

NELDISC®

Metal seated high performance triple eccentric disc valve

Series L9B/L90B

Installation, Maintenance and
Operating Instructions



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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.

Addresses and phone numbers are printed on the back cover.

See also www.metso.com/valves for the latest documentation.

SAVE THESE INSTRUCTIONS!

Subject to change without notice.

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1 GENERAL

1.1 Scope of the manual

This manual provides essential information on L9B and L90B series Neldisc® triple eccentric disc valves. Actuators and other accessories are only discussed briefly. Refer to the individual manuals for further information on their installation, operation and maintenance.

NOTE:

Selection and use of the valve in a specific application requires close consideration of detailed 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 Metso's Automation business for more information.

1.2 Valve construction

L9B and L90B series valves are weld ended metal seated triple eccentric disc valves. L9B series valves are full bore valves and L90B series valves are reduced bore valves.

The body is fabricated of boiler vessel quality carbon steel and can easily be welded into the piping without preheating.

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 shafts with pins.

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 the Section 10.

The valve is designed for trunk route of district heating network and steam piping for shut off and control applications.

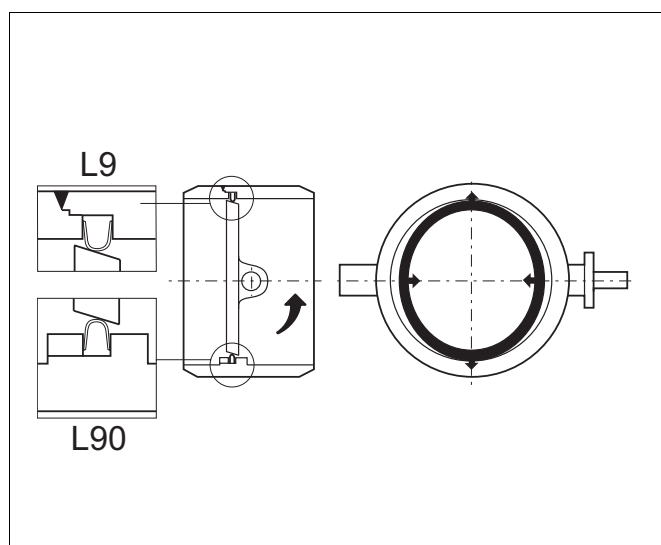


Fig. 1 Construction of a triple eccentric disc valve

1.3 Valve markings

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

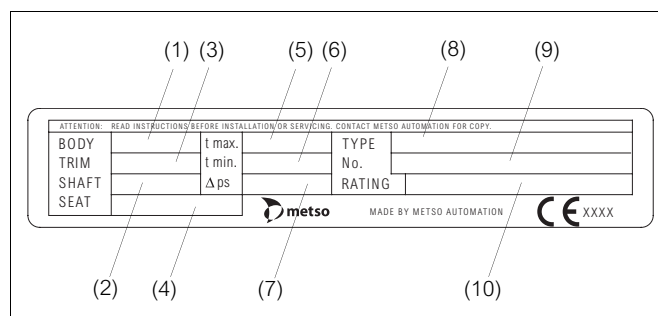


Fig. 2 Identification plate

Identification plate markings:

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

1.4 Technical specifications

Type

L9B:

Full bore, metal seated weld ended triple eccentric disc valve

L90B:

Reduced bore, metal seated weld ended triple eccentric disc valve

Pressure class

Body:

ASME 150 / DIN PN 25

Trim:

L9B:

ASME 150 (20 bar)

L90B:

ASME 150 (20 bar)

Temperature range:

Standard construction +150 °C
High temp. construction +250 °C

Flow direction:

Free

Dimensions:

See p. 11

Weights:

See p. 11

1.5 CE marking

The valve meets the requirements of the European Directive 97/23/EC 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 Metso Nelprof computer program. Observe the relevant work environment regulations on noise emission.

CAUTION:

Beware of a very hot valve!

The valve body may be very hot during use. Protect yourself against 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.

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°.

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

CAUTION:

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

Follow the lifting methods shown in Fig. 3.

