

V-port segment valves

Series R

Installation, Maintenance and
Operating Instructions



Table of Contents

1	GENERAL	3	7	MALFUNCTIONS	15
1.1	Scope of the manual	3	8	TOOLS	16
1.2	Valve construction	3	9	ORDERING SPARE PARTS	16
1.3	Valve markings	3	10	EXPLODED VIEWS AND PARTS LISTS	17
1.4	Technical specifications	4		10.1 Series RA	17
1.5	Valve approvals	5		10.2 Series RE	18
1.6	CE marking	5	11	DIMENSIONS AND WEIGHTS	19
1.7	Recycling and disposal	5	11.1 Series RA	19	
1.8	Safety precautions	5	11.2 RA - EC	20	
2	TRANSPORTATION, RECEPTION AND STORAGE	6	11.3 RA - EJ, EJ_A	21	
3	INSTALLATION AND COMMISSIONING	6	11.4 RA-B1C	22	
3.1	General	6	11.5 RA - B1J, B1JA	23	
3.2	Installing in the pipeline	6	11.6 RA - M	24	
3.3	Actuator	6	11.7 Series RE	25	
3.4	Commissioning	7	11.8 RE - EC	26	
4	MAINTENANCE	7	11.9 RE - EJ, EJ_A	27	
4.1	Maintenance general	7	11.10 RE - B1C	28	
4.2	Replacing the gland packing	7	11.11 RE - B1J, B1JA	29	
4.3	Detaching the actuator	8	11.12 RE - QPX	30	
4.4	Removing the valve from the pipeline	8	11.13 Suitability with different flanges, RA and RE1 valves	31	
4.5	Replacing the seat	9	11.14 Flange ratings, RE	31	
4.6	Dismantling the valve	10			
4.7	Inspection of removed parts	11			
4.8	Assembly	11			
5	TESTING THE VALVE	12	12	TYPE CODE	32
6	INSTALLING AND DETACHING THE ACTUATORS	12	12.1 Series RA	32	
6.1	General	12	12.2 Series RE, RE1	33	
6.2	Installing EC and EJ actuators	12			
6.3	Detaching EC and EJ actuators	13			
6.4	Installing B1C actuators	14			
6.5	Installing B1J actuators	14			
6.6	Detaching B series actuators	15			
6.7	Installing a Quadra-Powr® actuator	15			

READ THESE INSTRUCTIONS FIRST!

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

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

Addresses and phone numbers are printed on the back cover.

SAVE THESE INSTRUCTIONS!

Subject to change without notice.

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1 GENERAL

1.1 Scope of the manual

This manual provides essential information on 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 Metso Flow Control business for more information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Metso document id: 100270EN.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.

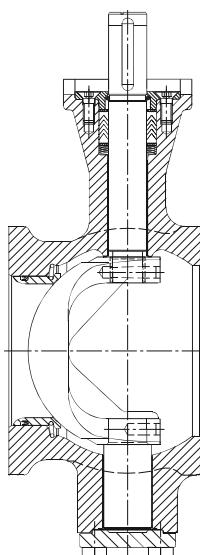


Fig. 1 Construction of a V-port segment valve, RA

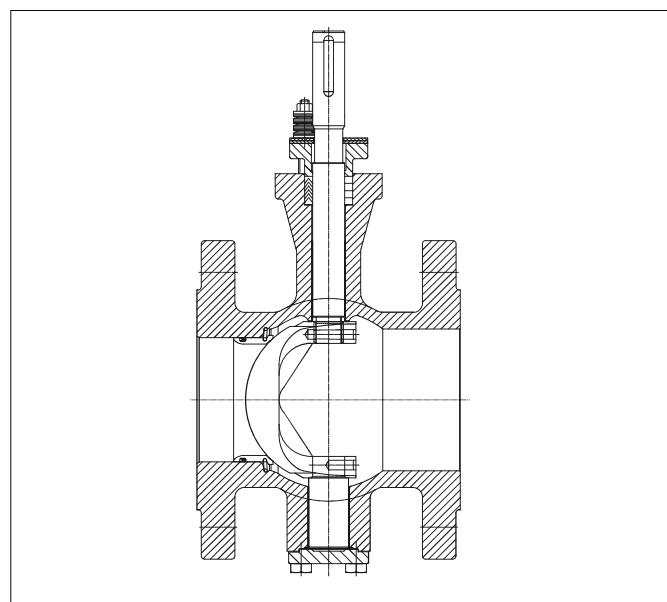


Fig. 2 Construction of a V-port segment valve, RE/RE1

1.3 Valve markings

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

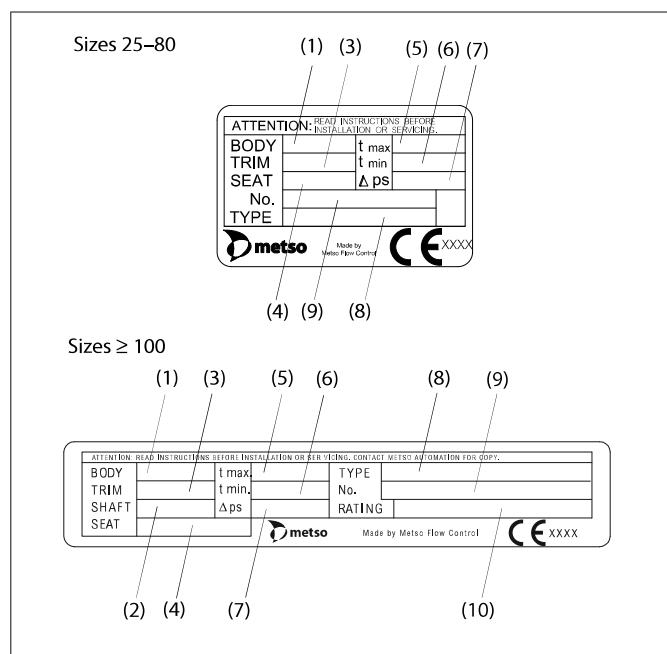


Fig. 3 Identification plate

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

1.4 Technical specifications

Initial openings (%) for RE/RA segment valves with different seats.			
Size	Seat		
	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 Metso 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/PN 40

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

Temperature ranges:

RA-series:

-40... +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

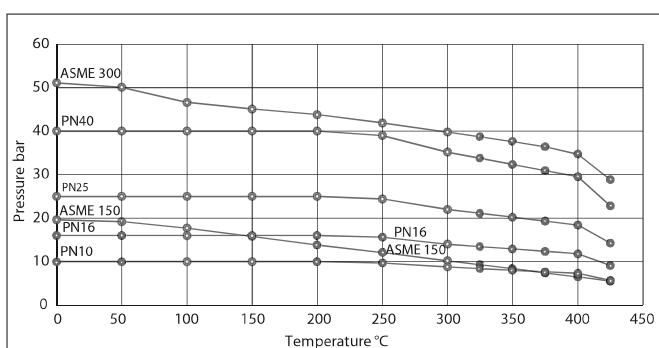


Fig. 4 Body pressure ratings, WCB

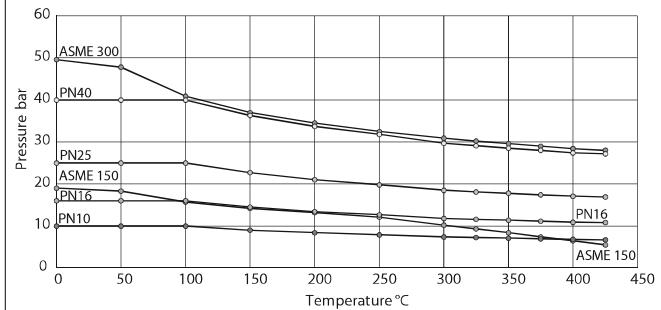


Fig. 5 Body pressure ratings, CF8M

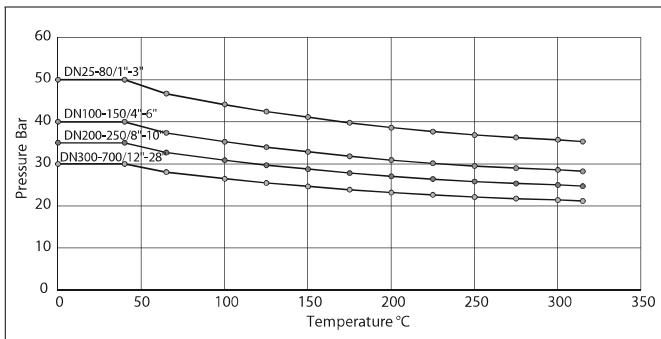


Fig. 6 Maximum pressure differentials in on-off operation, AISI 329 Shaft

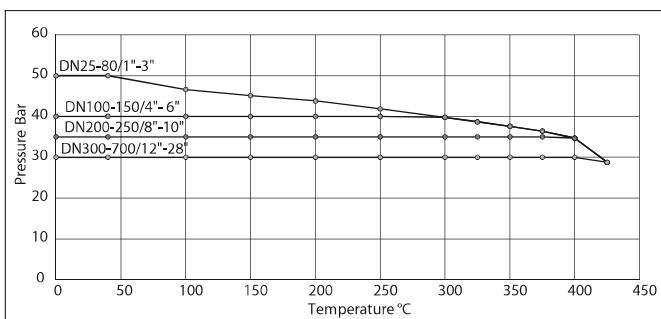


Fig. 7 Maximum pressure differentials in on-off operation, 17-4PH Shaft

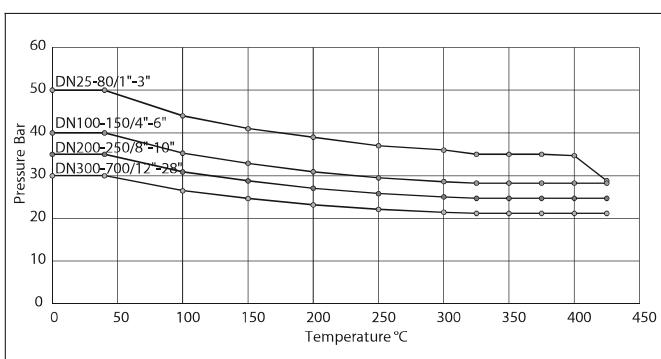


Fig. 8 Max operating pressure differential in control service, RE opening range 0 % - 70 %

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.

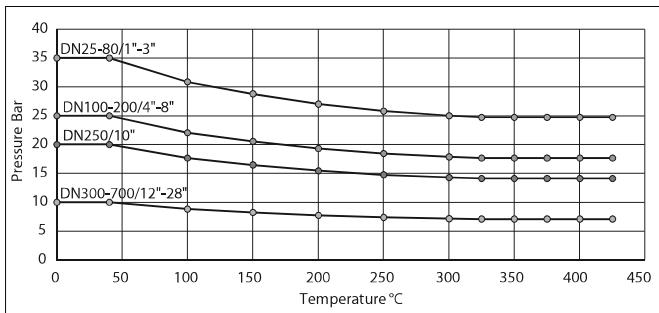


Fig. 9 Max operating pressure differential in control service, RE opening range 70 %–100 %

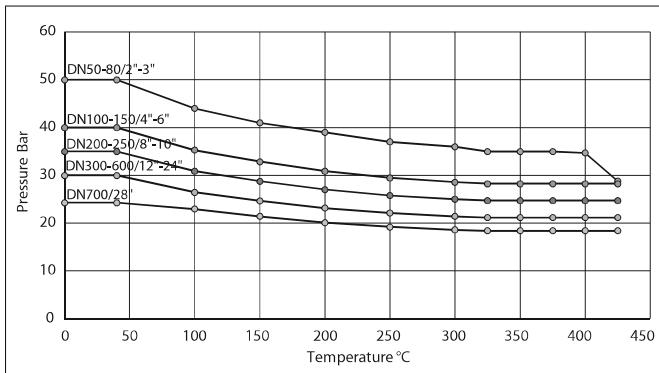


Fig. 10 Max operating pressure differential in control service, Q-RE opening range 0 %–30 %

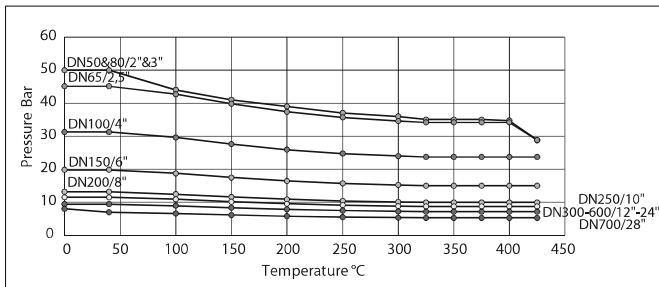


Fig. 11 Max operating pressure differential in control service, Q-RE opening range 30 %–60 %

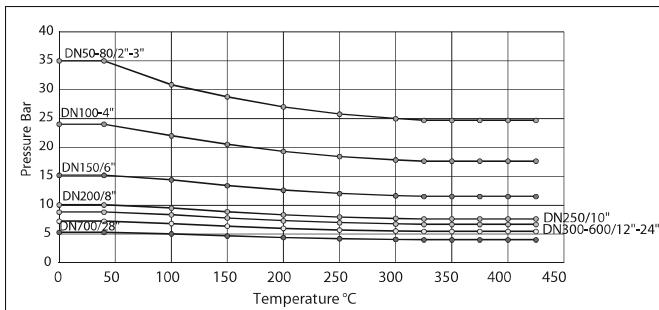


Fig. 12 Max operating pressure differential in control service, Q-RE opening range 60 %–100 %

1.5 Valve approvals

The valve meets the Fire-safe requirements of BS6755/API 607 Edition 3.

1.6 CE marking

The valve meets the requirements of the European Directive 97/23/EC relating to pressure equipment, and has been marked according to the Directive.

1.7 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 Metso 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.

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 AND COMMISSIONING

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 table in 11.19.

Choose flange gaskets according to the operating conditions.

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.

