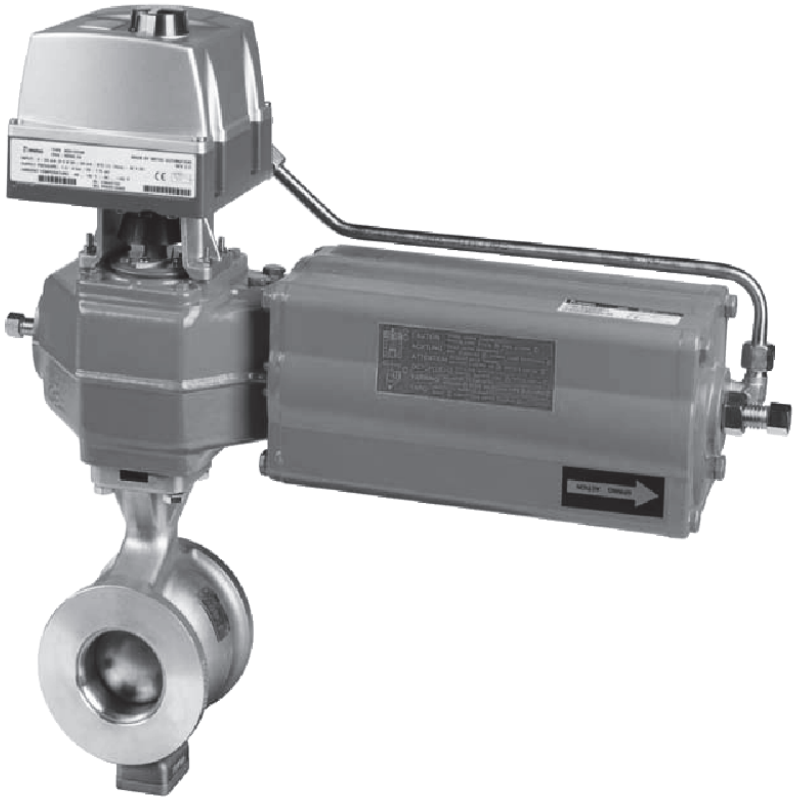
Neles™ V-port segment valves

Series R

Installation, maintenance and operating instructions



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READ THESE INSTRUCTIONS FIRST!

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

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

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1 GENERAL

1.1 Scope of the manual

This manual provides essential information on R series V-port segment valves, i.e. RA, RE and RE1-series valves. Actuators and other accessories are only discussed briefly. Refer to the individual manuals for further information on their installation, operation and maintenance.

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

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

1.2 Valve construction

RA, RE and RE1-series valves are V-port segment valves installed between flanges. RE series valves are flanged V-port segment valves. The body is in one part; the shaft and the segment are separate. Shaft blow-out is prevented by plates mounted against the shaft shoulder. See Figs. 1 and 2.

The valve is either soft or metal seated. Tightness derives from the spring force pressing the seat against the segment. The structure of the valve supplied may vary, depending on the customer's requirements. The detailed structure is revealed by the type code shown on the valve identification plate. The type code is explained in Section 15.

The valve is designed for both control and shut-off applications.

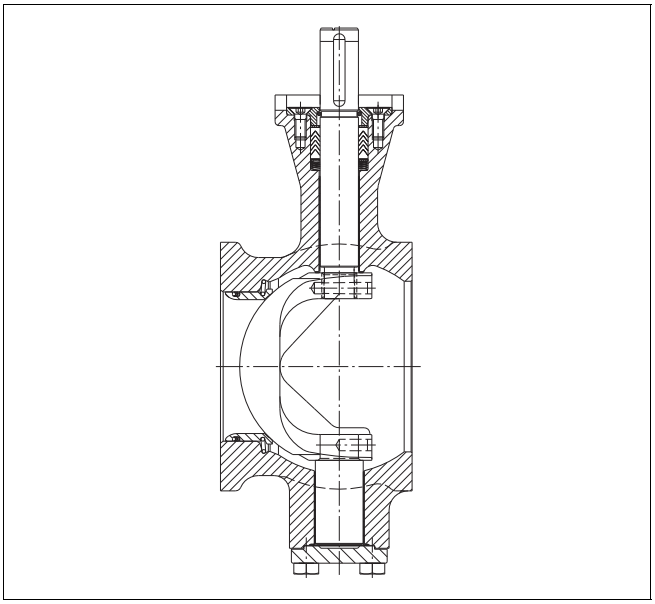


Fig. 1 Construction of a V-port segment valve, RA

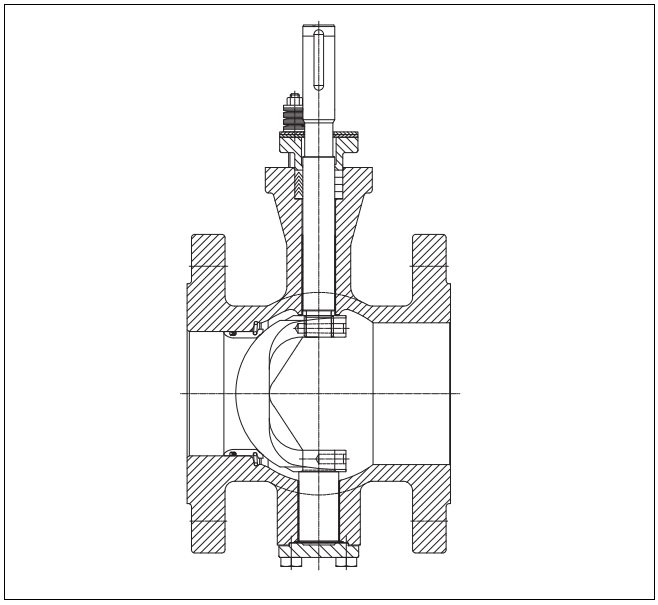


Fig. 2 Construction of a V-port segment valve, RE/RE1

1.3 Valve markings

Body markings are cast on the body. The valve also has an identification plate attached to it, see Fig. 3.

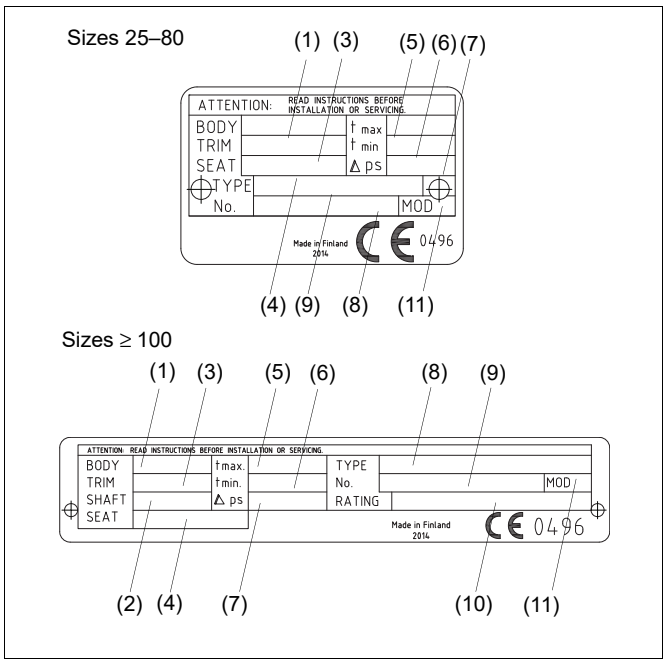


Fig. 3 Identification plate

Identification plate markings:

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

1.4 Technical specifications

Initial openings (%) for RE/RA segment valves with different seats.			
	Seat		
Size	S & A	1S	T2
25	14,2	12,8	24,1
C005 25/1	10.3	N/A	16.1
C015 25/2	10.3	N/A	16.1
C05 25/3	10.3	N/A	16.1
C15 25/4	10.3	N/A	16.1
40	11.9	9.3	18.6
50	16.7	11.4	21.1
65	12.6	10.6	16.8
80	8.9	7.8	14.1
100	8.1	7.0	14.1
150	7.0	5.6	12.2
200	6.2	5.9	11.4
250	6.1	5.6	9.7
300	5.6	5.0	9.0
350	5.2	5.4	8.6
400	5.1	4.4	8.2
500	4.4	4.4	7.1
600	N/A	5.9	N/A
700	N/A	6.3	N/A

Face-to-face length: RA: According to Neles internal standard
RE, RE1: acc. to IEC/EN 534-3-2

Body rating: RA: ASME Class 300 or PN 40
RE, RE1: ASME Class 300 or PN 50/PN40
NPS 1"-4" has option of ASME Class 600 or PN 63/PN 100

Max. pressure differential: see Figs. 6 ... 12

Temperature ranges:

RA-series:

-40 °C... +260 °C.

RE-series:

-50 °C ... +260 °C with soft bearings
-50 °C ... +315 °C with metal bearings in sizes 2" - 10"
-50 °C ... +425 °C with metal bearing and high temperature seats in sizes 2" - 10".

Flow direction: indicated by an arrow on the body

Dimensions: see Section 11

Weights: see Section 11

Note that max. shut-off and max. throttling pressures are based on mechanical maximum differential pressures at ambient temperature. You must always observe flowing temperature and flange rating when concluding applicable pressure values. In practice you must also check noise level, cavitation intensity, velocity, actuator load factor, etc. using Nelprof.

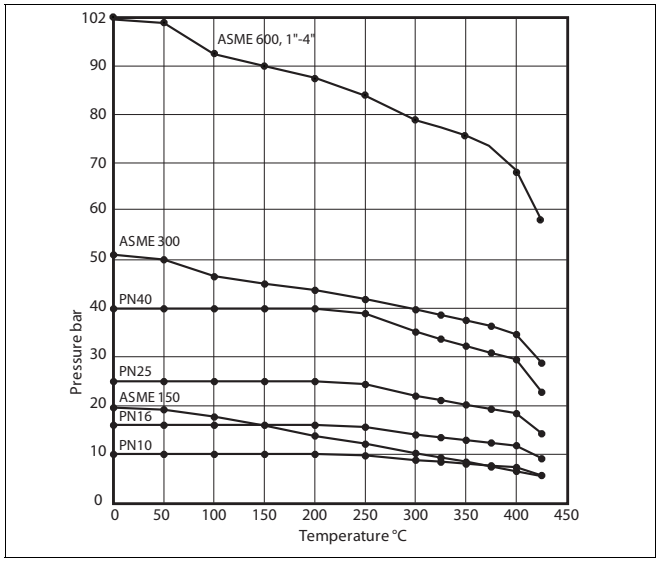


Fig. 4 Body pressure ratings, WCB

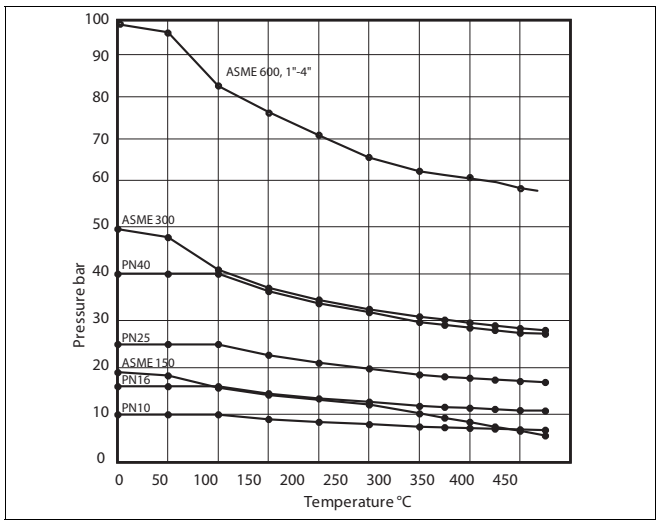


Fig. 5 Body pressure ratings, CF8M

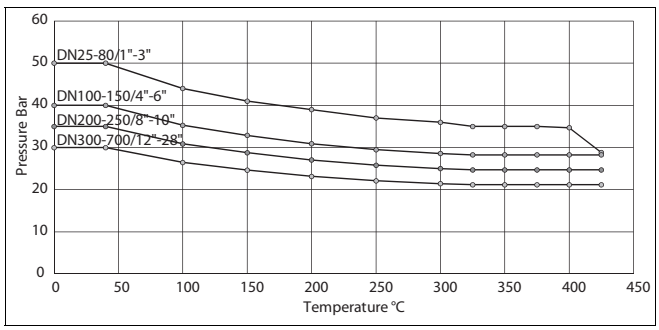


Fig. 6 Max operating pressure differential in control service, RE opening range 0 %-70 %

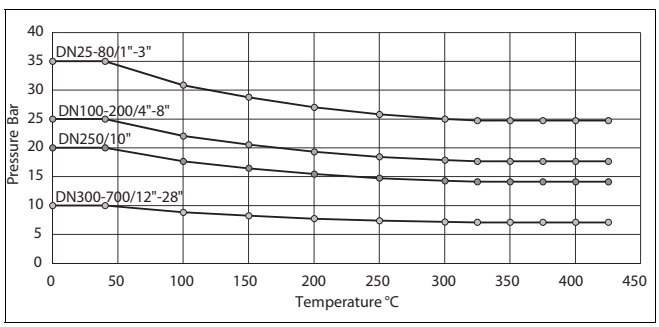


Fig. 7 Max operating pressure differential in control service, RE opening range 70 %-100 %

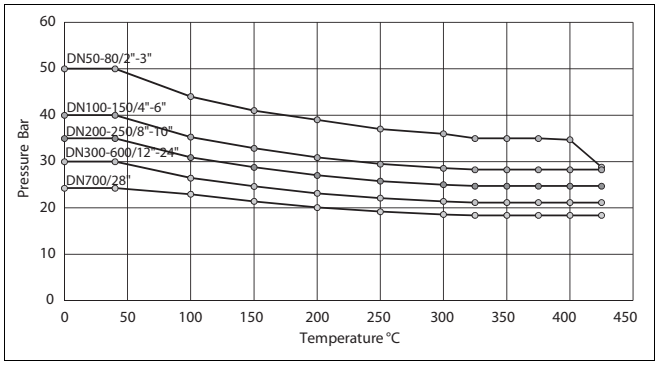


Fig. 8 Max operating pressure differential in control service, Q-RE opening range 0 %-30 %

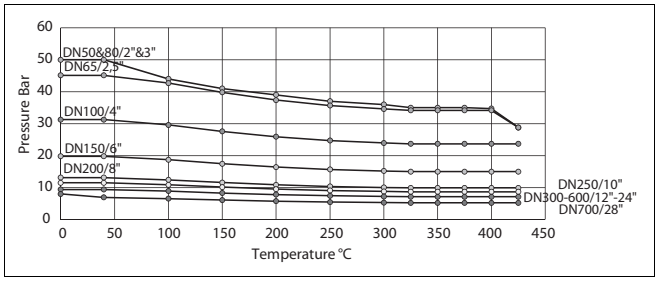


Fig. 9 Max operating pressure differential in control service, Q-RE opening range 30 %-60 %

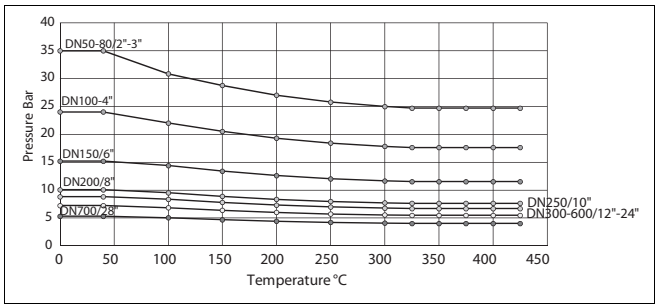


Fig. 10 Max operating pressure differential in control service, Q-RE opening range 60 %-100 %

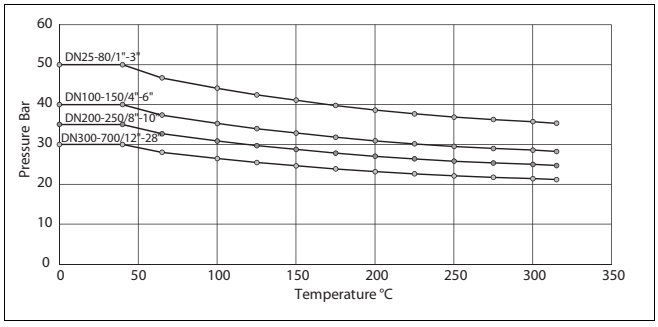


Fig. 11 Maximum pressure differentials in on-off operation, AISI 329 Shaft

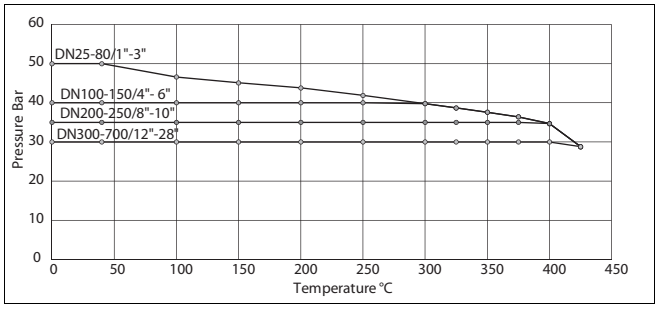


Fig. 12 Maximum pressure differentials in on-off operation, 17-4PH Shaft

1.5 Valve approvals

Valve meets the Fire safe requirements of ISO 10497:2010 - API 607, seventh edition.

