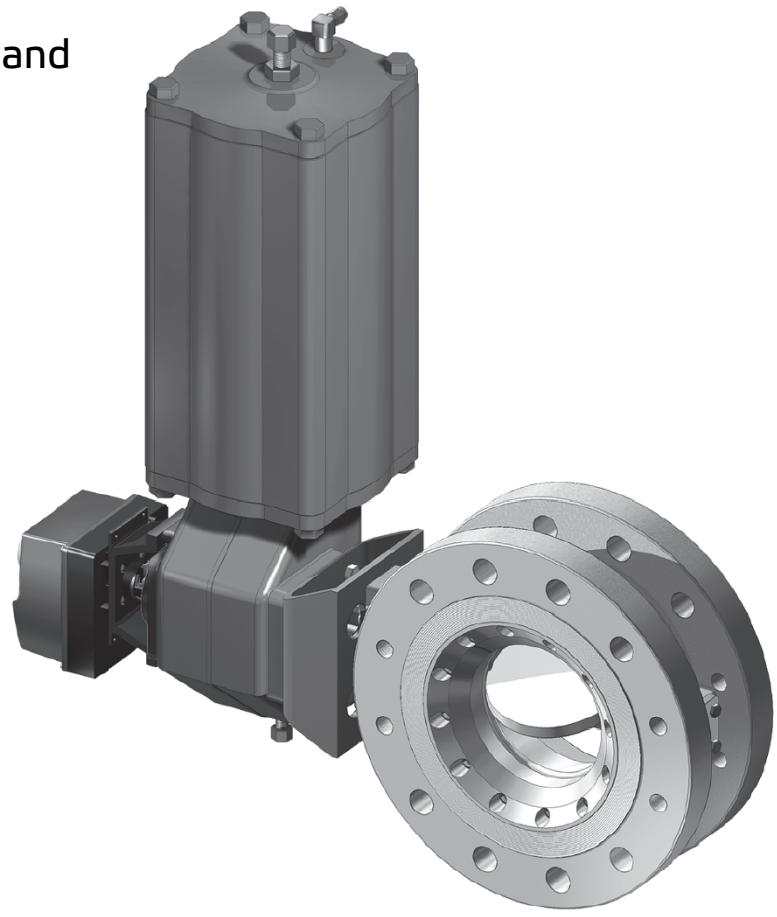
Neles™ Neldisc™ high performance butterfly valves

Series L6, L4

Installation, maintenance and operating instructions



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This product meets the requirements set by the Customs Union of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation.

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1 GENERAL

1.1 Scope of the manual

This manual provides essential information for users of Neles™ Neldisc™ triple eccentric disc valves. If you need further information on actuators and other accessories, please refer to the individual manuals on their installation, operation and maintenance.

NOTE:
Selection and use of the valve in a specific application requires close consideration of many different aspects. Due to the nature of the product, this manual cannot cover all the individual situations that may occur when the valve is used.
If you are uncertain about use of the valve or its suitability for your intended purpose, please contact Valmet for more information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Neles document id:10O270EN.pdf)

1.2 Valve description

Neles™ Neldisc™ series L6 is a double flanged type metal seated triple eccentric disc valve. Neldisc™ series L4 is a wafer type metal seated triple eccentric disc valve.

The disc is elliptical and has a triple eccentric mounting. When the valve is closed, the elliptical disc at the major axis displaces the seat ring outward, causing the seat ring to contact the disc at the minor axis. When the valve is opened, the contact is released and the seat ring returns to its original circular shape (see Fig. 1).

The disc is fitted to the shafts with pins and there are no holes through the disc.

Construction details of individual valves are included in the type code shown on the valve identification plate. To interpret the type code, please refer to Section 11.

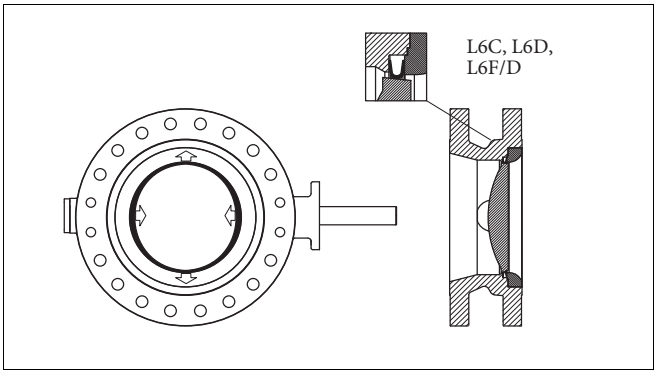


Fig. 1 Neldisc seating principle

1.3 Valve markings

Body markings are cast on the body. The valve also has an identification plate attached to it (see Fig. 2).

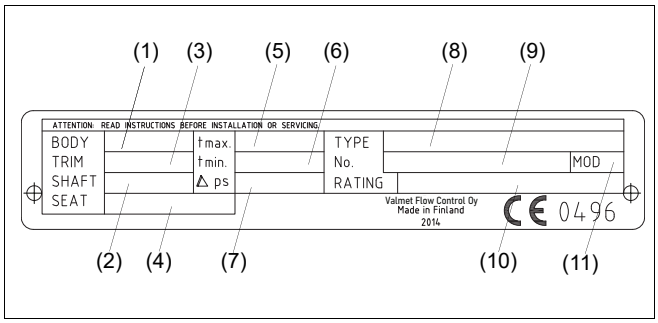


Fig. 2 Identification plate

Identification plate marking:

1. Body material
2. Shaft material
3. Trim material
4. Seat material
5. Maximum operating temperature
6. Minimum operating temperature
7. Maximum shut-off pressure differential
8. Type designation
9. Valve manufacturing parts list no.
10. Pressure class
11. Model

1.4 Technical specifications

Type:	
L6	Flanged metal seated triple eccentric disc valve
L4	Wafer metal seated triple eccentric disc valve
Pressure class:	
L6C	ASME Class 150
L6D	ASME Class 300
L6F/D	Body ASME Class 600 Trim ASME Class 300
L4F/D	Body ASME Class 600 Trim ASME Class 300
Possible flange drillings:	
L6C	ASME B16.5 & B16.47 Class 150 EN 1092-1 PN 10 & PN 16 ISO 7005 PN 20 JIS 2210 10K & 16K
L6D	ASME B16.5 & B16.47 Class 300 EN 1092-1 PN 25 & PN 40 ISO 7005 PN 50 JIS 20K & 30K
Temperature range:	-200 °C to +600 °C (-328 °F to +1100 °F)
Flow direction:	Free (L6C, L6D, L6F/D, L4F/D)
Dimensions:	See Section 10
Weights:	See Section 10

1.5 CE marking

The valve meets the requirements of the European Directive 2014/68/EU relating to pressure equipment, and has been marked according to the Directive.

1.6 Recycling and disposal

Most valve parts can be recycled if sorted according to material.

Most parts have material marking. A material list is supplied with the valve. In addition, separate recycling and disposal instructions are available from the manufacturer. A valve can also be returned to the manufacturer for recycling and disposal against a fee.

1.7 Safety precautions

CAUTION:
Do not exceed the valve performance limitations!
Exceeding the limitations marked on the valve may cause damage and lead to uncontrolled pressure release.
Damage or personal injury may result.

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!
Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve.
Be aware of the type of medium involved. Protect people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance.
Failure to do this may result in damage or personal injury.

CAUTION:
Beware of the discs cutting movement!
Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline.
When the valve is actuated, the disc functions as a cutting device. The position of the disc can also be changed when moving the valve. Close and detach the actuator pressure supply pipeline for valve maintenance.
Failure to do this may result in damage or personal injury.

CAUTION:
Beware of noise emissions!
The valve may produce noise in the pipeline. The noise level depends on the application. It can be measured or calculated using Neles Nelprof computer software. Observe the relevant work environment regulations on noise emission.

CAUTION:
Beware of a very cold or hot valve!
The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

CAUTION:
When handling the valve or the valve package, bear in mind its weight!
Never lift the valve or valve package by the actuator, positioner, limit switch or their piping.
Place the lifting ropes securely around the valve body (see Fig. 3).
Damage or personal injury may result from falling parts.

CAUTION:
For safety reasons use a blind flange after the valve always when the pipe line is terminated immediately after the valve.

NOTE:
Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

CAUTION:
Potential electrostatic charging hazard. Ensure the protection in the process.

1.8 Welding notes

WARNING: Welding and/or grinding stainless steel and other alloys containing chromium metal may cause the release of hexavalent chromium. Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

NOTE: A qualified welder must do the installation welding. The welder and welding procedure should be qualified in accordance with the ASME Boiler and Pressure Vessel Code Section IX or other applicable regulation.

CAUTION: To prevent damage to the seat and seals, do not allow the temperature of the seat and body seal area to exceed 94 °C (200 °F). It is recommended that thermal chalks be used to check the temperature in these areas during welding.

CAUTION: Ensure that any weld splatter does not fall onto the valve closing members eg. ball or seats. This may damage critical seating surfaces and cause leaks.

2 TRANSPORTATION, RECEPTION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

Store the valve carefully before installation, preferably indoors in a dry place.

Do not take the valve to the intended location and do not remove the flow port protectors until the valve is installed.

The valve is delivered in the closed position. A valve equipped with a spring-return actuator is delivered in a position determined by the spring. During storage the valve must be lightly closed.

3 INSTALLATION

3.1 General

Remove the flow port protectors and check that the valve is undamaged and clean inside.

CAUTION:
When handling the valve or the valve package, bear in mind its weight!
Follow the lifting methods shown in Fig. 3.

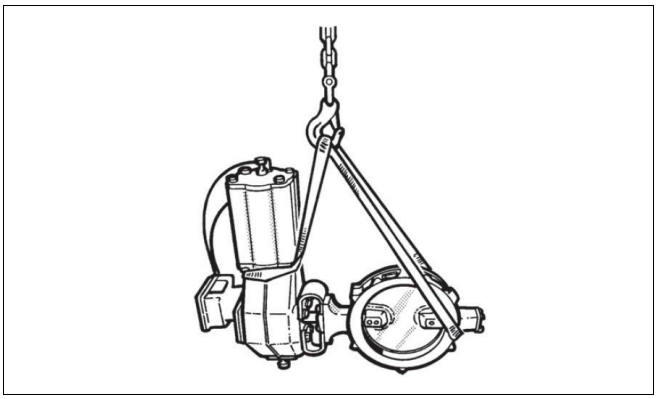


Fig. 3 Lifting of the valve

3.2 Installing into the pipeline

Flush or blow the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the disc sealing surface and seat.

The valve may be installed in any position and offers tightness in both directions (L6C/D, L6F/D).

Install the valve in the pipeline so that the shaft is horizontal if possible. However, we do not recommend installing the valve with the actuator on the underside because dirt in the pipeline may then enter the body cavity and damage the gland packing.

If the valve is equipped with a flow balancing trim (type code S-...), it must be on the down stream side of the valve body. The valve must be mounted so that the perforated plate will not collect any impurities in the pipeline (see Fig. 4).

Not recommended mounting position coding for valve-actuator unit if using S-disc: A-HL, B-HL, C-HL and D-HL.

Select flange gaskets according to the operating conditions.

Do not attempt to correct pipeline misalignment by means of flange bolting.

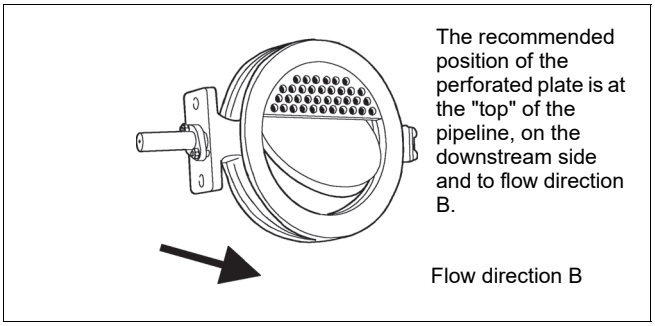


Fig. 4 Position of the flow balancing trim

It may be necessary to firmly support the pipeline to protect the valve from excess stress. Sufficient support will also reduce pipeline vibration and this ensures proper functioning of the positioner. Do not fasten supports to the flange bolting or to the actuator.

It is recommended that the length of any straight pipe preceding the control valve is at least 2 x pipe diameter.

The flow causes a so-called dynamic torque against the valve disc which attempts to close the valve. In a pipe elbow the pressure on the outer edge is higher than on the inner edge.

When installing the triple eccentric disc valve immediately after a pipe elbow, the valve shaft must be directed toward the centre point of the pipe (see Fig. 5). This is especially important when the valve is used as a control valve.

The valve shaft of a valve mounted after the centrifugal pump must be perpendicular to the pump shaft (see Fig. 6).

When thus installed, the valve discs will be more evenly loaded and vibrations otherwise possible in the intermediate positions will be eliminated.

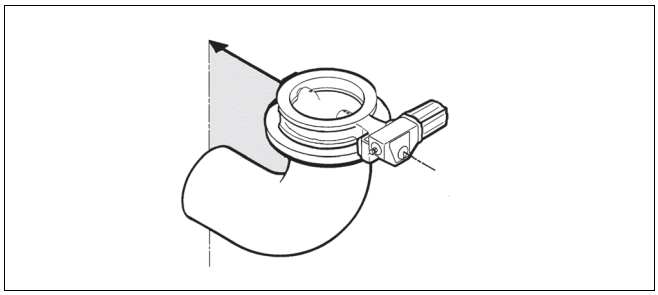


Fig. 5 Mounting after a pipe elbow

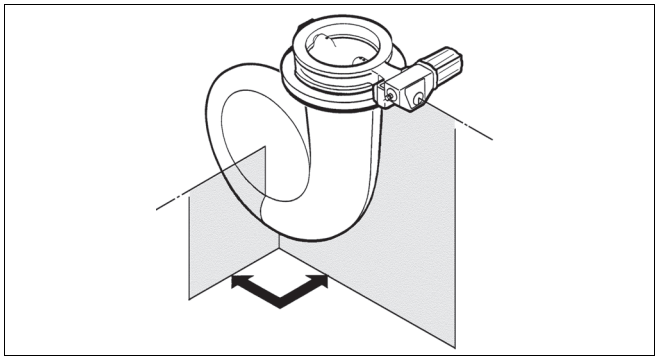


Fig. 6 Mounting after the centrifugal pump

When mounting the valve it must be in a closed position and be carefully centred between the pipe flanges so that the turning disc does not touch the pipe edge or flange gaskets, see Fig.7 and Table 1.

