



Series KNR/F, KNRP/F
KNR-D/F, KNRP-D/F

Control Ball Valve with V-control ball/stem unit and Richter ENVIPACK universal packing



Keep for future use!

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

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Relevant documents

◆ Declaration of conformity acc. to the EC Pressure Equipment Directive 97/23/EG	Lever elevation	Section	9520-00-3011
◆ Manufacturer's Declaration German Clean Air Act (TA-Luft)	Limit switch IFM	Dimen.	9520-00-4021
◆ Manufacturer's Declaration SIL	Spring return unit Kinetrol	Section	9520-00-3005
◆ Form for Safety Information Concerning the Contamination QM 0912-16-2001_en	Limit switch VDE/VDI	Dimen.	9520-00-4015
◆ For KNRP/F, KNRP-D/F: Operating manual for actuator	Initiator Turck	Section	9520-00-3006
◆ Depending on option, relevant drawing:	Locking plate	Dimen.	9520-00-4016
Double packing bonnet,	Heating jacket	Schnitt	9520-00-3007
Section	Change from manual operation	Dimen.	9520-00-4017
Dimen.	to power operation		9520-00-3002
Extended stem,			9520-00-3012
Section			
Dimen.			
Extended stem, round			
Section			
Dimen.			

1 Technical data

Manufacturer:

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 Fax: +49 (0) 2152 146-190
 E-Mail: richter-info@richter-ct.com
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Designation :

Control ball valve with ball/stem unit and Richter ENVIPACK universal selfadjusting packing, two-piece body.

Series:

- KNR/F** → Design with lever or hand gear
KNRP/F → Design prepared for pneumatic, hydraulic or electric actuator to ISO 5211
KNR-D/F → KNR/F with thick-walled (5mm) body lining
KNRP-D/F → KNRP/F with thick-walled (5mm) body lining

Rangeability 25:1

Certified to German 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:

DIN EN 558-1 basic series 1, ISO 5752 series 1
 DN 200 to ASME B16.10, Class 150 column 8

Flange connecting dimensions:

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

Materials :

Body material: Ductile cast iron EN-JS 1049 to DIN EN 1563 (0.7043 DIN 1693)

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

Temperature range :

See pressure-temperature diagram in Section 1.8.

Operating pressure:

DN 15 – DN 100 from vacuum to 16 bar (PN16)
 DN 150, 200 max. 10 bar (PN 16)
 optional: DN 25 – DN 80 to max. 16 bar (PN 25)
 (not KNR-D/F or KNRP-D/F)
 see pressure-temperature diagram in Section 1.8.

Ball valve sizes in mm :

DN 15, 20, 25, 40, 50, 80, 100, 150, 200

Installation position :

Arbitrary, a direction arrow on an additional name plate indicates the direction of flow.
 See Sections 6.2.

Weight, ball valve manually operated :

Nom.-size	15	20	25	40	50	80	100	150	200/150
ca. kg	5,5	6	6	14	16	35	55	105	120

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

Dimensions and individual parts:

See sectional drawings in Section 10.

Wear parts : Seat rings
 Packing components
 V-control ball

Options :

- ♦ Richter ENVIPACK double packing for particularly high safety requirements, self-adjusting.

On request, monitoring and flushing connection.

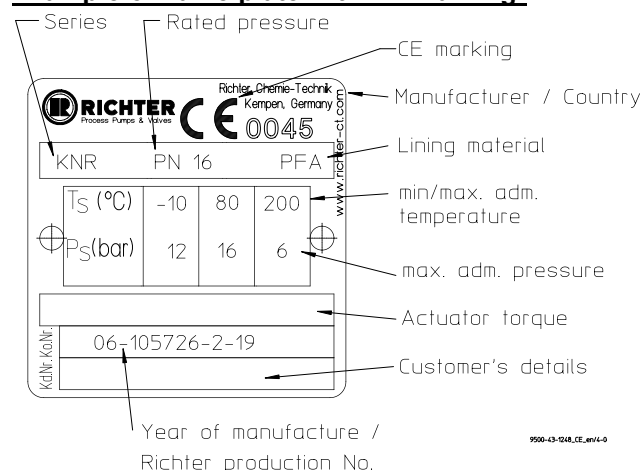
- ♦ Ball/stem unit extension for insulated pipes
- ♦ Hand lever extension depending on requirements
- ♦ Limit switches for remote monitoring of hand and remote-activated ball valves.
- ♦ Lockable hand lever to prevent unauthorised operation.
- ♦ Stainless steel heating jacket can be retrofitted, suitable for all common heat carriers.

1.1 Name plate, CE and body markings

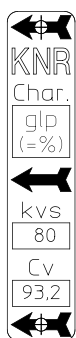
The stainless steel name plate is undetachably riveted to the body.

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: Additional name plate KNR

Control characteristics

Direction of flow

Flow rate kvs and cv

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

1.2 V-control ball/stem unit

The advantage of a single-piece v-control ball/stem unit is the play-free power transmission. This applies in particular to plastic-lined components.

The end of the stem journal or flat pivot point is marked with:

- ◆ direction of flow
- ◆ flow rate Kvs and Cv
- ◆ lining material

As viewed from above, closing is in clockwise direction.

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:

Packing screws

Tighten packing gland follower **503** until spring gland follower **502** is in contact without any gap. In DN 80, 100, 150 and 200 are 2 spring gland followers **502**.

