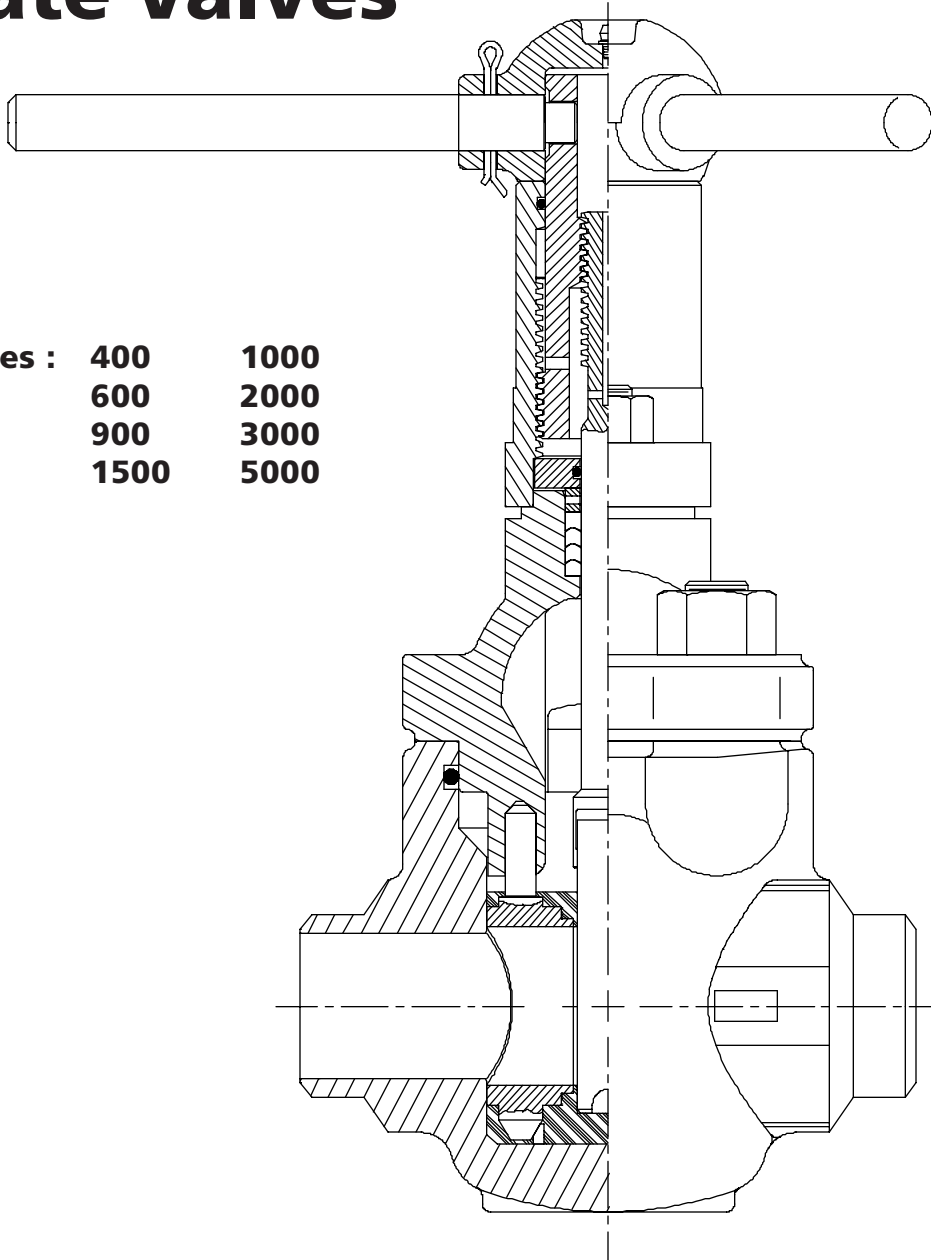


# DEMCO® Model DM Gate Valves

Classes : 400      1000  
          600      2000  
          900      3000  
          1500     5000



**Publication TC1641 Published May 2002**

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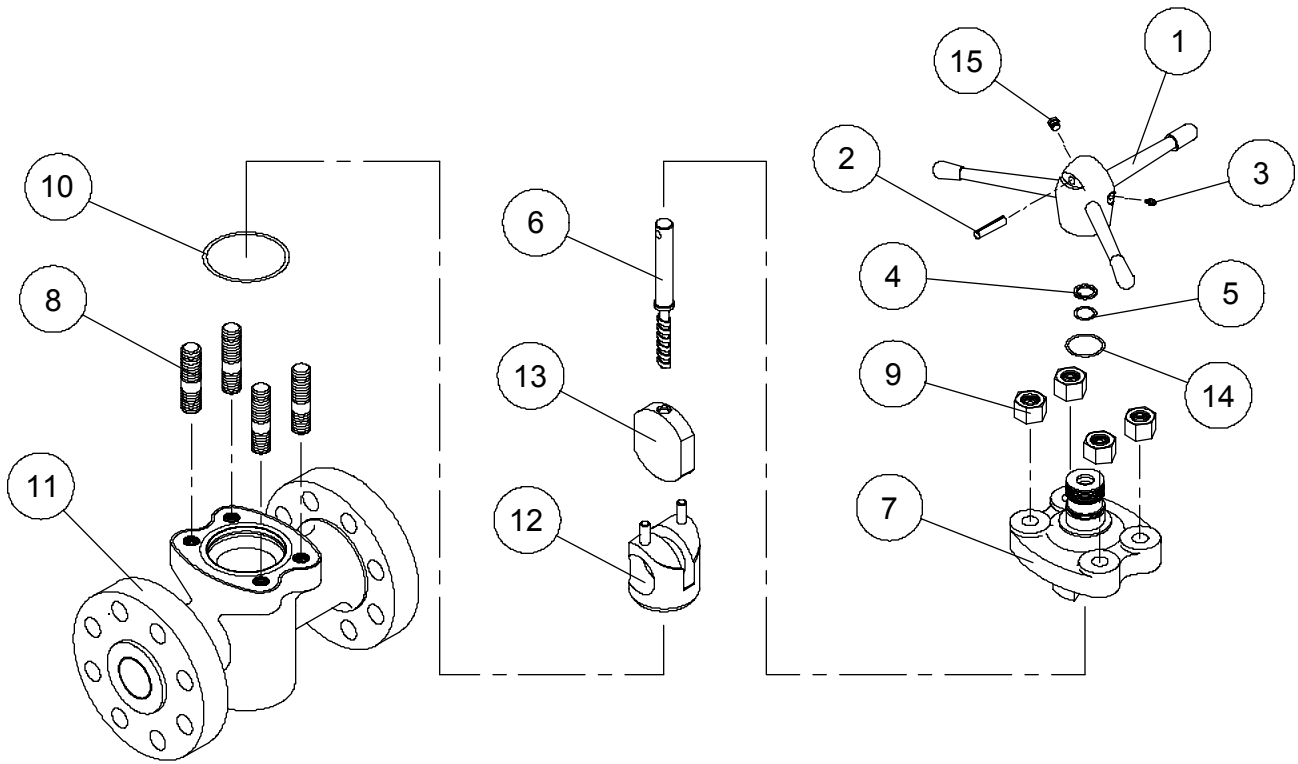


Figure 1 - Series DM Gate Valve Class 400-1500 (except 4" and 6x4" 1500)

ITEM	QTY	DESCRIPTION
1.	1	Handle
2.	1	Stem Pin
3.	1	Lube Fitting
4.	1	Back-up Ring
5.	1	Stem Seal
6.	1	Stem
7.	1	Bonnet
8.	4	Cap Screw or Stud
1	9.	* Nut
	10.	1 Bonnet Seal
	11.	1 Body
	12.	1 Seat Assembly
	13.	1 Gate
2	14.	* Screw Seal
3	15.	* Relief Fitting