Use caution when installing valve with Spring-to-open actuator. Valve must be in closed position during installation if the disc exceeds the Face-to-face length. Energy supply for the actuator must be safely fastened and it cannot suffer damage or break off during the installation.

In case of sudden shutdown of the energy supply the valve will open unexpectedly due to pre-stressed spring package. This may cause significant harm to people and material around the valve.

In valves with certain nominal sizes some flange bolts do not pass the valve body. The valve body is thus equipped with holes, see Fig. 8 and Tables 2...5.

Ensure that the disc can turn to the open position after preliminary tightening of the flange bolts. The actuators of control valves can be equipped with position stops which usually only allow the disc to open 80°.

Lenght of stud bolts in Tables 2...5 are based on:

- gasket thickness of 3 mm
- heavy nuts
- flange thickness of weldneck flanges per ASME

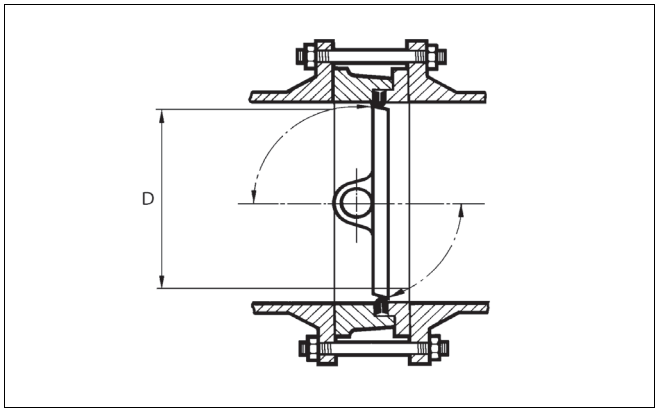


Fig. 7 Minimum pipe inside dimensions

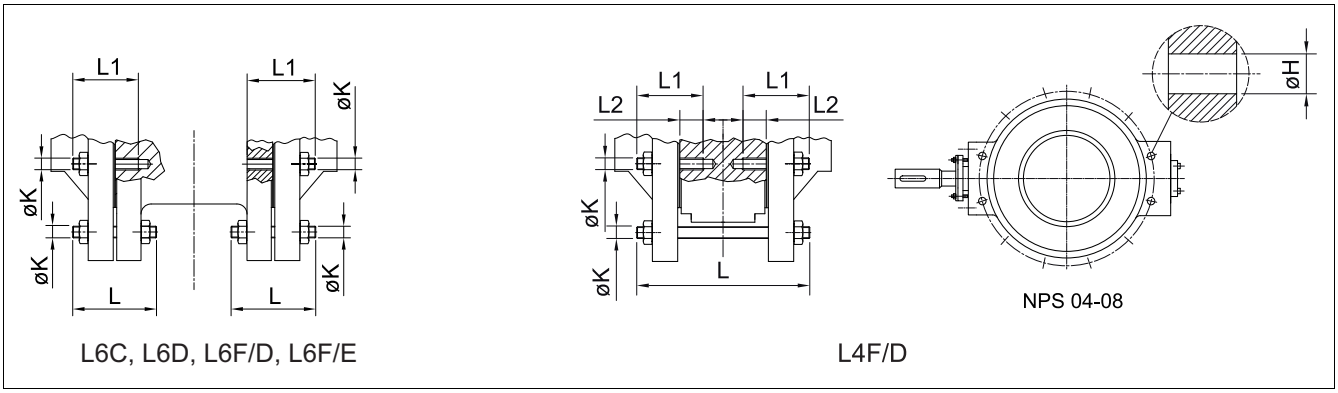


Fig. 8 Stud bolt lenght

Table 1 Minimum pipe inside dimensions (mm / in)

Valve size	L6C		L6D		L6F/D & L6F/E		L4F/D	
DN / NPS	mm	inch	mm	inch	mm	inch	mm	inch
4	-	-	-	-	-	-	60	2.4
5	-	-	-	-				
6	20	0.8	20	0.8	-	-	110	4.3
8	70	2.8	60	2.4	115	4.5	140	5.5
10	135	5.3	125	4.9	-	-	180	7.1
12	215	8.5	200	7.9	190	7.5	190	7.5
14	275	10.8	265	10.4	-	-	175	6.9
16	305	12.0	300	11.8	220	8.7	220	8.7
18	355	14.0	335	13.2	270	10.6		
20	400	15.7	385	15.2	335	13.2	335	13.2
24	445	17.5	425	16.7	415	16.3	415	16.3
26			535	21.1	395	15.6		0.0
28	530	20.9	535	21.1	450	17.7	535	21.1
30	525	20.7	520	20.5	450	17.7		
32	640	25.2	640	25.2	435	17.1	640	25.2
36	755	29.7	690	27.2	690	27.2	690	27.2
38	755	29.7						
40	835	32.9	690	27.2				
42	850	33.5	820	32.3				
48	920	36.2	810	31.9				
56	1115	43.9	1115	43.9				
64	1285	50.6						
72	1505	59.3						
80	1440	56.7						

Table 2 Stud bolt dimensions (mm), L6C ASME Class 150 flange. Both flanges included.

Size NPS	Thread K	L		L1	
		Length	Qty	Length	Qty
04	5/8-UNC	90	12	80	4
05	3/4-UNC	95	12	80	4
06	3/4-UNC	100	12	80	4
08	3/4-UNC	110	12	90	4
10	7/8-UNC	115	20	95	4
12	7/8-UNC	120	20	100	4
14	1-UNC	135	20	110	4
16	1-UNC	135	24	110	8
18	1 1/8-8UN	145	24	130	8
20	1 1/8-8UN	160	32	130	8
24	1 1/4-8UN	170	32	140	8
28*	1 1/4-8UN	230	48	170	8
30*	1 1/4-8UN	230	48	170	8
32*	1 1/2-8UN	260	48	200	8
34*	1 1/2-8UN	260	56	200	8
36*	1 1/2-8UN	280	56	210	8
40*	1 1/2-8UN	280	64	200	8
42*	1 1/2-8UN	290	56	210	16
48*	1 1/2-8UN	310	72	240	16
52*	1 3/4-8UN	350	72	280	16
56*	1 3/4-8UN	360	80	290	16
*) flanges acc. to ASME B16.47 series A					

Table 3 Stud bolt dimensions (mm), L6D ASME Class 300 flanges. Both flanges included.

Size NPS	Thread K	L		L1	
		Length	Qty	Length	Qty
04	3/4-UNC	115	12	100	4
05	3/4-UNC	120	12	100	4
06	3/4-UNC	120	16	100	8
08	7/8-UNC	140	16	110	8
10	1-UNC	160	24	120	8
12	1 1/8-8UN	170	24	130	8
14	1 1/8-8UN	180	32	140	8
16	1 1/4-8UN	190	32	150	8
18	1 1/4-8UN	195	40	150	8
20	1 1/4-8UN	205	40	160	8
24	1 1/2-8UN	230	40	180	8
26*	1 5/8-8UN	270	48	210	8
28*	1 5/8-8UN	280	40	210	16
30*	1 3/4-8UN	300	48	230	8
32*	1 7/8-8UN	320	40	250	16
36*	2-8UN	360	48	260	16
42*	1 5/8-8UN	350	48	250	16
44*	1 3/4-8UN	320	48	260	16
48*	1 7/8-8UN	390	48	340	16
56*	2 1/4-8UN	460	48	360	8
*) flanges acc. to ASME B16.47 series A					

Table 4 Stud bolt dimensions (mm), L6F/D & L6F/E ASME Class 600 flanges. Both flanges included.

Size NPS	Thread K	L		L1	
		Length	Qty	Length	Qty
04	7/8-UNC	170	8	130	4
06	1 UNC	200	16	135	8
08	1 1/8-8UN	225	16	150	8
10	1 1/4-8UN	250	24	170	8
12	1 1/4-8UN	260	32	170	8
14	1 3/8-8UN	250	32	150	8
16	1 1/2-8UN	300	32	210	8
18	1 5/8-8UN	320	32	220	8
20	1 5/8-8UN	290	32	195	8
24	1 7/8-8UN	330	32	225	8
28*	2-8UN	370	48	260	8
30*	2-8UN	370	40	260	16
36*	2 1/2-8UN	415	32	270	8
*) flanges acc. to ASME B16.47 series A					

Table 5 Stud bolt dimensions (mm), L4F/D ASME Class 600 flanges

Size NPS	Thread K	øH mm	L		L1		L2
			Length	Qty	Length	Qty	
04	7/8-UNC	25,4	210	8	-	-	-
06	1-8UN	28,4	250	12	-	-	-
08	1 1/8-8UN	31,7	290	12	-	-	-
10	1 1/4-8UN	-	340	12	160	8	40
12	1 1/4-8UN	-	410	16	170	8	45
14	1 3/8-8UN	-	440	16	170	8	44
16	1 1/2-8UN	-	490	16	200	8	60
20	1 5/8-8UN	-	540	20	210	8	48
24	1 7/8-8UN	-	610	20	230	8	60
28*	2-8UN	-	680	24	250	8	60
32*	2 1/4-8UN	-	710	28	230	8	55
36*	2 1/2-8UN	-	770	28	260	8	60
*) flanges acc. to ASME B16.47 series A							

Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 9.

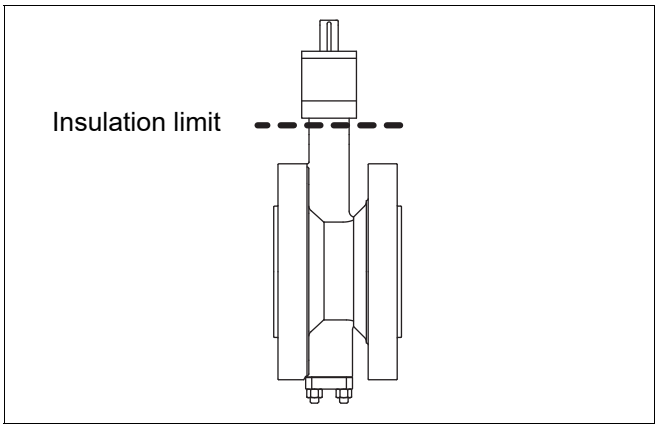


Fig. 9 Insulation of the valve

3.3 Actuator

When installing the actuator on the valve, make sure that the valve package functions properly. See instructions for installing in Section 6.

Observe the space needed for removal of the actuator.

The upright position is recommended for the actuator cylinder.

The actuator must not touch the pipeline, because pipeline vibration may damage it or interfere with its operation.

In some cases, e.g. when a large-size actuator is used or when the pipeline vibrates heavily, supporting the actuator is recommended. Please contact Valmet business for further information.

4 COMMISSIONING

Ensure that no dirt or foreign objects are left inside the valve or pipeline. Flush the pipeline carefully. Keep the valve 30–40° open during flushing.

When starting up the pump, ensure that the valve in the pipeline is closed or, at the very most, 20° open.

A waterhammer, which follows the start-up of high-capacity pumps, creates a torque peak in the disc. This can damage the pin connection between disc and shaft when the valve is 30–90° open.

The packing construction is live loaded. If the leakage occurs, re-tighten the gland nuts but don't exceed the values in the Tables 6 and 7 by 50 % or do not fully compress the disc springs.

5 MAINTENANCE

CAUTION:
Observe the safety precautions mentioned in Section 1.7 before maintenance!

CAUTION:
When handling the valve or the valve package as a whole, bear in mind the weight of the valve or the entire package.

CAUTION:
For safety reasons the retaining plates MUST always be installed according to Section 5.3.

5.1 Maintenance general

Although Neles valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Valmet recommends inspecting the valves at least every five (5) years. The inspection and maintenance interval depends on the actual application and process condition. The inspection and maintenance intervals can be specified together with your local Valmet experts. During this periodic inspection the parts detailed in the Spare Part Set should be replaced. Time in storage should be included in the inspection interval.

Maintenance can be performed as presented below. Fo maintenance assistance, please contact your local Valmet office. The part numbers in the text refer to the exploded view and to the parts list in Section 9, unless otherwise stated.

NOTE:
When sending goods to the manufacturer for repair, do not disassemble them. Clean the valve carefully and flush the valve internals.

For safety reasons, inform the manufacturer of the type of medium used in the valve (include material safety data sheets (MSDS)).

NOTE:
In order to ensure safe and effective operation, always use original spare parts to make sure that the valve functions as intended.

NOTE:
For safety reasons, replace pressure retaining bolting if the threads are damaged, have been heated, stretched or corroded.

5.2 Removing the valve from the pipeline

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

It is generally most convenient to detach the actuator and its auxiliary devices (see Section 6), before removing the valve from the pipeline. If the valve package is small or difficult to access, it may be more practical to remove the entire package at the same time.

Ensure that the valve is not pressurized and the pipeline is empty. Ensure that the medium cannot flow into the section where servicing is to take place. The valve must be in a closed position when removing.

Support the valve carefully with a hoist. Place ropes carefully and unscrew the pipe flange bolts. Ensure that the ropes are positioned correctly. Lift valve correctly (see Fig. 3).

5.3 Replacing the gland packing

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

PTFE V-rings are used as a standard gland packing and graphite rings for high temperature constructions. The packing construction is live loaded as standard.

The gland packing (20) must be changed if leakage occurs even after the hex nuts (25) have been tightened as recommended.

L6C, L6D, L6F/D and L4F/D

- Make sure the valve is not pressurized.
- Unfasten the nuts (25) and remove the disc spring (TA-Luft) kits (43), the retaining plates (42) and the gland (9).
- Remove old packing rings (20). Do not damage the surfaces of the packing ring counterbore and shaft. It is not necessary to change anti-extrusion ring (22).
- Clean the gland and packing ring counterbore. Install new set of packings (V-ring or graphite). Slip the rings onto the shaft. Ensure that there are no burrs in the keyway groove which could damage the packing.
- Install the gland.
- Mount the retaining plates with the text UPSIDE on top (see Fig. 10).

