SOMAS®

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Mi-203 EN

Operation and service instruction
Butterfly valves
Type VSS

Type VSS	Wafer design
Type VSS LT (Low Temperature)	Wafer design
Type VSS (Fire safe)	Wafer design
Nominal pressure	PN 10 - 40, Class 150, Class 300 (VSS) PN 10 - 25, Class 150 (VSS LT) PN 10 - 25, Class 150 (VSS Fire safe)
Nominal Size	DN 80 - 1200 NPS 3 - 48 (VSS) DN 80 - 500 NPS 3 - 20 (VSS LT) DN 80 - 500 NPS 3 - 20 (VSS Fire safe)

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.

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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 valve 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-203EN”.

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.

The user is responsible for knowing the impact from the media on the valve, the resulting wear rate, and establishing maintenance interval, to maintain safe operation.

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 butterfly valves

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

Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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 butterfly valve with actuator or installation and removal of the butterfly 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 butterfly 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 butterfly 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 butterfly valve!
Exceeding the design data marked on the butterfly 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 butterfly valve from the line as long as it is pressurised!
Dismantling or disassembly of a pressurised butterfly valve leads to an uncontrolled loss of pressure. Always isolate the relevant butterfly valve in the pipe system; despressurise the butterfly valve and remove the medium before working on the butterfly valve.

Warning!

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

Warning!

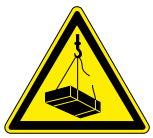
Protect yourself against noise - use the relevant safety equipment.
The butterfly valve may cause noise in the pipeline. The noise level depends on the type of application and can be determined with the Somas software SomSize.
Additional noise sources in the vicinity of the butterfly valve may increase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

Warning!

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

Warning!

When transporting and handling the butterfly 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 butterfly valve or parts thereof may injure persons if dropped.
Do not walk under suspended loads.



3 Description

3.1 General information for VSS standard and VSS Fire safe

The Somas butterfly valve type VSS is used for control shut-off and hand operation. The valve is suitable for liquids, vapours and gases in a wide temperature range.

Due to the sophisticated triple-eccentric design and the special shape of the disc a solid stainless steel seat can be used. This combination gives a solution resistant against high flow velocity and guarantees no leakage even under severe conditions.

The seat is available in different stainless qualities and is replaceable.

The butterfly valve type VSS is designed as a wafer style valve. As alternative there is a lug type version available.

The butterfly valve is checked and ready for use at delivery and can be equipped with actuators, valve positioners as well as with other accessories.

3.2 Function of the valve

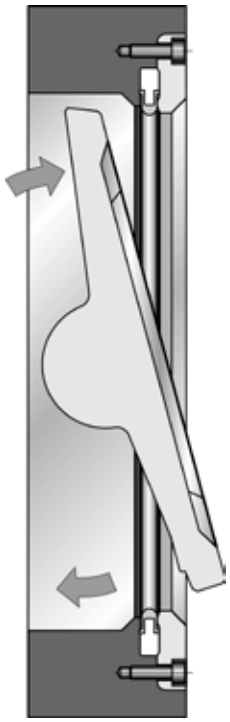


Fig.3-1 Function of the valve VSS standard

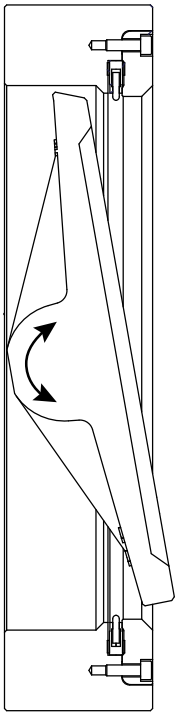


Fig.3-2 Function of the valve VSS Fire safe

The standard Somas VSS butterfly valve is equipped with a metal seat. Somas VSS Fire safe valve come with a 3-pcs metal seat as standard. Other available seat materials are PTFE, HiCo and HiNi.

The valve is adjustable. This means, the more the valve is closed the tighter it becomes (➔ Fig.3-1) and (➔ Fig.3-2).

Through the sophisticated triple eccentric design, the seat is relased from the disc when opening the valve. This reduce wearing and extend the durability of the valve.

To close the butterfly valves for liquids need less torque than valves for vapors and gases.

The butterfly valve is tight in both flow directions. The preferred flow direction is the direction towards the flat side of the disc. This direction is marked with arrows on both sides of the valve.

3.3 VSS LT - Butterfly valves for low temperature applications

The Somas butterfly valve, type VSS LT, is a control-, on/off- and manually operated valve. The valve is designed to handle a wide range of liquids and gases at very low temperatures down to -196°C (-320°F).

The VSS LT valve can be mounted between flanges and also supplied in lugged design.

The VSS LT valves of course also have an advanced triple eccentric design including a unique shape of the disc. The seat design allows the use of a solid stainless steel seat even if the glass filled PTFE seat with or without steel reinforcement is the most common for low temperature applications.

The VSS LT has an extended bonnet with the stuffing box located at the top. This design is used for liquified gases at low temperatures an ensures that the stuffing box is only get in contact with the gas cushion and thereby prevents the stuffing box actuator and/or other accessories to be encapsulated in ice. Maintenance then becomes substantially easier.

The VSS LT has all stainless steel parts manufactured from austenitic stainless steels that can be used in very low temperature service down to -196°C (-320°F).

3.4 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.

4 Technical specifications

4.1 Specifications

4.1.1 Gaskets

Note!
To ensure pressure on the cover plate use only gaskets with right inside diameter.

For installation between pipe flanges acc. to PN 10-25, the inside diameter acc. to EN 1514-1 of the gasket should not be exceeded, see (➔ Tab.4-1).

DN	Max. inside dia. (di) (mm)	Outside dia. (dy) (mm)			
		PN 10	PN 16	PN 25	PN 40
80	89	142	142	142	142
100	115	162	162	168	168
125	141	192	192	194	194
150	169	218	218	224	224
200	220	273	273	284	290
250	273	328	329	340	352
300	324	378	384	400	417
350	356	438	444	457	474
400	407	489	495	514	546
450	458	539	555	564	571
500	508	594	617	624	628
600	610	695	734	731	747
700	712	810	804	833	–
800	813	917	911	942	–
900	915	1017	1011	1042	–
1000	1016	1124	–	–	–
1200	1220	1341	–	–	–

Tab.4-1 Gaskets diameter acc. to EN 1514-1

To fit between pipe flanges acc. to Class 150 and Class 300, the dimensions acc. to ASME B16.21 RF are valid, whereas the following dimensions for gaskets are valid (➔ Tab.4-2).

NPS	DN	Max inside dia. (di) (mm)	Outside dia. (dy) (mm)	
			Class 150	Class 300
3	80	89	135	149
4	100	114	174	181
5	125	141	196	216
6	150	168	222	251
8	200	219	279	308
10	250	273	340	362
12	300	324	410	422
14	350	356	450	486
16	400	406	515	540
18	450	457	550	595
20	500	510	605	655
24	600	610	715	775
28	700	710	775	-
30	750	760	825	-
32	800	815	880	-
36	900	915	985	-

Tab.4-2 Gaskets diameter acc. to ASME Norm

4.2 Tightening torque for flange boltings

4.2.1 Fastening torque valve body

DN	PN/Class	Screw		Torque (Nm)[1]	DN	PN/Class	Screw		Torque (Nm)[1]
		Dim.	Qty.				Dim.	Qty.	
80	10, 16, 25 /150	M16 5/8“	8 4	65 120	450	10 16 25 /150	M24 M27 M33 1 1/8“	20 20 20 16	210 300 395 405
100	10,16 25 /150	M16 M20 5/8“	8 8 8	80 95 70	500	10 16 25 /150	M24 M30 M33 1 1/8“	20 20 20 20	245 410 480 355
125	10, 16 25 /150	M16 M24 3/4“	8 8 8	90 140 110	600	10 16 25 /150	M27 M33 M36 1 1/4“	20 20 20 20	310 615 630 510
150	10, 16 25 /150	M20 M24 3/4“	8 8 8	120 140 130	700	10 16 25 /150	M27 M33 M39 1 1/4“	24 24 24 28	355 420 795 450
200	10 16 25 /150	M20 M20 M24 3/4“	8 12 12 8	175 120 140 180	800	10 16 25 /150	M30 M36 M45 1 1/2“	24 24 24 28	475 530 1130 710
250	10 16 25 /150	M20 M24 M27 7/8“	12 12 12 12	140 150 200 170	900	10	M30	28	440
300	10 16 25 /150	M20 M24 M27 7/8”	12 12 16 12	160 180 205 230	1000	10	M33	28	570
350	10 16 25 /150	M20 M24 M30 1“	16 16 16 12	215 235 340 280	1200	6 10	M30 M36	32 32	425 750
400	10 16 25 /150	M24 M27 M33 1“	16 16 16 16	240 300 445 300					

Tab.4-3 Tightening torque for flange boltings Valve body

[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.

4.2.2 Fastening torque valve body PN 10/Class 150

DN	PN	Screw		Torque (Nm)[1]
		Dim.	Quantity	
900	10	M30	28	440
1000	10	M33	28	570
1200	10	M36	32	750

Tab.4-4 Tightening torque for flange boltings Valve body PN 10/Class 150

4.2.3 Tightening torque for screws in valves

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

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

4.2.4 Fastening torque valve body PN 40/Class 300

DN	PN/Class	Screw		Torque (Nm)[1]	DN	PN/Class	Screw		Torque (Nm)[1]
		Dim.	Quantity				Dim.	Quantity	
80	40 /300	M16 3/4“	8 8	100 90	350	40 /300	M33 1 1/8“	16 20	670 280
100	40 /300	M20 3/4“	8 12	145 130	400	40 /300	M36 1 1/4“	16 20	970 400
150	40 /300	M24 3/4“	8 12	205 130	450	-	-	-	-
200	40 /300	M27 7/8“	12 12	265 210	500	40 /300	M39 1 1/4“	20 24	1045 500
250	40 /300	M30 1“	12 16	400 220	600	40 /300	M45 1 1/2“	20 24	1680 760
300	40 /300	M30 1 1/8“	16 16	425 325					

Tab.4-5 Tightening torque for flange boltings Valve body PN 40/Class 300

[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.

