OPERATING INSTRUCTIONS FOR SAFETY VALVES

SVAA (456), SVAB (455), SVUA P (458), SVUB P (457)

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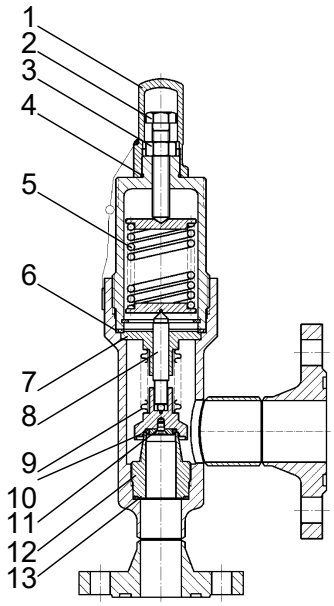
1 Overview of types

SVUA P (type 458)	Back-pressure independent, seat seal by means of PTFE ring
SVUB P (type 457)	Back-pressure independent, seat seal by means of elastomer O-ring
SVAA (type 456)	Back-pressure dependent, seat seal by means of PTFE ring
SVAB (type 455)	Back-pressure dependent, seat seal by means of elastomer O-ring



1	Cap	2	Adjusting screw (ISO 4017)
3	Lock nut	4	O-ring C (SVA type 455/456 only)
5	Compression spring	6	Bonnet gasket (flat gasket K)
7	Stem guide	8	Stem
9	Bellows (SVZ type 457/458 only)	10	Seat seal (O-ring S)
11	Valve disc screw (countersunk screw ISO 7046 / DIN 7500)	12	Seat nozzle
13	Flat gasket N		

2 Technical characteristics

Body material	Selection acc. to AD-2000 Series W
Steel	P235GH, S235JR, S355J2
Low-temperature steel	P355NL1
Stainless steel	X5CrNi18-10 or equivalent

2.1 Pressure/temperature operating limits

Pressure/temperature operating limits:
PS: Max. allowable operating pressure in bar
TS: Permissible operating temperature in °C corresponding to the permissible operating pressures (PS)
PN: Nominal pressure rating

PN	DN		SVUA P (458), SVAA (456)					SVUB P (457), SVAB (455)				
		TS (MWT) [°C]	-60[2)]	-60[1)]	-10	+50	+180	-50[2)]	-50[1)]	-10	+50	+110
25	15/25 – 40/65	PS (MWP) [bar]	18.7	25	25	25	25	18.7	25	25	25	25
40	15/25 – 40/65		30	40	40	40	40	30	40	40	40	40
63	15/25 – 25/40		47.2	63	63	63	63	47.2	63	63	63	63

1) Load case I (low-temperature steel, stainless steel)
2) Load case II (acc. to AD2000-W10) (Steel)
Permissible ambient temperature range (°C): -35 to +55 °C

2.2 Operating media

The valves described here are suitable for operation with refrigerants in accordance with EN 378 Part 1, e.g. NH3, R22, R134a, R290 (propane). R507 or mixtures with refrigeration machine oil as well as for neutral, gaseous and liquid media and glycol-based brines.

2.3 Certified coefficient of discharge

Certified coefficient of discharge		DN 15/25 DN 20/25 DN 25/25	DN 20/32 DN 25/32 DN 32/32	DN 25/40 DN 32/40 DN 40/40	DN 32/50 DN 40/50 DN 50/50	DN 40/65 DN 50/65 DN 65/65
For steam / gas	Kdr (αw) [-]	0.72	0.64	0.70	0.60	0.70
For liquid	Kdr (αw) [-]	-	-	-	-	-
Narrowest flow cross-section	[mm2]	117	206	320	460	716
Set pressure	pset [bar]	5–63	5–63	5–63	5–40	5–40

For pressure ranges of the compression springs, see spare parts list.
Installation position: vertical in accordance with AD2000 data sheet A2 and horizontal.
External leakage: <15g refrigerant per year, seat leakage: <5g refrigerant per year.

3 Safety instructions

3.1 General safety instructions

NOTICE

Danger from improper handling!

Risk of property damage.

