:**

Match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during reassembly.

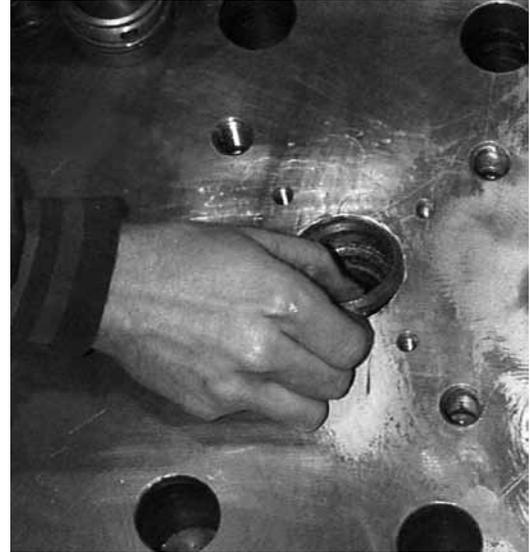
5.7.16 Remove stem from bonnet and cupola.



5.7.17 While the valve is disassembled, it is recommended that the cupola O-ring be replaced. To replace the cupola O-ring, remove the remaining nuts holding the cupola and bonnet together. Lift the cupola off of the bonnet and remove the cupola O-ring. Clean out the O-ring groove and install a new O-ring. Grease can be used to hold the O-ring in place. Re-assemble the bonnet and cupola. Insure that appendages are properly positioned.

5.7.18 Remove stem packing from the cupola. Clean and inspect the stem packing chamber thoroughly. Clean and inspect the stem packing. Replace if required. **NOTE: M&J Valve recommends stem packing be replaced whenever it is removed from the stem packing chamber.**

5.7.19 Install the stem packing into the cupola.



To Replace Stem:

5.7.20 Remove the T-bar from the new stem. If a complete stem assembly is supplied, remove the upper stem using section 5.7.12 for reference.

IMPORTANT: Match mark the top of the T-bar with the stem before removing the T-bar pin. This will facilitate proper alignment during assembly.

5.7.21 Clean, inspect, and install the bolted stem packing retainer. The upper adapter ring of the stem packing should seat in the counterbore located in the bottom of the bolted stem packing retainer. Fasten to the cupola using capscrews. Do not tighten.



5.7.22 Approaching from the top of the cupola, insert the new stem through the stem packing. Be careful not to damage the stem packing. Let the stem protrude from the bottom of the bonnet approximately the same amount as the old stem. Tighten the capscrews holding the bolted stem packing retainer to the cupola.

5.7.23 Install downstop coupling. Insert upper stem with integral key into keyslot provided in the lower stem. Screw the coupling down onto the lower stem until it bottoms out on the thread relief chamfer. Tighten the set screw.

5.7.24 Install yoke bolting if removed and install yoke. Be careful not to damage seal area on stem. Tighten bonnet to yoke bolts.

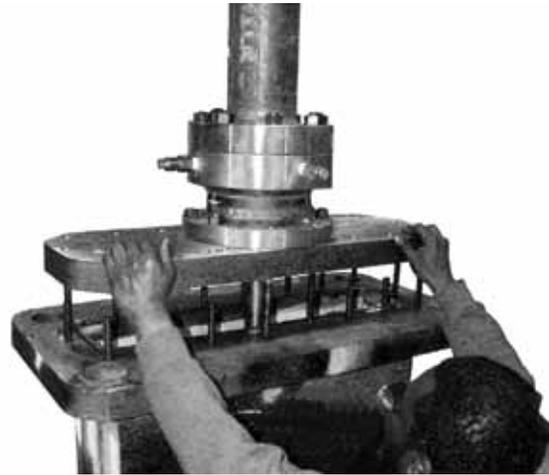
5.7.25 Install operator on stem and fasten to yoke using screws/bolts.

5.7.26 Reinstall new T-bar onto new stem. Be careful to align match marks to insure proper installation. Replace the stem retainer pin and stake the T-bar to lock in place.

5.7.27 Clean the bonnet O-ring groove. Install the bonnet O-ring. Replace bolting if removed.



5.7.28 Using proper equipment and lifting procedures, lift the entire top works assembly, including the bonnet, and place over the valve body.



5.7.29 Slide the T-bar into the T-bar slot on the top of the gate. Remove the drift pins if used and lower the complete top works assembly and gate into the place with the bonnet resting on the body bolting flange.

5.7.30 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.7.31 Reset limit switches for electric operators. See operator section for instructions.

5.7.32 Install the indicator rod.

5.7.33 Replace the stem protector, and stem protector cap.

5.7.34 Check all bolting to insure they are secure.

5.7.35 Test cycle the valve to insure proper operation. Close pressure relief valves if open. Pressurize valve and check for leaks.

5.8 Stem Replacement for valves with integral T-bar, with bolted stem packing retainer, and with cupola

CAUTION: DO NOT, Under any circumstances, attempt stem maintenance on valves WITH cupola while exposed to line pressure.



NOTE: A replacement stem should be available prior to disassembling the valve. If not carried in field inventory, it can be ordered from M&J Valve. M&J Valve also recommends replacing the stem packing and O-rings whenever the valve is disassembled. Always include the serial number in any correspondence with M&J Valve concerning your valve.

To Remove Stem:

5.8.1 Isolate pressure source from the pipeline and valve.

5.8.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.

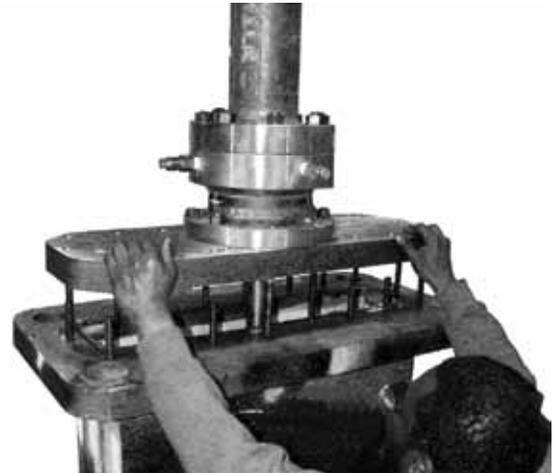
5.8.3 Open valve body pressure relief valve to vent trapped body/line pressure.

