

Rovalve



Thank you for purchasing a ROVALVE S20 knife gate valve product from Tyco Flow Control. With proper care it should provide you a long service life.

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1. General information

The ROVALVE S20 knife gate valve is a UNIDIRECTIONAL (one-way shut-off) product. Unidirectional valves have a preferred shut-off direction.



CAUTION

Care must be taken in valve installation with respect to direction of flow.

Unidirectional valves have the preferred direction of shut-off indicated by the word "SEAT" cast into the valve body or the word "SEAT" stamped on the upper right hand corner of the gate on the seat side. A unidirectional valve is normally installed with the seat side (preferred direction) downstream, with the line pressure pushing the gate toward the seat.



CAUTION

The user is responsible for correct directional installation.

On select applications, including low pressure - dry solids applications, greater performance may be realized by installing the S20 in the reverse flow position. Valves supplied with backing rings are normally installed in a reverse flow orientation, with the seat side of the valve upstream. Contact factory for details and additional recommendations.

Initial inspection:

1. Examine entire valve and report any damage or discrepancies immediately.
2. Accessories, if any, including solenoids, limit switches, positioners, etc., are tested for functionality prior to shipment. Examine carefully for damage which may occur during shipment.
3. **Operators:** Standard manual handwheels may be shipped loose for field installation. It is necessary to use a pipe wrench or large crescent wrench to properly tighten the handwheel retaining nut.
4. **Packing assembly:** The packing gland bolts should be checked and adjusted to obtain a first time packing seal. Packing gland bolts and or nuts may become slightly loose when valve is shipped. Field adjustment is expected and desired. Tighten each nut equally just enough to stop any leakage. Overtightening may increase valve operating torque and shorten packing life.

Assemble handwheel, be sure and fully tighten handwheel retaining nut

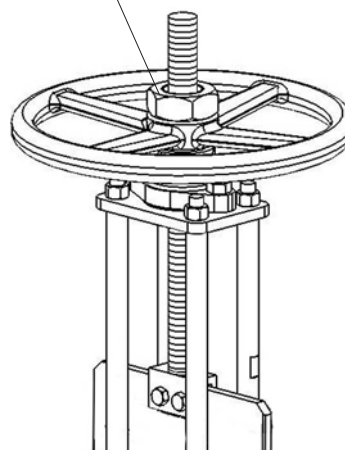


Figure 1

Inspect and tighten packing gland nuts to stop any leakage.

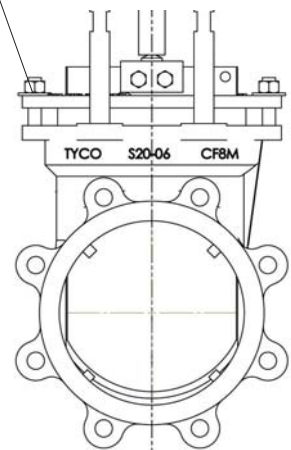


Figure 2

2. Installation instructions

Please take note of the specific installation tags provided with each valve.

1. The mating line flanges must be properly aligned prior to attempting installation. Slip on or weld flanges can be used. Never try to make up for misaligned pipe flanges by the line bolting. Pipe supports and/or expansion joints should be used to minimize pipe loads on valves.
2. Flange gaskets suitable for the application are required, sized to fit the raised face of the valve.
3. The ROVALVE S20 is suitable for use in either vertical or horizontal lines. If operator is other than vertical, additional support may be required if valve is not handwheel operated.
4. The port flanges of the S20, 2" through 24" are drilled and tapped to ANSI B16.5/150, 30" and 36" are per MSS-SP44 with the face to face per MSS-SP81. The bolt holes in the chest or upper flange area are blind tapped, (see Figure 3).



CAUTION

Care must be taken when installing studs or bolts in the tapped holes of the flange in the valve chest area to prevent damage. See figure 4.

5. Cap screws or bolts that are too long can pinch the valve body, thereby forcing the body wall into the gate, springing the gate out of line. Additional damage can occur on the gate face, such as scoring or scratching of the gate. This type of damage normally requires the valve be returned to our shop for repair.
6. To avoid damage, it is recommended that studs be used on all tapped bolt holes, especially the upper chest holes. If cap screws are used, be sure that they do not enter beyond the depth of the tapped hole when fully tightened.