1 **Nut Qty=**  
 0 for 1-1/2 through 3x2"  
 Class 400 and 600  
 4 for others

2 **Screw Seal Qty=**  
 0 for Class 400 and 600  
 1 for Class 900 and 1500

3 **Relief Fitting Qty=**  
 0 for Class 400 and 600  
 1 for Class 900 and 1500

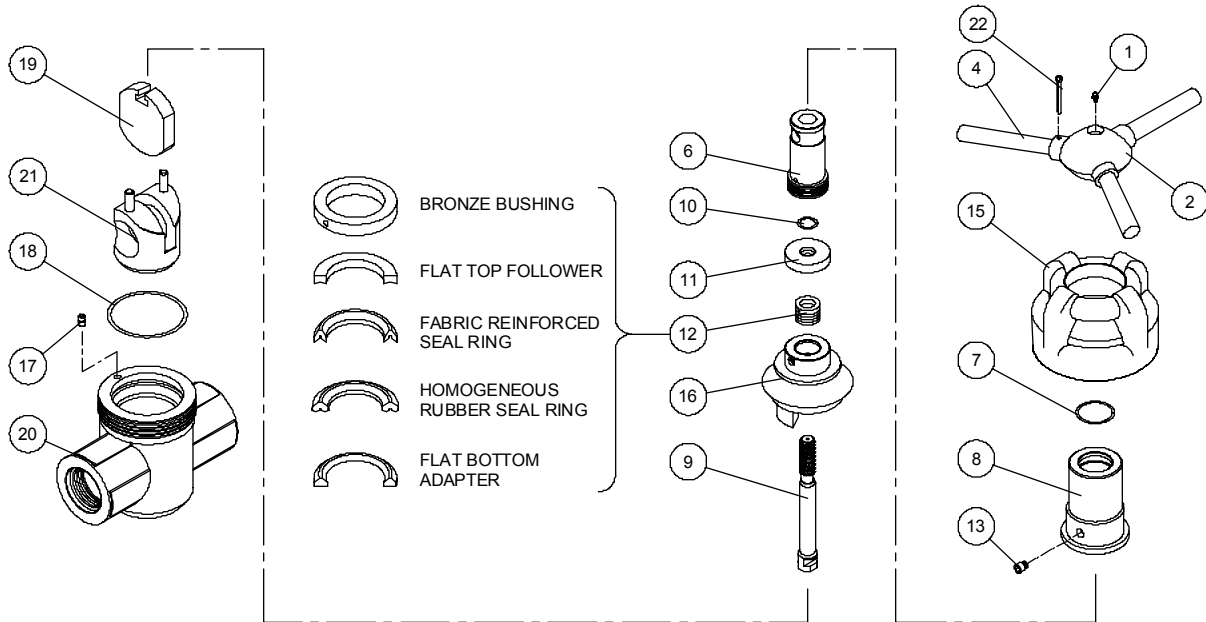


Figure 2 - Series DM Gate Valve 2000, 3000, 5000 2" & 2-1/2x2"

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1.	1	Lube Fiting	13.	1	Lock Screw
2.	1	Handle	15.	1	Coupling
4.	1	Lock Handles	16.	1	Bonnet
6.	1	Stem Screw	17.	1	Index Pin
7.	1	Stem Screw Seal	18.	1	Bonnet Seal
8.	1	Screw Housing	19.	1	Gate
9.	1	Stem	20.	1	Body
10.	1	Secondary Seal	21.	1	Seat Assembly
11.	1	Retainer	22.	1	Pin-Lock Handle
12.	1	Stem Seal Assembly			

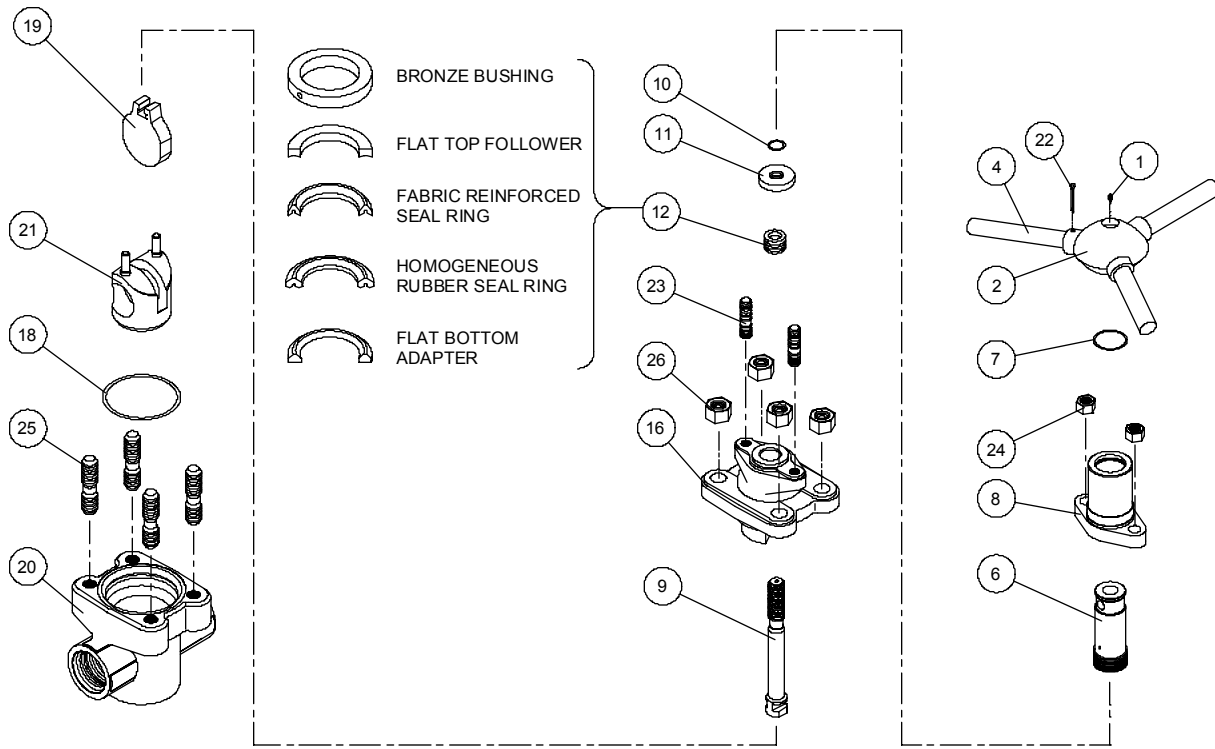


Figure 3 - Series DM Gate Valve 2000-3000: 2-1/2" - 5x4"; 5000: 3" & 4x3"; Class 1500: 4"; 1000: 5"

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1.	1	Lube Fiting	16.	1	Bonnet
2.	1	Hub Assembly	18.	1	Bonnet Seal
4.	1	Lock Handle	19.	1	Gate
6.	1	Stem Screw	20.	1	Body
7.	1	Stem Screw Seal	21.	1	Seat Assembly
8.	1	Screw Housing	22.	1	Pin-Lock Handle
9.	1	Stem	23.	2	Bonnet Stud
10.	1	Secondary Seal	24.	2	Bonnet Stud Nut
11.	1	Retainer	25.	4	Body Stud
12.	1	Stem Seal Assembly	26.	4	Body Stud Nut

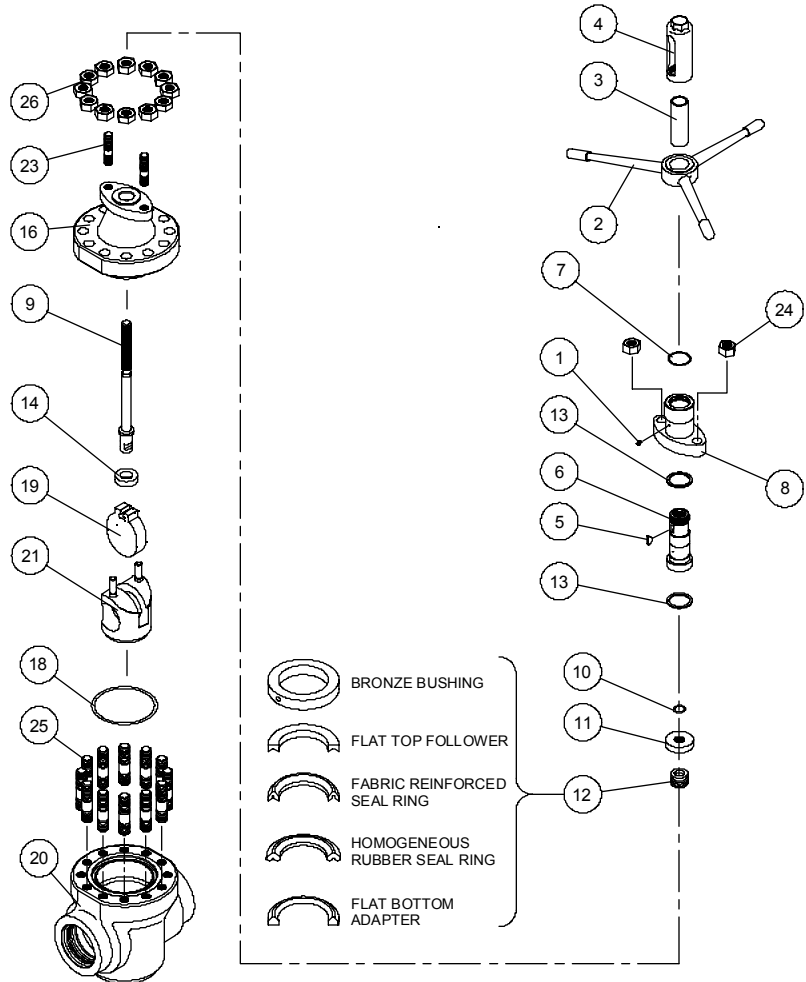


Figure 4 - Series DM Gate Valve 5000: 4", 5x4", 6x4"