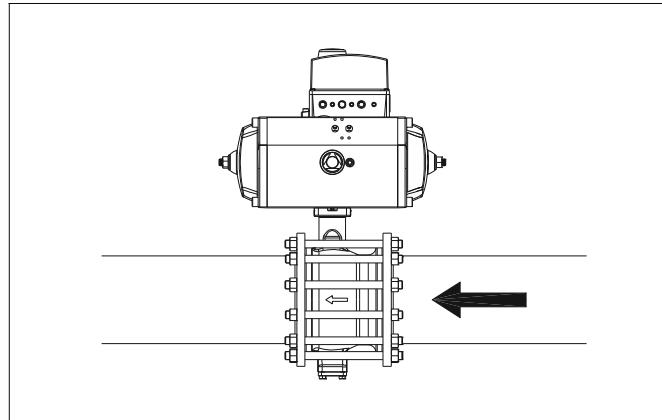


Fig. 14 Installing the valve into pipeline

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.

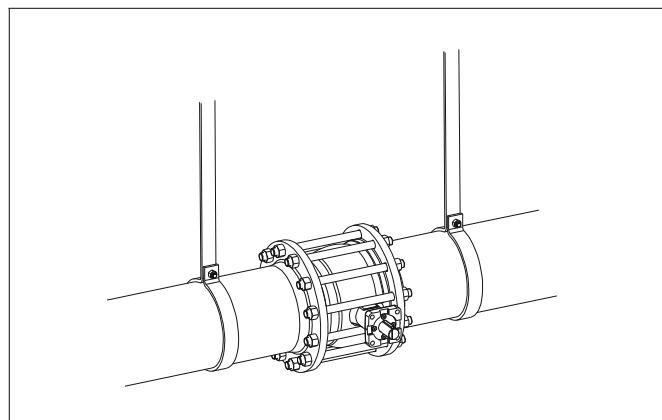


Fig. 15 Supporting the valve

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.

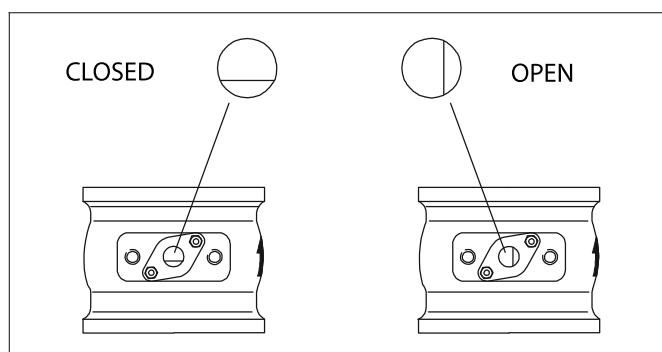


Fig. 16 Closed and open positions

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 Metso Flow Control business for further information.

3.4 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.

4 MAINTENANCE

4.1 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 Metso's 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. Metso 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 Metso 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 Metso 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 Replacing the gland packing

CAUTION:

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

4.2.1 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).

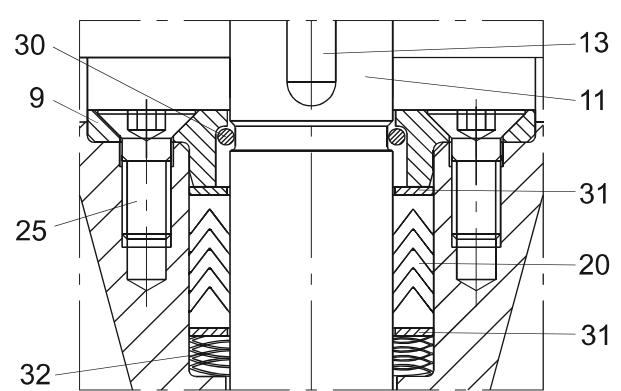


Fig. 17 Gland packing

- 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 2.
- Mount the key (13) on the shaft (11).

Table 1 Torques for gland screws

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

4.2.2 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.

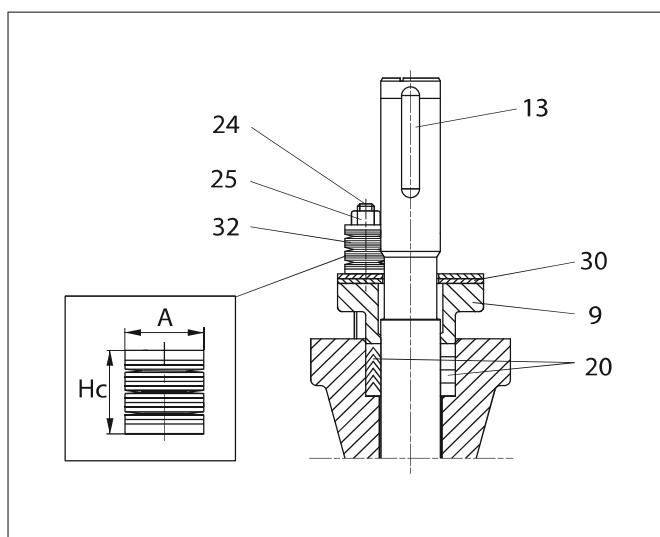


Fig. 18 Gland packing, RE/RE1

- 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 T_t, see the value from Table 3.
- 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 3. 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.

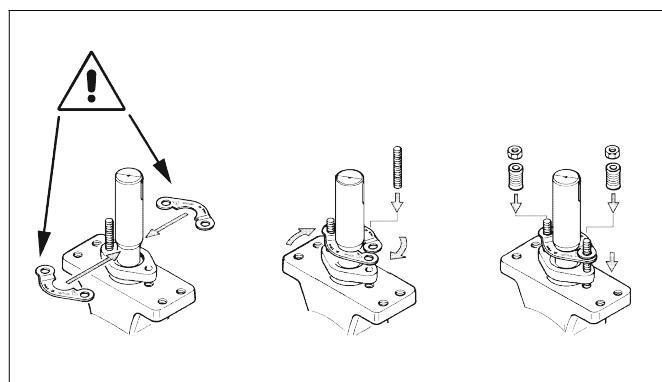


Fig. 19 Installing the retainer plates

Table 2 Tightening of the gland packing

Valve size	A (mm)	Hc (mm)	T _t (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

4.3 Detaching the actuator

CAUTION:

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

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.

4.4 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.

4.5 Replacing the seat

S- or U-seat (not DN25-50) can be changed as described in 4.5.1 & 4.5.2. For DN25-50 and other seats, the valve needs to be dismantled as described in 4.6.

4.5.1 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.

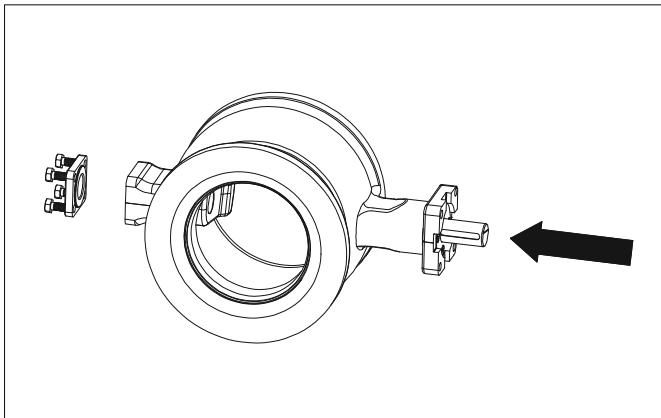


Fig. 21 Removing the blind flange

- DN 65-100 valves can be dismantled, as described in 4.6, 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.
- Turn the valve and lift the seat from the body through the downstream flow port, Fig. 23.
- Clean and check the removed parts.

4.5.2 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



Fig. 22 Knocking off the seat



Fig. 23 Lifting the seat

- 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.

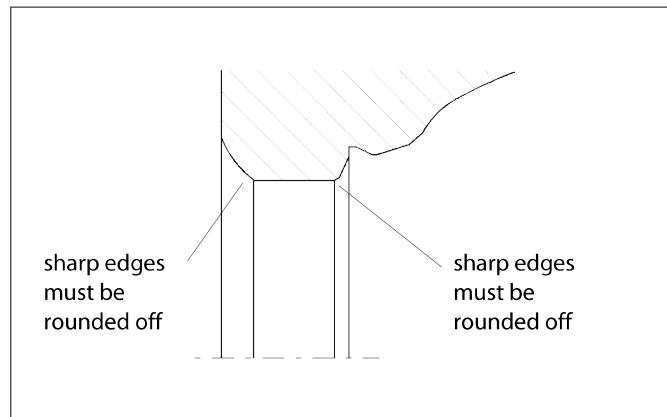


Fig. 24 Rounding the sharp edges

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

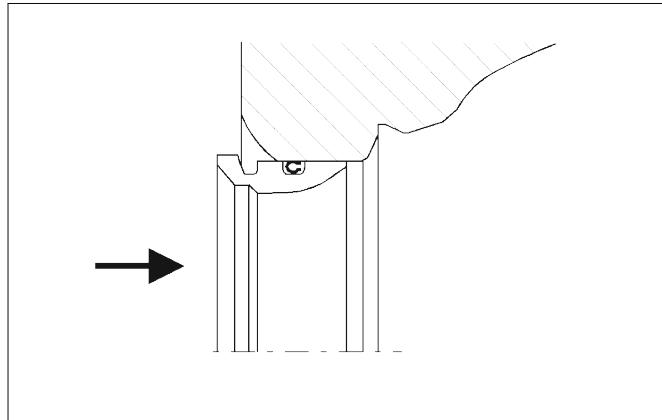


Fig. 25 Precompression of the lip seal

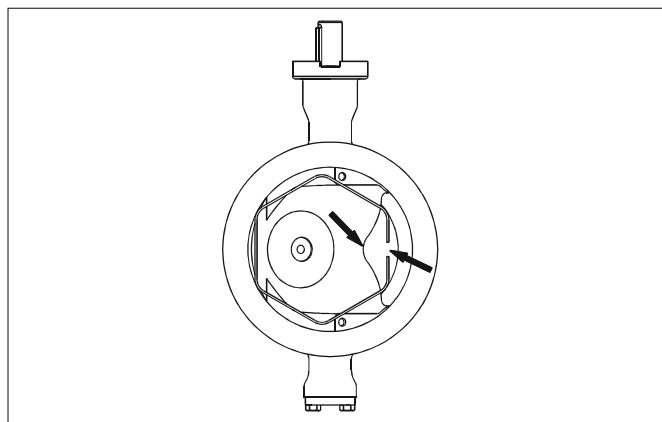


Fig. 26 Mounting the seat

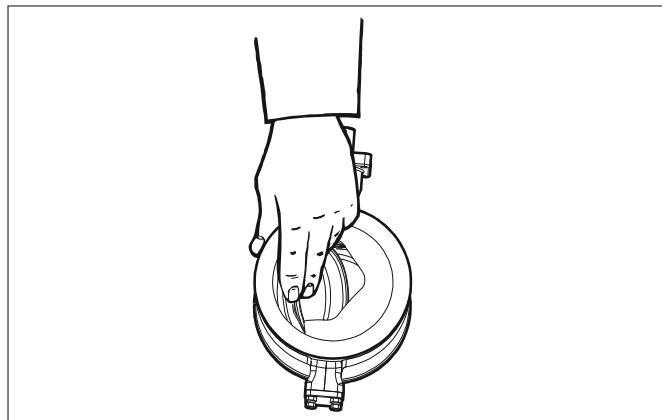


Fig. 27 Slipping the seat into the body

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

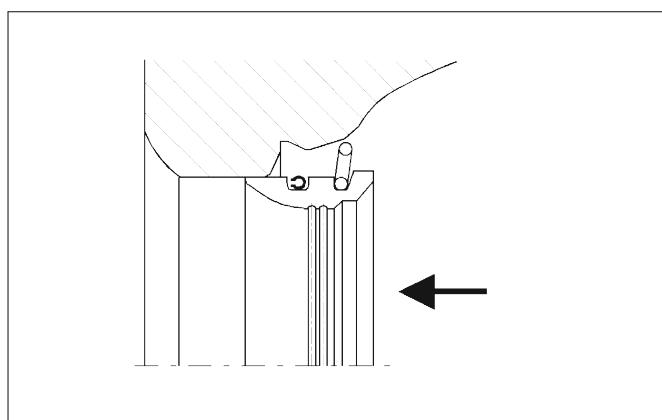


Fig. 28 Pushing the the spring angles against the control face

- Place a screwdriver on each visible spring angle one after the other and knock the spring into the groove, see Fig. 29.

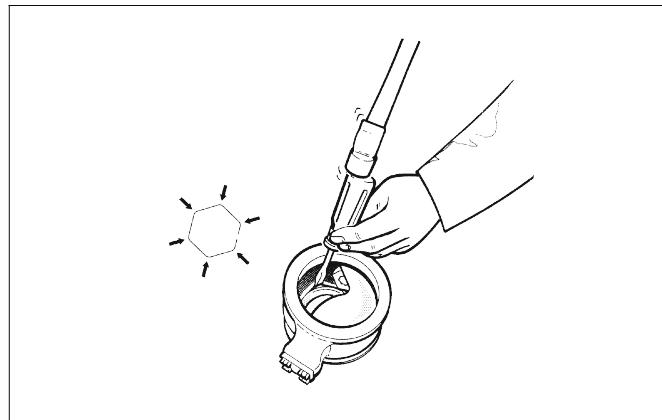


Fig. 29 Knocking the spring into the groove

- 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.

