OPERATING INSTRUCTIONS FOR SHUT-OFF VALVES

AVR (963, 964)

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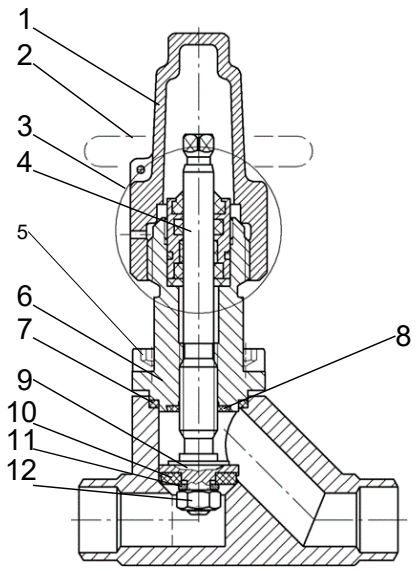
1 Overview of types

963	Straight-way shut-off valve
964	Angle shut-off valve

2 Type 963, 964

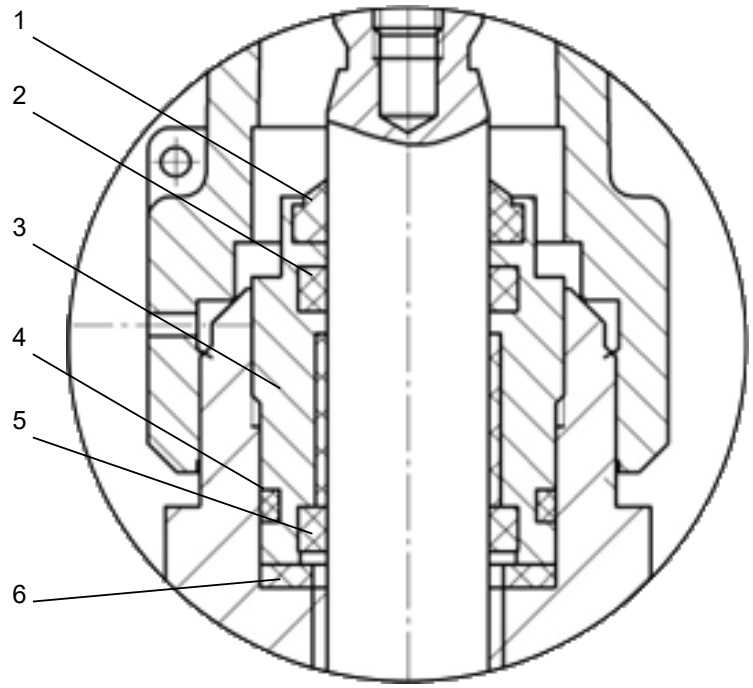
DN 6 – DN 20



1	Cap	2	Handwheel (optional)
3	Threaded bush, complete	4	Stem
5	Bonnet screws	6	Bonnet
7	Bonnet gasket (flat gasket K)	8	Back seal (flat gasket R)
9	Valve disc	10	Seat seal (flat gasket S)
11	Washer	12	Valve disc nut

3 Threaded bush, complete

Item 3 in the preceding overview.



1	Wiper ring	2	O-ring A
3	Threaded bush	4	O-ring B
5	PTFE-ring	6	Flat gasket SB

4 Technical characteristics

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

4.1 Pressure / temperature operating limits

When using screws of property class 8.8, the following values apply:

PN	TS (MWT) [°C]	-60[2)]	-40[2)]	-25[2)]	-10	+50	+150
25	PS (MWP) [bar]	6.25	12.5	18.7	25	25	25
40		10	20	30	40	40	40
63		15.75	31.5	47.2	63	63	63

When using screws of property class A2-70, the following values apply:

PN	TS (MWT) [°C]	-60[2)]	-60[1)]	-10	+50	+150
25	PS (MWP) [bar]	18.7	25	25	25	25
40		30	40	40	40	40
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: -50 to +50 °C

The following values apply to shut-off valves in heating technology (type 963...HT, 964...HT) (for both valves with 8.8 and A2-70 screws):

PN	TS (MWT) [°C]	-10	+50	+200
25	PS (MWP) [bar]	25	25	25
40		40	40	40
63		63	63	63
Permissible ambient temperature range: -50 to +50 °C				

4.2 Operating Mediums

Suitable for operation with refrigerants acc. to EN 378 Part 1, e.g. NH3, R22, R134a or mixtures with refrigeration oil, as well as for neutral gaseous and liquid media and glycol-based cooling brine.

