Service and operating instructions
Butterfly valves type VSS

Mi-203 EN

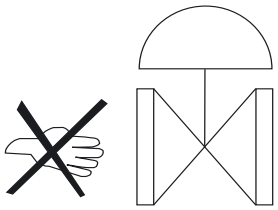
Edition: 2008-04

Nominal pressure	**PN 10 – 50**
Size	**DN 80 – 1200**

Safety Information

To avoid injury, disconnect the actuator from its power source before servicing the valve.

DO NOT place fingers, hands or arms either inside the valve or at the sealing surface when the power energy is connected to the actuator.



Contents

Valve function

The standard SOMAS VSS valve is equipped with a metal seat. PTFE, HiCo, HiNi and other seats are also available. See section “Valve specification system” for more information.

The valve is adjustable. Quite simply, this means that the more the valve is closed the tighter it becomes (see Fig. 1).

Due to the unique, triple-eccentric disc design, contact between the seat and the disc is released as soon as the valve starts to open, minimizing wear and extending the life of the valve.

Generally, valves for liquids require less torque than valves for steam and gases.

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

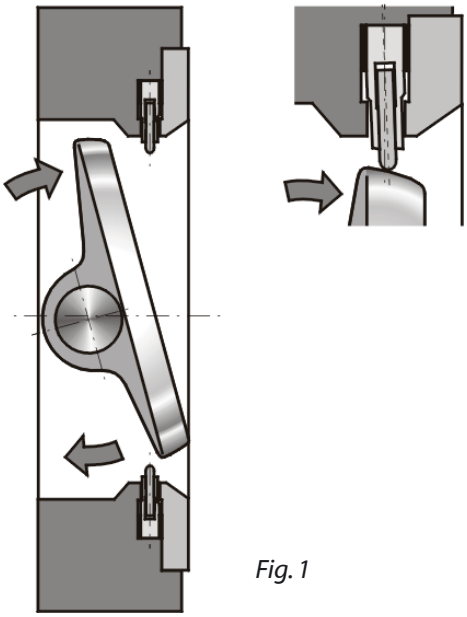


Fig. 1

Storage and handling

When unpacking the valve, first check that the valve has not been damaged during transport and handling. Protection plates should only be removed immediately before installation.

The valve should be stored in a dry, cool place on a clean, raised surface (not directly on the ground). The valve should always be protected against impurities during storage and installation.

Never lift the valve by the actuator. Always lift large valves using a strap as shown in Fig. 2.

NOTE the turns around the hook.

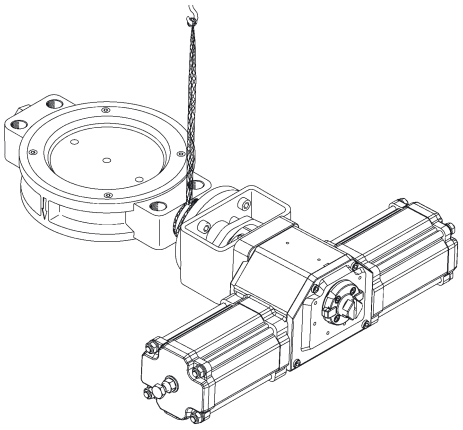


Fig. 2

Positioning the disc

A line on the shaft end marks the position of the disc in the valve. The line should be parallel to the valve body when the valve is closed and the key points to the right in the flow direction of the valve (see also Fig. 3).

The keyway is turned 5° from the centreline of the disc to ensure that the valve, in combination with an actuator, without overtravel can reach closed position (see Fig. 4).

The valve tightness is a function of the closing torque. See the chapter “Valve function”.

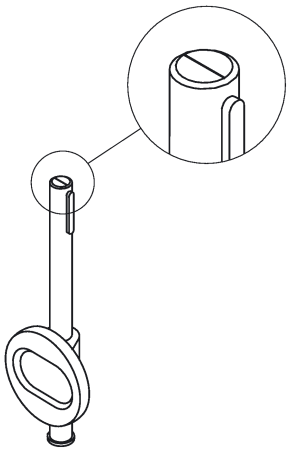


Fig. 3

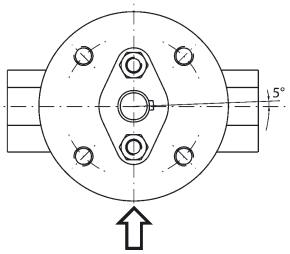


Fig. 4

Mounting

Note! *The preferred flow direction is towards the flat side of the disc. When lugged valves are installed, downstream piping can be removed when the valves are in the closed position. The valve can also be used for end-of-line service, in which case the fluid pressure must flow towards the flat side of the disc.*

The preferred flow direction is marked with arrows on both sides of the valve.

In control applications, avoid mounting the valve immediately before or after a pipe bend. If the valve must be mounted after a pipe bend, keep the valve shaft in the same plane as the bend to reduce the dynamic, unbalanced forces on the disc (see Fig. 5).

When mounting the valve on the pressure side of a centrifugal pump, position the valve shaft perpendicular to the pump shaft (see Fig. 6).

