

Neles™ Neldisc™ high performance butterfly valves

Series L1 and L2

Installation, maintenance and
operating instructions

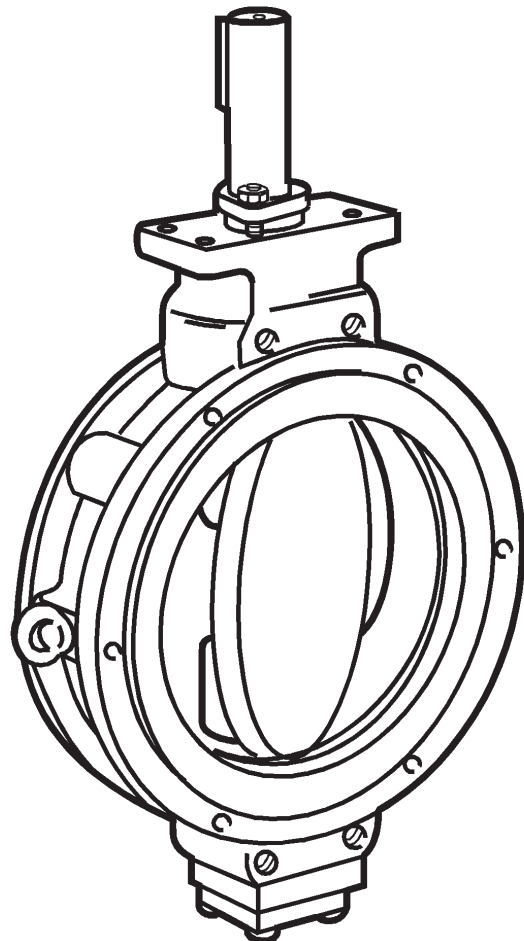


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READ THESE INSTRUCTIONS FIRST!

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.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

L series Neles™ Neldisc™ high performance butterfly valves

These instructions provide the customer/operator with important information in addition to the customer/operator's normal operation and maintenance procedures. Since operation and maintenance philosophies vary, Valmet does not attempt to dictate specific procedures, but to provide basic limitations and requirements created by the type of equipment provided.

These instructions assume that operators already have a general understanding of the requirements for safe operation of mechanical and electrical equipment in potentially hazardous environments. Therefore, these instructions should be interpreted and applied in conjunction with the safety rules and regulations applicable at the site and the particular requirements for operation of other equipment at the site.

These instructions do not intend to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the customer/ operator's purposes the matter should be referred to Valmet.

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These instructions contain proprietary information of Valmet and are furnished to the customer/operator solely to assist in the installation, testing, operation, and/or maintenance of the equipment described. This document shall not be reproduced in whole or in part nor shall its contents be disclosed to any third party without the written approval of Valmet.

INTRODUCTION

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.valmet.com/flowcontrol/valves for the latest documentation.

SAVE THESE INSTRUCTIONS!

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.

Valmet has highly skilled personnel available for startup, maintenance and repair of our valves and component parts. Arrangements for this service can be made through your local Valmet representative or sales department. When performing maintenance use only Valmet replacement parts. Parts are obtainable through your local representative or spare parts department.

When ordering parts, always include Model and Serial Number of the unit being repaired.

1. GENERAL

These installation and maintenance instructions apply to 18-40" (DN450-1000), pressure class ASME150/300 L1 and L2 series valves regardless of the type of material used.

The L1 and L2 series valves are designed with built in versatility making them well-suited to handle a wide variety of process applications.

Recommended spare parts required for maintenance refer to section 9. The model number, size, rating and serial number of the valve are shown on the identification tag located on the valve.

1.1 Scope of the manual

This installation, operation and maintenance manual provides essential information on the L series Neldisc triple eccentric disc valves. The actuators and instrumentation to be used with the L series valves are also discussed briefly. Refer to the separate actuator and control equipment instruction manuals for further 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

Offset Design

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 Figure 1).

The disc is connected 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 12. The valve Operates both in control and shut-off applications.

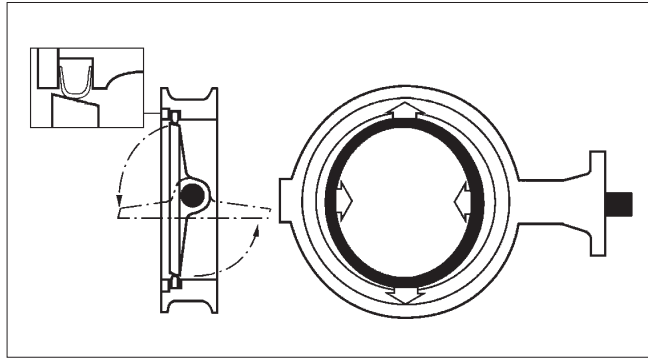


Fig. 1 Construction of a triple eccentric disc valve

1.3 Valve markings

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

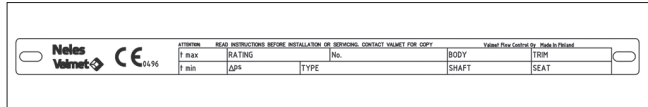


Fig. 2 Identification plate

Identification plate marking:

1. Size
2. Pressure class
3. Type code
4. Body material
5. Seat material
6. Model number
7. Date
8. Trim material
9. Shaft material
10. Maximum shut-off pressure
11. Maximum temperature
12. Certification and approvals, eg. CE, Atex etc.

1.4 Technical specifications

Type:	Full bore, metal seated triple eccentric disc valve
Pressure class:	
Body:	L1C, L2C ANSI 150/PN 25 L1D, L2D ANSI 300/PN 40
Trim:	L1C, L2C ANSI 150 L1D, L2D ANSI 300
Temperature range:	-200... +600 °C (for ambient temperatures > 600 °C, please contact the manufacturer)
Flow direction:	Free
Dimensions:	See Section 11
Weights:	See Section 11

1.5 Valve approvals

API 607 Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats

ISO 15848 INDUSTRIAL VALVES. MEASUREMENT, TEST AND QUALIFICATION PROCEDURES FOR FUGITIVE EMISSIONS

Group II Category 2 according to directive 2014/34/EU (ATEX).

NACE MR0103 & MR0175

1.6 CE and ATEX 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.

When applicable, the valve meets the requirements of the European Directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres, and has been marked according to the Directive.

1.7 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.

1.8 Safety precautions

WARNING:

DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

Exceeding the pressure or temperature limitations marked on the valve identification plate may cause damage and lead to uncontrolled pressure release. Damage or personal injury may result.

WARNING:

SEAT AND BODY RATINGS!

The practical and safe use of this product is determined by both the seat and body ratings. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some of the seat materials have pressure ratings that are less than the body ratings. All of the body and seat ratings are dependent on valve type and size, seat material, and temperature. Do not exceed these ratings!

WARNING:

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.

WARNING:

BEWARE OF DISC 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. Disconnect any pneumatic supply lines, any electrical power sources and make sure springs in spring-return actuators are in the full extended/relaxed state before performing any valve maintenance. Failure to do this may result in damage or personal injury!

