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42 048 659

1. Declaration of conformity

Hereby we,

KSB S.A.S.
Zone industrielle Gagnaire Fonsèche
24490 LA ROCHE CHALAIS
Registered Office: 92635 - Gennevilliers
France

declare that the valves listed below comply:

- with the requirements of the Pressure Equipment Directive 2014/68/EU.

Description of the valve types: **Butterfly valves**
 - KE PLASTOMER PS 10 bar DN 40-600
 - KE ELASTOMER PS 10 bar DN 40-300

As per harmonized European standards: EN 10213; EN 12516-2; EN 12516-4
 and other standards / directives: EN 593; EN 1563; ASME B 16.42

Suitable for: **Fluids group 1 and 2**

Conformity Assessment Procedure: **Module H**

PED classification for each product type:

Fluid	Liquids		Gas*	
	Dangerous 1)	Group	Dangerous 1)	Group
	Yes	No	Yes	No
Table N° 2)	1	2	1	2
	8	9	6	7
XV	●	●	●	●
XA	●	●	●	●
Y	●	●	●	●
CB	●	●	●	●
F	●	●	●	●

1) Definition in accordance with PED 2014/68/EU (from 07/19/2016)

2) Table in accordance with annex II of PED 2014/68/EU (from 07/19/2016)

Comply with PED

*: For unstable gas, consult us.

Production site :
 LA ROCHE CHALAIS

Name and address of the notified body
 for orders made from 01/10/2011:

Bureau Veritas Services SAS
8, cours du Triangle
92800 Puteaux
FRANCE

Number of notified body: **0062**

• Product information as per Regulation No. 1907/2006 (REACH)

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see <http://www.ksb.com/reach>.

Petruta Rey
 Integrated Management System Manager

Rev.1 - 01/22

This document was prepared electronically and is valid without signature. Its implementation in the public domain validates his condition.

2. General

These operating instructions apply to KSB elastomer and plastomer lined KE butterfly valves (see section 5).

Design, manufacturing and testing of the KSB valves are subject to a Quality Assurance System according to EN ISO 9001 and to the European Pressure Equipment Directive 2014/68/EU (PED).

For a specific product configuration as an actuated valve, the aggregate can be considered as a partly completed machine according to the machinery directive 2006/42/EC and comply with the requirements of the directive.

Correct installation and maintenance or repair are mandatory to ensure trouble free operation of the valves.

The manufacturer cannot be made liable for these valves if operating instructions are not being observed.

ATTENTION The valves must not be operated outside the permissible operating range. The limits are indicated on the name plate or currently applicable type leaflet. The pressure-temperature ratings, in particular, must not be exceeded. Operation of the valves outside the above-mentioned conditions may result in overloads which may damage the valves.

The type leaflets can be found at www.ksb.com – product catalogue.



Nonobservance of this warning may lead to personal injury or property damage, e.g.:

- Injury caused by escaping fluids (cold/hot, toxic, flammable, corrosive or under pressure)
- Incorrect operation or destruction of the valve.

The descriptions and instructions in this manual refer to the standard versions but also apply to the related variants.

These operating instructions do not take into consideration:

- incidents which may occur during installation, operation and maintenance.
- the local safety regulations. It is the user's responsibility to ensure that these are also observed by the installation staff involved.

For actuated valves, the specified connection parameters and the installation and maintenance instructions - including the operating manual for the actuator - must be observed.

ATTENTION Handling a valve requires skilled and experienced personnel.

The personnel in charge of operation, maintenance and installation of this valve must be aware of the interaction between the valve and the plant.

Operator's errors concerning the valve may have serious consequences for the entire plant, e.g.:

- fluid may escape
- downtime of the plant/machine
- adverse effect/reduction/increase of the efficiency/function of a plant/machine.

For further questions or in case of damage to the valve, please contact your KSB Sales Office.

For further questions and supplementary orders, especially when ordering spare parts, please always state the indications of the marking plate.

The specifications (operating data) of the valves are listed in the technical documentation & type leaflet of the related valve (see also section 5).

