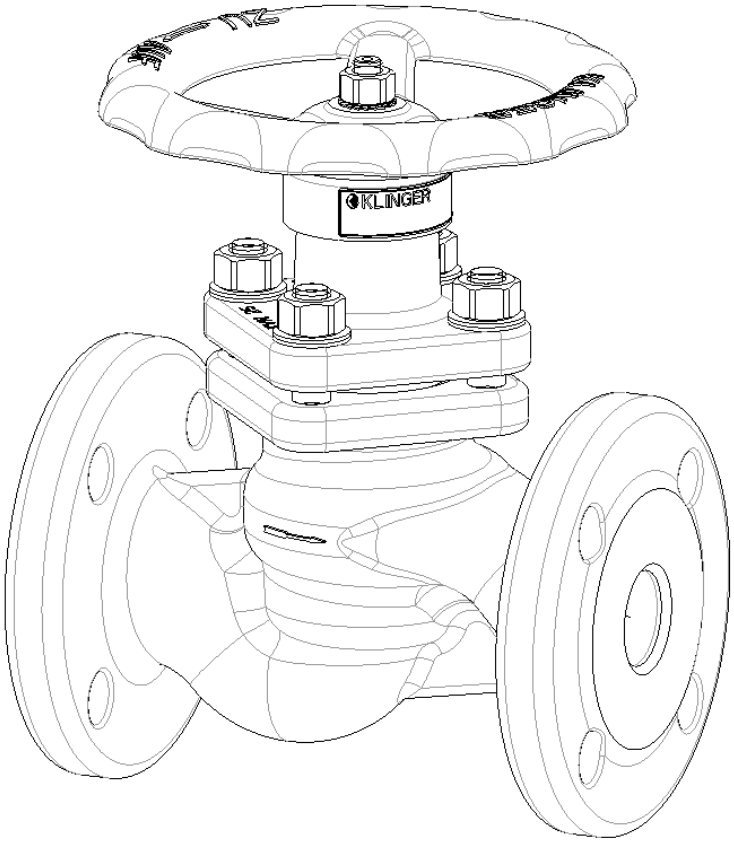
STANDARD OPERATION MANUAL FOR

KLINGER VALVES

PISTON VALVE KVN DN 15-50
PISTON VALVE KVN ANSI ½“-2“
REGULATING VALVE KVRKN DN 15-50



Issued: 09/2017
KLINGER Fluid Control GmbH
Am Kanal 8-10 » 2352 Gumpoldskirchen » Austria
office@klinger.kfc.at » www.klinger.kfc.at » Tel: +43 2252 600-0

Contents

1 Declaration of Conformity

DECLARATION OF CONFORMITY

according to Directive 2014/68/EU

We,

KLINGER Fluid Control GmbH
Am Kanal 8-10
A-2352 Gumpoldskirchen

declare, that the product range

KLINGER Piston Valve
Type: **KVN**
Size: **DN 32 - 200 und 1 1/4" bis 8"**
Connection: **Flange, welding ends, threads**

to which this declaration is refering to, is in compliance with the directive 2014/68/EU (PED) and the following standards:

EN 19, EN 1092-1/-2, EN 1561, EN 1563, EN 10213, EN 12266-1, EN 12516-1/-2 (except point 10), EN 13445-3 (only point 11), EN 16668 and AD 2000 (B0, W3/2)

and was subjected to the following conformity assessment procedure:

Modul H (full quality assurance)

The surveillance of the quality system and the design review is performed by:

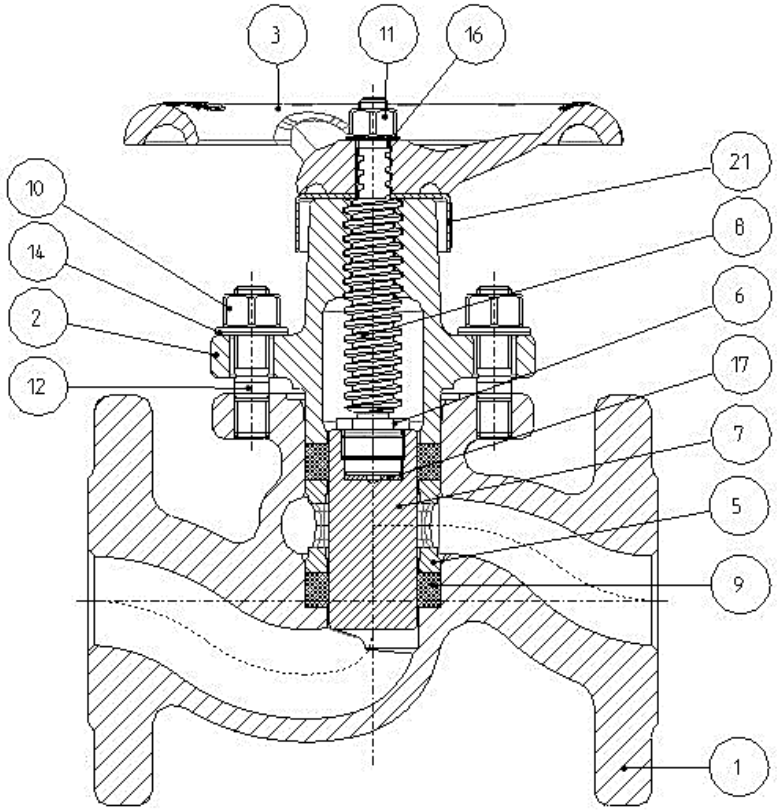
TÜV Süd Landesgesellschaft Österreich GmbH
Tiwagstraße 7
6200 Jenbach
(notified body No. 0531)