4.3 Flow coefficient

K_v-value of the valve at rated stroke (100% opening) in m^3/h

Type	PN (types 96...)	PN (types 96...HT)	DN 6	DN 8	DN 10	DN 15	DN 20
963	PN25; PN40(8.8)	PN25(8.8)	1.5	2.15	2.6	2.9	5.2
	PN40(A2-70); PN63	PN25(A2-70), PN40; PN63	3.4	3.9	4.3	4.8	
964	PN25; PN40(8.8)	PN25(8.8)	2.1	2.8	3.85	4.9	8.75
	PN40(A2-70); PN63	PN25(A2-70), PN40; PN63	6.2	6.9	7.6	8.3	

Any installation position; the direction of flow (see arrow on nameplate) should be observed. In the event of reverse flow, the specified Kv values cannot be guaranteed.
Seat leakage: <5g refrigerant per year

5 Safety instructions

⚠ WARNING

Risk of burns at extreme temperatures!

Burns are possible.

- ▶ Operate the valve in extreme temperatures while wearing protective gloves.

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.

NOTICE

Danger from impermissible pressure rise!

Risk of property damage.

- ▶ Avoid operating the valve against trapped liquid.
- ▶ Close shut-off valves in liquid lines in sequence towards a vessel with a gas volume.

6 Application

AWP shut-off valves are suitable for use in refrigerant circuits for industrial refrigeration systems and heat pump applications.
They close the pipework by lowering the valve disc onto the valve seat.
The stem is sealed via a threaded bush with a spring-energised PTFE ring.

7 Functional description

AWP shut-off valves are actuated by a handwheel. Turning the handwheel clockwise causes the valve disc to lower onto the valve seat, thereby closing the pipework. Turning the handwheel anti-clockwise causes the valve disc to lift from the valve seat, thereby opening the pipework.
The valves are designed only for shutting off the pipeline and must therefore only be operated in a fully open or fully closed position. When opening the valve, bring the stem to the uppermost position up to the stop (= fully open). The valves are equipped with a back seat (flat gasket R). When the valve is fully open, the sealing elements (O-rings A and B, PTFE ring) on the stem can be safely replaced by unscrewing the threaded bush.

8 Maintenance

AWP shut-off valves are 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.

8.1 Changing the stem seal

1. Unscrew the cap! Use a wrench with size 19 for this.
2. Bring the stem to the uppermost position using the handwheel.
3. Unscrew the threaded bush anti-clockwise. **NOTICE! Watch out for any residual refrigerant escaping! Leave the threaded bush loose in the bonnet until pressure is completely equalised. Only unscrew it after this.**
4. Then unscrew it completely. To unscrew the threaded bush, use a wrench with the sizes specified in the following table:

Nominal size	DN 6-15	DN 20
Wrench size	15	17

5. Remove O-rings A, B, and the wiper ring and replace them with new ones.
6. Remove the flat gasket SB from the installation space in the bonnet.
7. Clean the stem and insert a new flat gasket SB into the bonnet.
8. Grease the threaded bush with refrigeration grease (e.g. RENOLIT UNITEMP 2) and tighten hand-tight.
9. To check for leaks, bring the stem to the middle position and brush the bonnet area with a foaming agent.

8.2 Replacing the seat seal/back seat/valve insert

1. Open the valve up to the stop and loosen the bonnet bolts. **NOTICE! Watch out for any residual refrigerant escaping! Leave the bonnet bolts loose in the bonnet until pressure is completely equalised. Only unscrew it after this.**

Nominal size	DN 6-15	DN 20
Bonnet screws*	M6x18	M8x20
Wrench size	5	6
* The size of the bonnet bolts may vary depending on the screw property class, application and pressure rating.		

