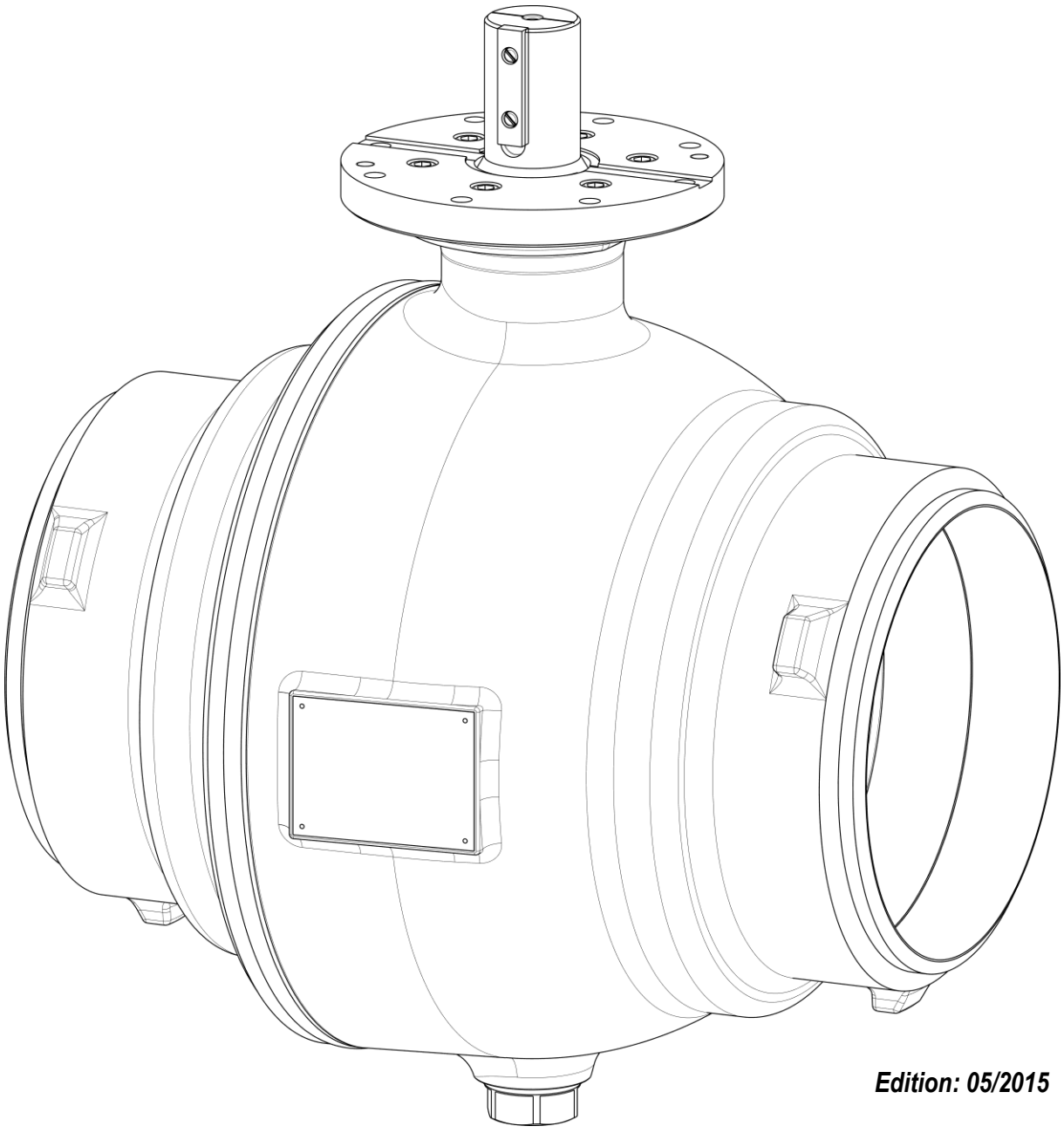
Mounting and operating instructions for

KLINGER

Ballostar KHSVI-VVS ball valves
standard and high temperature
fully welded design DN 150 - 800