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 yourself 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 segment 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 segment functions as a cutting device. The segment position may also change when the valve is moved. Close and detach the actuator pressure supply pipeline for valve maintenance. Failure to do this may result in damage or personal injury.

CAUTION:
Protect yourself from noise!
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 software. Observe the relevant work environment regulations on noise emission.

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

CAUTION:
When handling the valve or the valve package, take its weight into account!
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. 13). Damage or personal injury may result from falling parts.

CAUTION:
Make sure the valve is not pressurized when removing the actuator.

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 chalks be used to check the temperature in these areas during welding.

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

2 TRANSPORTATION, RECEPTION AND STORAGE

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

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

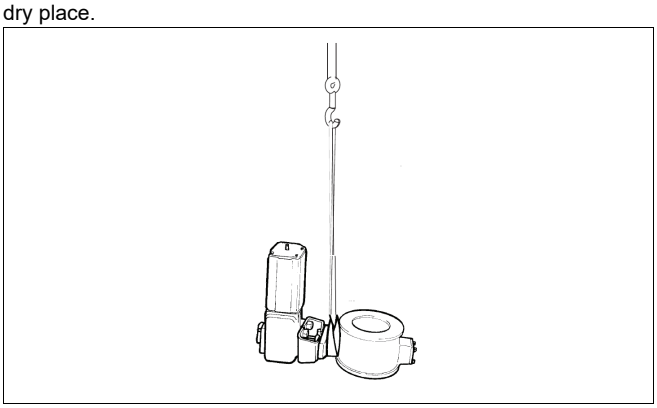


Fig. 13 Lifting the valve

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

The valve is delivered in the closed position. A valve equipped with a spring-return actuator is delivered in the position determined by the spring.

3 INSTALLATION

3.1 General

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

CAUTION:
When handling the valve or the valve package, take its weight into account!

3.2 Installing in the pipeline

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

The valve has an arrow indicating the flow direction. Install the valve in the pipeline so that the flow direction of the pipe corresponds to that marked on the valve. The mounting position does not place restrictions on operation of the valve, actuator or positioner. You should, however, avoid installing the valve so that the shaft points downwards because impurities travelling in the pipeline may then enter the body cavity and damage the gland packing. See Fig. 14.

The RA and RE1 valves should be applicable to the pipe flanges, see the chapter 11.19.

Choose flange gaskets according to the operating conditions.

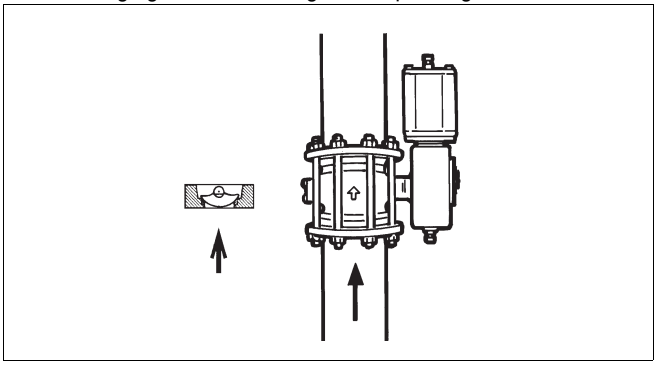


Fig. 14 Installing the valve into pipeline

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

Stress caused in the valve by pipeline vibration can be reduced by supporting the pipeline properly. Reduced vibration also helps ensure correct functioning of the positioner.

Servicing is facilitated if the valve needs no support. If necessary, you can support the valve by the body, using regular pipe clamps and supports. Do not fasten supports to the flange bolting or the actuator, see Fig. 15.

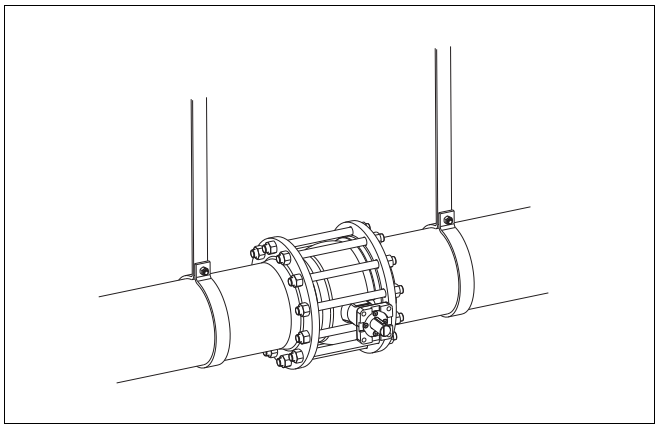


Fig. 15 Supporting the valve

3.3 Actuator

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

The valve closed and open positions are indicated by a groove at the end of the valve shaft. The groove shows the position of the segment with respect to the flow port, see Fig. 16.

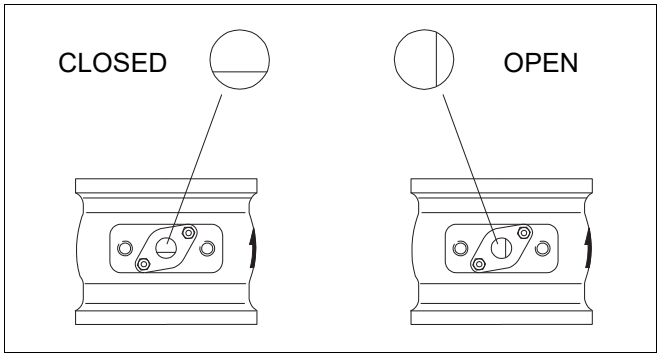


Fig. 16 Closed and open positions

If possible, install the valve so that the actuator can be disconnected without removing the valve from the piping.

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

In some cases, for instance when a large-size actuator is used or when the pipeline vibrates heavily, supporting the actuator is recommended. Contact Valmet for further information.

4 COMMISSIONING

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

Check all joints, pipings and cables.

Check that the actuator, positioner and limit switches are correctly adjusted. Refer to their installation, operation and service manuals.

5 MAINTENANCE

5.1 Maintenance general

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.

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.

5.2 Replacing the gland packing

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

RA series

In gland packing, V-ring set (20), tightness is ensured by pressure caused by the wave spring (32). See Fig. 17.

The gland packing must be replaced when leakage occurs through the gland (9).

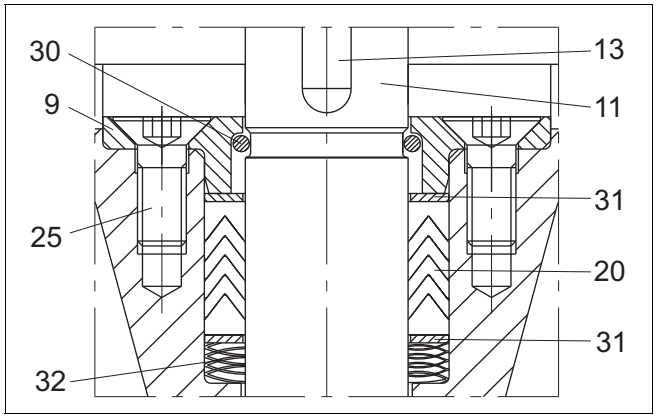


Fig. 17 Gland packing

- Make sure the valve is not pressurized.
- Remove the actuator from the valve shaft acc. to the instructions given in the actuator's manual.
- Remove the key (13) from the drive shaft (11). Unfasten the screws (25) and the gland (9).
- Remove the retainer (30) from the drive shaft. Avoid to damage the shaft's surface.
- Remove the upper sheet ring (31).
- Remove the old packing rings (20) using a pointed pin. Avoid to damage the sealing surfaces.
- Remove the lower sheet ring (31) and the wave spring (32).
- Clean the packing ring counterbore.
- Mount the spring (32) and the lower sheet ring (31) into the counterbore.
- Mount the new packing rings (20) one by one on the shaft (11) using the gland (9) as a tool. The keyway and shoulder must not damage the packing rings.
- Mount the upper sheet spring (31).
- Mount the retainer (30) in the groove of the shaft. Avoid to damage the surface of the shaft.
- Fasten the gland (9) with the screws (25) and tighten them according to the Table 1.
- Mount the key (13) on the shaft (11).

Table 1 Torques for gland screws

Thread	Torque, Nm	Width across flats
M6 M8 UNC 1/4 UNC 5/16	8 18 8 18	4 mm 5 mm 5/32" 3/16"

RE / RE1 series

In gland packings, tightness is ensured by the contact between the gland follower and the packing rings. See Fig. 18.

The gland packing (20) must be replaced if leakage occurs even after the hexagon nuts (25) have been tightened.

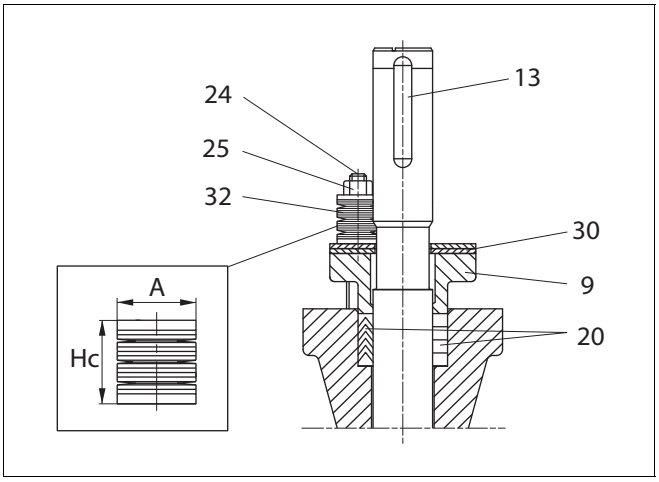


Fig. 18 Gland packing, RE/RE1

- Make sure that the valve is not pressurized.
- Detach the actuator and bracket according to the instructions in Section 4.3.
- Remove the key (13).
- Remove the hexagon nuts (25), disc spring sets (32), one stud (24), retaining plates (30) and gland follower (9).
- Remove the packing rings (20) from around the shaft using a knife or some other pointed instrument without scratching the surfaces.
- Clean the packing ring counterbore.
- Place the new packing rings (20) over the shaft (11). The gland follower may be used for pushing the rings into the counterbore. Do not damage packing rings in the shaft keyway. See Fig. 18.
- Screw down the removed stud.
- Deform the packing rings first by tightening the gland nuts (25) without disc springs to the torque Tt, see the value from Table 2.
- Remove the gland nuts and one stud. Mount the retaining plates (30) with the text UPSIDE on top and the removed stud and place the disc spring sets (32) on the gland studs. Tighten the nuts (25) so that the disc springs are compressed to the height Hc, see Table 2. Lock the nuts with locking compound e.g. Loctite 221. See Fig. 18.
- Check leakage when the valve is pressurized.

CAUTION:
For safety reasons the retainer plates MUST always be installed according to the above instructions.

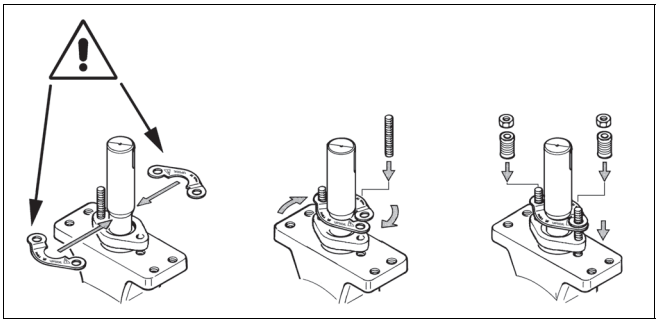


Fig. 19 Installing the retainer plates

Table 2 Tightening of the gland packing

Valve size	A (mm)	Hc (mm)	Tt (Nm)
DN 25 / 01	20	20.5	5
DN 40 / 1H	20	20.5	5
DN 50 / 02	20	20.5	5
DN 65 / 2H	20	20.5	5
DN 80 / 03	20	20.0	7
DN 100 / 04	20	20.0	7
DN 150 / 06	25	29.0	12
DN 200 / 08	25	29.0	14
DN 250 / 10	25	28.0	16
DN 300 / 12	25	28.0	18
DN 350 / 14	35.5	38.0	38
DN 400 / 16	35.5	37.0	45
DN 500 / 20	40	42.0	70
DN 600 / 24	40	41.5	90
DN 700 / 28	40	41.5	90

5.3 Detaching the actuator

CAUTION:
When handling the valve or the valve package, take its weight into account!

CAUTION:
Make sure the actuator is not pressurized when removing it.

CAUTION:
Make sure the valve is not pressurized when removing actuator.

NOTE:
Before dismantling, carefully observe the position of the valve in relation 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 and its auxiliary devices before removing the valve from the pipeline. If the valve package is small or if it is difficult to access, it may be more practical to remove the entire package at the same time.

See Section 6 for details of detaching actuators.

5.4 Removing the valve from the pipeline

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

- Make sure that the pipeline is not pressurized and that it is empty. Also make sure that no medium is led into the pipeline while the valve is being removed or after it has been removed.
- Place the hoisting ropes carefully, unscrew the pipe flange bolts and lift the valve from the pipeline using the ropes. Note the correct lifting method. See also Fig. 13.

5.5 Replacing the seat

S- or U-seat (not DN25-50) can be changed as described in 5.5.1 & 5.5.2. For DN25-50 and other seats, the valve needs to be dismantled as described in 5.6.

Detaching the S- or U-seat

- The valve must be removed from the pipeline.
- Turn the segment (3) so that it does not touch the seat, Fig. 20.

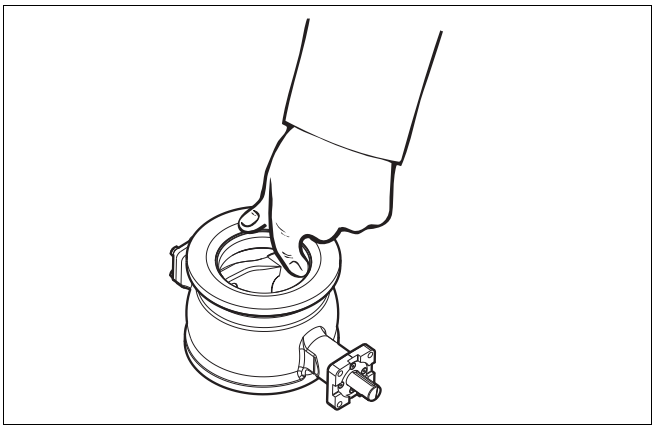


Fig. 20 Turning the ball segment

- In DN 65-100 valves (excluding the low-Cv versions), unfasten the blind flange (10) and push the segment into the back position, Fig. 21.