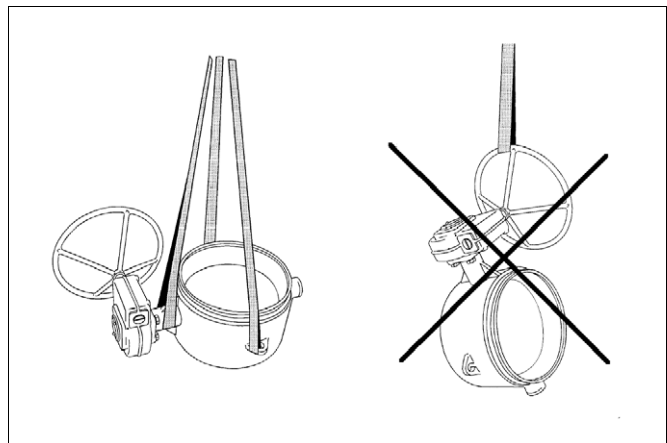


Fig. 3 Lifting of the valve

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

If the valve is delivered installed with the actuator by manufacturer, avoid removing the actuator during the installation.

Damages and leakages may result when the actuator is not installed or adjusted correct after removing.

3.2 Mounting into the pipeline

Close the valve totally before the welding it into the pipeline.

Lift the valve into the pipeline according the instructions in Fig. 3. Observe also the safety precautions listed in Section 1.5.

If the valve will be welded to vertical pipeline, close the valve and cover it with about 50 mm water cushion. Now the welding spatters does not damage the seat and the disc sealing face.

If possible, the valve should be mounted with its shafts in the horizontal position. Avoid mounting position when the shafts are totally vertical.

The recommended flow direction is when flat side of the disc is in the entry side.

When the valve is mounted into the district heat network, an oxygenous water or air may accumulate corrosion on the output side. To prevent the corrosion vent the space after the valve and fill it with unoxxygenous district heat water (see Fig. 4).

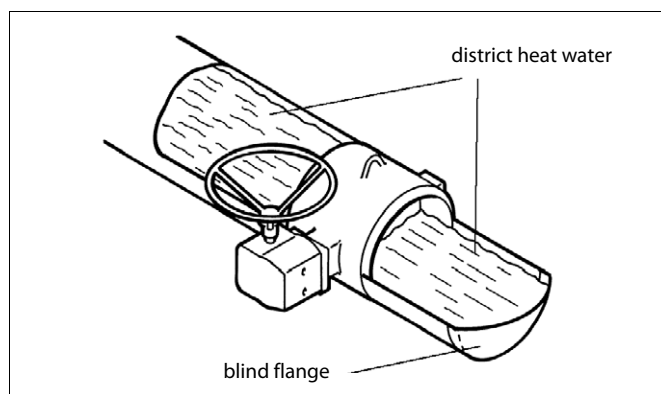


Fig. 4 Corrosion preventive water filling

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

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.

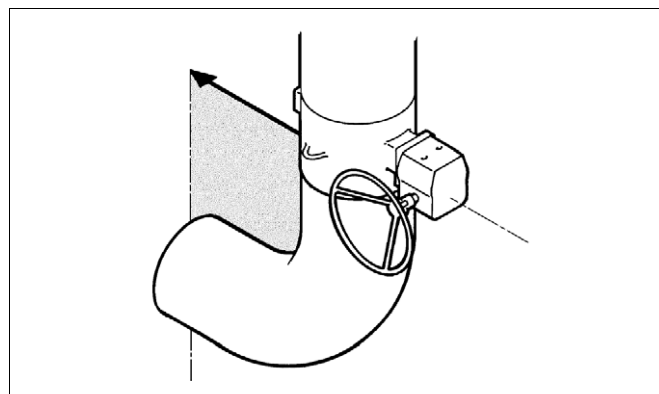


Fig. 5 Mounting after a pipe elbow

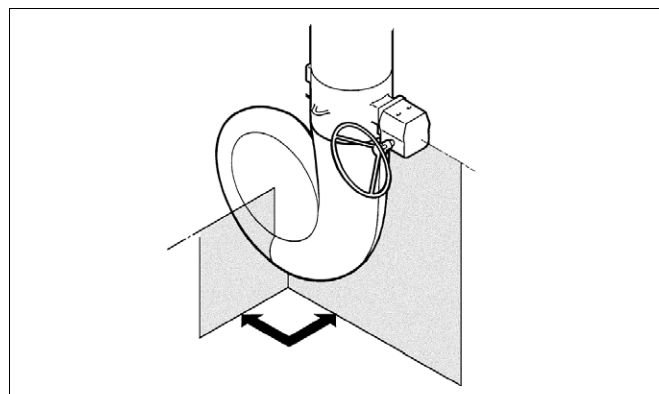


Fig. 6 Mounting after the centrifugal pump

3.3 Arrangement before the commissioning

- ☐ Flush the pipeline carefully. Keep the valve 30-40° open when flushing.
- ☐ Close the valve during the flushing until the disc is open about 5-10°. Rised flow rate removes the last bits of impurities.