- Do not install valves with transport or storage damage.
- Valves must be free of axial forces, bending moments, and torsional moments and must not serve as fixed points for pipework.
- In the event of oxy-fuel welding or brazing, the flame must not touch the valve.
- Keep the interior of the valves free of contamination.
- Opening or closing the valves with a valve wheel wrench or other lever-extending objects is not permissible.
- Only dismantle valves when the pipework is depressurised, evacuated, and sufficiently ventilated.

3.2 Conditions for safe use

NOTICE

- The safety devices must be permanently and conductively connected to the overall system; the overall system can be earthed individually or integrated into the building's equipotential bonding. The equipotential bonding must be checked by the operator at regular intervals.
- Outlets to safety devices should not be opposite other branches.
- Protect safety valves against harmful external influences (e.g. weather conditions) that may inhibit function.
- Permanently protect safety valves made of unalloyed body parts against corrosion.
- Avoid transmission of vibrations to the safety valve.
- Discharge lines must be dimensioned and routed, taking into account local operating conditions, so that static and dynamic reaction forces as well as thermal stresses can be safely absorbed. At safety devices where the escape of a flammable medium creates direct or indirect hazards for persons or ignition sources in the vicinity, suitable protective measures must be taken (e.g. discharging into a safe environment).
- The recommended explosion limitation measures or the recommendations for wearing personal protective equipment within the meaning of the product safety data sheets must be strictly observed and complied with when loosening screw connections or relaxing the pressure spring.
- Repair measures on the safety devices may only be carried out by the device manufacturer.
- Replacement of the safety device may only be carried out when the system and its lines are in a safe, depressurised state. For flammable gases such as propane, butane, methane, etc., low-sparking tools must be used for this purpose.
- When using ammonia as a refrigerant, special safety measures must be observed (see also safety data sheet).
- After installation of the safety valve, a leakage test must be carried out by a competent person. The response pressure must be checked at regular intervals using the setting certificate.

4 Applications

AWP safety valves are suitable for use in the refrigerant circuits of industrial refrigeration systems as discharge valves (SVA, type 455 / 456) or overflow valves (SVU, type 457 / 458). They are safety devices for protecting the system or its components against impermissible pressure stress (see also EN 378 Part 2). They comply with the AD2000 code.

5 Functional description

AWP safety valves begin to open as soon as the response pressure is reached. They open within a 10% pressure increase up to the design-limited stroke. If the pressure falls again, they begin to close as soon as the response pressure is reached and close fully within a pressure reduction of 10% below the response pressure.
Valves of types SVU 457 / 458 are equipped with a back-pressure-compensating metal bellows, i.e. the valves operate independently of back pressure (response pressure = set pressure). To guarantee the Kdr value, the back pressure [abs] must not exceed 25% of the response pressure [abs]. Valves of types SVA 455 / 456 operate dependent on back pressure (response pressure = set pressure + external back pressure). To guarantee the Kdr value, the back pressure [abs] must not exceed 10% of the response pressure [abs].

6 Installation

1. Clean pipework and system components before installation.
   NOTICE! The deviation from parallelism or perpendicularity of the welding ends or flange facings must not exceed 1°. Connecting flanges must be axially aligned. Components with transport or storage damage must not be installed. After removing the pipe plugs, the component can be welded in or installed. Observe the direction of flow (see arrow on the nameplate).
2. **NOTICE! When using modern welding processes (e.g. TIG, CO2 arc welding), do not dismantle weld-in valves.**
3. Tighten the mounting screws and nuts in a crisscross pattern and evenly.
4. When blowing off into the atmosphere, keep the discharge pipes as short as possible. They must not have any sharp bends. The bend radius must be at least 3 x OD (outside pipe diameter).
5. When filling the oil or water seal, ensure that no oil or water enters the safety valves.**NOTICE! Shut-off devices before and after the safety valve are prohibited, with the exception of change-over valves (for exceptions, see DIN 8975, Part 7, Point 8).**
6. Provide sufficient space above the valve for disassembling the bonnet / cap (see following table).