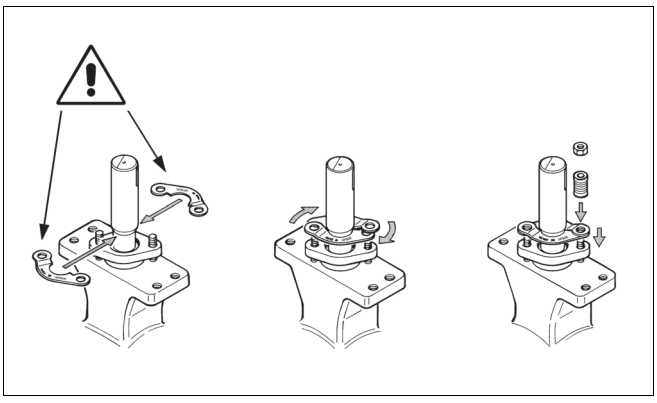


Fig. 10 Mounting the retaining plates

- Mount the disc spring kits.
- Place the nuts on the studs.
- Pre-compress the gland packing by tightening the nuts with a tool until the disc springs have value of compression (h_1–h_2) as in Tables 6 and 7.
- Carry out 3…5 operation cycles with the valve. Suitable range of movement is about 80 %.
  It is not necessary to fully close or open the valve during the operation.
- Unfasten the nuts and disc springs.
- Measure the height h_1 of the disc springs and use these values as a basis when defining the final height of the springs (as compressed condition).
- Re-install the disc springs and tighten the nuts with the tool. Tighten the nuts until the set value of compression (h_1–h_2) of disc springs is achieved, see Tables 6 and 7.

Table 6 Tightening of gland packing, L6C and L6D

L6C	L6D	Spring set dia	Thread	Compression (h_1–h_2), mm	
				Packing ring material	
DN / NPS	DN / NPS	mm	M, UNC	Graphite + PTFE	PTFE
100 / 4	100 / 4	20	M8, 5/16	2.0	1.0
150 / 6, 200 / 8	150 / 6	20	M8, 5/16	2.5	1.5
250 / 10	200 / 8	25	M10, 3/8	2.5	1.5
300 / 12		25	M10, 3/8	3.0	1.5
350 / 14	250 / 10	25	M10, 3/8	3.0	2.0
400 / 16		25	M10, 3/8	3.0	2.0
450 / 18	300 / 12	35.5	M14, 1/2	4.5	2.5
500 / 20	350 / 14	35.5	M14, 1/2	4.5	2.5
600 / 24	400 / 16	35.5	M14, 1/2	4.5	3.0
700 / 28, 750 / 30	450 / 18, 500 / 20	40	M18, 5/8	5.0	3.0
800 / 32	600 / 24	40	M18, 5/8	5.5	3.5
900 / 36, 950 / 38	700 / 28, 750 / 30	50	M20, 3/4	6.0	4.0
1000 / 40		50	M20, 3/4	6.5	4.0
1200 / 48		50	M20, 3/4	6.0	5.0
	800 / 32	56	M24, 1	6.5	5.5
	900 / 36	50	M22, 7/8	6.5	5.0
1400 / 56		71	M30, 1 1/4	6.5	6.5
	1000 / 40, 1200 / 48	56	M24, 1 (4 pcs.)	6.5	6.0
	1400 / 56	80	M36, 1 1/2	9.0	6.5

Table 7 Tightening of gland packing, L6F/D and L4F/D

L6F/D L4F/D	Spring set dia	Thread	Compression (h_1–h_2) mm	
			Packing ring material	
DN / NPS	mm	M, UNC	Graphite + PTFE	PTFE
100 / 4	25	M10, 3/8	1.5	1.0
150 / 6	25	M10, 3/8	1.5	1.0
200 / 8	35.5	M14, 1/2	2.0	1.0
250 / 10	40	M18, 5/8	3.5	1.5
300 / 12	50	M20, 3/4	4.0	2.0
350 / 14	50	M20, 3/4	3.5	2.0
400 / 16	50	M20, 3/4	3.5	2.0
450 / 18	50	M22, 7/8	4.0	2.5
500 / 20	56	M24, 1	6.0	3.5
600 / 24	56	M24, 1	6.5	4.0
700 / 28	71	M30, 1 1/4	6.5	4.0
750 / 30	71	M30, 1 1/4	6.5	4.0
900 / 36	56	M24, 1 (4 pcs.)	6.5	5.0

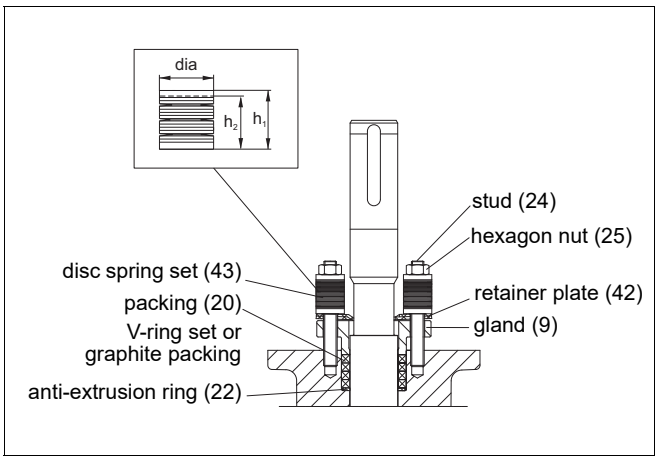


Fig. 11 Gland packing; L6C, L6D, L6F/D and L4F/D

- If the leakage still occurs when the valve is pressurized, re-tighten the nuts but don't exceed the values in the Tables 6 and 7 by 50 % or do not fully compress the disc springs.

5.4 Valve leakage

Valve leakage is not always caused by a damaged seat ring or disc. The reason can also be that the disc is not in the closed position.

- Check the position of the actuator relative to the valve. The screws may be loose or the bracket damaged.
- Check the adjustment in the closed position (see Section 6.4).

The marking line parallel to the disc on the valve shaft head shows roughly the closed position of the disc (see Fig. 12)

Pressure shocks can cause loosening of the pin connection between disc and shaft; consequently the shaft moves while the disc remains in place and this prevents full closing of the disc.

If the reason for the leakage does not become apparent after doing the above, the valve must be disassembled for replacing the parts.

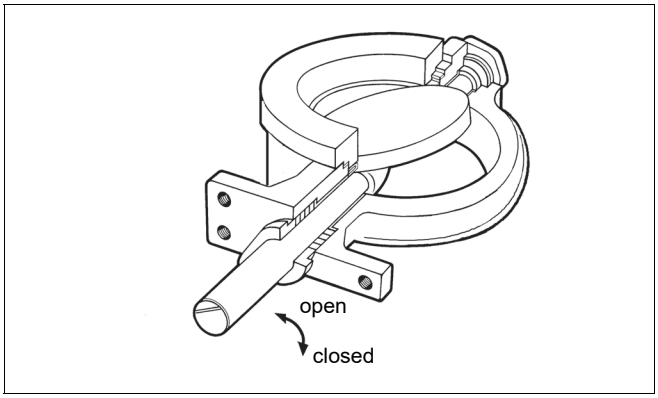


Fig. 12 Open and closed positions of the valve

5.5 Replacing the seat ring

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

- Ensure that the valve is not pressurized.
- Remove the valve from the pipeline. The valve must be in a closed position during removal.
  Follow the lifting methods shown in Section 3.

L6C, L6D, L6F/D, L6F/E and L4F/D

- Remove the clamp ring (2) by untightening the screws (27).
- Remove the old body seal (19) and the seat ring (4). Change the seat ring if it is damaged.
- Clean all the surfaces of the seats and check the surface of the seat ring.
- Check also the condition of the disc. A damaged disc must be changed (see Section 5.6).
- Check the condition of the pin connection. Repair it if necessary (see Section 5.6).
- Mount a new, self-adhesive body seal (19) into the body. The surface must be clean and free of grease. Handle the ends of the seal according to Fig. 13.

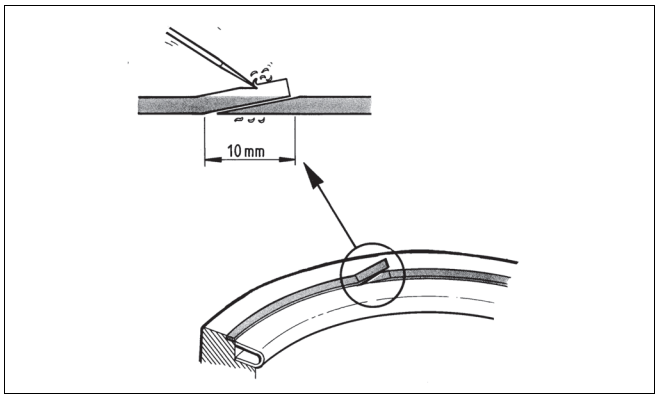


Fig. 13 Mounting the body seal

- Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the seat groove, surfaces of the clamp ring, seat ring and screws.
- Centre the seat ring (4) carefully into its groove and turn the disc to maintain light contact with the seat.
- Mount the clamp ring and tighten the screws (27) lightly.
- Turn the disc slightly open and pull it back to set the seat into the proper position.
- Tighten the screws (27) crosswise and evenly. First to 50 % of recommended torque, then to 100 %. Recommended torque values for screws are listed in Table 8. An unevenly tightened flange may damage the seat ring. The screw heads must be below the flange surface in lug type valves.

Table 8 Clamp ring/blind flange screw torque, Nm ±10 %

Thread mm / (UNC)	Clamp ring	Blind flange
M6, 1/4	14	11
M8, 5/16	19	15
M10, 3/8	38	29
M12, 1/2	66	51
M16, 5/8	160	123
M20, 3/4	310	240
M22, 7/8	420	324
M24, 1	540	416
M32, 1 1/4	1430	1100
M38, 1 1/2	2380	1830

- Check the position between the seat ring and the disc. The valve closes clockwise (see Fig.12).
- Mount the actuator into the valve. Adjust the closed position limit and check the open position limit (see Section 6).

5.6 Replacing the disc, shafts and bearings

Disassembling the valve

The pin connection of the disc must be opened by drilling for changing the disc (3), shafts (11, 12) and bearings (15, 16).

- Remove the valve from the pipeline and the actuator from the valve.
- Remove the clamp ring (2) and seat ring (4) according to section 5.5.
- Set the valve horizontally on a sturdy surface so that the flat side of the disc lays against the surface (see Fig. 14).

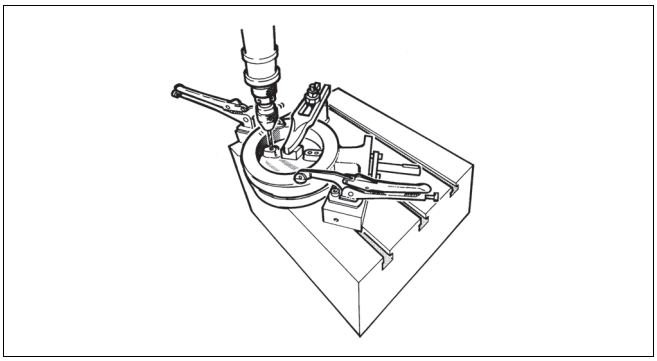


Fig. 14 Drilling the pins

- Drill the holes carefully to the centre of the pins (14). Choose a drill 0.2-0.5 mm smaller than the diameter of the pin.
- Drill the holes deep, but not enough to reach the disc.
- Pull the pins out.
- Dismantle the gland packing including anti-extrution ring (22), when applicable, according to Section 5.3.
- Detach the screws (26) and the blind flange (10) and remove the gasket (18).
- Place rubber strips or other protection between the disc edge and the body and remove the shafts (see Fig. 15).
- Remove the bearings (15, 16).
- Clean and check all parts carefully.

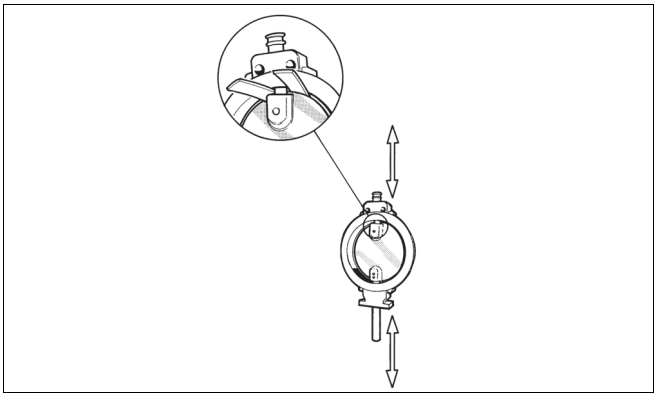


Fig. 15 Protecting the disc during disassembly and assembly

5.7 Assembling the valve

- Replace damaged parts with new ones.
- Set the disc and the shaft together beforehand. In case the pin holes have been damaged during removal of the old pins the holes can be drilled to a larger pin size. File off any burrs from the shafts.

The bearings for the valves (N, U and H constructions) are cobalt alloy bushings which are mounted into the body together with the shafts.

- Mount the bearing into the shaft. Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the inside surface of the bushing and the shaft bearing groove. Press the bushing with a tightening ring into the shaft bearing groove and fit the shaft with the bearings carefully into the body through the tightening ring.
- Place the disc horizontally on a surface so that the flat side of the disc lays against the surface. Lift the body around the disc so that the shaft bores are aligned with the bores in the disc. Protect the disc (see Fig. 19).
- Press the shafts into the disc drillings. Align the pin holes. The shaft (11) position against the disc must be according to Fig. 14.

NOTE:
Use only pins supplied by the manufacturer!

NOTE:
The pins must be pressed with enough force to deform them so that the connection will be free from backlash.

- Support the disc well in a horizontal position during mounting of the pins. Push the new pins into the holes and press them in a press to final form (see Fig. 16). Use a smaller tool than the pin diameter. See Table 9 for forces.

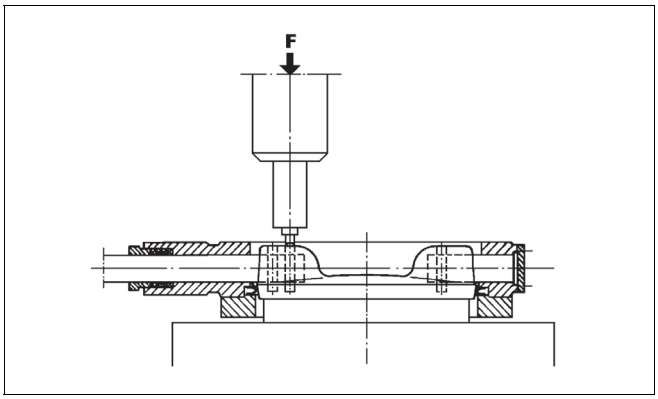


Fig. 16 Pressing the pins

Table 9 Pressing the pins, forces kN

Pin diameter, mm	Force, kN	Pin diameter, mm	Force, kN
5	45	20	500
6	70	25	780
8	95	30	1125
10	140	35	1500
12	200	40	2000
15	300	50	3150

- Install the gasket (18) and the blind flange (10). Tighten the screws (26) lightly.
- Then tighten the screws (26) crosswise and evenly. First to 50 % of recommended torque, then to 100 %. Recommended torque values for screws are listed in Table 8.
- Install the seat ring. See details in Section 5.5.
- Install the body seal (19) and the clamp ring (2). See details in Section 5.5.