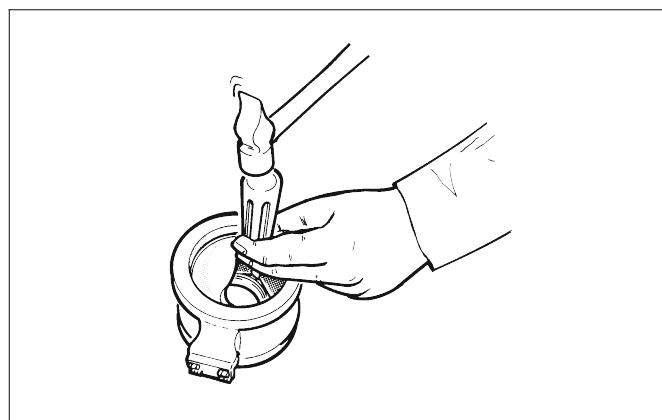


Fig. 30 Knocking the spring after turning the seat around

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

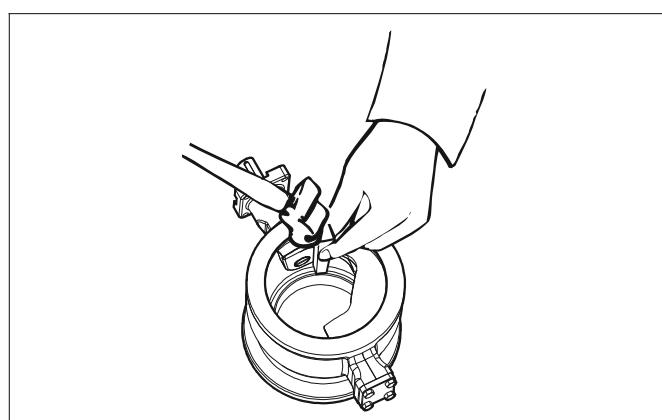


Fig. 31 Securing with a plastic spindle

4.6 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.

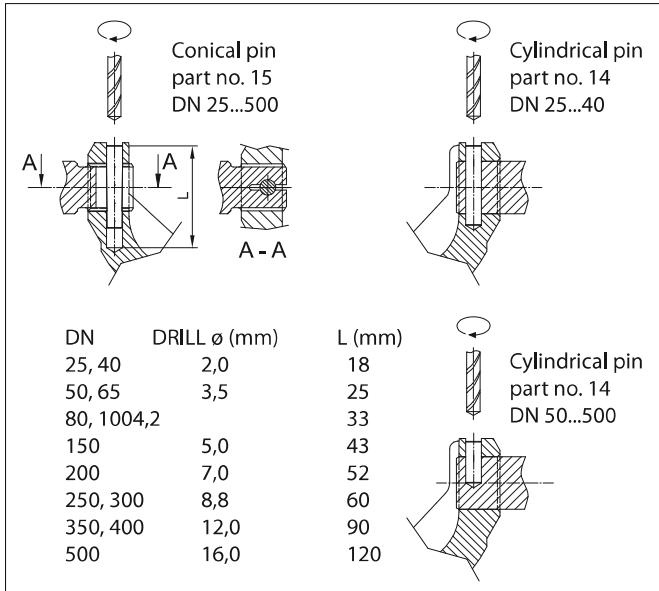


Fig. 32 Drilling the pin

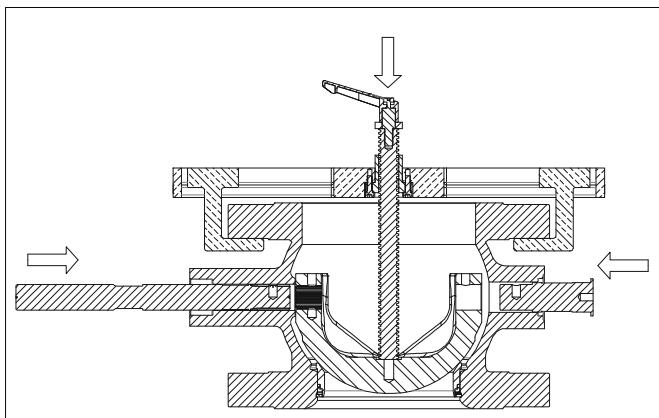


Fig. 33 Installing the shafts

4.7 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.

4.8 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 (4). 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.

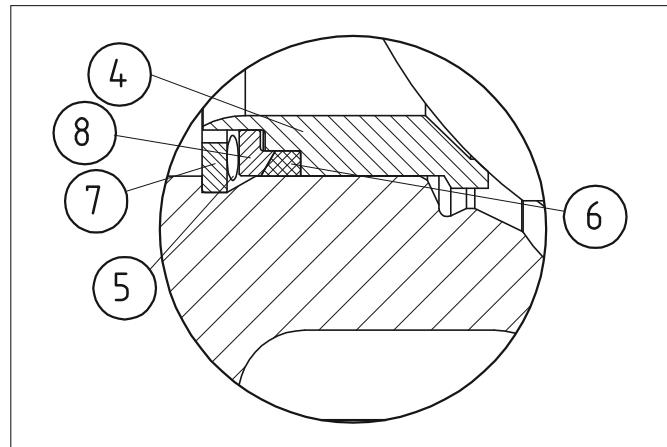


Fig. 34 A-seat

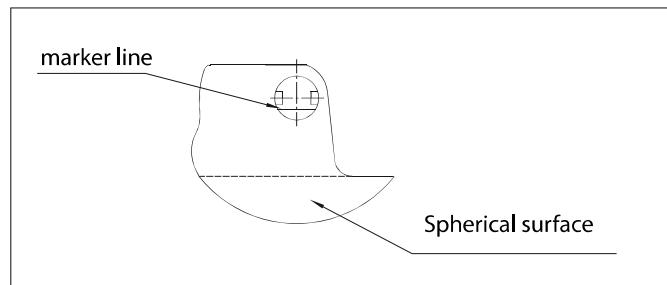


Fig. 35 Segment and shaft positions

- 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.

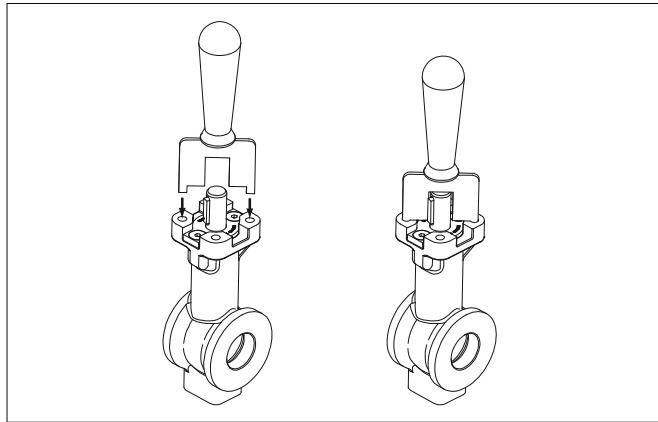


Fig. 36 Using a former to check shaft position

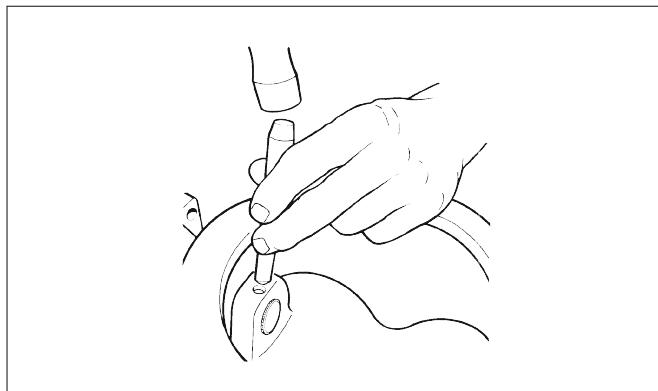


Fig. 37 Locking a pin

- Install the blind flange (10) with gaskets (19), tighten the bolts (26), see Table 3.
- Install the gland packing according to Section 4.2.

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

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 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.

6 INSTALLING AND DETACHING THE ACTUATORS

6.1 General

Different Metso 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.

6.2 Installing EC and EJ actuators

CAUTION:
Beware of the segment movement!

The actuator is attached to a valve via an ISO 5211 standard mounting interface. The actuator is adapted to the valve shaft with a separate bushing. The bushing (II + II) is a two-piece cone-shaped bushing, which is tightened firmly with a tightening screw (I) around the valve shaft.

- Mount the bushing and the tightening screw from the mounting interface side of the actuator, according to Fig. 38. Insert cylindrical pins (III) in the bushing slots, these must be directed into the corresponding slots in the actuator during tightening. Before the installation of the bushing and the tightening screw, remove impurities such as old threadlocking material from the threads of the tightening screw, and apply Loctite 225 or similar threadlock carefully to the threads, as shown in Fig. 38. Turn the tightening screw from inside the actuator shaft using a suitable hex key, Fig. 39.

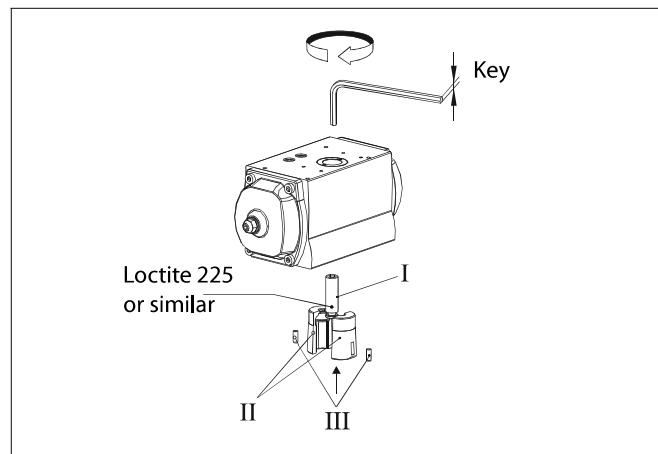


Fig. 38 Cone bushing installation

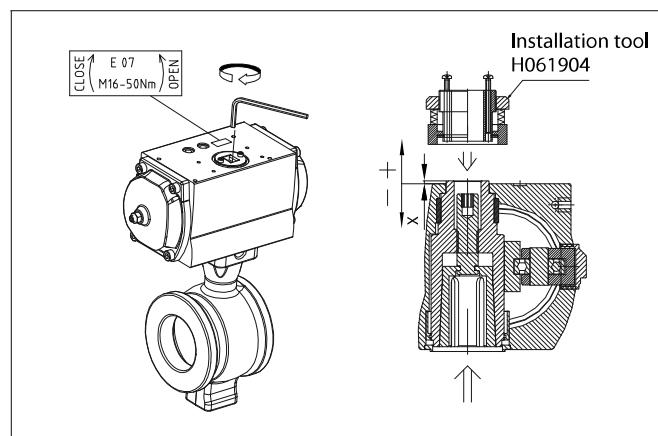


Fig. 39 Tightening of the cone bushing

- Prior to installation, the correct keyway position of the valve has to be checked. The bushing has four keyways, two of which are intended for valves with DIN key and two for valve shafts with ANSI key. The ANSI keyway is located in the middle of the half bushing, and the DIN keyway is located in the split between the bushing halves. Fig. 40 shows the keyway position when the actuator is in a closed position.

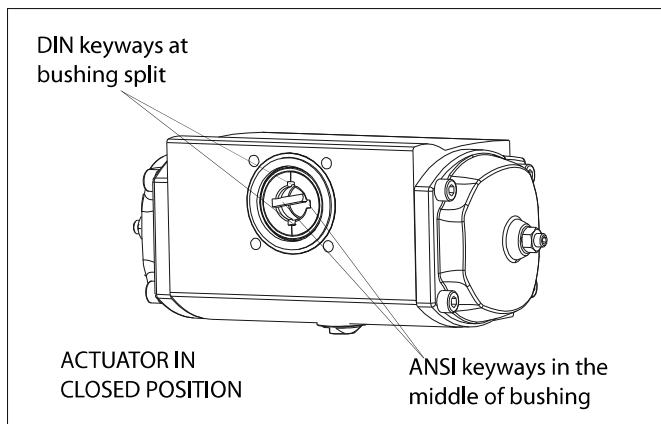


Fig. 40 Keyway positions on the actuator

- The open or closed positions of the actuator can be identified either by using compressed air, see Fig. 41, or by checking the position of the pointer at the end of the drive shaft. The actuator is closed if the pointer on the coupling plate is transverse to the direction of the actuator's main shaft.

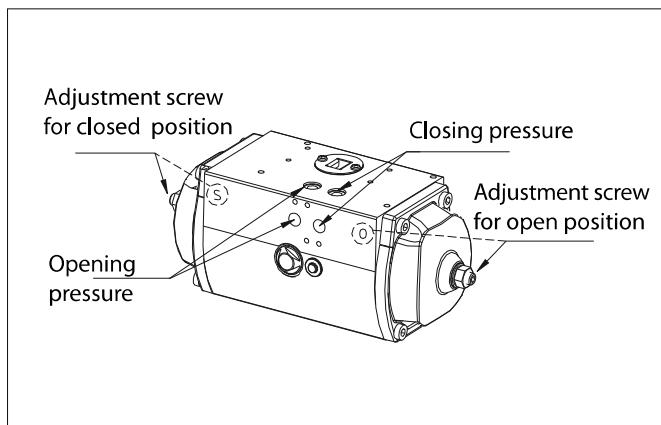


Fig. 41 Actuator connections

- Mount the actuator either directly on the valve, or attach it to the valve bracket with four screws. The tightening screw of the bushing should be loosened before mounting, to allow the shaft to fit easily into the actuator.
- The actuator construction allows axial movement of the drive shaft. Check, before the screw is tightened, that the drive shaft is in the upper position of its axial movement, which is its normal position (the mounting position shown in Fig. 39). Checking is important, as the actuator shaft drops down slightly when the screw is tightened. The drive shaft axial movement can be observed and measured before attachment to a valve. The actuator drive shaft is in the upper position when its upper surface conforms to Table 4, see also Fig. 39.

Table 4 Mounting faces, tightening screws and drive shaft clearances

Size	Mount.	Thread	Key	Nm	~X upper pos. (mm)	~X lower pos. (mm)
EC/EJ05	F05	M12	6	25	4.0	1
EC/EJ07	F07	M16	8	50	1.5	-2
EC/EJ10	F10	M20	10	100	2.5	-2
EC/EJ12	F12	M24	14	200	3.5	-2
EC/EJ14	F14	M36	19	700	4.5	-2

- The drive shaft will automatically find its correct position if the installation tool H061904 (see Fig. 39) is used. The installation tool is attached instead of the coupling plate using M4 screws with the drive shaft in lower position (before the valve is installed). Tighten the nut of the tool in such a way that the tool pulls the drive shaft to the uppermost position. The position may be checked from the side of the tool.
- Install the actuator on the valve and attach the valve mounting screws loosely by hand. Then tighten the tightening screw (I) according to Table 4. The required torque is also marked on a plate close to the drive shaft on the actuator housing. The installation tool is removed, and the coupling plate is reattached. Finally, tighten the valve mounting screws.
- Check the axial position of the drive shaft. The shaft position may not be at the upper or lower position X given in Table 4, or close to those values. Remount the actuator if the position is not correct.

