ITT RICHTER CHEMIE-TECHNIK

The Answer to Corrosion **Series RSS**

Operating Manual
Chemical Control Valve

Contents

Local agent:

See order

Note:
Before transport, installation operation, etc. read these instructions carefully !

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Richter

ITT Industries
Engineered for life

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1 General

Richter control valves comply with the technical delivery conditions to DIN 3230.
The operating manuals enclosed for the accessories must also be carefully read and observed.

1.1 Application

The valves have a corrosion-resistant plastic lining and are therefore especially suitable for aggressive media.

The details on the nameplate are to be observed.
See also **Section 4.12**.

Important features are documented in the enclosed data sheet:

- Data on the control valve and accessories
- Materials of the most important components

If the valve is to be used for operating conditions other than those intended, the following are to be checked again:

- Design of the control valve
- Design of the accessories
- Resistance of the materials.

1.2 Product data

Type code

RSS	:	Richter standard control valve
Nom. sizes	:	15, 20, 25, 40, 50, 65, 80, 100

2 Safety

The notes on safety contained in this operating manual which, if not observed, can result in risks to people are identified with this general hazard symbol.

CAUTION ! Non-observance of this safety warning may impair the valve and its operation.

2.1 Staff qualifications and training

The staff for installation, operation and maintenance must have the appropriate qualifications for this work.
The area of responsibility, authority and supervision of the staff must be regulated precisely by the customer.
If the staff do not have the necessary know-how, they are to be trained and instructed.
This can, if necessary, be performed by the manufacturer / supplier on behalf of the valve customer.
Furthermore, the customer must ensure that the contents of the operating manual are fully understood by the staff.

2.2 Risks if safety notes are not observed

Non-observance of the notes on safety may result in the loss of any and all claims for damages.

For example, non-observance may involve the following hazards:

- Failure of important functions of the valve / plant.
- Risk to people from electrical, mechanical and chemical effects.
- Risk to the environment through leaks of dangerous substances.

2.3 Safety-conscious working

The following are to be observed:

- The notes on safety in this operating manual.
- The national regulations on accident prevention.
- The work, operating and safety regulations of the customer.

2.4 Notes on safety for the customer / operator

- If hot or cold valves result in hazards, the customer must protect these parts from being touched.
- No protective facilities for moving parts may be removed as long as the valve is in operation.

2.5 Notes on safety for maintenance

Work on remotely actuated valves must always be performed when they are at a standstill.

Valves which are exposed to media which are a health hazard must be decontaminated.

Immediately on completion of the work, all safety and protective equipment must be refitted or re-activated.

The points listed in the section on initial commissioning must be followed before recommissioning.

2.6 Conversion work and production of spare parts by the customer

Conversion of or changes to the valve are only admissible after consultation with the manufacturer.
Original spare parts and accessories authorised by the manufacturer serve to enhance safety.
The use of other parts may annul the liability for any resultant consequences.

2.7 Inadmissible modes of operation

The operational safety of the valve is only guaranteed if it is used properly in accordance with **Section 1** of this operating manual.
The application limits specified on the nameplate must under no circumstances be exceeded.

3 Transport and storage

It is imperative for all transport work to observe generally accepted engineering practice and the accident prevention regulations.

3.1 Unpacking

Directly after unpacking the consignment must be checked for completeness and any in-transit damage.

3.2 Transport

The goods being transported must be handled with care to prevent damage.
Flange covers serve as protection during transport and must not be removed.

3.3 Storage

If the valve is not installed immediately after delivery, it must be put into proper storage.

It should be stored in a dry room at as constant a temperature as possible.

In the case of **prolonged storage** packing with a desiccant may be necessary. A decision on this must be taken on the basis of the local conditions.

3.4 Return consignments

The operator of valves which have been used for aggressive or toxic media must make sure that they are well rinsed and cleaned before being passed on to the maintenance staff. This applies in particular when the goods are returned to the manufacturer's works.

3.4.1 GRAS certificate

A GRAS certificate according to EUROPUMP on the field of application is to be enclosed with the returned goods.

If necessary, safety precautions and decontamination measures are to be mentioned.

Pre-printed forms can be requested from Richter.

4 Product description

Control valves of the series RSS are mainly used as **process control valves**.
Drawings in **Section 9** illustrate the design.

4.1 Body

A single-part metallic armouring affords the body the required stability.
A thick-walled plastic lining provides the body with chemical resistance.

The following data are cast into the body according to DIN EN 19:

- Nominal size
- Nominal pressure
- Armouring material
- Lining material
- Manufacturer's code
- Foundry code
- Melt number
- Arrow for the direction of flow

4.2 Seat

The seat is screwed into the body and can thus be replaced. There are several seats with different diameters for each nominal size. See table in **Section 9.6**.

The seat is marked with :
Nominal size
Seat ∅
Material

4.3 Plug

The plug is screwed into the bellows and is replaceable. It is secured in addition with a **round cord**.

There are various plugs, just like the different seats. These plugs are normally designed as **parabolic plugs**.
For high loads, so-called **U-plugs** are recommended for the nominal sizes DN 80 and DN 100. These plugs are also guided in the seat on several guide weirs.

For reasons of stability, a plug made of metal is used for the seat ∅ 5 mm. It is attached with a cap.

