



KIESELMANN

FLUID PROCESS GROUP

Translation of the original

Operating Instructions

Three way ball valve

pneumatic und manual operation

Types 403x

413x

423x



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1 General informations

1.1 Informations for your safety

We are pleased that you have decided for a high-class KIESELMANN product. With correct application and adequate maintenance, our products provide long time and reliable operation.

Before installation and initiation, please carefully read this instruction manual and the security advices contained in it. This guarantees reliable and safe operation of this product and your plant respectively. Please note that an incorrect application of the process components may lead to great material damages and personal injury.

In case of damages caused by non observance of this instruction manual, incorrect initiation, handling or external interference, guarantee and warranty will lapse!

Our products are produced, mounted and tested with high diligence. However, if there is still a reason for complaint, we will naturally try to give you entire satisfaction within the scope of our warranty. We will be at your disposal also after expiration of the warranty. In addition, you will also find all necessary instructions and spare part data for maintenance in this instruction manual. If you don't want to carry out the maintenance by yourself, our KIESELMANN - service team will naturally be at your disposal.

1.2 Marking of security instructions

Hints are available in the chapter "safety instructions" or directly before the respective operation instruction. The hints are highlighted with a danger symbol and a signal word. Texts beside these symbols have to be read and adhered to by all means. Please continue with the text and with the handling at the valve only afterwards.

Symbol	Signal word	Meaning
	DANGER	Imminent danger which will result severe personal injury or death.
	WARNING	Imminent danger which may result severe personal injury or death.
	CAUTION	Dangerous situation which may cause slight personal injury or material damages.
	NOTICE	An harmful situation which may result in damages of the product itself or of adjacent vicinity.
	INFORMATION	Marks application hints and other information which is particularly useful.

1.3 General designated use

The fitting is designed exclusively for the purposes described below. Using the fitting for purposes other than those mentioned is considered contrary to its designated use. KIESELMANN cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user. The prerequisite for the reliable and safe operation of the fitting is proper transportation and storage as well as competent installation and assembly. Operating the fitting within the limits of its designated use also involves observing the operating, inspection and maintenance instructions.

1.4 Personnel

Personnel entrusted with the operation and maintenance of the tank safety system must have the suitable qualification to carry out their tasks. They must be informed about possible dangers and must understand and observe the safety instructions given in the relevant manual. Only allow qualified personnel to make electrical connections.

1.5 Modifications, spare parts, accessories

Unauthorized modifications, additions or conversions which affect the safety of the fitting are not permitted. Safety devices must not be bypassed, removed or made inactive. Only use original spare parts and accessories recommended by the manufacturer.

1.6 General instructions

The user is obliged to operate the fitting only when it is in good working order. In addition to the instructions given in the operating manual, please observe the relevant accident prevention regulations, generally accepted safety regulations, regulations effective in the country of installation, working and safety instructions effective in the user's plant.

2 Safety instructions

2.1 Intended use

The Three way ball valve can be used as multiple way valve in the drinks and food industry, the pharmaceuticals and chem. Industry and the bio-technology sector.

2.2 General notes



NOTICE - observe the operating instructions

To avoid danger and damage, the fitting must be used in accordance with the safety instructions and technical data contained in the operating instructions.



NOTICE

All data are in line with the current state of development. Subject to change as a result of technical progress.

2.3 General safety instructions



⚠ WARNING

Risk of injury by outflowing medium

Dismantling the valve or valve assemblies from the plant can cause injuries.

- Medias flowing through the leakage drain outlet are to be drained off without splashing into a discharge arrangement.
- Carry the disassembling only if when the plant has been rendered pressure-less and free of liquid and gas.



⚠ WARNING

Risk of injury by moving parts

Do not grab into the valve when the actuator is pressurized. Limbs can be crushing or amputating.

- Remove the control air line before dismantling.
- Ensure that the actuator is unpressurized.



⚠ WARNING

Risk of injury by pre-stressed pressure spring.

The pneumatic-mechanical actuator is spring-loaded. When disassembling the actuator, components that jump out may cause injuries.

- Multiturn actuator are maintenance-free and therefore do not need to be opened!



⚠ WARNING

ATEX - Guidelines

If the valve or the plant is operated in a potentially explosive atmosphere, the valid ATEX directive of the EC and the installation instructions in this operating manual must be observed.



⚠ CAUTION

To avoid air leaking, only use pneumatic connection parts that have an O-ring seal facing the even surface.



⚠ CAUTION

Before starting the system, the entire pipeline system must be thoroughly cleaned.



 **CAUTION**

Steps should be taken to ensure that no external forces are exerted on the fitting.

3 Delivery, transport and storage

3.1 Delivery

- Immediately after receipt check the delivery for completeness and transport damages.
- Remove the packaging from the product.
- Retain packaging material, or expose of according to local regulations.

3.2 Transport



⚠ CAUTION

Risk of injury and damage to the product

During the transport the generally acknowledged rules of technology, the national accident prevention regulations and company internal work and safety regulations must be observed.

3.3 Storage



NOTICE

Damage to the product due to improper storage!