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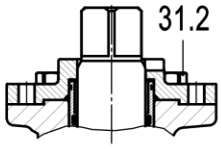
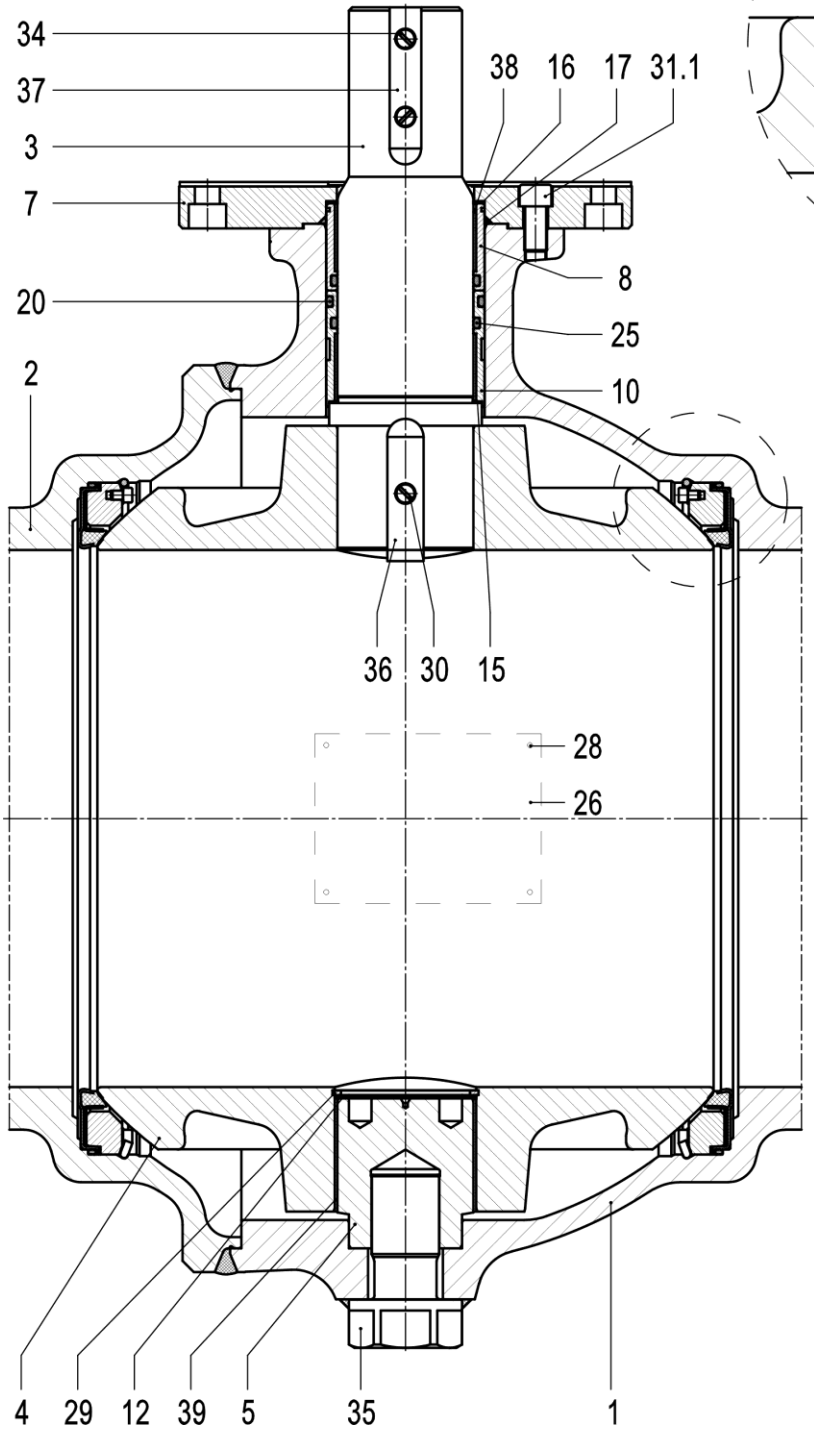
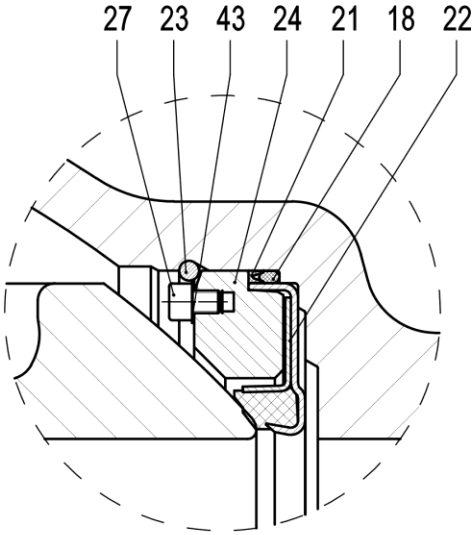
Contents

