SOMAS®

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Mi-706 EN

Service and operating instruction
Ball valves
Type SKV/SKVT

Flanged design

	Nominal pressure	**Nominal size**	**NPS**
Type SKV	PN 40 Class 300	DN 25 - 50	1 - 2
Type SKV	PN 25 Class 150	DN 80 - 400	3 - 16
Type SKVT	PN 25 Class 150	DN 450 - 500	18 - 20

Introduction

This operating manual is intended for the operating, maintenance and supervisory personnel.

This operating manual also describes components, equipment and ancillary units which are not or only partially included in the scope of supply.

The operating personnel must have read, understood and must comply with this operating manual.

We keep the right to do any technical changes which are necessary to improve the product without prior notice.

Copyright

Valve supplier

Somas Instrument AB
Norrlandsvägen 26-28
SE-661 40 SÄFFLE
SWEDEN

Phone: +46 (0)533 69 17 00
E-mail: sales@somas.se
Website: www.somas.se

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1 Preliminary remarks

To enable you to find information quickly and reliably in the operation manual, this chapter familiarises you with the structure of the operating manual.

This manual uses symbols and special characters which make it easier for you to find information. Please read the explanations of the symbols given in the section below.

Ensure that you read all the safety instructions in this operating manual very carefully.

You will find safety instructions in section 2, in the foreword to the sections and before any working instructions.

1.1 Explanation of warnings, symbols and signs

1.1.1 Warnings

Warnings are used in this operating manual to warn against injury and material damage. Always read and observe these warnings! Warnings are identified by the following symbols:

In this manual are used diverse types of safety and warning notices:

Danger!	
Type of danger. Advise for imminent danger. Not attention of the advices could be mortal or cause severe injuries as a consequence. Explanation of the countermeasures.	International Safety symbol

Warning!	
Type of danger. Advise for imminent danger. Not attention of the advices could cause severe injuries or property damage as a consequence. Explanation of the countermeasures.	International Safety symbol

Attention!	
Type of danger. Advise for possible danger. Not attention of the advices could cause property damage as a consequence. Explanation of the countermeasures.	International Safety symbol

Note

Advices and give tips for better understanding of the manual or a better handling of the valve.

1.1.2 Symbols and signs

Symbols and signs are used in this operating manual to provide fast access to information.

1.1.2.1 Symbols and signs in the text

Symbol	Denotation	Explanation
⇨	Operating instructions	This means there is an action to be carried out.
1. 2.	Operating instructions, multi-step	Work instructions must be carried out in the sequence shown. Deviations from the sequence shown may result in damages to the valves and accidents.
• –	Lists, two-stage	No activities are linked with lists.
➔	Cross-reference	References to images, tables, other sections or other instructions.

Tab.1-1 Symbols in the text

2 Safety

2.1 Safety instructions

2.1.1 General dangers

Sources of danger resulting in general hazards:

- Mechanical hazards
- Electrical hazards

2.1.2 Hazards due to electrical equipment

Due to the permanent dampness, electrically-operated machine parts represent a potential source of danger.
Comply with all regulations on electrical equipment in damp areas!

2.1.3 Additional hazards

2.1.3.1 Entanglement, crushing and cut/sever hazards

- by moving machine parts left exposed, by removing covers for inspection, sampling, etc.
- by automatic operated valves.

2.1.3.2 Burning or scalding hazards

- by opening or leaving open function-check and/or sampling openings on systems operating at high temperatures (above 40°C)
- by operating temperature >= 70°C. Short contacts (approx. 1s) of the skin with the surface of the valve may cause burns (pr EN 563)
- by operating temperature = 65°C. Longer contacts (approx. 3s) of the skin with the surface of the valve may cause burns (pr EN 563)
- by operating temperature 55°C…65°C. Longer contacts (approx. 3-10s) of the skin with the surface of the valve may cause burns (pr EN 563).

2.1.3.3 Explosion hazards

A high surface temperature on a valve and actuator, constitutes (a risk for burn injuries, and) a risk of ignition of explosive atmospheres in ATEX applications.

The surface temperature of the equipment is not dependent on the equipment itself, but on the ambient conditions and the process conditions. The protection from the surface temperature is the responsibility of the end user, and must be effectuated before the equipment is put into service.

2.1.4 State of the art

This product has been built by Somas Instrument AB in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the valve and to other material property, if:

- the product is not used as designated
- the product is operated or repaired by untrained personnel
- the product is modified or converted improperly and/or
- the safety instructions are not observed.

Therefore, every person involved in erecting, operating, inspecting, maintaining, servicing and repairing the valve must read, understand and observe the complete operating instructions, particularly the safety instructions.

2.1.5 Preconditions for using the valve

The valve only has to be used:

- in perfect technical condition
- as designated
- according to the instructions in the operating manual, and only by safety-conscious persons who are fully aware of the risks involved in operating the valve
- if all protective devices are installed and operative.

Rectify immediately any functional disorders, especially those affecting the safety of the valve!

2.2 Designated use of the valve

2.2.1 Use

The valves are appropriate to be used in pulp and paper industry, chemical industry, shipbuilding industry, energy industry and offshore industry.

Particular data to the operation and limit values are specified on the data sheet “Si-706EN”.

The operating values, limit values and setting data must not deviate from the values specified in the operating manual and correspondig information sheet without consulting the manufacturer! The manufacturer cannot be held liable for any damages resulting from non-observance of the operating manual.

2.2.2 Liability for non-designated use

Using the valve for other purposes than those mentioned previously is considered contrary to its designated use. For resulting damages of this, Somas Instrument AB is not liable! The user take the risk.

2.3 Organizational measures

2.3.1 Availability of operating manual

The operating manual has to be stored and be readily available!

2.3.2 Additional regulations

In addition to the operating manual, it have to be observed all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection! Direct the personnel to comply with them!

2.3.3 Checks

Periodically check that the personnel carry out the work in compliance with the operating manual and that they pay attention to risks and safety factors.

2.3.4 Protective equipment

Use when necessary protective equipment.

2.3.5 Rebuilds or modifications at the valve

Do not make any rebuilds or modifications at the valve yourself, which can affect the security of the valve.

2.3.6 Replacing damaged parts

Valve parts that are not in perfect condition must be replaced immediately with original spare parts! Use only original spare and wear parts from Somas Instrument AB.

On unauthorized parts is not guarantee that they have been designed and manufactured according to the application.

2.4 Selection and qualification of personnel

Operation, maintenance and repairing works require special knowledge and may only be carried out by trained technical specialists or qualified personnel authorized by the user.

2.5 Safety instructions for ball valves

- Operation of the ball valve is always subject to the local safety and accident prevention regulations.

Danger!

Risk of injury!
Observe movements of the ball.
Keep hands, tools and other objects away from the area where the ball moves when the actuator is connected to compressed air system. Single action actuators may move to “open” or “closed” position without being connected to the air system.

Warning!

Before carrying out maintenance or repair work on the ball valve with actuator or installation and removal of the ball valve from the pipeline, always disconnect the compressed air supply to the actuator.
Single action actuators may move to “open” or “closed” position without being connected to the air system.

Warning!

Ensure that personnel who work with, install or repair the ball valve are appropriately trained. This prevents unnecessary damage and accidents or injury to personnel.

The maintenace and assembly personnel must be familiar with the process of installing and disassembling the ball valve in a process line, the special and possible risks of the process and the most important safety regulations.

The repair and assembly personnel must be familiar with the risks when handling pressurised equipment, hot and cold surfaces, dangerous substances and substances which represent a hazard to health.

Warning!

Do not exceed the design data of the ball valve!
Exceeding the design data marked on the ball valve may lead to damage and uncontrolled escape of the pressurised medium.
Both the damage as such and the pressurised medium may lead to injuries to personnel.

Warning!

Do not remove the ball valve from the line as long as it is pressurised!
Dismantling or disassembly of a pressurised ball valve leads to an uncontrolled loss of pressure.
Always isolate the relevant ball valve in the pipe system; despressurise the ball valve and remove the medium before working on the ball valve.

Warning!

Before assembling or disassembling the pneumatic actuator of a ball valve installed in the pipeline depressurise the relevant valve in the pipeline system, isolate the valve and remove the medium before working on the valve.
The pressurised medium may lead to injuries to personnel.

Warning!

Inform yourself of the properties of the medium. Protect yourself and your environment from hazardous or poisonous substances.
Observe the safety instructions in the safety data sheets of the manufacturers. Ensure that no medium can enter the pipeline during maintenance work.

Warning!

Before replacing the stuffing box of a ball valve installed in the pipeline depressurise the relevant valve in the pipeline system, isolate the valve and remove the medium before working on the valve.
The pressurised medium may lead to injuries to personnel.

Danger!

Risk of injury!
Observe movements of the ball.
Keep hands, tools and other objects away from the area where the ball moves. The valve with ball installed may work as a cutting tool. Do not leave any foreign objects in the valve body. The ball of the ball valve always works as a separate device.
There is no difference whether an actuator is installed or not. The position of the ball may change during transport or handling of the ball valve.