Pipe screws

Flange nom. size [mm]	Screws [ISO/DIN]	Tightening torque [Nm]
15	4 x M12	6
20	4 x M12	8
25	4 x M12	10
40	4 x M16	20
50	4 x M16	26
80	8 x M16	25
100	8 x M16	35
150	8 x M20	65
200	12 x M20	100

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

Flange nom. size		Screws [ASME]	Tightening torque	
[mm]	[inch]		[in-lbs]	[Nm]
15	1/2"	4 x 1/2"	45	5
20	3/4"	4 x 1/2"	55	6
25	1"	4 x 1/2"	70	8
40	1 1/2"	4 x 1/2"	135	15
50	2"	4 x 5/8"	220	25
65	2 1/2"	4 x 5/8"	265	30
80	3"	4 x 5/8"	400	45
100	4"	8 x 5/8"	310	35
150	6"	8 x 3/4"	710	80
200	8"	8 x 3/4"	1020	115

Body screws

Nom. Size		Screws [ISO/DIN]	Tightening torque	
[mm]	[inch]		[Nm]	[in-lbs]
15	1/2"	4 x M12	35	310
20	3/4"	4 x M12	35	310
25	1"	4 x M12	35	310
40	1 1/2"	4 x M16	45	398
50	2"	4 x M16	45	398
80	3"	8 x M16	50	442
100	4"	8 x M16	60	531
150	6"	8 x M20	150	1330
200	8/6"	8 x M20	150	1330

1.4 Breakaway torques

Test medium: water 20 °C

Higher breakaway torques may occur with other media.

DN [mm]	Δp in bar				max. adm. [Nm]
	≤ 3 [Nm]	6 [Nm]	10 [Nm]	16 [Nm]	
15	8	8	8	10	70
20	8	8	8	10	70
25	12	12	12	12	70
40	20	20	20	25	225
50	25	25	25	30	225
80	60	60	65	80	500
100	80	80	90	170	500
150	200	250	350	---	2200
200	200	250	350	---	2250

The breakaway torque of the actuator must be at least just as high as the breakaway torque of the valve but better would be 20% higher.

With highly viscous media and/or solids in the medium it may be necessary to consider other safety allowances in dimensioning the actuator.

This applies in particular to non-Newtonian fluids, such as high polymer substances, suspensions, pastes, lubricants, resins, paints etc.

Admissible safety allowances are in the range of 20-25% of the breakaway torque.

In order to avoid damage to the valve, it is imperative to observe the max. admissible breakaway torque!

1.5 Cavitation coefficient z for 75% duty ($k_v/k_{v100}=0,75$)

There are at least 3 different V-control ball/stem units for each nominal size

DN	z1	z2	z3	z4	z5	z6
15	0,65	0,60	0,60	0,60	0,58	0,43
20	0,65	0,60	0,60	0,60	0,58	0,43
25	0,65	0,60	0,60	0,60	0,58	0,43
40				0,53	0,50	0,35
50				0,47	0,39	0,32
80				0,31	0,29	0,22
100				0,27	0,24	0,16
150				0,15	0,13	0,08
200/ 150				0,15	0,13	0,08

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

X_F = Differential pressure ratio

Δp = Differential pressure input/outlet

p_1 = Absolute pressure at inlet

p_v = Vapour pressure at operating temp.

$X_F \leq z$: non-critical conditions

$X_F \leq 1,4 \times z$: tolerable cavitation

$X_F > 1,4 \times z$: inadmissible cavitation

1.6 Flow values Kv in %

Opening [%]	Kv [%]
10	5,5
20	7,6
30	10,5
40	14,5
50	20,0
60	27,6
70	38,1
80	52,5
90	72,5
100	100,0

Characteristics
equal percentage

Rangeability 1:25

Best control range
20-90% of angle of
opening

1.7 Flow values Kv100 in m³/h

There are 3-6 different V-control ball/stem units per nominal size

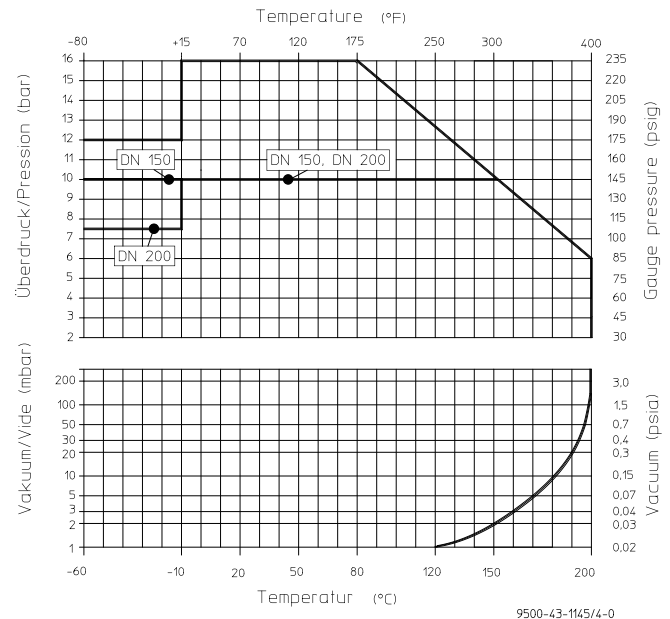
DN [mm] [inch]	Kv100 - Cv [m³/h] [USgpm]					
	0,8 0.93	1,6 1.86	4 4.66	8 9.32	14 16.3	20 23.3
15 ½"	0,8 0.93	1,6 1.86	4 4.66	8 9.32	14 16.3	20 23.3
20 ¾"	0,8 0.93	1,6 1.86	4 4.66	8 9.32	14 16.3	20 23.3
25 1"	0,8 0.93	1,6 1.86	4 4.66	8 9.32	14 16.3	20 23.3
40 1½"				16 18.64	25 29.12	40 46.6
50 2"			16 18.64	25 29.12	40 46.6	60 69.9
80 3"			40 46.6	80 93.2	120 139.8	160 186.4
100 4"			60 69.9	100 116.5	160 186.4	250 291.25
150 6"				160 186.4	250 291.25	400 466
200/ 150 8/6"				160 186.4	250 291.25	400 466

1.8 Pressure-temperature-diagram



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

A special core material is used for the v-control ball/stem unit for operating limits under $-10\text{ }^{\circ}\text{C}$ to $-60\text{ }^{\circ}\text{C}$.



2 Notes on safety

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

It must therefore be read before installation and commissioning!

For valves which are used in potentially explosive areas, see **Section 3**.

Installation, operation and maintenance 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 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 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:

- ◆ 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 control ball valves 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.

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

If a valve is used, the operator must ensure that

- ◆ actuators which are retrofitted are adapted 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.