Table A maximum flange bolt torques

(Foot pounds)

Size	Torque
5/8	55 +/-5
3/4	65 +/-5
7/8	110 +/-5
1	135 +/-5
1 1/8	150 +/-5
1 1/4	200 +/-5
1 1/2	250 +/-5

Figure 3

Bolt holes in the chest or upper flange area are blind tapped

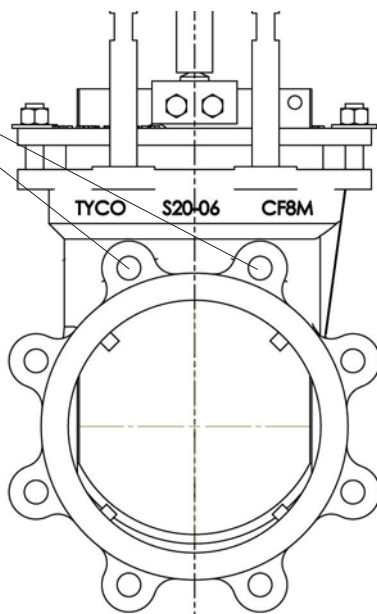
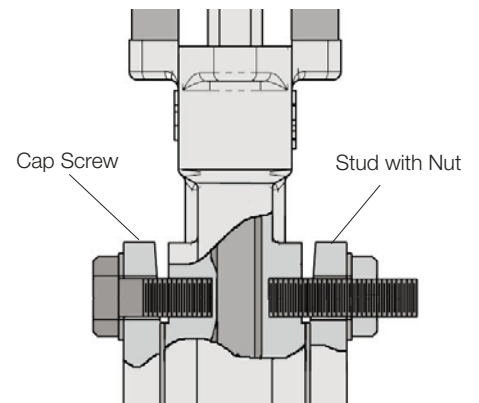


Figure 4



Right

Wrong

Body can be deformed or fractured if flange bolting is too long or overtightened.

Table B MSS-SP81 dimensions rovalve

Valve size	Flange diameter	Raised face	Bolt Circle diameter	No. bolt holes	Thread size / thread	Face to face	Flange thickness
2	6	3-5/8	4-3/4	4	5/8-11 NC	1-7/8	1/2
3	7-1/2	5	6	4	5/8 -11 NC	2	1/2
4	9	6-3/16	7-1/2	8	5/8 -11 NC	2	1/2
5	10	7-5/16	8-1/2	8	3/4 -10 NC	2-1/4	5/8
6	11	8-1/2	9-1/2	8	3/4 -10 NC	2-1/4	5/8
8	13-1/2	10-5/8	11-3/4	8	3/4- 10 NC	2-3/4	5/8
10	16	12-3/4	14-1/4	12	7/8 -9 NC	2-3/4	3/4
12	19	15	17	12	7/8 -9 NC	3	3/4
14	21	16-1/4	18-3/4	12	1 -8 NC	3	13/16
16	23-1/2	18-1/2	21-1/4	16	1 -8 NC	3-1/2	7/8
18	25	21	22-3/4	16	1 1/8-7 NC	3-1/2	15-1/16
20	27-1/2	23	25	20	1 1/8-7 NC	4-1/2	1
24	32	27-1/4	29-1/2	20	1-1/4-7 NC	4-1/2	1
30	38-3/4	33-3/4	36	28	1-1/4-7 NC	4-5/8	1-1/8
36	46	40-1/4	42-3/4	32	1-1/2-6 NC	4-5/8	1-1/8

Note 1) These dimensions duplicate ANSI B16.5/150 flange drilling

Note 2) Flange thickness includes 1/16" raised face

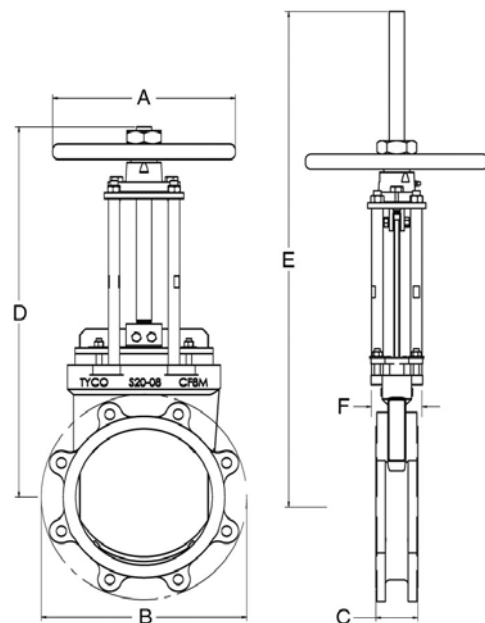
Note 3) Through bolt flange drilling is bolt size plus 1/8".

