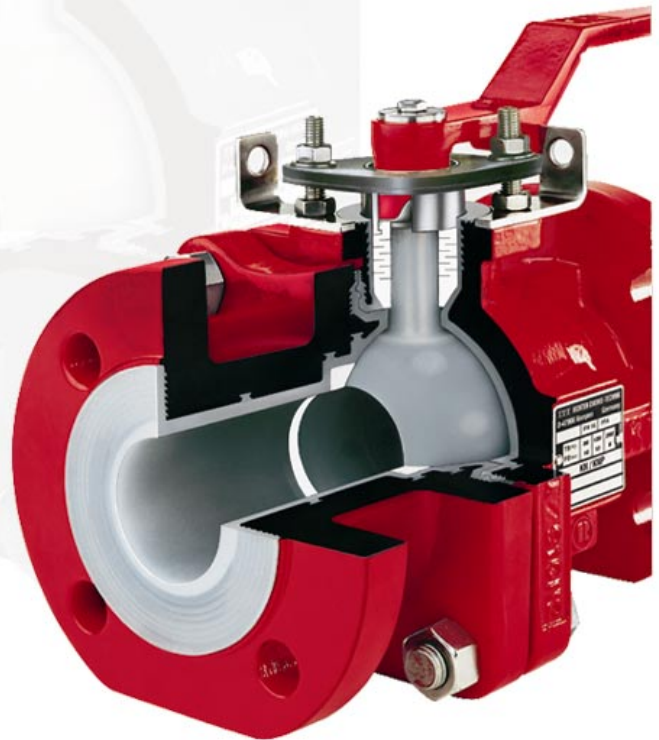


Ball Valve

with ball/stem unit
and Richter ENVIPACK
universal packing



Keep for future use!

This operating manual must be strictly observed before transport, installation, commissioning etc.

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ITT Industries
Engineered for life

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Relevant documents

- ◆ Declaration of conformity acc. to the EC Pressure Equipment Directive 97/23/EG
- ◆ Form for General Safety Certificate
QM 0912-16-2002
- ◆ For KNP: Operating manual for actuator
- ◆ Depending on option, relevant drawing:

Double packing	9520-00-0002
Ball/stem unit extension	9520-00-0003
Lever extension	9520-00-0004
Limit switch IFM	9520-00-0006
Limit switch VDE/VDI	9520-00-0008
Locking plate	9520-00-0009

1 Technical data

Manufacturer:

ITT Richter Chemie-Technik GmbH
 Otto-Schott-Str. 2
 D-47906 Kempen
 Tel. : +49 (0) 2152 146-0
 Fax: +49 (0) 2152 146-190
 E-mail : richter-info@fluids.ittind.se
 Internet: www.itt-richter.de

Designation :

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

Tightness tested to DIN 3230, Part 3

Series KN → Design with lever or hand gear
 KNP → Design prepared for pneum., hydr. or elec. actuator to DIN/ISO 5211

Face to face : _ DIN EN558-1 basic series 1, ISO 5752 series 1

Flange connecting dimensions:
 DIN EN 1092-2, design B
 (ISO 7005-2 type B) PN 16.

General conditions of delivery for valves to DIN 3230.

Materials :

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

Lining material: PFA or FEP
 on request : conductive design

Temperature range :

See pressure-temperature diagram in [Section 1.6](#).

Operating pressure: 15 – DN 150
 from vacuum to 16 bar
 DN 200 max. 10 bar

optional : DN 25 – DN 80 to max. 25 bar

Ball valve sizes in mm :

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

Weight, KN hand-activated:

Nom. size	15	20	25	40	50	80	100	150	200
kg	5.5	6	6	14	16	35	55	105	120

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

Installation position:

Arbitrary, with low-cavity ball/stem units a direction arrow indicates the direction of flow.

See [Sections 4.2 and 8.2](#).

Dimensions and individual parts:

See sectional drawings in [Section 8](#)

Wear parts: Seat rings
 Packing components
 Ball/stem unit

Options :

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

On request, monitoring and rinsing connection.

Ball/stem unit extension for isolated 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 Intended use

Ball valves are open/closed valves.

Richter ball valves of the series KN/KNP 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).