DN 150-200



DN 250-800





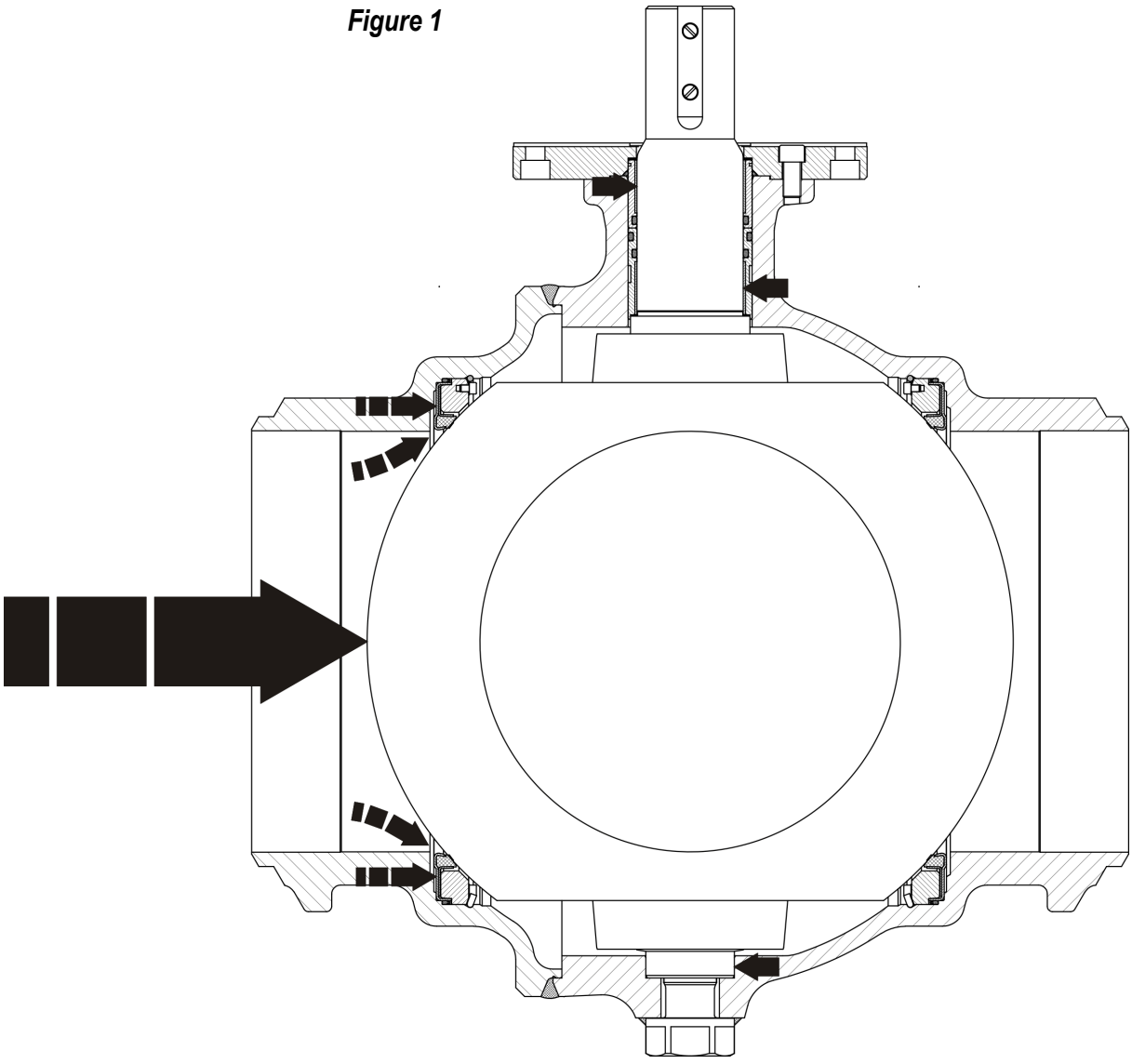
1 body
2 connection piece
3 operating stem
4 ball
5 bearing journal
7 flange
8 bush insert - UP
10 bush insert - LP
12 disk
15 gasket
16 gasket
17 O-ring
18 O-ring
20 O-ring
21 U-sleeve
22 sealing element
23 wire ring
24 back-up ring
25 O-ring
26 rating plate
27 cylinder head screw
28 grooved drive stud
29 circlip
30 filister head screw
31.1 cylinder head screw
31.2 hexagon head screw
34 filister head screw
35 hexagon head screw
36 feather key
37 feather key
38 bearing bush
39 bearing bush
43 serrated lock washer

FUNCTIONAL PRINCIPLE

The ball valve guarantees tightness under exposure both high and low pressures through its "ELASTIC SEALING SYSTEM". This tightness is achieved with two elastic sealing elements which work independently. The required application forces are generated first by applying an initial stress during the assembly, and second by the differential pressure arising in the valve fitting (Figure 1).

Comprised of the shut-off cross section multiplied by the pending differential pressure, the forces coming about on the shut-off ball valve are not conveyed to the sealing rings, but directly to the ball bearings which were installed for this purpose. As a result, the bearing and sealing functions are separated by design. This keeps the torque required for swivelling the shut–off fitting low. The closing behaviour of these ball valves with balls running on bearings gives them a long service life.