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1.	1	Lube Fiting	13.	2	Bearing
2.	1	Handle	14.	1	Downstop Ring
3.	1	Tube	16.	1	Bonnet
4.	1	Stem Cap	18.	1	Bonnet Seal
5.	1	Key	19.	1	Gate
6.	1	Stem Screw	20.	1	Body
7.	1	Stem Screw Seal	21.	1	Seat Assembly
8.	1	Screw Housing	23.	2	Bnnet Stud
9.	1	Stem	24.	2	Bonnet Stud Nut
10.	1	Secondary Seal	25.	*	Body Stud
11.	1	Retainer	26.	*	Body Stud Nut
12.	1	Stem Seal Assembly			

1 **Stud and Nut Qty=**  
 4 for valves with Assembly Bast Part Number J007420, J007421 and J011928.  
  
 12 studs and nuts for all other assemblies.

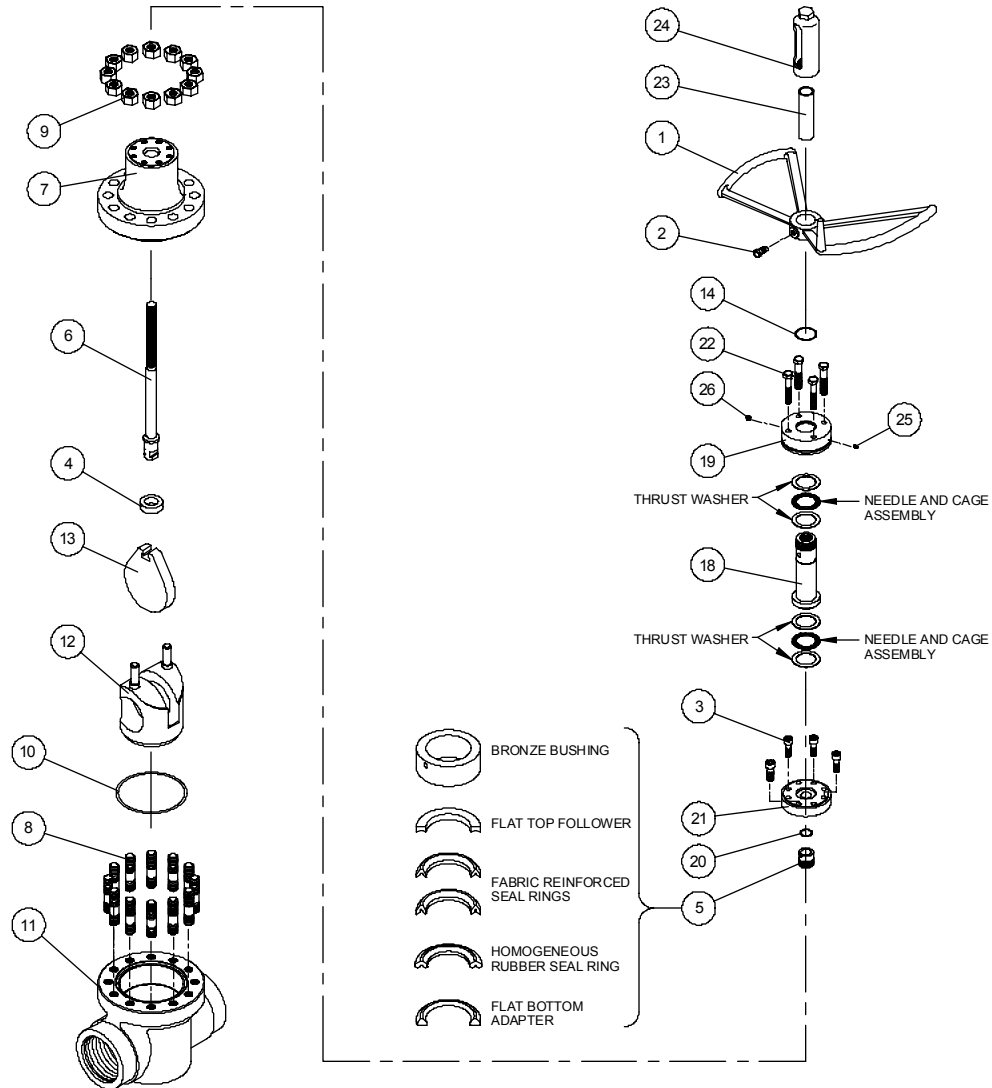


Figure 5 - Series DM Gate Valve 3000-5000: 5", 6x5"

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1.	1	Handwheel	13.	1	Gate
2.	1	Screw, Handwheel	14.	1	Stem Screw Seal
3.	4	Screw, Retainer	18.	1	Stem Screw w/Bearings
4.	1	Downstop Ring	19.	1	Housing
5.	1	Stem Seal Assembly	20.	1	Secondary Seal
6.	1	Stem	21.	1	Retainer
7.	1	Bonnet	22.	4	Screw, Housing
8.	12	Body Stud	23.	1	Tube
9.	12	Body Stud Nut	24.	1	Stem Cap
10.	1	Bonnet Seal	25.	1	Lube Fitting
11.	1	Body	26.	1	Relief Fitting
12.	1	Seat Assembly			



## Scope

This publication applies to the storage, installation, operation, routine maintenance and troubleshooting of the Demco model DM gate valves in pressure classes 400, 600, 900, 1500, 1000, 2000, 3000 & 5000. Other information concerning these valves (e.g. dimensional data, etc.) is to be found in other publications.

## Storage

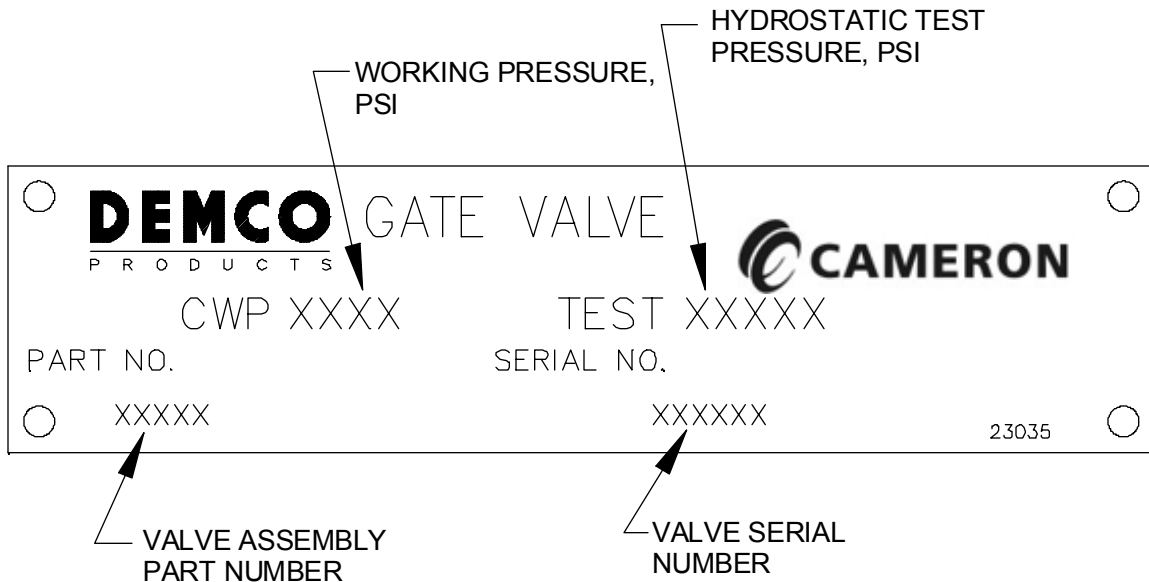
Demco model DM gate valves are shipped from the factory fully open and with end protectors. It is recommended that they remain in this condition until time for installation. They should be stored in a dry place, preferably indoors, away from extreme heat. These valves contain elastomeric seals which deteriorate with heat and age.

## Nameplate Information

The Demco model DM gate valve comes in several configurations, one of which is shown on the front cover of this publication. Each valve is completely identified by the nameplate data which is shown below.