5.8.4 When venting is complete, cycle the valve to the full open position.

5.8.5 Remove the stem protector cap, stem protector, and indicator rod.



5.8.6 Remove bonnet nuts. Studs may also be removed if desired to allow more work clearance. **NOTE:** Some bolts holding the bonnet may go through the lower cupola flange. Insure that these nuts are also removed.



5.8.7 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, cupola, and gate high enough to clear the T-bar slot in the gate. Insert customer supplied drift pins in the holes provided in the bottom of the gate T-bar slot.



5.8.8 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the bonnet O-ring.

5.8.9 Place removed top works assembly upright on blocks letting stem protrude from bottom of bonnet. Insure blocks are stable to avoid accidents.

5.8.10 Remove the screws/bolts holding the operator to the yoke. Remove the operator from the valve stem.

5.8.11 Remove nuts from yoke bolts. Remove yoke. Be careful not to damage the seal area of the stem. Studs may also be removed to allow more work clearance. Support stem as required.

5.8.12 Loosen set screw located in the downstop coupling. While holding the upper threaded portion of the stem, screw the coupling onto the upper stem until the upper and lower stem can be separated. Remove the upper stem.

5.8.13 Remove the capscrews holding the bolted stem packing retainer to the bonnet.

5.8.14 Remove the bolted stem packing retainer.

5.8.15 Remove stem from bonnet and cupola.

5.8.16 While the valve is disassembled, it is recommended that the cupola O-ring be replaced. To replace the cupola O-ring, remove the remaining nuts holding the cupola and bonnet together. Lift the cupola off of the bonnet and remove the cupola O-ring. Clean out the O-ring groove and install a new O-ring. Grease can be used to hold the O-ring in place. Re-assemble the bonnet and cupola. Insure that appendages are properly positioned.

5.8.17 Remove stem packing from the cupola. Clean and inspect the stem packing chamber thoroughly. Clean and inspect the stem packing. Replace if required. **NOTE: M&J Valve recommends stem packing be replaced whenever it is removed from the stem packing chamber.**

5.8.18 Install the stem packing into the cupola.



To Replace Stem:

5.8.19 Clean, inspect, and install the bolted stem packing retainer. The upper adapter ring of the stem packing should seat in the counterbore located in the bottom of the bolted stem packing retainer. Fasten to the cupola using capscrews. Do not tighten.

5.8.20 Approaching from the top of the cupola, insert the new stem through the stem packing. Be careful not to damage the stem packing. Let the stem protrude from the bottom of the bonnet approximately the same amount as the old stem. Tighten the capscrews holding the bolted packing retainer to the cupola.

5.8.21 Install downstop coupling. Insert upper stem with integral key into keyslot provided in the lower stem. Screw the coupling down onto the lower stem until it bottoms out on the thread relief chamfer. Tighten the set screw.

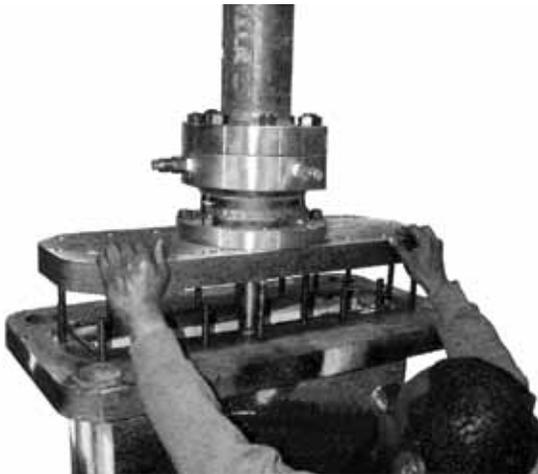
5.8.22 Install yoke bolting if removed and install yoke. Be careful not to damage seal area on stem. Tighten bonnet to yoke bolts.

5.8.23 Install operator on stem and fasten to yoke using screws/bolts.

5.8.24 Clean the bonnet O-ring groove. Install the bonnet O-ring. Replace bolting if removed.



5.8.25 Using proper equipment and lifting procedures, lift the entire top works assembly, including the bonnet, and place over the valve body.



5.8.26 Slide the T-bar into the T-bar slot on the top of the gate. Remove the drift pins if used and lower the complete top works assembly and gate into the place with the bonnet resting on the body bolting flange.

5.8.27 Bolt the bonnet to the bolting flange and tighten to the recommended torque.

5.8.28 Reset limit switches for electric operators. See operator section for instructions.

5.8.29 Install the indicator rod.

5.8.30 Replace the stem protector, and stem protector cap.

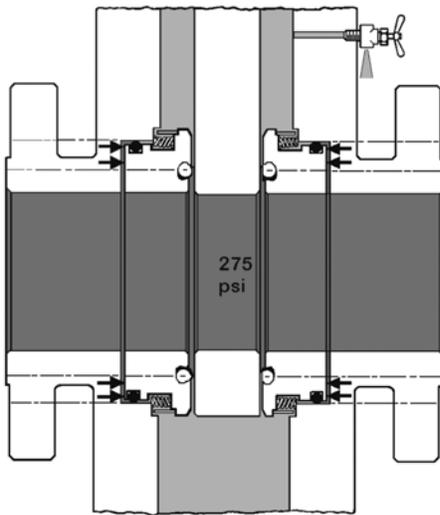
5.8.31 Check all bolting to insure they are secure.

5.8.32 Test cycle the valve to insure proper operation. Close pressure relief valves if open. Pressurize valve and check for leaks.