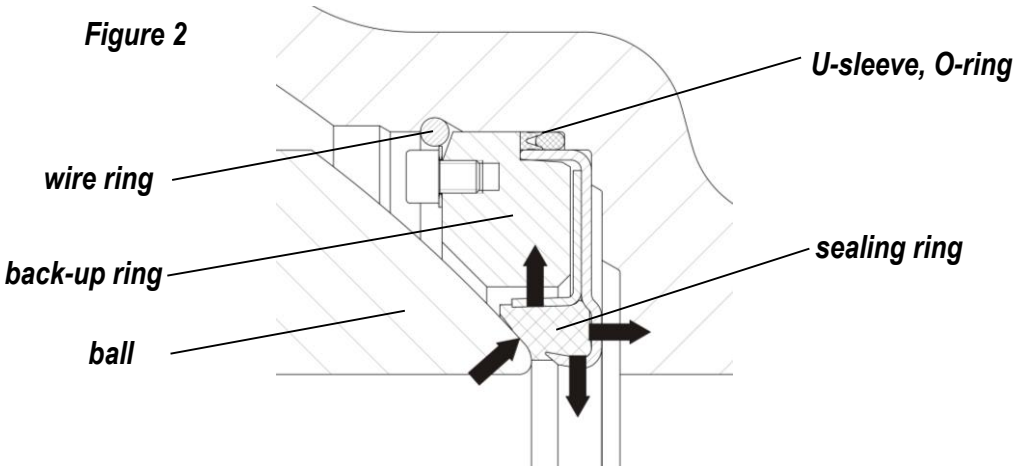
Figure 1



MODE OF OPERATING

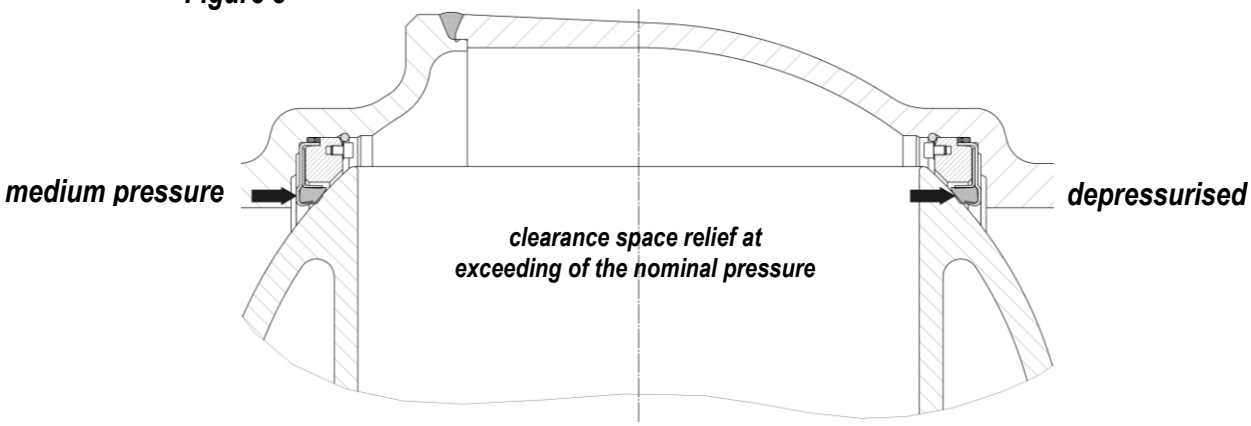
During the assembly of the body and connection piece, the sealing system is elastically at the ball. The two prestressed elastic sealing elements made of stainless steel in conjunction with the sealing rings and a seal at the periphery of the outer diaphragm form a system, including the ball, for the inlet and outlet side of the ball valve. A back-up ring protects the elastic sealing elements against excess stress, while a wire ring acts to hold the sealing unit in place (Figure 2).

Figure 2



As a result of the elasticity, two primary sealing points are always present of the valve opening up to a certain pressure. The differential surface areas on the sealing elements cause the pressure of the medium to press the sealing ring against the ball surface on the inlet side of the ball valve. The sealing element arranged on the side not exposed to the pressure or outlet side is lifted by the ball surface when the clearance space between the sealing ring is exposed to a pressure exceeding the nominal pressure.

