

LD145/WD145 SERIES

BUTTERFLY VALVE

INSTALLATION OPERATION MAINTENANCE

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INTRODUCTION

DESIGN FEATURES

LD145/WD145 SERIES

- Available in wafer or lug body.
- Flange holes comply with ANSI Class 125/150 dimensions.
- Cast-in top plate with ISO-5211 mounting dimensions provides for direct-mounting of Apollo® actuators and manual operators.
- The face-to-face dimensions were designed to comply with MSS SP-67 and API 609.
- Wafer body features four alignment holes for ease of installation.
- Through-shaft design with spline connection with stem to disc. Disc-to-seat interface provides bubble-tight shut-off with reduced torque and extended service life.
- Equipped with a stretch-resistant, non-collapsible, blowout-proof, phenolic-backed cartridge seat. (14" through 24" have aluminum backing)
- Meets the intent and has passed AWWA C504-87 Section 5 proof of design tests.
- Factory tested to 110% of full rated pressure in both directions before shipping.
- NSF 372 Approved.

FLANGE AND PIPE COMPATIBILITY

APOLLO® Butterfly Valves are designed to fit between the following piping flanges:

- ANSI 125 Cast iron flanges (all sizes)
- ANSI 150 Steel flanges, schedule 40 (all sizes)
- ANSI 150 Steel flanges, schedule 80 (2"-12")

Note: When installing valves in schedule 80 piping, make sure the valve is properly centered between the pipe flanges to prevent disc edge damage since the clearance between the disc O.D. and the pipe I.D. is reduced. If there is a compatibility question, compare the minimum pipe I.D. with the disc chord dimensions in Table 1.

OPERATING PRESSURES

LD145/WD145 SERIES:

- **2"-12"** (50mm-300mm) – 200 psig (13.78 bar)

PRODUCT STORAGE

- The valves should be stored with the disc in the partially open position.
- The valves should be stored indoors in a clean, dry, well-ventilated place away from corrosive materials and protected from excessive dust and dirt.
- The valves should be stored on a rack or pallet off the floor and arranged to prevent damage during handling.
- Keep valves out of direct sunlight and in a cool location to prolong elastomer life.
- Valves should be protected to prevent damage to the flange faces, disc sealing edge and operator.

PRODUCT MARKING

All APOLLO® Butterfly Valves are equipped with an identification tag attached to the valve neck. This tag provides the model number, part number, size, max pressure rating, and date of manufacture.



FIGURE 1. NAME PLATE

INSTALLATION INFORMATION

APOLLO® butterfly valves are designed for use between the faces of ANSI 125 and 150 pound flat, raised face, slip-on or weld-neck flanges at the pressure indicated on the nameplate. **Flange gaskets should not be used.** Due to the brittle nature of cast iron, consideration should be given to the proper piping alignment prior to the installation of any cast iron lug bodied valve. All APOLLO® resilient seated butterfly valves are bi-directional with the ability to control flow equally in either direction. All LD145 Series APOLLO® lug style butterfly valves may be used for dead-end service in either direction at their full pressure rating.

INSTALLATION INSTRUCTIONS

Step 1. Check to make sure that the pipe flange and valve sealing faces are clean and free from any debris (pipe scale, welding slag, etc.).

Step 2. Check the valve nameplate to ensure that the pressure and valve materials are correct for the application. See Tables 3 for seat material temperature ratings.

WARNING! – Apollo butterfly valves should never be installed where service conditions could exceed the valve ratings. Failure to heed warning may result in personal injury or property damage.

Step 3. The seat sealing face on the LD145/WD145 Series butterfly valves is wider than the valve body providing a leak-proof seal when compressed between pipe flanges. Therefore, no flange gaskets are required when installing any APOLLO® butterfly valve.

Step 4. To prevent damage to the disc sealing edge during installation, position the disc in the “partially open” position (Figure 2) so that the disc is still contained within the valve body.