When returning valves to the manufacturer, please refer to section 4.

3. Safety

This manual contains basic instructions to be complied with during operation and maintenance. It is therefore vital for the fitter and the operator/user to read this manual before installing/commissioning the valve. Also, this manual must always be available at the site where the valve is installed.

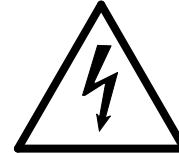
It is not enough to observe the general instructions listed in the section "safety", the specific safety instructions listed in the other sections should also be observed.

3.1. Safety Symbols in these Operating Instructions

Safety instructions put forth in this instruction manual, the nonobservance of which would involve the risk of personal injury, they are specially marked with the general hazard symbol:



in accordance with ISO 3864-B.3.1.
or with the electric voltage warning sign:



In accordance with ISO 3864-B.3.6.

Safety instructions the nonobservance of which would involve hazard to the valve and jeopardize its operation have been marked with the word

ATTENTION

Instructions directly attached to the valve, (e.g. nominal pressure) must be complied with and maintained in a legible condition.

3.2. Qualification of personnel and training

The personnel for operation, maintenance, inspection and installation must be adequately qualified for the work involved. The personnel responsibility, competence and supervision must be clearly defined by the user. If the personnel in question is not already in possession of the required know-how, appropriate training and instructions must be provided. If deemed necessary, the manufacturer/supplier will provide such training and instructions at the user's request. In addition, the user is responsible for ensuring that the contents of these operating instructions are fully understood by the personnel involved.

3.3. Danger or nonobservance of the safety instructions

Nonobservance of the safety instructions may lead to personal injury and danger for both the environment and the valve itself. Nonobservance of these safety instructions will also forfeit the user's warranty.

Such noncompliance could result in for example :

- failure of essential functions of the valve/plant
- failure of prescribed maintenance and repair practices
- hazard to people by electrical, mechanical or chemical effects
- hazard to the environment due to leakage of hazardous substances

3.4. Safety Consciousness

The safety instructions contained in this manual, the applicable national accident prevention regulations and any of the user's own applicable internal work, operation or safety instructions must be fully complied with.

3.5. Safety Instructions for the User/Operator

Any hot or cold parts of the valve (e.g. body or handle or actuator) that could cause a hazard must be protected by the user against accidental contact.

Leakage of hazardous substance (e.g. flammable, corrosive, toxic, hot) must be drained so as to avoid all danger to people or the environment. All relevant laws must be observed.



Electrical hazards must be effectively prevented. (For details, please refer to the IEC 364 or equivalent national standard and/or local utility energy supply regulations).

3.6. Safety Instructions for Maintenance, Inspection and Installation work

3.6.1. General

On an actuated valve the operating instructions of the valve must be strictly followed as well as those of the operating instructions of the actuators, the limit switch or automation boxes.

The user is responsible for ensuring that all maintenance, inspection and installation work is carried out by authorized, adequately qualified staff who are thoroughly familiar with this instruction manual.

Any work on a valve may only be performed when the valve is un-pressurized and has cooled down to 60 °C.

Any work on actuated valves may only be done after that the actuator has been disconnected from its energy supply.

The procedure described in the operating instructions to shut down the actuator must be observed. Valves in contact with hazardous media must be decontaminated. Immediately following completion of the work, all safety relevant and protective devices must be reinstalled and/or re-enabled.

Prior to recommissioning, refer to the points listed under section 7 Commissioning.

3.6.2. End of line installation

Use as end of line and downstream dismantling at ambient temperature of standard range.

End of line and downstream dismantling not authorized for bodies type 1 (annular shape).

NB: A valve fitted at the end of a pipe with a blind flange downstream is not to be considered as an end of pipe service.

