

Installation, operating and maintenance manual safety shut-off valve Type53 N/H according to DIN EN 14382

Table of content

- 1. General on installation, operating and maintenance manual**
 - 1.1 Hazard notices
 - 1.2 Qualified staff
- 2. Functional description**
 - 2.1 Description
 - 2.2 Sectional drawing/ installation example
 - 2.3 Function
- 3. Installation, operating instructions**
 - 3.1 Installation/assembly
 - 3.2 Pipe connections
 - 3.3 Commissioning
 - 3.4 Settings
- 4. Inspection and maintenance tasks**
 - 4.1 Inspection/maintenance
 - 4.2 Special maintenance instructions
 - 4.3 Special tools
 - 4.4 Inspection before commissioning / service inspections
- 5. Technical documentation**
 - 5.1 Spare parts drawing
 - 5.2 Spare parts list
 - 5.3 Technical data sheet
- 6. Disposal**
- 7. Inspection certificates/certificates/certifications***
- 8. Documentation of included components**

*Attached here depending on the scope of the order

1. General on installation, operating and maintenance manual

1.1 Hazard notices

These instructions comply with EC safety standards, EC directive 97/23/EC (Pressure Equipment Directive) and the relevant rules and regulations of the Federal Republic of Germany.

When the valve is used outside the Federal Republic of Germany, those responsible for the design and operation of the plant must ensure that the relevant standards and national rules and regulations are observed.

This instruction contains the instructions how to install and operate the valve safely and in the prescribed manner.

If problems arise that cannot be solved with the help these instructions, more information can be obtained from the manufacturer.

The manufacturer reserves all rights to make technical changes and improvements at any time. The use of these instructions assumes that the user is qualified as described in Section 1.2.

The operator has to receive training according to the instructions.

1.2 Qualified staff

Qualified staff are persons who from their training and experience are familiar with the installation, mounting, commissioning, operation and maintenance of the valves apply.

They may carry out inspections, functional checks, maintenance and re-commissioning. At plants regulated by the German Association for Gas and Water (DVGW), a second person must be present.

2. Functional description

The safety shut-off valve Type 53N/H has the task to protect downstream equipment, such as in pressure-regulating systems against excessive pressure and/or pressure reduction. It can be used for all gases according to DVGW worksheet G260 and all non-corrosive gases. (There are special versions available for other gases.)

The safety shut-off valve (SAV) Type 53N/H consists basically of the three modules measuring unit (I), actuator (II) and control element (III).

The measuring unit is available in versions DN and 53H; the former is used as standard for the range up to 50 mbar, the latter for the range above 50 mbar operating pressure.

2.1 Description

The valve is identified with a hard stamp on the valve body and nameplate

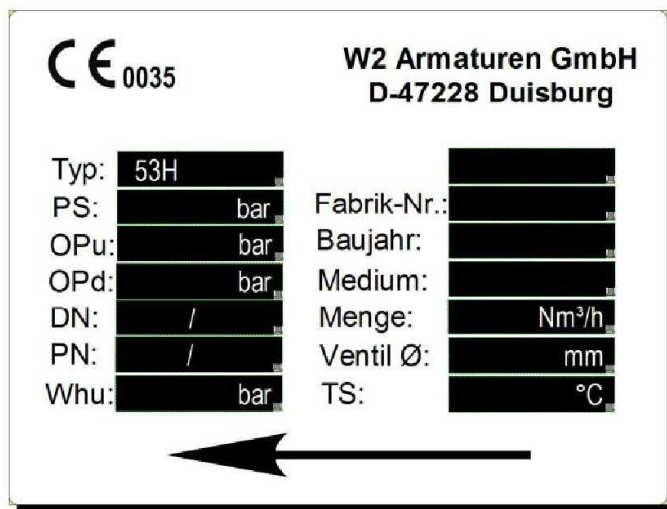
Valve body: Directional arrow

Factory number

Material, possibly according to APZ,

DN PN, material and standard of the flanged joints

Nameplate:



