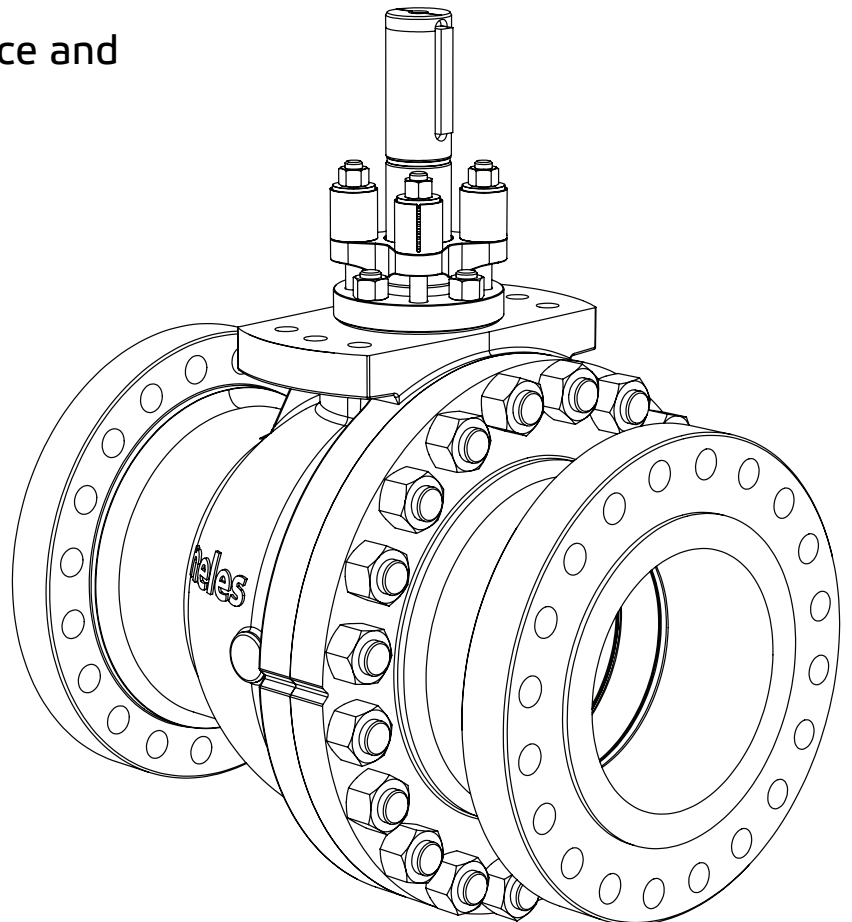


# Trunnion mounted Neles™ ball valve Series XH Class 600

Installation, maintenance and  
operating instructions



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Subject to change without notice.

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

## READ THESE INSTRUCTIONS FIRST!

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

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

## SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

# 1 GENERAL

## 1.1 Scope of the manual

This installation, operation and maintenance manual provides essential information on trunnion mounted XH series ball valves. The actuators and instrumentation to be used with these valves are also discussed briefly. Refer to the separate actuator and control equipment instruction manuals for further information.

### NOTE:

Selection and use of the valve in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the individual situations that may occur when installing, using or servicing the valve.

If you are uncertain about use of the valve or its suitability for your intended purpose, please contact Valmet for more information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Neles document id:10Q270EN.pdf).

## 1.2 Valve description

Trunnion mounted XH series valves are flanged full bore ball valves. The valve body is in two parts, fastened together by body-joint bolting. The ball and shaft are separate. Shaft blowout is prevented by bonnet.

The valve is metal seated. Shaft torque is transmitted to the ball through a splined bore in the ball.

The valve is 1-way or 2-way tight depending on the seat construction. Tightness direction is shown with an arrow on 1-way valves.

Construction details of individual valves are included in the type code shown on the valve identification plate. To interpret the type code, please refer to the type coding key in this manual.

Trunnion mounted XH series ball valves are specially designed for demanding throttling and shut-off service with high pressure differentials.

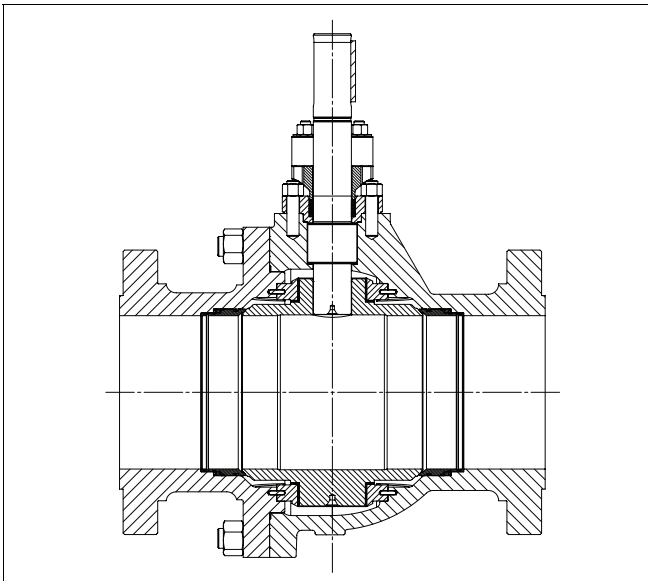


Fig. 1 Construction of a trunnion mounted XH Class 600 series ball valve

## 1.3 Markings

Body markings are stamped on the body (see Fig. 2).

