

Neles™ capping valve

Series PZ

Installation, maintenance and
operating instructions

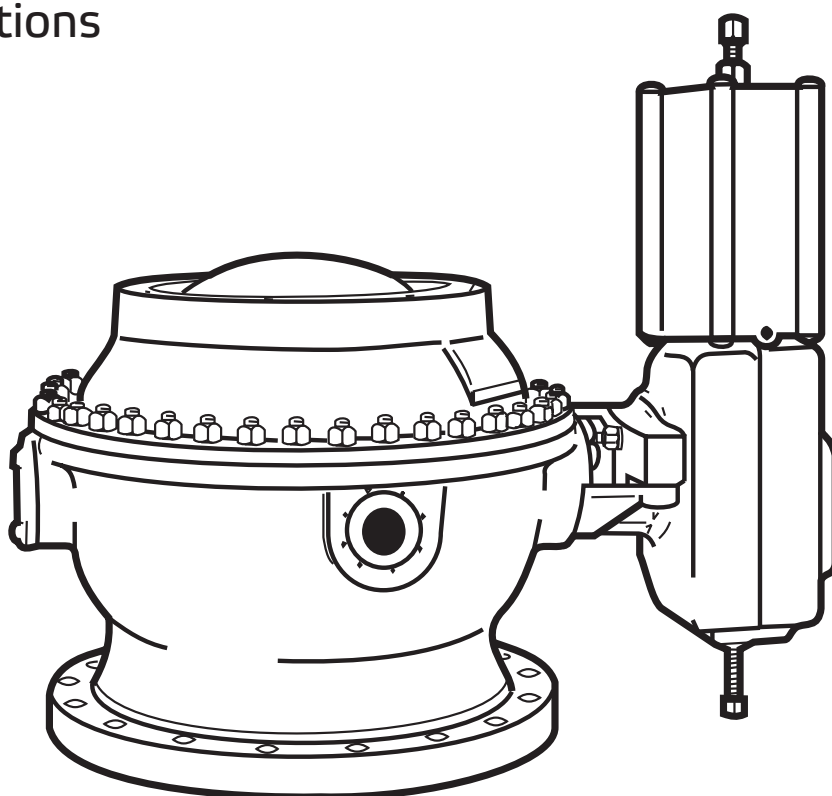


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Subject to change without notice.

All trademarks are property of their respective owners.

READ THESE INSTRUCTIONS FIRST!

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

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

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1.4 Specifications

| | |
|----------------------|---|
| Product type: | Full-bore ball valve Ball and stem integrally cast Split-body design Metal-seated Custom-fit lower flange |
| Body pressure class: | PN 16 and ANSI 150 |
| Size range: | DN 500, 600 and 750 NPS 20", 24" and 30" |
| Max. temperature: | +200 °C / 390 °F |
| Flanges: | To order |
| Standard materials: | |
| Body halves: | ASTM A 351 gr. CF8M |
| Ball: | ASTM A 351 gr. CF8M + hard-chrome |
| Bearings: | Hard-chromed PTFE + UNS S21800 |
| Seat: | AISI 316 + cobalt based alloy |

NOTE:

Final valve materials may vary due to application and customer requirements. The final selected materials are shown in the bill of materials of delivered valve.

1.5 Valve performance

Actuators are factory set for proper opening times.

Operation time

During start-up or other exceptional circumstances, capping valves must meet extreme conditions where pressure, impurities and high operational velocities can cause material damages (ball / seat ring). Therefore PZ capping valves have a recommended minimum operation time for 90° rotation as listed:

| Valve size | Adjusted operating time with 6 bar supply pressure, B1C actuator |
|--------------|--|
| PZ 500 (20") | 20 seconds |
| PZ 600 (24") | 24 seconds |
| PZ 750 (30") | 30 seconds |

Adjusted operating times are factory preset values, obtained with restrictor valves installed in actuator air supply lines between solenoid valve and actuator cylinder.

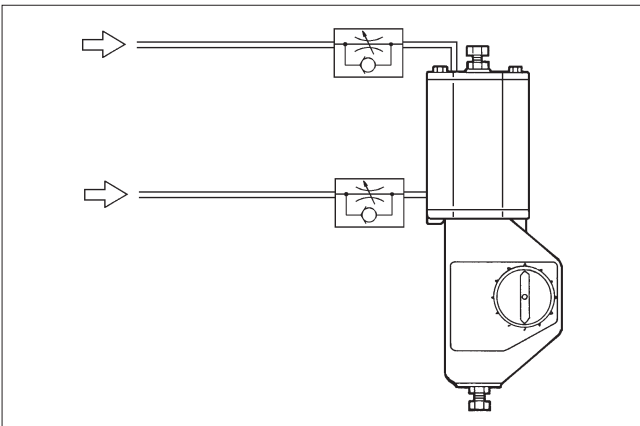


Fig. 4 Speed control

Vacuum during cooking

In modern cooking processes there can be sequences where digester vessel operates below atmospheric pressure ie. in vacuum conditions.

In such cases it is recommended not to exceed 30 kPa (0.3 bar) vacuum with PZ capping valve.

If higher values are expected, please contact the manufacturer. See also Section 1.5.5.

Valve tightness

All PZ capping valves are factory tested to fulfill ISO 5208 rate D leakage test.

Corresponding leakage values, tested with water 1.1 x nominal pressure.

Other tightness rates upon request.

| DN | NPS | ml/min, water |
|-----|-----|---------------|
| 500 | 20 | 3.0 |
| 600 | 24 | 3.6 |
| 750 | 30 | 4.5 |

Additional arrangements

During normal sequences of cooking the PZ-series locked scraping metal seat keeps the hard chrome plated ball surface clean ensuring long lasting tightness and smooth operation. However, in practice, it is difficult to totally prevent chips, sawdust, dirt or any other contaminants from adhering to the ball surface, particularly during the cooking sequence (temp about 175 °C / 347 °F), causing possible ball surface damages.

Valmet realizes that some mills may require a water wash/spray to the ball surface and others may require a water bed. Information on these additional services may be found in bulletin 2611/01/05 or contact your nearest Valmet business office: www.neles.com/contact/

Rear tilting device

The support (38) can be replaced with a rear tilting device which locks the ball against the seat during cooking. The device must be unlocked when operating. See Sections 9 and 10.

Operation:

1. The valve is open during filling. The pressure on top the piston keeps the lock open (the supply pressure is lead to part 74).
2. The valve is closed for cooking. The pressure underneath the piston push up the rear stem (the supply pressure is lead to part 72).
3. During cooking the lock pushes the ball against the seat. This prevents impacts of the vacuum to the ball and improves the tightness in the beginning of cooking.
4. Before opening of the valve the pressure should be lead on top the piston to open the lock. If the locking is on when opening the valve, the seating surfaces of the ball and seat will be damaged.
5. Supply air pressure range to the locking cylinder is 4 ... 6 bar.