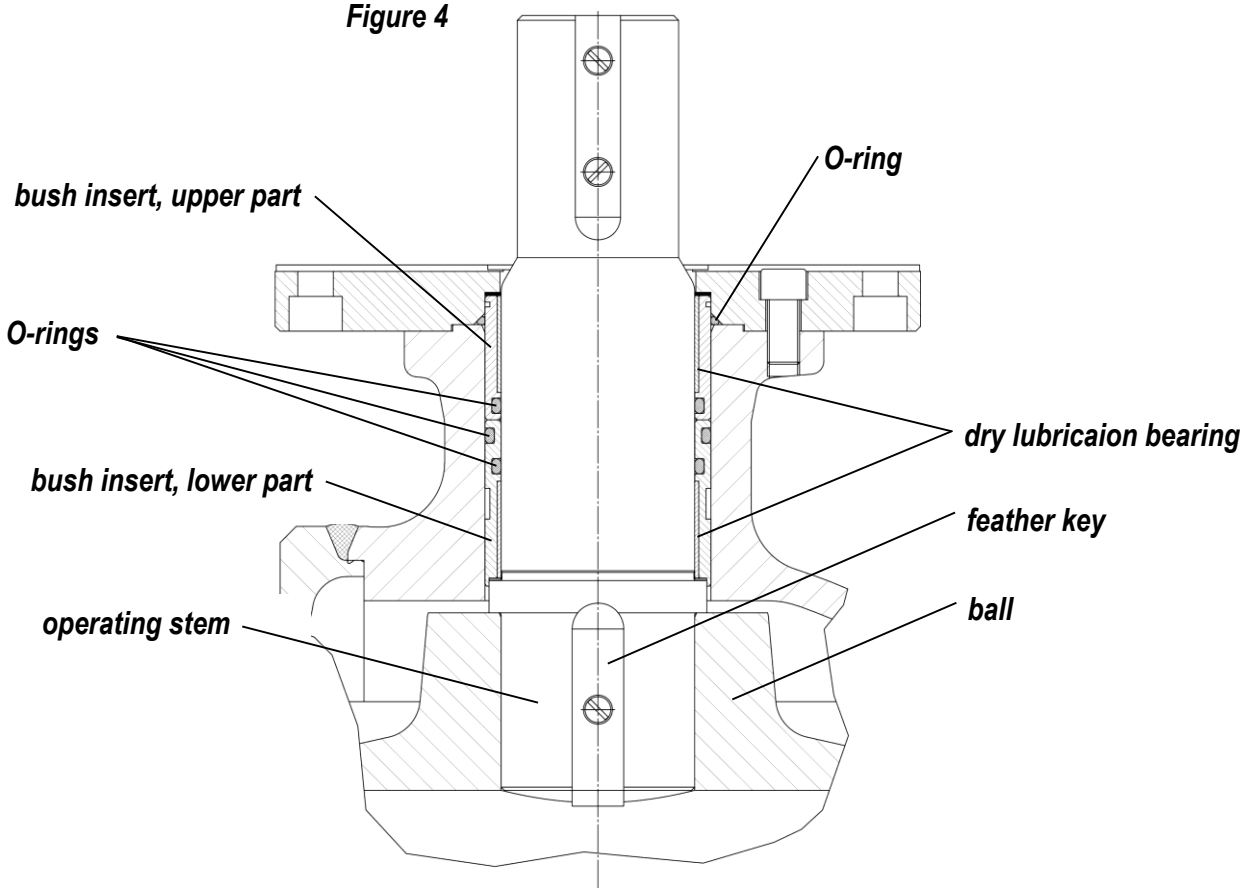
Figure 3



The ball valve may be pressurised in both directions of flow.
Heat expansions are compensated by the elasticity of the sealing elements.

The operating stem is used to switch the ball. The shaft-hub connection is established with feather keys. The seal to the outside is brought about with O-rings arranged in series. These O-rings are placed in a bush insert for easier replace ability. The arising forces are absorbed by two dry lubrication bearings.

Figure 4



All sealings and bearing zones are MAINTENANCE FREE

OPERATING INSTRUCTIONS

Ballostar ball valves are delivered in the OPEN setting. The connections are covered to safeguard against contamination and damage. We recommend that these plugs only be removed shortly before installing the valve.
The ball valves are to be stored in closed areas with non-aggressive atmosphere and protected against moisture and contamination. Furthermore, it must be ensured that the valve is not used for higher temperatures and pressures than intended. Only under these conditions can a warranty be extended for the indicated time.
Parts subjected to corrosion, erosion, etc. during operations or to natural wear are excluded.

Please bear in mind the general hazard notes of Klinger valves (see document wT2792.11....)

Ball valves are MAINTENANCE FREE!

During prolonged standstills, the valve must be emptied for freezing media, while pressure relief must be provided for expanding media.
In the event of leaks to the outside, the torques of the screws have to be checked at the appropriate locations according to ***Tab.1****.*

To increase the live time in service with low quantity of operations, Klinger suggest to operating the ball valve from time to time.
It is sufficiently to move the ball only some degree of an angle (to break free).

Tab.1: torques of the screws (Pos.31)

nominal width	*dimension*	*torque (Nm)*
		VII, VIII
150	*M 12*	*28*
200	*M 16*	*68*
250,300	*M 16*	*220*
350,400	*M 20*	*428*
500,600	*M 20*	*428*
700,800	*M 30*	*1478*

For explanation to material code see page 14

INSTALLATION INSTRUCTIONS

The ball valves are delivered in the OPEN setting with a sealed valve opening.

INSTALLATION:

Ballostar ball valves may be installed in any desired position. They should be in OPEN setting during the installation to prevent damage to the ball surface. The cover discs are only to be removed just prior to installation.

Pulleys appropriate for the weight and the eyebolts located on the valve are used for manipulation purposes. See Klinger catalogue for standard ball valve weights.

Follow the attached welding instructions during installations for ball valves with welded ends.

The temperature while preheating and welding should not exceed 200° C at a distance of 115 mm from the weld up to DN350 and at a distance of 170 mm starting at DN 400.

Take care of welding quality-requirements according to the welding manual.
We can only guarantee the tightness of our ball valves if they are skilfully welded.

COMMISSIONING

- *After installation and before commissioning, make sure that solid parts, not constituting part of the medium are removed from the pipeline.*
- *Functional test*
- *Pressure test*
- *By putting a valve into service within a steam application it is necessary to pay attention to a proper condensate draining. Neglecting this advice can cause a burst of the valve.*

We remind you that damage caused by parts strange to the medium are not covered under our warranty.

SAFETY INSTRUCTIONS

In general the using of these valves is without any risks. For this it is necessary to act with enough care.

- *For the the respective application of the valves please take care of the* ***Safety Directions*** *for pressure/temperature limits and the selection of materials in the relevant product catalogue*

- ***The mounting and installation can be done ONLY when the pipe is completely empty and pressure released.***

- *It is forbidden to loose screws while the valve is under pressure (media). It is permitted only to loosen screws of hand wheels or levers*

- *Do not untighten any screws on pressure tightening parts, unless advised and described in the Assembly Instructions and Handling Regulations*

- *The Assembling as well as handling should be done only by qualified people*

- *Please do make sure that all connecting pieces are well tightened again, if you had to untighten them before*

- *Do not open any screws with violence*

- ***ATTENTION*** *– when opening and closing drain cocks (optional) – DANGER caused by leakage of Medium. If the valve is used in superheated water, the drain cock may only opened if an appropriate backpressure is in the drainpipe or the temperature of the medium is lower than 100°C (prevention of steam hammer in the dead camber)*

- ***ATTENTION*** *– take care with movable parts: specially with electric/pneumatic actuators RISK OF INJURY!*

- *ATEX:*

  In the case of valves for the use in accordance with the ATEX directive 94/9/EC the allocation to the corresponding temperature class is determined by the temperature of the flowing medium.