6. Sealing Characteristics and Seat Ring Replacement

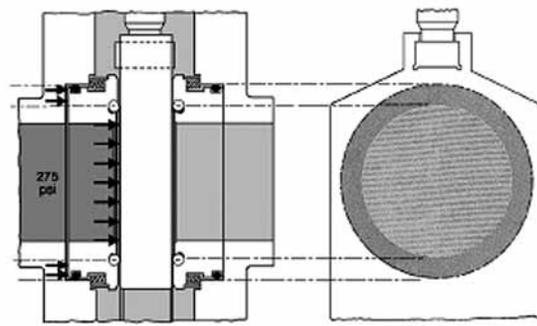
The M&J M303 thru conduit slab type gate valve uses patented steel seat rings to obtain tight shut off in either high or low differential pressure conditions. Effective low pressure and differential sealing is the result of closely spaced pre-compressed springs and a combination of plastic and elastomer face seals. The floating slab gate used in the M-303 allows the seats and gate to float parallel to the valve bore. Line pressure energizes the gate and seat rings and causes them to move together in unison. Like pistons, their load bearing surfaces quickly transmit the full dynamic force of line pressure to sealing surfaces on both sides of the gate.

NOTE: The RQ-8 by design is a low profile non thru- conduit gate valve. It uses many of the same parts as the M-303 including seat rings. While it has many of the features of the M-303, it does not seal in the open position.



RQ-8 shown in the Open Position

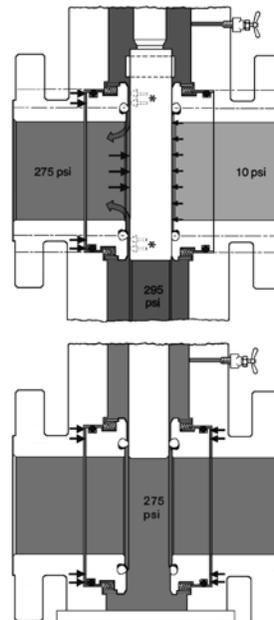
For low pressure differential, the seat rings are mechanically energized by the springs. The gate thickness, being wider than the gap between the two seat rings, pushes the seats back into their pockets when it is installed. This causes the pre-compressed springs to engage the recessed spring ledge machined into the body. The uniform mechanical force exerted evenly by the springs around the entire seat sealing surface is sufficient for low pressure differential sealing.



SIDE AND PORT VIEW SHOWING SEPARATE AREAS AFFECTED BY LINE PRESSURE ON SEAT RING & GATE UNDER - FULL DIFFERENTIAL

M-303 Automatic Relief of thermal body pressure upstream

With the gate in the closed position and the body bleed valve closed, fluid retained in the valve body at upstream pressure may expand as external temperature increases. When thermal expansion creates a pressure increase slightly greater than existing upstream line pressure, the upstream seat ring momentarily moves back into its machined seat pocket. This movement allows excess body cavity pressure to relieve into the high pressure or upstream side of the line. When thermal body pressure has decreased, the upstream seat immediately returns to its sealing position against the upstream face of the gate. It should be understood that the downstream seat ring cannot move because line pressure applied to the gate has forced it into its maximum travel position against the body seat pocket. This action assures relief to the upstream side.



6.1 Seat Ring Replacement: M-303 and RQ-8

CAUTION: DO NOT, under any circumstances, attempt seat and/or gate maintenance while valve is exposed to line pressure.



NOTE: Replacement seat rings should be available prior to disassembling the valve. If seats are not carried in field inventory, they can be ordered from M&J Valve. Always include the valve serial number in any correspondence with M&J Valve concerning your valve.

To Remove Seat Ring:

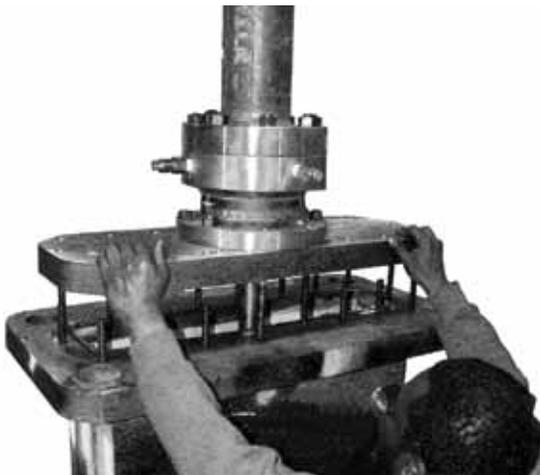
6.1.1 Isolate pressure source from pipeline and valve.

6.1.2 Cycle the valve to the mid travel position. This position will allow venting of both the valve body and pipeline.

6.1.3 Open the valve body pressure relief valve to vent trapped body/line pressure.

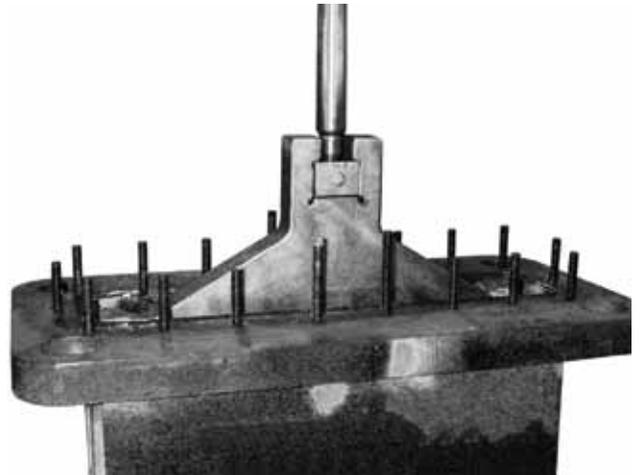
6.1.4 Remove bonnet nuts. Studs may also be removed, if desired, to allow more work clearance.

6.1.5 Using proper equipment and lifting procedures, lift the entire top works assembly, bonnet, and gate high enough to clear the T-bar slot in the gate neck. Insert customer supplied drift pins in the holes provided in the bottom of



the gate T-bar slot.