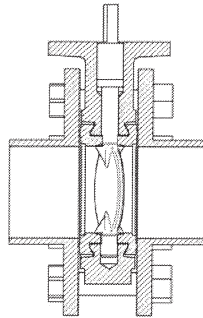


FIGURE 2. VALVE IN PARTIALLY OPEN POSITION

- Step 5. Spread the pipe flanges apart allowing the valve to be slipped easily in between the flanges.
- Step 6. Center the valve between the flanges and loosely install all the flange bolts. On the Model 145 wafer valve, the flange bolts that pass through the alignment lugs should be installed first. Consult Table 2 for correct flange bolt size and quantity.
- Step 7. Slowly open the valve to the full open position (Figure 3) and back to the partially open position ensuring that the disc moves freely without any obstruction. If no obstruction is encountered, return the valve to the full open position and hand-tighten all flange bolts using the bolt tightening sequence shown in Figure 4.

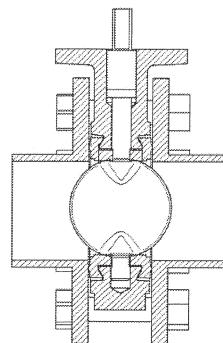


FIGURE 3. VALVE IN FULL OPEN POSITION

- Step 8. Rotate the disc from the fully open position to the fully closed position and make sure that the valve is properly centered and the disc edge does not contact the pipe ID. Return the disc to the full open position and tighten the flange bolts following the bolt tightening sequence shown in Figure 4. However, do not fully tighten each flange bolt all at once. Tighten each bolt incrementally following the sequence in Figure 4 several times until the flange bolts are tight. After all flange bolts are fully tightened, cycle the valve from full open to full closed to ensure that there is proper disc clearance.

MAINTENANCE AND REPAIR

APOLLO® butterfly valves are designed for extended service with minimal wear and servicing. No regular lubrication is required. Prior to any replacement or repair, the valve must be removed from the line following these precautions:

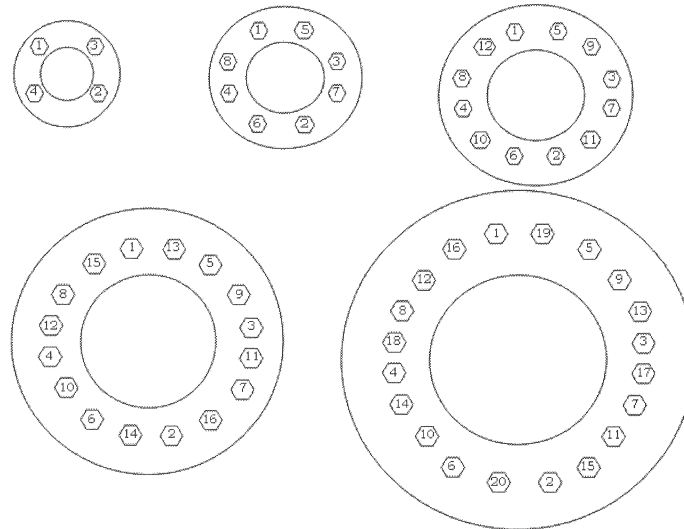
1. The pipeline on either side of the valve must be depressurized and drained.
2. Ensure that the disc is in the partially open or full closed position before removing the valve from the line.
3. **DO NOT** remove an actuator or operator from the valve while the line is still pressurized.

Valve Size		Disc Chord
(in)	(mm)	
2	50	1.133
2.5	65	1.706
3	80	2.450
4	100	3.488
5	125	4.296
6	150	5.697
8	200	7.468
10	250	9.484
12	300	11.456
14	350	13.000
16	400	14.970
18	450	16.847
20	500	18.650
24	600	22.558

