

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

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Installation, Maintenance and Operation Instructions for NIBCO[®] Series 6822 and 7822 High Performance Butterfly Valves

Statements:

NIBCO High Performance Butterfly Valves, Series 6822 and 7822, have been designed and manufactured for fluid control handling in suitable mechanical systems. It is important to follow the instructions below to assure proper valve installation and safe trouble-free operation. Failure to follow these instructions may result in reduced valve performance and may cause loss of manufacturer's warranty.

1. APPLICATION:

1.1 The selection of the valve design and materials of construction as related to the specific service application is the sole responsibility of the end user.

1.2 All NIBCO HPBFVs have an Identification Plate attached to the perimeter of the valve top flange. Important information including valve size, class, materials of construction, and pressure/temperature ratings are shown.

1.3 Review corrosive effects of the media to be used in the valve and assure it is compatible with the valve materials of construction.

1.4 Do not install the valve where the pressure/temperature ratings can be exceeded. As temperature increases, the safe working pressure decreases. The pressure/temperature ratings are based on API Standard 609 and can be found in the appropriate NIBCO Butterfly Valve catalog.

1.5 Valves should be regularly maintained; reference **Section 7**. Valves used in services where erosion or other detrimental situations can occur should be inspected on a regular basis.

2. STORAGE:

2.1 Valves are shipped in the closed position with flange covers to protect the sealing surfaces and internal valve parts. These covers should remain on the valve until actual installation into piping.

2.2 The valves must be stored in a dry environment, protected from temperature extremes and possibility of damage. The valve body is made from carbon steel and rust can appear on inside surfaces, this will not affect valve performance. Special care should be taken to prevent damage to the disc edge and sealing surfaces.

CAUTION: Only qualified personnel should undertake the procedures outlined in this document. NIBCO INC., its agents, representatives and employees assumes no liability for the use of these procedures. These procedures are offered as suggestions only.

3. INSTALLATION:

3.1 Inspect the piping and remove all dirt, welding slag, rust, and scale from the piping and flange faces. It is advisable to install a strainer upstream of the valve to prevent contamination from entering the valve. It is very important for long trouble-free service to keep the valve free of all contamination that may damage the seal surfaces.

3.2 Remove the protective covers from valve faces and carefully check the valve for any damage that may have occurred during shipping and handling.

3.3 Fully open the valve and verify that sufficient diametrical clearance is available for the valve disc to extend into both mating pipe flanges and piping.

3.4 Cycle the valve from full open to full closed positions checking to assure the operator stops are set properly. **Stops must be properly set before the valve is installed into the piping.** See **Section 4** for proper stop adjustment procedure.

3.5 Fully close the valve before installation into piping to prevent damage to disc.

3.6 Determine valve orientation. The valve can be installed in any position or direction; however it is preferred to install the valve so flow direction matches the direction arrow cast in valve body and with the stem in the horizontal ($\pm 30^\circ$) position. This allows better protection for the seat from particles flowing in the media and from sediment build-up at stem base giving optimal valve service life. This is very important for steam service applications due to the high travel velocities.

3.7 Always check to assure seat retainer screws are securely tightened. Refer to Section 7.17 for procedure and proper torque specifications.

3.8 New flange gaskets are required between valve and flanges. Valves are designed to work with 1/16" thick fiber and metallic wound gaskets. Gaskets are customer supplied.

3.9 Align gasket with valve face and pipe flanges. Install proper size cap screws (bolts) thru the flange and loosely tighten into threaded valve mounting lugs. See **Section 5** for proper cap screw sizing.

3.10 Fully open and close the valve to verify proper operation and that the disc moves freely.

3.11 First, snug all caps screws using the "Cross-over" diagonal method. Second, evenly tighten all screws using the "crossover" diagonal method to the proper torque for the Grade Designation of cap screw being used. Do not over tighten cap screws.

3.12 Again fully open and close the valve to verify proper operation and free disc movement.

3.13 While NIBCO HPBFVs are rated for dead-end service, NIBCO recommends that a downstream flange be used.

4. STOP ADJUSTMENT:

4.1 HPBFVs can be actuated by a manual lever, a manual gear operator, an electric actuator, or a pneumatic actuator. No matter what style of actuation is used, **it is critical that the actuator CLOSED travel limit stop is properly set to match valve disc/seat orientation for proper seal.** The OPEN stop adjustment is not critical; $\pm 5^\circ$ travel is adequate.