Warning!

Protect yourself against noise - use the relevant safety equipment.
The ball valve may cause noise in the pipeline. The noise level depends on the type of application and can be determined with the Somas software SomSize.
Additional noise sources in the vicinity of the ball valve may increase the noise level.

Warning!

Beware of very cold or hot surfaces!
The body of the ball valve may become very cold or very hot during operation. Protect yourself against frostbite and burns.

Warning!

When transporting and handling the ball valve, observe its weight.
Never lift the valve by its positioner, limit switch, solenoid valve or piping. Place the hoisting ropes securely according to lift instruction.
The ball valve or parts thereof may injure persons if dropped.
Do not walk under suspended loads.

3 Description

3.1 General information

The Somas ball valves were developed to meet the requirements of industrial production for control, on/off and hand operated valves. An unhindered flow is particularly advantageous for substances containing dirt and the design enables a tight shut off function in closed position.

The valves of type SKV and SKVT are suitable for liquids, pulp slurry, muddy media, vapours, gases and acids.

Two types of internal design are used: SKV and SKVT. SKV with “floating ball” design or “seat supported ball” design, used for DN25 to DN400. SKVT with trunnion supported ball design, used for DN450 and DN500.

Two types of seats are available PTFE 53 and HiCo (High Cobalt alloy)

3.2 Function and design

The Somas ball valve type SKV and SKVT is a full bore valve with a cylindrical bore for maximum capacity. The pressure rating for DN25 - 50 is PN50 and for DN80 - 500 it is PN25. The flanges comply with various standards and can be drilled according to the EN, ISO and ASME standards.

Spring loaded seats for excellent tightness at low differential pressures.

The valve is also available with “locked seats”. This design is used when there is a risk of media penetrating behind the seats, a condition that forces the seats towards the ball and blocks the ball’s rotary motion.

As standard the ball is hard chrome plated. As an option it can be coated with High Cobalt alloy (HiCo).

The valve seats are available in two different materials:
PTFE 53 (which is PTFE reinforced with stainless steel powder) or HiCo (High Cobalt alloy).

PTFE 53 consists of 50% stainless steel powder and 50% virgin PTFE. PTFE 53 can be used up a temperature of 200° C. To minimize deformation at high differential pressure and high temperature the PTFE 53 material is mounted into a support ring made of stainless steel. (➔ Fig.3-1).

Seat in HiCo material (➔ Fig.3-2) is used for higher temperatures and for fluids containing impurities which mechanically can destroy a PTFE 53 seat.

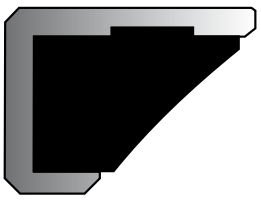


Fig.3-1 PTFE 53

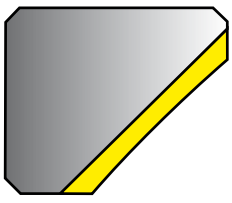


Fig.3-2 HiCo (High Cobalt alloy)

4 Technical specifications

4.1 Tightening torque for bolts

4.1.1 Torques for flange boltings

Use washers and greased bolts to ensure that the joints function properly. Tighten the bolts alternately with a torque wrench.

Suitable torque varies according to the size of the bolt.

DN	PN/Class	Bolt		Torque (Nm) [1]	DN	PN/Class	Bult		Torque (Nm) [1]
		Dim.	Qty.				Dim.	Qty.	
25	10, 16, 25 40 /150 /300	M12 M12 1/2" 5/8"	4 4 4 4	32 48 35 60	200	10 16 25 /150	M20 M20 M24 3/4"	8 12 12 8	175 120 140 180
40	10,16, 25 40 /150 /300	M16 M16 1/2" 3/4"	4 4 4 4	65 95 65 75	250	10 16 25 /150	M20 M24 M27 7/8"	12 12 12 12	140 135 200 170
50	10,16, 25 40 /150 /300	M16 M16 5/8“ 5/8“	4 4 4 8	80 120 60 45	300	10 16 25 /150	M20 M24 M27 7/8"	12 12 16 12	160 180 205 230
80	10,16, 25 Class 150	M20 5/8"	8 4	65 105	350	10 16 25 /150	M20 M24 M30 1"	16 16 16 12	215 235 340 280
100	10,16 25 /150	M16 M20 5/8"	8 8 8	80 95 70	400	10 16 25 /150	M24 M27 M33 1"	16 16 16 16	240 300 445 270
125	10,16 25 /150	M16 M24 3/4"	8 8 8	90 110 110	450	10 16 25 /150	M24 M27 M33 1 1/8"	20 20 20 16	210 300 395 405
150	10,16 25 /150	M20 M24 3/4"	8 8 8	120 140 130	500	10 16 25 /150	M24 M30 M33 1 1/8"	20 20 20 20	245 410 480 355
					600	10 16 25 /150	M27 M33 M36 1 1/4"	20 20 20 20	310 615 630 510

Tab.4-1 Torque for flange boltings

[1] The information in the table refers to lubricated bolts. The correction factor for new, unlubricated bolts is 1.5. Tighten the bolts alternately until the correct tightening torque is reached.

Tightening torque applies to flat gaskets corresponding to non-reinforced and reinforced graphite according to EN 12516-2: 2014 with m-factor according to ASME 2.0 to 2.5. Maximum thickness for gasket: 2.0 mm. Tightening torque must not be exceeded, because then the functionality of the valve can be compromised. Tightening torques in Nm are designed for gaskets according to EN 1514-1, ASME B16.21 and counter flanges according to EN 1092-1, EN 1759-1, ASME B16.47.

4.1.2 Tightening torque for screws in valves

Screw dim./class	M6	M8	M10	M12	M16	M20	M24	M27
Tightening torque MV 1) (Nm)	10	25	47	57	140	273	472	682

1) Mv-recommendations refer to flat burr-free surfaces lubricated with a good quality lubricant.

4.1.3 Tightening torque for stuffing box gland

Screw dim./class	M6	M8	M10	M12	M16	M20	M24
Torques Graphite box (Nm)	7	15	25	50	80	125	185
Torques PTFE box (Nm)	7	10	15	25	50	80	125

4.1.4 Tightening Torque Bearing Blocks

Valve	DN450		DN500	
Number of bolts / Diameter	**12X**	**M16**	**8X**	**M20**
First mounting torque	**50 (Nm)**		**50 (Nm)**	
Second mounting torque	**220 (Nm)**		**220 (Nm)**	
Final tightening torque	**280 (Nm)**		**547 (Nm)**	

5 Assembly

5.1 Unpacking and transportation

Inspect the ball valve for transport damage when unpacking. The protective caps must only be removed immediately before assembly. The valve must be stored on a suitable base and protected against dirt until installed.

The valve must be stored in a cool, dry, clean place, not in direct contact with the floor. The valve must always be protected against dirt during storage and assembly, see also Technical Information sheet, Ti-935 that is available at www.somas.se.

Warning!

When transporting and handling the valve, observe the weight of the valve or of the whole unit. Do not walk under suspended loads.

Transportation must be carried out with suitable hoisting equipment as shown in (➔ Fig.5-1). The picture shows a standard situation. Please note that all possible situations that can occur cannot be covered in this lift instruction.

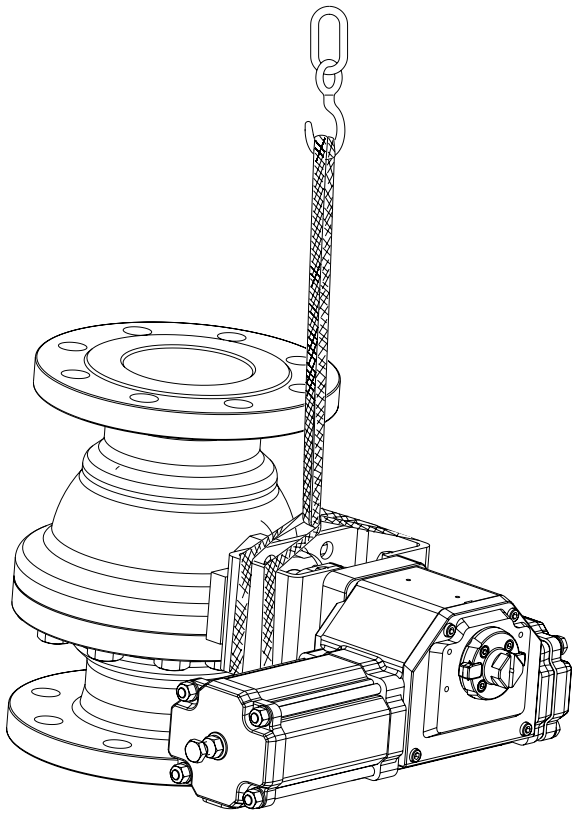


Fig.5-1 Lifting

5.2 Installation of the valve in the pipeline

Attention!

The valve is normally installed in the pipeline complete with mounted actuator.

