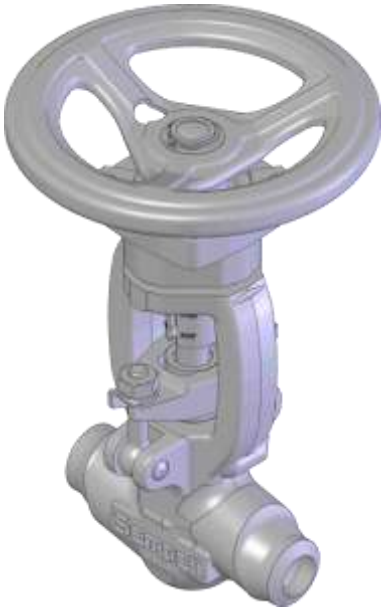
Operating Manual
MA.080.01.1117 EN
28.11.2017

High Pressure-Stop Valve

Type VA500



Nominal size:	DN 10 – DN 50 NVS ½“ – 2“	
Nominal pressure:	DIN	PN 630
	ASME	Class 2680

Notice!
This operating instruction does not govern the scope of delivery. It is valid for several sizes, designs, accessories and additional devices. Its contents therefore generally exceed the respective contractually specified scope of delivery.
The actual scope of delivery is provided in the nameplate.
The display of the VA500 as described here depicts the standard design with handwheel.

Read the instructions prior to performing any task!

SEMPELL

EMERSON

Notice!

Refer to design data on the nameplate!

Design according to TO.080.01/080.02 (VA500)

- One-piece body made of forged steel (VA500)
- Valve yoke with axial needle bearing
- Packing made of pure graphite

With accessories (SN) :

- SN 25 Copper free materials (undescribed)
- SN 30 Seal water type gland
- SN 33 Valve yoke with connection acc. to ISO 5210
- SN 34 A-C with connection for linear actuator acc. to DIN 3358
- SN 34 F with connection for linear actuator
- SN 36/37 Electrical limit switches "closed/open"
- SN 38.1 Handwheel locking with pad lock
- SN 41 Stellited disc seat (undescribed)
- SN 41.5 Stem and threaded bush nitrided (undescribed)
- SN 43 Welding rings
- SN 45.1 Throttling disc, inlet below disc
- SN 53 Back seat
- SN 160.1 Spring-loaded gland
- SN 177 Nameplate (undescribed)
- SN 178 Nameplate, foreign language (undescribed)
- SN 182 Lubrication of stem thread
- SN 183 Inlet above disc (undescribed)
- SN 371 - 373 Valve lock A 3 - A 5

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Translation of the original operating instructions
VA500-MA.080.01, 2, en_US

Table of contents

1 General

1.1 Information on this manual

This manual is only released for specially trained personnel.

It enables safe and efficient handling of the valve. The manual is part of the valve and must be kept in the direct vicinity of the valve available to the personnel at all times.

The personnel must have read and understood this manual prior to commencing any work. A basic prerequisite for safe working is compliance with all specified safety instructions and handling instructions in this manual.

Furthermore, the local accident prevention regulations and general safety conditions are applicable for the area of application of the valve.

The figures in this manual are provided for basic understanding and may deviate from the actual design.

In addition to this manual, the instructions for the installed components found in the documentation folder also apply.

1.2 Explanation of symbols

Safety instructions

In this manual, safety instructions are marked by symbols. The safety instructions are introduced by signal words expressing the degree of danger.

To avoid accidents, personal injury and material damage, the safety instructions must always be observed.

DANGER!
This combination of symbol and signal word indicates an immediately dangerous situation which causes death or serious injuries if not avoided.

WARNING!
This combination of symbol and signal word indicates a potentially dangerous situation which could cause death or serious injuries if not avoided.

CAUTION!
This combination of symbol and signal word indicates a potentially dangerous situation which can cause minor or slight injuries if not avoided.

NOTICE!
This combination of symbol and signal word indicates a potentially dangerous situation which can cause material or environmental damage if not avoided.

Tips and recommendations

This symbol highlights useful tips and recommendations as well as information for efficient and interference-free operation.

Special safety instructions

In order to call attention to special dangers, the following symbols are used in connection with safety instructions:

DANGER!
This combination of symbol and signal word indicates a hazard due to electrical current. Non-observance of the safety instructions can result in the danger of serious or fatal injuries.

Indications in this manual

In this manual, the following characters and forms of emphasis are used to designate handling instructions, result descriptions, lists, references and other elements:

Sign	Explanation
	Designates step-by-step handling instructions.
⇨	Designates a state or an automatic sequence as result of a handling step.
	Designates references to chapters in this manual and in accompanying documents.
■	Designates lists and list entries without specified sequence of steps.
(X)	Numbers in brackets refer to the part number of the drawings in the documentation.

1.3 Limitation of liability

All data and notes in this operating manual have been prepared under consideration of the valid specifications and regulations, the state of engineering as well as our long-standing knowledge and experience.

In the following cases, the manufacturer accepts no liability for any damage:

- non-observance of this manual
- use deviating from intended use
- employment of untrained personnel
- unauthorized modifications
- technical alterations
- use of unauthorized spare parts
- use of unauthorized operating materials
- improper maintenance and setting of the valve
- temporary or permanent connection of devices not authorized by us

For special designs, utilization of additional order options or due to recent technical changes, the actual scope of delivery may differ from the explanations of the drawings described here.

The obligations, General Business Terms and Conditions and the delivery conditions of the manufacturer agreed upon in the delivery contract are applicable, along with the legal regulations valid at the time the contract is concluded.

1.4 Copyright

1.5 Warranty provisions

The warranty provisions are included in the manufacturer's General Business Terms and Conditions.

NOTICE!
Any work on the valve during the warranty period must always be carried out by a service technician.

1.6 Service

Our service team is available to provide technical information (see manufacturer's address).

Furthermore, our employees are always interested in new information and experiences that result from the application and can be valuable for the improvement of our products.

1.7 Other applicable documents

- Declaration of conformity:
  The valve is designed and built according to the rules of the technology. The declaration of conformity is enclosed with the documentation.
- Dimension drawing
- Sectional drawing
- Materials list
- Dimension record

2 Safety

This section provides an overview of all important safety aspects for optimum protection of personnel and for safe, interference-free operation.

Other task-related safety instructions are included in the sections on the individual life phases.

Non-observance of the handling instructions and safety instructions listed in this manual can cause considerable dangers.

2.1 Intended use

The valve is exclusively designed and constructed for the intended use described here.

The high-pressure stop valve is used within pipe systems to block media flows. The high-pressure stop valve may only be used within the pressure and temperature ranges stated on the nameplate. The high-pressure stop valve must be used in accordance with the medium tolerances of the used materials.

Intended use also includes observance of all information in this manual.

Any use above and beyond the intended use or any other use constitutes misuse.

WARNING!

Danger due to misuse!

Misuse of the valve may lead to dangerous situations.

- Do not operate the valve or its components outdoors.
- Do not operate the valve beyond the values specified in the technical data, the valve data sheet and on the nameplate.
- Do not reconstruct, retool or modify the valve or individual components.

All claims for damage due to misuse are excluded.

2.2 Responsibility of the operator

Operator

The operator is the person who operates the valve for business or commercial or commercial purposes themselves or cedes use/ application to a third party and bears legal product responsibility for protection of the user, the personnel or third parties during operation.

Operator's obligations

The valve will be used in commercial areas. The operator of the valve is therefore subject to the statutory obligations for occupational safety.

In addition to the safety instructions in this manual, the safety, accident protection and environmental protection regulations valid for the area of application of the valve must be complied with.

The following applies in particular:

- The operator must stay up-to-date on the valid occupational safety regulations and also, in a risk assessment, determine additional dangers arising from the specific working conditions at the installation site of the valve. They must implement these in the form of operating instructions for the operation of the valve.
- Throughout the whole time the valve is operating, the operator must check whether the operating manual that they have compiled conforms to current regulations and adapt it if necessary.
- The operator must clearly regulate and establish the responsibilities for installation, operation, troubleshooting, maintenance and cleaning.
- The operator must ensure that all employees working on or with the valve have read and understood this manual. They must also train the personnel at regular intervals and notify them of potential dangers.
- The operator must provide personnel with the required protective equipment and also instruct them on how they are obliged to wear it.
- The operator must regulate conduct in cases of fire and emergency based on the applicable laws, rules and regulations and must train the personnel accordingly.

Furthermore, the operator is responsible for the valve always being in a technically safe condition. Therefore, the following applies:

- The operator must ensure that the maintenance intervals described in this manual are complied with.
- The operator is responsible for the appropriate implementation of the insulation. In particular, protection against burns on hot surfaces must be ensured. Furthermore, temperature-sensitive components may not be overheated.
- The operator must ensure that recurrent inspections (inspections by experts) are regularly carried out on the valve.
- The operator must have all safety devices regularly inspected for functional capability and completeness.
- During operation of the valve, the operator must perform a suitable lifetime monitoring based on the applicable laws, rules and regulations.

- The operator must provide the appropriate tools, spare parts, operating media, auxiliary media and means of transport for all work related to the valve. They are responsible for these media being in a good condition that makes it possible for the intended tasks to be completed safely.
- The operator must ensure that all connections of the valve (including pre-heating and drainage – if applicable) are correctly executed. The valve has to be connected into the system in such manner that the intended functionality of all connections is ensured without limitations.

2.3 Plant downtimes

NOTICE!

For longer plant downtimes, a downtime preservation must be carried out.

If plants are set out of operation for a shorter or longer period of time, procedures (VGB-R 116) depending on downtime duration and frequency should be applied to preserve the plant.

2.4 Requirements of the personnel

2.4.1 Qualifications

WARNING!

Risk of injury due to insufficiently qualified personnel!

If unqualified personnel carry out work on the valve or are in the danger area of the valve, dangers which can cause serious injuries and considerable material damage may arise.

– All activities must be carried out by qualified personnel only.
– Keep unqualified personnel away from the danger areas.

In this manual, the personnel qualifications for the various areas of activity listed in the following are specified:

Electrically qualified person
Due to their professional training, knowledge and experience, and their knowledge of the relevant standards and regulations, the electrically qualified person is able to perform work on electrical systems and independently recognize and prevent potential dangers.

The electrically qualified person is specially trained for the work environment in which they are active and knows the relevant standards and regulations.

The electrically qualified person must fulfill the regulations of the applicable statutory regulations for accident prevention.

Forklift driver
Forklift drivers must be at least 18 years old and have the physical, mental and personal characteristics to drive industrial trucks with a driver's seat or driving cab.

Furthermore, the forklift driver must have received training in driving industrial trucks with a driver's seat or driving cab.

The forklift drivers have verified their abilities in driving industrial trucks with a driver's seat or driving cab to the operator and subsequently have been authorized for driving by the operator in writing.

Hydraulically qualified person / Pneumatically qualified person
Due to their professional training, knowledge and experience, and their knowledge of the relevant standards and regulations, the hydraulically / pneumatically qualified person is able to perform work on hydraulic / pneumatic systems and independently recognize and prevent potential dangers.

The hydraulically / pneumatically qualified person is specially trained for the work environment in which they are active and knows the relevant standards and regulations.

The hydraulically / pneumatically qualified person must fulfill the requirements of the applicable statutory regulations for accident prevention.

Service technician
The service technician is a qualified employee, who is able to perform work on valves and independently recognize and prevent potential dangers due to their professional training, knowledge and experience, and their knowledge of the relevant standards and regulations.

The service technician is specially trained and authorized by Sempell GmbH for the working environment in which they are active. They know the relevant standards and regulations.

The service technician must fulfill the requirements of the applicable statutory regulations for accident prevention.

Technical specialist
The technical specialist is a qualified member of personnel trained for the performance of specific tasks and familiar with assembly, disassembly, commissioning, operation and maintenance of the product due to experience and knowledge.

The technical specialist must be able to evaluate and perform the tasks assigned to him, and be able to detect and eliminate possible dangers. He should also be familiar with the relevant standards and regulations.

The technical specialist must fulfill the requirements of the applicable legal provisions for accident prevention.

Welding specialist
Due to their professional training, knowledge and experience, and their knowledge of the relevant standards and regulations, the welding specialist is able to perform welding work on the plant and independently recognize and prevent potential dangers.

The welding specialist is specially trained for the work environment in which they are active and knows the relevant standards and regulations.

The welding specialist must fulfill the requirements of the applicable statutory regulations for accident prevention.

Only persons who reliably execute their work may be authorized as personnel. People whose reactions are impaired, e.g. by drugs, alcohol or medications, are not authorized.

The operator must observe the age and occupation-related regulations applicable at the installation site when selecting personnel.

2.5 Unauthorized persons

WARNING!

Danger of death for unauthorized persons due to hazards in the danger area and work area!

Unauthorized persons who do not meet the requirements described here are not aware of the dangers in the work area. This means there is a danger of serious injuries or even death for unauthorized persons.

- Keep unauthorized persons away from the danger and work area.
- In case of doubt, address persons and direct them out of the danger and work area.
- As long as unqualified persons remain in the danger and work area, work must be suspended.

2.6 Instruction

The personnel must be instructed by the operator on a regular basis. For improved monitoring, instruction must be logged (↬ *Chapter 13.1 “Instruction protocol” on page 121*).

2.7 Personal protective equipment

Personal protective equipment serves to protect the personnel against dangers that could affect their safety and health when working.

The personnel must wear personal protective equipment when carrying out the various tasks on or with the valve. This will be indicated separately in the individual chapters of this manual. This personal protective equipment is explained in the following:

- The required personal protective equipment described in the different chapters of this manual absolutely must always be put on before starting the respective task.
- Follow the instructions for personal protective equipment attached in the danger and work area.

Description of the personal protective equipment

The personal protective equipment is explained in the following:

Heat-resistant safety gloves with arm protection
The safety gloves serve to protect the hands and lower arms from contact heat when they touch high-temperature components.

Industrial protective helmet
Industrial protective helmets protect the head against falling objects, suspended mobile loads and impacts on rigid objects.

Protective glasses
Protective glasses serve to protect the eyes from flying parts and splashes of liquid.

Protective welding apron
The protective welding apron serves to protect of the body against sparks and hot objects.

Protective work clothing
Protective work clothing is tight-fitting work clothing with low tear resistance, with tight sleeves and without protruding parts. It predominantly serves to protect the worker from being caught in moving valve parts. Do not wear any rings, chains or other jewelry.

Safety gloves
Safety gloves serve to protect the hands from friction, abrasion, piercing or deeper injuries as well as from contact with hot surfaces.

Safety shoes
Safety shoes serve to protect the feet from heavy falling parts and slipping on a slippery surface.

Welding shield
The welding shield serves to protect the eyes and face from welding flash and flying particles.

2.8 Fundamental dangers

Residual dangers which can originate from the valve and have been ascertained by a risk assessment are specified in the following section.

To reduce health hazards and prevent dangerous situations, attention must be paid to the safety instructions presented here and to the safety instructions in the other chapters of this manual.

2.8.1 General dangers at the workplace

Noise

WARNING!
Risk of injury due to noise!
The noise level occurring in the work area may cause severe hearing damage.

– When working, hearing protection must be worn.
– Only remain in the danger area when required.

Hand injuries

WARNING!

Risk of hand injuries!

When working on the valve, ensure that hands are not injured due to clamping in, crushing or any sharp edges.

Sharp-edged components, points and corners on or in the valve can cause punction and cut wounds.

Areas that are difficult to access on or in the valve may cause crushing of fingers and hands.

- Before starting work, ensure there is sufficient space.
- Handle open sharp-edged components carefully.
- Wear safety gloves.

Liquid accumulation

CAUTION!

Risk of injury due to slipping in liquid accumulations!

Slipping in liquid accumulations on the ground may lead to falling. Falls can cause injuries.

- Immediately wipe up accumulated liquids with appropriate means.
- Wear slip-resistant safety shoes.
- Attach warning notices and signs giving orders at or near an area in which liquids may accumulate on the floor.

2.8.2 Dangers due to electrical energy

Electric current

DANGER!

Danger to life due to electric current!

There is an immediate danger to life from electric shock if live parts are touched. Damage to the insulation or individual components may be potentially fatal.

- Work on the electrical system must only be performed by electrically qualified persons.
- If damage to the insulation is detected, switch off the power supply immediately and arrange for repair.
- Before starting work on live parts of electrical systems and operating equipment, de-energize them and ensure they remain de-energized for the duration of the work. Observe the 5 safety rules when doing so:
  - Switch off power.
  - Secure against restarting.
  - Verify the component is de-energized.
  - Connect to ground and short-circuit.
  - Cover or separate adjacent live parts.
- Never bypass or switch off fuses. When replacing fuses, observe the correct amperage.
- Keep live parts free from moisture. Moisture can cause a short circuit.

Stored charges

DANGER!

Danger to life due to stored charges!

In the electronic components, electrical charges can be stored which remain even after switching off and disconnecting from the power supply. Contact with these components can cause serious injuries or even death.

- Before working on these components, disconnect them completely from the power supply.
- Before work, these components must be discharged by specialist personnel and their de-energized state ascertained.

This work may only be performed by specialist personnel with adherence to the respective national requirements.

2.8.3 Danger due to mechanics

Moving components

WARNING!

Risk of injury due to moving components!

Moving components may cause serious injuries.

- Do not touch or handle moving components during operation.
- Never open covers during operation.
- Pay attention to the follow-up time: Before opening covers, make sure that no components are still moving.
- Wear tight-fitting protective work clothing with low tear resistance in the danger area.

2.8.4 Dangers due to pneumatic energies

Pneumatic

WARNING!

Risk of injuries from movements caused by stored pneumatic energy!

Pneumatically driven components can move unexpectedly and cause severe injuries due to stored residual energy.

- Work on the pneumatic system must only be performed by pneumatically qualified persons
- The pneumatic system must be completely depressurized before beginning work on the device. Completely empty pressure reservoir.

2.8.5 Dangers due to chemical substances

Chemical substances

CAUTION!

Risk of injury due to chemical substances!

Chemical substances such as lubricants, lapping abrasives, degreasing agents and assembly lubricants emit toxic vapors. The vapors may irritate eyes and respiratory tracts.

- Ensure fresh air supply when working with chemical substances.
- Observe the manufacturer's safety data sheet.

2.8.6 Dangers due to fire

Solvent vapors

CAUTION!

Fire risk due to solvent vapors!

Operating materials may contain volatile chemical substances that emit combustible vapors. The vapors may trigger a fire at ignition sources that can cause life-threatening injuries or even death.

- Ensure fresh air supply when working with chemical substances.
- Observe the manufacturer's safety data sheet.
- No smoking while working.

Hot surfaces

CAUTION!

Fire risk due to hot surfaces!

During operation, the surfaces of components can heat up dramatically and ignite combustible substances nearby, which can cause life-threatening injuries or even death.

- Do not store any combustible substances near the valve.
- Take suitable measures to protect hot surfaces from contact with potentially released operating materials.

2.8.7 Danger due to media under pressure

Pressurized components

WARNING!

Danger to life due to pressurized components!

When improperly handled, pressurized components can move uncontrollably and cause serious injuries. When improperly handled or in the event of a defect, liquid can escape from pressurized components under high pressure and may lead to serious injuries or even death.

Before starting work on these components:

- Establish a depressurized state. Also discharge residual energy.
- Always make sure that it is not possible for liquid to escape inadvertently.
- Defective components which are pressurized during operation must be replaced by the relevant specialist personnel immediately.

2.8.8 Danger due to high temperatures

Hot surfaces

WARNING!

Risk of injury due to hot surfaces!

During operation, the surfaces of components can heat up dramatically. Skin contact with hot surfaces causes severe burns to the skin.

– Whenever working in the vicinity of hot surfaces, heat-resistant protective work clothing and safety gloves must be worn at all times.
– Before all work, ensure that all surfaces have cooled down to ambient temperature.

Hot operating materials

WARNING!

Risk of injury due to hot operating materials!

During operation, operating materials can reach high temperatures. Skin contact with hot operating materials causes severe burns to the skin.

– Whenever working with hot operating materials, heat-resistant protective work clothing and safety gloves must be worn at all times.
– Before all work with operating materials, check if they are hot. If necessary, allow them to cool down.

Hot medium

WARNING!

Risk of injury due to hot medium!

Even when depressurized, the valve may still contain hot media that can cause severe burns to the skin.

– Before working on the valve, ensure that it has cooled to a sufficient degree.
– Before working on the valve, check whether the installation position has caused there to be local low points within the valve where liquid can accumulate.
– Keep the danger area formed by the medium that may potentially escape clear.

2.8.9 Dangers due to microorganisms

WARNING!

Risk of infection by microorganisms!

Depending on the operating conditions and the medium, there may be suitable conditions in and on the valve for the growth of microorganisms, which can cause damage to health or even death.

– Always wear personal protective equipment.
– No eating, drinking or smoking in the workplace.
– Wash hands after completing the work.

2.9 Conduct in the event of fire and accidents

The operator must regulate conduct in cases of fire and emergency based on the applicable laws, rules and regulations and must train the personnel accordingly.

Preventive measures

- Always be prepared for fire and accidents!

2.10 Environmental protection

NOTICE!

Danger to the environment due to improper use of environmentally hazardous substances!

Improper handling of environmentally hazardous substances, especially improper disposal, can cause considerable damage to the environment.

– Always observe the information regarding handling of environmentally hazardous substances and their disposal presented below.
– If environmentally hazardous substances accidentally enter the environment, take appropriate action immediately. If in doubt, inform the responsible local authority about the damage and ask for the appropriate protective measures to take.

The following environmentally hazardous substances will be used:

Lubricants

Lubricants such as greases and oils contain toxic substances. They must not be released into the environment. They must be disposed of by a specialist waste disposal facility.

Observe the manufacturer's safety data sheet.

Degreasing agents

Degreasing agents consist of organic solvents (CHC, HFC, CFC). Degreasing agents must not be released into the environment. They cause long-term adverse effects on the aquatic environment. They must be disposed of by a specialist waste disposal facility.

Observe the manufacturer's safety data sheet.

Assembly lubricants

Assembly lubricants consist of molybdenum disulfide (MoS_2) and graphite. Assembly lubricants must not be released into the environment because they cause long-term adverse effects on the aquatic environment. During disposal, observe local or national regulations. Only transfer assembly lubricants in hazardous waste containers or dispose of at a collecting point for hazardous substances.