6.1.6 Slide the stem T-bar out of the T-bar slot in the gate neck. This will disengage the top works assembly from the gate allowing its removal. Remove the top works assembly and set aside. Be careful not to damage it during handling.



6.1.7 Using proper lifting procedures and equipment, remove the gate from the valve body.



CAUTION: Be careful not to damage sealing surfaces on the gate.



6.1.8 Remove the bonnet gasket from the groove in the valve body bonnet flange. **NOTE: M&J Valve recommends that all seals be replaced when disturbed.**

6.1.9 Using a M&J Valve pry bar (M&J Valve part no. 154406) or a small hand tool, carefully dislodge each seat ring from its recessed pocket located inside the valve body. Use the toe of the pry bar to catch the pry out groove or lip in the seat ring. Alternate prying positions from one side of the seat ring to the other, working the seat ring out.

NOTE: On large valves, attach the lifting rod as soon as the tapped hole provided in the seat ring is revealed. Support the lifting rod to prevent the seat ring from falling into the valve body.

Lifting rod for seat ring maintenance:

2-12" M&J Valve part no. 261610

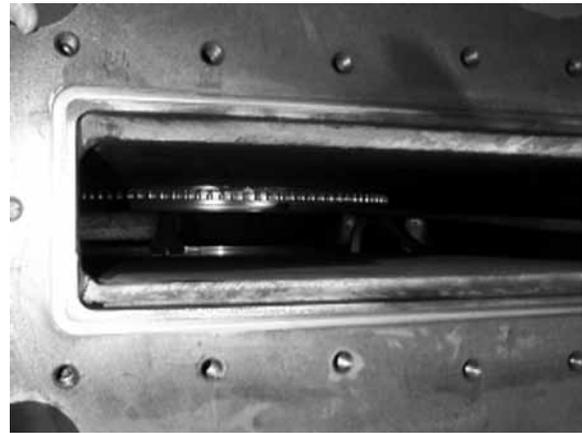
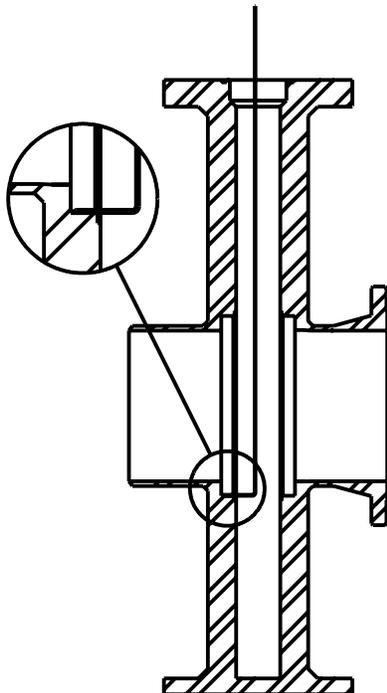
14-20" M&J Valve part no. 060389

22-30" M&J Valve part no. 060391

32-42" M&J Valve part no. 060390

NOTE: These items can be obtained from M&J Valve or manufactured locally out of rod or barstock.

6.1.10 Lift the seat rings out of the valve body.

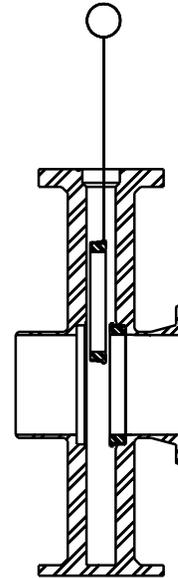


6.1.11 Clean and inspect the seat pockets in the valve body. A cleaning tool can be made from a piece of rod or barstock. File a tapered edge on one end of the rod. Bend the tapered end to 90° and use it to clean the seat pockets of sludge or debris.

To Install Seat Ring:

6.1.12 Before installing seats, apply a liberal coating of grease to the tail o-rings of the replacement seat.

6.1.13 Using a lifting rod, position one seat ring in front of a seat pocket.



6.1.14 Press the seat ring into the seat pocket using alternate wedging action on opposite sides of the seat ring face.

CAUTION: Be careful not to damage the seat face when installing seat rings.



To press the seat ring into the pocket the following procedure can be used:

4" thru 12"

Use a 1 x 4 split in half about 4 Ft. long. Place the seat ring at pocket level. Slide the 1 x 2 pieces down each side of the seat ring. Use a pipe wrench to twist the 1 x 2's, forcing the seats into the seat pocket. Repeat for remaining seat ring.

14" thru 30"

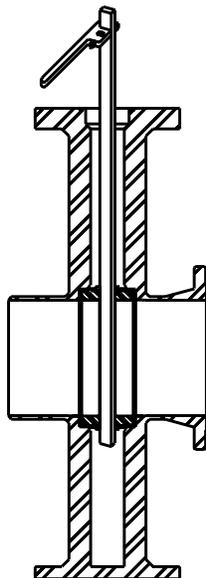
Use two 2 x 4's approximately 6 to 8 Ft. long. Place the seat ring at pocket level. Slide the 2 x 4's down each side of the seat ring. Use a pipe wrench to twist the 2 x 4's forcing the seat into the seat pocket. Repeat for the remaining seat ring.

32" thru 54"

Place the seat ring at pocket level. For the first seat ring, use two 1 x 4's 10 to 14 Ft. long. Slide the 1 x 4's into the valve body in front of each seat ring. Next, slide two 2 x 4's behind the 1 x 4's. Use a pipe wrench to twist the 2 x 4's forcing the seat into the seat pocket. For the second seat ring, place the seat ring at pocket level. Use four 1 x 4's, two on each side of the seat ring face. Slide two 2 x 4's, one on each side, between the two 1 x 4's. Drive the 2 x 4 down, forcing the second seat into the seat pocket.

