

Series RSS/F

Chemical Bellows Control Valve remote actuated



Keep for future use!

This operating manual must be strictly observed before transport, installation, operation and maintenance

Subject to change without notice.

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Relevant documents

- ◆ Data sheet
- ◆ Manufacturer's Declaration German Clean Air Act (TA-Luft)
- ◆ SIL Declaration by the Manufacturer
- ◆ Declaration of conformity acc. to the EC Pressure Equipment Directive 97/23/EC
- ◆ Form for Safety Information Concerning the Contamination QM 0912-16-2001_en
- ◆ Operating manual actuator

1 Technical data

Manufacturer :

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 Otto-Schott-Str. 2
 D-47906 Kempen
 Telephone: +49 (0) 2152 146-0
 Fax: +49 (0) 2152 146-190
 E-Mail: richter-info@idexcorp.com
 Internet: <http://www.richter-ct.com>

Designation :

Chemical bellows control valve, series RSS/F, with safety stuffing box and bellows as well as interchangeable seat and plug, actuated pneumatically or by electric motor.

Control characteristics to DIN EN 60534, equal percentage, linear, on-off, rangeability 25:1. V-plug, rangeability 100:1

Certified to Clean Air Act (TA-Luft)

Strength and tightness (P10, P11) of the pressure-bearing body tested to DIN EN 12266-1.

Gas-tight (P12) in the seat to DIN EN 12266-1, leak rate A

Face to face alternatively:

EN 558-1 basic series 1, ISO 5752 series 1 with flanges DIN EN 1092-2, type B (ISO 7005-2 Type B) PN 16 or flanges drilled to ASME B16.5 Class 150

- ANSI/ISA-75.08.09-2004, class 150 with flanges ASME B16.5 Class 150, raised face
- ANSI/ISA-75.08.09-2004, class 300 with flanges ASME B16.5 Class 300, raised face

Materials :

Body material: Ductile cast iron EN-JS 1049 / ASTM A395

Lining material: PFA/PTFE .../F
 On request: antistatic .../F-L
 highly permeation-resistant .../F-P

Bellows: PTFE, modified PTFE, Hastelloy

Seat and plug: reinforced modified PTFE, at low Cv values also Hastelloy, tantalum

Design pressure :

PN 10 with standard PTFE bellows with heavy-duty PTFE bellows with PTFE/carbon support rings

PN 16 with heavy-duty PTFE bellows with stainless steel support rings with Hastelloy C bellows

See pressure-temperature diagram in [Section 1.4](#).

Sizes :

DN 15, 20, 25, 40, 50, 65, 80, 100 in mm
 ½", ¾", 1", 1½", 2", 3", 4" in inches, CI 150
 1", 1½", 2" in inches, CI 300 on request

Temperature range : -60 °C to 180 °C

See pressure-temperature diagram in [Section 1.4](#).

Installation position :

Normally in horizontal line with the actuator on top. See [Section 6.2](#).

The direction of flow is marked by an arrow cast into the body.

Dimensions and individual parts :

See sectional drawings in [Section 10](#).

Weight :

Nom. size		Weight ca. kg	
ISO	ASME	ISO	ASME
15	½"	6	6
20	¾"	6	6
25	1"	11	11
40	1½"	17	17
50	2"	19	19
65	--	20	--
80	3"	39	39
100	4"	44	44

For weight of actuator, see actuator manufacturer's manual.

Wear parts : Seat, plug, bellows

Options :

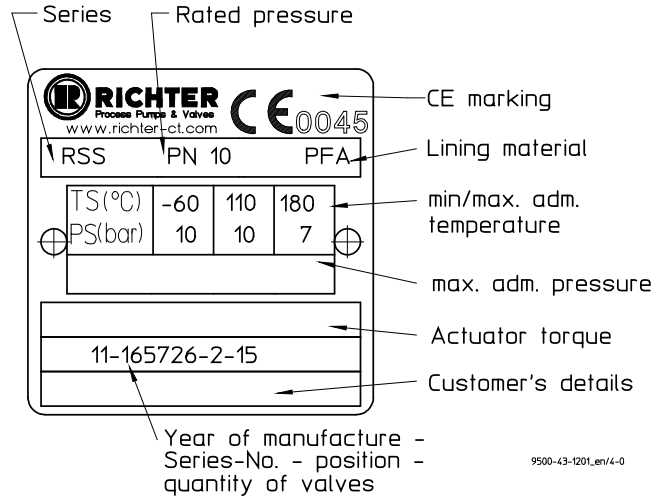
- ◆ Heavy-duty-PTFE-bellows (DN 25-100, 1"- 4")
For permeating media and elevated pressures/temperatures
- ◆ Hastelloy C-bellows
For special applications (e.g. extreme permeation)
- ◆ V-control plug for small Cv values
- ◆ Monitoring connection
For higher safety requirements
- ◆ Actuator and actuator accessories

1.1 Name plate, CE and body markings

The stainless steel name plate is undetachably riveted to the body.

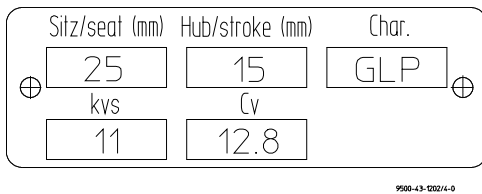
If the operator attaches his identification, it must be ensured that the valve matches the application in question.

Example of name plate with CE marking:



No CE marking is permissible for the sizes 15, 20 and 25; the name plate therefore has no CE marking.

Example: Name plate for control data



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

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

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

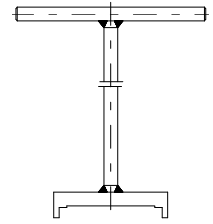
Body identification:

The following are visible on the body according to DIN EN 19 and AD 2000 A4:

- ◆ Nominal size
- ◆ Rated pressure
- ◆ Body material
- ◆ Manufacturer's identification
- ◆ Melt number/Foundry identification
- ◆ Cast date
- ◆ Arrow for direction of flow

1.2 Screw-in tools for seats

Nom. size		Article No.
[mm]	[inch]	
15, 20	½", ¾"	9568-96-1011
25	1"	9568-96-1001
40	1½"	9568-96-1002
50, 65	2"	9568-96-1003
80	3"	9568-96-1004
100	4"	9568-96-1005



1.3 Tightening torques

All screws greased, tighten in diametrically opposite sequence!

The tightening torques for pipe screws and body screws mentioned must not be exceeded. For an exception, see **Section 8**, Flange connection valve / pipe is leaking.

The following tightening torques are recommended.

Pipe screws, flanges to ISO/DIN

Flange nom. size [mm]	Screws [ISO/DIN]	Tightening torque	
		[Nm]	[in-lbs]
15	4 x M12	6	55
20	4 x M12	8	70
25	4 x M12	10	90
40	4 x M16	20	175
50	4 x M16	26	230
65	4 x M16	40	355
80	8 x M16	25	220
100	8 x M16	35	310

Pipe screws, flanges to ASME Class 150 or flanges ISO/DIN drilled to ASME Class 150

Flange nom. size		Screws [ASME]	Tightening torque	
[mm]	[inch]		[Nm]	[in-lbs]
15	½	4 x ½"	5	45
20	¾	4 x ½"	6	55
25	1	4 x ½"	8	70
40	1½	4 x ⅝"	15	135
50	2	4 x ⅝"	25	220
65	--	4 x ⅝"	30	265
80	3	4 x ⅝"	45	400
100	4	8 x ⅝"	35	310

Pipe screws, flanges to ASME Class 300

Flange nom. size		Screws	Tightening torque	
[mm]	[inch]		[ASME]	[Nm]
25	1"	4 x 5/8"	15	133
40	1 1/2"	4 x 3/4"	25	221
50	2"	8 x 5/8"	15	133

Cover screws ISO/DIN

Flange nom. size		Screws	Tightening torque	
[mm]	[inch]		[ISO/DIN]	[Nm]
15	1/2"	4 x M10	30	266
20	3/4"	4 x M10	30	266
25	1"	4 x M10	50	442
40	1 1/2"	4 x M12	50	442
50	2"	4 x M12	50	442
65	--	4 x M12	50	442
80	3"	8 x M12	50	442
100	4"	8 x M12	50	442