- Install the gland packing (see Section 5.3).
- Check the contact line between the seat ring and the disc (see Fig. 12).

6 INSTALLING AND DETACHING THE ACTUATOR

6.1 General

CAUTION:
When handling the valve or the valve package, bear in mind its weight!

CAUTION:
The actuator must not be removed from the valve in a pipeline under pressure as result of dynamic torque!

CAUTION:
Do not detach a spring-return actuator unless a stop-screw is carrying the spring force!

NOTE:
Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

NOTE:
Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch so as to ensure that the package can be properly reassembled.

The actuator is factory-mounted on the valve and the stroke limit stop screws are adjusted in advance.

6.2 Installing the B1 series actuator

- Turn the valve to the closed position before mounting the actuator.
- Clean the shaft and the shaft bore and file off any burrs which could interfere with mounting. Protect the joint surfaces from corrosion, e.g. with Cortec VCI 369 or an equivalent anti-corrosive agent..
- If a bushing is required between the actuator shaft bore and the valve shaft, mount it first in the actuator shaft bore.
- The valve keyway is on the side opposite the flat side of the disc. The actuator shaft bore has two keyways set 90° apart.
- For double-acting cylinder actuator, B1C, and spring-return cylinder actuator, B1J (spring-to-close), choose the keyway which establishes the piston in its upper position (at the top end of the cylinder) when the valve is closed.
  In the spring-return cylinder actuator B1JA (spring-to-open), choose the keyway which establishes the piston in its lower position when the valve is open.
- Check visually that the actuator is correctly positioned relative to the valve. Tighten all the fastening screws as tightly as possible.
- Adjust the stop screws to the closed position (see Section 6.7).
- The opening angle in a control valve can be limited by a stop screw to 80°. The opening angle of a shut-off valve is 90°.
- When a shaft extension is required, the sizing of the shaft extension must be discussed with the valve manufacturer.

6.3 Detaching the B1 series actuators

- Disconnect the actuator from its power source; detach the air supply pipe and control signal cables or pipes from their connectors.
- Unscrew the bracket screws.
- Detach the actuator using a suitable extractor. The correct tool can be ordered from the manufacturer (see Fig. 17).
- Remove the bracket and coupling, if any.

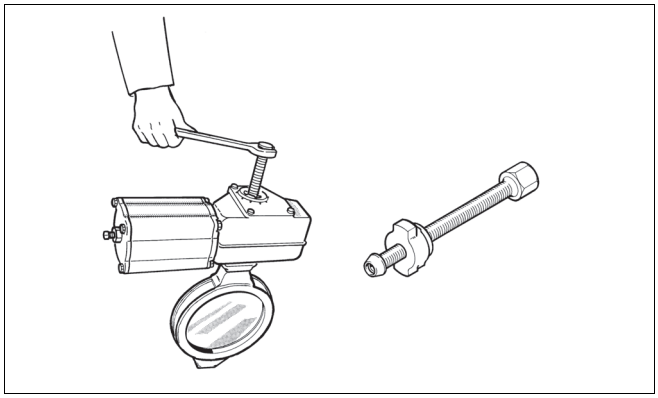


Fig. 17 Actuator removal, B1 series

6.4 Detaching and installing other actuator types

See actuator's manual for details.

6.5 Stop screw adjustment

General

Close the metal seated triple eccentric disc valve by turning the disc with a torque against the seat. Choose the torque from Tables 11, 12 and 13 for adjusting the stop screw to the closed position of the actuator. Try not to exceed the given values since excessive torque would strain the seat and the joint between the disc and the shaft. Always readjust the stop screw after changing the seat and after mounting the actuator.

Actuators other than tabulated

Close the valve as per the tabulated torque Mc and adjust the stops accordingly. Note the increased torque created by the actuator while the valve is closed.

NOTE:
Valmet accepts no responsibility for compatibility of actuators not installed by Valmet.

Changing the mounting position

CAUTION:
The actuator must not be removed from the valve in a pipeline under pressure as result of dynamic torque!

Always remove the actuator from the valve shaft before mounting it into another key groove. Readjust the closed position limit as instructed.

If manually operated, the valve should close when the handwheel is turned clockwise. In a double-action cylinder, the piston must be in the upper position of the cylinder when the valve is closed. In this position the actuator creates maximum torque. **Do not turn the disc more than 90° as this could damage the seat.**

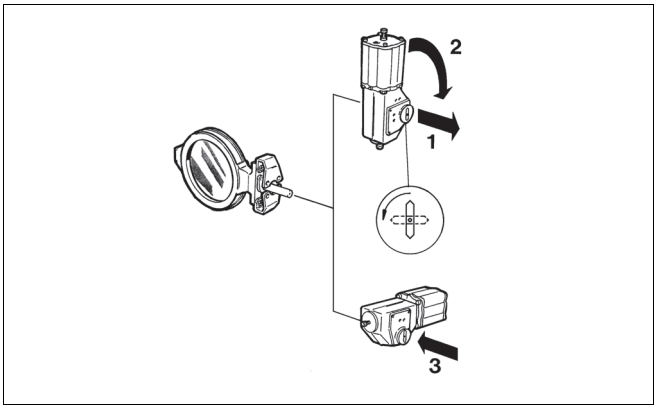


Fig. 18 Changing the mounting position

Double-acting cylinder actuator B1C

- Apply the tabulated shut-off pressure Pc to the air connection at the cylinder base.
- With the stop screw removed, check through the air connection hole that the piston does not touch the cylinder end. If it does, loosen the bracket screws and turn the actuator clockwise to increase the adjusting margin.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leak-proofing the stop screw.
- An extra long screw is needed for opening angles < 80°.

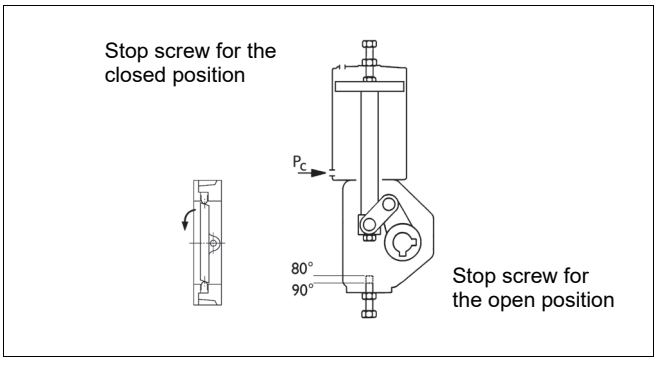


Fig. 19 Cylinder actuator, series B1C

Spring-return cylinder actuator B1J

"Spring-to-close"

- Before mounting the cylinder, screw in the closed position stop screw completely.
- The tables indicates **) spring* when the spring-created torque does not exceed the maximum permitted closing torque Mc. Otherwise, apply the tabulated pressure Pc into the air connection at the cylinder end against the spring force. **The stop screw must not be removed when the cylinder is pressurized!** Open the stop screw until it does not touch the piston.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leak-proofing the stop screw.
- After adjusting, check the adjusting margin through the air connection hole. The piston must not touch the cylinder end. If necessary, increase the margin by loosening the bracket screws and turning the actuator clockwise.
- An extra long screw is needed for opening angles < 80°.

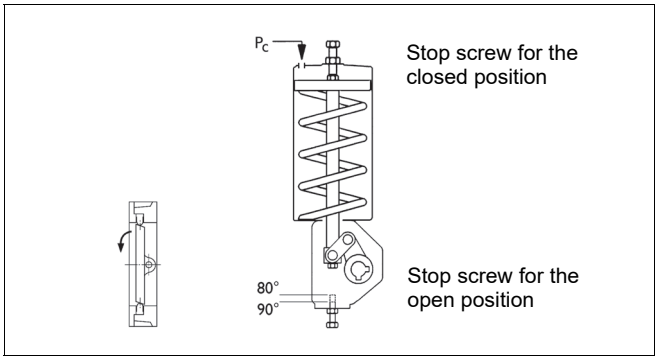


Fig. 20 Cylinder actuator, series B1J

Spring-return cylinder actuator B1JA

"Spring-to-open"

- The actuator being unpressurized the valve is open. Unscrew the close limit stop screw (actuator housing). Apply tabulated shut-off pressure Pc to the air connection at the cylinder bottom end against the spring force to close the valve.
- Check through the stop screw hole that the piston rod does not touch the cylinder top end. If it does, loosen the bracket screws and turn the actuator clockwise to increase the adjusting margin.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leak-proofing the stop screw.
- An extra long screw is needed for opening angles < 80°.

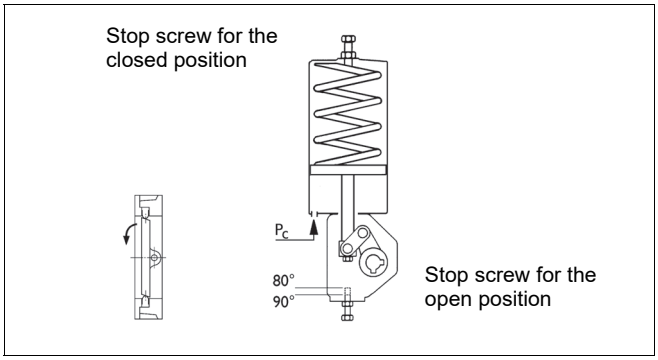


Fig. 21 Cylinder actuator, series B1JA

M-series operator

- Close the valve as per the tabulated primary torque M1 (handwheel torque) given in Tables 11, 12 and 13.
- Tighten the closed position stop screw until it touches the linkage, then turn back 1/4 turn and lock up with with Loctite 225 or similar.

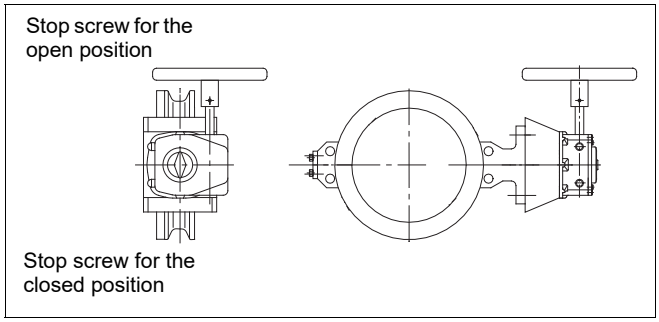


Fig. 22 Actuator, series M

Electric operator

Instructions for adjustment are given in a separate leaflet, code D304568, which is available from the manufacturer.

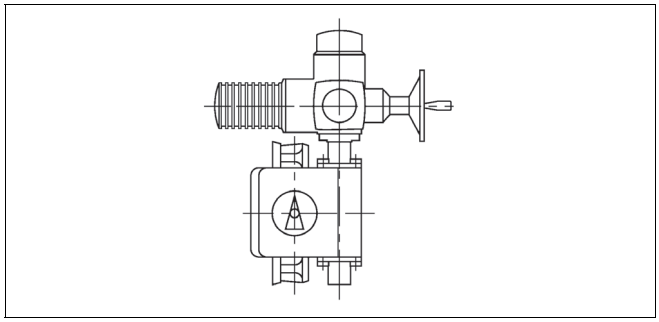


Fig. 23 Electric operator

7 TROUBLE SHOOTING TABLE

Table 10 lists malfunctions that might occur after prolonged use.

Table 10 Trouble shooting table

Symptom	Possible fault	Recommended action
Leakage through a closed valve	Wrong stop screw adjustment of the actuator	Adjust the stop screw for closed position
	Faulty zero setting of the positioner	Adjust the positioner
	Damaged seat	Replace seat
	Damaged closing member	Replace the closing member
	Closing member in a wrong position relative to the actuator	Select the correct keyway in the actuator
Leakage through body joint	Damaged gasket	Replace the gasket
	Loose body joint	Tighten the nuts or screws
Irregular valve movements	Actuator or positioner malfunction	Check the operation of the actuator and positioner
	Process medium accumulated on the sealing surface	Clean the sealing surfaces
	Closing member or seat damaged	Replace the closing member or seat
	Crystallizing medium has entered the bearing spaces	Flush the bearing spaces
Gland packing leaking	Gland packing worn or damaged	Replace the gland packing
	Loose packing	Tighten the packing nuts

8 TOOLS

No special tools are needed for servicing the valve. However, we recommend an extractor tool (ID-code table in actuator's IMO) for removing the actuator from the valve. The tool can be ordered from the manufacturer.