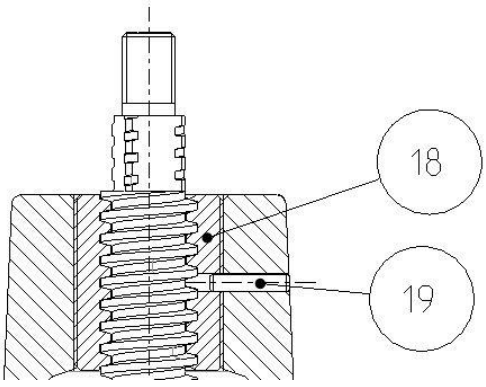
Gumpoldskirchen, 01.08.2017
(place and date of issue)

Manfred Stockinger
(managing director)

Rev: 08/2017

2 Individual Parts Designation





Pos. 18 and Pos. 19
(DN 40 and DN 50)

1 Body
2 Bonnet
3 Handwheel
5 Lantern bush
6 Split nut
7 Piston
8 Spindle
9 Valve ring KX-GT
10 Hex nut
11 Hex nut
12 Stud bolt
14 Belleville washer
16 Serrated lock washer
17 Disc
18 Threaded bush
19 Tension pin
21 Type Plate

3 Proper Use

This product is exclusively intended to shut off or convey media within the approved pressure and temperature limits after installation in a pipeline system. Please see the P/T diagram (pressure temperature diagram) for the permissible threshold values in accordance with the utilized materials. This operating manual must unconditionally be brought to the attention of the corresponding personnel!

Prior to installation and putting into service for the first time, please read the operating manual carefully and pay attention to the hazard and safety notes!

! CAUTION	**Non-compliance with the hazard and safety notes of this operating manual may result in the creation of hazards and loss of the manufacturer's warranty.** Please contact the manufacturer under +43 2252 600-0 for further details.

Subject to technical alterations and misprints!

4 Testing of KLINGER Valves

KLINGER Valves are pressure-tested in accordance with EN 12266-1. The pressure test comprises the tests P10, P11 and P12. Testing the resistance to pressure of the piston (P20) is not included in the standard package.

5 Labeling of the Valves

Each valve is provided with the following data listed either on the body or on a type plate.

	Designation	Comment
Manufacturer	KLINGER	Please see the operation manual for the address
Model	e.g. KVN	Manufacturer's type designation
Size	DN and numeric value	Numeric value in mm, e.g. DN 80 or in inch, e.g. 3"
PN / class	Numeric value for PN / class	Provides the max. permissible pressure at ambient temperature, e.g. PN 40
FA-No.	Numbers / letters	FA-No. serves identification purposes
Material	e.g. 1.0619 or VIII	In accordance with material codes
	CE	Market approval symbol

6 Safety Instructions

This operation manual must be brought to the attention of the operating personnel.

6.1 General Notes on Safety

The safety instructions for valves also apply to the pipeline systems, into which they are installed. This operating manual exclusively focuses on safety instructions, which are to be additionally complied with for valves.

6.2 Safety Instructions for Operators

! Danger to Life	A valve with a permissive pressure/temperature range that is **not** sufficient for the operating conditions may not be operated! This range is to be derived from the P/T diagram. With regard to materials, pressures or temperatures not listed there, contacting the manufacturer is mandatory. **Ignoring this regulation can result in life-threatening situations and can cause damage to the pipeline system.**
! Danger to Life	It must be ensured that materials selected for the parts coming into contact with the media are suitable for the utilized media. The manufacturer takes no responsibility for damages resulting from corrosion or through aggressive media. **Ignoring this regulation can result in life-threatening situations and can cause damage to the pipeline system.**

The following items do **not** lie in the scope of responsibility of the manufacturer. As a consequence, when utilizing the valve, it must be ensured that

- the valve is only utilized in accordance with its proper use, as illustrated under "Proper Use".
- the actuator unit, which is subsequently mounted on the valve, is adjusted to the valve and correctly adjusted in the end position.
- when connecting a valve actuator to the power grid, the safety notices of the actuator manufacturer are complied with.
- the valves are correctly implemented into the system, especially those connected to the pipeline system by means of welding.
- no additional tensions bear on the valves.
- the operation parameters and operating conditions have been clarified with the manufacturer of the valve and that operating conditions such as vibrations, water hammers, pressure surges, erosion etc. are to be avoided.
- pipeline system connections and valves, which are operated at operating temperatures > 50 °C or < -20 °C, are protected against contact.
- during welding procedures, the safety regulations of the plant operator and/or plant constructor are to be complied with.
- the valve is only operated and maintained by trained personnel.
- valves, which are utilized with hazardous media (inflammable, corrosive, harmful to health etc.), are to be handled in accordance with their dangers. The corresponding handling regulations are the responsibility of the plant operator.
- all ergonomic hazards are to be considered by the plant operator, such as e.g. accessibility, gauges etc.

- when applying internal pressure for the first time (pressure test, trial operation) a sufficient safety distance is to be maintained.
- it is prohibited to open screw connections (with the exception of those on hand levers and handwheels), when pressurized (medium).
- installation and removal of valves is only carried out with a depressurized and drained pipeline.
- all connections, following loosening, are again correctly tightened afterwards.
- no screws are loosened on pressure-retaining parts, unless described so in the operation manual.
- no screwed connections are forcibly opened.
- during longer shutdown periods, in the event of freezing media, the valve is drained and/or that depressurization is achieved in case of expanding media.

6.3 Hazard Warnings

Mechanical hazards:

- Beware of possible sharp or protruding parts posing risk of injury.
- Extra care is required during putting into operation: Do not reach into the bore opening during the valve closing process, as this poses a risk of injury.
- Be careful of falling parts during transportation, maintenance and putting into operation.
- When manipulating lifting appliances, the safety regulations for lifting appliances must be complied with.
- Unauthorized and improper handling can result in undesired and spontaneous pressure loss and can result in significant damage.
- With regard to valves featuring a mounting bracket it must be ensured that moving valve parts do not result in a risk of injury.