Observe storage instructions
avoid a prolonged storage



INFORMATION

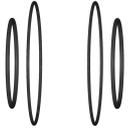
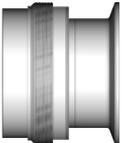
Recommendation for longer storage

We recommend regularly checking the product and the prevailing storage conditions during long storage times.

- To avoid damage to seals and bearings,
 - products up to DN 125 / OD 5 inch should be stored horizontally for maximum 6 months.
 - products larger than DN 125 / 5 inch, should be stored in the upright position with the actuator on top.
- Don't store any objects on the products.
- Protect the products for wetness, dust and dirt.
- The product should be stored in a dry and well ventilated room at a constant temperature (optimal indoor temperature: 25 C ±5 ; indoor humidity data 70% ±5%).
- Protect seals, bearings and plastic parts for UV light and ozone.

4 Specification

4.1 Modular system

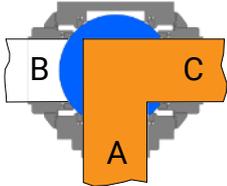
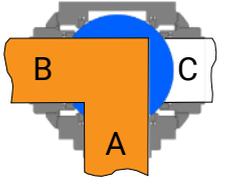
KI-Top control head		Feedback unit			
					
Stainless steel hood:	Transparent hood				
drive systems					
pneumatical			electrical		
PDA 90/75 Ø 75	PDA 90/100 Ø 100	PDA 90/125 Ø 125	4040		
					
manual					
Hand lever	Hand lever with sensor mounting	Hand lever stainless steel	Hand lever continuously adjustable		
					
Model					
Standard PTFE - Thrust collar		Filling element PTFE - shell			
					
Seal material					
			EPDM NBR FKM VMQ		
Connection flanges					
S	G	K/M	FI	CI	-
					

5 Function and operation

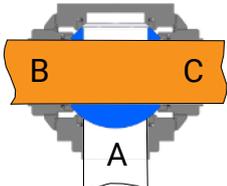
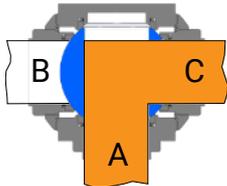
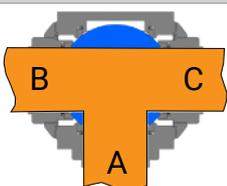
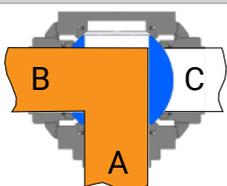
5.1 Description of function

The Three way ball valve is a distribution valve with the function of the valve is the opening or closing of several pipes to divert the flow. The possible assembly-line ways in dependence of the stop functions linked with it are shown in the table as valve positions.

Valve positions L - ball

Valve position 1 Connection A - C open Connection B closed - Basic position -	Valve position 2 Connection A - B open Connection C closed
	

Valve positions T - ball

Valve position 1 Connection B - C open Connection A closed - Basic position -	Valve position 2 Connection A - C open Connection B closed
	
Valve position 3 Connection A - B - C open	Valve position 4 Connection A - B open Connection C closed
	

Functional description for valves with manual operation

When actuating a fitting manually, the respective switching position will be locked in place in the final position. The desired valve position can be positioned in 90° steps by a rotary movement by means of a hand lever strength in a swivelling angle of 360°.

Before operation, unlock the final position lock by lifting the notch lever against the hand lever. By letting go of the notch lever in the respective final position the spring-loaded notch lever will latch back by itself to the final position lock.

Description of function for pneum. valves

By means of a pneum. multiturn actuator, the valve ball is rotated by a 90° rotary movement.

Functional description for valves with pneumatic operation

The valve opens and closes by way of a pneum. multiturn actuator with a rotary movement of 90°.

normal closed (NC)

- pneum. OPERATED opens the valve
- not pneum. OPERATED spring force closes the valve

normal open (NO)

- pneum. OPERATED closes the valve
- not pneum. OPERATED spring force opens the valve

double acting (DA)

- pneum. OPERATED the valve opens or closes according to control

5.2 Control system and position indication

Retrofitting to end position feedback for manually operated valves

By replacing the hand lever and the catch disc the valve can be retrofitted for end position feedback (proximity switch).

Conversion from manual operation to pneumatic actuation

By a simple retrofitting operation the valve can be converted to pneumatic actuation. The rotary actuator for this purpose is supplied complete with fitting device. The following actuators are available, depending on the desired actuating function.

Nominal size	Drive	air open - air close (DA)	Normally closed (NC)
DN25 - DN80	PDA 90/100	4100 080 100-022	4200 080 100-022
DN 100	PDA 90/125	4100 100 125-022	4200 100 125-022

Nominal size	Drive	air open - air close (DA)	Normally closed (NC)
OD 1" - 3"	PDA 90/100	4100 080 100-022	4200 080 100-022
OD 4"	PDA 90/125	4100 100 125-022	4200 100 125-022



Position indicator with sensor mounting for feedback signal.