4.2.5 Fastening torque for VSS stuffing box

DN	Stud	No. of Studs	PN 10-25 Shaft ø (mm)	Stuffing box ø di/dy (mm)	Moment 1 Nm	Moment 2 Nm	No. of disc springs	Position of disc springs
80	M8	2	20	20/30	8	4	8	(())
100	M8	2	20	20/30	8	4	8	(())
125	M8	2	20	20/30	8	4	8	(())
150	M8	2	25	25/35	8	4	8	(())
200	M8	2	25	25/35	8	4	8	(())
250	M10	2	30	30/40	15	8	12	((()))
300	M10	2	35	35/45	15	8	12	((()))
350	M12	2	40	40/55	25	13	8	(())
400	M16	2	50	50/65	40	20	8	()()
450	M16	2	50	50/65	40	20	8	()()
500	M20	2	60	60/75	60	30	8	()()
600	M20	2	70	70/90	90	45	8	(())
700	M20	2	70	70/90	90	45	8	(())
750	M20	2	70	70/90	90	45	8	(())
800	M24	2	80	80/100	120	60	8	(())
900	M24	2	80	80/100	120	60	8	(())
1000	M16	2	100	100/120	50	25	–	–
1200	M16	4	100	100/120	50	25	–	–

DN	Stud	No. of Studs	PN 40 Shaft ø (mm)	Stuffing box ø di/dy (mm)	Moment 1 Nm	Moment 2 Nm	No. of disc springs	Position of disc springs
80	M10	2	20	20/35	15-20	8	-	-
100	M10	2	25	25/40	15-20	8	12	((()))
125	-	-	-	-	-	-	-	-
150	M12	2	30	30/45	20-30	13	8	(())
200	M12	2	35	35/50	20-30	13	8	(())
250	M16	2	40	40/55	30-45	20	8	()()
300	M16	2	50	50/65	40-55	25	-	-
350	M20	2	60	60/75	60-80	40	-	-
400	M20	2	70	70/90	80-120	60	-	-
450	-	-	-	-	-	-	-	-
500	M24	2	80	80/100	120-160	80	-	-

Tab.4-6 Torque for VSS stuffing box

1) Moment 1. Initial compression. Tighten the nuts alternately and repeatedly until all nuts have reached the specified tightening torque.
2) Moment 2. Final compression. Loosen the nuts and then retighten them alternately and repeatedly until all nuts have reached the specified tightening torque.

If the stuffing box leaks during operation, a higher tightening torque may be required to achieve sufficient compression of the stuffing box material. The above values apply to a new and correctly installed stuffing boxes. For unlubricated threads, the higher torque value should be used.

The ”**Position of springs**” column illustrates the orientation of the disc springs on the stud bolt.

5 Assembly

5.1 Unpacking and transportation

Inspect the butterfly 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 below. The picture shows a standard situation. Please note that all possible situations that can occur cannot be covered in this lift instruction.

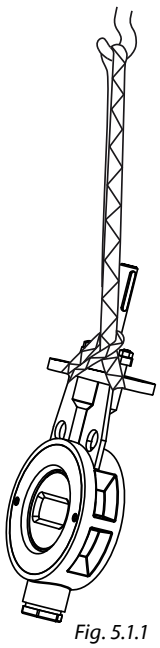


Fig. 5.1.1

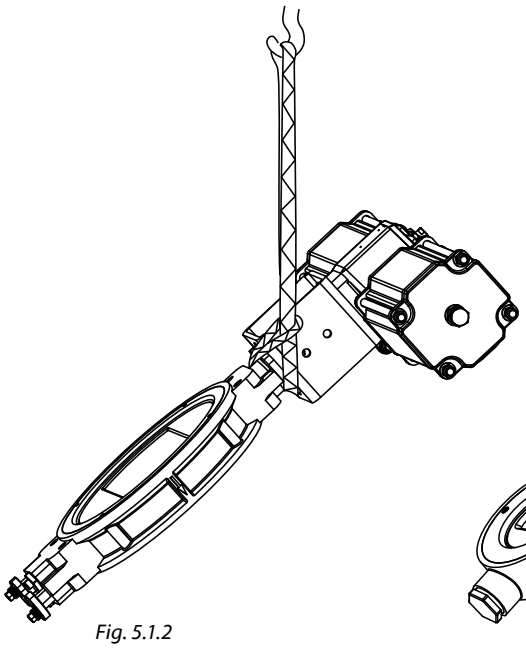


Fig. 5.1.2

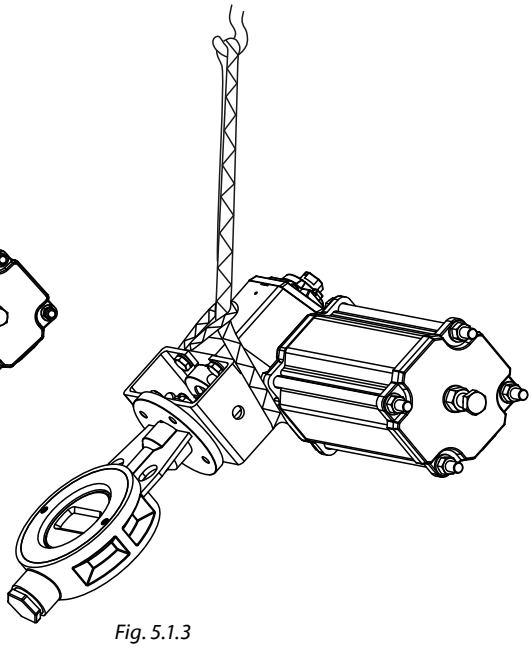


Fig. 5.1.3

1. **Bare shaft valves and valves with gear unit or hand lever, all sizes:**
   To be lifted under the valve´s actuator mounting flange, see (➔ Fig.5.1.1)
2. **Valves with Somas A-type actuator -DA (double acting), size >= DN300:**
   To be lifted under the valve´s actuator mounting flange, see (➔ Fig.5.1.2)
3. **Valves with Somas A-type actuator -SC/SO (single acting), all sizes:**
   To be lifted under actuator see (➔ Fig.5.1.3)

5.2 Installation of the valve in the pipeline

Attention!

The installation of the butterfly valve is usually made with full installed actuator. The assembly is made by closing spring loaded and double acting actuators with closed butterfly valve, by opening spring loaded actuators with open butterfly valve.
At opening spring loaded actuators, a short adapter with additional flanges is to be installed in the pipeline immediately in front of and behind the valve.

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.

Note!

The prefered flow direction is shown with arrows on the valve body (→ Fig.5-2). The medium should impact on the flat side of the disc. End of line-installation of the valve is only permitted after approval from Somas

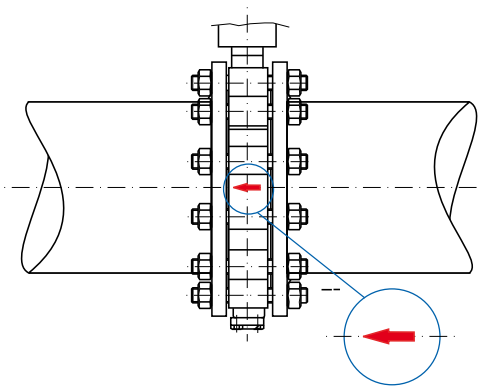


Fig.5-2 Prefered flow direction marking

Warning!

Before carrying out maintenance or repair work on the valve with actuator as well as installation and disassembly of the butterfly valve in 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.

Note!

Use gaskets with the nominal size of the valve, to have a leak-proof sealing in both flow directions.

5.2.1 Important information for installation

- The protective devices are to be removed directly before mounting the valve
- Counterflanges must be in accordance to the European or ASME standards
- Clean the whole pipeline system prior start up. Impurities damage the seat and the butterfly edge and lead to leakage
- Flush the pipeline system with fully opened valve
- Use gaskets of an appropriate quality (no spiral-wound gasket)
- Check if all flange surfaces are clean and undamaged
- Check if all screws of the cover plate are tightened.
  Do not pull the ends of the counterflange with force to the valves, to compensate wide clearances.
- **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.

In case of control application avoid mounting the butterfly valve direct behind or ahead of a pipe bend. If the valve must be mounted behind a pipe bend, observe that the shaft is assembled aligned to the bend to reduce dynamic, irregular forces on the butterfly (→ Fig.5-3).

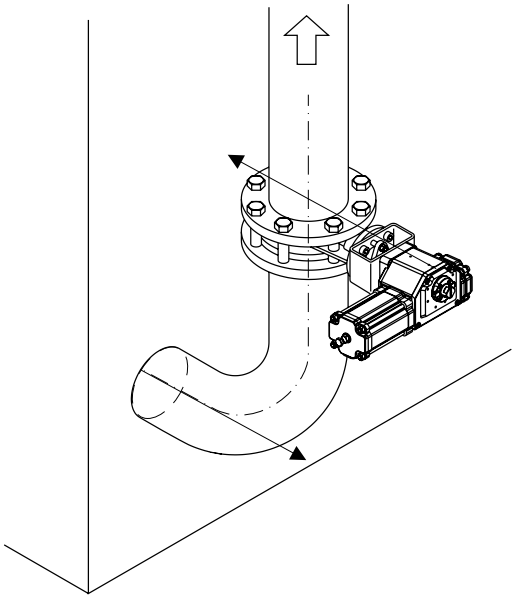


Fig.5-3 Installing near pipe bends

5.2.2 End of line installations

When the valve is installed “end of line”, it is important that the valve inlet (coverplate side) is facing towards the piping. (→Fig.5-4).

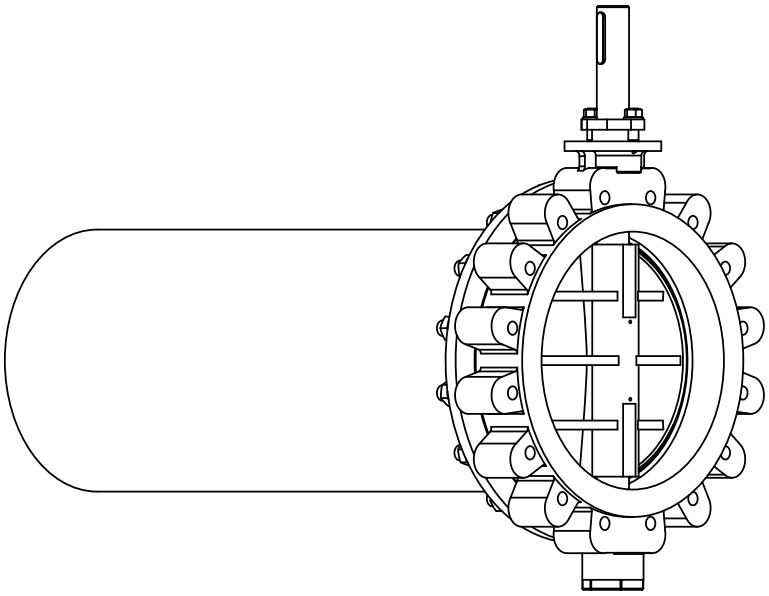


Fig.5-4 Installing end of line

To install the butterfly valve on the pressure side of a centrifugal pump, you have to position the butterfly valve shaft perpendicular to the pump shaft (→ Fig.5-5).

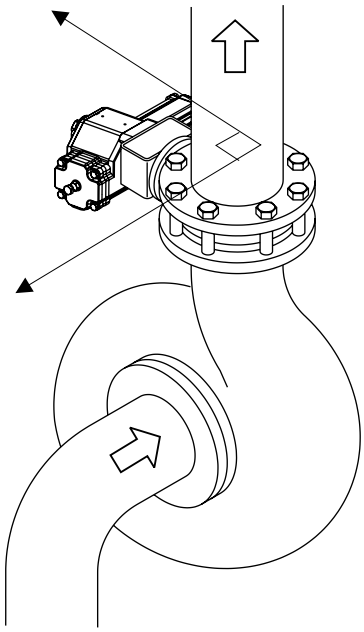


Fig.5-5 Installing the butterfly valve after a centrifugal pump

1. Make sure that the pipelines are flushed clean.
2. Open and close the valve completely before tightening the screws of the flange. Consider that the butterfly valve opens 60°-80° by control applications and about 80° by shut-off function. To seal the flanges tightly you have to use plain washers and tighten the screws in sequence with a torque wrench. The fastening torque depends on the size of the screw (→ Chap. 4.2).
3. If possible open the valve approx. 5° right before installing.
4. Make sure that the sealing areas of the counterflange are clean and parallel situated.
5. Make sure that the butterfly valve and the gaskets are correctly centered and that correct quality is used. By a good shut-off function the pressure of the counterflange is transmitted through the gasket to the cover plate (→ Fig.5-6).