The valve may malfunction if the tightening of the connection has been carried out improperly.

- Finally, the extreme positions of the valve are adjusted with the stop screws at the ends of the actuator. The location of the screws for adjusting the Close and Open positions of the valve are marked with letters on the ends of the actuator housing, see Fig. 41.

6.3 Detaching EC and EJ actuators

The actuator is detached in the same way that it is attached, but the order is reversed.

The actuator must always be depressurized and the air supply pipes removed before detaching the actuator.

- First detach the positioner, or any other accessory, from the actuator, and detach the coupling plate from the drive shaft. Next, the bushing is loosened by turning the tightening screw counter-clockwise. The tightening screw also acts as an extractor. It is highly recommended to use a suitable bushing from the tool set H061544 between the tightening screw (I) and drive shaft. The bushing dimensions are given in Table 5.
- Detach the actuator finally from the valve after the screws that attach the actuator to the valve have been removed.
- Observe the respective positions between the actuator and valve and also between the key and keyway before removal. Attaching the actuator back is then easier.

Table 5 Bushing dimensions

Actuator	Outer dim. (mm)	Inner dim. (mm)	Height (mm)
EC/EJ05	24.5	12.5	15
EC/EJ07	24.5	16.5	32.75
EC/EJ10	24.5	20.5	45

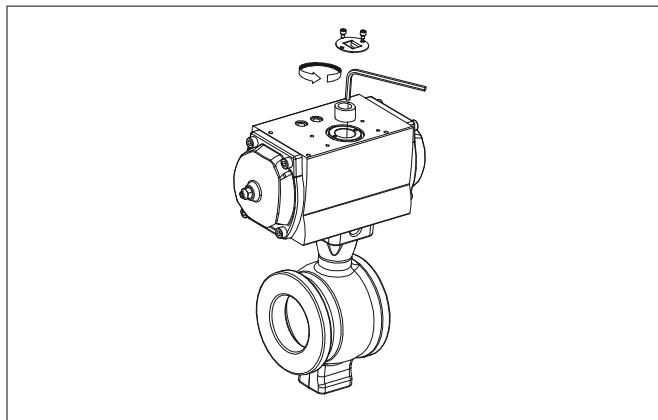


Fig. 42 Detaching an actuator by loosening the tightening screw

6.4 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. 43.
- 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 4.
- Adjust the segment open and closed positions (limits to piston movement) by means of the actuator stop screws, see Fig. 43. 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!

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. 44.

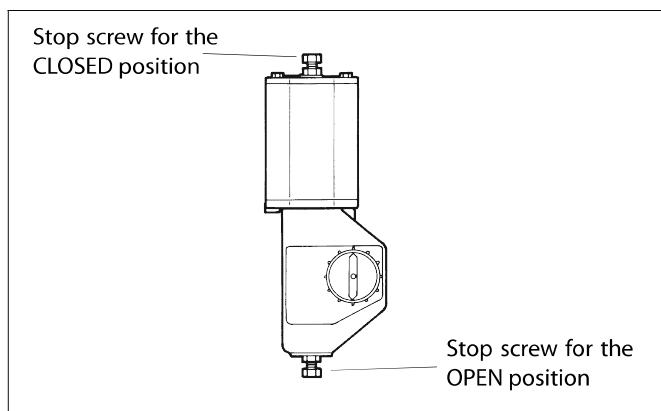


Fig. 43 Open and closed positions of a B1 actuator

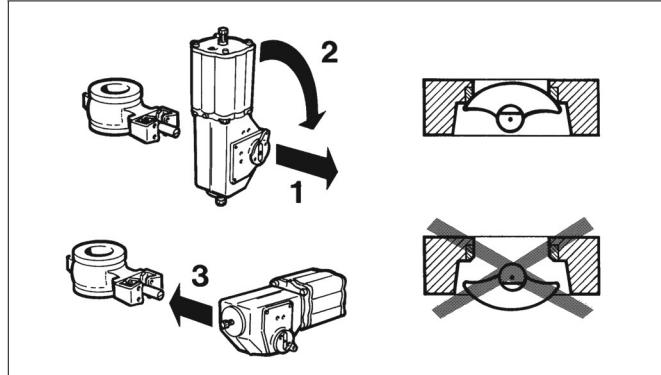


Fig. 44 Changing the actuator position

- 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 segment 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.

6.5 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.

6.5.1 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.

6.5.2 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.

6.6 Detaching B series actuators

- 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. 45. The tool can be ordered from the manufacturer.

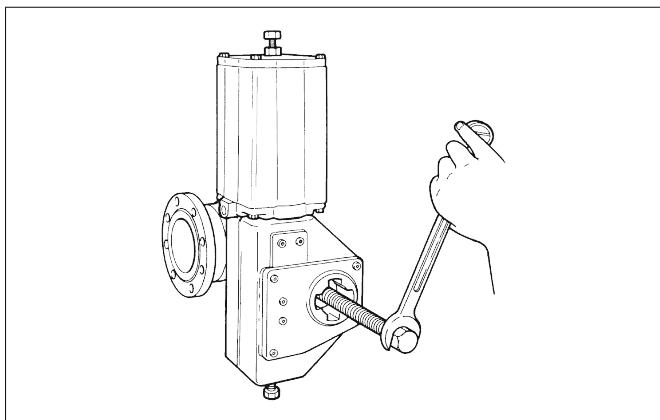


Fig. 45 Detaching an B series actuator

- Remove the bracket and coupling, if any.

6.7 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. 46 for the correct installation position.

Table 6 Possible malfunctions

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 segment	Replace segment
	Segment in a wrong position relative to the actuator	Select the correct keyway in the actuator
Irregular valve movements	Actuator or positioner malfunction	Check the operation of the actuator and positioner
	Process medium accumulated on the segment surface	Clean the segment
	Segment or seat damaged	Replace the segment or seat
	Crystallizing medium has entered the bearing spaces	Flush the bearing spaces
Gland packing is leaking	Gland packing set worn or damaged	Replace the gland packing set

The valve is behind the actuator!

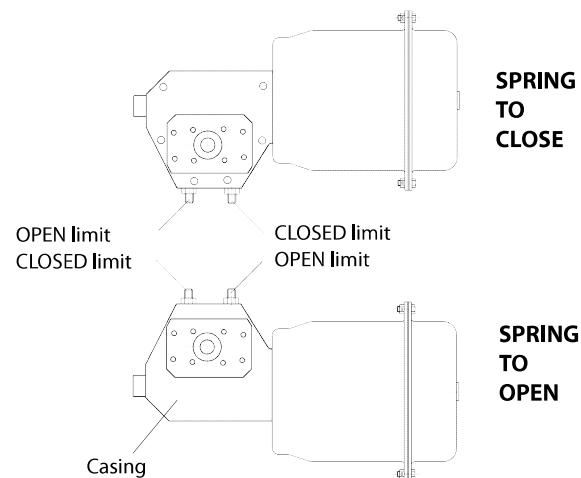


Fig. 46 Installation of a Quadra-Powr actuator and adjustment of the open and closed limits

- 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 4.
- 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 Fig. 46.

Keep your fingers out of the flow port!

7 MALFUNCTIONS

Table 6 lists malfunctions that might occur after prolonged use.

8 TOOLS

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

- For removal of the actuator

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.

9 ORDERING SPARE PARTS

NOTE:

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

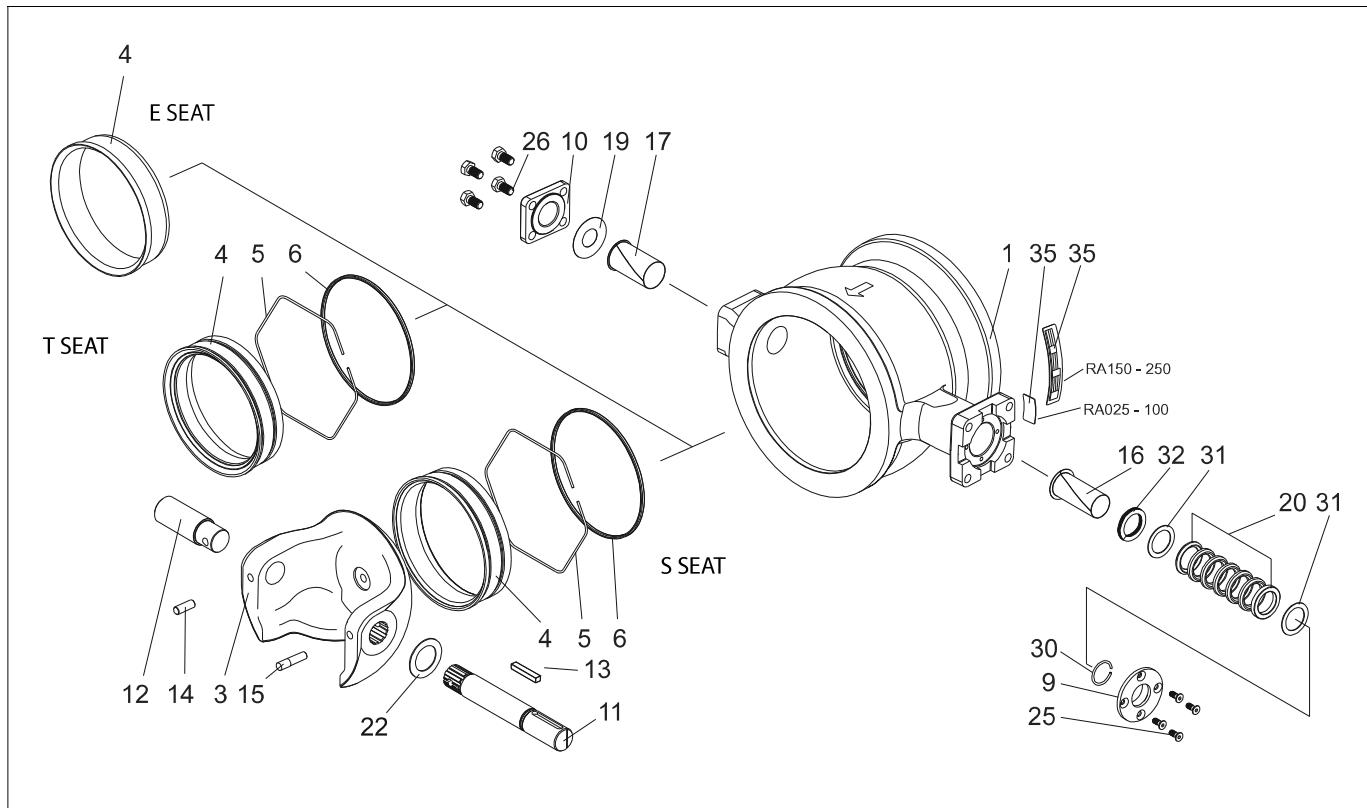
When ordering spare parts, always include the following information:

- 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.

10 EXPLODED VIEWS AND PARTS LISTS

10.1 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	

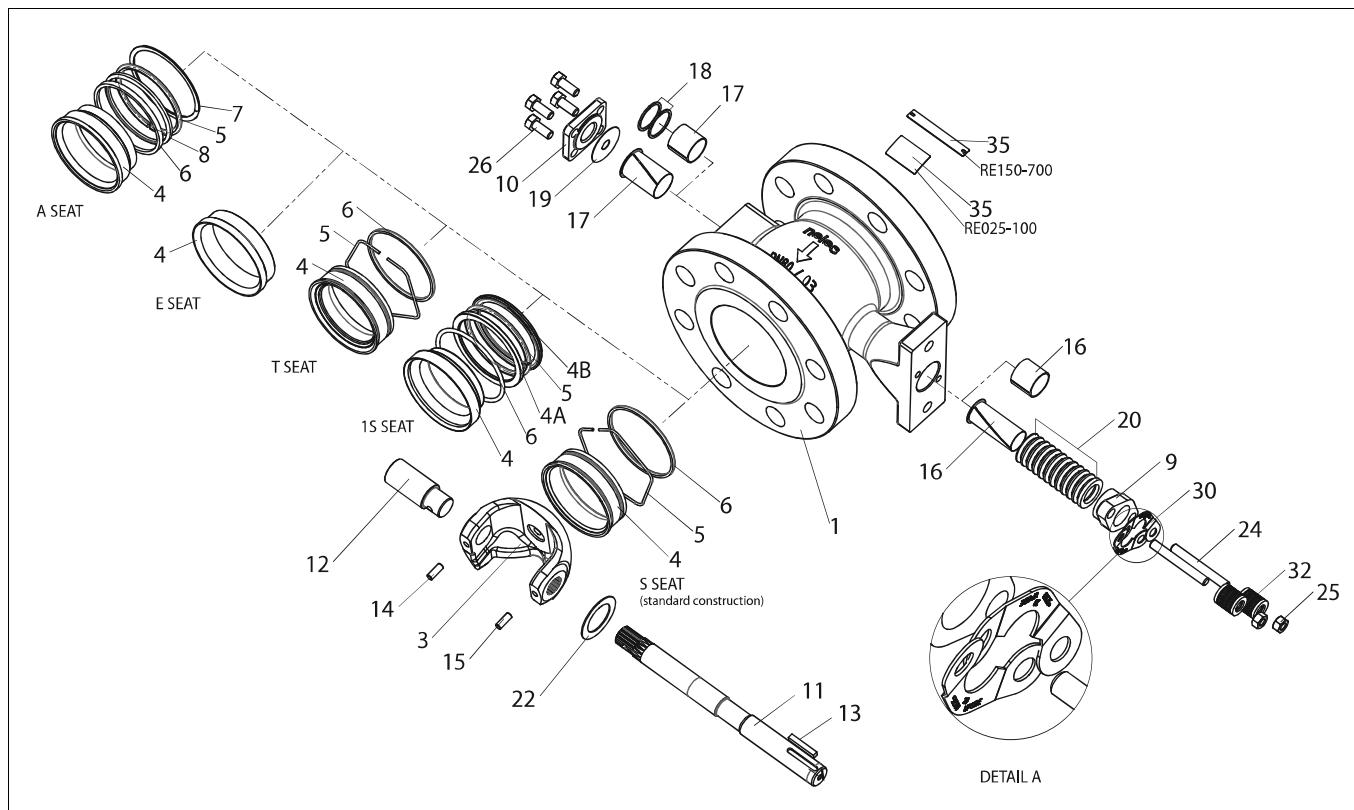
Spare part set category: Recommended soft parts, always needed for the repair. Delivered as a set.