4.2 The CLOSED actuator stop should be set before the valve is installed into piping so you can visually see that the disc is centered in the seat (disc front face is parallel with seat retainer face). Note that the valve has an “over-travel” stop at the disc edge. This “over-travel” stop is only to keep the disc from rotating too far thru the seat. When the disc is properly centered in the seat, the disc edge usually does not contact the “over-travel” stop.

4.3 There are several different manufactures of gear operators, electric and pneumatic actuators. While the adjustment procedure is not exactly the same for all manufacturers, they are all very similar to procedures described below.

Manual Lever Adjustment

4.4 Move the lever handle into the closed position and allow trigger to securely latch in the last notch of the throttle plate. Visually inspect the disc to assure it is centered in the seat. If not, slightly loosen the (2) cap screws that hold the throttle plate to the top flange of valve. With the trigger securely latched in last notch, rotate manual lever (and throttle plate) until disc is centered in seat. There is enough clearance in throttle plate mounting holes to allow for adjustment. Securely tighten throttle plate cap screws. Cycle valve from CLOSED position to OPEN position, then back to CLOSED. Verify disc is centered in seat when CLOSED. Adjustment of OPEN stop is not necessary, as it will automatically be set.

Manual Gear Operator Adjustment

4.5 Verify cap screws attaching gear operator to the valve are securely tight. Rotate handwheel clockwise until it stops; disc should be visually centered in the seat. If not, adjustment is necessary. Locate gear operator CLOSED stop set screw. Unlock adjustment stop set screw by removing outer locking set screw or loosening locking nut. Rotate adjustment stop set screw counter-clockwise 2 turns. Rotate handwheel until disc is visually centered in the seat. Rotate adjustment stop set screw clockwise until it stops. Lock adjustment stop set screw by reinstalling outer locking set screw or tightening locking nut. Rotate handwheel counterclockwise opening valve. Rotate handwheel clockwise until it stops and check disc to verify it is visually centered in the seat. If not, repeat adjustment procedure until it is.

4.6 Adjustment of OPEN stop can be achieved by similar adjustment of the OPEN stop set screw. The OPEN stop adjustment is not critical; $\pm 5^\circ$ travel is adequate.

Electric Actuator Adjustment

4.7 Verify cap screws attaching the actuator to the valve are securely tight. Remove top cover of actuator exposing electrical limit switches and cams. **Use caution when working on this as electrical connections are exposed causing potential electric shock hazard.** Operate actuator to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not,

determine if valve in not fully closed or past closed. Unloosen CLOSED stop position cam set screw and rotate slightly in the desired direction, then retighten set screw. Open valve, then operate valve to closed position. Visually inspect the disc to assure it is centered in the seat. If not, repeat process until disc is centered in seat.

4.8 Adjustment of OPEN stop can be achieved by similar adjustment of the OPEN stop cam. The OPEN stop adjustment is not critical; $\pm 5^\circ$ travel is adequate.

Pneumatic Actuator Adjustment

4.9 Verify cap screws attaching the actuator to the valve are securely tight. Operate actuator to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not, adjustment is necessary. Locate actuator CLOSED stop set screw. Unlock adjustment stop set screw by removing outer locking set screw or loosening locking nut. Rotate adjustment stop set screw counterclockwise 2 turns. Rotate valve until disc is visually centered in the seat. Rotate adjustment stop set screw clockwise until it stops. Lock adjustment stop set screw by reinstalling outer locking set screw or tightening locking nut. Operate actuator opening valve. Operate actuator CLOSED and check disc to verify it is visually centered in the seat. If not, repeat adjustment procedure until it is.

4.10 Adjustment of OPEN stop can be achieved by similar adjustment of the OPEN stop set screw. The OPEN stop adjustment is not critical; $\pm 5^\circ$ travel is adequate.