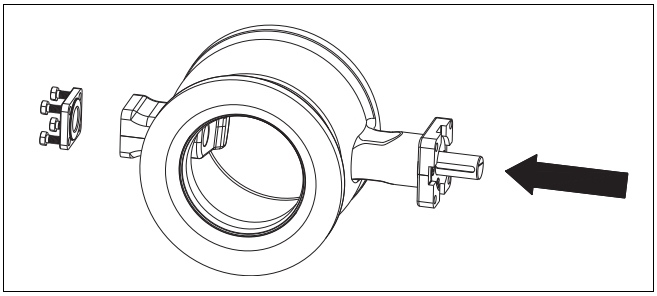


Fig. 21 Removing the blind flange

- DN 65-100 valves can be dismantled, as described in 5.6, to make the replacement of the seat easier.
- Tap the seat (4) with a soft spindle all around the circumference from the upstream side to make it fall into the body, Fig. 22.

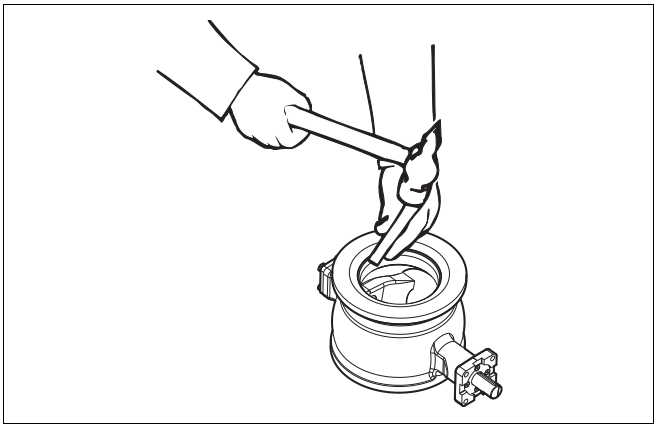


Fig. 22 Knocking off the seat

- Turn the valve and lift the seat from the body through the downstream flow port, Fig. 23.

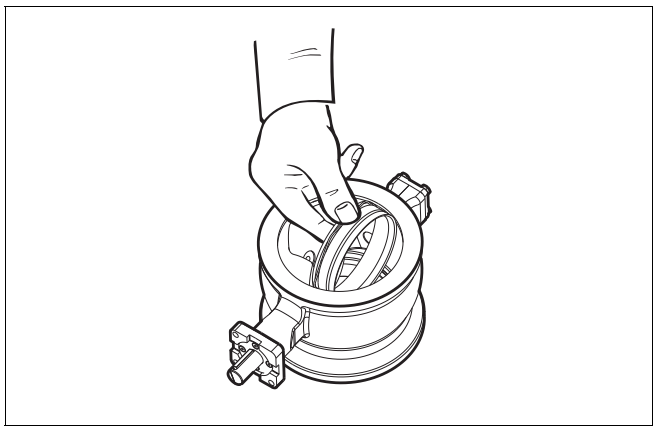


Fig. 23 Lifting the seat

Installing the seat

The back seal (6) of the segment seat (4) is normally a lip seal. The seat is easier to install if the back seal is precompressed. An O-ring seal does not need precompression.

- Clean the flow port that houses the seat. Remove any burrs. Round off the edges using a fine abrasive paper and clean the flow port carefully, see Fig. 24. Place the back seal (6) onto the seat (4).
- Lubricate the flow port, seat (4) and back seal (6) and the lock spring (5) with a volatile lubricant, e.g. Hyprez.
  Make sure that the lubricants are compatible with the medium.
- **Only for a lip seal:** Push the seal carefully into the flow port for about 15 minutes, Fig. 25. The following work phases must be completed before the precompression is lost.

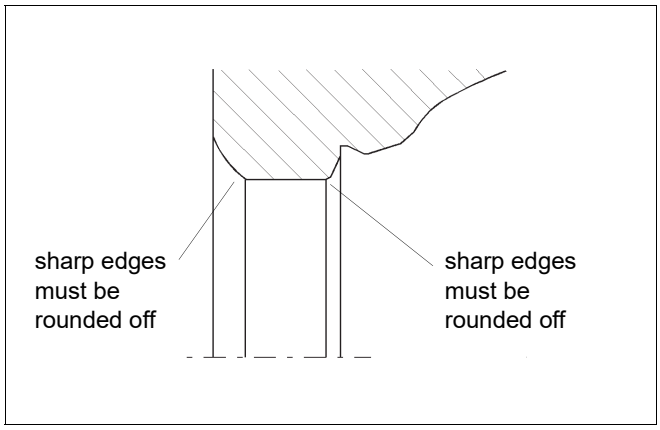


Fig. 24 Rounding the sharp edges

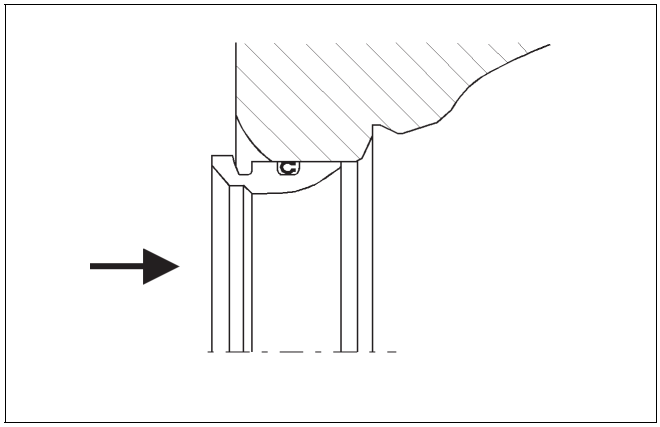


Fig. 25 Precompression of the lip seal

- Place the lock spring (5) on the seat.
- When the valve is opened, the ends of the spring must be by the V-shaped opening, see Fig. 26.

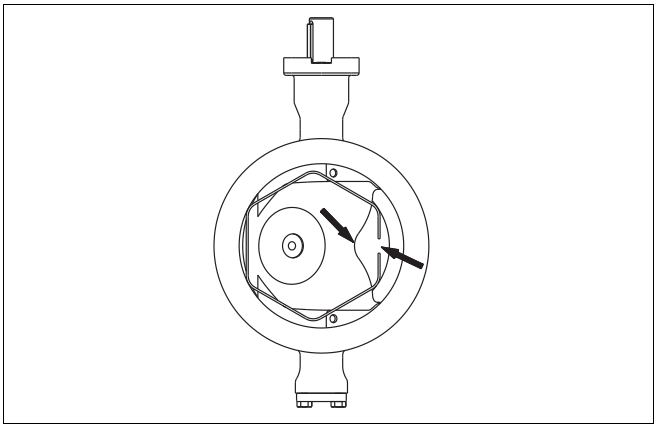


Fig. 26 Mounting the seat

- Place the seat package into the body as shown in Figs. 27 and 28.

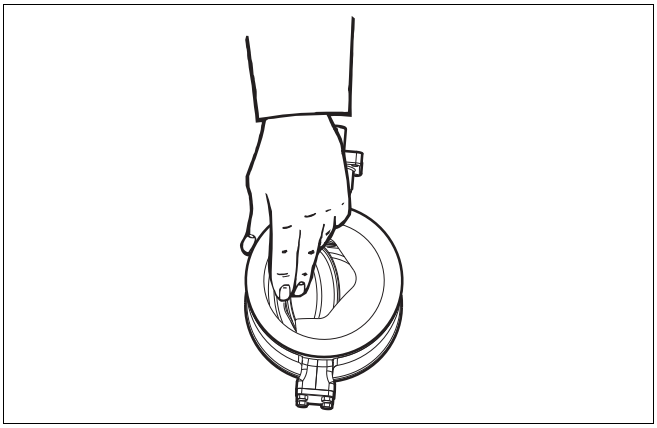


Fig. 27 Slipping the seat into the body

- Check that the spring angles extend to the control face.

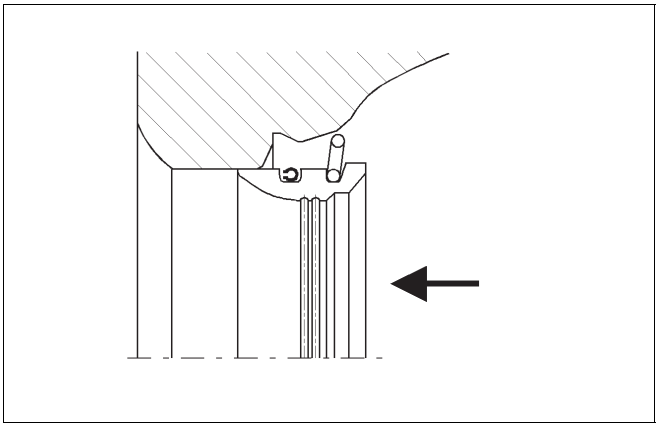


Fig. 28 Pushing the the spring angles against the control face

- Place a screwdriver on each visible spring angle one after the other and knock the spring into the groove, see Fig. 29.
- Turn the segment 180° clockwise and knock the rest of the spring angles into the groove, Fig. 30. A special tool available from the manufacturer may also be used for the work phases in Figs. 29 and 30.

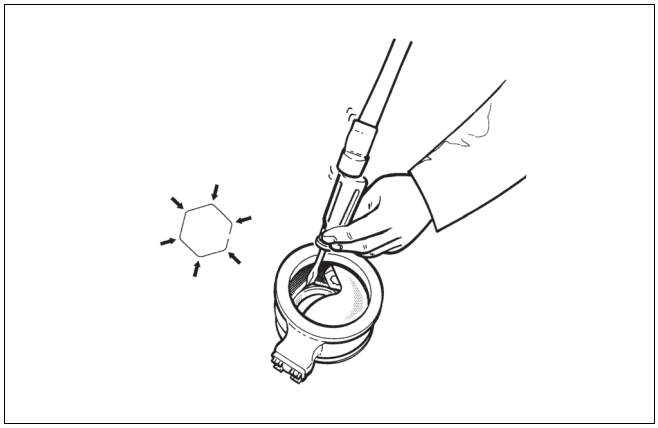


Fig. 29 Knocking the spring into the groove

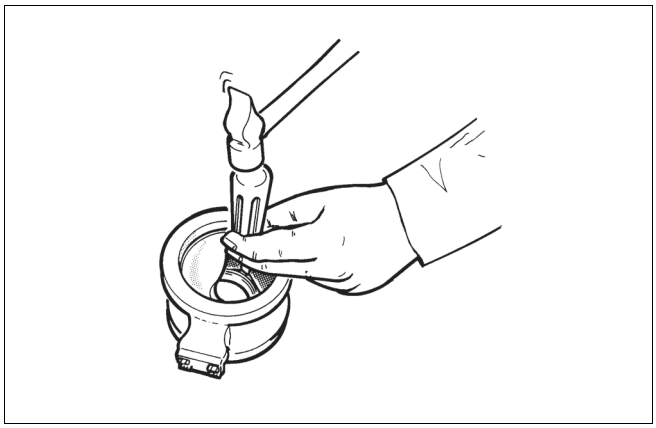


Fig. 30 Knocking the spring after turning the seat around

- Use a plastic spindle to ensure that the seat is correctly placed and can move freely, Fig. 31.

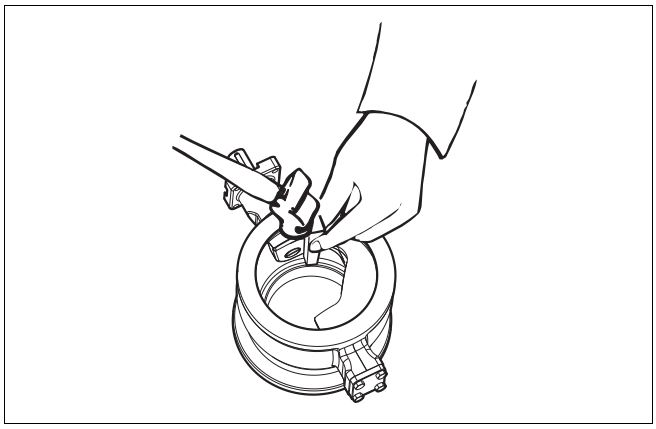


Fig. 31 Securing with a plastic spindle

5.6 Dismantling the valve

- Turn the valve into the closed position.
- Remove the pin lockings either by grinding or using a spindle. Detach the pins (14 and 15) by drilling, Fig. 32. Be careful not to damage the original bores. Note! The pins and the drive shaft have been secured by welding in the titanium version and in the acid-resistant high-consistency version S.
- Detach the retainer plates (30).
- Detach the gland packings (20).
- Remove the shafts (11 and 12), Fig. 33.

- Lift the segment from the body.
- Remove the bearings (16 and 17) and clean the bearing spaces.
- Remove the seat by pushing it evenly inside the body.

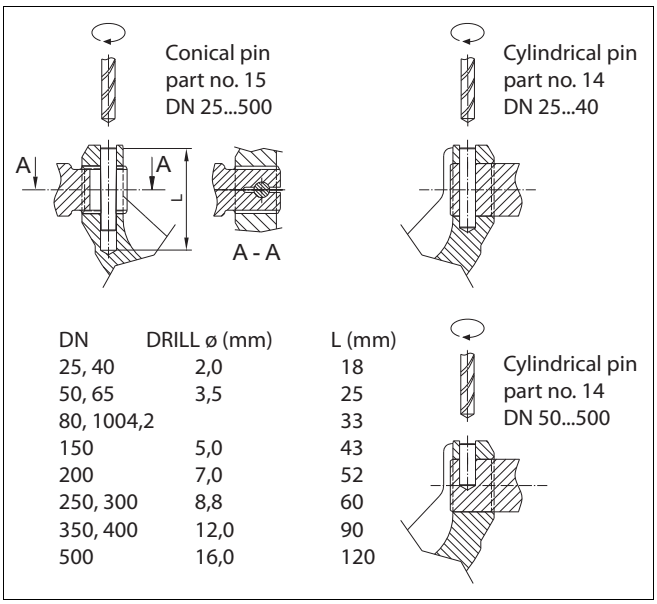


Fig. 32 Drilling the pin

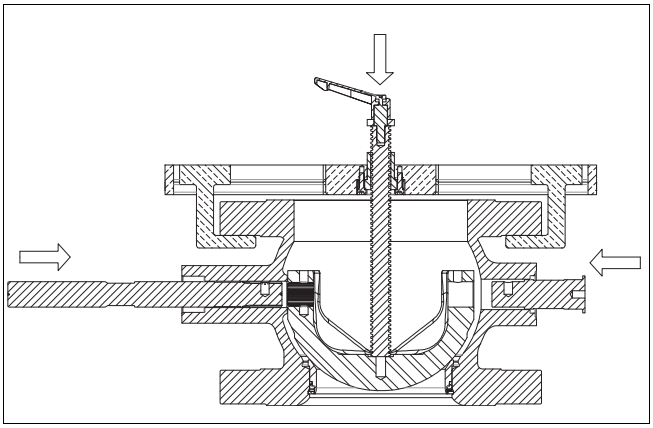


Fig. 33 Installing the shafts

5.7 Inspection of removed parts

- Clean the removed parts.
- See if the shafts (11, 12) and bearings (16, 17) are damaged.
- Check if the sealing surfaces of the segment and the seat (4) are damaged.
- If necessary, replace the parts with new.