Electrical hazards:

- With regard to valves featuring electric actuators, the operating manual and the safety instructions of the actuator manufacturer must be complied with.

Thermal hazards:

- During operation, the surfaces of valves may feature high / low temperatures. Caution: Burn hazard.
- Caution: The hot surfaces can cause self-ignition of flammable materials through either contact or heat emission.

Hazard generated by noise:

- Depending on the application conditions, high levels of noise can be created by the cavitation processes, which bear the risk of hearing damage.
- Opening an internally pressurized valve can result in major noise exposure as a result of exiting media; hearing damage hazard.

Vibration hazard:

- Caution: Abrupt opening or closing of a valve can lead to undesired surges and vibrations in the pipe, which may possibly damage the valve or the pipeline system.

Electromagnetic radiation hazard:

» The hazards resulting from possibly created electromagnetic radiation are to be consulted in the operating manual of the actuator manufacturer.

Hazards linked to the operational environment:

» The ambient atmosphere and the ambient temperature are to be set in a manner that has no negative influence on the valve, the actuator of the valve, and the medium.

Transportation hazards:

» Please see the chapter “Transportation and Storage” for transportation hazards.

Maintenance hazards:

» All maintenance and repair tasks with the exception of lubricating and subsequent sealing of stuffing boxes and valve rings are without exception to be carried out in an unpressurized state. Where required, the valve may have to be drained prior to servicing.
» Valves may only be removed from pipeline systems in an unpressurized and empty state.
» Attention must be paid to exiting media when resealing.
» Caution: (Fire and chemical) burn hazard and risk of poisoning caused by valves utilized in dangerous media. Attention must be paid to medium residues during maintenance and putting into operation tasks.
» Maintenance and repairs may only be carried out by qualified personnel.

Placing out of operation hazards:

» When placing out of operation, the valves must be emptied fully and attention must be paid to hazards resulting from medium residue.
» Should valves be no longer used, they are to be disposed of correctly.

Material failure hazard:

» Parts made of grey cast iron are especially sensitive to brittle fracture and impact. This aspect must be considered in the course of material selection.

7 Technical Data

7.1 Material codes

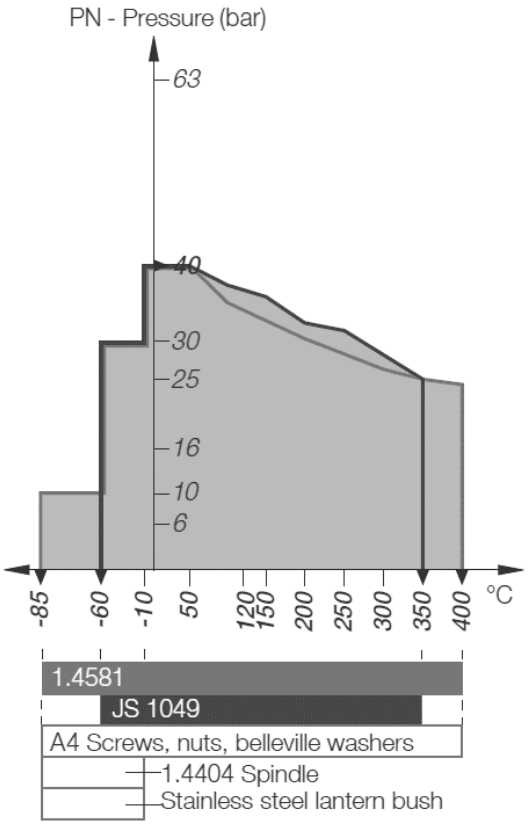
The main criterion of the material codes is the basic material of the body.

Symbol	Body	Interior Parts
III	Grey cast iron	Without nonferrous metal parts
IV	Brass	Nonferrous metal parts possible
VI	Spheroidal cast iron	Without nonferrous metal parts
VII	Cast steel	Nonferrous metal parts possible
VIII	Cast steel	Without nonferrous metal part
X	Stainless steel	Parts coming into contact with the medium are acid-resistant
Xc	Stainless steel	All parts acid-resistant

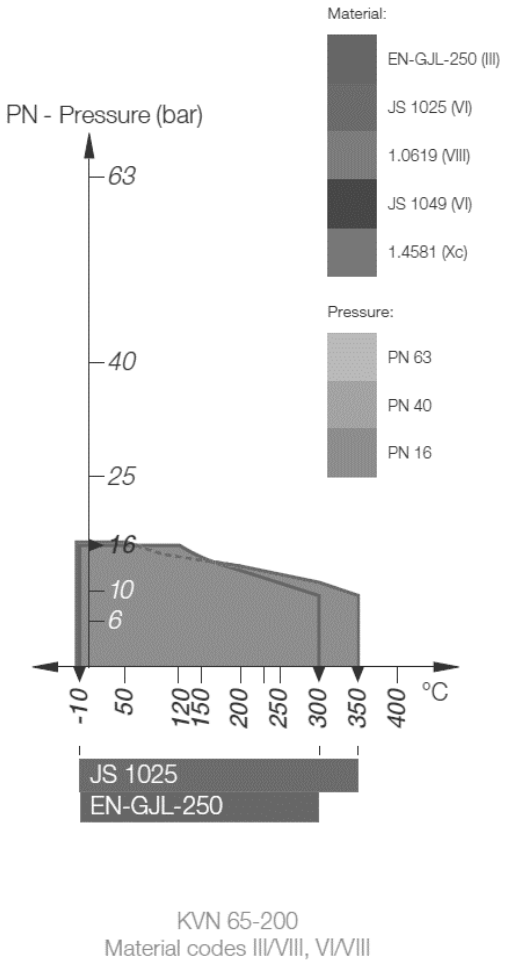
The above table may also contain material codes unavailable for this product.