5. CAP SCREW SIZING CHARTS:

LCS-6822 CLASS 150 HPBFV's												
FLANGE SPECIFICATION		ASME/ANSI B16.1 CLASS 125 CAST IRON		ASME/ANSI B16.5 CLASS 150 STEEL		MSS SP-106 CLASS 125 BRONZE		MSS SP-106 CLASS 150 BRONZE		CAP SCREW LENGTH ALLOWS FOR 1/16" THICK FLANGE GASKETS		
VALVE SIZE	VALVE BODY THICKNESS	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	QTY OF LONG CAP SCREWS REQUIRED PER VALVE	QTY OF ** SHORT CAP SCREWS REQUIRED PER VALVE	CAP SCREW SIZE AND THREAD PITCH
2"	1.69	0.62	1.25	0.75	1.50	0.31	1.00	0.50	1.25	8		5/8"-11 UNC
2½"	1.84	0.69	1.50	0.88	1.75	0.31	1.00	0.56	1.25	8		5/8"-11 UNC
3"	1.88	0.75	1.50	0.94	1.75	0.38	1.25	0.62	1.50	8		5/8"-11 UNC
4"	2.12	0.94	1.75	0.94	1.75	0.38	1.25	0.69	1.50	16		5/8"-11 UNC
5"	2.25	0.94	2.00	0.94	2.00	0.38	1.25	0.75	1.75	16		3/4"-10 UNC
6"	2.25	1.00	2.00	1.00	2.00	0.38	1.25	0.81	1.75	16		3/4"-10 UNC
8"	2.50	1.12	2.00	1.12	2.00	0.50	1.50	0.94	2.00	16		3/4"-10 UNC
10"	2.83	1.19	2.25	1.19	2.25	0.56	1.75	1.00	2.25	24		7/8"-9 UNC
12"	3.19	1.25	2.50	1.25	2.50	0.62	1.75	1.06	2.25	24		7/8"-9 UNC
14"	3.62	1.38	3.00	1.38	3.00					24		1"-8 UNC
16"	4.00	1.44	3.00	1.44	3.00					32		1"-8 UNC
18"	4.50	1.56	3.00	1.56	3.00					24	8	*1-1/8"-8 UN
			2.75		2.75							
20"	5.00	1.69	3.50	1.69	3.50					32	8	*1-1/8"-8 UN
			2.75		2.75							
24"	6.06	1.88	4.00	1.88	4.00					32	8	*1-1/4"-8 UN
			3.00		3.00							

* Special pitch cap screw thread required per MSS SP-68 specifications.

** Short screws required for blind tapped holes nearest to stem for 18" and larger size valves.

LCS-7822 CLASS 300 HPBFV's							
FLANGE SPECIFICATION		ASME/ANSI B16.1 CLASS 250 CAST IRON		ASME/ANSI B16.5 CLASS 300 STEEL		CAP SCREW LENGTH ALLOWS FOR 1/16" THICK FLANGE GASKETS	
VALVE SIZE	VALVE BODY THICKNESS	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	QUANTITY OF CAP SCREWS REQUIRED PER VALVE	CAP SCREW SIZE AND THREAD PITCH
2"	1.69	0.88	1.50	0.94	1.75	16	5/8"- 11 UNC
2½"	1.84	1.00	1.75	1.06	1.75	16	3/4"- 10 UNC
3"	1.88	1.13	2.00	1.19	2.00	16	3/4"- 10 UNC
4"	2.12	1.25	2.00	1.31	2.25	16	3/4"- 10 UNC
5"	2.31	1.38	2.50	1.44	2.50	16	3/4"- 10 UNC
6"	2.31	1.44	2.50	1.50	2.50	24	3/4"- 10 UNC
8"	2.88	1.63	3.00	1.69	3.00	24	7/8"- 9 UNC
10"	3.25	1.88	3.25	1.94	3.25	32	1"- 8 UNC
12"	3.62	2.00	3.50	2.06	3.50	32	*1-1/8"- 8 UNC

* Special pitch cap screw thread required per MSS SP-68 specifications.

6. OPERATION:

6.1 The valve can be actuated by a manual lever, a manual gear operator, an electric actuator, or a pneumatic actuator. Turning the valve (as viewed from top) clockwise closes the valve; counter-clockwise opens the valve.

6.2 Due to the double offset design of HPBFVs, the differential pressure over the disc can cause sufficient torque to open the valve spontaneously. For this reason, it is important not to remove lever or actuator from a valve that is or will be pressurized.

6.3 Lever operated valves should always be locked securely in desired throttle plate notch to prevent unexpected disc movement.

7. MAINTENANCE:

7.1 Typical maintenance consists of periodic inspection and exercising (cycling) of the valve to assure proper function.

7.2 Fluid leakage at weep hole near top of valve neck below flange is an indication that the stem packing needs tightened. Evenly tighten both nuts (8) below valve top flange ¼ turn each until leakage stops. It is important to adjust nuts evenly and not to over-tighten or premature stem packing wear will occur.