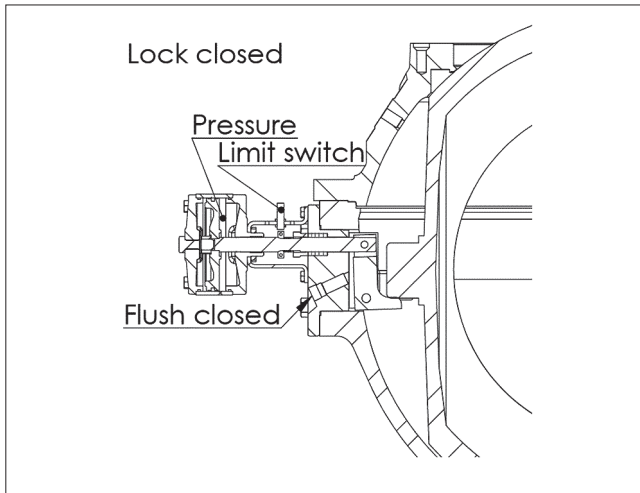


Fig. 5 Rear tilting device closed

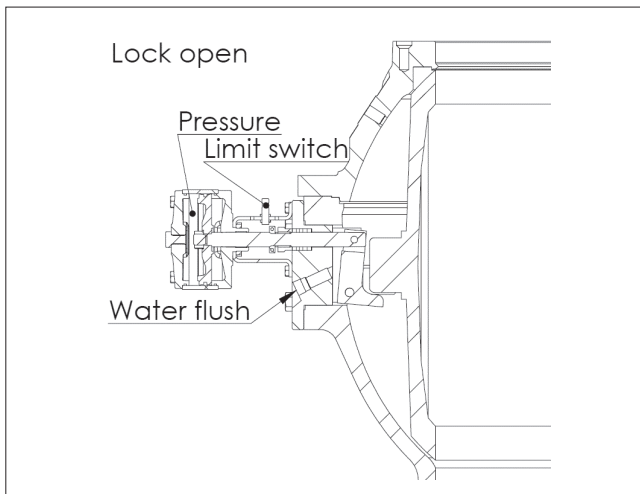


Fig. 6 Rear tilting device open

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

CAUTION:

Do not exceed the permitted values!

Exceeding the permitted values marked on the valve may cause damage and result in uncontrolled pressure release. Damage to equipment or personal injury may result.

CAUTION:

Do not remove or dismantle a pressurized valve!

Removing or dismantling a pressurized valve leads to uncontrolled pressure release. Always release pressure and remove the media from the valve before removing or dismantling it.

Protect yourself and the environment from poisonous or otherwise harmful substances.

Otherwise, personal injury or damage to equipment may result.

CAUTION:

Beware of the cutting movement of the ball!

Keep hands, other body parts, tools and other objects away from the open flow port. When the valve is in operation, the ball functions like a cutter. Shut off the actuator pressure supply and detach the supply pipes for the duration of maintenance.

Otherwise, personal injury or damage to equipment may result.

CAUTION:

Do not open the valve during cooking!

Valve control must be arranged to ensure that the valve cannot be opened during cooking. Otherwise, personal injury or damage to equipment may result.

CAUTION:

Beware of 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.

Always fasten the lifting ropes to the lifting eye bolts, see Fig. 8. Weights are detailed in the table on page 15.

Please consult separate document: Instructions for lifting Neles products. (See Neles document id: 10LIFT70en.pdf). Damage or personal injury may result from falling parts.

CAUTION:

The actual surface temperature of valve is depended 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. ball or seats. This may damage critical seating surfaces and cause leaks.

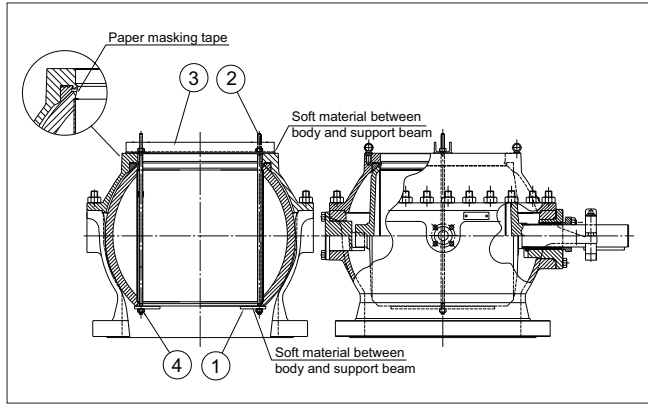


Fig. 7 Transport supports and protection tape

3.2 Mounting the valve on the digester

CAUTION:

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

Lift the valve by the lifting eye bolts, see Fig. 8.

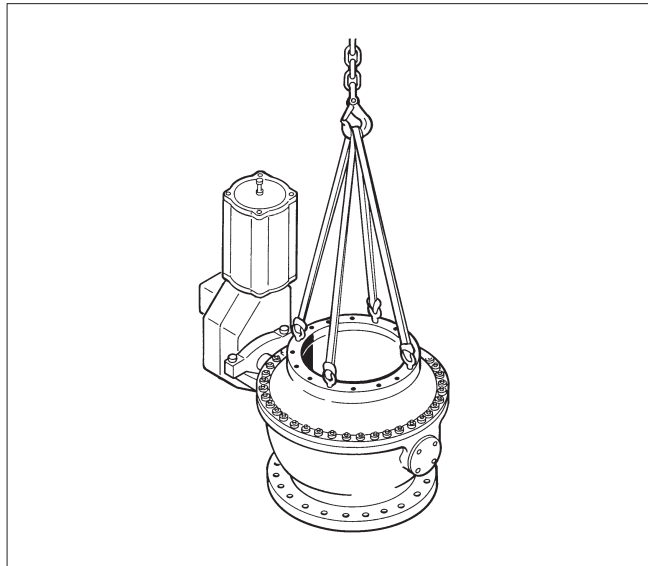


Fig. 8 Lifting the valve

2. TRANSPORTATION, RECEPTION AND STORAGE

Check the valve and accompanying devices for any damage that may have occurred during transport. Store the valve carefully prior to installation, preferably indoors in a dry place. Do not take the valve to the installation site or remove the flow port protectors until it is installed.

The valve is delivered in the open position mounted on transportation supports.

3. INSTALLATION AND COMMISSIONING

3.1 General

Remove the flow port protectors and check that the valve is clean inside and not damaged. Do not remove the transportation supports and flow port protection tape until shortly prior to mounting the valve on the digester.

The valve is delivered with the ball in the open position. After any test-runs, make sure that the valve remains in the open position to protect the ball surface.

To check whether an installed valve is in the open position, ensure that

- the arrow on the actuator pointer cover,
- the groove at the end of the ball stem,
- the stem key slot,

are all parallel to the ball flow port.

We recommend that the chip chute be provided with a manhole approximately 300-500 mm above the valve.

3.3 The actuator

NOTE:

When installing the actuator, make sure that the valve/actuator package functions properly. Detailed information on actuator installation is given in the separate actuator instructions.

The valve should be installed in a position enabling the actuator to be removed without detaching the valve from the digester.

The recommended installation position is with the cylinder upright.

The actuator must not touch the digester structure; vibration may damage it or interfere with its operation.

3.4 Commissioning

Make sure there is no foreign matter in the chip chute. If the valve leaks check adjusting of the tilting device as described in Section 4.7.2 Assembly. If the valve still leaks something has been damaged in shipment or installation and the factory should be contacted.

After long storage, the gland packing (28) may leak. Tighten it before the valve is brought into use.

4. MAINTENANCE

4.1 General

Observe the safety precautions mentioned in Section 1.8 before maintenance!

CAUTION:

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

Although Neles™ valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Valmet recommends inspecting the valves at least every five (5) years.

The inspection and maintenance interval depends on the actual application and process condition.

The inspection and maintenance intervals can be specified together with your local Valmet experts. During this periodic inspection the parts detailed in the Spare Part Set should be replaced.

Time in storage should be included in the inspection interval.

Maintenance can be performed as presented below. 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 8, unless otherwise stated.

NOTE:

When sending goods to the manufacturer for repair, do not disassemble them. Clean the valve carefully and flush the valve internals. For safety reasons, inform the manufacturer of the type of medium used in the valve (include material safety 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.

4.2 Changing the gland packing

CAUTION:

Ensure that the valve is not pressurized while the gland packing is changed!