WARNING:

WHEN HANDLING THE VALVE OR VALVE/ACTUATOR ASSEMBLY, TAKE ITS WEIGHT INTO ACCOUNT!

Never lift the valve or valve/actuator assembly by the actuator, positioner, limit switch or their piping. Place lifting devices securely around the valve body. Failure to follow these instructions may result in damage or personal injury from falling parts .

Please consult separate document: instructions for lifting Neles products. (See Neles document id: 10LIFT70EN.PDF).

CAUTION:

BEWARE OF NOISE EMISSIONS!

The valve may produce noise in the pipeline. The noise level depends on the application. Observe the relevant work environment regulations on noise emission. This can be measured or calculated using Neles Nelprof software.

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.

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°.

ATEX/Ex Safety

CAUTION!

Potential electrostatic hazard, ensure the protection (grounding, etc.) in the process.

CAUTION!

The actual surface temperature of valve is dependent on the process temperature. The protection from high or low temperature must be considered by the end user before valve is put into service.

CAUTION!

Ensure the general process and worker protection from static electricity in the facilities.

Note! Within series there is possibility to Category 2, Category 3 and non-ATEX valve.

1.9 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 chocks 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. trim 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 remove the flow port protectors until installing the valve.

Move the valve to its intended location just before installation. The valve is usually 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.

If the valve(s) are to be stored for a long duration, follow the recommendations of M-1147-En.

2.1 Unpacking

Care must be exercised when unpacking the valve to prevent damage to the accessories and component parts. Contact the local Valmet Sales office or Service Center with any issues or problems. Be sure to note the valve model number and serial number in all correspondence.

3. INSTALLATION

3.1 General

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

Before installing the valve in the line, clean piping and valve of all foreign material such as welding chips, scale, oil, grease or dirt. Gasket surfaces should be thoroughly cleaned to ensure leak-proof joints.

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. 3).

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.

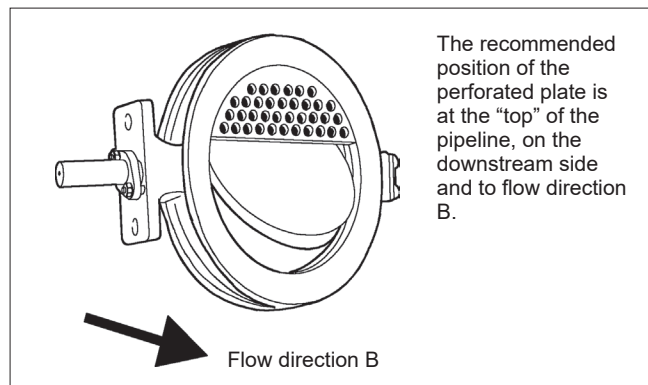


Fig. 3 Position of the flow balancing trim

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 valve immediately after a pipe elbow, the valve shaft must be directed toward the centre point of the pipe (see Fig. 4). This is especially important when the valve is used as a control valve.

The valve shaft of a triple eccentric disc valve mounted after the centrifugal pump must be perpendicular to the pump shaft (see Fig. 5).

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

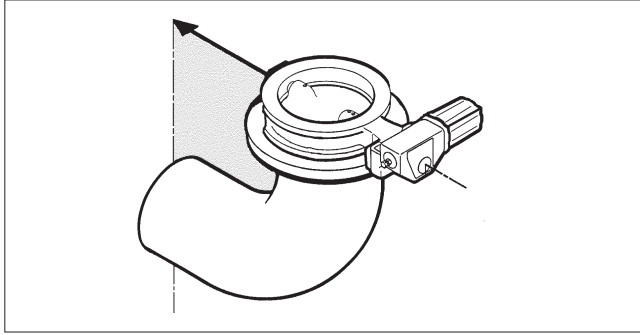


Fig. 4 Mounting after a pipe elbow

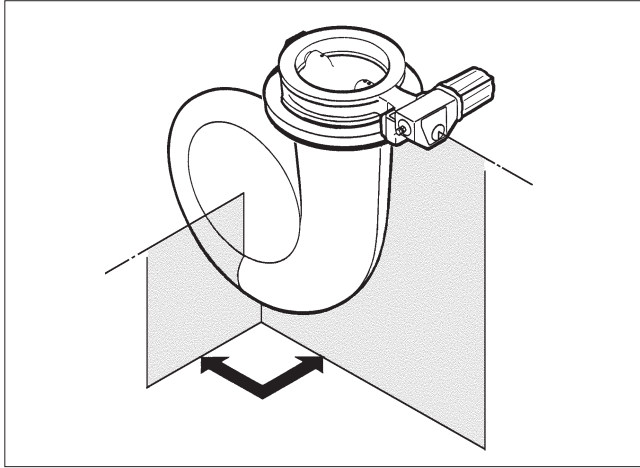


Fig. 5 Mounting after the centrifugal pump

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.

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 3...4.

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

See Figure 8 and Tables 3...4, length of stud bolts are based on:

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

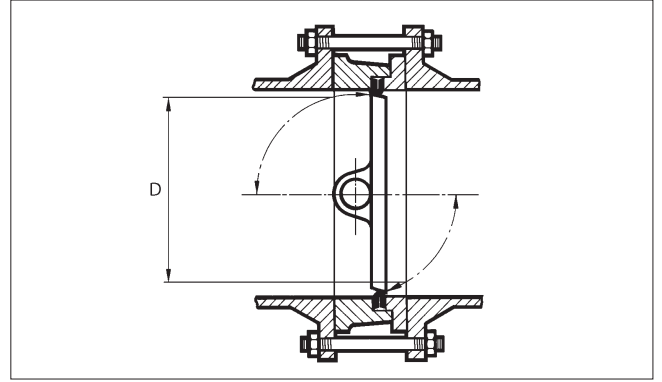


Fig. 6 Minimum pipe inside dimensions

Table 1 Minimum pipe inside dimensions D/(mm)

Valve size	D	
	L1CM	L1DM
18	422	400
20	464	443
24	565	536
28	665	
30	716	
32	762	
36	870	
40	960	

Mounting options

- **X** Flange bolts pass the neck of the body
- **UH** Unthreaded holes at the neck of the body
- **SB** Stud bolts at the neck of the body (L2 always)
- **BH** Stud bolts at the neck of the body and fraised holes on the body and flange ring
- **FH** Unthreaded holes at the neck of the body and fraised holes on the body and flange ring
- **XF** Flange bolts pass the neck of the body and fraised holes on the body and flange ring
- **HM** Fraised holes on the neck of the body for flange bolts
- — Flange drilling not suitable