The actuator is equipped with a proximity switch mounting (sensor mounting) and a position indication. When inductive proximity initiators M 12x1 are installed, the current "Open" or "Shut" position can be interrogated. By screwing the proximity initiator to the limit position the required switching gap for the signal transmission is established.. When the valve is closed the position indication is oriented vertically to the direction of valve passage. When the valve is open it is oriented parallel to the valve passage.



Feedback unit -optional-

Optionally, modular valve control head systems can be installed to the actuator for reading and actuating valve positions. The standard version is a closed system with SPS or ASI-bus switch-on electronics, and integrated 3/2-way solenoid valves. For tough operating conditions we recommend employing a high-grade steel cover.

6 Commissioning, service and maintenance

6.1 Commissioning

6.1.1 Installation instructions

For ball valves without leakage outlet, the installation position is without importance.

Ball valves with leakage outlet must always be installed vertically to ensure that outflow of leakage, or of cleaning medium, from the valve is such that no residue will remain inside the valve.

For valves which are to be welded in on both sides, a releasable connection has to be fitted into the pipework to allow dismounting (maintenance).

6.1.2 General welding guidelines

Sealing elements integrated in weld components must generally be removed prior to welding. To prevent damage, welding should be undertaken by certified personnel (EN ISO 9606-1). Use the TIG (Tungsten Inert Gas) welding process.



CAUTION

Damage and injuries due to high temperature supply

To avoid a distortion of the components, all welding parts must be welded to stress-relieved.

Allow all components to cool before assembling.



NOTICE

Damage due to impurities

Impurities can cause damage to the seals and seals area.

Clean inside areas prior to assembly.

6.1.3 Use in EX area

For valves or plants/installations that are operated in the ATEX area, sufficient bonding (grounding) must be ensured. (see e.g. ATEX Directives EC; UKSI 696:2019-Schedule 25)

6.2 Service



RECOMMENDATION

Replacement of seals

To achieve optimal maintenance cycles, the following points must be observed!

- When replacement of seals, all product-contacting seals should be replaced.
- Only original spare parts may be installed.

Maintenance interval

The maintenance intervals depend on the operating conditions "temperature, temperature-intervals, medium, cleaning medium, pressure and opening frequency". We recommend replacing the seals 2-year cycle. The user, however should establish appropriate maintenance intervals according to the condition of the seals.

Lubricant recommendation

	EPDM; HNBR; NBR; FKM; k-flex	- Klüber Paraliq GTE703*
	Silicone	- Klüber Sintheso pro AA2*
	Thread	- Interflon Food*
*) It is only permitted to use approved lubricants, if the respective fitting is used for the production of food or drink. Please observe the relevant safety data sheets of the manufacturers of lubricants.		

6.3 Cleaning

In order to ensure continuous flawless function during operation, the surfaces between the valve body and the ball must be cleaned.

Open and close the valve several times from the open position. With an angle of rotation of $\geq 20^\circ$, cleaning fluid flows into the area between the ball and casing. A time-dependent actuation in the angle of rotation range 20° - 45° makes the cleaning process more efficient. The duration and the number of actuations should be adjusted according to the type of dirtying and the degree of dirtying.

7 Technical data

Model	Three way ball valve	
Size	DIN: DN 25 - DN 80 Inch: DN 1" - DN 3"	
Connection type	Welding end (S) DIN EN 10357 Thread (G) DIN 11851 Flange (FI) Clamp (CI) Liner/nut (K/M) DIN 11851	
Temperature range	Ambient temperature: (air)	+4° to +45°C
	Operating temperature: (depends on medium)	+0° to +95°C
	Sterilisation temperature: (SIP 30 min)	EPDM +140°C PTFE +130°C NBR +100°C FKM +140°C
Operating pressure	16 bar	
Cleaning pressure	3 bar	
Leakage rate	A (DIN EN 12266-1)	
Control air	Control air pressure: 5,5 - 8,0 bar	Control air quality:: ISO 8573-1 : 2001 quality class 3
Material (in contact with product)	Stainless steel:	1.4404 / AISI 316L 1.4301 / AISI 304
	Surface:	Ra ≤ 0,8µm, e-polished
	Sealing material:	EPDM / PTFE NBR / PTFE FKM / PTFE VMQ / PTFE

8 Disassembly and assembly

8.1 Disassembly



NOTICE

All threaded joints have right-hand thread.

Unscrew and remove control air, steam resp. cleaning lines and electrical lines, complete feedback unit or control head.

Remove the ball valve completely from the housing.