CE according to PED

PS: Pressure Stage

OPu: Operating Pressure Upstream

OPd: Operating Pressure Downstream

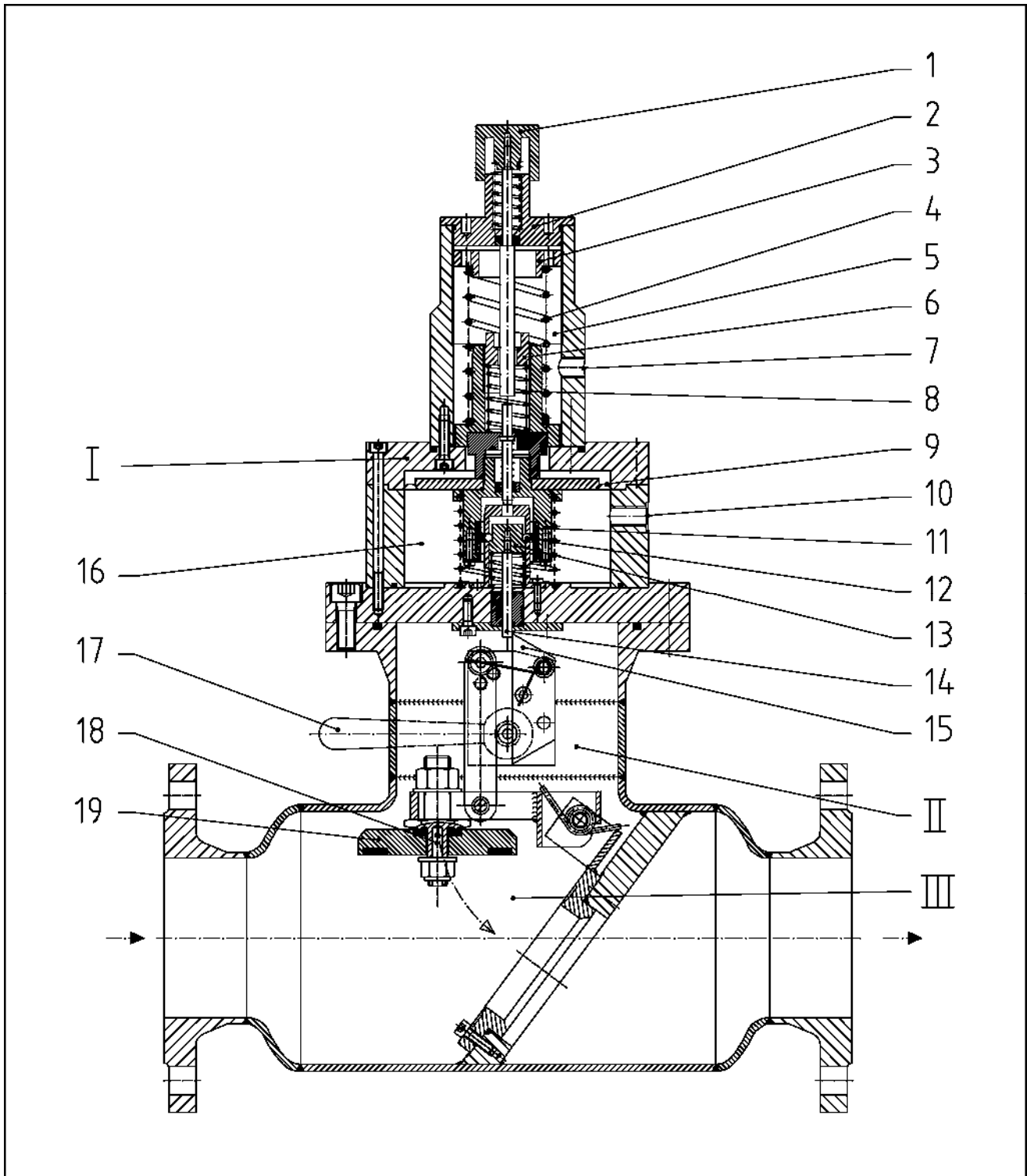
DN: Nominal Width

PN: Rated Pressure

W_{ds}: Specific Set Input Range (Adjustment Range)

2.2 Sectional drawing/installation example

Safety shut-off valve Type 53 N/H



2.3 Function (according to the sectional drawing)

Upper response pressure

The pressure to be monitored passes through the measuring pulse line 10 into the diaphragm chamber 16. If the pressure rises too high and exceeds the adjustment of the excess pressure spring 4, then the diaphragm 9 lifts and with it the release sleeve 11. This releases the balls 12 so that the trip plunger 13 and with it the lower rod 14 rushes to the top. This releases the latch 15. The valve 19 closes with spring force.

Lower response pressure

The pressure to be monitored passes through the measuring pulse line 10 into the diaphragm chamber 16. If the pressure drops inadmissibly and exceeds the setting of the deficiency spring 8, the diaphragm 9 drops and with it the release sleeve 11. The rest of the procedure corresponds with the procedure described above: upper response pressure.

Diaphragm rupture safety device

If a diaphragm ruptures, the gas flows into the spring chamber 5 and passes through the ventilation duct 7 to the outside. This causes the pressure in the diaphragm chamber 16 to decrease. The rest of the procedure corresponds with the procedure: lower response pressure.

3. Installation, operating instructions

3.1 Installation/assembly

The SAV Type 53N/H can be installed upright horizontally with the measuring unit or vertically with the measuring unit pointing to the side.

In vertical installation, the flow direction up to a valve diameter of 150 mm can be both from top to bottom and vice versa; from a valve diameter of 200 mm the flow for vertical installation **may** only be from top to bottom.

3.2 Pipe connections

Ventilation	G ¼"
Measuring pulse	G ¼"
Pipe couplings	G ¼"

3.3 Commissioning (as per the sectional drawing)

Before start-up (open), make sure that downstream valves are closed. By slowly raising the hand lever 17 to the first stop, the integrated pressure compensation valve 18 is opened. If the pressure has equalised before and behind the valve plate 19, the hand lever 17 can slowly be raised until it stops. The pressure to be monitored passes through the measuring pulse line 10 into the diaphragm chamber 9 and places a load on the diaphragm 9. Only when the operating pressure is set, may the trip plunger 13 be pressed downward using the pushbutton 1 so that the balls 12 can engage. The release sleeve 11 and with it the diaphragm 9 rushes to the neutral position. The pushbutton 1 can be released. Now the hand lever 17 can be released slowly until the latch 15 rests against the lower rod 14. The safety shut-off valve (SAV) is ready for operation.

3.4 Settings (as per the sectional drawing)

To make the response pressure settings, the tower lid 2 must be loosened and removed using the special SAV tool key.

Upper response pressure

The adjustment is made using the special SAV tool key on the spring cup 3. Right turn increases the value.