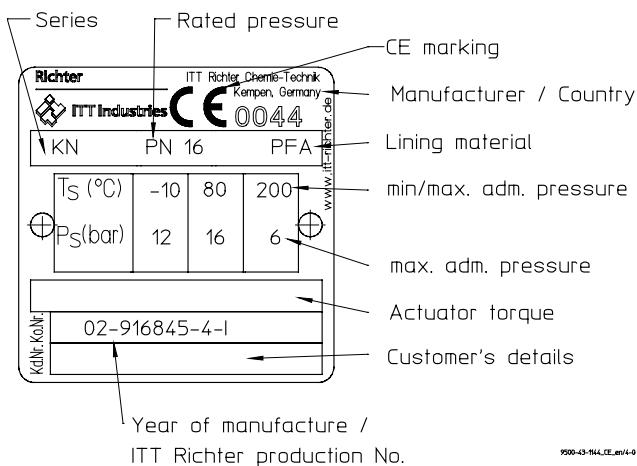
1.2 Name plate, CE and body markings

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

Another stainless steel tag plate riveted to the valve indicates the test pressure.

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

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
- ◆ Foundry date

1.3 Tightening torques

Tighten all screws in diametrically opposite sequence!

The tightening torques for pipe screws and body screws mentioned must not be exceeded. For an exception, see **Section 6**, Flange connection ball valve/pipe is leaking.

Packing screws

The pretension has been reached when the spring gland follower is bent horizontally.

Pipe screws greased

The following tightening torques are recommended for the pipe screws:

Flanges nom. size (mm)	Screws	Tightening torque (Nm)
15	4 x M12	12
20	4 x M12	12
25	4 x M12	12
40	4 x M16	22
50	4 x M16	30
80	8 x M16	25
100	8 x M16	30
150	8 x M20	55
200	8 x M24	75

Body screws greased

Nom. size (mm)	Screws	Tightening torque (Nm)
15	4 x M12	35
20	4 x M12	35
25	4 x M12	35
40	4 x M16	45
50	4 x M16	45
80	8 x M16	50
100	8 x M16	80
150	8 x M20	150
200	8 x M24	100

1.4 Breakaway torques

Test medium: water 20 °C

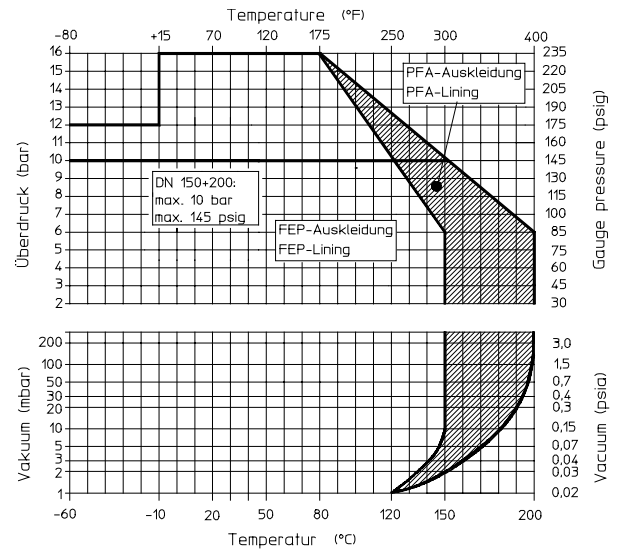
Higher breakaway torques may occur with other media.

DN	Δp in bar				
	3	6	10	16	max. adm.
mm	Nm	Nm	Nm	Nm	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	/	2200

1.5 Flow rates

Nom. size (mm)	kv100 (m ³ /h)
15	17,5
20	31
25	75
40	200
50	310
80	800
100	1250
150	2800
200	3200

1.6 Pressure-temperature-diagram



A special material is used for the ball/stem unit for operating limits under -10°C to -60°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.

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:

- ◆ 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 For customer / operator

When using the ball valve, it must be ensured 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 ball 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.

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

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

2.2 Inadmissible modes of operation

The operational reliability of the ball valve supplied is only guaranteed if it is used properly in accordance with **Section 1.1** 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 Transport and storage



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



The ball 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.

3.1 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.