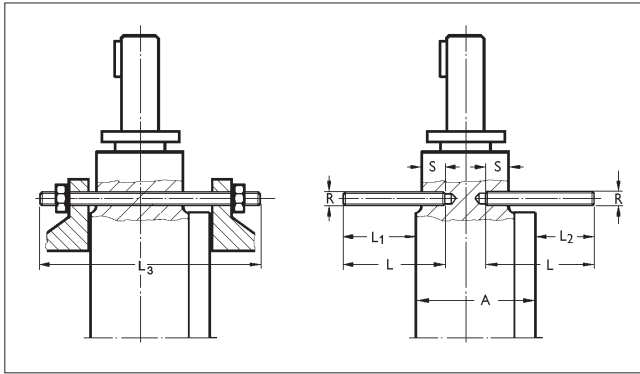


Fig. 8 Stud bolt mounting dimensions, mounting options SB, BH

3.3 Valve insulation

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

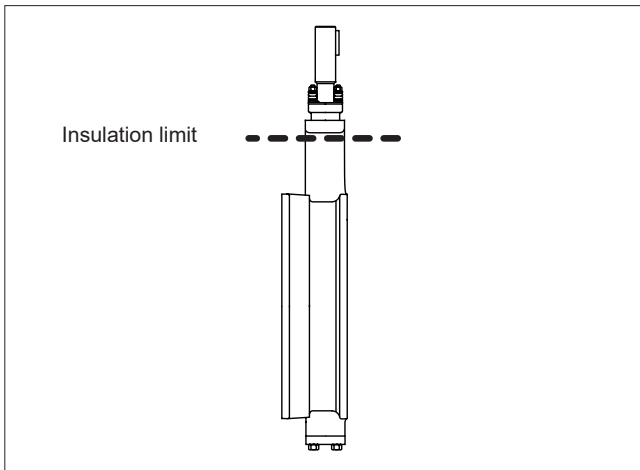


Fig. 9 Insulation of the valve

3.4 Actuator

CAUTION:

The actuator must not touch the pipeline, because pipeline vibration may damage it or interfere with its operation. In some certain cases, when a large-size actuator is used, extended stems are required or when the pipeline vibrates heavily, supporting the actuator is recommended.

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 actuator should be installed in a manner that allows plenty of room for its removal.

The upright position is recommended for the actuator cylinder.

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 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 1.8 before maintenance

CAUTION:

When handling the valve or the valve package as a whole, be mindful of 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 valves at least every five (5) years. The inspection and maintenance frequency depend 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. For 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.

Overhaul maintenance consists of replacing seats and seals.

A standard repair kit consisting of these parts may be obtained through Valmet or your authorized Valmet Distributor.

NOTE: Repair kits include body gasket (32), blind flange gasket (31) and packing ring set (22). Refer to section 10.

WARNING:

FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:

1. Wear any protective clothing or equipment normally required when working with the fluid involved.
2. Depressurize the pipeline and cycle the valve as follows:
 - Place the valve in the open position and drain the pipeline.

After removal and before any disassembly, cycle the valve again several times.

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 datasheets (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.

5.3 Replacing the gland packing

WARNING:

DO NOT DISMANTLE THE VALVE OR REMOVE IT FROM 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.

- Make sure the valve is not pressurized.
- Unfasten the nuts (25) and remove the disc spring (TA-Luft) sets (44), 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.
- Ensure that there are no burrs in the keyway groove which could damage the packing. Clean the gland packing and packing ring counterbore. Install new set of packings (V-ring or graphite). Slip the rings onto the shaft.
- Install the gland.
- Mount the retaining plates with the text UPSIDE on top (see Fig. 10).

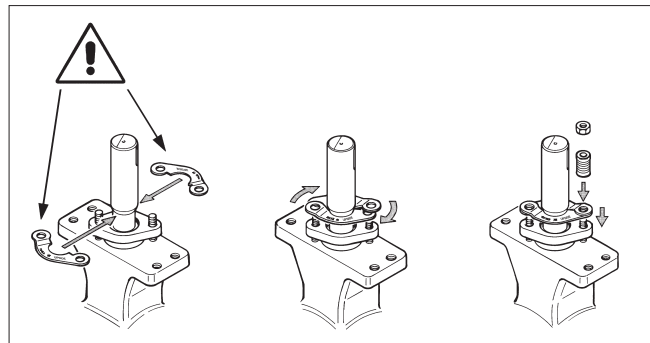


Fig. 10 Mounting the retaining plate

- Mount the disc spring sets.
- 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 Table 5.
- 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 Table 5

Table 5 Tightening of gland packing

L1C, L2C	L1D, L2D	Spring set dia	Thread	Compression (h1-h2) mm	
				Packing ring material	
DN / NPS	DN / NPS	mm	M, UNC	Graphite + PTFE	PTFE
450 / 18		35.5	M14, 1/2	4.0	2.5
500 / 20		35.5	M14, 1/2	4.5	2.5
600 / 24	16 / 400, 18 / 450	40	M18, 5/8	5.0	3.0
700 / 28	20 / 500	40	M18, 5/8	5.5	3.5
750 / 30		40	M18, 5/8	5.5	3.5
800 / 32	24 / 600	50	M20, 3/4	6.0	3.5
900 / 36		50	M20, 3/4	6.5	4.0
	900 / 36	50	M20, 3/4	6.5	6.0
1000 / 40	28 / 700	56	M24, 1	6.5	5.5
	30 / 750	50	M22, 7/8	6.5	5.0
1200 / 48		71	M30, 1 1/4	6.5	6.5
	36 / 900	56	M24, 1 (4 pcs.)	6.5	6.0

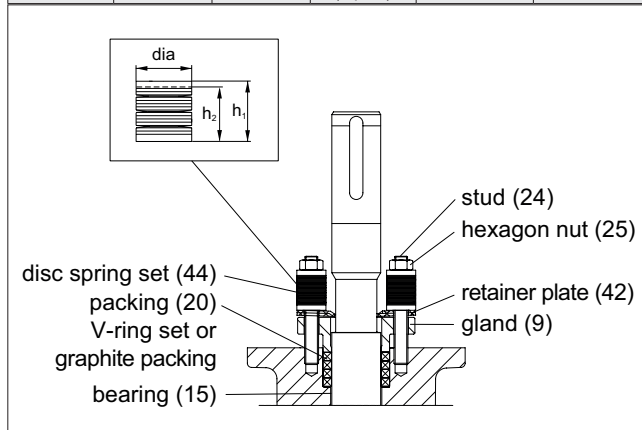


Fig. 11 Gland packing

- If the leakage still occurs when the valve is pressurized, re-tighten the nuts but don't exceed the values in the Table 5 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.

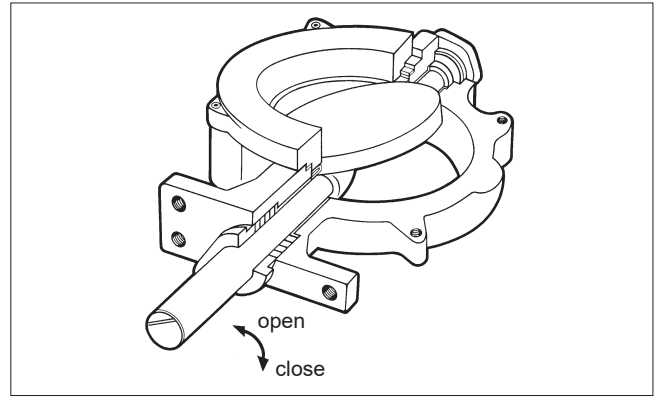


Fig. 12 The contact line between the disc and seat ring

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.
- 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 seating surfaces of the body and clamp ring. 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).