Ball valves which are used as end valves must be sealed with a blind flange at the free connection end and appropriately secured against unauthorised activation.

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 $<10^9$ Ohm, leakage resistance $<10^6$ Ohm).

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 are to 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 German Clean Air Act (TA Luft)

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

- Perform maintenance at regular intervals and check the screw connections relevant to leak-tightness and, if necessary, retighten them.

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 the external epoxy coating.

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 ball 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.



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

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 glass-lined, 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

Installation is independent of the direction of flow.

A direction arrow on an additional name plate for control ball valve shows the direction of flow. See [Section 1.1](#).

6.3 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.

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

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.

The V-control ball/stem unit **201** is grounded using a grounding spring washer **557**.

6.4 Test pressure

The test pressure PT of an open valve must not exceed the value of $1.5 \times PS(PN)$ 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 body bolting. 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 may result in damage to the seat rings or ball/stem unit. This can be prevented by heating. In extreme cases this may cause blocking.
- ◆ If the ball blocks, do not apply force as the ball/stem unit may break if the max. adm. torque is exceeded.
- ◆ 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.
- ◆ Do not subject the lever to heavy loads; the lever or ball valve may be damaged.
- ◆ Do not use a lever extension as otherwise there is a risk of damage.

7.3 Shutdown

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

Prior to undoing the flange connection ensure, that the plant is depressurised and emptied.

Move V-control ball/stem unit into the "half-open position".



Prior to starting any repair work, the valve is to be thoroughly cleaned. Even if the valve has been properly emptied and rinsed, residual medium may still be found in the valve.

After dismantling, immediately protect the valve flanges against mechanical damage with flange caps. See also **Section 6.1**.



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

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/body end piece is leaking

Retighten body screws. See paragraph "Flange connection valve/pipe is leaking".

◆ Packing is leaking

Retighten packing nuts according to the details in **Section 1.3**.

◆ Ball valve does not operate

Is the actuator being supplied with power?

Is any directional control valve connected correctly?

Is there any foreign matter in the valve?

◆ The ball no longer closes completely

Is the stem deformed?

Is the coupling worn?

Are the sleeve nuts **512** and setscrew **904/4** tightened?

The V-control ball/stem unit has too much play/hysteresis.

With a worm gear or actuator, check whether the end stops can be re-adjusted. The operating manuals of the gear and actuator manufacturers contain accurate instructions.



Never apply force to the lever or use an extension.

1. Try to get the ball valve working again by moving the lever to and from.
2. Remove the lever stop and try to switch against the normal direction of rotation.
3. If actuation is not possible with the max. admissible breakaway torque as per **Section 1.4**, dismantle ball valve and inspect individual components.

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.
- ◆ 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 Dismantling

9.1.1 Ball valve with lever

- Remove lever **203**.
- Take out grounding spring washer **557**.
- Dismantle packing gland follower **503** and spring gland follower **502**.
- The thrust ring **405/1**, packing bellows **403** and retaining washer **526** (not in DN 150 and DN 200) are one unit and it is levered out using 2 screwdrivers.
- Undo screw connection body end piece **102** / main body **100**.
- Remove body end piece **102**.
- Remove V-control ball/stem unit **201**. Pay attention so as not to damage the body lining.
- Remove seat rings **401**.

9.1.2 Packing bellows

- Remove retaining washer **526**.
- Separate thrust ring **405/1** and packing bellows **403** by pushing them apart.

9.1.3 Ball valve with actuator

- Undo setscrew **904/4** in the coupling **804** by one turn.
- Undo sleeve nut **512** on the coupling by about 2 turns. Left-hand thread. Observe drawing in **Sections 10.3 and 10.5**.
- Remove actuator **850** and coupling **804**.
- Dismantle packing gland follower **503** and spring gland follower **502**.
- Remove bracket **510**.

Further dismantling is performed as described in **Section 9.1.1**.

9.2 Assembly

- Prior to assembly all parts are to be cleaned and the plastic-lined components checked for damage.
- Insert seat rings **401** in the main body **101** and body end piece **102**.
- Mount and adjust V-control ball/stem unit **201**. Pay attention so as not to damage the body lining.
- Notice the direction of flow. See sectional drawing in **Section 10**.
- An additional bore in the ball/stem unit, e.g. to ensure it is cavity-free, must lie on the p1 side in the closed position.
- Mount body end piece **102**. Tighten the body screws to a tightening torque according to **Section 1.3** in diametrically opposite sequence.

9.2.1 Packing bellows

- Press thrust ring **405/1** into packing bellows **403**.
- Install retaining washer **526** (not in DN 150 and DN 200).
- Press unit into body end piece **102**.
- Press in grounding spring washer **557**.

9.2.2 Ball valve with lever

- Mount lever stop **577**, spring gland follower **502** (in DN 80, 100, 150 and 200 are 2 spring gland followers **502**) and packing gland follower **503**. Tighten packing nuts until there is no gap between packing gland follower and spring gland follower. See **Section 1.2 and 10**.
- Notice direction of rotation of V-control ball/stem.
- Seal any tapped bores still open with plugs.
- Mount lever **203**.

9.2.3 Ball valve with actuator

- Mount spring gland follower **502** (in DN 80, 100, 150 and 200 are 2 spring gland followers **502**) and packing gland follower **503**. Tighten packing nuts until there is no gap between packing gland follower and spring gland follower. See **Section 1.2 and 10**.
- Mount bracket **510** with the opening at right angles to the direction of flow.
- Mount coupling **804** and actuator **850**. Notice direction of rotation of V-control ball/stem unit **201**.
- Observe the actuator position in accordance with the actuator operating manual.

- Tighten setscrew **904/4** in the coupling **804**.
- Tighten sleeve nut **512** on the coupling **tight**.
Attention: Left-hand thread.
- Observe drawing in **Section 10.3 and 10.5**.

9.3 Conversion from lever to actuator

- Select the actuator in accordance with the instructions of the actuator manufacturer.
- Remove hand lever **203**.