The various plug designs are illustrated in **Section 9.**

The plugs are marked with:
Nominal size
Seat ∅
Travel
Type of characteristic
K_{v100} value
Material

4.4 Bellows

The upper section of the valve is protected against the medium by bellows. When subjected to compressive loading, the **standard bellows** rest on the stem. With the **heavy-duty bellows**, each fold rests on its own **support ring**. The stem therefore remains free to move. For special cases, metal bellows are also used.
Section 9 contains sectional drawings and a pressure/temperature diagram for the various designs.

4.5 Cover flange

The cove flange has several functions:

1. Top sealing.
2. Holding the **guide rings**. With DN 80 and 100 a **guide** is installed which accommodates the guide rings.
3. Holding the safety packing.
4. Possibility of connecting an alarm.
   Not a standard feature.
5. Holding a bracket or yoke for connecting an actuator.

As the cover flange is a pressure-bearing component, the data prescribed in DIN EN 19 are cast into it.

4.6 Stem

The stem is screwed into the metallic core of the bellows. Upward travel is limited. As a result the bellows are protected against excessive upsetting:

- With DN 15 to DN 65 a collar in the stem strikes the cover flange.
- With DIN 80 and DN 100 a **support disc** which lies at the bottom of the bellows rests against the guide.

The stem has at its upper end a thread for accommodating the coupling which is part of the scope of delivery of the actuator manufacturer.

4.7 Safety packing

The safety packing is installed as a standard feature. It complies with the German Clean Air Act, Part 5, Section 2.3.1.8.4.

If the bellows leak, only relatively small amounts of medium can emerge from the safety packing.

4.8 Alarm connection

On request, the cover flange can be provided with a possibility for connecting an alarm. If a rise in pressure or a leak is reported, the valve must be repaired immediately.

4.9 Travel stop

Overdimensioned actuators can deform the seat. These forces can be kept away from the seat by means of an adjustable travel stop. **Section 9.9** indicates when a travel stop is required.

The installation of a travel stop also necessitates the use of protective bellows for reasons relating to the accident prevention regulations.

4.10 Protective bellows

Dirt and moisture can penetrate the valve owing to the travel motion of the stem. This can lead to corrosion in the cover flange. Protective bellows prolong the service life of the safety packing and the bearings.

4.11 Actuator

Commercially available diaphragm actuators or electric actuators can be mounted on the control valve.

ITT Richter mounts these actuators or prepares the valve for the mounting of an actuator at the customer's. The connection dimensions of the valve are adapted to suit those of the actuator.

Actuators with a bracket can be connected directly to the valve.

Richter supplies the appropriate **yokes** for connecting column-type actuators.

Couplings are part of the scope of delivery of the actuator manufacturer. Richter adapts the stems to suit the couplings.

The **opening and closing forces** are listed in **Section 9.9**. Safety margins are not required.

4.12 Nameplate

The nameplate contains the following data:

- Type, nominal pressure, lining material
- Admissible temperatures at various operating pressures.
- Richter factory No.
- Any customer-specific data

Example of a factory No. : 983020/1/2
Please indicate this number on all correspondence.

The plate for the **control data** indicates:

- Seat ∅ in mm
- Travel in mm
- Control characteristics: G = equal percentage
  L = linear
  A = on - off

Flow rate K_{v100} in m^3/h or Cv in US gpm

If **heavy-duty bellows** are installed, another plate indicates:

HD - BVA = Heavy-duty bellows with support rings made of stainless steel

HD - BKo = Heavy-duty bellows with support rings made of PTFE carbon

5 Installation

Dirt or damage to the sealing surfaces is best avoided if the flange covers remain on the flanges until just before installation.

We recommend the installation of gaskets so that the sealing surfaces are not damaged by the mating flanges.
If the risk of damage is particularly high, e.g. with the mating flanges being metal or ceramic-lined, PTFE-coated gaskets with a metal inlay should be used (included in the Richter range of products).

Operations can be maintained with a bypass around the control valve.

Depending on the Kv value, the free cross section in the valve may be considerably smaller than the cross section of the nominal size. To avoid clogging, the pipe upstream of the valve is to be cleaned thoroughly.

5.1 Position and direction of flow

Normally, the valve is installed in a horizontal line with the actuator at the top. The valve can also be installed with the actuator facing vertically downwards. However, this is only admissible when there is no risk of contamination of the bellows.

Inclined positions of the actuator are only admissible after consultation with the manufacturer. In this case a support structure may have to be provided for the actuator.

The direction of flow is from the bottom up against the plug. An arrow on the body indicates the direction of flow.

5.2 Earthing

If the valve has to be earthed, this is also achieved using the pipe screws.

A tooth lock washer is placed under one nut of each valve flange. This washer penetrates the paint layer and thus creates the electric contact with the screw.

5.3 Alarm connection

If the cover flange has a screw-in pipe connector for an alarm connection, the latter must also be connected or the screw-in pipe connector must be sealed up. Otherwise, medium can escape if the bellows become defective.

6 Operation

6.1 Initial commissioning

CAUTION! Normally, the valves are tested for leaks with water and air. Therefore, unless special agreements have been made, there could still be residual amounts of water in the flow section. This must be noted in view of a possible reaction with the operating medium.

After initial loading at operating pressure and operating temperature the tightening torques of all connection screws must be checked. For tightening torques, see **Section 9.4**.

6.2 Shutdown

Observe safety regulations

Make sure that a remotely operated actuator cannot be switched on by mistake.

With a diaphragm actuator make sure that no compressed air is in the actuator; the springs must be relieved.

Before undoing the pipe screws or cover flange screws, ensure that the plant is depressurised on both sides of the valve.

Drain the valve on both sides. The local regulations must be observed.
Immediately after dismantling the valve from the pipe, rinse the valve and protect flanges with flange covers.