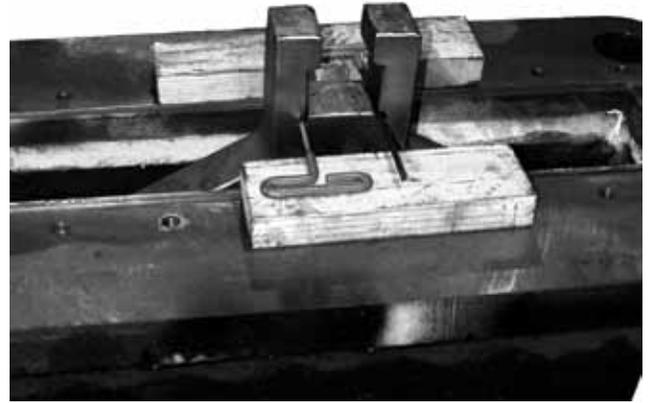
54" thru 60"

Use the same procedure as the 32" thru 56" except use more 1 x 4's



Replace gate and topworks

6.1.15 Install the gate into the valve body. A rocking action may be used to work the gate between the seat rings as it is lowered into place. Install the drift pins in the holes provided at the bottom of the T-bar slot to insure gate does not slide completely into the body.

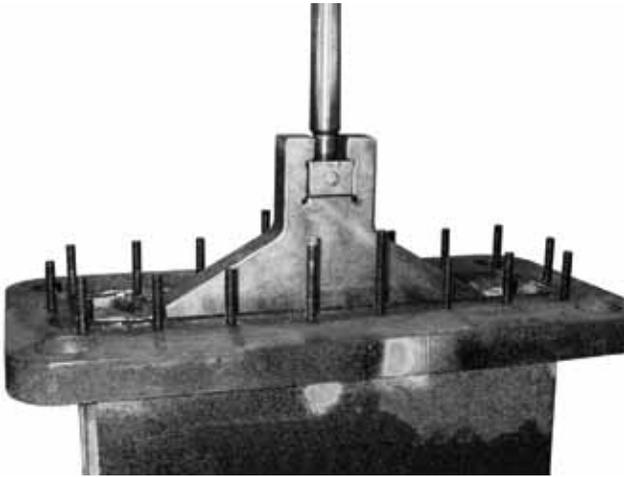


6.1.16 Install bonnet o-ring. Install bonnet studs, if previously removed

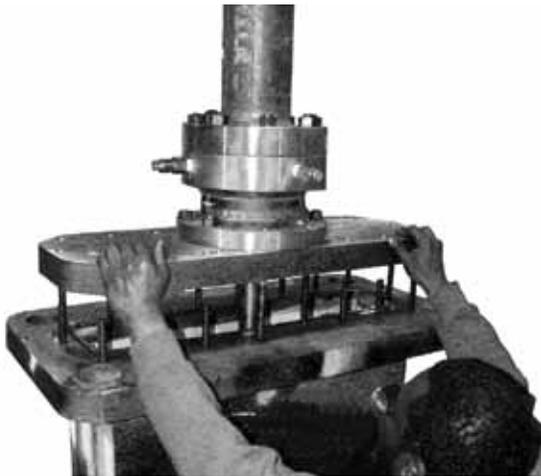
CAUTION: Take care not to damage the gate or seat sealing surfaces during installation.



6.1.17 Using proper equipment and lifting procedures, lift the entire top works assembly including the bonnet and slide the stem T-bar into the T-bar slot of the gate.



6.1.18 Remove the drift pins and lower the complete assembly down onto the valve body.



6.1.19 Install bonnet studs, if previously removed, and bonnet nuts. Tighten nuts to their applicable torque.

Bolt Tightening Specifications for M-303 Valve Topworks	
Bolt Size	Torque (Ft. Lbs.)
5/8"-11	153
3/4"-10	254
7/8"-9	406
1"-8"	606
1-1/8"-8	880
1-1/4"-8	1226
1-3/8"-8	1651
1-1/2"-8	2165
1-5/8"-8	2776
1-3/4"-8	3492
1-7/8"-8	4320
2"-8	5279
2-1/8"-8	6349
2-1/4"-8	756

6.1.20 Insure that the body pressure relief is closed.

6.1.21 Pressurize the valve and check for leaks. For electric operators, check limit switch adjustment.

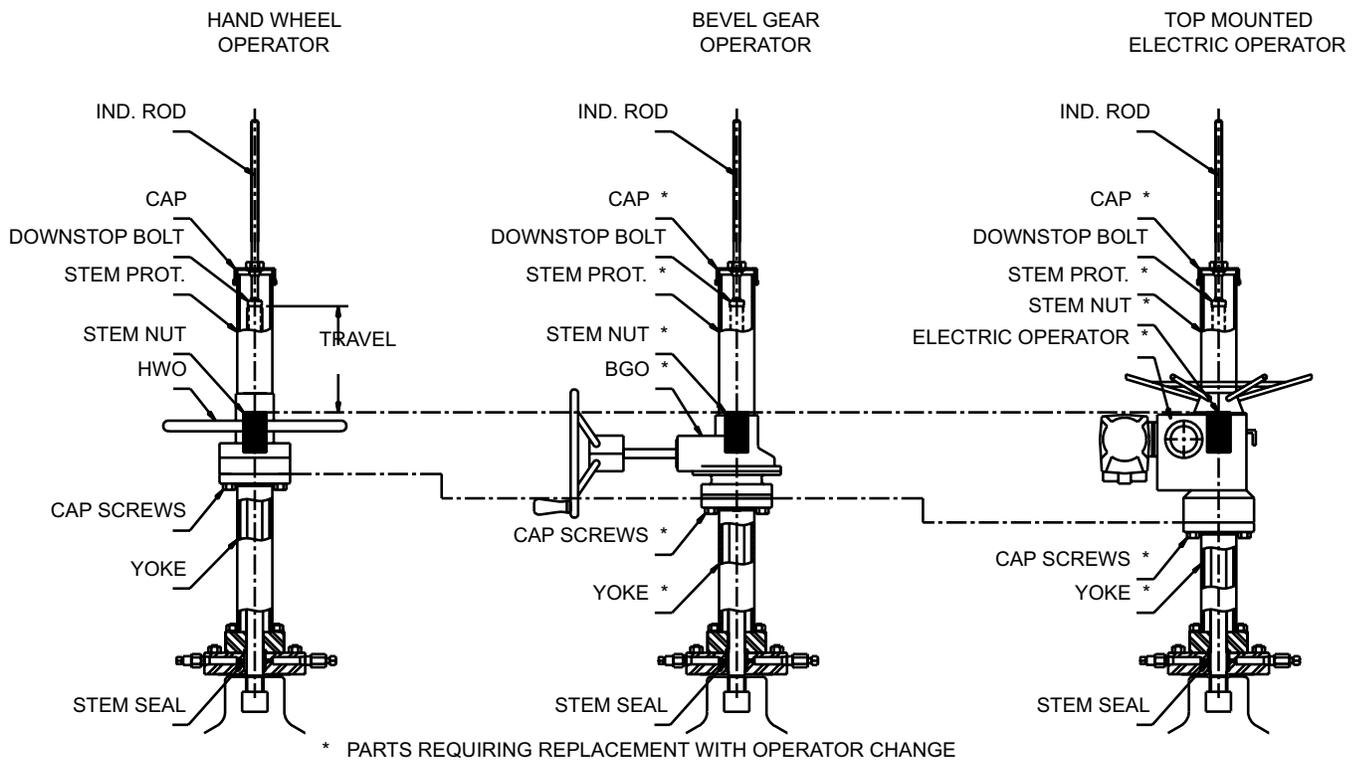
7. Valve Operators (NOTE: See page 42 for M-303A & RQ-8A)