  ⟨Ex⟩ II 2 DG c TX

  The product specific temperature classes are mentioned in the document „Categorization and labelling of KLINGER valves“.

  The user is responsible for the correct selection of the temperature class.

This Assembly Instructions and Handling Regulations have to be passed over to the people working with these valves.

- ***ATTENTION**: as per dismantling the actuator and before the connecting screws are to be unscrewed, the actuator has to be secured in his mounting position against distortion.*

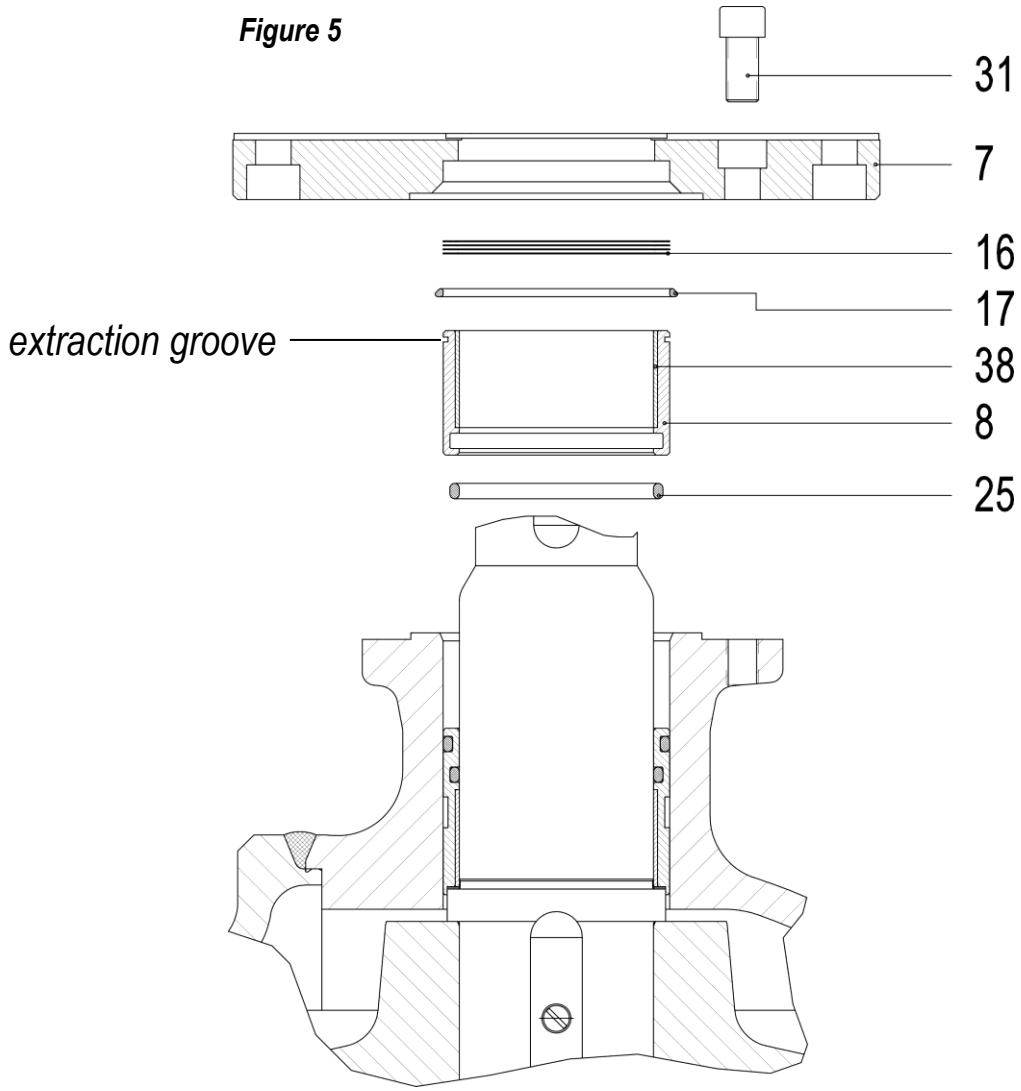
SPARE PART ASSEMBLY

***SEAL REPLACEMENT** on the operating stem with the valve fitting installed*

Bush insert – upper part Pos.8:

- *Depressurise the line*
- *Switch valve fitting to OPEN setting*
- *Dismantle cock handle or drive unit*
- *Loosen mounting flange bolts (Pos. 31) and take off flange (Pos. 7) with sealing ring (Pos. 17) over the shaft end*
- *Remove cushion joints (Pos. 16). The same number of identical cushion joints must be installed again during assembly*
- *Pull bush inserts, upper part (Pos. 8) out of body by using extraction groove*
- *Replace seals (Pos. 25,17) according to spare parts list. Clean components thoroughly and lubricate with the corresponding grease to facilitate installation*
- *Check the bearing surface (Pos. 38). Replace the bearing if damage is present*
- *Rebuild in reverse order*