Cover screws ASME

Flange nom. size		Screws	Tightening torque	
[mm]	[inch]		[ASME]	[Nm]
15	1/2"	4 x 3/8"	30	266
20	3/4"	4 x 3/8"	30	266
25	1"	4 x 1/2"	50	442
40	1 1/2"	4 x 1/2"	50	442
50	2"	4 x 1/2"	50	442
80	3"	8 x 1/2"	50	442
100	4"	8 x 1/2"	50	442

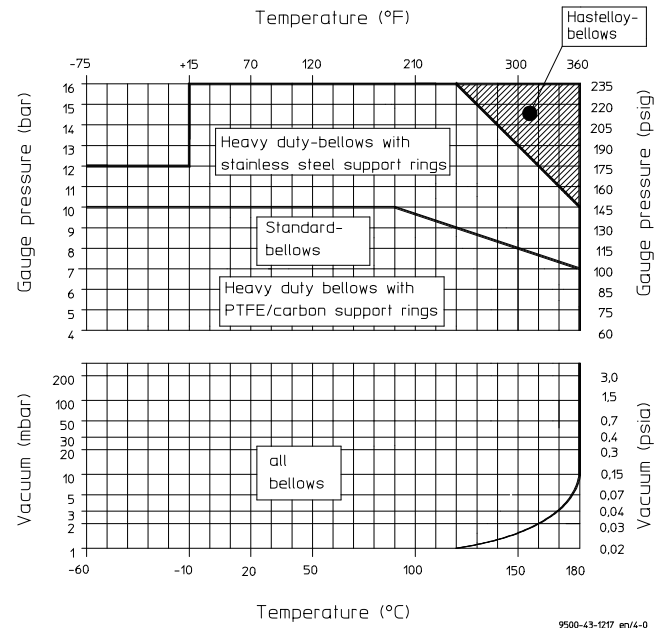
Seat

Screws not greased

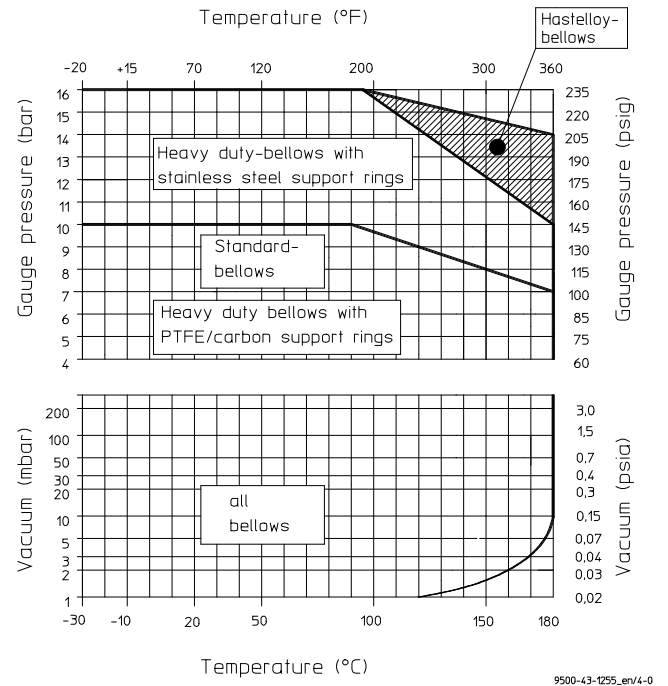
Flange nom. size		Tightening torque	
[mm]	[inch]	[Nm]	[in-lbs]
15	1/2"	3	26
20	3/4"	3	26
25	1"	6	53
40	1 1/2"	12	106
50	2"	16	142
65	2 1/2"	16	142
80	3"	28	248
100	4"	30	265

1.4 Pressure-temperature diagram

According to AD 2000



According to ASME B 16.42



When used in the area of application of ASME or ANSI/ISA, the low temperature of ASTM A395 is limited to -20°F (-29°C).



When used in the minus temperature range, the regulations applicable in the country in question must be observed.

1.5 Flow values, kv100 (Cv)

V- and Parabolic plugs

Nominal size		Kv100 Cv	Seat -∅ in mm															
[mm]	[inch]		8	8	8	8	8	8	8	8	14	14	14	14	14	14	15	20
15	1/2"	m ³ /h USgpm	0,01 0,01	0,05 0,06	0,10 0,12	0,20 0,23	0,50 0,58	0,80 0,93	2 2,3							4 4,7		
20	3/4"	m ³ /h USgpm		0,05 0,06	0,10 0,12	0,20 0,23	0,50 0,58	0,80 0,93	2 2,3							4 4,7		
25	1"	m ³ /h USgpm							2 2,3	0,05 0,06	0,10 0,12	0,20 0,23	0,50 0,58	0,80 0,93	1,20 1,40	4 4,7	7 8,2	11 12,8
Nominal size		Kv100 Cv	Seat -∅ in mm															
mm]	[inch]		15	20	25	30	40	50	65	80	96							
40	1 1/2"	m ³ /h USgpm	4 4,7	7 8,2	11 12,8	15 17,5	28 32,6											
50	2"	m ³ /h USgpm		7 8,2	11 12,8	15 17,5	28 32,6	42 48,9										
65	--	m ³ /h USgpm		7 8,2	11 12,8	15 17,5	28 32,6	42 48,9										
80	3"	m ³ /h USgpm				15 17,5	28 32,6	42 48,9	65 75,7	100 117								
100	4"	m ³ /h USgpm						42 48,9	65 75,7	100 117	155 180							

U-Plugs

DN		Seat -∅ in mm [inch]	
[mm]	[inch]	80 [3.15]	96 [3.78]
80	3"	90 m ³ /h 105 USgpm	
100	4"	90 m ³ /h 105 USgpm	135 m ³ /h 157 USgpm

Notes:

The next lower kv100/Cv value can also be achieved with special plugs without changing the seat ∅.

This is important if the kv100/Cv value is subsequently changed as only the plug then has to be replaced.

Conversion into Cv (US gpm) = kv100 x 1,165.

1.6 Cavitation coefficient z

$$K_v / K_{v100} = 75\%$$

DN		Seat -∅ in mm										
[mm]	[inch]	8	14	15	20	25	30	40	50	65	80	96
15	1/2"	0,60	0,60	0,60								
20	3/4"	0,60	0,60	0,60								
25	1"	0,60	0,60	0,60	0,60	0,60						
40	1 1/2"			0,60	0,60	0,60	0,55	0,50				
50	2"				0,60	0,60	0,55	0,50	0,40			
65	--				0,60	0,60	0,55	0,50	0,40			
80	3"						0,55	0,50	0,45	0,32	0,30	
100	4"								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

1.7 Valve travel

DN		Standard PTFE bellows			Heavy duty PTFE-bellows			Hastelloy bellows		
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
15	½"	15	20					15	20	
20	¾"	15	20					15	20	
25	1"	15	20		15			15	20	
40	1½"	15	20	30	15	20		15	20	
50	2"	15	20	30	15	20		15	20	
65	--	15	20	30	15	20		15	20	
80	3"			30			30			30
100	4"			30			30			30

The valve travel depends on the actuator selected.

1.8 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 $< p_2$, p_2 is used in the tables. observe the application limits acc. to the pressure-temperature diagram in **Section 1.4**.

- ◆ A **mechanical travel stop** is required in the area marked.