TABLE 1. BUTTERFLY VALVE DISC CHORD DIMENSIONS

Valve Size		WAFER BODY HEAVY HEX BOLTS & NUTS WITH NC THREAD			LUG BODY REGULAR HEX HEAD SCREWS WITH NC THREADS		
(in)	(mm)	Diameter	Length	Quantity	Diameter	Length	Quantity
2	50	5/8"	4"	4	5/8"	1-1/2"	8
2.5	65	5/8"	4-1/4"	4	5/8"	1-1/2"	8
3	80	5/8"	4-1/2"	4	5/8"	1-3/4"	8
4	100	5/8"	5"	8	5/8"	1-3/4"	16
5	125	3/4"	5"	8	3/4"	1-3/4"	16
6	150	3/4"	5"	8	3/4"	2"	16
8	200	3/4"	6"	8	3/4"	2-1/4"	16
10	250	7/8"	6"	12	7/8"	2-1/4"	24
12	300	7/8"	6-1/2"	12	7/8"	2-1/2"	24
14	350	1"	7"	12	1"	2-3/4"	24
16	400	1"	8-1/2"	16	1"	3-1/4"	32
18	450	1-1/8"	9"	16	1-1/8"	3-1/2"	32
20	500	1-1/8"	10"	20	1-1/8"	4"	40
24	600	1-1/4"	11"	20	1-1/4"	4"	40

TABLE 2. STUD AND BOLT SPECIFICATION FOR LUG AND WAFER



FLANGE SIZE	BOLT SIZE	MIN. BOLT TORQUE (FT./LBS.)	MAX BOLT TORQUE (FT./LBS.)
2"-4"	5/8"	20	70
5"-8"	3/4"	30	120
10" AND 12"	7/8"	50	200
14" AND 16"	1"	70	240
18" AND 20"	1-1/8"	100	380
24"-30"	1-1/4"	140	520
32"-48"	1-1/2"	200	800
54"-60"	1-3/4"	350	1800

FIGURE 4. FLANGE BOLT TIGHTENING SEQUENCE AND TORQUE VALUES

ASSEMBLY/DISASSEMBLY INSTRUCTIONS

LD145/WD145 SERIES BUTTERFLY VALVE ASSEMBLY AND DISASSEMBLY

The LD145/WD145 Series butterfly valves **DO NOT** have field replaceable parts. Therefore, assembly or disassembly is not permitted. Once the valve is removed from the line, inspect the parts for wear. If valve parts show wear, replacement is necessary. Contact your local APOLLO® distributor for a replacement valve.

Type	Min	Max
Buna-N	+10 °F (-12 °C)	+180 °F (82 °C)
EPDM	-30 °F (-34 °C)	+225 °F (135 °C)
Viton	-20 °F (-29 °C)	+300 °F (149 °C)

TABLE 3. LD145/WD145 SERIES SEAT MATERIAL TEMPERATURE RANGES

BUTTERFLY VALVE PART LISTS

LD145/WD145 SERIES PARTS LIST

ITEM #	PART #	QTY	DESCRIPTION
1	LB14103D	1	BODY, 3", DLAPC BFV, LD145
2	SH14103S4	1	SHAFT, 3" APC BFV, 416 SS.
3	S14103WE	1	SEAT, 3" BFV, WRC-EPDM,
4	D14103B	1	DISC, 3" BFV, ALUM BRZ
5	BU14103P	1	BUSHING, 3" APC BFV, PTFE,
6	O14103N	1	O-RING, 3" APC BFV, EPDM,
7	W14103W	1	WASHER, FLAT, 3" APC BFV, BRS,
8	RS14103W	1	RET RING, EXT, 3" APC BFV, STL,
9	RH14103W	1	RET RING, INT, 3" APC BFV, STL,
10	HF14103W	2	SCREW, SET, 3" APC BFV, STL, FLAT PNT
11	HC14103W	2	SCREW, SET, 3" APC BFV, STL, CONE PNT
12	I850800	1	NAMEPLATE, 145 SERIES BFV, ALUM