Mounting in horizontal pipes

How Somas valves are mounted in a horizontal pipe can depend on a variety of factors like the media, the application as such and available space.

Somas valves (ball valves, segmented valves and butterfly valves) should generally be mounted:

- In the first place with the shaft horizontally.
- If it is necessary to deviate from above, the spindle should point upwards in the upper half plane
- For media that has a thick ”bottom fraction” that can accumulate in the lower shaft bearing, avoid mounting with the shaft straight up or near straight up.
- Mounting with the shaft pointing down in the lower half plane should be avoided, and especially mounting with the shaft straight down.
- If there are strong reasons for choosing the mountings that contradict the instructions above, Somas should be contacted to evaluate the risks associated with these mountings.

The direction of flow is indicated with arrows on the valve body. Fix the pipeline correctly to prevent the exertion of external forces on the valve.

Warning!

Before carrying out maintenance or repair work on the ball valve with actuator or installation and removal of the ball valve from the pipeline, always disconnect the compressed air supply to the actuator.
Single action actuators may move to “open” or “closed” position without being connected to the air system.

5.2.1 Important information for installation

- Only remove protective devices immediately before installation of the valve.
- Mating flanges must be in accordance to the European or ASME standards.
- Ensure that the valve is not dirty and the pipeline is cleanly purged. Dirt damages the seat and the ball segment and leads to leakages.
- Ensure that the sealing areas of the mating flanges are clean and parallel.
- Ensure that the valve and the gaskets are correctly centred and gaskets of the correct quality are used.
- Tighten the flange bolt carefully. The tightening torque depends on the bolt size (➔ Tab.4-1). Keep the valve closed when it is not put into operation.
- **Valves can be delivered with threaded connection holes intended for TA Luft, flushing, lubrication, steam etc. Components and equipment to be connected shall fulfil the safety requirements according to the PED (2014/68/EU).**
  Pipe threads with parallel threads and a separate sealing ring shall be used

5.3 Commissioning

1. Ensure that the valve is cleaned well before commissioning. Dirt damages the ball and/or seat and leads to leakages.
2. Open the valve completely.
3. Check the stuffing box when the pipe system is pressuerized and retighten the nuts of the stuffing box gland in the event of leakage.

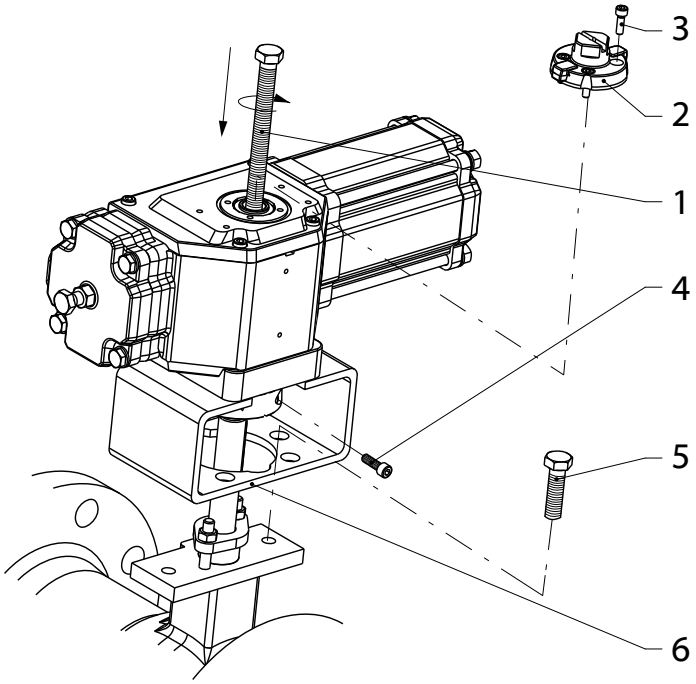
5.4 Disassembly of the pneumatic actuator

Note

Observe also the detailed information in the operating manual of the actuator Mi-503 EN.

Warning!	
Before assembling or disassembling the pneumatic actuator of a ball valve installed in the pipeline depressurise the relevant valve in the pipeline system, isolate the valve and remove the medium before working on the valve. The pressurised medium may lead to injuries to personnel.	

Warning!	
Before carrying out maintenance or repair work on the ball valve with actuator or installation and removal of the ball valve from the pipeline, always disconnect the compressed air supply to the actuator. Single action actuators may move to “open” or “closed” position without being connected to the air system.	



1	Puller	3	Screw	5	Bolt
2	Driver	4	Clamping ring bolts	6	Bracket

Fig.5-2 Disassembly of the actuator (schematic diagram)

Use a puller to remove the actuator from the valve. This prevents damage to the seat and ball of the valve.

Pullers

Actuator size	A11	A13	A21	A22	A23	A24	A31	A32
Article no.	34786	34786	34786	34786	34786	34786	34787	34787
Actuator size	**A33**	**A34**	**A41**	**A42**	**A43**	**A44**	**A51**	**A52**
Article no.	34787	34787	34788	34788	34788	34788	34788	34788

1. Undo the clamping ring bolts (➔ Fig.5-2/4).
2. Remove the accessory parts such as positioners and end position limit switches.
3. Remove the screws (➔ Fig.5-2/3), to remove the driver (➔ Fig.5-2/2).
4. Remove the bracket (➔ Fig.5-2/6) from the valve by removing the bolts (➔ Fig.5-2/5).
5. Press the actuator off the valve with the puller (➔ Fig.5-2/1). Turn the puller in until the actuator can be removed from the valve shaft.
6. Lift the actuator off and turn the puller out again.

5.5 Positioning of the shaft with disassembled actuator

The shaft of DN 25-50 valves has one key while the shaft of DN 80-400 valves has two keys placed 180° from each other.

The valve is closed when each key is 90° from the flow direction.

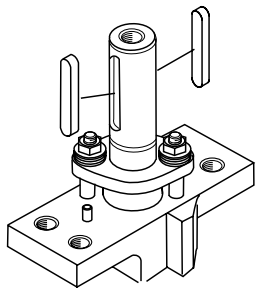


Fig.5-3 Location of the keyway. DN 80-400

5.6 Assembly of the pneumatic actuator

Note

Observe also the detailed information in the operating manual of the actuator Mi-503 EN.

Warning!

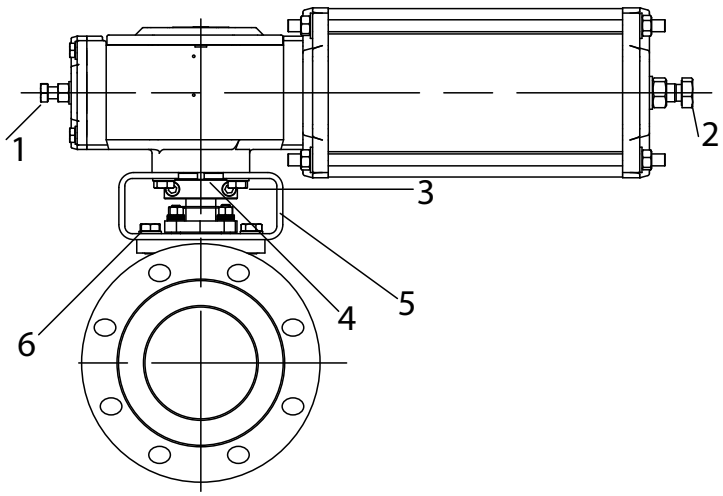
Before assembling or disassembling the pneumatic actuator of a ball valve installed in the pipeline depressurise the relevant valve in the pipeline system, isolate the valve and remove the medium before working on the valve.
The pressurised medium may lead to injuries to personnel.

Warning!

Before carrying out maintenance or repair work on the ball valve with actuator or installation and removal of the ball valve from the pipeline, always disconnect the compressed air supply to the actuator.
Single action actuators may move to “open” or “closed” position without being connected to the air system.

Danger!

Risk of injury!
Observe movements of the ball.
Keep hands, tools and other objects away from the area where the ball moves. The valve with ball mounted may work as a cutting tool. Do not leave any foreign objects in the valve body. The ball of the ball valve always works as a separate device.
There is no difference whether an actuator is installed or not. The position of the ball may change during transport or handling of the ball valve.



1	End stop bolt	4	Clamping ring
2	End stop bolt	5	Bracket
3	Bolt	6	Bolt

Fig.5-4 Assembly of the actuator (schematic diagram)

5.6.1 Actuator mounting alternatives

Following mounting positions are possible.