Observe the manufacturer's safety data sheet.

2.11 Signage

The following symbols and information signs are in the work area. They refer to the immediate environment to which they are attached.

WARNING!

Danger in the event of illegible signs!

Over time, labels and signs can get dirty or become unrecognizable in some other way, such that dangers are not recognized and required information for operation cannot be followed. This poses a risk of injury.

– Always keep all safety, warning and operating information in a clearly legible condition.
– Always replace damaged signs or labels immediately.

2.11.1 Signs giving orders

Observe operating manual

Only use the designated valve after reading the operating manual.

2.11.2 Warning signs

Hot liquids and gases

It is not always possible to recognize hot liquids and vapors in open containers or escaping under high pressure. Do not touch them without safety gloves.

Hot surface

It is not always possible to recognize hot surfaces such as hot machine components, containers or materials as well as hot liquids. Only touch these using gloves and once they have completely cooled down.

2.11.3 Information signs on the valve

Directional arrow

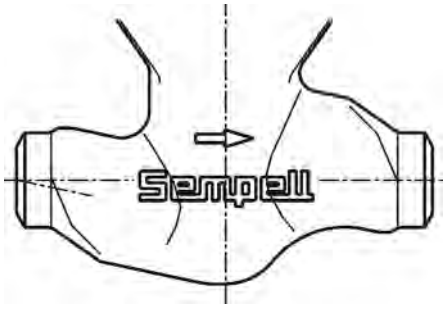


Fig. 1: Directional arrow

The directional arrow is located at the bottom of the body and indicates the flow direction of the medium.

3 Technical data

3.1 General information

Details regarding the technical data can be found in the documentation.

Among others, it contains the following data:

- *General information*
- *Dimension sheets and drawings*
- *Design data (pressure and temperature)*
- *Operating data (pressure and temperature)*
- *Materials*
- *Connection*

3.2 Operating materials

3.2.1 Lubrication the functional components

To lubricate the functional components on the valve, the greases specified in Table A should be used.

The functional components of a valve are the threaded stem drive (external thread of the valve stem and the internal thread of the stem nut) and the bearing for positioning the stem nut in the actuator head of the valve.

Both functional components are lubricated with the same grease.

The material pairing of the threaded stem drive is definitive in selecting the right grease to apply (cf. Table A).

Table A: Greases for lubricating the functional components of the valve

Material pairing on the threaded stem drive	Stem nut	Special brass CW 713 R (2.0550)	Cast iron, GGG (0.7060)	Nitriding steel (1.8550, N)
	Valve stem	1.4057 1.4122 1.4922	1.4122 1.4922	1.8550, N 1.4122, PLN
Grease to be applied:		**Rhenus LKX 2** [1)]	**Barrierta® L55/2** [2)]	**Zepf AR - 1** [1)]

N: Nitrided PLN: Plasma-nitrided

[1)]*Before applying the grease, ensure that the surfaces are metallically blank (free of oil, grease, etc.) and free of dirt particles.*

[2)]*Before applying the grease, ensure that the surfaces are metallically blank (free of oil, grease, etc.) and free of dirt particles. Before applying Barrierta® grease L55/2, clean the surfaces of the greasing point with mineral turpentine 180/210 and then with Klüberalfa XZ 3-1. Never mix Barrierta® L55/2 with other lubricants.*

The greases specified in Table A are manufactured and/or supplied by the following manufacturers and/or suppliers:

Grease	Manufacturer / Supplier
Rhenus LKX 2	Rhenus Lub GmbH & Co. KG Erkelenzer Straße 36 41179 Mönchengladbach, Germany
Barrierta® L55/2	Klüber Lubrication München KG Geisenhausenerstraße 7 81379 Munich, Germany
Zepf AR - 1	Walter Zepf Schmierungstechnik Byk Gulden Str. 10 D-78467 Constance, Germany

3.2.2 Lubricating the removable valve components

To lubricate the removable or detachable valve components during assembly, use the greases indicated in Table B .

Removable or detachable valve components are all screw connections, especially pressure-retaining screw connections, and other components within the distribution of forces.

All removable or detachable valve components are lubricated with the same grease if they are lubricated in the assembly process.

The operating temperature of the valve is definitive for selecting the grease to be applied for the removable valve components (cf. Table B).

Table B: Greases for lubricating the removable valve components

Operating temperature of the valve T_B	Grease
0 °C ≤ T_B < 400 °C	Molykote® BR 2 Plus [1)]
400 °C ≤ T_B < 700 °C	Molykote® P 37 [1)]

[1)] *Before applying the grease, ensure that the surfaces are metallically blank (free of oil, grease, etc.) and free of dirt particles.*

The greases specified in Table B are manufactured and/or supplied by the following manufacturers and/or suppliers:

Grease	Manufacturer / Supplier
Molykote® BR 2 plus	Dow Corning GmbH Wiesbaden Rheingaustr. 34, 65201 Wiesbaden, Germany
Molykote® P 37	Dow Corning GmbH Wiesbaden Rheingaustr. 34, 65201 Wiesbaden, Germany

3.2.3 Abrasives

It is necessary to use special abrasives that contain finely distributed hardened particles for grinding seat surfaces on body - and disk seats. The following abrasives grain sizes are recommended by Sempell: K100, K280.

3.3 Nameplate

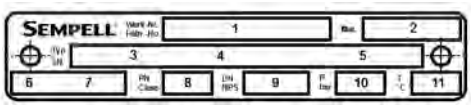


Fig. 2: Nameplate

The insulation of the body may cover the nameplate. The valve can be identified at any time by the fabrication number. For a quick identification, it is recommended to keep records of all information in-house.

The nameplate, see *Fig. 2*, is attached to the body and includes the following information:

- 1 = Commission / Position / Serial number
- 2 = Material
- 3 = Type = VA500
- 4 = Accessories (SN)
- 5 = Valve identification
- 6 = Year of manufacture
- 7 = Type tested / ASME B16.34
- 8 = Nominal pressure
- 9 = Nominal width
- 10 = Design pressure
- 11 = Operating temperature

3.4 Means of transport

It is the operator's responsibility to select and provide suitable means of transport with regard to the weight and dimensions of the valve and the local conditions (cf. ↳ *Chapter 2.2 "Responsibility of the operator" on page 12*).

3.5 Tools / auxiliary equipment

Tools

- Open-end wrenches 22, 27 mm
- Hexagonal screw driver 6, 8, 14 mm
- Torque wrench 22, 27 + 6, 8, 14 (hexagon socket)
- Straight circlip pliers for external circlips Ø 22, 28, 42
- Hammer
- Spacers
- Grinding mandrel for reworking the body seat
- Abrasive segments

or

- Tool case, available as an option, see ↳ *Chapter 12.2 "Tools" on page 120*

3.6 Calibration interval of torque tools

Torque tools should be calibrated before and after each use.

Calibration interval of torque tools

4 Design and function

4.1 Overview

Information on details and drawings is included in the documentation.

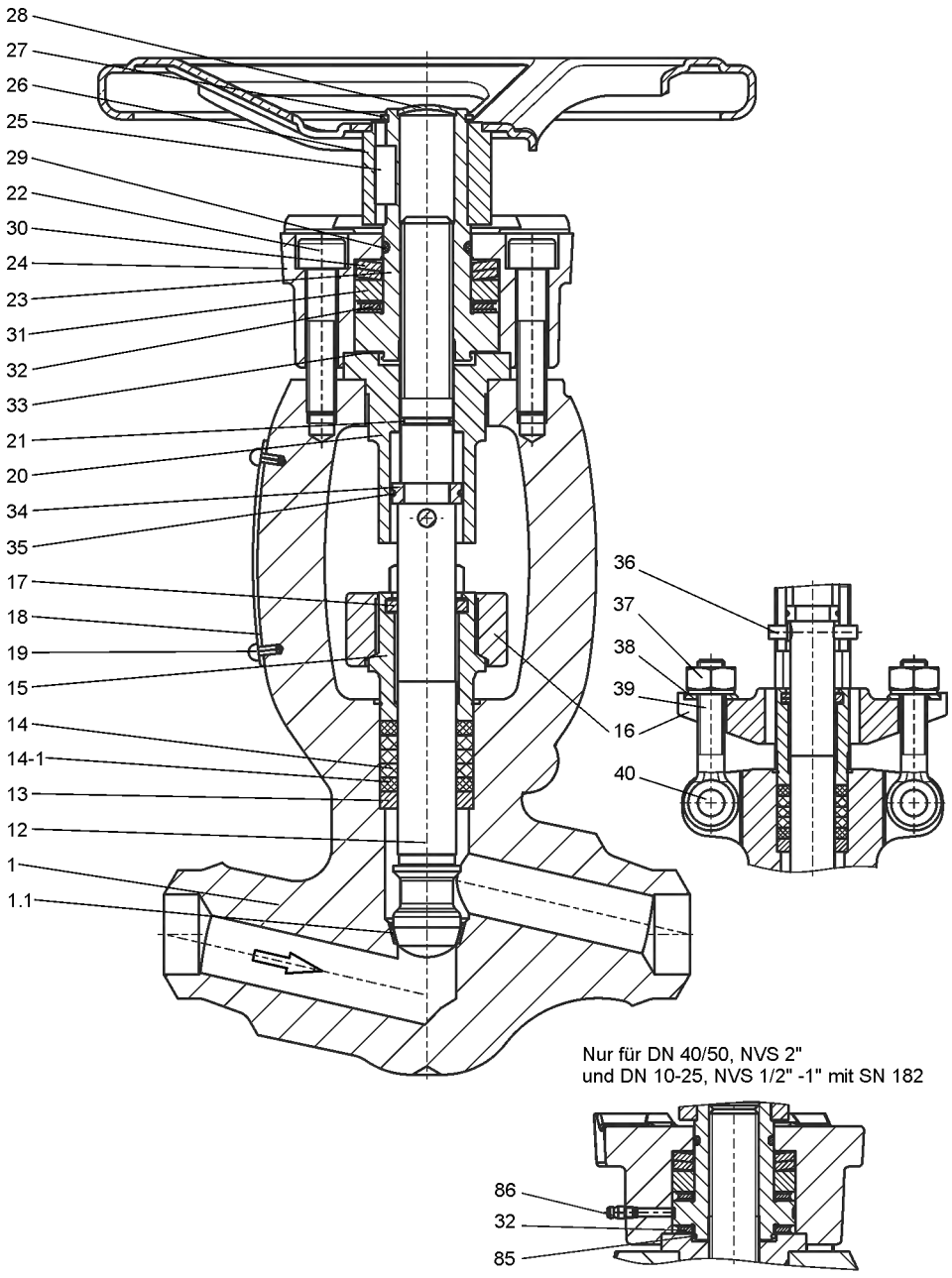


Fig. 3: Overview (Figure: VA500, DN 25, NVS 1")

Part list

1	Body
1.1	Body seat
12	Stem
13	Base ring
14	Packing ■
14-1	Packing
15	Gland shaft
16	Gland flange
17	Wiper ring
18	Nameplate
19	Grooved pin
20	Guide bush
21	O-ring
22	Allen bolt
23	Threaded bush
24	Cover
25	Parallel key
26	Handwheel
27	Retaining ring
28	Washer
29	O-ring
30	Disc spring ●
31	Disc ring
32	Axial needle bearing ▲
33	Slide ring ▲
34	Split ring
35	Ring
36	Guide bolt
37	Hexagonal nut
38	Washer
39	Eye bolt
40	Slotted pin
85	Snap ring
86	Lubrication nipple∗

Translation from the figure *Fig. 3*	
Nur für DN 40/50, NVS 2" und DN 10-25, NVS 1/2" mit SN 182	Only for DN 40/50, NVS 2" and DN 10-25, NVS 1/2" with SN 182

■	For DN 10-25 / NVS 1/2 - 1"	3 pcs
	For DN 40/50 / NVS 2"	2 pcs
●	For DN 10-15 / NVS 1/2"	1 pcs
▲	For DN 40/50 / NVS 2" without slide ring (33), see *Fig. 3*	
	In case of SN 182 instead of slide ring, axial needle bearing (see *Chapter 9.4.11 " SN 182 Lubrication of stem thread(standard on DN 40/50, NVS 2")" on page 110*)	2 pcs
∗	at DN 40/50, NVS 2" standard at SN 182	

4.2 Brief description

The one-piece drop-forged body with hard-faced valve seat only requires the sealing of the stem (12), see *Fig. 3*, toward the outside.

This sealing is effected via pre-pressed packing rings (14, 14.1), which guarantee a high leak tightness and a long service life.

The two-part version of the gland allows the packing with the stem (12) to be disassembled very easily.

As standard the valve yoke is equipped with slide ring (33) below and axial needle bearings (32) above for DN 10-25, NVS 1/2 - 1".

For DN 40/50, NVS 2" the valve yoke is equipped with axial needle bearings (32) above and below.

Disk springs (30) ensure that no non-permissible tensions occur between valve seat (1.1) and disk, e.g. as a result of temperature fluctuations.

All sliding surfaces feature durable long-term lubrication.

The valve yoke is fully enclosed and sealed from dust by o-rings (21, 29) that protect against harmful external influences and prevent loss of lubricant.

The cylindrical welding ends allow easy testing.

A re-equipment from handwheel to electrical actuator, and vice versa, is possible without difficulties while operating (see *Chapter 9.4.2.1 on page 94*).

CAUTION!
Tools for increasing the manual torque are not allowed. The use of valve hooks for operation is only admissible with DN 40/50, NVS 2“ subject to the torque of max. 250 Nm.

4.3 Position indicator

Position indicator

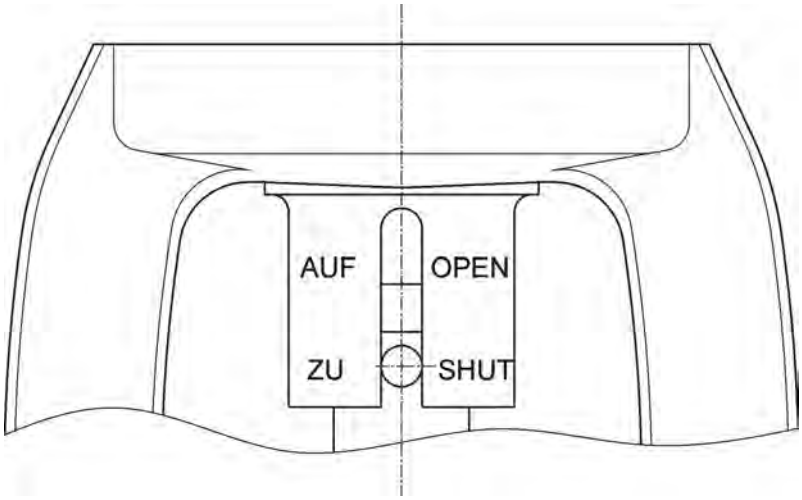


Fig. 4: Position indicator

The position indicator is in the middle section of the cap arm.

It indicates the current position of the valve (from "OPEN" to "CLOSED").

4.4 Installation of double shut-off

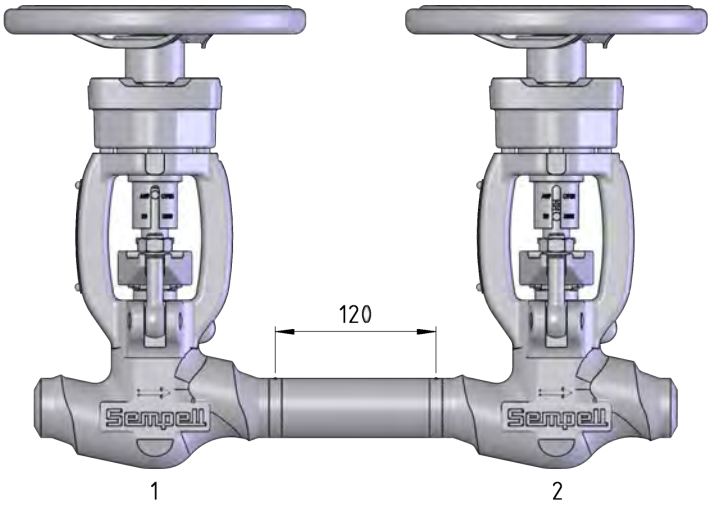


Fig. 5: Double shut-off

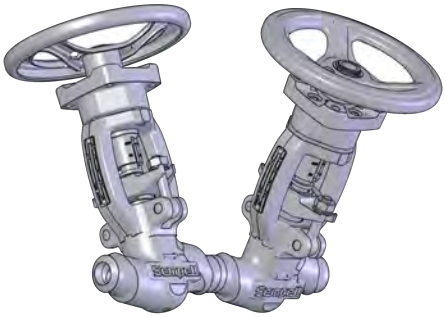


Fig. 6: Double shut-off - V-shaped

Valve 1 normal position "OPEN" (repair valve), see *Fig. 5*.

Valve 2 normal position "CLOSED" (shut-off valve)

Both valves are installed with pressure below the disk (usual flow-through).

This has the advantage that the stem (12), see *Fig. 3*, is centered during throttling with valve 2, thereby minimizing vibrations. The packing (14, 14.1) is relieved.

It is also possible to install valve 2 with pressure above the disk. The required closing forces are reduced by this. This can be advantageous at high operating pressures, above all for DN 40/50, (NVS 2“).

For reliable actuation of the double block, observe a minimum distance of 120 mm between the valves.

The valves can also be aligned to one another V-shaped, see *Fig. 6*.

NOTICE!

When installing double blocks in line systems in which water or other preserving fluids can collect, it is necessary to prevent this fluid from becoming trapped between valves 1 and 2.

CAUTION!

Risk of destruction due to overpressure upon renewed heating!

– Always keep repair valve in open during operation, if necessary provide lock or effective overpressure protection.

Installation of double shut-off

5 Transportation, packaging and storage

5.1 Safety instructions for transport

Suspended loads

WARNING!

Danger to life due to suspended loads!

Loads can swing out and fall down during lifting operations. This can cause serious injuries or even death.

- Never stand under or within the swiveling range of suspended loads.
- Only move loads under supervision.
- Only use approved hoists and sling gear with sufficient bearing capacity.
- Do not use torn or frayed hoists such as ropes or belts.
- Do not allow hoists such as ropes or belts to contact sharp edges or corners; do not knot or twist them.
- Set down the load when leaving the workplace.

Offset center of gravity

WARNING!

Risk of injury due to falling or tipping packing items!

Packing items may have an offset center of gravity. If not attached correctly, the packing item can tip and fall. Tilting or falling packing items can cause serious injuries.

- Observe the markings and information indicating the center of gravity on the packing items.
- When transporting by crane, attach the crane hook so that it is located above the packing item's center of gravity.
- Attach packing item carefully and observe whether it tilts. If necessary, change the attachment.

Swinging packing item

WARNING!

Risk of injury due to swinging packing item!

During transport by crane, the packing item may swing out and cause serious injuries and considerable material damage.

- Ensure that no persons, objects or obstacles are located in the swinging range of the transport item while it is being transported.

Improper transport

NOTICE!

Material damage due to improper transport!

During improper transport, packing items can fall or overturn. This can cause considerable material damage.

– When unloading packing items upon delivery as well as during in-plant transport, proceed with caution and observe the symbols and information on the packaging.
– Only use the attachment points provided.
– Only remove packaging just before assembly.

5.2 Transport inspection

Check the delivery for completeness and transport damage immediately upon receipt.

For externally identifiable transport damage, proceed as follows:

- Do not accept the delivery or accept it only with reservation.
- Note the extent of damage on the transport documents or on the transporter's delivery note
- Initiate complaints procedure.

Lodge a complaint for each defect as soon as it is identified. Damage compensation claims can only be asserted within the scope of the applicable contractual warranty.

5.3 Packaging

About packaging

The valve is delivered ready for installation, shrink-wrapped and packed in boxes or wooden crates.

The welding ends or flanges are protected by plastic caps.

Until the valve is mounted, the packaging is intended to protect the individual parts against transport damage, corrosion and other damage. Therefore, do not destroy the packaging and only remove it just before installation.

Handling packaging materials

Dispose of packaging materials in accordance with the respectively applicable legal regulations and local requirements.

NOTICE!

Hazard to environment due to incorrect disposal!

Packaging materials are valuable raw materials and can continue being used or sensibly reconditioned and recycled in many cases. Incorrect disposal of packaging materials can endanger the environment.

– Dispose of packaging materials in an environmentally sound manner.
– Observe the locally applicable regulations for disposal. If necessary, commission a specialist with the disposal.

5.4 Symbols on the packaging

The following symbols are attached to the packaging. Always observe the symbols during transport.

Fragile

Indicates packing items with fragile or sensitive contents.

Handle the packing item with caution and do not drop or expose to shock

Protect against moisture

Protect packing items from moisture and keep them dry.

Attach here

Attach sling gear (sling chain, hoisting strap) only at positions marked with this symbol.

Center of gravity

This signs clearly marks the position of the center of gravity.

Top

The package must always be transported, handled and stored such that the arrows are at any time pointing upwards.

5.5 Transport

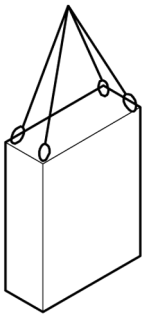
Transport of packing items by crane

Packing items equipped with hoisting lugs can be directly transported by crane under the following conditions:

- Crane and hoists must be designed for the weight of the packing items.
- The operator must be authorized to operate the crane.

Attaching

Protective equipment: ■ Industrial protective helmet



1. Attach ropes, belts or multi-point suspension tackles according to *Fig. 7*.
2. Ensure that the packing item hangs straight; if necessary, observe offset centers of gravity.
3. Start transportation.

Fig. 7: Transport by crane

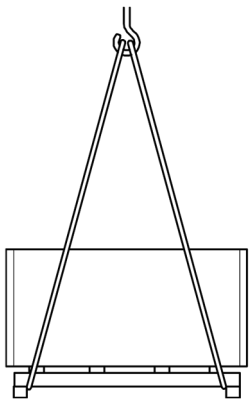
Transport of pallets by crane

Packing items attached to pallets can be transported by crane under the following conditions:

- Crane and hoists must be designed for the weight of the packing items.
- The operator must be authorized to operate the crane.

Attaching

Protective equipment: ■ Industrial protective helmet



1. Attach ropes, belts or multi-point suspension tackles according to *Fig. 8* to the pallet and secure against sliding.
2. Ensure that the packing item hangs straight; if necessary, observe offset centers of gravity.
3. If the pallet has an offset center of gravity, ensure that it cannot tilt.
4. Start transportation.