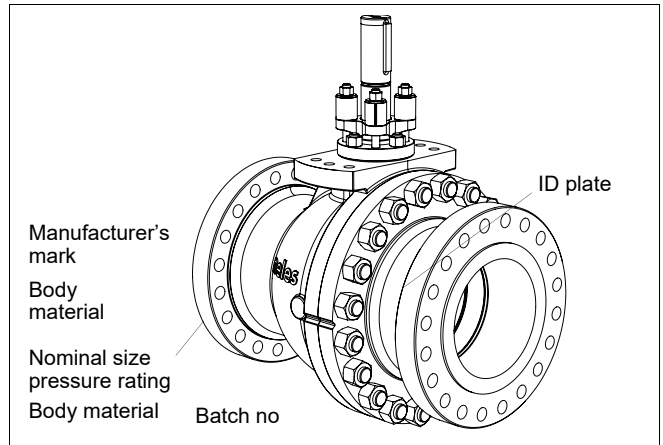


Fig. 2 Valve markings

The identification plate (Fig. 3) is attached to the flange. Identification plate markings are:

1. Body material
2. Ball material
3. Stem material
4. Seat material
5. Maximum operating temperature
6. Minimum operating temperature
7. Maximum shut-off pressure differential
8. Type code
9. Number of the list of valve manufacturing parts
10. Pressure class
11. Model

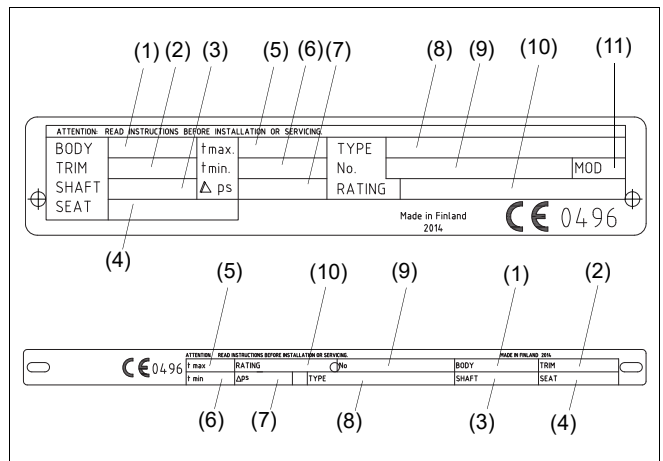


Fig. 3 Identification plate

## 1.4 Specifications

|                      |                                                                  |
|----------------------|------------------------------------------------------------------|
| Face-to-face length: | ASME B.16.10<br>Table 3<br>long pattern                          |
| Body rating:         | ASME Class 600                                                   |
| Temperature range:   | -50°...+425 °C<br>-58 °...+797 °F                                |
| Tightness:           | Bi-directional or uni-directional depending on seat construction |
| Metal seated         | ISO 5208 Rate D or Class V                                       |
| Dimensions:          | see tables in Section 13                                         |
| Weights:             | see tables in Section 13                                         |

## 1.5 Valve approvals

XH-series ball valves meet the requirements set by ASME B 16.34.

Fire safety characteristics are designed according to API 607.

## 1.6 CE marking

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

## 1.7 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 valve performance limitations!**

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

### CAUTION:

#### **Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!**

Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve. Be aware of the type of medium involved. Protect people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance. Failure to do this may result in damage or personal injury.

### CAUTION:

#### **Beware of the ball cutting movement!**

Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline. When the valve is actuated, the ball functions as a cutting device. Close and detach the actuator pressure supply pipeline for valve maintenance. Failure to do this may result in damage or personal injury.

### CAUTION:

#### **Beware of noise emission!**

The valve may produce noise in the pipeline. The noise level depends on the application. It can be measured or calculated using the Neles Nelprof computer program.

Observe the relevant work environment regulations on noise emission.

### CAUTION:

#### **Beware of extreme temperatures!**

The valve body may be very hot or very cold during use.

Protect people against cold injuries or burns.

### CAUTION:

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

Never lift the valve or valve package by the actuator, positioner, limit switch or their piping. Place the lifting ropes securely around the valve body (see Fig. 5). Damage or personal injury may result from falling parts.

The weights are shown in Section 13.

### CAUTION:

Lifting threads in pipe flanges are not to be used for lifting the entire valve.

### CAUTION:

Follow the proper procedures when handling and servicing oxygen valves.

### CAUTION:

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

## 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.

## 2 TRANSPORTATION, RECEPTION AND STORAGE

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

Store the valve carefully. We recommend storing indoors in a dry place.

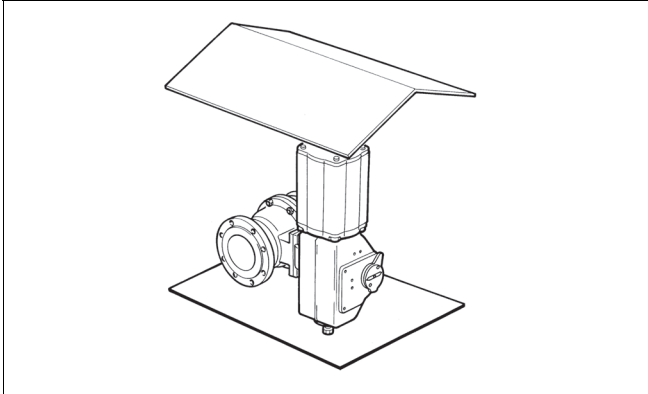


Fig. 4 Storing the valve

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 open position.

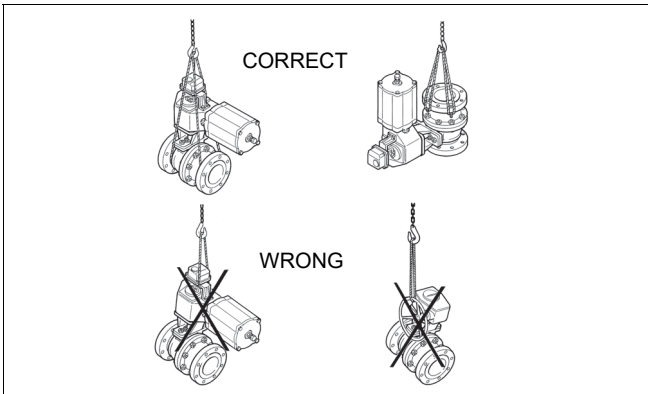


Fig. 5 Lifting the valve

## 3 INSTALLATION AND USE

### 3.1 General

Remove the flow bore protectors and check that the valve is clean inside. Clean the valve if necessary.

### 3.2 Installing in the pipeline

#### CAUTION:

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

Flush the pipeline carefully before installing the valve. Make sure the valve is entirely open when flushing. Foreign particles, such as sand or pieces of welding electrode, will damage the ball and seats.

#### NOTE:

Use screws, nuts, bolts and gaskets equivalent to the fastenings used elsewhere in the pipeline. Center the flange gaskets carefully when fitting the valve between flanges.

#### NOTE:

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

The valve may be installed in any position and offers 1-way or 2-way tightness, see Sections 1.2 and 1.4. However we do not recommend installing the valve with the actuator on the underneath side because dirt in the pipeline may then enter the body cavity and damage the gland packing. The position to be avoided is shown in Fig. 6.