5.8 Assembly

- The bearing material of the standard construction valves is PTFE-impregnated stainless steel net. The bearings for the high temperature valves are cobalt alloy bushings which are mounted into the body together with the shafts. High temperature is over +260 °C.
- Put the bearings (16, 17) in their places.
- Mount the S, U or T-seat as explained in 4.5.2.
- For A-seat (Fig. 34), mount the retaining ring (7) to the groove in Body (1). Install back seal (6), support ring (8) and spring (5) to the seat (7). Mount the assembled seat package to the body. Use a plastic spindle to ensure that the seat is correctly placed.
- Mount the segment in the body in the closed position. In the low Cv version, insert the filling ring (22) between the drive shaft (11) and segment (3). Press the segment to fit the shaft (12).
- For A-seat special compression tool is needed for compress the spring to mount the shaft and drive shaft. See Fig. 33.

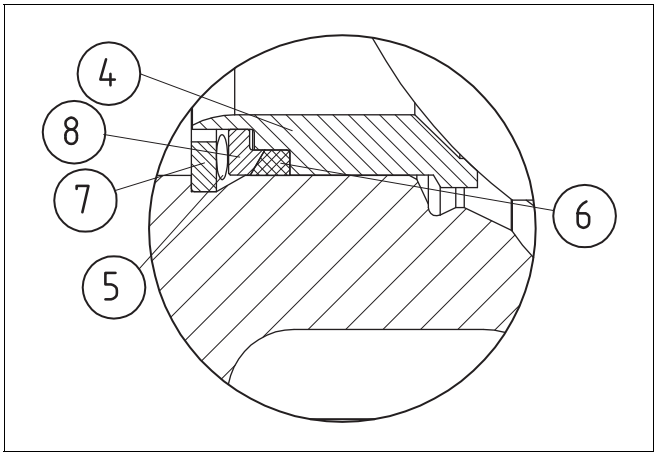


Fig. 34 A-seat

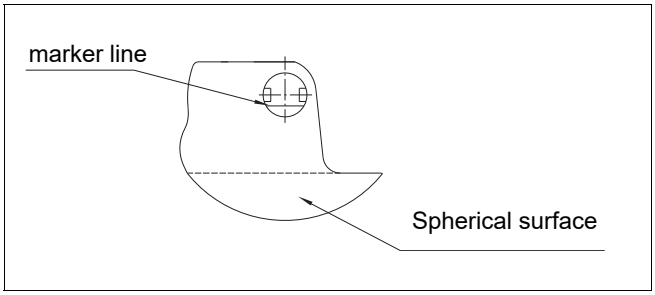


Fig. 35 Segment and shaft positions

- Install the drive shaft (11). Note the location of the pin hole and the keyway. See Figs. 36 and 37.
- High temperature-construction: Mount the bearings (16, 17 and 18) into the shafts. Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the inside surface of the bushing and the shaft bearing groove. Press the bushing with a tightening ring into the shaft bearing groove and fit the shaft with the bearings carefully into the body through the tightening ring.
- Please note the depth of the hole (L) for the conical pin, Fig. 32. Use a former to check the proper shaft position of low Cv valves, see Fig. 36 . Put the pins (14, 15) in their places and lock them, Fig. 37. Both pins are locked with TIG welding in the high-consistency acid-resistant version and in the standard and high-consistency titanium versions. Moreover, the drive shaft is welded to the segment in the high-consistency versions. Contact the manufacturer for more information.

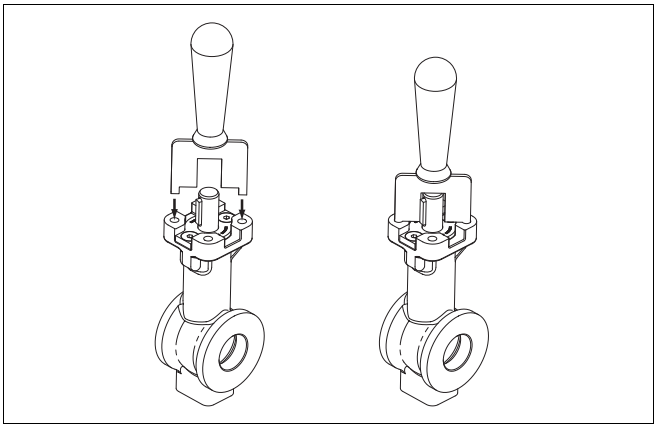


Fig. 36 Using a former to check shaft position

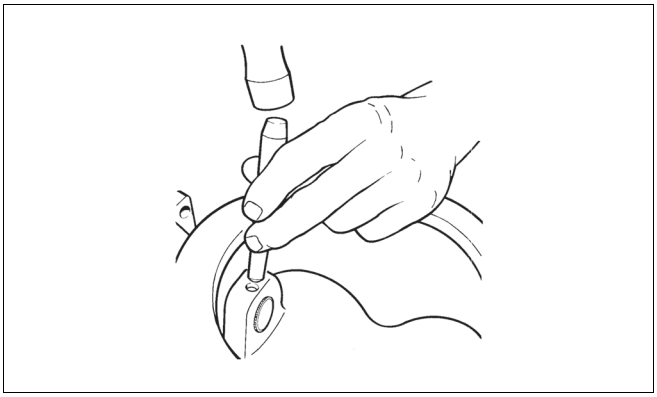


Fig. 37 Locking a pin

- Install the blind flange (10) with gaskets (19), tighten the bolts (26), see Table 3.
- Install the gland packing according to Section 5.2.

Table 3 Screw torques (for lubricated screws)

Screw	M6 UNC 1/4	M8 UNC 5/16	M10 UNC 3/8	M12 UNC 1/2	M16	M29
Torque, Nm	8	18	35	65	170	330

6 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 bore of the valve. The valve must be in the open position during the test.

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

7 INSTALLING AND DETACHING THE ACTUATORS

7.1 General

Different Neles actuators can be mounted using suitable brackets and couplings. The valve can be operated, for example, by actuators of the E, B1 or Quadra-Powr series.

7.2 Installing B1C actuators

CAUTION:
Beware of the segment movement!

- Drive the actuator piston to the extreme outward position and turn the valve into the closed position, see Fig. 38.
- Clean the shaft bore and file off any burrs. Lubricate the shaft bore.
- If a coupling is needed between the actuator shaft bore and the valve shaft, lubricate the coupling and install it in the actuator.
- Fasten the bracket loosely to the valve using lubricated screws.
- Push the actuator carefully onto the valve shaft. Avoid forcing it, since this may damage the segment and seat. We recommend mounting the actuator so that the cylinder is pointing upwards.
- Align the actuator as accurately as possible using the valve as a guide. Lubricate the mounting screws. Install the washers and tighten all screws, see Table 3.
- Adjust the segment open and closed positions (limits to piston movement) by means of the actuator stop screws, see Fig. 38. The correct opening angle is 90°, for the R2_S valve 70°. The accurate position can be seen in the flow port. Check that the yellow arrow indicates the position of the segment.
  Keep your fingers out of the flow port!

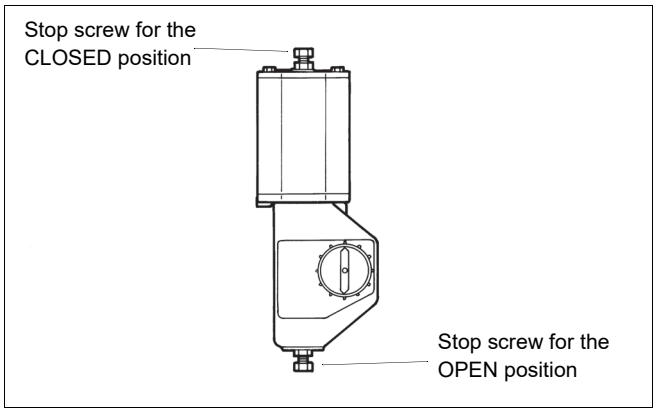


Fig. 38 Open and closed positions of a B1 actuator

There is no need to adjust the stop screw if the actuator is re-installed in the same valve. Drive the actuator piston to the housing end (open position).Turn the actuator by hand until the valve is in the open position (unless it is already open). Fasten the actuator in this position. The actuator may be installed in another position with respect to the valve by selecting another keyway in the actuator, see Fig. 39.

- Check the tightness of the stop screw at the end of the cylinder during cylinder operation. The threads must be sealed using an appropriate non-hardening sealant, e.g. Loctite 225.
- Check that the actuator is functioning correctly. Check the seg-

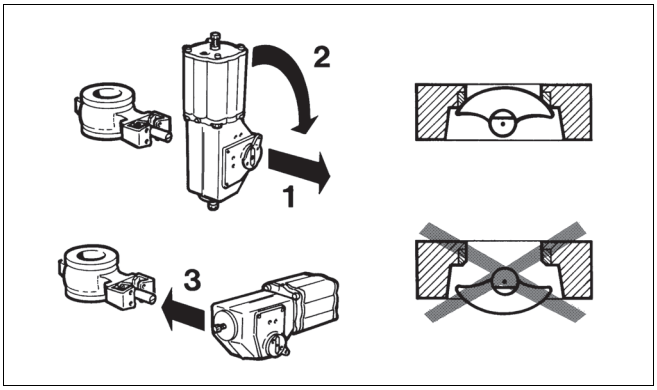


Fig. 39 Changing the actuator position

ment flow bore position and the actuator movement relative to the valve (clockwise: close, counterclockwise: open) after installing the actuator. The valve should be closed when the piston is in the extreme outward position.

- Check that the yellow arrow indicates the position of the segment. If necessary, change the position of the arrow.

7.3 Installing B1J actuators

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 is between the piston and the cylinder end and pushes the piston towards the housing.

Spring-return actuators are installed in a manner similar to B1C series actuators, taking into account the following.

Type B1J

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, see Fig. 16.

Type B1JA

Install the actuator so that the piston is in the cylinder-end position at housing side. The cylinder must not be pressurized and the air supply connection must be open. The valve must be in the open position, see Fig. 16.

The rest of the installation procedure is the same as for B1C actuators.

7.4 Detaching B series actuators

CAUTION:
Make sure the valve is not pressurized when removing the actuator.

- Disconnect the actuator from its power source; detach the air supply pipe and control signal cables or pipes from their connectors.
- Unscrew the bracket screws.
- Detach the actuator using a suitable extractor, see Fig. 40. The tool can be ordered from the manufacturer.
- Remove the bracket and coupling, if any.

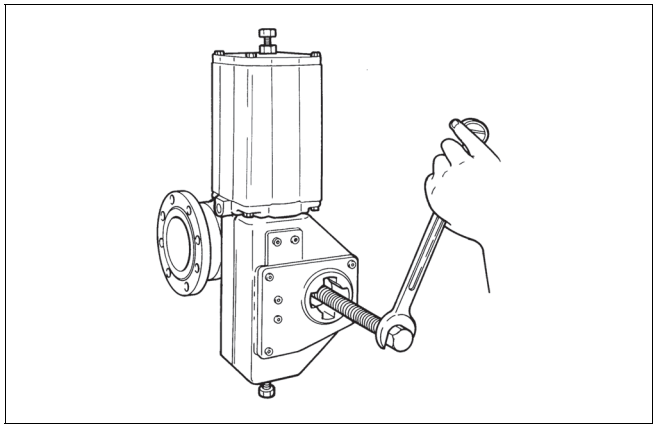


Fig. 40 Detaching an B series actuator

7.5 Installing a Quadra-Powr™ actuator

CAUTION:
Beware of the segment movement!

Quadra-Powr actuators may be used for spring-to-close and spring-to-open operations depending on the installation position. After selecting the desired operation, see Fig. 41 for the correct installation position.

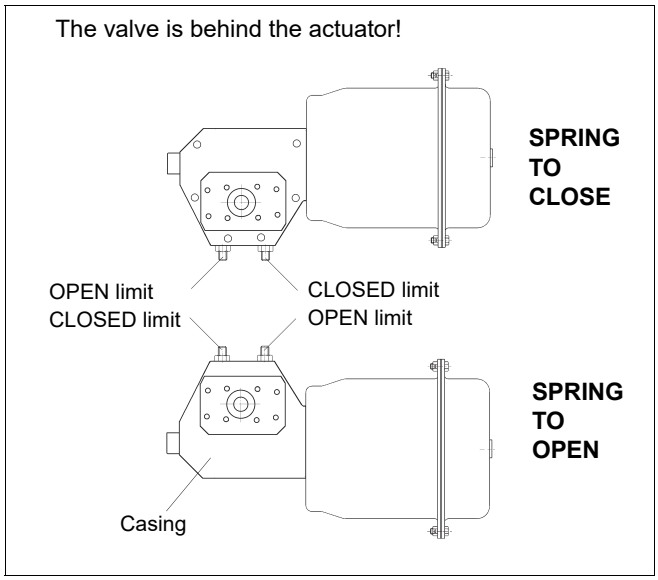


Fig. 41 Installation of a Quadra-Powr actuator and adjustment of the open and closed limits

- The actuator must not be pressurized and the air supply connection must be open.
- Turn the valve segment to correspond to the spring operation: clockwise close, counterclockwise open. The marker line at the end of the shaft shows the position, see Fig. 16.
- Clean the actuator shaft bore and lubricate it.
- Push the actuator carefully onto the valve shaft. Avoid forcing it, since this may damage the segment and seat.
- Lubricate the actuator mounting screws and screw them in. Tighten all screws, see Table 3.

Adjust the valve open and closed positions by means of the screws at the side of the actuator; remember to tighten the locking nuts. See See Fig. 41.
Keep your fingers out of the flow port!

8 TROUBLE SHOOTING TABLE

Table 4 lists malfunctions that might occur after prolonged use.

Table 4 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

9 TOOLS

In addition to standard tools the following special tools might be needed to facilitate working.

- For removal of the actautor

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

- For mounting and removal of the seat.

Product:	ID:
DN 01	273336
DN 015	273337
DN 02	273338
DN 03	273339
DN 04	273340
DN 06	273341
DN 08	273342
DN 10	273343
DN 12	273344

- Shaft position checking (low Cv valves)
  - former H069563 (Series RA)
  - former H069564 (Series RE, RE1)

These are available from the manufacturer.

10 ORDERING SPARE PARTS

NOTE:
Always use original spare parts to make sure that the valve functions as intended.