Replacing the housing seals (3), (5), (6), (19)

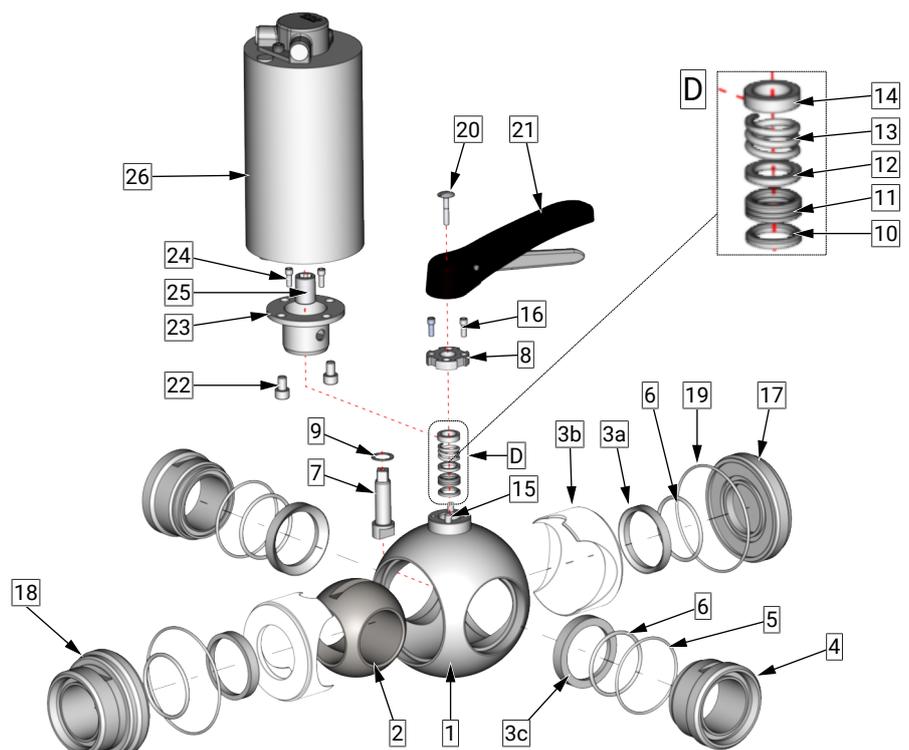
- Unscrew the flange (4) (2x), (17) and (18).
- Dismantle the O-rings (5)(2x), (6)(4x), (19)(2x) and thrust collar (3)(4x).
- Dismount the ball (2) from the housing (1).

Ball valve manual operation - Replacing the sealing package (10), (11), (12)

- Unscrew the screw (20) and remove the hand lever (21).
- Unscrew the screw (16) and remove the locking disc (8).
- Remove the plain bearing (14) and the pressure spring (13) from the axis (7).
- Dismantle the axis (7) with sliding ring (9) downwards.
- Take the sealing package (10/11/12) out of the housing (1).

Ball valve - pneum. operation - Replacing the sealing package (10), (11), (12)

- Unscrew the screw (22) and remove the multiturn actuator (26) with the square boss (25).
- Unscrew the screws (24) and remove the angle bracket (23).
- Remove the plain bearing (14) and the pressure spring (13) from the axis (7).
- Dismantle the axis (7) with sliding ring (9) downwards.
- Remove the sealing package (10/11/12) out of the housing (1).



8.2 Assembly

- Before installation, thoroughly clean and slightly lubricate mounting areas and running surfaces.
- Assemble in reverse order.



NOTICE

Instructions d'installation

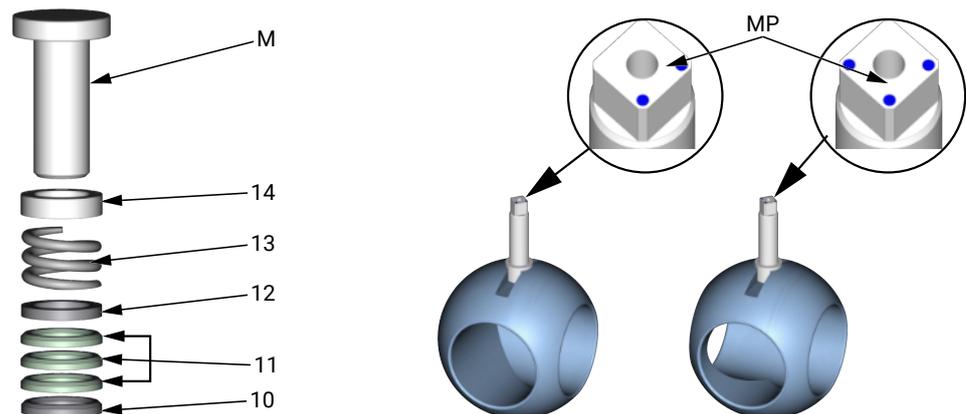
Mount the sealing package (10/11/12) in the sequence shown under view.

b) Push the bearing ring (10), the V-rings (11) (3x) and the thrust collar (12) with the mounting sleeve (M) into the limit stop.

c) When mounting the ball (2) and the axis (7), regards for exact match from the marks on the axis (7) and the position of the ball (2).