3.4 Commissioning

- ☐ 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.
- ☐ Ensure the gland packing is not leaking when pressure rises to maximum. Tighten both nuts in the packing evenly until the leakage stops.

4 SERVICING

CAUTION:

Observe the safety precautions listed in Section 1.7 before starting work!

The triple eccentric disc valves require no regular maintenance. However, check the packing regularly for tightness. If the valve should require maintenance for some reason, a few simple service measures are normally sufficient.

The numbers in parentheses refer to the parts list and the exploded view of the valve in Section 10.

4.1 Replacing the gland packing

CAUTION:

Do not remove the valve from the pipeline while the valve is pressurized!

- ☐ Detach the actuator (see Section 5.2) and the key (13) from the shaft.
 - ☐ Remove the lock ring (40) from the valve shaft.
 - ☐ Remove the support ring (41).
 - ☐ Remove the bushing (9). The groove in the outside edge of the bushing helps removing.
 - ☐ Change the O-rings. Ensure the shaft is faultless and clean it carefully.
 - ☐ Lubricate the O-rings with silicone grease before pushing the bushing its place.
 - ☐ Push the bushing to its place.
 - ☐ Install the support ring and the lock ring.
 - ☐ Re-install the actuator, see section 5.3.
- Remember to adjust the stop screw for closed position!**

4.2 Changing the packing (graphite)

- ☐ Detach the actuator (see Section 5.2) and the key (13).
 - ☐ Remove the bushing (9).
 - ☐ Remove the packing rings.
 - ☐ Clean the shaft, especially the area which has been connected to gland packing.
 - ☐ Install the new packing rings.
 - ☐ Install the gland packing to its place.
 - ☐ Re-install the actuator, see section 5.3.
- Remember to adjust the stop screw for closed position!**

5 DETACHING AND MOUNTING THE ACTUATOR

5.1 General

CAUTION:

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

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°.

5.2 Detaching the actuator

CAUTION:

The actuator cannot be removed from the valve when the pipeline is under pressure as a result of dynamic torque!

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. As a result of the dynamic torque the actuator can not be removed from the valve when the pipeline is under pressure.

- ☐ 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. 7).
- ☐ Remove the bracket and coupling, if any.

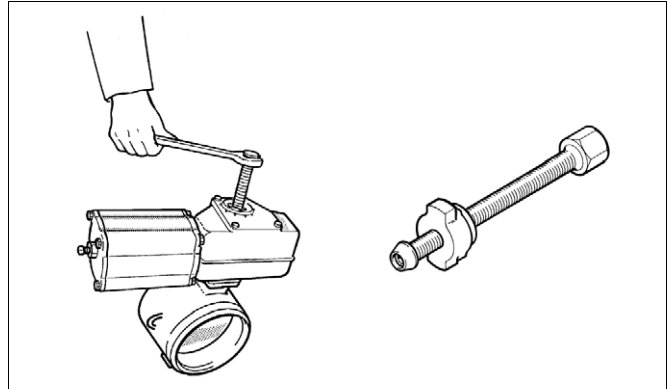


Fig. 7 Removing the B series actuator with an extractor

5.3 Mounting the actuator onto the valve

- ☐ Assemble the bracket to the 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.
- ☐ 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.
- ☐ For double-acting cylinder actuator, BC, and spring-return cylinder actuator, BJ (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 BJA (spring-to-open), choose the keyway which establishes the piston in its lower position when the valve is open.

In valves with manual operation the disc must be closed by turning the handwheel clockwise.

- ☐ 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 5.4).
- ☐ The opening angle in a control valve is usually limited by a bolt 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.

5.4 Stop screw adjustment

5.4.1 General

Close the metal seated triple eccentric disc valve by turning the disc with a torque wrench against the seat. Choose the torque from the Table 1 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 mounting the actuator. Adjust the stop screw preferably when the valve is fastened in the pressure test unit.

5.4.2 Actuators other than tabulated

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

NOTE:

Metso accepts no responsibility for compatibility of actuators not installed by Metso.

5.4.3 Changing the mounting position

CAUTION:

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

Always remove the actuator from the valve shaft before mounting it into another 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.

5.4.4 Double-acting cylinder actuator B1C

- ❑ Apply the tabulated shut-off pressure P_c 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. Leak-proof with Loctite 225 or other non-hardening sealant. The sealant must not flow inside the cylinder.
- ❑ An extra long screw is needed for opening angles $< 80^\circ$.