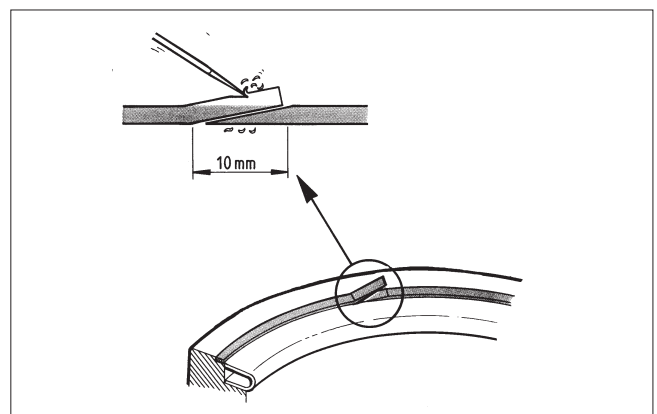


Fig. 13 Mounting the body seal

- 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. 14.
- Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the seat groove, surfaces of the clamp ring and seat ring.
- 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) evenly. An unevenly tightened flange may damage the seat ring. The screw heads must be below the flange surface.

Table 6 Pin pressing force, kN

PIN material	DIAMETER OF PIN (mm)											
	5	6	8	10	12	15	20	25	30	35	40	50
	DIA OF PRESSING TOOL (TOOL MUST BE SAME AS PIN OR SIZE BIGGER)											
	6	8	10	12	15	20	25	30	35	40	50	55
PIN PRESSING FORCE (kN)												
1.4460 / 1.4462	32	46	82	128	184	287	511	798	1149	1563	2042	3191
17-4PH H1150M	39	56	100	156	224	350	623	973	1401	1907	2491	3893
NIMONIC 80A	46	66	117	183	263	411	730	1141	1643	2237	2922	4565
XM-19HS, NITRONIC 50	49	71	126	196	283	442	785	1227	1767	2239	2925	3893

- Check the position between the seat ring and the disc. The valve closes clockwise (see Fig. 13).
- Mount the actuator into the valve. Adjust the closed position limit and check the open position limit (see Section 6.4).

5.6 Replacing the disc, shafts and bearings

Replacing the disc, shafts and bearings

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.

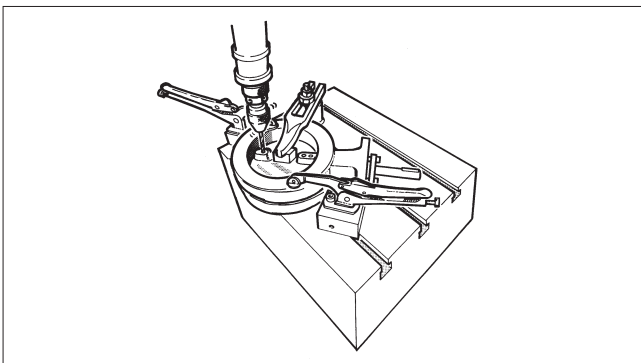


Fig. 14 Drilling the pins

- 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 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.

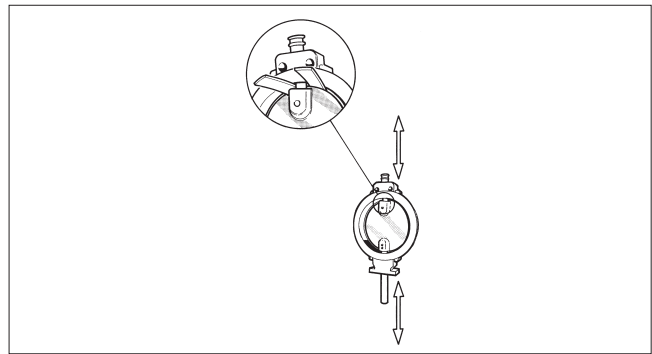


Fig. 15 Protecting the disc during disassembly and assembly

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 bearing material of the standard construction valves is PTFE-impregnated stainless steel net.

The bearings for the high temperature valves (H-construction) are cobalt alloy bushings which are mounted into the body together with the shafts.

- Mount the bearings into the body (see Fig. 16).



Fig. 16 Mounting the standard bearings

H-construction: 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 area. Press the bushing with a tightening ring into the shaft bearing area and fit the shaft with the bearings carefully into the body through the tightening ring (see Fig. 17).

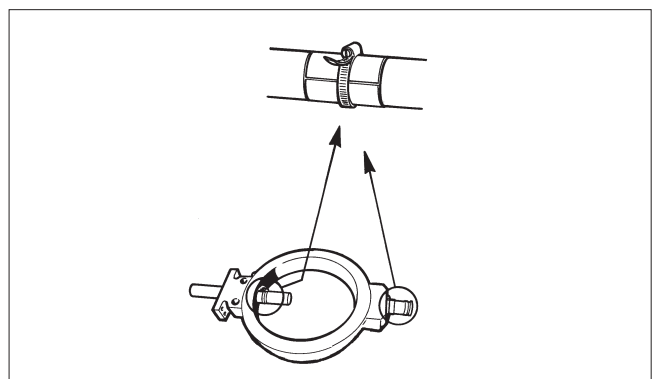


Fig. 17 Mounting the H-construction bearings

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. 15).

Press the shafts into the disc drillings. Align the pin holes. The shaft (11) position against the disc must be according to Fig. 12.

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. 18). Use slightly larger pressing tool than the pin diameter. See Table 6 for force needed.

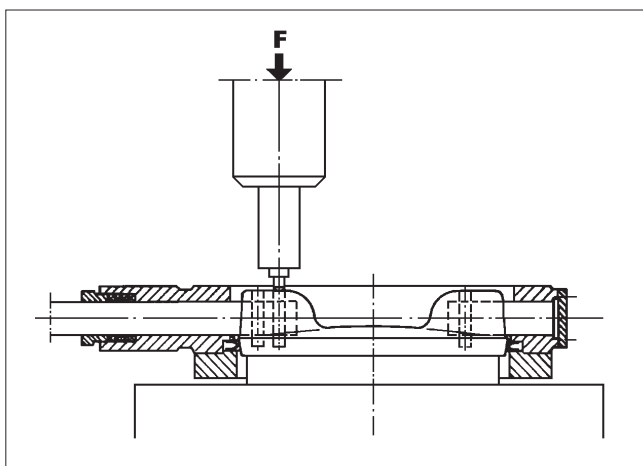


Fig. 18 Pressing the pins

Table 7 Clamp ring/blind flange screw torque, Nm ± 10%

TORQUE FOR A4-70		TORQUE FOR B8M CL1	
Thread size [mm]	Torque [Nm]	Thread size [mm]	Torque [Nm]
M5	5	M5	3
M6	9	M6	5
M8	21	M8	11
M10	41	M10	22
M12	70	M12	38
M14	110	M14	61
M16	170	M16	95
M20	340	M20	190
M24	590	M24	320

- Install the gasket (18) and the blind flange (10). Screws of the blind flange must be tightened evenly. An unevenly tightened flange will damage the seat.
- 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.