7.3 If repair parts or service information is required, please locate valve Identification Plate (23) and supply following information:

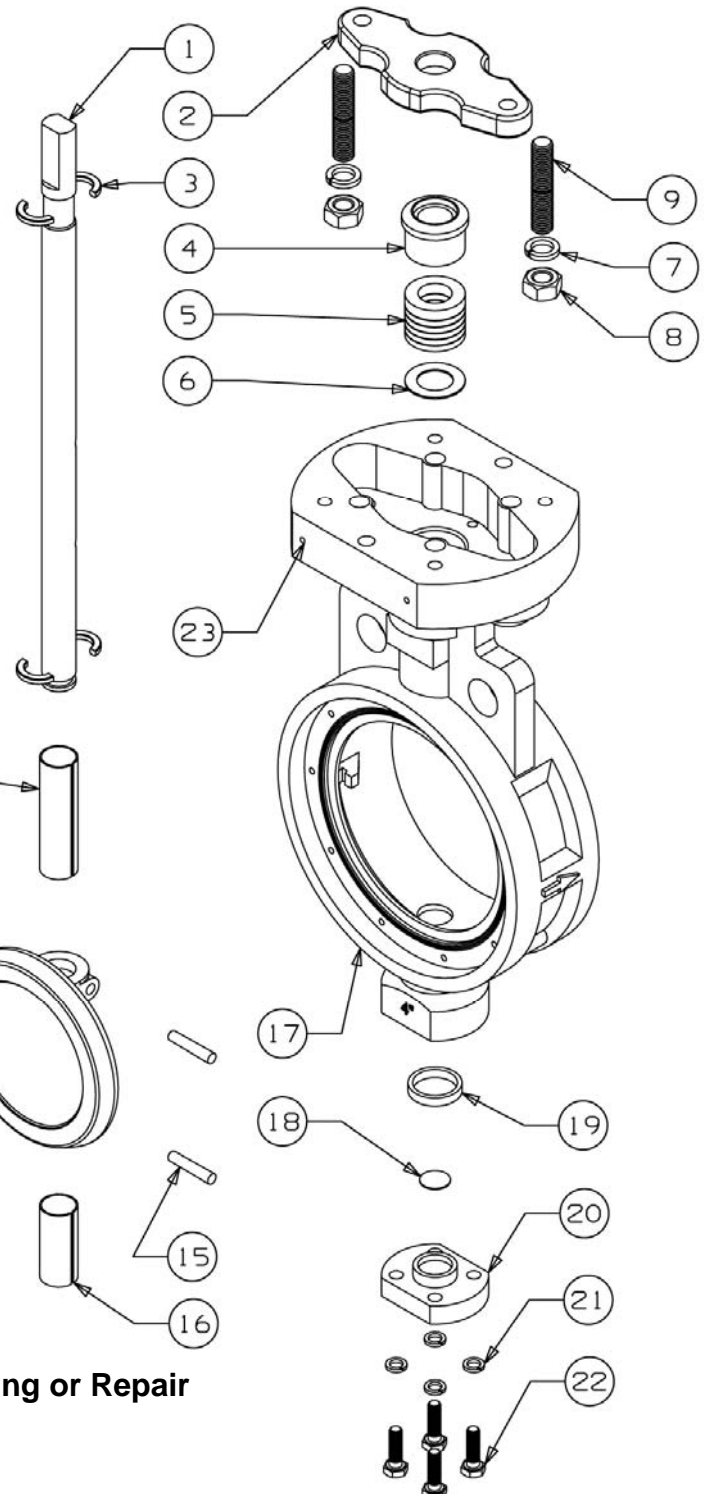
- Valve Figure Number
- Valve Size
- Valve Class

- Manufacture Date Year
- Valve Serial Number
- Type of Actuator

BILL OF MATERIALS

MATERIAL LIST

PART	SPECIFICATION
1. Stem	Stainless Steel UNS ASTM A564 UNS S17400
2. Flange, Gland	Stainless Steel ASTM A351 Grade CF8M
3. Retainer, Stem (2)	Stainless Steel ASTM A276 UNS S31600
4. Gland, Packing	Stainless Steel ASTM A276 UNS S31600
5. Packing	PTFE
6. Retainer, Packing	Stainless Steel ASTM A276 UNS S31600
7. Lockwasher (2)	Stainless Steel Type 304 18-B
8. Nut (2)	Stainless Steel Type 304 18-B
9. Stud (2)	Stainless Steel Type 304 18-B
10. Screw, SHCS	Stainless Steel Type 304 18-B
11. Retainer, Seat	Stainless Steel ASTM A276 UNS S31600
12. Bushing, Upper	Stainless Steel Type 304 PTFE Coated
13. Seat	PTFE 15% Glass Reinforced
14. Disc	Stainless Steel ASTM A351 Grade CF8M
15. Pin, Disc (2)	Stainless Steel ASTM A276 UNS S31600
16. Bushing, Lower	Stainless Steel Type 304 PTFE Coated
17. Body	Carbon Steel ASTM A216 Grade WCB
18. Disc, Spacer	Stainless Steel ASTM A240 UNS S31600
19. Seal, Lower	PTFE
20. Cap, Body	Stainless Steel ASTM A351 Grade CF8M
21. Lockwasher (4)	Stainless Steel Type 304 18-B
22. Screw, Hex (4)	Stainless Steel Type 304 18-B
23. ID Plate	Stainless Steel