Fig. 8: Attach hoist

Transportation of pallets by means of a forklift truck

Packing items attached to pallets can be transported by forklift under the following conditions:

- The forklift must be designed for the weight of the packing items.
- The packing item must be securely attached to the pallet.

Transportation

Personnel: ■ Forklift driver

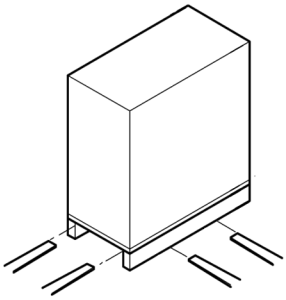


Fig. 9: Transport by forklift

1. Run the forks of the forklift between or under the rails of the pallet, according to *Fig. 9*.
2. Move the forks in to such an extent that they protrude at the opposite end.
3. If the pallet has an offset center of gravity, ensure that it cannot tilt.
4. Lift the pallet complete with the packing item and start transportation.

Loading and unloading

In order to exclude any damage being caused during loading and unloading, move valves manually or by means of suitable hoists only.

WARNING!
Always ensure that injury due to clamping in, crushing or any sharp edges is prevented.

Heavy weight

WARNING!
Risk of injury due to heavy weight!
Back problems and injuries may result from lifting and moving parts with a high dead weight.

– Never try to lift heavy parts on your own.
– Apply appropriate lifting technology or use suitable lifting devices.

NOTICE!
Handwheels or other actuating elements are unsuitable for use as attachment points.

Overview of weight for dimensioning the crane without actuator:

		Weight [kg]∗ without accessories	
		with welding ends	with flange
DN 10/15	NVS 1/2"	approx. 8	approx. 16
DN 25	NVS 1"	approx. 12	approx. 28
DN 40/50	NVS 2"	approx. 40	approx. 88

∗*may deviate depending on welding and flange dimensions*

5.6 Storage

Storage of the packing items

Store packing items under the following conditions:

- Do not store outdoors.
- Store in dry and dust free conditions.
- Do not expose to any aggressive media.
- Protect against solar radiation.
- Avoid any mechanical shocks.
- Storage temperature: 0 to 25°C.
- Distance between direct heat source and packing items: at least 1 m.
- Relative air humidity: max. 65 %.
- Protect from ozone. There must not be any ozone-generating devices (fluorescent light sources, mercury vapor lamps, electric motors, copiers etc.) in the storage area.
- When storing for longer than 3 months, check the general condition of all parts and packaging regularly. If necessary, refresh or renew the corrosion protection.
- The maximum storage period with undamaged packaging is approx. 18 months. For longer storage periods, refresh or renew the corrosion protection.

Packing items may have storage instructions that exceed the requirements stated here. Observe these accordingly.

6 Installation and first commissioning

6.1 Safety

Incorrect installation and first commissioning

WARNING!

Risk of injury due to incorrect installation and first commissioning!

Improper installation and first commissioning may cause serious injuries and considerable material damage.

- Before commencing work, ensure there is sufficient space for assembly.
- Handle open sharp-edged components carefully.
- Ensure cleanliness and tidiness in the assembly area! Components and tools lying loosely on top of each other or lying around are accident hazards.
- Assemble and install components correctly. Observe prescribed screw torque specifications.
- Secure components so that they do not fall down or overturn.
- Before first commissioning, observe the following:
  - Ensure that all installation work has been carried out and completed in accordance with the information and instructions in this manual.
  - Ensure that no persons are in the danger area.

Heavy weight

WARNING!

Risk of injury due to heavy weight!

Back problems and injuries may result from lifting and moving parts with a high dead weight.

- Never try to lift heavy parts on your own.
- Apply appropriate lifting technology or use suitable lifting devices.

Secure against restarting

WARNING!

Risk of death due to unauthorized restart!

Risk of grave injuries all the way to death for persons within the hazard area due to unauthorized reactivation of the energy supply during installation.

- Prior to commencement of work, turn off all energy supplies and secure against restarting.

6.2 Requirements for the installation site

Preparation of installation

The following sections provide important information for the preparation and installation of the individual components. Compliance is required for safe and functionally optimized operation of the valve.

Limitations of use

The limitations of use specified on the nameplate must not be exceeded under any circumstances.

The valve has to be used only according to the media compatibility of the used materials.

NOTICE!

Lifetime monitoring

During operation of the valve, the operator must perform a suitable lifetime monitoring under creep conditions of the material used.

- The creep strength values drawn upon for the design are informative and verified by corresponding tests for the material batch specifically used.
- The operational loading history may deviate from the design calculation, in particular with regard to alternating stress and other additional loads.

Installation and deinstallation dimensions

The installation and disassembly dimensions can be seen in the drawings from the documentation.

NOTICE!

Material damage due to contamination!

Contamination causes malfunctions and can affect the safe function of the components.

- Ensure cleanliness at the installation site.
- Close all openings with protective caps.
- Before disconnecting screw connections and components, clean the external environment.
- Do not use solvent to clean packings or gaskets.

The gaskets must be installed dry. Do not use lubricants in the gasket area.

The valve must be mounted in accordance with its tasks. Install the valve so that the following conditions are met :

General information

- The safe position of the valve is ensured.
- The entire installation area is free of objects.
- Sufficient lighting is available throughout the entire installation area.
- All monitoring indicators are mounted so they are clearly visible.
- The valve is installed such that hoists can be attached directly and maintenance work can be carried out directly.
- The nominal size of the connection lines corresponds to the nominal diameter of the specified connections of the valve.
- Emergency escape routes and rescue equipment are freely accessible.

Details on oscillations and vibrations

NOTICE!

Material damage due to vibrations!

Extreme vibrations may have a detrimental effect on leak tightness and functionality!

- The valve must be installed corresponding to its task. No vibrations of other components should be transferred to the valve.
- The supply lines are vibration-free, routed at short lengths and have been fitted with as few bends as possible.

Details regarding drainage

- The feed lines at the inlet and outlet of the valve must drained sufficiently and continuously.
- Pipes, valves and drains must be protected against freezing.

NOTICE!

Must be observed!

Before the installation is commissioned, the pipes must be cleaned, as otherwise the leak tightness of the seat cannot be guaranteed!

6.3 Installation position

Installation in any position. Flow direction: entry preferably under the disk. Provide dimension "X" as free space for operation, maintenance and disassembly (only for handwheel version).

If possible, install valves with actuators with stem in vertical position.

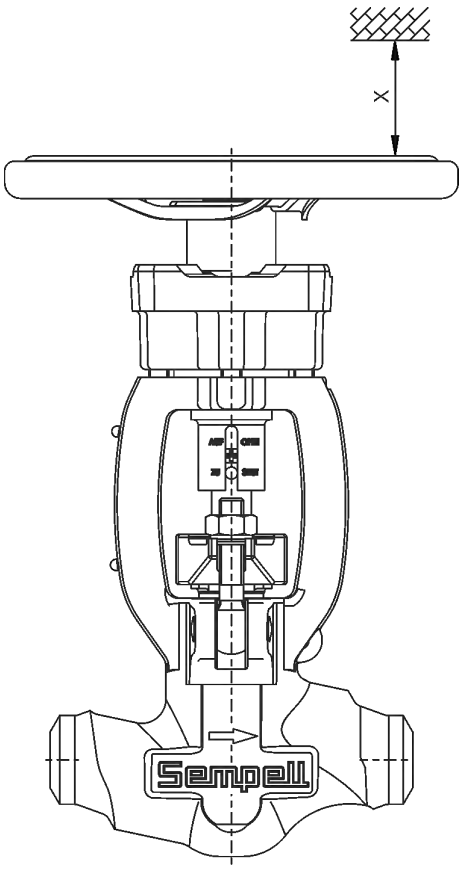


Fig. 10: Installation position

NW	X (mm)
DN 10/15	approx. 500
NVS 1/2"	
DN 25	approx. 550
NVS 1"	
DN 40/50	approx. 750
NVS 2"	

Required supports are to be provided by the piping company.

6.4 Pipe and hanger loads

NOTICE!

Material damage due to deformation of the valve body!

External loads lead to additional stresses in the valve, which were not considered in the design against predominantly inactive internal pressure loading. Inadmissibly high pipeline forces can deform the valve body. This can cause malfunctions such as leaks.

– Have any additional loads that may occur checked by the manufacturer and, if necessary, the designated body.
– It is imperative to blow out pipelines before commissioning to remove foreign particles.
– All activities must be carried out by qualified personnel only.

The valve can only absorb low pipeline forces. Usage as an anchor point is not permissible unless this has been explicitly approved by the manufacturer. The pipelines must be connected without mechanical tension. The permissible pipe and suspension loads must be adapted to the local conditions.

Tensions on the valve body may cause leakages at the valve seat.

6.5 Welding in

Personnel:
- Technical specialist
- Welding specialist

Protective equipment:
- Protective work clothing
- Welding shield
- Protective welding apron
- Heat-resistant safety gloves with arm protection
- Safety shoes

Before welding, the following conditions must be fulfilled:

- Check welding ends and valve for damage.
- The applicable welding and annealing regulations are adhered to.
- Do not attach welding cable (opposite pole) to the valve.

WARNING!
Always ensure that injury due to clamping in, crushing or any sharp edges is prevented.

NOTICE!
Material damage due to contamination!
Contamination causes malfunctions and can affect the safe function of the components.

- Ensure cleanliness at the installation site.
- Close all openings with protective caps.
- Before disconnecting screw connections and components, clean the external environment.
- Do not use solvent to clean packings or gaskets.

1. Valve is to be put into the open position.
2. Remove protection caps.
3. Protect internal parts against contamination (e.g. by welding spatter or slag).

NOTICE!
The weld-in connection pieces are long enough for any heat treatment and non-destructive testing procedures that may become necessary. It is not necessary to disassemble the packing (14, 14.1), see *Fig. 3*, if the annealing temperature remains limited to the welding seam area.

4. Fit valve corresponding to the flow direction into pipe, align and arrest in position such that they can be welded in without any stresses occurring.
5. Weld the inlet and outlet openings of the valve to the corresponding operator-side pipelines.
6. Treat weld seams (e.g. cleaning, grinding, heat treating).

6.6 Valves with flange connection

When using valves with a flange connection, it must be ensured that the connecting flange and flange gaskets are clean and undamaged.

Connection elements and flange gaskets are not part of the scope of delivery as standard.

Furthermore, correct alignment of the connecting flange to the pipe must be ensured.

The flange connections are to be smoothly inserted through the flange bores and must be tightened crosswise.

Ensure sufficient space for the actuating element (handwheel, actuator),see "Installation position".

6.7 Flushing, pickling and blowing out

Generals

NOTICE!

Material damage due to contaminants in pipeline system!

Contaminants in pipeline system caused by e.g. welding or assembly work cause material damage to the valve. The smallest parts can accumulate in the valve and interfere with its function.

– Before commissioning, flush the entire pipeline system; if necessary, pickle and blow out.

It is recommended to commission a special pickling company for this work. Contact the manufacturer for more information (see manufacturer address).

The usual valve materials are resistant against attacks from pickling liquids. Minor attacks on the surface of the valve parts are usually recognized as safe.

Move valve into OPEN position and do not operate during the pickling and flushing phase. The pickling process should follow without any delay. Avoid excessively long application of the pickling liquid. Remove all traces of pickling liquid by e.g. flushing. Here, special attention needs to be paid to dead space in valves as well as to dead line sections.

CAUTION!
Replace any seals and gland packings which came into contact with the pickling fluid. Carefully clean sealing areas before replacement. Remove all traces of potential foreign particles.

NOTICE!
Damage due to foreign particles e.g. to valve seats can also occur when flushing" at high velocity.

6.7.1 Insulation

6.7.1.1 Thermal insulation

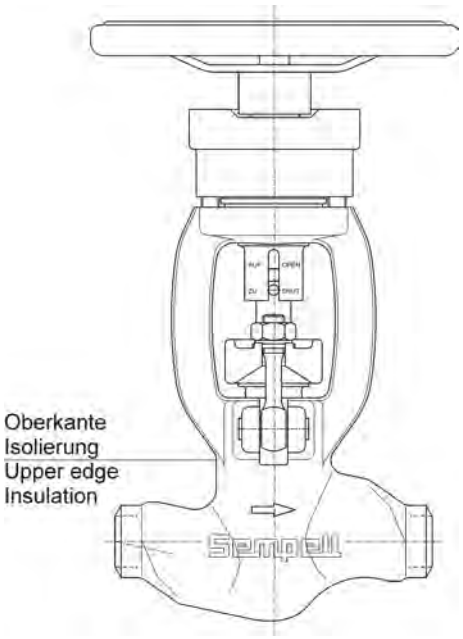


Fig. 11: Insulation

WARNING!
Risk of injury due to hot surfaces!
During operation, the surfaces of components can heat up dramatically. Skin contact with hot surfaces causes severe burns to the skin.

- Whenever working in the vicinity of hot surfaces, heat-resistant protective work clothing and safety gloves must be worn at all times.
- Before all work, ensure that all surfaces have cooled down to ambient temperature.
- Thermally insulate the body as well.

The valve body must be thermally insulated to prevent injuries and keep thermal loss low.

Fit necessary insulation in accordance with the diagram, see *Fig. 11*, only up to the eye bolts to ensure that setting and operating elements are permanently accessible.

The cover attachment must not be insulated. The gland must be easily accessible for maintenance work and must not be exposed to high heat loads.

NOTICE!

Material damage due to improper insulation!

Gland, yoke, actuator and all electrical components must not be insulated under any circumstances.

Any insulating limits that may be displayed on the dimension drawing are a recommendation and do not release the operator from their responsibility to design and execute insulation.

6.8 On commissioning

Incorrect installation and first commissioning

WARNING!

Risk of injury due to incorrect installation and first commissioning!

Improper installation and first commissioning may cause serious injuries and considerable material damage.

- Before commencing work, ensure there is sufficient space for assembly.
- Handle open sharp-edged components carefully.
- Ensure cleanliness and tidiness in the assembly area! Components and tools lying loosely on top of each other or lying around are accident hazards.
- Assemble and install components correctly. Observe prescribed screw torque specifications.
- Secure components so that they do not fall down or overturn.
- Before first commissioning, observe the following:
  - Ensure that all installation work has been carried out and completed in accordance with the information and instructions in this manual.
  - Ensure that no persons are in the danger area.

After the initial pressurizing, after every disassembly and after the initial warm-up, observe the following points:

- Check gland.
  When retightening the packing (14,14.1): Observe tightening torques (↳ *Chapter 9.3.1 “Tightening torques and pressing paths of the gland packing” on page 91*).
- Check that stem (12) moves smoothly.

On commissioning

7 Operation

7.1 Safety

Improper operation

WARNING!

Risk of injury due to improper operation!

Improper operation can lead to serious injuries and major material damages.

- Carry out all operation steps in accordance with the information and instructions in this manual.
- Before starting work ensure that:
  - all covers and safety devices are installed and fully functional.
  - no persons are in the hazard area.
- Never disable or bypass safety devices during operation.

7.2 Emergency

In dangerous situations, the movements of components must be stopped and the power supply switched off as quickly as possible.

The operator must regulate conduct in cases of fire and emergency based on the applicable laws, rules and regulations and must train the personnel accordingly.

WARNING!

Danger to life due to restarting without authorization or without checking!

Unauthorized or uncontrolled switching back on of the power supply can cause serious injuries or even death.

- Before switching the power supply back on, ensure that all safety devices are assembled and functioning properly and that there are no dangers for persons.

7.3 Operating options

7.3.1 Handwheel

The valve is closed by turning the handwheel clockwise, and opened by turning the handwheel counterclockwise.

NOTICE!

Tools for increasing the manual torque are not allowed.

The use of valve hooks for operation is only admissible with DN 40/50, NVS2" subject to the torque of max. 250 Nm.

7.3.2 Electric actuator

Setting of the actuator

- Close: Dependent on torque
- Open: Path-dependent

The torque preset by the factory must not be exceeded.

The operating instruction of the installed actuator is included in the documentation.

7.3.3 Linear actuator

The operating instruction of the installed actuator is included in the documentation.

8 Maintenance

8.1 Safety

Maintenance work carried out incorrectly

WARNING!

Risk of injury due to incorrect execution of maintenance work!

Incorrect maintenance can lead to serious injuries and major material damages.

- Before commencing work, ensure there is sufficient space for assembly.
- Make sure the workplace is clean and tidy! Components and tools lying loosely on top of each other or lying around are accident hazards.
- If components have been removed, pay attention to correct assembly, reinstall all fastening elements and observe screw tightening torques.
- Secure components so that they do not fall down or overturn
- Before recommissioning, observe the following:
  - Ensure that all maintenance work has been carried out and completed in accordance with the information and instructions in this manual.
  - Ensure that no persons are in the danger area.
  - Make sure that all covers and safety devices are installed and fully functional.

Secure against restarting

WARNING!

Risk of death due to unauthorized restart!

Risk of grave injuries all the way to death for persons within the hazard area due to unauthorized reactivation of the power supply during the maintenance.

- Before starting work, switch off all power supplies and secure them from restarting.

Environmental protection

During maintenance, observe the following information on environmental protection:

- At all lubricating points that are manually supplied with lubricant, remove the escaping, consumed or excess grease and dispose of it according to the valid local provisions.
- Collect replaced oil in suitable containers and dispose of it according to the valid local provisions.

8.2 Maintenance schedule

NOTICE!

Recurrent inspections

The operator must ensure that recurrent inspections are regularly carried out on the valve in accordance with the specifications of the designated body. These apply in addition to the specifications of the maintenance schedule and are not listed here.

The following sections describe maintenance procedures that are required to ensure optimum and interference-free operation of the valve.

If increased wear is found during routine inspections, shorten the maintenance interval to correspond to the actual signs of wear. For questions regarding maintenance work and intervals, contact the manufacturer, see manufacturer address.

In case of frequent operating, using an actuator and in case of difficult conditions we recommend to provide the valves with accessory 182, see Chapter 9.4.11 “ SN 182 Lubrication of stem thread(standard on DN 40/50, NVS 2")” on page 110, (stem lubrication, standard at DN 40/50, NVS 2“).

CAUTION!

Accident hazard due to escaping medium!

– Under operating pressure, do not loosen the gland flange (16), see *Fig. 3*, or repack the gland; otherwise the packing (14, 14.1) can be suddenly forced out.

In the event of fault-free operation, Sempell recommends that a complete visual inspection be conducted on the internal sections of the valve every 4 years

Interval	Maintenance work	Personnel
First application of pressure, first warm-up	Check gland. In case of accessory 160.1 (spring-loaded gland) discernible at gap between guide bush (65), see *Chapter 9.4.10 " SN 160.1 Spring-loaded gland" on page 109*, and washer (67). When retightening the packing (14, 14.1), see *Fig. 3*: Observe tightening torques (*Chapter 9.3.1 "Tightening torques and pressing paths of the gland packing" on page 91*).	Technical specialist
	Check that stem (12) moves freely, see *Fig. 3*.	Technical specialist
Following each disassembly	Check gland. In case of accessory 160.1 (spring-loaded gland) discernible at gap between guide bush (65), see *Chapter 9.4.10 " SN 160.1 Spring-loaded gland" on page 109*, and washer (67). When retightening the packing (14, 14.1), see *Fig. 3*: Observe tightening torques (*Chapter 9.3.1 "Tightening torques and pressing paths of the gland packing" on page 91*).	Technical specialist
	Check that stem (12) moves freely, see *Fig. 3*.	Technical specialist
Every six to twelve months, in case of difficult conditions -according to necessity	Check gland and re-tighten if necessary. In case of accessory 160.1 (spring-loaded gland) discernible at gap between guide bush (65), see *Chapter 9.4.10 " SN 160.1 Spring-loaded gland" on page 109*, and washer (67). Observe tightening torques (*Chapter 9.3.1 "Tightening torques and pressing paths of the gland packing" on page 91*). Replace leaking packing (14, 14.1), see *Fig. 3*. If necessary, clean stem above the gland shaft (15).	Technical specialist
	Check valve for ease of movement. If necessary, lubricate stem (12). See *Fig. 3*. In case of accessory 182, see *Chapter 9.4.11 " SN 182 Lubrication of stem thread(standard on DN 40/50, NVS 2")" on page 110*, this can be done via the lubricating nipple (86).	Technical specialist

Interval	Maintenance work	Personnel
	Disassemble the valve yoke for the standard valve.	
	Standard valve has long-term lubrication for max. 3 years. Completely replace the grease in the valve yoke after 3 years at the latest, see *"Lubricate valve yoke" on page 81*.	Technical specialist
Every six to twelve months, in case of difficult conditions -according to necessity	In case of accessories 371-373 (valve lock), see *Chapter 9.4.12 "SN 371 - 373 Valve lock" on page 110*: Clean outer valve lock. Check function of the interlock by using the key. Use creeping lubricant if not moving freely. Contact Customer Service in case of faults.	Technical specialist
	In case of accessory 30 (watertight gland), see *Chapter 9.4.1 " SN 30 Seal water type gland" on page 93*: Check for leaks. If necessary, replace sealing ring (98).	Technical specialist

8.3 Maintenance work

8.3.1 Visual inspection for damage and leak tightness

Personnel:
- Technical specialist

Protective equipment:
- Protective glasses
- Protective work clothing
- Safety shoes

1. Switch off valve with actuator and secure against being switched on again.
2. Check valve from all sides for external damage.
3. Check gland for tightness and replace if necessary (if necessary replace the gland, see *Chapter 9 "Disassembly and reassembly" on page 65*).

8.3.2 Maintenance with valve disassembled

Personnel:	■ Technical specialist ■ Service technician
Protective equipment:	■ Protective glasses ■ Protective work clothing ■ Safety gloves ■ Safety shoes
Materials:	■ Section drawing

Tools

- Open-end wrenches 22, 27 mm
- Hexagonal screw driver 6, 8, 14 mm
- Torque wrench 22, 27 + 6, 8, 14 (hexagon socket)
- Straight circlip pliers for external circlips Ø 22, 28, 42
- Hammer
- Spacers
- Grinding mandrel for reworking the body seat
- Abrasive segments

or

- Tool case, available as an option, see *Chapter 12.2 "Tools" on page 120*

The following preconditions must be fulfilled:

- Written approval has been received and the entire system is shut off.
- The entire system has been depressurized and the valve body has cooled to ambient temperature.
- Lay out tools, gaskets and spare parts.
- Always replace gaskets as they may only be used once.