6. MOUNTING AND DETACHING THE ACTUATOR

6.1 General

WARNING:

Before installing the valve and actuator, be sure that the indicator pointer on top of the actuator is correctly indicating the valve position. Failure to assemble these products to indicate correct valve position could result in damage or personal injury.

CAUTION:

When installing a linkage or servicing a valve/ actuator assembly, the best practice is to remove the entire assembly from service.

CAUTION:

An actuator should be remounted on the valve from which it was removed. The actuator must be readjusted for proper open and close position each time it is remounted.

WARNING:

The linkage has been designed to support the weight of the Neles actuators and recommended accessories. Use of this linkage to support additional equipment such as people, ladders, etc. may result in the failure of the linkage, valve or actuator and may cause personal injury.

CAUTION:

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. Mounting an open actuator to a closed valve may result in valve stem damage.

CAUTION:

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

WARNING:

Do not detach a spring-return actuator unless a stopscrew is carrying the spring force!

CAUTION:

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:

When Valmet supplies whole valve-actuator assembly, the actuator is mounted at Valmet factory on the valve and the stroke limit stops are adjusted by Valmet.

6.2 Mounting the actuator onto the valve

- 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 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. 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.
- Adjust the stop screws to the closed position (see Section 6.4).
- 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.

6.3 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.

- Ensure that the pipeline is not pressurized.
- 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. 19).
- Remove the bracket and coupling, if any.

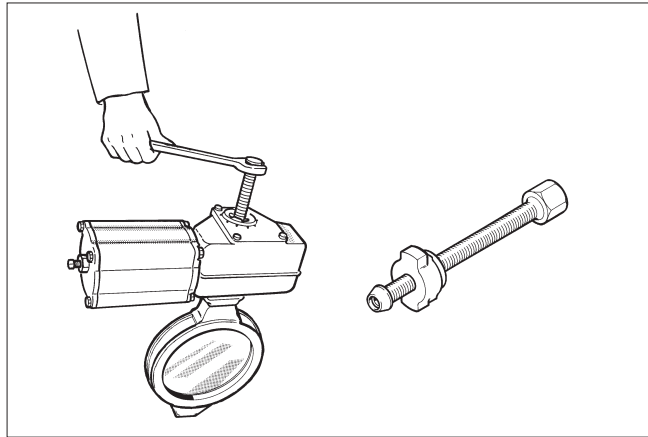


Fig. 19 Removing the actuator with an extractor

6.4 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 9 and 10 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 M_c 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

WARNING:

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

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

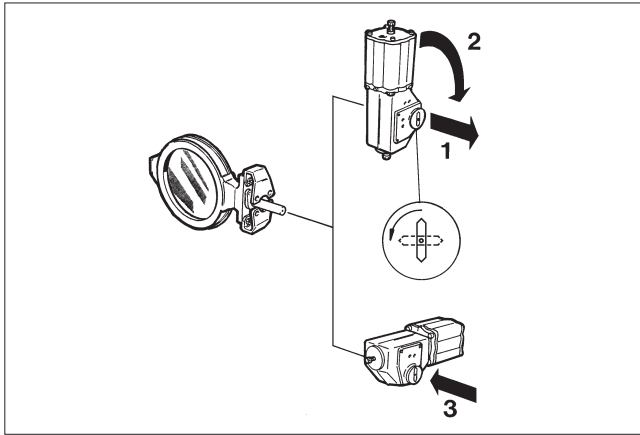


Fig. 20 Changing the mounting position

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.

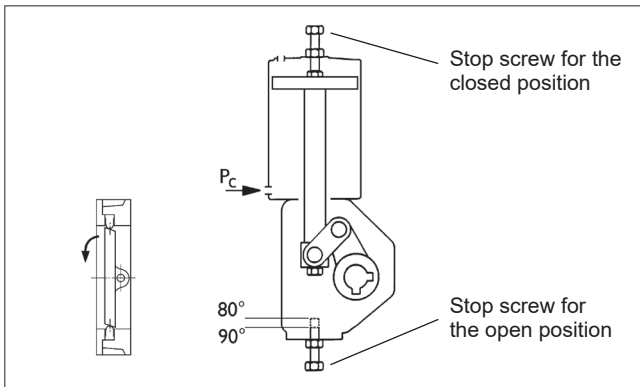


Fig. 21 Cylinder actuator, Series B1C

- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. Leakproof with Loctite or other non-hardening sealant. The sealant must not flow inside the cylinder.
- An extra long screw is needed for opening angles < 80°.

6.5 Manual operator M

- Close the valve as per the tabulated primary torque M1 (handwheel torque) given in Tables 9 and 10.
- Tighten the closed position stop screw until it touches the linkage, then turn back 1/4 turn and lock up with Loctite locking glue.

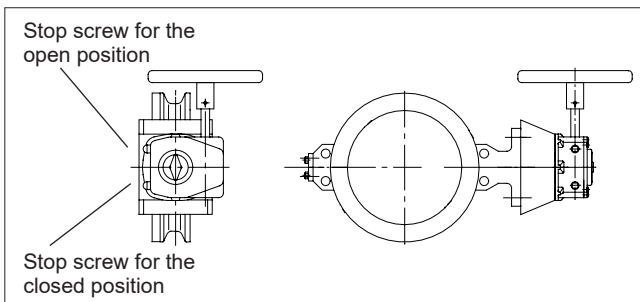


Fig. 22 Actuator, Series M

Electric operator

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

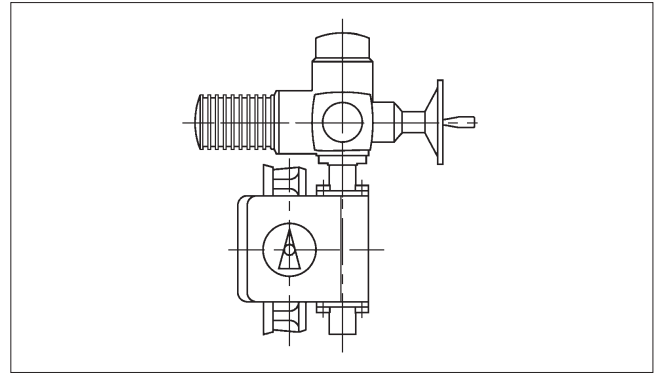


Fig. 23 Electric operator

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 spring-created 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. An O-ring is used for leakproofing 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°.