1. Check that the valve and all flange surfaces are clean and not damaged.
2. Check that the screws for the cover plate are tight.
3. Make sure that the piping is flushed clean and that there will be no further “pipe work” after the valve has been mounted.
4. If possible, open the valve by approximately 5° immediately before mounting.
5. Make sure that the sealing surfaces on the counter flanges are parallel and clean.
6. Make certain that the valve and gaskets are properly centred and that the correct gasket quality is used. For proper shut-off function, the pressure of the counter flanges must be transmitted via the gaskets to the cover plate (see Fig. 7).
7. Before tightening the flange bolts, manoeuvre the valve between fully open and fully closed position. Note that the valve operates 60 - 80° in control applications and at approximately 80° during on/off applications.
   To properly seal flanges, use washers and tighten the bolts in rotating order with a torque wrench. Suitable torque varies according to the size of the bolt. Refer to page 11 for complete specifications.
8. Once mounting is complete, leave the valve in the closed position so that is ready for use.

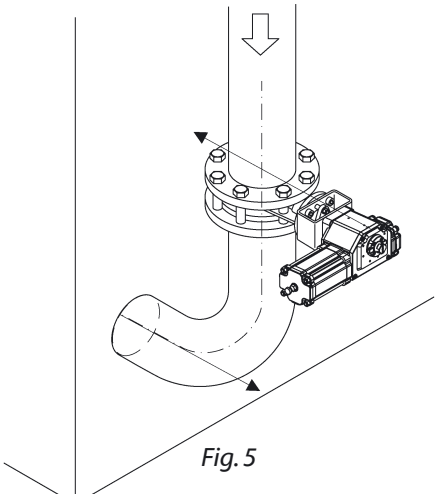


Fig. 5

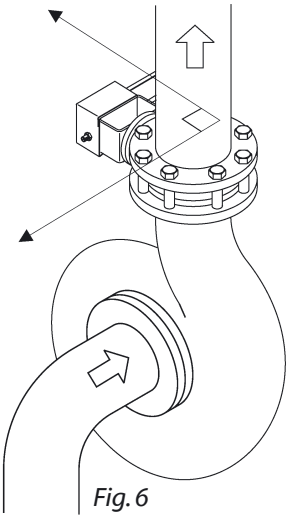


Fig. 6

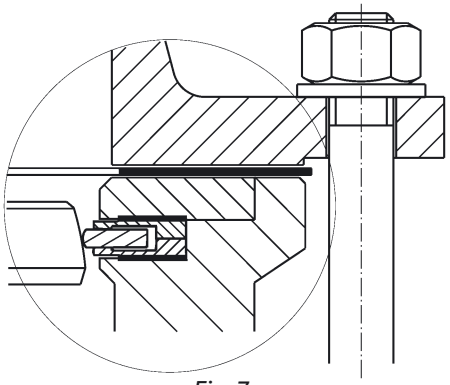


Fig. 7

Start up

Always start up the system with the valve in the closed position.

Before start up, make sure that the system is clean, as impurities can quickly damage the seat and cause leaking.

For a final flushing, operate the system with a fully open valve.

Check the valve stuffing box and tighten the gland nuts if leaking occurs.

Maintenance and adjustment *(Fig. 8)*

The VSS-valve does not require regular maintenance.

Re-tightened flange bolts according to the gasket supplier recommendations.

Check and tighten the stuffing box within a month of start up.

Testing of tightness must always be performed with the valve secured between flanges.

The surface pressure between the seat and the disc can be adjusted with the travel stop on the closing side of the actuator. Use a 2 to 3 cm wide strip of writing paper to control the surface pressure between the disc and the seat as shown in figure 8, and close the valve. **Note! Be careful, not to cut your fingers.** The limit position screw and input torque are correctly adjusted when the surface pressure almost causes the paper strip to be cut, but not torn.

In case of leakage:
Open the valve to flush out obstructions on the sealing surfaces. Check that there are no obstructions between the seat and the disc, and then close the valve.

If leaking continues, open the valve slightly. Loosen the look nut on the travel stop and turn the screw one-counter turn counter-clockwise. Test the valve. Repeat this procedure until the valve is tight. If the travel stop screw is loosened more than three turns and the valve continues to leaks, this could indicate that the seat is damaged and must be replaced.

When the valve is tight:
Tighten the lock nut on the travel stop on the actuator.

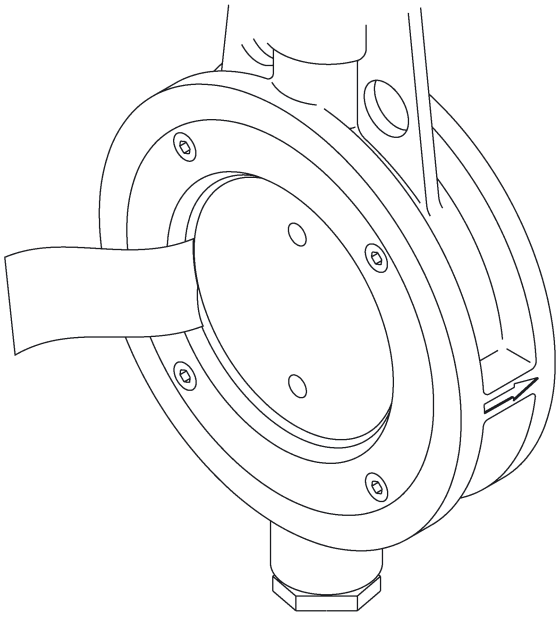


Fig. 8

Actuator assembly

Refer also to the instruction provided by the actuator supplier.