Table C valve dimensions

Valve size	A	B	C	D	E	F	Weight
2	8	6	1-7/8	12	14-1/4	2-3/4	18
3	8	7-1/2	2	13-3/4	17	2-7/8	22
4	8	9	2	15-1/2	19-3/4	2-7/8	28
6	12	11	2-1/4	20-5/8	26-7/8	3-3/4	53
8	12	13-1/2	2-3/4	24-3/8	32-5/8	3-5/8	72
10	16	16	2-3/4	28-3/4	39	4-1/2	109
12	16	19	3	32-1/4	44-1/2	4-1/2	146
14	20	21	3	35-1/2	49	8	225
16	20	23-1/2	3-1/2	38-7/8	54-1/4	5-3/4	288
18	20	25	3-1/2	43	60-3/8	10	356
20	20	27-1/2	4-1/2	47	66-1/2	11-3/8	488
24	20	32	4-1/2	54-1/2	77-3/4	15-5/8	723
30	18	38-3/4	4-5/8	74-3/4	95-1/4	18	1303
36	18	46	4-5/8	87-3/4	113-7/8	12	1842

Note: 30" and 36" are standard with bevel gear actuator, Dimension D is centerline to top of 18" diameter handwheel.

Figure 5



3. General maintenance

We recommend that all ROVALVE products be inspected at least every 60 days. The following points should be examined and corrected as required (see Figure 6):

- 1. Valve stems, extension stems, and stem nut:** Look for excessive corrosion, galling or lack of lubrication. If valve stem requires lubrication, utilize the grease fitting provided and pump standard bearing grease through the yoke hub to lubricate the stem and stem nut assembly. Additional lubrication may be applied directly onto stem or stem threads. (Use material which meets ASTM 4950 GBLB.)
- 2. Packing gland:** Check for leaks or worn packing. If leakage is occurring around the packing gland, equally tighten the packing gland nuts, being careful not to overstress the bolting. If the valve requires repacking, you may use any standard square braided packing as suitable for your service. See additional instructions for repacking.
3. If possible stroke the valve through the full open and closed position to make sure it is functioning properly.

Note 1: Stop all small leaks as soon as possible as considerable damage can be done to the valve and the surrounding area if leakage is allowed to continue to grow.

Note 2: Replacement parts including handwheel and yoke assemblies, gates, packing glands, seats and packing can be provided from our factory. If valve requires further repair, please contact our office for an estimate of feasibility and cost of repair.

4. Spare parts

1. The following spare parts are recommended:

Valves:

- 1- Set replacement packing

Cylinder Operator (if applicable):

- 1- Repair Kit

2. When ordering replacement parts for a ROVALVE product or cylinder operator, please include valve or cylinder size and complete description including serial number with your request.
3. Additional replacement parts such as handwheels, stem nut assemblies, retainers, 4-Post Yoke, stems, packing glands, and gates are available from factory. Again, please provide complete description with serial number when ordering.

Note: Stem Nut assemblies include the #1 retaining nut and #2 stem nut.