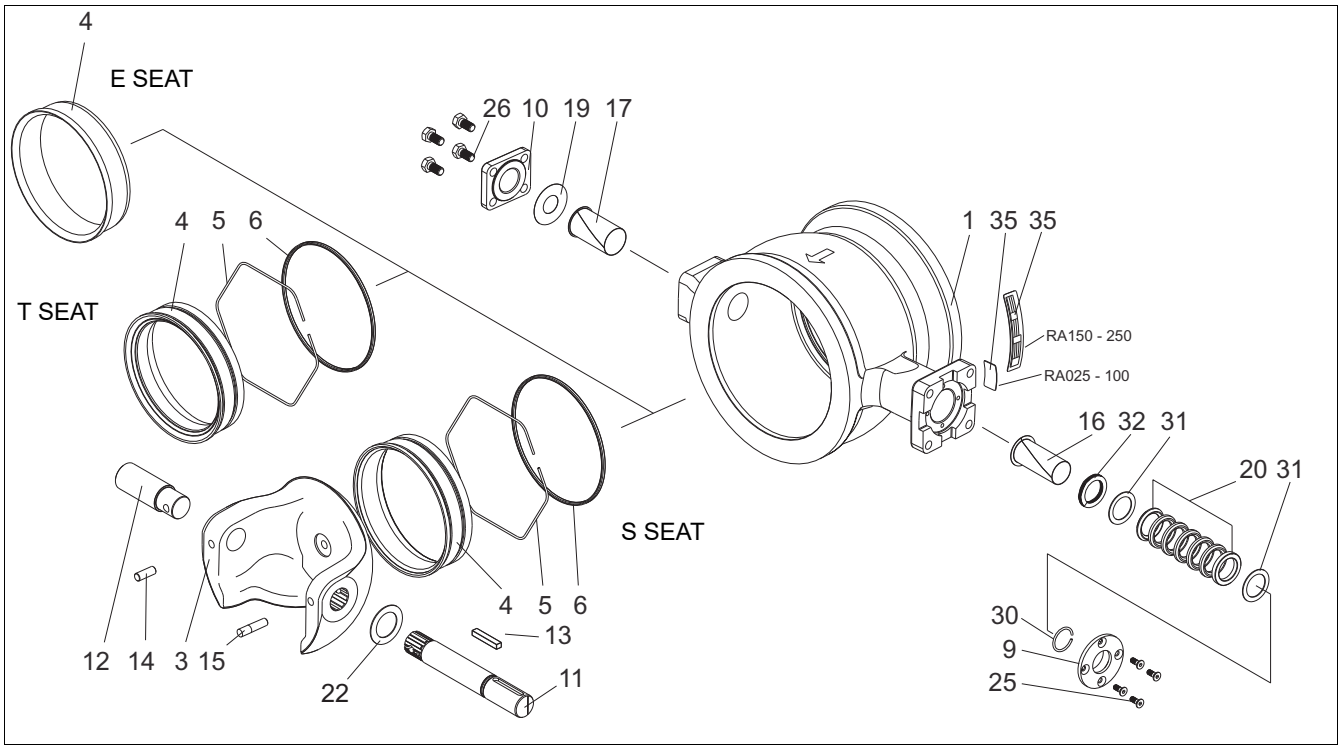
When ordering spare parts, always include the following information:

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

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

11 EXPLODED VIEWS AND PARTS LISTS

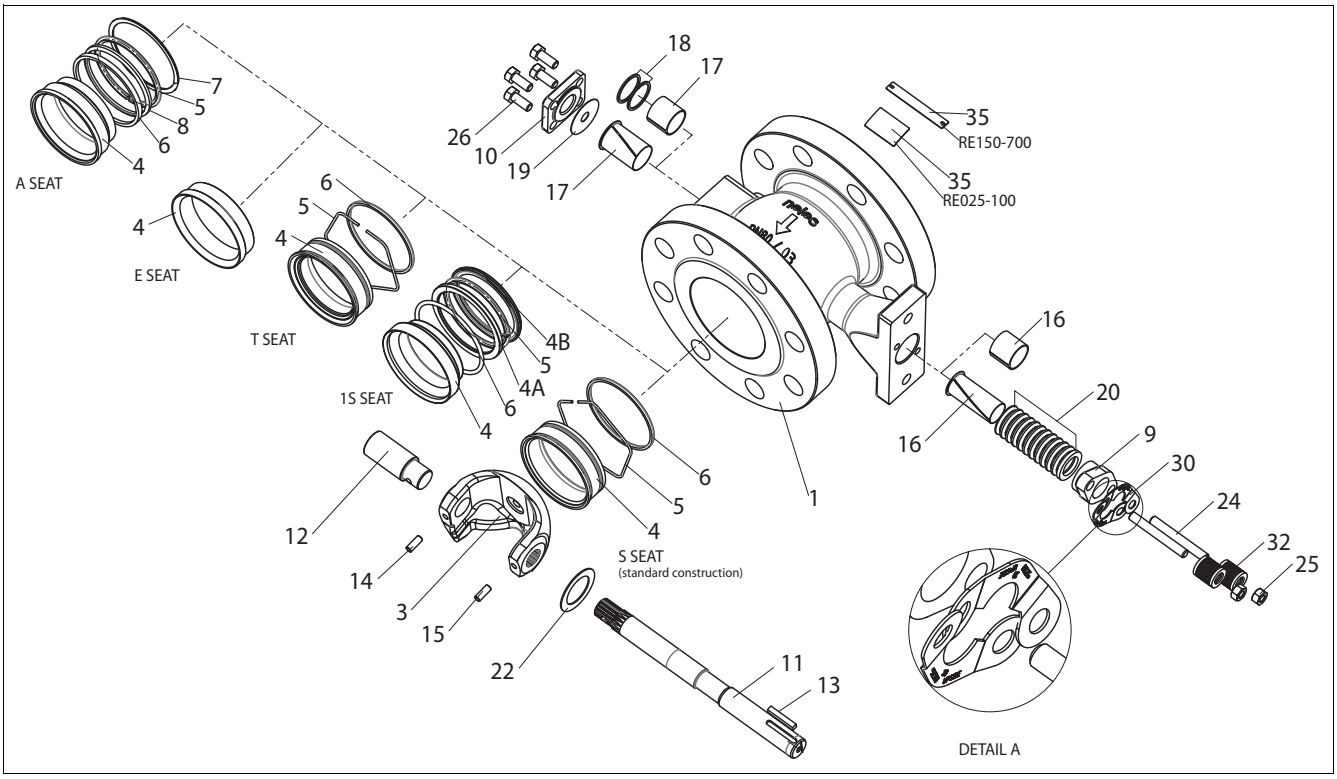
11.1 Series RA



Item	Qty.	Description	Spare part category
1	1	Body	
3	1	Segment	3
4	1	Seat	2
5	1	Lock spring	2
6	1	Back seal	2
9	1	Gland follower	
10	1	Blind flange	
11	1	Drive shaft	3
12	1	Shaft	3
13	1	Key	3
14	1	Cylindrical pin	3 (Cat. 2 for sizes 01"–02")
15	1	Cylindrical pin	3 (Cat. 2 for sizes 01"–02")
16	1	Bearing	3
17	1	Bearing	3
19	1–2	Sealing plate	1
20	1	Packing	1
22	1	Filling ring (only in new low Cv version)	
25	2–4	Countersunk screw	
26	4	Hexagon screw	
30	2	Retainer ring	
31	2	Sheet ring	
32	1	Wave spring	
35	1	Identification plate	

Spare part set category: Recommended soft parts, always needed for the repair. Delivered as a set.
Spare part category 2: Parts for replacing of the seat. Delivered 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.

11.2 Series RE

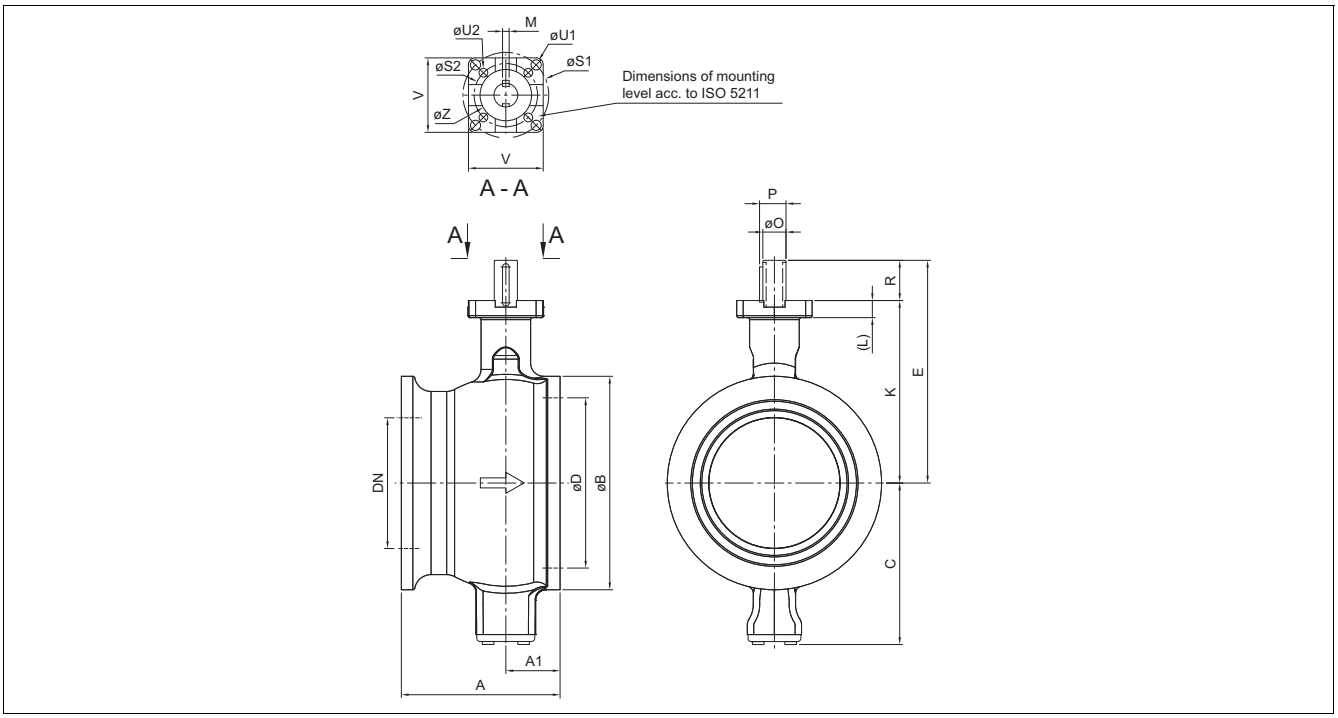


Part	Name	Stainless steel	Carbon steel	Spare part cat.
1	Body	ASTM A351 gr. CF8M	ASTM A216 gr. WCB	
3	V-port segment	AISI 329 + chromium / CG8M + chromium[1)]	AISI 329 + chromium / CG8M + chromium[1)]	3
4	Seat	AISI 316 + Cobalt based alloy / PTFE[1)]	AISI 316 + Cobalt based alloy / PTFE[1)]	2
4A	Back ring	AISI 316	AISI 316	1
4B	Support ring	AISI 316	AISI 316	1
5	Lock spring	INCONEL 625	INCONEL 625	
6	Back seal	Stainless steel + PTFE / Viton GF / Graphite	Stainless steel + PTFE / Viton GF / Graphite	
7	Retaining ring	EN 10028-1.4571	EN 10028-1.4571	1
8	Support ring	AISI 316	AISI 316	1
9	Gland follower	ASTM A351 gr. CF8M	ASTM A351 gr. CF8M	
10	Blind flange	ASTM A351 gr. CF8M	ASTM A351 gr. CF8M	3
11	Drive shaft	AISI 329 / 17-4PH [1)]	AISI 329 / 17-4PH [1)]	3
12	Shaft	AISI 329 / 17-4PH [1)]	AISI 329 / 17-4PH [1)]	3
13	Key	AISI 329	AISI 329	3
14	Cylindrical pin	AISI 329 / 17-4PH [1)]	AISI 329 / 17-4PH [1)]	3 (Cat. 2 for sizes 01"–02")
15	Cylindrical pin	AISI 329 / 17-4PH [1)]	AISI 329 / 17-4PH [1)]	3 (Cat. 2 for sizes 01"–02")
16	Bearing	PTFE + SS net / cobalt based alloy[1)]	PTFE + SS net / cobalt based alloy[1)]	3
17	Bearing	PTFE + SS net / cobalt based alloy[1)]	PTFE + SS net / cobalt based alloy[1)]	3
18	Thrust bearing	Cobalt based alloy[1)]	Cobalt based alloy[1)]	2
19	Sealing plate	Graphite / PTFE	Graphite / PTFE	1
20	Packing	PTFE/Graphite[1)]	PTFE/Graphite[1)]	1
22	Filling ring (only low Cv 1"/DN 25)	Stainless Steel AISI 316	Stainless Steel AISI 316	
24	Stud	ISO 3506 A4-80/B8M	ISO 3506 A4-80/B8M	
25	Hexagon nut	ISO 3506 A4-80/B8M	ISO 3506 A4-80/B8M	
26	Hexagon bolt	ISO 3506 A4-80/B8M	ISO 3506 A4-80/B8M	
30	Retainer Plate	AISI 316	AISI 316	
32	Spring stack	SIS 2324 & CrMo Steel + ENP	SIS 2324 & CrMo Steel + ENP	
35	Identification plate	AISI 316	AISI 316	

Spare part set category: Recommended soft parts, always needed for the repair. Delivered as a set.
Spare part category 2: Parts for replacing of the seat. Delivered 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.

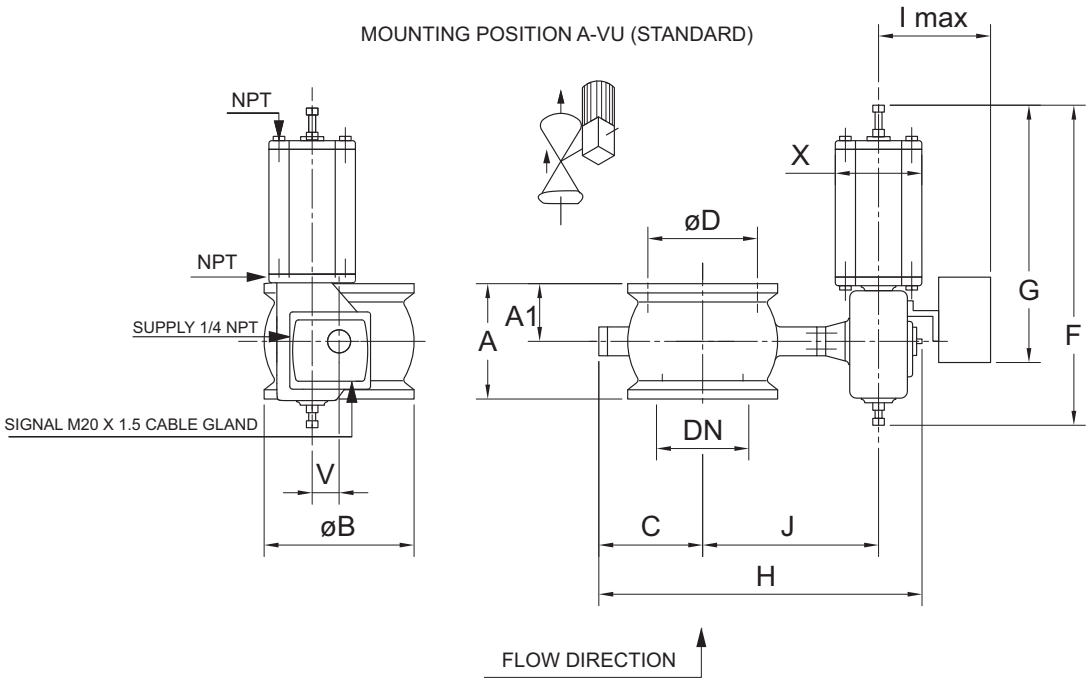
12 DIMENSIONS AND WEIGHTS

12.1 Series RA



Type	DN	ISO 5211	Dimensions, mm																	kg
			A1	A	øB	C	øD	E	R	K	øO	M	P	øS1	øS2	øU1	øU2	øZ	L	V	
RA	25	F05	21	50	64	56	33	127	27	102	15	4.76	17	-	50	-	6.6	35	15.5	52	1.3
	40	F05	21	60	82	65	49	133.5	25	108.5	15	4.76	17	-	50	-	6.6	35	15.5	52	2.4
	50	F05, F07	27	75	100	91	60	144.5	25	119.5	15	4.76	17	70	50	9	6.6	55	15.5	67	3.7
	65	F05, F07	40	100	118	97	75	151	25	126	15	4.76	17	70	50	9	6.6	55	15.5	67	5.3
	80	F07, F10	38	100	130	108	89	177	35	142	20	4.76	22.2	102	70	11	9	70	16	94	6.2
	100	F07, F10	41	115	158	120	115	186	35	151	20	4.76	22.2	102	70	11	9	70	16	94	9.6
	150	F10, F12	55	160	216	174	164	244	44	200	25	6.35	27.8	125	102	14	11	85	22	114	24
	200	F10, F12	70	200	268	201	205	285	50	235	30	6.35	32.9	125	102	14	11	85	22	114	42
	250	F12, F14	82	240	324	251	259	338	61	277	35	9.53	39.1	140	125	18	14	100	26	136	68