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.

10.2 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.

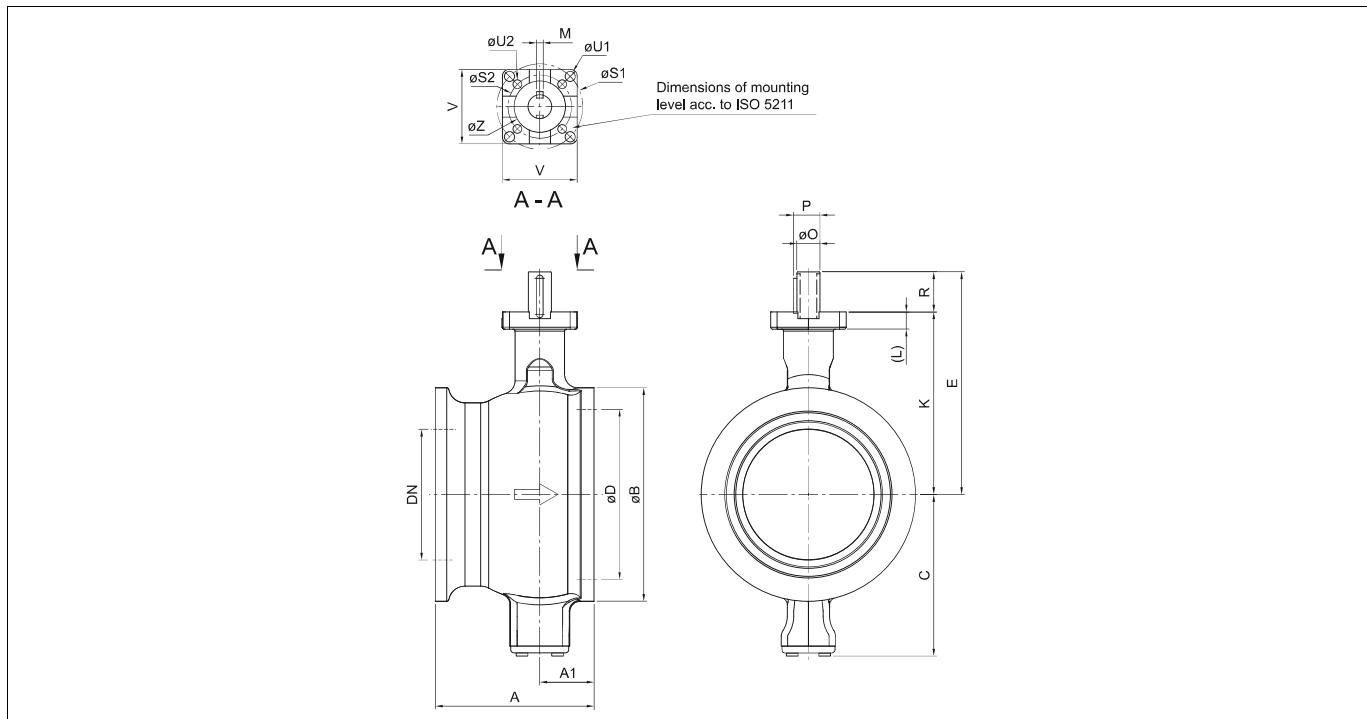
Spare part category 2: Parts for replacing the seat. Delivered as a set.

Spare part category 3: Parts for replacing the closing element.

Spares for the full overhaul: All parts from the categories 1, 2 and 3.

11 DIMENSIONS AND WEIGHTS

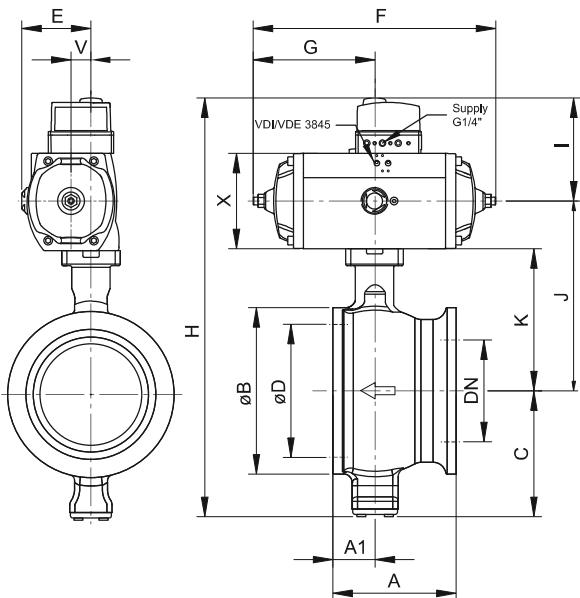
11.1 Series RA



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

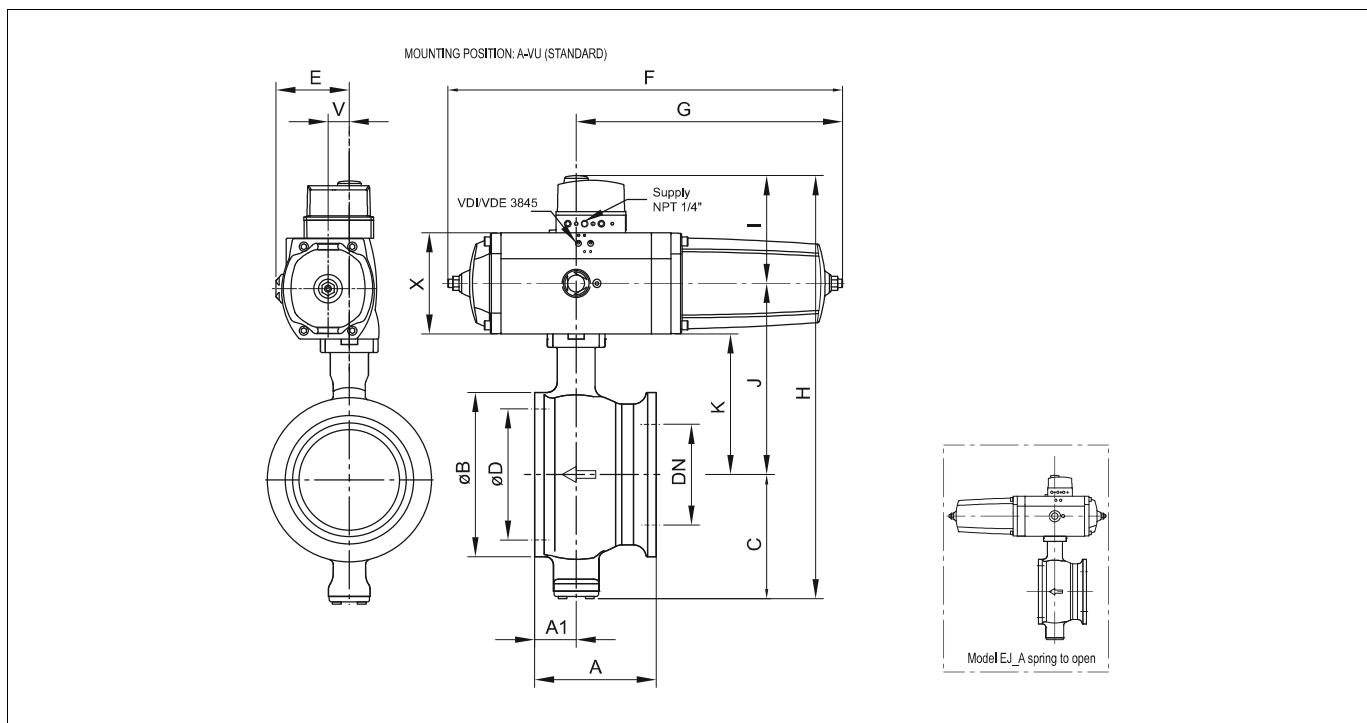
11.2 RA - EC

MOUNTING POSITION: A-VU (STANDARD)



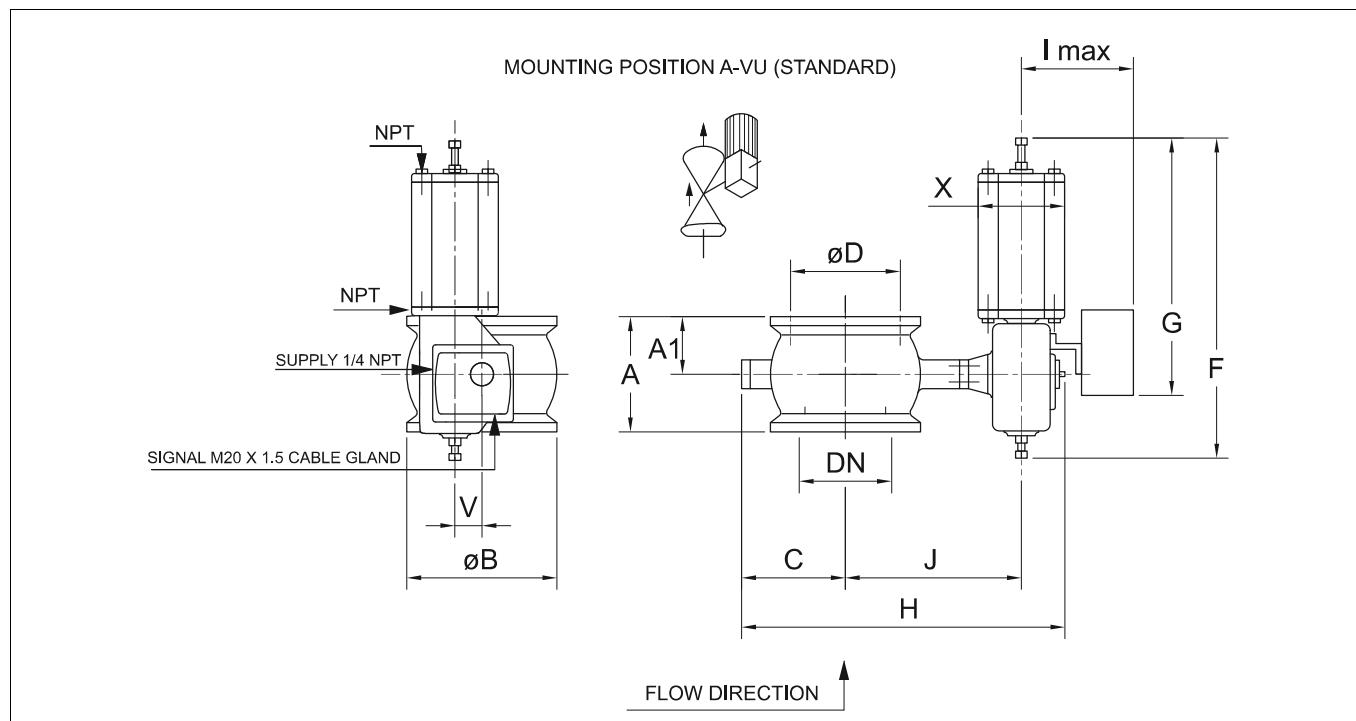
Type	Actuator mounting	DN	Dimensions, mm													VDI/ VDE 3845	kg	
			A1	A	øB	C	øD	E	F	G	H	I	J	K	V	X		
RA	EC05 / F05	25	21	50	64	56	33	64	256	128	364	160	148	102	18	91	-	7
		40	21	60	82	65	49	64	256	128	380	160	155	109	18	91	-	8
		50	27	75	100	91	60	64	256	128	417	160	166	120	18	91	-	10
		65	40	100	118	97	75	64	256	128	429	160	172	126	18	91	-	11
	EC07 / F07	50	27	75	100	91	60	81	308	154	442	172	179	120	24	117	G1/4"	12
		65	40	100	118	97	75	81	308	154	454	172	185	126	24	117	G1/4"	14
		80	38	100	130	108	89	81	308	154	481	172	201	142	24	117	G1/4"	15
		100	41	115	158	120	115	81	308	154	502	172	210	151	24	117	G1/4"	18
	EC10 / F10	80	38	100	130	108	89	112	406	203	519	191	220	142	32	155	G1/4"	23
		100	41	115	158	120	115	112	406	203	540	191	229	151	32	155	G1/4"	26
		150	55	160	216	174	164	112	406	203	643	191	278	200	32	155	G1/4"	40
		200	70	200	268	201	205	112	406	203	705	191	313	235	32	155	G1/4"	58
	EC12 / F12	150	55	160	216	174	164	145	524	262	688	214	300	200	42	200	G1/4"	57
		200	70	200	268	201	205	145	524	262	750	214	335	235	42	200	G1/4"	75
		250	82	240	324	251	259	145	524	262	842	214	377	277	42	200	G1/4"	101
	EC14 / F14	250	82	240	324	251	259	196	696	348	901	243	407	277	56	259	G1/4"	140

11.3 RA - EJ, EJ_A



Type	Actuator mounting	DN	Dimensions, mm													VDI/ VDE 3845	kg	
			A1	A	øB	C	øD	E	F	G	H	I	J	K	V	X		
RA	EJ05 / F05	25	21	50	64	56	33	64	363	235	364	160	148	102	18	91	-	9
		40	21	60	82	65	49	64	363	235	380	160	155	109	18	91	-	10
		50	27	75	100	91	60	64	363	235	417	160	166	120	18	91	-	11
		65	40	100	118	97	75	64	363	235	429	160	172	126	18	91	-	12
	EJ07 / F07	50	27	75	100	91	60	81	454	300	442	172	179	120	24	117	G1/4"	15
		65	40	100	118	97	75	81	454	300	454	172	185	126	24	117	G1/4"	17
		80	38	100	130	108	89	81	454	300	481	172	201	142	24	117	G1/4"	18
		100	41	115	158	120	115	81	454	300	502	172	210	151	24	117	G1/4"	21
	EJ10 / F10	80	38	100	130	108	89	112	606	403	519	191	220	142	32	155	G1/4"	29
		100	41	115	158	120	115	112	606	403	540	191	229	151	32	155	G1/4"	32
		150	55	160	216	174	164	112	606	403	643	191	278	200	32	155	G1/4"	47
		200	70	200	268	201	205	112	606	403	705	191	313	235	32	155	G1/4"	65
		250	55	160	216	174	164	145	800	538	688	214	300	200	42	200	G1/4"	76
	EJ12 / F12	200	70	200	268	201	205	145	800	538	750	214	335	235	42	200	G1/4"	94
		250	82	240	324	251	259	145	800	538	842	214	377	277	42	200	G1/4"	120
	EJ14 / F14	250	82	240	324	251	259	196	1052	704	901	243	407	277	56	259	G1/4"	178