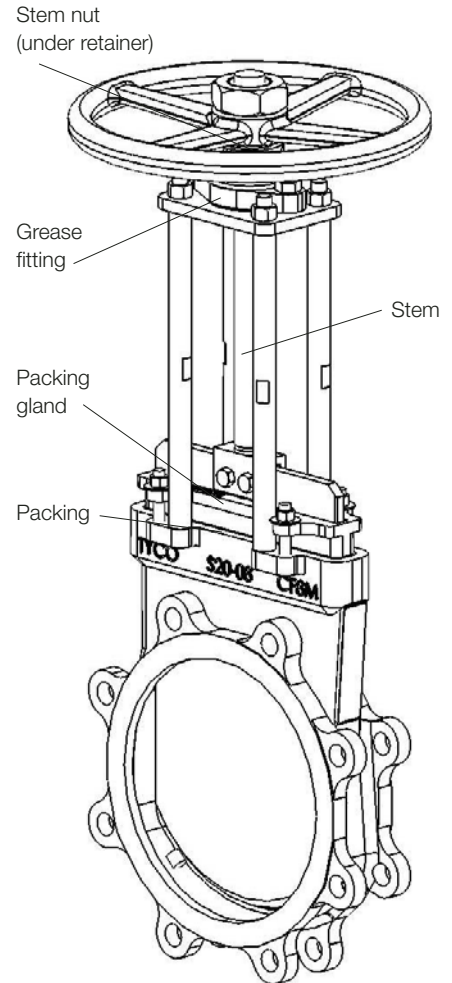


Figure 6

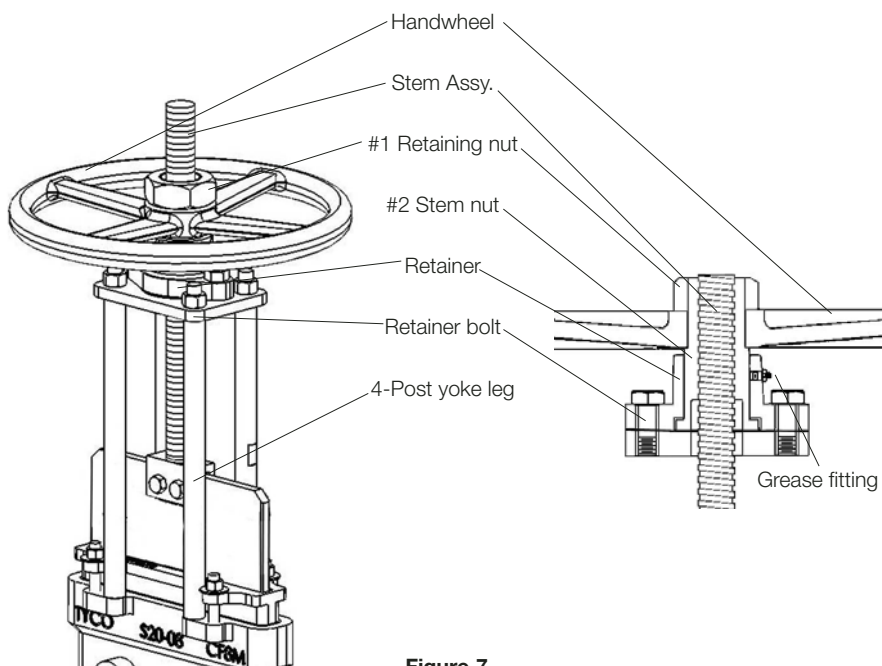


Figure 7

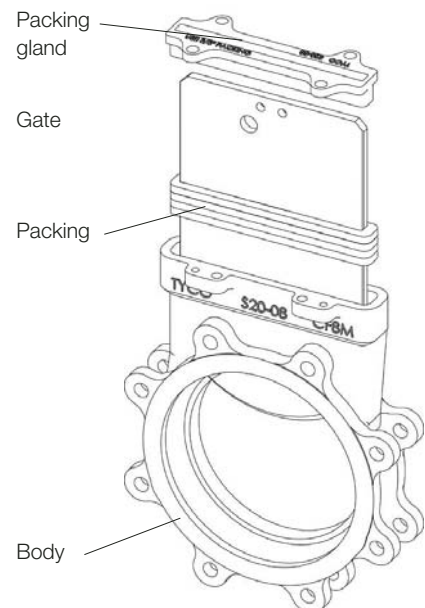


Figure 8

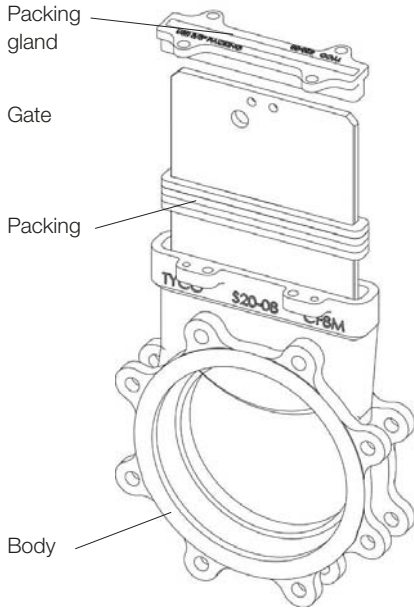
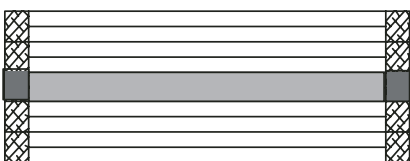