In an upper response pressure over 3 bar the setting is only allowed in an unpressurised state after a deficiency release, otherwise there is a risk that the diaphragm is destroyed.

Lower response pressure

The adjustment is made using the special SAV tool key on the dome spring cup 6. Right turn increases the value.

In a lower response pressure over 150 bar the setting is only allowed in an unpressurised state after a deficiency release, otherwise there is a risk that the diaphragm is destroyed.

The setting of the lower response pressure slightly affects the upper response pressure. This must therefore be checked after each adjustment of the lower response pressure and corrected if necessary.

Minimum pressure difference between operating pressure P and response pressure P_b :

Set input range [bar]	Drawing number	p_{min} $p_s - p_b$ [bar]
Measuring unit N (excessive pressure)		
0.030 - 0.150	4-53-1 6/4x1 00	0.020
0.150 - 0.250	4-53-1 6/5x1 00	0.020
0.250 - 0.500	4-53-1 6/6x1 00	0.030
Measuring plant N (lack of pressure)		
0.007 - 0.025	4-53-15/2.0x58	0.020
0.025 - 0.070	4-53-15/2.5x49	0.030
Measuring unit H (excessive pressure)		
0.100 - 0.350	4-53-16/4x100	0.040
0.350 - 0.850	4-53-16/5x100	0.040
0.850 - 1.600	4-53-1 6/6x1 00	0.080
1.600 - 2.700	4-53-16/7x100	0.150
2.700 - 4.200	4-53-1 6/8x1 00	0.200
4.200 - 7.000	4-53-1 6/9x1 00	0.300
Measuring unit H (lack of pressure)		
0.040 - 0.120	4-53-15/2.0x58	0.030
0.120 - 0.280	4-53-15/2.5x49	0.030
0.280 - 0.650	4-53-15/3.0x55.1	0.030
0.657 - 1.050	4-53-1 5/3.6x48.2	0.050
1.050 - 1.500	4-53-15/4.0x49	0.100

4. Inspection and maintenance tasks

4.1 Inspection/maintenance

For the installation and the equipment as well as the monitoring and maintenance of safety shut-off valves, the respective regulations, but in particular the DVGW G491 and G495 worksheets, must be complied with.

The maintenance intervals depend on the operating conditions and the nature of the gas used. Rigid maintenance intervals are therefore not specified, the responsibility lies with the operator.

Servicing should always be carried out only on unpressurised equipment and only by qualified staff.

4.2 Special maintenance instructions

The measuring unit (as per sectional drawing 2 or 3) can be removed for maintenance purposes. For this purpose, the screws on the blank flange 3 are loosened and the complete measuring unit removed. Its function can also be tested when removed.

The excess pressure and deficiency spring must be released before every dismantling of the measuring unit.

The following instructions apply to both measuring units; should the numbering vary, the item number refers to Type 53H while the number of Type 53N is in brackets.

During maintenance, specifically check the membrane 8, as well as the release sleeve 31 (33) and trip plunger 28 (35) for damage.

By loosening the Allen screws on the spring tower, H 18 (or diaphragm housing, N, top 11), the entire upper top part can be removed.

Then the central rod 12 must be pressed and the entire unit with diaphragm 8 and 6 sleeve body simultaneously pulled upwards. Now the above parts can be checked and renewed if necessary.

All moving parts should be lightly lubricated during assembly with a suitable agent.

The O-ring 28 is tested by applying pressure (operating pressure) below the diaphragm 8. Using a suitable leak detector agent, any leak found at the drill hole can also be detected.

The O-rings 37 and 39 (and 44) can only be tested when assembled.

For this purpose, the actuator body is placed under operating pressure; current leaks at the drill hole for the measuring pulse can then be detected with a suitable leak detector agent.

During maintenance it must be checked that the actuator (as per sectional drawing 4) operates smoothly and has no external leaks. The torsion spring 18 must be replaced if the spring force has diminished. For this purpose, the screw 16 must be loosened so that the torsion spring 18 can be pulled out from the holes of the screws 17 or 19.

During assembly, it is essential to ensure that the correct number of washers 14 are used. The screw 16 may be tightened only to the extent that the latch 15 can still move freely. In addition, they must be countered with the nut 12. In the rare case that an external leak occur, the O-rings 8 and 10 must be replaced. For this purpose, the drive dog 21 must first be released from the excenter 13. Here again, the number of washers 20 and 22 need to be observed! To remove the hand lever 1, the slotted pin 2 must be driven out carefully.

The hex nut 4 (SW 36) can now be loosened, while the neck journal bearing 25 must be held in the milled recess provided for it using a spanner (SW 41).

The complete neck journal bearing 25 can now be taken out together with the shaft 9 and the excenter 13. Only now the shaft 9 is slowly pulled out of the neck journal bearing 25. The internal O-ring 10 can now be carefully removed using a bent scriber. Use a suitable tool when installing the new O-ring to avoid the risk of damage. The outer O-ring 8 is pulled off and replaced.

Assembly is carried out in reversed order. The interior of the neck journal bearing 25 should be oiled with a suitable lubricant before assembly.

After opening the actuator (by lifting the measuring unit) the O-ring inserted into the groove of the body flange or the O-ring number should be replaced.

During a performance test or maintenance must be checked that *the actuator* (as per sectional drawing 5) seals tightly. If there is leakage, the valve plate 12 must be replaced. Due to better accessibility the neck journal bearing of the actuator should be removed first.