Figure 5

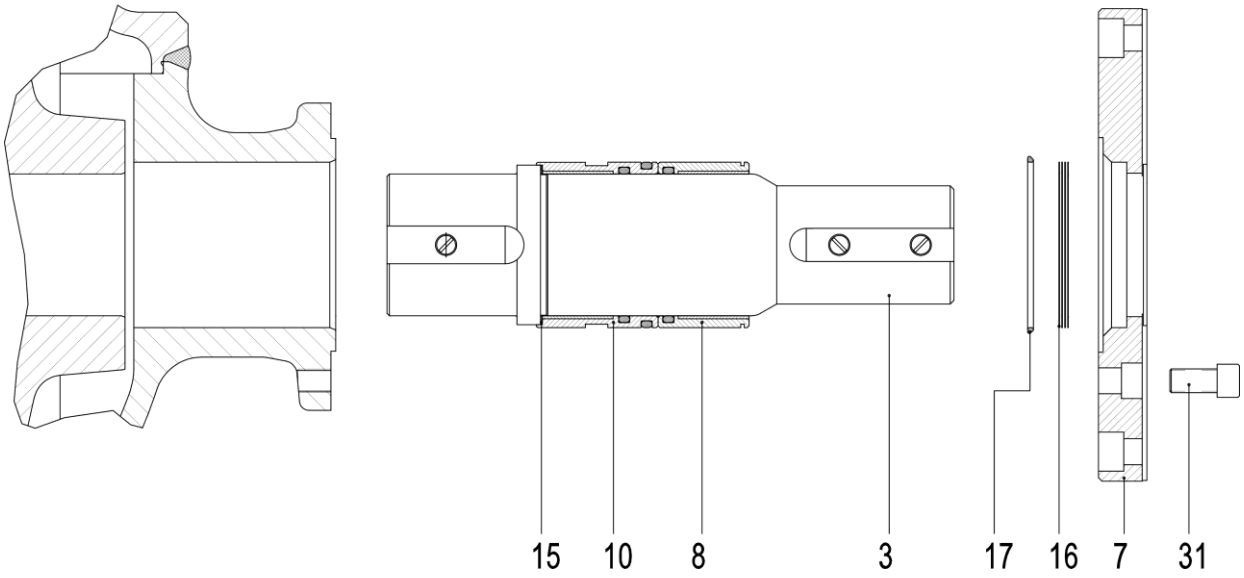


ASSEMBLY OF COMPONENTS

If the ball valve is dismantled of the pipeline, we also recommend to replace the spare parts of the bush insert- lower part. (Figure.6)

- *Dismantle consoles, etc.*
- *Unscrew mounting flange screws (Pos. 31) and take off flange (Pos. 7) with sealing ring (Pos. 17) over the shaft end. Remove cushion joints (Pos. 16).*

Figure 6



- *Pull the operating stem (Pos. 3) and bush inserts (Pos. 8,10) carefully out of the body along with sealing rings and bearing bushes*

ATTENTION: *All components particularly the seals and the sealing surfaces, are to be conscientiously checked before assembly, and replaced by new parts in the event of damage. Visible contamination on the machined locations must be cleaned. Cleaned components are to be provided with a uniformly thin layer of grease prior to installation.*

STANDARD lubrication chart:

O-rings: ***Silicon grease OKS 1110***
other parts: ***MOLYKOTE 55 M***

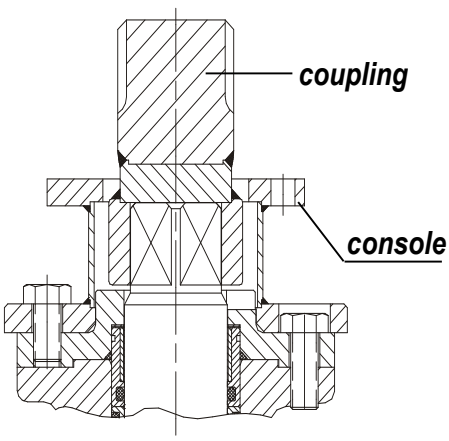
In special cases the lubricant prescribed while ordering must be used.
z.B.: *oxygen applications* ***Klüberalfa YV93-302***
sterile steam applications ***Klüberalfa YV91***

INSTALLATION INSTRUCTIONS FOR ACTUATOR ASSEMBLY

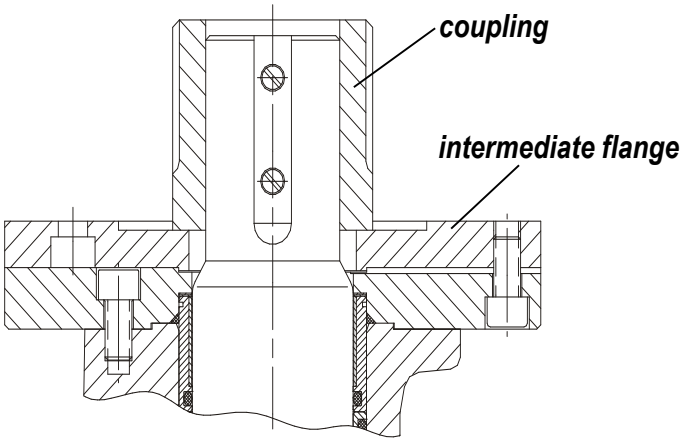
***Preparation**:*

The actuator must be designed with a torque corresponding to the nominal width. The valves are to be set following a technical consultation (pressure, sealing material, media, etc.) with the manufacturer. The connecting parts must be fabricated in accordance with the size of the actuator.

Figure 7



DN 125 – 200



DN 250 – 800

Actuator assembly work may also be done subsequently at any time without dismantling the valve fitting.