If a leak in the gland packing cannot be eliminated by tightening it, the packing must be replaced. The actuator can be removed to facilitate this work.

- Remove caps (53).
- Loosen a little the tilting device nuts (18).
- Remove nuts (17) and gland (6).
- Remove ring (34) and old gland packings (28). The lowest ring (34) need not be removed. Use a suitable pointed instrument for removing the gland packings. Do not damage the seating surface.
- Clean the packing counterbore.
- Push the new packing rings (28) one by one into the counterbore with the gland (6). Position the cut ends of the rings at a 90° angle to each other and at a 45° angle to the flow port.
- Push the outer ring (34) and gland (6) into place and tighten the nuts (17) lightly.
- Fasten tight the tilting device nuts (18) and then the nuts (17) and install the cap (53). See Section 4.7.2.
- Always check the seal of the gland packings after installation.

4.3 Bearings (5, 22)

The ball stem bearing is located in the bonnet (8) under the gland packing rings (28). The bearing is maintenance free. It is recommended to be dismantled only when the whole valve is dismantled.

The purpose of the bearing at the rear end of the ball, i.e. the support (38), is to keep the ball at the valve center line during operation, allowing a free up-and-down movement. Normally, the support does not need to be inspected or replaced.

4.4 Body joint

If the body joint leaks, tighten nuts (16) as shown in Table 1.

If the leak continues after the tightening, the valve must be dismantled. Inspect the seating surface and ensure that the body joint plane is level. Then replace the body gasket (26). See Section 4.7.2.

4.5 Ball and seating

If the valve leaks, the probable cause is chips between the ball and the seat. Before adjusting lifting springs (20), wash and pool the ball surface with a water jet when valve partly open. Operate the valve 2-3 times and retest.

NOTE:

Lifting springs are factory preset and excessive tightening might damage the ball surface. See Section 4.7.2, Table 2.

If washing does not help, the valve must be dismantled and cleaned.

If the ball surface is damaged for some reason and causes leakage, the ball can be turned 180° provided that the ball seat is not damaged. A damaged ball seat will destroy the ball surface in a short time. The valve must be dismantled for inspection before turning the ball.

4.6 Dismantling the valve

CAUTION:

Do not dismantle or remove the valve when it is pressurized!

It is best to dismantle the valve for servicing when it is detached from the digester. The lower body half can alternatively be left mounted on the digester. Use the loops delivered with the valve for lifting.

Dismantle the valve on a clean, level cardboard or wooden underlay.

- Lower the valve onto the underlay if you have removed the whole valve from the digester.
- Turn the ball to the closed position.
- Detach the actuator using the extractor, see Chapter 6.
- Dismantle the upper body half (1).
- Fasten the lifting strap through the ball and keep it adequately tightened.
- Remove caps (53) and the tilting device nuts (18), disc springs (20) and screws (13).
- Detach the actuator console (7).
- Remove the bonnet with gland packings (28) and bearings (5, 22).
- Remove the support (38) with extractor screws.
- Lift the ball out of the body; take care not to damage the seating surfaces or the stem.
- Clean all dismantled parts carefully and replace worn or damaged parts as necessary.

The ball

After lifting the ball from the body, place it on a clean, soft surface for cleaning. Take special care to clean the ball seating surfaces and the gland packing area. Grind any minor scratches on the ball and packing with 28/20 µm grinding paste and finish with 7/5 µm paste. Scratches and burrs in the stem can be ground with fine abrasive cloth of grade 400. If there are deeper scratches in the ball or it is misshapen, send it to the manufacturer for repair.

Ball seat

The seat (4) is locked in its groove. If the seat is in order and there is no reason to suspect the condition of the seal (25), the seat need not be dismantled for servicing.

Remove the seat as follows:

- First grind down the locking points with a grinder, see Fig. 9.

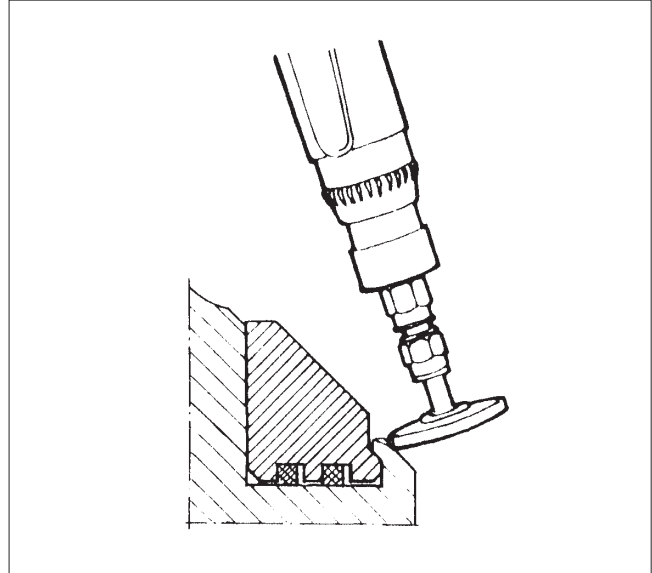


Fig. 9 Grinding the seat locking

- Open the locking points with a sharp chisel to facilitate removal, see Fig. 10.

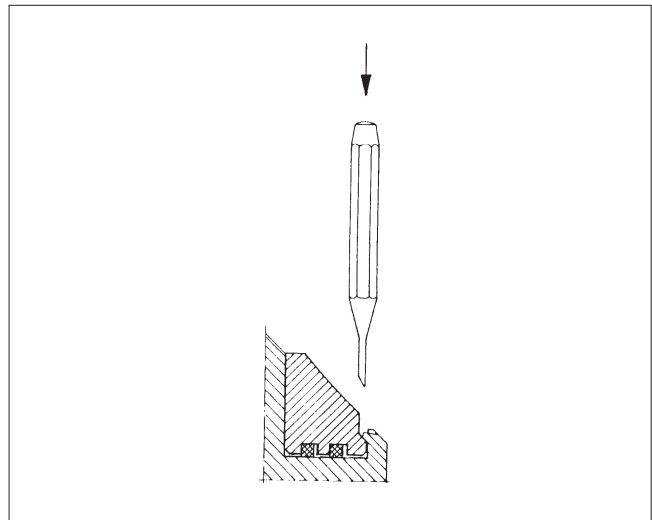


Fig. 10 Opening the seat locking

- Make sure that the seat slides freely in the groove.
- Turn the body half upside down and knock it lightly near the seating edge to make the seat drop out of the groove on the underlay.

The body

Clean the body halves carefully and check all seating surfaces.

The body gasket (26) must be replaced each time the valve is dismantled.

4.7 Valve assembly

Ball seat

To replace the back seal (25) of the seat (4), proceed as follows:

- Cut the ends of the seal band to give a tight seal against the edges of the groove where the two ends overlap, see Fig. 11.

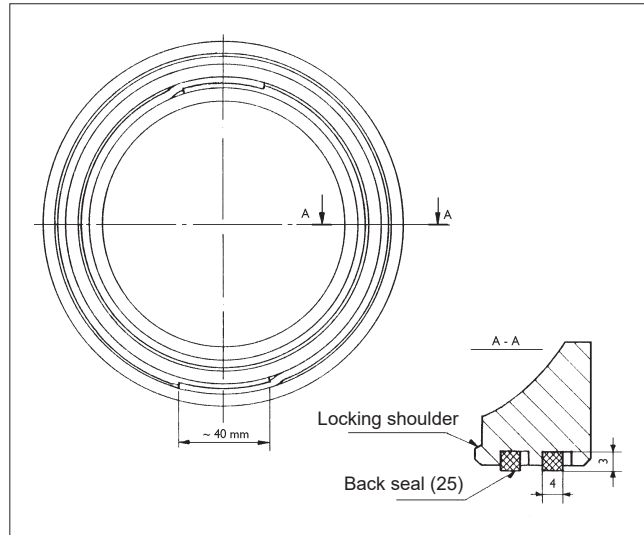


Fig. 11 Mounting the back seal

- Place the seat into the upper body half and lock it at the four points at 90° intervals, see Fig. 12.