7.2 P/T Diagrams

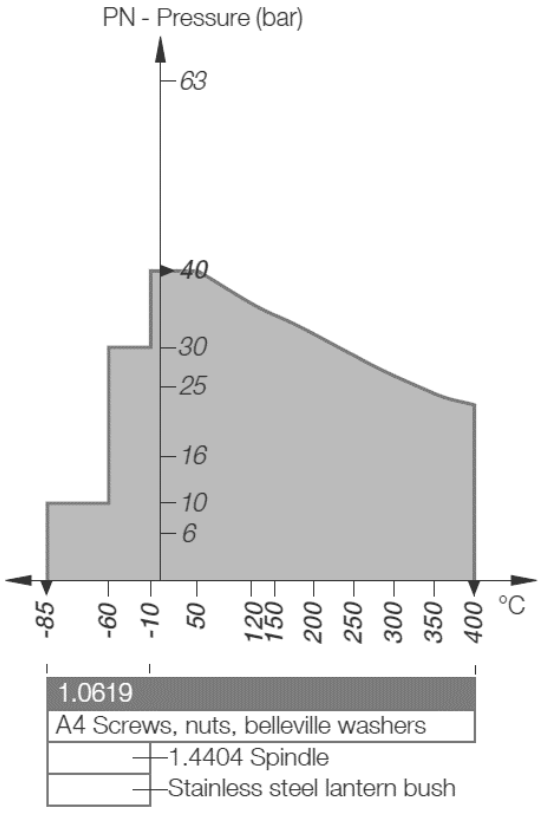
The applicable maximum limitations of use regarding pressure and temperature are defined by their mutual interdependency. A P/T diagram is an ideal tool in order to select a suitable valve for pre-defined operational characteristics.



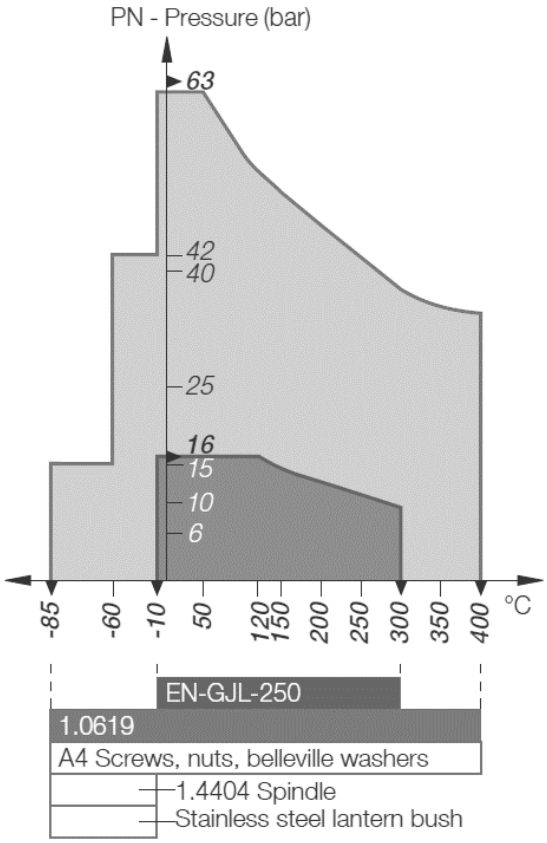
KVN 15-50
Material codes VI, Xc



KVN 65-200
Material codes III/VIII, VI/VIII



KVN 15-200
Material codes VIII



KVMN 1/2"-2" (III,VIII)
KVSN 1/2"-2"/15-50 (VIII)
KVN 15-150 (III)

CAUTION	The diagrams illustrate all possible limitations of use of KLINGER valves. **The area of application for standard valves is from -10 °C up to +400 °C.**

7.3 Tightening Torques

The values provided below are approximations and valid for lubricated stud bolts and nuts. Valves, which have already been in operation over longer periods of time, and already show wear and tear on the sealing surfaces and/or are not tight at higher pressures due to gaseous media, can be made tight again by retightening the bonnet securing nut (Pos. 10). The tightening torques may only be exceeded by max. 40 % in such cases.

Bonnet securing nut (Pos. 10)				
	Stud bolt		Tightening torque (Nm)	
Nominal size	Dimension	Pcs.	KX-GT	TFM 1600
15 / ½“	M 10 x 30	2	7,5	5
20 / ¾“	M 10 x 30	3	7,5	5
25 / 1“	M 10 x 30	4	9	6
32 / 1 ¼“	M 12 x 35	4	13,5	8
40 / 1 ½“	M 12 x 35	4	21	10
50 / 2“	M 12 x 35	4	21	12

Handwheel nut (Pos. 11)			
	Nut		Tightening torque (Nm)
Nominal size	Dimension	Pcs.	
15/ 20/ 25/ ½“ / ¾“ / 1“	M8	1	10
32 / 1 ¼“	M10	1	12
40 / 50 / 1 ½“ / 2“	M12	1	12

7.4 Table of Weights

This table provides a weight estimation of a PN 40 valve with flange connection.

Nominal Size	Weight
15 / ½“	2.7 kg
20 / ¾“	4.6 kg
25 / 1“	5.9 kg
32 / 1 ¼“	9.1 kg
40 / 1 ½“	11.4 kg
50 / 2“	16.3 kg

8 Transportation and Storage

Check the shipment immediately upon receipt for completeness of delivery and transport damage. Furthermore, it should be ensured that the valves and possibly mounted actuators have not been damaged during transport. Please also check that the supplied valves (types, nominal sizes etc.) correspond with the order. KLINGER Fluid Control is to be notified immediately of any kind of deviations. Regarding damage obviously resulting from transportation, please contact the freight forwarder in charge of delivery.