8.3.2.1 Reworking of body seat / stem

Instructions on maintenance with the valve disassembled

1. Clean stem (12), see , in the area of the packing (14, 14.1).

   When reworking the stem: Comply with cylinder shape 0,05 mm (DIN EN ISO 1101), concentricity 0,1 mm, surface longitudinally polished (Ra 0,2 µm),
   min. Ø 15,85 (DN 10/15, NVS 1/2"),
   Ø 19,85 (DN 25, NVS 1") and Ø 31,85 (DN 40/50, NVS 2").

2. Use new packing (14, 14.1), see .

3. . Lubricate moving parts in the valve yoke, see . Lubricate threads of the stem (12), use brush for this purpose .

4. When changing the grease of the rotary actuator unit, also relubricate the drive head of the valve, see .

5. If necessary, rework seating areas in the body (1) and on the stem (12).

   The stem (12) may then plunge max. 3 mm more deeply into the body (1).

   Record actual measurement before the first reworking. Rework valve seat inclination 15°, disk seat on lathe.

   If the disk seat cannot be reworked, this can also be ground together with the body seat.

Max. permissible removal in[mm]	DN 10/15 NVS 1/2"	DN 25 NVS 1"	DN 40/50 NVS 2"
Seat	2	2	2
Stem	2	2	2
Total	3	3	3

6. Assemble the valve as described in .

8.4 Measures after successful maintenance

After concluding maintenance work and before switching on the valve, carry out the following steps:

1. Check all previously loosened screw connections for a tight fit.

2. Check that all previously removed protective devices and covers have been properly re-installed.

3. Make sure that all tools, materials and other equipment used have been removed from the work area.

4. Clean work area and remove any escaped materials such as liquids, processing material or the like.

8.5 On recommissioning

WARNING!

Risk of injury due to escaping medium!

Under operating pressure, neither loosen the gland flange nor repack the gland as otherwise the packing can suddenly be forced out.

Before starting work on these components:

– Establish a depressurized state. Also discharge residual energy.

After the initial pressurizing, after every disassembly and after the initial warm-up:

- Check gland. Retighten or replace if leaking. When retightening the packing, observe tightening torques. Check mobility of the stem.
- Check the gaskets for leaks.

On recommissioning

9 Disassembly and reassembly

9.1 Safety

Improper disassembly

WARNING!

Risk of injury due to improper disassembly!

Stored residual energies, sharp-edged components, points and corners on or in the valve or on the required tools can cause injuries.

- Before starting work, ensure there is sufficient space.
- Handle open sharp-edged components carefully.
- Make sure the workplace is clean and tidy! Components and tools lying loosely on top of each other or lying around are accident hazards.
- Properly disassemble components. Pay attention to the dead weight of the components, which is sometimes heavy. If required, use hoists.
- Secure components so that they do not fall down or overturn.
- If anything is unclear, consult with the manufacturer.

9.2 Disassembly

Personnel:	■ Technical specialist
Protective equipment:	■ Protective glasses
	■ Protective work clothing
	■ Safety gloves
	■ Safety shoes
Materials:	■ Section drawing

The following preconditions must be fulfilled:

- Written approval has been received and the entire system is shut off.
- The entire system has been depressurized and the body has cooled to ambient temperature.
- Lay out tools, gaskets and spare parts.
- Always replace gaskets as they may only be used once.

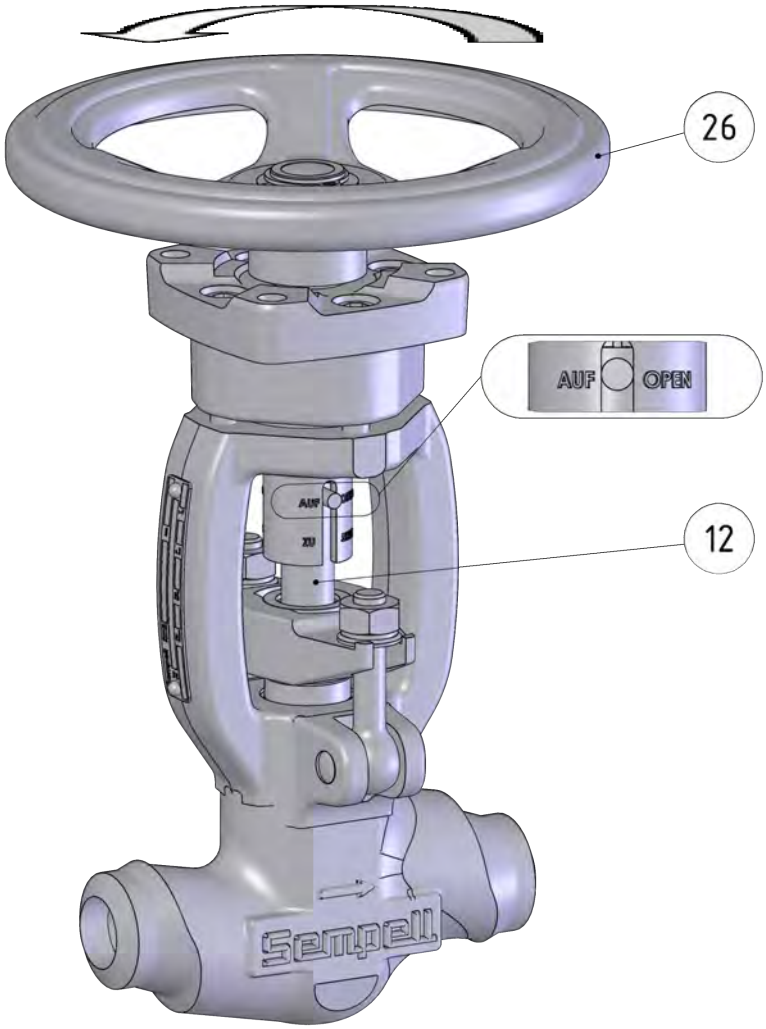


Fig. 12

1. Move stem (12) into open position by turning the handwheel (26) counterclockwise.

2. In the case of valves with fitted special accessories, first disassemble special accessories as described in *Chapter 9.4 “Disassembly and reassembly of special accessories (SN)” on page 91*.

Disassembling valve

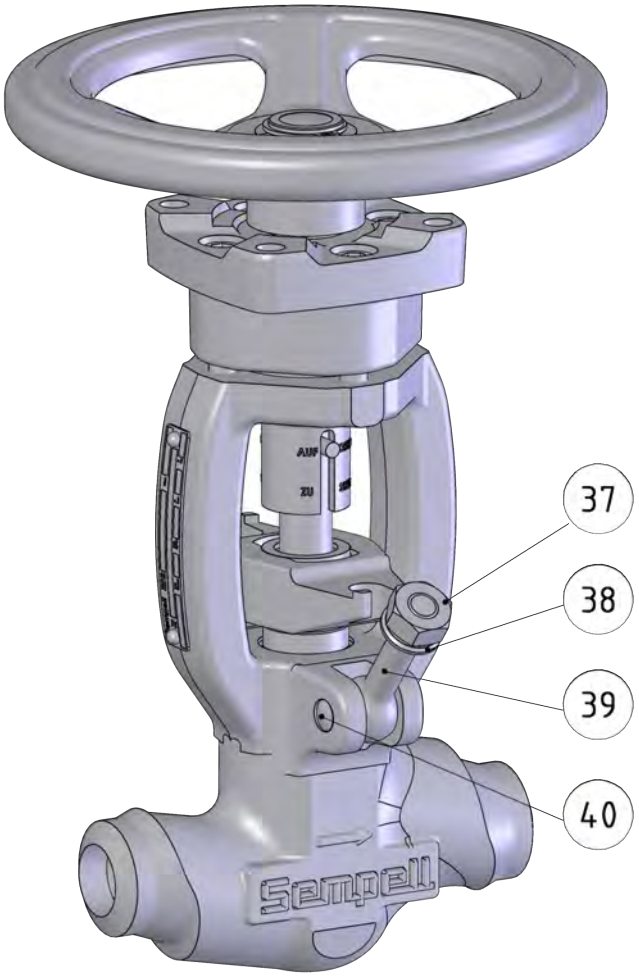


Fig. 13

1. Loosen hexagonal nuts (37) .
2. Fold away eye bolts (39).

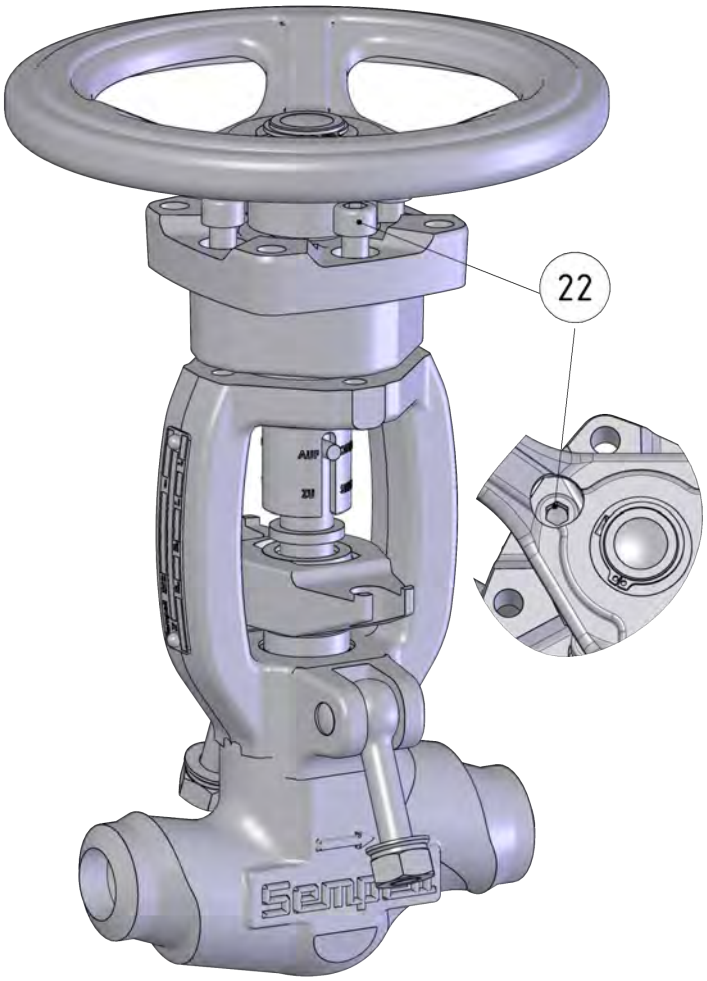


Fig. 14

→ Undo Allen bolts (22) through assembly bore in the hand-wheel.

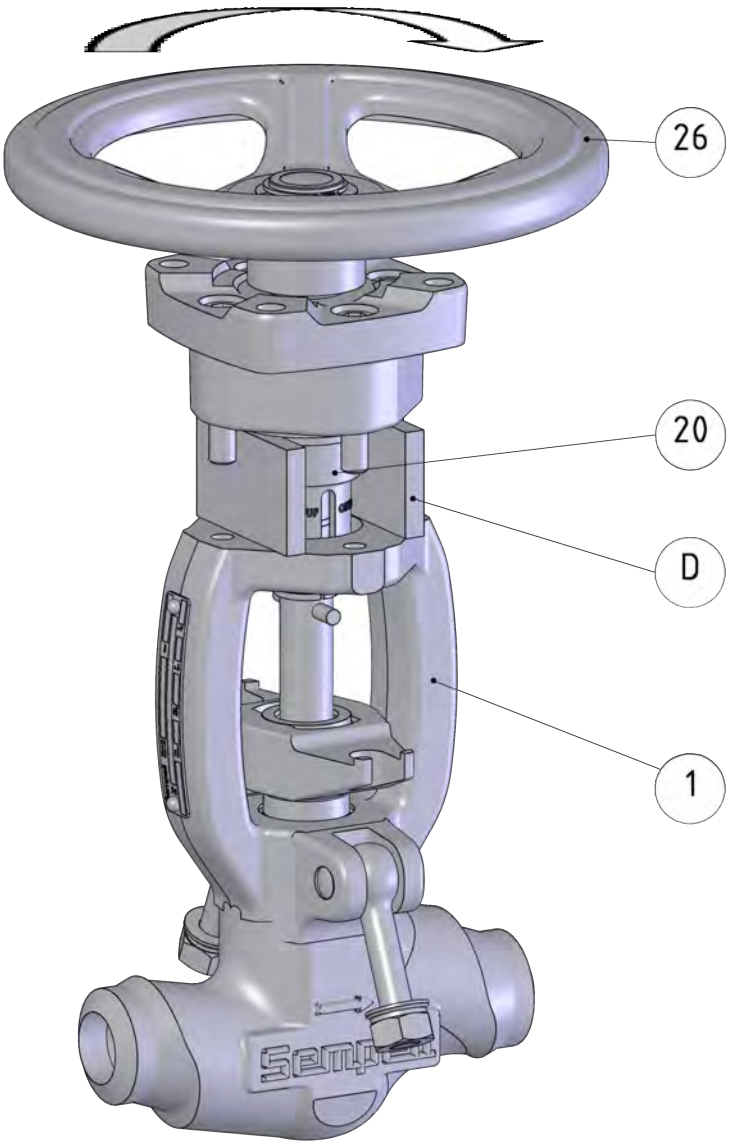


Fig. 15

1. Turn the handwheel (26) clockwise to lift the entire drive head and push up guide bush (20).
2. Slide spacer (D) (e.g. from tool case) between the body flange (1) and guide bush (20).

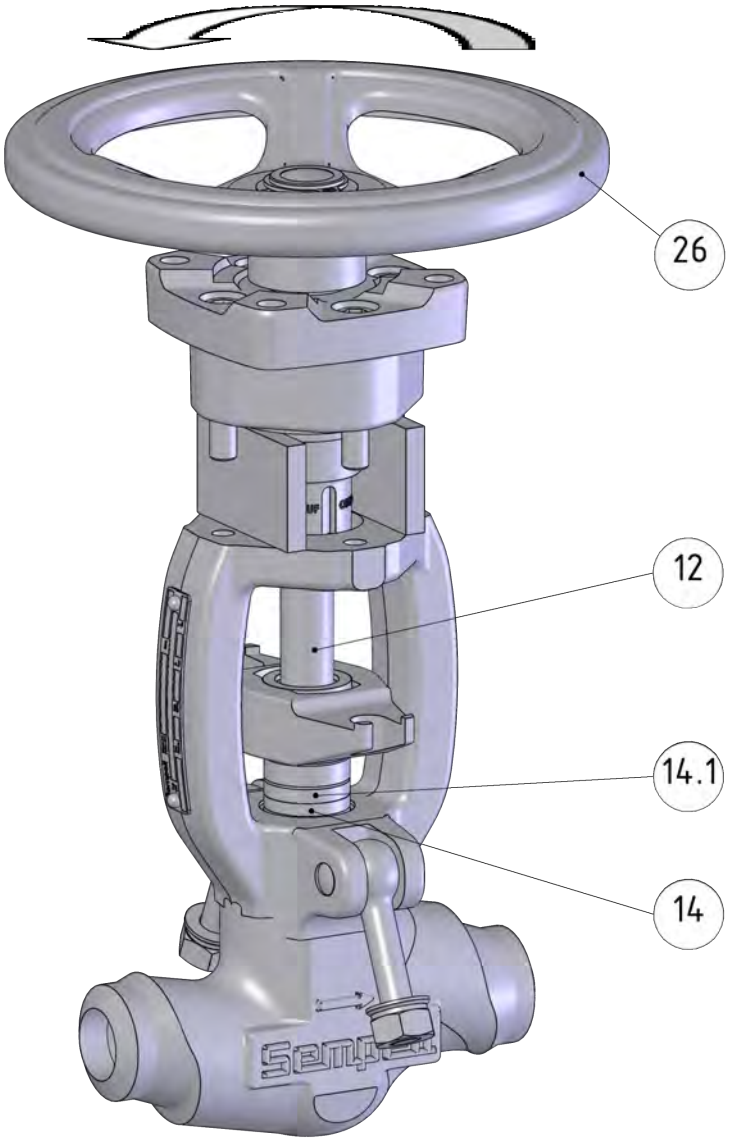


Fig. 16

→ Turn the handwheel (26) counterclockwise in order to pull packing (14, 14.1) by means of the collar on the stem (12) until the topmost packing ring becomes visible.

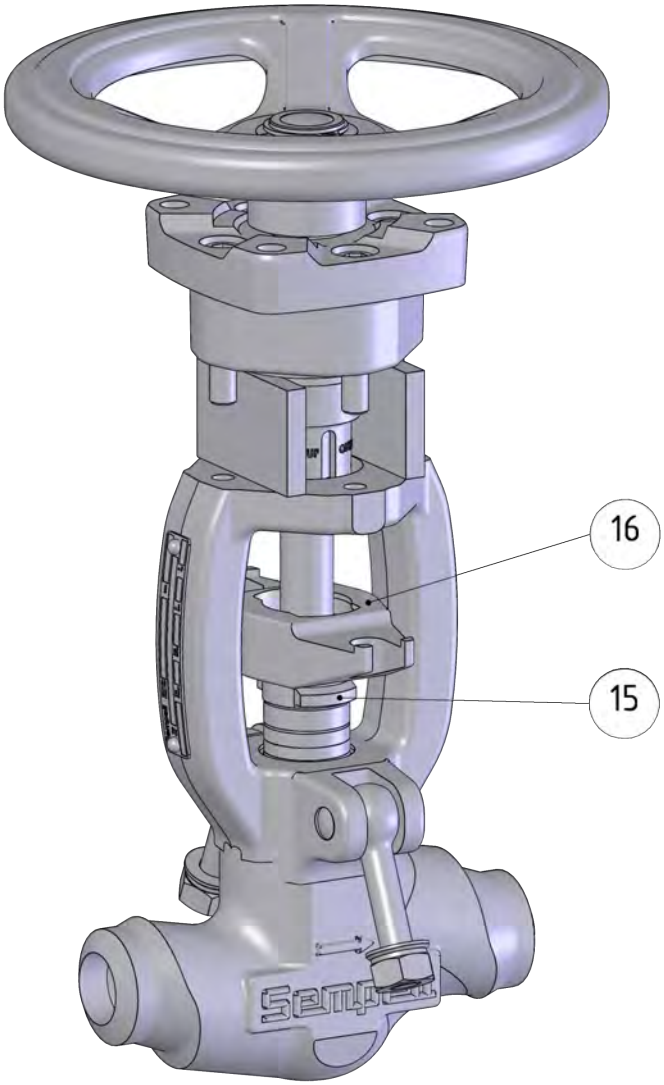


Fig. 17

→ Lift gland flange (16) by approx. 5 mm and turn gland shaft (15) by 90° (Bayonet).

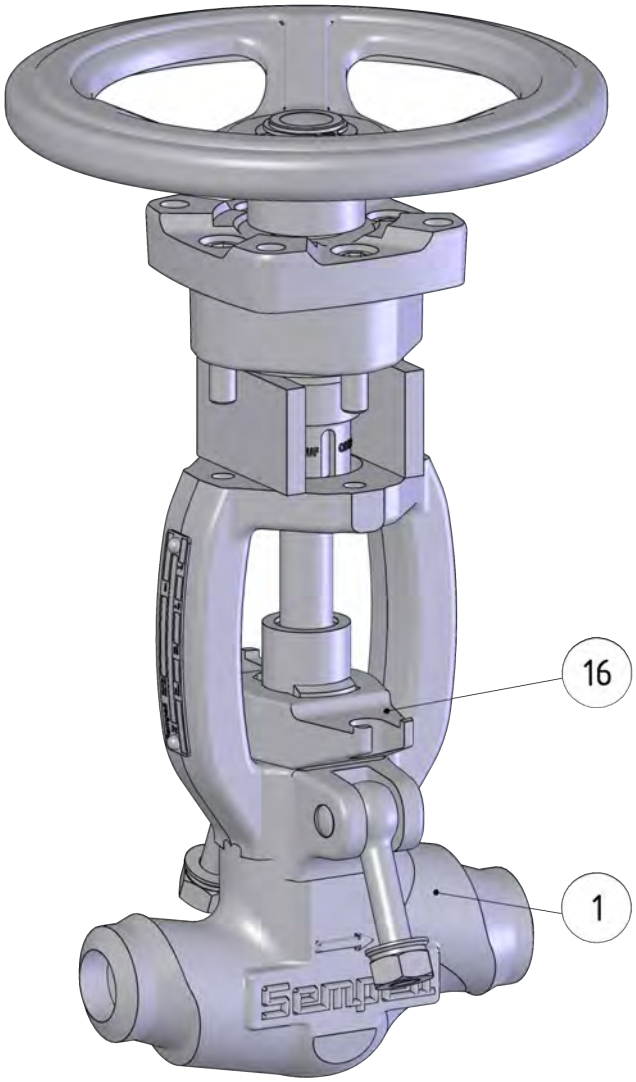


Fig. 18

→ Place gland flange (16) on the body (1).

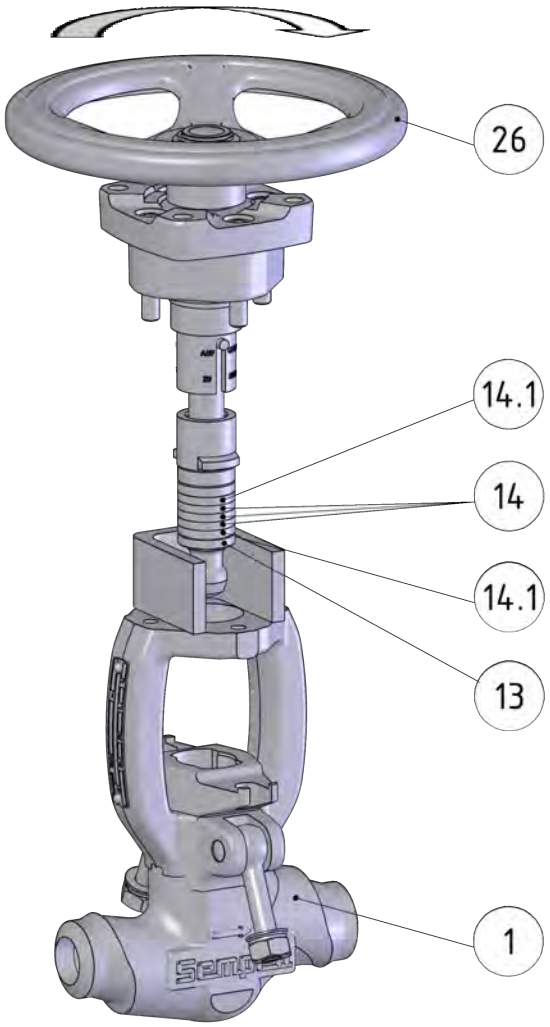


Fig. 19

→ Continue to turn clockwise by handwheel (26) , pull packing (14, 14.1) from the body (1) and disassemble complete valve insert as a unit.