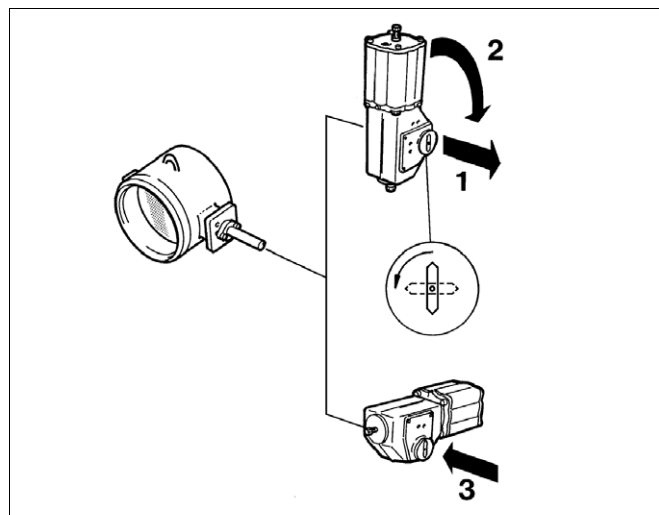


Fig. 8 Changing the mounting position

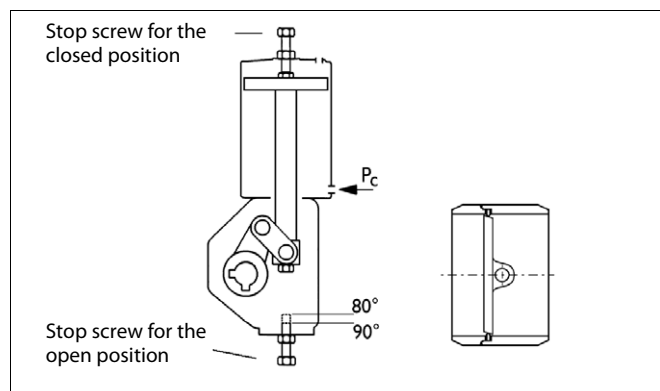


Fig. 9 Cylinder actuator, series B1C

5.4.5 Manual operator M

- ❑ Close the valve as per the tabulated primary torque M_1 (handwheel torque) given in Table 1.
- ❑ Tighten the closed position stop screw until it touches the linkage, then turn back 1/4 turn and lock up.

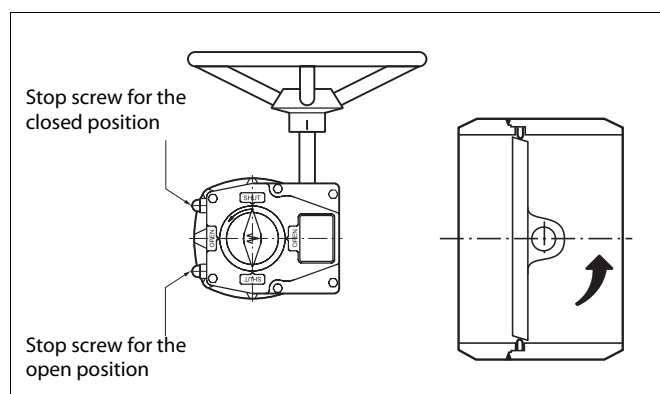


Fig. 10 Actuator, series M

5.4.6 Electric operator

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

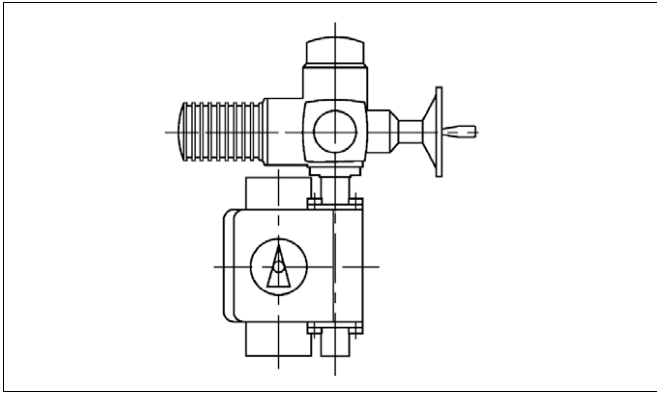


Fig. 11 Electric operator

5.4.7 Spring-return cylinder actuator B1J

Spring-to-close

- ❑ Before mounting the cylinder, screw in the closed position stop screw completely.
- ❑ The table overleaf indicates *) spring when the springcreated torque does not exceed the maximum permitted closing torque M_c . Otherwise, apply the tabulated pressure P_c into the air connection at the cylinder end against the spring force. **The stop screw cannot 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. Leak-proof with Loctite 225 or other non-hardening sealant. The sealant must not flow inside the cylinder.
- ❑ 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 $< 80^\circ$.