Valves and valve replacement parts may only be stored in dry storage areas. Fully assembled valves must be stored in the condition as supplied to the customer (valve in CLOSED position, connections covered with protective caps). Valve replacement parts must be handled with care and should remain as packaged by the factory during storage.

- Storage in the default factory packaging.
- The valves are to be stored in closed rooms, in a non-aggressive atmosphere, and protected against humidity and contaminants.
- In the event that protective sheeting or shrinking foils are used, it must be ensured – through adequate measures – that the atmosphere within the covers remain free of condensation.
- Corresponding protective measures are recommended for storage in dusty rooms.
- In order to avoid mix-ups, all stored parts should be labeled in accordance with the shipping notes and stored in the correct place.
- The temperature in the storage rooms should not exceed the limits -20 °C and +50 °C. Rapid temperature changes are to be avoided whenever possible (condensate water).
- Possible changes originating from KLINGER Fluid Control and having an impact on storage will be announced in a timely manner in the form of a circular.
- The operation manual is part of the delivery and must be stored with the item. This ensures that all important information and documents can be passed on.
- Lift lines suitable for the weight and the lifting aids on the valve (to the extent present) are to be used for manipulation purposes.

Damages resulting from incorrect storage or manipulation free KLINGER Fluid Control from any obligations derivable from the warranty, guarantee and product liability.

9 Operating Principle and Mode of Operation

Piston valves are closed clockwise and opened counterclockwise. Care should especially be taken during the closing process, i.e. the handwheel should be turned until it rests against the bonnet. As opposed to globe valves, piston valves require no increased end torque. As a result of the construction of piston valves, it is possible to achieve tightness prior to reaching the CLOSED position. In order to protect valve rings from taking damage, piston valves must always be closed as far as they will go.

10 Installation and Putting into Service Regulations

Piston valves can be installed into the pipe system in any given orientation. The preferred flow direction, however, should be taken into consideration in this context.

In order to protect against impurities and damage, the connections of the valves are covered. We recommend removal of these covers only prior to installation.

The spindle of the valve must be protected against dirt in order to avoid premature wear and tear of the trapezoid thread.

Valves with welding ends may generally be welded into a pipework by means of fusing welding procedures. In this context, the welding and quality requirements and their norms are to be complied with. As a consequence, welding may only be carried out by qualified personnel. The safety regulations of the plant operator and/or the plant manufacturer are also to be complied with.

Installation of valves with flange ends may only be carried out by qualified personnel in accordance with EN 1591. It must in this case be observed that no additional tension is exerted on the valve, such as for example as the result of selecting a too large distance between the to be bolted flanges.

Should the pipe and the valve be insulated, then insulation should only reach up to the body-side top flange. This ensures accessibility of the bonnet securing nuts and allows for the valve body to remain in the pipe during repair and maintenance work, necessitating only the removal of the bonnet.

Following installation and prior to putting into service, it must be ensured that solids and impurities, which are not part of the medium, have been removed from the pipeline system and/or from the facility. A pressure and a function test must be carried out prior to putting into operation

When opening the valve, care should be taken to ensure that, after having reached the end position, the handwheel must be again turned clockwise between ½ to a full rotation in order to avoid jamming of the piston in the body.

Prior to putting into service of valves in steam pipes, proper condensate draining must be ensured in order to avoid steam hammer hazards. In extreme cases, a steam hammer may lead to breaking of the valve. Rapid increases in temperature and pressure are to be avoided during all operation phases (start – operation – shutting down).

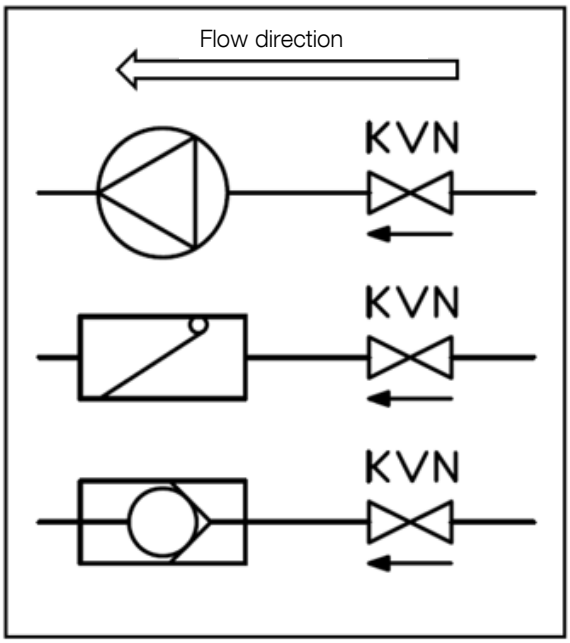
The maximum permissible test pressure is 1.1 x PN if the piston valve is in a closed state. The valve must be open when testing the pipe pressure (1.5 x PN).