Valves	Gaz or liquids *		Liquids	
	Hazardous	Non hazardous	Hazardous	Non hazardous
KE Plastomer silicon backup liner (liner FS)	All sizes: not authorized	All sizes: not authorized	All sizes: not authorized	All sizes: $\Delta PS = 7$ bar max.
KE Plastomer viton backup liner (liner FV)	All sizes: not authorized	All sizes: not authorized	All sizes: not authorized	All sizes: not authorized
KE Elastomer liners XA, XC, XV, K, Y VC, CB	All sizes: not authorized	All sizes: not authorized	All sizes: not authorized	All sizes: $\Delta PS = 7$ bar max.
KE Elastomer liners CC, SK, NB	All sizes: not authorized	All sizes: not authorized	All sizes: not authorized	All sizes: $\Delta PS = 4.5$ bar max.

ΔPS : Differential pressure

* Liquids whose vapour pressure at the maximum allowable temperature is greater than 0.5 bar above normal atmospheric pressure (1013 mbar)

3.7. Unauthorized Modification and Manufacturing of Spare Parts

The equipment shall not be altered or modified in any way prior to consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer will ensure operational safety. The manufacturer cannot be held responsible for damage resulting from the use of non-genuine parts or accessories.

3.8. Inadmissible Modes of Operation

Operational safety and reliability of the valve supplied is only warranted for its designated use as defined in section 2 "General" of the operating instructions.

The limits stated in the technical documentation must not be exceeded under any circumstances.

4. Transport and Interim Storage

4.1. Transport

The valves in the as-supplied condition are ready for operation.

ATTENTION For transport and storage, the valves must always be maintained in the semi-closed position and be packed in cardboard, crate or case with suitable protection (dessicant, thermowelded barrier).

ATTENTION To prevent damage, do not hang the valve by its handle or actuator. After delivery or prior to installation, the valve should be checked for damage during transit.

4.2. Interim Storage

The valves must be stored in such a way that correct operation is assured even after prolonged storage.

This comprises:

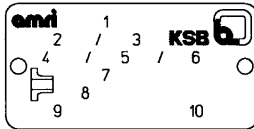
- Storing at 5 ° from the closed position
- Suitable measures against contamination, frost and corrosion (e.g. by using thermowelded plastic bags with dessicant, protection caps and plugs onto threaded holes).

5. Description of valves

The sectional drawings shown hereafter are examples for the general design of our valves. For drawings and other information pertaining to a specific valve series, please refer to the relevant type leaflets.

5.1 Marking

The valves are marked to PED 2014/68/EU.



Marking of the identity plate



Example

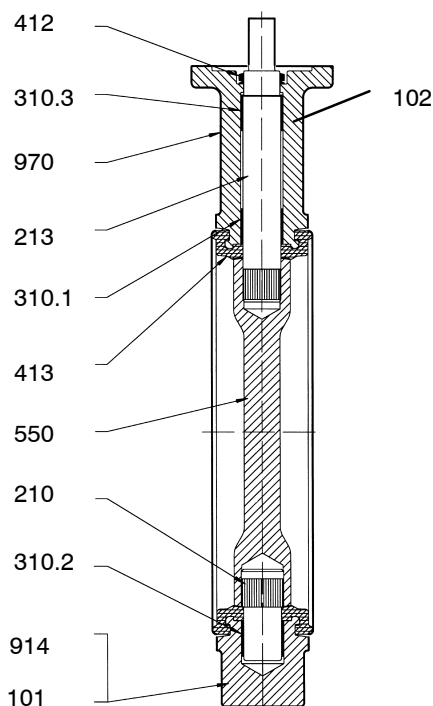
- 1 - Valve type model
- 2 - Internal material code
- 3 - Valve PN /Class designation
- 4 - Maximum allowable pressure
- 5 - Maximum allowable pressure at end of line or for downstream dismantling
- 6 - Maximum allowable temperature
- 7 - Pipe flange drilling pattern (if known)
- 8 - Month and year of production
- 9 - Equipment serial number
- 10 - CE marking with notified body identification number