Nominal size	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Required space for disassembly (mm)	90	100	100	100	120

7 Maintenance

AWP safety valves operate maintenance-free. If functional defects occur, repair is possible. During the warranty period, repairs may only be carried out by AWP or, with their consent, by the system operator's trained maintenance personnel. AWP recommends checking safety valves every 5 years. After each response (accident case), the set pressure [pset] and the tightness at the seat must be checked. **NOTICE! Maintenance on valves only when installed.**

7.1 Replacing the seat seal/sealing unit/stem

1. Remove the lead seal and seal wire.
2. Unscrew the bonnet from the body (for wrench sizes see the following table).

Nominal size	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Wrench size	46	60	60	80	80

3. Remove the bonnet gasket (flat gasket K), stem and sealing unit (SVU) or stem guide and valve disc (SVA) from the body.
4. Unscrew the valve disc screw (countersunk screw ISO 7046 or DIN 7500) and remove and replace the seat seal (O-ring S). Screw in the countersunk screw and secure it, e.g. with thread-locking compound.

Nominal size	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
ISO 7046			M5x8	M6x10	M6x10
DIN 7500	M3x8	M3x8			

5. In the event of damage to the sealing unit or the stem guide, replacement is always carried out together with a new stem (see spare parts list).
6. Replacement of the flat gasket N is possible with a special tool. Tighten the seat nozzle with the following torque:

Nominal size	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Wrench size	15.5	21	26	31	36.5
Tightening torque (Nm)	90	180	180	180	180

7. Clean individual parts before assembly and lightly oil the stem.
8. Check the presence and correct seating of the ball in the centring points on the stem and valve disc. If necessary, fix the ball in the centring of the stem using low-temperature grease.
9. Then insert a new flat gasket K and fit the hood such that the tip of the stem engages in the centring point on the spring plate. Pull the stem slightly out of the stem guide if necessary to allow for secure centring.
10. The bonnet is to be tightened with the following torque:

Nominal size	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Wrench size	46	60	60	80	80
Tightening torque (Nm)	300	350	350	520	650

NOTICE! After each disassembly of the internal parts, install a new O-ring S. Check the set pressure [pset] after every parts replacement. A dwell time of 48 hours in the assembled state must be ensured before checking. The setting of the set pressure [pset], the lead sealing of the adjustment screw and the issuing of a setting certificate must be carried out by a TÜV expert.

7.2 Replacing the compression spring

1. Remove the lead seal and seal wire.
2. Unscrew the bonnet from the body (for wrench sizes see table).

	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Wrench size	46	60	60	80	80

3. Remove the bonnet gasket (flat gasket K) from the body.
4. Unscrew the cap from the bonnet, loosen the lock nut (M12) anti-clockwise and unscrew the adjusting screw (M12x50). A wrench size 30 is required for the cap, and a wrench size 19 for the lock nut and adjusting screw.
5. Remove retaining ring DIN 472 with suitable assembly pliers DIN 5256 ZGJ (for retaining ring sizes see the following table).

	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Retaining ring size	42x2	52x2	52x2	70x2.5	70x2.5

6. Insert new compression spring (see spare parts list) lightly oiled and reassemble the bonnet.
7. Clean individual parts of the bonnet before assembly and lightly oil the bonnet in the area of the bonnet gasket.

8. Then insert a new bonnet gasket (flat gasket K) and place the bonnet in such a way that the tip of the stem engages in the centring on the valve disc. Pull the stem slightly out of the stem guide if necessary to allow for secure centring.
9. Then tighten the bonnet (for wrench size and torque see table).

	DN 15/25	DN 20/32	DN 25/40	DN 32/50	DN 40/65
Wrench size	46	60	60	80	80
Tightening torque (Nm)	300	350	350	520	650

Re-adjust the set pressure [pset] after every compression spring replacement. A dwell time of 48 hours in the assembled state must be ensured before checking. The setting of the set pressure [pset], the lead sealing of the adjustment screw and the issuing of a setting certificate must be carried out by a TÜV expert.

7.3 Checking and correcting the set pressure

1. Remove the lead seal and seal wire.
2. Unscrew the cap from the bonnet and loosen the lock nut anti-clockwise. A wrench size 30 is required for the cap and a wrench size 19 for the lock nut.
3. Turn the adjusting screw clockwise to increase the set pressure. Turn the adjusting screw anti-clockwise to decrease the set pressure. Use a wrench with size 19 for this. **NOTICE! Observe the set pressure range of the compression springs. See spare parts list.**
4. Check the response pressure by loading the valve from the valve inlet (DN1) with compressed air or a permissible operating medium at the level of the response pressure. The valve opens. Trigger the valve three times. (Set pressure tolerance [pset] = +3%, -1%)
5. Then check the reseating pressure by lowering the pressure. When a pressure 10% below the response pressure is reached, the valve must be fully closed.