6.3 Inadmissible modes of operation and their consequences

- Crystallisation must be prevented, e.g. by heating. In extreme cases leaks may occur.
- Increased wear occurs in operation with solids-laden media.
- Increased wear occurs in operation involving cavitation.
- Non-observance of the pressure/temperature diagram may result in damage.
- The valve is not to be operated in the wrong direction of flow. If it is, however, it may close unintentionally with a standard dimensioned actuator.

7 Maintenance

The maintenance staff can decide whether the valve is dismantled from the pipe or not for maintenance work.

In both cases **Section 6.2** is to be observed .

It is also up to the maintenance staff to decide whether the actuator or other accessories are dismantled for the maintenance work.

Section 7.5 is to be observed for re-assembly of the actuator.

The valve is to be cleaned thoroughly before the start of repair work. Even if the valve has been properly drained and rinsed, there could still be residual amounts of medium in the valve, e.g. between the sealing surfaces.

Moreover, the plastic components may have absorbed medium which emerges gradually from the material after rinsing.

Protective clothing should therefore be worn.
See also **Section 3.4.**

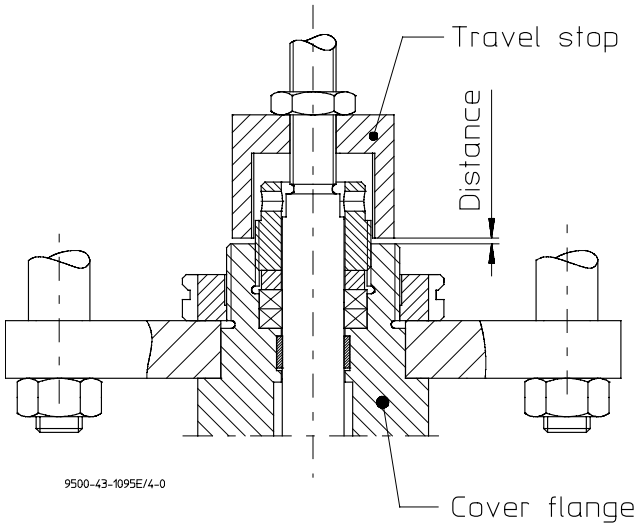
7.1 Checking the screw connections

Regular check of the tightening torques in line with the operating requirements at the following locations:

- Packing nut
- Cover flange screws
- Pipe screws

For tightening torques, see **Section 9.4**.

7.2 Setting the travel stop



To ensure the valve closes tight, a distance between the travel stop and cover flange must be observed:

DN 15 - 50 : 0.5 mm
DN 65 - 100 : 1.0 mm

If these distances are not correct, the travel stop must be reset:

- Close valve.
- Move travel stop to the correct distance.
- Tighten lock nut.

7.3 Maintenance of the upper section

This mainly involves the following work:

- Replacing the plug.
- Replacing the bellows.
- Inspecting the metal parts of the upper section and replacing them if necessary.

The entire dismantling and assembly procedure is described below. If only partial assembly is required, this can be derived from the text.

Dismantling

– Move plug into open position if the actuator is mounted.
– Remove cover flange screws.
– Pull upper section vertically out of the body.
– Remove protective bellows, travel stop and packing nut.
– Remove stem with bellows and plug from below.

– Clamp stem in a vice with protective jaws.
– Round cord:
  - Pull out of the plug with pliers.
  - With seat ∅5 mm pull out of the cap.
    See diagram in **Section 9.11.**
– Unscrew plug or cap by hand or with a strap wrench. Right-hand thread.
– Unscrew bellows by hand or with a strap wrench. Right.-hand thread.
  With the heavy-duty bellows the support rings and support disc cannot be removed.

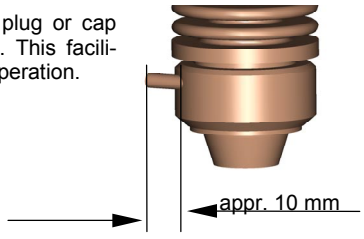
– Only remove packing rings and thrust ring if necessary.
– Only remove guide rings if necessary. Use a sharp tool, e.g. scribing iron or screwdriver.
– With DN 80 and DN 100: Only remove guide if necessary. Press in the direction of the stuffing box using a press.

– Check to see whether the seat is still o.k.
  If not: replace. See **Section 7.4.**

Assembly

DN 15 - DN 65

– Insert guide rings.
– Clamp stem in a vice with protective jaws.
– Screw bellows without lubricant onto the stem and tighten by hand.
– Check to see whether the new plug fits in the valve seat. Make sure that neither the seat nor the plug is damaged.
– Screw plug or cap with plug onto the bellows without lubricant and tighten by hand.
– Press round cord into the plug or cap leaving about 10 mm over. This facilitates the next dismantling operation.



– Install stem with bellows and plug without lubricant into the cover flange
– Mount safety stuffing box without lubricant. For tightening torques, see **Section 9.4**.
– Screw travel stop and lock nut onto the stem.
– Carefully lower upper section into the body.
– Install cover flange screws. For tightening torques, see **Section 9.4**.
– If the bracket or yoke was dismantled, install it again. Tighten groove nut.
– Mount the protective bellows with inserted snap rings onto the stem.
– Mount hose clip onto the stem.
– If the actuator was removed, mount it again now.
– Set valve and mount coupling.
  See **Section 7.5**.
– Set travel stop. See **Section 7.2**.
– Attach protective bellows with hose clip.
– Connect alarm connection again.