By loosening the screws 19 the complete valve insert (1-6, 10, 11) can now be removed together with the valve plate 12. Then, the nut 13 is removed and the valve plate 12 can be removed together with the centre screw 15 by lifting the swing arm 10.

The self-locking nut 17 is loosened and the valve seat to the centre screw 15 checked for possible damage. In this case, the centre screw must also be replaced.

When assembling, make sure that the nut 17 is tightened only to the extent that there remains about 2 mm play between the valve plate 12 and the valve seat of the centre screw 15.

Moreover, attention should be paid to the concentricity of the valve plate 12 to the valve insert 11 during installation.

If the spring force of the torsion springs 3 diminish or if there are signs of damage to the valve seat of the valve insert 11, must the complete unit (1-6, 10, 11) must be replaced.

The unit (1-6, 10, 11) may not be disassembled, since the torsion springs 4 are fitted under high preload and hence there is a risk of injury.

4.3 Special tools

SAV tool key, available from R+A Terschüren GmbH

4.4 Inspection before commissioning / service inspections

The operator must do and document service inspections before commissioning and at regular time intervals. The intervals specified in the DVGW worksheet 495 apply.

Inspections relating to, among other, compliance with the construction requirements, equipment integration, leaks and function with due regard to the DVGW worksheet 491.

5. Technical documentation

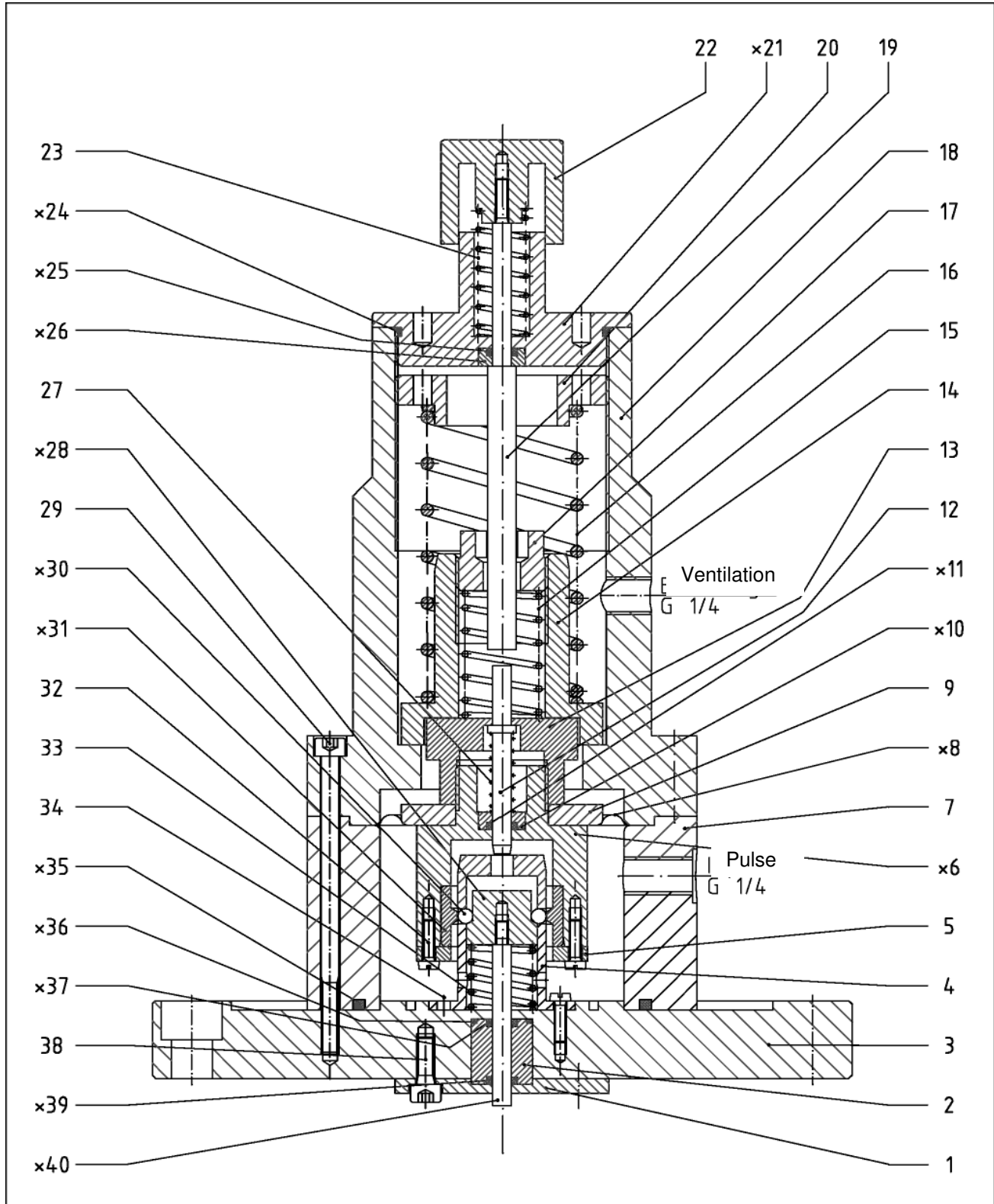
5.1 Spare parts drawing

x: Keep wear parts in stock for maintenance.

The storage requirements of the respective manufacturers apply.