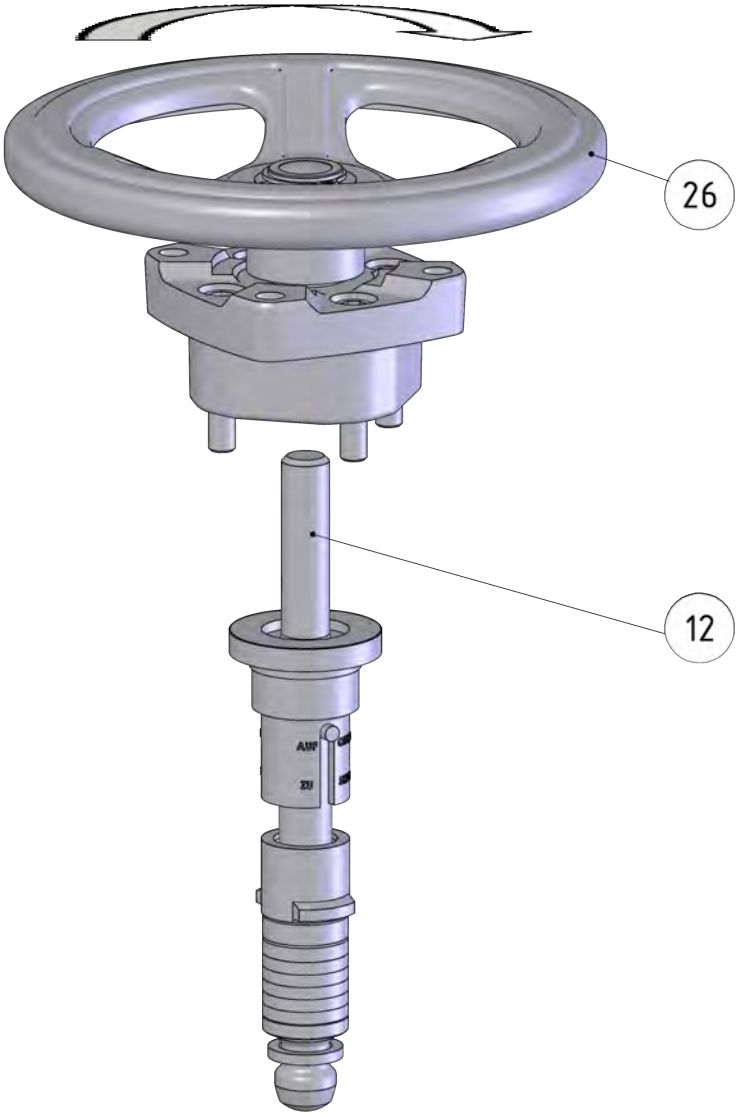


Fig. 20

→ Unscrew the complete drive head from stem (12) by turning handwheel (26) clockwise.

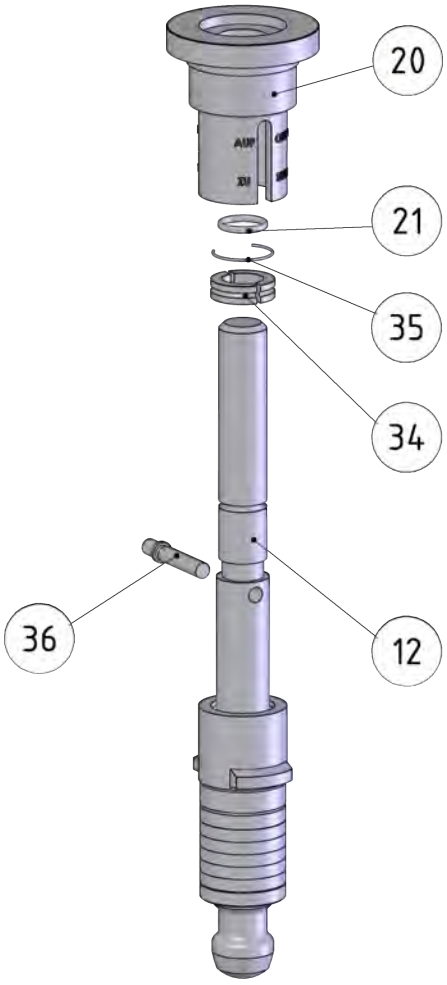


Fig. 21

1. Withdraw guide bush (20).
2. Remove O- ring (21).
3. Remove ring (35).
4. Remove split ring (34).
5. Remove guide bolts (36).

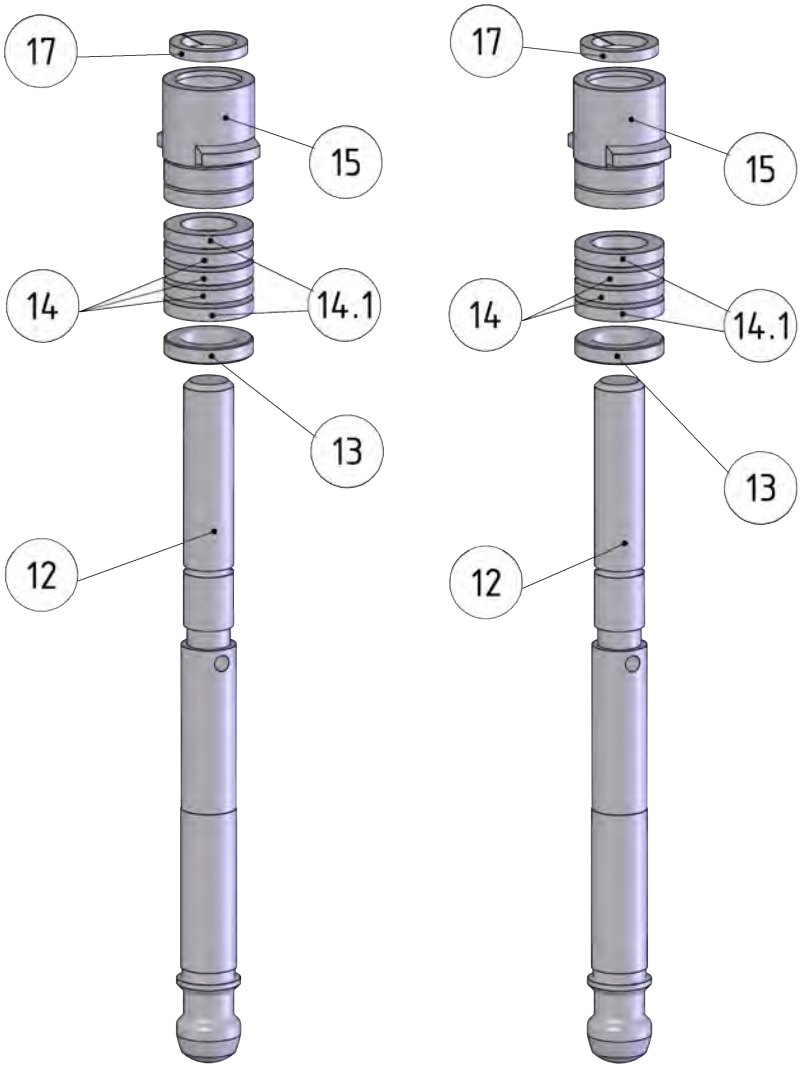


Fig. 22: Figure left DN 10-25, NVS 1/2"-1", figure right DN 40/50, NVS 2"

→ Pull out gland shaft (15) with wiper ring (17), packing (14), (14.1) and base ring (13).

The number of packings (14), see Fig. 31, is indicated in the table below.

Part 14	
DN 10-25, NVS 1/2"-1"	3 pcs
DN 40/50, NVS 2"	2 pcs

Disassembling valve yoke
DN 10-25, NVS 1/2"-1" and DN 40/50, NVS 2"

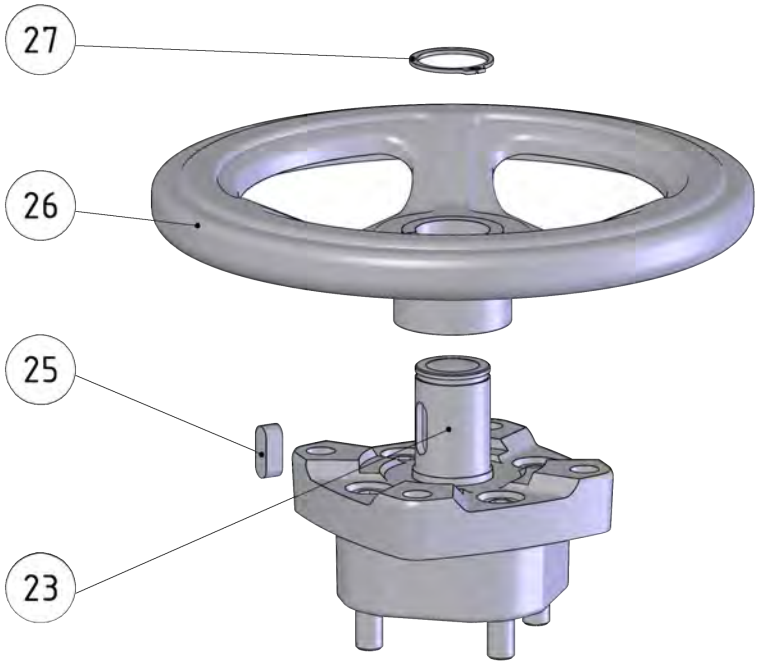


Fig. 23

1. Remove retaining ring (27) and take off handwheel (26).
2. Remove parallel key (25) from threaded bush (23).

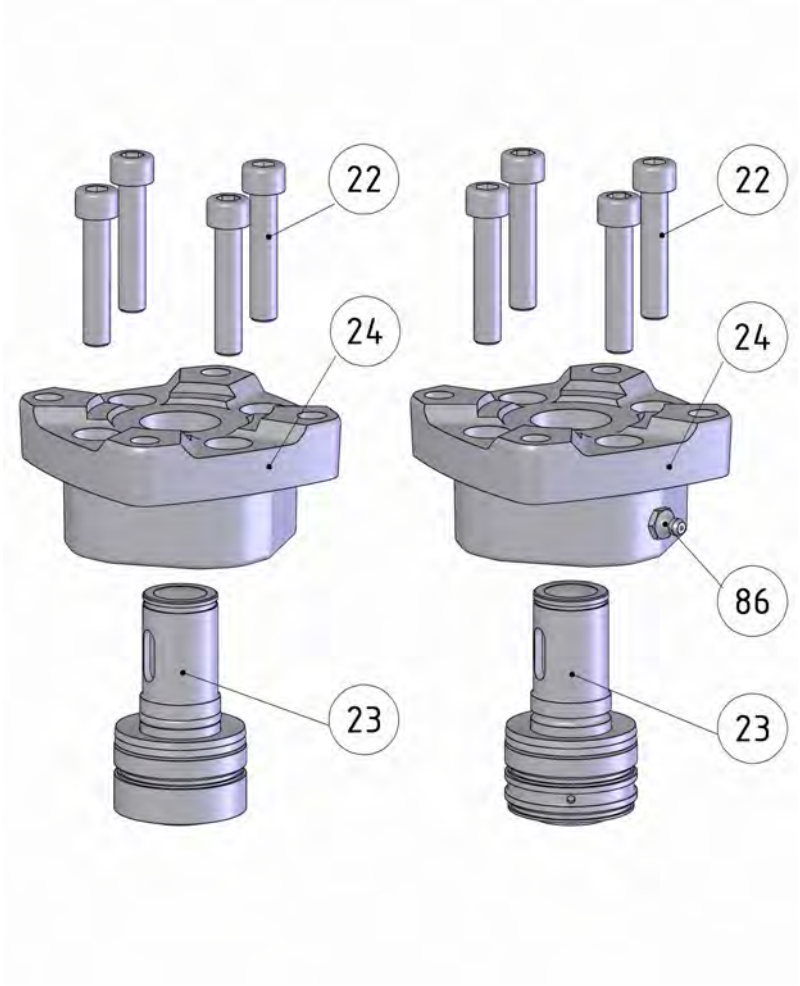


Fig. 24: Figure left DN 10-25, NVS 1/2"-1", figure right DN 40/50, NVS 2", with lubrication nipple (86)

→ Remove Allen bolts (22) and cover (24) from threaded bush.

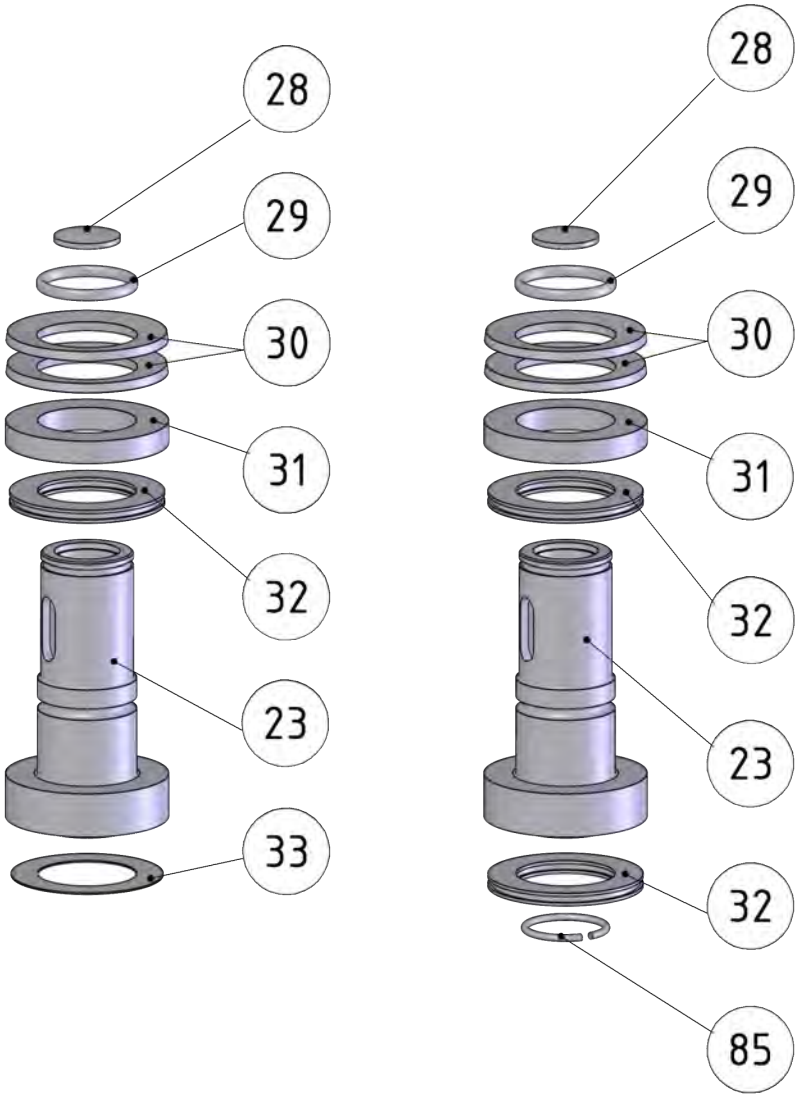


Fig. 25: Figure left DN 10-25, NVS 1/2"-1", figure right DN 40/50, NVS 2"

1. Remove snap ring (85) (for DN 40/50, NVS 2").
2. Remove O-ring (29).
3. Remove disk springs (30), disk rings (31), slide ring (33) (for DN 10-25, NVS 1/2"-1") and bearing (32).
4. Undo closure disk (28).

For placing out of operation

Properly clean all remaining assemblies and components and disassemble under observance of applicable local occupational safety and environmental protection guidelines.

9.3 Reassembly

The following conditions must be fulfilled before starting reassembly:

- All parts have been cleaned and checked.
- Seals and packings have been replaced.
- Stem and seat have been reground.

Reassembly of the valve

Personnel:
- Technical specialist

Protective equipment:
- Protective glasses
- Protective work clothing
- Safety gloves
- Safety shoes

Materials:
- Engineering drawing

Reassembly valve yoke

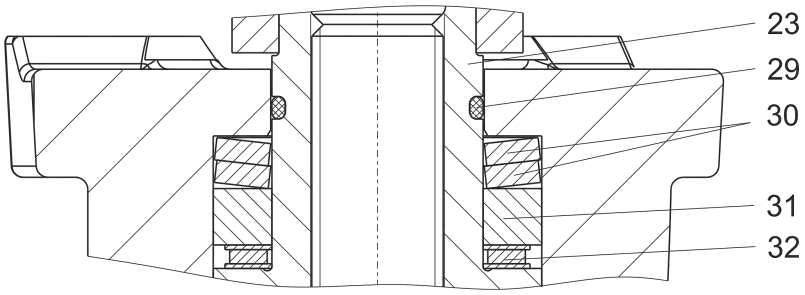


Fig. 26: Reassembly valve yoke

Lubricate valve yoke

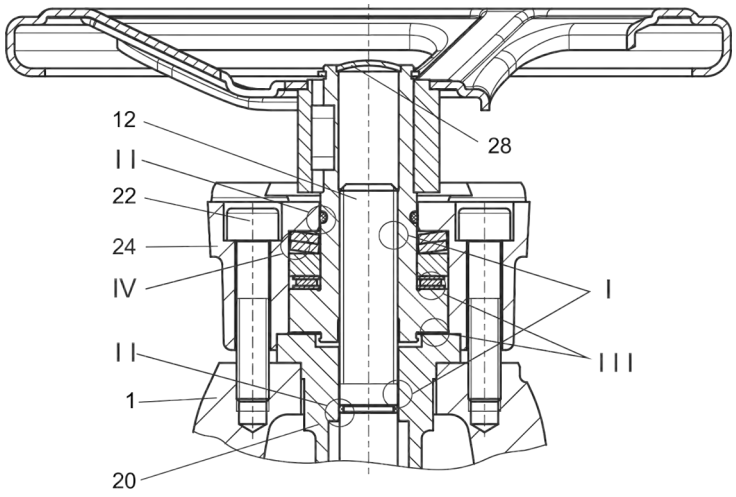


Fig. 27

1.

CAUTION!
The support surfaces between the cover (24), see *Fig. 27*, guide bush (20) and body (1) must be free of grease to prevent the parts from rotating (position indicator).

Lubricate stem threads (12) and bolt threads (22) with the corresponding grease, see ↳ *Chapter 3.2 "Operating materials" on page 28*.

I	Threads of disk stem (12), see *Fig. 27*, and threaded bush (23)
I I	O-rings (21), (29), see *Fig. 3*
I I I	Slide ring (33) (DN 10-25, NVS 1/2"-1"), see *Fig. 3* or bearing (32) (DN 40/50, NVS 2")
IV	Disk spring (30) and disk ring (31) see *Fig. 3*

2.

WARNING!
Risk of injury!
Do not exceed the total lubrication amount on valves with a handwheel. If the total lubrication amount is exceeded, the sealing washer (28), see *Fig. 27*, can be forced out and cause serious injuries.

Grease amount for a valve yoke:	
DN 10-25, NVS 1/2"-1"	approx. 2 cm³ (1,8 gram)
DN 40/50, NVS 2"	approx. 3 cm³ (2,7 gram)

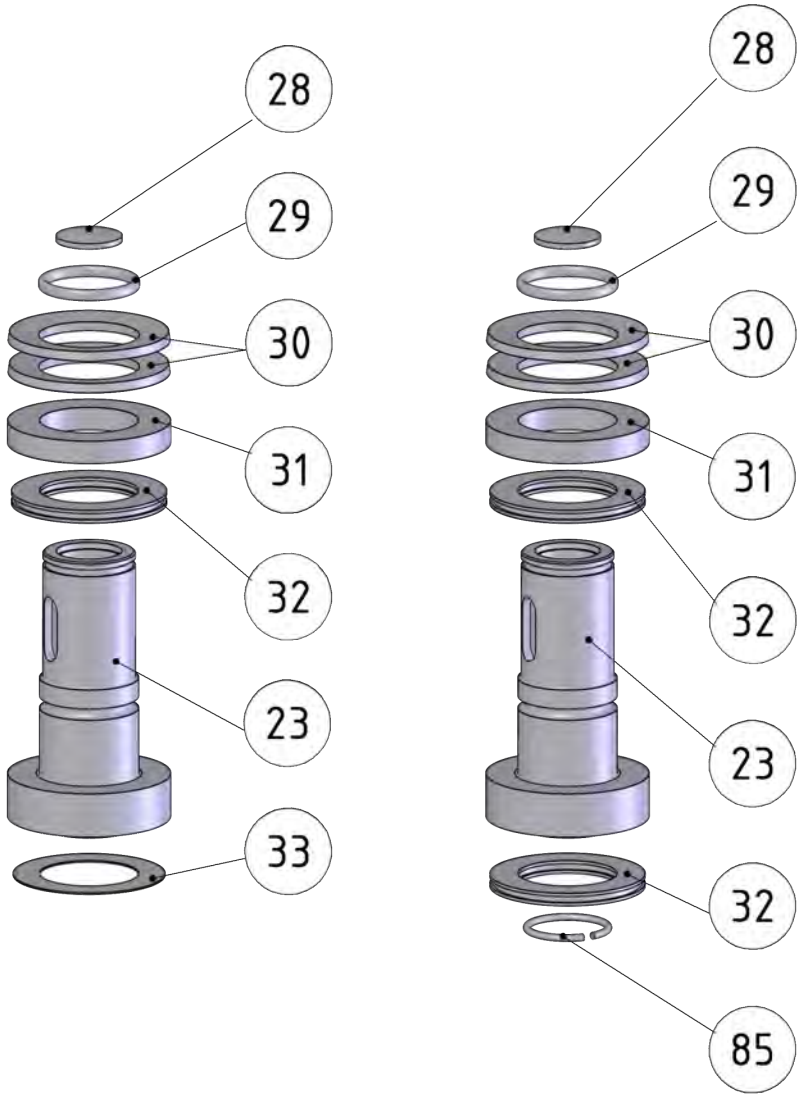


Fig. 28: Figure left DN 10-25, NVS 1/2"-1", figure right DN 40/50, NVS 2"

1. Check threaded bush (23) and bearing (32) for any damage and replace if necessary.
2. Provide all parts with new lubrication grease (↳ *Chapter 3.2 "Operating materials" on page 28*).Observe ↳ *"Lubricate valve yoke" on page 81*.
3. Stack bearing (32), disk ring (31) and disk spring (30) onto the threaded bush (23).
4. With their small diameter, the disk springs (30), see *Fig. 26*, rest on the disk ring (31).
5. Insert new O-ring (29).
6. Insert closure disk (28).
7. For DN 10-25, NVS 1/2"-1", slide on slide ring (33). For DN 40/50, NVS 2", slide on bearing (32) and mount snap ring (85).