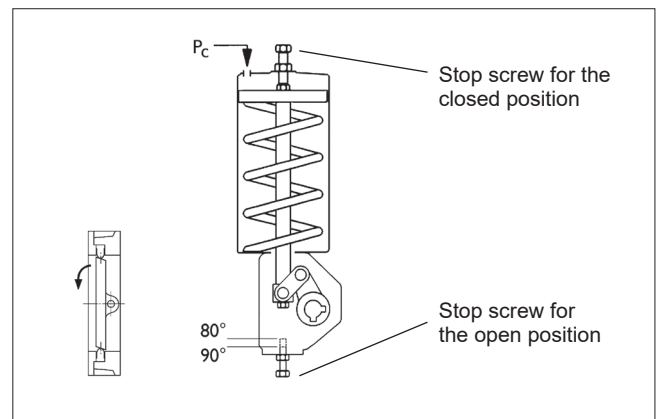


Fig. 24 Cylinder actuator, Series B1J

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

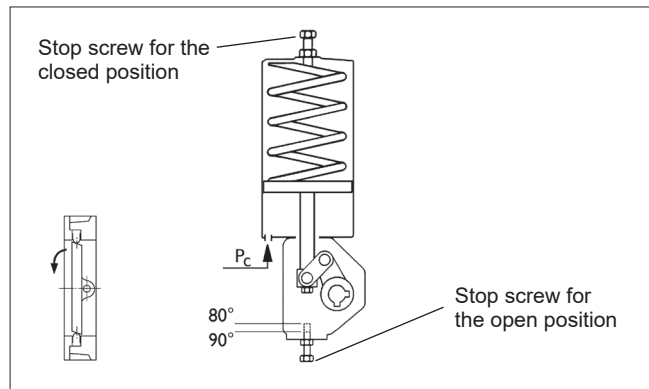


Fig. 25 Cylinder actuator, Series B1JA

7. TROUBLE SHOOTING TABLE

Table 8 Trouble shooting

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 for removing the actuator from the valve. The tool can be ordered from the manufacturer.

Extractor tools (Actuator Series B1C/B1J)

Product:	ID:
B1C/B1J 6	303821
B1C 8-11 / B1J 8-10	8546-1
B1C 12-17 / B1J 12-16	8546-2
B1C/B1J 20	8546-3
B1C/B1J 25	8546-4
B1C/B1J 32	8546-5
B1C 40 / B1J 322	8546-6
B1C 50	8546-7
B1C 502	8546-8

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 9 Series L1C, L2C closing torques

DN SIZE	Mc		BC and BJ SIZE	BC pc		BJ pc		BJA**) pc		BJK pc		BJKA**) pc		BJV pc		BJVA**) pc		Manual operator	Input torque M1	
	(Nm)	(lbf ft)		(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbf ft)
450 18"	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			
500 20"	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			0.4	6	2.7	39	1.3	19	3.8	55	M25	98	72
600 24"	4400	3240	25	6.7	97	*)spring		4.8	70			4.2	61	*)spring		5.3	77	M16	166	122
			32	3.3	48	0.4	6	3.7	54	*)spring		3.1	45	0.8	12	4.3	62			
			40	1.6	23															
700 28"	6500	4790	32	4.9	71	*)spring		4.2	61			3.6	52	0.3	4	4.8	70	M25	244	180
			322			0.6	9			0.2	3									
			40	2.4	35															
750 30"	8000	5900	32	6.1	88			4.6	67			4	58	*)spring		5.2	75	M25	103	76
			322			0.5	7			*)spring										
			40	3.9	42															
800 32"	9400	6930	50	1.2	17															
			322			0.3	4			*)spring										
			40	3.5	51															
900 36"	12600	9290	50	1.8	26															
			322			*)spring														
			40	4.6	67															
1000 40"	16400	12090	50	2.4	35															
			40	5.7	83															
			50	2.9	42															
1200 48"	25600	18880	50	4.8	70															
			502	1.3	19															

*) 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.

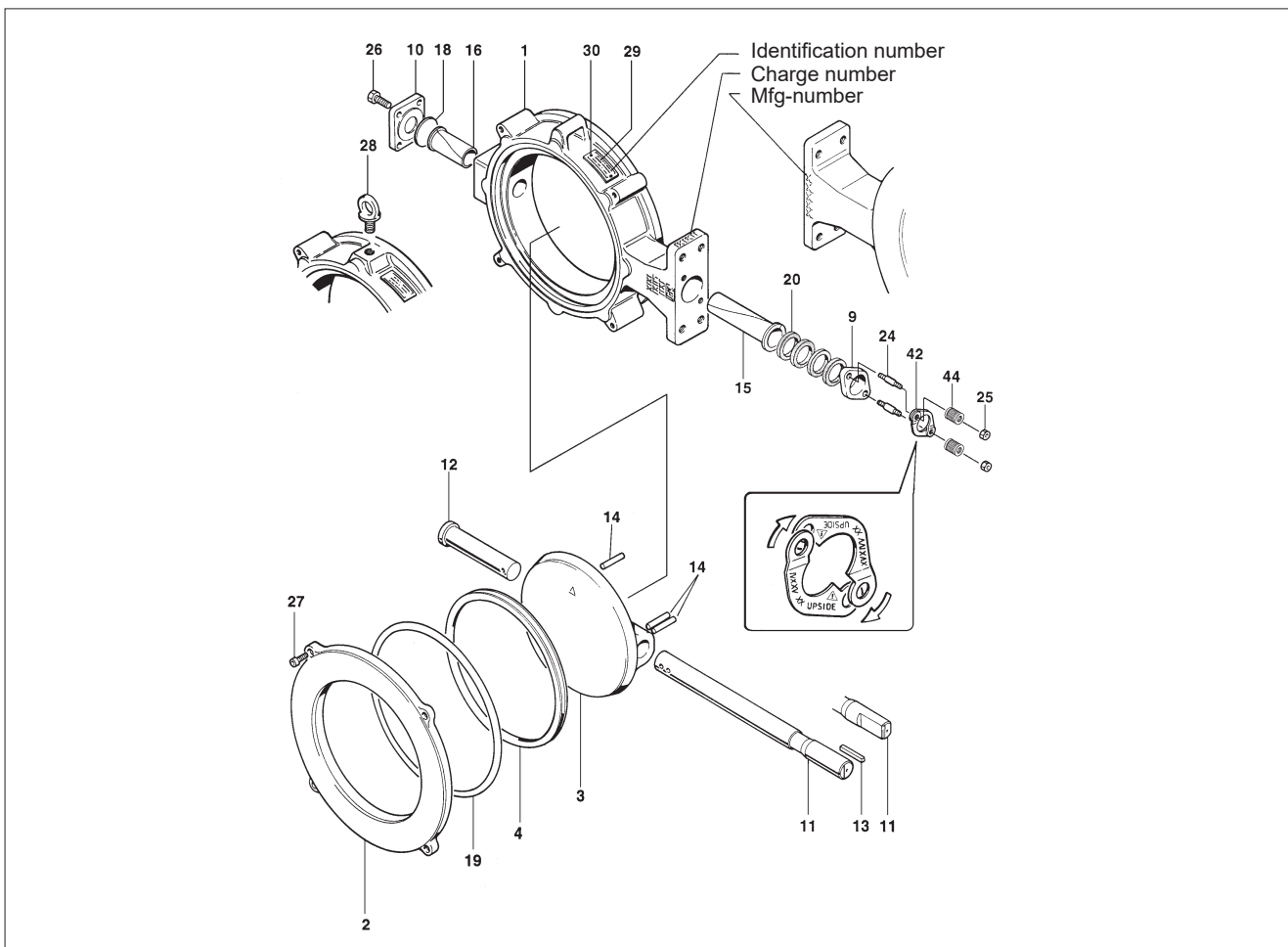
Table 10 Series L1D, L2D closing torques