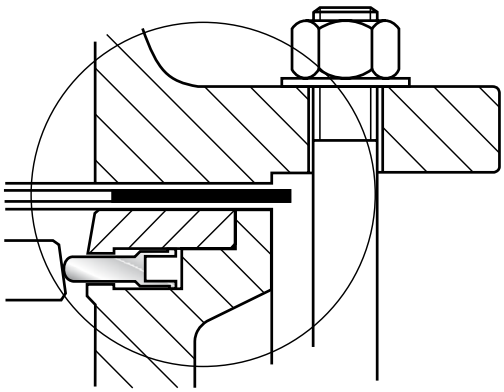


Fig.5-6 Flanges and gaskets

6. Tighten flange screws (→ Chap. 4.2).
7. Leave the butterfly valve in closed position when the installation is finished. The butterfly valve is now ready for operation.

5.3 Start up

1. Always start up the system only with closed butterfly valve.
2. Be sure that the system is clean before starting up. Impurities may damage the seat immediately and in addition cause a leakage of the butterfly valve.
3. The valve should be fully opened at the last flushing by cleaning the system.
4. Check the stuffing box and in case of leakage, tighten the nuts of the stuffing box gland (→ Tab.4-6).

5.4 Disassembly of the pneumatic actuator

Note!

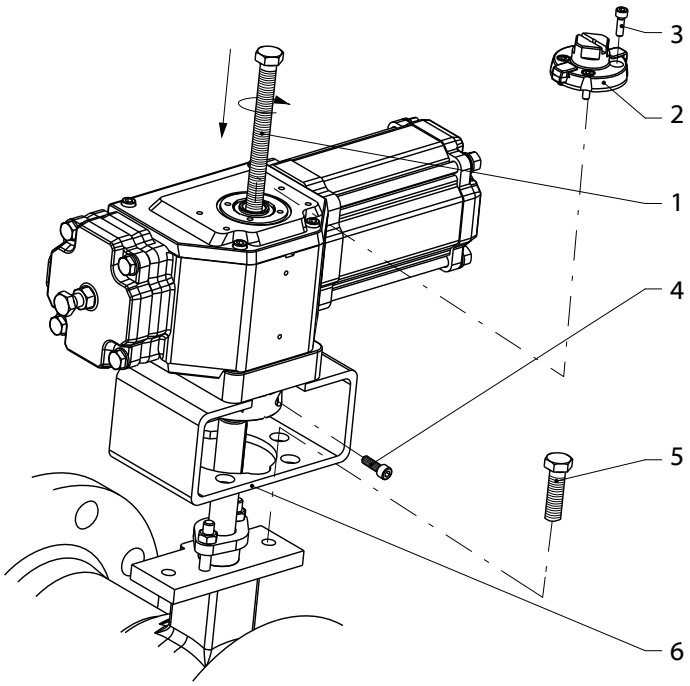
Observe also the detailed information in the operating manual of the actuator Mi-503EN.

Warning!

Before assembling or disassembling the pneumatic actuator of a butterfly 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 valve with actuator as well as installation and disassembly of the butterfly valve in 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.5-7 Disassembly of the actuator (schematic diagram)

Use a puller to disassemble the actuator from the butterfly valve. This prevents damage to the seat and the butterfly 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.5-7/4).
2. Remove the accessory parts such as positioners and end position limit switches.
3. Remove the screws (→ Fig.5-7/3), to remove the driver (→ Fig.5-7/2).
4. Remove the bracket (→ Fig.5-7/6) from the butterfly valve by removing the bolts (→ Fig.5-7/5).
5. Press the actuator off the valve with the puller (→ Fig.5-7/1). 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

A groove) or a line at the end of the shaft, marks the position of the disc in the butterfly valve. The groove or the line must be parallel to the butterfly valve body, when the valve is closed and the key in the flow direction points to the right (→ Fig.5-8).

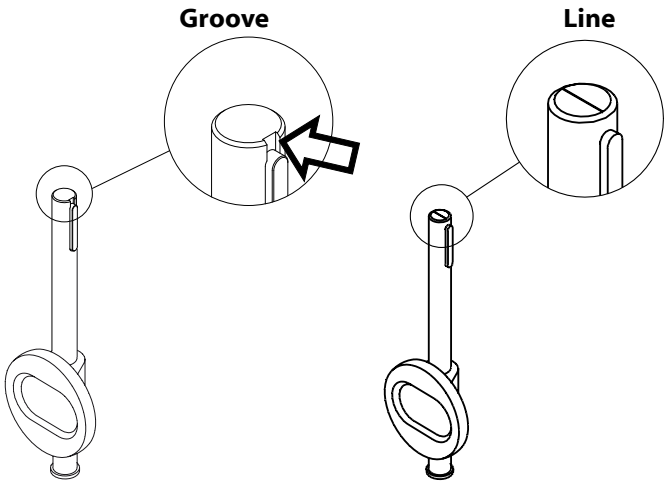


Fig.5-8 Marking (at the end of the shaft)

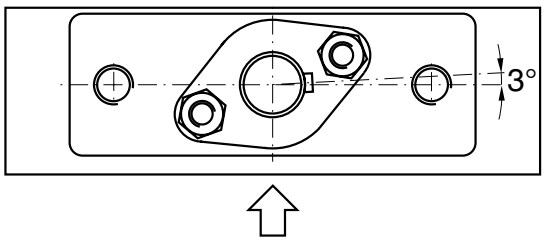


Fig.5-9 Slot angle

To ensure that the valve in combination with an actuator without overtravel achieves the closing position (→ Fig.5-9) the slot of the key is turned out of the centre line aprox. 3°.

The tightness of the butterfly valve depends on the closing torque.

5.6 Assembly of the pneumatic actuator

Note!

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

Warning!

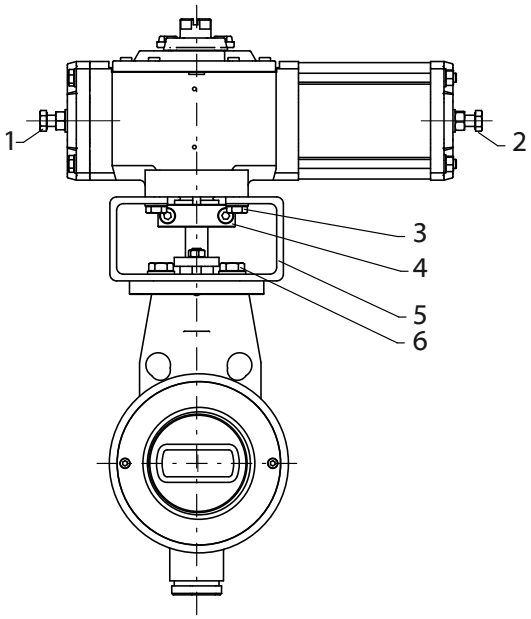
Before assembling or disassembling the pneumatic actuator of a butterfly valve installed in the pipeline depressurise the relevant valve in the pipeline system, isolate the valve and remove the medium before working on the valve.
The pressurised medium may lead to injuries to personnel.

Warning!

Before carrying out maintenance or repair work on the valve with actuator as well as installation and disassembly of the butterfly in 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 valve disc.
Keep hands, tools and other objects away from the area where the valve disc moves. The valve with valve disc mounted may work as a cutting tool. Do not leave any foreign objects in the valve body. The valve disc of the butterfly valve always works as a separate device. There is no difference whether an actuator is installed or not. The position of the disc may change during transport or handling of the butterfly valve.



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

Fig.5-10 Assembly of the actuator (schematic diagram)

5.6.1 Actuator mounting alternatives

Following mounting positions are possible.

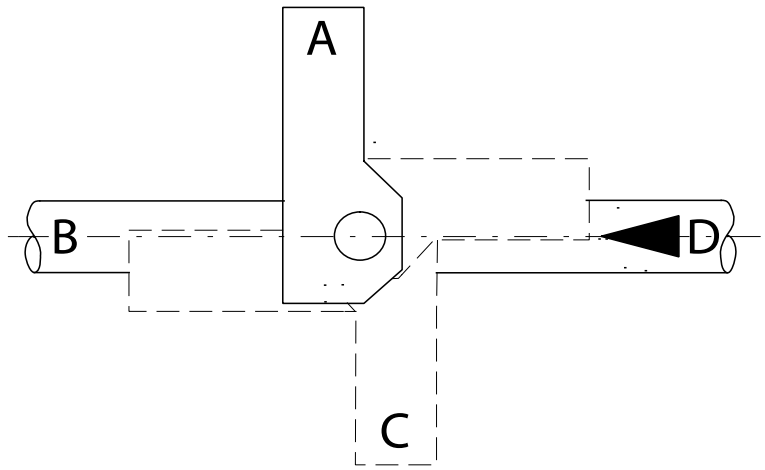


Fig.5-11 Actuator mounting position

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. Make sure that the butterfly valve is closed when using double acting and closing spring loaded actuators.
2. Make sure that the butterfly valve is open when using opening spring loaded actuators.
3. Lubricate the shaft and the key.
4. Fix the bracket (→ Fig.5-10/5) to the actuator with the aid of the bolts (→ Fig.5-10/3).

Assemble the actuator with the bracket on the desired position (A, B, C or D) (→ Fig.5-11) onto the shaft of the butterfly valve body. Fix the unit with the screws (→ Fig.5-10/6).

5. Connect the shaft's end of the butterfly valve to the actuator using the clamping ring (→ Fig.5-10/4). Assemble the clamping ring so that the yellow markings show the position of the butterfly. When the valve is closed, the markings must have an offset of 90° to the flow direction.
6. Tighten the bolts at the clamping ring (→ Fig.5-10/4).
7. Adjust the end positions afterwards (→Chap. 6.6).

6 Maintenance

6.1 Disassembly of the butterfly valve from pipeline

Attention!

The disassembling of the butterfly valve is usually made with full installed actuator. The disassembly is made by closing spring loaded and double acting actuators with closed butterfly valve, by opening spring loaded actuators with open butterfly valve.
At opening spring loaded actuators, a short adapter with additional flanges is to be installed in the pipeline immediately in front of and behind the valve.

Warning!

Before carrying out maintenance or repair work on the butterfly valve with actuator or installation and removal of the butterfly 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!

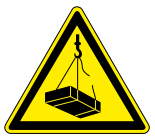
Inform yourself of the properties of the medium. Protect yourself and your environment from hazardous or poisonous substances.
Observe the safety instructions in the safety data sheets of the manufacturers.
Ensure that no medium can enter the pipeline during maintenance work.

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.



Warning!

In Cryogenic applications the liquefied gas can be oxygen. Oxygen is strong oxidizing agent that can make normal grease catch fire. Make sure to use grease that is approved for oxygen use.

Warning!

Risk of injury!
Do not unscrew bolts between extended bonnet and valve when valve is pressurized.