1. To avoid damage on the seat, turn the disc 90° counter-clockwise from the closed position while mounting the actuator.
2. Mount the actuator in the desired position on the shaft. Note the position of the key.
3. Fix the actuator in the correct position on the valve by tightening the bracket screws.

The disc shall be turned 90° counter-clockwise from the closed position when dismounting.

Filling the stuffing box *(Fig. 9)*

1. Remove the key (D) and loosen the gland nuts (A).
2. Remove the gland (B) and add stuffing box rings (C).
3. Put back the gland and the gland nuts.
4. Tighten the nuts alternately, securely but not too hard. Retighten as needed.
5. Replace the key.

Note! Should the valve has an actuator that cannot be removed, follow these instructions (see Fig. 9a):

1. Cut the stuffing box ring diagonally.
2. Thread the ring carefully onto the shaft, and down into the stuffing box.

Fig. 9a

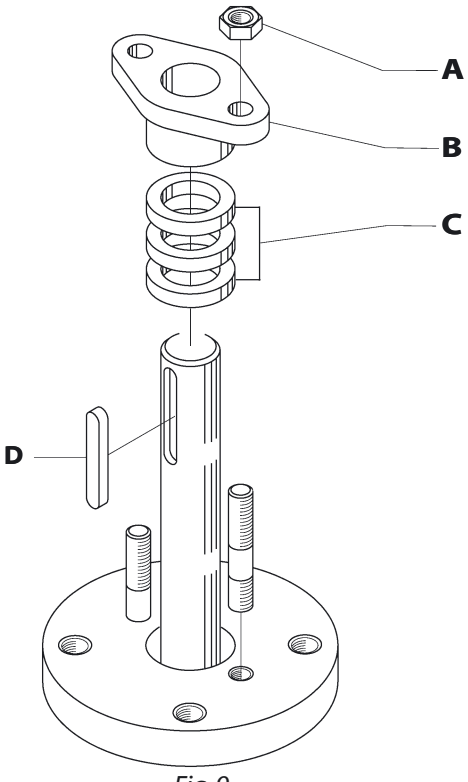


Fig. 9

Changing the seat

Standard metal seat *(Fig. 10-11)*

Disassembly

1. Place the valve with the inlet side pointing upwards and open the valve approximately 5° from closed position.
2. Loosen the screws (17) and remove the cover plate (10)
3. Lift out the gaskets (12), spring washers (13) and seat (14). For DN 800 - 1200 valves, only the seat (14) must be lifted out.

Cleaning, lubricating and assembling the seat

4. 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.
5. Lubricate the screws (17) with paste type molybdenumdisulphide.
6. Mount the new spring washers, new gaskets and a new seat. For DN 800 - 1200 valves, only the seat (14) must be mounted.
7. Fit the cover plate (10).
8. Tighten the screws (17) firmly in rotating order.
9. Test the valve.

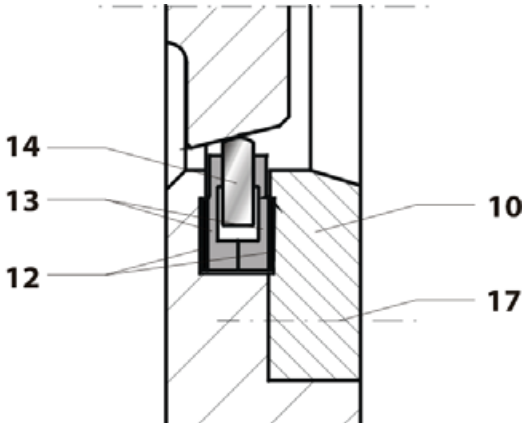


Fig. 10

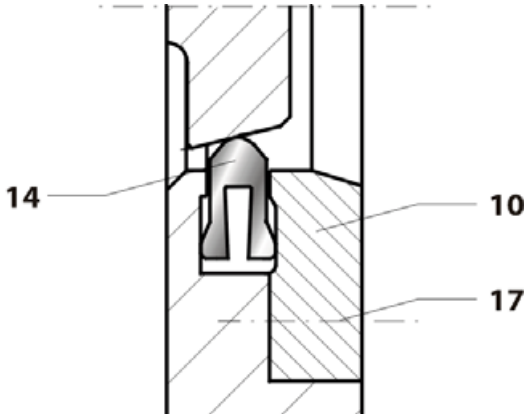


Fig. 11

PTFE-seat *(Fig. 12-13)*

Disassembly

1. Place the valve with the inlet side pointing upwards and open the valve approximately 5° from closed position.
2. Loosen the screws (17) and remove the cover plate (10)
3. Lift out the seat (14) and backing ring (11).

Cleaning, lubricating and assembling the seat

4. 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.
5. Lubricate the screws (17) with paste type molybdenumdisulphide.
6. Mount the new seat and a new backing ring.
   NOTE! The bevel at the inside of the seat (see Fig. 13) should be placed downwards to the disc.
7. Fit the cover plate (10).
8. Tighten the screws (17) firmly in rotating order.
9. Test the valve.