DN SIZE	Mc		BC and BJ SIZE	BC pc		BJ pc		BJA**) pc		BJK pc		BJKA**) pc		BJV pc		BJVA**) pc		Manual operator	Input torque M1	
	(Nm)	(lbf ft)		(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)		(Nm)	(lbf ft)
450 18"	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															
500 20"	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					0.5	7	2.4	35					M25	149	110
			322			0.9	13	3	43											
			50	0.8	12															
600 24"	6700	4940	502	0.3	4															
			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									
700 28"	9800	7230	40	2.3	33															
			322			0.2	3			*)spring										
			50	1.8	26															
750 30"	12000	8850	322			*)spring														
			40	4.2	61															
			50	2.2	32															
800 32"	14000	10320	40	4.9	71															
			50	2.5	36															
900 36"	19000	14010	50	3.4	49															
			502	1.5	22															

*) 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.

10. EXPLODED VIEW AND PARTS LIST



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
18	1	Gasket	1 *
19	1	Body seal	1 *
20	1 set	Gland packing	1 *
24	2	Stud	
25	2	Hexagon nut	
26		Hexagon screw	
27		Hexagon socket screw	
28	1	Lifting eye bolt (DN 600-)	
29	1	Identification plate	
42	2	Retaining plate	
44	2	Disc spring set	

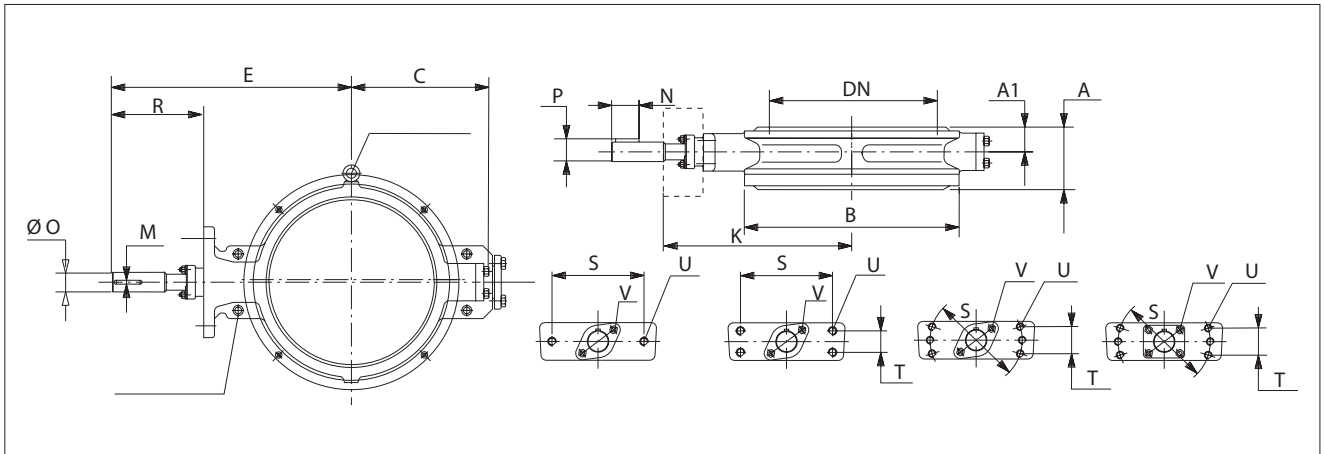
Spare part set category 1: Recommended soft parts, always needed for the repair. Delivered as a set.

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



L1C/ASME 150

Size		Dimensions, mm							U UNC	V UNC	Dimensions, mm					Weight kg
in	DN	A	A1	B	C	E	S	T			O	R	M	P	N	
18	450	114	46	537	370	608	160	55	3/4	1/2	50	228	12.7	55.5	90	130
20	500	127	53	590	415	649	160	55	3/4	1/2	55	229	12.7	60.6	90	160
24	600	154	65	690	505	794	230	90	1	5/8	70	299	19.05	78.2	119	280
28	700	229	96	805	545	886	230	90	1	5/8	85	326	22.23	94.7	146	400
30	750	229	96	870	585	911	230	90	1	5/8	85	326	22.23	94.7	146	470
32	800	241	101	910	600	1006	330	120	1 1/4	3/4	95	376	22.23	104.8	156	550
36	900	241	105	1010	660	1060	330	120	1 1/4	3/4	105	395	25.4	116.2	180	710
40	1000	300	130	1120	715	1090	330	120	1 1/4	3/4	120	330	31.75	133.8	205	950

L1D/ASME 300

Size		Dimensions, mm							U UNC	V UNC	Dimensions, mm					Weight kg
in	DN	A	A1	B	C	E	S	T			O	R	M	P	N	
18	450	180	90	565	410	655	230	90	1	5/8	70	250	19.05	78.2	119	245
20	500	200	100	625	465	705	230	90	1	5/8	85	250	22.23	94.7	146	305
24	600	240	120	743	525	860	330	120	1 1/4	3/4	95	330	22.23	104.8	156	540
28	700	250	125	848	615	935	330	120	1 1/4	3/4	120	330	31.75	133.8	205	830
30	750	300	150	942	655	970	360	135	1 1/4	7/8	135	330	31.75	149.0	225	1250
36	900	360	180	1100	730	1060	360	135	1 1/4	1	165	330	38.10	181.0	280	2000

12. TYPE CODE

Neles™ Neldisc™ high performance butterfly valves, series L1 and L2.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	/	12.	13.
-	L1	C	M	A	20	A	A	J	A	T		-	-

1.	S-DISC CONSTRUCTION
-	without sign, standard valve without S-disc
S-	Flow balancing trim on downstream side

2.	PRODUCT SERIES
L1	Wafer type / full bore
L2	Lug type / full bore

3.	PRESSURE RATING
C	Body ASME class 150 (PN 25, PN10-25, ASME150, ISO PN 20, JIS 10K, JIS 16K). Body max pressure 25 bar, maximum differential pressure 20 bar.
D	Body ASME class 300 (ISO PN 50, PN40, ISO PN50, ASME300, JIS 16K, JIS 20K, JIS 30K) Body max pressure 50 bar.