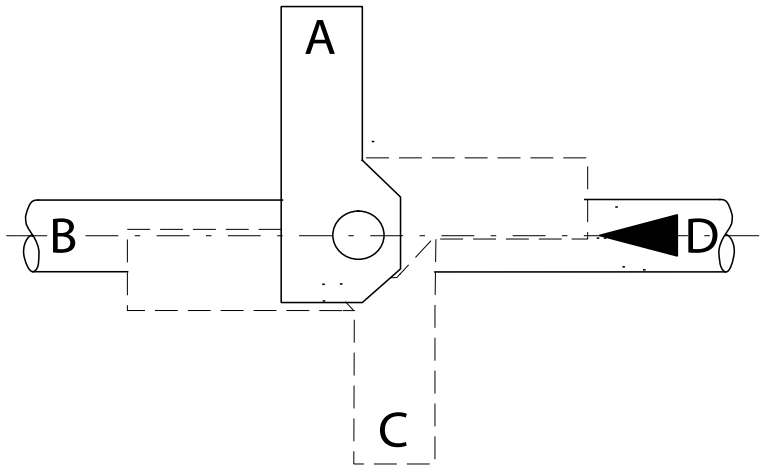
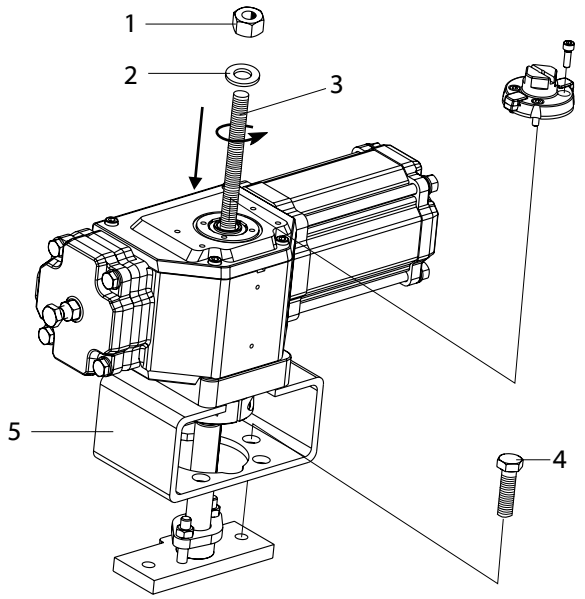


Fig.5-5 Actuator mounting position

Note

To prevent damage, do not fit the actuator with force.

When large actuators (both single - and double acting) are used in vertical pipes, install them with the cylinder in the pipe direction. This will result in less wear and easier maintenance.



1	Nut	3	Threaded rod	5	Bracket
2	Washer	4	Bolt		

Fig.5-6 Assembly of the actuator (schematic diagram)

Threaded rod dimension (for actuator assembly)

DN	Thread
25 - 40	M6
50 - 200	M10
250 - 500	M12

Tab.5-1 Threaded rod dimension

Procedure

1. When using double action and spring closed actuators, ensure that the valve in “closed” position.
2. When using spring opened actuators, ensure that the valve is in “open” position.
3. Lubricate the shaft and the key.
4. Fix the bracket (➔ Fig.5-4/5) to the actuator with the aid of the bolts (➔ Fig.5-4/3).
5. Insert and tighten a threaded rod (➔ Fig.5-5/3) into the valve shaft. The length and size of the threaded rod varies with each valve size. (➔ Tab.5-1)
6. Place the actuator over the rod and place the washer (➔ Fig.5-5/2) on the the top of the rod.
7. Tighten the nut (➔ Fig.5-5/1) until the actuator is fixed into right position and the bracket meets the mounting flange on the valve.
8. Fix the actuator with the bolt (➔ Fig.5-5/4).
9. Connect the shaft end of the valve and the actuator to the clamping ring (➔ Fig.5-4/4). The clamping ring is to be installed in such a way that its yellow markings indicate the position of the ball. When the valve is closed, the markings must then be offset to the direction of flow by 90°.
10. Tighten the bolts on the clamping ring (➔ Fig.5-4/4).
11. Then set the end positions (➔ Chap.6.7).

If the actuator cannot be mounted according to the above instructions:
Fix the shaft to ensure that the seats and ball will not be damaged during actuator assembly. Alternatively contact Somas or a Somas representative for instructions on mounting the actuator or refer to the manufacturer’s instructions for the respective actuator.

6 Maintenance

6.1 Disassembling the ball valve from pipeline

Attention!

The valve is normally removed from the pipeline complete with mounted actuator.

Warning!

Before carrying out maintenance or repair work on the ball valve with actuator or installation and removal of the ball valve from the pipeline, always disconnect the compressed air supply to the actuator.
Single action actuators may move to “open” or “closed” position without being connected to the air system.

Warning!

Inform yourself of the properties of the medium. Protect yourself and your environment from hazardous or poisonous substances.
Observe the safety instructions in the safety data sheets of the manufacturers.
Ensure that no medium can enter the pipeline during maintenance work.

Warning!

Do not remove the valve from the line as long as the valve is under pressure!
Dismantling or disassembly of a valve under pressure leads to an uncontrolled pressure drop.
Always isolate the relevant valve in the pipeline system; depressurise the valve and remove the medium before working on the valve.

Warning!

When transporting and handling the valve, observe the weight of the valve or of the whole unit.
Never lift the valve by its positioner, limit switch, solenoid valve or piping. Place the hoisting ropes securely according to lift instruction.
The valve or parts thereof may injure persons if dropped.
Do not walk under suspended loads.

Procedure

1. Seal off the pipeline section containing the ball valve.
2. Depressurise the sealed off pipeline section.
3. Drain the sealed off pipeline section.
4. If necessary, purge the pipeline section.
5. Check the temperature of the pipeline and of the valve. Allow the pipeline and valve to cool down to the ambient temperature if necessary.
6. Secure the valve against falling (➔ Fig.5-1).
7. Undo the boltings between the ball valve and the pipeline (➔ Chap. 5.2).

6.2 Maintenance

Regular maintenance is necessary to be able to operate the valve with maximum efficiency and low operating costs. Somas products enable trouble-free operation and are very low-maintenance.

Check the valve, the actuator and accessory parts regularly to ensure safe, trouble-free operation. The tightening torques of the boltings on the flanges must be checked in accordance with the specifications of the gasket manufacturer and tightened if necessary. The stuffing box must be checked regularly and re-tightened if necessary. The most important replacement parts are contained in the Somas replacement part set. The gasket set contains all necessary seals and sealing rings for basic repair of the valve. The repair kit contains a seal kit as well as bearings, ball etc. for a complete overhaul of the valve.

Note

Note down the details of the type plate (➔ Fig.6-1) before contacting the contact partners given in the order confirmation.
Only use original replacement and wear parts from Somas Instrument AB.

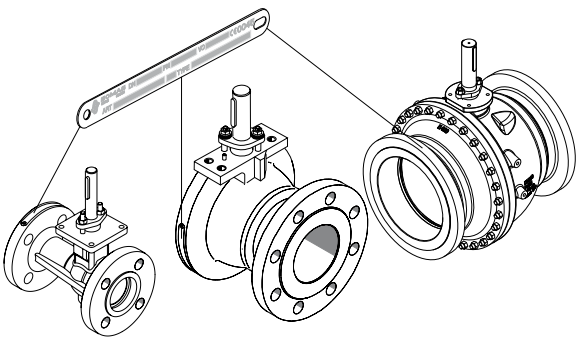


Fig.6-1 Type plate

6.3 Installation and disassembly of the stuffing box

1. Check the stuffing box after commissioning and then regularly. Retighten the nuts of the stuffing box gland (➔ Fig.6-2/1) if necessary.

⇨ The stuffing box package must be replaced if leaks can no longer be eliminated by tightening the nuts.

Changing the stuffing box is normally a part of valve overhaul. Follow applicable safety instructions concerning dismounting of the ball segment valve from pipeline (➔ Chap. 6.1) and dismounting the pneumatic actuator from the ball valve (➔ Chap. 5.4).

When indicated it is possible to change the stuffing box if the valve is installed in the pipeline. For this regard the following safety instructions.

Warning!

Before replacing the stuffing box of a ball valve installed in the pipeline depressurise the relevant valve in the pipeline system, isolate the valve and remove the medium before working on the valve.
The pressurised medium may lead to injuries to personnel.

Warning!

Before carrying out maintenance or repair work on the ball valve with actuator or installation and removal of the ball valve from the pipeline, always disconnect the compressed air supply to the actuator.
Single action actuators may move to “open” or “closed” position without being connected to the air system.

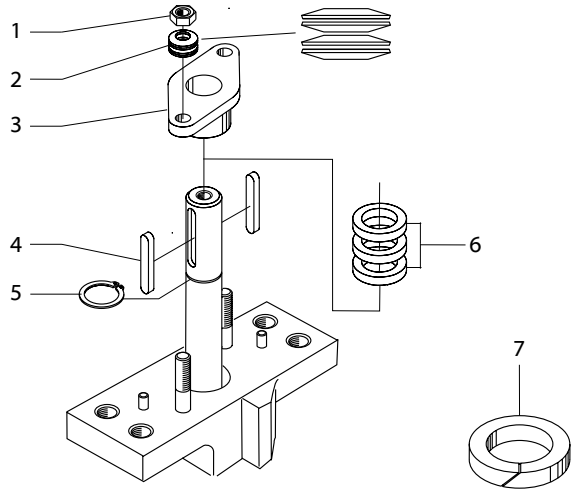
Installation and disassembly

If the stuffing box cannot be tightened further, fill or replace the graphite rings according to the instructions below.