It is provided when

$\Delta p > 10\text{bar}/145\text{ psi to Seat-}\varnothing 15\text{-}50\text{ mm}$

$\Delta p > 6\text{ bar}/87\text{ psi to Seat-}\varnothing \geq 65\text{ mm}$

1.8.1 Standard bellows

Opening forces

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

Closing forces

Seat \varnothing	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
290	290	310	330	350	370	390	410	430	450	470
330	290	310	330	350	370	390	410	430	450	470
390	330	385	435	490	540	595	645	695	750	800
450	390	460	525	595	665	730	800	865	935	1010
550	450	545	640	735	830	925	1020	1115	1205	1305
680	550	680	805	935	1065	1190	1320	1445	1575	1705
830	680	885	1085	1290	1490	1695	1895	2095	2300	2480
1040	830	1130	1425	1720	2020	2315	2610	2910	3205	3500
1300	1040	1500	1960	2420	2890	3350	3810	4270	4740	5190
1600	1300	1970	2630	3300	3960	4630	5300	5960	6630	7305
	1600	2520	3440	4370	5290	6210	7130	8050	8980	9900

1.8.2 Heavy-duty bellows

Opening forces

DN		N
[mm]	[inch]	
	1"	900
	1½"	2000
	2"	2000
	--	2000
	3"	800
1	4"	800

Closing forces

Seat Ø	maximum Δp or p2 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
8	290	310	330	350	370	390	410	430	450	470	495	510	525	540	555	570
14	330	385	435	490	540	595	645	695	750	800	865	900	935	970	1005	1040
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

2 Notes on safety

This operating manual contains fundamental information which is to be observed during installation, operation and maintenance.

It must be read before installation and commissioning!

For valves which are used in potentially explosive areas, see [Section 3](#).

Installation and operation are to be performed by qualified staff.

The area of responsibility, authority and supervision of the staff must be regulated by the customer.



General hazard symbol!

People may be put at risk.



Safety symbol! The ball valve and its function may be put at risk if this safety symbol is not observed.

It is imperative to observe warnings and signs attached directly to the ball valve and they are to be kept fully legible.

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 as:

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

2.1 Intended use

Richter Bellows Control valves of the series RSS/F are pressure containing components in accordance with the Pressure Equipment Directive (PED) for the passage and shut-off of fluids. The valves are suitable for vapours, gases and non-boiling liquids of group 1 according to the PED and have a corrosion-resistant plastic lining.

Sie werden zur Regelung von korrosiven, reinen und hochreinen Flüssigkeiten, Gasen und Dämpfen in Chemie-, Pharma-, Lebensmittel- und industriellen Prozessen eingesetzt.

Solids can lead to increased wear, damage to sealing surfaces or to a reduction in the service life of the valve.

The operator must carefully examine in the event of operating data other than those provided whether the designs of the valve, accessories and materials are suitable for the new application (consult the manufacturer).

2.2 For the customer / operator

When using the valve, it must be ensured that

- ◆ actuators which are retrofitted are adapted and designed to suit the valve
- ◆ hot or cold valve parts are protected by the customer against being touched
- ◆ the valve has been properly installed in the pipe system
- ◆ the usual flow rates are not exceeded in continuous operation.

This is not the manufacturer's responsibility.

Loads caused by earthquakes were not allowed for in the design.

Fire protection to DIN EN ISO 10497 is not possible (plastic lining and plastic components).

2.3 Improper operation

The operational reliability of the valve supplied is only guaranteed if it is used properly in accordance with **Section 2.1** of this operating manual.



The operation limits specified on the identification plate and in the pressure-temperature diagram must under no circumstances be exceeded.

3 Safety notes for applications in potentially explosive areas based on the Directive 94/9/ EC (Atex)

The valves are intended for use in a potentially explosive area and are therefore subject to the conformity assessment procedure of the directive 94/9/EC (ATEX).

As part of this conformity assessment, an ignition hazard analysis to EN 13463-1 to satisfy the fundamental safety and health requirements was conducted with the following result:

- ◆ **The valves do not have any ignition source of their own and can be operated both manually as well as mechanically/electrically.**
- ◆ **The valves are not covered by the scope of application of the ATEX directive and therefore do not need to be identified accordingly.**
- ◆ **The valves may be used in a potentially explosive area.**

Supplementary notes:

- ◆ **Electric/mechanical actuators must be subjected to their own conformity assessment to ATEX.**

It is imperative to observe the individual points of intended use for application in a potentially explosive area.

3.1 Intended use

Improper operation, even for brief periods, may result in serious damage to the unit.

In connection with explosion protection, potential sources of ignition (overheating, electrostatic and induced charges, mechanical and electric sparks) may result from these improper operation; their occurrence can only be prevented by adhering to the intended use.

Furthermore, reference is made in this connection to the Directive 95/C332/06 (ATEX 118a) which contains the minimum regulations for improving the occupational health and safety of the workers who may be at risk from an explosive atmosphere.

A difference is made between two cases for the use of chargeable liquids (conductivity < 10⁻⁸ S/m):

1. Chargeable liquid and non-conductive lining

Charges can occur on the lining surface. As a result, this can produce discharges inside the valve. However, these discharges cannot cause ignitions if the valve is completely filled with medium.

If the valve is not completely filled with medium, e.g. during evacuation and filling, the formation of an explosive atmosphere must be prevented, e.g. by superimposing a layer of nitrogen.

It is recommended to wait 1 hour before removing the valve from the plant in order to permit the elimination of static peak charges.

This means that, to safely prevent ignitions, the valve must be completely filled with medium at all times or else a potentially explosive atmosphere must be excluded by superimposing a layer of inert gas.

2. Chargeable liquid and conductive lining

No hazardous charges can occur as charges are discharged direct via the lining and shell (surface resistance < 109 Ohm, leakage resistance < 106 Ohm).

The following special feature applies to the series with bellows (RSS, BAVM, PAP):

The bellows are not offered in a conductive version, i.e. the restrictions under point 1. apply.

Richter optionally offers conductive metallic bellows for the series HV and RSS.

Static discharges of non-conductive linings are only produced through the interaction with a non-conductive medium and are therefore the responsibility of the plant operator.

Static discharges are not sources of ignition which stem from the valves themselves!

- The temperature of the medium must not exceed the temperature of the corresponding temperature class or the maximum admissible medium temperature as per the operating manual.
- If the valve is heated (e.g. heating jacket), it must be ensured that the temperature classes prescribed in the Annex are observed.
- To achieve safe and reliable operation, it must be ensured in inspections at regular intervals that the unit is properly serviced and kept in technically perfect order.
- Increased wear to the valve can be expected with the conveyance of liquids containing abrasive constituents. The inspection intervals should be reduced compared with the usual times.
- Actuators and electric peripherals, such as temperature, pressure and flow sensors etc., must comply with the valid safety requirements and explosion protection provisions.
- The valve must be grounded. This can be achieved in the simplest way via the pipe screws using tooth lock washers. Otherwise grounding must be ensured by other action, e.g. cable bridges.
- Attachments such as actuators, position controllers, limit switches etc. must satisfy the relevant safety regulations as regards explosion protection and, if required, be designed in compliance with Atex.
- Special attention must be paid to the appropriate safety and explosion protection notes in the respective operating manuals.
- Plastic-lined valves must not be operated with carbon disulphide

4 Safety note for valves, certified to Clean Air Act (TA-Luft)

On request, this valve can be supplied compliant with the German Clean Air Code.

Certificate / Manufacturer Declaration Validity is dependent on the operating instructions being read and observed.

In particular, servicing must be conducted at regular intervals, and the bolted connections relevant for tightness must be inspected and retightened if necessary.

5 Transport, storage and disposal



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



The valve is supplied with flange caps. Do not remove them until just before installation. They protect the plastic surfaces against dirt and mechanical damage.

Handle the goods being transported with care. During transport the valve must be protected against impacts and collisions.

Directly after receipt of the goods, the consignment must be checked for completeness and any in-transit damage.

Do not damage paint protection.

5.1 Storage

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

It should be stored in a dry, vibration-free and well-ventilated room at as constant a temperature as possible.

Elastomers are to be protected against UV light.

In general, a storage period of 10 years should not be exceeded.

5.2 Return consignments



Valves which have conveyed aggressive or toxic media must be well rinsed and cleaned before being returned to the manufacturer's works.

It is **imperative** to enclose a **safety information sheet / general safety certificate** on the field of application with the return consignment.

Pre-printed forms are enclosed with the installation and operating manual.

Safety precautions and decontamination measures are to be mentioned.

5.3 Disposal

Parts of the valve may be contaminated with medium which is detrimental to health and the environment and therefore cleaning is not sufficient.



Risk of personal injury or damage to the environment due to the medium!

- ◆ Wear protective clothing when work is performed on the valve.
- ◆ Prior to the disposal of the valve:
 - Collect any medium, etc. which has escaped and dispose of it in accordance with the local regulations.
 - Neutralise any medium residues in the valve.
- ◆ Separate valve materials (plastics, metals, etc.) and dispose of them in accordance with the local regulations.

