

# DEMCO<sup>®</sup> Resilient-Seated Butterfly Valve

## Installation, Operation, and Maintenance Manual



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The procedures included in this book are to be performed in conjunction with the requirements and recommendations outlined in API Specifications. Any repairs to the equipment covered by this book should be done by an authorized Cameron service representative. Cameron will not be responsible for loss or expense resulting from any failure of equipment or any damage to any property or death or injury to any person resulting in whole or in part from repairs performed by other than authorized Cameron personnel. Such unauthorized repairs shall also serve to terminate any contractual or other warranty, if any, on the equipment and may also result in equipment no longer meeting applicable requirements.

File copies of this manual are maintained. Revisions and/or additions will be made as deemed necessary by Cameron. The drawings in this book are not drawn to scale, but the dimensions shown are accurate.

**BILL OF MATERIALS**

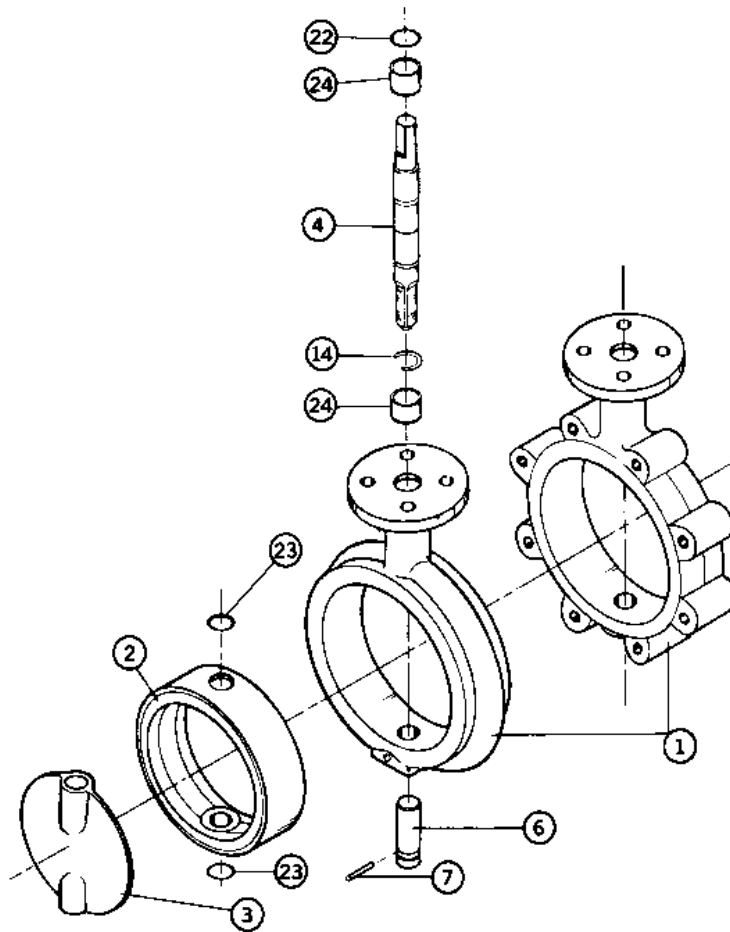


Figure 1 - DEMCO 2" through 12" Resilient Seat Butterfly Valve

Table 1 - DEMCO 2" through 12" Parts List

Item	Qty.	Description
1	1	Body
2	1	Seat
3	1	Disc
4	1	Upper Stem
6	1	Lower Stem
7	2	Spring Pin
14	1	Retainer
22	1	Top O-Ring
23	*	Stem O-Ring
24	2	Bearing

\* 4 required for throttling valves only.