Procedure

1. Seal off the pipeline section containing the butterfly valve.
2. Depressurise the seal off pipeline section.
3. Drain the pipeline section.
4. If necessary purge the pipeline section.
5. Set butterfly valves double acting actuators in closed position.
6. Remove the compressed air supply to the actuator.
7. Control the temperature of both pipeline and butterfly valve. Let cool down the pipeline and the butterfly valve to the ambient temperature if necessary.
8. Ensure the butterfly valve against falling (→ Fig.5-1).
9. If the butterfly valve is equipped with double acting or closing spring loaded actuators dismantle the connection between valve and piping.
10. If the butterfly valve is equipped with an opening spring loaded actuator, remove the compete butterfly valve with the spacers assembled on each side (→ Chap. 5.2).

6.2 Maintenance

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

Check the butterfly 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 retightened 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 segments 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!

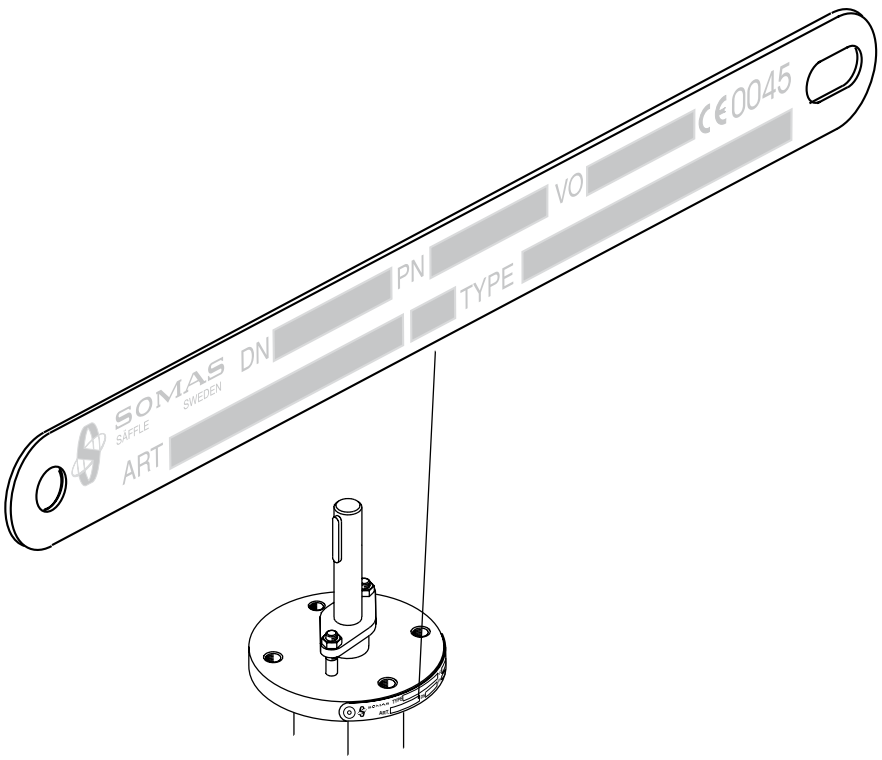
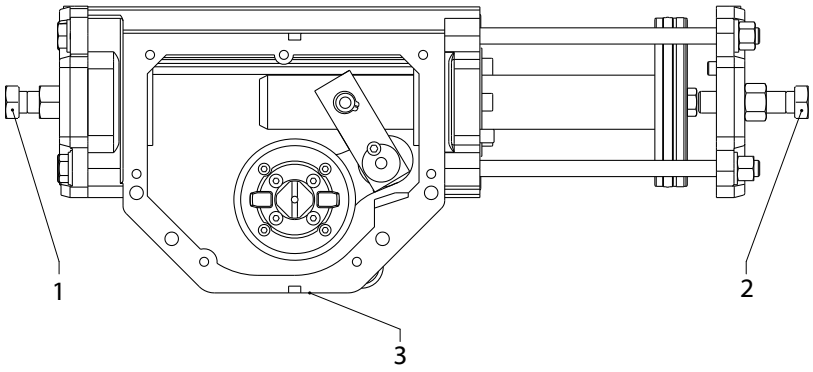


Fig.6-1 Type plate

6.2.1 Procedure to evaluate a leakage on a butterfly valve installed in a pipeline

1. Open the butterfly valve entirely, to flush out existing particles on the sealing areas.
2. Make sure that no impurities was clamped between the seat and the disc.
3. Close the butterfly valve.



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

Fig.6-2 End position bolts on pneumatic actuator

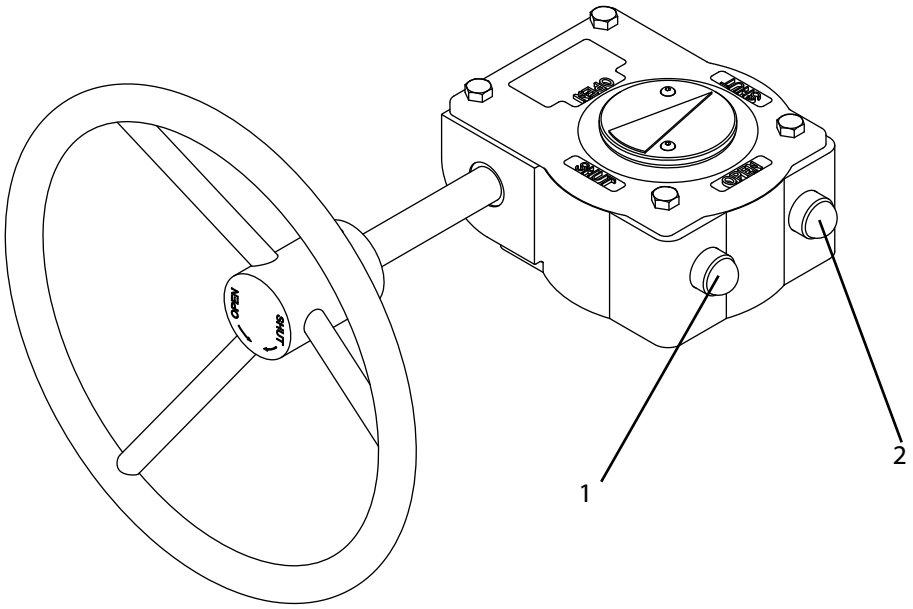
If the leakage remains futhermore, open the valve slightly:

Loosen the end position bolts “closed” (→ Fig.6-2/2) of the pneumatic actuator and turn this a fourth-turn anticlockwise. Test the valve. Repeat the procedure until the valve is tight. If the end position bolt was loosend more than three turns, and the butterfly valve remains leaking, the seat is damaged and has to be replaced.

Tighten the lock nut of the end position bolt, if the butterfly valve is tight.

6.2.2 Procedure to evaluate a leakage on a butterfly valve with gear installed in a pipeline

1. Open the butterfly valve entirely, to flush out existing particles on the sealing areas.
2. Make sure that no impurities was clamped between the seat and the disc.
3. Close the butterfly valve.



1 End position bolt “open” position 2 End position bolt “closed” position

Fig.6-3 End position bolts on gear actuator

If the leakage remains futhermore, open the valve slightly:

Loosen the end position bolts “closed” (→ Fig.6-3/2) of the worm gear actuator and turn this a fourth-turn anticlockwise. Test the valve. Repeat the procedure until the valve is tight. If the end position bolt was loosend more than three turns, and the butterfly valve remains leaking, the seat is damaged and has to be replaced.

Tighten the lock nut of the end position bolt, if the butterfly valve is tight.

Attention!	
Damage to PTFE seats! While adjusting disc valves equipped with PTFE seats keep attention not to close the valve to firm. This causes damage to the seat!	

6.3 Installation and disassembly of the stuffing box

1. Check the stuffing box after starting up and after this regularly. Retighten the nuts of the stuffing box gland if necessary (→ Fig.6-3/1).

⇨ 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 butterfly valve from pipeline (→Chap. 6.1) and dismounting the pneumatic actuator from the ball segment valve (→ Chap. 5.4).

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

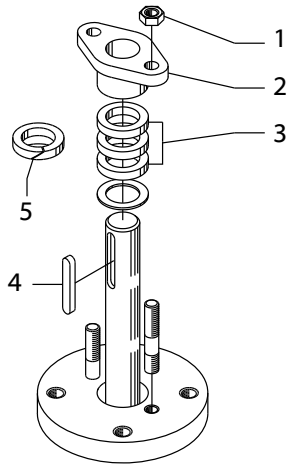
Warning!	
Before replacing the stuffing box of a butterfly valve installed in the pipeline depressurise the relevant butterfly valve in the pipeline system, isolate the butterfly valve and remove the medium before working on the butterfly valve. The pressurised medium may lead to injuries to personnel.	

Warning!	
Before carrying out maintenance or repair work on the butterfly valve with actuator or installation and removal of the butterfly 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

When using PTFE stuffing boxes, the actuator is always to be disassembled (→ Chap. 5.4).

When using graphite stuffing boxes, the actuator can remain installed. In this case you can install the graphite rings by cutting through them at an angle and then carefully pushing them over the shaft (→ Fig.6-3/5).



1	Nut	3	Graphite/PTFE rings	5	Graphite rings
2	Stuffing box gland	4	Key		

Fig.6-3 Assembly of the stuffing box

1. Remove the key (→ Fig.6-3/4) and undo the nuts (→ Fig.6-3/1).
2. Remove the stuffing box gland (→ Fig.6-3/2) and insert the graphite rings (→ Fig.6-3/5).
3. Fix the stuffing box gland again with the nuts.
4. Tighten the nuts alternately, but not too tight.
5. Insert the new key.

6.4 Replacing the seat (standard metal seat)

To replace the seat, the complete valve assembly is dismounted from the pipeline (→ Chap. 6.1) and sometimes the actuator must also be removed from the valve (→ Chap. 5.4).

Attention!

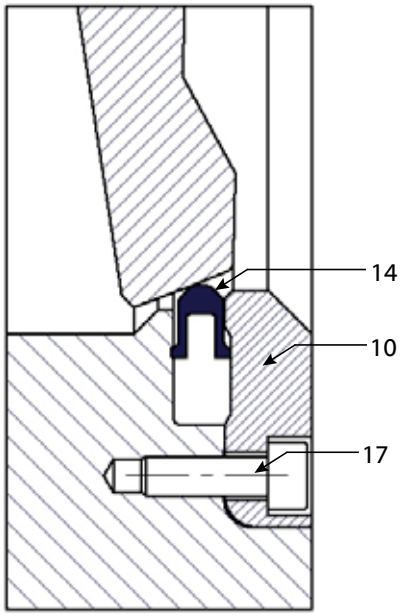
To change the seat, the butterfly valve has to be safely fixed in a fastening device!

Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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 valve with actuator as well as installation and disassembly of the butterfly valve in 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.



14 Seat
10 Cover plate
17 Screw

Fig.6-4 Clean and assemble metal seat

6.4.1 Disassembly

Note!

The replacement of the seat should be made with installed actuator.

Attention!

The seat disassembly is made by closing spring loaded and double acting actuators with closed valve, by opening spring loaded actuators with open valve.

Procedure

1. Loosen the screws (→ Fig.6-4/17) and remove the cover plate (→ Fig.6-4/10).
2. Lift the seat (→ Fig.6-4/14), out of the valve.