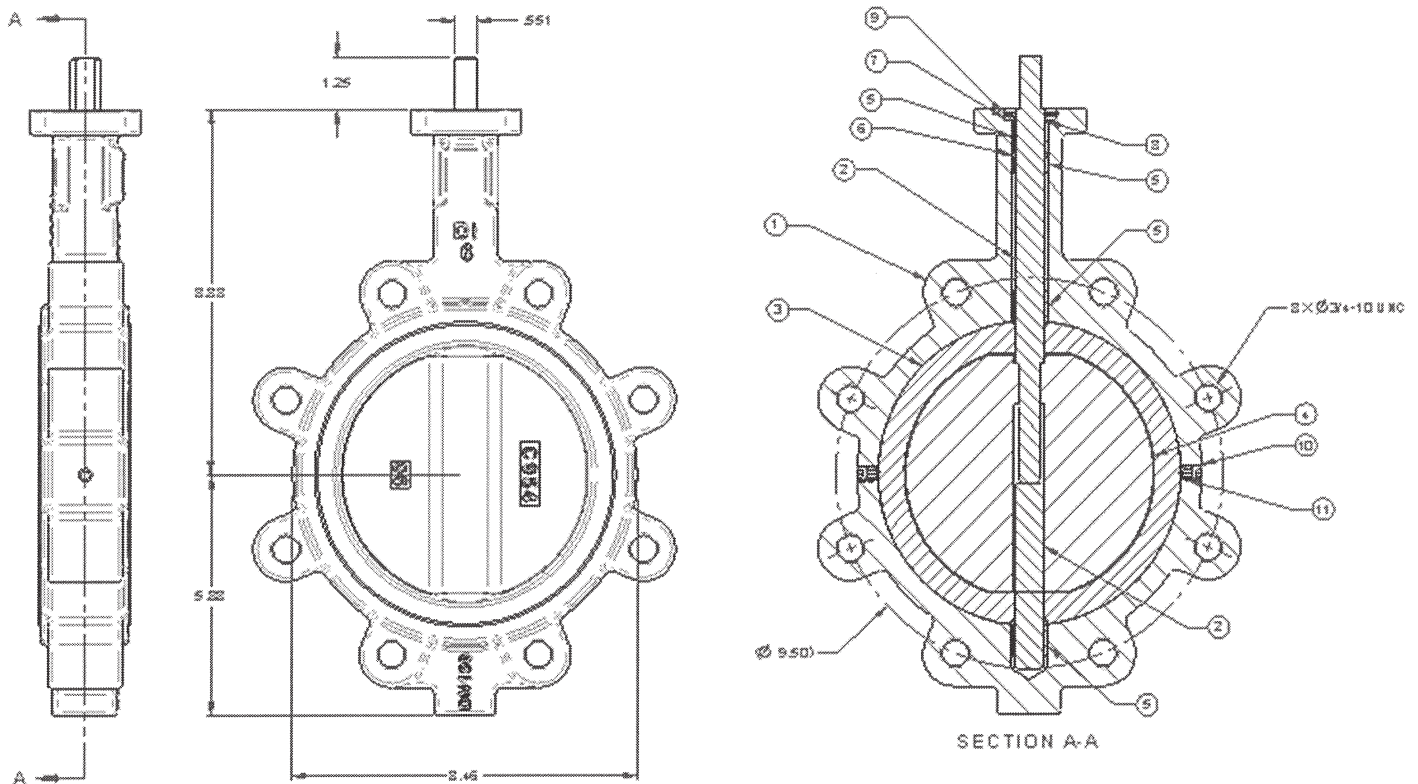


Figure 5: Assembly View: 3" Butterfly Valve Shown

DOUBLE-D AND KEYED STEM

Size Inches	Size DN	Dimensions in Inches																	
		A	B	C	D	E	ØF	ØG	ØG2	Key	ØH	ØH2	ØI	ØJ	K	L	M	N (WD)	N (LD)
2	50	3.25	6.375	1.25	1.75	0.394	0.496	0.375	--	--	2.756	--	2.699	4	2.09	1.113	4.75	0.688	.625-11
2.5	65	3.75	6.880	1.25	1.88	0.394	0.496	0.375	--	--	2.756	--	2.699	4.75	2.54	1.706	5.50	0.688	.625-11
3	80	4.00	7.130	1.25	1.88	0.394	0.496	0.375	--	--	2.756	--	2.699	5.13	3.09	2.450	6.00	0.688	.625-11
4	100	4.88	7.880	1.25	2.13	0.472	0.621	0.375	--	--	2.756	--	2.699	6.75	4.09	3.488	7.50	0.688	.625-11
5	125	5.38	8.380	1.25	2.25	0.551	0.745	0.375	--	--	2.756	--	2.699	7.75	4.85	4.296	8.50	0.813	.625-11
6	150	5.88	8.880	1.25	2.25	0.551	0.745	0.375	--	--	2.756	--	2.699	8.63	6.13	5.697	9.50	0.813	.751-10
8	200	7.13	10.250	1.75	2.50	0.669	0.870	0.563	0.438	--	4.921	4.015	4.606	10.56	7.89	7.468	11.75	0.813	.750-10
10	250	8.25	11.500	1.88	2.75	0.866	1.120	0.563	0.438	--	4.921	4.015	4.606	13.06	9.89	9.484	14.25	0.938	.750-10
12	300	9.75	13.250	1.88	3.13	0.945	1.244	0.563	--	--	4.921	--	4.606	16	11.89	11.456	17.00	0.938	.875-9

Approximate Weight for Bare Shaft Valve

Valve Size		WD Model Lbs (kg)	LD Model Lbs (kg)
Inches	DN		
2	50	6 (2.7)	8 (3.6)
2.5	65	6 (2.7)	10 (4.5)
3	80	7 (3.2)	11 (5.0)
4	100	11 (5.0)	17 (7.7)
5	125	13 (5.9)	20 (9.1)