PS	Size						
	40	50	65	80	100	125	150
10							

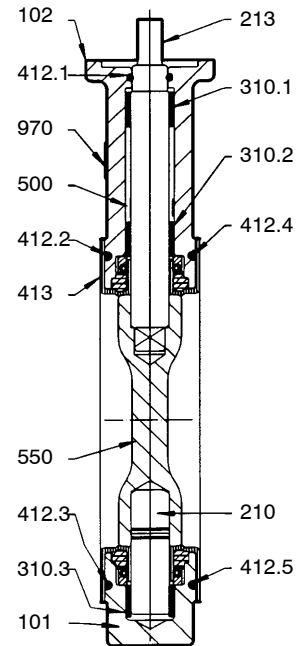
Valves for hazardous liquids and gaz (group 1) according to table 6 of annex II (PED)

5.2 Drawings and documents

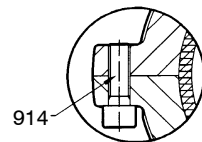
Type	Size (mm)	PS (bar)	Leaflet no.
KE Elastomer	40 - 300	10	0167



Type	Size (mm)	PS (bar)	Leaflet no.
KE Plastomer	40 - 600	10	0166

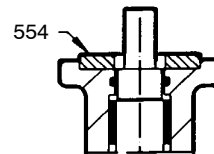


halves body

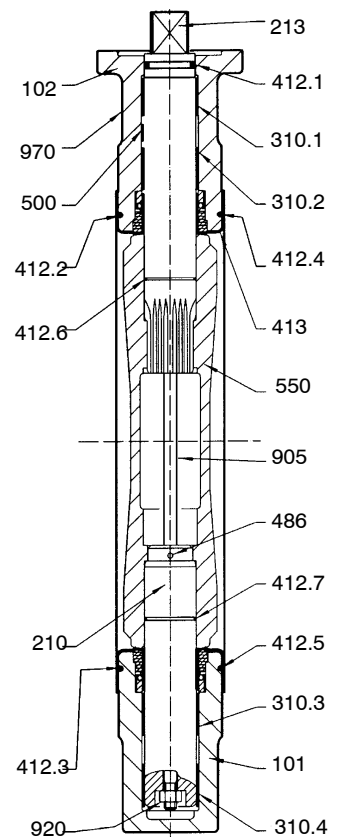
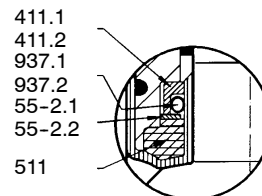


01/02

NAMUR centering



Safety tightness



5.3. List of Components

Part No	Name of parts
101	Lower half-body
102	Upper half-body
210	Lower shaft
213	Operating shaft
310.*	Plain bearing
411.*	Safety sealing casing
412.1	O-ring
412.*	Flange face O-Ring
413	Liner
486	Ball
500	Anti-static ring
511	Back-up
55-2.*	Friction washer
550	One-piece shaft/disc or disc
554	Namur centring plate
905	Tie rod
914	Body bolt
920.*	Nut
937.*	Metallic spring with contiguous spirals
940.*	Key (only size 600)
970	Identity plate
*	Repetitive part

5.4. Functioning principle

Description

The valve consists mainly of a body in two parts (101/102), assembled by screws (914), a one piece disc shaft (550) or disc (550) and shaft (210) - (213) assembled and rubber liner (413) or PFA-Teflon® liner (413).

The liner is an in-house designed formulated and manufactured part.

Anti blow-out device: Every valve is fitted with an anti blow-out device which prevents the shaft to burst off the body in case of shaft failure.

Operation: The valves are quarter-turn operated manually by handles or gear box or hydraulic, pneumatic and electric actuators bolted on the valve top plate (as per ISO 5211 standard).

6. Installation

6.1. General

ATTENTION To avoid leakage, deformation or rupture of the body, the piping should be laid out in such a way that no thrust or bending forces act on the valve bodies (101/102) when they are installed and operational.

ATTENTION For KE Plastomer, the sealing faces of the flanges must be clean and undamaged ($Ra \leq 6.3\mu m$).