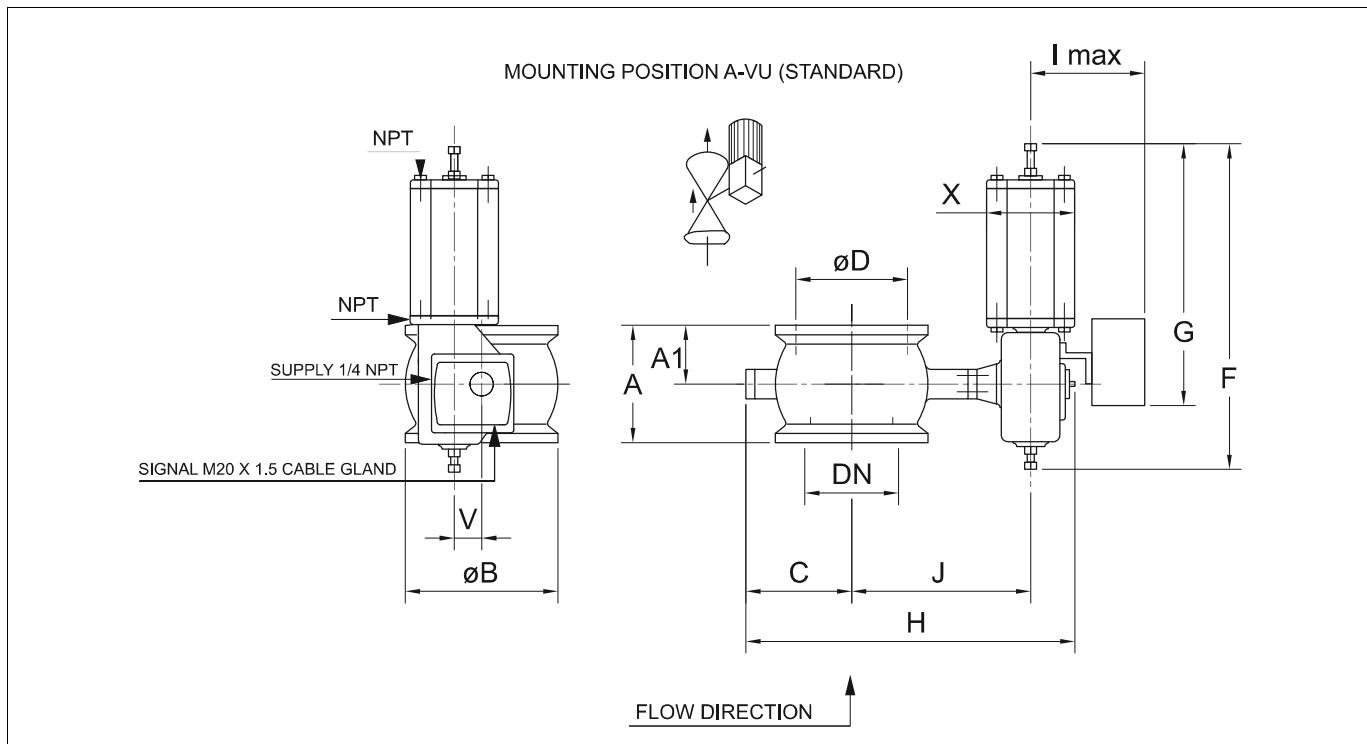
11.4 RA-B1C



Type	Max $\Delta p^1)$	Dimensions, mm												NPT	kg	
		DN	A	A1	ϕB	C	ϕD	F	G	X	V	J	H			
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

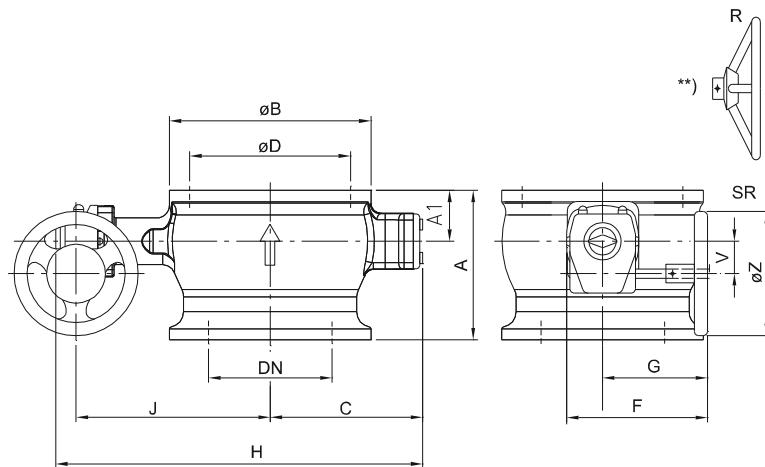
11.5 RA - B1J, B1JA



Type	Max Δp ¹⁾	Dimensions, mm													NPT	kg
		DN	A	A1	$\varnothing B$	C	$\varnothing D$	F	G	X	V	J	H	I _{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
								800	620	215	65	324	635	235	1/2	100
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															
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

11.6 RA - M

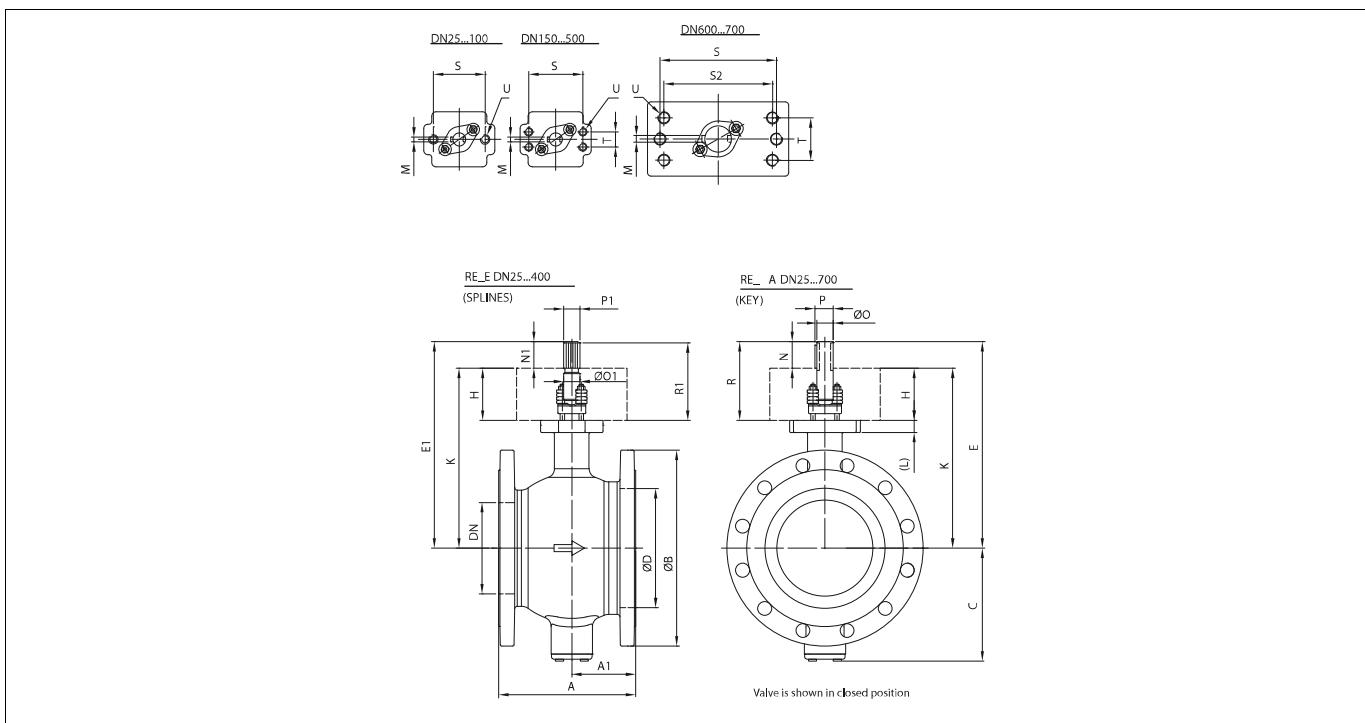


Type	Actuator/ mounting ISO 5211	DN	Dimensions, mm										kg	
			øD	A	A1	øB	C	F	G	H	J	V	øZ	
RA	M07/15F05	25	33/38*	50	21	64	56	235	184	223	131	52	160	5.1
	M07/15F05	40	49	60	21	82	65	235	184	238	137	52	160	6.2
	M07/15F05	50	60	75	27	100	91	235	184	275	148	52	160	7.5
	M07/15F05	65	75	100	40	118	97	235	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.

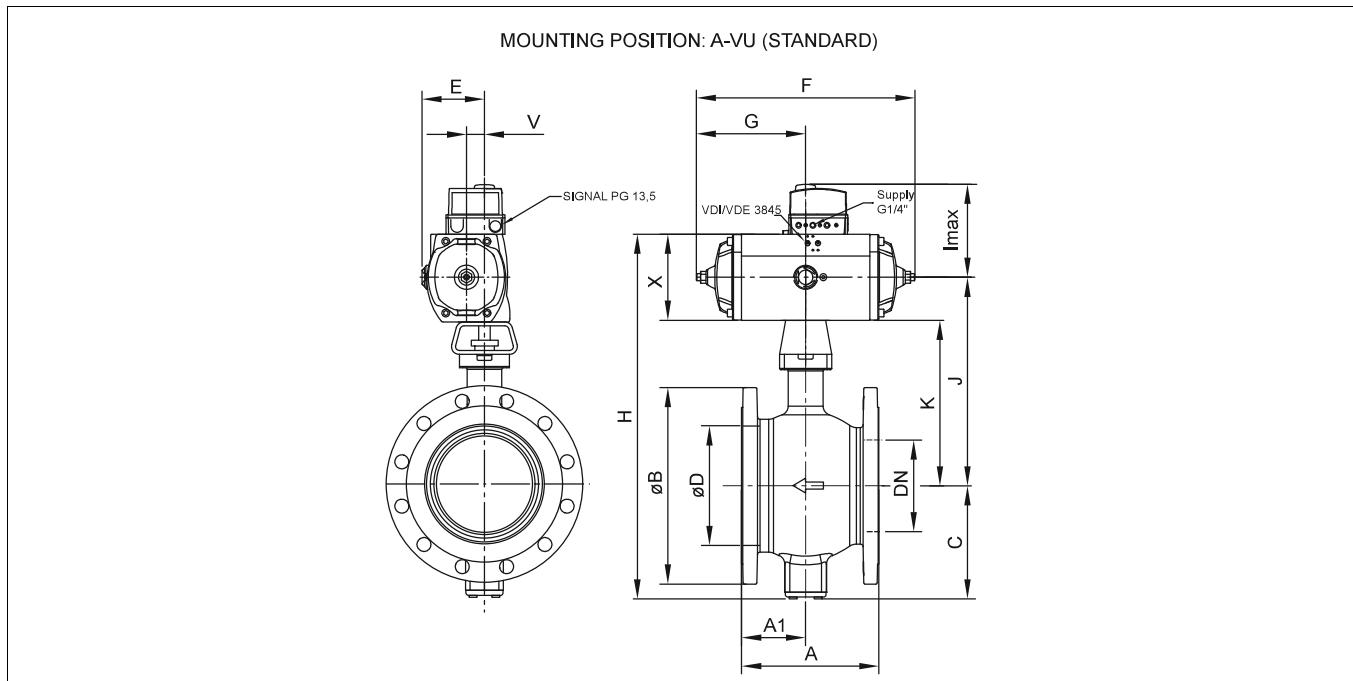
11.7 Series RE



DN / inch	Dimensions, mm									Shaft dimensions, mm											
	A1	A	C	ØD	K	S/S2	T	U	L	H	RE_A (Key)					RE_E (Splines)					
											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		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	125	4.9	115	4.6	115	4.6	115	4.6	115	4.6
40 / 1 1/2"	125	4.6	155	7.5	150	6.2	150	6.2	150	6.2	150	6.2
50 / 2"	150	7.4	165	9.5	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	200	16	200	16	200	16	200	16
100 / 4"	230	21	255	29	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	-	-