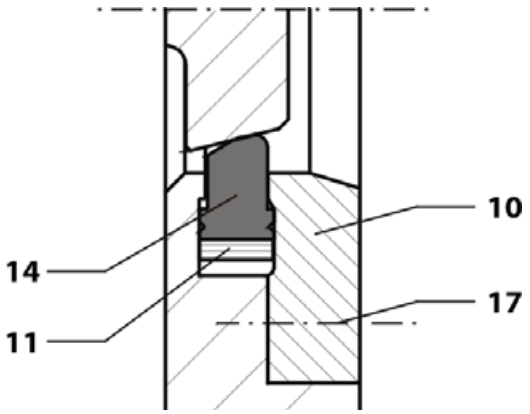


Fig. 12

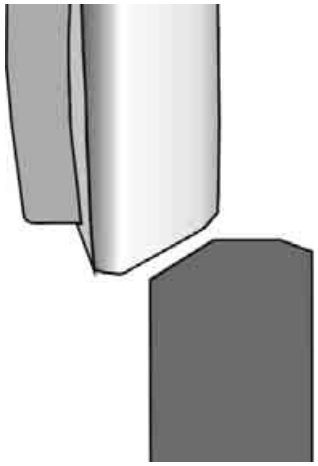


Fig. 13

Service

Regular maintenance is the most important step in keeping the process operating at its maximum efficiency and the lowest operating costs possible.

SOMAS' products are designed for a problem-free use and minimized maintenance. Check valve, actuator and accessories regularly to ensure a safe operation and accuracy.

Joints should be re-tightened according to recommendations from the gasket supplier. The stuffing box should be checked regularly and if necessary tightened. Most of the spare parts are included in the SOMAS spare part kits.

The sealing kit consists of a required number of sealings and gaskets necessary for a normal overhaul of the valve.

Note! Check the type sign (Fig. 14) and make a note of all data before contacting SOMAS or SOMAS sales representative

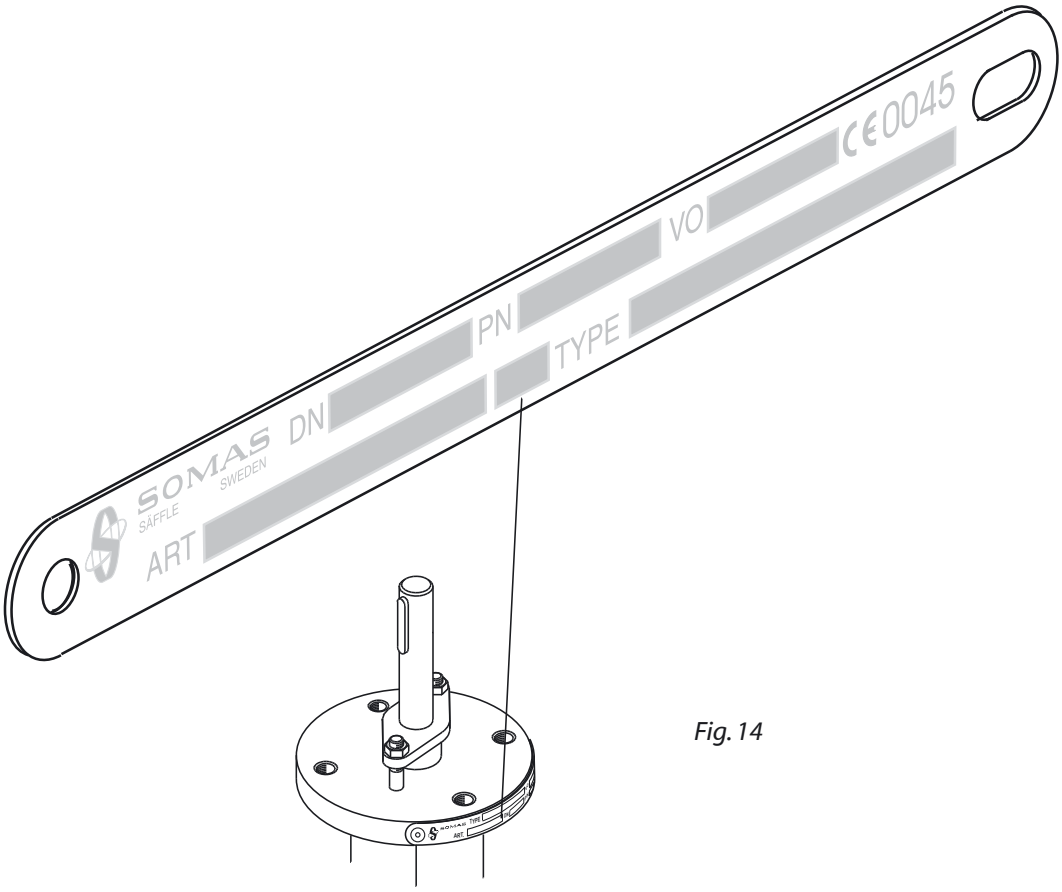
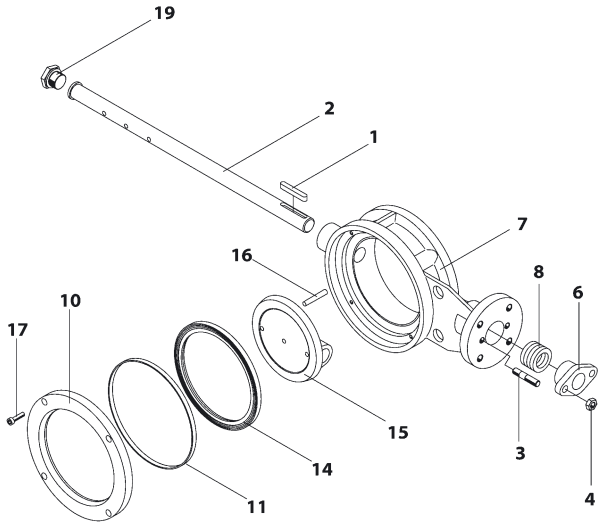
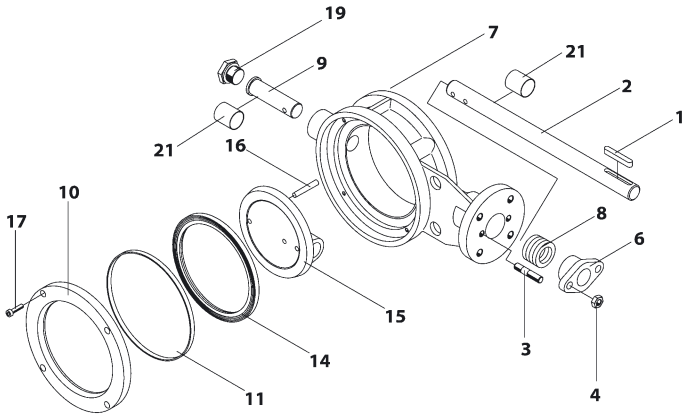