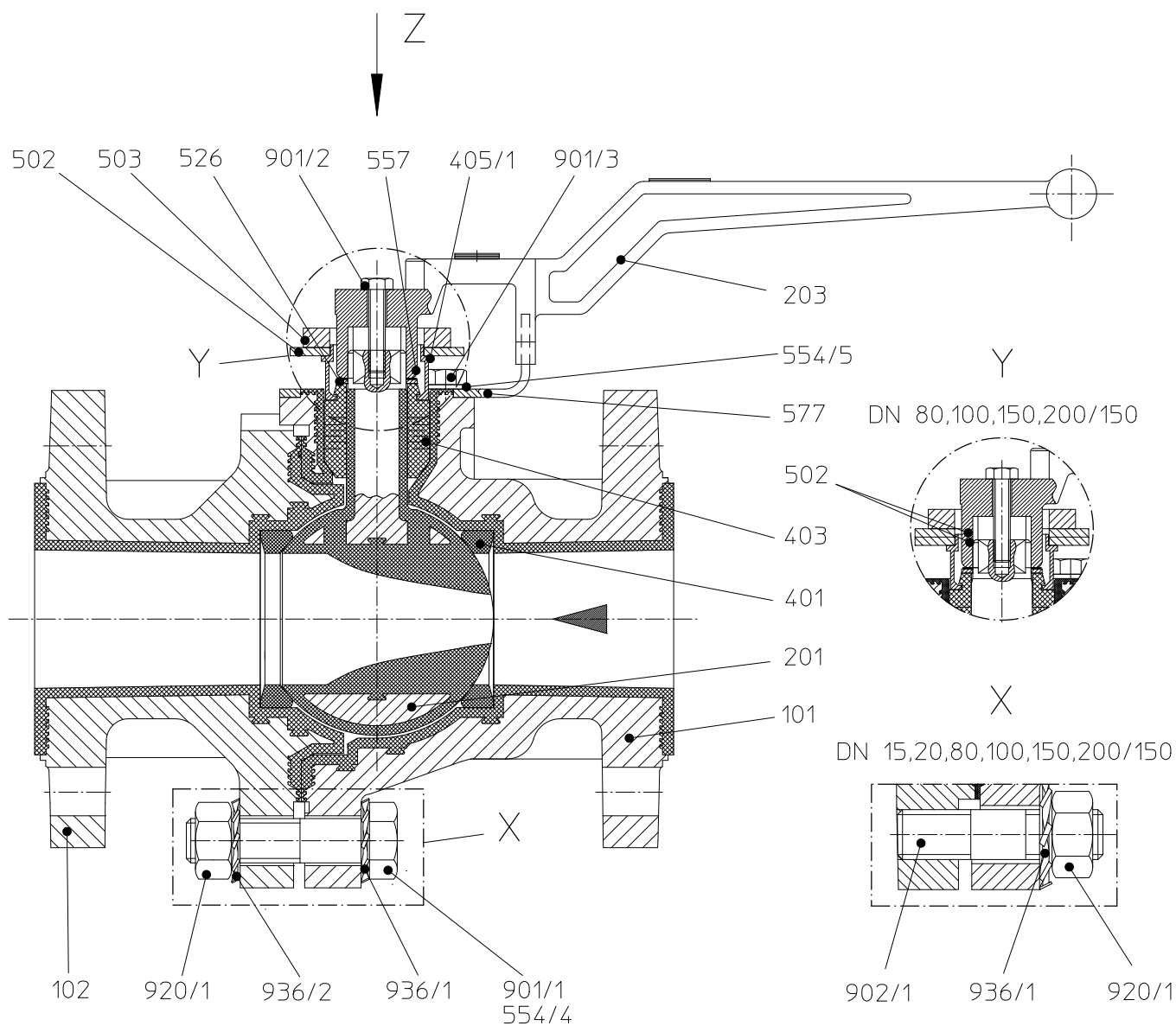
- Remove lever stop **577** and plug.
- Check the fits of the coupling **804**, bracket **510** and actuator **850**.
- Mount bracket **510** with the opening at right angles to the direction of flow.
- Mount coupling **804** and actuator **850**. While doing so, observe direction of rotation of the v-control ball/stem unit.
- Observe the actuator position in accordance with the actuator operating manual.
- Tighten setscrew **904/4** in the coupling **804**.
- Tighten sleeve nut **512** on the coupling **tight**.
Attention: Left-hand thread.
- Observe drawing in **Section 10.3 and 10.5**.