6.4.2 Cleaning, lubrication and assembly

1. Clean the seat area and cover plate and make sure that the disc periphery is undamaged. Any damage can quickly destroy a new seat. Small scratches on the disc edge can be removed by lightly polishing the edge with fine emery cloth.
2. Lubricate the screws (→Fig.6-4/17) with molybdenum disulphide paste.
3. Mount a new seat (→Fig.6-4/14).
4. Fit a cover plate (→ Fig.6-4/10)
5. Tighten screws (→Fig.6-4/17) in rotating order.
6. Check the “closed position” of the butterfly valve and adjust if necessary by setting the end position bolt on the actuator (→ Chap. 6.6).

6.5 Replacing the seat (3-pcs)

To replace the seat, the complete valve assembly is dismounted from the pipeline (→Chap. 6.1) and sometimes the actuator must also be removed from the valve (→ Chap. 5.4).

Attention!

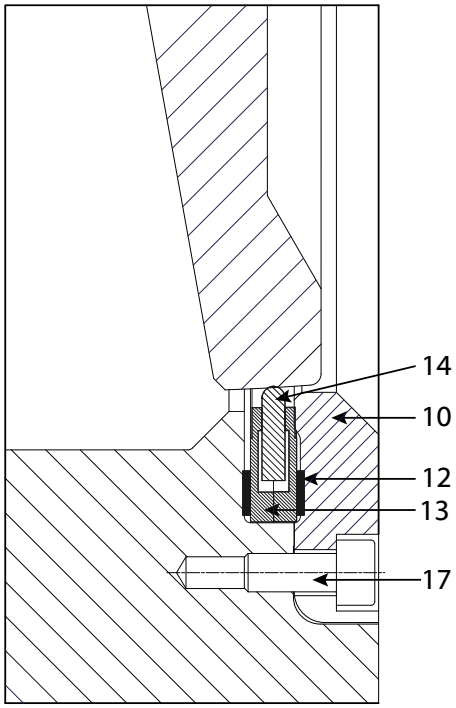
To change the seat, the butterfly valve has to be safely fixed in a fastening device!

Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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 valve with actuator as well as installation and disassembly of the butterfly valve in 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.



10 Cover plate 13 Spring washer 17 Screw
12 Gasket 14 Seat

Fig.6-5 Clean and assemble 3-pcs seat

6.5.1 Removal

Note!

The replacement of the seat should be made with installed actuator.

Attention!

The seat disassembly is made by closing spring loaded and double acting actuators with closed valve, by opening spring loaded actuators with open valve.

Procedure

1. Undo the screws (→ Fig.6-5/17) and remove the cover plate (→ Fig.6-5/10).
2. Lift out the seat (→ Fig.6-5/14), spring washers (→Fig.6-5/13) and gaskets (→ Fig.6-5/12).

6.5.2 Cleaning, grinding and installation of a new seat

1. Clean the seat location and cover plate so that no residue from the old gasket are left in place. Check that the peripheral area of the disc is undamaged. Any damage may quickly destroy a new seat. Minor scratches can be removed by means of gentle polishing with sandpaper K120.
2. Lubricate the peripheral area of the disc (→ Fig.6-5) and the cover plate screws (→ Fig.6-5/17) with assembly paste of molybdenum disulphide type.
3. Fit the new seat (→ Fig.6-5/14), gaskets (→ Fig.6-5/14) and spring washers (→ Fig.6-5/13).
4. Then fit the cover plate. (→ Fig.6-5/10).
5. Tighten screws hard (→ Fig.6-5/17) in rotating order.
6. Check the “closed position” of the butterfly valve and adjust if necessary by setting the end position bolt on the actuator (→ Chap. 6.7).

6.6 Replacing the PTFE seat

To replace the seat, the complete valve assembly is dismounted from the pipeline (→ Chap. 6.1) and sometimes the actuator must also be removed from the valve (→ Chap. 5.4).

Attention!

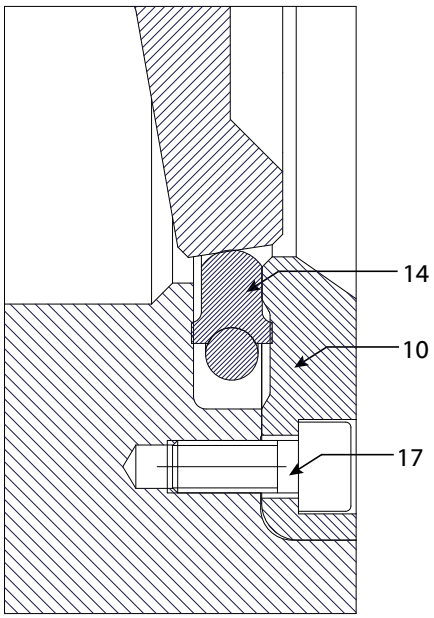
To change the seat, the butterfly valve has to be safely fixed in a fastening device!

Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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 valve with actuator as well as installation and disassembly of the butterfly valve in 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.



10 Cover plate
11 Support ring
14 Seat

Fig.6-6 Replacing the PTFE seat

6.6.1 Disassembly

Note!

The replacement of the seat should be made with installed actuator.

Warning!	
Risk of injury! Do not unscrew bolts between extended bonnet and valve when valve is pressurized.	

Attention!	
The seat disassembly is made by closing spring loaded and double acting actuators with closed valve, by opening spring loaded actuators with open valve.	

Procedure

1. Loosen the screws (→ Fig.6-6/17) and remove the cover plate (→ Fig.6-6/10).
2. Remove the seat (→ Fig.6-6/14).

6.6.2 Cleaning, lubrication and assembly

1. Clean the recess of the seat and the cover plate. Replace the butterfly if damaged. Remove the small scratches of the butterfly edge by polishing it with emery cloth.
2. Lubricate the screws (→ Fig.6-6/17) with molybdenum disulphide paste.
3. Insert the new seat and the new support ring.

Warning!

In Cryogenic applications the liquefied gas can be oxygen. Oxygen is strong oxidizing agent that can make normal grease catch fire. Make sure to use grease that is approved for oxygen use.

Attention!

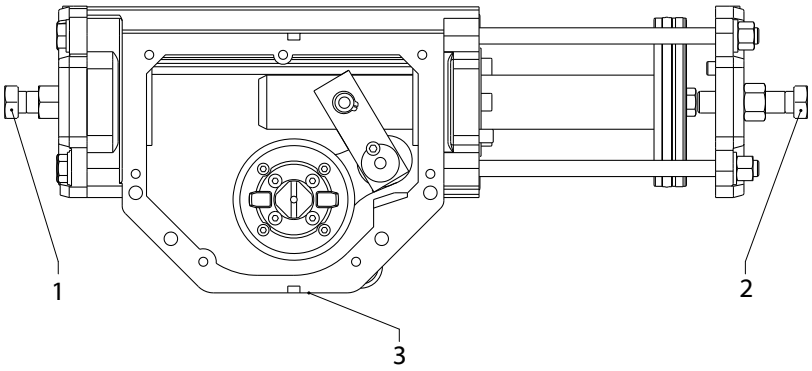
Damage of the seat and support ring!

4. Mount a new cover plate (→ Fig.6-6/10).
5. Tighten screws (→ Fig.6-6/17) in rotating order.
6. Check the “closed” position of the butterfly valve and adjust if necessary by setting the end position bolt on the actuator (→ Chap. 6.7).

6.7 Adjustment of the end positions

Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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

Attention!

Damage to PTFE seats!
While adjusting disc valves equipped with PTFE seats keep attention not to close the valve to firm. This causes damage to the seat!

6.7.1 Setting of the “closed” position with type VSS

1. Connect compressed air via a pressure reduction valve. Adjust the pressure to 3 bar.
2. Operate the valve to closed position.
3. If the valve is not mounted in the pipeline, make a visual check the disc edge is in contact with the seat.
4. If the valve is mounted in the pipeline, check for leakage across closed valve.
5. The design of the valve is such that increased surface pressure between seat and disc will reduce leakage. Do not increase surface pressure more than necessary.
6. If the points 4 or 5 above require some action please see procedure below.

Procedure

1. Loosen the nut of end position bolt (→ Fig.6-7/2) and turn the end position bolt 0.25 turns counter clockwise.
2. Repeat point 2 above.
3. Repeat point 3 alternative 4 above.
4. When the set-up is correct, apply sealing tape and tighten the lock nut.
5. If the valve is outside the pipe line is preferable to make a leakage test (→ Chap. 6.9).

6.7.2 Setting of the “open” position with type VSS

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 if the valve opens to the desired position.

In control and on/off application application the opening angle is 80°.

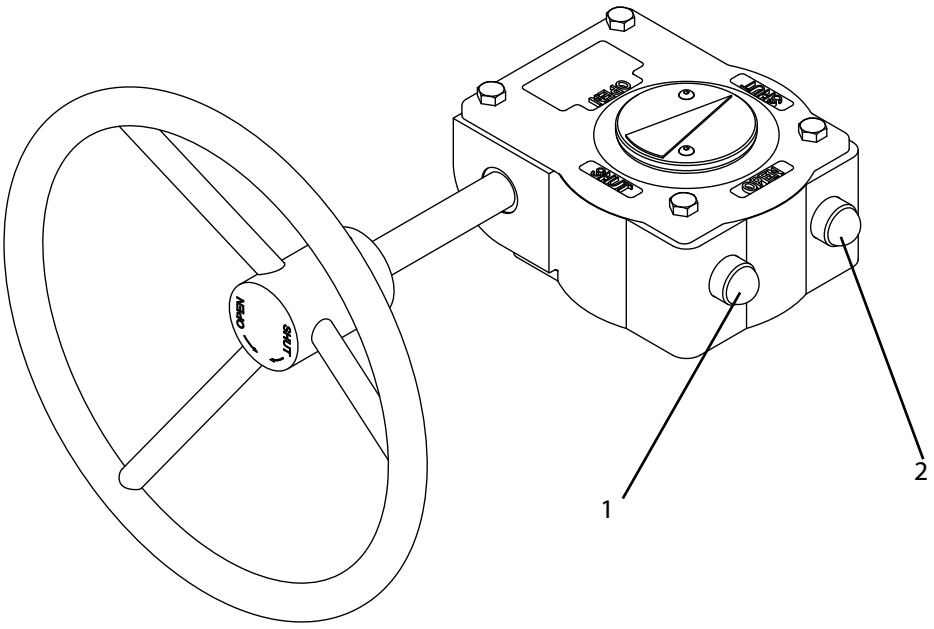
Procedure

1. If the butterfly does not reach the position, loosen the lock nut of the end position bolt and turn the end position bolt (→ Fig.6-7/1) 1-2 turns counterclockwise.
2. If the butterfly rides over the position, loosen the lock nut of the end position bolt and turn the end position bolt (→ Fig.6-7/1) 1-2 turns clockwise.
3. Operate the valve to test.
4. When the correct setting is reached, attach thread seal tape and tighten the locknut.

6.8 Adjustment of the end positions on gear

Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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

Fig.6-8 End position bolts on gear actuator

Attention!

Damage to PTFE seats!
While adjusting disc valves equipped with PTFE seats keep attention not to close the valve to firm. This causes damage to the seat!

6.8.1 Setting of the “closed” position on the butterfly valve type VSS

1. Operate the valve to test.
2. Check if the butterfly touches the seat in the closed position.
3. The adjustment is correct if the butterfly touches the seat.