6 Installation

- ◆ Examine valve for in-transit damage, damaged bellows control valves must not be installed.
- ◆ Before installation the valve and the connecting pipe must be carefully cleaned to remove any dirt, especially hard foreign matter.
- ◆ During installation, pay attention to the correct tightening torque, aligned pipes and tension-free assembly.
- ◆ The all-round gap between the body and the cover must remain constant so that a centric position of the plug in relation to the seat is guaranteed.
- ◆ Operation during maintenance work can be continued with a bypass around the control valve.



Ensure that a remotely actuated actuator cannot be accidentally switched on.

- ◆ Depending on the kv-value, the free cross section in the valve may be much smaller than the cross section of the nominal size. To prevent clogging, the pipe must be carefully cleaned upstream of the valve.

6.1 Flange caps and gaskets

Leave protective caps on the flanges until just prior to installation.

Where there is a particularly high risk of damage to the plastic sealing surfaces, e.g. if the mating flanges are made of metal or enamel, PTFE-lined gaskets with a metal inlay should be used. These gaskets are available as special accessories in the Richter range.

6.2 Direction of flow and installation position

Normally the valve is installed in a horizontal pipe with the actuator on top. The valve can also be installed with the actuator underneath.

However, this is only admissible if there is no risk of contamination to the bellows, e.g. from the sedimentation of solids.

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 below against the plug. An arrow on the body indicates the direction of flow.

6.3 Test pressure

The test pressure PT of an open valve must not exceed the value of $1.5 \times \text{PN/PS}$ as per the identification of the valve.

7 Operation

7.1 Initial commissioning

Normally, the valves have been tested for leaks with air or water. Prior to initial operation check cover screws. For torques see [Section 1.3](#).



Unless otherwise agreed, there could be residual amounts of water in the flow section of the valve; this could result in a possible reaction with the medium.

To prevent leaks, all connection screws should be retightened after the initial loading of the valve with operating pressure and operating temperature. For torques, see [Section 1.3](#).

7.2 Improper operation and their consequences

- ◆ Crystallisation must be prevented, e.g. by heating. In extreme cases this may cause blocking.
- ◆ Operation with solids leads to increased wear.
- ◆ Operating during cavitation leads to increased wear.
- ◆ Non-observance of the pressure-temperature diagram can lead to damage.

6.4 Grounding

The valve must be grounded. The simplest solution is to use tooth lock washers which are placed under one pipe bolt of each flange.

At the customer's request a setscrew M6 with a hex. nut and washer will be provided at each flange as an additional grounding connection.

Otherwise grounding must be ensured by different measures e.g. a cable link.

6.5 Monitoring connection



If the cover flange has a screw-in fitting for an alarm connection, the latter must also be connected or the screw-in fitting has to be sealed. Otherwise, medium could escape if the bellows became defective.

In order to ensure leak monitoring, Richter recommends the combination of the safety stuffing box with a warning connection.

- ◆ If no monitoring is provided by the warning connection, do not tighten safety stuffing box. Otherwise any leak cannot be seen.
- ◆ The valve is not to be operated in the wrong direction of flow. Otherwise, it may close unintentionally with an actuator of normal dimensions.

7.3 Shutdown

The local regulations are to be observed when dismantling the valve.



Make sure that a remote-controlled actuator cannot be switched on by accident.

In the case of a diaphragm actuator make sure that there is no more compressed air in the actuator; the springs must be in the unstressed state.

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



Prior to the start of maintenance work, the valve must be thoroughly cleaned. Medium residue may be in the valve even if it has been properly drained and flushed. Drain the valve on both sides.

After dismantling, immediately protect the valve flanges against mechanical damage by using flange caps. See also [Section 6.1](#).

8 Malfunctions

◆ Flange connection valve/pipe is leaking

Retighten the flange screws to a tightening torque according to **Section 1.3**. If this does not remedy the leak, the recommended torques may be exceeded by 10%.

If this also fails to stop the leak, dismantle and inspect the valve.

◆ Flange connection main body/cover is leaking

Retighten the cover screws to a tightening torque according to **Section 1.3**. If this does not remedy the leak, the recommended torques may be exceeded by 10%.

If this also fails to stop the leak, dismantle and inspect the valve.

◆ Packing is leaking

First of all, the packing gland follower can be tightened.

Then dismantle the valve as quickly as possible and repair.

Disadvantages:

The medium can destroy the metallic internals relatively quickly.

- Corrosion on the stem may result in sluggishness and therefore impair the control behaviour.

Replace bellows.

Replace plug and/or seat.

Replace packing rings.

◆ Monitoring connection reports a rise in pressure or a leak

Replace bellows.

Replace plug and/or seat.

Replace packing rings.

◆ Valve does not switch

Is the actuator supplied with power?

Is any directional control valve correctly connected?

Is there any foreign matter in the control valve?

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 the air pressure high enough?

Is the 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?

◆ The flow rate is too high or too low.

◆ The performance curve is not correct.

◆ The valve cavitates.

Do the rated data according to the data sheet or works certificate match the data of the plant?

Are the correct seat and plug installed? See markings on the seat and plug and compare them with the name plate and the data sheet.

9 Maintenance

- ◆ All repair work is to be performed by qualified personnel using the appropriate tools.
- ◆ For the arrangement, designation and item numbers of all parts of the valve, see Section 10.
- ◆ Spare parts are to be ordered with all the details in acc. with the valve identification.
- ◆ Only original spare parts may be installed.
- ◆ The maintenance staff can decide whether the valve is dismantled from the pipe or not for maintenance work. In both cases **Section 7.3** 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 9.4** is to be observed for re-assembly of the actuator.
- ◆ To prevent leaks, a regular check of the connection screws should be made in line with the operating requirements.
For torques see **Section 1.3**.

9.1 Setting the travel stop

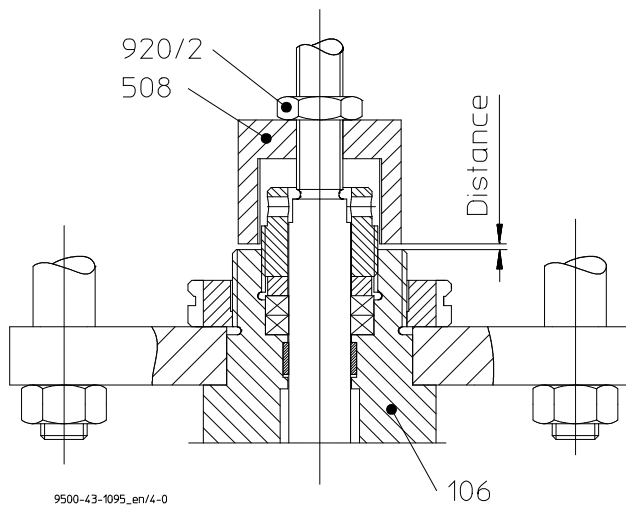


Fig. 1

To ensure the valve closes tight, a distance between the travel stop **508** and cover **106** must be observed:

DN 15 – 50 (½" – 2")	: 0,5 mm
DN 65 – 100 (2½" – 4")	: 1,0 mm

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

- Close valve.
- Remove protection bellows **687**.
- Move travel stop **508** to the correct distance.
- Tighten lock nut **920/2**.

9.2 Maintenance of the upper section

This mainly involves the following work:

- ◆ Replacing the plug **204**.
- ◆ Replacing the bellows **206**.
- ◆ 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.

9.2.1 Dismantling

- Move plug **204** into open position if the actuator **850** is mounted.
- Remove cover nuts and screws **901/1**, **1x936/1**, **1x936/2** and **920/2** (DN 100 **902/2**, **1x936/1**, **1x936/2**, **920/2** and **920/3**).
- Pull cover **106** vertically out of the body **100**.
- Remove protective bellows **687**, travel stop **508** and packing nut **404**.
- Remove valve stem **800** with bellows **206** and plug **204** below.
- Clamp valve stem **800** in a vice with protective jaws.
- Pull round cord **522** out of the plug **204** with a pair of pliers.
- Unscrew plug **204** by hand or with a strap wrench. Right-hand thread.
- Unscrew bellows **206** by hand or with a strap wrench. Right-hand thread.
- With the heavy-duty bellows **206** the support rings **231** and support disc **232** cannot be removed.
- Only remove packing rings **402/1** and thrust ring **405** if necessary.
- Only remove guide rings **302** if necessary. Use a sharp tool, e.g. scribing iron or screwdriver.
- With DN 80 and DN 100 (3" and 4"): only remove guide **801** if necessary. Press in the direction of the stuffing box using a press.
Check to see whether the seat **205** is still ok. If not: replace. See **Section 9.3**.