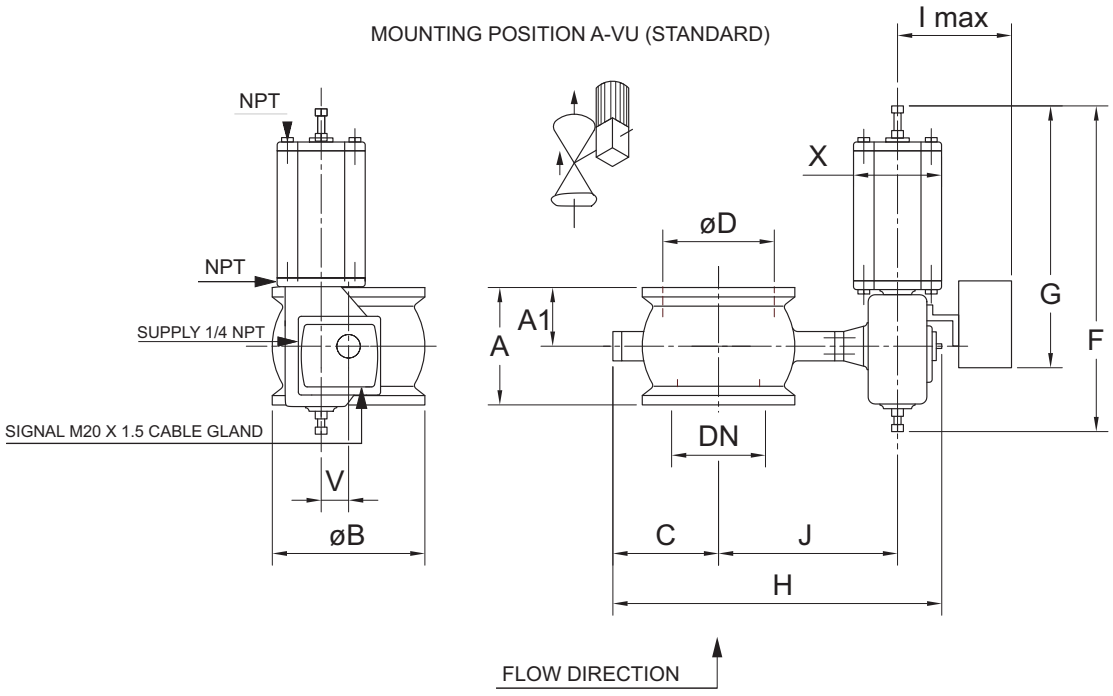
12.2 RA-B1C



Type	Max $\Delta p^{1)}$	Dimensions, mm													NPT	kg
		DN	A	A1	øB	C	øD	F	G	X	V	J	H	l_{max}		
RA_025-B1C6	50	25	50	21	64	56	33	400	260	90	36	168	305	310	1/4	5,5
RA_040-B1C6	50	40	60	21	82	65	49	400	260	90	36	175	320	310	1/4	6,6
RA_050-B1C6	50	50	75	27	100	91	60	400	260	90	36	185	355	310	1/4	8
RA_050-B1C9	50	50	75	27	100	91	60	455	315	110	43	185	365	305	1/4	13,5
RA_065-B1C6	50	65	100	40	118	97	75	400	260	90	36	192	367	310	1/4	9,5
RA_065-B1C9	50	65	100	40	118	97	75	455	315	110	43	192	380	305	1/4	15
RA_080-B1C6	50	80	100	38	130	108	89	400	260	90	36	200	390	310	1/4	11
RA_080-B1C9	50	80	100	38	130	108	89	455	315	110	43	200	400	305	1/4	16
RA_100-B1C6	40	100	115	41	158	120	115	400	260	90	36	210	410	310	1/4	15
RA_100-B1C9	40	100	115	41	158	120	115	455	315	110	43	210	420	305	1/4	19
RA_150-B1C9	25	150	160	55	216	174	164	455	315	110	43	260	515	305	1/4	34
RA_150-B1C11	40	150	160	55	216	174	164	540	375	135	51	265	530	310	3/8	40
RA_150-B1C13	40	150	160	55	216	174	164	635	445	175	65	280	550	325	3/8	55
RA_200-B1C9	15	200	200	70	268	201	205	455	315	110	43	294	575	305	1/4	52
RA_200-B1C11	32	200	200	70	268	201	205	540	375	135	51	310	590	310	3/8	59
RA_200-B1C13	35	200	200	70	268	201	205	635	445	175	65	325	610	325	3/8	73
RA_250-B1C13	30	250	240	82	324	251	259	635	445	175	65	366	730	325	3/8	100
RA_250-B1C17	35	250	240	82	324	251	259	770	545	215	78	373	750	340	3/8	125

1) Max Δp in on-off service with actuator load factor 0.6 and supply pressure 5 bar

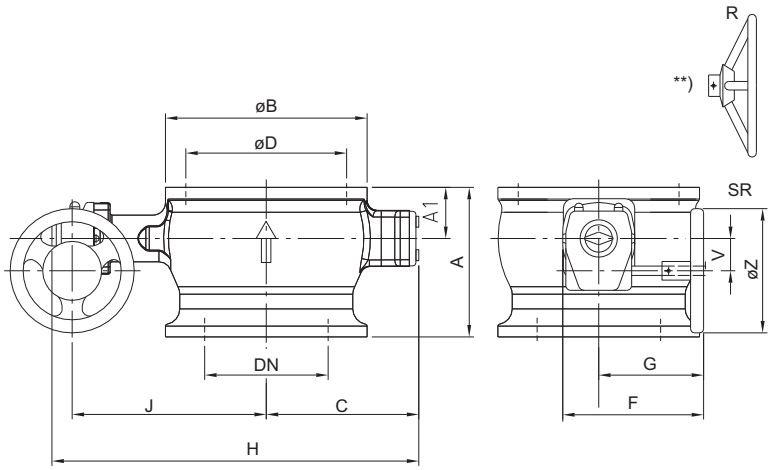
12.3 RA - B1J, B1JA



Type	Max $\Delta p^{1)}$	Dimensions, mm													NPT	kg
		DN	A	A1	øB	C	øD	F	G	X	V	J	H	l_{max}		
RA_025-B1J6	50/50	25	50	21	64	56	33	485	368	110	36	166	291	280	3/8	14
RA_040B1J6	50/50	40	60	21	82	65	49	485	368	110	36	173	306	280	3/8	15
RA_050-B1J6	50/50	50	75	27	100	91	60	485	368	110	36	183	343	280	3/8	16
RA_065-B1J6	50/50	65	100	40	118	97	75	485	368	110	36	193	358	280	3/8	18
RA_080B1J6	50/50	80	100	38	130	108	89	485	368	110	36	198	374	280	3/8	19
RA_100-B1J6	50/50	100	115	41	158	120	113	485	368	110	36	208	398	280	3/8	22
RA_025-B1J8/B1JA8	50/50	25	50	21	64	56	33	555	420	135	43	168	293	305	3/8	19
RA_040-B1J8/B1JA8	50/50	40	60	21	82	65	49	555	420	135	43	175	308	305	3/8	20
RA_050-B1J8/B1JA8	50/50	50	75	27	100	91	60	555	420	135	43	185	345	305	3/8	21
RA_065-B1J8/B1JA8	50/50	65	100	40	118	97	75	555	420	135	43	195	360	305	3/8	23
RA_080-B1J8/B1JA8	50/50	80	100	38	130	108	89	555	420	135	43	200	376	305	3/8	24
RA_100-B1J8/B1JA8	50/50	100	115	41	158	120	113	555	420	135	43	210	400	305	3/8	27
RA_150-B1J8/B1JA8	10/25	150	160	55	216	174	164	555	420	135	43	258	500	305	3/8	41
RA_150-B1J10/B1JA10	40/40							650	490	175	51	275	530	225	3/8	55
RA_200-B1J10/B1JA10	15/25	200	200	70	268	201	205	650	490	175	51	310	590	310	3/8	75
RA_200-B1J12/B1JA12	32/35							800	620	215	65	324	635	235	1/2	100
RA_250-B1J16/B1JA16	35/35	250	240	85	324	251	259	990	760	265	78	373	760	340	1/2	170

1) Supply pressure BJ 4 bar / BJA 5 bar

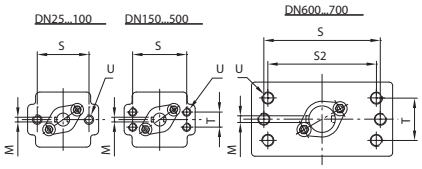
12.4 RA - M

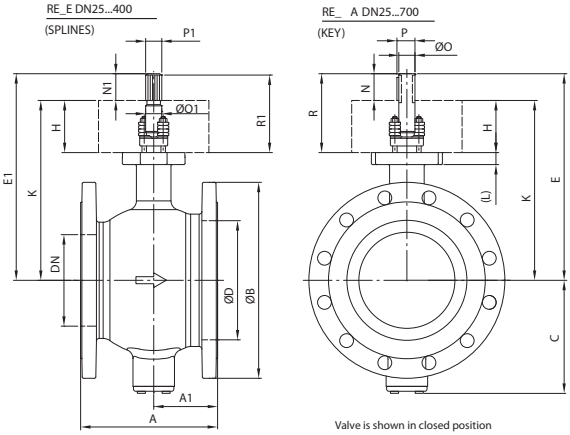


Type	Actuator/ mounting ISO 5211	DN	Dimensions, mm											kg
			øD	A	A1	øB	C	F	G	H	J	V	øZ	
RA	M07/15F05	25	33/38*	50	21	64	56	235	184	223	131	52	160	5.1
	M07/15F05	40	49	60	21	82	65	235	184	238	137	52	160	6.2
	M07/15F05	50	60	75	27	100	91	235	184	275	148	52	160	7.5
	M07/15F05	65	75	100	40	118	97	235	184	288	155	52	160	9.5
	M07/20F07	80	89	100	38	130	108	235	184	315	171	52	160	10
	M07/20F07	100	115	115	41	158	120	235	184	336	180	52	160	14
	M10/25F10	150	164	160	55	216	174	238	187	439	235	52	200	29
	M12/30F12	200	205	200	70	268	201	307	238	524	276	71	315	52
	M12/35F12	250	259	240	82	324	251	307	238	616	318	71	315	78
	M14/35F12	250	259	240	82	324	251	385	285	621	320	86	400	87

*) Actuators equipped with extended input shaft.
**) Actuators M07...M12 are equipped with handwheel type SR, actuators M14...M16 are equipped with handwheel type R.

12.5 Series RE

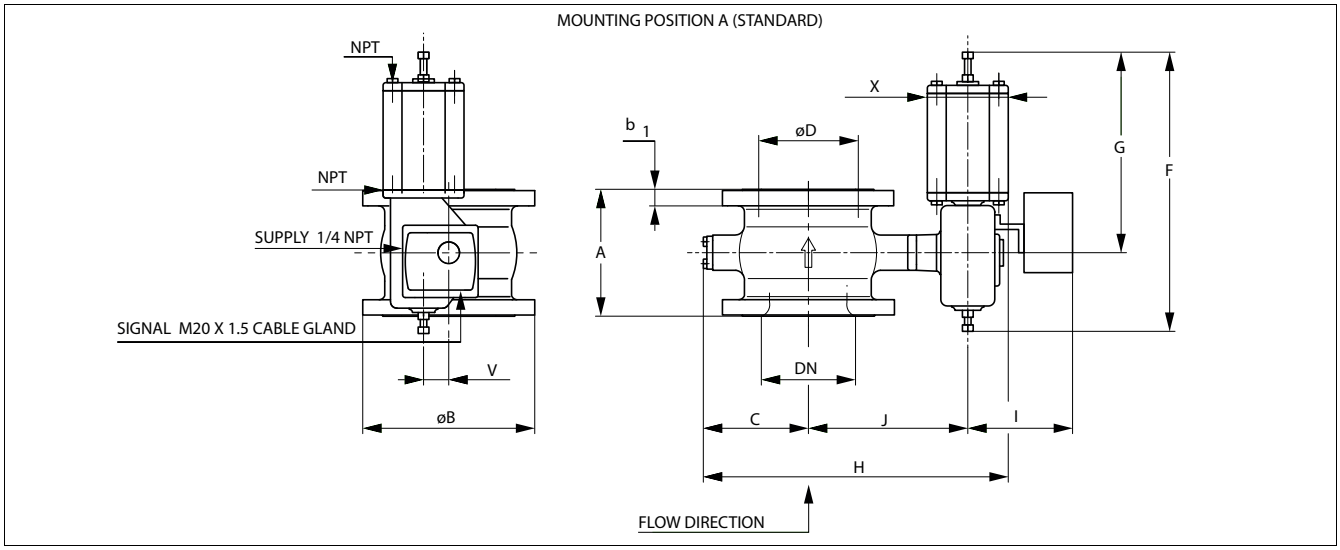




DN / inch	Dimensions, mm										Shaft dimensions, mm										
											RE_A (Key)						RE_E (Splines)				
	A1	A	C	ØD	K	S/S2	T	U	L	H	E	R	ØO	M	P	N	E1	R1	ØO1	P1/DIN5480	N1
25 / 1"	51	102	56	33	182	70	-	M10	15.5	80	207	105	15	4.76	17	25	203	101	15	W14x1x12	20
40 / 1 1/2"	57	114	65	49	188.5	70	-	M10	15.5	80	213.5	105	15	4.76	17	25	209.5	101	15	W14x1x12	20
50 / 2"	62	124	91	60	199.5	70	-	M10	15.5	80	224.5	105	15	4.76	17	25	219.5	100	15	W14x1x12	20
65 / 2 1/2"	72.5	145	97	75	206	70	-	M10	15.5	80	231	105	15	4.76	17	25	226	100	15	W14x1x12	20
80 / 3"	82.5	165	108	89	232	90	-	M12	16	90	267	125	20	4.76	22.2	35	253	111	20	W14x1x12	20
100 / 4"	97	194	120	113	241	90	-	M12	16	90	276	125	20	4.76	22.2	35	262	111	20	W18x1x16	20
150 / 6"	114.5	229	174	164	290	110	32	M12	22	90	335	135	25	6.35	27.8	46	315	115	25	W25x1x24	25
200 / 8"	111.5	243	201	205	345	130	32	M12	22	110	395	160	30	6.35	32.9	51	370	135	30	W25x1x24	25
250 / 10"	138.5	297	251	259	387	130	32	M12	26	110	445	168	35	9.53	39.1	58	422	145	35	W34x1x32	35
300 / 12"	154	338	269	300	417	160	40	M16	26	120	485	188	40	9.53	44.2	68	452	155	40	W34x1x32	35
350 / 14"	175	400	311	350	433	160	40	M16	29	120	513	200	45	12.70	50.4	80	468	155	45	W34x1x32	35
400 / 16"	160	400	353	400	494	160	55	M20	29	140	584	230	50	12.70	55.5	90	529	175	50	W34x1x32	35
500 / 20"	233	508	420	500	615	230	90	M27	40	180	727	292	70	19.05	78.2	119	-	-	-	-	-
600 / 24"	355	610	490	600	704	330/304.7	120	M30	40	220	838	354	75	19.05	81.9	134	-	-	-	-	-
700 / 28"	295	710	539	700	768	330/304.7	120	M30	55	220	914	366	85	22.225	95.3	146	-	-	-	-	-
800 / 32"	380	840	635	800	871.5	330/304.7	120	M30	55	220	1052	402	105	25.4	114.4	180	-	-	-	-	-