9 ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- type code, sales order number, serial number (stamped on a valve body)
- number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

Table 11 Series L6C, closing torques

L6C DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA** pc		BJK pc		BJKA** pc		BJV pc		BJVA** pc		Q-P actuator	Spring close		Spring open		Manual operator	Input torque M1	
	Nm	lbf ft	SIZE	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi		bar	psi	bar	psi		Nm	lbf ft
100 4"	45	33	6	2.5	36													QP2C	0.6	9	3.6	52	M07	4	3
			8	2.1	30	0.7	10	3.3	48	0.3	4	2.8	41	1.1	16	4	58	QP3C	1.1	16	3.2	46			
			10	1.6	23	1.1	16	2.8	41	0.7	10	2.2	32	1.6	23	3.4	49								
125 5"	75	55	6	4.1	59													QP2C			4.3	62	M07	7	5
			8	3.4	49	0.2	3	3.8	55	*)spring		3.3	48	0.6	9	4.6	68	QP3C	0.8	12	3.5	51			
			9	2.1	30																				
			10	1.9	28	0.9	13	3.1	45	0.5	7	2.6	38	1.4	20	3.7	54								
			11	1.1	16																				
150 6"	110	80	6	6	87													QP3C	0.3	4	3.9	57	M07	10	7
			8	5	72	*)spring		4.5	65			3.8	55	*)spring		5.3	77	QP4C	1	14	3.3	48			
			9	3	43																				
			10	2.4	35	0.6	9	3.4	49	0.2	3	2.9	42	1.1	16	4	58								
			11	1.5	22																				
			12	1.3	19	1.1	16	3	43	0.7	10	2.2	32	1.6	23	3.7	54								
200 8"	150	110	6	8.2	119													QP3C			4.3	62	M07	14	10
			9	4.1	59													QP4C	0.8	12	3.5	51			
			10	3.3	48	0.2	3	3.8	55	*)spring		3.2	46	0.8	12	4.3	62								
			11	2.1	30																				
			12	1.6	23	0.9	13	3.1	45	0.5	7	2.6	38	1.5	22	3.9	57								
250 10"	300	220	10	6.5	94	*)spring		5	72			4.4	64	*)spring		5.6	81	QP4C			4.3	62	M07	26	19
			11	4.2	61													QP5C	0.8	12	3.5	51	M10	27	20
			12	3.3	48	0.2	3	3.8	55	*)spring		3.2	46	0.8	12	4.6	68								
			13	2.1	30																				
			16	1.6	23	0.9	13	3.1	45	0.5	7	2.6	38	1.3	19	3.8	55								
300 12"	500	370	12	5.5	80	*)spring		4.6	67			4	58	*)spring		5.5	80	QP5C	0.1	1	4.1	59	M10	43	32
			13	3.5	51																		M12	44	32
			16	2.8	41	0.5	7	3.6	52	0		3	43	1	14	4.3	62								
			17	1.8	26																				
350 14"	825	610	13	5.8	84																		M12	69	51
			16	4.5	65	*)spring		4.2	61			3.6	52	0.3	4	5	73						M14	51	38
			17	3	43																				
			20	2.3	33	0.6	9	3.4	49	0.2	3	2.8	41	1.1	16	3.9	57								
400 16"	1160	860	16	6.4	93	*)spring		4.9	71			4.3	62	*)spring		5.7	83						M14	72	53
			17	4.2	61																				
			20	3.3	48	0.3	4	3.7	54	*)spring		3.1	45	0.8	12	4.2	61								
			25	1.7	25	0.9	13	3.1	45	0.5	7	2.6	38	1.4	20	3.6	52								
450 18"	1650	1220	16	9.5	138			5.9	86			5.2	75	*)spring		6.8	99						M14	125	92
			17	6	87																		M15	80	59
			20	4.7	68	*)spring		4.2	61			3.6	52	0.3	4	4.7	68								
			25	2.4	35	0.6	9	3.4	49	0.2	3	2.8	41	1.1	16	3.9	57								
500 20"	2200	1620	20	6.3	91	*)spring		4.8	70			4.2	61	*)spring		5.3	77						M15	107	79
			25	3.2	46	0.4	6	3.7	54	*)spring		3.1	45	0.9	13	4.2	61						M16	83	61
			32	1.6	23	0.9	13	3.1	45	0.5	7	2.5	36	1.4	20	3.7	54								
600 24"	2700	1990	25	3.9	57	0.1	1	3.9	57	*)spring		3.3	48	0.6	9	4.4	64						M16	102	75
			32	1.9	28	0.8	12	3.2	46	0.4	6	2.7	39	1.3	19	3.8	55						M25	98	72
700 28"	4400	3240	25	6.4	93	*)spring		4.8	70			4.2	61	*)spring		5.3	77						M16	166	122
			32	3.2	46	0.4	6	3.7	54	*)spring		3.1	45	0.8	12	4.3	62								
750 30"	4400	3240	40	1.5	22																				
800 32"	6500	4790	32	4.7	68	*)spring		4.2	61			3.6	52	0.3	4	4.8	70						M25	244	180
			322			0.6	9			0.2	3														
			40	2.3	33																				
			50	1.2	17																				
900 36"	9400	6930	322			0.3	4			*)spring															
			40	3.3	48																				
950 38"	9400	6930	50	1.7	25																				
1000 40"	12600	9290	322			*)spring																			
			40	4.4	64																				
			50	2.3	33																				
1200 48"	16400	12090	40	5.7	83																				
			50	2.9	42																				
			502	1.3	19																				
1400 56"	25600	18880	50	4.8	70																				
			502	2	29																				
1600 64"	35000	25800	50	6.6	96																				
			502	2.7	39																				
1700 68"	22000	16200	50	4.2	61																				
			502	1.7	25																				
1800 72"	22000	16200	50	4.2	61																				
			502	1.7	25																				
2000 80"	22000	16200	50	4.2	61																				
			502	1.7	25																				

*) Spring = spring torque not adequete to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

Table 12 Series L6D, closing torques

L6D DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA** pc		BJK pc		BJKA** pc		BJV pc		BJVA** pc		Q-P actuator	Spring close		Spring open		Manual operator	Input torque M1	
	Nm	lbf ft	SIZE	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi		bar	psi	bar	psi		Nm	lbf ft
100 4"	45	33	6	2.5	36													QP2C	0.6	9	3.6	52			
			8	2.1	30	0.7	10	3.3	48	0.3	4	2.8	41	1.1	16	4	58	QP3C	1.1	16	3.2	46	M07	4	2
			10	1.6	23	1.1	16	2.8	41	0.7	10	2.2	32	1.6	23	3.4	49								
125 5"	75	55	6	4.1	59													QP2C			4.3	62			
			8	3.4	49	0.2	3	3.8	55	*)spring		3.3	48	0.6	9	4.6	68	QP3C	0.8	12	3.5	51	M07	7	5
			9	2.1	30																				
			10	1.9	28	0.9	13	3.1	45	0.5	7	2.6	38	1.4	20	3.7	54								
			11	1.1	16																				
150 6"	110	80	6	6	87													QP3C	0.3	4	3.9	57	M07	10	7
			8	5	72	*)spring		4.5	65			3.8	55	*)spring		5.3	77	QP4C	1	14	3.3	48			
			9	3	43																				
			10	2.4	35	0.6	9	3.4	49	0.2	3	2.9	42	1.1	16	4	58								
			11	1.5	22																				
			12	1.3	19	1.1	16	3	43	0.7	10	2.2	32	1.6	23	3.7	54								
200 8"	230	170	10	5	72	*)spring		4.4	64			3.8	55	0.1	1	5	73	QP4C	0.3	4	3.9	57	M07	20	15
			11	3.2	46													QPC5	1	14	3.3	48	M10	21	15
			12	2.5	36	0.5	7	3.5	51	0.1	1	2.9	42	1.1	16	4.3	62								
			13	1.6	23																				
			16	1.3	19	0.9	13	3	43	0.6	9	2.3	33	1.5	22	3.7	54								
250 10"	460	340	11	6.4	93													QPC5	0.3	4	3.9	57	M10	40	29
			12	5	72	*)spring		4.4	64			3.8	55	0.1	1	5.3	77						M12	38	28
			13	3.2	46																		M14	28	21
			16	2.5	36	0.5	7	3.5	51	0.1	1	2.9	42	1	14	4.2	61								
			17	1.7	25																				
			20	1.4	20	1	14	2.9	42	0.6	9	2.3	33	1.5	22	3.5	51								
300 12"	800	590	13	5.6	81																		M14	49	36
			16	4.4	64	*)spring		4.2	61			3.6	52	0.4	6	4.9	71								
			17	2.9	42																				
			20	2.3	33	0.7	10	3.3	48	0.3	4	2.8	41	1.2	17	3.8	55								
350 14"	1250	920	17	4.6	67		1																M15	61	45
			20	3.6	52	0.2	3	3.8	55	*)spring		3.2	46	0.7	10	4.3	62						M16	44	32
			25	1.8	26	0.8	12	3.2	46	0.4	6	2.6	38	1.3	19	3.7	54								
			32	1	15																				
400 16"	1750	1290	17	6.4	93																		M15	85	63
			20	5	72	*)spring		4.3	62			3.7	54	0.2	3	4.8	70						M16	62	46
			25	2.6	38	0.6	9	3.4	49	0.2	3	2.9	42	1.1	16	3.9	57								
			32	1.3	19	1	14	2.9	42	0.6	9	2.3	33	1.5	22	3.6	52								
450 18"	2500	1840	25	3.6	52	0.2	3	3.8	55	*)spring		3.2	46	0.7	10	4.3	62						M16	94	69
			32	1.8	26	0.8	12	3.2	46	0.4	6	2.6	38	1.3	19	3.8	55						M25	91	67
			40	0.9	13																				
500 20"	3400	2510	25	4.9	71	*)spring		4.3	62			3.7	54	0.2	3	4.8	70						M16	128	94
			32	2.4	35	0.6	9	3.4	49	0.2	3	2.8	41	1.1	16	4	58								
			322			1	15	2.9	42	0.6	9	2.2	32	1.5	22	3.4	49								
			40	1.2	17																				
600 24"	4100	3020	32	3	43	0.4	6	3.6	52	*)spring		3	43	0.9	13	4.2	61						M16	155	114
			40	1.4	20																		M25	149	110
			322			0.9	13	3	43	0.5	7	2.4	35												130
			50	0.8	12																				
			502	0.3	4																				
700 28"	6700	4940	32	4.8	70	*)spring		4.3	62			3.6	52	0.2	3	4.9	71						M25	244	180
			322			0.6	9			0.2	3														
750 30"			40	2.3	33																				
800 32"	9800	7230	322			0.2	3			*)spring															
			40	3.4	49																				
			50	1.8	26																				
900 36"	12000	8850	322			*)spring																			
			40	4.2	61																				
			50	2.2	32																				
1000 40"	19000	14010	50	3.4	49																				
			502	1.5	22																				
1050 42"																									
1100 44"																									
1200 48"																									
1250 50"																									
1400 56"	38000	28000	50	7.2	104																				
			502	2.9	42																				
1500 60"			602	2	29																				

*) Spring = spring torque not adequete to reach tIghtness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

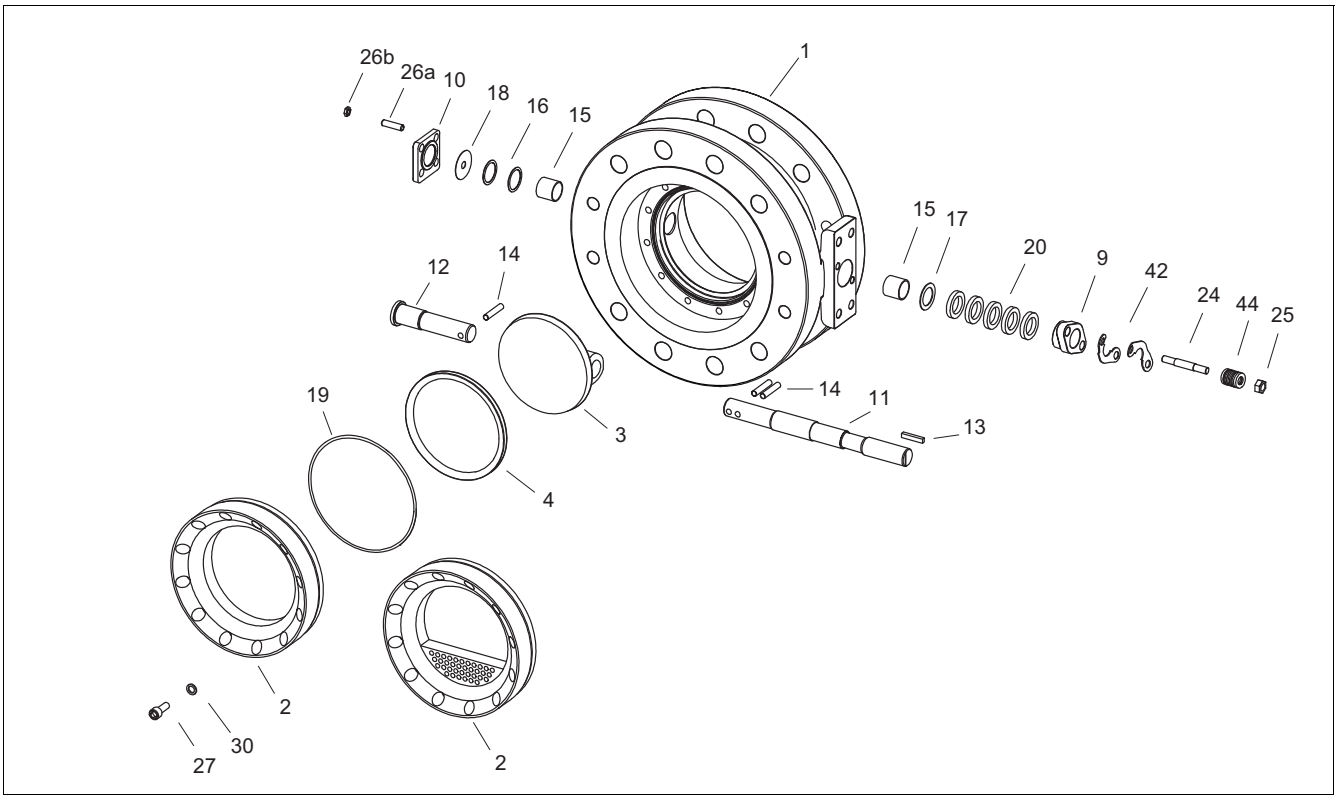
Table 13 Series L6F/D, L6F/E, L4F/D, closing torques