The M-303 and RQ-8 Gate Valves may be operated by many different types of operators. Handwheel, bevel gear, electric, and hydraulic operators can easily be mounted. Normally, valves are shipped from the M&J Valve plant in Houston, Texas, complete with operators mounted and tested. Occasionally, per request, valves and operators may be shipped as separate components. The following instructions will aid in field mounting those actuators.

When mounting or changing operators on M-303 and RQ-8 gate valves, established valve travel must be maintained. Travel is the distance

measured from the bottom of the downstop bolt to the top of the operator stem nut when the valve is in the full open position (see the valve travel chart, (page 4). Modifying this distance so that the stem travel is either longer or shorter than specified will result in improper gate positioning during the full close cycle. To maintain travel (see the straight horizontal line across the top of the stem nut) and compensate for the varying stem nut heights of different operators, M&J provides a yoke assembly with an adjusted length based on the specific dimensions of the operator being mounted (see the horizontal step down line between the different yoke and operator assemblies)

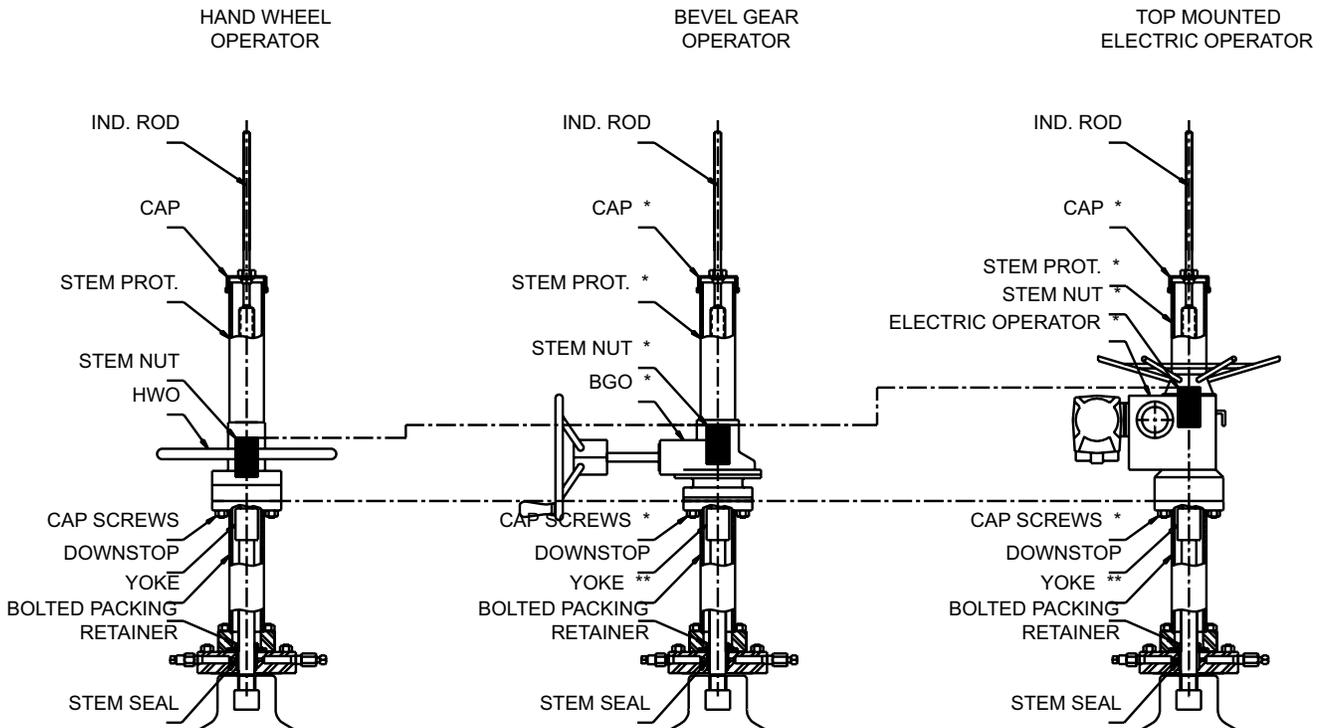
M-303 With or Without Cupola



M-303A and RQ-8A gate valves are no longer dependent on operator stem nut height. (See the horizontal step down line across the top of the operator stem nuts). Valve travel is now controlled below the operator stem nut inside of the yoke assembly. The downstop/coupling seats on the bolted packing retainer in the full closed position. This arrangement allows the yoke assembly to be one common length for a specified valve size and

series (see the straight horizontal line across the top of the upper yoke flange). This simplifies operator mounting. Operators with the same mounting flange requirements can be directly installed on the same yoke assembly. Operators that do not match the existing yoke mounting flange may still use the same yoke assembly provided that an adapter flange can be used.