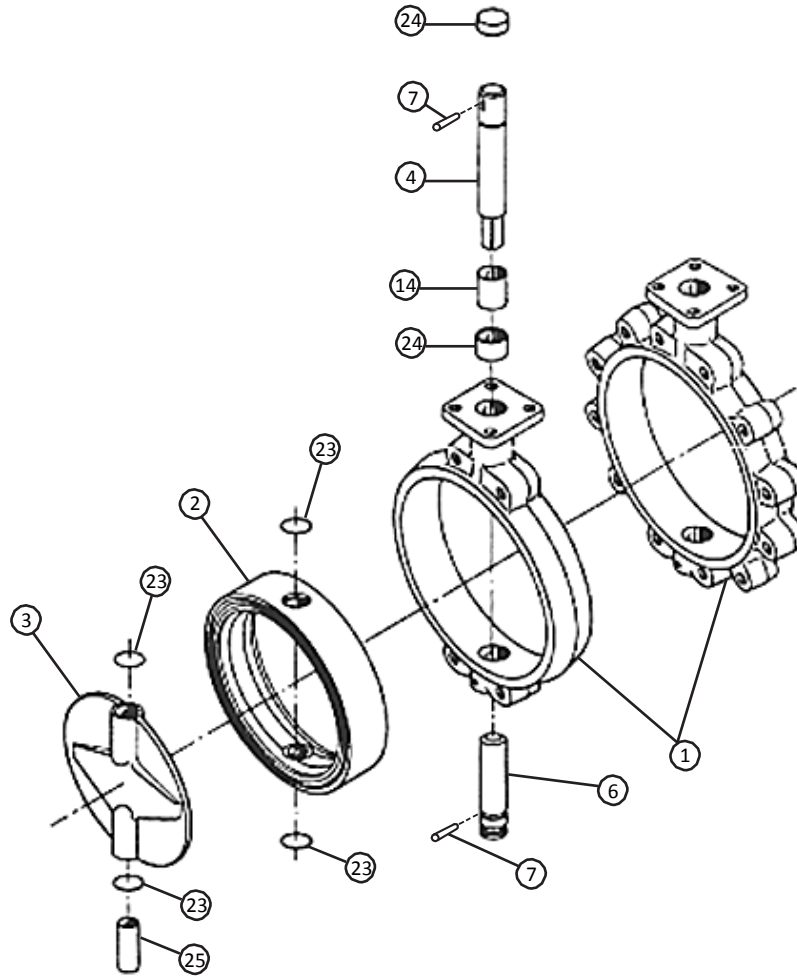


Figure 2 - DEMCO 14" through 36" Resilient Seated Butterfly Valve

Table 2 - DEMCO 14" through 36" Parts List

Item	Qty.	Description
1	1	Body
2	1	Seat
3	1	Disc
4	1	Upper Stem
6	1	Lower Stem
7	2	Spring Pin
14	1	Retainer**
23	*	Stem O-Ring
24	2	Upper Bearing
25	1	Lower Bearing
* 4 required for throttling valves only.		
** 24" - 36" spacer.		

**SCOPE**

DEMCO resilient-seated butterfly valves are an economical alternative to ball, gate or plug valves in many applications. They are light weight quarter turn devices with few parts. They are designed for bubble-tight sealing up to rated pressure and are capable of throttling service. They are easily adapted to automatic actuators.

The DEMCO Resilient Seated Butterfly Valve is available in flangeless wafer design or single flange tapped lug configuration

**NAMEPLATE INFORMATION**


Valves & Measurement 	P/N	1	
	Descr:	2	
DEMCO Oklahoma City, OK, USA	Body:	3	Stem: 6
	Disc:	4	Seat: 5
			WO:

Figure 3 – DEMCO Resilient-Seated Butterfly Valve Nameplate

Table 3 - DEMCO Resilient-Seated Butterfly Valve Nameplate Information

Item	Stamp
1	Product ID Number
2	Product Description
3	Body Material
4	Disc Material
5	Seat Material
6	Stem Material

**STORAGE**

DEMCO Resilient Seated Butterfly Valves are shipped in the partial open position to minimize permanent deformation of the resilient seat. The disc edge is contained within the flange faces of the valve to prevent damage to the sealing area (Figure 4).

**Caution:** valves with fail open or closed actuators are shipped with the disc in the fail position and extra care should be given to prevent damage to the disc edges. Valves should be stored in a clean dry area away from extremes of heat. The resilient seat surfaces should be protected from sunlight and physical abuse.

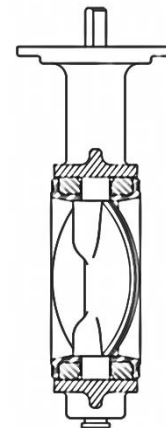


Figure 4

## INSTALLATION AND OPERAION INSTRUCTIONS

### INSTALLATION

DEMCO Resilient Seated Butterfly Valves are bi-directional and will operate in any position. Normally the valve is installed with the upper stem pointing upward (Figure 5). Elevated valves with gear operators and chain wheels should be installed with the upper stem pointing down (Figure 6) so the open-closed indicator is visible from the ground and the chain does not drag on the pipe.