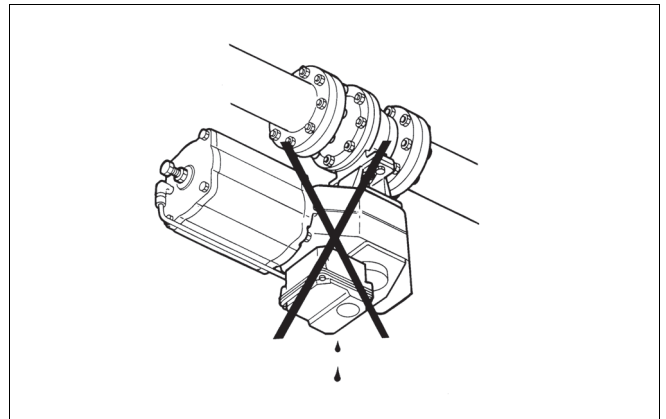


Fig. 6 Avoid this mounting position

It may be necessary to firmly support the pipeline in order to protect the valve from excess stress. Sufficient support will also reduce pipeline vibration and thus ensures proper functioning of the positioner.

To facilitate servicing, it is preferable that the valve be supported by the body, using pipe clamps and supports. Do not fasten supports to the flange bolting or to the actuator, see Fig. 7.

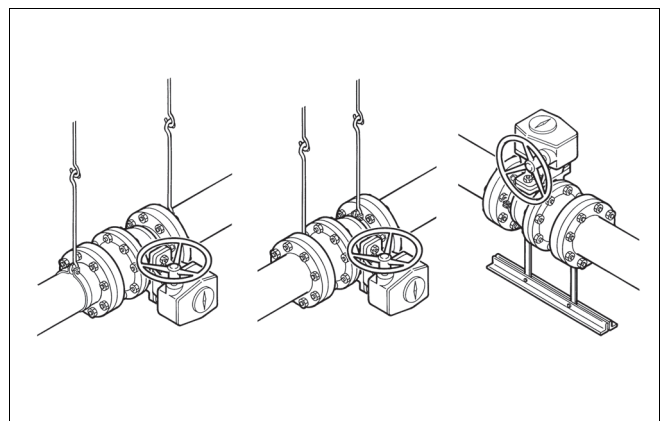


Fig. 7 Supporting the valve

## Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 8.

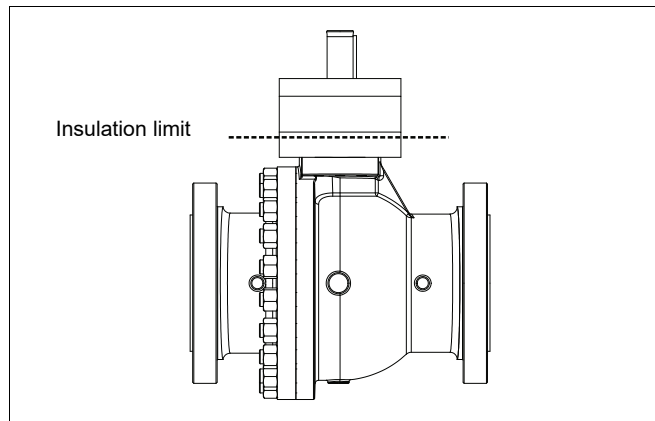


Fig. 8 Insulation of the valve

## 3.3 Actuator

### NOTE:

When installing the actuator on the valve, make sure that the valve package functions properly. Detailed information on actuator installation is given in Section 6 or in the separate actuator instructions.

The valve open/closed position is indicated as follows:

- by an indicator on the actuator or
- by a groove at the end of the ball shaft (parallel to the ball flow opening).

If there is any uncertainty about the indicator, check the ball position by the groove.

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.

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

In certain cases it may be considered advantageous to provide additional support to the actuator. These cases will normally be associated with large actuators, extended shafts, or where severe vibration is present. Please contact Valmet for advice.

## 3.4 Commissioning

Ensure that there is no dirt or foreign objects left inside the valve or pipeline. Flush the pipeline carefully. Make sure that the valve is entirely open when flushing.

Ensure that all nuts, pipings, and cables are properly fastened. Check that the actuator, positioner, and switch are correctly adjusted. Actuator adjustment is explained in Section 6. To adjust the accompanying device refers to the separate control equipment instruction manuals.

## 4 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, bear in mind the weight of the valve or the entire package!

## 4.1 Maintenance general

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

Maintenance can be performed as presented below. 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 10, 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 while the valve is in the pipeline

### CAUTION:

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

In graphite gland packings, tightness is ensured by contact between the gland follower and the packing rings.

The gland packing (69) must be changed if leakage occurs even after the hex nuts (18) have been tightened.

- Make sure that the valve is not pressurized.
- Detach the actuator and bracket according to the instructions in Section 4.4.
- Remove the key (10).

- Remove the nuts (18), the disc spring sets (150), washers 150B, anti static springs (150C), the gland (9), and anti extrusion ring (9A).
- Remove old packing rings (69). Do not damage the surfaces of the packing ring counterbore and shaft.
- Clean the packing ring counterbore.
- Place the new packing rings (69) over the shaft (5). The gland (9) may be used for pushing the rings into the counterbore. Do not damage packing rings in the shaft keyway.
- Install Washers (150B), anti static springs (150C) in opposite side studs (14)
- Pre-compress the packing rings first by tightening the gland with disc springs (150) to the height X. See Fig. 9 and the value from Table 1.
- 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.
- Loosen the gland nuts. Retighten the nuts (18) so that the disc springs are compressed to the height X, see Table 1.
- If the leakage still occurs when the valve is pressurized, re-tighten the nuts but don't exceed the value in the Table 1 by 50 % or do not fully compress the disc springs.