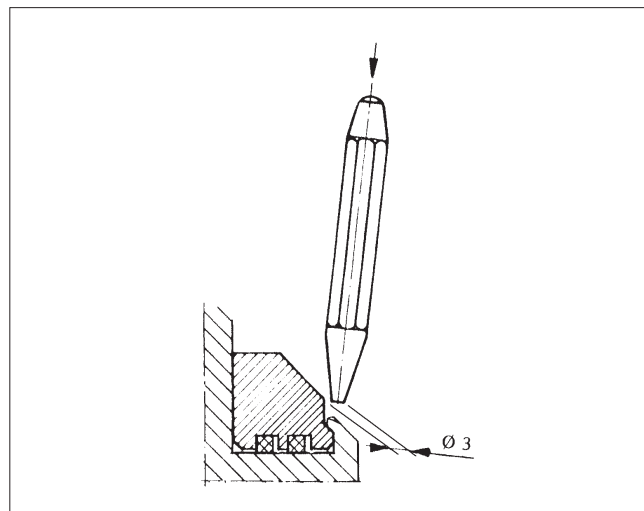


Fig. 12 Locking the seat

- Do not lock the seat too tight; it must be allowed to slide in the groove.

Assembly

- Place e.g. corrugated cardboard in the body to protect the ball during the lifting. Fasten the lifting straps through the flow port.
- Lift the ball into the lower body half with the stem first through the bonnet opening. Center the ball in the flow port. Leave the ball suspended by the lifting straps.
- Mount the support (38) and the new spiral gasket (39).
- Push the bearing (5) over the stem to match the locking notches with the locking ring stops at the butt of the ball stem.

- Slip the bearing (22) along the stem. The bearing lock notch must match with the locking groove on the bonnet (8).
- Mount the bonnet (8) and the new bonnet gasket (9).
- Push the ring (34) and the new gland packings (28) one by one into the packing groove with the gland. Position the cut ends of the rings at a 90° angle to each other and at a 45° angle to the flow port.
- Set the outer ring (34) and the gland (6) into place and tighten the nuts (17) lightly.
- Set the body gasket (26) in place. The gasket must be replaced each time the valve is dismantled.
- Install the tilting device. Replace the bearings (24) and ring (41) of the console (7). Slide the ring (41) onto the stem.
- Turn the screws (13) into the valve lugs, lock them with lock nut (13a). Tighten the disc spring packs (20) with nuts (18).
- Loosen the ball from the lifting straps and remove the straps.
- Make sure that the ball is in the center of the flow port by measuring the distances from the ball surface to the groove of the body joint plane.
- Lift the upper body half into place in the original position. See that a gap of about 5 mm (0.2") is left in the body joint when the body half is resting on the ball.
- Tighten the body joint nuts (16) as shown in Table 1.

Table 1 Tightening torques in Nm

| Material | Thread size | | | |
|----------|-------------|-------|--------------|------------|
| | 3/4 UNC | 1 UNC | 1 1/8 - 8 UN | 1 1/2-6UNC |
| B8M Cl.1 | 160 | 380 | 560 | 1400 |
| B8M Cl.2 | 420 | 840 | 1000 | 1800 |
| A2/A4 | 290 | 690 | 1000 | 2500 |

- Mount the actuator, see Chapter 5.
- Measure the distance "B", See Fig. 13.

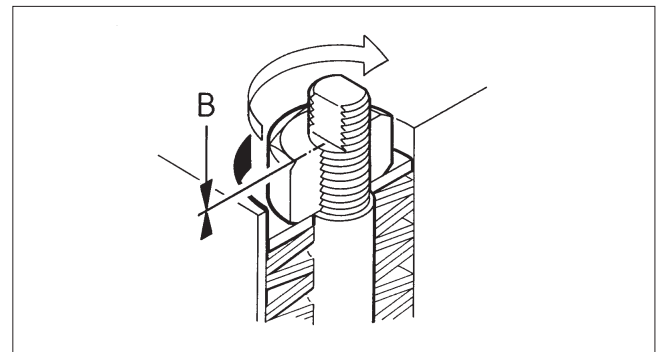


Fig. 13 Measuring "B"

- Feed compressed air into the actuator via the pressure regulator, see Fig. 14.

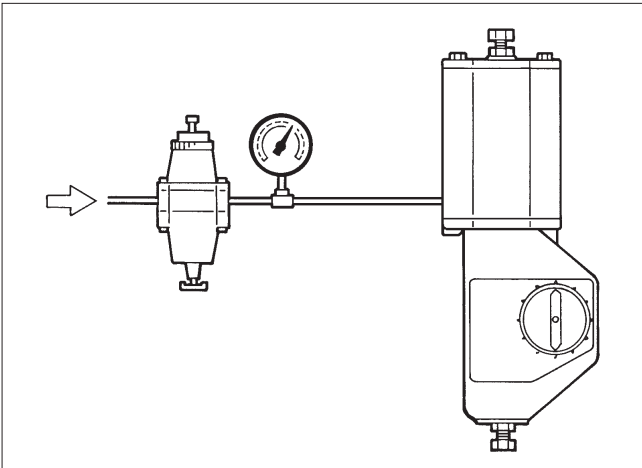


Fig. 14 Air supply for adjusting the tilting device

- If the actuator cannot turn the ball with the pressure indicated in Table 2, depressurize the actuator and loosen both tilting device nuts (18) by 90°. When necessary, continue loosening the nuts 90° at a time until the valve turns at the pressure indicated in the table, see Fig. 15. Measure the distance "A", see Fig. 16

Table 2 Feed pressure for adjusting the tilting device.

| Valve-actuator | Feed pressure, bar (psi) |
|----------------|--------------------------|
| PZ 500 - BCP32 | < 1.3 (< 19) |
| PZ 600 - BCP32 | < 1.8 (< 26) |
| PZ 750 - BCP40 | < 2.0 (< 29) |

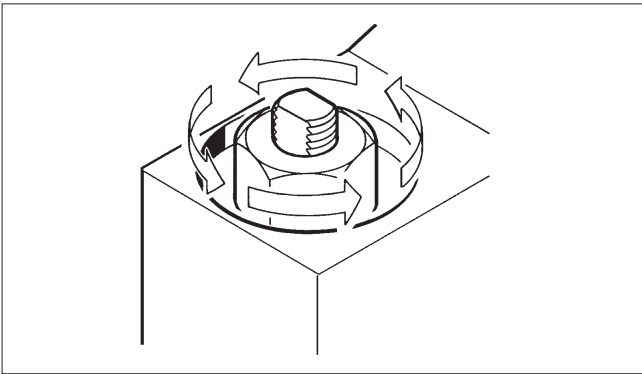


Fig. 15 Loosening of the nuts

- The measure "C" is the correct thickness of the washer. If necessary, thin the washer. See Fig. 17. Tighten the screws, keeping them in horizontally balance.