10.1 Standard Installation Safety Notes

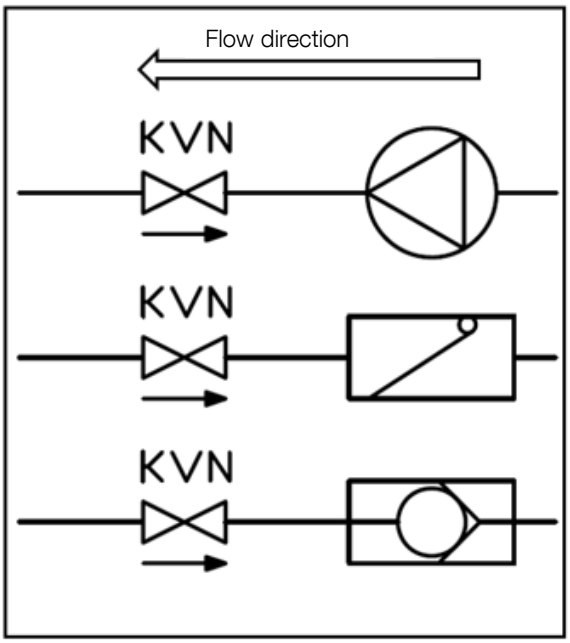
The following aspects must be taken into consideration especially during the plant planning phase.

In the event of temperature changes, a medium enclosed between two piston valves can lead to significant changes in pressure, which may exceed the pressure class of the valves. A corresponding volume compensation (expansion vessel) is required in such cases.

With regard to incompressible media, the actuation of piston valves can result in pressure changes in tightly sealed plant sections. This implies that a piston pump effect occurs, which may lead to an increase in pressure on the upstream side.
Based on the interaction with backflow preventers, piston pumps and check valves, piston valves must either be installed in front of the components in the preferred flow direction or after the components, however, against the preferred flow direction.



Direction of installation in front of the components



Direction of installation after the components

10.2 Welding Instructions

The face-to-face length of the piston valves has been dimensioned in a manner that allows for welding in of the valve in the CLOSED position. It does not require the removal of individual parts.

The temperature at the valve seat rings must be monitored. With regard to TFM 1600 rings, it may not exceed a value of 130 °C. Regarding KX-GT rings, a value of 400 °C may not be exceeded.

The applicable welding and quality-technical requirements and their respective standards must be complied with during welding.

11 Service and Maintenance

Maintenance and inspection intervals are to be determined by the operator dependent on the operating mode, as these valves can be utilized under a number of different operating conditions. Maintenance and inspection work may only be carried out by trained personnel.

Prior to the start of service and maintenance work, it must be ensured that the pipeline system is depressurized and that no medium residues are contained within.

Should a valve become leaky, the tightening torques of the bonnet securing nuts must be compared to the tightening table. Retightening may be necessary. Prior to doing so, the valve must be brought into the CLOSED position.

Care should be taken to keep the spindle thread sufficiently lubricated at all times. Please refer to chapter 11.6 for suitable lubricants.

In the event that the spindle thread shows a high degree of wear the valve should be depressurized and maintenance carried out.

When removing an actuator, it is necessary to protect it against rotation prior to loosening of the connecting screws.

11.1 Disassembly for Valve Ring Replacement

» Depressurize and purge pipe
» Fully open piston valve
» Unscrew and remove bonnet securing nuts (Pos.10) and belleville washers (Pos.14)
» Rotate the handwheel (Pos. 3) clockwise (closing direction) until the bonnet is moved out of the body and the bonnet flange is situated above the stud bolts
» Now slightly twist the bonnet (Pos. 2) so that the bonnet flange is braced on the stud bolt faces (Pos. 12). Rotate the handwheel counterclockwise (opening direction), until the piston (Pos. 7) is fully pulled out of the upper valve ring (Pos. 9) (see Figure 1)
» Remove the bonnet with the handwheel, spindle and piston
» Pull out the upper valve ring (Pos. 9) and the lantern bush by means of a lantern drawer without damaging the surface of the body's bore (see Fig. 2)
» Remove the lower valve ring (Pos. 9) by means of a ring extractor hook without damaging the surface of the body's bore (see Fig. 3)
» Clean the bore of the body and the valve ring seat

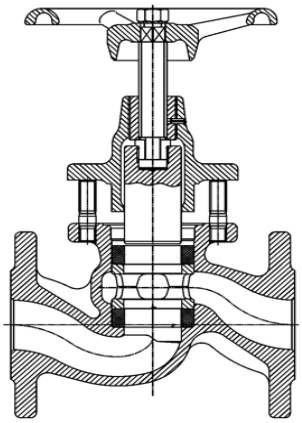


Figure 1

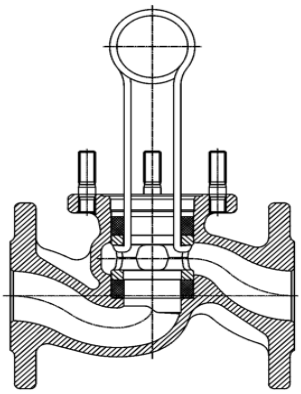


Figure 2

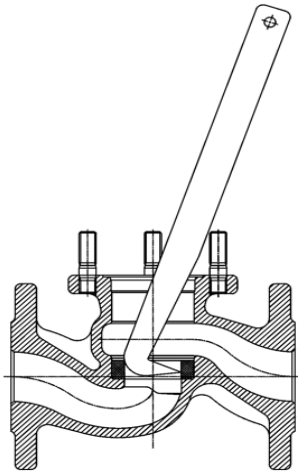


Figure 3

11.2 Checks during Valve Ring Replacement

! CAUTION	The elements of the bonnet (piston, spindle, thread, bonnet) must always be examined with regard to their correct function during the course of valve ring replacement.

» The surface of the piston must be smooth and not display any score marks.
» The spindle head must be easy to turn in the split nut.
» The trapezoid thread of the spindle may not display too much wear.
» The clearance between the spindle thread and the thread of the bonnet and/or the threaded bush may not be unnaturally large.

Should no components require replacement, the trapezoid thread and the bonnet throat must be lubricated prior to assembly of the valve.