DN / inch	Flange dimensions, mm, and weights											
	REC ASME 150		RED ASME 300(600)		REJ PN10		REK PN16		REL PN25		REM PN40	
	B	kg	B	kg	B	kg	B	kg	B	kg	B	kg
25 / 1"	110	3.6	124	4.9(5.2)	115	4.6	115	4.6	115	4.6	115	4.6
40 / 1 1/2"	125	4.6	155	7.5(8.5)	150	6.2	150	6.2	150	6.2	150	6.2
50 / 2"	150	7.4	165	9.5(11.4)	165	8.8	165	8.8	165	8.8	165	8.8
65 / 2 1/2"	180	13	190(-)	13(-)	185	13	185	13	185	13	185	13
80 / 3"	190	14	210	19(22.6)	200	16	200	16	200	16	200	16
100 / 4"	230	21	254(275)	29(41.4)	220	18	220	18	235	21	235	21
150 / 6"	280	39	320	54	285	37	285	37	300	42	300	42
200 / 8"	345	62	380	83	340	56	340	60	360	64	375	71
250 / 10"	405	95	445	132	395	90	405	91	425	101	450	125
300 / 12"	485	143	520	203	445	124	460	130	485	166	515	189
350 / 14"	535	194	585	290	505	174	520	182	555	248	580	275
400 / 16"	595	249	650	364	565	223	580	235	620	314	660	361
500 / 20"	700	453	775	595	670	375	715	468	730	486	755	549
600 / 24"	815	853	915	1051	780	791	840	899	845	910	890	1007
700 / 28"	925	1260	1035	1535	895	1134	910	1146	960	1243	1145	1338
800 / 32"	1060	1850	1150	-	1102	1550	1025	1570	1085	1790	-	-

12.6 RE - B1C

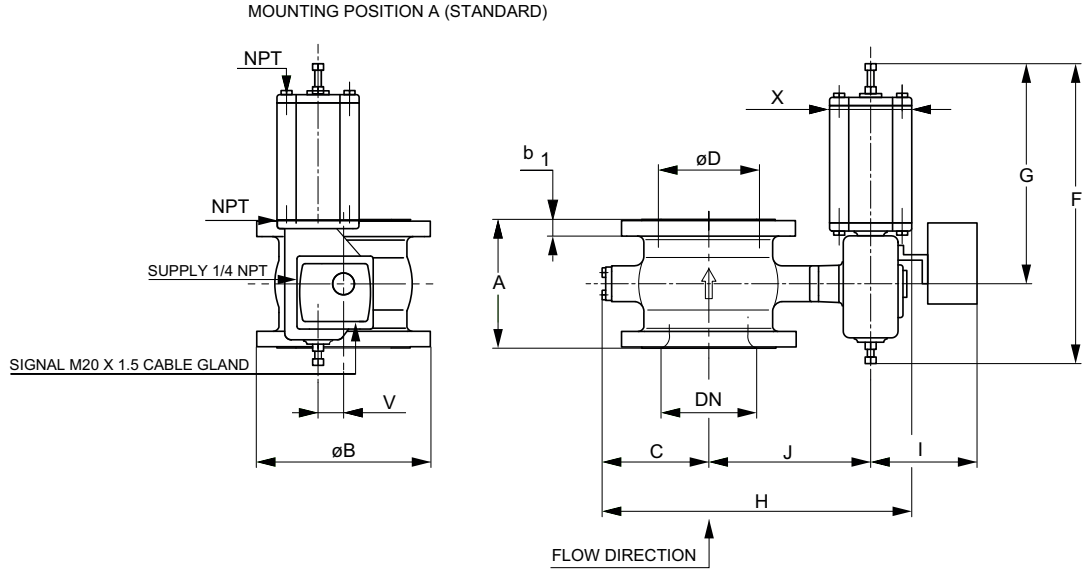


Type	Max $\Delta p^{1)}$	Dimensions, mm												NPT	REJ_ PN 10			REK_ PN 16			REL_ PN 25			REM_ PN 40			REC_ ASME 150			RED_ASME 300(600)		
		NPS	DN	A	C	øD	F	G	X	V	J	H	l_{max}		øB	b_1	kg	øB	b_1	kg	øB	b_1	kg	øB	b_1	kg	øB	b_1	kg	øB	b_1	kg
RE_ 01-B1C6	50	1	25	102	56	33/38*	400	260	90	36	240	341	310	1/4	115	18	11.9	115	18	11.9	115	18	11.9	115	18	11.9	108	18	11.9	124	18(17.5)	11.9(12.2)
RE_ 1H-B1C6	50	1.5	40	114	65	49	400	260	90	36	247	357	310	1/4	150	18	13.5	150	18	13.5	150	18	13.5	150	18	13.5	127	18	13.5	155	18(23)	14.3(15.3)
RE_ 02-B1C6	50	2	50	124	91	60	400	260	90	36	258	394	310	1/4	165	20	16.1	165	20	16.1	165	20	16.1	165	20	16.1	152	20	16.1	165	20(25.4)	16.8(18.7)
RE_ 2H-B1C6	50	2.5	65	145	97	75	400	260	90	36	265	410	310	1/4	185	22	18	185	22	18	185	22	18	185	22	18	185	22	18	-	-	-
RE_ 03-B1C6	50	3	80	165	108	89	400	260	90	36	290	443	310	1/4	200	20	23	200	20	23	200	24	23	200	24	23	191	24	21	210	24(31.8)	26(29.6)
RE_04-B1C6	40	4	100	194	120	113	400	260	90	36	299	464	310	1/4	220	20	25.3	220	20	25.3	235	24	28.3	235	24	28.3	229	24	28.3	254(275)	24(38.1)	34.3(46.7)
RE_06-B1C6 RE_06-B1C9 RE_06-B1C11	10 25 40	6	150	229	174	164	400 455 540	260 315 375	90 110 135	36 43 65	348 349 355	567 578 597	310 305 310	1/4 1/4 3/8	285	22	44.3 50 57	285	22	44.3 50 57	300	28	49.3 55 62	300	28	49.3 55 62	279	28	46.3 52 59	318	28	51.3 57 64
RE_08-B1C6 RE_08-B1C9 RE_08-B1C11	4 15 32	8	200	243	201	205	400 455 540	260 315 375	90 110 135	36 43 51	403 404 410	649 660 679	310 305 310	1/4 1/4 3/8	340	24	63 70 77	340	24	67 73 80	360	30	71 77 84	375	34	78 84 91	343	30	69 75 82	381	34	90 96 103
RE_10-B1C9 RE_10-B1C11 RE_10-B1C13 RE_10-B1C17	7 15 29 35	10	250	297	251	259	455 540 635 770	315 375 445 545	110 135 175 215	43 51 65 78	446 452 468 483	752 771 807 842	310 310 325 340	1/4 3/8 3/8 1/2	405	26	99 106 121 144	405	26	99 106 121 144	425	32	115 122 137 160	450	38	139 146 161 184	406	32	104 114 139 162	450	38	152 159 174 197
RE_12-B1C11 RE_12-B1C13 RE_12-B1C17	7 19 30	12	300	338	269	300	540 635 770	375 445 545	135 175 215	51 65 78	482 498 513	819 855 890	310 325 340	3/8 3/8 1/2	460	26	144 159 182	460	28	144 159 182	485	34	168 183 206	520	42	202 217 240	483	34	162 177 200	520	42	219 234 257
RE_14-B1C13 RE_14-B1C17 RE_14-B1C20	9 21 27	14	350	400	311	350	635 770 840	445 545 575	175 215 215	65 78 97	514 529 548	913 947 967	325 340 355	3/8 1/2 1/2	505	26	213 236 255	520	30	218 241 260	555	38	258 281 300	580	46	301 324 343	534	38	238 261 280	584	46	319 342 361
RE_16-B1C17 RE_16-B1C20 RE_16-B1C25	15 21 30	16	400	400	353	400	770 840 1075	545 575 725	215 215 265	78 97 121	590 609 632	1051 1071 1118	340 355 390	1/2 1/2 1/2	565	26	293 312 370	580	32	298 317 375	620	40	349 368 426	660	50	405 424 482	597	40	323 342 400	648	50	414 433 491
RE_20-B1C25	16	20	500	508	430	500	1075	725	265	121	723	1286	390	1/2	670	26	547	715	42	566	730	46	661	755	57	552	700	41,3	562	775	64	584
RE_24-B1C25 RE_24-B1C32	9 19	24	600	610	497	600	1075 1370	725 920	265 395	121 153	842 879	1498 1573	390 430	1/2 3/4	780	28	1034 1159	840	40	1105 1230	845	46	1165 1290	890	60	1171 1296	815	46,1	1100 1225	915	68,3	1298 1423
RE_28-B1C32 RE_28-B1C40	10 23	28	700	710	547	700	1370 1670	920 1150	395 505	153 194	944 993	1686 1756	430 450	3/4 3/4	895	30	1345 1535	910	42	1386 1576	960	50	1467 1657	995	64	1580 1770	925	69,9	1506 1696	1035	88,9	1770 1960

1) Max Δp in on-off service with actuator load factor 0.6 and supply pressure 5 bar

*) 38 mm for low capacity segment eg. C005-RE_

12.7 RE - B1J, B1JA

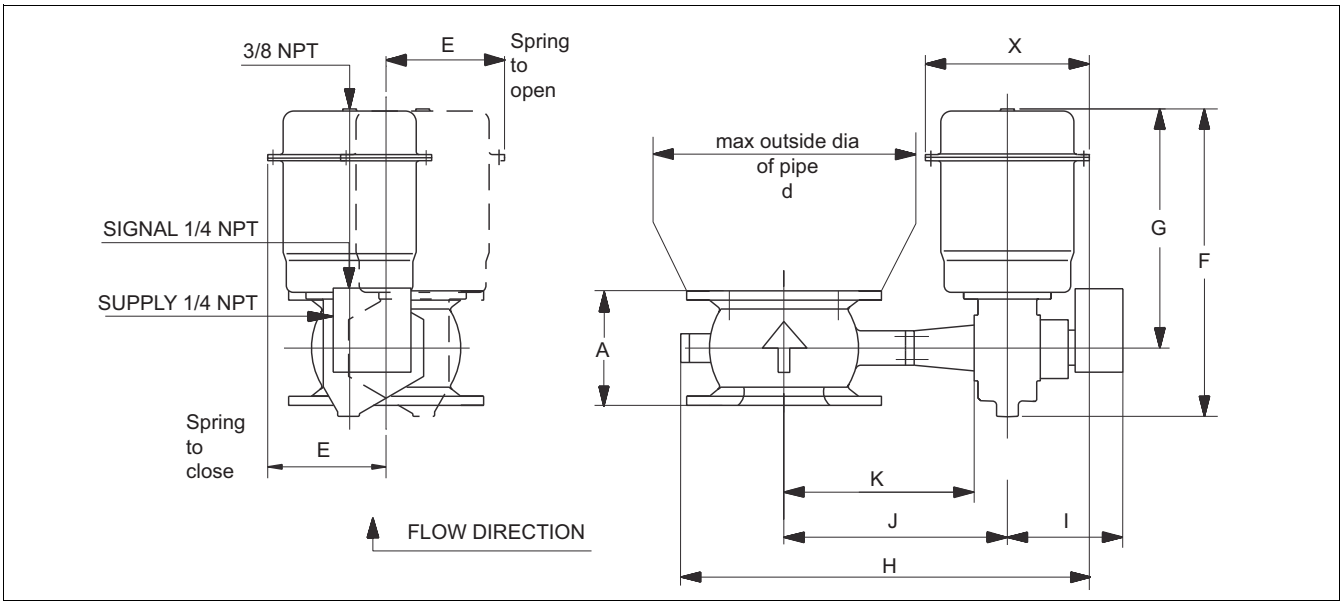


Type	Max $\Delta p^{1)}$	Dimensions, mm												NPT	REJ_ PN10			REK_ PN16			REL_ PN25			REM_ PN40			REC_ ASME 150			RED_ASME 300(600)		
		NPS	DN	A	C	øD	F	G	X	V	J	H	l_{max}		øB	b_1	kg	øB	b_1	kg	øB	b_1	kg	øB	b_1	kg	øB	b_1	kg	øB	b_1	kg
RE_01-B1J6	50/50	1	25	102	56	33/ 38*	485	368	110	36	238	362	305	3/8	115	18	20	115	18	20	115	18	20	115	18	20	108	18	20	124	18(17.5)	11.9(12.2)
RE_1H-B1J6	50/50	1,5	40	114	65	49	485	368	110	36	245	378	305	3/8	150	18	22	150	18	22	150	18	22	150	18	22	127	18	22	155	18(23)	14.3(15.3)
RE_02-B1J6	50/50	2	50	124	91	60	485	368	110	36	256	414	305	3/8	165	20	24	165	20	24	165	20	24	165	20	24	152	20	24	165	20(25.4)	16.8(18.7)
RE_2H-B1J6	50/50	2,5	65	145	97	75	485	368	110	36	263	428	305	3/8	185	22	25	185	22	25	185	22	25	185	22	25	185	22	25	-	-	-
RE_03-B1J6	50/50	3	80	165	108	89	485	368	110	36	288	464	305	3/8	200	20	31	200	20	31	200	24	31	200	24	31	191	24	29	210	24(31.8)	34(37.6)
RE_04-B1J6	50/50	4	100	194	120	113	485	368	110	36	297	485	305	3/8	220	20	33	220	20	33	235	24	36	235	24	36	229	24	37	254(275)	24(38.1)	42(52.4)
RE_01-B1J8/B1JA8	50/50	1	25	102	56	33/ 38*	560	420	135	43	240	364	305	3/8	115	18	25	115	18	25	115	18	25	115	18	25	108	18	25	124	18	25
RE_1H-B1J8/B1JA8	50/50	1,5	40	114	65	49	560	420	135	43	247	380	305	3/8	150	18	27	150	18	27	150	18	27	150	18	27	127	18	27	155	18	28
RE_02-B1J8/B1JA8	50/50	2	50	124	91	60	560	420	135	43	258	416	305	3/8	165	20	29	165	20	29	165	20	29	165	20	29	152	20	29	165	20	30
RE_2H-B1J8/B1JA8	50/50	2,5	65	145	97	75	560	420	135	43	265	430	305	3/8	185	22	30	185	22	30	185	22	30	185	22	30	185	22	30	-	-	-
RE_03-B1J8/B1JA8	50/50	3	80	165	108	89	560	420	135	43	290	466	305	3/8	200	20	36	200	20	36	200	24	36	200	24	36	191	24	34	210	24	39
RE_04-B1J8/B1JA8	50/50	4	100	194	120	113	560	420	135	43	299	487	305	3/8	220	20	38	220	20	38	235	24	41	235	24	41	229	24	42	254	24	47
RE_06-B1J8/B1JA8 RE_06-B1J10/B1JA10	10/25 40/40	6	150	229	174	164	560 650	420 490	135 175	43 51	348 355	590 617	305 225	3/8 3/8	285	22	57 70	285	22	57 70	300	28	62 75	300	28	62 75	279	28	59 72	318	28	65 77
RE_08-B1J8/B1JA8 RE_08-B1J10/B1JA10 RE_08-B1J12/B1JA12	- /12 15/25 32/35	8	200	243	201	205	560 650 800	420 490 620	135 175 215	43 51 65	404 410 426	673 700 736	305 310 235	3/8 3/8 1/2	340	24	76 90 118	340	24	80 93 120	360	30	84 97 124	375	34	91 104 132	343	30	82 95 123	381	34	103 116 144
RE_10-B1J10/B1JA10 RE_10-B1J12/B1JA12 RE_10-B1J16/B1JA16	5/15 20/25 35/35	10	250	297	251	259	650 800 990	490 620 760	175 215 265	51 65 78	452 468 483	790 827 867	310 325 340	3/8 1/2 1/2	405	26	119 147 200	405	26	119 147 200	425	32	135 163 216	450	38	159 187 240	406	32	124 145 218	450	38	172 200 253
RE_12-B1J12/B1JA12 RE_12-B1J16/B1JA16 RE_12-B1J20/B1JA20	8/18 20/25 30/30	12	300	338	269	300	800 990 1200	620 760 935	215 265 395	65 78 97	498 513 534	875 916 1000	325 340 270	1/2 1/2 3/4	460	26	185 228 303	460	28	185 228 303	485	34	209 252 327	520	42	243 217 361	483	34	203 246 321	520	42	260 303 378
RE_14-B1J16/B1JA16 RE_14-B1J20/B1JA20	11/22 30/30	14	350	400	311	350	990 1200	760 935	265 395	78 97	529 548	973 1057	340 355	1/2 3/4	505	26	282 357	520	30	287 362	555	38	327 402	580	46	370 445	534	38	307 382	584	46	388 463
RE_16-B1J20/B1JA20 RE_16-B1J25/B1JA25	19/25 30/30	16	400	400	353	400	1200 1530	935 1200	395 505	97 121	609 632	1161 1238	355 390	3/4 3/4	565	26	414 590	580	32	419 595	620	40	470 646	660	50	526 702	597	40	444 620	648	50	535 711
RE_20-B1J25/B1JA25	25/25	20	500	508	430	500	1530	1200	505	121	723	1406	390	1/2	670	47	720	715	47	720	730	47	825	755	57	596	699	47	720	775	62	628
RE_24-B1J32/B1JA32	18/18	24	600	610	497	600	1885	1435	540	153	879	1577	427	1	780	28	1574	840	40	1645	845	46	1705	890	60	1711	815	46.1	1640	915	68.3	1838
RE_28-B1JV32/B1JVA32	13/13	28	700	710	547	700	1885	1435	540	153	943	1691	427	1	895	30	1760	910	42	1801	960	50	1882	995	64	1995	925	69.9	1921	1035	88.9	2185