For KE Elastomer, the sealing faces of the flanges must be clean and undamaged ($Ra \leq 25\mu m$).



It is prohibited to add any additional gasket (except electric insulation gasket, please consult us) between body and piping flanges. To insert the valve between flanges, pull apart the two pipes flanges to obtain sufficient clearance between flange face and valve seat cheeks. All holes provided in the flanges must be used for the flange connection.



If construction work is still in progress, non-mounted valves must be protected against dust, sand and building material etc. (cover with suitable means).

Do not use valve handles and gear handwheels as footholds!



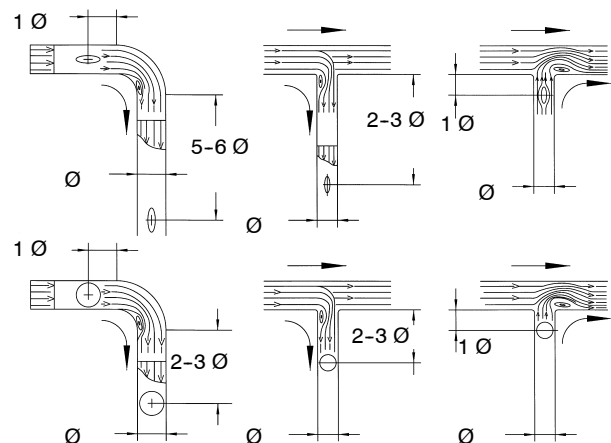
Valves and pipes used for high ($> 60\text{ }^\circ\text{C}$) or low ($< 0\text{ }^\circ\text{C}$) temperatures must either be fitted with a protective insulation, or there must be warning signs fitted showing that it is dangerous to touch these valves.



If a valve is used as end-valve in a pipe, this valve should be protected against unauthorized or unintentional opening to prevent personal injury or damage to property.

6.2. Installation conditions

6.2.1. Recommended minimum distances between the position of the valve and of the T-piece or elbow.

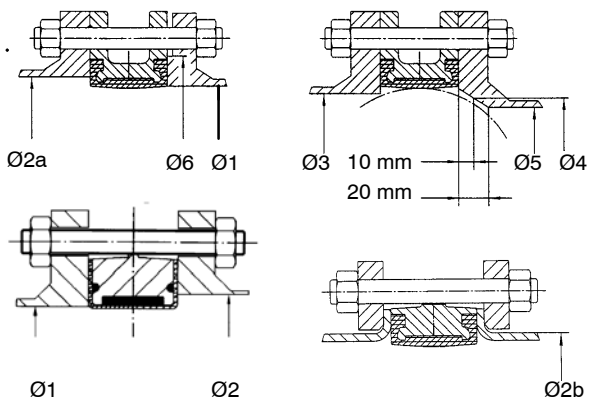


Also valid for valve placed at pump discharge

6.2.2. Flanging dimensions

Connection to the piping.

Piping flanges must match the following dimensions.



- Ø2 / Ø2a: max. allowable diameter on flange face
- Ø2b: external diameter of the pipe when fitting loose plate flange with lapped pipe end
- Ø3: allowed minimum diameter on flange face.
- Ø4: minimum diameter at 10mm from the flange face
- Ø5: minimum diameter at 20mm from the flange face
- Ø6: allowed minimum diameter of raised face

KE Plastomer

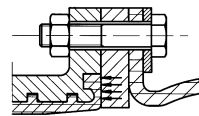
Size	NPS	ø1	ø2	ø3	ø4	ø5	ø6
40	1 1/2	40	55	27			71
50	2	53	68	38			84
65	2 1/2	65	82	51			98
80	3	79	97	69	50		113
100	4	98	117	90	74	43	133
125	5	125	143	116	104	85	162
150	6	148	171	145	136	122	192
200	8	197	223	196	189	179	244
250	10	249	277	247	241	233	298
300	12	298	329	293	288	280	350
350	14	348	372	344	337	329	412
400	16	398	423	396	390	383	462
450	18	447	474	442	434	427	522
500	20	497	524	494	487	480	572
600	24	579	624	570	565	558	682