With the valve assembly part number and serial number a complete valve bill of material may be obtained. The valve assembly part number will appear on the purchase order and shipping ticket.

The valve serial number is a four to six digit number that is stamped on the nameplate and body at the time of assembly. Serial numbers are kept on file at the factory and are traceable to the valve assembly part number and date of assembly. The serial number is stamped on or near one of the end connections.



## Installation

Demco model DM gate valves are bi-directional and may be installed with either end upstream.

The valves should be installed as far as possible from sources of extreme heat, vibration and pulsation. The piping system should be equipped with a pulsation dampener if a reciprocating pump is being used. Vibration and pulsation cause premature wear of the internal parts of the valve.

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**Note on weld end valves:** Remove the bonnet, bonnet seal and seat prior to welding the valve into the line. Protect the seat bore from weld spatter. Be sure the weld procedure is qualified for both pipe material and valve body material. If the valve is going to be exposed to hydrogen sulfide, the weld procedure must conform to the requirements of NACE spec MR0175. The material grade of the valve body is cast or stamped on the valve body. If in doubt, contact the factory. After the valve body has been welded into the line and has cooled down to below 200F, the bonnet seal, seat and bonnet assembly may be reinstalled. Make sure the valve gate is in the fully open

position. Apply a coating of grease to the body seat bore and seat. Install the bonnet seal into the body. Then, while holding the seat onto the bonnet so that the gate is started into the slot in the seat and the two pins on the seat are engaging the holes in the bonnet, install the seat/bonnet assembly as a unit into the body. This may require two people on the larger valves. Never put the seat into the body and then try to get the bonnet on. This will most likely result in a damaged seat. Draw the bonnet down uniformly until it is flush with the body, then torque the nuts in a star or cross pattern. Never draw one side of the bonnet all the way down before tightening the nuts on the opposite side. This will most likely result in a damaged seat.

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Before testing the system, the lines should be flushed out to remove weld debris and other foreign material. Test pressure should not exceed that shown on the valve nameplate with the valve open and the pressure applied to a closed valve should not exceed the rated working pressure shown on the nameplate.

## Operation

A gate valve should be either fully open or fully closed. Flow through a partially open valve may erode the gate and seat. The Demco DM gate valve is designed to be opened or closed under full rated pressure differential but it will last longer if it is operated when there is little or no pressure in the line. The valve is opened by turning the handle counterclockwise until a sharp increase in torque is felt. Further turning of the handle will damage the stem. The valve is closed by turning the handle clockwise. On all valves covered by this publication, either one of the following applies:

- 1) The handle moves down as the valve is being closed. The valve is fully closed when the handle stops down on the bonnet or housing. No further movement is possible.
- 2) The stem head engages a step in the inside of the bonnet when the valve is fully closed. Further turning of the handle will damage the stem. On these valves the top of the stem will be flush with the top of the stem screw. This condition is visible through the clear plastic stem protector tube.

Number of handle turns required to fully open or close the valve:

ValveSize	Rated working pressure as shown on the nameplate							
	990	1480	2220	3705	1000	2000	3000	5000
<b>1-1/2, 2X1-1/2</b>	3.4	3.4						
<b>2, 3x2</b>	4.0	4.0	4.2	4.2		10.1	10.1	10.1
<b>2-1/2</b>	5.1	5.1	5.1	5.1		9.2	9.2	
<b>3, 4x3</b>	5.9	5.9	6.0	6.0		10.6	10.6	10.6
<b>4, 5x4, 6x4</b>	7.6	7.6	7.6	11.6		11.6	11.6	23.0
<b>5, 6x5</b>					14.8		29.7	29.7
<b>6, 8x6</b>	11.1	11.1	11.1					

## Routine Maintenance

It is important to see that the valve is kept properly lubricated. Use a good #2 grade of water-resistant grease. Chevron Ultra-Duty #2 is used at the factory. Grease is applied with an automotive type grease gun to the Alemite fitting either on the handle hub or on the housing. On valves with the fitting on top of the handle hub, the valve is best lubricated when it is closed. This prevents the grease from escaping from the space between the handle and stem screw before the housing threads

are adequately lubricated. The valve should be lubricated at least once a year, depending on use.

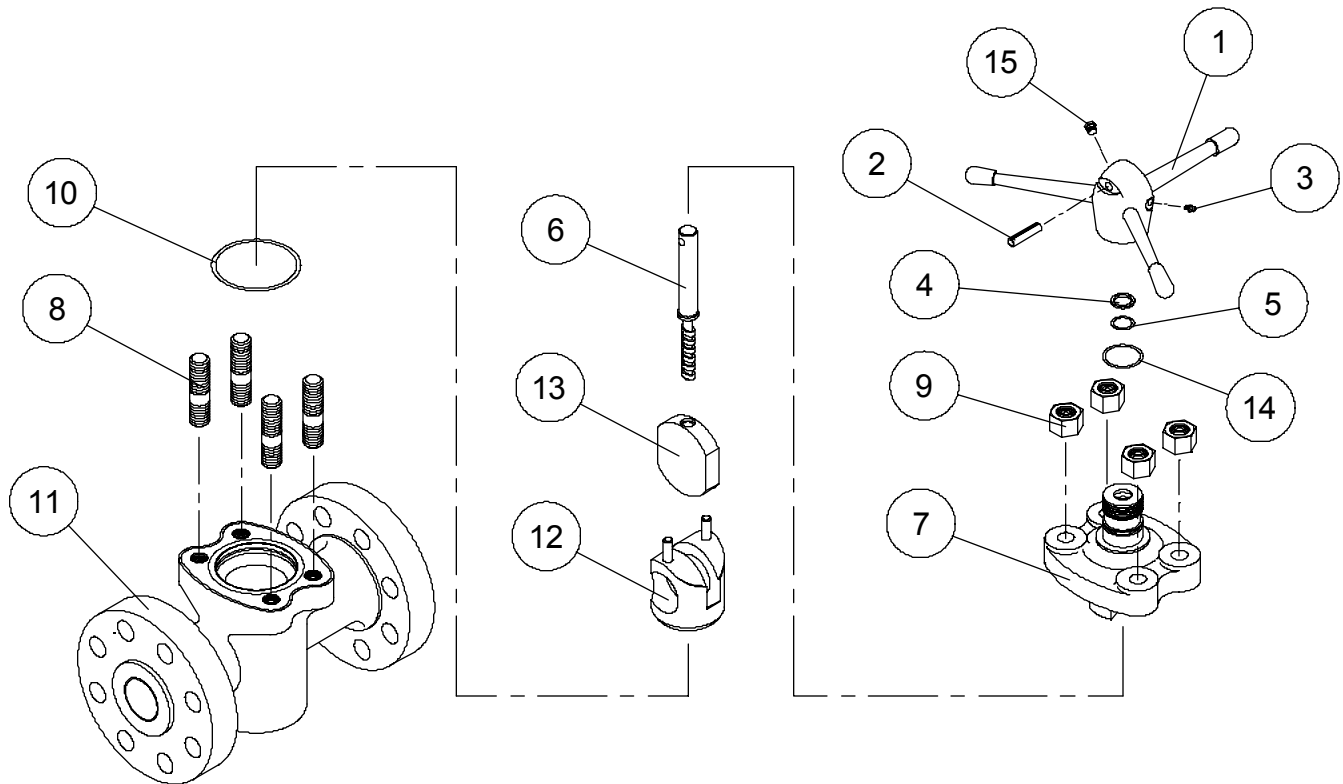
Whenever the valve is exposed to frac sand, drilling mud, cement or acidizing fluids it should be flushed out thoroughly at the first opportunity. Sand, drilling mud, and cement can set up inside the valve and render it inoperable. Acidizing fluids can corrode the internal parts and result in leakage.

## Repair - General

Repair as described in this manual is limited to replacement of parts or minor cleaning and polishing of existing parts. For major repairs of

badly corroded or washed out bodies or bonnets please contact an authorized Cameron repair facility.

## Repair – Series DM gate valve class 400-1500 (except 4" and 6x4" 1500)



### Disassembly

Demco Class 400-1500 gate valves may be disassembled for inspection without removing from the line. Simplicity of design and precision workmanship assure ready replacement of parts and satisfactory operation following field repairs.

1. Fully open the gate valve. Remove nuts (9) (or cap screws on 1-1/2" and 2" valves) and lift the bonnet (7) with stem and gate, from the body. Using a hammer and pin punch, drive the stem pin (2) out of the handle hub. Rotate the handle counterclockwise, unscrewing it from the bonnet. Withdraw the stem and gate from the bottom of the bonnet; rotate the gate (13) clockwise, unscrewing it from the stem (6).
2. Stem seal (5) and back-up ring (4) may now be removed from the groove in the stem bore. Remove seal (14) on Class 900-1500 valves.
3. Collapse the seat (12) by compressing the top pins together and remove it from the valve body. Remove the bonnet seal ring (10) from its groove in the body.