6	150	16 (7.3)	23 (10.4)
8	200	29 (13.2)	39 (17.7)
10	250	44 (20.0)	62 (28.1)
12	300	70 (31.8)	97 (44.0)

145 Series: Assembled & Tested in USA

MANUAL OPERATOR INSTALLATION

LEVER HANDLE MOUNTING PROCEDURE

- Step 1. First, start by loosely assembling the notch plate on the valve top plate. The notch plate should be installed with the notches in the third quadrant of the valve top plate with the stop tabs at the 6 o'clock and 9 o'clock position. The notch plate should be installed with the stop tabs pointing upward (Figure 5).
- Step 2. Next, install the handle so that the lever fully engages in the notches when the lever is released and tighten the handle set screw.
- Step 3. Compress the handle lever and position the disc so that the valve is in the fully closed position. Align the last notch on the notch plate at the 9 o'clock position with the handle lever and tighten the notch plate screws.
- Step 4. Compress the handle lever and position the disc so that the valve is in the fully open position and release the lever. The lever should line-up with the last notch on the notchplate at the 6 o'clock position.

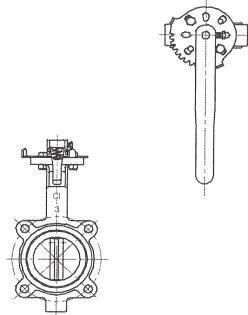


FIGURE 6. NOTCHPLATE INSTALLATION POSITION

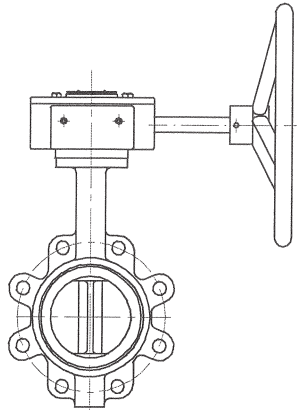


FIGURE 7. GEAR OPERATOR INSTALLATION POSITION

Instructions for Setting Gear Operator – (Refer to illustrations 1 and 2)