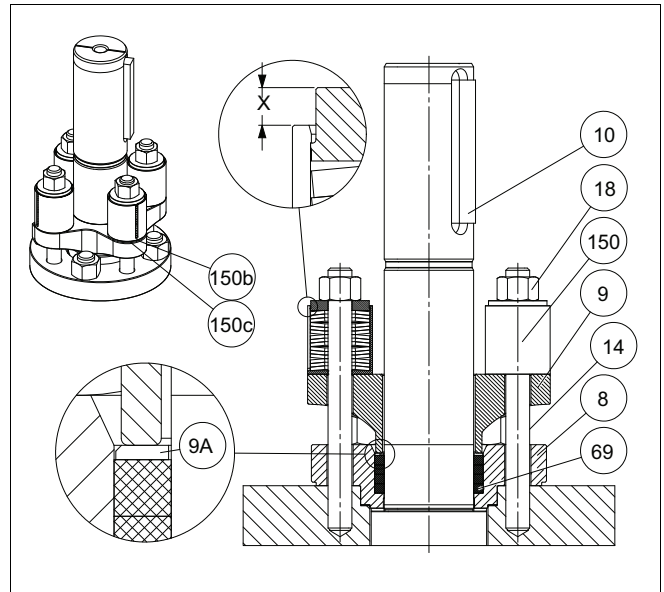


Fig. 9 Gland packing

Table 1 Tightening of gland packing

| Valve size |     | Shaft diameter | Gland bolting | Compressed cap & housing difference (graphite) |
|------------|-----|----------------|---------------|------------------------------------------------|
| DN         | NPS | mm             | Thread        | X, mm                                          |
| 150        | 6   | 45             | M16           | 1,8                                            |
| 200        | 8   | 55             | M16           | 1                                              |
| 250        | 10  | 65             | M16           | 0,2                                            |
| 300        | 12  | 75             | M20           | 0,4                                            |

### 4.3 Repair of a jammed or stuck valve while it is in the pipeline

Jamming may be due to the ball (3) and seats (7) becoming clogged with flow medium. They may be cleaned by turning the ball to the partly open position and flushing the pipeline. If this does not help, follow the instructions in the following sections.

### 4.4 Detaching the actuator

#### CAUTION:

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

#### CAUTION:

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

#### NOTE:

Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch so as to make sure that the package can be properly re-assembled.

It is generally most convenient to detach the actuator before removing the valve from the pipeline. If the valve is small or if it is difficult to access, it may be more practical to remove the entire package at the same time.

- Close and detach the actuator pressure supply pipeline and remove control cables.
- Unscrew the bracket screws.

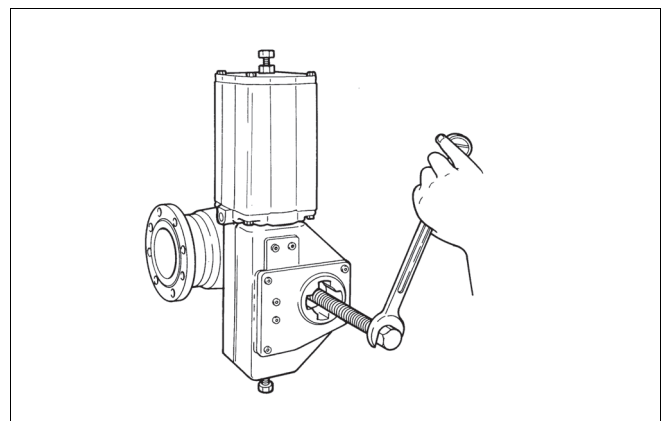


Fig. 10 Removing the actuator with an extractor

- Detach the actuator. The actuator can be removed by hand or with a special tool made for this purpose. The tool can be ordered from the manufacturer (see Section 8 "Tools").
- Remove the bracket.

## 4.5 Removing the valve from the pipeline

### CAUTION:

Do not dismantle the valve or remove pipeline while the valve is pressurized!

- Make sure that the valve is not pressurized and that the pipeline is empty. Make sure that the medium cannot flow into the section where servicing is to take place.
- Support the valve carefully with a hoist. Place ropes carefully and unscrew the pipe flange bolts. See that the ropes are positioned correctly, see Fig. 5. Lift valve down.

## 4.6 Dismantling the valve

- Place the valve in a standing position on the pipe flange end. Use a level surface that will not scratch the flanges. See that the body stud nuts (16) are facing upward.
- Mark the the body halves for correct orientation during re-assembly.
- Turn the ball to the closed position.
- Remove the key (10).
- Unscrew the gland nuts (18). Remove the the disc spring sets (150), washers (150B), anti static springs (150C), the gland (9), retainer ring (42) and anti extrusion ring (9A).
- Unscrew the body stud nuts (16).
- Remove the body cap (2). If the seat (7) is not lying on the ball (3), prevent the seat from falling from the body cap and detach it later. **Don't leave your fingers between the body cap and the surface!**  
Stand the removed body cap on its pipe flange.
- Remove the seat (7) from body cap (2) if it is still in place.
- Unscrew the bonnet stud nuts (17). Remove the shaft (5) and bonnet (8). Knock the bonnet off with a piece of wood and a hammer, if needed.
- Lift the ball (3) along with the trunnion plates (89) and bearings (91, 99) out of the body (1) Handle the ball carefully and place it on a soft surface.
- Remove the seat (7) from the body (1).
- Remove the trunnion plates (89) from the hubs of the ball.
- Remove the trunnion bearings (99) and the thrust bearing (91) from each trunnion.
- Push the shaft out of the bonnet.
- Remove thrust bearings (70) from the shaft and packing rings (69) from the bonnet (8).
- Remove the body gasket (65) and the bonnet gasket (66).

## 4.7 Inspection of removed parts

- Clean removed parts.
- See if the shaft (5) or bearings (70, 99) are damaged.
- See if the ball (3) or seats (7) are damaged (scratched), by examining them under bright light. The ball and the seat can be replaced if necessary.
- See if the body joint sealing surfaces are damaged.

## 4.8 Replacing parts

We recommend that soft material parts be replaced whenever the valve is dismantled for servicing. Other parts may be replaced if necessary. Always use genuine spare parts to ensure proper functioning of the valve (see section "Ordering spare parts").

## 4.9 Assembly

- Place the valve body (1) and the body cap (2) on the pipe flange end. Use a level surface that will not scratch the flanges.