### Inspection

Thoroughly clean all disassembled parts and inspect them for wear and damage. Clean the stem bore in the bonnet, including the seal ring groove, and inspect for dirt or corrosion. It is

recommended that seals (4), (5), (10) and (14) be replaced if worn or damaged. Inspect the straight section of the stem, which passes through the bonnet, for nicks or scratches and smooth with emery cloth if required. Before re-assembling the valve, apply a good grade of general purpose grease to all threads, seal rings (not the back-up ring), exterior of the seat and on the surfaces of the bonnet and stem which contact seals.

## Reassembly

1. Install the stem seal (5) in the bonnet bore groove and insert the back-up ring (4) above it. This ring prevents extrusion of the stem seal into the clearance between stem and bonnet, so it must be positioned on the low-pressure side of the stem seal. Replace seal (14) on Class 900-1500 valves. Screw the handle on the bonnet to its limit of travel and slide the stem through the bonnet from the underside.

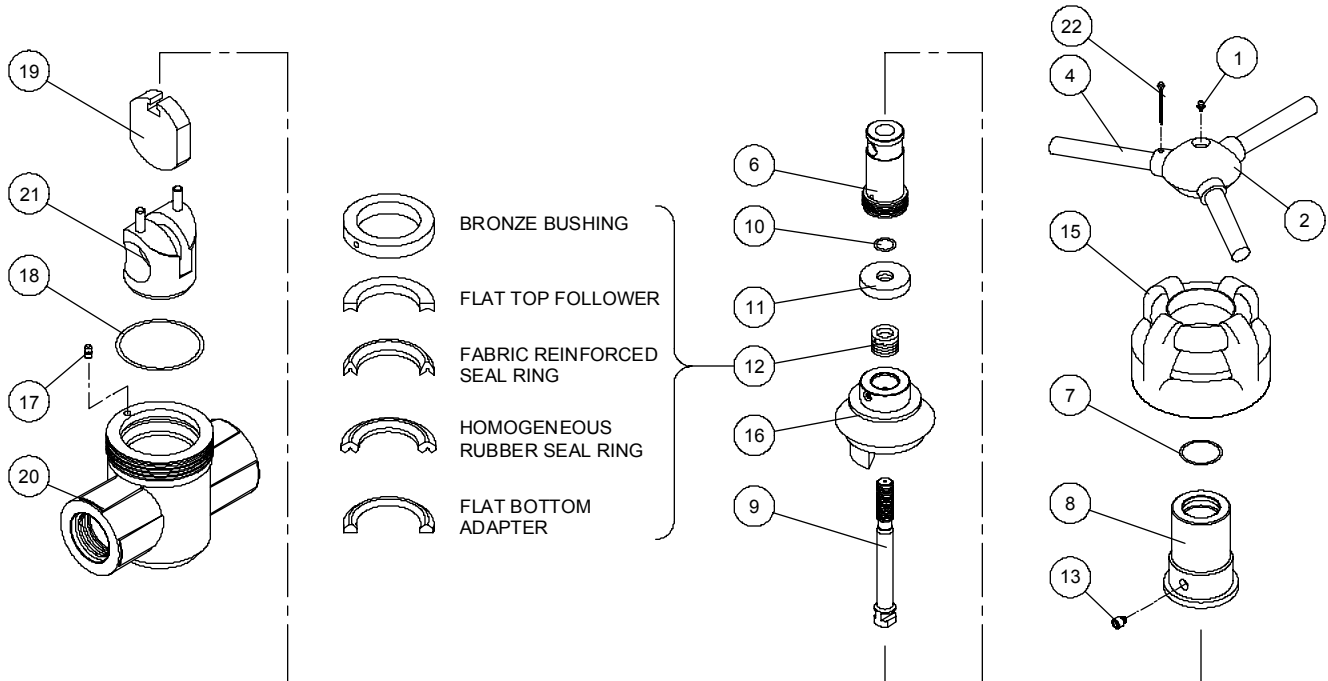
1a. Class 400-600 valves 2" through 8"x6":  
Line up the holes in the hub and stem and insert a pin punch or screwdriver, of approximately pin hole size, through the hub. Screw the gate on the stem counterclockwise until it touches the underside of the bonnet, then back it off to align the gate with the bonnet cavity. Remove the punch or screwdriver. Pull the stem out of the bonnet at least one-half inch, (do not permit stem rotation) then rotate the gate on the stem one more turn counterclockwise. Re-insert the stem in the bonnet and the punch or screwdriver through the holes in the stem and hub. Measure the distance from the underside of the bonnet to the farthest edge of the gate. This distance must be within the following limits for each size valve.

Valve Size	Distance
2", 3x2"	2-15/16" – 3-3/16"
2-1/2"	3-17/32" – 3-15/16"
3", 4x3"	4-5/32" – 4-9/16"
4", 6x4"	5-9/32" – 5-5/8"
6", 8x6"	7-3/4" – 8-1/32"

If the distance is incorrect, shorten or lengthen by pulling the stem and turning the gate a half turn on the stem. (This changes the dimension 1/4 inch.) When the distance is correct, replace the punch or screwdriver by pin (2) and turn the handle to full open position, retracting the gate into the bonnet.

- 1b. Other valves: Line up the holes in the hub and stem and drive pin (2) through the hub. Screw the gate on the stem counterclockwise until it touches the underside of the bonnet, then back it off to align the gate with the bonnet cavity. Turn the handle to full open position, retracting the gate into the bonnet.
2. Replace the bonnet seal (10). Assemble seat (12) and bonnet to the valve body keeping the seat ports aligned with the body line bore, making sure the gate is in the slot in the seat and that the top pins on the seat are in the drilled holes in the bonnet while performing this operation. Replace nuts (9) (or cap screws on 1-1/2", 2" and 3x2" valves). Repack the handle threads with general purpose grease through fitting(3).

## Repair – Series DM gate valve 2000, 3000, 5000 2" & 2-1/2x2"



### Disassembly

1. Fully open the gate valve. Unscrew coupling (15) and withdraw the bonnet assembly from the body. Collapse the seat (21) by compressing the top pins together and remove it from the body.
2. With the bonnet assembly on its side, remove pin (22) and lock handle (4) then lift off hub (2). Remove coupling (15). Turn stem screw (6) clockwise to bottom, then withdraw gate (19) from stem (9) by rotating a quarter turn and sliding it off the tee-head of the stem.
3. Seat or gate replacement may be made at this point. To reassemble the valve, proceed from reassembly instruction 3 after following the applicable maintenance instructions. If it is desired to inspect other parts, the following instructions apply.
4. Turn the stem clockwise until it disengages from stem screw (6) and withdraw it from the underside of the bonnet. Unscrew the lock screw (13) and lift screw housing (8) off the bonnet. Remove retainer (11), o-ring seal (10) and stem seal assembly (12) from the bonnet. Turn stem screw (6) clockwise out of the screw housing. Remove screw seal (7) from the screw housing and bonnet seal (18) from the valve body.

## Inspection

Thoroughly clean all parts and inspect them for wear or damage. It is recommended that seals (7), (10), (18) and stem seal assembly (12) be replaced if they are worn or cut. All sealing surfaces should be clean and free of dirt, rust, nicks and scratches. These will include the areas inside the body adjacent to the line bore where the seat fits, the area around the lower part of the bonnet that lies against the bonnet o-ring seal, the bonnet stuffing box and the surface of the stem that passes through the packing. Clean these surfaces well and polish with emery cloth if necessary, paying particular attention to the valve stem. Before reassembling, apply a good grade of general purpose grease to all threads, seal rings and exterior of the seat and on the surfaces of the bonnet, stem and stem screw which are in contact with seals.