KE Elastomer

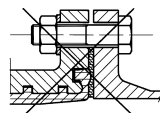
Size	NPS	ø1	ø2a	ø2b	ø3	ø4	ø5	ø6
40	1 1/2	41	50	49	33			73
50	2	51	63	61	38			89
65	2 1/2	66	78	77	55			104
80	3	81	92	89	74	53		124
100	4	101	117	115	92	77	48	147
125	5	126	145	140	117	107	88	177
150	6	151	172	169	143	137	123	202
200	8	201	223	220	191	183	173	251
250	10	251	278	273	241	234	226	305
300	12	302	329	324	290	284	276	358

6.2.3. Interface between valve and pipe flanges

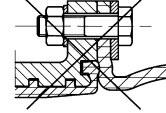
Correct fitting



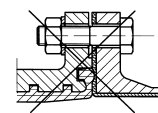
Metallic intermediate insertion flange



no gasket



no direct contact with the expansion joint



no rubber coated flange

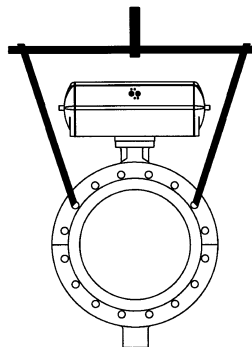
In case of coated pipe (hard rubber or Teflon for example), coating hardness and flanges detailed dimensions shall be given to KSB for acceptance.

6.3 Handling

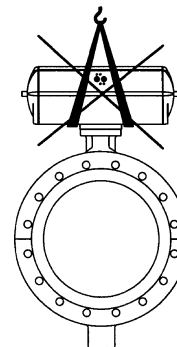
Handling means may be necessary to install large sizes valves. They must be used as shown.

VALVE WITH MOTORIZATION

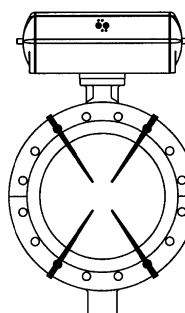
CORRECT



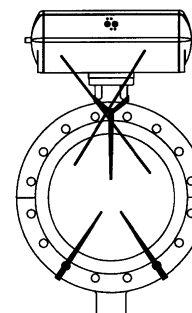
FORBIDDEN



CORRECT



FORBIDDEN



6.4. Recommendations for installation

Before assembly

- Verify that pipeline flanges are free from metallic chips and weld
- Verify that pipeline flanges are located on the same centreline and are parallel.
- Verify that inside diameter of pipeline flange is in accordance with the minimum and maximum diameters given by the manufacturer.
- Verify that nothing hinders the complete moving of the disc during opening or closing, in particular at the internal weld seams or at the pipe ends.
- Pull apart the pipeline flanges to allow valve insertion without damaging the elastomer liner of the valve.

During assembly

- Place the disc as spaced apart as possible from the closing position, but without that disc protrudes past the valve's body.
- Insert valve between pipeflanges and center using several tie-rods.

KE Elastomer

- Screw up progressively the nuts until metal to metal contact is achieved between the vave body and pipeline flanges, by making sure the good centering of the body compared with the flange is maintained.

KE Plastomer

- Screw up progressively the nuts to a maximum torque as follows by making sure the good centering of the body compared with the flange is maintained.

Size	NPS	Torque (FtLBS)			Torque (mdaN)		
		PN10	PN16	PN20	PN10	PN16	PN20
40	1 1/2	18.8	18.8	22.5	2.5	2.5	3
50	2	22.5	22.5	29.5	3	3	4
65	2 1/2	29.5	29.5	37	4	4	5
80	3	22.5	22.5	44.5	3	3	6
100	4	29.5	29.5	37	4	4	5
125	5	44.5	44.5	51.5	6	6	7
150	6	74	74	74	10	10	10
200	8	96	88.5	96	13	12	13
250	10	103	125.5	125.5	14	17	17
300	12	125.5	147.5	147.5	17	20	20
350	14	88.5	110.5	162.5	12	15	22
400	16	125.5	147.5	147.5	17	20	20
450	18	140	162.5	206.5	19	22	28
500	20	162.5	199.5	199.5	22	27	27
600	24	225	263	263	30	35	35

- Operate the valve several times to ensure no valve disc obstruction.