### S seat:

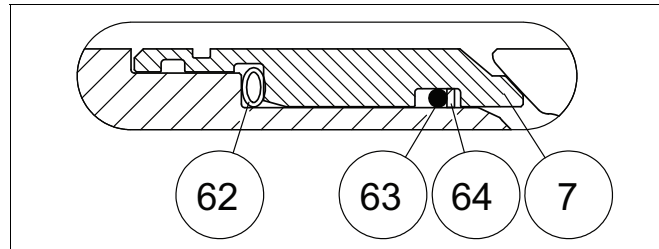


Fig. 11 S seat

- Check the sealing surfaces.
- Place the back seal (O-ring) (63) into the groove in the seat. See Figure 11.
- Place the back-up rings (64) made of PTFE strips at the side of the O-ring. To ensure that the seam becomes flexible, the strip must have slanted ends.
- For easier assembly, lubricate the O-ring and back-up ring surfaces facing the seats with silicone grease or another suitable substance.
- Place the spring (62) on the seat (7). Connect the ends of the spring. NPS06 has 2pcs spring (62) separated with spacer ring (62A).
- Place the seats into the body and body cap by hand or if necessary, using a plastic mallet. The seat is in correct position when the spring touches the body shoulder.
- S-seat has groove on the back that is normally left empty. This groove is for late configuration if solids proof seal is needed.

### B seat:

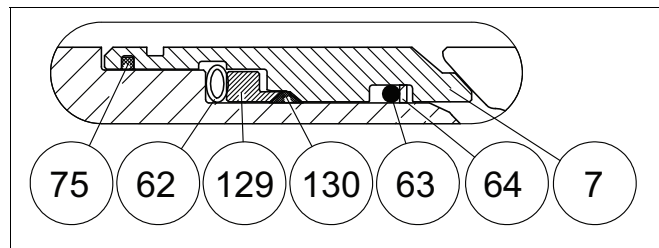


Fig. 12 B seat

- Check the sealing surfaces.
- Place the back seal (O-ring) (63) into the groove in the seat. See Figure 12.
- Place the back-up rings (64) made of PTFE strips at the side of the O-ring. To ensure that the seam becomes flexible, the strip must have slanted ends.
- For easier assembly, lubricate the O-ring and back-up ring surfaces facing the seats with silicone grease or another suitable substance. Please ensure the compatibility with the flow medium. Place the backseal (130) and ring (129) on the seat.
- Place the spring (62) on the seat (7). Connect the ends of the spring. NPS06 has 2pcs spring (62) separated with spacer ring (62A).
- Place the braided graphite (75) into the groove in the seat.
- Place the seats into the body and body cap by hand or if necessary, using a plastic mallet. The seat is in correct position when the spring touches the body shoulder.

### G seats:

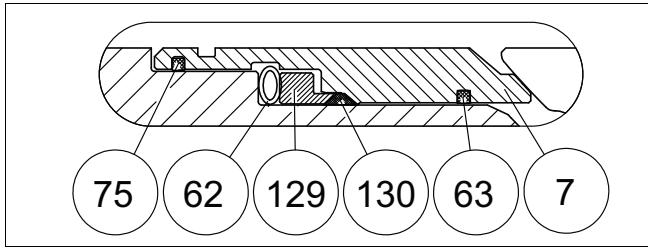


Fig. 13 G seat

- Check the sealing surfaces.
- Place the backseal (130) and ring (129) on the seat.
- Place the spring (62) on the seat (7). Connect the ends of the spring. NPS06 has 2pcs spring (62) separated with spacer ring (62A).
- Place the braided graphites (63)(75) into the grooves in the seat.
- Place the seats into the body and body cap by hand or if necessary, using a plastic mallet. The seat is in correct position when the spring touches the body shoulder.

### CAUTION:

Be careful not to damage the lapped surfaces of the seat.

### All versions:

- Place a trunnion bearing (99) into each trunnion plate (89) counterbore.
- Place a thrust bearing (91) over each ball trunnion, bearing surface facing the ball.
- Fit a trunnion plate over each ball trunnion until the plate rests against the thrust bearing (91). This operation must be performed with care and without excessive force or the bearing will be damaged. It may be necessary to tap the plate on with a plastic mallet.
- Align the trunnion plates (89) relative to the ball port in the closed position.

### NOTE:

The shaft will fit into the ball in one position only. There's a larger cog in the splined bore and a matching groove in the splined shaft. It is essential to note the groove's position during the next assembly step.

- With the ball (3) in the "closed" position, and trunnion plate pins (89A) installed to holes in body (1), lower the ball/trunnion plate subassembly into the body (1). **NOTE:** This procedure is critical and careful attention is a must. The outside diameter of the trunnion plates must pilot in the body counterbore and the pins need to align with the holes in trunnion plate. Carefully lower the subassembly until a trunnion plate enters the counterbore and pins go inside the trunnion plate. (Usually one trunnion plate will enter the counterbore and the other will be out of position.) Use a plastic mallet or a block of wood to rotate the second trunnion into position. Once trunnion plates are aligned, lower the subassembly until the trunnion plates are seated in the bottom of the counterbore.
- Slide the thrust bearings (70) over the shaft (5). Thrust bearings are assembled on both sides of the shaft. Bearing surface against the shaft.
- Insert shaft subassembly through the bonnet (8) and install packing (69).

- Install the anti extrusion ring (9A) and gland (9) over shaft (5) and gland studs. Install the washers (150B), anti static springs (150C), disc springs sets (150) and the gland stud nuts (18) on studs and tighten "finger tight."
- Install the bonnet gasket (66) and the bonnet subassembly over the bonnet studs (13). Note the correct shaft position! Lubricate the threads of studs (13) and tighten the nuts (17) according to values in Table 2.
- Install the body gasket (65) in the body groove.
- Install trunnion pins (89A) in trunnion plate
- Place the body cap (2) carefully over the body studs (12) and the body (1). See that the flange holes are aligned acc. to the mark made during the dismatling. Take care not to damage the body gasket and the seat (7) in the body cap.
- Check that trunnion pins (89A) align with the holes in body cap (2).
- Fasten the body nuts (16). Tighten the nuts gradually, always switching to other side of the valve after every nut. The recommended torques is given in Table 2. The flange faces must in even contact with each other.
- Mount the key (10).
- Cycle the valve slowly a couple of times to insure correct position of the ball between the two seats.