3.2 Return consignments



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

A **General Safety Certificate** on the field of application is to be enclosed with the returned goods.

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

Safety precautions and decontamination measures are to be mentioned.

4 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.

4.1 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 ITT Richter range.

4.2 Direction of flow and installation position

Installation is independent of the direction of flow.

Any installation position can be chosen.

Otherwise, it is marked by a direction arrow on the ball valve, e.g. in the case of cavity-free ball/stem units.

4.3 Grounding

Grounding is achieved via the pipe screws.

The ball/stem unit is grounded using a grounding spring washer **557**.

4.4 Test pressure

The test pressure PT of an **open valve** must not exceed the value of 1.5 x PN/PS as per the identification of the valve.

5 Operation

5.1 Initial commissioning



Normally, the ball valves have been tested for leaks with air or water.

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

Following the initial loading of the ball valve with operating pressure and temperature, the torques of all connecting bolts must be checked.

See **Section 1.3**.

5.2 Inadmissible modes of operation and their consequences

- ◆ The ball valve is an open/closed valve and is not to be operated in an intermediate position. Damage to the seat rings or the ball/stem unit could occur.
- ◆ 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.
- ◆ 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 handwheel to heavy loads; the handwheel or ball valve may be damaged.
- ◆ Do not use a lever extension as otherwise there is a risk of damage.

5.3 Shutdown

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

Prior to starting any repair work, the ball 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, e.g. between the lining and the body.

6 Malfunctions

- ◆ Flange connection ball 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 ball valve.
- ◆ Flange connection main body/body end piece is leaking
Retighten body screws. See paragraph "Flange connection ball 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 ball valve?

- ◆ The ball no longer closes completely

Is the stem deformed?

Is the coupling worn?

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 fro.
2. Remove the lever stop and try to switch against the normal direction of rotation.
3. If activation is not possible with the max. admissible breakaway torque as per **Section 1.4**, dismantle ball valve and inspect individual components.

7 Maintenance

Spare parts are to be ordered with all the details in acc. with the valve identification.
Only original spare parts may be installed.

7.1 Dismantling

7.1.1 KN 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/main body.
- Remove body end piece **102**.
- When dismantling the ball/stem unit **201**, make sure that the body lining is not damaged.
- Remove seat rings **401**.

7.1.2 Packing bellows

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

7.1.3 KNP with actuator

- 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 7.1.1](#).

7.2 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**.
- When installing the ball/stem unit **201**, make sure that the lining of the main body is not damaged. 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.

7.2.1 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.

7.2.2 KN with lever

- Mount lever stop, spring gland follower and packing gland follower. Observe tightening torques as per [Section 1.3](#). Seal any tapped bores still open with plugs.
- Mount lever.