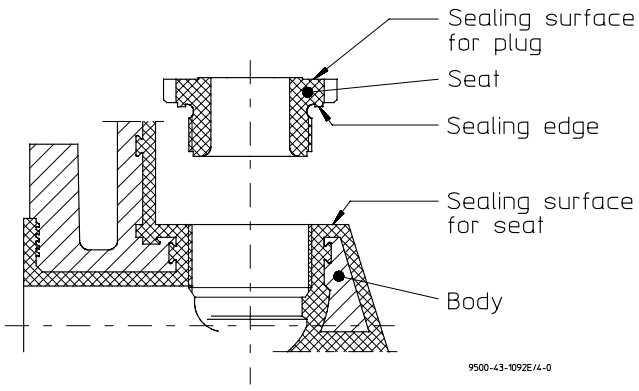
DN 80 - DN 100

– Press guide into the cover flange without lubricant.
– Now continue as described under DN 15 - DN 65.

7.4 Replacing the seat

A screw-in tool is required for assembling and dismantling the seat. The article numbers for the individual nominal sizes are listed in **Section 9.3**.

The new seat is to be carefully protected prior to assembly. The sealing edge and the sealing surface for the plug must not be damaged.



Procedure

– Remove the upper section as described in **Section 7.3**.
– Using the Richter screw-in tool, turn the seat out of the body. Right-hand thread.
– Carefully clean the sealing surface in the body and check for
– If there is any damage, you can try to rework the sealing surface.
– Screw the new seat into the body without lubricant using the Richter screw-in tool. For tightening torques, see **Section 9.4**.

Further assembly as described in **Section 7.3**.

7.5 Mounting the actuator

Assembly of the actuator varied depending on the make and type. Observe the assembly instructions of the actuator manufacturer.

AS regards the process valve, special attention is to be paid to the following:

- The stem must under no circumstances by turned to adapt to the coupling. If turned counterclockwise, it would otherwise turn out of the metal core of the bellows.
- The actuator manufacturers prescribe that the valve is moved into the closed position when the coupling is mounted. In this closed position many bellows are pre-tensioned in the valve. They would possibly open the valve again. Therefore, the stem is to be kept in the closed position when the coupling is mounted.

7.6 Tests

After assembly some tests have to be conducted on the valve. These tests are performed on the basis of DIN IEC 534-4. This standard can be used for further information.

If the medium is not allowed to come into contact with water, the valve must be blown dry after the tests.

7.6.1 Pressure test

The valve must be opened fully prior to this test. During the test this condition must be maintained.

Test medium:	Air, nitrogen or water		
Test temperature:	5-40°C		
Test pressure:	1.5-fold admissible operating pressure Admissible operating pressure: see nameplate		
Min. testing time:	DN 15 - DN 40 DN 50 - DN 100	: :	15 seconds 60 seconds

7.6.2 Leak test

The valve is closed. The valve inlet side is subjected to pressure. The valve outlet remains open.

Test medium:	Air or nitrogen		
Test temperature:	5-40°C		
Test pressure:	3-4 bar or		
When the operating differential pressure is less than 3.5 bar: Test pressure = max. operating differential pressure ± 5%			
Min. testing time:	DN 15 - DN 40 DN 50 - DN 100	: :	15 seconds 60 seconds

During this period the valve must be bubble-tight.

7.6.3 Actuator

The actuators are set according to the data in the works certificate or data sheet.

The operating manuals for actuators, positioners and other accessories must be observed.

The safety function, i.e. opening or closing of the valve if the air or power fails, must be checked.

8 Faults

See also **Section 6.3** on admissible modes of operation and their consequences.

- Flange connection valve/pipe leaks

  Tighten pipe screws to a torque in accordance with **section 9.4**. Should there still be a leak, the recommended tightening torques can be exceeded by 10%.
  If this does not rectify the leak, dismantle the valve and check it.

- Flange connection body/cover flange leaks

  Retighten cover flange screws. Proceed as above.

- Safety packing leaks

  Replace bellows.

  Repair upper section.

  If it is not possible to perform the necessary repairs immediately, the packing nut can be retightened.
  Max. tightening torque: 10 Nm
  Disadvantages:
  - The medium can destroy the metallic internals relatively quickly.
  - The hysteresis can be impaired.

- Alarm connection reports a rise in pressure or a leak

  Replace bellows.

  Repair upper section.

- Valve does not switch

  Is the actuator supplied with power?

  Is any directional control valve correctly connected?

  Is the stuffing box tightened too much?

- Valve does not close tight

  Check distance of the travel stop.

  Are there any solids between seat and plug?

  Are the sealing surfaces of the seat or plug damaged?

  Is the actuator too small?

  Is any positioner set correctly?

- Valve does not open completely

  Is the air pressure high enough?

  Is the positioner set correctly?

  Does the actuator permit enough travel?

  Does the valve permit enough travel? See drawings in **Sections 9.11 and 9.12.**

- The flow rate is too high or too low

  The characteristic is not correct

  The valve cavitates

  Do the design data as per data sheet or works certificate match those of the plant?

  Have the correct seat and plug been installed? See identification on seat and plug and compare them with the nameplate and data sheet.