The setting of the set pressure [pset], the lead sealing of the adjustment screw and the issuing of a setting certificate must be carried out by a TÜV expert.

8 Transport, storage and disposal

AWP components are transported protected against impact and covered with foil.

- Storage must take place in dry rooms.
- Ensure that the connection ports are sealed intact.
- Contamination of any kind must be kept away from the interior.
- The external surfaces are provided with a corrosion protection coating for dry storage at room temperature, which is effective for at least 1 year.
- The corrosion protection coating CELEROL® Reaktionsgrund 918 is a good adhesion promoter for 1- and 2-component top coats.
- Dismantle for disposal.
- Collect lubricants during dismantling. The materials must be separated from one another and disposed of in accordance with local regulations.

9 Warranty

Unless agreed otherwise, the statutory warranty provisions apply. For further information, please also refer to our General Terms and Conditions, available on our website **awpvalves.com**.

10 Spare parts

Seal and repair kits

The seal kits listed below contain the bonnet gasket (flat gasket K), the seat seal (O-ring S) and, for SVAs (types 455 and 456), also the cap seal (O-ring C). In addition to all seals, repair kits also contain the stem, ball, stem guide, valve disc and seat nozzle and, for SVUs of types 457 and 458, the complete sealing unit with bellows, seat washer and valve disc screw.

Type	Nominal size	Seal kit	Repair kit	Cap
455	DN 15/25	45500.10.5/00019	45500.10.5/00029	44331.10.3180003
	DN 20/32	45500.11.5/00019	45500.11.5/00029	44331.10.3180003
	DN 25/40	45500.12.5/00019	45500.12.5/00029	44331.10.3180003
	DN 32/50	45500.13.5/00019	45500.13.5/00029	44331.10.3180003
	DN 40/65	45500.14.5/00019	45500.14.5/00029	44331.10.3180003
456	DN 15/25 (pset < 40 bar)	45600.10.5/00019	45600.10.5/00029	44331.10.3180003
	DN 15/25 (pset ≥ 40 bar)	45640.10.5/00019	45640.10.5/00029	44331.10.3180003
	DN 20/32 (pset < 40 bar)	45600.11.5/00019	45600.11.5/00029	44331.10.3180003
	DN 20/32 (pset ≥ 40 bar)	45640.11.5/00019	45640.11.5/00029	44331.10.3180003
	DN 25/40 (pset < 34 bar)	45600.12.5/00019	45600.12.5/00029	44331.10.3180003
	DN 25/40 (pset ≥ 34 bar)	45634.12.5/00019	45634.12.5/00029	44331.10.3180003
	DN 32/50	45600.13.5/00019	45600.13.5/00029	44331.10.3180003
	DN 40/65	45600.14.5/00019	45600.14.5/00029	44331.10.3180003
457	DN 15/25	45700.10.5/00019	45700.10.5/00029	44331.10.3180003
	DN 20/32	45700.11.5/00019	45700.11.5/00029	44331.10.3180003
	DN 25/40	45700.12.5/00019	45700.12.5/00029	44331.10.3180003
	DN 32/50	45700.13.5/00019	45700.13.5/00029	44331.10.3180003
	DN 40/65	45700.14.5/00019	45700.14.5/00029	44331.10.3180003
458	DN 15/25 (pset < 40 bar)	45800.10.5/00019	45800.10.5/00029	44331.10.3180003
	DN 15/25 (pset ≥ 40 bar)	45840.10.5/00019	45840.10.5/00029	44331.10.3180003
	DN 20/32 (pset < 40 bar)	45800.11.5/00019	45800.11.5/00029	44331.10.3180003
	DN 20/32 (pset ≥ 40 bar)	45840.11.5/00019	45840.11.5/00029	44331.10.3180003
	DN 25/40 (pset < 34 bar)	45800.12.5/00019	45800.12.5/00029	44331.10.3180003
	DN 25/40 (pset ≥ 34 bar)	45834.12.5/00019	45834.12.5/00029	44331.10.3180003
	DN 32/50	45800.13.5/00019	45800.13.5/00029	44331.10.3180003
	DN 40/65	45800.14.5/00019	45800.14.5/00029	44331.10.3180003

Compression springs

Please note: For valves with PTFE seat seals (SVUA or SVAA), set pressures below 10 bar cannot be adjusted.