7.2.3 KNP with actuator

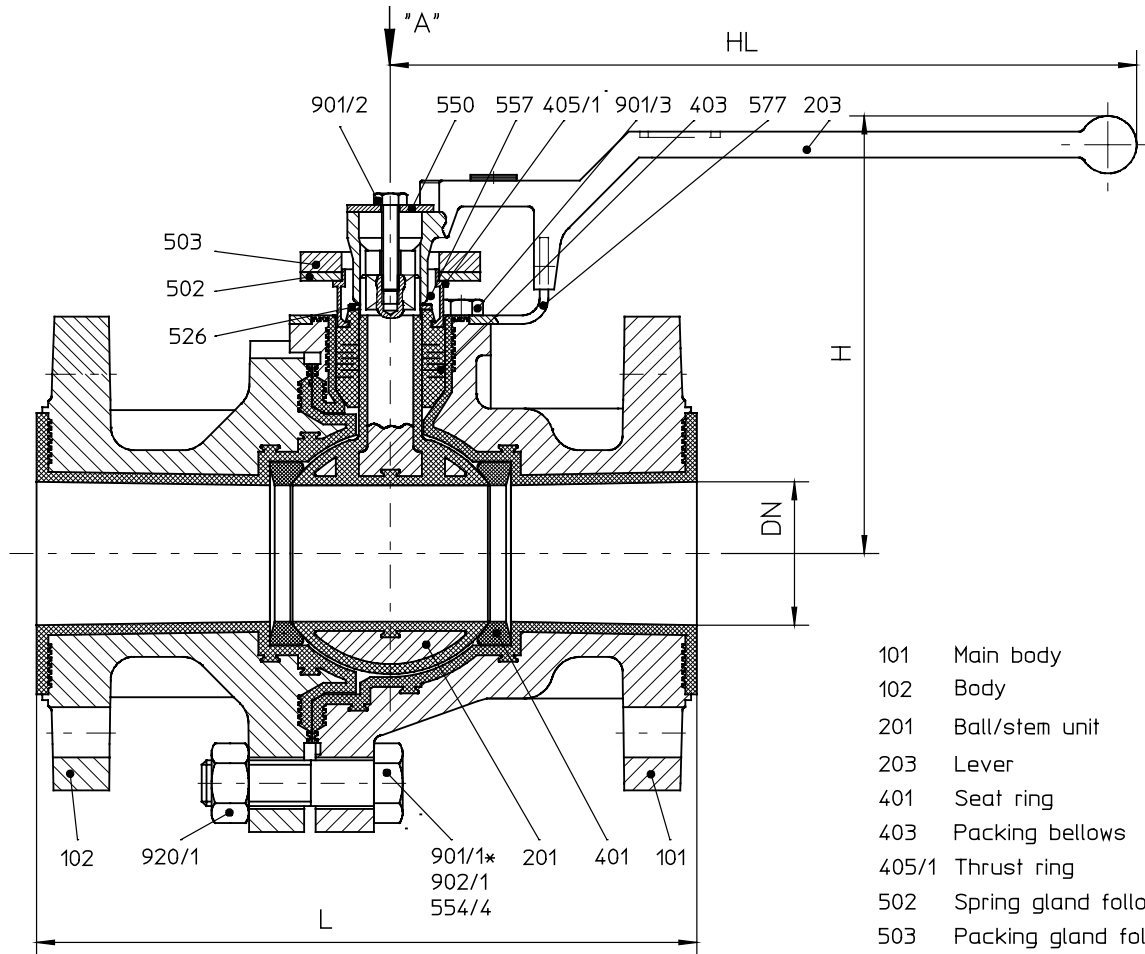
- Mount spring gland follower and packing gland follower. Observe tightening torques as per [Section 1.3](#).
- Mount bracket with the opening at right angles to the direction of flow.
- Mount coupling and actuator. Observe the actuator position in accordance with the actuator operating manual.

7.3 Conversion from lever to actuator

- Select the actuator in accordance with the instructions of the actuator manufacturer.
- Remove hand lever.
- Remove lever stop and plug.
- Check the fits of the coupling, bracket and actuator.
- Mount bracket with the opening at right angles to the direction of flow.
- Mount coupling and actuator. Observe the actuator position in accordance with the actuator operating manual.