9 Tables, diagrams, drawings

9.1 Connection dimensions

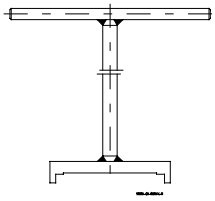
- Face to face : see order
- Flange pattern : see order
- Actuator : see order

9.2 **Weights** (without actuator)

DN	kg
15	6
20	6
25	11
40	17
50	19
65	20
80	39
100	44

9.3 Screw-in tools for seats

DN	Article No.
15, 20	9568-96-1011
25	9568-96-1001
40	9568-96-1002
50, 65	9568-96-1003
80	9568-96-1004
100	9568-96-1005



9.4 Tightening torques

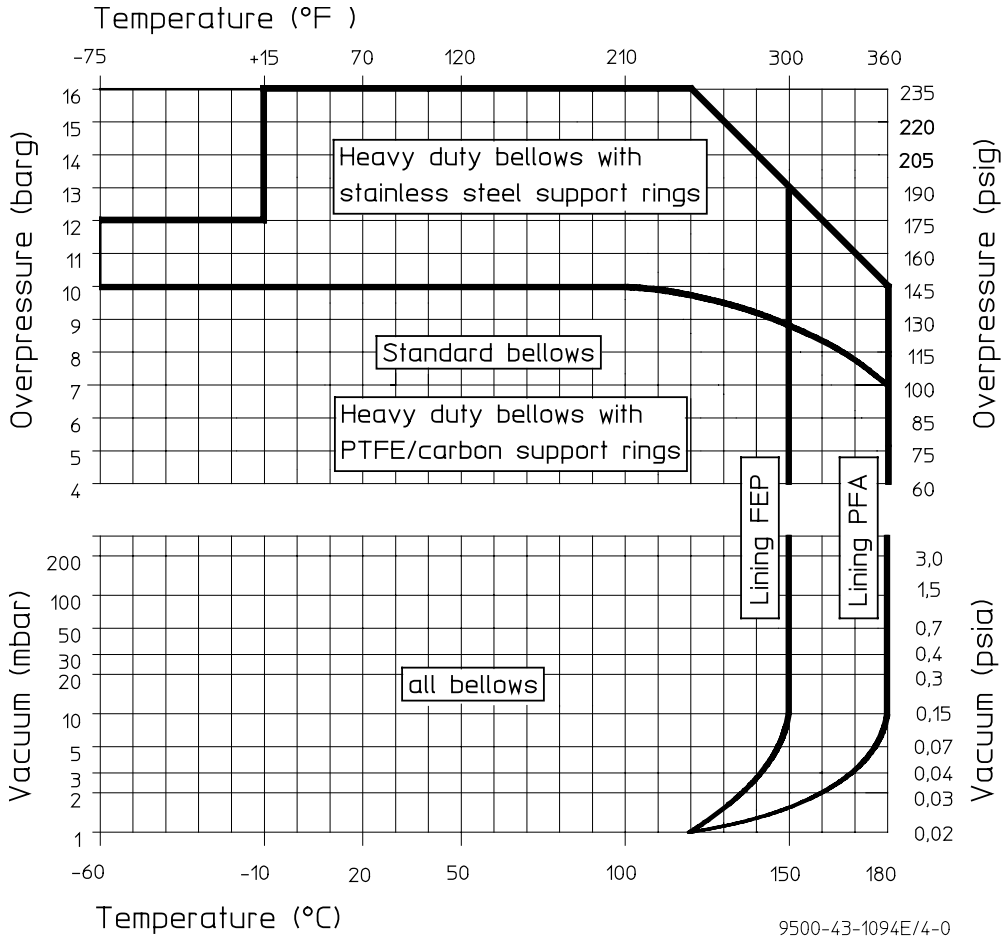
Screws greased, tighten in diametrically opposite sequence.

DN	Cover flange screws		Pipe screws	
	No. x size	Nm	No. x size	Nm
15	4 x M10	30	4 x M12	12
20	4 x M10	30	4 x M12	12
25	4 x M12	50	4 x M12	12
40	4 x M12	50	4 x M16	22
50	4 x M12	50	4 x M16	30
65	4 x M12	50	4 x M16	40
80	8 x M12	50	8 x M16	25
100	8 x M12	50	8 x M16	30

Thread **not** greased

DN	Seal	Packing nut
	Nm	Nm
15	3	7
20	3	7
25	6	7
40	12	7
50	16	7
65	16	7
80	28	7
100	30	7

9.5 Pressure/temperature diagram



9.6 Flow rates K_{v100} in m^3/h

Parabolic seats

DN	Seat ∅ in mm														
	5	5	5	5	5	8	15	20	25	30	40	50	65	80	96
15	0.05	0.1	0.2	0.5	0.8	2	4								
20	0.05	0.1	0.2	0.5	0.8	2	4								
25	0.05	0.1	0.2	0.5	0.8	2	4	7	11						
40							4	7	11	15	28				
50								7	11	15	28	42			
65								7	11	15	28	42			
80										15	28	42	65	100	
100												42	65	100	155

U-plugs

DN	Seat ∅ in mm	
	80	96
80	90	
100	90	135

9.7 Cavitation coefficient Z

K_v / K_{v100} = 75%

DN	Seat ∅ in mm										
	5	8	15	20	25	30	40	50	65	80	96
15	0.70	0.60	0.60								
20	0.70	0.60	0.60								
25	0.70	0.60	0.60	0.60	0.60						
40				0.60	0.60	0.55	0.50				
50				0.60	0.60	0.55	0.50	0.40			
65				0.60	0.60	0.55	0.50	0.40			
80						0.55	0.50	0.45	0.32	0.30	
100								0.47	0.33	0.30	0.26

$$X_F = \frac{\Delta p}{p_1 - p_v}$$

X_F = Differential pressure ratio
Δp = Differential pressure inlet/outlet
p_1 = Absolute pressure at inlet
p_v = Vapour pressure at operating temperature