1) Supply pressure BJ 4 bar / BJA 5 bar

*) 38 mm for low capacity segment eg. C005-RE_

12.8 RE - QPX



DN	Actuator QPX	Max shut-off Δp bar RE, Q-RE	Max control Δp bar RE	Max control Δp bar Q-RE	Dimensions, mm										Total weight, kg	
															Valve+actuator+positioner	
					A	E	F	G	H	I	J	K	X	Pipe d	ASME 150	ASME 300(600)
25	1	50	35	-	102	142	382	330	388	160	225	182	213	230	19	20.5(20.8)
40	1	50	35	-	114	142	382	330	404	160	232	189	213	245	20	23(24)
50	1	50	35	35	124	142	382	330	441	160	243	200	213	265	22	25(26.9)
80	2	35	25	18	165	142	382	330	506	172	284	232	213	330	38	43(46.6)
100	2	35	25	18	194	156	480	389	527	172	293	241	228	350	45	53(65.4)
150	2 3	28 40	25 25	18 18	229 229	156 190	480 565	389 446	630 657	191 214	342 346	290 290	228 274	450 410	63 78	78 93
200	3 4	16 35	16 25	15 15	243 243	190 228	565 635	446 495	739 768	191 214	401 407	345 345	274 320	520 485	101 121	122 142
250	4 5	20 35	20 20	10 10	297 297	228 276	635 768	495 608	860 906	214 243	449 464	387 387	320 382	570 540	150 205	198 253
300	5	25	10	8	338	276	768	608	982	214	522	445	382	650	256	313
350	5	12	10	8	400	276	768	608	1065	243	563	486	382	735	317	398
400	5	8	8	8	400	276	768	608	1174	243	630	553	382	870	378	470

12.9 Suitability with different flanges, RA and RE1 valves

Flange	Valve size								
	DN 25 / 01	DN 40 / 01H	DN 50 / 02	DN 65	DN 80 / 03	DN 100 /04	DN 150 / 06	DN 200 / 08	DN 250
ASME B16.5 Class 150	x	x	x	x	x	x	x	x	x
ASME B16.5 Class 300	x	x	x	x	x	x	x	x	-
PN 40	x	x	x	x	x	x	x	-	x
PN 25	x	x	x	x	x	x	x	x	x
PN 16	x	x	x	x	x	x	x	x	x
PN 10	x	x	x	x	x	x	x	x	x
ISO 7005 PN 20	x	x	x	x	x	x	x	x	x
ISO 7005 PN 50	x	x	x	x	x	x	x	x	-
JIS 2238 10K	x	x	x	x	x	x	x	x	x
JIS 2238 16K	x	x	x	x	x	x	x	x	x
JIS 2238 20K	x	x	x	x	x	x	x	x	x
JIS 2238 30K	x	x	x	x	x	x	x	x	x

x = suitable with this flange
- = not suitable with this flange

12.10 Flange ratings, RE (Class 150, 300)

Size	PN 10	PN 16	PN 25	PN 40
025*	equal to PN 40	equal to PN 40	equal to PN 40	M
040*	equal to PN 40	equal to PN 40	equal to PN 40	M
050*	equal to PN 40	equal to PN 40	equal to PN 40	M
065	equal to PN 16	K	equal to PN 40	M
080*	equal to PN 40	equal to PN 40	equal to PN 40	M
100*	equal to PN 16	K	equal to PN 40	M
150*	equal to PN 16	K	equal to PN 40	M
200	J	K	L	M
250	J	K	L	M
300	J	K	L	M
350	J	K	L	M
400	J	K	L	M
500	J	K	L	M
600	J	K	L	M
700	J	K	L	-
800	J	K	L	-

Note: Class 600 RE with full rated valve body.

13 TYPE CODE

13.1 Series RA

V-port segment valve, series RA						
1.	2.	3.	4.	5.	6.	7.
	RA	A	100	A	S	_

1.	C_V-CODE FOR VALVE SIZE DN 25 (01")
STANDARD CV	
	Without sign
Q-TRIM	
Q	Low noise and anti-cavitation trim
NON-STANDARD CV	
C005-	Max. C_V = 0.5
C015-	Max. C_V = 1.5
C05-	Max. C_V = 5.0
C15-	Max. C_V = 15.0

2.	PRODUCT SERIES / DESIGN
RA	Wafer, reduced bore, Neles face-to-face lenght, body PN 40* / ASME Class 300**.
* DN 250 body only acc. to EN PN 40. **Max. shut-off pressure for trim, see Table 1.	

3.	CONSTRUCTION
A	Standard, drive shaft with keyway
Y	Special

4.	SIZE
	In millimetres: 025, 040, 050, 065, 080, 100, 150, 200, 250

5.	BODY	SEGMENT	SCREWS	SHAFT, PINS / BEARINGS
A	CF8M	AISI 329 + HCr	A2-70	AISI 329 / PTFE
C	CG8M	AISI 329 + HCr	A2-70	AISI 329 / PTFE
H (with T6 seat)	CW-6M (Hastelloy C)	CW-6M	A2-70	Hastelloy C / PVDF
S (with T2 seat)	CF8M	AISI 329	A2-70	AISI 329 / PTFE
U (with U seat)	CK3MCuN (SMO)	ASTM A351 gr. CK3MCuN + ceramic coating (TiO)	A2-70	UNS31254 / filled PTFE on SMO 254 net
Seals for above:		Gland packing: Blind flange:	PTFE V-ring type PTFE	
Y	Special			

Low Cv + metal seat: segment material AISI 316 + HCr.
Low Cv + soft seat: segment material AISI 316 (without HCr).

6.	SEAT MATERIAL AND CONSTRUCTION
S	Stainless steel + Cobalt Hard facing, -40 °C to +260 °C. 1-way tight metal seat, for NPS 1" - 10" / DN 25 - 250
1S	Stainless steel + Cobalt Hard facing, -30 °C to +200 °C. 2-way tight metal seat, for NPS 1" - 10" / DN 25 - 250.
T2	Stainless steel with PTFE+C25, -40 °C to +260 °C.
T6	Hastelloy with Xtreme insert, -40 °C to +120 °C.
E	Cobalt based alloy, -50 °C to +260 °C. Non-tight, extremely erosive services.
U	Titanium, -40 °C to +120 °C.

7.	FLANGE FACING
STANDARD	
	Without sign: EN1092-1 Type B1 (Ra 3.2 ... 12.5) Covers: DIN2526 form C DIN2526 form D Raised face stock finished (Ra10...12.5)
NON-STANDARD	
/Y	Special

13.2 Series RE, RE1

V-port segment valve, series RE and RE1												
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.
Q-	RE	D	A	03	D	J	J	S	T	A	/	-

1.	C_V-CODE	
	Standard V-port (without sign)	
Q-	Q-trim, low noise and anti-cavitation trim. (for DN 50 / 2" and bigger)	
C005-	Max. C_v = 0.5 (for DN 25 / 1" only)	(Not with 1S-seat)
C015-	Max. C_v = 1.5 (for DN 25 / 1" only)	
C05-	Max. C_v = 5 (for DN 25 / 1" only)	
C15-	Max. C_v = 15 (for DN 25 / 1" only)	

2.	PRODUCT SERIES / DESIGN
RE	Flanged, one piece body, V-port segmented ball, face-to-face acc. to ISA S75.04 and IEC Part 3-2. Inch threads.
RE1	Flangeless one piece body, V-port segmented ball, face-to-face acc. to ISA S75.04 and IEC 534 Part 3-2.
RE13	Flanged body, V-port segmented ball face-to-face acc. to ASME B16.10 (spool piece constr.).

3.	PRESSURE RATING	Size range
C	ASME 150	NPS 1" - 32"
D	ASME 300	NPS 1" - 32"
F	ASME 600	NPS 1" - 4"
J	PN 10	DN 200 - DN 800
K	PN 16	DN 50 - DN 800
L	PN 25	DN 200 - DN 800
M	PN 40	DN 25 - DN 600
R	JIS 10K flanges, based on body casting of ASME 150	DN 25 – DN 800
S	JIS 16K flanges, based on body casting of ASME 300	DN 25 – DN 800
T	JIS 20K flanges, based on body casting of ASME 300	DN 25 – DN 800
Y	Special, to be specified	-

4.	CONSTRUCTION
A	Standard, (2-way tight with 1S-seat)
B	Low emission construction (ISO 15848-1; Class BH, CC-3 / temp: 260 °C, Class BH CC-2 / temp: 400 °C)
E	Drive shaft with splines to actuator
U	Protected bearings (Viton GF O- rings) (*
V	Hydrogen Peroxide (H2O2) construction.
X	Antistatic device (*
S	Steam jacket (for DN 25 - 50 / NPS 1" - 2") consult the factory.
Z	Oxygen construction, only for Gaseous Oxygen Service. - BAM listed non-metallic materials - Temperature: +200 °C to -50 °C - Cleaning acc. to Neles internal procedure Recommended type code: RE_Z__AJJSG
Y	Special, to be specified

5.	SIZE		
	ASME	EN	
01	ASME flanged, 150, 300 and 600	025	EN flanged, PN 40
1H	ASME flanged, 150, 300 and 600	040	EN flanged, PN 40
02	ASME flanged, 150, 300 and 600	050	EN flanged, PN 40
2H	ASME flanged, 150 and 300	065	EN flanged, PN16, 40
03	ASME flanged, 150, 300 and 600	080	EN flanged, PN 40
04	ASME flanged, 150, 300 and 600	100	EN flanged, PN 16, 40
06	ASME flanged, 150 and 300	150	EN flanged, PN 16, 40
08	ASME flanged, 150 and 300	200	EN flanged, PN 10, 16, 25, 40
10	ASME flanged, 150 and 300	250	EN flanged, PN 10, 16, 25, 40
12	ASME flanged, 150 and 300	300	EN flanged, PN 10, 16, 25, 40
14	ASME flanged, 150 and 300	350	EN flanged, PN 10, 16, 25, 40
16	ASME flanged, 150 and 300	400	EN flanged, PN 10, 16, 25, 40
20	ASME flanged, 150 and 300	500	EN flanged, PN 10, 16, 25, 40
24	ASME flanged, 150 and 300	600	EN flanged, PN 10, 16, 25, 40
28	ASME flanged, 150 and 300	700	EN flanged, PN 10, 16, 25
32	ASME flanged, 150 and 300	800	EN flanged, PN 10, 16, 25

6.	BODY MATERIALS
	STANDARD
D	ASTM A216 gr. WCB / 1-0619
A	ASTM A351 gr. CF8M / 1.4408
C	ASTM A351 gr. CG8M (for DN 25 – DN 500 / 1" – 20")
	NON STANDARD
H	H ASTM A494 gr. CW-6M (Hastelloy C)
U	ASTM A351 gr. CK3MCuN (SMO)
F	ASTM A352 gr. LCC
Y	Special

7.	SEGMENT MATERIALS
	STANDARD
J	Type AISI 329 + HCr, with seat S
S	AISI 329, with seat T2
	NON STANDARD
H	ASTM A494 gr. CW-6M (Hastelloy C), with seat T6.
U	ASTM A351 gr. CK3MCuN (SMO) + ceramic (TiO), with seat U.
T	Titanium + ceramic coating
Y	Special

8.	SHAFT AND PIN MATERIALS	BEARING MATERIALS
	STANDARD	
J	Type AISI 329	Filled PTFE on SS 316 net, max +260 °C
	NON STANDARD	
H	Hastelloy C	PVDF, max +120 °C
U	UNS31254	Filled PTFE on Inconel 625 net, max +260 °C
N	Nitronic 50 (XM-19)	Filled PTFE on SS 316 net, max +260 °C
S	17-4 PH	Cobalt based alloy, max +425 °C
V	Type AISI 329	Virgin PTFE on SS 316 net, max +260 °C
U	17-4 PH	Filled PTFE on SS 316 net, max +260 °C
Y	Special	

9.	SEAT DESIGN AND MATERIALS
	STANDARD
S	Stainless steel + Cobalt Hard facing, -50 °C to +260 °C. 1-way tight metal seat, For NPS 1" - 20" / DN 25 - 500
	NON STANDARD
1S	Stainless steel + Cobalt Hard facing, -30 °C to +200 °C. 2-way tight metal seat, For NPS 1" - 32" / DN 25 - 800.
U	Titanium, -50 °C to +260 °C.
T2	Stainless steel with Xtreme insert, -40 °C to +260 °C.
T6	Hastelloy with Xtreme insert, -50 °C to +120 °C.
E	Cobalt based alloy, -50 °C to +260 °C. Non-tight, extremely erosive services.
E1	Non tight metal seat for extremely erosive applications
A, A1	High temp. metal seat, -50 °C to +425 °C. ANSI cl, IV.
O	No seat
Y	Special

10.	STEM PACKING	BLIND FLANGE SEAL
	STANDARD	
T	PTFE V- rings, live loaded	PTFE Max +260 °C
G	Graphite rings, live loaded	Graphite Max +425 °C (Fire-safe)
	NON STANDARD	
	PTFE V- rings, without live loading	PTFE Max +260 °C
	Graphite rings, without live loading	Graphite Max +425 °C

11.	MODEL CODE
-	Version 0
A	Version A is used only with NPS02, NPS03-10 / DN50, DN80-DN250

12.	FLANGE FACING
-	EN 1092-1 Type B1 (Ra3.2-12.5) Covering: ASME B16.5 Ra 3.2 – 6.3
02	Raised face Ra 10 - 12.5

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