6.5. Actuated valves



Electrical cables may only be connected by qualified personnel.



The applicable electrical regulations (e.g. IEC and national standards), also for equipment in hazardous locations, must be observed. All electrical equipment such as actuator, switchboard, magnetic valve drive, limit switch etc. must be installed in floodproof dry locations. Voltage and frequency must match the valves stated on the identity plate.

7. Commissioning/Decommissioning

7.1. Commissioning

7.1.1 General

Prior to commissioning the valve, the pressure, temperature and material data stated on the valve should be compared to the actual operating conditions in the piping system to check whether the valve can withstand the loads occurring in the system.



Possible pressure surges (water hammer) must not be exceed the highest admissible pressure. Adequate precautions should be taken. In new pipe systems and especially after repair work, the system should be flushed with the valves fully open to remove solids, e.g. weld beads, which may damage the liners.

7.1.2. Operation

The position of the disc is indicated by the pointer of the actuator or by handle lever. The valves are closed by turning in the clockwise direction (top view) and opened in the counterclockwise direction.

7.1.3. Functional Check

The following functions should be checked: Before commissioning, the shut-off function of the valves should be checked by repeated opening and closing.

7.1.4. Actuated valves

Adjustable end stops and torque limiter are pre-adjusted in factory. The customer may have to complete the adjustment on site during the commissioning, if necessary.

7.2. Decommissioning

During extended shutdown periods, liquids liable to change their condition due to polymerization, crystallization, solidification etc. must be drained from the piping system. If necessary, the piping system should be flushed with the valves fully open.

8. Maintenance/Repair

8.1. Safety Instructions

Maintenance and repair work may only be carried out by skilled and qualified personnel.

For all maintenance and repair work, the safety instructions listed below and also the general notes in section 2 must be observed. Always use suitable spare parts and tools, even in case of emergency, otherwise correct operation of the valves cannot be assured.

8.2. Valve removal from piping and actuator disconnecting

Identify the valve by identity plate.



Please check what is the relevant spare kit. Place the disc at 10 ° opening.



The entire valve must be unpressurized and must have cooled down sufficiently so that the temperature of the medium is lower than 60° C, to prevent scalding.



Opening pressurized valves will cause danger to life and limb. If toxic or highly inflammable substances or liquids whose residues may cause corrosion by interaction with the air humidity were handled by the valve, then the valve should be drained and flushed or vented. If necessary, wear safety clothing and a face guard/mask. Depending on the installation position, any liquid remaining in the valve may have to be removed.

Prior to possible transport, the valves must be flushed and drained carefully. If you have any questions please contact your KSB Sales Office.



If actuators powered by an external source of energy (electric, pneumatic, hydraulic) need to be removed from the valves or dismantled, the energy supply must be shut down prior to starting any repair work.

Remove the valve from the piping with its actuator. Do not damage the liner during removal the valve from the pipe. Therefore, pull apart the pipe flanges to allow sufficient clearance.

Identify the mounting position of the actuator

Disconnect the actuator and take care of all bolting parts.

8.3. Spares, list of tools, Consummables

8.3.1 Spares

Use the relevant spare parts included in the liner kit or disc kit or shaft kit. Please refer to leaflets.

All constitutive parts of kits must be replaced.



During the mounting /dismantling of the valve, the order of operations given in § 8.4.1 must be respected to prevent injuries and material damages.

During the tests, while closing and opening valves, care must be taken that no operator interferes with the disc travel.

8.3.2. List of tools for mounting/dismantling

Pneumatic screwing machine, open ended spanner, ring spanner, box spanner, screwdrivers, hammer, pneumatic polisher, wedges, crow bar and silicon grease.