$X_F \leq z$: non-critical conditions
$X_F \leq 1{,}4 \times z$: tolerable cavitation
$X_F > 1{,}4 \times z$: inadmissible cavitation

9.8 Travel

DN	Standard bellows			Heavy-duty bellows		
mm	mm	mm	mm	mm	mm	mm
15	15	20				
20	15	20				
25	15	20		15		
40	15	20	30	15	20	
50	15	20	30	15	20	
65	15	20	30	15	20	
80			30			30
100			30			30

9.9 Opening and closing forces required

- The values specified in the tables apply to a seat/plug material of modified PTFE.
  With other materials, e.g. PTFE/carbon, higher closing forces are required. Please inquire at manufacturer's.
- If the maximum Δp is < p2, p2 is used in the tables.
- A mechanical travel stop is required in the area marked.

Standard bellows

Opening forces

The opening forces remain below the closing forces and are therefore not shown.

Closing forces

Seat∅	maximum Δp or p_2 in bar									
	1	2	3	4	5	6	7	8	9	10
mm	N	N	N	N	N	N	N	N	N	N
5	280	290	300	305	315	325	335	340	350	360
8	290	310	330	350	370	390	410	430	450	470
15	330	385	435	490	540	595	645	695	750	800
20	390	460	525	595	665	730	800	865	935	1010
25	450	545	640	735	830	925	1020	1115	1205	1305
30	550	680	805	935	1065	1190	1320	1445	1575	1705
40	680	885	1085	1290	1490	1695	1895	2095	2300	2480
50	830	1130	1425	1720	2020	2315	2610	2910	3205	3500
65	1040	1500	1960	2420	2890	3350	3810	4270	4740	5190
80	1300	1970	2630	3300	3960	4630	5300	5960	6630	7305
96	1600	2520	3440	4370	5290	6210	7130	8050	8980	9900

Heavy-duty bellows

Opening forces

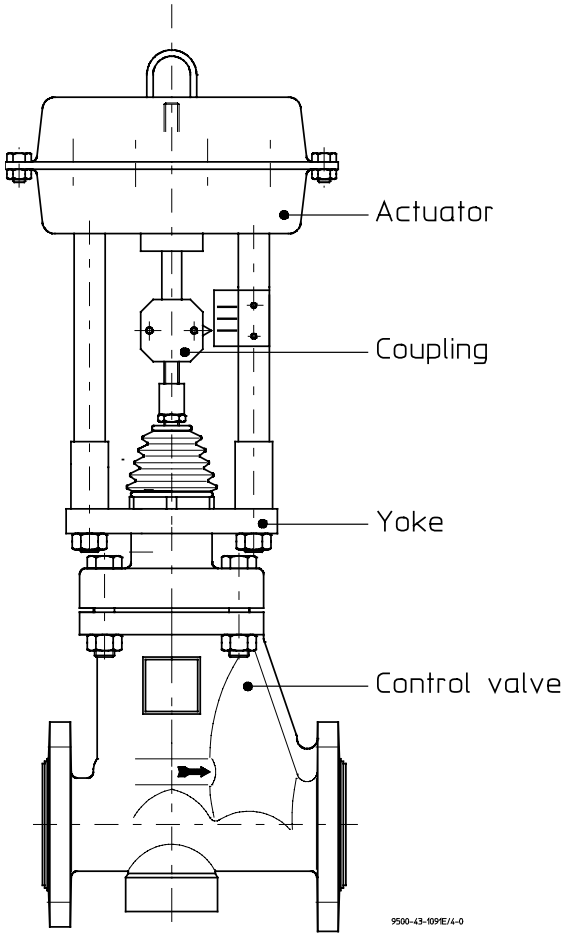
DN	N
25	900
40	2000
50	2000
65	2000
80	800
100	800

Closing forces

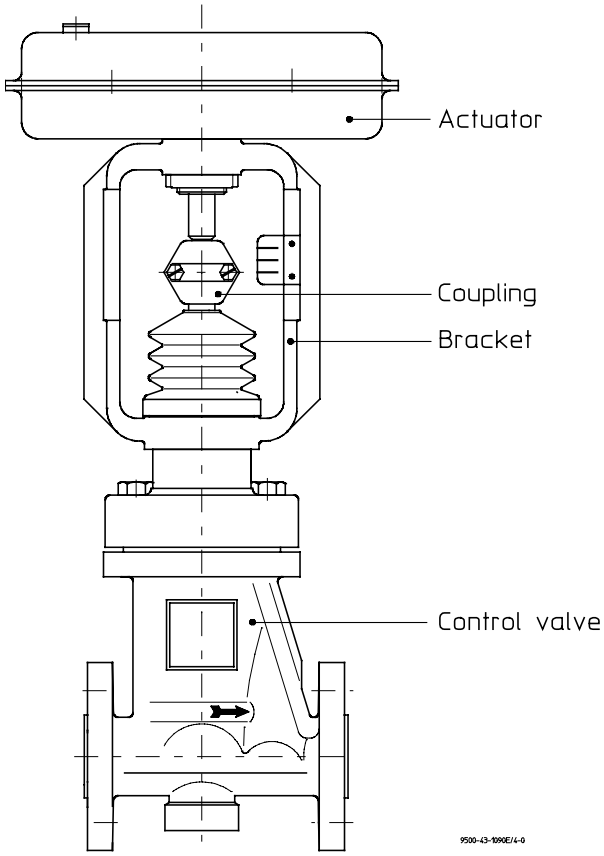
Seat∅	maximum Δp or p_2 in bar															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
mm	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5	280	290	300	305	315	325	335	340	350	360	380	390	400	410	420	430
8	290	310	330	350	370	390	410	430	450	470	495	510	525	540	555	570
15	330	385	435	490	540	595	645	695	750	800	865	900	935	970	1005	1040
20	390	460	525	595	665	730	800	865	935	1010	1145	1195	1250	1300	1355	1410
25	450	545	640	735	830	925	1020	1115	1205	1305	1475	1550	1625	1705	1780	1855
30	550	680	805	935	1065	1190	1320	1445	1575	1705	1890	1990	2095	2195	2295	2400
40	680	885	1085	1290	1490	1695	1895	2095	2300	2480	2750	2915	3080	3250	3415	3570
50	830	1130	1425	1720	2020	2315	2610	2910	3205	3500	3790	4035	4280	4525	4770	5020
65	1040	1500	1960	2420	2890	3350	3810	4270	4740	5190	5675	6070	6465	6860	7255	7650
80	1300	1970	2630	3300	3960	4630	5300	5960	6630	7305	7945	8525	9105	9685	10265	10850
96	1600	2520	3440	4370	5290	6210	7130	8050	8980	9900	10790	11610	12425	13240	14060	14880