Figure 9

Table D Packing Sizes

Valve Size	Number of Rows	Cross Section	Cut Length
2	3	3/8	6 3/8
3	3	3/8	8 3/8
4	3	3/8	10 3/8
6	4	3/8	14 3/4
8	5	3/8	19 1/4
10	4	3/8	23 3/4
12	4	3/8	28 7/8
14	4	1/2	27 1/4
16	4	1/2	35
18	4	1/2	38 5/8
20	4	1/2	42 5/8
24	4	5/8	51 1/2
30	4	5/8	64 1/2
36	4	5/8	77

Figure 10



Valves with SM636 packing

5. Instruction for repacking Rovalve S20

Tools and materials required:

1. Open end wrenches or sockets to fit packing gland hex nuts and 4-Post yoke hex nuts.
2. Square braided packing suitable for application.
 -ROVALVE standard packing is special TEFLON impregnated synthetic (AFPL).
3. Knife, to cut packing.
4. 3/8" x 2" flat bar approximately 2' long with rounded end.
5. Tool with radius end to fit inside of packing box.

CAUTION

Follow required safety procedure and policies. Assure line is not pressurized before loosening packing and removing valve. Use proper lifting and support techniques when moving valve and or valve subassemblies.

Prepare Valve

1. Relieve pressure on valve or remove valve.
2. Close the valve.
3. Disconnect the gate lifter.
4. Raise stem or rod to the fully raised (open) position, providing clearance, or if desired, the entire actuator assembly may be pulled up and away from valve.
 - a) After step 3, remove top plate hex nuts and washers from 4-Post yoke.
 - b) Pull valve stem and entire actuator assembly, excluding 4-Post yoke up and away from valve, set aside.
6. Remove packing gland hex nuts, packing gland, and old packing.

Installation of New Packing

If valve is equipped with SM636 packing, see note 2 before starting.

1. Cut packing to exact length for each row (See Table D). Starting on either side of the gate install the packing all-around the gate one row at a time.
2. Tamp packing into packing box, even and flat using flat bar or other suitable tool.
3. Add next row, alternating sides of the gate where the ends of the packing meet against each other. (Ends of packing must not line up. If they do premature leakage could occur.) Complete by adding the number of rows required.
4. Reassemble packing gland to valve by sliding it down gate, aligning bolt holes with gland studs.
5. Tighten packing gland until the top row of packing is slightly compressed.
6. Reassemble the actuator assembly, attach lifter to gate.
7. Slowly charge line, stop when packing leak is evident or until normal pressure is reached.
8. Retighten packing gland bolts only enough to stop the leakage, do not overstress the bolting.
9. If normal pressure has not been achieved, continue to add pressure and adjust packing gland until normal pressure has been reached.
10. Check gland bolts and snug all packing gland nuts.

Note 1: Important, do not tighten packing gland bolts any more than required to stop packing gland leaks after line pressure is applied.

Note 2: SM636 packing is triangular in shape, 1/2" (equilateral) on a side and about 2-1/2" long. It can be broken into pieces to conform to the shape of the packing box. Install one (or two) row(s) of Self Mold #636 as appropriate for the size valve. See Figure 2. Make sure that all voids are filled.

Note 3: High-temperature packing may not reach full pliability until normal temperature is achieved. Packing may require readjustment as temperature changes.

6. Stem nut replacement instructions

Replacement of the stem nut assembly on a Rovalve S20 is very simple. It is not necessary, or desired, to remove the yoke assembly to replace the nut.

Tools required:

1. Pipe wrench or large crescent wrench
2. Appropriate size open end wrench for retainer bolts



CAUTION

Follow required safety procedure and policies. Use proper lifting and support techniques when moving valve and or valve subassemblies.

Prepare the valve:

1. Line should be depressurized or gate secured prior to disassembly. If valve is equipped with pin-style lockouts (see figure 12) gate can be locked in the open or closed position using the lock pin. If pin-style lockouts are not present, the gate must be held in place to prevent unwanted movement. These precautions are necessary to keep the gate from moving.