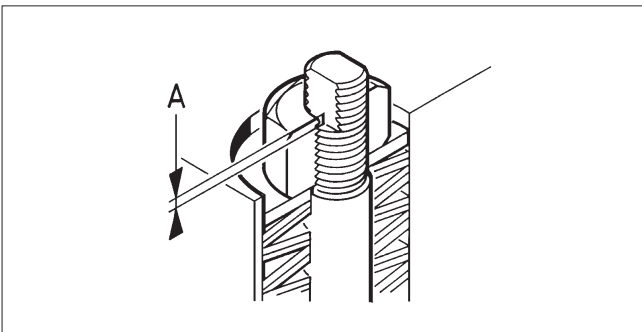


Fig. 16 Measuring "A"

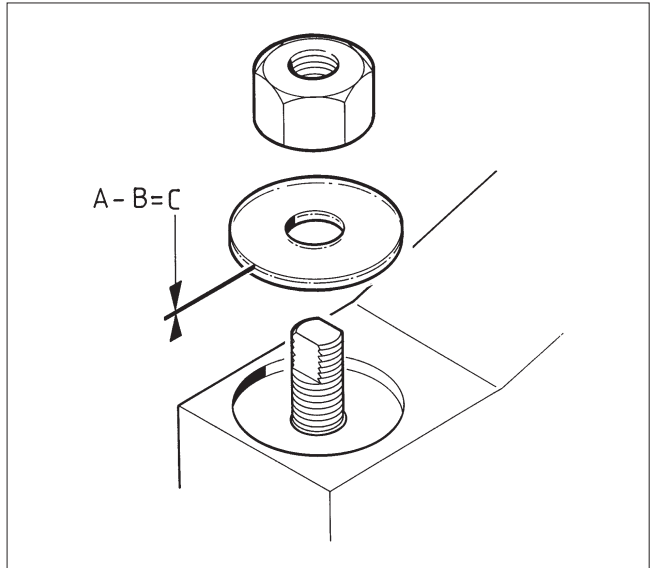


Fig. 17 The thickness of the washer

- Tighten the nuts (18).
- Treat the disc springs with a thin layer of corrosion inhibitors, e.g. Cortec VCI 369 and lubricate the studs and nuts using a suitable lubrication. Mount the caps (53).
- Fasten tight the gland packing nuts (17). Always check the tightness of the gland packings after installation of the valve.

5. INSTALLING THE ACTUATOR

Make use of the separate actuator instructions.

- Make sure that the stem end is clean and free from burrs.
- Select the stem key slot that indicates that the valve is in the extreme position when the valve is closed.
- Turn the studs into the actuator before sliding the actuator onto the stem.
- Slide the actuator into position carefully.
- Adjust the open and closed position limits.

5.1 Adjusting open and closed positions

The open and closed position limits of the valve are adjusted with the stop screws on the actuator, see Fig. 18.

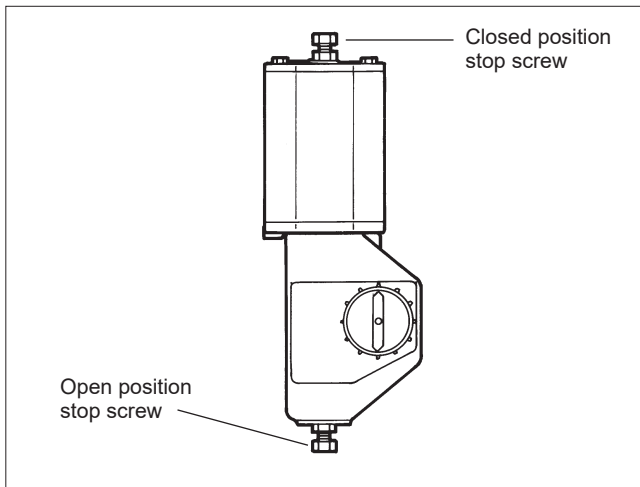


Fig. 18 Actuator stop screws

Adjusting the closed position:

Using a soft pencil, draw two lines on the top surface of the ball, the first at G1 and the second at G2 distance from the edge of the ball flow port, see Fig. 19 and Table 3.

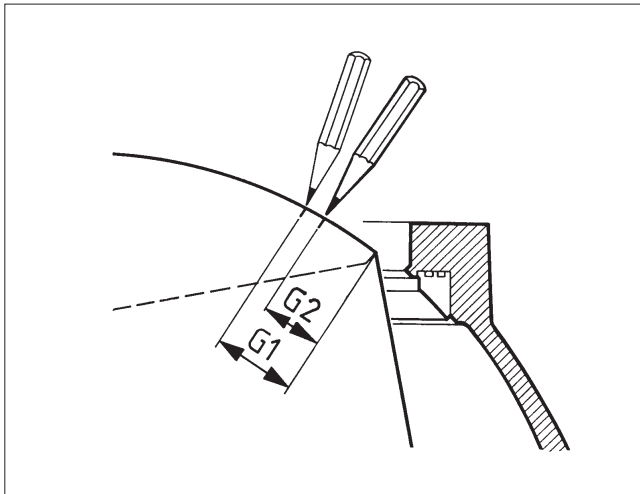


Fig. 19 Drawing the marking lines

Table 3 G-dimensions

| Valve | G1, mm | G2, mm |
|--------------|-----------|-----------|
| PZ 500 (20") | 52 (2.1") | 30 (1.2") |
| PZ 600 (24") | 62 (2.5") | 35 (1.4") |
| PZ 750 (30") | 69 (2.8") | 35 (1.4") |

- Adjust the closed position stop screw so that the end of the G1 line is just visible directly under the edge of the body flow port when the valve is closed, see Fig. 20.

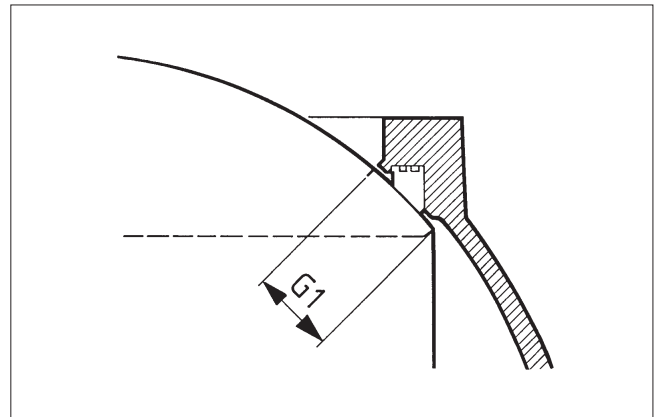


Fig. 20 G1 measure

- Adjust the limit switch's close position, limit switch is activated when the end of the G2 line is just visible directly under the edge of the body flow port, see Fig. 21.

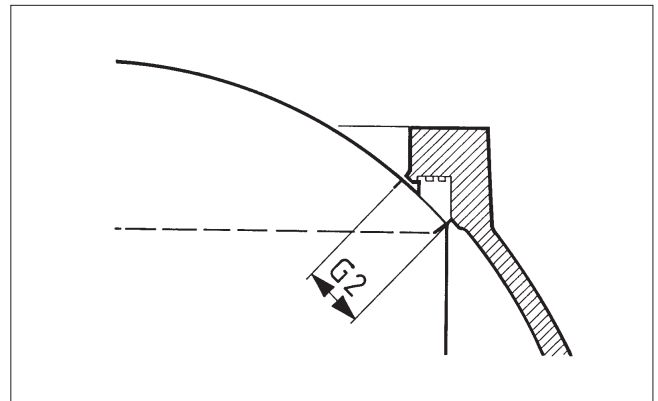


Fig. 21 G2 measure

Adjusting the open position:

- Open the valve and adjust the open position stop screw so that the ball and the body flow ports are parallel.
- After the adjustment, lock the retaining screws and seal them e.g. with Loctite 225.