Table 2 Recommended tightening torques of the body stud nuts

| Material  | ASTM A320 gr.L7M       | ASTM A193 gr. B8M cl.2 |
|-----------|------------------------|------------------------|
| Bolt Size | Tightening Torque (Nm) | Tightening Torque (Nm) |
| M8        | 25                     | 31                     |
| M10       | 50                     | 60                     |
| M12       | 85                     | 100                    |
| M14       | 140                    | 170                    |
| M16       | 210                    | 260                    |
| M18       | 290                    | 350                    |
| M20       | 420                    | 420                    |
| M22       | 560                    | 560                    |
| M24       | 720                    | 720                    |
| M27       | 1100                   | 870                    |
| M30       | 1400                   | 1200                   |
| M33       | 2000                   | 1200                   |
| M36       | 2500                   | 1600                   |
| M39       | 3300                   | 2100                   |
| M42       | 4200                   | 2600                   |
| M45       | 5200                   | 3300                   |
| M48       | 6400                   | 4000                   |
| M52       | 8300                   | 5200                   |
| M56       | 10000                  | 6500                   |

Note! Threads must be well lubricated.

- Tighten the gland nuts (18) acc. to Section 4.2 . Pull on the shaft (5) while tightening to assure that shaft and thrust bearings are always in contact with the body. Check for leakage once the valve is pressurized.
- Install the valve in the pipeline as carefully and accurately as when removing it. Follow the instructions given in Section 3.

## 5 TESTING THE VALVE

### CAUTION:

Pressure testing should be carried out using equipment conforming to the correct pressure class!

We recommend that the valve body be pressure tested after the valve has been assembled.

The pressure test should be carried out in accordance with an applicable standard using the pressure rating required by the pressure class or flange drilling of the valve. The valve must be in a half-open position during the test.

If you also want to test the tightness of the closure member, contact the manufacturer.

## 6 INSTALLING THE ACTUATOR

### 6.1 General

### CAUTION:

Beware of ball cutting movement!

Different Neles actuators can be mounted using suitable brackets and couplings. The valve can be actuated by an M-handwheel operator or B1-series actuators.

### 6.2 Installing the M-handwheel operator

- The mark at the end of the shaft indicates the direction of the ball flow bore. Turn the valve to the closed position.
- Lubricate the grooves of the actuator and the couplings. Place the coupling on the shaft and lock it. Place the bracket on the valve and turn the lubricated screws a few times.
- Turn the actuator to the closed position and push it carefully onto the valve shaft on which the coupling has been mounted. Please note the marks on the handwheel and the coupling.
- Lubricate the actuator screws. Tighten all screws.
- Adjust the ball open and closed positions with the hexagon screws located at the side of the housing (see Figure 14). The stop-screw for the open position is nearest to the handwheel on the side of the housing and the screw for the closed position is at the opposite end. The turning directions for the handwheel are marked on the wheel.
- Check the handwheel by turning the valve to the extreme positions. The yellow arrow should indicate the direction of the ball flow bore.

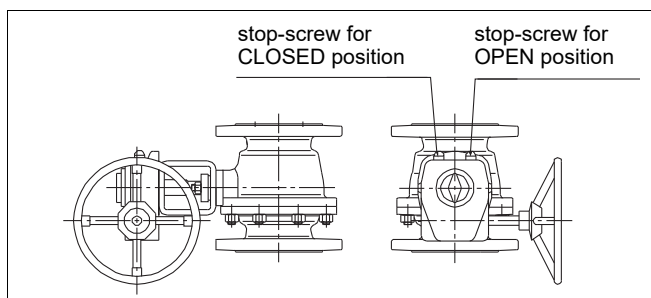


Fig. 14 Open and closed positions of the M actuator

### 6.3 Installing the B1C-series actuator

- Turn the valve to the closed position and drive actuator piston to the extreme outward position.
- File off any burrs and clean the shaft bore.
- The line at the end of the shaft indicates the direction of the ball flow bore.
- Lubricate the actuator shaft bore. Fasten the bracket loosely to the valve.
- Slip the actuator carefully onto the valve shaft. Avoid forcing it since this may damage the ball and seats. We recommend mounting the actuator so that the cylinder is pointing upwards.
- Position the actuator parallel or vertical to the pipeline as accurately as possible. Lubricate the actuator mounting screws and then fasten all screws.

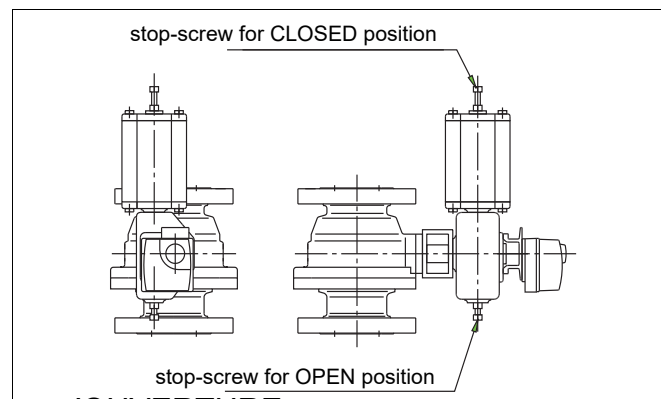


Fig. 15 Open and closed positions of the B1C/B1J actuator

- Adjust the ball open and closed positions by means of the actuator stop screws located at both ends (see Fig. 15). An accurate open position can be seen in the body flow bore. Check that the yellow arrow on the actuator indicates the ball flow opening position. **Keep fingers out of the flow bore!**

There is no need for stop screw adjustment if the actuator is re-installed in the same valve. Drive actuator piston to the housing end (open position). Turn the actuator by hand until the valve is in the open position. Fasten the actuator in this position as explained above.

- Check the stop screw thread tightness. An O-ring is used for sealing.
- Check that the actuator is functioning correctly. Drive the actuator piston to both cylinder ends and check the ball position and its movement with respect to the actuator (close: clockwise; open: counterclockwise). The valve should be closed when the piston is in the extreme outward position.
- If necessary, change the position of the actuator pointing cover to correctly indicate the valve open/closed position.

### 6.4 Installing the B1J-series actuator

Spring-return actuators are used in applications where valve opening or closing movement is needed in case the air supply is interrupted. The B1J type is used for spring-to-close operation; the spring pushes the piston towards the cylinder end, the extreme outward position. In turn, the B1JA type is used for spring-to-open operation; the spring pushes the piston towards the housing. Spring-return actuators are installed in a manner similar to B1C-series actuators, taking into account the following.