Procedure

1. If the butterfly does not touch the seat, loosen the lock nut of the end position bolt (→ Fig.6-8/2) and turn the end position bolt 1-2 turns counterclockwise.
2. If the contact pressure of the butterfly onto the seat is too high loosen the lock nut of the end position bolt and turn the end position bolt (→ Fig.6-8/2) 1-2 turns clockwise.
3. Operate the valve to test.
4. When the set-up is correct, thighten the lock nut on the actuator
5. The butterfly valve should undergo a leakage test subsequently (→ Chap. 6.9).

6.8.2 Setting of the “open” position on the butterfly valve type VSS

1. Operate the valve to test.
2. Check if the valve opens to the desired position (about 80°).

In case of shut off/on application the max. opening angle of the butterfly valve is about 80°.

Tillvägagångssätt

1. If the butterfly does not reach the position, loosen the lock nut of the end position bolt and turn the end position bolt (→ Fig.6-8/1) urns counterclockwise.
2. If the butterfly rides over the position, loosen the lock nut of the end position bolt and turn the end position bolt (→ Fig.6-8/1) 1-2 turns clockwise.
3. Operate the valve to test.
4. When the correct setting is reached, tighten the locknut.

6.9 Leak test of the valve

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

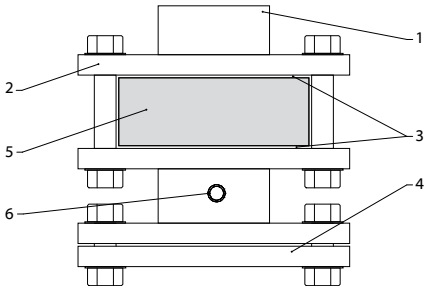
Danger!

Risk of injury!
Observe movements of the disc.
Keep hands, tools and other objects away from the area where the disc 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 butterfly valve can be tested with a testing device as in (→ Fig.6-9) shown.

⇨ Please consult Pressure testing instruction Mi-901EN.



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

Fig.6-9 Leak test device (schematic diagram for wafer valve types)

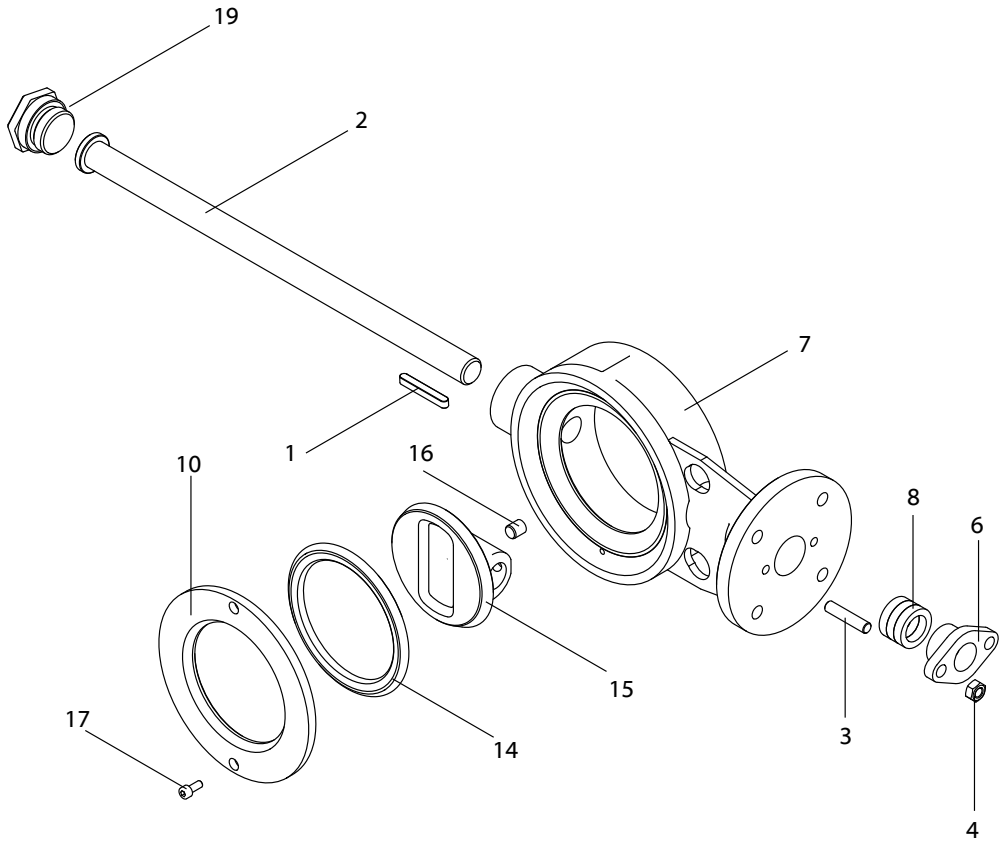
In case of leakage the valve must be adjusted again (→ Chap. 6.9).

Nominal size DN	Max. differential pressure (closed valve)	Gaskets [mm]		Force of pressure total [t]	Torque [Nm]
		ø inside	ø outside		
80	25	89	142	5	100 - 120
100	25	115	168	10	120 - 165
125	25	141	194	15	180 - 220
150	25	169	224	20	200 - 250
200	25	220	284	25	250 - 290
250	25	273	340	30	400 - 500
300	25	324	400	40	500 - 620
350	20	356	457	50	800 - 1000
400	20	407	514	65	1000 - 1350
450	16	458	564	90	1350 - 1900
500	15	508	624	100	1900 - 2700
600	10	610	731	115	2400 - 2900
700	8	712	833	130	3200 - 4200
800	8	813	942	150	4000 - 5000
900	7	915	1042	–	–
1000	6	1116	1154	–	–
1200	4.5	1220	1364	–	–

Tab.6-1

7.0 Components

7.0.1 VSS DN 80-150, with PTFE seat

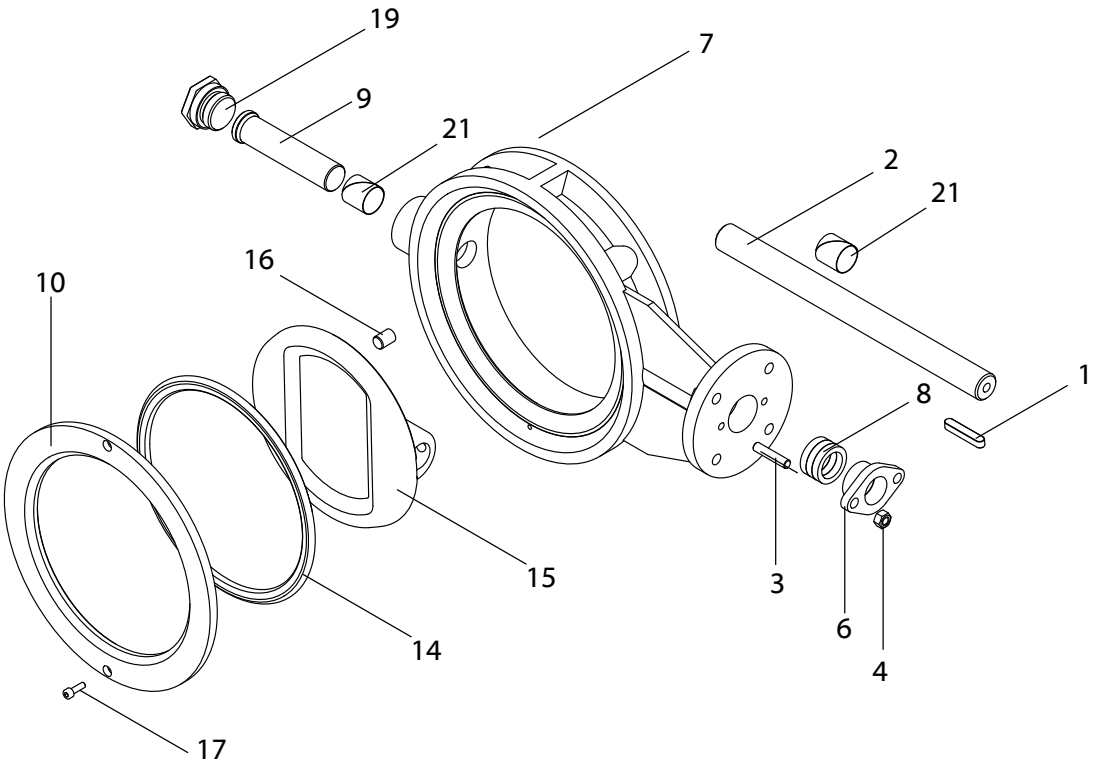


1	Key	8	Stuffing box	15	Disc
2	Shaft	9	-	16	Cylindrical pin
3	Stud	10	Cover plate	17	-
4	Nut	11	-	18	-
5	-	12	-	19	Plug
6	Stuffing box gland	13	-		
7	Valve body	14	Seat complete		

Fig.6-10 VSS DN 80-150, with PTFE seat

Following parts are included in the sealing kit for valves with PTFE seat:
DN 80-150: Pos. No. 1, 8 and 14.

7.0.2 VSS DN 200-400, with PTFE seat



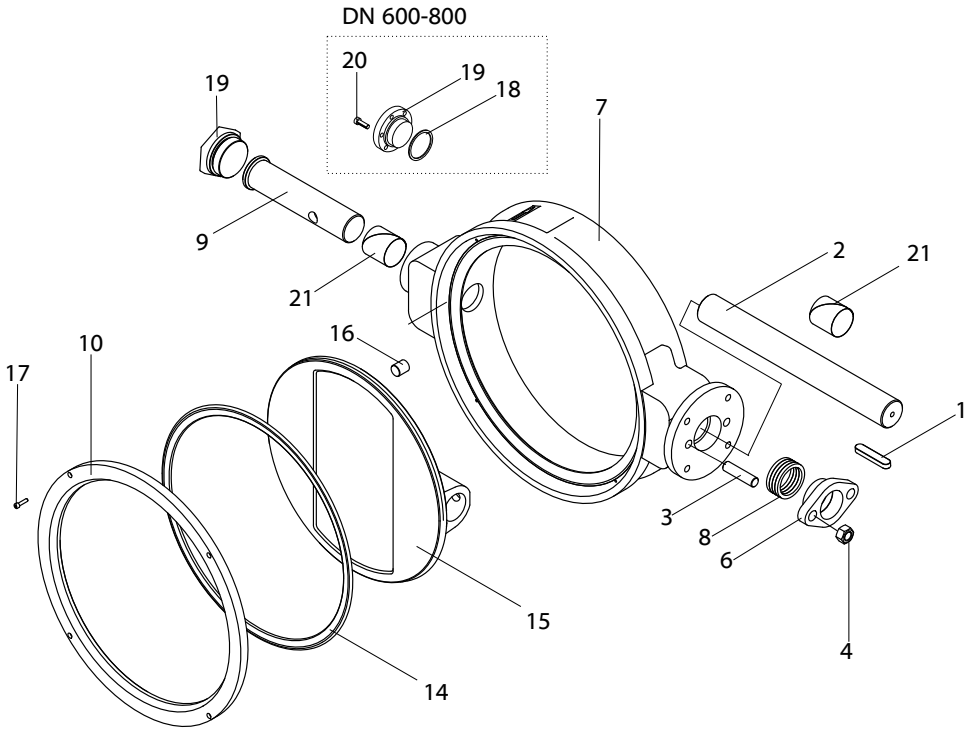
1	Key	8	Stuffing box	15	Disc
2	Shaft, upper	9	Shaft, lower	16	Taper pin
3	Stud	10	Cover plate	17	Screw
4	Nut	11	-	18	-
5	-	12	-	19	Plug
6	Stuffing box gland	13	-	20	-
7	Valve body	14	Seat complete	21	Bearing sleeves, kit[1]

[1] for DN 350 and higher

Fig.6-11 VSS DN 200-400, with PTFE seat

Following parts are included in the sealing kit for valves with PTFE seat:
DN 80-400: Pos. No. 1, 8 and 14.