6. TOOLS

In addition to standard tools, you might need the following special tools, which can be ordered from the manufacturer:

- Detaching the actuator from the valve
 - extractor

Table 4 Extractors

| Valve-actuator | Extractor |
|----------------|-----------|
| PZ 500 - BCP32 | 8546-5 |
| PZ 600 - BCP32 | 8546-5 |
| PZ 750 - BCP40 | 8546-6 |

7. ORDERING SPARE PARTS

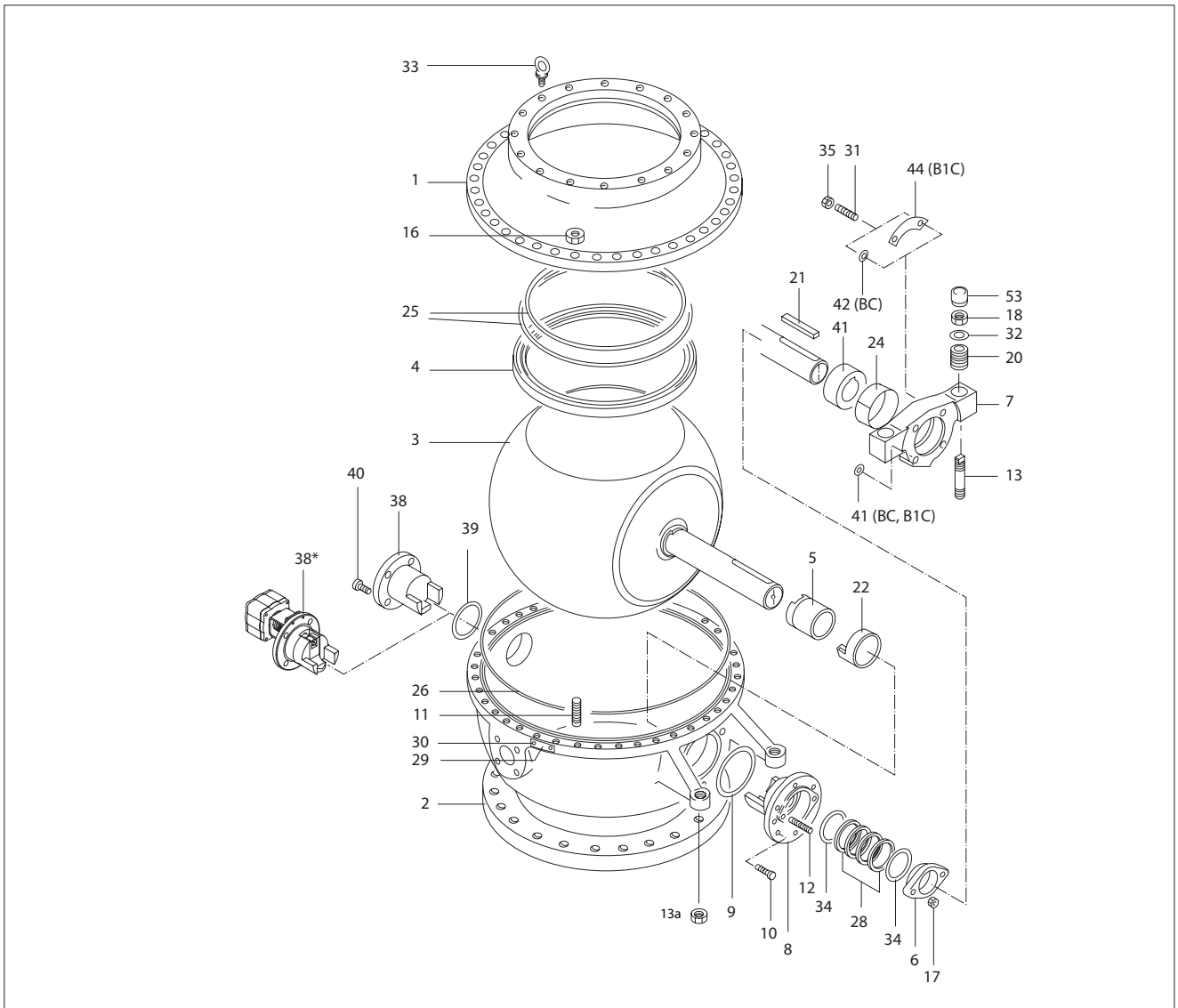
NOTE:

Use original spare parts to ensure that the valve functions as intended.

When ordering spare parts, always give the following information:

- valve type designation (from the identification plate or valve documents)
- parts list number (or number of this manual), part number, name of the part and number of pieces required.

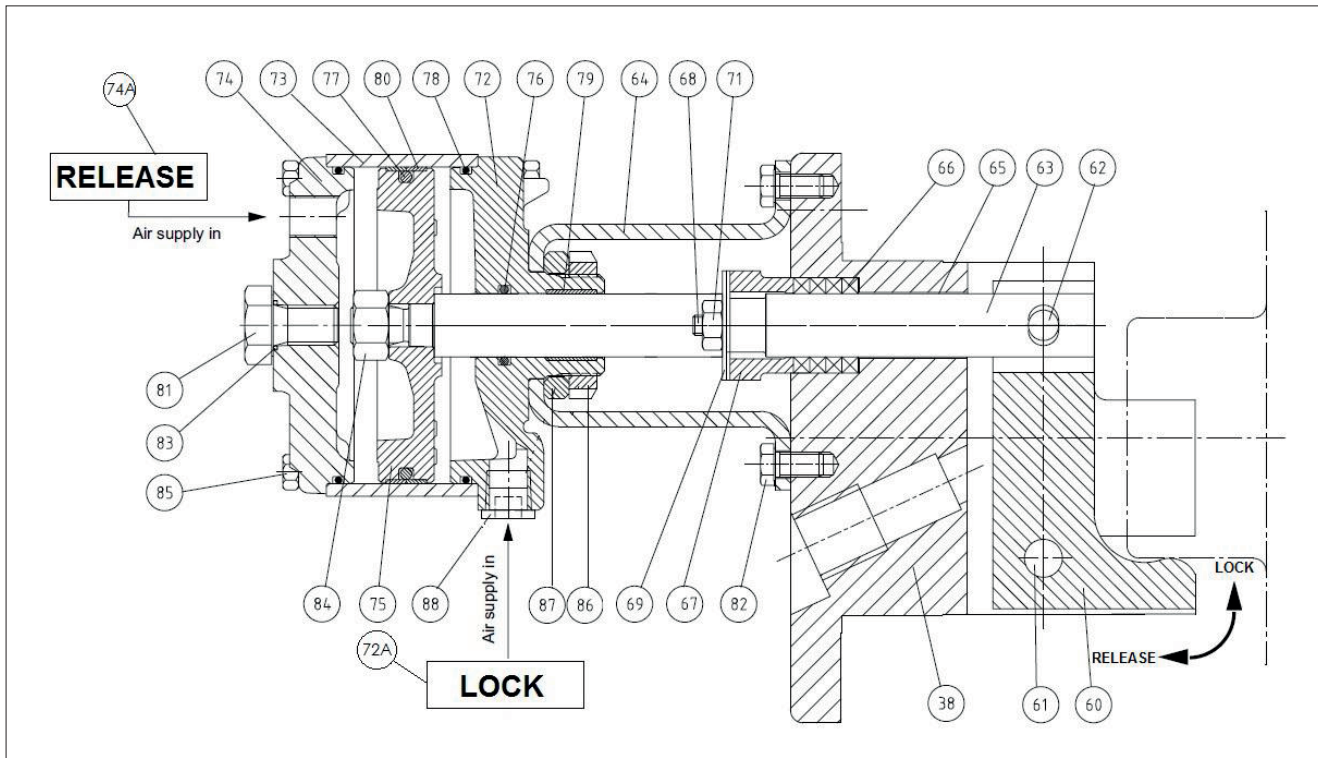
8. EXPLODED VIEW AND PARTS LIST



| Item | Qty | Description | Recommended spare part |
|------|-----|------------------|------------------------|
| 1 | 1 | Body, upper part | |
| 2 | 1 | Body, lower part | |
| 3 | 1 | Ball | |
| 4 | 1 | Ball seat | |
| 5 | 1 | Bearing bushing | |
| 6 | 1 | Gland | |
| 7 | 1 | Console | |
| 8 | 1 | Bonnet | |
| 9 | 1 | Spiral gasket | x |
| 10 | | Screw | |
| 11 | | Stud | |
| 12 | 2 | Stud | |
| 13 | 2 | Stud | |
| 13a | 2 | Lock nut | |
| 16 | | Nut | |
| 17 | 2 | Nut | |
| 18 | 2 | Nut | |
| 20 | | Disc spring | |
| 21 | 1 | Key | |