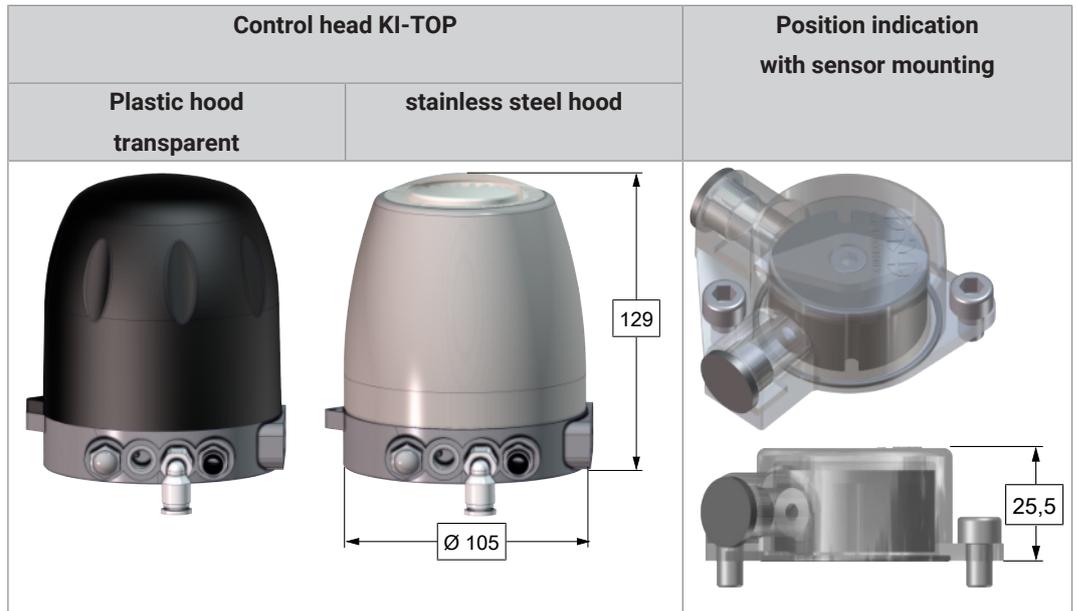
d) The mark points (MP) on the switch axis correspond to the respective ball openings.

e) Mount the hand lever or the pneumatic actuator according of the valve functions.



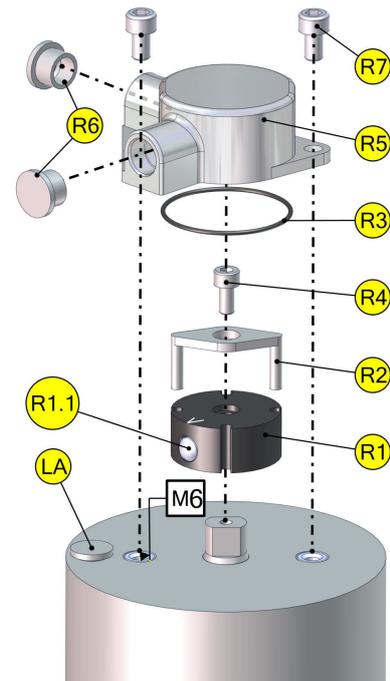
9 Drawings and dimensions

9.1 Control units



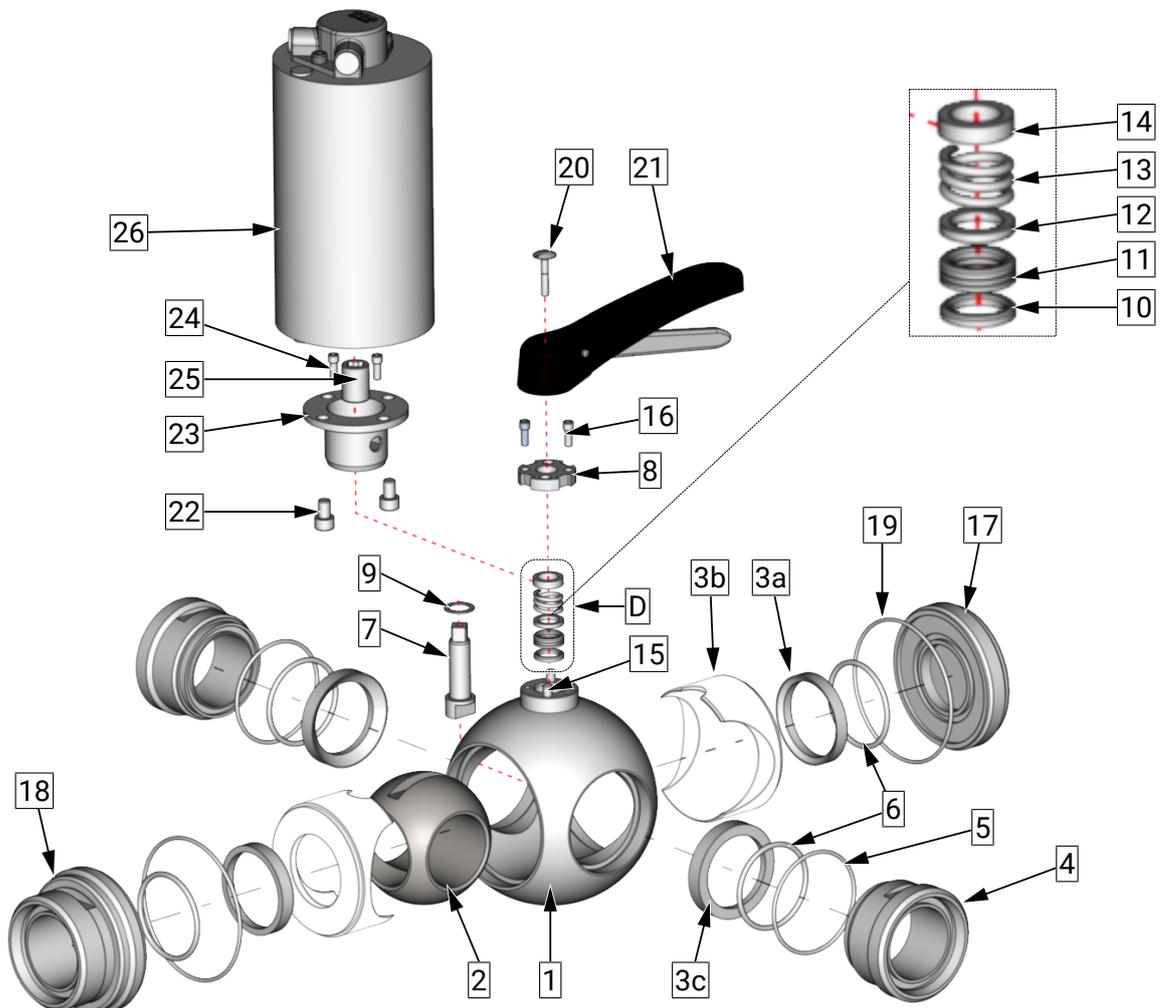
Position indication with sensor mounting (R)