2. After pressure equalisation, unscrew all bonnet bolts and pull out the bonnet, including all internal parts attached to it, by the handwheel.
3. Unscrew the handwheel from the stem and unscrew the stem from the bonnet.
4. Remove the back seat gasket (flat gasket R) from the installation space on the underside of the bonnet and replace it with a new one.
5. For nominal diameter DN 6 to DN 20, the seat seal (flat gasket S) is screwed onto the valve disc. Remove the seat seal by unscrewing the valve disc nut.
6. Insert a new flat gasket S, insert the washer and tighten the valve disc screws (or nuts).
7. Clean all individual parts before assembly.
8. Then insert a new bonnet gasket (Flat gasket K). Insert the valve insert into the body and tighten the bonnet bolts evenly and crosswise. See the following table for this:

Bonnet screws	M6x18	M8x20
	ISO 4762	
Wrench size	5	6
Tightening torque for 8.8 screws		
Torque [Nm]	10	25
Tightening torque for A2-70 screws		
Torque [Nm]	6	16

9 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.

10 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**.

11 Spare parts

The following spare parts are available for AWP shut-off valves in accordance with the overviews in **Overview of types [▶ 4]**.

Nominal size	Handwheel		Cap	
	Item number	Dimensions	Item number	Thread size
DN 6-15	36302.10.5280001	⦸ 60 x 6/9	96300E10.3180001	M27 x 2
DN 20	36302.10.5280001	⦸ 60 x 6/9	96300E10.3180001	M27 x 2

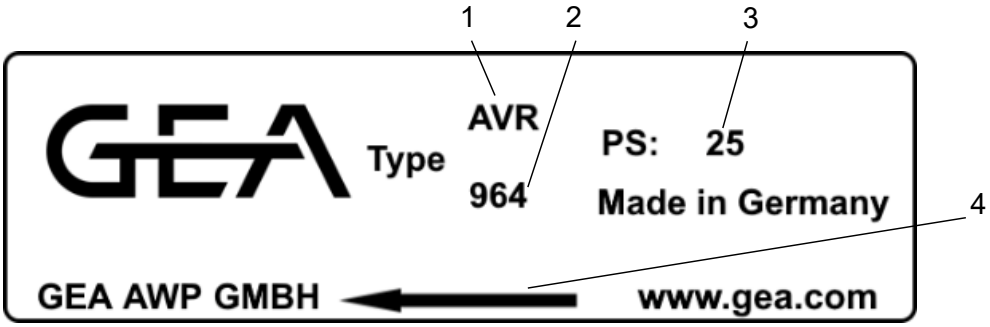
A washer and a screw/nut for attachment to the stem are included in the scope of delivery of the handwheels. An O-ring for sealing is included in the scope of delivery of the caps.

Nominal size	Threaded bush (CR), complete	Seal kit (CR)	Valve insert (Steel, CR), complete
DN 6-15	96300E10.8142001	96300.10.5/00019	96300E10.5110021
DN 20	96300E11.8142001	96300.11.5/00019	96300E11.5110021

A seal kit contains all O-rings and flat sealing rings shown in the **Overview of types [▶ 4]** suitable for the respective nominal diameter. A valve insert contains all internal parts including seals, i.e. stem, valve disc, threaded bush plus bonnet with screws and cap, pre-assembled. All spare parts mentioned above refer to the standard design of the valves, i.e. body material = steel, pressure rating = PS 25, O-ring material = CR, with cap, for valves without bonnet extension (i.e. without extended stem). Different spare part numbers apply to valves with a design deviating from this!
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.

12 Marking

AWP shut-off valves are marked in accordance with Pressure Equipment Directive 2014/68/EU by means of a sticker as well as by stamping on the valve body. The following information is included on the label:



1 Type designation (e.g. AVR)	2 Type number (e.g. 963)
3 Max. permissible operating pressure	4 Flow direction

13 Notice regarding residual risks in accordance with the Pressure Equipment Directive 2014/68/EU

Residual hazards that cannot be eliminated by the manufacturer include:

NOTICE

- Do not remove the cover during operation (without authorization).
- Do not install flange connections (inlet and outlet flanges, flanged valve covers) incorrectly.
- Contaminants in the operating fluid or improper handling of components can cause damage to the seat seal.
- Failure to observe the operating limits and manufacturer's instructions as specified in these operating instructions.

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