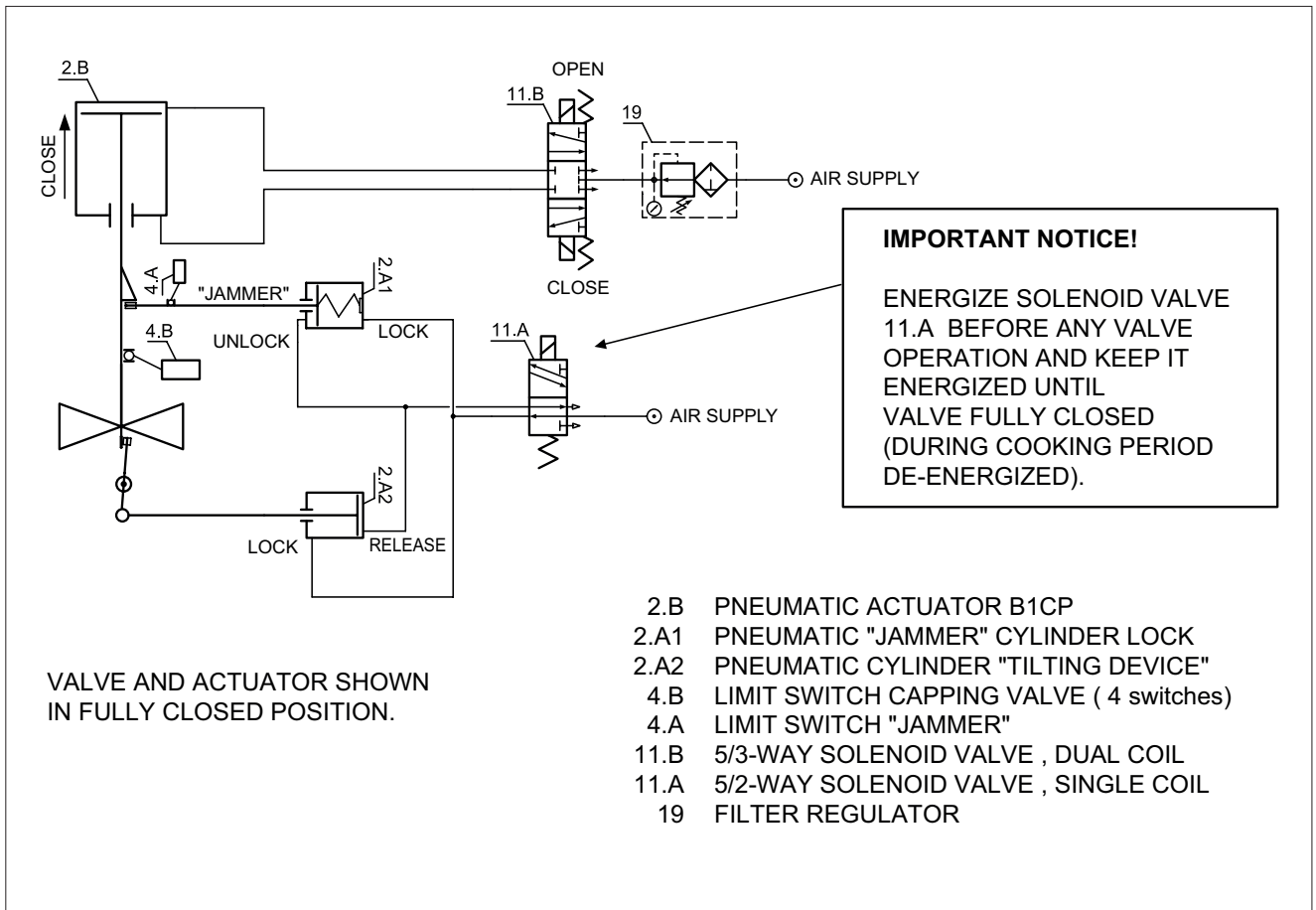
| Item | Qty | Description | Recommended spare part |
|------|-----|----------------------|------------------------|
| 22 | 1 | Bearing bushing | |
| 24 | 1 | Bearing strip | x |
| 25 | 2 | Sealing cord | x |
| 26 | 1 | Seal strip | x |
| 28 | 4 | Packing ring | x |
| 29 | 1 | Identification plate | |
| 31 | 8 | Stud | |
| 32 | 2 | Adjusting plate kit | |
| 33 | 4 | Lifting eye bolt | |
| 34 | 2 | Support ring | |
| 35 | 8 | Nut | |
| 38 | 1 | Support | |
| 38* | 1 | Rear tilting device | |
| 39 | 1 | Spiral gasket | x |
| 40 | 6 | Screw | |
| 41 | 1 | Bearing ring | |
| 42 | 2 | Washer | |
| 44 | 1 | Retainer plate | |
| 53 | 2 | Protection cover | |