- R1 = dog
- R1.1 = Straight pin
- R2 = Position indication
- R3 = O-ring
- R4 = Screw
- R5 = Sensor mounting
- R6 = Cap
- R7 = Screw
- LA = air supply



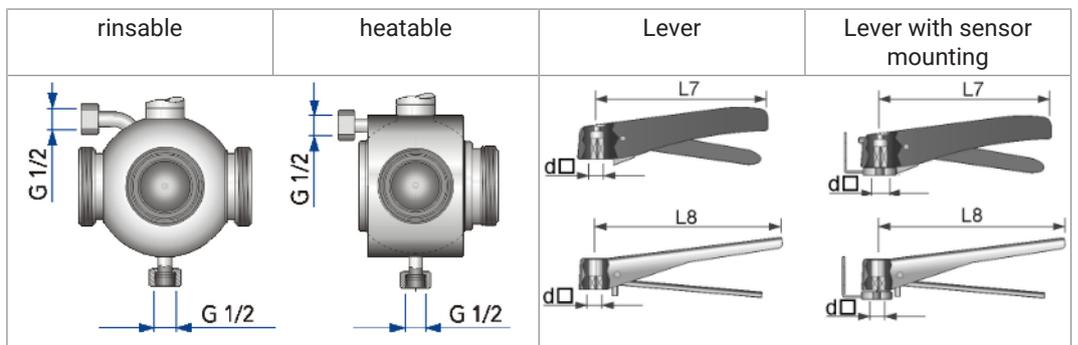
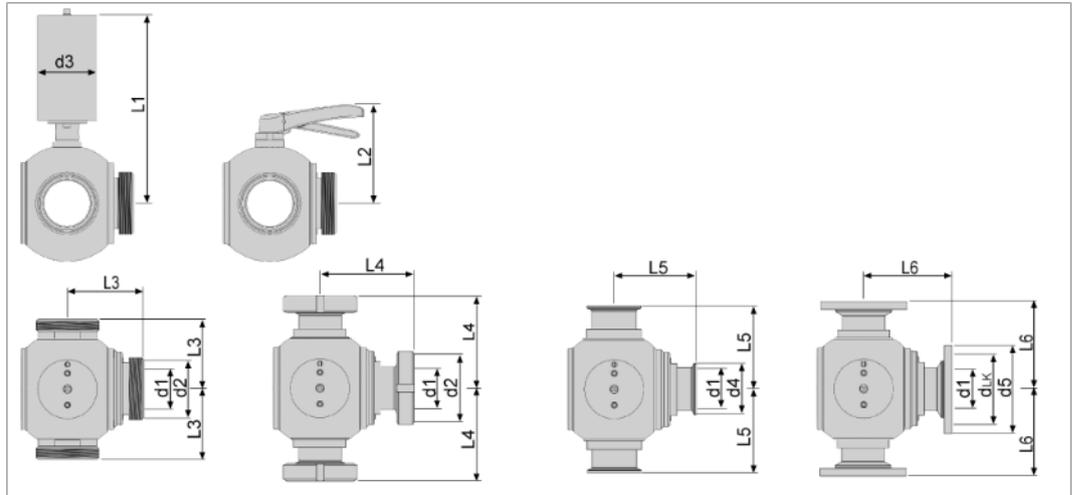
9.2 Drawings