Note

Cap springs (➔ Fig.6-2/2) and locking ring (➔ Fig.6-2/5) are not available for the DN 25–50 valves.

It is not necessary to replace rings, which are not damaged or destroyed.



1	Nut	3	Stuffing box gland	5	Locking ring	7	Stuffing box ring
2	Cap springs	4	Key	6	Graphite rings		

Fig.6-2 Assembly of the stuffing box

1. Remove the key/keys (➔ Fig.6-2/4). For DN 80–400 valves, remove the locking ring (➔ Fig.6-2/5) as well.
2. Remove the nuts (➔ Fig.6-2/1), the stuffing box gland (➔ Fig.6-2/3) and for DN 80–400 valves, the cap springs (➔ Fig.6-2/2). Note how the cap springs are mounted.
3. Remove the remaining damaged graphite rings.
4. Using the stuffing box gland, add the new compressed moulded graphite rings (➔ Fig.6-2/6) one-by-one. The number of rings added will depend on the valve size. The top ring should be at the same level as or slightly below the upper section of the actuator mounting flange.
5. Assemble the stuffing box gland, cap springs and nuts.
6. Tighten the nuts alternately until the cap springs are completely flat.
7. Replace the locking ring and the keys.

If the valve has an actuator that cannot be removed, follow these instructions:

1. Cut the stuffing box ring (➔ Fig.6-2/7) diagonally.
2. Thread the ring carefully onto the shaft, and down into the stuffing box.

6.5 Replacing the seats and ball

To replace the seats and the ball, the complete valve assembly is dismounted from the pipeline and the actuator is dismounted from the valve (➔ Chap. 6.1). Follow the applicable instructions (➔ Chap. 5.4).

Attention!

To replace the seats and the ball, the valve should when possible be securely clamped in a clamping device.

Danger!

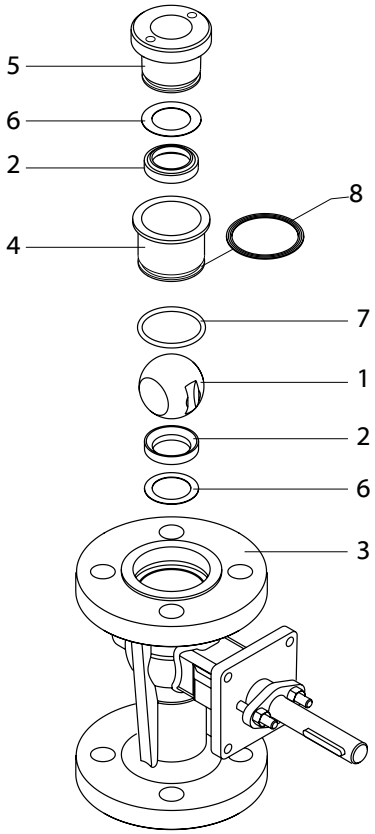
Risk of injury!
Observe movements of the ball segment.
Keep hands, tools and other objects away from the area where the ball moves. The valve with ball installed may work as a cutting tool. Do not leave any foreign objects in the valve body. The ball of the ball valve always works as a separate device.
There is no difference whether an actuator is installed or not. The position of the ball may change during transport or handling of the ball valve.

6.5.1 Disassembly, DN 25 – 50 valves

1. Close the valve.
2. Place the valve on the working bench with the cover plate (➔ Fig.6-3/5) facing upwards.
3. Loosen and remove the cover plate (➔ Fig.6-3/5).
4. Lift out the spring washers (➔ Fig.6-3/6), seats (➔ Fig.6-3/2), support ring (➔ Fig.6-3/4), sealing ring (➔ Fig.6-3/7) and ball (➔ Fig.6-3/1).

6.5.2 Cleaning, lubricating and mounting, DN 25 – 50 valves

1. Clean the seat areas and ensure that the ball's surface is undamaged. Any damage can quickly destroy the new seats. If necessary, replace the ball.
2. Lubricate the seat areas and the areas for the spring washers with a paste type molybdenumdisulfide.
3. Mount the new spring washer and new seat in valve body.
4. Mount the ball.
5. Mount new sealing ring.
6. Mount a new O-ring (➔ Fig.6-3/8) on the support ring and place the support ring in the valve body.
7. Place a new spring washer and a new seat on the cover plate and carefully insert all three into the valve. Tighten the cover plate.
8. Perform a test run.



1	Ball	4	Support ring	7	Sealing ring
2	Seat	5	Cover plate	8	O-ring
3	Valve body	6	Spring washer		

Fig.6-3 Replacing the seats and ball, DN 25-50

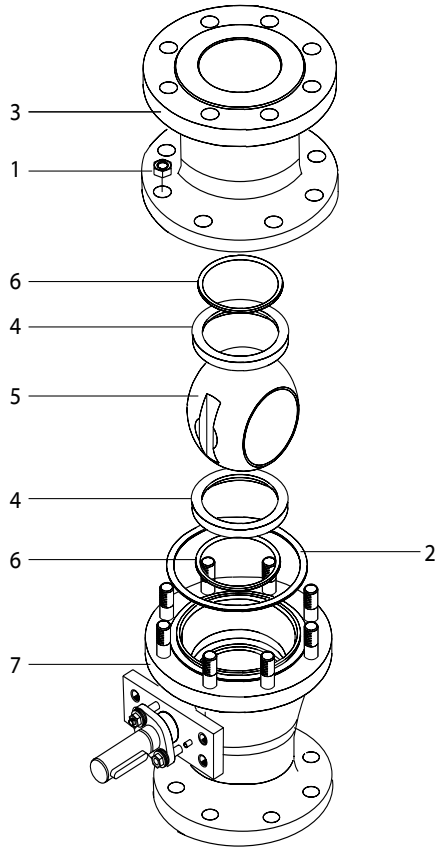
6.5.3 Disassembly, DN 80 - 400 valves

Use a lift device to lift the valve and heavy parts.

1. Close the valve.
2. Place the valve with the front valve body half (➔ Fig.6-4/7) towards the working bench.
3. Loosen and remove the nuts (➔ Fig.6-4/1).
4. Lift away the other valve body half (➔ Fig.6-4/3).
5. Lift out the ball (➔ Fig.6-4/5).
6. Dismount the seats (➔ Fig.6-4/4) and C-rings (➔ Fig.6-4/6).

6.5.4 Cleaning, lubricating and mounting, DN 450 – 500 valves

1. Clean the seat areas and C-ring areas and ensure that the the ball's surface is undamaged. Any damage can quickly destroy the new seats. If necessary, replace the ball.
2. Lubricate the seat and C-rings areas with a paste type molybdenumdisulfide.
3. Mount the new C-rings and new seats in respectively valve body half.
4. Mount the ball in the front valve body half.
5. Clean the surface where the two body halves meet and attach a new gasket (➔ Fig.6-4/2) to the front half on the valve body.
6. Fit the other valve body half, position the nuts and tighten.
7. Perform a test run.



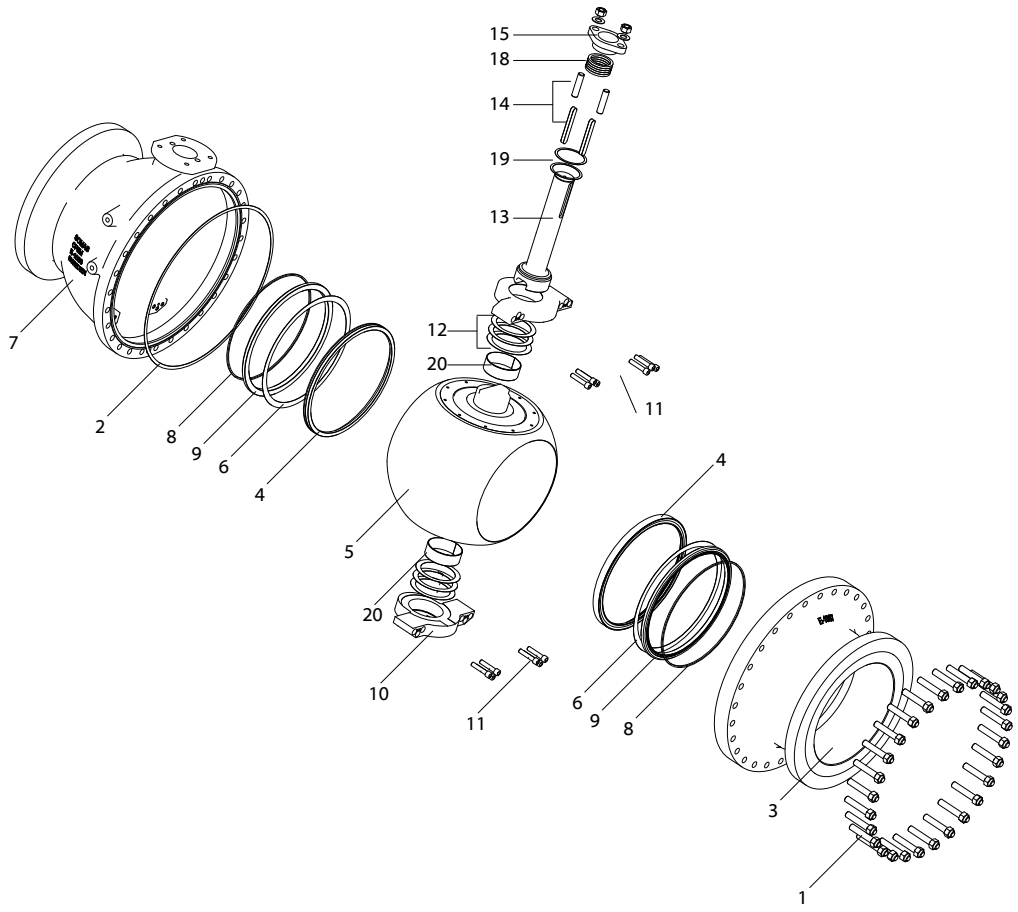
1	Nut	4	Seats	7	Front valve body half
2	Gasket	5	Ball		
3	Rear valve body half	6	C-rings		

Fig.6-4 Replacing the seats and ball, DN 80-400

6.5.5 Disassembly, DN 450 – 500 valves

Use a lift device to lift the valve and heavy parts.