9.2.2 Assembly

DN 15 - DN 65 (1/2" - 2 1/2")

- Insert guide rings **302/1**, **302/2**.
- Clamp valve stem **800** in a vice with protective jaws.
- Screw bellows **206** without lubricant onto the valve stem **800** and tighten by hand.
- Check to see whether the new plug **204** fits in the valve seat **205**. Make sure that neither the seat nor the plug is damaged.
- Screw plug **204** with plug onto the bellows **206** without lubricant and tighten by hand.
- Press round cord **522** into the plug **204** leaving about 10 mm over. This facilitates the next dismantling operation.

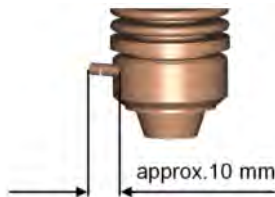


Fig. 2

- Install valve stem **800** with bellows **206** and plug **204** without lubricant into the cover **106**.
- Insert packing rings **402/1** offset by 90° and thrust ring **405** into the cover and tighten with packing nut **404**. For tightening torques, see **Section 1.3**.
- Screw travel stop **508** and lock nut **920/2** onto the valve stem **800**.
- Carefully lower upper section into the body.
- Install cover **106**. Tightening torques see **Section 1.3**.
- If the bracket **510** or yoke **516** was dismantled, install it again. Tighten groove nut **509/1**.
- Mount the protective bellows **687** with inserted snap rings **954/1** onto the valve stem **800**.
- Mount clip **937/1** onto the valve stem **800**.
- If the actuator **850** was removed, mount it again now.
- Set valve and mount coupling **804**. See **Section 9.4**.
- Set travel stop **508**. See **Section 9.1**.
- Attach protective bellows **687** with clip **937/1**.
- Connect monitoring connection again.

DN 80 und DN 100 (3" und 4")

- Press guide **801** into the cover **106** without lubricant.
- Now continue as described under assembly DN 15 - DN 65 (1/2" - 2 1/2").

9.3 Replacing seat

The seat is marked with:

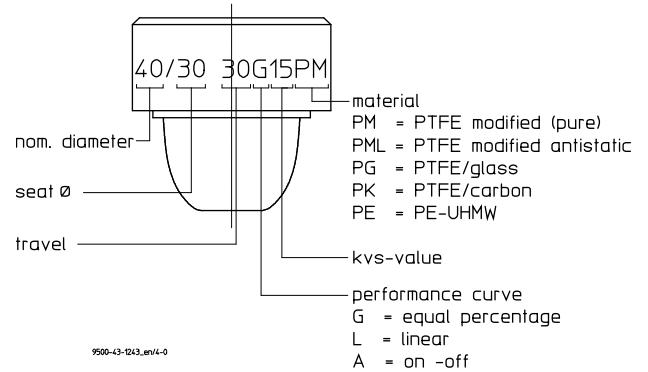


Fig. 3

The plug is marked with:

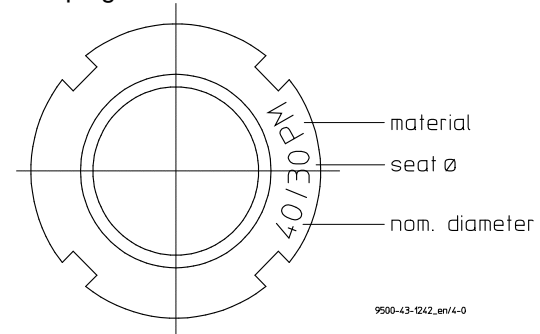


Fig. 4

A screw-in tool is required for assembling and dismantling the seat **205**. The article numbers for the individual nominal sizes are listed in **Section 1.2**.

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.

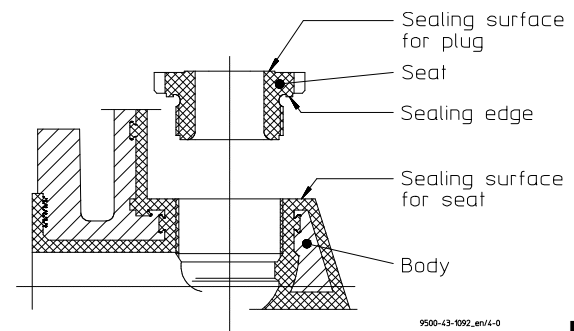


Fig. 5

- Remove the upper section as described in **Section 9.2**.
- Using the Richter screw-in tool, turn the seat **205** out of the body. **Right-hand thread**.
- Carefully clean the sealing surface in the body **100** and check for
- If there is any damage, you can try to rework the sealing surface.
- Screw the new seat **205** into the body **100** without lubricant using the Richter screw-in tool. For tightening torques, see **Section 1.3**.
- Further assembly as described in **Section 9.2**.

9.3.1 V-plug

In contrast to the normal valve plug, the seat diameter is smaller than the V-plug diameter.

The V-plug is pushed firmly over the resilient sealing lip of the valve seat. This seals the plug.

9.4 Mounting the actuator

- ◆ Assembly of the actuator varied depending on the make and type.
- ◆ The operating manuals for actuators, positioners and other accessories must be observed.

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

- The stem **800** must under no circumstances be turned to adapt to the coupling **804**. If turned counterclockwise, it would otherwise turn out of the metal core of the bellows **206**.
- The actuator manufacturers prescribe that the valve is moved into the closed position when the coupling **804** is mounted. In this closed position many bellows are pre-tensioned in the valve. They would possibly open the valve again. Therefore, the stem **800** is to be kept in the closed position when the coupling **804** is mounted.



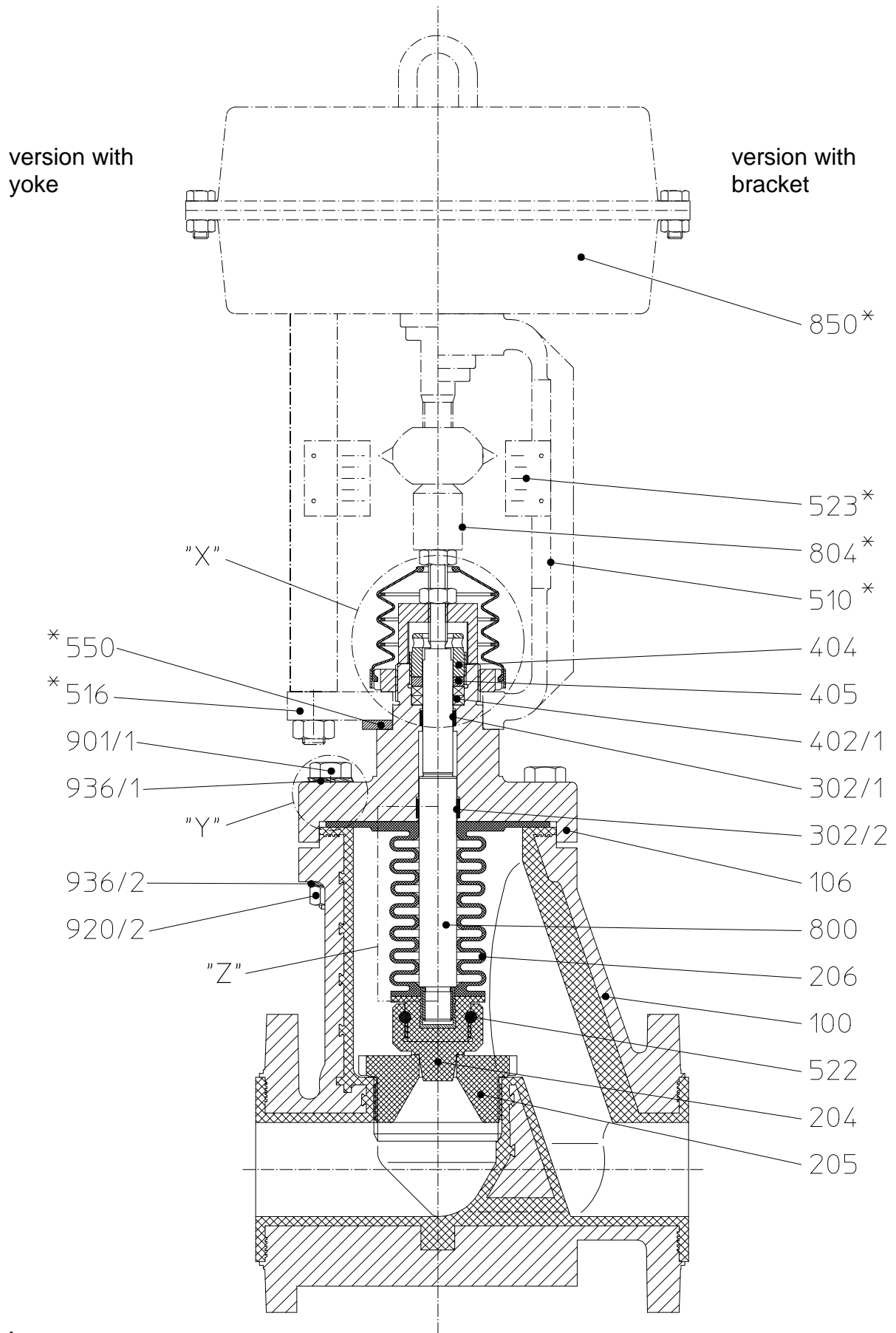
The safety function, i.e. opening or closing of the valve if the air or power fails, must be checked.