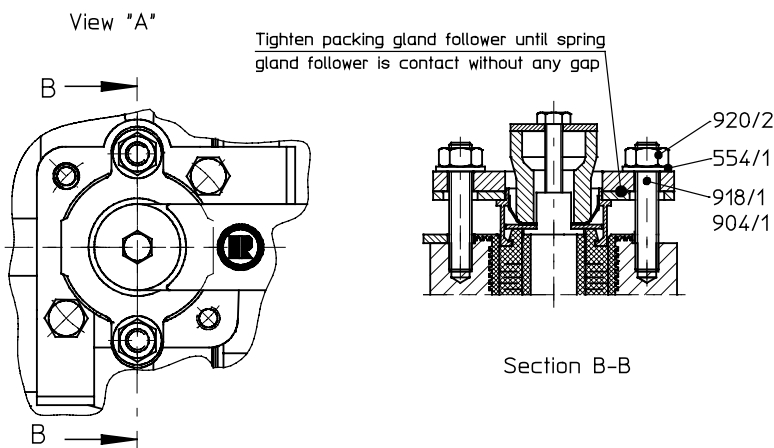
8 Drawings

8.1 Sectional drawing KN with handwheel



* 901/1 only in DN 25, 40, 50

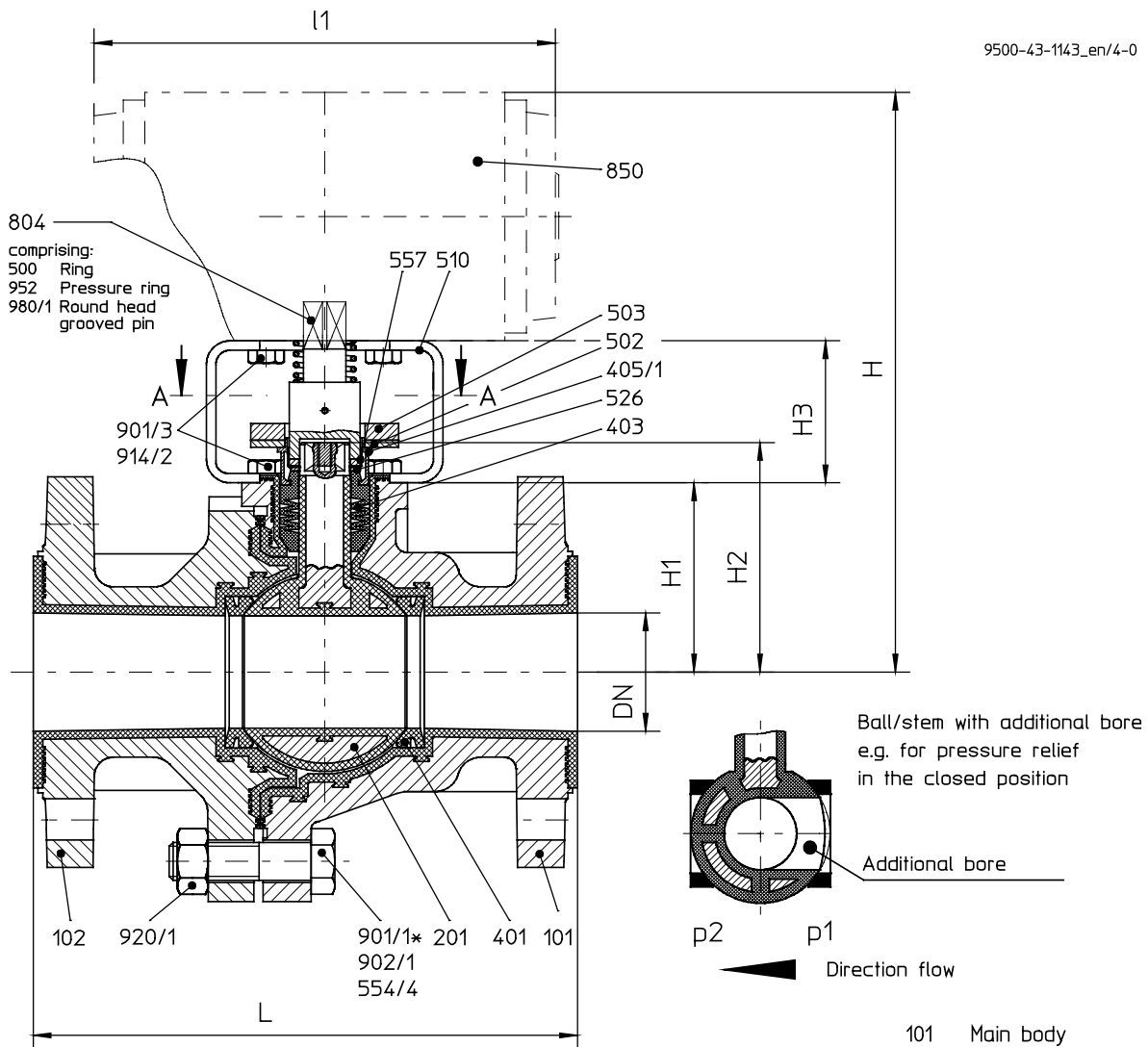
- 101 Main body
- 102 Body
- 201 Ball/stem unit
- 203 Lever
- 401 Seat ring
- 403 Packing bellows
- 405/1 Thrust ring
- 502 Spring gland follower
- 503 Packing gland follower
- 526 Retaining washer
(DN 15,20,25,40,50,80,100)
- 550 Disc
- 554/1 Washer
- 554/4 Washer
(DN 25)
- 557 Grounding spring washer
- 577 Lever stop
- 901/x Hex. screw
- 902/1 Stud screw
(DN 15,20,80,100,150,200)
- 904/1 Setscrew
- 918/1 Threaded rod
(DN 150,200)
- 920/x Hex. nut