7.0.3 VSS DN 450-800, with PTFE seat

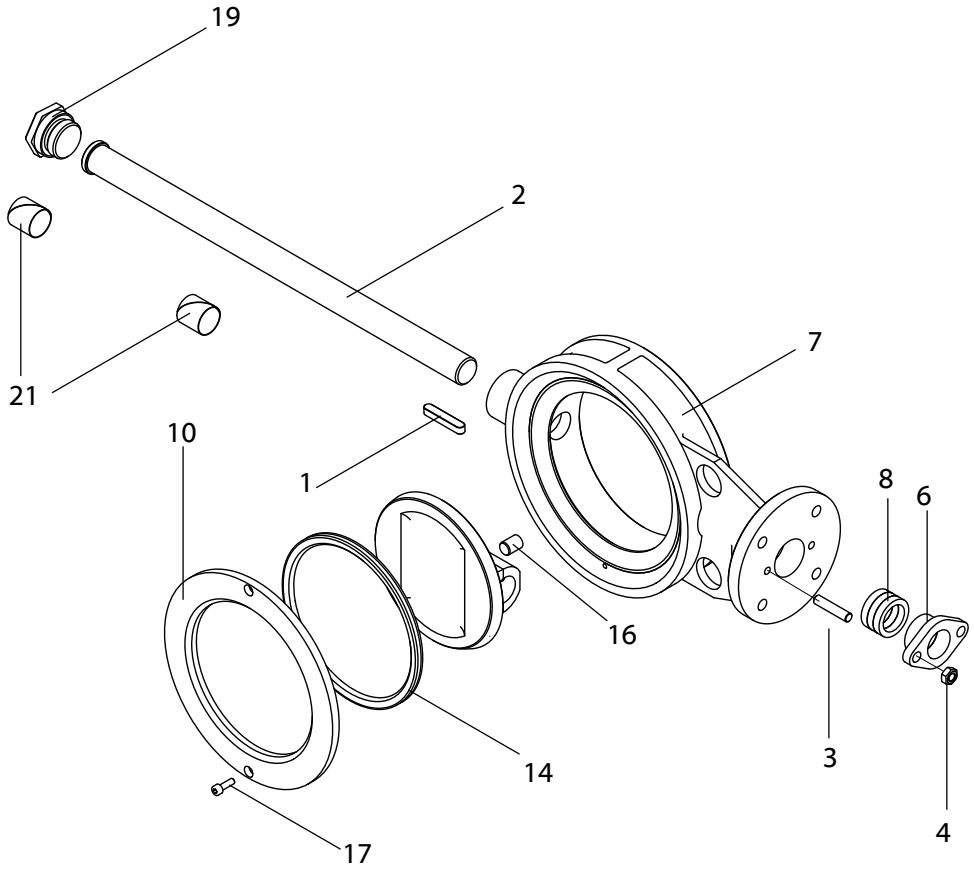


1	Key	8	Stuffing box	15	Disc
2	Shaft, upper	9	Shaft, lower	16	Taper pin
3	Stud	10	Cover plate	17	Screw
4	Nut	11	Support ring	18	Gasket
5	-	12	-	19	Plug
6	Stuffing box gland	13	-	20	Screw
7	Valve body	14	Seat complete	21	Bearing sleeves, kit

Fig.6-12 VSS DN 450-800, with PTFE seat

Following parts are included in the sealing kit for valves with PTFE seat:
DN 80-500: Pos. No. 1, 8 and 14.
DN 600-800: Pos. No. 1, 8, 14 and 18.

7.04 VSS DN 80-150, with seat type Y



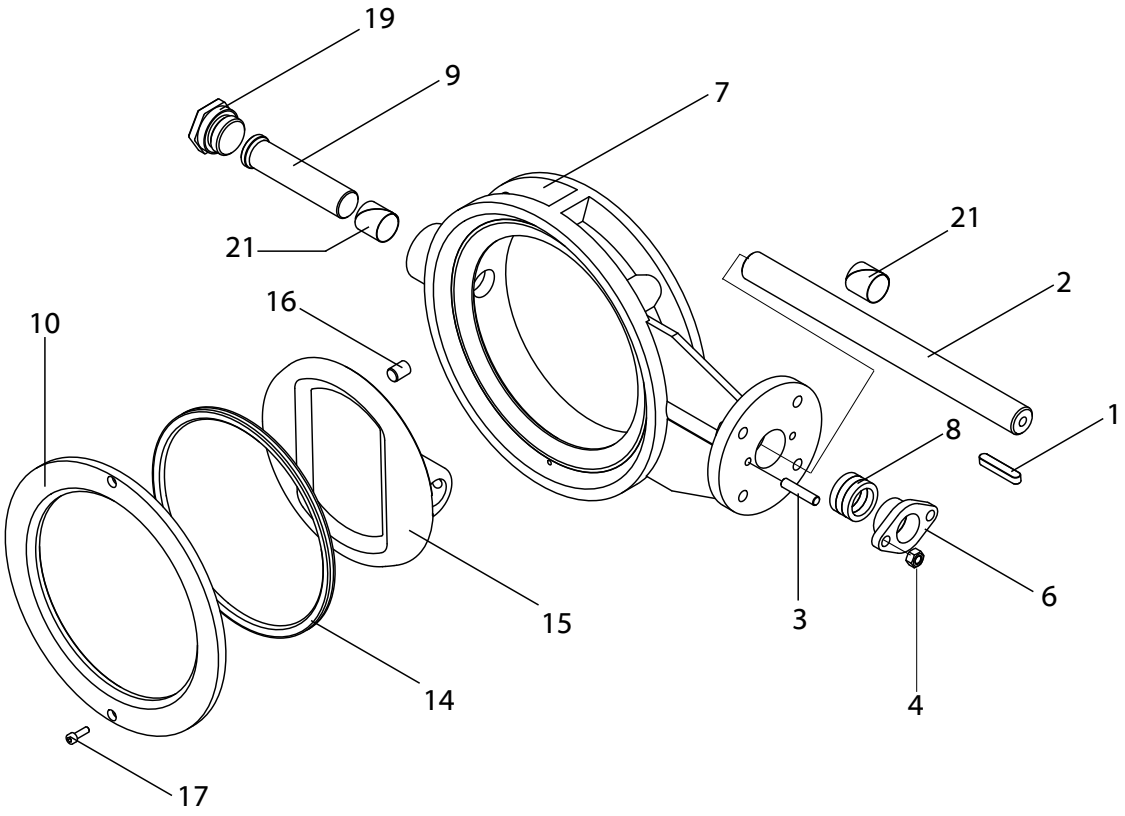
1	Key	8	Stuffing box	15	-
2	Shaft	9	-	16	Taper pin
3	Stud	10	Cover plate	17	Screw
4	Nut	11	-	18	-
5	-	12	-	19	Plug
6	Stuffing box gland	13	-	20	-
7	Valve body	14	Seat	21	Bearing sleeves, kit[1]

[1] only for PN 40

Fig.6-13 VSS DN 80-150, with seat, type Y

Following parts are included in the sealing kit for valves with metal seat:
DN 80-150: Pos. No. 1, 8 and 14.

7.0.5 VSS DN 200-400, with seat type Y



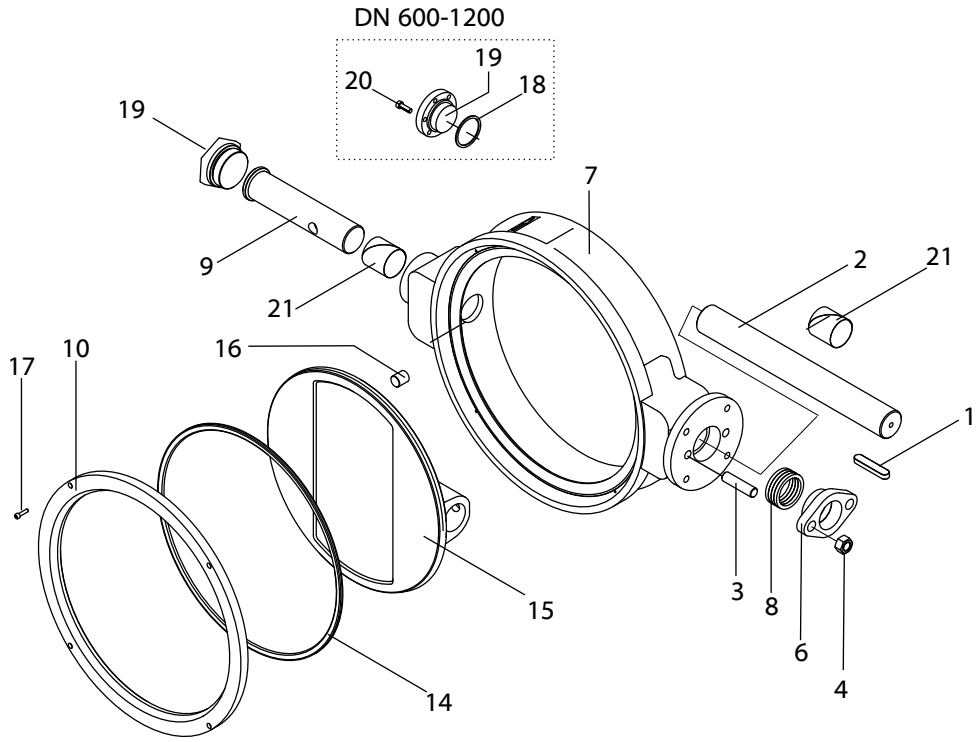
1	Key	8	Stuffing box	15	Disc
2	Shaft, upper	9	Shaft, lower	16	Taper pin
3	Stud	10	Cover plate	17	Screw
4	Nut	11	-	18	-
5	-	12	-	19	Plug
6	Stuffing box gland	13	-	20	-
7	Valve body	14	Seat	21	Bearing sleeves, kit[1]

Fig.6-14 VSS DN 200-400, with seat, type Y

Following parts are included in the sealing kit for valves with metal seat:
DN 200-400: Pos. No. 1, 8 and 14.