10 Drawings

10.1 Legend

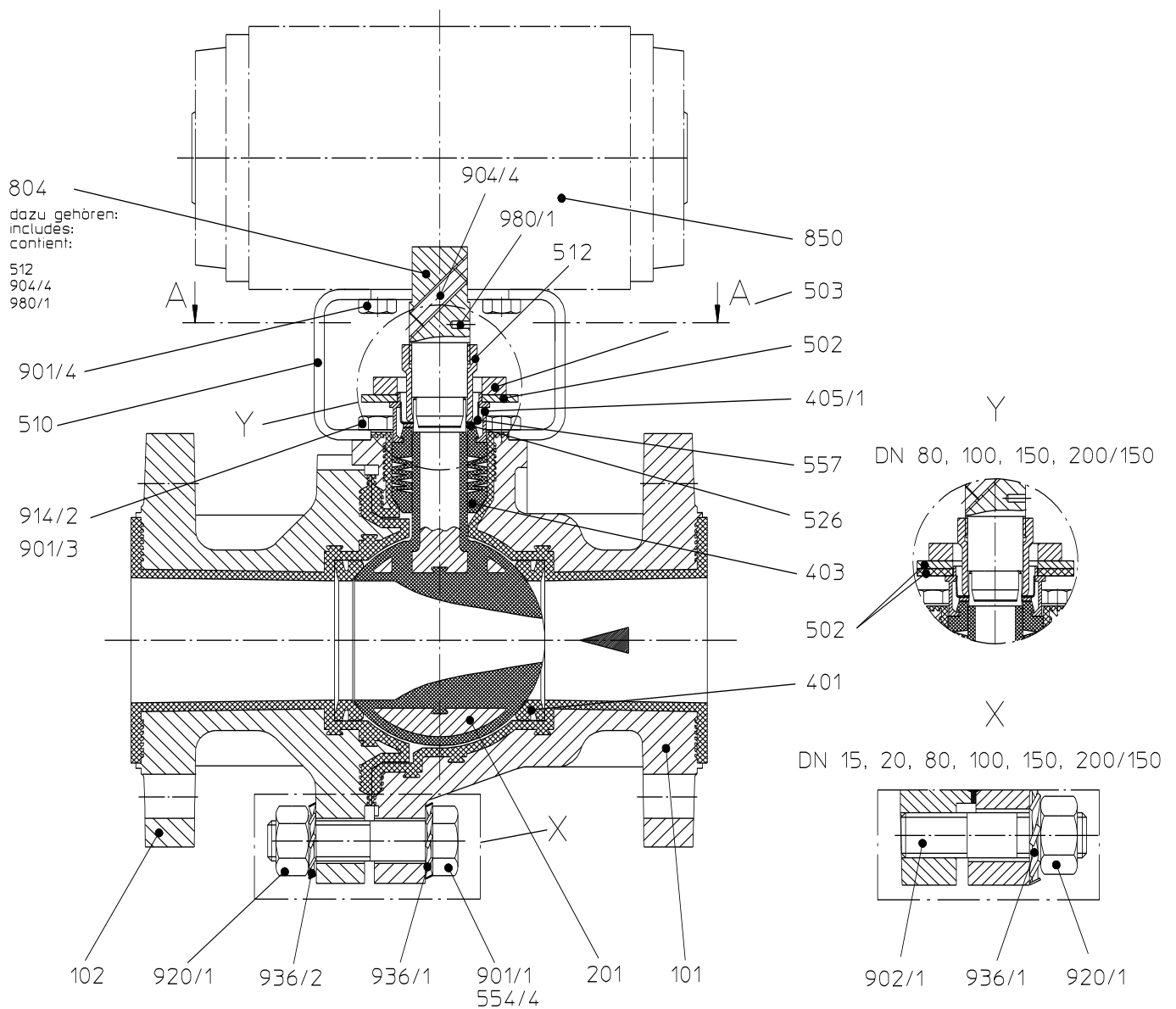
101	main body	804	coupling
102	body end piece	includes:	
201	ball/stem unit	512	sleeve nut
203	lever	904/4	set screw
401	seat ring	980/1	round head grooved pin
403	packing bellows	850	actuator
405/1	thrust ring	901/1	hex. screw (DN 25,40,50)
502	spring gland follower	901/2	hex. screw
503	packing gland follower	901/3	hex. screw
510	bracket	901/4	hex. screw
526	retaining washer (DN 15,20,25,40,50,80,100)	902/1	stud screw
554/1	washer	904/1	set screw
554/4	washer (DN 25)	914/2	hex. socket screw (F07) (DN 50)
554/5	washer	918/1	threaded rod (DN 150, 150/200)
557	grounding spring washer	920/x	hex. nut
577	lever stop	936/x	toothed lock washer

10.2 Sectional drawing ball valve with lever



Holes of the flange- and housing screws view displaced by 45°

10.3 Sectional drawing ball valve with actuator

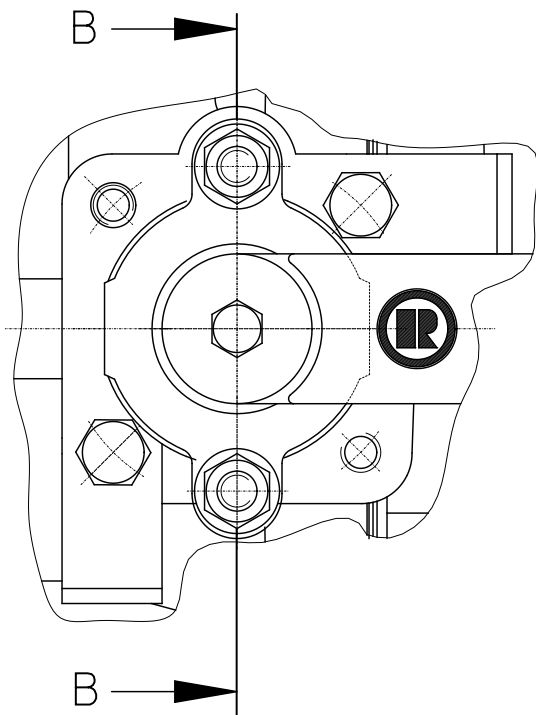


Holes of the flange- and housing screws view displaced by 45°

9520-00-3031_B2

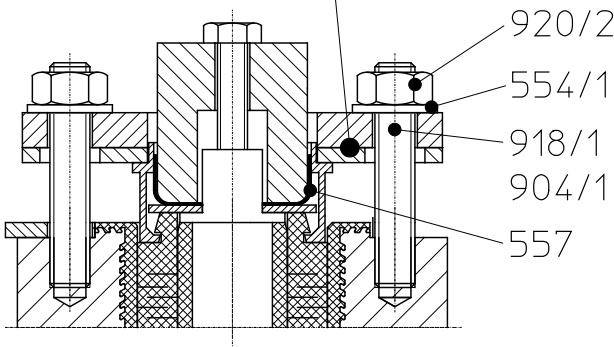
10.4 View and section ball valve with lever

View Z



Section B-B

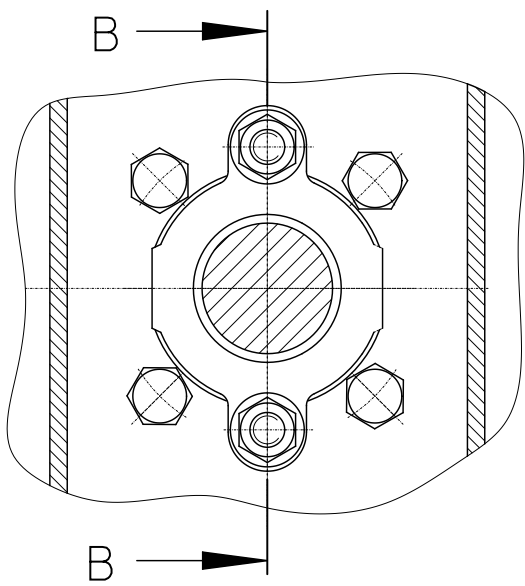
Tighten packing gland follower 503 until spring gland follower 502 is in contact without any gap