Nominal size	Compression spring	Pressure range	
		SVUA P 458 / SVUB P 457	SVAA 456 / SVAB 455
DN 15/25	44331.10.5003063	5 - <9	5 - <7
	44331.10.5009103	9 - <11	7 - <9
	44331.10.5010123	11 - <14	9 - <11

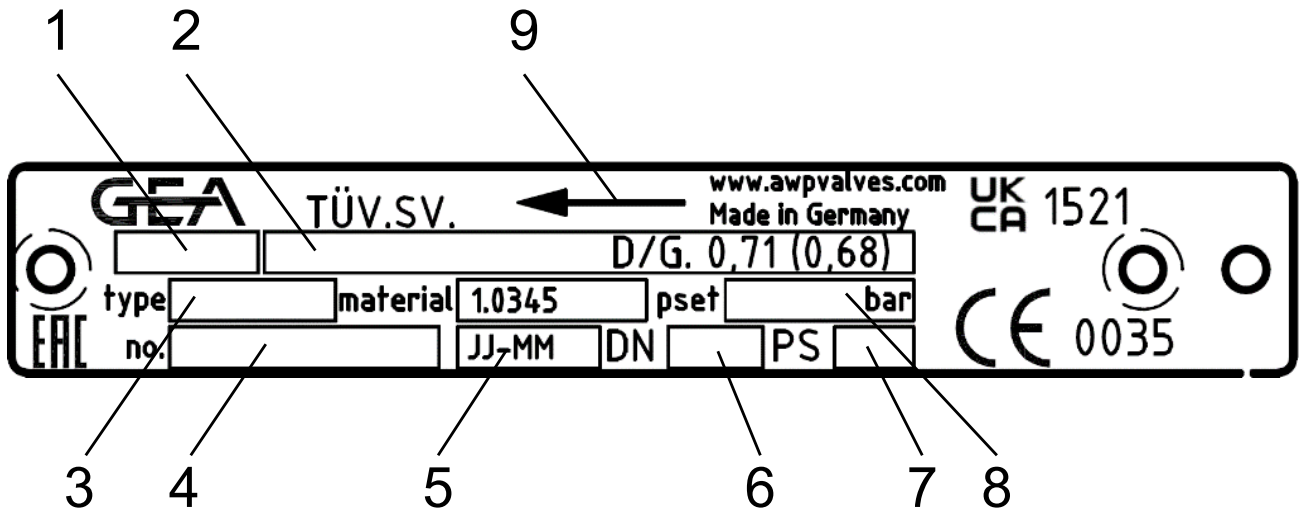
Nominal size	Compression spring	Pressure range	
	44331.10.5013143	14 - <19	11 - <15
	44331.10.5015173	19 - <22	15 - <20
	44331.10.5018213	22 - <24	20 - <25
	44331.10.5021243	24 - <32	25 - <32
	44331.10.5032403	32 - <40	32 - <40
	44331.10.5040503	40 - <50	40 - <50
	44331.10.5050633	50 - 63	50 - 63
DN 20/32	44331.11.5009003	5 - <9	5 - <7
	44331.11.5010003	9 - <11	7 - <9
	44331.11.5012003	11 - <12	9 - <10
	44331.11.5013003	12 - <16	10 - <13
	44331.11.5015003	16 - <20	13 - <18
	44331.11.5018003	20 - <24	18 - <20
	44331.11.5020003	24 - <28	20 - <26
	44331.11.5021003	-	26 - <28
	44331.11.5028333	28 - <33	28 - <33
	44331.11.5033403	33 - <40	33 - <40
	44331.12.5042503	40 - <44	40 - <44
	44331.14.5016183	44 - <55	44 - <55
	44331.14.5018193	55 - 63	55 - 63
DN 25/40	44331.12.5009113	5 - <9	5
	44331.12.5011133	9 - <11	6 - 8
	44331.12.5013143	11 - <14	9 - <11
	44331.12.5014163	14 - <15	11 - <14
	44331.12.5016193	15 - <18	14 - <18
	44331.12.5019203	18 - <19	18 - <20
	44331.12.5020223	19 - <22	20 - <22
	44331.12.5022253	22 - <24	22 - <25
	44331.12.5025283	24 - <34	25 - <34
	44331.12.5034423	34 - <42	34 - <40
	44331.12.5042503	42 - <50	40 - <48
	44331.14.5018193	50 - 63	48 - 63
DN 32/50	44331.13.5008093	5–6	5
	44331.13.5009103	7	6
	44331.13.5010113	8 - <9	7
	44331.13.5011133	9 - <11	8 - <9
	44331.13.5013143	11 - <12	9 - <10
	44331.13.5014163	13 - <15	11 - <12
	44331.13.5016183	15 - <16	12 - <14
	44331.13.5018193	16 - <19	14 - <16
	44331.13.5019223	19 - <23	16 - <19