Precautions Prior to Valve Removal from Piping or Repair

7.4 Turn off supply pressure to piping in which valve is located. Lock-out & Tag-out per established safety procedure.

7.5 Identify media in piping and determine how to safely drain piping. Use proper personal protection clothing and supplies as needed.

Removal of Valve from Piping

7.6 Check to confirm piping has been depressurized and drained.

7.7 Actuate valve until in full CLOSED Position.

7.8 Attach appropriate lifting strap or sling to valve neck. Attach other end of strap or sling to secure point capable of supporting valve weight.

7.9 Disconnect any supply lines (air and electric) to actuator if applicable. Lock-out & Tag-out per established safety procedure.

7.10 Unloosen and remove all cap screws from mating pipe flanges.

7.11 Remove valve from between flanges. Remove old gaskets and clean piping flange seal surfaces of old gasket residue.

7.12 Note that any time the valve is removed from between flanges, it if necessary to re-torque seat retainer cap screws (10).

Seat Replacement Procedure

7.13 Remove valve from piping per procedure above.

7.14 Place valve on bench with seat retainer (11) facing up. Remove cap screws (10) from retainer. Thread 2 of the removed cap screws (10) into the 2 threaded holes in retainer (11) at 12 o'clock and 6 o'clock. This will assist in pushing the retainer (11) from valve body (17).

7.15 Remove old seat (13) and discard.

7.16 Clean seat cavity and retainer (11). Clean, and inspect seal surfaces on disc (14). Polish disc edge to remove any small scratches that may interfere with disc / seat seal.

7.17 Install new seat (13) into valve body (17). Install retainer (11) onto seat and align screw holes. Install cap screws (10) and snug. Torque cap screws using the "Cross-over" diagonal method. Torque screws as follows:

SCREW SIZE	TORQUE FT./LBS.	SCREW SIZE	TORQUE FT./LBS.
4mm	4 ft./lbs.	8mm	11 ft./lbs.
6mm	8 ft./lbs.	10mm	15 ft./lbs.

7.18 Operate actuator to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not, refer to **Section 4** for proper stop adjustment.

7.19 Open and close valve several times and check for proper operation before placing valve back in service.

Lower Seal Replacement Procedure

7.20 Remove valve from piping per procedure above.

7.21 Remove 4 caps screws (22) and lockwashers (21). Remove body cap (20) being careful not to lose disc spacer (19).

7.22 Being careful not to damage any seal surfaces, remove lower seal (19) from valve body (17) and discard.

7.23 Clean seal cavity and cap (20). Inspect for any damage.

7.24 Install new seal (19) into valve body (17). Install spacer (18), cap (20), cap screws (22), and lockwashers (21). Torque cap screws evenly using the “Cross-over” diagonal method.

Stem Packing Replacement Procedure

7.25 Remove valve from piping per procedure above.

7.26 Mark orientation of actuator in relation to valve body.

7.27 Remove actuator and all hardware from top of valve to expose gland flange (2).

7.28 Remove nuts (8) and lockwashers (7). Push upward on studs (9) and remove gland flange (2) from top of valve. Remove gland (4) from stem (1).

7.29 Being careful not to damage any seal surfaces, remove PTFE packing (5) from valve body (17) and discard.

7.30 Clean packing cavity and gland (4). Inspect for damage.

7.31 Install new packing assembly (5) into valve body (17). Slide gland (4) over stem with flat side towards packing.

7.32 Slide gland flange (2) with studs (9) over stem and into cavity. Install lockwashers (7) and nuts (8). Tighten nuts evenly to torque as follows:

VALVE SIZE	NUT TORQUE FT./LBS.
2" – 6"	4 ft./lbs.
8" – 14"	8 ft./lbs.
16" – 24"	11 ft./lbs.