Spare parts drawing 1

Measuring unit Type 53 H

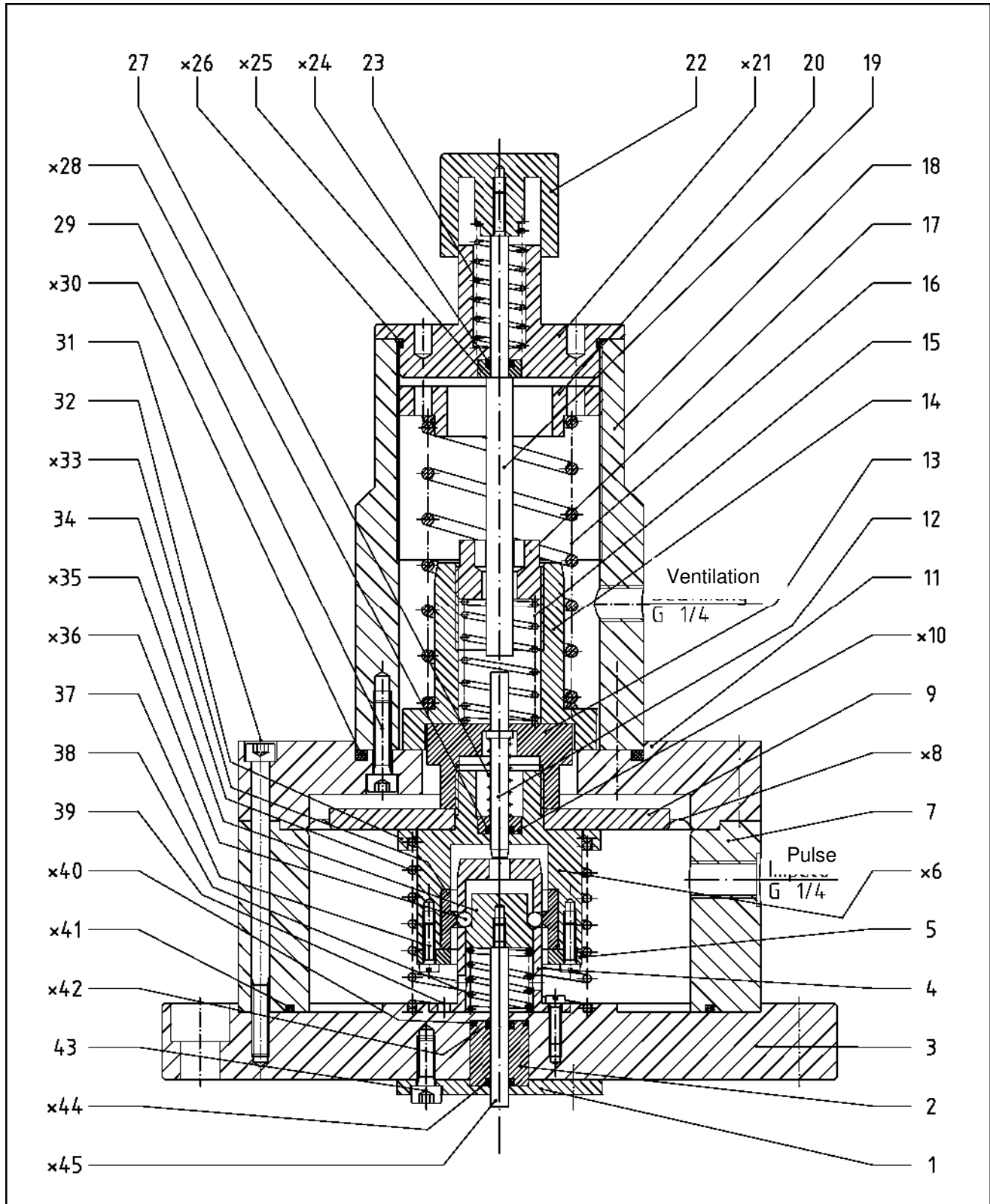


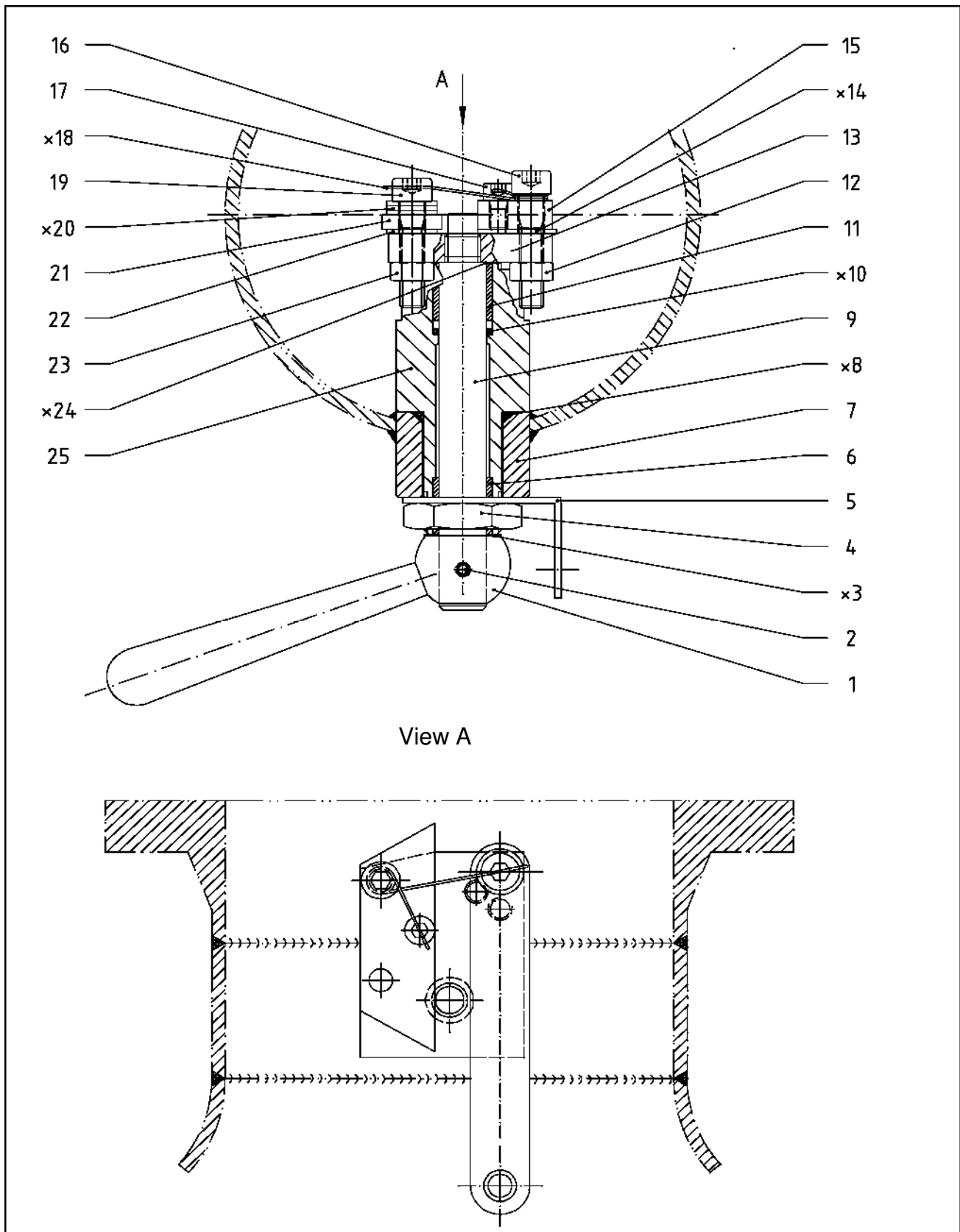


ARMATUREN GmbH

Spare parts drawing 2

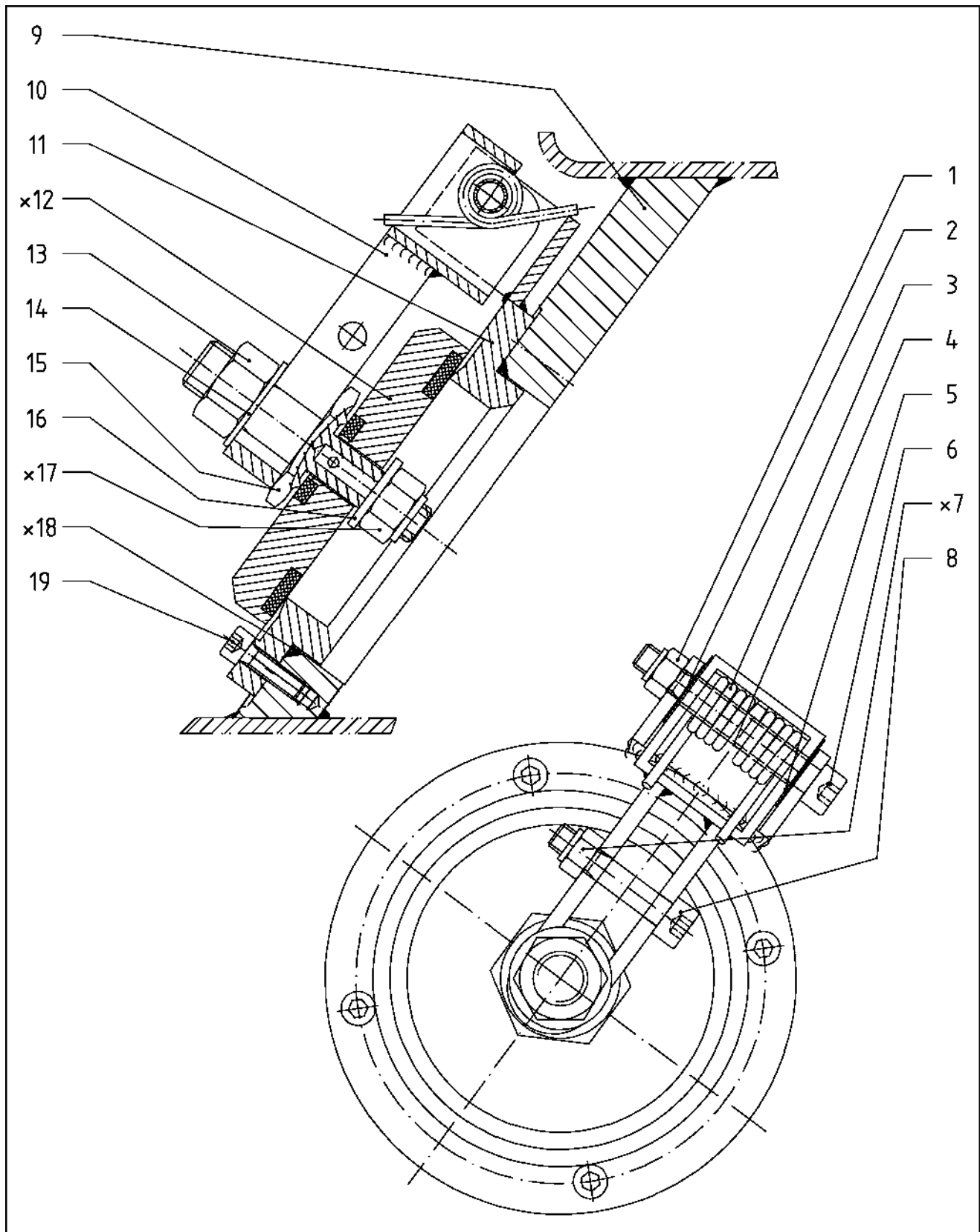
Measuring unit Type 53N





Spare parts drawing 4

Control element



5.2 Spare parts list

Spare parts list 1

Measuring unit Type 53H

Item	Quantity	Unit	Designation	Standard / drawing number	Material / remarks
1	1	Piece	Aluminium flange	4-53-1	Al
2	1	Piece	Guide	4-53-2	Ms
3	1	Piece	Blank flange, H	4-53-3/H/...	St, chromated
4	1	Piece	Orifice component	4-53-4	Ms
5	1	Piece	Plate for sleeve body	4-53-5	Al
x6	1	Piece	Sleeve body	4-53-6	Al
7	1	Piece	Diaphragm housing, H,	4-53-7/H	Al