1. Close the valve.
2. Place the valve with the front body half (w. drive shaft and stuffing box) (➔ Fig.6-4/7) towards the working bench.
3. Loosen and remove the nuts (➔ Fig.6-4/1).
4. Lift the rear body half and place it beside (➔ Fig.6-4/3).
5. Loosen and remove the bolts (➔ Fig.6-4/11) of the bearing blocks (drive shaft end and bottom end).
6. Lift out the ball (➔ Fig.6-4/5) with the bearing blocks (➔ Fig.6-4/10).
7. Dismount the seats (➔ Fig.6-4/4) support ring (➔ Fig.6-4/9) seat gasket (➔ Fig.6-4/8) and spring washer (➔ Fig.6-4/6).



Obr. 6-5

1	Nut + Pinbolt	8	Seat gasket	15	Stuffing box gland
2	Gasket between body halves	9	Support ring	16	Cap springs
3	Rear body half	10	Bearing block	17	Gland nuts
4	Seat	11	Bearing block bolts	18	Stuffing box
5	Ball trunnion supported	12	Shims ball shafts	19	Shims (shaft)
6	Spring washer	13	Drive shaft	20	Bearing
7	Front body half	14	Keys		

6.5.6 Cleaning, lubrication and mounting, DN 450 – 500 valves

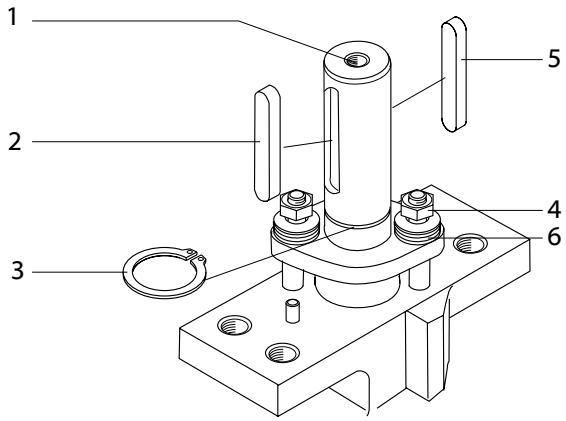
1. Clean the areas for the seat, spring washer and support ring. Ensure that the ball's surface is undamaged. Any damage can quickly destroy the new seats. If necessary, replace the ball.
2. Lubricate the seat spring washer and support rings areas with a lubrication paste type molybdenum disulphide.
3. Mount the new seat (➔ Fig.6-4/4), spring washer (➔ Fig.6-4/6), support ring (➔ Fig.6-4/9) and seat gasket (➔ Fig.6-4/8) in respectively valve body half.
4. Remove the bearing blocks and inspect them as well as the trunnion shafts.
5. Grease the trunnion shafts with a paste type molybdenum disulphide and remount the bearing blocks.
6. Carefully lower the trunnion ball with bearing blocks into the front half. Fasten the bearing block (➔ Fig.6-4/10) with two bolts with a torque 50Nm first. Then all the bolts cross wise with a torque 220 Nm. Finally, all the bolts cross wise with a torque according to table 4.4.1.
7. Clean the surface where the two body halves meet and attach a new gasket (➔ Fig.6-4/2) to the front half (➔ Fig.6-4/7) of the valve body.
8. Fit the rear valve body half (➔ Fig.6-4/3), position the nuts (➔ Fig.6-4/1) and tighten.
9. Perform a test run.

6.6 Replacing the shaft

To replace the shaft, the valve is to be removed and the actuator (➔ Chap. 6.1) is to be disassembled from the valve. Follow the corresponding instructions (➔ Chap. 5.4).

Danger!

Risk of injury!
Observe movements of the ball segment.
Keep hands, tools and other objects away from the area where the ball moves. The valve with ball installed may work as a cutting tool. Do not leave any foreign objects in the valve body. The ball of the ball valve always works as a separate device.
There is no difference whether an actuator is installed or not. The position of the ball may change during transport or handling of the ball valve.



1	Shaft	3	Locking ring[1]	5	Key[1]
2	Key	4	Nut	6	Cap springs

[1] Only DN 80-400

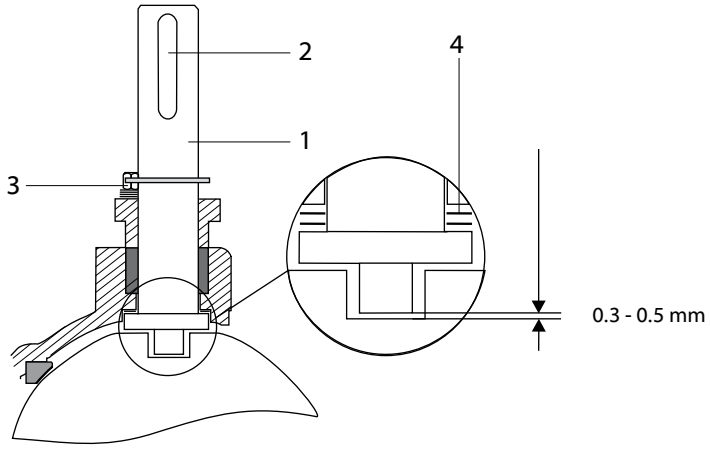
Fig.6-5 Replacing the shaft, DN 25-50

6.6.1 Disassembly, DN 25 – 50 valves

1. Close the valve.
2. Dismantle the actuator. If necessary. Dismantle the seats and ball according to “Replacing the seats and ball” (➔ Chap.6.5).
3. Remove the key (➔ Fig.6-5/2) and the loosen the nuts (➔ Fig.6-5/4).
4. Remove the plug in the bottom of the valve.
5. Remove the shaft (➔ Fig.6-5/1) by pressing the shaft into the valve body.

6.6.2 Cleaning, lubricating and mounting, DN 25 – 50 valves

1. Test mount the shaft with the shims (➔ Fig.6-6/4). Use the same number and thicknes as used previously.
2. Test mount the ball. The distance between the shaft and the groove in the ball should be 0.3 - 0.5 mm (➔ Fig.6-6).
   Adjust the number and thickness of the shims if necessary.
3. Lubricate shaft and corresponding bearings in the body with a paste type molybdenumdisulfide. Remount the shaft.
4. Assemble the valve. Tighten the nuts and mount a new key.



1 Shaft 2 Key 3 Nut 4 Shims

Fig.6-6 Replacing the shaft, DN 25-400

6.6.3 Disassembly, DN 80 – 400 valves

1. Close the valve and dismantle the actuator.
2. Dismantle the seats and ball (➔ Chap. 6.5.3).
3. Remove the keys (➔ Fig.6-5/2) (➔ Fig.6-5/5), the cap springs (➔ Fig.6-5/6), the locking ring (➔ Fig.6-5/3) and loosen the nuts (➔ Fig.6-5/4).
4. Remove the shaft (➔ Fig.6-6/1) by pressing the shaft into the valve body.

Note

Note how the cap springs are mounted.

6.6.4 Cleaning, lubrication and mounting, DN 80 – 400 valves

1. Test mount the shaft with the same number and size of shims (➔ Fig.6-6/4) (used previously.
2. Test mount the ball by placing it in the valve body half. The distance between the shaft and the groove in the ball should be 0.3 – 0.5 mm (➔ Fig.6-6). Adjust the number and thickness of the shims if needed.
3. Lubricate the shaft and corresponding bearings in the body halves with a paste type molybdenumdisulfide. Remount the shaft.
4. Remount the other valve body half, fit the nuts and tighten.
5. Remount the cap springs and nuts. Tighten the nuts alternately and remount the locking ring and new keys.

6.6.5 Disassembly, DN 450 – 500 valves

Use a lift device to lift the valve and heavy parts.