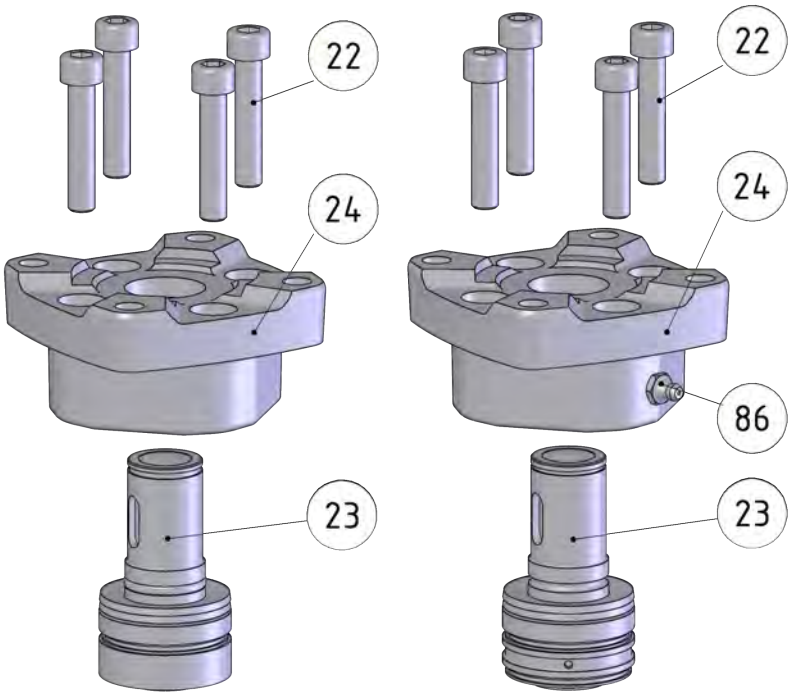


Fig. 29: Figure left DN 10-25, NVS 1/2"-1", figure right DN 40/50, NVS 2"

1. Insert Allen bolts (22) in the cover (24).
2. Push cover (24) onto the threaded bush (23).

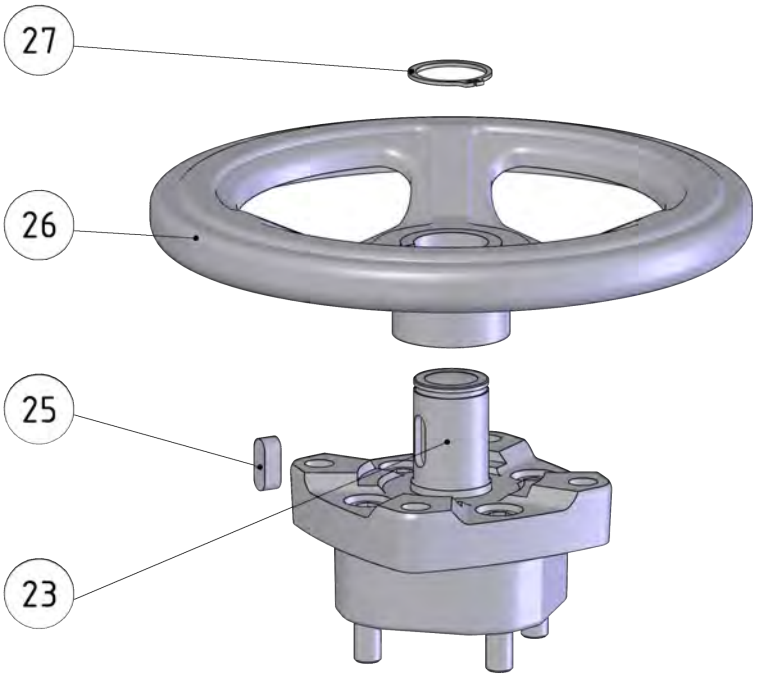


Fig. 30

1. Insert parallel key (25) into threaded bush (23).
2. Fit handwheel (26) on threaded bush and secure by means of retaining ring (27).

Reassembly of valve

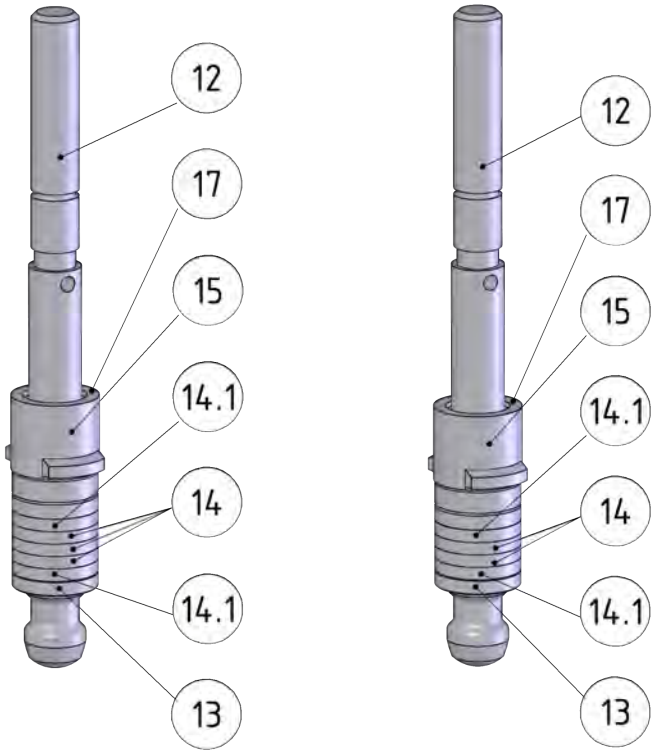


Fig. 31: Stem pre-assembly. Figure left DN 10-25, NVS 1/2"-1", figure right DN 40/50, NVS 2"

→ Pull base ring (13), packing (14, 14.1), gland shaft (15) and wiper ring (17) onto the stem (12).

The number of packings (14) is indicated in the table below.

Part 14	
DN 10-25, NVS 1/2"-1"	3 pcs
DN 40/50, NVS 2"	2 pcs

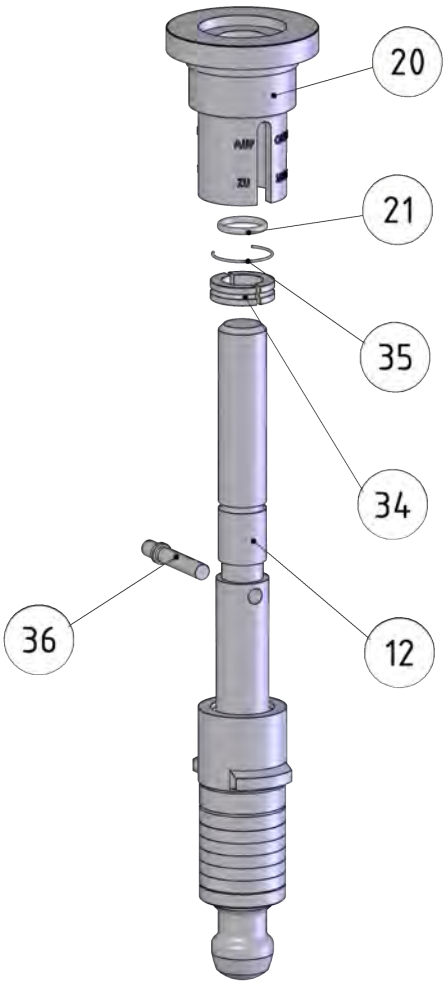


Fig. 32: Stem pre-assembly

1. Lightly tap guide bolts (36) into the stem (12) (retaining lip).
2. Fit split ring (34) on stem (12) and secure by means of ring (35).
3. Check new O-ring (21) for damage, (if necessary replace), lubricate and pull onto stem (12).
4. Slide guide bush (20) over stem (12) onto the guide bolt (36).

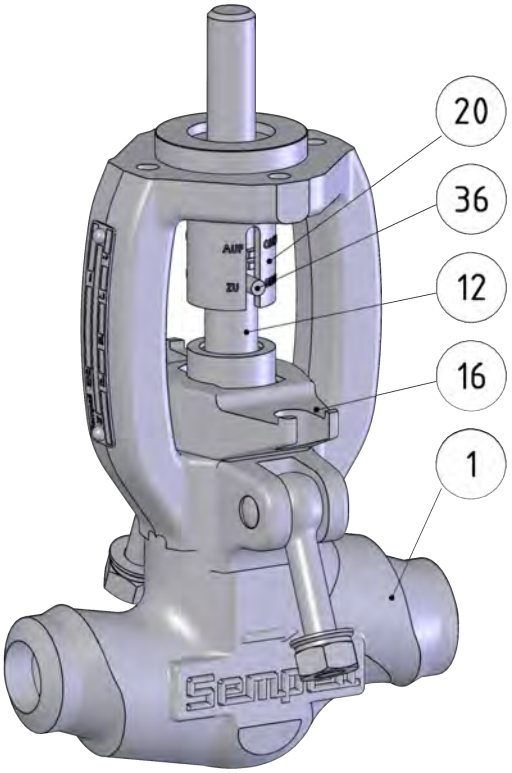


Fig. 33

1. Place gland flange (16), as shown, on the body (1).
2. Insert pre-assembled stem (12) through the gland flange (16) into the body (1); here, the bore for the guide bolts (36) must be aligned at 90° to the pipe axis.

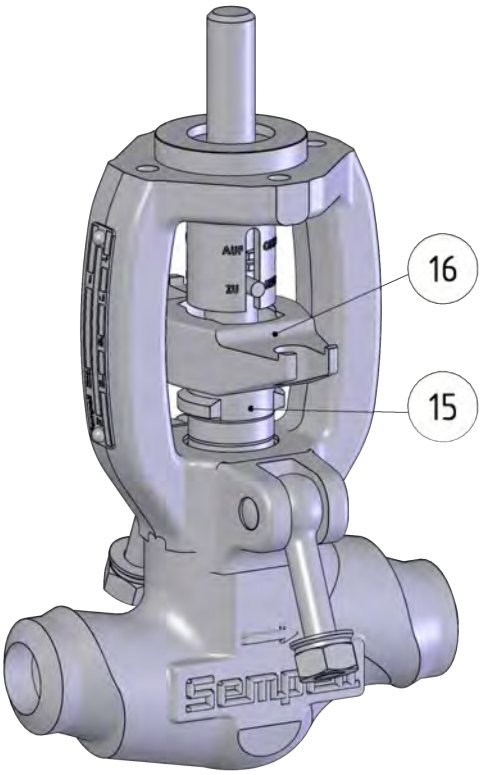


Fig. 34

→ Lift gland flange (16), turn gland shaft (15) until it engages (90°, bayonet).

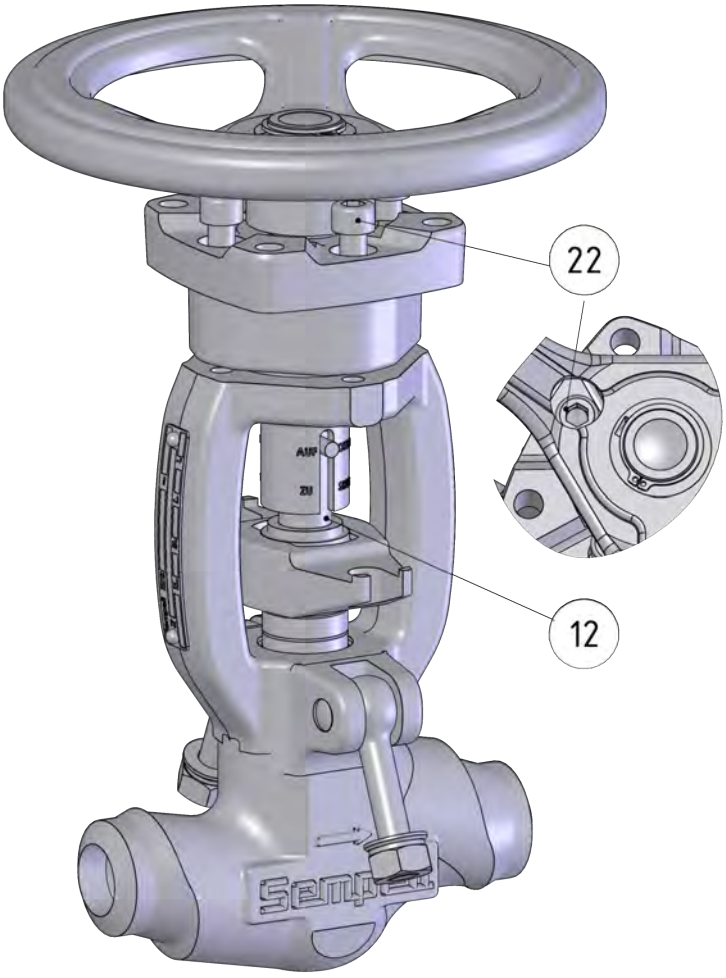


Fig. 35

1. Turn complete drive head onto the stem (12).
2. Fasten drive head with Allen bolts (22) through assembly bore in the handwheel (tightening torques see *"Assembly" on page 101*).

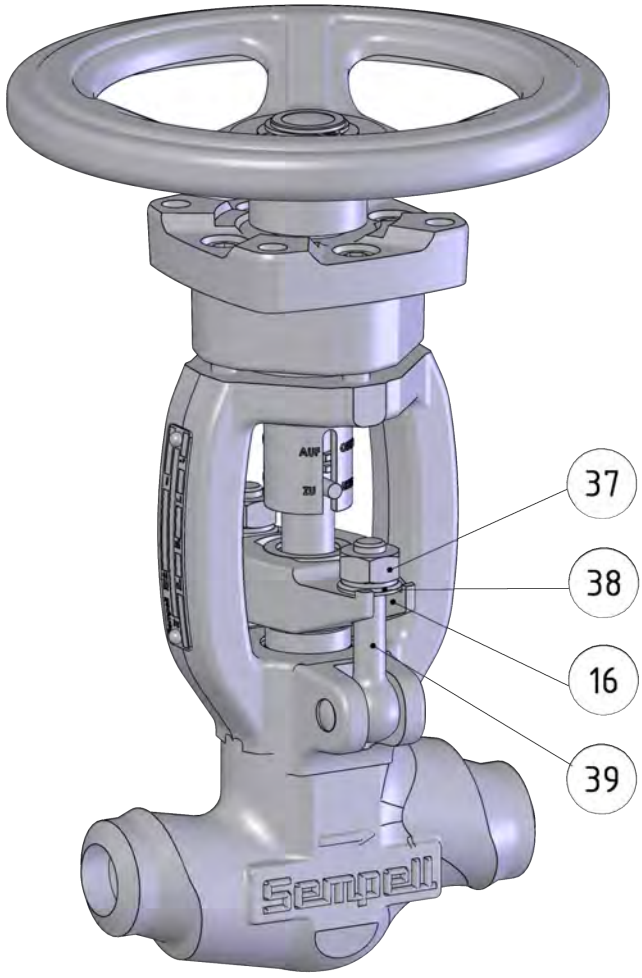


Fig. 36

1. Lubricate thread of the eye bolts and supports of the hexagonal nuts (37) and washers (38) (see ↳ *Chapter 3.2.2 "Lubricating the removable valve components" on page 29*).
2. Fold up eye bolts (39) and fasten with hexagonal nuts (37), and washer (38).
3. Tighten gland flange (16) with hexagonal nuts (37) as described below:
   - Move valve into open position
   - Pretensioning with increased torque (Md Assembly), see ↳ *Chapter 9.3.1 "Tightening torques and pressing paths of the gland packing" on page 91*
   - Loosen hexagonal nuts (37)

- Re-tension with torque for operation (Md Operation), see *Chapter 9.3.1 "Tightening torques and pressing paths of the gland packing" on page 91*
- Move valve into **CLOSED**- position
- Re-tension again with torque for operation (Md Operation)

9.3.1 Tightening torques and pressing paths of the gland packing

Packing di / da / l	Screws		Md-Assembly	Md Operation pB ≤ 100	Md Operation pB > 100	Md Operation pB > 350
16 / 24 /16 (DN 15 / 10) (NVS ½")	**2 x M12**	**Tightening torque (Nm)**	**19.0**	**6.0**	**9.0**	**11.0**
		Path graphite (mm)	-	1.2	1.6	1.9
		Path PTFE (mm)	-	1.4	1.6	1.7
20 / 32 / 24 (DN 25) (NVS 1")	**2 x M12**	**Tightening torque (Nm)**	**29.0**	**12.0**	**18.0**	**22.0**
		Path graphite (mm)	-	1.8	2.4	2.8
		Path PTFE (mm)	-	2.0	2.4	2.7
32 / 50 / 36 (DN 40 / 50) (NVS 2")	**2 x M16**	**Tightening torque (Nm)**	**75.0**	**36.0**	**54.0**	**65.0**
		Path graphite (mm)	-	2.7	3.5	4.0
		Path PTFE (mm)	-	3.0	3.6	4.0

9.4 Disassembly and reassembly of special accessories (SN)

Pressurized components

WARNING!

Danger to life due to pressurized components!

When improperly handled, pressurized components can move uncontrollably and cause serious injuries. When improperly handled or in the event of a defect, liquid can escape from pressurized components under high pressure and may lead to serious injuries or even death.

Before starting work on these components:

– Establish a depressurized state. Also discharge residual energy.
– Always make sure that it is not possible for liquid to escape inadvertently.
– Defective components which are pressurized during operation must be replaced by the relevant specialist personnel immediately.

Hand injuries

WARNING!

Risk of hand injuries!

When working on the valve, ensure that hands are not injured due to clamping in, crushing or any sharp edges.

Sharp-edged components, points and corners on or in the valve can cause punction and cut wounds.

Areas that are difficult to access on or in the valve may cause crushing of fingers and hands.

- Before starting work, ensure there is sufficient space.
- Handle open sharp-edged components carefully.
- Wear safety gloves.

Hot operating materials

WARNING!

Risk of injury due to hot operating materials!

During operation, operating materials can reach high temperatures. Skin contact with hot operating materials causes severe burns to the skin.

- Whenever working with hot operating materials, heat-resistant protective work clothing and safety gloves must be worn at all times.
- Before all work with operating materials, check if they are hot. If necessary, allow them to cool down.

9.4.1 SN 30 Seal water type gland

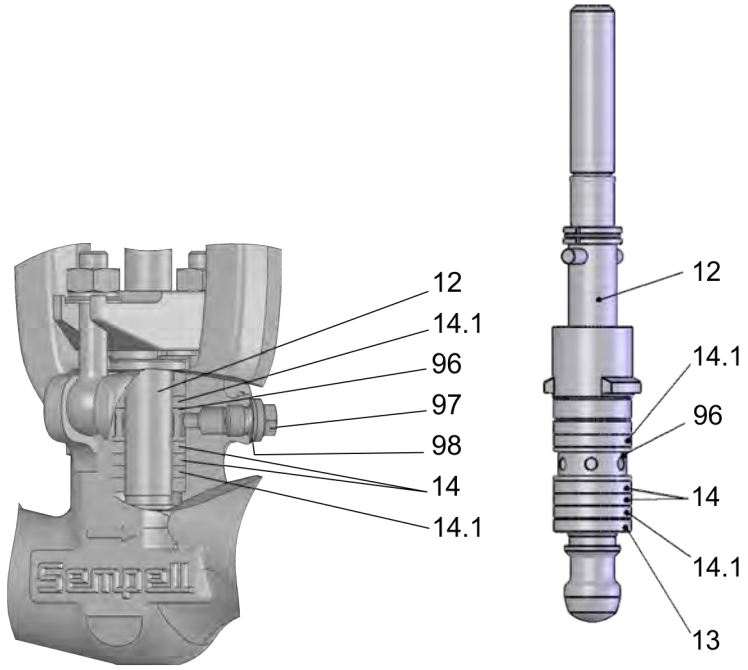


Fig. 37

Parts list

Item	Designation
12	Stem
13	Base ring
14	Packing
14.1	Packing
96	Gland yoke
97	Locking screw G 1/4" ISO 228/1
98	Sealing ring

The valves are provided at the factory with a locking screw (97) and sealing ring (98).

Replace the sealing ring (98) when installing the gland yoke (96).

Always ensure a clean sealing surface here. Tightening torque for locking screw (97): 80 Nm.

9.4.2 SN33 Valve yoke with connection acc. to ISO 5210

9.4.2.1

SN 33.A (DN 10-25, NVS 1/2"-1"), valve yoke with connection acc. to ISO 5210 - F10 B1

SN 33.B (DN 40/50, NVS 2"), valve yoke with connection acc. to ISO 5210 - F14 B1

Personnel:	■ Electrically qualified person ■ Technical specialist
Protective equipment:	■ Protective work clothing ■ Safety gloves ■ Safety shoes
Materials:	■ Engineering drawing

A modification from handwheel to electrical actuator, and vice versa, is possible without difficulties while operating, taking into account the operating conditions.

The Operating Manual of the installed actuator is included in the doumentation.

The following preconditions must be fulfilled before disassembly:

- Written approval has been received and the affected part of the plant is diconnected.
- The valve has moved into a process-dependent position (open / close).
- Plugs or cables of the actuator are disconnected.
- The actuator is unlocked according to the five electrical safety rules.