9500-43-1279_en/4-0

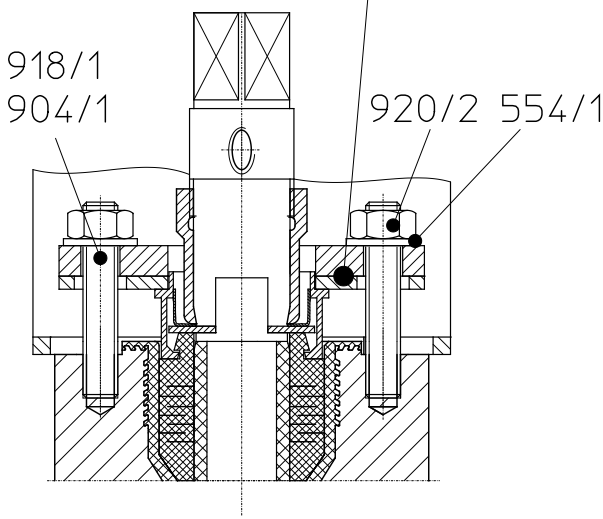
10.5 View and section ball valve with actuator

Section A-A



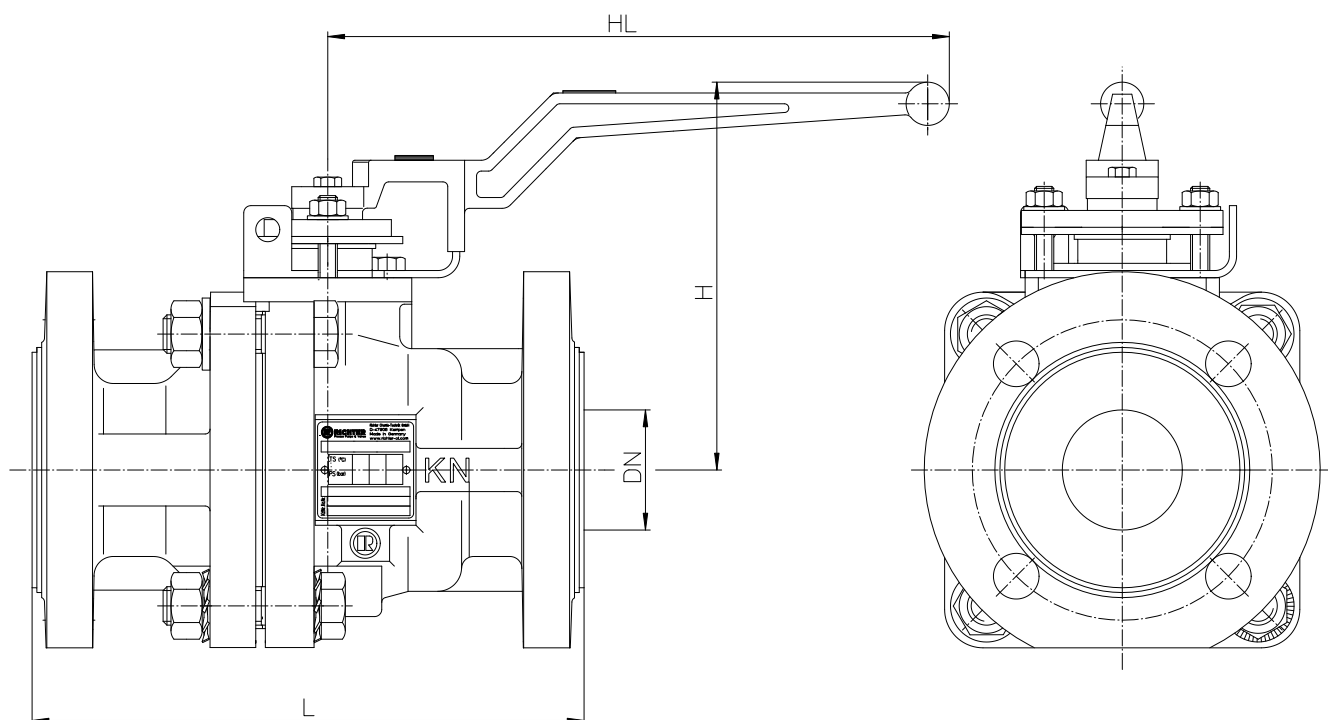
Section B-B

Tighten packing gland follower until spring gland follower is in contact without any gap



9500-43-1247_en/4-0

10.6 Dimensional drawing with lever



DN	15	20	25	40	50	80	100	150	200 *
L	130	150	160	200	230	310	350	480	457
H	130	130	130	155	155	180	195	265	265
HL	179	179	179	260	260	313	313	515	515