L6F/D L4F/D DN SIZE	Mc		BC and BJ	BC pc		BJ pc		BJA* pc		BJK pc		BJKA* pc		BJV pc		BJVA* pc		Q-P actuator	Spring close		Spring open		Manual operator	Input torque M1	
	Nm	lbf ft	SIZE	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi		bar	psi	bar	psi		Nm	lbf ft
100 4"	60		6	3.3	48													QPC2	0.5	7	4.7	68	M07	5	4
			8	2.7	39	0.5	7	4.3	62	0.2	3	3.6	52	0.8	12	5.2	75	QPC3	0.8	12	4.2	61			
			10	2.1	30	0.8	12	3.6	52	0.5	7	2.9	42	1.2	17	4.4	64								
125 5"			6	5.3	77													QPC2			5.6	81	M07	9	7
			8	4.4	64	0.2	3	4.9	71			4.3	62	0.5	7	6.0	87	QPC3	0.6	9	4.6	67			
			9	2.7	39																				
			10	2.5	36	0.7	10	4.0	58	0.7	10	3.4	49	1.1	16	4.8	69								
			11	1.4	20																				
150 6"	150		6	7.8	113													QPC3	0.2	3	5.1	74	M07	13	10
			8	6.5	94			5.9	86			4.9	71			6.9	100	QPC4	0.8	12	4.3	62			
			9	3.9	57																				
			10	3.1	45	0.5	7	4.4	64	0.2	3	3.8	55	0.8	12	5.2	75								
			11	2.0	29																				
			12	1.7	25	0.8	12	3.9	57	0.5	7	2.9	42	1.2	17	4.8	70								
200 8"	300		10	6.5	94			5.7	83			4.9	71	0.1	1	6.5	94	QPC4	0.2	3	5.1	74	M07	21	16
			11	4.2	61													QPC5	0.8	12	4.3	62	M10	27	20
			12	3.3	48	0.4	6	4.6	67	0.1	1	3.8	55	0.8	12	5.6	81								
			13	2.1	30																				
			16	1.7	25	0.7	10	3.9	57	0.5	7	3.0	44	1.2	17	4.8	69								
250 10"	600		11	8.3	120													QPC5	0.2	3	5.1	74	M12	21	16
			12	6.5	94			5.7	83			4.9	71	0.1	1	6.9	100						M14	36	27
			13	4.2	61																				
			16	3.3	48	0.4	6	4.6	67	0.1	1	3.8	55	0.8	12	5.5	80								
			17	2.2	32																				
			20	1.8	26	0.8	12	3.8	55	0.5	7	3.0	44	1.2	17	4.6	67								
300 12"	1050		13	7.3	106																		M14	60	44
			16	5.7	83			5.5	80			4.7	68	0.3	4	6.4	93								
			17	3.8	55																				
			20	3.0	44	0.5	7	4.3	62	0.2	3	3.6	52	0.9	13	4.9	71								
350 14"	1050		17	3.8	55																		M15	60	44
			20	3.0	44	0.5	7	4.3	62	0.2	3	3.6	52	0.9	13	4.9	71								
			25	2.3	33	0.6	9	4.2	61	0.3	4	3.4	49	1	15	4.8	70								
400 16"	1630		17	8.3	120																		M15	65	48
			20	6.5	94			5.6	81			4.8	69	0.2	3	6.2	90								
			25	3.4	49			4.4	64	0.2	3	3.8	55	0.8	12	5.1	74								
			32	1.7	25			3.8	55	0.5	7	3.0	44	1.2	17	4.7	68								
450 18"	2280		25	4.7	68			4.9	71			4.2	61	0.5	7	5.6	81						M15	92	68
			32	2.3	33			4.2	61	0.3	4	3.4	49	1	15	4.9	71								
500 20"	3250		25	6.4	93			5.6	81			4.8	69	0.2	3	6.2	90						M16	88	65
			32	3.1	45			4.4	64	0.2	3	3.6	52	0.8	12	5.2	75								
			40	1.6	23																				
600 24"	5330	3930	32	3.9	57	0.3	4	4.7	68			3.9	57	0.7	10	5.5	80						M25	147	108
			40	1.8	26																				
			322			0.7	10	3.9	57	0.4	6	3.1	45												
700 28"	8710	6422	32	6.2	90			5.6	81			4.7	68	0.2	3	6.4	93								
			322			0.5	7			0.2	3														
750 30"			40	3.0	44																				
800 32"	12740	9390	322			0.2	3																		
			40	4.4	64																				
			50	2.3	33																				
900 36"	15600	11495	40	5.5	80																				
			50	2.9	42																				

*) Spring = spring torque not adequete to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
**) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

10 EXPLODED VIEW AND PARTS LIST

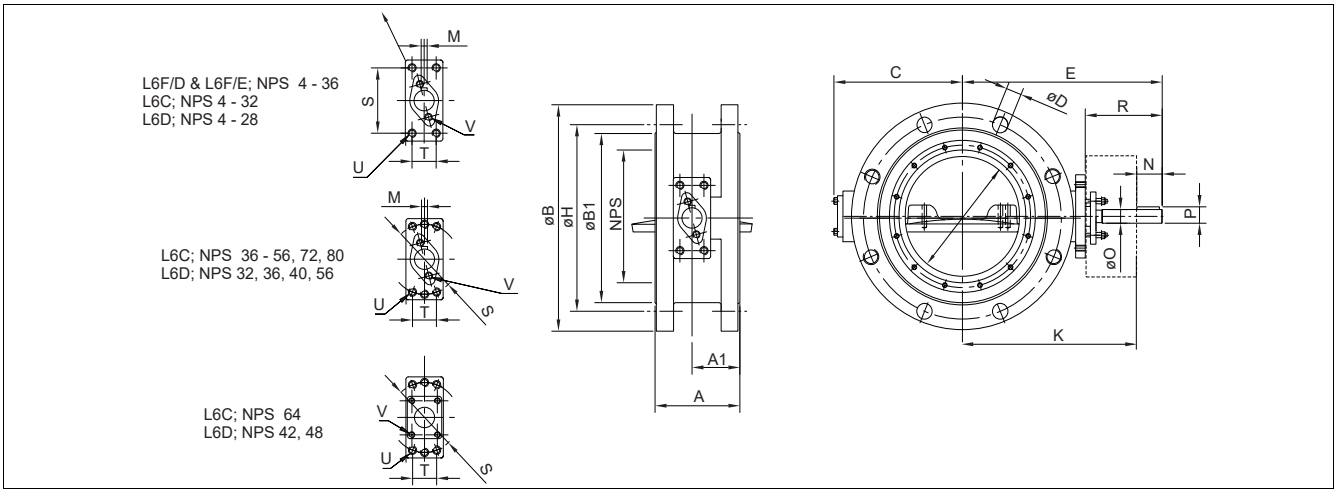
10.1 L6C, L6D



Item	Qty	Description	Spare part category
1	1	Body	
2	1	Clamp ring	
3	1	Disc	3
4	1	Seat ring	2
9	1	Gland	
10	1	Blind flange	
11	1	Drive shaft	3
12	1	Shaft	3
13	1	Key	3
14	3	Pin	3
15	1	Bearing	3
16	1	Bearing	3
17	2	Thrust bearing	
18	1	Gasket	1
19	1	Body seal	1
20	1 set	Gland packing	1
21	1	Spring washer	
22	1	Anti-extrusion ring	
24	2	Stud	
25	2	Hexagon nut	
26a	4	Stud	
26b	4	Nut	
27		Socket head screw	
29	1	Identification plate	
30		Washer	
42	2	Retaining plate	
44	2	Disc spring set	

Spare part set category 1: Recommended soft parts, always needed for the repair. Delivered as a set.
Spare part category 2: Parts for replacing of the seat
Spare part category 3: Parts for replacing of the closing element
Spares for the full overhaul: All parts from the categories 1, 2 and 3

11 DIMENSIONS AND WEIGHTS



L6C, ASME CLASS 150

NPS	Dimensions, mm																kg	U	V
	A	A1	øB	øB1	øH	øD	C	E	øO	R	P	M	N	K	S	T			
4	127	74	230	157.2	190.5	19	90	273	15	105	17	4.76	25	248	70	-	25	M10	M8
5	140	80	255	185.7	215.9	23	135	307	20	125	22.2	4.76	35	272	90	-	34	M12	M8
6	140	79	280	215.9	241.3	23	135	330	20	125	22.2	4.76	35	295	90	-	40	M12	M8
8	152	82.5	345	269.9	298.5	23	160	352	20	125	22.2	4.76	35	317	110	32	60	M12	M8
10	165	88	405	323.8	362	26	185	393	25	136	27.8	6.35	46	347	110	32	85	M12	M10
12	178	104	485	381	431.8	26	225	451	30	161	32.9	6.35	51	400	130	32	120	M12	M10
14	190	118	535	412.8	476.3	29	280	490	35	170	39.1	9.52	58	430	130	32	150	M12	M10
16	216	134	595	469.9	539.8	29	315	545	40	190	44.2	9.52	68	475	160	40	220	M16	M10
18	222	131	635	533.4	577.9	32	340	568	45	200	50.4	12.7	80	488	160	40	250	5/8	1/2
20	229	129	700	584.2	635	32	370	608	50	230	55.5	12.7	90	518	160	55	320	3/4	1/2
24	267	158	815	692.2	749.3	35	435	669	55	230	60.6	12.7	90	579	160	55	490	3/4	1/2
28*	292	144	925	800	863.6	35	464	820	70	300	78.2	19.05	119	701	230	90	700	1	5/8
30*	318	170	985	857	914.4	35	492	785	70	300	78.2	19.05	119	666	230	90	850	1	5/8
32*	318	159	1060	914	977.9	42	530	875	85	325	94.7	22.23	146	730	230	90	1050	1	5/8
36*	330	150	1170	1022	1085.8	42	630	995	95	375	104.8	22.23	156	839	330	120	1350	1 1/4	3/4
38*	330	150	1240	1073	1149.3	42	695	1085	95	375	104.8	22.23	156	929	330	120	1400	1 1/4	3/4
40*	410	222	1290	1124	1200.2	42	645	1090	105	395	116	25.4	180	913	330	120	1600	1 1/4	3/4
48*	470	256	1510	1359	1422.4	42	756	1235	120	425	133.8	31.75	205	1030	330	120	2300	1 1/4	3/4
56*	530	288	1745	1575	1651	48	1001	1470	150	530	181	38.1	280	1190	400	160	4600	1 1/2	1 1/4
64*	600	370	1870	1714	1790	38	1097	1540	165	530	181	38.1	280	1260	400	160	5200	1 1/2	1 1/4
72*	356	160.5	2020	1917	1957	29	1130	1512	135	475	148.9	31.75	225	1287	360	135	4800	1 1/4	7/8
80*	540	274.5	2345	2213	2257	45	1173	1700	135	475	148.9	31.75	225	1475	360	135	6900	1 1/4	7/8

NPS	Dimensions, in																lb	U	V
	A	A1	øB	øB1	øH	øD	C	E	øO	R	P	M	N	K	S	T			
4	5.00	2.91	9.13	6.18	7.50	0.75	3.54	10.75	0.59	4.13	0.67	0.19	0.98	9.76	2.76	-	55	M10	M8
5	5.51	3.15	10.12	7.31	8.50	0.91	5.31	12.09	0.79	4.92	0.87	0.19	1.38	10.71	3.54	-	75	M12	M8
6	5.51	3.11	11.81	8.50	9.50	0.91	5.31	12.99	0.79	4.92	0.87	0.19	1.38	11.61	3.54	-	88	M12	M8
8	5.98	3.25	13.62	10.62	11.75	0.91	6.30	13.86	0.79	4.92	0.87	0.19	1.38	12.48	4.33	1.26	132	M12	M8
10	6.50	3.46	16.18	12.75	14.25	1.02	7.28	15.47	0.98	5.35	1.09	0.25	1.81	13.66	4.33	1.26	187	M12	M10
12	7.01	4.09	19.21	15.00	17.00	1.02	8.86	17.76	1.18	6.34	1.30	0.25	2.01	15.75	5.12	1.26	264	M12	M10
14	7.48	4.65	21.22	16.25	18.75	1.14	11.02	19.29	1.38	6.69	1.54	0.37	2.28	16.93	5.12	1.26	330	M12	M10
16	8.50	5.28	23.70	18.50	21.25	1.14	12.40	21.46	1.57	7.48	1.74	0.37	2.68	18.70	6.30	1.57	484	M16	M10
18	8.74	5.16	25.00	21.00	22.75	1.26	13.39	22.36	1.77	7.87	1.98	0.50	3.15	19.21	6.30	1.57	550	5/8	1/2
20	9.02	5.08	27.52	23.00	25.00	1.26	14.57	23.94	1.97	9.06	2.19	0.50	3.54	20.39	6.30	2.17	704	3/4	1/2
24	10.51	6.22	32.01	24.77	29.50	1.38	17.13	26.34	2.17	9.06	2.39	0.50	3.54	22.80	6.30	2.17	1078	3/4	1/2
28*	11.50	5.67	36.50	31.50	34.00	1.38	18.27	32.28	2.76	11.81	3.08	0.75	4.69	27.60	9.06	3.54	1540	1	5/8
30*	12.52	6.69	38.74	33.75	36.00	1.38	19.37	30.91	2.76	11.81	3.08	0.75	4.69	26.22	9.06	3.54	1870	1	5/8
32*	12.52	6.26	41.73	36.00	38.50	1.65	20.87	34.45	3.35	12.80	3.73	0.88	5.75	28.74	9.06	3.54	2310	1	5/8
36*	12.99	5.91	45.98	40.25	42.75	1.65	24.80	39.17	3.74	14.76	4.13	0.88	6.14	33.03	12.99	4.72	2970	1 1/4	3/4
38*	12.99	5.91	48.74	42.24	45.25	1.65	27.36	42.72	3.74	14.76	4.13	0.88	6.14	36.57	12.99	4.72	3080	1 1/4	3/4
40*	16.14	8.74	50.75	44.25	47.24	1.65	25.39	42.91	4.13	15.55	4.57	1.00	7.08	35.94	12.99	4.72	3520	1 1/4	3/4
48*	18.50	10.08	59.49	53.50	56.00	1.65	29.76	48.62	4.72	16.73	5.27	1.25	8.07	40.55	12.99	4.72	5060	1 1/4	3/4
56*	20.87	11.34	68.90	62.01	65.00	1.89	39.41	57.87	5.91	20.87	7.13	1.50	11.02	46.85	15.75	6.30	10120	1 1/2	1 1/4
64*	23.62	14.57	73.62	67.48	70.47	1.50	43.19	60.63	6.50	20.87	7.13	1.50	11.02	49.61	15.75	6.30	11440	1 1/2	1 1/4
72*	14.02	18.13	83.46	78.39	80.00	1.14	44.49	59.53	5.31	18.70	5.86	1.25	8.86	50.67	14.17	5.31	10560	1 1/4	7/8
80*	21.26	10.81	92.32	87.13	88.86	1.77	46.18	66.93	5.31	18.70	5.86	1.25	8.86	58.07	14.17	5.31	15180	1 1/4	7/8

*) Size 28" and bigger acc. to ASME B16.47 Series A, drilling for sizes 64" and bigger to be agreed with the factory