10 Drawings

10.1 Legend

100	body	550	disc
106	cover	687	protective bellows
204	plug	includes:	
205	seat	509/1	groove nut
206	bellows	937/1	clip
206	heavy-duty bellows	954/1	snap ring
includes:		800	valve stem
231	support ring	801	guide (DN 80, 100, 3", 4")
232	support disc	804	coupling
302/x	guide ring	850	actuator
402/1	packing ring	901/1	hex. screw (DN 15 to 80, ½" to 3")
404	packing nut	902/1	stud screw (DN 100, 4")
405	thrust ring	917/1	screw-in pipe connector
508	travel stop	920/x	hex. nut
510	bracket	936/x	tooth lock washer
516	yoke	938/1	hex. head screw plug
522	round cord		
523	stroke index		

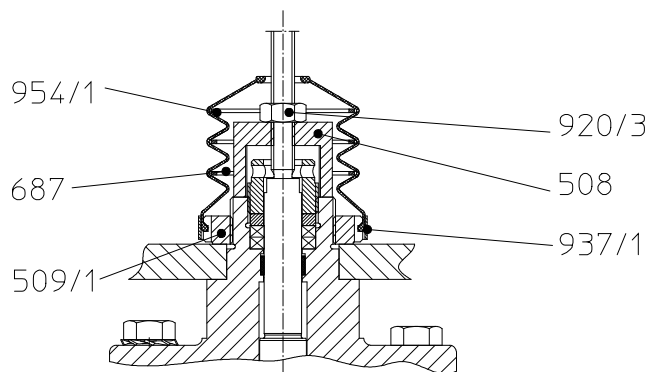
10.2 RSS/F Sectional drawing (with standard UVV-bellows)



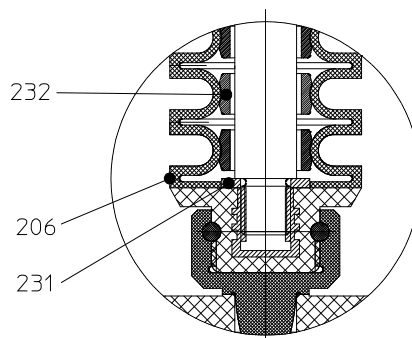
* depending on actuation

10.3 Details, options and dimensions

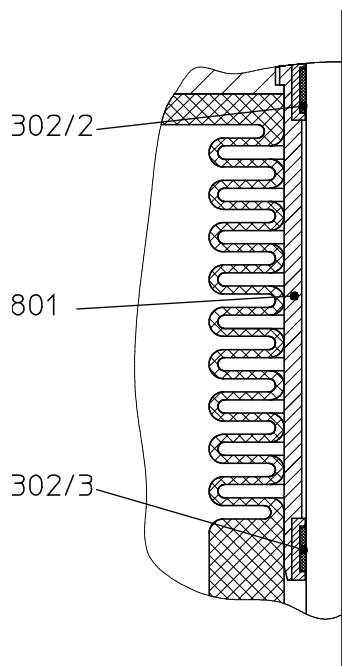
Detail "X" Travel Stop



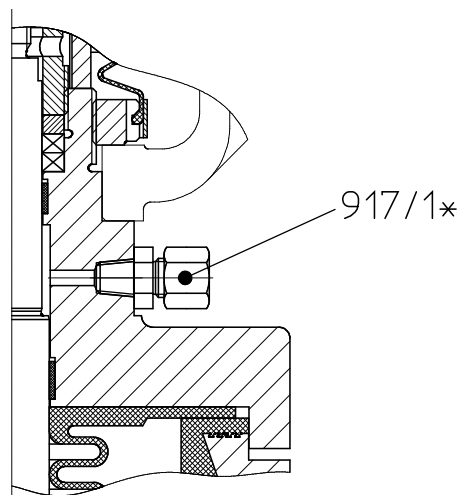
Option heavy-duty bellows



Detail "Z" (DN 80, 100, 3", 4")