11.3 Bonnet Disassembly and Assembly (without threaded bush)

» Loosen the handwheel hex nut (Pos. 11)
» Remove serrated lock washer (Pos. 16) and handwheel (Pos. 3)
» Unscrew and remove the spindle (Pos. 8)
» Secure the piston (Pos. 7) in a vise under utilization of soft brackets
» Loosen split nut (**left-handed** thread) (Pos. 6) and remove disc (Pos. 17)
» Replace damaged parts with new parts
» Installation of the spindle (Pos. 8) and disc (Pos. 17) into the piston after thorough lubrication of the spindle head
» Screw spindle into the bonnet and lubricate
» Mounting of the handwheel (Pos. 3) and the serrated lock washer (Pos. 16)
» Attach handwheel hex nut (Pos. 11) with tightening torque provided in table

11.4 Bonnet Disassembly and Assembly (with threaded bush)

» Loosen the handwheel hex nut (Pos. 11)
» Remove serrated lock washer (Pos. 16) and handwheel (Pos. 3)
» Secure piston (Pos. 7) in a vise under utilization of soft brackets
» Loosen split nut (**left-handed** thread) (Pos. 6) and remove disc (Pos. 17)
» Unscrew spindle (Pos. 8)
» In the event that the threaded bush displays damage, the bonnet must be secured in a vise and the tensions pins (Pos. 19) knocked out from the outside inwards
» Unscrew the threaded bush
» Screw the new threaded bush in, drill holes and pin
» Replace damaged parts with new parts
» Installation of spindle (Pos. 8) and disc (Pos. 17) into piston after thorough lubrication of piston head
» Screw spindle into bonnet and lubricate
» Mount the handwheel (Pos. 3) and the serrated lock washer (Pos. 16)
» Tighten handwheel nut with tension torque provided in table

11.6 Valve Ring Installation and Assembly

! CAUTION	All individual parts, especially the sealing surfaces, must be thoroughly inspected prior to assembly. Damaged parts must be replaced with new parts. Visible dirt on the machined parts must be removed.

! CAUTION	Special care must be taken to avoid the KX-GT rings being inserted into the bore if they become jammed with the mounting tool.

- » Installation of the lower valve ring into the body by means of KX-GT assembly tool. Do not use any grease or lubricant (see Fig. 4)
- » Insertion of the cleaned lantern bush. Ensure that no lantern bush root face rests on the valve output side in order to achieve an optimized K_v-value
- » Installation of the upper valve ring by means of KX-GT assembly tool. Note that no grease or lubricant may be used here, either
- » Take the bonnet and screw out spindle until it recedes no further (turn handwheel left)
- » Place bonnet on valve body, fit belleville washers (Pos. 14) and screw on hex nuts (Pos. 10) with a few convolutions
- » Now fully close and reopen valve (during the opening process the bonnet recedes into the body)
- » Retighten nuts
- » Now fully close valve (turn handwheel right)
- » Tighten bonnet securing nuts in accordance with tightening torques provided in table
- » Function test

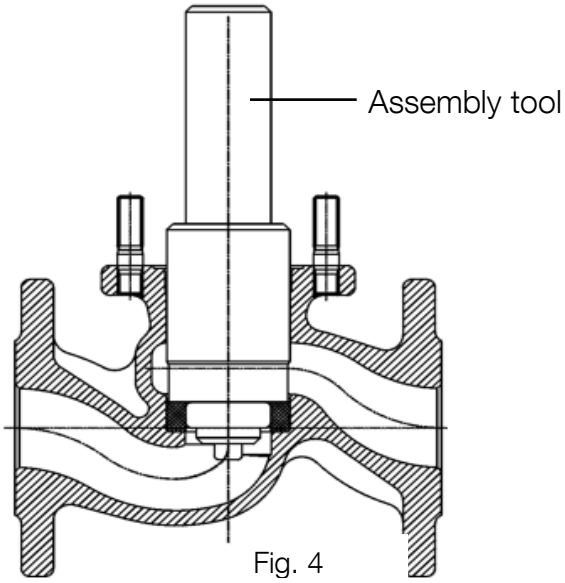


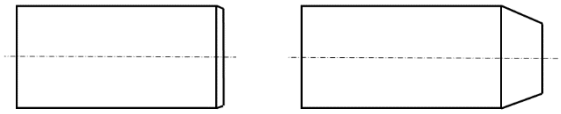
Fig. 4

11.7 Standard Lubricants

The standard lubricant used to lubricate the thread in piston valves has the designation "GLEIT-µ HP 506 Hochleistungspaste".

12 Conversion of an on/off Valve to a Control Valve

The difference between a KVN piston valve and a KVRKN control valve is the piston. The control piston features a defined geometry, which results in an almost linear flow curve and simplifies the control of media flows.
Due to the fact that the sealing system of control valves corresponds to that of piston valves, the shut-off function is also present in the bore.
The advantage of using the same sealing components lies in the fact that it enables the conversion of an installed piston valve – requiring only the exchanging of the piston – into a control valve.