Fig. 14

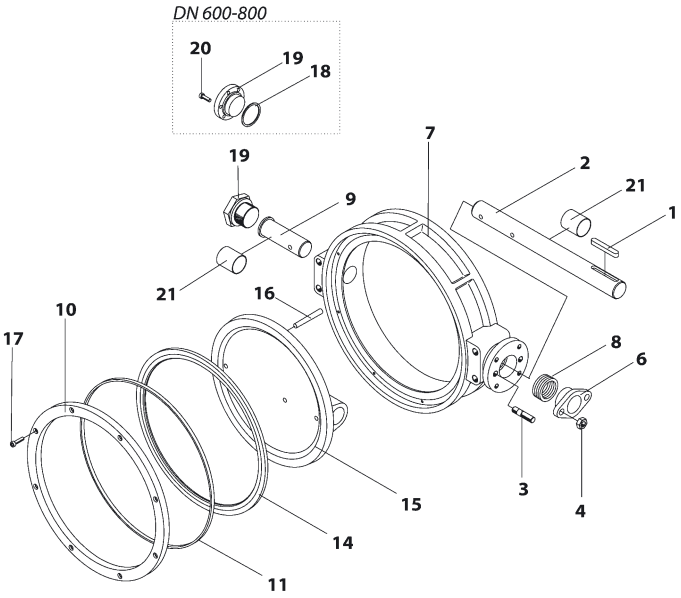
DN 80-150 PTFE-seat



DN 200-400 PTFE-seat



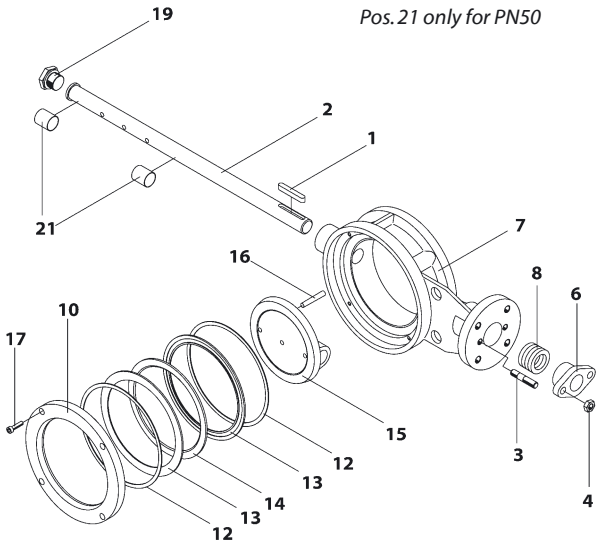
DN 450-800 PTFE-seat



1. Key
2. Shaft (Shaft, upper for DN 200-800)
3. Stud
4. Nut
6. Gland
7. Valve body
8. Stuffing box kit
9. Shaft, lower (only for DN 200-800)
10. Cover plate
11. Backing ring

14. Seat
15. Disc
16. Taper pin
17. Screw
18. Gasket
19. Plug
20. Screw
21. Bearing sleeves, kit
    (from DN 350 and upward)