4.	SEAT TYPE
M	Metal seat

5.	CONSTRUCTION
A	STANDARD
C	CRYOGENIC (Standard Cryo extension) T = -198 °C...-50 °C
1C	CRYOGENIC (Optional Cryo extension, short) T = -100 °C...-50 °C
2C	CRYOGENIC (Optional Cryo extension, extra long) T = -198 °C...-50 °C
H	HIGH TEMP (ATEX II 2 G c) Tmax = +600 °C
S	STEAM JACKET (ATEX II 2 G c) (ONLY FOR L1)
E	EROSION CONSTRUCTION (ONLY FOR L1C)
B	BEARING PROTECTION - O-ring bearing protection for soft bearings.
P	POLISHED (ONLY FOR L1) - polished flow port and disc (Ra 0.8), guided flange.
Z	OXYGEN CONSTRUCTION - Degreasing acc. to Neles standard Note! This is the construction for oxygen flow media more info see IMO 100270en.pdf
Y	Special, to be specified

6.	VALVE SIZE
	Valves acc. to ASME pressure ratings: L1C: 18, 20, 24, 28, 30, 32, 36, 40, 48 L2C: 18, 20, 24, 28, 30, 32, 36 L1D: 18, 20, 24, 28, 30, 36, 48 (48" with Class 150 internals) L2D: 18, 20, 24, 30

7.	BODY MATERIAL
A	ASTM A351 gr. CF8M
C	ASTM A351 gr. CG8M
P	ASTM A216 gr. WCB
F	ASTM A352 gr. LCC
Y	Special

8.	DISC MATERIAL
A	ASTM A351 gr. CF8M
C	ASTM A351 gr. CG8M
P	ASTM A216 gr. WCB
Y	Special

9.	SHAFT AND PIN MATERIAL
J	SS 329 (SIS 2324)
C	Gr. 630 (17-4PH)
H	Nimonic 80A
N	XM-19 (Nitronic 50)

10.	SEAT MATERIAL
A	Incoloy 825, hard chrome plated, valve size 16" - 24" T = -200 °C ... + 500 °C
B	W. No. 1.4418, hard chrome plated, available only for valve size 28" and bigger T = -200 °C ... + 400 °C
H	Nimonic 80A (UNS N07080), hard chrome plated, valve size 16" - 64" (64" is max internal size) T = -200 °C ... + 650 °C (not Nace)
H1	ASTM A182 Gr F5, hard chrome plated, valve size 26" and bigger T = -50 °C ... + 540 °C
K	W. No. 2.4681, UNS R31233 (ULTIMET), valve size 16" - 24" T = -200 °C ... + 600 °C

11.	PACKING CONSTRUCTION
T	Live loaded PTFE V-ring packing with spring sets.
G	Live loaded graphite packing. (ATEX II 3 G c) Firesafe

12.	FLANGE FACING
-	Ra 3,2 - 6,3 standard covering: EN 1092-1 type B1 (a 3.2-12.5) ASME B16.5, Ra 6,3-6,3, (125-250 µin)

13.	FLANGE DRILLING
-	without sign according to valve pressure rating, C ASME cl.150 and D ASME cl.300.
J	PN 10
K	PN 16
L	PN 25
M	PN 40
R	JIS 10K
S	JIS 16K
T	JIS 20K
U	JIS 30K
X	ISO PN 20
Z	ISO PN 50
B	ASME 16.47 Series B cl.150 and cl.300 (size 24"...48".)
Y	Special

13. GENERAL SAFETY WARNINGS AND DISCLAIMERS

General safety warnings (Only for Neles Neldisc™ L-series)

Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
 2. Valves may be equipped with lifting threads on the body or on the flanges. These are intended to be used with the lifting plan.
 3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
 4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
 5. Workers must be trained for lifting and handling valves.
 6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
 3. Store valves and equipment in a dry and protected area until the equipment is installed.
 4. Do not exceed the maximum storage temperatures given in the IMO (installation, maintenance, and operating instructions).
 5. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
 6. Remove the valve endcaps just before mounting into the pipeline.
 7. FOR YOUR SAFETY IT IS IMPORTANT TO FOLLOW THESE PRECAUTIONS BEFORE REMOVAL OF THE VALVE FROM THE PIPELINE OR ANY DISASSEMBLY:
 - Be sure you know what flow medium is in the pipeline. If there is any doubt, confirm with the proper supervisor.
 - Wear any personal protective equipment (PPE) required for working with the flow medium involved in addition to any other PPE normally required.
 - Depressurize the pipeline, bring to ambient temperature, and drain the pipeline flow medium.
 - Cycle the valve to relieve any residual pressure in the body cavity.
 - After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
 - The valves with offset shaft (Butterfly, eccentric rotary plug) have greater trim area on one side of the shaft. This will cause the valve to open when pressurized from the FTO direction.
 - **WARNING:** DO NOT PRESSURIZE THE ECCENTRIC VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!
 - **WARNING:** DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM AN ECCENTRIC VALVE WHILE PRESSURIZED!
 - Before installing the eccentric valve in or remove it from the pipeline, cycle the valve closed. Eccentric valves must be in the closed position to bring the trim within the face to face of the valve. Failure to follow these instructions will cause damage to the valve and may result in personal injury.

Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.
7. Beware of Trim (Disc, Ball or Plug) movement even when the valve is disassembled. Trim may move simply due to the weight of the part or change in position of the valve. Keep hands or other body parts away from locations where they may be injured by movement of the trim. Do not leave objects near or in the valve port which may fall in and need to be retrieved.

General disclaimers

Receiving, handling and unpacking

1. Respect the safety warnings above!

Operating

8. The identification plate (ID-plate, type plate, nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
9. (For soft seats) The practical and safe use of this product is determined by both the temperature and pressure ratings of the seat and body. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some seat materials have pressure ratings that are lower than the body ratings. All body and seat ratings are dependent on the valve type, size and material of the body and seat. Never exceed the marked rating.
10. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process medium. Damage or personal injury may result.
11. The operating torque of the valve may rise over time due to wear, particles or other damage of the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.

12. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.
13. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
14. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
15. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
16. As the use of the valve is application specific, several factors should be considered when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
17. It is the end user's responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
18. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
19. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
20. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.

Maintenance

21. Respect the safety warnings above!
22. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.
23. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.
24. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
25. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
 - See IMO for the correct stem position.
 - Consider that the positioner may give the wrong signals.
26. Sealing materials (soft sealing parts) should be changed when the valve is in maintenance. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
27. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
28. Valve pressure retaining parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure retaining parts. Damaged pressure retaining parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warranty.
29. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
30. Check the condition of sealing surfaces on the seats, trim (disc, ball, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
31. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
32. Do not weld on pressure retaining parts without an ASME and PED qualified procedure and personnel.
33. Pressure retaining parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
34. Make sure that the valve is positioned in the correct flow direction into the pipeline.
35. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
36. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
37. Never store a valve in maintenance without flow port protection.
38. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut-off pressure marked on the valve identification plate.
39. Actuator mounting and unmounting:
 - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
 - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
 - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories either as is or with additional actuator support. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.
40. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.
41. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
 - Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
 - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
 - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test medium during the test.
 - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.

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