8.3.3. Consummables

Use only the silicon grease enclosed in the kit (Molykote type 111). The use of mechanical grease is strictly prohibited.

8.4. Valve disassembly and re-assembly

8.4.1. Valve disassembly

Remove the screws (914) and disassemble the 2 halves bodies.

KE Plastomer:

Remove the safety sealing casing (411), the metallic spring (937), the friction washer (55-2) and the back-up (511).

To remove the teflon liner (413), put the disc in an oven at 150 °C during 15 minutes, bend the liner out of shape and remove it from the disc starting with the shortest shaft side.



Handle the Teflon liner with gloves to prevent operator skin injury by burning.

KE Elastomer:

To remove the elastomer liner (413), bend it out of shape and remove it from the disc starting with the shortest shaft side.

KE Plastomer sizes 350 to 600 with stainless steel disc

To disassembly disc and shaft, remove the nut (920) and pull the shafts 210 / 213) out of the disc.



Take care to prevent disc edge, liner and paint from any damage.

8.4.2. Valve re-assembly

Change all O-rings 412 using silicone grease

KE Plastomer:

Put grease on the disc (550) edge and at the shaft passages.

Put the Teflon liner in an oven at 150 °C during 15 minutes minimum.

Slide the drive shaft through one of the 2 liner holes, bend the liner out of shape and slide the shortest shaft through the second hole.



Handle the Teflon liner with gloves to prevent operator skin injury by burning.

Mount the back-up (511) around the liner, the friction washer (55-2), the metallic spring (937) and the safety sealing casing (411)

KE Elastomer:

Put grease onto the liner at shaft passages. Slide the drive shaft through one of the 2 liner holes, bend the liner out of shape and slide the shortest shaft through the second hole.

Assemble the 2 halves bodies around the disc in opening position with the screws (914).

KE Plastomer Sizes 350 to 600 mm with stainless steel disc

Change O-rings (412) of shafts (210/213) using silicon grease.

Mount the shaft (210) with the ball (486).

Mount the driving shaft (213) with keys (940) if any. Check the correct indexation with the disc edge (550).

Screw the nut (920).

Assemble the 2 halves body around the disc in open position with the screws (914).



Take care to prevent liner damage during the assembly.

8.5. Test and re-installation

Reassemble the actuator (check the N or M position)

Place the disc as spaced apart as possible from the closing position

Pull apart the pipeline flanges to allow valve insertion without damaging the liner of the valve.

Connect the power supply if necessary.

Check that the valve can be fully operated by the actuator.

Connect the valve to the pipe and refer to § 6.4 for installation .

9. Trouble shooting

9.1. General

All repair and service work must be carried out by qualified personnel using suitable tools and genuine spare parts.

The previous safety instructions must be observed.

9.2. Faults & Remedies

Downstream/Upstream leakage	
Shaft leakage	
Flange leakage	
Over torque	
No opening	
No closing	
Hard point	
Vibration / Fluttering	
Foreign particles in the valve	Actuator on safe position - Open the valve, line without fluid or flow, remove the particle - inspect liner/disc - replace liner/disc
Broken body	Defect due to water hammer Search for the reasons. Replace / Repair the valve
Broken or warped disc	Defect due to water hammer Search the reasons. Replace / Repair the valve
Damaged disc, corroded disc	Disc : check flanging dimensions and replace using the disc kit
Broken shaft, twisted shaft	Analyse the defect / research of causes / replace shaft
Worn out liner	Replacement liner (liner kit)
Receding liner, damaged liner	If the liner is undamaged : separate the pipe flanges / remove valve / put it back between the pipe flanges / check operations.
Wrong flanging	Check type and flange bolting torque
Wrong flanging size	Follow instructions given in operating instructions
Wrong face to face, non parallel flanges	Flanging has to be modified in accordance with KSB technical leaflet requirements.
Flow conditions Wrong operating conditions	Check the technical offer versus service conditions
Damaged actuator	Check sizing versus operating conditions (please, consult KSB)



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