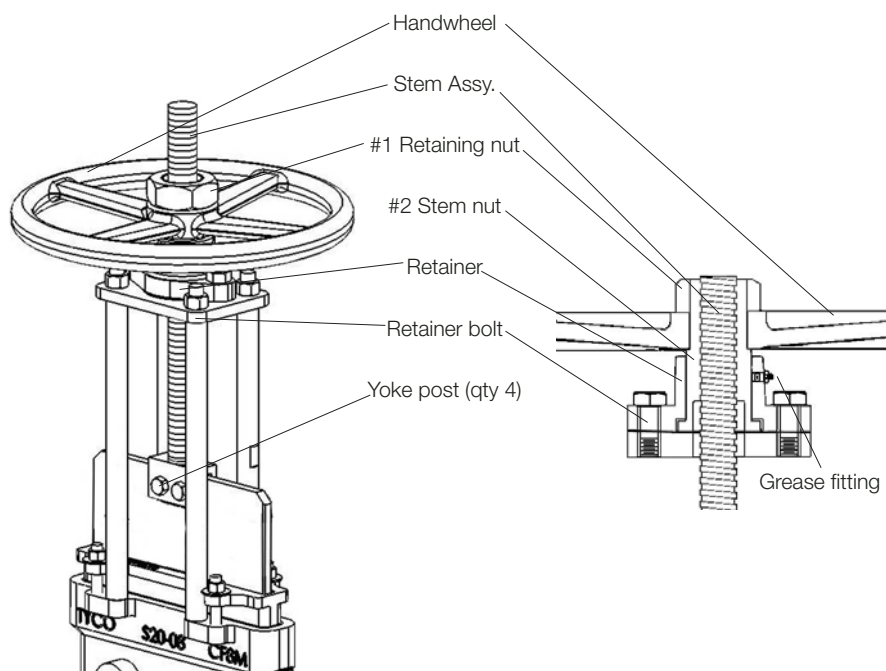
Disassembly:

1. Using pipe wrench or crescent wrench, remove handwheel retaining nut from stem nut.
2. Remove handwheel.
3. Remove (2) or (4) retainer bolts.
4. Pull retainer off
5. Rotate old stem nut until free from stem.

Reassembly:

1. Rotate new stem nut until it bottoms against top plate.
2. Place retainer over stem nut, lining up the bolt holes.
3. Replace retainer bolts and nuts, tighten completely.
4. Place handwheel over stem nut, aligning the hex.
5. Attach new handwheel retaining nut, using pipe wrench or crescent wrench, tighten completely.
6. Grease as required using grease fitting.

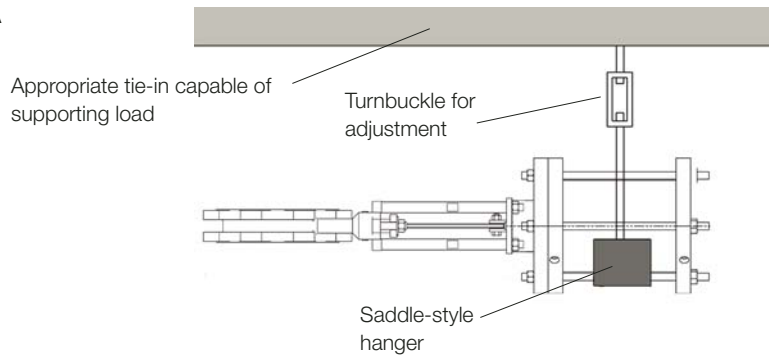
Figure 11



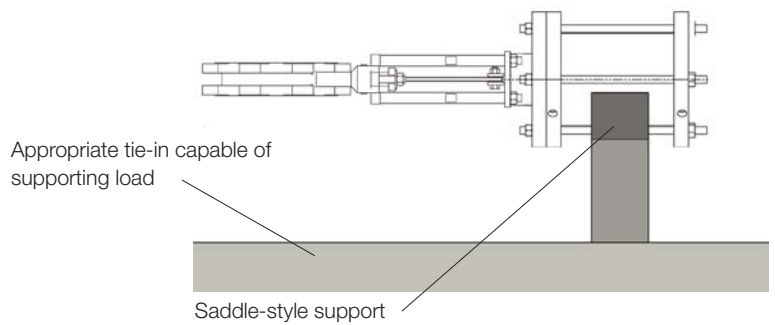
7. Suggested cylinder support methods when cylinder is mounted in horizontal or off-vertical orientation

Cylinders require additional support when mounted in the other than vertical position. Failure to do so could lead to premature failure of cylinder and/or valve. The following figures are suggestions; specific details will have to be determined by customer so support best suits surrounding area. It is important that the cylinder/gate alignment be maintained during valve operation. Supports should be designed to maintain alignment and support bulk of cylinder weight.