Disassembly

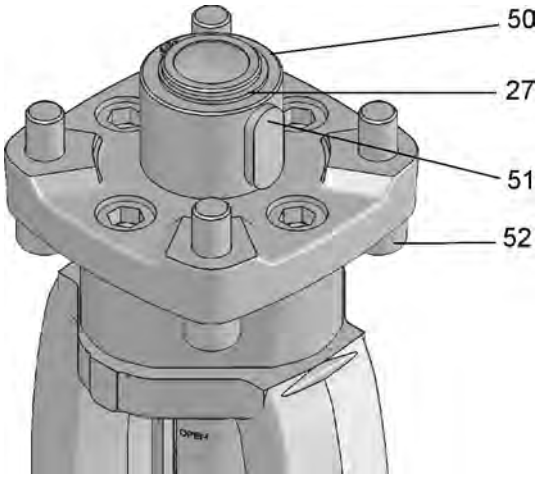


Fig. 38

1. Undo Allen bolts (52) and lift off rotary drive; in so doing, pay attention to the parallel key (51).
2. During further disassembly of the valve: Remove retaining ring (27) and take off bush (50).
3. Fit handwheel (26) (assembly aid), see Chapter 4.1 "Overview", and secure with retaining ring (27).

Reassembly

If necessary, slide on bush (50) and secure by means of retaining ring (27). Fit electrical drive with parallel key (51) and attach by means of Allen bolts (52).

Tightening torques	
DN 10/15, NVS 1/2"	25 Nm
DN 25, NVS 1"	25 Nm
DN 40/50, NVS 2"	100Nm

Actuator settings	
Closed position	Torque-dependent
Open position	Path-dependent, torque-dependent overlaid

CAUTION!
The torque preset by the factory must not be exceeded.

The instruction for the installed actuator is included in the documentation.

9.4.2.2 SN 33.A Valve yoke DN40/50, NVS 2" (ISO5210 - F10 B1)

Personnel:
- Electrically qualified person
- Technical specialist

Protective equipment:
- Protective work clothing
- Safety gloves
- Safety shoes

Materials:
- Engineering drawing

A modification from handwheel to electrical actuator, and vice versa, is possible without difficulties while operating, taking into account the operating conditions.

The Operating Manual of the installed actuator is included in the doumentation.

The following preconditions must be fulfilled before disassembly:

- Written approval has been received and the affected part of the plant is diconnected.
- The valve has moved into a process-dependent position (open / close).
- Plugs or cables of the actuator are disconnected.
- The actuator is unlocked according to the five electrical safety rules.

Disassembly

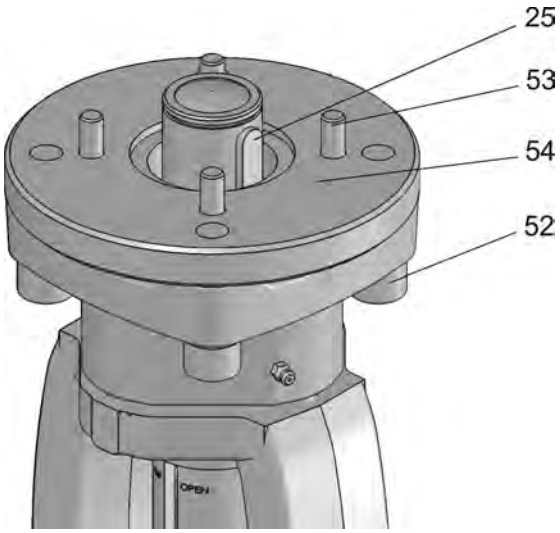


Fig. 39

1. Undo Allen bolts (52), see *Fig. 39*, and lift off rotary drive with flange (54); in so doing, pay attention to the parallel key (25).
2. Fit handwheel (26) (assembly aid), see ↳Chapter 4.1 "Overview", and secure with retaining ring (assembly aid).

Reassembly

→ Fit electrical drive with parallel key (25), see *Fig. 39*, and attach with Allen bolts (52)

Tightening torques	
Pos. 52	100 Nm
Pos. 53	25 Nm

Actuator settings	
Closed position	Torque-dependent
Open position	Path-dependent

CAUTION!
The torque preset by the factory must not be exceeded.

The instruction for the installed actuator is included in the documentation.

9.4.3 SN 34 With connection for linear actuator according to DIN 3358

only with entry above disk and disk seat SN 41(not for SN 45.1)

Personnel:	■ Hydraulically qualified person / Pneumatically qualified person ■ Technical specialist
Protective equipment:	■ Protective work clothing ■ Safety gloves ■ Safety shoes
Materials:	■ Engineering drawing

Disassembly and re-assembly aid for stem:

Materials: ■ Handwheel (26)

Disassembly

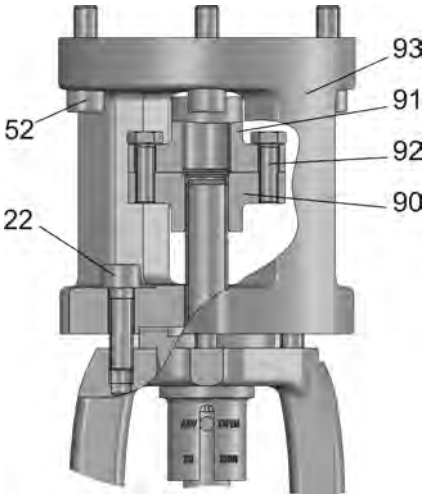


Fig. 40

1. Loosen hexagon screw (92).
2. Undo Allen bolts (52).
3. Lift off linear actuator with coupling (90).
4. Unscrew coupling (90).
5. Undo Allen bolts (22).
6. Lift off yoke (93).

Reassembly

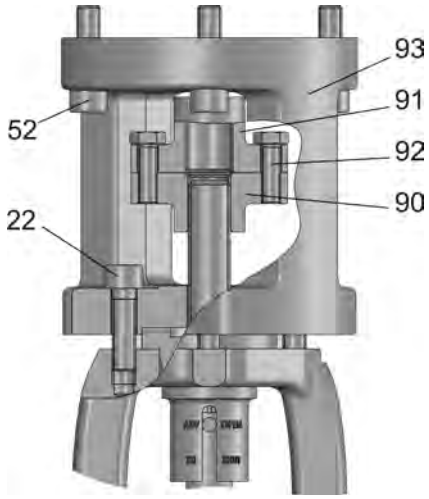


Fig. 41

1. Fit yoke (93) and fasten with Allen bolts (22).
2. Screw on coupling (90).
3. Screw coupling (91) onto linear actuator and place on yoke (93).
4. Fasten linear actuator with Allen bolts (52).
5. Fasten coupling (90) and coupling (91) with hexagonal nuts (92).

   Fasten coupling (90) and coupling (91) with hexagonal nuts (92).

Tightening torques				
DN	**ISO 5210**	**Pos. 22**	**Pos. 52**	**Pos. 92**
10/15, NVS 1/2"	F10 B1	25 Nm	25 Nm	10 Nm
25, NVS 1"	F10 B1	40 Nm	25 Nm	10 Nm
25, NVS 1"	F14 B1	40 Nm	100 Nm	30 Nm
40/50, NVS 2"	F14 B1	150 Nm	100 Nm	30 Nm

The instruction for the installed actuator is included in the documentation.

9.4.4 SN 34 F With connection for linear actuator special design

Personnel:	■ Hydraulically qualified person / Pneumatically qualified person ■ Technical specialist
Protective equipment:	■ Protective work clothing ■ Safety gloves ■ Safety shoes
Materials:	■ Engineering drawing

Disassembly and re-assembly aid for stem:

Materials: ■ Handwheel (26)

Demontage

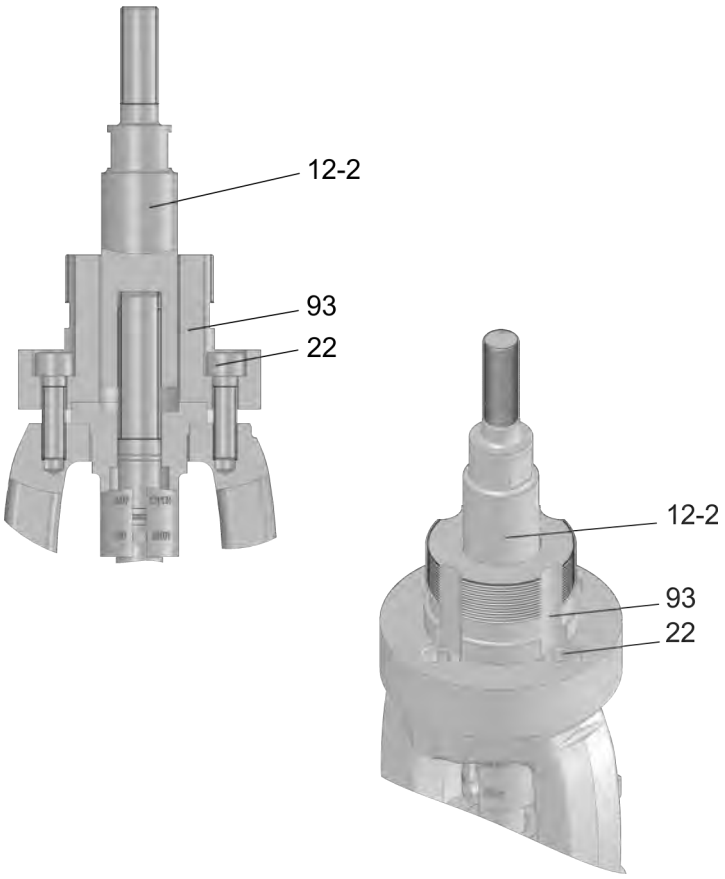


Fig. 42

1. Linear actuator. Undo coupling and snap ring nut.
2. Lift off linear actuator.
3. Undo socket Allen bolts (22) and lift off flange (93).
4. Unscrew extension (12-2).

Assembly

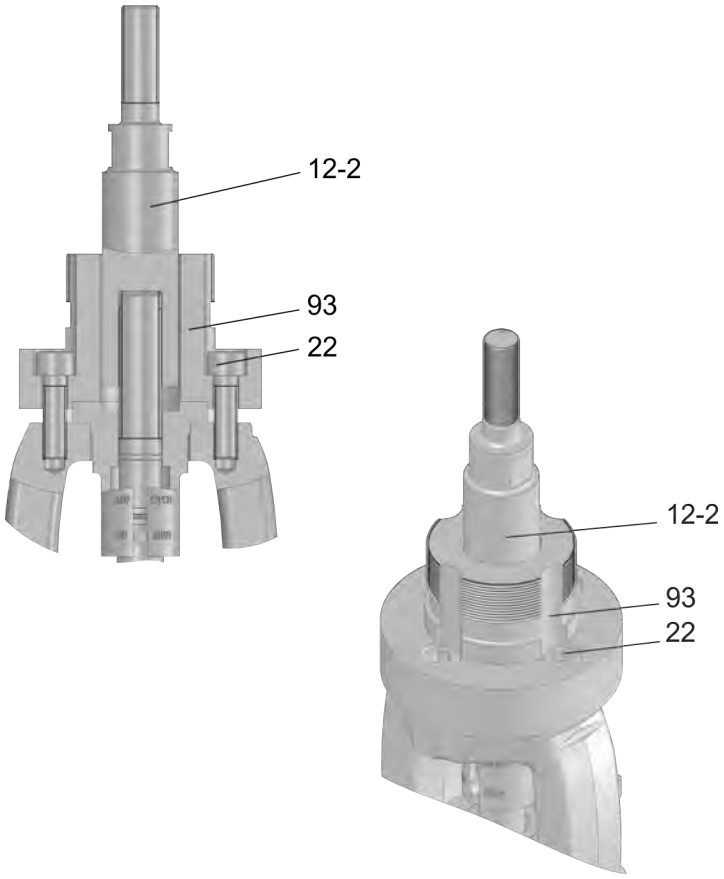


Fig. 43

1. Screw on extension (12-2).
2. Fit flange (93) and fasten with Allen bolts (22).
3. Place linear actuator on flange (93) and fasten with snap ring nut.
4. Connect linear actuator and coupling over the extension (12-2).

See the following table for tightening torques.

Tightening torques	
DN, NVS	**Pos. 22**
10/15, 1/2"	25 Nm
25, 1"	40 Nm
50, 2"	150 Nm

The instruction for the installed actuator is included in the documentation.

9.4.5 SN 36/37 Electrical limit switches "Closed/Open"

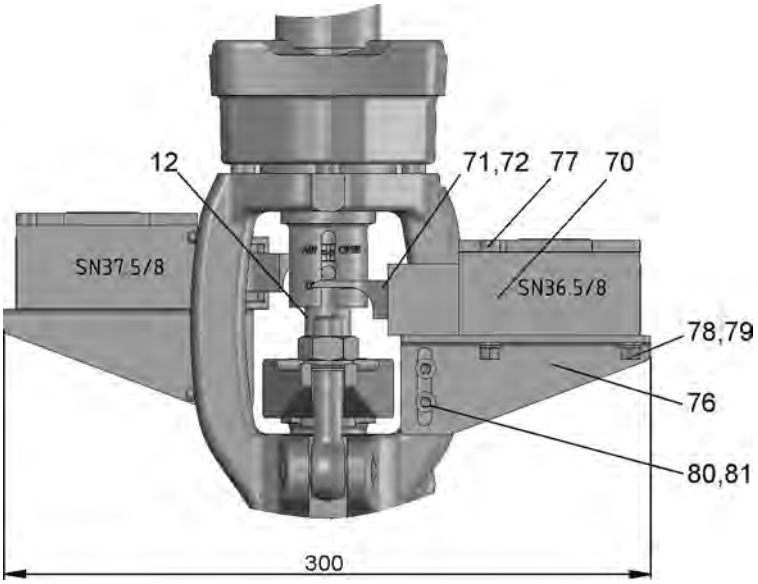


Fig. 44

Disassembly

→ Loosen screws (80) and remove electrical contacts.

Reassembly

1. → Fasten electrical contacts with screws (80) and washers (81) on the body. The distance to the stem (12) can be changed via the long-hole bores by the nuts (78). The contacts are adjusted via the long-hole bores by the screws (80).
2. → Move stem (12) into closed position and adjust contact (SN 36) for lower limit stop.
3. → Move stem (12) into open position and adjust contact (SN 37) for upper limit stop.

9.4.6 SN 38.1 Handwheel locking with padlock

Disassembly

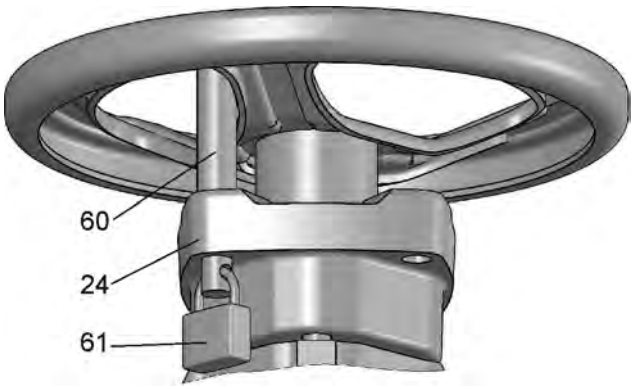


Fig. 45

1. Open padlock (61), see *Fig. 45*.
2. Pull interlock (60) out of cover (24).

Reassembly

1. Insert interlock (60) into cover (24).
2. Secure interlock (60) with padlock (61).

9.4.7 SN 43 Welding rings

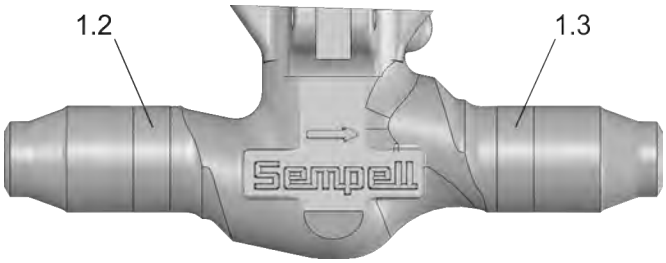


Fig. 46

SN	Designation
SN 43.0	Welding ring inlet- and outlet side
SN 43.2	Welding ring inlet side (1.2)
SN 43.3	Welding ring outlet side (1.3)

9.4.8 SN 45.1 Throttling disc, inlet below disc

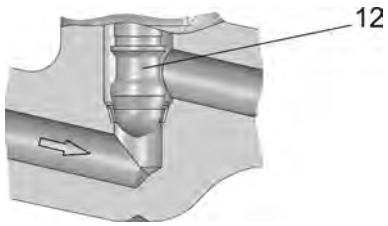


Fig. 47

9.4.9 SN 53 Back seat

WARNING!

Danger due to leaking medium!

Repacking the gland under operating pressure is forbidden, as the back seal may become loose (e.g. because of foreign particles in the medium).

Disassembly

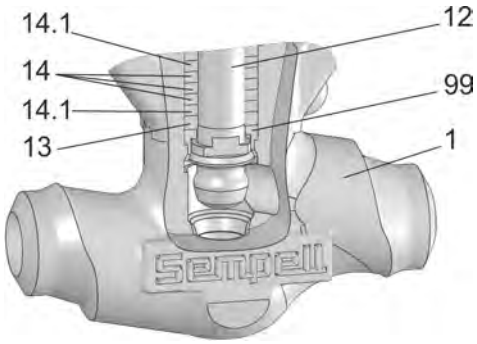


Fig. 48

→ During disassembly against the standard version, make sure that when pulling the packing (14, 14.1), see *Fig. 48* the stem (12) is rotated by 90°, i.e. the guide bolt (36), see *Fig. 49*, points in the direction of flow.

NOTICE!

A new bush (99) must be used after each disassembly.

Reassembly

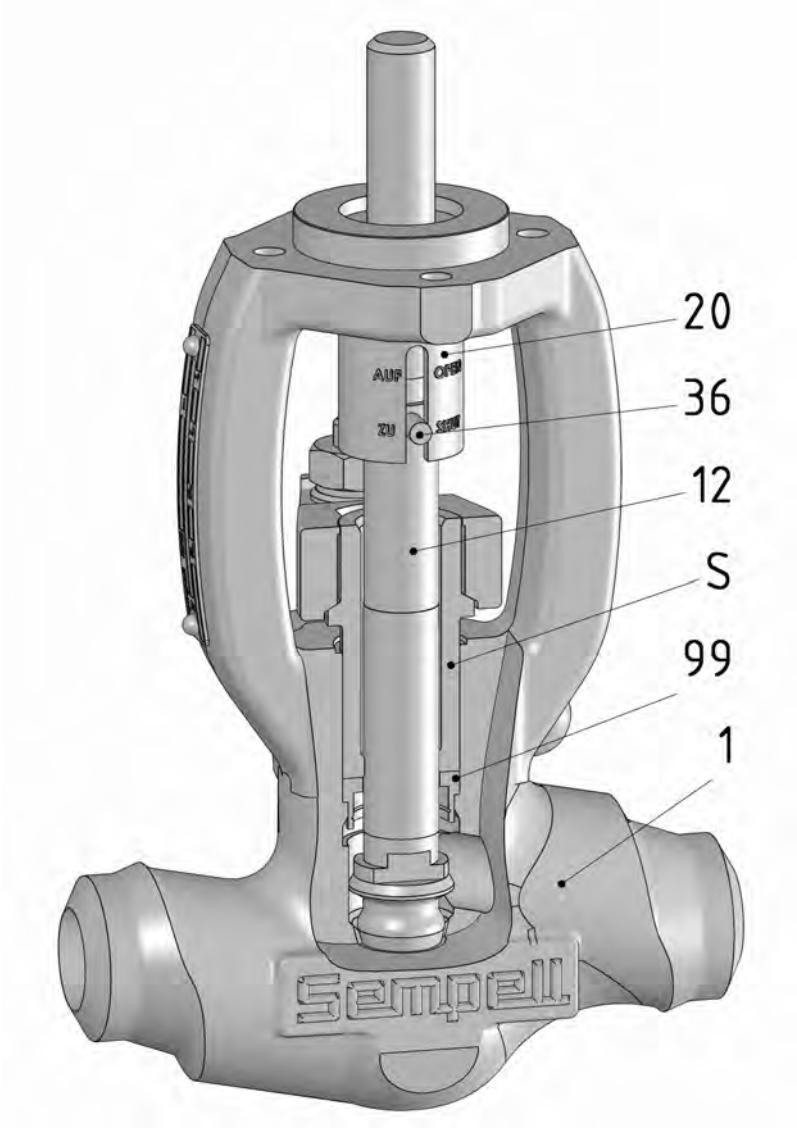


Fig. 49

→ Insert stem (12) with bush (99), extended gland shaft (S (special tool optionally available)), guide bolt (36) and guide bush (20) into the body (1).

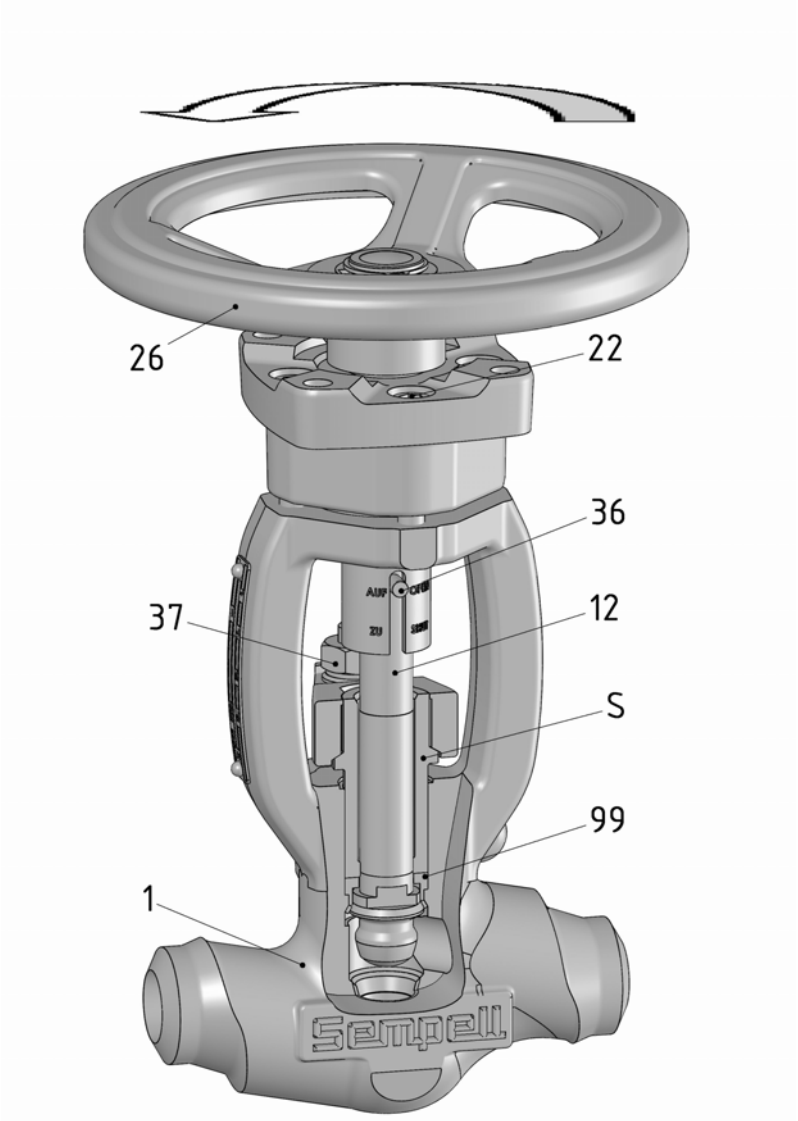


Fig. 50

1. Turn complete drive head onto the stem (12).
2. Fasten drive head with Allen bolts (22) through assembly bore in the handwheel hand-tight.
3. The guide bolt (36) must be offset by 90° to the direction of flow.
4. Turn the handwheel (26) to the left to move the stem into the back seal until the bush (99) is bordered at the body edge (1).
5. Disassemble drive head with extended gland shaft (S).