- Example: Ball valve, T-ball with male part flange



1	Housing	2	ball
3a	thrust collar	3b	shell
3c	thrust collar	4	Flange
5	O-ring	6	O-ring
7	axis	8	locking disc
9	sliding ring	10	Support ring
11	v-ring	12	thrust collar
13	Pressure spring	14	sliding ring
15	cylinder pin	16	Allen screw
17	blind flange	18	Flange
19	O-ring	20	pan-head screw
21	lever	22	Allen screw
23	holding flange	24	Allen screw
25	Square boss	26	pneum. mult. actuator
D	Detail		

9.3 Dimensions



DN	d1	d2	d3	d4	d5	d _{LK}	L1	L2	L3	L4	L5	L6	L7	L8	d _■
25	26	Rd52x1/6	104	50.5	80	65	303	118	64	75	74.5	77	165	180	10
32	32	Rd58x1/6	104	50.5	86	71	314	124	70	84	80.5	83	165	180	10
40	38	Rd65x1/6	104	50.5	92	77	319	129	80	95	90.5	93	165	180	10
50	50	Rd78x1/6	104	64	108	92	328	138	85	103	96.5	99	165	180	10
65	66	Rd95x1/6	104	91	130	110	342	152	100	122	118	114	165	180	10
80	81	Rd110x1/4	129	106	146	126	401	194	115	141	132	128	-	285	14

DN	d1	d2	d3	d4	d5	d _{LK}	L1	L2	L3	L4	L5	L6	L7	L8	d _■
1"	22.1	Rd52x1/6	104	50.5	80	65	303	118	64	75	74.5	77	165	180	10
1½"	34.8	Rd65x1/6	104	50.5	92	77	319	129	80	95	90.5	93	165	180	10
2"	47.5	Rd78x1/6	104	64	108	92	328	138	85	103	96.5	99	165	180	10
2½"	60.2	Rd95x1/6	104	77.5	130	110	342	152	100	122	-	114	165	180	10
3"	72.1	Rd110x1/4	129	91	146	126	401	194	115	141	149	128	-	285	14

10 Wearing parts

10.1 Wear parts kit

Sealing kit

- Pos. (3), (5), (6), (9), (10), (11), (12), (14), (19), (M)

DN	NBR/PTFE	EPDM/PTFE	VITON/PTFE	- Mounting sleeve* M
25	4085 025 000-000	4085 025 000-054	4085 025 000-051	4084 080 021-057
32	4085 032 000-000	4085 032 000-054	4085 032 000-051	4084 080 021-057
40	4085 040 000-000	4085 040 000-054	4085 040 000-051	4084 080 021-057
50	4085 050 000-000	4085 050 000-054	4085 050 000-051	4084 080 021-057
65	4085 065 000-000	4085 065 000-054	4085 065 000-051	4084 080 021-057
80	4085 080 000-000	4085 080 000-054	4085 080 000-051	4084 100 021-057

DN	NBR/PTFE	EPDM/PTFE	VITON/PTFE	- Mounting sleeve* M
1"	4085 025 000-000	4085 025 000-054	4085 025 000-051	4084 080 021-057
40	4085 040 000-000	4085 040 000-054	4085 040 000-051	4084 080 021-057
50	4085 050 000-000	4085 050 000-054	4085 050 000-051	4084 080 021-057
65	4085 065 000-000	4085 065 000-054	4085 065 000-051	4084 080 021-057
80	4085 080 000-000	4085 080 000-054	4085 080 000-051	4084 100 021-057