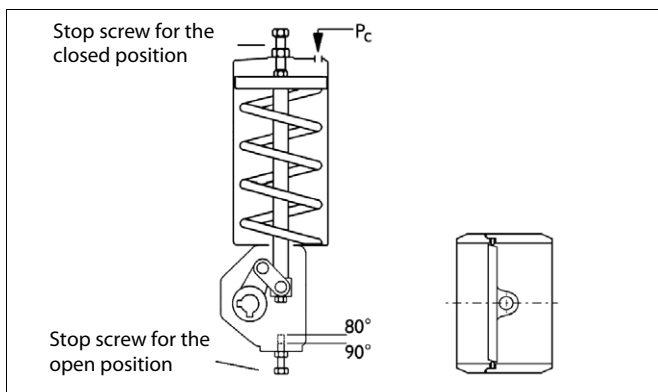


Fig. 12 Cylinder actuator, series B1J

5.4.8 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 P_c 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. Leak-proof with Loctite 225 or other non-hardening sealant. The sealant must not flow inside the cylinder.
- ❑ An extra long screw is needed for opening angles $< 80^\circ$.

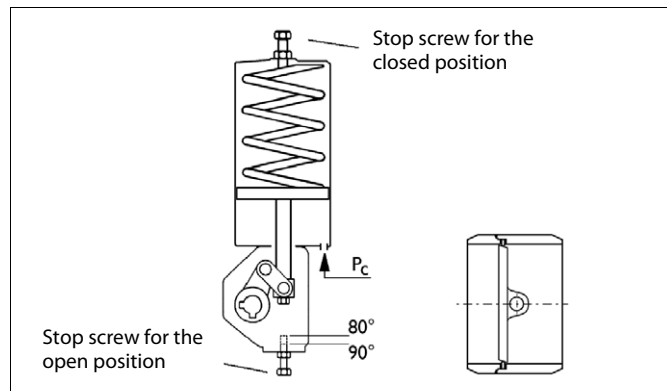


Fig. 13 Cylinder actuator, series B1JA

6 TOOLS

No special tools are needed for servicing the valve. However, we recommend an extractor for removing the actuator from the valve. The tool can be ordered from the manufacturer.

7 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

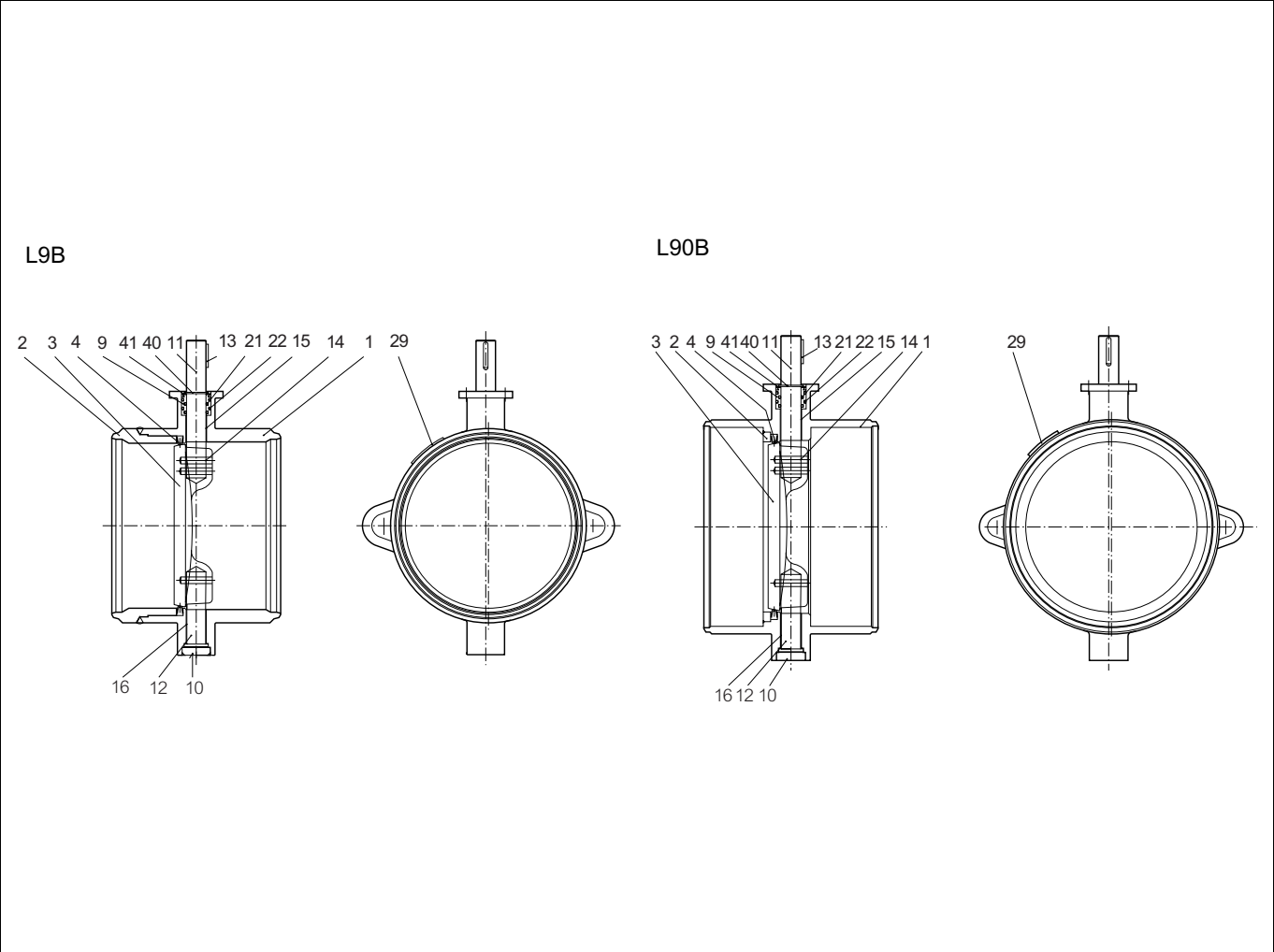
This information can be found from the identification plate or documents.