L6D, ASME CLASS 300

NPS	Dimensions, mm																kg	U	V
	A	A1	øB	øB1	øH	øD	C	E	øO	R	P	M	N	K	S	T			
4	127	74	255	157.2	200	23	90	273	15	105	17	4.76	25	248	70	-	34	M10	M8
5	140	80	280	185.7	235	23	120	307	20	125	22.2	4.76	35	272	90	-	50	M12	M8
6	140	79	320	215.9	269.9	23	135	330	20	125	22.2	4.76	35	295	90	-	60	M12	M8
8	152	80	380	269.9	330.2	26	165	368	25	136	27.8	6.35	46	322	110	32	90	M12	M10
10	165	83	445	323.8	387.4	29	205	440	35	166	39.1	9.52	58	382	130	32	135	M12	M10
12	178	96.5	520	381	450.8	32	280	520	45	200	50.4	12.7	80	440	160	40	200	M16	M14
14	190	110.5	585	412.8	514.4	32	335	590	50	230	55.5	12.7	90	500	160	55	250	M20	M14
16	216	126.5	650	469.9	571.5	35	375	630	55	230	60.6	12.7	90	540	160	55	330	M20	M14
18	222	115.5	710	533.4	628.6	35	395	725	70	310	78.2	19.05	119	606	230	90	420	1	5/8
20	229	116	775	584.2	685.8	35	445	750	70	310	78.2	19.05	119	631	230	90	510	1	5/8
24	267	140	915	692.2	812.8	41	510	810	85	310	94.7	22.23	146	664	230	90	760	1	5/8
26	292	140	970	749	876.3	45	575	955	95	375	104.8	25.4	156	799	330	120	900	1 1/4	3/4
28*	292	140	1035	800	939.8	45	575	975	95	395	104.8	25.4	156	819	330	120	1100	1 1/4	3/4
32*	318	159	1150	914	1054	51	640	1055	120	425	133.8	31.75	205	850	330	120	1400	1 1/4	1
36*	330	165	1270	1022	1168.4	54	780	1175	135	475	149	31.75	225	950	360	135	1900	1 1/4	1 1/4
40*	410	165	1240	1086	1155.7	45	780	1175	135	475	149	31.75	225	950	360	135	1900	1 1/4	1 1/4
42*	410	205	1290	1137	1206.5	45	820	1260	165	530	181	38.1	280	980	360	135	2530	1 1/4	1 1/4
48*	470	255	1465	1302	1371.6	51	940	1380	165	530	181	38.1	280	1100	360	135	3530	1 1/4	1 1/4
56*	530	285	1710	1518	1600.2	60	1110	1590	200	590	222.1	50.8	340	1250	460	180	5650	1 1/2	1 1/2

NPS	Dimensions, in																lb	U	V
	A	A1	øB	øB1	øH	øD	C	E	øO	R	P	M	N	K	S	T			
4	5.00	2.91	10.12	6.19	7.87	0.91	3.54	10.75	0.59	4.13	0.67	0.19	0.98	9.76	2.76	-	75	M10	M8
5	5.51	3.15	11.14	7.31	9.25	0.91	4.72	12.09	0.79	4.92	0.87	0.19	1.38	10.71	3.54	-	110	M12	M8
6	5.51	3.11	12.64	8.50	10.63	0.91	5.31	12.99	0.79	4.92	0.87	0.19	1.38	11.61	3.54	-	132	M12	M8
8	5.98	3.15	15.12	10.62	13.00	1.02	6.50	14.49	0.98	5.35	1.09	0.25	1.81	12.68	4.33	1.26	198	M12	M10
10	6.50	3.27	17.72	12.75	15.25	1.14	8.07	17.32	1.38	6.54	1.54	0.37	2.28	15.04	5.12	1.26	297	M12	M10
12	7.01	3.80	20.71	15.00	17.75	1.26	11.02	20.47	1.77	7.87	1.98	0.50	3.15	17.32	6.30	1.57	440	M16	M14
14	7.48	4.35	23.19	16.25	20.25	1.26	13.19	23.23	1.97	9.06	2.19	0.50	3.54	19.69	6.30	2.17	550	M20	M14
16	8.50	4.98	26.18	18.50	22.50	1.38	14.76	24.80	2.17	9.06	2.39	0.50	3.54	21.26	6.30	2.17	726	M20	M14
18	8.74	4.55	28.00	21.00	24.75	1.38	15.55	28.54	2.76	12.20	3.08	0.75	4.69	23.86	9.06	3.54	924	1	5/8
20	9.02	4.57	30.50	23.01	27.00	1.38	17.52	29.53	2.76	12.20	3.08	0.75	4.69	24.84	9.06	3.54	1122	1	5/8
24	10.51	5.51	36.00	27.25	32.00	1.61	20.08	31.89	3.35	12.20	3.73	0.88	5.75	26.14	9.06	3.54	1672	1	5/8
26	11.50	5.51	38.27	29.50	34.50	1.77	22.64	37.60	3.74	14.76	4.13	1.00	6.14	31.46	12.99	4.72	1980	1 1/4	3/4
28*	11.50	5.51	40.75	31.50	37.00	1.77	22.64	38.39	3.74	15.55	4.13	1.00	6.14	32.24	12.99	4.72	2420	1 1/4	3/4
32*	12.52	6.26	45.28	37.80	41.50	2.01	25.20	41.54	4.72	16.73	5.27	1.25	8.07	33.46	12.99	4.72	3080	1 1/4	1
36*	12.99	6.50	50.00	40.25	46.00	2.13	30.71	46.26	5.31	18.70	5.87	1.25	8.86	37.40	14.17	5.31	4180	1 1/4	1 1/4
40*	16.14	6.50	48.74	42.75	45.50	1.77	30.71	46.26	5.31	18.70	5.87	1.25	8.86	37.40	14.17	5.31	4180	1 1/4	1 1/4
42*	16.14	8.07	50.75	40.35	47.50	1.77	32.28	49.61	6.50	20.87	7.13	1.50	11.02	38.58	14.17	5.31	5566	1 1/4	1 1/4
48*	18.50	10.04	57.76	51.25	54.00	2.01	37.01	54.33	6.50	20.87	7.13	1.50	11.02	43.31	14.17	5.31	7766	1 1/4	1 1/4
56*	20.87	11.22	67.24	59.75	63.00	2.36	43.70	62.60	7.87	23.23	8.74	2.00	13.39	49.21	18.11	7.09	12430	1 1/2	1 1/2

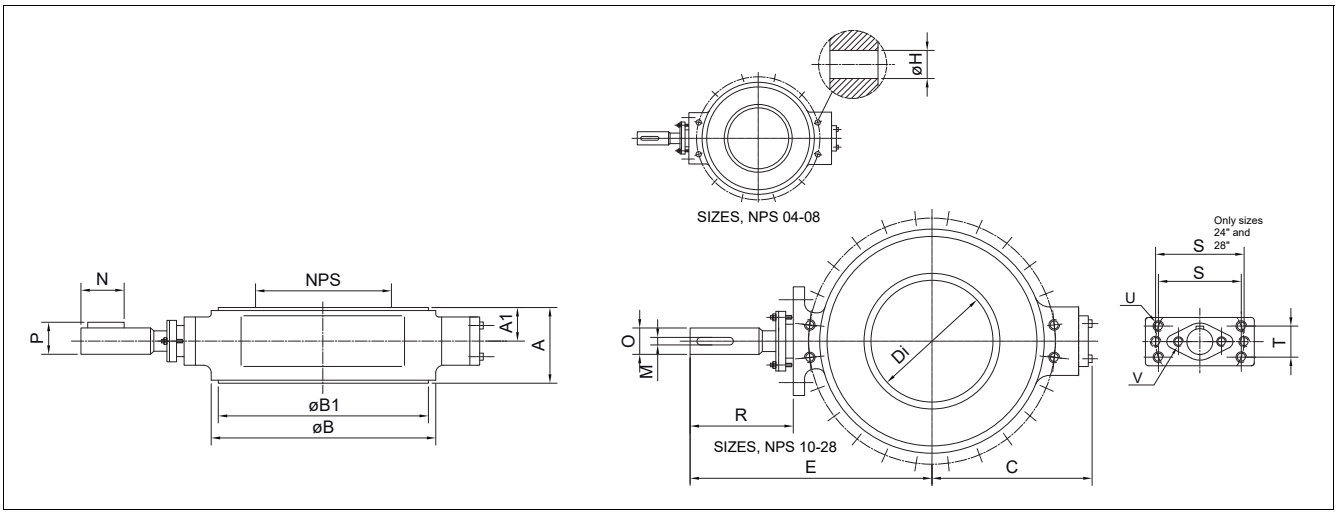
*) Size 28" and bigger acc. to ASME B16.47 Series A

L6F/D & L6F/E, ASME CLASS 600/300

NPS	Dimensions, mm																kg	U	V
	A	A1	øB	øB1	øH	øD	C	E	øO	R	P	M	N	K	S	T			
4	190	110	275	157.2	215.9	26	110	270	15	125	17	4.76	25	245	110	32	45	3/8	3/8
6	210	125	355	215.9	292.1	29	150	315	20	115	22.7	4.76	35	280	110	32	90	1/2	3/8
8	230	177	420	269.9	349.2	32	225	376	25	146	27.8	6.35	46	330	110	32	150	1/2	1/2
10	250	145	510	323.8	431.8	35	220	443	35	158	39.1	9.53	58	385	160	40	215	5/8	5/8
12	270	181	560	381	489	35	326	612	45	230	50.4	12.7	80	532	230	90	350	1	3/4
14	290	180	605	412.8	527.0	38	350	585	45	230	50.4	12.7	80	505	230	90	410	1	3/4
16	310	202	685	469.9	603.2	41	400	666	50	230	55.5	12.7	90	576	230	90	450	1	3/4
18	330	220	745	533.4	654.0	45	420	629	55	239	60.6	12.7	90	539	230	90	600	1	1/2
20	350	243.5	815	584.2	723.9	45	460	778	70	278	78.15	19.05	119	659	230	90	895	1	1
24	390	256.5	940	692.2	838.2	51	490	1451	85	846	94.625	22.225	146	1305	330	120	1225	1 1/4	1 1/4
28*	430	200	1075	800	863.6	48	565	1605	95	980	104.825	22.225	156	1449	330	120	1625	1 1/4	1 1/4
30*	430	200	1130	857	1022.3	54	646	1006	95	381	104.825	22.225	156	850	330	120	1795	1 1/4	1 1/4
36*	510	345	1315	1022	1193.8	67	710	1600	135	890	148.95	31.75	225	1375	360	135	2770	1 1/4	1 1/4

NPS	Dimensions, in																lb	U	V
	A	A1	øB	øB1	øH	øD	C	E	øO	R	P	M	N	K	S	T			
4	7.48	4.33	10.75	6.19	8.50	1.02	4.33	10.63	0.59	4.92	0.67	0.19	0.98	9.65	4.33	1.26	99	3/8	3/8
6	8.27	4.92	14.02	8.50	11.50	1.14	5.91	12.40	0.79	4.53	0.89	0.19	1.38	11.02	4.33	1.26	198	1/2	3/8
8	9.06	6.97	16.54	12.13	13.75	1.26	8.86	14.80	0.98	5.75	1.09	0.25	1.81	12.99	4.33	1.26	330	1/2	1/2
10	9.84	5.71	20.00	14.00	17.00	1.38	8.66	17.44	1.38	6.22	1.54	0.38	2.28	15.16	6.30	1.57	473	5/8	5/8
12	10.63	7.13	22.01	15.00	19.25	1.38	12.83	24.09	1.77	9.06	1.98	0.50	3.15	20.94	9.06	3.54	770	1	3/4
14	11.42	7.09	23.82	16.26	20.75	1.50	13.78	23.03	1.77	9.06	1.98	0.50	3.15	19.88	9.06	3.54	902	1	3/4
16	12.20	7.95	27.01	20.00	23.75	1.61	15.75	26.22	1.97	9.06	2.19	0.50	3.54	22.68	9.06	3.54	990	1	3/4
18	12.99	8.66	29.25	21.00	25.75	1.77	16.54	24.76	2.17	9.41	2.39	0.50	3.54	21.22	9.06	3.54	1320	1	1/2
20	13.78	9.59	32.22	21.26	28.50	1.77	18.11	30.63	2.76	10.94	3.08	0.75	4.69	25.94	9.06	3.54	1969	1	1
24	15.35	10.10	37.50	24.72	33.00	2.01	19.29	57.13	3.35	33.31	3.73	0.88	5.75	51.38	12.99	4.72	2695	1 1/4	1 1/4
28*	16.93	7.87	42.24	30.31	34.00	1.89	22.24	63.19	3.74	38.58	4.13	0.88	6.14	57.05	12.99	4.72	3575	1 1/4	1 1/4
30*	16.93	7.87	44.49	29.50	40.25	2.13	25.43	39.61	3.74	15.00	4.13	0.88	6.14	33.46	12.99	4.72	3949	1 1/4	1 1/4
36*	20.08	13.58	51.73	38.87	47.00	2.64	27.95	62.99	5.31	35.04	5.86	1.25	8.86	54.13	14.17	5.31	6094	1 1/4	1 1/4

*) Size 28" and bigger acc. to ASME B16.47 Series A



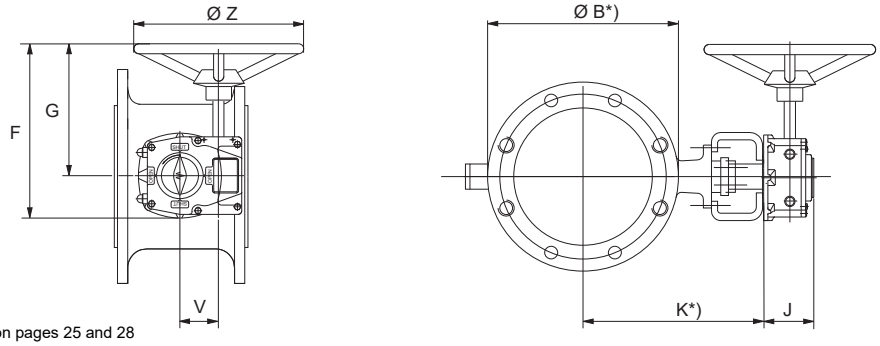
L4F/D, ASME CLASS 600/300

Size	Dimensions, mm														UNC		Weight kg
NPS	Di	A	A1	øB	øB1	C	E	O	R	P	M	N	S	T	U	V	
04	3	64	26	275	157.2	135	270	15	125	17.0	4.76	25	110	32	1/2	3/8	17
06	5	76	30	355	215.9	190	335	20	135	22.2	4.76	35	110	32	1/2	3/8	30
08	6	89	36	420	269.9	225	386	25	146	27.8	6.35	46	110	32	1/2	1/2	65
10	8	114	49	510	323.8	300	525	35	180	39.1	9.52	58	160	40	5/8	5/8	140
12	10	178	89	560	381	326	612	45	230	50.4	12.70	80	230	90	1	3/4	190
14	10	190	95	605	412.8	350	585	45	230	50.4	12.70	80	230	90	1	3/4	270
16	12	216	108	685	469.9	400	676	50	240	55.5	12.70	90	230	90	1	3/4	300
20	16	229	122.5	815	584.2	460	778	70	278	78.2	19.05	119	230	90	1	1	450
24	20	267	133.5	940	692.2	560	951	85	346	94.7	22.23	146	330	120	1 1/4	1	660
28*	24	292	140	1075	800	640	1006	95	316	104.8	22.23	156	330	120	1 1/4	1	840
32*	28	318	159	1195	914	660	1066	120	426	133.7	31.75	205	330	120	1 1/4	1	1225
36*	30	330	165	1315	1022	685	1195	135	475	148.9	31.75	225	360	135	1 1/4	1	1625