Standard mounting flange according to ISO 5211

ASSEMBLY

- *Switch ball valve to OPEN setting*
- *Place on coupling piece*
- *Fasten console on the ball valve (DN150, DN200) respectively mount the drive flange on the gear or actuator (DN250-DN800)*
- *Place on actuator in correct position and screw down. Pin together, if necessary.*
- *If an electrical actuator is used, take care to use limit switches instead of torque limit switches.*

***ATTENTION:** Turn valve fitting to right to close. Make sure that the 90° movement between its end settings ON and OFF is precisely maintained.*

- *Functional test*

MATERIAL CODES FOR KLINGER BALLOSTAR – BALL VALVES

Symbol	*body/connection piece*	*internal parts*	*colour of cock*
VII	*cast steel*	*non-ferrous metal parts possible*	*blue RAL 5015*
VIII	*cast steel*	***no*** *non-ferrous metal parts*	*blue RAL 5015*

Major item of the material code is the basic material of body and connecting piece

Used materials:

	DIN material number	*DIN token*	*EN token*
cast steel	*1.0619*	*GS-C25*	*GP240GH*

Testing of valves

KLINGER VALVES are tested according to EN12266-1. This test procedure comprises testing P10, P11 and P12. The test procedure for the strength of the shut-off device, so called P20, is not included in the standard testing procedure.

SPARE PART LIST

Ballostar – ball valve DN 150

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		45/54x1
16	3	cushion joint	K-Sil		46/58x0,3/0,5
17	1	O-ring	*)		56,75x3,53
20	1	O-ring	*)		47x5,33
25	2	O-ring	*)		equal to Pos.20
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	45/50x20

Ballostar – ball valve DN 200

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		60/70x1
16	3	cushion joint	K-Sil		61/75x0,3/0,5
17	1	O-ring	*)		72,62x3,53
20	1	O-ring	*)		59,7x5,33
25	2	O-ring	*)		equal to Pos.20
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	60/65x25

Ballostar – ball valve DN 250

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		70/80x1
16	3	cushion joint	K-Sil		71/85x0,3/0,5
17	1	O-ring	*)		82,14x3,53
20	1	O-ring	*)		69,2x5,33
25	2	O-ring	*)		equal to Pos.20
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	70/75x40

*) O-ring compound in according to the service conditions

SPARE PART LIST

Ballostar – ball valve DN 300

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		70/80x1
16	3	cushion joint	K-Sil		71/85x0,3/0,5
17	1	O-ring	*)		82,14x3,53
20	1	O-ring	*)		69,2x5,33
25	2	O-ring	*)		equal to Pos.20
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	70/75x40

Ballostar – ball valve DN 350

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		90/105x1
16	3	cushion joint	K-Sil		91/110x0,3/0,5
17	1	O-ring	*)		110,73x3,53
20	1	O-ring	*)		91,45x5,33
25	2	O-ring	*)		equal to Pos.20
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	90/95x48

Ballostar – ball valve DN 400

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		90/105x1
16	3	cushion joint	K-Sil		91/110x0,3/0,5
17	1	O-ring	*)		110,73x3,53
20	1	O-ring	*)		91,45x5,33
25	2	O-ring	*)		equal to Pos.20
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	90/95x48

**) O-ring compound in according to the service conditions*

In the interest of technical progress, designs and dimensions are subject of modification

SPARE PART LIST

Ballostar – ball valve DN 500

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		120/135x1,5
16	3	cushion joint	K-Sil		122/140x0,3/0,5
17	1	O-ring	*)		139,06x5,33
20	1	O-ring	*)		126,36x7,00
25	2	O-ring	*)		120,2x7
38	2	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	120/125x60

Ballostar – ball valve DN 600

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		120/135x1,5
16	3	cushion joint	K-Sil		122/140x0,3/0,5
17	1	O-ring	*)		139,06x5,33
20	1	O-ring	*)		126,36x7,00
25	2	O-ring	*)		120,2x7
38	1	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	120/125x60
	1	bearing bush			120/125x100

Ballostar – ball valve DN 700

Pos.	pc	part name	materials by mc		dimension
			VII	VIII	
15	1	cushion joint	KFC-25		150/180x2
16	3	cushion joint	K-Sil		151/190x0,3/0,5
17	1	O-ring	*)		189,87x5,33
20	1	O-ring	*)		177,16x7
25	2	O-ring	*)		151,76x7
38	3	bearing bush	St/Bz/Flon	AISI 316 L/PTFE 90	150/155x60

*) O-ring compound in according to the service conditions

In the interest of technical progress, designs and dimensions are subject of modification

SPARE PART LIST

Ballostar – ball valve DN 800

Pos.	*pc*	*part name*	*materials by mc*		*dimension*
			VII	*VIII*	
15	*1*	*cushion joint*	*KFC-25*		*150/180x2*
16	*3*	*cushion joint*	*K-Sil*		*151/190x0,3/0,5*
17	*1*	*O-ring*	****)***		*189,87x5,33*
20	*1*	*O-ring*	****)***		*177,16x7*
25	*2*	*O-ring*	****)***		*151,76x7*
38	*1*	*bearing bush*	*St/Bz/Flon*	*AISI 316 L/PTFE 90*	*150/155x60*
	2	*bearing bush*			150/155x80

****)*** *O-ring compound in according to the service conditions*