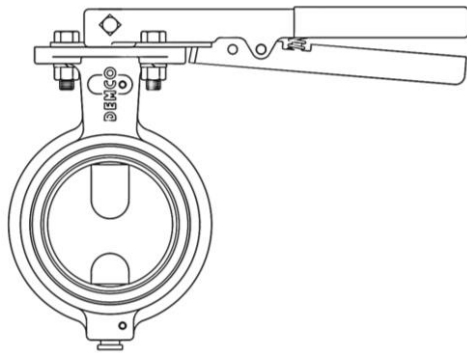


Figure 5

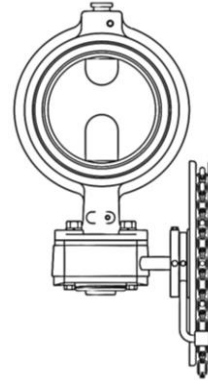


Figure 6

### INITIAL INSTALLATION

The following procedure applies to new installation between standard ASME pipe flanges.

1. When replacing a valve from an existing installation, clean the flange faces and check for excessive corrosion or other damage to the sealing face of the flange.
2. Remove the valve from any packaging material. Close the valve disc so that it is contained within the flange faces. It is not necessary to fully close the valve; the disc must be contained within the confines of the valve body so it will slip between the mating flanges without contact with the flanges.
3. When installing wafer body valves, install the lower flange studs without tightening. Position the valve between the flanges, within the pocket formed by the flange studs. (The OD of the wafer body is equal to the inside of the bolt circle of the flanges, so the valves are self-centering). Install the remaining flange studs.
4. Lug bodies have tapped holes coinciding with those in the flanges. They should be positioned between the flanges and the capscrews inserted through the flange holes into the threaded lug holes.
5. Tighten all nuts/capscrews in a crossover or star pattern to assure even sealing. Tighten sufficiently to assure metal-to-metal contact between the flange face and the metal butterfly valve body. No further tightening is required.
6. Carefully check disc clearance by placing the valve in the full open position. Any binding or scraping should be investigated and corrections made.

## END-OF-LINE SERVICE

DEMCO tapped lug butterfly valves are suitable for liquid service end-of-line applications with downstream piping removed (Figure 7). Sizes 2"-12" are suitable for 200 psi, while sizes 14"-36" are suitable for 150 psi. Weld neck (all sizes), slip-on (sizes 2"-12") and socket weld (sizes 2"-12") flanges can be used for this service. Since the upstream pressure is excluded between the flange and the seat face by the exclusive DEMCO flange seal, there is no effective force to slide the seat downstream.

**Caution: the valves must not be opened or closed with the downstream piping removed as the seat might be shifted breaking the flange seal and allowing pressure to slide the seat downstream.**

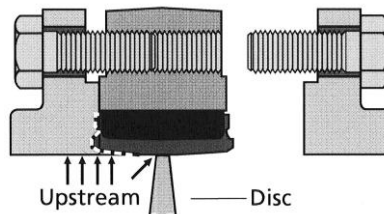


Figure 7

## GASKETS

Flange gaskets are not required nor recommended for use with positive shut-off DEMCO Resilient Seated Butterfly Valves. An integral flange seal is molded into the edge of the rubber seat eliminating the need for flange gaskets. Throttling Valves, only, utilize an O-ring stem seal that must be assisted with flange gaskets for a proper seal.

## FLANGES

Steel ASME Class 150 (or MSS SP-44) weld neck flanges are suitable for all sizes. Slip-on, threaded and socket weld – as well as "stub end" type C flanges – are suitable for use with 2" thru 12" DEMCO Resilient Seated Butterfly Valves. 30" and 36" DEMCO Resilient Seated Butterfly Valves fit between ASME 125/ASME 150 Series A Flanges (or MSS SP-44).