#### B1J type

- Install the actuator so that the piston is in the extreme outward position. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the **closed** position.

## B1JA type

- Install the actuator so that the piston is in the cylinder end position at housing side. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the **open** position.

The rest of the installation procedure is the same as in Section 6.3.

## 6.5 Installing other makes of actuators

### NOTE:

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

Other actuators can be installed only if they have an ISO 5211 actuator connection.

## 7 TROUBLE SHOOTING TABLE

The following Table 3 lists malfunctions that might occur after prolonged use.

Table 3 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

In addition to standard tools, the following special tools might facilitate some phases of the work.

- For removal of the actuator:
  - extractor (ID-code table in actuator's IMO).

This tool can be ordered from the manufacturer. Always give the valve type designation when ordering.

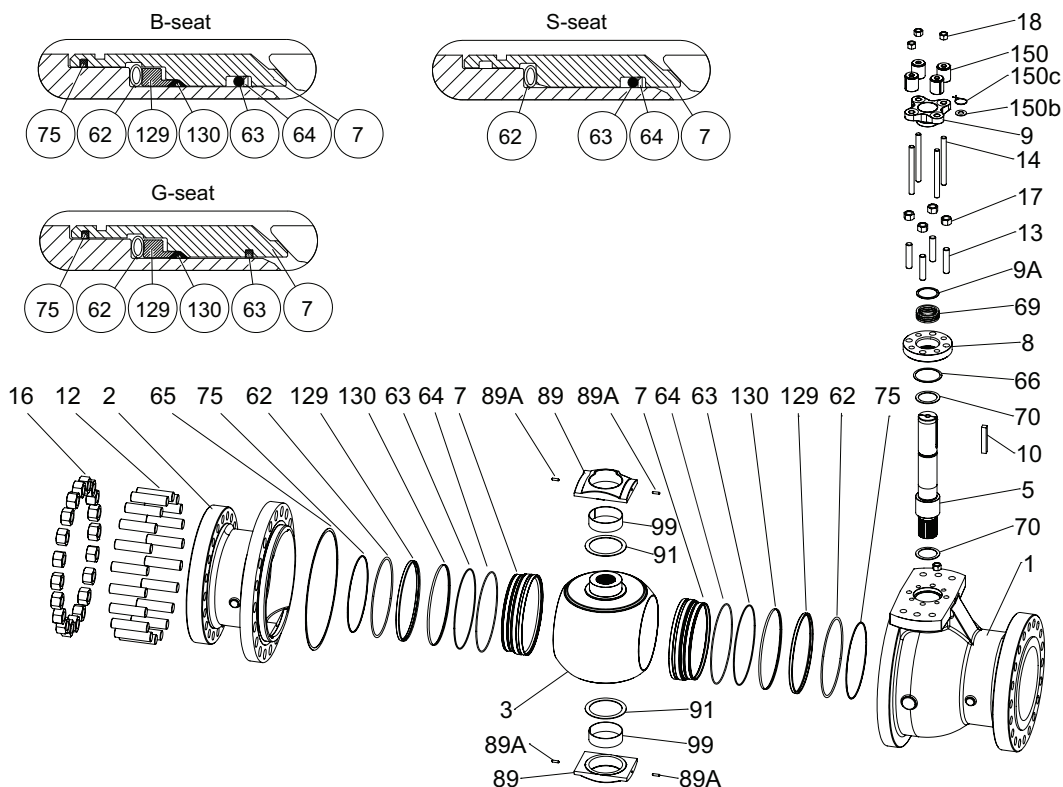
## 9 ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- type code, sales order number, serial number
- 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.

## 10 EXPLODED VIEW AND PARTS LIST



| Item | Qty    | Part Description           | Spare part category |
|------|--------|----------------------------|---------------------|
| 1    | 1      | BODY                       |                     |
| 2    | 1      | BODY CAP                   |                     |
| 3    | 1      | BALL                       | 3                   |
| 5    | 1      | SHAFT                      | 3                   |
| 7    | 1 or 2 | SEAT (B)                   | 2                   |
|      | 1 or 2 | SEAT (G)                   |                     |
|      | 1 or 2 | SEAT (S)                   |                     |
| 8    | 1      | BONNET                     |                     |
| 9    | 1      | GLAND                      |                     |
| 9A   | 1      | ANTI-EXTRUSION RING        |                     |
| 10   | 1      | KEY                        | 3                   |
| 12   |        | STUD                       |                     |
| 13   |        | STUD                       |                     |
| 14   |        | STUD                       |                     |
| 16   |        | HEXAGON NUT                |                     |
| 17   |        | HEXAGON NUT                |                     |
| 18   |        | HEXAGON NUT                |                     |
| 19   | 1      | IDENTIFICATION PLATE       |                     |
| 62   | 1 or 2 | SPRING                     | 2                   |
| 63   | 1 or 2 | O-RING (S, B)              | 1                   |
| 64   | 1 or 2 | BACK-UP RING               | 1                   |
| 65   | 1      | BODY SEAL SPIRAL WOUND     | 1                   |
| 66   | 1      | SHEET RING                 | 1                   |
| 69   | 1      | PACKING RING/V-RING SET    | 1                   |
| 70   | 2      | THRUST BEARING             | 1                   |
| 75   | 1 or 2 | BRAIDED SEAL SQUARE (G, B) | 1                   |
| 89   | 2      | TRUNNION PLATE             |                     |
| 89A  | 4      | PIN                        | 1                   |
| 91   | 2      | THRUST BEARING             | 1                   |
| 99   | 2      | TRUNNION BEARING           | 1                   |
| 129  | 1 or 2 | SUPPORT RING (G, B)        | 2                   |
| 130  | 1 or 2 | BACK SEAL (G, B)           | 1                   |
| 150  |        | DISC SPRING SET            |                     |
| 150B | 2      | WASHER                     |                     |
| 150C | 2      | ANTI-STATIC SPRING         |                     |

Spare part (Spare Part Set): Recommended soft parts, always needed for the repair. Delivered as a set.

Spare part category 2: Parts for replacing of the seat. Available also as a set.

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.

Technical drawings of a valve assembly, showing front, side, and end views with dimensions and labels.