M-303A With or Without Cupola



* PARTS REQUIRING REPLACEMENT WITH OPERATOR CHANGE
 ** IN MOST CASES, YOKE WILL NOT CHANGE IF SAME MOUNTING FLANGE CAN BE USED OR IF AN ADAPTER FLANGE IS USED

Field Mounting of Operators

Valves shipped less operator will arrive on site with the upper threaded portion of the stem wrapped or protected in some way. Remove this material to expose the stem and mounting flange area. Apply a light coating of grease to the stem threads.

7.1 Handwheel and Bevel Gear Operators

7.1.1 Using the proper equipment and lifting procedures, place the handwheel or bevel

gear operator (BGO) onto the gate valve stem. Carefully thread the operator assembly down the stem until it contacts the mounting flange on the valve yoke.

7.1.2 For bevel gears, attach the handwheel. Use the handwheel to reposition the BGO if it is required.

Rotate the handwheel until the new BGO orientation is obtained.

7.1.3 Line up the operator mounting bolt holes with the upper yoke flange holes and install the mounting bolts or screws. **DO NOT TIGHTEN.**

7.1.4 Turn the handwheel counterclockwise to raise the stem a few inches above the top of the operator.

7.1.5 If the valve is equipped with a downstop bolt, thread it into the top of the stem. Make sure that the downstop bolt is tight.

7.1.6 Install the indicator rod using either a roll pin or cotter pin as supplied.

7.1.7 Turn handwheel approximately twenty revolutions to check torque consistency. If hard spots are found, shift the operator base until the hard spots are eliminated (NOTE: Operator mounting screws/bolts may need to be loosened). Tighten the mounting screws/bolts and recheck the consistency of operation.

7.1.8 Slide stem protector over protruding stem and screw into the operator. NOTE: M&J Valve recommends a pipe thread sealer be used on the stem protector threads. Tighten stem protector.

7.1.9 Slide stem protector cap over indicator rod and screw onto stem protector and tighten. Insure that indicator rod sealing device or old style grommet are in place in the stem protector cap.

7.2 Top Mounted Electric Operators

NOTE: Consult the appropriate electric operator manuals for specific instructions on operator assembly, installation and wiring, and switch adjustment.

IMPORTANT: Operator stem nuts may be counterbored to M&J Valve dimensions (dependent on the length of stem nuts) to prevent damage to the stem thread during cycle to the full open position.

7.2.1 Using the proper equipment and lifting procedures, place the electric operator onto the gate valve stem.

7.2.2 Orientate the operator in the desired position. Turn the auxiliary handwheel counterclockwise threading the operator down the valve stem until it contacts the mounting flange on the valve yoke.

7.2.3 When the motor is properly oriented and the mounting base is seated against the upper yoke flange, line up the operator mounting bolt holes with the upper yoke flange holes and install the mounting bolts or screws. **DO NOT TIGHTEN.**

7.2.4 Turn the auxiliary handwheel counterclockwise to raise the stem a few inches above the top of the operator.

7.2.5 If the valve is equipped with a downstop bolt, thread it into the top of the stem. Make sure that the downstop bolt is tight.

7.2.6 Install the indicator rod using either a roll pin or cotter pin as supplied.

7.2.7 Turn the auxiliary handwheel approximately twenty revolutions to check torque consistency. If hard spots are found, shift the operator base until the hard spots are eliminated. (**NOTE: Operator mounting screws/bolts may need to be loosened.**) Tighten the mounting screws/bolts and recheck the consistency of operation.

7.2.8 Using the auxiliary handwheel, move the valve to the mid travel position.

7.2.9 Connect power supply to operator. Follow the electric operator vendor's instructions for connecting power. **NOTE: Insure that all codes and procedures are maintained.**

7.2.10 Check the operator control buttons for correct motor rotation. Valve stem should move up when the "OPEN" button is pressed and down when the "CLOSED" button is pressed. If the valve begins to move in the wrong direction, stop the operator, turn off the power at the source, and reverse the power leads to the motor.

7.3 Limit Switch Adjustment

CAUTION: Damage to the valve or operator may result if the motor is energized in the wrong direction when the valve is in the full open or full closed position.



CAUTION: For valves that use a downstop bolt screwed into the top of the stem, **AVOID** limit switch settings that allow the downstop bolt to “BUMP” into the stem nut. This can cause the motor operator to torque out, damaging the stem nut and/or the stem threads.



CAUTION: For valves that use a downstop collar or coupling, **AVOID** limit switch settings that allow them to “BUMP” into the stem packing retainer. This can cause the motor operator to torque out, damaging the downstop collar or coupling and/or the stem threads.



NOTE: The M-303 and RQ-8 Gate Valves are position seated valves. For electric operated valves, the open and closed position is controlled by the operator limit switches

Limit Switch Adjustment:

“CLOSED” Position

7.3.1 Use the auxiliary handwheel to cycle the valve to the full close position. **NOTE:** For valves that use a downstop bolt, the downstop will be seated on the top of the stem nut.

7.3.2 With the auxiliary handwheel, manually back the valve off toward the open position approximately 1/8 to 1/4 of an inch. Backing off this amount allows for operator coast. Use the stem movement above the operator to gauge the distance traveled.

7.3.3 Set the closed limit switch per the operator manufacturer’s instructions.

7.3.4 To test the closed limit switch for proper adjustment and gate coast.

7.3.4.1 Cycle the valve to the mid travel position.

7.3.4.2 Push the “CLOSE” button to activate the operator.

7.3.4.3 Observe valve travel watching the stem movement as the limit switch is tripped. The stem should coast into the full closed position with the downstop gently contacting the stem packing retainer.