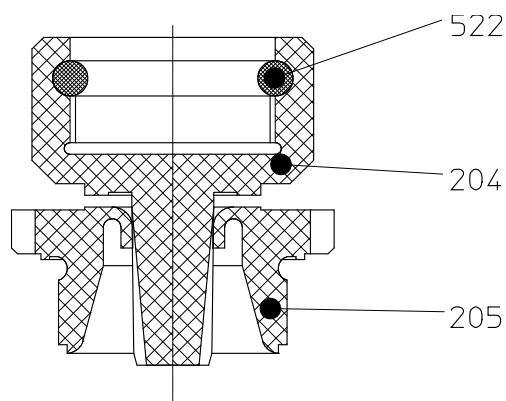


Option monitoring connection

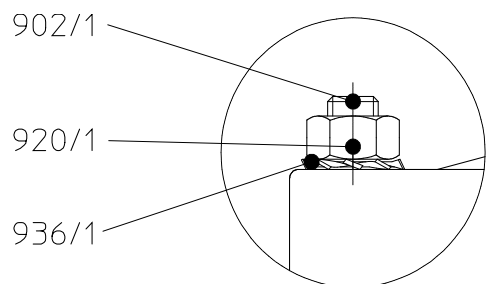


* If requested with 938/1

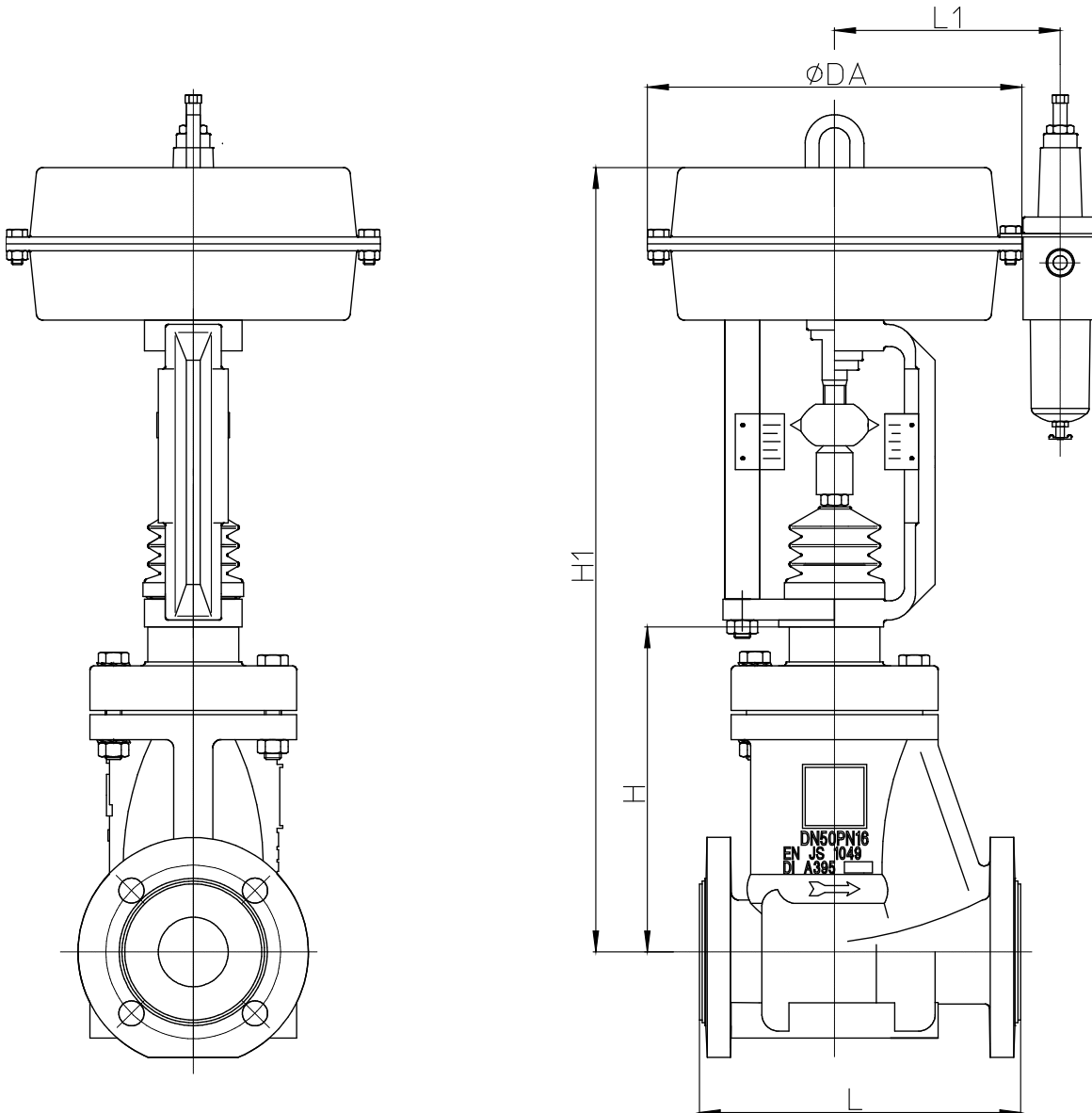
V-control plug for small Cv values



Detail "Y" (DN 100, 4")



10.4 Dimensional drawing



DN							EN 558 Reihe 1		ANSI/ISA-75.08.01 Class 150		ANSI/ISA-75.08.01 Class 300	
		ØDA	H1	H		L1	L		L		L	
mm	inch	mm/inch	mm/inch	mm	inch	mm/inch	mm	inch	mm	inch	mm	inch
15	1/2"			130	5.12		130	5.12"	130 ¹⁾	5.12 ¹⁾	2)	2)
20	3/4"										2)	2)
25	1"			185	7.28		160	6.30	184	7.24	197	7.76
40	1 1/2"			225	8.86		200	7.87	222	8.70	235	9.25
50	2"			230	9.05		230	9.05	254	10.00	267	10.50
65	2 1/2"							290	11.42	2)	2)	2)
80	3"			340	13.35		310	12.20	298	11.73	2)	2)
100	4"			350	13.78		350	13.78	352	13.86	2)	2)

1) not to ANSI/ISA
2) not available

Flange connecting dimensions:

DIN EN 1092-2, type B (ISO 7005-2, type B) PN 16 or flanges drilled to ASME B16.5 Class 150 or with flanges ASME B 16.5 Class 150 or ASME B 16.5 Class 300

CE Konformitätserklärung nach EN ISO/IEC 17050
Declaration of Conformity according to EN ISO/IEC 17050

Produkt <i>Product</i>	Kunststoffausgekleidete Regelarmaturen <i>Plastic lined control valves</i>		
Bauart <i>Design</i>	Absperr- oder Regelventil, Faltenbalg-Stellventil <i>Globe shut-off or control valve, bellows control valve</i>		
Baureihe <i>Series</i>	HV, HVR, RSS		
Nennweite <i>Size</i>	DN 15 bis DN 100, ½" bis 4" <i>DN 15 to DN 100, ½" to 4"</i>		
Seriennummer <i>Series number</i>	ab/from 29.12.2009		
EU-Richtlinie <i>EU-Directive</i>	97/23/EG Druckgeräterichtlinie <i>97/23/EC Pressure Equipment</i>	2006/42/EG ²⁾ <i>2006/42/EC²⁾</i>	Maschinenrichtlinie <i>Directive Machinery</i>
Angewandte Technische Spezifikation <i>Applied Technical Specification</i>	DIN EN ISO 12100-2 AD 2000		
Überwachungsverfahren <i>Surveillance Procedure</i>	97/23/EG Zertifizierungsstelle für Druckgeräte der TÜV Nord Systems GmbH & Co. KG Notified Body 0045		
Konformitätsbewertungs- verfahren 97/23/EG <i>Conformity assessment procedure 97/23/EC</i>	Modul H		
Kennzeichnung <i>Marking</i>	97/23/EG ¹⁾ 97/23/EC ¹⁾ ≥ DN 32, ≥ 1" 2006/42/EG ²⁾ 2006/42/EC ²⁾	CE 0045 CE	

Das Unternehmen Richter Chemie-Technik GmbH bescheinigt hiermit, dass die o.a. Baureihen die grundsätzlichen Anforderungen der aufgeführten Richtlinien und Normen erfüllt.
Richter Chemie-Technik GmbH confirms that the basic requirements of the above specified directives and standards have been fulfilled.

- ¹⁾ Für nicht aufgeführte Nennweiten ist eine Kennzeichnung nicht zulässig.
For sizes not listed a marking is not permitted.
- ²⁾ Alle Armaturen, mit Ausnahme der Armaturen mit Handbetätigung.
For all valves, with exceptions to valves with hand operation

Kempen, 14.011.2011



G. Kleining
Leiter Forschung & Entwicklung
Manager Research & Development



A. Linges
Leiter Qualitätsmanagement
Quality Manager

Herstellererklärung / *Manufacturer's Declaration*

TA-Luft / *German Clean Air Act (TA-Luft)*

Richter Stellventil / *Richter Control Valve*

Hiermit erklären wir, dass die Stellventile der Baureihen
Hereby we declare, that the Control Valves of the series

RSS, HV

die Anforderung bezüglich der Gleichwertigkeit gemäß Ziffer 5.2.6.4 der Technischen Anleitung-Luft (TA-Luft vom 01.10.2002 / VDI 2440 Ziffer 3.3.1.3) erfüllen.

Grundlage sind die "Prüfgrundsätze für den Eignungsnachweis von Spindelabdichtungen in Armaturen als gleichwertig nach TA-Luft" des TÜV Süddeutschland Bau und Betrieb GmbH vom 22.09.1992.

Zusätzlich beinhaltet die Herstellererklärung den Eignungsnachweis einer Spindelabdichtung und einer inneren Flanschverbindung gemäß VDI 2440 hinsichtlich Dichtheit bzw. der Einhaltung der spezifischen Leckagerate nach TA-Luft $\lambda \leq 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{s} \cdot \text{m}}$ und einer erweiterten Prüfung unter Betriebsbedingungen.

Voraussetzung für die Gültigkeit der Herstellererklärung ist das Beachten und Einhalten der Betriebsanleitung. Insbesondere sind regelmäßige Wartungsintervalle durchzuführen und die dichtheitsrelevanten Schraubverbindungen zu überprüfen und, wenn notwendig, nachzuziehen.

meets the requirement relating to the equivalence according to Section 5.2.6.4 of the German Clean Air Act (Clean Air Act dated 01.10.2002 / VDI 2440 Section 3.3.1.3).