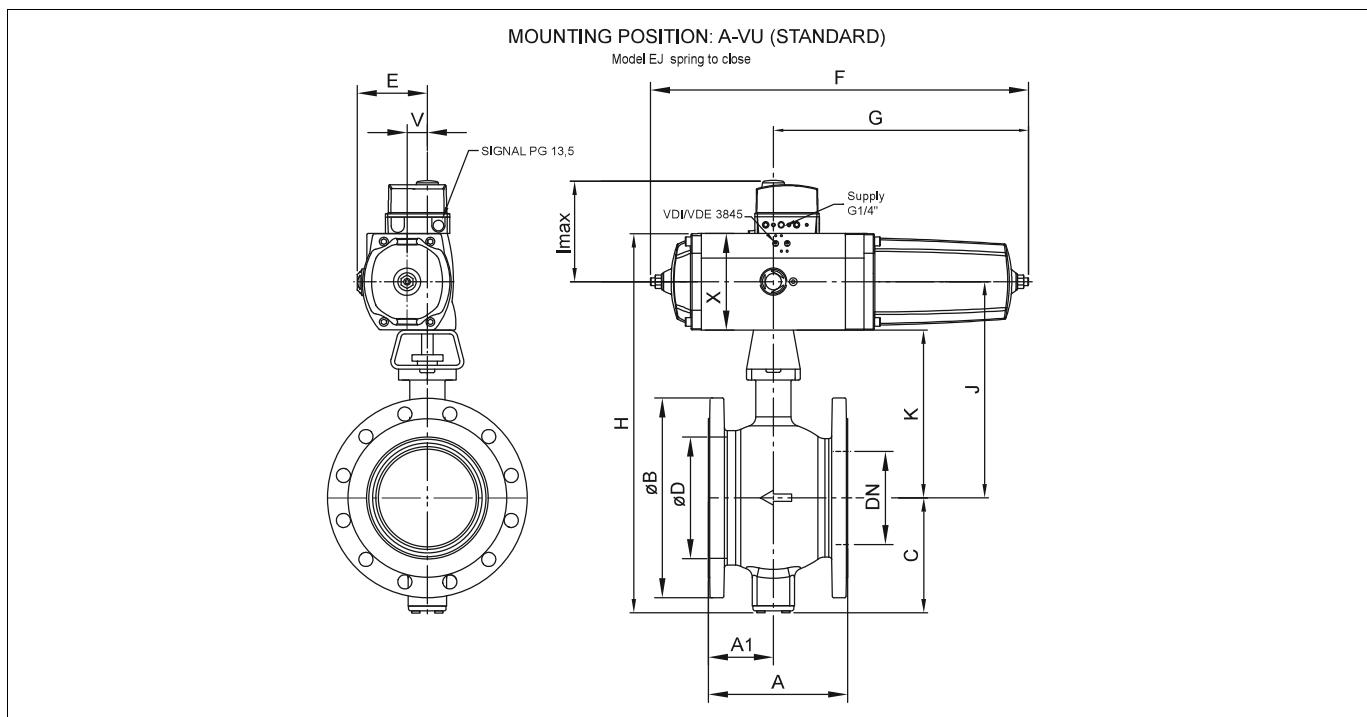
11.8 RE - EC



DN / inch	Max $\Delta p^1)$	Actuator	Dimensions, mm												
			A	A1	C	ϕD	E	F	G	H	I_{max}	J	K	V	X
25 / 1"	50	EC05	102	51	56	33	64	256	128	329	215	228	182	18	91
40 / 1 1/2"	50	EC05	114	57	65	49	64	256	128	345	215	235	189	18	91
50 / 2"	35	EC05	124	62	91	60	64	256	128	382	215	246	200	18	91
	50	EC07	124	62	91	60	81	308	154	408	228	259	200	24	117
65 / 2 1/2"	20	EC05	145	72.5	97	75	64	256	128	395	160	252	207	18	91
	50	EC07	145	72.5	97	75	81	308	154	421	172	265	207	24	117
80 / 3"	32	EC07	165	82.5	108	89	81	308	154	457	228	291	232	24	117
	50	EC10	165	82.5	108	89	112	406	203	495	247	310	232	32	155
100 / 4"	23	EC07	194	97	120	113	81	308	154	478	228	300	241	24	117
	50	EC10	194	97	120	113	112	406	203	509	247	319	241	32	155
150 / 6"	24	EC10	229	114.5	174	164	112	406	203	619	247	368	290	32	155
	50	EC12	229	114.5	174	164	145	524	262	664	270	390	290	42	200
200 / 8"	15	EC10	243	111.5	201	205	112	406	203	701	247	423	345	32	155
	35	EC12	243	111.5	201	205	145	524	262	746	270	445	345	42	200
250 / 10"	20	EC12	297	138.5	251	259	145	524	262	838	270	487	387	42	200
	45	EC14	297	138.5	251	259	196	696	348	897	300	517	387	56	259
300 / 12"	10	EC12	338	154	269	300	145	524	262	914	270	545	445	42	200
	27	EC14	338	154	269	300	196	696	348	973	300	575	445	56	259
350 / 14"	15	EC14	400	175	311	350	196	696	348	1056	300	616	486	56	259
400 / 16"	12	EC14	400	160	353	400	196	696	348	1165	300	683	553	56	259

DN / inch	Actuator	Flange outside diameter B ja and total weights, kg (Valve + actuator + positioner)											
		REC, ASME 150		RED, ASME 300		REJ, PN 10		REK, PN 16		REL, PN 25		REM, PN 40	
		ϕB	kg	ϕB	kg	ϕB	kg	ϕB	kg	ϕB	kg	ϕB	kg
25 / 1"	EC05	108	11	124	12.5	115	12	115	12	115	12	115	12
40 / 1 1/2"	EC05	127	12	155	15	150	13.5	150	13.5	150	13.5	150	13.5
50 / 2"	EC05	152	15	165	17	165	16.5	165	16.5	165	16.5	165	16.5
	EC07	152	17.5	165	19.5	165	19	165	19	165	19	165	19
65 / 2 1/2"	EC05	185	20	-	-	185	20	185	20	185	20	185	20
	EC07	185	24	-	-	185	24	185	24	185	24	185	24
80 / 3"	EC07	191	24	210	29	200	26	200	26	200	26	200	26
	EC10	191	32	210	37	200	34	200	34	200	34	200	34
100 / 4"	EC07	229	31	254	39	220	28	220	28	235	31	235	31
	EC10	229	39	254	47	220	36	220	36	235	39	235	39
150 / 6"	EC10	279	59	318	74	285	57	285	57	300	62	300	62
	EC12	279	76	318	91	285	74	285	74	300	79	300	79
200 / 8"	EC10	343	70	381	91	340	76	340	80	360	84	375	91
	EC12	343	99	381	120	340	93	340	97	360	101	375	108
250 / 10"	EC12	406	128	450	176	405	122	405	121	425	138	450	162
	EC14	406	167	450	215	405	161	405	160	425	177	450	201
300 / 12"	EC12	483	179	520	236	460	161	460	160	485	185	520	219
	EC14	483	218	520	275	460	200	460	199	485	224	520	258
350 / 14"	EC14	534	280	584	361	505	255	520	260	555	300	580	343
400 / 16"	EC14	597	341	648	432	565	311	580	316	620	367	660	423

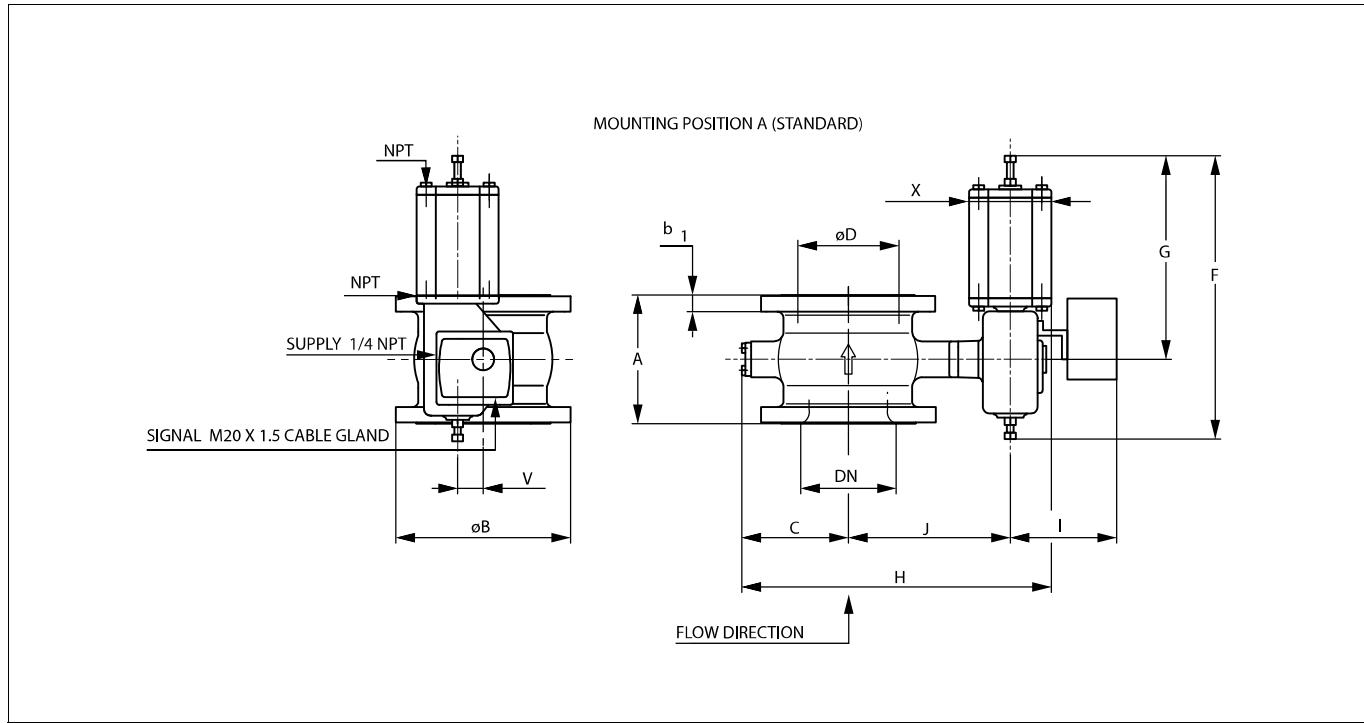
11.9 RE - EJ, EJ_A



DN / inch	Max Δp ¹⁾	Actuator	Dimensions, mm												
			A	A1	C	ϕD	E	F	G	H	I_{max}	J	K	V	X
25 / 1"	50	EJ05	102	51	56	33	64	363	235	329	215	228	182	18	91
40 / 1 1/2"	50	EJ05	114	57	65	49	64	363	235	345	215	235	189	18	91
50 / 2"	35	EJ05	124	62	91	60	64	363	235	382	215	246	200	18	91
	50	EJ07	124	62	91	60	81	454	300	408	228	259	200	24	117
65 / 2 1/2"	20	EJ05	145	72.5	97	75	64	363	235	395	160	252	207	18	91
	50	EJ07	145	72.5	97	75	81	454	300	421	172	265	207	24	117
80 / 3"	33	EJ07	165	82.5	108	89	81	454	300	457	228	291	232	24	117
	50	EJ10	165	82.5	108	89	112	606	403	495	247	310	232	32	155
100 / 4"	24	EJ07	194	97	120	113	81	454	300	478	228	300	241	24	117
	50	EJ10	194	97	120	113	112	606	403	509	247	319	241	32	155
150 / 6"	24	EJ10	229	114.5	174	164	112	606	403	619	247	368	290	32	155
	50	EJ12	229	114.5	174	164	145	800	538	664	270	390	290	42	200
200 / 8"	15	EJ10	243	111.5	201	205	112	606	403	701	247	423	345	32	155
	35	EJ12	243	111.5	201	205	145	800	538	746	270	445	345	42	200
250 / 10"	20	EJ12	297	138.5	251	259	145	800	538	838	270	487	387	42	200
	50	EJ14	297	138.5	251	259	196	1052	704	897	300	517	387	56	259
300 / 12"	10	EJ12	338	154	269	300	145	800	538	914	270	545	445	42	200
	30	EJ14	338	154	269	300	196	1052	704	973	300	575	445	56	259
350 / 14"	16	EJ14	400	175	311	350	196	1052	704	1056	300	616	486	56	259
400 / 16"	13	EJ14	400	160	353	400	196	1052	704	1165	300	683	553	56	259

DN / inch	Actuator	Flange outside diameter B and total weights, kg (valve + actuator + positioner)											
		REC, ASME 150		RED, ASME 300		REJ, PN 10		REK, PN 16		REL, PN 25		REM, PN 40	
		ϕB	kg	ϕB	kg	ϕB	kg	ϕB	kg	ϕB	kg	ϕB	kg
25 / 1"	EJ05	108	12.5	124	14	115	13.5	115	13.5	115	13.5	115	13.5
40 / 1 1/2"	EJ05	127	13.5	155	16.5	150	15	150	15	150	15	150	15
50 / 2"	EJ05	152	16.5	165	18.5	165	18	165	18	165	18	165	18
	EJ07	152	20.5	165	22.5	165	22	165	22	165	22	165	22
65 / 2 1/2"	EJ05	185	22	185	22	185	22	185	22	185	22	185	22
	EJ07	185	26	185	26	185	26	185	26	185	26	185	26
80 / 3"	EJ07	191	27	210	32	200	29	200	29	200	29	200	29
	EJ10	191	39	210	44	200	41	200	41	200	41	200	41
100 / 4"	EJ07	229	34	254	42	220	31	220	31	235	34	235	34
	EJ10	229	46	254	54	220	43	220	43	235	46	235	46
150 / 6"	EJ10	279	66	318	81	285	64	285	64	300	69	300	69
	EJ12	279	95	318	110	285	93	285	93	300	98	300	98
200 / 8"	EJ10	343	77	381	106	340	82	340	87	360	91	375	98
	EJ12	343	118	381	139	340	112	340	116	360	120	375	127
250 / 10"	EJ12	406	147	450	195	405	141	405	140	425	157	450	181
	EJ14	406	205	450	253	405	199	405	198	425	215	450	239
300 / 12"	EJ12	483	198	520	255	460	180	460	179	485	204	520	238
	EJ14	483	256	520	313	460	238	460	238	485	262	520	296
350 / 14"	EJ14	534	318	584	399	505	293	520	298	555	338	580	381
400 / 16"	EJ14	597	379	648	470	565	349	580	354	620	405	660	461