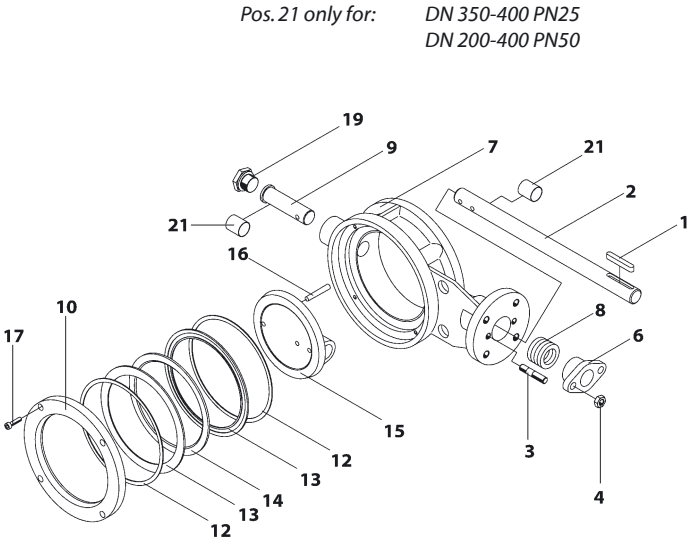
DN 80-150 metal seat, 3-pieces



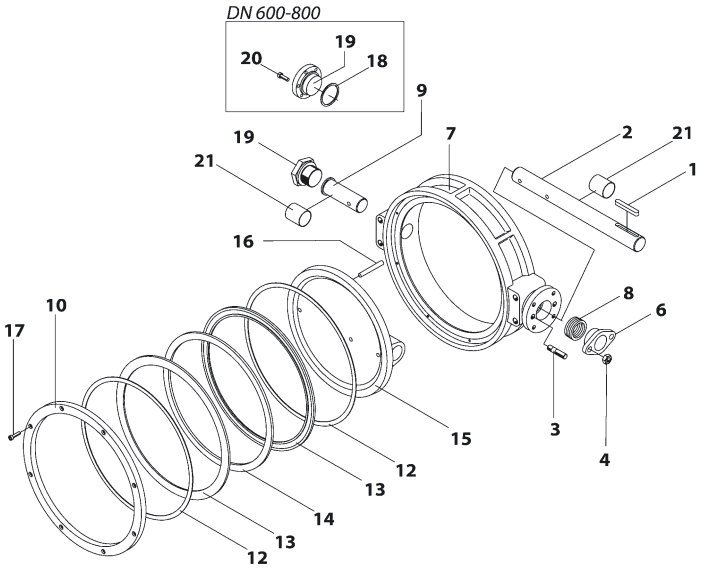
1. Key
2. Shaft (Shaft, upper for DN 200-1200)
3. Stud
4. Nut
6. Gland
7. Valve body
8. Stuffing box kit
9. Shaft lower (only for DN 200-1200)
10. Cover plate

12. Gaskets, kit
13. Spring washers, kit
14. Seat
15. Disc
16. Taper pin
17. Screw
18. Gasket
19. Plug
20. Screw
21. Bearing sleeves, kit

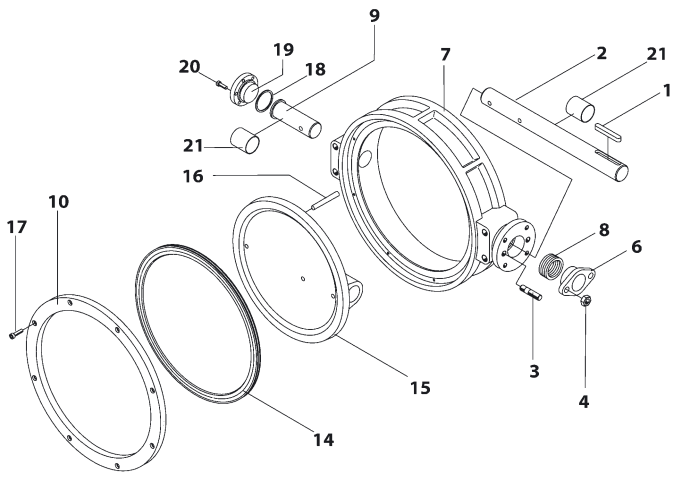
DN 200-400 metal seat, 3-pieces



DN 450-800 metal seat, 3-pieces



DN 900-1200 metal seat, type Y



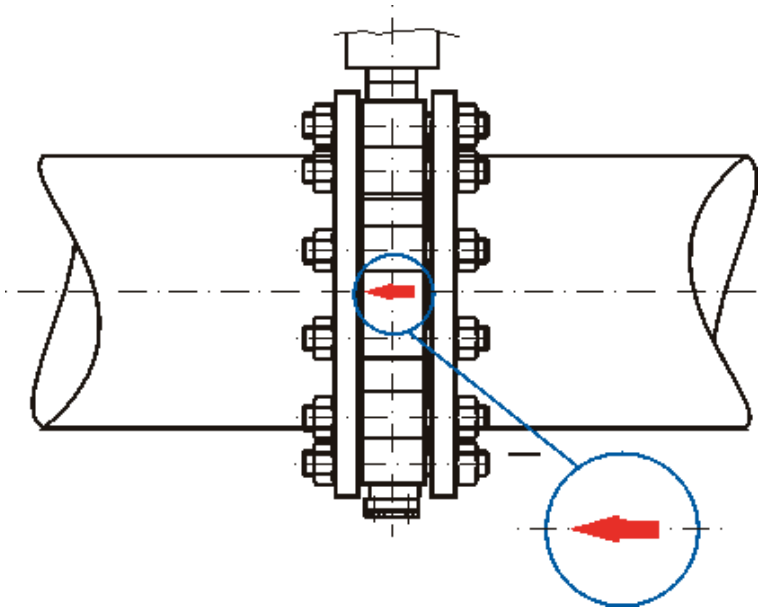
Sealing kit:

The following parts are included in the seal kit for valves with metal seat:

DN 80-500: Pos. No. 1, 8, 12, 13 and 14.
DN600-800: Pos. No. 1, 8, 12, 13, 14 and 18.
DN 900-1200: Pos. No. 1, 8, 14, 18 and 21.