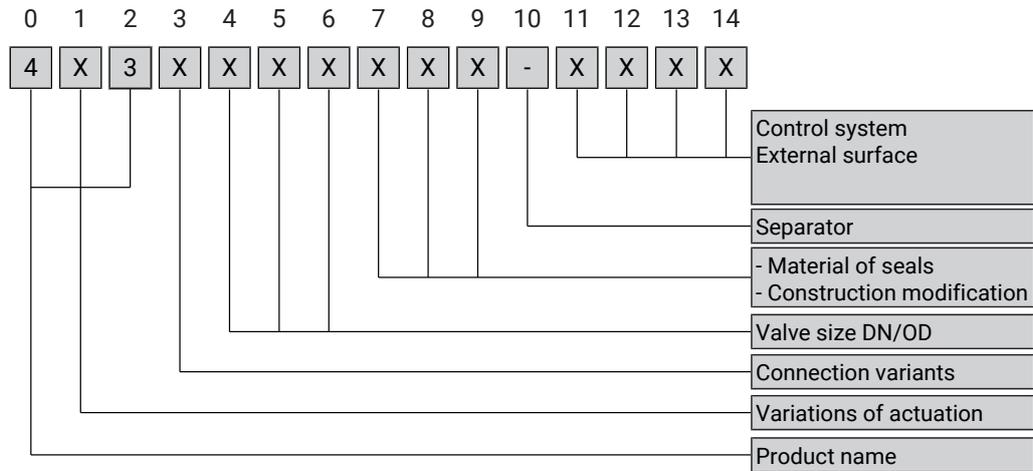
*) not included in seal kit

10.2 Spare parts list

Item	Designation	Material
1	Housing	1.4301, 1.4404
2	ball	1.4301, 1.4404
3a	Thrust collar	PTFE
3b	Filling element optional	PTFE
4	Flanges: Male (G) - Small flange (FI) Liner/nut (K/M) Clamp (CI)	1.4301, 1.4404
5	O-ring	- NBR, EPDM, FKM
6	O-ring	- NBR, EPDM, FKM
7	axis	1.4301, 1.4404
8	locking disc	1.4308
9	sliding ring	PTFE
10	Backup ring	PTFE
11	V-ring package	PTFE
12	Thrust collar	PTFE
13	Pressure spring	1.4310
14	Slide bearing	PTFE
15	Straight pin DIN7	1.4301
16	Socket screw DIN912	1.4301
17	Blind socket	1.4301, 1.4404
18	Flanges: Male (G) - Small flange (FI) Liner/nut (K/M) Clamp (CI)	1.4301, 1.4404
19	O-ring	- NBR, EPDM, FKM
20a	saucer-head screw	1.4301
20b	Socket screw DIN912	1.4301
21a	Hand lever - GFK	GFK
21b	Hand lever - stainless steel	1.4301
22	Socket screw DIN912	1.4301
23	Holding flange	1.4301
24	Socket screw DIN912	1.4301
25	Square boss	1.4301
26	Actuator (air - spring, air - air)	---

11 Classification

11.1 Structure of Order Number



Product name

4x3 x xxx xxx-xxxx	Pos. 0	Pos. 1	Pos. 2
Three way ball valve	4	x	3

e.g. Type 4231 - Three way ball cock pneumatic operation, air open - spring close (NC)

Kind of actuators

4x3 x xxx xxx-xxx	Pos. 1
Manual drive	0
Pneumatic actuator (air / air)	1
Pneumatic actuator (air / spring)	2

Connection variant

4x3 x xxx xxx-xxx	Pos. 3
(G-G-G) 3 x Male part	1
(K/M-G-G) Liner/nut - 2x Male part	2
(FI-FI-FI) 3x Small flange PN10	3

Valve size

xxxx XXX xxx-xxxx								
Nominal diameter	Pos. 4	Pos. 5	Pos. 6		Nominal diameter	Pos. 4	Pos. 5	Pos. 6
DN 25	0	2	5		DN 65	0	6	5
DN 40	0	4	0		DN 80	0	8	0
DN 50	0	5	0					
OD 1"	0	2	6		OD 2 1/2"	0	6	4
OD 1 1/2"	0	3	8		OD 3 "	0	7	6
OD 2 "	0	5	1					

Sealing material / construction modification

4x3x xxx -xxx	Pos. 7	Pos. 8	Pos. 9
EPDM; NBR; FKM	x	x	x
Filling element PTFE heatable rinsable L-ball T-ball - -	x	x	x

Separator

xxxx xxx -xxxx	Pos. 10
- Standard	-

Control system, position indicator, surfaces

xxxx xxx -XXXX	Pos. 11	Pos. 12	Pos. 13	Pos. 14
Valve with feedback unit, External surface AISI304 blank	0	2	0	
Valve with feedback unit, External surface AISI316L blank	0	4	0	
Valve with feedback unit, External surface AISI304 E-polished	0	2	1	
Valve with feedback unit, External surface AISI316L, E-polished	0	4	1	
Valve with feedback unit, External surface AISI304 blasted	0	2	2	
Valve with feedback unit, External surface AISI316L blasted	0	4	2	
Control head KI-Top SPS	K	5	x	x
Control head KI-Top ASi-Bus	K	6	x	x

12 Appendix

12.1 Declaration of incorporation



Declaration of incorporation

Translation of the original

Manufacturer / authorised representative:

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(for compiling technical documents)

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<u>Product name</u>	<u>Function</u>
pneum. Lift actuators	Stroke movement
pneum. Rotary actuators	Rotary movement
Ball valves	Media cutoff
Butterfly valves	Media cutoff
Single seat valves	Media cutoff
Flow control valves	Control of liquefied media
Throttle valve	Control of liquefied media
Overflow valve	Definition of fluid pressure
Double seat valve	Media separation
Bellow valves	Sampling of liquids
Sampling valves	Sampling of liquids
Two way valves	Media cutoff
Tankdome fitting	Prevention of overpressure and vacuum, Tank cleaning
Safety valve	Prevention of overpressure

The manufacturer hereby states that the above product is considered as an incomplete machine in the sense defined in the Directive 2006/42/EC on Machinery. The above product is exclusively intended to be installed into a machine or an incomplete machine. The said product does not yet conform to all the relevant requirements defined in the Directive on Machinery referred to above for this reason.

The specific technical documents listed in Appendix VII, Part B, have been prepared. The Authorized Agent empowered to compile technical documents may submit the relevant documents if such a request has been properly justified.

Commissioning of an incomplete machine must not only be carried out if it has been determined that the respective machine into which the incomplete machine is to be installed conforms to the regulations set out in the Directive on Machinery referred to above.

The above product conforms to the requirements of the directives and harmonized standards specified below:

- Directive 2014/68/EU
- EN ISO 12100 Safety of machinery

Knittlingen, 21.09.2017

i.V. Uwe Heisswolf
Head of Development