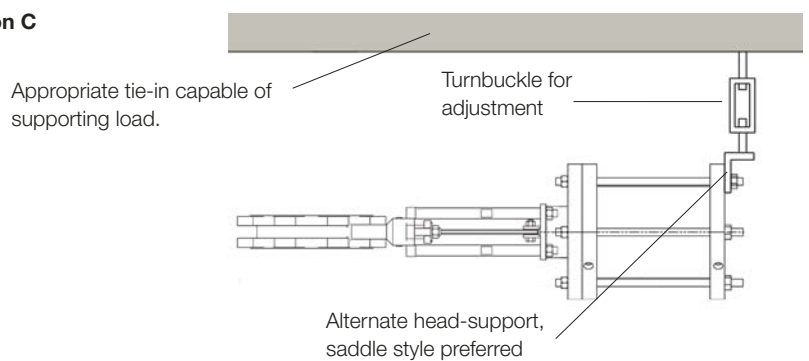
Installation A



Installation B



Installation C



CAUTION

Tie-rod mounted supports are not recommended on spring-style cylinder actuators.

8. Converting MH to BG valves

Bevel gear conversion for the Rovalve S20 is very simple. It is not necessary to remove the 4-Post yoke assembly. Conversion kits include bevel gear operator with integral thrust style stem nut, conversion mounting plate, appropriate bolts, and handwheel or drive nut as required. Existing stem and yoke posts will be reused. If stem or yoke posts require replacement, contact the factory.



CAUTION

Follow required safety procedure and policies. Assure line is not pressurized or gate has been secured to prevent unwanted movement before disassembly. Use proper lifting and support techniques when moving valve and or valve subassemblies.

Tools required:

1. Pipe wrench or large crescent wrench
2. Appropriate size open end wrenches or sockets

Prepare the valve:

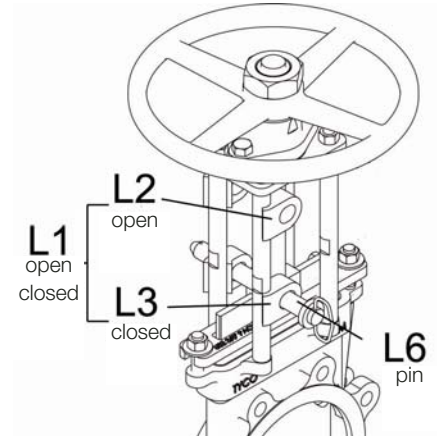
1. Line should be depressurized or gate secured prior to disassembly. If valve is equipped with pin-style lockouts (see figure 12) gate can be locked in the open or closed position using the lock pin. If pin-style lockouts are not present, the gate must be held in place to prevent unwanted movement. These precautions are necessary to keep the gate from moving.

Disassembly:

1. Using pipe wrench or crescent wrench, remove handwheel retaining nut from stem nut.
2. Remove handwheel.
3. Remove (2) or (4) retainer bolts.
4. Pull retainer off
5. Rotate old stem nut until free from stem.
6. Remove nuts from the 4-post yoke legs.
7. Pull existing top plate up and away from valve.

Reassembly:

1. The conversion kit will be shipped with the thrust stem nut installed within the bevel gear.
2. Place the adapter plate over the 4-Post yoke legs aligning the holes.
3. Attach nuts onto 4-post yoke legs securing the top plate into position.
4. Slip the bevel gear over the stem nut, engaging the threads. Rotate the handwheel which will in turn rotate the thrust stem nut down the stem, bringing the bevel gear into proper position, aligning the bolt holes.
5. Bolt the bevel gear to the adapter plate. Do not overstress bolting.
6. Stroke the valve from full open to full closed making sure all parts are aligned and working properly. Check bolts for tightness, the gate and operator assembly should stay snug with the valve body.
7. If binding or off-center movement of gate is evident, loosen yoke bolts, stroke gate up and down a few times, retighten yoke bolts.