**Front View (Top Left):** Shows the valve body with a flange. Dimensions include  $\phi O$  (flange outer diameter),  $\square M$  (flange thickness),  $H$  (height from mounting face to top of valve body),  $K$  (height from mounting face to center of valve body), and  $E$  (height from mounting face to top of actuator).

**Side View (Top Right):** Shows the valve body with a key. Dimensions include  $P$  (key width),  $C$  (key height),  $\phi B1$  (valve body outer diameter),  $\phi B$  (valve body inner diameter),  $\phi D$  (valve body bore diameter),  $DN$  (nominal diameter),  $A1$  (valve body length), and  $A$  (total valve body length).

**End View (Bottom Left):** Shows the valve body with dimensions  $U$ ,  $V$ ,  $W$ ,  $T$ , and  $S$ .

**End View (Bottom Right):** Shows the valve body with dimensions  $U$ ,  $V$ ,  $W$ ,  $T$ , and  $\phi S$ .

**Labels:**

- Flange acc. to ISO 5211
- Key acc. to ANSI B17.1

**Size 6" - 10"**

**Size 12"**

See actuator dimensions from bulletin 6B20.  
K\* indicates the mounting bracket top face.

# 12 TYPE CODE

## Trunnion mounted, Neles™ ball valve, series XH ASME class 600, EN PN 100

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| XH | 06 | F  | W  | TA | J2 | PJ | S  | B  | D   | F   | A   |     |

| 1. sign | VALVE SERIES & STYLE & FACE-TO-FACE                                                                 |
|---------|-----------------------------------------------------------------------------------------------------|
|         | Flanged                                                                                             |
| XH      | Full bore, trunnion bearings, f-to-f ASME B 16.10, table 3, long pattern, ASME Class 600, EN PN 100 |

| 2. sign | ASME VALVES, NPS Pressure class availability, Class 600 |
|---------|---------------------------------------------------------|
| 06      | 6"                                                      |
| 08      | 8"                                                      |
| 10      | 10"                                                     |
| 12      | 12"                                                     |
|         | EN VALVES, DN Pressure class availability, EN PN 100    |
| 150     | 150                                                     |
| 200     | 200                                                     |
| 250     | 250                                                     |
| 300     | 300                                                     |

| 3. sign | PRESSURE CLASS |
|---------|----------------|
| F       | ASME class 600 |
| N       | PN 63          |
| P       | PN 100         |

| 4. sign | END CONNECTION STYLE                                     |
|---------|----------------------------------------------------------|
|         | ASME rated flanges:                                      |
| W       | Raised face, ASME B 16.5 (Ra 3.2-6.3), standard          |
| Z       | Ring joint, ASME B 16.5                                  |
| Y       | Special form or surface, to be specified, e.g. weld ends |
|         | EN flanges:                                              |
| C       | EN 1092-1 Type B1 (Ra 3.2 – 12.5).                       |

| 5. sign | CONSTRUCTION & APPLICATION                                 |
|---------|------------------------------------------------------------|
| TA      | Standard construction. Double seated. Live loaded packing. |
| TE      | Single seated. Otherwise standard.                         |

| 6. sign | BODY MATERIALS, FORGINGS / CASTINGS |    |                        |
|---------|-------------------------------------|----|------------------------|
|         | STANDARD materials                  |    |                        |
| J2      | ASTM A216 gr WCB                    | S6 | ASTM A351 gr CF8M (SS) |
|         | NON-STANDARD materials              |    |                        |
| J1      | ASTM A216 gr WCC                    | S1 | ASTM A351 gr CF3M (SS) |
| J4      | ASTM A217 gr WC6                    | S8 | ASTM A351 gr CF8C(SS)  |
| J8      | ASTM A352 gr LCC                    |    |                        |

| 7. sign | BALL / COATING & STEM MATERIAL    |
|---------|-----------------------------------|
|         | XH, STANDARD materials            |
| PJ      | 316SS / Hard chrome & 17-4PH      |
| PX      | 316SS / Chrome carbide & 17-4PH   |
| PV      | 316SS / Tungsten carbide & 17-4PH |

| 8. sign | SEAT AND BACK SEAL TYPES / SPRING MATERIALS<br>SEAT CONSTRUCTIONS ARE SHOWN ON PAGE 9 |                   |             |              |
|---------|---------------------------------------------------------------------------------------|-------------------|-------------|--------------|
|         | Seat type                                                                             | Back seal type    | Spring      | Back-up ring |
| S       | Metal, general service                                                                | O-ring            | Inconel 625 | PTFE         |
| B       | Metal, solids proof                                                                   | Graphite + O-ring | Inconel 625 | PTFE         |
| G       | Metal, high temperature                                                               | Graphite          | Inconel 625 | ----         |

| 9. sign | SEAT MATERIAL |                        |
|---------|---------------|------------------------|
|         | Metal seats   |                        |
|         | Seat material | Coating                |
| A       | 316SS         | Cobalt based alloy     |
| B       | 316SS         | Chrome Carbide, CrC-LF |
| V       | 316SS         | Tungsten Carbide, TC2  |

| 10. sign | BEARING AND SEAL MATERIALS |          |              |         |                |
|----------|----------------------------|----------|--------------|---------|----------------|
|          | Trunnion bearing           | Packings | Body gaskets | O-rings | Thrust bearing |
| A        | RPTFE                      | V-rings  | PTFE         | FKM     | RPTFE          |
| B        | RPTFE                      | Graphite | Graphite     | FKM     | RPTFE          |
| C        | Metal                      | V-rings  | PTFE         | FKM     | Metal          |
| D        | Metal                      | Graphite | Graphite     | FKM     | Metal          |

| 11. sign | BOLTING MATERIALS                          |      |
|----------|--------------------------------------------|------|
|          | Bolting material with unified (XH) threads |      |
|          | Studs                                      | Nuts |
| D *      | B8M                                        | 8M   |
| F **     | L7M                                        | 7M   |

\*) Bolting materials for stainless steel body  
 \*\*) Bolting materials for carbon and low alloy steel body

| 12. sign | MODEL CODE      |
|----------|-----------------|
| A        | XH model code A |

| 13. sign | Option / Modifier      |
|----------|------------------------|
| D        | Drain plug on the body |
| B        | Bleeder valve          |



**Valmet Flow Control Oy**

Vanha Porvoontie 229, 01380 Vantaa, Finland.

Tel. +358 10 417 5000.

[www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol)

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