Table 1 Series L9B and L90B, closing torques

L9 DN SIZE	L90 DN SIZE	Mc		BC & BJ SIZE	BC pc		BJ pc		BJA ^{*)} pc		BJK pc		BJKA ^{*)} pc		BJV pc		BJVA ^{*)} pc		Manual operator	Input torque M1	
		(Nm)	(lbfft)		(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbfft)
200 8"		300	220	10	6.5	94			5	72			4.4	64			5.6	81	M10	27	20
				11	4.2	61													M12	27	20
				12	3.3	48	0.2	3	3.8	55			3.2	46	0.8	12	4.3	68	AR11	24	18
				13	2.1	30															
				16	1.6	23	0.9	13	3.1	45			2.6	38	1.3	19	3.8	55			
250 10"		500	370	12	5.5	80			4.6	67			4	58			5.5	80	M12	44	32
				13	3.5	51													AR11	40	30
				16	2.8	41	0.5	7	3.6	52	0		3	43	1	14	4.3	62			
				17	1.8	26															
				13	5.8	84													M14	51	38
300 12"		825	610	16	4.5	65			4.2	61			3.6	52	0.3	4	5	73	M15	40	30
				17	3	43													AR21	50	37
				20	2.3	33	0.6	9	3.4	49	0.2	3	2.8	41	1.1	16	3.9	57			
				16	6.4	93			4.9	71			4.3	62			5.7	83	M14	72	53
				17	4.2	61													M15	57	42
350 14"		1160	860	20	3.3	48	0.3	4	3.7	54			3.1	45	0.8	12	4.2	61	M16	44	32
				25	1.7	25	0.9	13	3.1	45	0.5	7	2.6	38	1.4	20	3.6	52	AR21	70	52
				16	9.5	138			5.9	86			5.2	75			6.8	99	M14	102	75
				17	6	87													M15	80	59
				20	4.7	68			4.2	61			3.6	52	0.3	4	4.7	68	M16	62	46
400 16"		1650	1220	25	2.4	35	0.6	9	3.4	49	0.2	3	2.8	41	1.1	16	3.9	57	AR31	70	52
																			(AR21)	95	70
				20	6.3	91			4.8	70			4.2	61			5.3	77	M15	107	79
				25	3.2	46	0.4	6	3.7	54			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	AR31	95	70
500 20"		2700	1990	25	3.9	57	0.1	1	3.9	57			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	AR41	110	80
				25	6.4	93			4.8	70			4.2	61			5.3	77	M16	170	120
				32	3.2	46	0.4	6	3.7	54			3.1	45	0.8	12	4.3	62	AR41	190	140
				40	1.5	22															
600 24"		4400	3240	32	4.7	68			4.2	61			3.6	52	0.3	4	4.8	70	M25	236	174
				322																	
				40	2.3	33	0.6	9			0.2	3									
				50	1.2	17															
				322																	
800 32"		6500	4790	40	3.3	48															
				50	1.7	25	0.3	4													
900 36"		9400	6930	40	3.3	48															
				50	1.7	25															
1000 40"		12600	9290	322																	
				40	4.4	64															
				50	2.3	33															
				40	5.7	83															
				50	2.9	42															
1200 48"		16400	12090	502	1.3	19															
1400 52"		26000	19170	50	4.7	68															
				502	2	29															
				50	4.7	68															
				502	2	29															