## Reassembly

1. Slide the threaded end of the stem through the bonnet bore from the underside and place the stem seal assembly over the stem. This assembly consists of a flat bottomed adapter ring, homogeneous rubber seal ring, fabric reinforced seal ring, a flat topped follower ring and a bushing, which are placed over the end of the stem, lips first, in that order. The lips on "V" rings point towards bottom of bonnet. Slide the retainer (11) with o-ring seal (10) inside over the stem. Seat the stem seal assembly into its counterbore in the bonnet.
2. Engage the stem screw (6) in the screw housing (8) about half its total travel and place the screw housing on the bonnet and stem. Replace lock screw (13). Place the coupling on the screw housing.
3. Rotate the stem screw clockwise until it bottoms on the retainer, then back it up approximately one-eighth turn. Engage the gate on the tee-head of the stem and turn them together counterclockwise

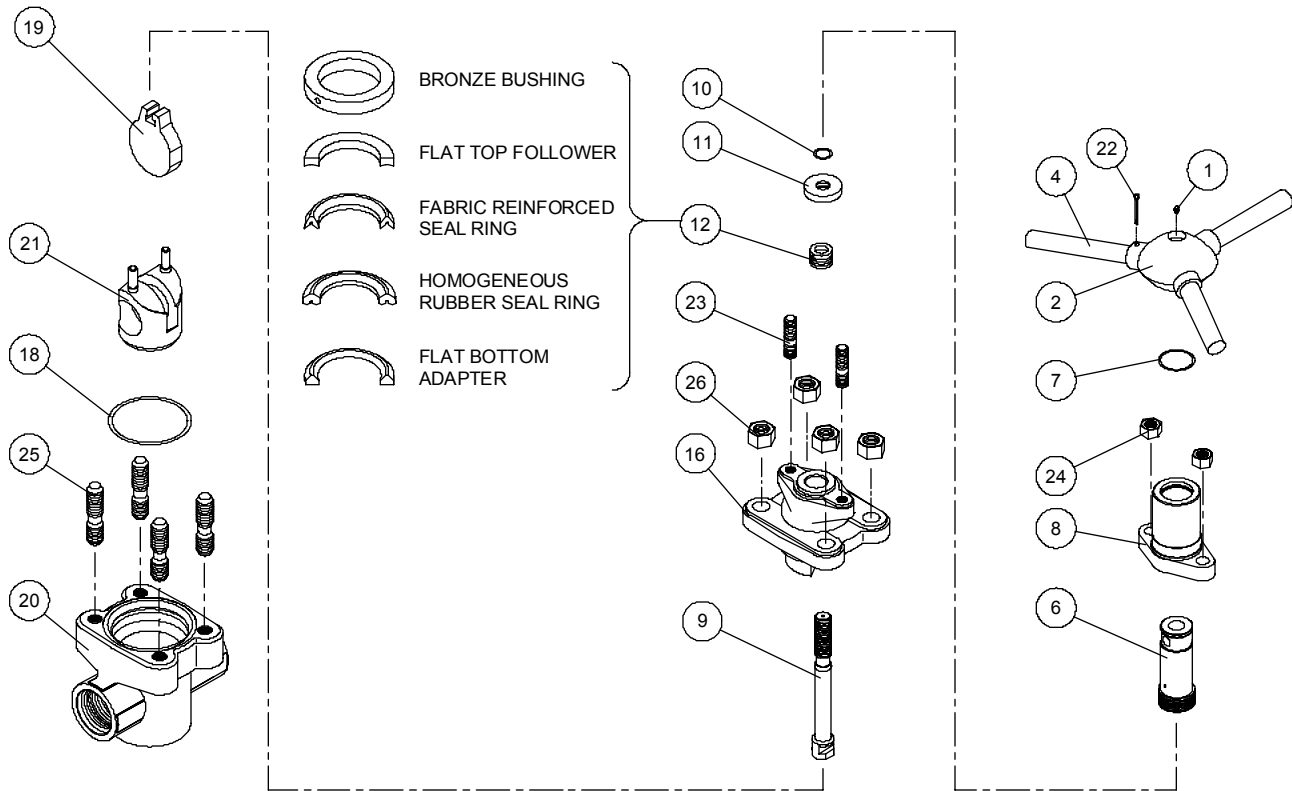
until the gate touches the underside of the bonnet lugs. Align the gate with the opening between the lugs and retract it into the bonnet by turning the stem screw counterclockwise. Place the hub on the stem screw, insert the lock handle and retain it with the cotter pin. Do not spread the pin since it may be removed later while adjusting the gate level.

4. Install the seat on the bonnet and stand the assembly upright resting on the seat. Turn the handle clockwise until the hub is stopped by the top of the screw housing.

Make a pencil mark on one side of the gate even with the bottom of the seat port. Raise the bottom of the gate into the seat bore by rotating the handle and measure the distance from the pencil mark to the bottom of the gate. This distance must be between 5/16" - 7/16". If the distance is correct, proceed to assembly step 5. If not, remove the seat, lock handle and hub from the assembly. Rotate the stem screw clockwise to bottom then back off one-eighth turn. Turn the gate and stem together while holding the stem screw: counterclockwise to reduce the distance or clockwise to increase the distance as required. One-half turn of the gate and stem changes the distance 1/16". Repeat step 4 until the closed gate position is correct.

5. Replace bonnet seal (18). Assemble seat (21) and bonnet to the valve body keeping the seat ports aligned with the body line bore, making sure the gate is in the slot in the seat and that the top pins of the seat are in the drilled holes in the bonnet while performing this operation. Tighten the coupling. Spread the cotter pin (22) in the lock handle and repack the hub with general-purpose grease through fitting (1). This is most effectively done when the valve is closed.

## Repair – Series DM gate valve 2000-3000: 2-1/2" – 5X4"; 5000: 3" & 4x3"; Class 1500: 4"; 1000: 5"



### Disassembly

1. Fully open the gate valve. Remove nuts (26) and withdraw the bonnet assembly from the body. Collapse the seat (21) by compressing the top pins together and remove it from the body.
2. With the bonnet assembly on its side, remove pin (22) and lock handle (4) then lift off hub (2). Turn stem screw (6) clockwise to bottom, then withdraw gate (19) from stem (9) by rotating a quarter turn and sliding it off the tee-head of the stem.
3. Seat or gate replacement may be made at this point. To reassemble the valve, proceed from reassembly instruction 3 after following the applicable maintenance instructions. If it is desired to inspect other parts, the following instructions apply.
4. Turn the stem clockwise until it disengages from stem screw (6) and withdraw it from the underside of the bonnet. Unscrew the nuts (24) (cap screws on 5" and 6x5") and lift screw housing (8) off the bonnet. Remove retainer (11), o-ring seal (10) and stem seal assembly (12) from the bonnet. Turn stem screw (6) clockwise out of the screw housing. Remove screw seal (7) from the screw housing and bonnet seal (18) from the valve body.

### Inspection

Thoroughly clean all parts and inspect them for wear or damage. It is recommended that seals (7), (10), (18) and stem seal assembly (12) be replaced if they are worn or cut. All sealing surfaces should be clean and



free of dirt, rust, nicks and scratches. These will include the areas inside the body adjacent to the line bore where the seat fits, the area around the lower part of the bonnet that lies against the bonnet o-ring seal, the bonnet stuffing box and the surface of the stem that passes through the packing. Clean these surfaces well and polish with emery cloth if necessary, paying particular attention to the valve stem. Before reassembling, apply a good grade of general purpose grease to all threads, seal rings and exterior of the seat and on the surfaces of the bonnet, stem and stem screw which are in contact with seals.

## Reassembly

1. Slide the threaded end of the stem through the bonnet bore from the underside and place the stem seal assembly over the stem. This assembly consists of a flat bottomed adapter ring, homogeneous rubber seal ring, fabric reinforced seal ring, a flat-topped follower ring and a bushing, which are placed over the end of the stem, lips first, in that order. The lips on "V" rings point towards bottom of bonnet. Slide the retainer (11) with o-ring seal (10) inside over the stem. Seat the stem seal assembly into its counterbore in the bonnet.
2. Engage the stem screw (6) in the screw housing (8) about half its total travel and place the screw housing on the bonnet and stem. Replace nuts (24) (cap screws on 5" and 6x5").
3. All except 5" 1000:  
Rotate the stem screw clockwise until it bottoms on the retainer, then back it up approximately one-eighth turn. Engage the gate on the tee-head of the stem and turn them together counterclockwise until the gate touches the underside of the bonnet lugs. Align the gate with the opening between the lugs and retract it into the bonnet by turning the stem screw counterclockwise. Place the hub on the stem screw, insert the lock handle and retain it with the cotter pin. Do not spread the pin since it may be removed later while adjusting the gate level.