[1]) From DN 350 PN 25

7.06 VSS DN 450-1200, with seat type Y

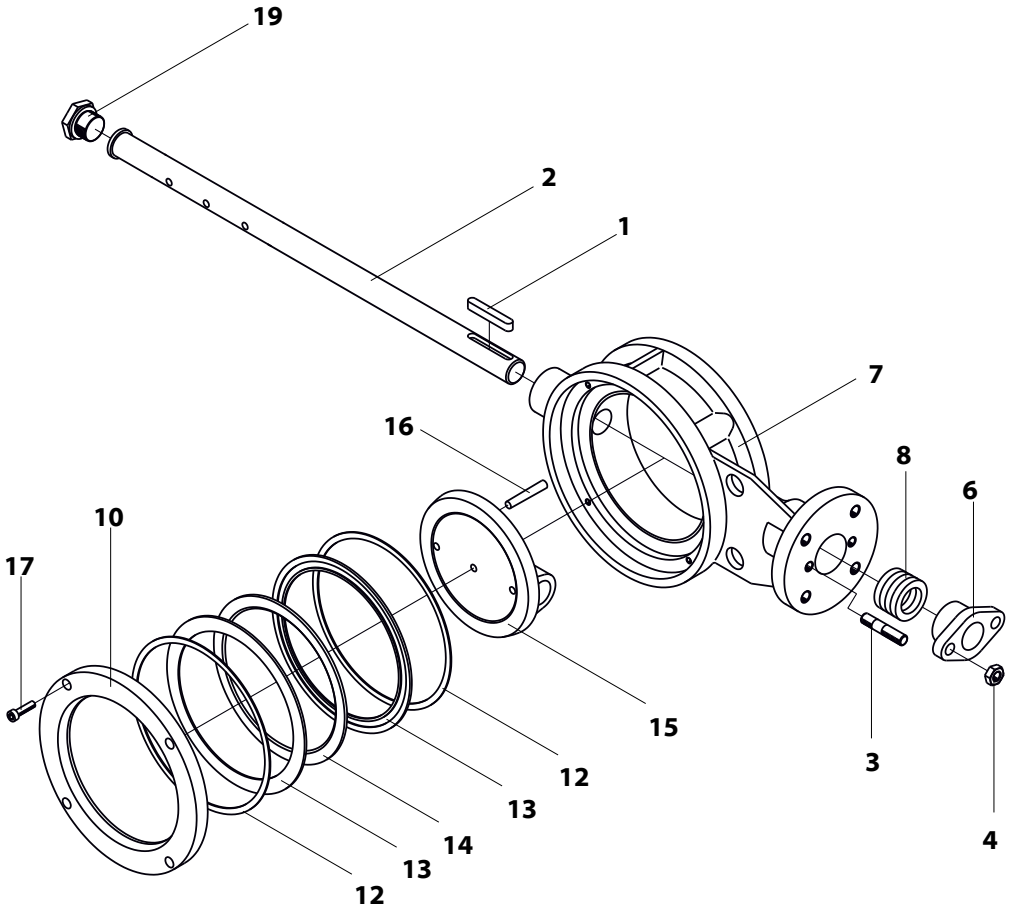


1	Key	8	Stuffing box	15	Disc
2	Shaft, upper	9	Shaft, lower	16	Taper pin
3	Stud	10	Cover plate	17	Screw
4	Nut	11	-	18	Gasket
5	-	12	-	19	Plug
6	Stuffing box gland	13	-	20	Screw
7	Valve body	14	Seat	21	Bearing sleeves, kit

Fig.6-15 VSS DN 450-1200, with seat, type Y

Following parts are included in the sealing kit for valves with metal seat:
DN 450-500: Pos. No. 1, 8 and 14.
DN 600-1200: Pos. No. 1, 8, 14 and 18.

7.0.7 VSS DN 80-150, with 3-pcs seat

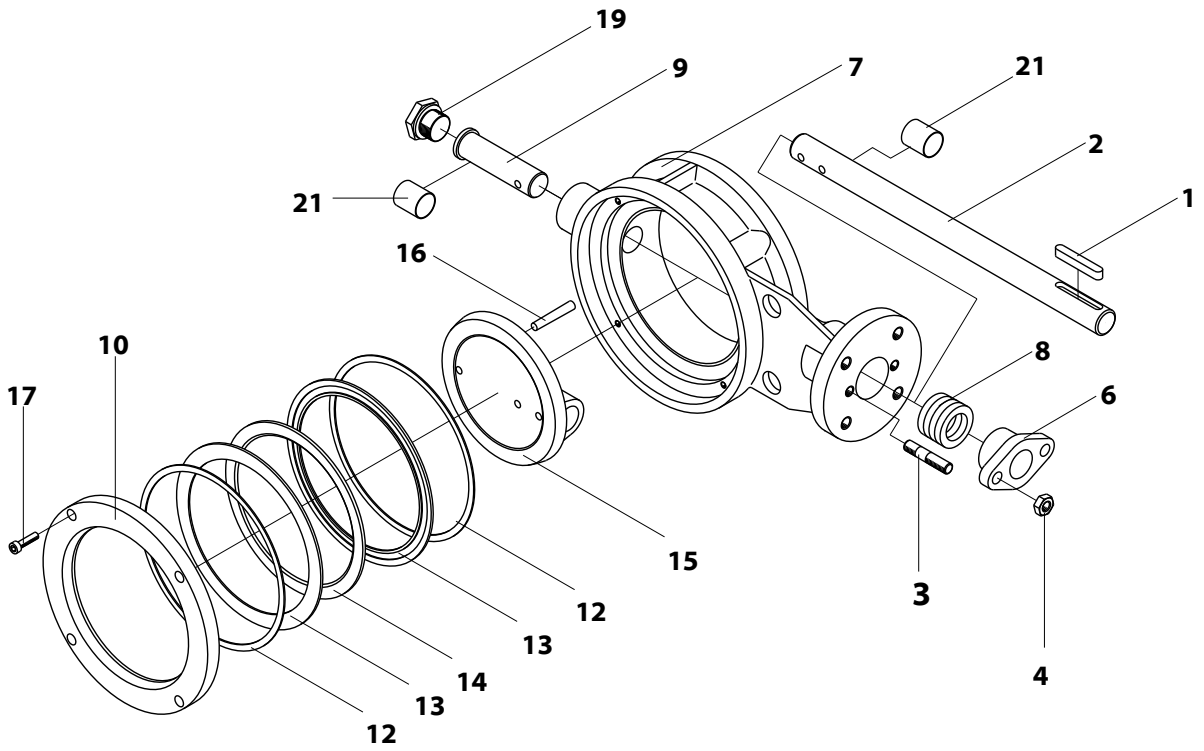


1	Key	8	Stuffing box kit	15	Disc
2	Shaft	9	-	16	Rivet
3	Stud,	10	Cover plate	17	Screw
4	Nut,	11	-	18	-
5	-	12	Gaskets, kit	19	Plug
6	Gland	13	Spring washers, kit	20	-
7	Valve body	14	Seat	21	-

Fig.6-16 VSS DN 80-150, with 3-pcs seat

Following parts are included in the sealing kit for valves with 3-pcs seat:
DN 80-150: Pos. nr. 1, 8, 12, 13 och 14

7.0.8 VSS DN 200-500, with 3-pcs seat



1	Key,,	8	Stuffing box kit	15	Disc
2	Upper shaft	9	Lower shaft	16	Rivet
3	Stud,,	10	Cover plate	17	Screw
4	Nut	11	-	18	-
5	-	12	Gaskets, kit	19	Plug
6	Gland	13	Spring washers, kit	20	-
7	Valve body	14	Seat	21	Bearing sleeves,kit

Fig.6-17 VSS DN 200-500, with 3-pcs seat

Following parts are included in the sealing kit for valves with 3-pcs seat:
DN 450-500: Pos. nr. 1, 8, 12, 13 och 14

7.0.9 VSS LT

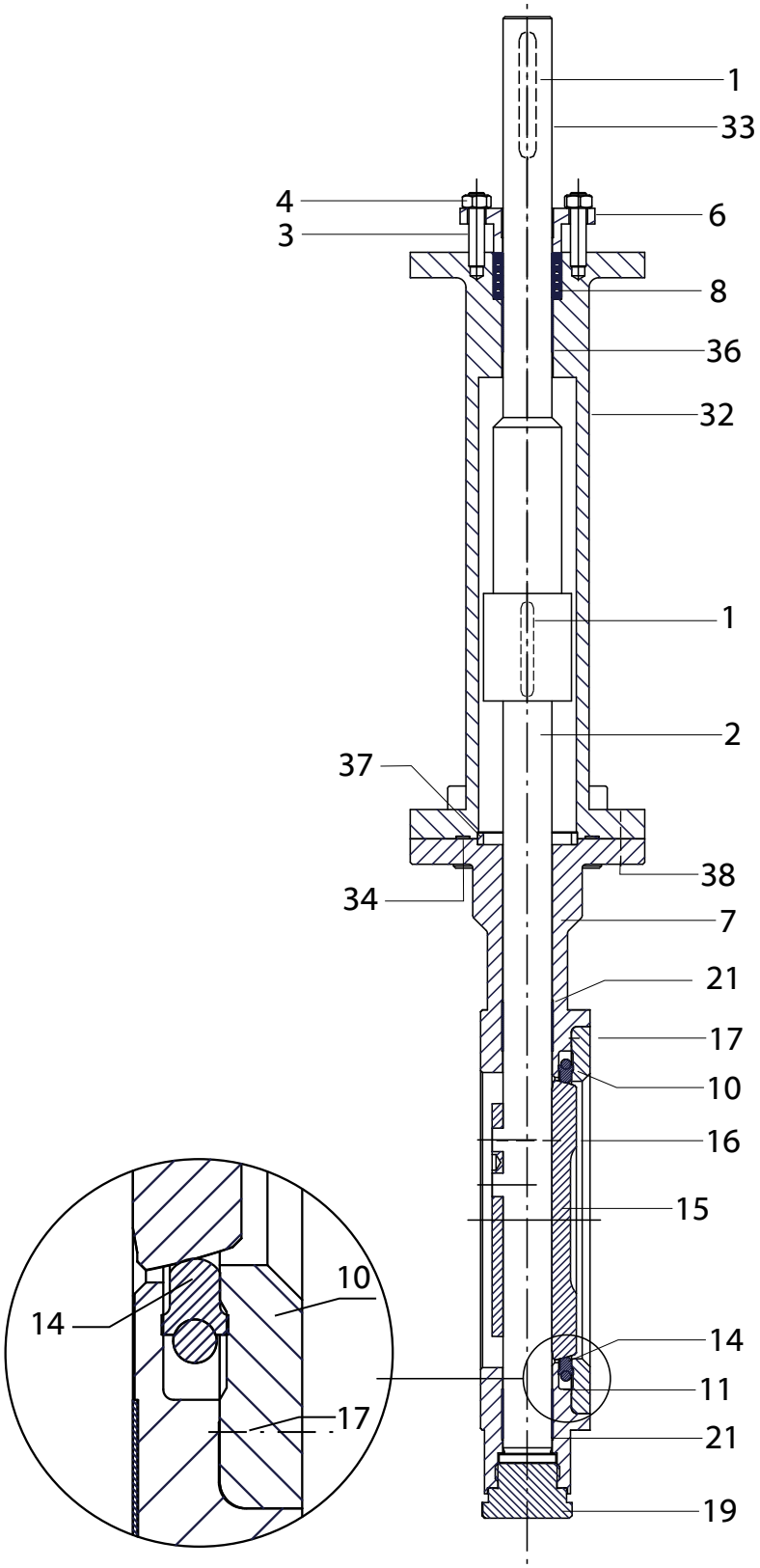


Fig.6-17 VSS LT

1	Key	11	Support ring	33	Shaft extension
2	Shaft	14	Seat complete	34	Gasket
3	Stud	15	Disc	36	Bearing
4	Nut	16	Taper pin	37	Guide ring
6	Stuffing box gland	17	Screw	38	Screw
7	Valve body	19	Plug	39	-
8	Stuffing box	21	Bearing	40	-
10	Cover plate	32	Extension		

Following parts are included in the sealing kit:
Pos. No. 1, 8, 14 and 34.

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