x8	1	Piece	Diaphragm, H	4-53-8/H	Perbunan
9	1	Piece	Diaphragm plate, H	4-53-9/H	Al
x10	1	Piece	O-ring bushing	4-53-10	Ms
x11	1	Piece	O-ring	6 x 2	Perbunan
12	1	Piece	Centre rod	4-53-12	VA
13	1	Piece	Rod guide	4-53-13	Al
14	1	Piece	Spring dome	4-53-14	Al
15	1	Piece	Spring, deficiency	4-53-15	Spring steel C,
16	1	Piece	Spring, excess pressure	4-53-16	Spring steel C,
17	1	Piece	Spring cup, dome	4-53-17	St, chromated
18	1	Piece	Spring tower, H	4-53-18/H	Al
19	1	Piece	Upper rod	4-53-19	VA
20	1	Piece	Spring cup	4-53-20	St, chromated
x21	1	Piece	Tower lid	4-53-2 1	Al
22	1	Piece	Pushbutton	4-53-22	Al
23	1	Piece	Spring, top	4-53-23	VA spring steel
x24	1	Piece	O-ring	60 x 3	Perbunan
x25	1	Piece	O-ring	6 x 2	Perbunan
x26	1	Piece	O-ring bushing	4-53-10	Ms
27	1	Piece	Spring, centre	4-53-27	VA spring steel
x28	1	Piece	Trip plunger	4-53-35	V-St, chromated
29	8	Piece	Allen screw	DIN 912 - M6 x 100	8.8, galvanised
x30	6	Piece	Ball	SKF - RB5 / G20	St
x31	1	Piece	Release sleeve	4-53-33	V-St, chromated
32	4	Piece	Machine screw	DIN 84 - M4 x 10	8.8, galvanised
33	1	Piece	Spring, bottom	4-53-38	VA spring steel
34	4	Piece	Machine screw	DIN 84 - M4 x 10	8.8, galvanised
x35	1	Piece	O-ring	90 x 4	Perbunan
x36	1	Piece	O-ring	16 x 2	Perbunan
x37	1	Piece	O-ring	6 x 2	Perbunan
38	4	Piece	Allen screw	DIN 912 - M6 x 16	8.8, galvanised
x39	1	Piece	O-ring	6 x 2	Perbunan
x40	1	Piece	Lower rod	4-53-45	VA