9.10 Examples of complete control elements

Control valve with yoke connection for actuator

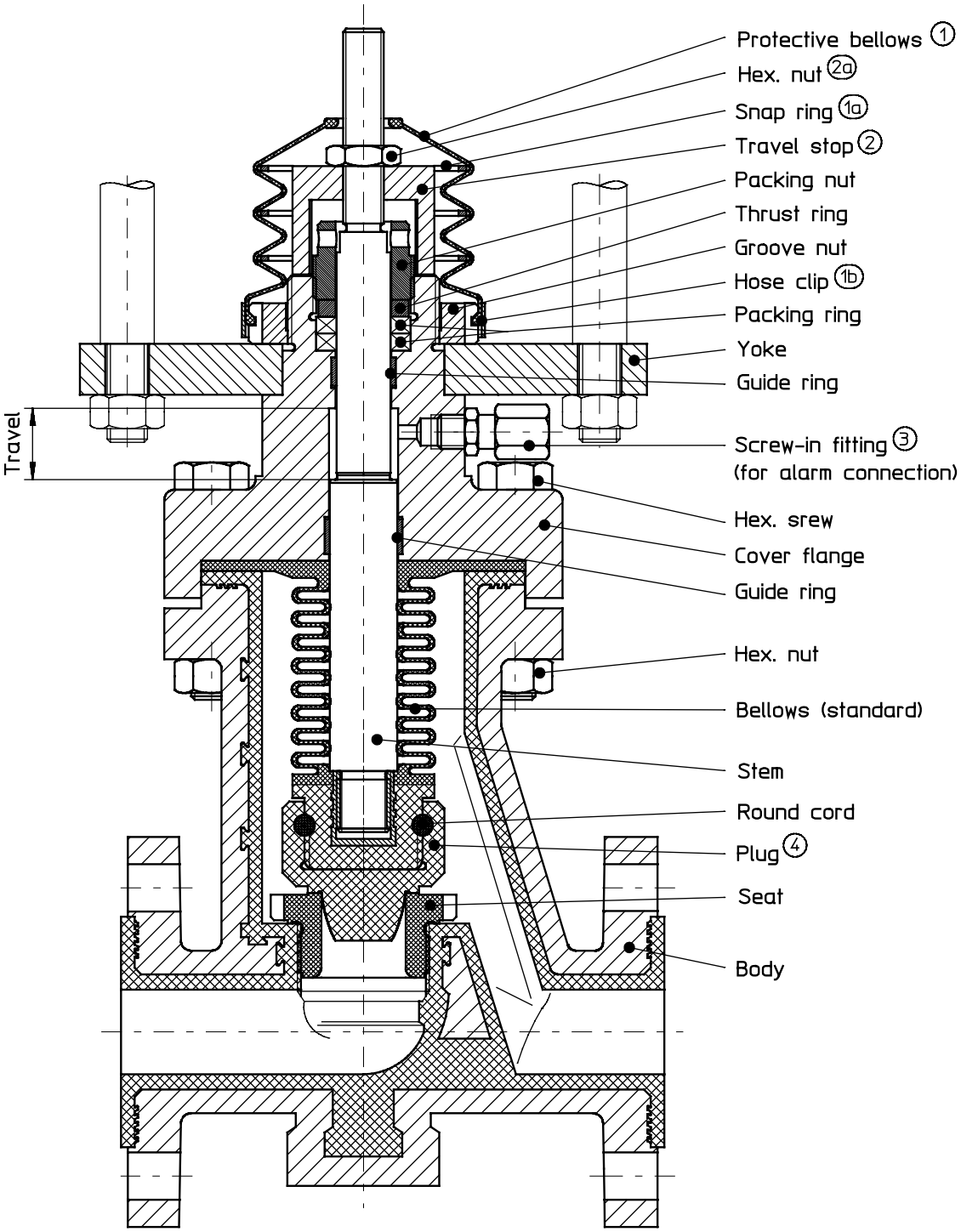


Control valve with bracket connection for actuator

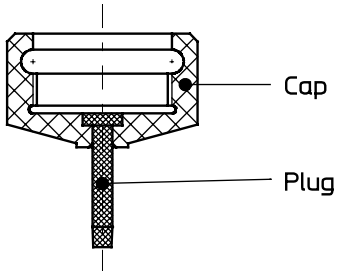


9.11 Sectional drawing RSS DN 15 to DN 65 for column-type actuator and standard bellows

For actuator with bracket and heavy-duty bellows, see Section 9.12



④ with seat ø 5mm :