7.33 Install actuator and hardware to top of valve in original orientation as marked. Tighten all fasteners securely.

7.34 Cycle actuator several times, then to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not, refer to **Section 4** for proper stop adjustment.

7.35 Open and close valve several times and check for proper operation before placing valve back in service.

NIBCO® 6822 and 7822 Series High Performance Butterfly Valve

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Replacement Parts

LCS6822 SERIES CLASS 150	GEAR OPERATOR		HANDWHEEL		HANDWHEEL PIN		STEM BUSHING / KEY		LEVER HANDLE	LEVER BUSHING	RPTFE SEAT KIT	CARBON SEAT (ONLY)	
	RATIO	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	
2"	24:1	RG70001	8" OD X .625" BORE	RG70014	Ø.190" X 1.63" LONG	RG70020	Ø.500 X .375 FLATS	DIRECT	RG70031	RG70034	RG70035	RG70054	
2½"	24:1	RG70002	8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS	RG70022	RG70032	DIRECT	RG70036	RG70037	RG70055
3"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG70038	RG70056
4"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG70039	RG70058
5"	24:1	RG70003	8" OD X .625" BORE	RG70015	Ø.190" X 1.63" LONG	RG70023	RG70033	DIRECT	RG70040	RG70041	RG70060		
6"	24:1	8" OD X .625" BORE	Ø.190" X 1.63" LONG		Ø.750 X .500 FLATS					RG70024	RG70061		
8"	30:1	RG70004	12" OD X .750" BORE	RG70016	Ø.190" X 1.63" LONG	RG70025	.250" X .250" X 2" LG.		RG70042	RG70043	RG70062		
10"	30:1	RG70006	12" OD X .750" BORE		Ø.190" X 1.63" LONG					RG70026	RG70063		
12"	50:1	RG70007	16" OD X .750" BORE	RG70017	Ø.190" X 1.63" LONG	RG70028	.312" X .312" X 2- 1/4" LG.		RG70044	RG70045	RG70064		
14"	50:1	RG70008	16" OD X .750" BORE		Ø.380" X 1.81" LONG					RG70029	RG70065		
16"	80:1	RG70010	16" OD X 1.00" BORE	RG70018	Ø.380" X 2.50" LONG	RG70029	.500" X .375" X 3" LG.		RG70046	RG70047	RG70066		
18"	80:1	RG70011	20" OD X 1.00" BORE		Ø.380" X 2.50" LONG					RG70030	RG70067		
20"	320:1	RG70012	20" OD X 1.19" BORE	RG70019	Ø.380" X 2.50" LONG	RG70030	.750" X .500" X 4" LG.		RG70048	RG70067	RG70067		
24"	320:1	RG70013	20" OD X 1.19" BORE		Ø.380" X 2.50" LONG								

LCS7822 SERIES CLASS 300	GEAR OPERATOR		HANDWHEEL		HANDWHEEL PIN		STEM BUSHING / KEY		LEVER HANDLE	LEVER BUSHING	RPTFE SEAT KIT	CARBON SEAT (ONLY)	
	RATIO	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	
2"	24:1	RG70001	8" OD X .625" BORE	RG70014	Ø.190" X 1.63" LONG	RG70020	Ø.500 X .375 FLATS	DIRECT	RG70031	RG70034	RG70035	RG70054	
2½"	24:1	RG70002	8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS	RG70022	RG70032	DIRECT	RG70036	RG70037	RG70055
3"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG70038	RG70056
4"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG70039	RG70058
5"	24:1	RG70003	8" OD X .625" BORE	RG70015	Ø.190" X 1.63" LONG	RG70023	RG70033	DIRECT	RG70040	RG70041	RG70060		
6"	24:1	8" OD X .625" BORE	Ø.190" X 1.63" LONG		Ø.750 X .500 FLATS					RG70024	RG70061		
8"	30:1	RG70005	12" OD X .750" BORE	RG70016	Ø.190" X 1.63" LONG	RG70025	.250" X .250" X 2" LG.		RG70042	RG70043	RG70062		
10"	50:1	RG70008	16" OD X .750" BORE		Ø.190" X 1.63" LONG					RG70026	RG70063		
12"	80:1	RG70009	16" OD X 1.00" BORE	RG70017	Ø.380" X 1.81" LONG	RG70027	.375" X .375" X 3" LG.		RG70044	RG70045	RG70064		