5" 1000:

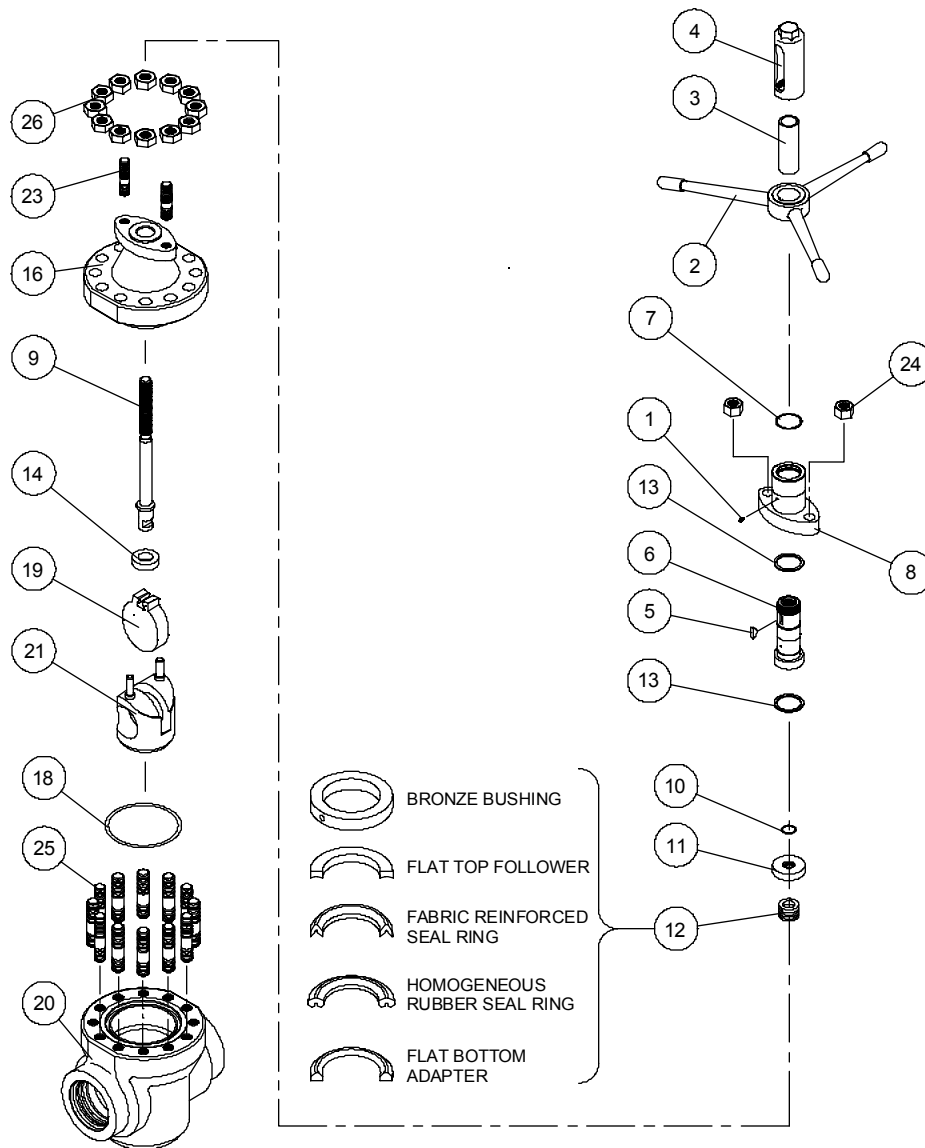
Place the hub on the stem screw, insert the lock handle and retain it with the cotter pin. Turn the handle clockwise until the hub contacts the screw housing. Engage the gate on the tee-head of the stem and turn them together counterclockwise until the gate touches the underside of the bonnet lugs. Align the gate with the opening between the lugs and retract it into the bonnet by turning the handle counterclockwise.

4. Install the seat on the bonnet and stand the assembly upright resting on the seat. Turn the handle clockwise until the hub is stopped by the top of the screw housing. Make a pencil mark on one side of the gate even with the bottom of the seat port. Raise the bottom of the gate into the seat bore by rotating the handle and measure the distance from the pencil mark to the bottom of the gate. This distance must be within the following limits for each size valve: 2-1/2", 3" and 4x3" - 3/8" to 1/2"; 4" and 5x4" - 7/16" to 9/16"; 5" and 6x5" - 1/2" to 5/8".

If the distance is correct, spread the cotter pin and proceed to assembly step 5. If not, remove the seat, lock handle and hub from the assembly. Rotate the stem screw clockwise to bottom then back off one-eighth turn. Turn the gate and stem together while holding the stem screw: counterclockwise to reduce the distance or clockwise to increase the distance as required. One-half turn of the gate and stem changes the distance approximately 3/32". Repeat step 4 until the closed gate position is correct.

5. Replace bonnet seal (18). Assemble seat (21) and bonnet to the valve body keeping the seat ports aligned with the body line bore, making sure the gate is in the slot in the seat and that the top pins of the seat are in the drilled holes in the bonnet while performing this operation. Replace and tighten nuts (26). Spread the cotter pin (22) in the lock handle and repack the hub with general-purpose grease through fitting (1). This is most effectively done when the valve is closed.

## Repair – Series DM gate valves 5000: 4", 5x4" and 6x4"



### Disassembly

1. Fully open the gate valve. Remove nuts (26) (this valve may have either 4 or 12 studs and nuts) and withdraw the bonnet assembly from the body. Collapse the seat (21) by compressing the top pins together and remove it from the body.
2. With the bonnet assembly on its side, turn the handle (2) clockwise to move the gate (19) out of the bonnet. Withdraw the gate from the stem (9) by rotating a quarter turn and sliding it off the tee-head of the stem.
3. Seat or gate replacement may be made at this point. To reassemble the valve, proceed from reassembly instruction 4 after following the applicable maintenance instructions. If it is desired to inspect other parts, the following instructions apply.
4. Remove stem cap (4), tube (3), handle (2) and key (5). Remove nuts (24) and lift off the screw housing (8). Rotate the stem screw (6) clockwise off the stem and remove bearings (13) and retainer (12).

(11). Lift the stem part way so that the down stop ring (14) may be removed, then withdraw the stem from the underside of the bonnet. The stem seal assembly (12), including the bushing, may now be removed.