Spare parts list 2

Measuring unit Type 53N

ARMATUREN GmbH

Item	Quantity	Unit	Designation	Standard / drawing number	Material / remarks
1	1	Piece	Aluminium flange	4-53-1	Al
2	1	Piece	Guide	4-53-2	Ms
3	1	Piece	Blank flange, N	4-53-3/N/...	St, chromated
4	1	Piece	Orifice component	4-53-4	Ms
5	1	Piece	Plate for sleeve body	4-53-5	Al
x6	1	Piece	Sleeve body	4-53-6	Al
7	1	Piece	Diaphragm housing, N,	4-53-7/N	Al
x8	1	Piece	Diaphragm, N	4-53-8/N	Perbunan
9	1	Piece	Diaphragm plate, N	4-53-9/N	Al
x10	1	Piece	O-ring bushing	4-53-10	Ms
11	1	Piece	Diaphragm housing, N, top	4-53-11	Al
12	1	Piece	Centre rod	4-53-12	VA
13	1	Piece	Rod guide	4-53-13	Al
14	1	Piece	Spring dome	4-53-14	Al
15	1	Piece	Spring, deficiency	4-53-15	Spring steel C,
16	1	Piece	Spring, excess pressure	4-53-16	Spring steel C,
17	1	Piece	Spring cup, dome	4-53-17	St, chromated
18	1	Piece	Spring tower, N	4-53-18/N	Al
19	1	Piece	Upper rod	4-53-19	VA
20	1	Piece	Spring cup	4-53-20	St, chromated
x21	1	Piece	Tower lid	4-53-21	Al
22	1	Piece	Pushbutton	4-53-22	Al
23	1	Piece	Spring, top	4-53-23	VA spring steel
x24	1	Piece	O-ring	6 x 2	Perbunan
x25	1	Piece	O-ring bushing	4-53-10	MS
x26	1	Piece	O-ring	60 x 3	Perbunan
27	1	Piece	Spring, centre	4-53-27	VA spring steel
x28	1	Piece	O-ring	6 x 2	Perbunan
29	4	Piece	Allen screw	DIN 912 - M6 x 20	8.8, galvanised
x30	1	Piece	O-ring	90 x 4	Perbunan
31	8	Piece	Allen screw	DIN 912 - M6 x 100	8.8, galvanised
32	1	Piece	Spring cup, compensation	4-53-32	Al
x33	1	Piece	Release sleeve	4-53-33	V-St, chromated
34	1	Piece	Compensation spring	4-53-34	Spring steel C,
x35	1	Piece	Trip plunger	4-53-35	V-St, chromated
x36	6	Piece	Ball	SKF / RB-5 / G20	St
37	4	Piece	Machine screw	DIN 84 - M4 x 10	8.8, galvanised
38	1	Piece	Spring, bottom	4-53-38	VA spring steel
39	4	Piece	Machine screw	DIN 84 - M4 x 10	8.8, galvanised
x40	1	Piece	O-ring	16 x 2	Perbunan
x41	1	Piece	O-ring	140 x 3	Perbunan
x42	1	Piece	O-ring	6 x 2	Perbunan
43	4	Piece	Allen screw	DIN 912 - M6 x 16	8.8, galvanised
x44	1	Piece	O-ring	6 x 2	Perbunan
x45	1	Piece	Lower rod	4-53-45	VA

Spare parts list 3

Actuator

Item	Quantity	Unit	Designation	Standard / drawing number	Material / remarks
1	1	Piece	Hand lever	4-53-110	St, chromated
2	1	Piece	Slotted pin	DIN 1481, 5 x 30	VA
x3	1	Piece	Disc	17x26x0.4	PTFE
4	1	Piece	Hexagon nut	DIN 431, G3/4	8, galvanised
5	1	Piece	Fixing plate	4-53-105	St, chromated
6	1	Piece	Brass bushing	4-53-117	Ms
7	1	Piece	Weld-in bushing	4-53-108	St
x8	1	Piece	O-ring	26 x 3	Perbunan
9	1	Piece	Shaft	4-53-116/...	VA
x10	1	Piece	O-ring	16 x 2.5	Perbunan
11	1	Piece	Brass bushing	4-53-117	Ms
12	1	Piece	Hexagon nut	DIN 934, M8	8, galvanised
13	1	Piece	Excenter	4-53-119	VA
x14	1	Piece	Disc	DIN 125, 8.4	Ms
15	1	Piece	Latch	4-53-112	VA
16	1	Piece	Allen screw	DIN 912, M8x40	8.8, galvanised
17	1	Piece	Allen screw	DIN 912, M6x10	8.8, galvanised
x18	1	Piece	Torsion spring	4-53-102	VA spring steel
19	1	Piece	Allen screw	DIN 912, M8x40	8.8, galvanised
x20	2	Piece	Disc	DIN 125, 8.4	Ms
21	1	Piece	Drive dog	4-53-111	VA
22	1	Piece	Disc	DIN 125, 8.4	Ms
23	1	Piece	Hexagon nut	DIN 934, M8	8, galvanised
x24	1	Piece	Disc	17x26x0.4	PTFE
25	1	Piece	Neck journal bearing	4-53-115/...	St, chromated

Spare parts list 4

Control element

Item	Quantity	Unit	Designation	Standard / drawing number	Material / remarks
1	1	Piece	Hexagon nut	DIN 985/8, M8	8, galvanised
2	1	Piece	Disc	8x24x0.4	PTFE
3	1	Pair	Torsion spring left-right	4-53-213	Spring steel C,
4	1	Piece	Sleeve	10x1x40	Precision tube DIN 2391
5	1	Piece	Disc	8x24x0.4	PTFE
6	1	Piece	Allen screw	DIN 912, M8x60	8.8, galvanised
x7	1	Piece	Hexagon nut	DIN 985/8, M8	8, galvanised
8	1	Piece	Allen screw	DIN 912, M8x55	8.8, galvanised, 40 mm
9	1	Piece	Partition wall (ellipse)	4-53-217/...	St
10	1	Piece	Swing arm	4-53-212/...	St, chromated
11	1	Piece	Valve insert	4-53-203/...	St, chromated
x12	1	Piece	Valve plate	4-53-208/...	St, chromated
13	1	Piece	Hexagon nut	DIN 934, M16	8, galvanised
14	1	Piece	Spring washer	DIN 137, 17x30x1.6, Form B	St, galvanised
15	1	Piece	Centre screw	4-53-209	St, chromated
16	1	Piece	Disc	DIN 125, 13x24x2.5	St, galvanised
x17	1	Piece	Hexagon nut	DIN 985/8, M12	8, galvanised
x18	1	Piece	O-ring	4	Perbunan
19	4 - 8	Piece	Allen screw	DIN 912, M6x20 / M8x20	8.8, galvanised

6. Disposal

Environmental damage can occur during disposal when the equipment still contain poisonous fluid residues.

It is therefore essential to ensure that the equipment is cleaned and free of fluid residues before disposal.

After that, all materials can be disposed of according to the regulations applicable at the operating site.