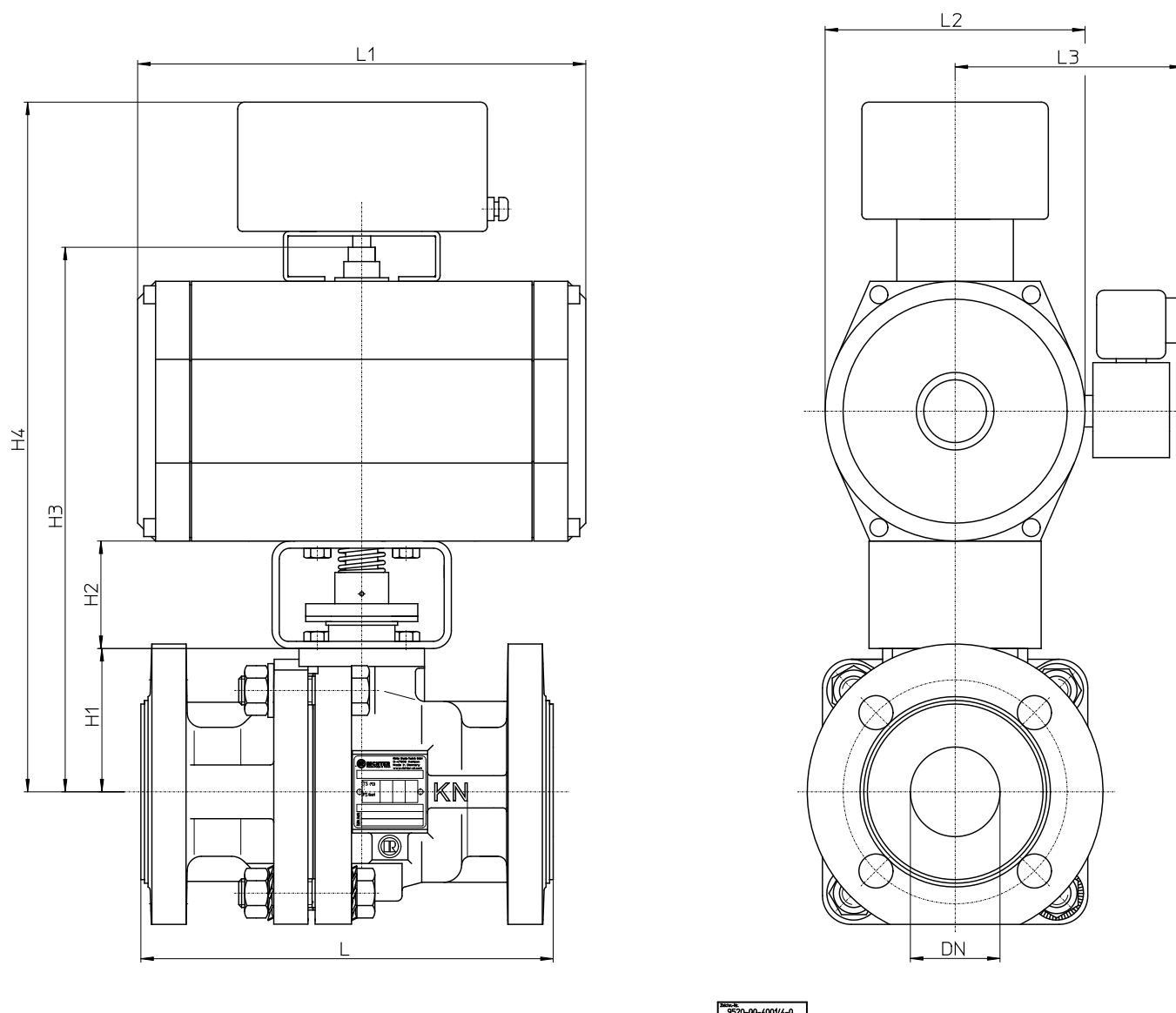
* DN 200 with reduced bore DN 150

All dimensions in mm.

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

10.7 Dimensional drawing with actuator



DN	H1	H2	Connect. dimen. acc. to ISO 5211	H3	H4	L	L1	L2	L3
15	50	60	F05			130			
20						150			
25						160			
40	77	60**	F07			200			
50	80					230			
80	118	80	F10			310			
100	134					350			
150	184	80	F12			480			
200 *						457			

* DN 200 with reduced bore DN 150

** H2 = 80mm if F10 or F12 on the actuator side

Dimensions H3, H4, L1, L2 and L3 vary depending on the actuator manufacturer.

All dimensions in mm.

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.



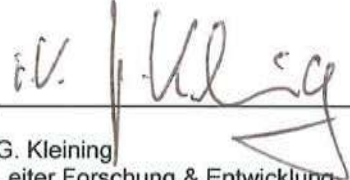
Konformitätserklärung nach EN ISO/IEC 17050
Declaration of Conformity according to EN ISO/IEC 17050

Produkt <i>Product</i>	Kunststoffausgekleidete Dreharmaturen <i>Plastic lined quarter turn valves</i>		
Bauart <i>Design</i>	Kugelhahn, Regel-Kugelhahn, Kompakt-Kugelhahn, Bodenablass-Kugelhahn, Absperr- und Regelklappe <i>Ball valve, control ball valve, sandwich ball valve, bottom drain ball valve, shut-off and control butterfly valve</i>		
Baureihe <i>Serie</i>	KN..., KNA..., BVA..., BVI..., KNR..., KNAR..., KH..., KK..., KK-FU..., KA-N..., NKL..., NKS...		
Nennweite <i>Size</i>	DN 15 bis DN 400, ½" bis 16" <i>DN 15 to DN 400, ½" to 16"</i>		
Seriennummer <i>Series number</i>	ab/from 19.07.2016		
EU-Richtlinie <i>EU-Directive</i>	2014/68/EU Druckgeräterichtlinie <i>2014/68/EU Pressure Equipment</i>	2006/42/EG ²⁾ <i>2006/42/EC ²⁾</i>	Maschinenrichtlinie <i>Directive Machinery</i>
Angewandte Technische Spezifikation <i>Applied Technical Specification</i>	DIN EN ISO 12100 AD 2000		
Überwachungsverfahren <i>Surveillance Procedure</i>	2014/68/EU Zertifizierungsstelle für Druckgeräte der TÜV Nord Systems GmbH & Co. KG Notified Body 0045		
Konformitätsbewertungsverfahren 2014/68/EU <i>Conformity assessment procedure 2014/68/EU</i>	Modul H		
Kennzeichnung <i>Marking</i>	2014/68/EU ¹⁾ ≥ DN 32, ≥ 1"	CE 0045	
	2006/42/EG ²⁾ 2006/42/EC ²⁾	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, 19.07.2016


G. Kleining
Leiter Forschung & Entwicklung
Manager Research & Development


M. Pohlmann
Leiter Qualitätsmanagement
Quality Manager

Herstellererklärung ATEX
Richtlinie 2014/34/EU
Manufacturer's Declaration ATEX
Directive 2014/34/EU

Alle Richter Armaturen inkl. Absperr-, Regel- und Sicherheitsventile
All Richter Valves incl. Shut-off, Control and Safety Valves