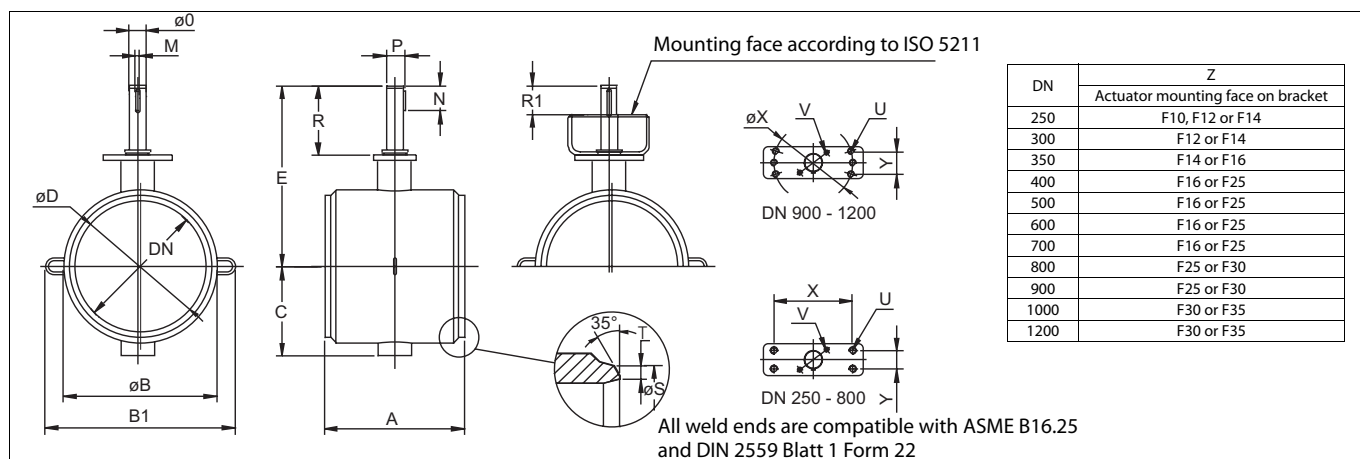
*) spring = spring torque not adequate to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970
) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

8 ASSEMBLY DRAWING AND PARTS LIST



Item	Qty	Description	Recommended spare parts
1	1	Body	
3	1	Disc	
4	1	Seat ring	x
9	1	Bushing	
	1	Gland	
10	1	Blind flange	
11	1	Drive shaft	
12	1	Shaft	
13	1	Key	
14	3	Pin	
15	1	Bearing	
16	1	Bearing	
18	1	Sheet ring	
20	5	Packing ring	
21	2	O-ring	
22	2	O-ring	x
24	2	Stud	
25	2	Hexagon nut	
29	1	Identification plate	x
40	1	Lock ring	x
41	1	Support ring	

9 DIMENSIONS AND WEIGHTS



Type	Dimensions, mm															Standard weld ends		Kg
	DN/ ϕD	A	ϕB	B1	C	E	M	N	ϕO	P	R	R1	U	X	Y	ϕS	T	
L9B250	250	210	298.5	378.5	190	372	6.35	51	30	32.90	161	51	M12	130	32	273	4.8-6.4	40
L9B300	300	210	343	423	223	412	9.52	58	35	39.10	168	58	M12	130	32	324	5.2-7.1	55
L9B350	350	240	394	478	252	468	9.52	68	40	44.20	188	68	M16	160	40	356	5.2-7.1	80
L94400	400	270	445	529	284	510	12.70	80	45	50.40	200	80	M16	160	40	406	5.2-7.1	130
L9B500	500	290	546	646	350	606	12.70	90	55	60.60	230	90	M20	160	55	508	6.3-8.0	190
L9B600	600	330	660	760	430	745	19.05	119	70	78.20	292	112	M27	230	90	610	6.3-8.0	260
L90B700/600	700/600	350	720	836	430	792	19.05	119	70	78.20	292	112	M27	230	90	711	7.9-9.5	360
L9B800/700	800/700	380	821	941	550	892	22.23	146	85	96.40	326	146	M27	230	90	813	7.9-9.5	530
L90B900/800	900/800	410	922	1042	600	1007	22.23	156	95	104.80	371	151	M33	330	120	914	8.8-10.3	710
L90B1000/900	1000/900	440	1027	1172	645	1060	25.40	180	105	116.10	377	157	M33	330	120	1016	9.5-11.1	900
L90B1200/1000	1200/1000	500	1230	1375	735	1150	31.75	205	120	133.80	377	157	M33	330	120	1219	11.9-13	1250