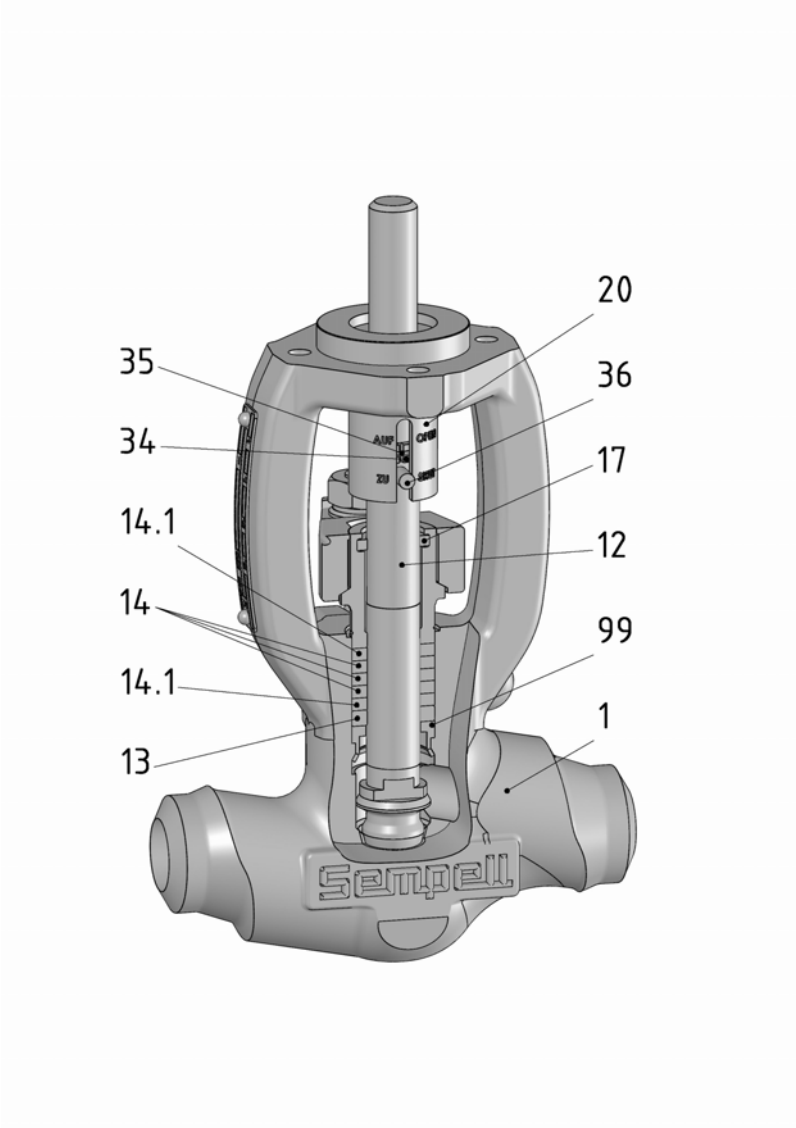


Fig. 51

Standard - Assemble valve parts as described in ↳ chaper 9 "Disassembly and reassembly".

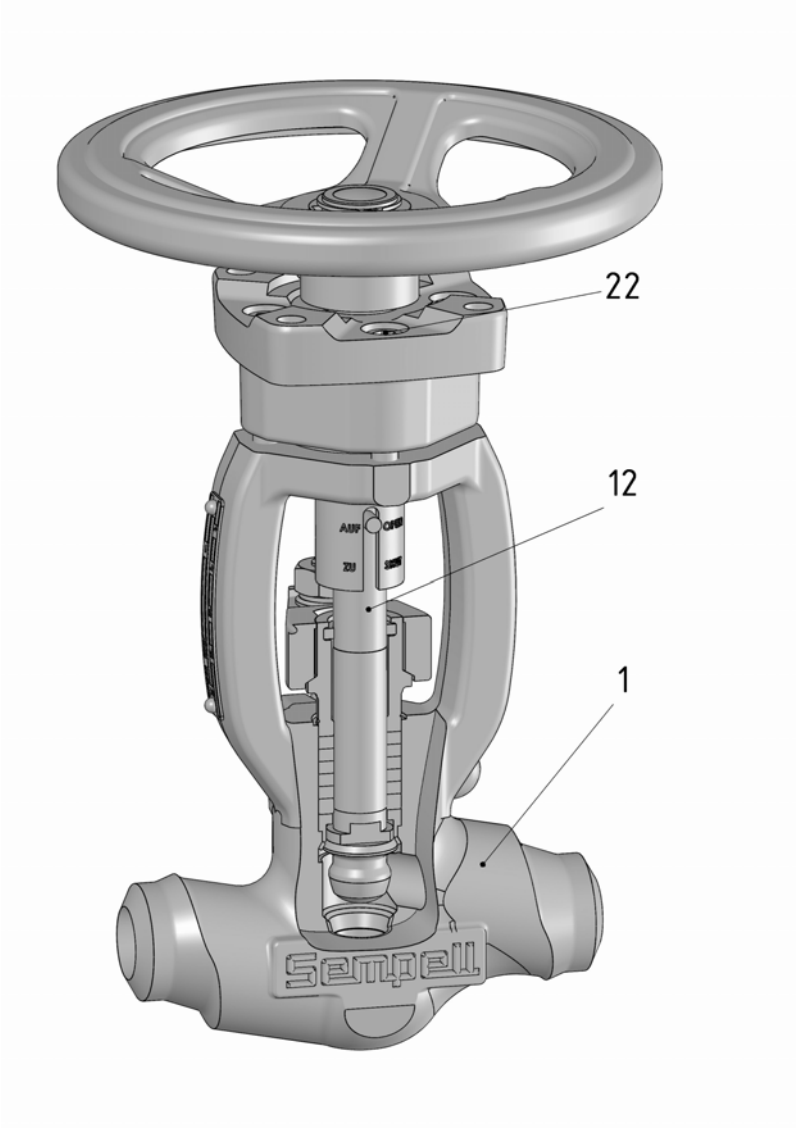


Fig. 52

1. Turn complete valve yoke onto the stem (12).
2. Fasten drive head with Allen bolts (22) through assembly bore in the handwheel.
3. Seal packings (14, 14.1) as described in chapter ↳ 9.3 ↳"Reassembly of the valve".

9.4.10 SN 160.1 Spring-loaded gland

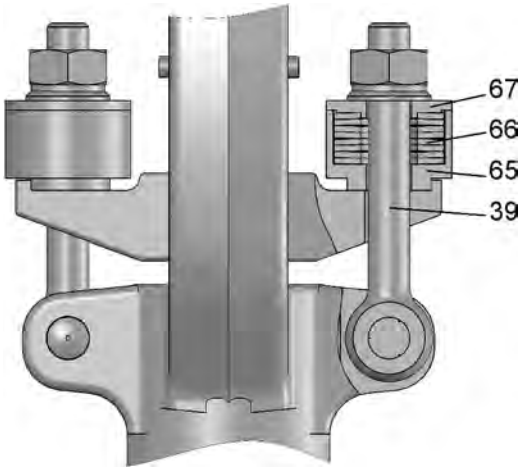


Fig. 53

Pay attention to the correct embedding of the disk springs (66), see *Fig. 53* during assembly, see *Fig. 54*.

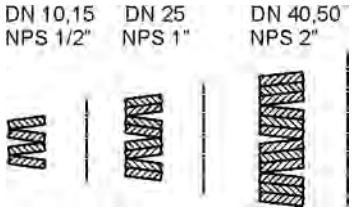


Fig. 54: Disk springs (66)

9.4.11 SN 182 Lubrication of stem thread(standard on DN 40/50, NVS 2")

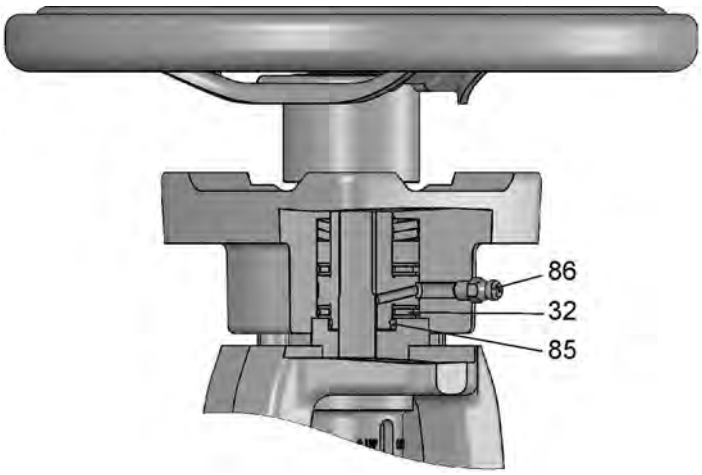


Fig. 55

Disassembly and assembly as standard valve DN10-25, NVS 1/2"-1", see Chapter 9 " Disassembly drive head", but instead of slide ring (33), see Chapter 4.1 "Overview", use second axial needle bearing (32), see *Fig. 55*, and secure with snap ring (85).

9.4.12 SN 371 - 373 Valve lock

NOTICE!

Check locking cylinder number and closing position of valve locks or interlocks according to closing plan. Keep the removable key separately and under lock.

Shown in locking position

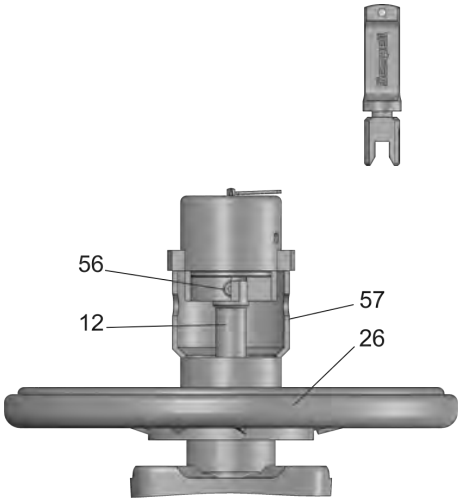


Fig. 56: SN 371 open locked

NOTICE!
It is not allowed to use the handwheel in locked order to avoid a damage of the retaining ring by accessory SN 372-373.

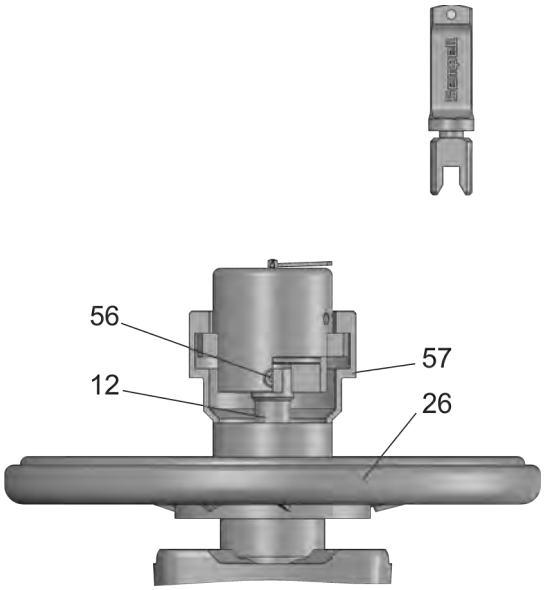


Fig. 57: SN 372 closed locked

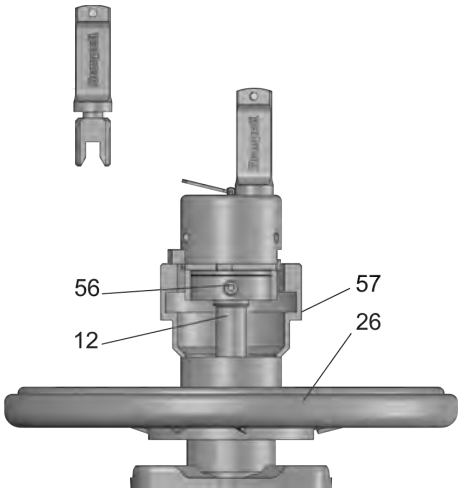


Fig. 58: SN 373 open locked

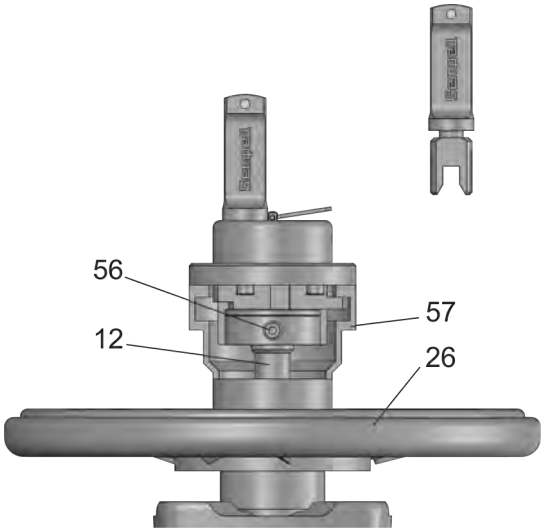


Fig. 59: SN 373 closed locked

Disassembly

1. Unlock valve lock with numbered release code.
2. Guide valve with handwheel (26) into middle position.

> **NOTICE!**
> The bore in the bush (57), see *Fig. 56* - *Fig. 59*, must be aligned with the set screw (56).

3. Loosen set screw (56).
4. Unscrew valve lock.

Reassembly

1. Mount bush (57) on valve with extended stem (12).
2. Guide valve with handwheel (26) into middle position.
3. Screw on valve lock as far as the limit stop.(left hand thread).
4. Turn back valve lock max. 180° until the bore is aligned in the bush (57) with the bore of the stem (12).
5. Tighten set screw (56).
6. Guide valve into locking position.
7. Turn key, pull out and keep locked.

10 Malfunctions

The following chapter describes possible causes for faults and how to rectify them.

In the event of increasingly occurring faults, shorten the maintenance intervals according to the actual load.

In the event of faults that cannot be rectified using the following information, contact the manufacturer, see manufacturer's address.

10.1 Safety

Improperly executed troubleshooting work

WARNING!

Danger of injury due to improper troubleshooting!

Improperly executed troubleshooting work can cause serious injuries and considerable damage to property.

- Before commencing work, ensure there is sufficient space for assembly.
- Ensure cleanliness and tidiness in the assembly area! Parts or tools loosely piled or lying about are potential accident hazards.
- When all components are removed, ensure correct assembly, replace all mounting elements and adhere to bolt tightening torques.
- Secure components so that they do not fall down or crash.
- Before recommissioning, observe the following:
  - Ensure that all troubleshooting work has been carried out and completed in accordance with the information and instructions in this manual.
  - Ensure that no persons are in the danger area.
  - Make sure that all covers and safety devices are installed and fully functional.

Response in the event of malfunctions

The following basically applies:

1. For malfunctions which present an immediate danger for persons or material assets, initiate emergency stop.
2. Determine the cause of malfunction.
3. If the troubleshooting requires work in the danger area, switch off the valve and secure against being switched on again.

   Notify responsible party at installation site of malfunction immediately.
4. Depending on the type of malfunction, have it rectified by authorized qualified personnel or rectify it yourself.

The malfunction table below provides information about who is authorized to rectify the malfunction.

Secure against restarting

WARNING!

Risk of death due to unauthorized restart!

Risk of grave injuries all the way to death for persons within the hazard area due to unauthorized reactivation of the power supply during troubleshooting.

– Before starting work, switch off all power supplies and secure them from restarting.

10.2 Fault indicators

There are no fault indicators on the valve. Faults are only shown in the control room. Observe signaling of the operator at all costs.

10.3 Malfunction table

No.	Fault description	Cause	Remedy	Personnel
01	No flow	Valve closed	Open valve, **observe** ↯ ***Chapter 7 "Operation" on page 55*****.**	Technical specialist
02	Restricted flow	Valve not open enough	Open valve, **observe** ↯ ***Chapter 8 "Maintenance" on page 57***	Technical specialist
03	Valve does not move / moves with difficulty	Wrong direction of rotation	Observe direction of rotation, **observe** ↯ ***Chapter 8 "Maintenance" on page 57*****.**	Technical specialist
04	Valve does not move / moves with difficulty	Torque of electrical drive improperly set	Correctly set torque. **Observe the drive manufacturer's operating manual; observe** ↯ ***Chapter 8 "Maintenance" on page 57*****.**	Technical specialist
05	Valve does not move / moves with difficulty	Insufficient lubrication	Lubricate stem (12), see *Fig. 3*, through lubrication nipple (86); **observe** ↯ ***Chapter 8 "Maintenance" on page 57*****.**	Technical specialist
06	Valve does not move / moves with difficulty	Stem (12), see *Fig. 3*, threaded bush (23), or other parts in drive head are damaged	Check drive head; exchange damaged parts, **Attention: Only with valve depressurized; observe** ↯ ***Chapter 8 "Maintenance" on page 57*** **and** ↯ ***Chapter 9 "Disassembly and reassembly" on page 65*****.**	Technical specialist
07	Valve does not move / moves with difficulty	Gland flange (16), see *Fig. 3*overtightened	Loosen gland screws (37, 39), see *Fig. 3*, and tighten with prescribed torque, **Attention: Only with valve depressurized; observe** ↯ ***Chapter 8 "Maintenance" on page 57*** **and** ↯ ***Chapter 9 "Disassembly and reassembly" on page 65*****.**	Technical specialist
08	Valve leaking at stem	Gland flange (16) too loose, see *Fig. 3*	Loosen gland screws (37, 39), see *Fig. 3*, and tighten with prescribed torque, **Observe** ↯ ***Chapter 9.3 "Reassembly" on page 80*** **and** ↯ ***Chapter 9 "Disassembly and reassembly" on page 65*****.**	Technical specialist
09	Valve leaking at stem	Packing (14, 14.1), see *Fig. 3*, stem (12), base ring (13), gland shaft (15) damaged	Rework or exchange damaged parts, **Attention: Only with valve depressurized; observe** ↯ ***Chapter 8 "Maintenance" on page 57*** **and** ↯ ***Chapter 9 "Disassembly and reassembly" on page 65*****.**	Technical specialist
10	Valve leaking at seat	Valve not completely/ tightly closed	Tighten using the handwheel. Check torque of electrical drive. **Observe the drive manufacturer's operating manua,** ↯ ***Chapter 7 "Operation" on page 55***	Technical specialist
11	Valve leaking at seat	Body seat (1.50), see *Fig. 3*, or stem (12) damaged and/ or distorted by foreign bodies	Rework or exchange components, clean valve and pipeline system **Attention: Only with valve depressurized, see,** ↯ ***Chapter 8 "Maintenance" on page 57*** **and** ↯ ***Chapter 9 "Disassembly and reassembly" on page 65*****.**	Technical specialist

Malfunction table

11 Disposal

Provided that no take-back agreement or discharge agreement has been made, send dismantled components for recycling:

- Scrap metals.
- Send plastic elements for recycling.
- Sort and dispose of remaining components according to material properties.
- When disposing of operating materials (hydraulic oil, lubricating, lapping, degreasing and assembly lubricants), observe the local or national regulations or commission a waste management company.

NOTICE!

Danger to environment due to incorrect disposal!

Incorrect disposal may give rise to hazards for the environment.

– Have electronic scrap, electronic components, lubricating and other auxiliary materials disposed of by authorized specialist companies.
– If in doubt, seek information on environmentally suitable disposal from the local department or special waste management company.

End of use

Once the period of use has expired, the valve must be disassembled and the unusable components disposed of in accordance with environmental protection regulations.

12 Spare parts / Tools

WARNING!

Risk of injury due to the use of incorrect spare parts!

Using incorrect or defective spare parts may give rise to risks for the personnel and may cause damages as well as malfunctions or complete shutdown.

– Only use genuine spare parts supplied or spare parts approved by the manufacturer.
– Always consult the manufacturer if in doubt.
– When ordering, specify the valve number(s) and Sempell commission.

Spare parts lists and drawings can be found in the documentation.

12.1 Spare parts

- Stem (12) with O-ring (21)
- Threaded bush (23) wish washer (28)
- Packing (14, 14.1))
- Axial needle bearing (32)
- Wiper ring (17)
- O-ring (29)
- Slide ring (33)

Check each part of the valve every 4 years.

12.1.1 The following spare parts must be renewed after each disassembly

- O-ring (21)
- O-ring (29)

12.2 Tools

Tool box

Fig. 60

The tool box (available as an option) contains all tools and assembly aids for proper and quick assembly and maintenance work:

- Spacer for disassembling the valve yoke.
- Grinding mandrel including abrasive paper for grinding the body seat.
- Drive machine, optionally available with 220 V AC, 40 V DC, 6 - 8 bar compressed air.
- Reject gage for body seat and stem, whereby the body seat is integrated in the grinding mandrel.
- Lamp with mirror for assessing the body seat.
- Grinding segments

13 Appendix

13.1 Instruction protocol

Date	Name	Type of instruction	Instruction given by	Signature

Instruction protocol

14 Index