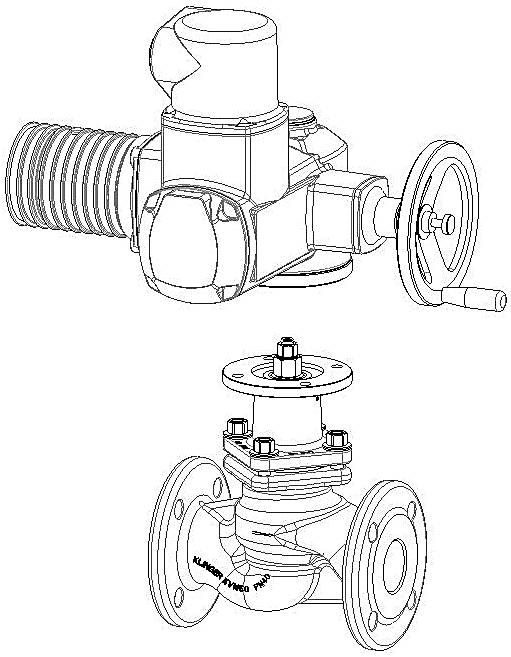
12.1 Conversion Instructions

- » Depressurize and purge pipe
- » Fully open piston valve
- » Screw off bonnet securing hex nuts (Pos. 10)
- » Turn handwheel (Pos. 3) clockwise (closing direction) until bonnet is moved out of the body and bonnet flange is located above the stud bolts
- » Subsequently lightly turn bonnet (Pos. 2) out of position, so that the bonnet flange can rest on the stud bolt faces (Pos. 12). Turn the handwheel counterclockwise (opening direction) until the piston (Pos. 7) is fully pulled out of the upper valve ring (Pos. 9) (see Fig. 1)
- » Remove handwheel and piston set
- » Loosen handwheel securing nut (Pos. 11) and remove handwheel (Pos. 3)
- » Screw out spindle (Pos. 8)
- » Secure piston (Pos. 7) in vise with the aid of soft brackets
- » Loosen split nut **(left-handed** thread) (Pos. 6)
- » Replace with control piston
- » Installation of spindle (Pos. 8) and disc (Pos. 17) into control piston after thorough lubrication of the spindle head
- » Screw spindle into bonnet and lubricate
- » Mount handwheel and handwheel nut and apply tensioning torque as provided in table
- » Take the bonnet and unscrew spindle with control piston until it stops (turn handwheel left)
- » Mount bonnet on valve body and screw on nuts (Pos. 10) with a few convolutions

» Now fully close and then reopen valve (the bonnet recedes into the body during the opening process)
» Retighten nuts
» Fully close valve (turn handwheel right)
» Tighten bonnet securing nuts in accordance with tightening torques provided in table
» Function test

13 Actuator Mounting

The actuator is to be executed with a torque in accordance with the nominal size. The values are to be defined with the manufacturer following a technical query (pressure, sealing material, media etc.).



13.1 Fitting the Actuator

When fitting actuators, the requirements of the actuator manufacturer have to be mandatorily complied with. The manufacturer assumes no liability for damage resulting from improper actuator installation. In case of doubt, it is recommended to discuss every actuator installation with the manufacturer of the actuator and the valve. Installation work may only be carried out by qualified personnel.

» Bring piston valve into the „CLOSED“ position
» Place the actuator in the correct positional arrangement and screw together
» Set the end positions
» Function test

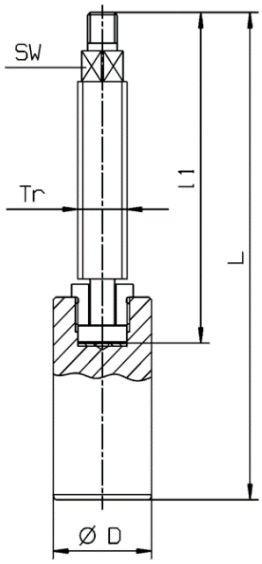
! CAUTION	With regard to electrical actuators, it must be ensured that the end positions are limited by the path end switches and not by the torque end switches.

! CAUTION	The valve is closed clockwise. It is to be ensured that the movement is precisely complied with in its OPEN-CLOSED end positions.

14 Spare Parts List

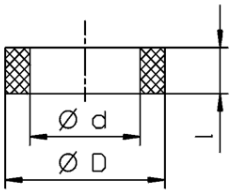
Spare parts set: Piston and spindle

Nominal size	L	l_1	AF	Tr	D
15 / ½“	112	82	8	14 x 4	15
20 / ¾“	128	94	8	14 x 4	20
25 / 1“	148	106	9,5	16 x 4	25
32 / 1 ¼“	164	117	11	20 x 4	30
40 / 1 ½“	195	135	12,5	20 x 4	40
50 / 2“	221	153	14	22 x 5	50



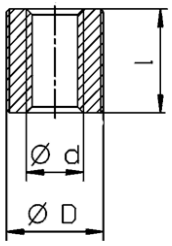
Valve rings: KX-GT

Nominal size	D	d	l
15 / ½“	23,5	15	8
20 / ¾“	30	20	9,3
25 / 1“	38	25	10,6
32 / 1 ¼“	45	30	14,6
40 / 1 ½“	58	40	14,6
50 / 2“	70	50	16



Threaded bush: DN 40 and 50 (VI, VIII, Xc)
DN 1 ½“ and 2“ ANSI (VIII)

Nominal size	D	d	l
40 / 1 ½“	M 34 x 1,5	Tr 20 x 4	35
50 / 2“	M 34 x 1,5	Tr 22 x 5	40



14.1 Special tools

Lantern drawer:

Nominal size	Order Number
15 / ½“	A006019
20 / ¾“	A006020
25 / 1“	A006021
32 / 1 ¼“	A006022
40 / 1 ½“	A006023
50 / 2“	A006024

Ring extractor hook:

Nominal size	Order Number
15 / ½“	A006011
20 / ¾“	A006012
25 / 1“	A006013
32 / 1 ¼“	A006014
40 / 1 ½“	A006015
50 / 2“	A006016

Assembly tools:

Nominal size	Order Number
15 / ½“	A017346
20 / ¾“	A017347
25 / 1“	A017348
32 / 1 ¼“	A017349
40 / 1 ½“	A017350
50 / 2“	A017351

15 Disposal

To the extent that other laws do not require a deviating treatment, the utilized materials should be separated in accordance with their properties and entered into the raw materials recycling process. The pre-requirement in this regard is that the raw materials have been correspondingly decontaminated on the order of the operator.