10 TYPE CODE

**NELDISC® HIGH PERFORMANCE TRIPLE ECCENTRIC DISC VALVE,
series L90B**

1.	2.	3.	4.	5.	6.	7.
L9	B	400	E	A	F	

1.	PRODUCT SERIES / DESIGN				
L9	Weld ends, full bore, DN 200-600				
L90	Weld ends, reduced bore, DN 700-1200				

2.	PRESSURE RATING / CONSTRUCTION				
B	Body PN 25 / Trim ASME 150 (PN 20) - metal seated - O-ring gland packing - bearings PTFE + AISI 316 net - drive shaft with keyway				
Y	Special				

3.	SIZE				
L9-series: 200, 250, 300, 350, 400, 500, 600					
L90-series: 700/600, 800/700, 900/800, 1000/900, 1200/1000					

MATERIALS					
L9-series (DN 200-600)					
4.	BODY	5.	DISC	SHAFT & PINS	SEAT
E	St 52.0 + NiCo	A	CF8M / F316	SS 329 (SS 2324)	Incoloy 825, hard chrome plated

L90-series (DN 700-1200)					
4.	BODY	5.	DISC	SHAFT & PINS	SEAT
E	St 52.0 + NiCo A105 + 316	A	CF8M / F316	SS 329 (SS 2324)	W.No. 1.4418 (Incoloy 825 in DN 700), hard chrome plated
		E*	WCB + NiCo	SS 329 (SS 2324)	W.No. 1.4418 hard chrome plated

*) Only in sizes DN 800 - 1200

6.	NON-STANDARD CONSTRUCTION				
-	Standard, without sign				
F	Adjustable graphite gland packing				
Y	Special				

7.	WELD ENDS		
STANDARD, WITHOUT SIGN			
	Valve type / size	Pipe outside diameter (mm)	Suitable for pipe wall thickness (mm)
-	L9B 200	219	4.8 – 6.4
-	L9B 250	273	4.8 – 6.4
-	L9B 300	324	5.2 – 7.1
-	L9B 350	356	5.2 – 7.1
-	L9B 400	406	5.2 – 7.1
-	L9B 500	508	6.3 – 8.0
-	L9B 600	610	6.3 – 8.0
-	L90B 700/600	711.2	7.9 – 9.5
-	L90B 800/700	812.8	7.9 – 9.5
-	L90B 900/800	914.4	8.8 – 10.3
-	L90B 1000/900	1016	9.5 – 11.1
-	L90B 1200/1000	1219	11.9 – 13.0

7.	Valve type / size	Pipe outside diameter (mm)	Suitable for pipe wall thickness (mm)
216 x 080	L9B 200	216	5.0 – 6.2
273 x 080	L9B 250	273	7.1 – 8.0
267 x 064		267	5.0 – 6.4
324 x 088	L9B 300	324	7.9 – 8.8
318 x 064		319	5.0 – 6.4
356 x 080	L9B 350	356	7.9 – 8.8
377 x 085		377	6.5 – 8.5
377 x 100		377	8.5 – 10.0
406 x 088	L9B 400	406	7.9 – 8.8
426 x 085		426	7.9 – 8.5
426 x 100		426	8.5 – 10.0
508 x 095	L9B 500	508	8.7 – 9.5
530 x 075		530	6.0 – 7.5
530 x 095		530	8.0 – 9.5
530 x 110		530	10.0 – 11.0
610 x 100	L9B 600	610	8.7 – 10.0
630 x 100		630	8.5 – 10.0
711 x 111	L90B 700/600	711.2	10.0 – 11.0
720 x 100		720	8.0 – 10.0
720 x 130		720	11.0 – 13.0
813 x 119	L90B 800/700	812.8	10.2 – 11.9
820 x 110		820	9.0 – 11.0
820 x 130		820	12.0 – 13.0
914 x 127	L90B 900/800	914.4	11.9 – 12.7
920 x 120		920	10.0 – 12.0
920 x 140		920	12.5 – 14.0
1016 x 143	L90B 1000/900	1016	12.5 – 14.3
1020 x 100		1020	8.5 – 10.0
1020 x 130		1020	11.0 – 13.0
1020 x 160		1020	14.0 – 16.0
1219 x 160	L90B 1200/1000	1219	14.0 – 16.0
1219 x 190		1219	17.0 – 19.0

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