1. Close the valve and dismantle the actuator.
2. Dismantle the seat and ball according to “Replacing the seat and ball” (➔ Chap.6.5).
3. Remove the keys (➔ Fig.6-5/14) and loosen the gland nuts (➔ Fig.6-5/17).
4. Remove the shaft (➔ Fig.6-5/13) by pressing the shaft into the valve body.

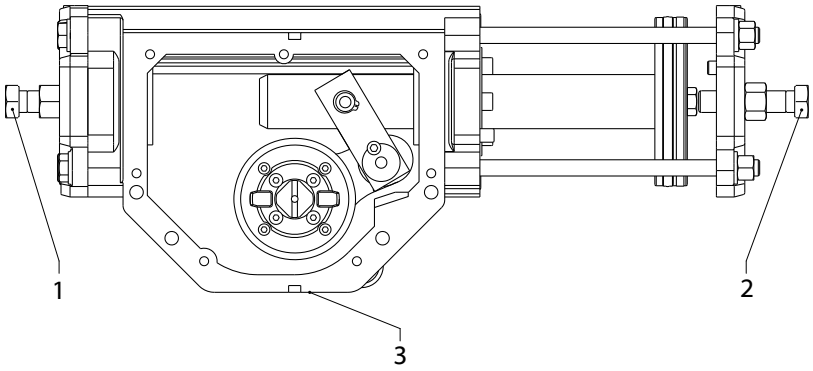
6.6.6 Cleaning, lubrication and mounting, DN 450 – 500 valves

1. Test to mount the shaft.
2. Test to remount the ball with bearing blocks and check the distance between the shaft and the grove, making sure that the function is correct and the ball can turn freely.
3. Lubricate the shaft with molybdenumdisulfide, and corresponding surfaces in the valve body. Mount the shaft.
4. Remount the other valve body half fit the nuts and tighten. Remount the ball and bearing blocks.
5. Remount the cap springs and nuts. Tighten the nuts alternatively.

6.7 Adjustment of the end positions

Danger!

Risk of injury!
Observe movements of the ball.
Keep hands, tools and other objects away from the area where the ball moves when the actuator is connected to compressed air system. Single action actuators may move to “open” or “closed” position without being connected to the air system.



1 End position bolt “open” position 2 End position bolt “closed” position 3 Type plate

Fig.6-7 End position bolts on pneumatic actuator

6.7.1 Setting of the “closed” position with type SKV

1. Connect compressed air via a pressure reduction valve 4-5,5 bar depending on actuator specification.
2. Operate the valve to test.
3. Check whether the valve closes correctly. The keyway connection on the valve shaft is turned 90° from the flow direction of the valve.

Procedure

1. If the ball does not reach the “closed” position, undo the locknut of the end position bolt and turn the end position bolt (➔ Fig.6-7/2) 1-2 turns counterclockwise.
2. If the ball moves beyond the “closed” position, undo the locknut of the end position bolt and turn the end position bolt (➔ Fig.6-7/2) 1-2 turns clockwise.
3. Operate the ball segment to test.
4. When the correct setting is reached, attach thread seal tape and tighten the

locknut.

6.7.2 Setting of the “open” position with type SKV

1. Connect compressed air via a pressure reducing valve 4-5,5 bar depending on actuator specification.
2. Operate the valve to test.
3. Check whether the valve opens correctly. The bore of the ball should be in line with the centre line of the valve housing.

Procedure

1. If the required degree of opening is not reached, undo the locknut of the end position bolt and turn the end position bolt (➔ Fig.6-7/1) 1-2 turns counterclockwise.
2. If the ball moves beyond the required degree of opening, undo the locknut of the end position bolt and turn the end position bolt (➔ Fig.6-7/1) 1-2 turns clockwise.
3. Operate the ball segment to test.
4. When the correct setting is reached, attach thread seal tape and tighten the locknut.

6.8 Leak test of the valve

Each valve should be tested for leakage after maintenance work on the seat.

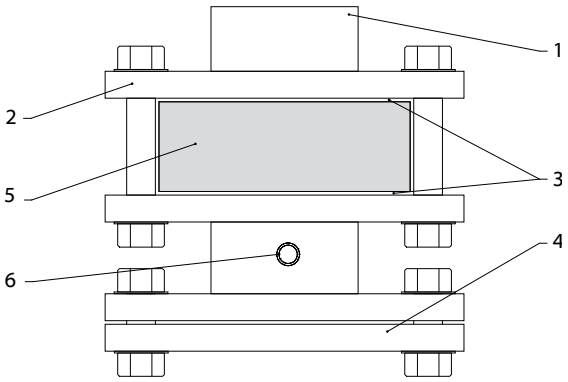
Danger!

Risk of injury!
Observe movements of the ball.
Keep hands, tools and other objects away from the area where the ball moves when the actuator is connected to compressed air system. Single action actuators may move to “open” or “closed” position without being connected to the air system.

The valve has to be installed between the flanges for the test procedure with a prescribed torque (➔ Tab.6-1).

1. The ball valve can in principle be tested with a testing device as in (➔ Fig.6-8) shown.

⇨ Please consult Pressure testing instruction Mi-901 EN.



1	Piece of pipe	3	Flange gaskets	5	Ball valve
2	Counter flange	4	Blind flange	6	Water connection

Fig.6-8 Leak test device (schematic diagram for wafer valve types)

6.8.1 Decommissioning and disposal

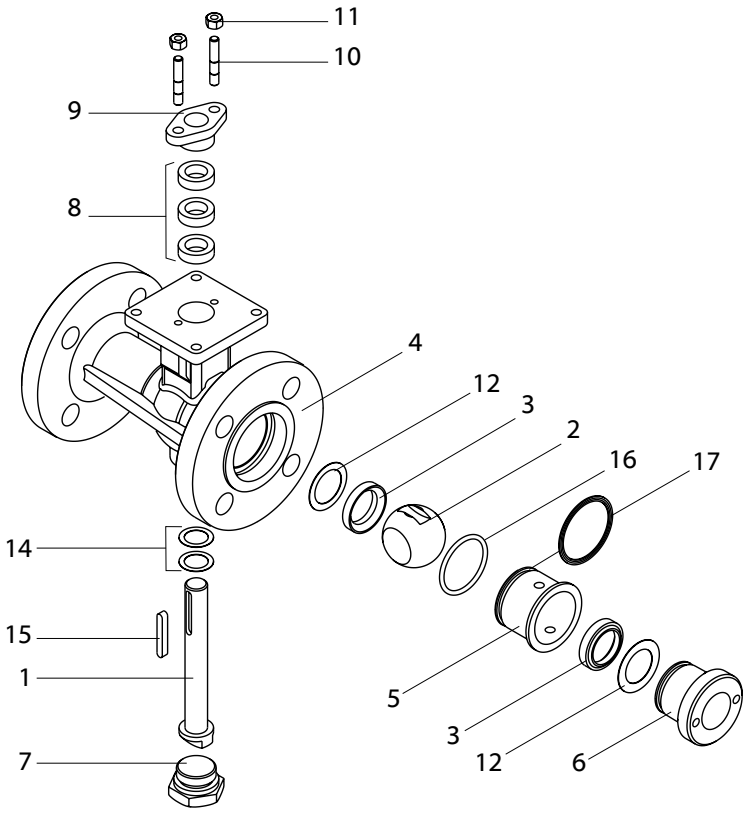
Somas valves are designed for easy maintenance and repair, ensuring an environmentally friendly and cost-efficient use.

Replaced components and valves shall be disassembled and recycled according to local rules and regulations.

The materials of the valve components can be found on the valve marking plate and in Somas valve data sheets.
Material information can also be acquired from Somas Instrument AB.