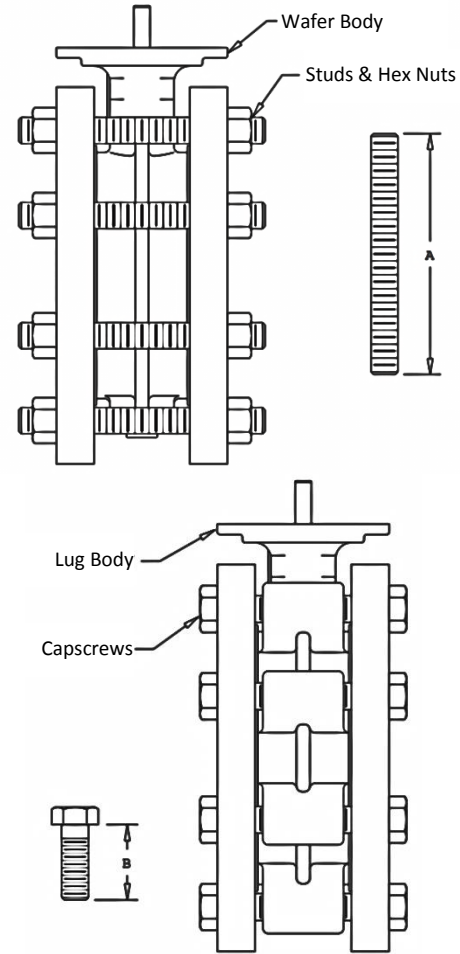
Other flange types may be applicable also, but should be thoroughly checked to assure proper seal makeup. Plastic flanges are subject to damage at installation by over-tightening the bolting and may defect or "cup" resulting in flange leaks.

Recommended bolt and stud lengths for installation in ANSI flanges are provided in Table 4.

Table 4

Valve Size (in)	Bolt Circle Dia (in)	Bolt Size	Wafer Body		Lug Body	
			Qty	Stud Length (in) 'A'	Qty	Capscrew Length (in) 'B'
2	4.75	5/8-11	4	5.00	8	1.50
2-1/2	5.50	5/8-11	4	5.50	8	1.50
3	6.00	5/8-11	4	5.50	8	1.75
4	7.50	5/8-11	8	5.75	16	1.75
5	8.50	3/4-10	8	6.50	16	1.75
6	9.50	3/4-10	8	6.50	16	2.00
8	11.75	3/4-10	8	7.00	16	2.25
10	14.25	7/8-9	12	7.50	24	2.25
12	17.00	7/8-9	12	8.25	24	2.50
14	18.75	1-8	12	8.25	24	2.50
16	21.25	1-8	16	10.00	32	3.25
18	22.75	1-1/8-7	16	10.50	32	3.50
20	25.00	1-1/8-7	20	11.75	40	4.00
24	29.50	1-1/4-7	20	12.50	40	4.00
30	36.00	1-1/4-7	*	*	56	5.00
36	42.75	1-1/2-6	**	**	***	***

- \* - 24 Studs 1 1/4" - 7 x 15.50" ; 8 Capscrews 1 1/4" - 7 x 5.00"
- \*\* - 28 Studs 1 1/2" - 6 x 18.50" ; 8 Capscrews 1 1/2" - 6 x 5.50"
- \*\*\* - 56 Capscrews 1 1/2" - 6 x 6.00" ; 8 Capscrews 1 1/2" - 6 x 5.50"



### DISC/PIPE CLEARANCE

Before beginning installation, disc/pipe clearance should be checked (Figure 10) to avoid the possibility of scraping the disc edge on the pipe ID and damaging the sealing surface. Minimum pipe ID requirements are shown below in Table 5.

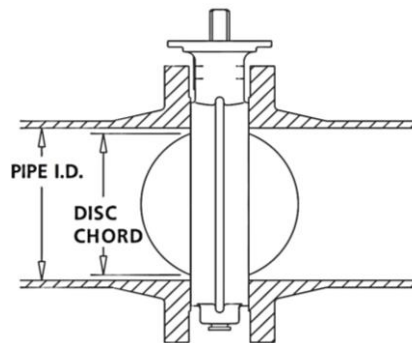


Figure 10



Table 5 - Disc Clearance

Valve Size (in.)	Disc Swing Size (in.)	Opens into:		
		Std Pipe	Sch 40	Sch 80
2"	1.467"	X	X	X
2 1/2"	2.144"	X	X	X
3"	2.743"	X	X	X
4"	3.601"	X	X	X
5"	4.582"	X	X	X
6"	5.624"	X	X	X
8"	7.428"	X	X	X
10"	9.382"	X	X	X
12"	11.35"	X	X	X
14"	12.86"	X	X	N/A
16"	14.72"	X	X	N/A
18"	16.61"	X	X	N/A
20"	18.53"	X	X	N/A
24"	22.57"	X	X	N/A
30"	28.67"	X	N/A	N/A
36"	34.70"	X	N/A	N/A

**OPERATION**

DEMCO Resilient Seated Butterfly Valves should never be operated without a handle or other means of controlling the disc.