Die oben bezeichneten Armaturen wurden einer Risikoanalyse nach der Richtlinie 2014/34/EU mit folgendem Ergebnis unterzogen:

The valves specified above underwent a risk analysis according to Directive 2014/34/EU with the following result:

- **Richter Armaturen besitzen keine eigenen potentiellen Zündquellen. Die Armaturen können sowohl manuell als auch mechanisch/elektrisch angetrieben werden.**
Die Armaturen fallen nicht in den Anwendungsbereich der ATEX-Richtlinie 2014/34/EU und dürfen deshalb auch nicht danach gekennzeichnet werden.
Richter valves do not have their own potential sources of ignition. The valves can be actuated manually as well as mechanically/electrically.
ATEX Directive 2014/34/EU is not applicable to these valves. Therefore, it is not allowed to mark the valves according to that Directive.
- **Die Armaturen dürfen in explosionsgefährdeten Bereichen eingesetzt werden.**
The valves can be used in potentially explosive atmospheres.
- **Dennoch müssen für den Armatureneinsatz in explosionsgefährdeten Bereichen Sicherheitshinweise bzgl. des Explosionsschutzes beachtet werden. Richter hat hierzu die Betriebsanleitungen um den Zusatz „Sicherheitshinweise für den Einsatz in explosionsgefährdeten Bereichen in Anlehnung an die Richtlinie 2014/34/EU“ erweitert.**
However, when using the valves in potentially explosive atmospheres, specific safety notes on explosion protection must be observed. Here, Richter has extended their operating manuals to include the supplement „Safety notes for applications in potentially explosive atmospheres based on Directive 2014/34/EU“.

Ergänzender Hinweis: *Supplementary note:*

- **Elektrische/mechanische Antriebe müssen einer eigenen Konformitätsbewertung nach ATEX unterzogen werden.**
Electric/mechanical actuators must undergo a separate conformity assessment.

Kempen, 20.04.2016

Richter Chemie-Technik GmbH


M. Böhm

Leiter Qualitätsmanagement
Quality Manager

Herstellererklärung / *Manufacturer's Declaration*

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

Richter Kugelhahn / *Richter Ball Valve*

Hiermit erklären wir, dass die Kugelhähne der Baureihen
Hereby we declare, that the ball valves of the series

KN, KNR, KNA, KNAR, KNB, KNBR, KNA-S; BVA, BVI, KK, KK/FU, KH; KA-N

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.

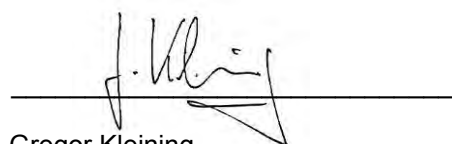
meets the requirement relating to the equivalence according to Section 5.2.6.4 of the German Clean Air Act (Clean Air Act dated 01.10.2002 / VDI 2440 Section 3.3.1.3).

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.

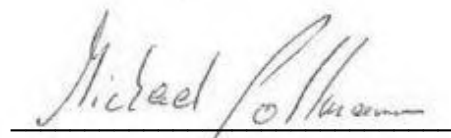
Additionally, the manufacture's declaration contains the suitability verification of a stem seal and internal flange connection in accordance to VDI 2440 with regard to tightness and the observance of the specific leakage rate according to the German Clean Air Act $\lambda \leq 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{s} \cdot \text{m}}$ 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, 14.03.2013



Gregor Kleining
Leiter Forschung & Entwicklung
Manager Research & Development



Michael Pohlmann
Leiter Qualitätsmanagement
Quality Manager

Kempen, 1.03.2016

SIL**Declaration by the Manufacturer**

Functional Safety according to IEC 61508

We declare, that the devices

KN, KNR, KNA, KNAR, KNP, KNRP, KNAP, KNARP

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}:	129 FIT
λ_{SD}:	14 FIT
λ_{DU}:	108 FIT
λ_{DD}:	36 FIT
SFF:	62,5 %
PFD_{Avg}:	$4,73 \cdot 10^{-4}$ (for $T_{Proof} = 1$ year)
MTBF:	398 years

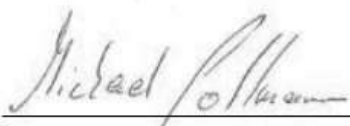
Safety Integrity Level: SIL 2

Usable lifetime: According to IEC 61508-2 §7.4.7.4 values of up to 10 years can be assumed. Different values can be used based on the experience of the user. In principle, critical applications and cases of operation (e. g. highly permeable or solid loaded media) can reduce the usable lifetime. For safe and reliable operation please follow the relevant instructions documented in the manual.

The evidence is based on proven in use combined with a FMEDA.



G. Kleining
Leiter Forschung & Entwicklung
Manager research & Development



M. Pohlmann
Leiter Qualitätsmanagement
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 ☒ Please mark the applicable	
Street :		Repair: ☐ subject to fee ☐ Warranty	
Postcode, city:		Exchange: ☐ subject to fee ☐ Warranty	
Contact person:		☐ Exchange/ Replacement already initiated/received	
Phone :	Fax :	Return: ☐ Leasing ☐ Loan ☐ for credit note	
End user :			
A. Details of Richter-product:		Failure description:	
Classification:			
Article number:			
Serial number:			
B. Condition of the Richter-product:		Contamination :	
	no ¹⁾ yes no		no ¹⁾ yes
Was it in operation ?	☐ ☐	toxic	☐ ☐
Drained (product/operating supply item) ?	☐ ☐	caustic	☐ ☐
All openings hermetically locked!	☐ ☐	inflammable	☐ ☐
Cleaned ?	☐ ☐	explosive ²⁾	☐ ☐
If yes, with which cleaning agent:		mikrobiological ²⁾	☐ ☐
and with which cleaning method:		radioactive ³⁾	☐ ☐
¹⁾ if "no", then forward to D.		other pollutant	☐ ☐
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	
3. Dangerous decomposition products during thermal load ?		☐ ☐	
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

08.01.2015

Declaration of no objection

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 GMBH