The following parts are included in the seal kit for valves with PTFE-seat:

DN 80-500: Pos. No. 1, 8, 11 and 14.
DN 600-800: Pos. No. 1, 8, 11, 14 and 18.



Mounting

Note!
The preferred flow direction is towards the flat side of the disc. When lugged valves are installed, downstream piping can be removed when the valves are in the closed position. The lugged valve can also be used for end-of-line service, in which case the fluid pressure must flow towards the flat side of the disc.

The preferred flow direction is marked with arrows on both sides of the valve.

IMPORTANT INSTALLATION INFORMATION

- Protection plates should not be removed until the valve is subject to installation.
- Counter flanges should be standard according to European or ANSI standard.
- Gaskets should be flat type (not spiral wounded) in a correct quality. For dimensions see page 10.
- The bolts in the flange connection should be tightened according to figures given in the table at page 11.
- Before start up make sure that the valve system is well cleaned. Remaining impurities can quickly damage seat and disc edge and make the valve untight.
- The valve should be left fully open during pipe cleaning procedure.

Supplemental information

Gaskets

Note: Use gaskets with the correct inside diameter to ensure that pressure is applied on the cover plate.

For mounting between flanges according to PN 10-25, the inside gasket diameter should not exceed the dimensions specified in the standard DIN-EN 1514-1. See the table below.

Valve 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	1128	1154	----
1200	1220	1341	1342	1364	----

For mounting between flanges according to ANSI 150 dimensions according to the standard ANSI B 16.21 RF are valid where the following dimensions refer to the gasket:

Valve DN	Max. Inside dia. di *(mm)*	Outside dia. (dy) *(mm)* ANSI 150	ANSI 300
80	89	136	149
100	114	174	181
125	141	196	215
150	168	222	250
200	219	279	308
250	273	340	362
300	324	410	422
350	356	451	486
400	406	515	540
450	457	550	595
500	508	606	654
600	610	720	775
750	762	857	----

Torque specifications for VSS stuffing box

Valve DN	PN 10-25 Shaft dia. *(mm)*	Stuffing box dim. di / dy *(mm)*	Torque *(Nm)*	PN 50 Shaft dia. *(mm)*	Stuffing box dim. di / dy *(mm)*	Torque *(Nm)** Gland
80	20	20/35	15-20	20	20/35	15-20
100	20	20/35	15-20	25	25/40	15-20
125	20	20/35	15-20	----	----	----
150	25	25/40	15-20	30	30/45	20-30
200	25	25/40	15-20	35	35/50	25-35
250	30	30/45	20-30	40	40/55	30-40
300	35	35/50	25-35	50	50/65	45-65
350	40	40/55	30-40	60	60/75	60-90
400	50	50/65	45-65	70	70/90	80-120
450	50	50/65	45-65	----	----	----
500	60	60/75	60-90	80	80/100	110-150
600	70	70/90	80-120	90	90/110	120-160
700	70	70/90	80-120	----	----	----
750	70	70/90	80-120	----	----	----
800	80	80/100	110-150	----	----	----
900	80	80/100	110-150	----	----	----
1000	80	80/100	110-150	----	----	----
1200	100	100/120	50-80*	----	----	----

*with four studs

The table of torque specifications above assumes the use of new, correctly mounted stuffing boxes. When using ungreased threads, the higher values should be applied.

If leaking occurs during operation, it may be necessary to use higher torque values in order to achieve optimal compression of the stuffing box material.

In general: To stop leaking, tighten all of the gland nuts equally, by small increments.

Tightening torque

Valve body PN 25

DN	PN	Bolt dim.	Q'ty	Torque Nm	DN	PN	Bolt dim.	Q'ty	Torque Nm	DN	PN	Bolt dim.	Q'ty	Torque Nm
80	10-16	M16	8	50	**250**	10	M20	12	125	**500**	10	M24	20	230
	20	M16	4	95		16-20	M24	12	150		16-20	M30	20	295
	25	M16	8	50		25	M27	12	180		25	M33	20	324
	ANSI 150	5/8″	4	95		ANSI 150	7/8	12	140		ANSI 150	1 1/8″	20	275
100	10-20	M16	8	65	**300**	10	M20	12	145	**600**	10	M27	20	365
	25	M20	8	75		16-20	M24	12	175		16-20	M33	20	415
	ANSI 150	5/8″	8	65		25	M27	16	155		25	M36	20	450
						ANSI 150	7/8″	12	165		ANSI 150	1 1/4″	20	400
125	10-16	M16	8	80	**350**	10	M20	16	170	**700**	10	M27	24	500
	20	M20	8	100		16	M24	16	200		16	M33	24	475
	25	M24	8	75		20	M27	12	325		20	M33	28	405
	ANSI 150	3/4″	8	95		25	M30	16	250		25	M39	24	560
						ANSI 150	1″	12	280		ANSI 150	1 1/4″	28	390
150	10-20	M20	8	105	**400**	10	M24	16	230	**750**	20	M33	28	440
	25	M24	8	130		16-20	M27	16	280		ANSI 150	1/4″	28	415
	ANSI 150	3/4″	8	100		25	M33	16	325					
						ANSI 150	1″	16	245					
200	10	M20	8	155	**450**	10	M24	20	200	**800**	10	M30	24	515
	16	M20	12	100		16	M27	20	240		16	M36	24	615
	20	M20	8	155		20	M30	16	305		20	M39	28	575
	25	M24	12	125		25	M33	20	275		25	M45	24	800
	ANSI 150	3/4″	8	150		ANSI 150	1 1/8″	16	295		ANSI 150	1″	28	565