**Caution: Failure to restrain the disc under flow conditions can result in the disc slamming closed and possible damage or broken parts.**

2" through 12" DEMCO Resilient Seated Butterfly Valves have flats on the upper stem. 14" and larger valves have a single square key. Stem flats or the square key indicate valve position. When they are in line with the flow stream, the valve is open. When perpendicular, the valve is closed.

**MANUALLY OPERATED**

DEMCO Resilient Seated Butterfly Valves operate from fully-open to fully-closed by a 90° turn of the handle. The handle is marked with a flow arrow. When this arrow is in line with the pipe axis, the valve is open (Figure 11). When perpendicular to the pipe, the valve is closed (Figure 12).

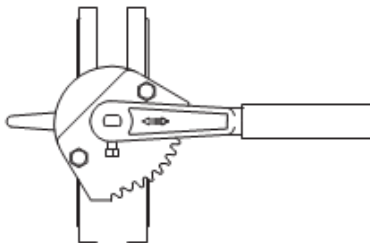


Figure 11 – Valve Shown Open

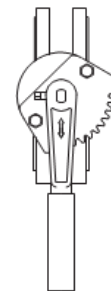


Figure 12 – Valve Shown Closed

WORM GEAR OPERATED

Worm gear operators are recommended for valves larger than 6 inches. Clockwise rotation of the handwheel closes the butterfly valve. Counterclockwise rotation opens the valve.

Gear operators are always mounted with the input shaft perpendicular to the pipe axis for handwheel clearance. Each operator has an arrow on the top of the gear, which indicates the "OPEN - CLOSED" position of the valve (Figure 13).

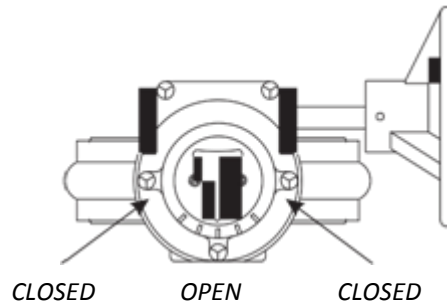


Figure 12 – Valve with Gear Operator

AUTOMATIC VALVES

Butterfly valves with their quarter turn operation are easily adapted to automatic actuators for remote operation. To prevent water hammer, actuators should close the valve slower than 6 to 8 seconds, open-to-close. Rapid closure causes water hammer which can break or otherwise damage valve parts.

MAINTENANCE PROCEDURES

TROUBLESHOOTING

Table 6 - Troubleshooting

Trouble	Probable Cause	Remedy
The valve will not seal properly.	The seat and/or disc is worn or damaged.	Replace worn parts.*
	Foreign matter is present between seat and disc.	Operate several times to wipe clean.
	Operator stops are not set properly.	Adjust stops to proper setting.
The valve is hard to operate.	Build-up of solids or roughness on edge of disc.	Operate several times to wipe clean or disassemble valve and clean disc edge.*
	Operator is not installed properly.	Reinstall operator in proper alignment with valve stem.

The valve will not open.	Disc hits on side of pipe.	Check for proper pipe clearance.
The valve is leaking around stem.	Seat is damaged or worn.	Replace Seat.*
	Disc is bent.	Replace disc, stems and seat as required*
	Flange seal is leaking	Correct flange seal leak to prevent fluid from migrating behind seat and out stem.
The valve closes with line flow.	Handle or actuator does not provide proper restraint.	Restrain disc with handle or actuator.
	Line flow too great.	Choose larger valve or slow down flow.
Flange leaks.	Flange seal surface on seat is damaged.	Replace seat.*
	Flange surfaces are damaged or corroded.	Clean, repair or replace flanges.
	Flange bore is too large.	Replace with proper flanges.
Clockwise rotation of Gear Operator handwheel opens valve. Open-Shut indicators do not coincide with valve disc position.	Gear operator has been rotated 90° on valve top. Handwheel shaft aligns with pipe (should be perpendicular).	Rotate gear operator 90° on valve top to put input shaft perpendicular with pipe axis.
Automatic actuator slams valve shut or open.	Speed control valves missing or not adjusted.	Install and/or adjust speed control valves.
Hard, soft or cracked seat damage is present.	Heat or chemical damage to seat	Replace elastomer seat with compatible material and/or correct offending fluid conditions.

\* Contact your Cameron representative for repair manual.

## CONTACT INFORMATION

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