①②③ not standard

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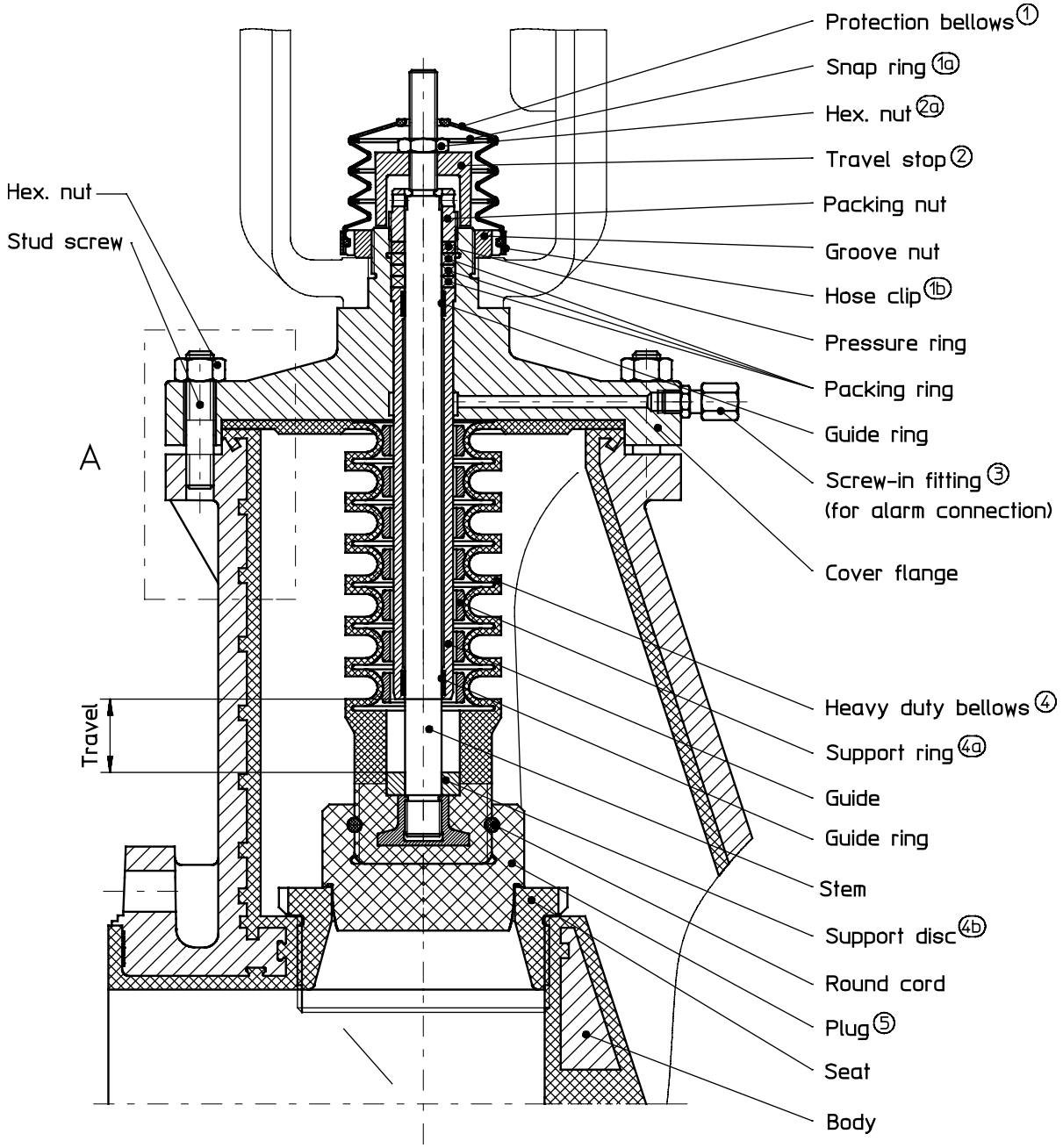
9.12 Sectional drawing RSS DN 80 and DN 100 for actuator with bracket and heavy-duty bellows

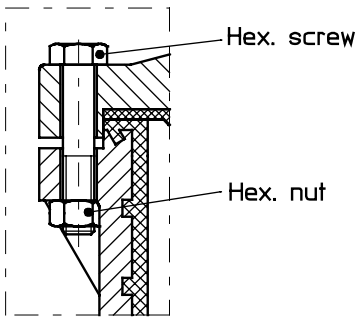
For column-type actuator and standard bellows, see Section 9.11



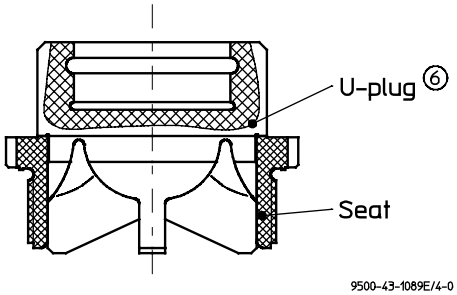
① ② ③ ④ ⑥ not standard

A

with DN 80 :



⑤ U-plug :



9500-43-1089E/4-0