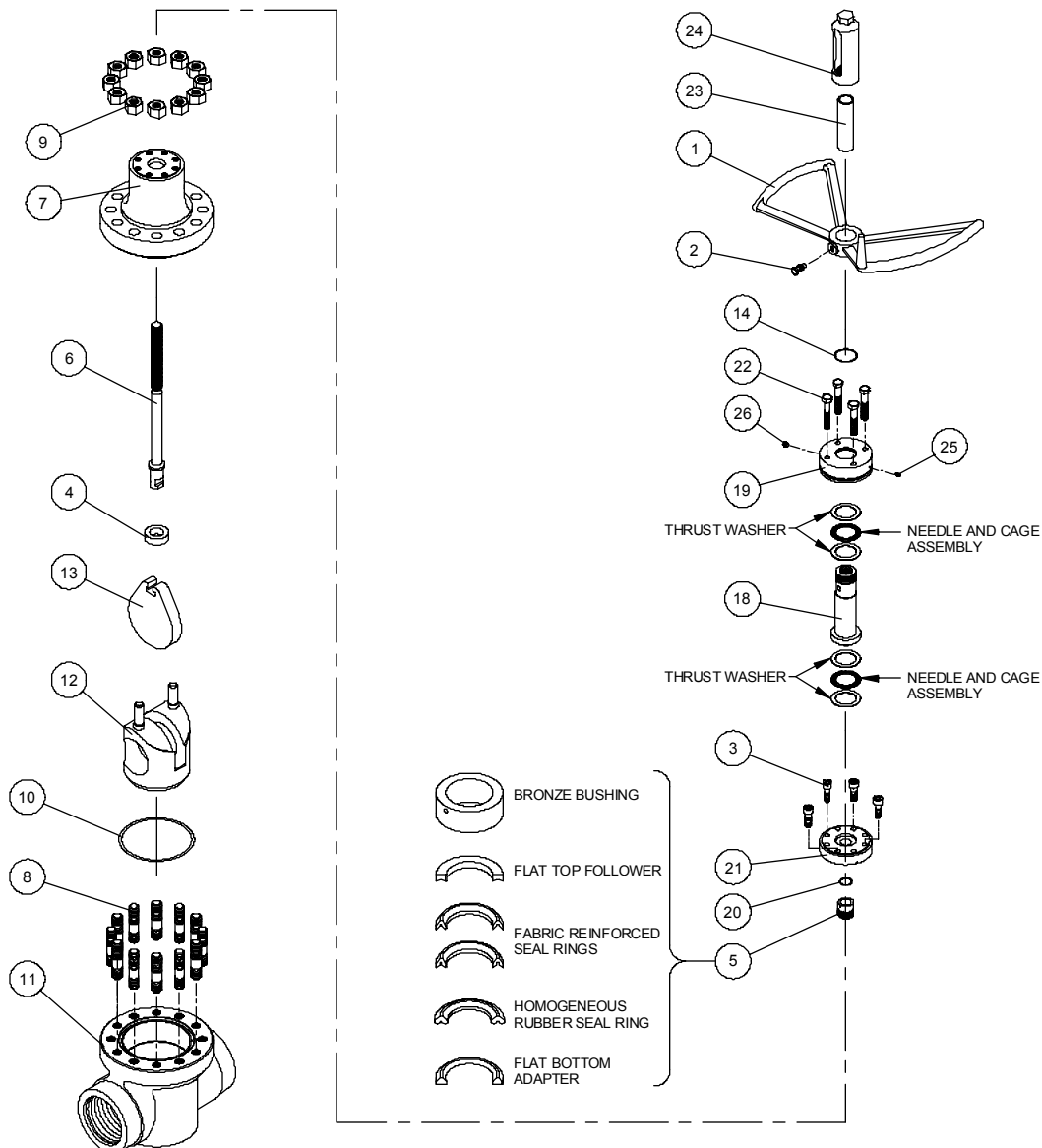
## Inspection

Thoroughly clean all parts and inspect them for wear or damage. It is recommended that seals (7), (10), (18) and stem seal assembly (12) be replaced if they are worn or cut. All sealing surfaces should be clean and free of dirt, rust, nicks and scratches. These will include the areas inside the body adjacent to the line bore where the seat fits, the area around the lower part of the bonnet that lies against the bonnet o-ring seal, the bonnet stuffing box and the surface of the stem that passes through the packing. Clean these surfaces well and polish with emery cloth if necessary, paying particular attention to the valve stem. Also clean and polish the surfaces of the stem screw that run against the bearings. Before reassembling, apply a good grade of general purpose grease to all threads, bearings, seal rings and exterior of the seat and on the surfaces of the bonnet, stem and stem screw which are in contact with seals.

## Reassembly

1. Slide the threaded end of the stem (9) through the bonnet bore from the underside and draw the stem head part way up into the bonnet (16). Put the down stop ring (14) on over the bottom of the stem head, lower the stem so that the down stop ring shoulders on the inside of the bonnet.
2. Place the stem seal assembly (12) over the stem. This assembly consists of a flat bottomed adapter ring, homogeneous rubber seal ring, fabric reinforced seal ring, a flat topped follower ring and a bushing which are placed over the end of the stem in that order. The lips on "V" rings point towards bottom of bonnet. Work the seal and follower rings carefully down over the stem thread, lips first, and into the stuffing box, being careful that the lips of the rings do not get curled back. After the bushing, put the retainer (11), with o-ring inside, down over the stem with flat side up.
3. Follow the retainer with a bearing (13) and the stem screw (6). The bearing must be concentric with the stem screw before further assembly. Place another bearing down over the stem screw and follow with the screw housing (8), with o-ring seal (7) inside, and tighten nuts (24). Put the key (5) into its slot in the stem screw and replace the handle (2), tube (3) and stem cap (4) in that order.
4. Slide the gate (19) into the stem, turn it a quarter turn to line it up with the slot in the bonnet and draw it up all the way into the bonnet by turning the handle counterclockwise. Replace bonnet seal (18). Assemble seat (21) and bonnet to the valve body keeping the seat ports aligned with the body line bore, making sure the gate is in the slot in the seat and that the top pins on the seat are in the drilled holes in the bonnet while performing this operation. Tighten nuts (26) and repack the screw housing (8) with general-purpose grease through fitting (1).

## Repair – Series DM gate valve 3000-5000: 5", 6x5"



### Disassembly

1. Fully open the gate valve. Remove nuts (9) and withdraw the bonnet assembly from the body. Collapse the seat (12) by compressing the insert pins together and remove it from the body.
2. With the bonnet assembly on its side, turn the handwheel (1) clockwise to move the gate (13) out of the bonnet. Withdraw the gate from the stem (6) by rotating a quarter turn and sliding it off the tee-head of the stem.
3. Seat or gate replacement may be made at this point. To reassemble the valve, proceed from reassembly instruction 4 after following the applicable maintenance instructions. If it is desired to inspect other parts, the following instructions apply.
4. Remove stem cap (24), tube (23), screw (2) and handwheel (1). Remove screws (22) and lift off the housing (19). Rotate the stem screw (18) off the

stem (left hand Acme) and remove needle and cage assemblies and thrust washers. Remove screws (3) and lift off the retainer (21). Lift the stem part way so that the down stop ring (4) may be removed, then withdraw the stem from the underside of the bonnet. The stem seal assembly (5), including bushing, may now be removed.

## Maintenance

Thoroughly clean all parts and inspect them for wear or damage. It is recommended that the seals (10), (14), (20) and stem seal assembly (5) be replaced if they are worn or cut. All sealing surfaces should be clean and free of dirt, scale, nicks and scratches. These will include the areas inside the body adjacent to the line bore where the seat fits, the area around the lower part of the bonnet that lies against the bonnet o-ring seal, the bonnet stuffing box and the surface of the stem that passes through the packing. Clean these surfaces well and polish with 320 grit emery cloth if necessary, paying particular attention to the valve stem. Before reassembling, apply a good grade of general purpose grease to all threads, bearings, seal rings and exterior of the seat and on the surfaces of the bonnet, stem and stem screw which are in contact with seals.

## Reassembly

1. Slide the threaded end of the stem (6) through the bonnet bore from the underside and draw the stem head part way up into the bonnet. Put the down stop ring (4) on over the bottom of the stem head, lower the stem so that the down stop ring shoulders on the inside of the bonnet.
2. Place the stem seal assembly (5) over the stem. The order in which the rings are assembled must be exactly as shown with sealing lips down. While installing the rings over the thread on the stem, assure these lips are not damaged. Place bushing on top of the stem seal assembly.
3. Put o-ring (20) into its groove in the bottom of retainer (21) and work retainer with o-ring down over the stem. Bolt retainer to the bonnet with four screws (3). Place two thrust washers with a needle and cage assembly between them on top of the retainer then turn the stem screw (18) counterclockwise on the stem so that it seats against the thrust washer and lifts the stem off the down stop ring approximately one turn. Place the other two thrust washers with needle and cage assembly between them over the stem screw. Put o-ring (14) in its groove in housing (19) and bolt the housing to the bonnet with screws (22). Attach handwheel (1) to the stem screw with screw (2) and replace tube (23) and stem cap (24).
4. Slide the gate (13) onto the stem, turn it a quarter turn to line it up with the slot in the bonnet and draw it up all the way into the bonnet by turning the handle counterclockwise. Replace the bonnet seal o-ring (10). Assemble the seat (12) and bonnet to the valve body keeping the seat ports aligned with the body line bore, making sure the gate is in the slot in the seat and that the top pins on the seat are in the drilled holes in the bonnet while performing this operation. Replace and tighten nuts (9). Repack housing (19) with a good grade of general-purpose grease through fitting (25).

## Troubleshooting

Trouble	Pr obable Cause	Remedy
Leakage through valve	Valve not fully closed due to obstruction in line.	Open valve slightly and re-close. If this does not fix the problem, remove bonnet for inspection.
	Valve is not fully closed due to improper assembly.	Disassemble valve and reassemble according to proper instructions.
	Valve gate may be jammed into bottom of seat.	Back off hand 1/4 turn. Never back off the handle under normal conditions.
	Seat or gate is damaged.	Replace defective parts.
	Seat material incompatible with operating media or temperature.	Consult factory for proper materials.
	Body has eroded or corroded out of tolerance.	Replace or repair body.
Leakage around stem	Stem seal material is incompatible with operating media or temperature.	Consult factory for proper materials.
	Stem is bent or otherwise damaged.	Replace
Leakage between body and bonnet	Bonnet seal damaged.	Replace
	Bonnet seal material is incompatible with operating media or temperature.	Consult factory for proper materials.
	Porosity has developed in body or bonnet.	Replace valve.
Difficult or rough operation	Valve needs lubrication.	Lubricate per instructions under "Routine Maintenance"
	Threads or bearings are worn or otherwise damaged.	Replace defective parts.
Valve will not open or close	Valve is packed with solids.	If ice or hydrates are suspected, the valve may be heated to 200°F max. If the valve is packed with other solids, it must be disassembled and cleaned out.
	Threaded parts are locked up.	Damage may have resulted from excessive operating forces. See page 11 "Operation."
	Valve was improperly assembled.	Reassemble per proper instructions.

Additional information is also available on-line at <http://www.c-a-m.com>





Contact your Cameron's Valves & Measurement group representative for a Repair Manual



For the most current contact and location information go to: [www.c-a-m.com/valvesandmeasurement](http://www.c-a-m.com/valvesandmeasurement)

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