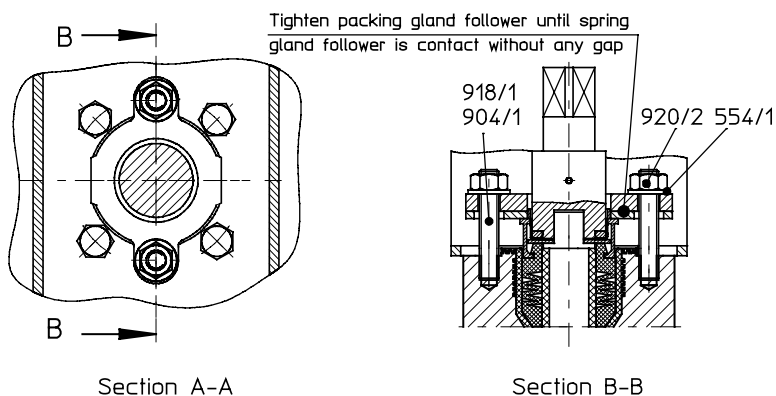
DN	15	20	25	40	50	80	100	150	150/200
L	130	150	160	200	230	310	350	480	457
H	130	130	130	155	155	180	195	265	265
HL	179	179	179	260	260	313	313	515	515

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8.2 Sectional drawing KNP with actuator



* 901/1 only in DN 25, 40, 50



- 101 Main body
- 102 Body
- 201 Ball/stem unit
- 401 Seat ring
- 403 Packing bellows
- 405/1 Thrust ring
- 502 Spring gland follower
- 503 Packing gland follower
- 510 Bracket
- 526 Retaining washer (DN 15,20,25,40,50,80,100)
- 554/1 Washer
- 554/4 Washer (DN 25)
- 557 Grounding spring washer
- 804 Coupling
- 850 Actuator
- 901/1 Hex. screw
- 901/3 Hex. screw
- 902/1 Stud screw (DN 15,20,80,100,150,200)
- 904/1 Setscrew
- 914/2 Hex. socket screw (F07)
- 918/1 Threaded rod (DN 150,200)
- 920/x Hex. nut

DN	15	20	25	40	50	80	100	150	150/200
H1		50		77	80	118	134	184	184
H2		60		94	97	140	156	215	215
H3		60		60	60	80	80	80	80
L	130	150	160	200	230	310	350	480	457
	F04	F05	F05	F07	F07	F10	F12	F12	F16

Dimensions H and l1 vary depending on the actuator manufacturer

GENERAL SAFETY CERTIFICATE

for order No.:

ITT Richter serial No.:

We herewith declare that the equipment mentioned below is being returned for inspection/repair.

Type:

No.:

Reason for inspection/repair:

.....
.....

The equipment was used for the following fluids (Details according to safety data sheet as per 91/155/EEC):
Always indicate the last product conveyed.

.....
.....

The equipment was carefully emptied and cleaned both inside and outside prior to dispatch/return:

yes no

The following safety precautions as regards rinsing fluids, residual fluids and waste disposal are required (indicate decontamination agent):

.....
.....
.....

We herewith declare that the above. information is correct and complete and that transport will be made according to the statutory provisions.

Company:
.....
.....

Phone:
Fax:
E-mail address:

Address:
.....
.....

Name:
(in capitals)

Position:

.....
Date

.....
Stamp/Signature

Safety notes for applications in potentially explosive areas based on the Directive 94/9/ EC (Atex 95)

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.

1. Intended use:

Inadmissible modes of 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 inadmissible modes of 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 long as the valve is completely filled with medium, no hazardous discharges can result from these charges.
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)
The following special feature applies to the series with bellows (HV, RSS, BAV, KSE, GU, GUT, PA):
The bellows are not offered with a conductive lining, i.e. the restrictions under point 1 apply.

**Safety notes for applications in potentially explosive
areas based on the
Directive 94/9/ EC (Atex 95)**

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.