Size	Dimensions, in														UNC		Weight lb
NPS	Di	A	A1	øB	øB1	C	E	O	R	P	M	N	S	T	U	V	
04	3	2.52	1.02	10.83	6.19	5.31	10.63	0.59	4.92	0.67	0.19	0.98	4.33	1.26	1/2	3/8	37
06	5	2.99	1.18	13.98	8.50	7.48	13.19	0.79	5.31	0.87	0.19	1.38	4.33	1.26	1/2	3/8	66
08	6	3.50	1.42	16.54	10.63	8.86	15.20	0.98	5.75	1.09	0.25	1.81	4.33	1.26	1/2	1/2	143
10	8	4.49	1.93	20.08	12.75	11.81	20.67	1.38	7.09	1.54	0.37	2.28	6.30	1.57	5/8	5/8	308
12	10	7.01	3.50	22.05	15.00	12.83	24.09	1.77	9.06	1.98	0.50	3.15	9.06	3.54	1	3/4	418
14	10	7.48	3.74	23.82	16.25	13.78	23.03	1.77	9.06	1.98	0.50	3.15	9.06	3.54	1	3/4	594
16	12	8.50	4.25	26.97	18.50	15.75	26.61	1.97	9.45	2.19	0.50	3.54	9.06	3.54	1	3/4	660
20	16	9.02	4.82	32.09	23.00	18.11	30.63	2.76	10.94	3.08	0.75	4.69	9.06	3.54	1	1	990
24	20	10.51	5.26	37.01	27.25	22.05	37.44	3.35	13.62	3.73	0.88	5.75	12.99	4.72	1 1/4	1	1450
28*	24	11.50	5.51	42.32	31.50	25.20	39.61	3.74	12.44	4.13	0.88	6.14	12.99	4.72	1 1/4	1	1848
32*	28	12.52	6.26	47.05	35.98	25.98	41.97	4.72	16.77	5.26	1.25	8.07	12.99	4.72	1 1/4	1	2695
36*	30	12.99	6.50	51.77	40.24	26.97	47.05	5.31	18.70	5.86	1.25	8.86	14.17	5.31	1 1/4	1	3575

*) Size 28" and bigger acc. to ASME B16.47 Class A

VALVE + MANUAL GEAR OPERATOR

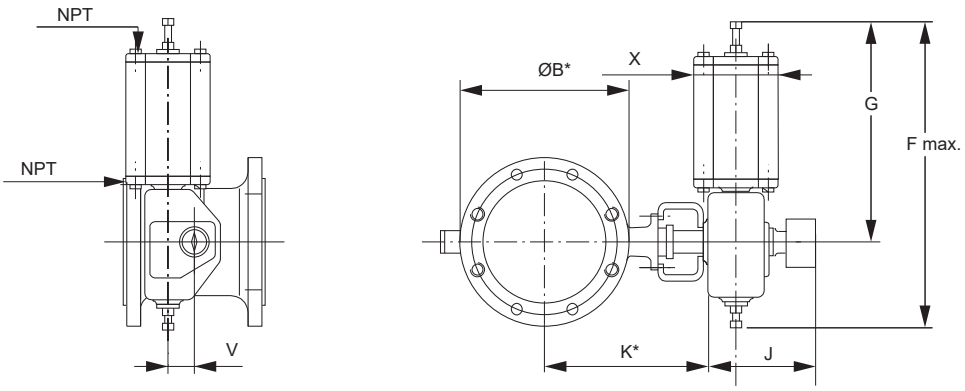


') See dimensions K and øB on pages 25 and 28

Type	Dimensions, mm					kg
	F	G	J	V	Z	
M07	241	185	65	52	160	3
M10	241	185	65	52	200	5
M12	304	235	88	71	315	10
M14	405	305	93	86	400	18
M15	456	346	102	105	500	31
M16	530	389	124	130	500	45
M25	597	412	160	182	600	61

Type	Dimensions, in					lb
	F	G	J	V	Z	
M07	9.40	7.21	2.53	2.03	6.24	6
M10	9.40	7.21	2.53	2.03	7.80	11
M12	11.85	9.16	3.43	2.77	12.28	21
M14	15.80	11.90	3.63	3.35	15.60	40
M15	17.78	13.49	3.98	4.09	19.50	68
M16	20.67	15.17	4.84	5.07	19.50	99
M25	23.28	16.07	6.24	7.10	23.40	134

VALVE + PNEUMATIC ACTUATOR B1C, B1J, B1JA



Type	Dimensions, mm					NPT	kg
	X	G	F	V	J		
B1C6	90	260	400	36	283	1/4	4,2
B1C9	110	315	455	43	279	1/4	9,6
B1C11	135	375	540	51	290	3/8	16
B1C13	175	445	635	65	316	3/8	31
B1C17	215	545	770	78	351	1/2	54
B1C20	215	575	840	97	385	1/2	73
B1C25	265	710	1040	121	448	1/2	131
B1C32	395	910	1330	153	525	3/4	256
B1C40	505	1150	1660	194	595	3/4	446
B1C50	610	1350	1970	242	690	1	830

Type	Dimensions, in					NPT	lb
	X	G	F	V	J		
B1C6	3.54	10.24	15.75	1.42	11.14	1/4	9
B1C9	4.33	12.40	17.91	1.69	10.98	1/4	21
B1C11	5.31	14.76	21.26	2.01	11.42	3/8	35
B1C13	6.89	17.52	25.00	2.56	12.44	3/8	68
B1C17	8.46	21.46	30.31	3.07	13.82	1/2	119
B1C20	8.46	22.64	33.07	3.82	15.16	1/2	161
B1C25	10.43	27.95	40.94	4.76	17.64	1/2	289
B1C32	15.55	35.83	52.36	6.02	20.67	3/4	564
B1C40	19.88	45.28	65.35	7.64	23.43	3/4	983
B1C50	24.02	53.15	77.56	9.53	27.17	1	1829

Type	Dimensions, mm					NPT	kg
	X	G	F	V	J		
B1J, B1JA8	135	420	560	43	279	3/8	17
B1J, B1JA10	175	490	650	51	290	3/8	30
B1J, B1JA12	215	620	800	65	316	1/2	57
B1J, B1JA16	265	760	990	78	351	1/2	100
B1J, B1JA20	395	935	1200	97	358	3/4	175
B1J, B1JA25	505	1200	1530	121	448	3/4	350
B1J, B1JA32	540	1410	1830	153	525	1	671

Type	Dimensions, in					NPT	lb
	X	G	F	V	J		
B1J, B1JA8	5.31	16.54	22.05	1.69	10.98	3./8	37
B1J, B1JA10	6.89	19.29	25.59	2.01	11.42	3/8	66
B1J, B1JA12	8.46	24.41	31.5	2.56	12.44	1/2	126
B1J, B1JA16	10.43	29.92	38.98	3.07	13.82	1/2	220
B1J, B1JA20	15.55	36.81	47.24	3.82	14.09	3/4	386
B1J, B1JA25	19.88	47.24	60.24	4.76	17.64	3/4	771
B1J, B1JA32	21.26	55.51	72.05	6.02	20.67	1	1479

12 TYPE CODE

Neles™ Neldisc™ high performance butterfly valves. Series L6, L4													
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.	13.
	L6	C	B	N	08	P	A	C	A	G	/		

1.	S-DISC CONSTRUCTION
S-	Flow balancing trim on downstream side of body flow port

2.	PRODUCT SERIES / DESIGN
L6	L6C and L6D pressure ratings are flanged and face-to-face according to EN 558 part 1, basic serie 13, ISO 5752 series 13, API 609 category B, double flanged, short pattern L6F/D and L6F/E are flanged and face-to-face according to EN 558 part 1, basic serie 14, ISO 5752 series 14, API 609 category B
L4	Wafer, reduced bore, face-to-face: ISO 5752 series 16 / BS 5155 / API 609 4" to 10" and series 13 / BS 5155 12" to 28"

3.	PRESSURE RATING
C	Body ASME Class 150
D	Body ASME Class 300
F/D	Body ASME Class 600 / Internals ASME Class 300
F/E	Body ASME Class 600 / Internals extended ASME Class 300

4.	SEAT DESIGN
B not L6F/D or L6F/E	Metal seat - actuator mounting neles standard / metric threads with drive shaft with 2 key ways - pipe flange threads according to pipe flange standard applied (sign 13) Used together with sign 5, codes N, C, H, S (also NACE versions)

5.	CONSTRUCTION
N or 1N (NACE)	STANDARD in size range 4"...24"(cl.150, cl.300) - t_{max} = +425 °C / +800 °F - bearings cobalt based alloy, shaft bearing surface nitrated (17-4PH shaft) - body and blind flange gaskets graphite - bare shaft valve ATEX II 2 G c - not used in L6F/D or L6F/E
A	Standard design in size range 04"...24" (cl.150, cl.300) -Bearings PTFE + C25 +AISI 316 or PTFE + C25 + Alloy 625 depending on body material, shaft bearing surface non-nitrated. - tmax = +260 °C / +500 °F - Gr. 630 (17-4PH) shaft - body and blind flange gaskets graphite
U or 1U (NACE)	Standard design in size range 28"...80" (cl.150, cl.300) and 4"-36" L6F/D & L6F/E - Tmax + 425 °C/+800 °F - shaft bearings surfaces chrome plated - bearings NITRONIC 60 (not NACE) - bearings cobalt based alloy (NACE) - body and blind flange gaskets graphite - clamp ring screws Gr. 660 (NACE) - bare shaft valve ATEX II 2 G c
H or 1H (NACE)	High temperature / High Cycle - bearing surfaces of shafts cobalt based alloy - bearings cobalt based alloy - body and blind flange gaskets graphite (ATEX II 2 G c)
C	Cryogenic, t= -200 °C...+260 °C, code C t= -50 °C or -100 °C ...+260 °C, code 1C t= -200 °C...+260 °C, code 2C - extended bonnet and drive shaft (Cryo extension for T = -200 °C to +260 °C) - bearings PTFE+ C25 + AISI 316 - body and blind flange gaskets graphite
X or 1X (NACE)	LOW EMISSION CONSTRUCTION - Low emission graphite packing - Low emission blind flange - Low emission blind flange bolting - Otherwise as construction "N" or "1N"
S or 1S (NACE)	STEAM JACKET WITH BEARING PROTECTION - steam jacket on valve body and graphite bearing protection, otherwise as construction "BN" or "BU"
Z	OXYGEN CONSTRUCTION - BAM tested non-metallic materials - T = -50 ...+200 °C - Max pressure as per body rating - Bearings cobalt based alloy - Oxygen cleaning acc. to manufacturer internal procedures. (See IMO 10O270EN.pdf)

6.	SIZE
	L6C: 04, 06, 08, 10, 12, 14, 16, 18, 20, 24, 28, 30, 32, 36, 38, 40, 42 48, 52, 54, 56, 60, 64, 72, 80
	L6D: 04, 06, 08, 10, 12, 14, 16, 18, 20, 24, 26, 28, 30, 32, 36, 40, 42, 44, 48, 50, 56
	L4F/D: 04, 06, 08, 10, 12, 14, 16, 20, 24, 28
	L6F/D & L6F/E: 04, 06, 08, 10, 12, 14, 16, 18, 20, 24, 28, 30, 36

7.	BODY MATERIALS
A	ASTM A 351 gr. CF8M. Standard.
P	ASTM A 216 gr. WCB. Standard.
F	ASTM A 352 gr. LCC

8.	DISC MATERIAL
A	ASTM A 351 gr. CF8M / F 316. Standard.

9.	SHAFT AND PIN MATERIAL
C	Gr. 630 (17-4PH). Standard.
H	Nimonic 80A (high temp. above +425 °C / +800 °F)

10.	SEAT MATERIAL
A Not L6F/E	Incoloy 825, hard chrome plated.
B	W.no. 1.4418, hard chrome plated (AVESTA 248 SV).
D Not L6F/E	F6NM, hard chrome plated (Nace) t= -75 ° to +425 °C / -100° to +800 °F
H	Nimonic 80A, hard chrome plated, (high temp. above +425 °C / +800 °F).

11.	PACKING MATERIAL OPTION
G	Live loaded graphite packing, Fire-safe
T	Live loaded PTFE V-ring packing

12.	FLANGE FACING
-	Ra 3.2 - 6.3, standard, without sign cover: EN 1092-1 Type B1 (Ra 3.2 - 12.5) ASME B16.5, Ra 3.2 - 6.3 (125 - 250 µin)

13.	FLANGE DRILLING
-	According to ASME B16.5, without sign (4" - 24"). According to ASME B16.47 series A (26" and up).
B	ASME B16.47 Series B Class 150 & Class 300 (size26" and bigger)

Examples:

L6CBN08AACAG = Standard construction with metal bearings, stainless steel body and disc. Max. temperature +425 °C

L6CBN08AACAT = Max. temperature +230 °C

L6CBU28AACAG = Standard construction in bigger sizes, metal bearings, stainless steel body and disc. Flanges acc. to ASME B16.47 Series A. Max. temperature +425 °C

L6CBH10AAHHG = High temperature construction

L6CBC12AACAG = Cryo construction

L6F/DMU08PACAG = Standard construction with metal bearings, carbon steel body and stainless steel disc. Body ASME Class 600, Internals ASME Class 300

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