The basics are the "Testing principles for the suitability verification of stem seals in valves as being equivalent in accordance to the German Clean Air Act of the TÜV Süddeutschland Bau und Betrieb GmbH dated 22 September 1992.

Additionally, the manufacture's declaration contains the suitability verification of a stem seal and internal flange connection in accordance to VDI 2440 with regard to tightness and the observance of the specific leakage rate according to the German Clean Air Act $\lambda \leq 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{s} \cdot \text{m}}$ and an extended test under the above-mentioned operating conditions.

Manufacturer's declaration validity is dependent on the operating instructions being read and observed. In particular, service must be conducted at regular intervals and the bolted connection relevant for tightness should be inspected and retightened if necessary.


Kempen, 01.03.2010



Dipl.-Ing. Gregor Kleining

Leiter Forschung & Entwicklung
Manager Research & Development

Erstellt/Compiled: CRM/GK am/on : 23.02.2010
Genehmigt/Approved: CRQ/AI am/on : 23.02.2010



Dipl. Wirt.-Ing. Alexander Linges

Leiter Qualitätsmanagement
Quality Manager

Seite/Page : 1 QM-Nr.: 0905-40-1022_RSS_HV/4-04
von/of : 1

Kempen, 27.01.2011

SIL**Declaration by the Manufacturer**

Functional Safety according to IEC 61508

We declare, that the devices

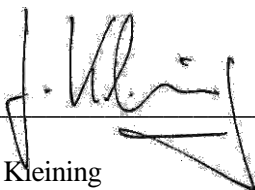

RSS

are suitable for use in a safety related application, if the safety instructions and the following parameters are observed:

Device Type:	A
Proof Test Interval:	≤ 1 year
HFT:	0 (single channel usage)
λ_{SU}:	224 FIT
λ_{SD}:	37 FIT
λ_{DU}:	197 FIT
λ_{DD}:	64 FIT
SFF:	62,2 %
PFD_{Avg}:	$8,64 \cdot 10^{-4}$ (for $T_{Proof} = 1$ year)
MTBF:	219 years

Safety Integrity Level: SIL 2

The specified values are valid only for the valve. Accessories such as an actuator, solenoid valves, limit switches etc. are not included.

Gregor Kleining
Dir. Research & DevelopmentAlexander Linges
Quality Manager

Safety Information / **Declaration of No Objection** Concerning the Contamination of Richter-Pumps, -Valves and Components

1 SCOPE AND PURPOSE

Each entrepreneur (operator) carries the responsibility for the health and safety of his employees. This extends also to the personnel, who implements repairs with the operator or with the contractor.

Enclosed declaration is for the information of the contractor concerning the possible contamination of the pumps, valves and component sent in for repair. On the basis of this information for the contractor is it possible to meet the necessary preventive action during the execution of the repair.

Note: The same regulations apply to repairs **on-site**.

2 PREPARATION OF DISPATCH

Before the dispatch of the aggregates the operator must fill in the following declaration completely and attach it to the shipping documents. The shipping instructions indicated in the respective manual are to be considered, for example:

- Discharge of operational liquids
- remove filter inserts
- lock all openings hermetically
- proper packing
- Dispatch in suitable transport container
- Declaration of the contamination fixed **outside!!** on the packing

Declaration about the Contamination of Richter Pumps, -Valves and Components

The repair and/or maintenance of pumps, valves and components can only be implemented if a completely filled out declaration is available. If this is not the case, delay of the work will occur. If this declaration is not attached to the devices, which have to be repaired, the transmission can be rejected.

Every aggregate has to have it's own declaration.

This declaration may be filled out and signed only by authorized technical personnel of the operator.

Contractor/dep./institute : _____		Reason for transmitting <input checked="" type="checkbox"/> Please mark the applicable	
Street : _____		Repair: <input type="checkbox"/> subject to fee <input type="checkbox"/> Warranty	
Postcode, city: _____		Exchange: <input type="checkbox"/> subject to fee <input type="checkbox"/> Warranty	
Contact person: _____		<input type="checkbox"/> Exchange/ Replacement already initiated/received	
Phone : _____ Fax : _____		Return: <input type="checkbox"/> Leasing <input type="checkbox"/> Loan <input type="checkbox"/> for credit note	
End user : _____			
A. Details of Richter-product:		Failure description:	
Classification: _____		Equipment: _____	
Article number: _____		Application tool: _____	
Serial number: _____		Application process: _____	
B. Condition of the Richter-product:		Contamination :	
	no ¹⁾ yes no		no ¹⁾ yes
Was it in operation ?	<input type="checkbox"/> <input type="checkbox"/> →	toxic	<input type="checkbox"/> <input type="checkbox"/>
Drained (product/operating supply item) ?	↓ <input type="checkbox"/> <input type="checkbox"/>	caustic	<input type="checkbox"/> <input type="checkbox"/>
All openings hermetically locked!	↓ <input type="checkbox"/> <input type="checkbox"/>	inflammable	<input type="checkbox"/> <input type="checkbox"/>
Cleaned ?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	explosive ²⁾	<input type="checkbox"/> <input type="checkbox"/>
If yes, with which cleaning agent:		mikrobiological ²⁾	<input type="checkbox"/> <input type="checkbox"/>
and with which cleaning method:		radioactive ³⁾	<input type="checkbox"/> <input type="checkbox"/>
	←	other pollutant	<input type="checkbox"/> <input type="checkbox"/>
¹⁾ if "no", then forward to D. ²⁾ Aggregates, which are contaminated with microbiological or explosive substances, are only accepted with documented evidence of an approved cleaning. ³⁾ Aggregates, which are contaminated with radioactive substances, are not accepted in principle.		↓	
C. Details of the discharged materials (must be filled out imperatively)			
1. With which materials did the aggregate come into contact ? Trade name and/or chemical designation of operational funds and discharged materials, material properties, e.g. as per safety data sheet (e.g. toxic, inflammable, caustic)			
X Trade name: _____		Chemical designation: _____	
a) _____		_____	
b) _____		_____	
c) _____		_____	
d) _____		_____	
2. Are the materials specified above harmful to health ?		no yes	<input type="checkbox"/> <input type="checkbox"/>
3. Dangerous decomposition products during thermal load ?		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
If yes, which ones ? _____		←	

D. Mandatory declaration: We assure that the data in this explanation are truthful and complete and as a signatory I am able to form an opinion about this. We are aware that we are responsible towards the contractor for damages, which results from incomplete and incorrect data. We commit ourselves to exempt the contractor from claims for damages of thirds resulting from incomplete or incorrect data. We are aware that we are directly responsible towards thirds, irrespective of this declaration, which belongs in particularly to the employees of the contractor consigned with the handling repair of the product.

Name of the authorized person (in block letters): _____

_____ Date

_____ Signature

Company stamp

FAX**Fax No. ()****Pages (incl. cover sheet) ()****To:**

()

Richter Chemie-Technik GmbH
Otto-Schott-Straße 2
D-47906 KempenTelefon +49 (0) 21 52/146-0
Telefax +49 (0) 21 52/146-190richter-info@richter-ct.com
www.richter-ct.comContact person:
()Reference:
()Extension:
- ()E-Mail Address:
()Date:
()**Your order No.:** ()**Our Kom. No.:** ()**Serial No.:** ()

Dear Sirs,

The compliance with laws for the industrial safety obligates all commercial enterprises to protect their employees and/or humans and environment against harmful effects while handling dangerous materials.

The laws are such as: the Health and Safety at Work Act (ArbStättV), the Ordinance on Harzadous Substances (GefStoffV, BIOSTOFFV), the procedures for the prevention of accidents as well as regulations to environmental protection, e.g. the Waste Management Law (AbfG) and the Water Resources Act (WHG)

An inspection/repair of Richter products and parts will only take place, if the attached explanation is filled out correctly and completely by authorized and qualified technical personnel and is available.

In principle, radioactively loaded devices sent in, are not accepted.

Despite careful draining and cleaning of the devices, safety precautions should be necessary however, the essential information must be given.

The enclosed declaration of no objection is part of the inspection/repair order. Even if this certificate is available, we reserve the right to reject the acceptance of this order for other reasons.

Best regards
RICHTER CHEMIE-TECHNIK GMBHEnclosures

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