- Step 1. Mount gear operator (Item 1) on top of butterfly valve with the four bolts and washers provided with each assembly.
- Step 2. Use Allen wrench to remove locking set screws (item 2) and to adjust stops (item 3), see tools required.
- Step 3. Remove locking (short) set screw from both sides of the gear operator. (Item 2)
- Step 4. Loosen the second (longer) set screws (Item 3) approximately three to four turns on both sides of the gear operator.
- Step 5. Rotate handle to the fully open position and tighten set screw (item 3) into position. Now, add locking set screw (item 2) and lock both into place.
- Step 6. Rotate hand wheel to the fully closed position. Note disc should be centered in the seating surface.
- Step 7. Once disc is fully closed, tighten set screw (item 3) into the stop position. Then open disc 20% and then back to closed position. Re-adjust set screw (item 3) if necessary. Add Locking set screw (item 2) and lock both into place. You have now locked both the open and closed positions into place.
- Step 8. As a quick reference, note the position of the pointer and the word **CLOSE**. The pointer should be near the center or close to the top of the letter “E” in the word **CLOSE**. See Illustration 2.

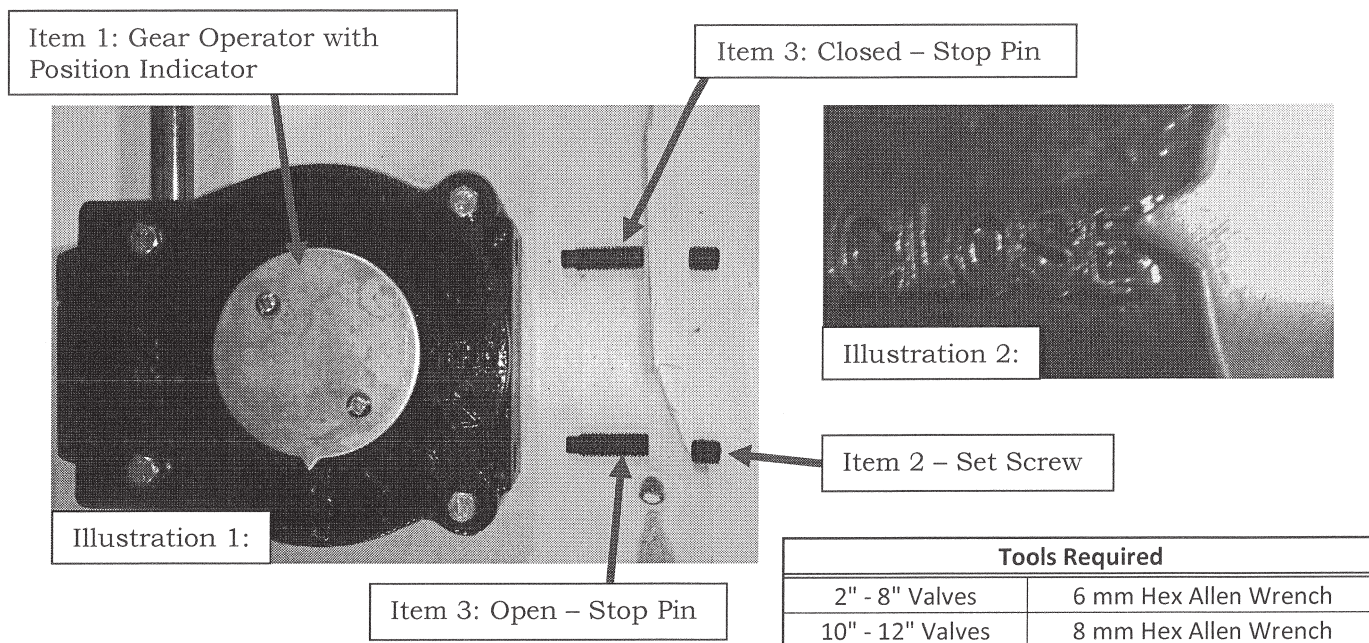


Figure8: Pointer Location in Closed Position

AMENDMENT REGISTER

Date	ECN	Rev.	Page	Description	Initiator
9/22/2014	M14630	A	ALL	New Release	SAV <i>EDF</i>