9. REAR TILTING DEVICE

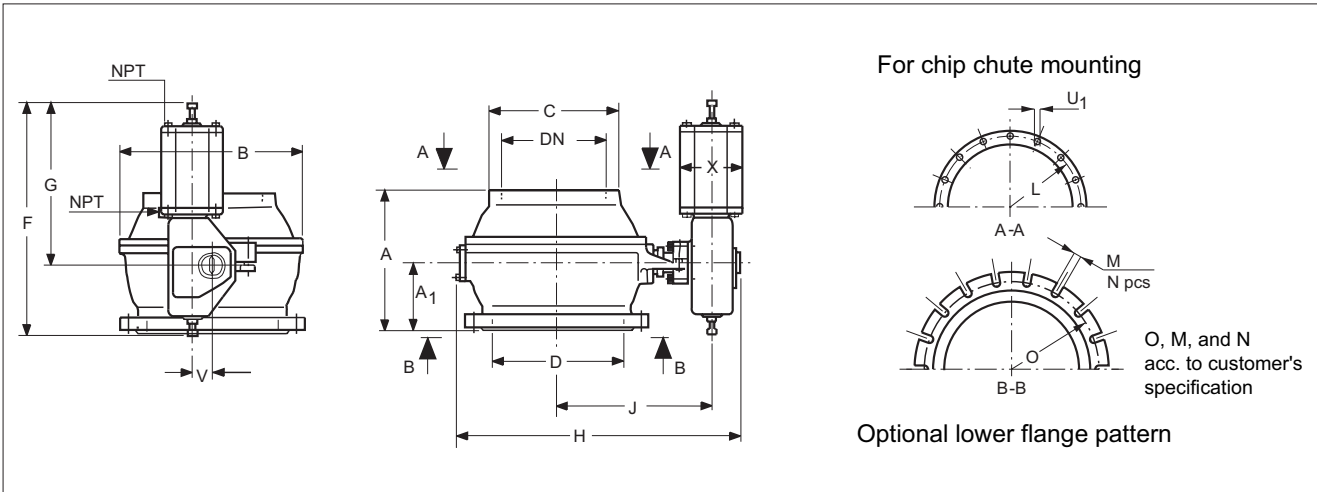


| Item | Qty | Description | Recommended spare part |
|------|-----|-------------------|------------------------|
| 038 | 1 | Support | |
| 060 | 1 | Support bar | |
| 061 | 1 | Cylindrical pin | |
| 062 | 1 | Cylindrical pin | |
| 063 | 1 | Piston rod | |
| 064 | 1 | Bracket | |
| 065 | 1 | Bearing strip | |
| 066 | 1 | V-ring set | x |
| 067 | 1 | Casting gland | |
| 068 | 2 | Stud | |
| 069 | 2 | Retainer plate | |
| 070 | 2 | Disc spring set | |
| 071 | 2 | Hexagon nut | |
| 072 | 1 | Cylinder base | |
| 072A | 1 | Sticker "LOCK" | |
| 073 | 1 | Cylinder pipe | |
| 074 | 1 | Cylinder end | |
| 074A | 1 | Sticker "RELEASE" | |
| 075 | 2 | Piston | |
| 076 | 1 | O-ring | x |
| 077 | 1 | O-ring | x |
| 078 | 2 | O-ring | x |
| 079 | 1 | Bearing strip | x |
| 080 | 2 | Piston ring | x |
| 081 | 1 | Hexagon screw | |
| 082 | 4 | Hexagon screw | |
| 083 | 1 | O-ring | |
| 084 | 1 | Hexagon nut | |
| 085 | 8 | Hexagon screw | |
| 086 | 1 | Lock nut | |
| 087 | 1 | Filling ring | |
| 088 | 2 | Protection plug | |

10. SAFETY INTERLOCKING (JAMMER, REAR TILTING DEVICE)



11. DIMENSIONS



| Valve | | | Main dimensions in mm | | | | | | | | | | | | Pneumatic actuator type | Weight kg ^{**}) |
|-----------|-----|--------------------------------|-----------------------|------------|------|-----|-----|-----|-------|------|------|-----|-----|------|-------------------------|---------------------------|
| Type | DN | Lower flange* | A | A1 | B | C | L | U1 | | F | G | X | V | J | | |
| | | | | | | | | UNC | Depth | | | | | | | |
| PZ 500 AK | 500 | 490 ≤ D ≤ 520 640 ≤ D ≤ 680 | 730 630 | 400 300 | 920 | 625 | 590 | 3/4 | 38 | 1330 | 910 | 395 | 153 | 840 | B1C 32 | 1250 |
| PZ 600 AK | 600 | 580 ≤ D ≤ 590 720 ≤ D ≤ 740 | 870 770 | 480 380 | 1070 | 740 | 700 | 7/8 | 42 | 1330 | 910 | 395 | 153 | 970 | B1C 32 | 1750 |
| PZ 750 AK | 750 | 730 ≤ D ≤ 740 880 ≤ D ≤ 890 | 1080 930 | 600 450 | 1330 | 910 | 860 | 1 | 42 | 1660 | 1150 | 505 | 194 | 1200 | B1C 40 | 2600 |

| Valve | | | Main dimensions in inch | | | | | | | | | | | | Pneumatic actuator type | Weight lbs ^{**}) |
|-----------|------|--|-------------------------|----------------|-------|-------|-------|-----|-------|-------|-------|-------|------|-------|-------------------------|----------------------------|
| Type | Size | Lower flange* | A | A1 | B | C | L | U1 | | F | G | X | V | J | | |
| | | | | | | | | UNC | Depth | | | | | | | |
| PZ 500 AK | 20 | 19.29 ≤ D ≤ 20.47 25.19 ≤ D ≤ 26.77 | 28.74 24.80 | 15.75 11.81 | 36.22 | 24.61 | 23.23 | 3/4 | 1.50 | 52.36 | 35.83 | 15.55 | 6.02 | 33.07 | B1C 32 | 2750 |
| PZ 600 AK | 24 | 22.83 ≤ D ≤ 23.23 28.34 ≤ D ≤ 29.13 | 34.25 30.31 | 18.90 14.96 | 42.13 | 29.13 | 27.56 | 7/8 | 1.65 | 52.36 | 35.83 | 15.55 | 6.02 | 38.19 | B1C 32 | 3850 |
| PZ 750 AK | 30 | 28.74 ≤ D ≤ 29.13 34.64 ≤ D ≤ 35.04 | 42.52 36.61 | 23.62 17.72 | 52.36 | 35.83 | 33.86 | 1 | 1.65 | 65.35 | 45.28 | 19.88 | 7.64 | 47.24 | B1C 40 | 5720 |

*) The lower flange is made to correspond to the digester flange. The valve height A varies with the lower flange diameter.

**) Weights are only approximative due different lower flange sizes.

12. TYPE CODE

| Neles™ capping valve, series PZ | | | | | | | |
|---------------------------------|----|----|-----------|----|----|----|----|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
| PZ | K | S | 600 / 800 | | A | R | V |

Size marking, either in inches or in millimeters, defines also the upper end connection threads; unified threads when size expressed in inches and metric threads when size expressed in millimeters.

| 1. | Product series/Construction/Pressure rating |
|----|--|
| PZ | Ball valve, lower body half with flange to be specified in order. Upper body half with 16 pcs tapped holes with metric threads or unified threads starting from center line. Body pressure rating PN16 / ANSI class 150. |

| 2. | Connections / Special construction |
|----|---|
| K | 2 pcs PN16 / DN 80 connections in lower body half. |
| C | 2 pcs ANSI class 150 / NPS 3" connections in lower body half. |
| N | Lower body half without connections. |
| Y | Special connections, special location e.g. in upper body half or special quantity or some other speciality. |

| 3. | End-to-end length | | |
|----|-------------------|-----------------|------------------|
| | DN 500 / 20" | DN 600 / 24" | DN 750 / 30" |
| L | 730 mm / 28.74" | 870 mm / 34.25" | 1080 mm / 42.52" |
| S | 630 mm / 24.80" | 770 mm / 30.31" | 930 mm / 36.61" |
| Y | Special | Special | Special |

| 4. | Size | |
|----|-------|----------|
| | DN/mm | NPS/inch |
| | 500 | 20 |
| | 600 | 24 |
| | 700 | 30 |

| 5. | Nominal size of lower body half (mm or in) |
|----|---|
| | Specified in the order. Nominal size of lower body half is given in the same units as the valve size, see 4. sign separated by slash. |

| 6. | BODY | BALL | BALL SEAT | BEARINGS |
|----|------|--------------------|-----------------------------------|---------------------------------|
| A | CF8M | CF8M + hard chrome | 316 SS + cobalt based hard facing | Coated hard chrome + UNS S21800 |
| C | CG8M | CG8M + CA-chrome | 317 SS + cobalt based hard facing | Cobalt based alloy |

| 7. | Ball seat type |
|----|--|
| R | Scraping, locked, seat seals in grooves. |

| 8. | Options* |
|----|-------------------------|
| - | Standard, without sign |
| V | Water flushing for ball |
| L | Rear tilting device |
| Y | Special |

Safety equipment versions are specified in Application Bulletins 2611/01/02 (ACC) and 2611/01/03 (Jammer inside the actuator).

13. GENERAL SAFETY WARNINGS AND DISCLAIMERS

General safety warnings

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.

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!
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 preferred direction without a locking handle or an actuator installed.
 - **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.

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.
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.

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 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.
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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