- L1: Pin style, both open and closed lockpositions
 L2: Pin style, open position only
 L3: Pin style, closed position only.
 L6: Case hardened pin for use on L1, L2 or L3

Figure 12

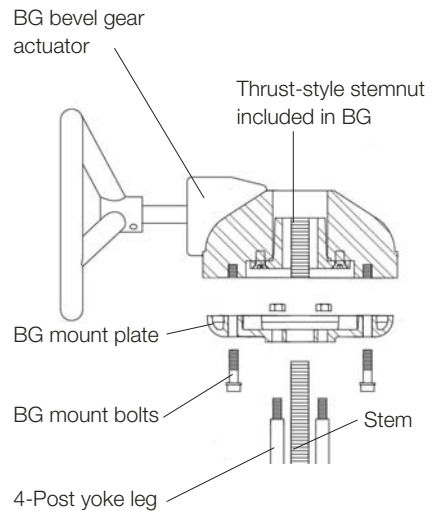


Figure 13

9. Recommended long term storage procedure

The following are the factory's recommendations for storage procedures to retain maximum product integrity during long term storage of 1 to 5 years.

Handwheel or bevel gear operated valves

- A. Storage facility: The preferred storage location is a clean, dry protected warehouse. If valves are to be stored outside, precautions should be taken to keep valves clean and dry. Standard packaging materials provided in valve shipment can not be considered sufficient for outdoor storage.
- B. Equipment orientation: Valves may be stored in the vertical or horizontal position.
- C. Preparation for storage: Valves may be stored as shipped, provided the above Storage Facility and Equipment Orientation instructions above are followed. If valve packaging is altered or removed for receiving inspection, repackage valve as originally received.
- D. Storage inspection: Visual inspection shall be performed on a semiannual basis and results recorded. Inspection as a minimum shall include reviewing the following:
 - Packaging
 - Flange Covers
 - Dryness
 - Cleanliness
- E. Maintenance: Maintenance shall consist of correcting deficiencies noted during inspection. All maintenance shall be recorded. Contact factory prior to performing any maintenance if valve is still covered under warranty.

Cylinder operated valves

- A. Storage facility: The preferred storage location is a clean, dry protected warehouse. If valves are to be stored outside, precautions should be taken to keep valves clean and dry. Standard packaging materials provided in valve shipment can not be considered sufficient for outdoor storage.
- B. Equipment orientation: The preferred orientation for optimum protection is with the valve fully opened and the cylinder in the vertical position. This position gives the best support to the cylinder rod and helps reduce the chance of a "flat spot" developing on the cylinder seals. An acceptable alternate position for valves with cylinder diameters of less than 6" is with the cylinder in the horizontal position.
- C. Preparation for storage: Valves may be stored as shipped, provided the above Storage Facility and Equipment Orientation instructions above are followed. If valve packaging is altered or removed for receiving inspection, repackage valve as originally received.
- D. Cylinder storage
These cylinder storage instructions are not intended to replace the instructions of the specific cylinder manufacturer and are to be used as a guide only. If specific instructions are required, please contact our office.
For storage of up to 3 years; Squirt a high quality grade of hydraulic oil or synthetic lubricant into the cylinder ports and operate cylinder 6-12 times on a yearly basis.
For storage 3-5 years; lubricate as above. Additionally, extend cylinder rod until the valve is fully closed. Coat cylinder rod with high quality heavy grease or synthetic lubricant. Retract cylinder rod until valve is fully open, drawing lubricant into rod end of cylinder. Securely plug cylinder ports with pipe plugs, if cylinder is not pre-piped to control accessories. If cylinder is prepiped to accessories, plug all input and output ports of accessories.
- E. Storage inspection: Visual inspection shall be performed on a semiannual basis and results recorded. Inspection as a minimum shall include reviewing the following:
 - Packaging
 - Flange Covers
 - Dryness
 - Cleanliness
- F. Maintenance: Maintenance shall consist of correcting deficiencies noted during inspection. All maintenance shall be recorded. Contact factory prior to performing any maintenance if valve is still covered under warranty.