6.9 Components

6.9.1 SKV, DN 25 – 50



1	Shaft	7	Plug	14	Shims kit
2	Ball	8	Stuffing box kit	15	Key
3	Seats (kit)	9	Stuffing box gland	16	Sealing ring
4	Valve body	10	Stud	17	O-ring
5	Support ring	11	Nut		
6	Cover plate	12	Spring washers (kit)		

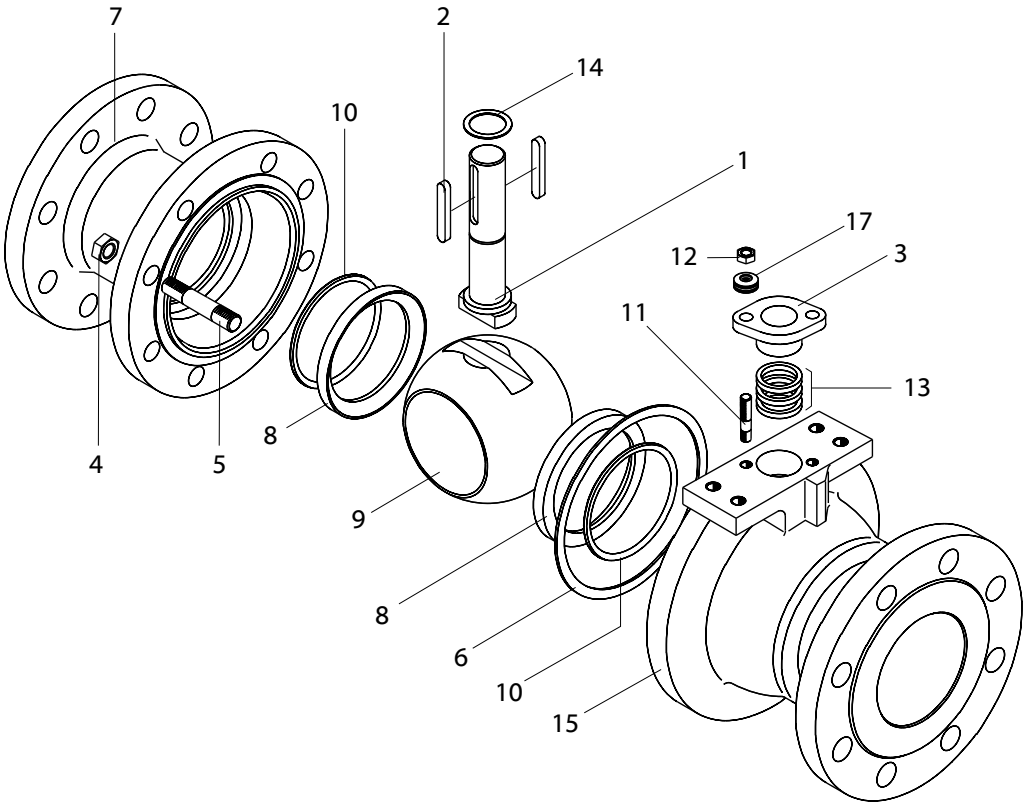
Fig.6-9 SKV, DN 25-50

The following parts are included in the sealing kit for valves with PTFE 53 seats:
Pos. No. 3, 8, 12, 15, 16 and 17.

The following parts are included in the sealing kit for valves with HiCo seats:
Pos. No. 8, 12, 15, 16 and 17.

The following parts are included in the repair kit for all DN 25–50 valves:
Pos. No. 2, 3, 8, 12, 14, 15, 16 and 17.

6.9.2 SKV, DN 80 – 400



1	Shaft	7	Valve body half, rear	13	Stuffing box kit
2	Key	8	Seats (kit)	14	Shims (kit)
3	Stuffing box gland	9	Ball	15	Valve body half, front
4	Nut	10	C-rings (kit)	17	Cap springs (kit)
5	Stud	11	Stud		
6	Gasket	12	Nut		

Fig.6-10 SKV, DN 80-400

The following parts are included in the sealing kit for valves with PTFE 53 seats: Pos. No. 2, 6, 8, 10, and 13.

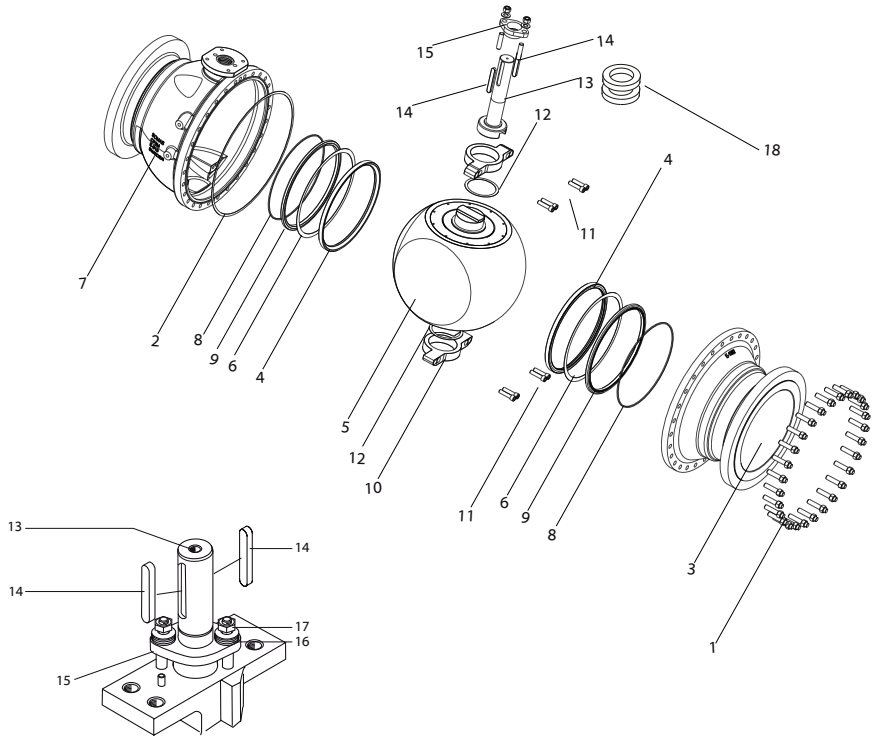
The following parts are included in the sealing kit for valves with HiCo seats: Pos. No. 2, 6, 10, and 13.

The following parts are included in the repair kit for all DN 80–400 valves: Pos. No. 2, 6, 8, 9, 10, 13, and 14.

6.9.3 SKVT, DN 450 – 500

Use a lift device to lift the valve and heavy parts.

1. Close the valve.
2. Place the valve with the front body half (w. drive shaft and stuffing box) (➔ Fig.6-4/7) towards the working bench.
3. Loosen and remove the nuts (➔ Fig.6-4/1).
4. Lift the rear body half and place it beside (➔ Fig.6-4/3).
5. Loosen and remove the bolts (➔ Fig.6-4/11) of the bearing blocks (drive shaft end and bottom end).
6. Lift out the ball (➔ Fig.6-4/5) with the bearing blocks (➔ Fig.6-4/10).
7. Dismount the seats (➔ Fig.6-4/4) support ring (➔ Fig.6-4/9) seat gasket (➔ Fig.6-4/8) and spring washer (➔ Fig.6-4/6).



1	Nut + Pinbolt	7	Front body half	13	Drive shaft
2	Gasket between body halves	8	Seat gasket	14	Keys
3	Rear body half	9	Support ring	15	Stuffing box gland
4	Seat	10	Bearing block	16	Cap springs
5	Ball trunnion supported	11	Bearing block bolts	17	Gland nuts
6	Spring washer	12	Shims ball shafts	18	Stuffing box

Fig.6-5 SKVT, DN450-500

The following parts are included in the sealing kit for valves with PTFE 53 seats:
Pos. No. 2, 4, 6, 8, 14 and 18.

The following parts are included in the sealing kit for valves with HiCo seats:
Pos. No. 2, 6, 8, 14 and 18.

6.10 Alternative seat design

6.10.1 Locked seats

This design is used for applications where the media, by entering behind the seats, will block the rotary motion. The locking is done by pressing the lip in the body on a number of spots towards the seat (➔ Fig.6-11).

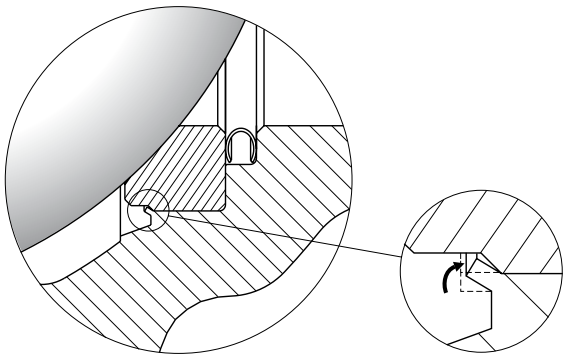


Fig.6-11 Locked design

6.10.2 Scraping seats

For applications where fluid builds up scaling inside the valve. The sharp edge of the scraping seat will scrape off the sealing area (➔ Fig.6-13).

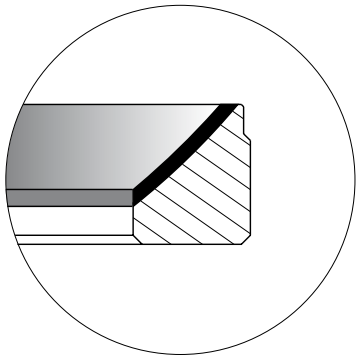


Fig.6-12 Standard design

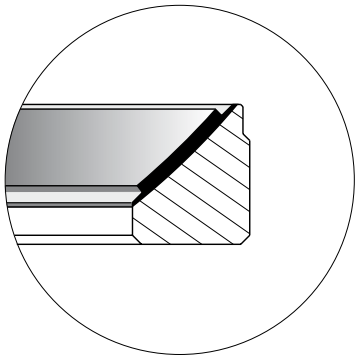


Fig.6-13 Scraper design

A combination of locked and scraping design is also possible.

Somas.se LinkedIn

Head office
Somas Instrument AB
Norrlandsvägen 26
SE-661 40 SÄFFLE
Sweden

Phone: +46 (0)533 69 17 00
E-mail: sales@somas.se
www.somas.se

43756-EN

SOMAS®