NOTE: For valves with downstop bolts, the downstop bolt should gently coast to the full closed position coming to rest on the stem nut.

7.3.4.4 To insure that the gate is in the full closed position, try closing the valve using the auxiliary handwheel. If the handwheel turns more than one revolution, allowing additional downward movement of the gate, reset the close position limit switch to activate closer to the end of travel. See the CAUTION note at the beginning of this section.

“OPEN” Position

7.3.5 Use the auxiliary handwheel to cycle the valve to the full open position.

NOTE: The motor operator may be used to partially open large size gate valves.

CAUTION: If the motor operator is used to partially open the valve, do not let the valve travel upward more than 3/4 of the total valve travel before stopping. Use the auxiliary handwheel to bring the valve to the full open position. Failure to follow this caution may result in damage to the valve and/or operator.



In the full open position, the top of the gate will contact the bottom side of the bonnet or bottom side of the upper cupola flange.

7.3.6 With the auxiliary handwheel, manually back the valve down toward the closed position approximately 1/8 to 1/4 of an inch. Backing off this amount allows for operator coast. Use the stem movement above the operator to gauge the distance traveled.

7.3.7 Set the open limit switch per the operator manufacturer's instructions.

7.3.8 To test the open limit switch for proper adjustment and gate coast

7.3.8.1 Cycle the valve to the mid-travel position.

7.3.8.2 Push the "OPEN" button to activate the operator.

7.3.8.3 Observe valve travel watching the stem movement as the limit switch is tripped. The stem should coast into the full open position. Listen for gate contact with the bottom of the bonnet /cupola.

7.3.8.4 To insure that the gate is in the full open position, try opening the valve using the auxiliary handwheel. If the handwheel turns more than one revolution, allowing additional upward movement of the gate, reset the open position limit switch to activate closer to the end of travel. See the CAUTION note at the beginning of this section.

Test Limit Switch Settings

7.3.9 To test the limit switch settings, cycle the valve two or three times. **NOTE: Be prepared to stop the operator immediately if a setting should prove to be faulty.**

Complete Installation of Operator

7.3.10 Slide stem protector over protruding stem and screw into the operator. **NOTE: M&J Valve recommends a pipe thread sealer be used on the stem protector threads. Tighten stem protector.**

7.3.11 Slide stem protector cap over indicator rod and screw onto stem protector and tighten. Insure that indicator rod sealing device or old style grommet are in place in the stem protector cap.

7.4 Side Mounted Electric Operators (Through Bevel Gear)

7.4.1 Remove the existing bevel gear handwheel.

7.4.2 Remove the stem protector and stem protector cap. This will allow observation of stem movement when setting limit switches.

7.4.3 Installation of side mounted operators may require replacement or modification of the bevel gear pinion and possibly the pinion housing. If the gear box must be open, protect the inside from dirt and debris.

7.4.4 If required, mount the adapter flange or spool to the pinion/gear housing.

7.4.5 Install the drive key into the pinion keyslot.

7.4.6 Line up the key in the pinion and the keyway in the motor operator and engage the pinion shaft with the operator drive sleeve. Slide operator onto pinion until its mounting base contacts the adapter flange/spool.

7.4.7 Set the open and closed limit switches per the instructions in Section IV, 7.3.

7.4.8 Replace the stem protector and stem protector cap.

7.5 Hydraulic Cylinder Operators

M&J Valve manufactures/supplies several types of hydraulic operators as do other vendors such as SHAFER, LEDEEN, etc. that mount to the M-303 and RQ-8 valves. All hydraulic operators mount to the valve stem. Methods may vary according to the manufacturer.

On hydraulically operated valves, the valve stroke is controlled by the hydraulic cylinder stroke. Any adjustments required for gate alignment are made externally using the coupling or other means as dictated by the operator manufacturer.

Operator controls and limit switches vary with customer specifications and are too numerous to list here. For information on mounting and adjusting hydraulic operators and their controls, refer to the manufacturers installation, operation, and maintenance manuals.

Recommended General Purpose Assembly and Seat Lubrication Grease		
Moderate Temperature	Low Temperature	High Temperature (or any Service Using Ethylene Seals)
Mobil Mobilux E.P. #1	Bardahl #87050	Desco #330
Shell Alvania E.P. #1		
Exxon Ronex M.P.		
Texaco Marfax A.P.		

Bolt Tightening Specifications For M-303 Valve Topworks	
Bolt Size	Torque (FT. Lbs.)
5/8"-11	153
3/4"-10	254
7/8"-9	406
1"-8	606
1-1/8"-8	880
1-1/4"-8	1226
1-3/8"-8	1651
1-1/2"-8	2165
1-5/8"-8	2776
1-3/4"-8	3492
1-7/8"-8	4320
2"-8	5279
2-1/8"-8	6349
2-1/4"-8	756

V. Appendix

The valve travel chart can be used to determine if the gate is in the full open or full closed position

Port Size	Class 150-900 Gate Travel (in)	Class 1500 Gate Travel (in)
2	2-7/8	2-7/8
3	3-5/8	3-5/8
4	5-1/2	5-1/2
6	7	7
8	9-1/16	10
10	11-3/8	12-1/4
12	13-1/2	14
14	14-5/8	14-5/8
16	16-5/8	16-5/8
18	18-3/16	18-13/16
20	21	21
22	23	23
24	25-3/16	25-3/16
28	27-1/16	27-1/16
28	29	29
30	31-1/4	31-1/4
32	33-1/4	33-1/4
34	35-1/4	35-1/4
36	37-1/4	37-1/4
38	39-3/4	39-3/4
40	41-5/8	41-5/8
42	43-3/4	43-3/4
44	45-3/4	45-3/4
46	47-5/8	47-5/8
48	49-5/8	49-5/8
50	51-3/4	51-3/4
52	53-5/8	53-5/8
54	55-7/8	55-7/8
56	57-1/2	57-1/2
58	60-7/8	60-7/8
60	62-7/8	62-7/8

Notes

Notes



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