11.10 RE-B1C

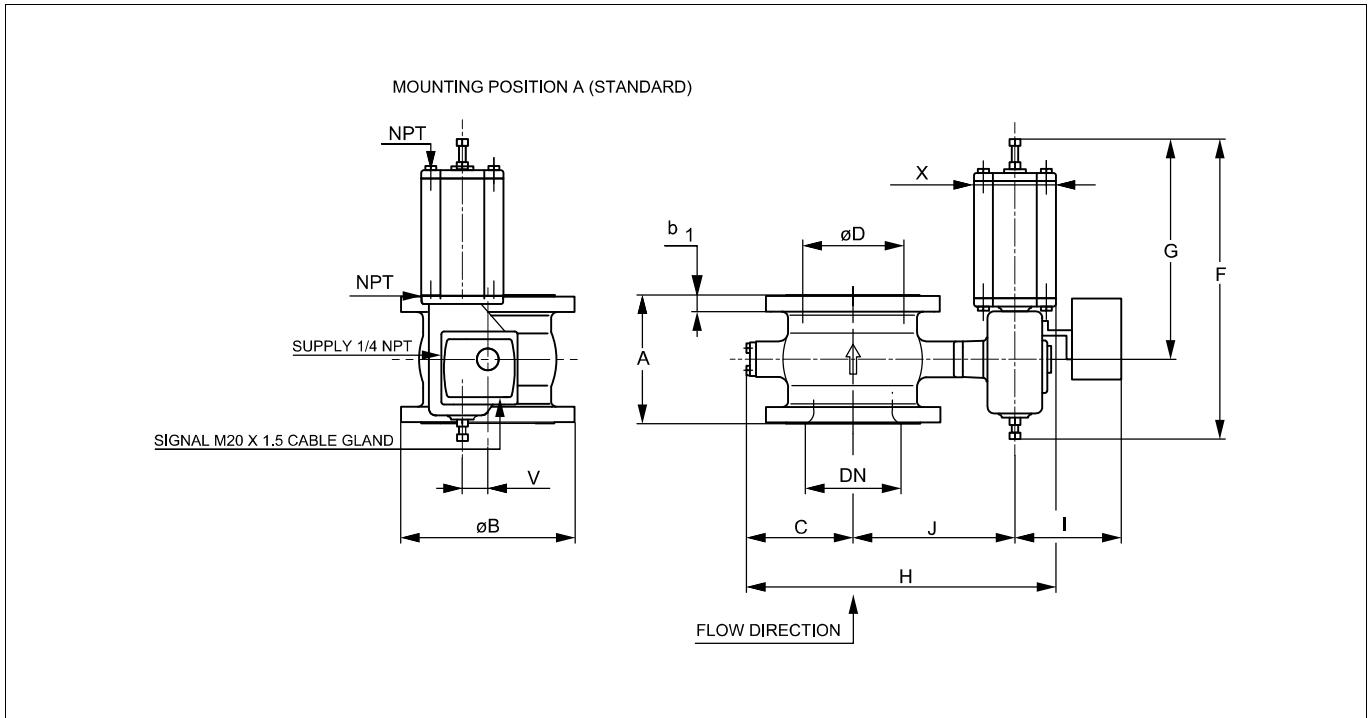


Type	Max Δp ₁ Δp ₂	Dimensions, mm										NPT	REJ_PN 10			REK_PN 16			REL_PN 25			REM_PN 40			REC_ASME 150			RED_ASME 300						
		NPS	DN	A	C	oD	F	G	X	V	J		øB	b ₁	kg	øB	b ₁	kg	øB	b ₁	kg	øB	b ₁	kg	øB	b ₁	kg							
RE_01-B1C6	50	1	25	102	56	33/38*	400	260	90	36	240	341	310	1/4	115	18	11.9	115	18	11.9	115	18	11.9	108	18	11.9	124	18	11.9					
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	127	18	13.5	155	18	14.3					
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	165	20	16.8					
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	26		
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	24	34.3		
RE_06-B1C6	10	6	150	229	174	164	400	260	90	36	348	567	310	1/4	285	22	44.3	285	22	44.3	300	28	49.3	279	28	46.3	318	28	51.3					
RE_06-B1C9	25	6					455	315	110	43	349	578	305	1/4			50	57				55	62		52	59		57	64					
RE_06-B1C11	40	6					540	375	135	65	355	597	310	3/8																				
RE_08-B1C6	4	8	200	243	201	205	400	260	90	36	403	649	310	1/4	340	24	63	340	24	67	360	30	71	375	34	78	343	30	69	381	34	90		
RE_08-B1C9	15	8					455	315	110	43	404	660	310	1/4			70	77				73	80		84	91		75	82		96	103		
RE_08-B1C11	32	8					540	375	135	51	410	679	310	3/8																				
RE_10-B1C9	7	10	250	297	251	259	455	315	110	43	446	752	310	1/4	405	26	99	405	26	99	425	32	115	450	38	139	406	32	104	450	38	152		
RE_10-B1C11	15	10					540	375	135	51	452	771	310	3/8			106	106				122	137		146	161		139	162		159	174		
RE_10-B1C13	29	10					635	445	175	65	468	807	325	3/8			121	121				137	144		184	200		139	162		174	197		
RE_10-B1C17	35	10					770	545	215	78	483	842	340	1/2																				
RE_12-B1C11	7	12	300	338	269	300	540	375	135	51	482	819	310	3/8	460	26	144	460	28	144	485	34	168	520	42	202	483	34	162	520	42	219		
RE_12-B1C13	19	12					635	445	175	65	498	855	325	3/8			159	159				183	206		217	240		177	200		234	257		
RE_12-B1C17	30	12					770	545	215	78	513	890	340	1/2																				
RE_14-B1C13	9	14	350	400	311	350	635	445	175	65	514	913	340	3/8	505	26	213	520	30	218	555	38	258	580	46	301	534	38	238	584	46	319		
RE_14-B1C17	21	14					770	545	215	78	529	947	340	3/8			121	121				241	260		236	255		324	343		342	361		
RE_14-B1C20	27	14					840	575	215	97	548	967	355	1/2			144	144				300	300		260	260		343	343		280	361		
RE_16-B1C17	15	16	400	400	353	400	770	545	215	78	590	1051	340	1/2	565	26	293	580	32	298	620	40	349	660	50	405	597	40	323	648	50	414		
RE_16-B1C20	21	16					840	575	215	78	609	1071	355	1/2			121	121				312	370		368	426		424	482		433	491		
RE_16-B1C25	30	16					1075	725	265	121	632	1118	390	1/2			118	118				375	375		426	482		400	400		400	400		
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	9	24	600	610	497	600	1075	725	265	121	842	1498	390	1/2	780	28	1034	840	40	1105	845	46	1165	890	60	1171	815	46,1	1100	915	68,3	1298		
RE_24-B1C32	19	24					1370	920	395	153	879	1573	430	3/4			1159	1159				1230	1230		1296	1296		1225	1423					
RE_28-B1C32	10	28	700	710	547	700	1370	920	395	153	944	1686	430	3/4	895	30	1345	910	42	1386	960	50	1467	995	64	1580	925	69,9	1506	1035	88,9	1770		
RE_28-B1C40	23	28					1670	1150	505	194	993	1756	450	3/4			1535	1535				1576	1576		1657	1657		1770	1770		1696	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_

11.11 RE - B1J, B1JA

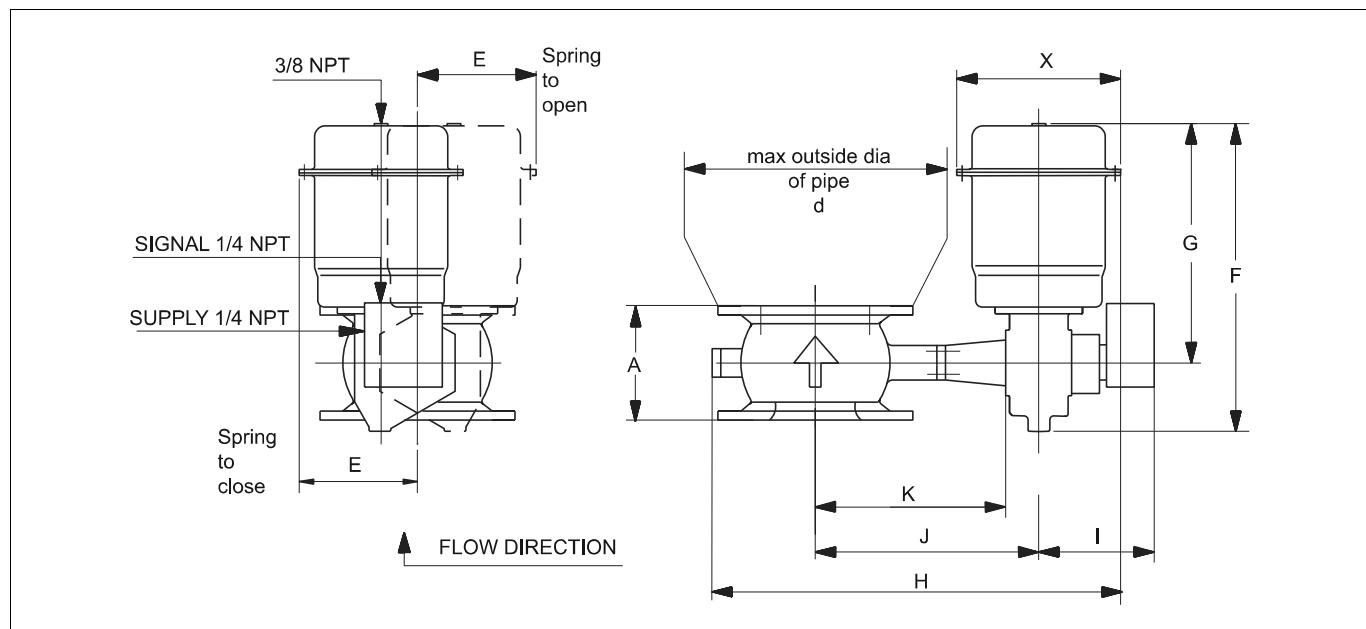


Type	Max Ap ¹⁾	Dimensions, mm											NPT	REJ_PN10			REK_PN16			REL_PN25			REM_PN40			REC_ASME 150			RED_ASME 300					
		NPS	DN	A	C	oD	F	G	X	V	J	H		oB	b ₁	kg	oB	b ₁	kg	oB	b ₁	kg	oB	b ₁	kg	oB	b ₁	kg	oB	b ₁	kg			
RE_01-B1J6	50/50	1	25	102	56	33/38*	485	368	110	36	238	362	305	3/8	115	18	20	115	18	20	115	18	20	115	18	20	108	18	20	124	18	20		
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		
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		
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	34		
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	24	42		
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	10/25	6	150	229	174	164	560	420	135	43	348	590	305	3/8	285	22	57	285	22	57	300	28	62	300	28	62	279	28	59	318	28	65		
RE_06-B1J10/B1JA10	40/40																																	
RE_08-B1J8/B1JA8	-/12	8	200	243	201	205	560	420	135	43	404	673	305	3/8	340	24	76	340	24	80	360	30	84	375	34	91	343	30	82	381	34	103		
RE_08-B1J10/B1JA10	15/25																																	
RE_08-B1J12/B1JA12	32/35																																	
RE_10-B1J10/B1JA10	5/15	10	250	297	251	259	650	490	175	51	452	790	310	3/8	405	26	119	405	26	117	425	32	135	450	38	159	406	32	124	450	38	172		
RE_10-B1J12/B1JA12	20/25																																	
RE_10-B1J16/B1JA16	35/35																																	
RE_12-B1J12/B1JA12	8/18	12	300	338	269	300	800	620	215	65	498	875	325	1/2	460	26	185	460	28	185	485	34	209	520	42	243	483	34	203	520	42	260		
RE_12-B1J16/B1JA16	20/25																																	
RE_12-B1J20/B1JA20	30/30																																	
RE_14-B1J16/B1JA16	11/22	14	350	400	311	350	990	760	265	78	529	973	340	1/2	505	26	282	520	30	287	555	38	327	580	46	370	534	38	307	584	46	388		
RE_14-B1J20/B1JA20	30/30																																	
RE_16-B1J20/B1JA20	19/25	16	400	400	353	400	1200	935	97	609	1161	355	3/4	565	26	414	580	32	419	595	620	40	470	660	50	526	597	40	444	648	50	535		
RE_16-B1J25/B1JA25	30/30																																	
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/B1JA32	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 eq. C005-RE

11.12 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	
					A	E	F	G	H	I	J	K	X	Pipe d	ASME 150	ASME 300
25	1	50	35	-	102	142	382	330	388	160	225	182	213	230	19	20,5
40	1	50	35	-	114	142	382	330	404	160	232	189	213	245	20	23
50	1	50	35	35	124	142	382	330	441	160	243	200	213	265	22	25
80	2	35	25	18	165	142	382	330	506	172	284	232	213	330	38	43
100	2	35	25	18	194	156	480	389	527	172	293	241	228	350	45	53
150	2 3	28 40	25 25	18 18	229	156	480	389	630	191	342	290	228	450 410	63 78	78 93
200	3 4	16 35	16 25	15 15	243	190	565	446	739	191	401	345	274	520 485	101 121	122 142
250	4 5	20 35	20 20	10 10	297	228	635	495	860	214	449	387	320	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

11.13 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

11.14 Flange ratings, RE

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	-

See 12.3 for guidance.

12 TYPE CODE

12.1 Series RA

V-port segment valve, series RA

1.	2.	3.	4.	5.	6.	7.
	RA	A	100	A	S	-

C_v-CODE FOR VALVE SIZE DN 25 (01")	
STANDARD CV	
Without sign	
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

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.	

CONSTRUCTION	
A	Standard, drive shaft with keyway
Y	Special

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).

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.

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

12.2 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)	
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"
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.
	Oxygen construction, only for Gaseous Oxygen Service. - BAM listed non-metallic materials
Z	- Temperature: +200 °C to -50 °C - Cleaning acc. to Metso internal procedure Recommended type code: RE_Z__AJSG
Y	Special, to be specified

5.	SIZE	
	ASME	EN
01	ASME flanged, 150 and 300	025 EN flanged, PN 40
1H	ASME flanged, 150 and 300	040 EN flanged, PN 40
02	ASME flanged, 150 and 300	050 EN flanged, PN 40
2H	ASME flanged, 150 and 300	065 EN flanged, PN16, 40
03	ASME flanged, 150 and 300	080 EN flanged, PN 40
04	ASME flanged, 150 and 300	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	
U	PVDF, max +120 °C	
N	UNS31254	
S	Filled PTFE on Inconel 625 net, max +260 °C	
V	Nitronic 50 (XM-19)	
U	Cobalt based alloy, max +425 °C	
Y	Virgin PTFE on SS 316 net, max +260 °C	
	Filled PTFE on SS 316 net, max +260 °C	
	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	
	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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