Nominal size	Compression spring	Pressure range	
	44331.13.5022263	23 - <27	19 - <23
	44331.13.5027323	27 - <32	23 - <28
	44331.13.5028303	-	28 - <30
	44331.14.5023253	32 - <36	30 - <34
	44331.14.5025283	36 - 40	34 - 40
DN 40/65	44331.14.5007083	5 - 8	5 - 6
	44331.14.5008093	9 - <10	7
	44331.14.5010113	10 - <11	8 - <9
	44331.14.5011123	11 - <12	9 - <10
	44331.14.5012133	12 - <13	10 - <12
	44331.14.5013153	13 - <15	-
	44331.14.5015163	15 - <17	12 - <14
	44331.14.5016183	17 - <19	14 - <16
	44331.14.5018193	19 - <21	16 - <19
	44331.14.5021233	21 - <25	19 - <21
	44331.14.5023253	25 - <28	21 - <25
	44331.14.5025283	28 - <31	25 - <30
	44331.14.5031403	31 - <40	30 - <36
	44331.14.5036403	-	36 - <40

The spare part numbers mentioned apply to the standard version of the valves. For valves in a different design (other body material and / or O-ring material), different item numbers may apply.
In case of doubt, please contact our Sales Support either via our website awpvalves.com/contact or by email to **info@awpvalves.com**. The most reliable method to correctly identify the required spare part is to send a photo of the nameplate on which the serial number of the valve is clearly visible.

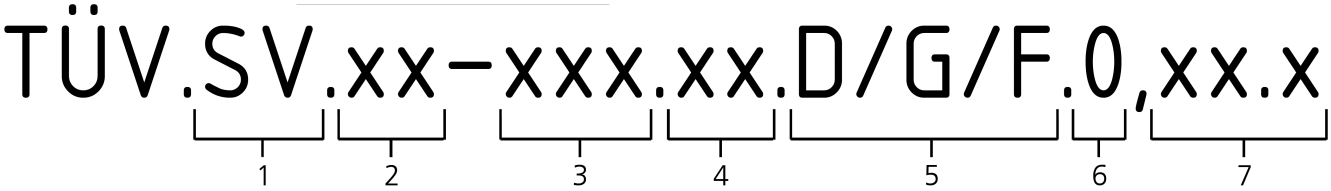
11 Marking

Nameplate
The marking of AWP safety valves is carried out in accordance with Pressure Equipment Directive 2014/68/EU.



1	Type designation	2	Component identification (breakdown below)
3	Type number	4	Serial number
5	Manufacturing time (YY-MM)	6	Nominal size (DN)
7	Pressure rating (PS)	8	Set pressure
9	Flow direction		

Component marking



1	SV = safety valve
2	Year of component test / retest
3	Component test number
4	Narrowest flow diameter upstream of the valve seat [mm]
5	Applicable for: D = steam, G = gas, F = liquids
6	Certified coefficient of discharge (αw)
7	Set pressure pset [bar]

12 Note on residual hazards in accordance with Pressure Equipment Directive 2014/68/EU

Residual risks that cannot be avoided by the manufacturer exist due to:

NOTICE

- Do not loosen bonnets (without authorisation) during operation.
- Do not incorrectly assemble flange connections (inlet and outlet flanges, flanged bonnets).
- Contamination in the operating medium or improper handling of internal components can lead to damage to the seat seal.
- Non-compliance with the operating limits and manufacturer's regulations according to these operating instructions.

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Latest revision: 17.06.2026