Nm = Hм

Valve body PN 10 / ANSI 150

DN	PN	Bolt dim.	Q'ty	Torque Nm
900	10	M30	28	500
	20	M39	32	570
	ANSI 150	1 1/2″	32	560
1000	10	M33	28	780
	20	M39	36	525
	ANSI 150	1 1/2″	36	515
1200	10	M36	32	575
	20	M39	44	450
	ANSI 150	1 1/2″	44	440

Valve body PN 50

DN	PN	Bolt dim.	Q'ty	Torque Nm	DN	PN	Bolt dim.	Q'ty	Torque Nm
80	40	M16	8	75	**350**	40	M33	16	370
	50	M20	8	100		50	M30	20	270
	ANSI 300	3/4″	8	125		ANSI 300	1 1/8″	20	145
100	40-50	M20	8	100	**400**	40	M36	16	465
	ANSI 300	3/4	8	125		50	M33	20	350
						ANSI 300	1 1/4″	20	335
150	40	M24	8	175	**450**	40	M36	20	450
	50	M20	12	145		50	M33	24	350
	ANSI 300	3/4″	12	145		ANSI300	1 1/4″	24	335
200	40	M27	12	205	**500**	40	M39	20	755
	50	M24	12	165		50	M33	24	400
	ANSI 300	3/4″	12	130		ANSI300	1 1/4″	24	385
250	40	M3012		200	**600**	40	M45	20	915
	50	M2716		150		50	M39	24	855
	ANSI 300	1″	16	130		ANSI300	1 1/2″	24	625
300	40-50	M30	16	220					
	ANSI 300	1 1/8″	16	160					

Valve specification system

VSS - A 5 - A A C - B 1 2 - DN... - PN...

1 2 3 4 5 6 7 8 9 10 11

1 Valve type

2 Valve body design
- A = Wafer design according to EN 558-1, Series 20
- F = Lugged design

3 Nominal pressure
- 1 = PN 6
- 2 = PN 10
- 5 = PN 25
- 6 = PN 50

4 Material – valve body
- A = 2343-12 (CF8M)
- D = 1.4408
- E = CK-3MCuN

* 1.4436 for DN80-200

5 Material – disc
- A = 2343-12*
- B = 2343-12* (hard chromed)
- C = 2343-12* (HiCo coated)

6 Material – seat
- A = PTFE (10 % carbon)
- C = 1.4462 (3 pcs.)
- D = 1.4462 (type Y) (DN 900-)
- E = 1.4547
- L = HiNi (High Nickel alloy)
- T = HiCo (High Cobalt alloy)

7 Material – shaft
- A = 1.4460
- B = 1.4460 (hard chromed)
- C = 1.4460 (HiCo coated)
- H = 1.4429
- J = 1.4547

8 Bearing – valve body/shaft
- 1 = Without bearing
- 3 = HiCo (High Cobalt alloy)
- 6 = 1.4547
- 7 = 1.4539

9 Stuffing box kit
- 1 = Graphite
- 2 = PTFE

10 Valve dimension, DN

11 Drilling, counter flanges

Temperature ranges for seat and shaft

Seat	Max. temp.
A = PTFE (10 % carbon)	170°C
C = 1.4462 (metal seat, 3 pcs.)	350°C [1]
	550°C [2]
D = 1.4470 (metal seat type Y)	350°C [1]
	550°C [2]
E = 1.4547	400°C
L = HiNi (High Nickel alloy)	550°C (Contact SOMAS)
P = PTFE (fibre glass 15 %)	170°C
T = HiCo (High Cobalt alloy)	550°C

Shaft	Max. temp.
A = 1.4460	150°C
B = 1.4460 (hard chromed)	350°C [1]
	550°C [2]
C = 1.4460 (HiCo coated)	350°C [1]
	550°C [2]
F = 1.4435	150°C
G = 1.4435 (hard chromed)	550°C
K = 1.4539	350°C [1]
T = Titanium	150°C

Valve body	Max. temp.
A = 2343-12 CF8M	550°C
	500°C
D = 1.4408	400°C
E = CK-3MCuN	400°C

[1] Check with SOMAS for temperatures between 350 and 550 °C
At higher pressures for example steam turbine applications

[2] At lower pressures for example exhaust applications

Art. No. 260 12

SOMAS reserves the right to make improvements without prior notice.

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