



OPERATING INSTRUCTIONS FOR CONSTANT PRESSURE VALVES

RVR (435, 436)

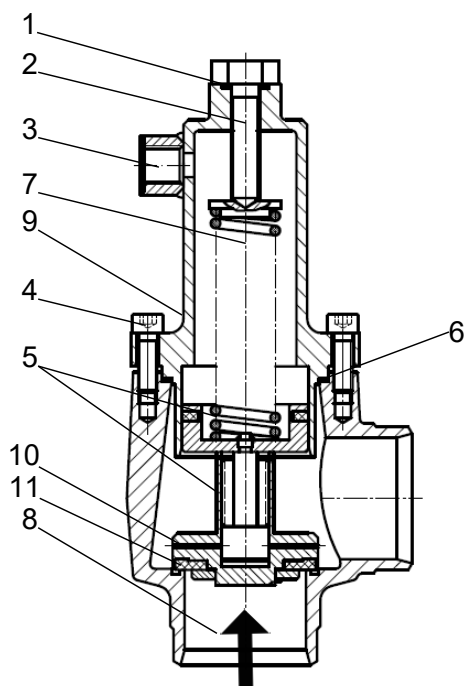
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1 Overview of types

Type 435, 436

DN 40 - DN 150



1 O-ring	2 Adjustment screw
3 Reference pressure connection	4 Bonnet screw
5 Compression spring	6 Flat gasket K
7 Space above the valve disc	8 Space below the valve disc
9 Bonnet	10 Valve disc
11 Flat gasket S	

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

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

PN	TB (MWT) [°C]	-35 ²⁾	-25 ²⁾	-10	+50	+120
25	PS (MWP) [bar]	12.5	18.7	25	25	25
40		20	30	40	40	40
63		31.5	47.2	63	63	63

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

PN	TB (MWT) [°C]	-35 ²⁾	-35 ¹⁾	-10	+50	+120
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 (°C) -50 to +50

2.2 Operating media

Refrigerants of fluid groups 1+2 according to 97/23/EC Pressure Equipment Directive.

2.3 Flow coefficient

Type	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
435	37.1	53.5	80	159	231	360	530
436	39	57	86	164	242	373	541

Installation position: horizontal and vertical with flow from bottom to top.

External leakage, seat < 5 g refrigerant per year $\Delta p=10$ bar across valve disc.

3 Safety instructions

4 Application

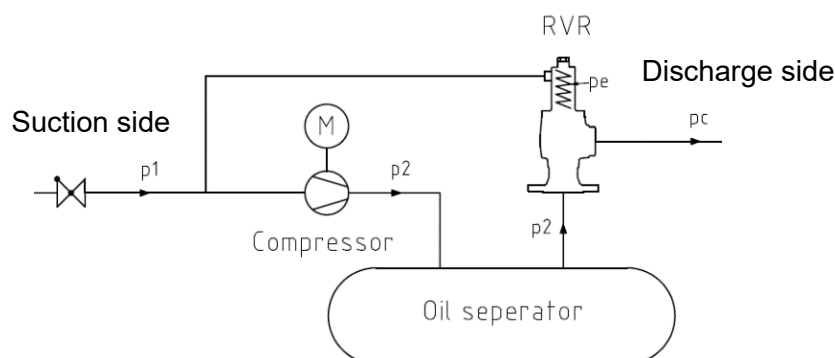
AWP pressure-maintaining valves are automatic control devices which, within the refrigerant circuit of refrigerant compressor units in the start-up phase, immediately ensure a defined pressure in the oil separator and thus build up the necessary oil pressure. The pressure-maintaining valve is equipped with a back-pressure-compensating sealing element. The valve operates with three switching positions.

Please note: Valves operate depending on the pressure ratio above and below the valve disc.

They are opened by the pressure of the operating medium below the valve disc depending on the set opening pressure (p_e). This is specified by the customer and permanently set by the manufacturer. If the set pressure is to be changed, the manufacturer must be consulted

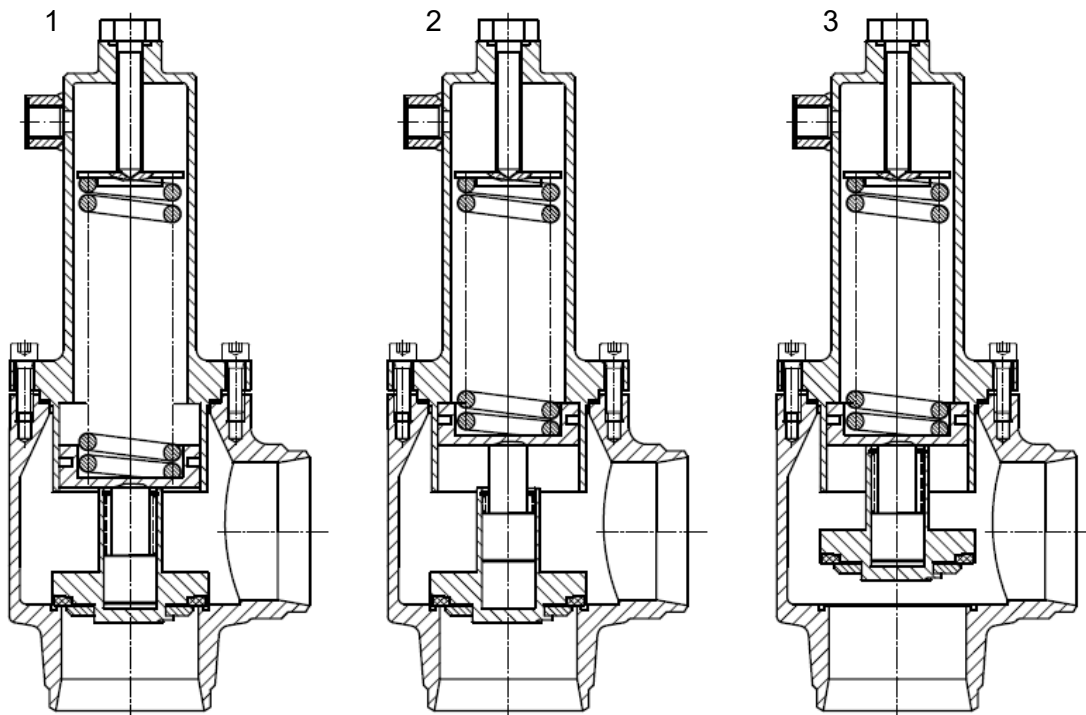
5 Functional description

Functional diagram



p1	Compressor suction side pressure
p2	Compressor discharge side pressure Pressure in the oil separator
pc	Pressure in the condenser
pe	Set pressure

Switching positions.



Switching position 1 Figure 1	The valve remains in this position until the pressure differential between p1 and p2 or p1 and pc does not exceed the opening pressure predefined via the compression spring. This occurs when the compressor is switched off and the discharge side of the compressor has the same pressure level as the suction side. $p_c - p_1 < p_e$ $p_c > p_2$
Switching position 2 Figure 2	Switching position 2 occurs when the condensing pressure is greater than the pressure in the oil separator and the pressure differential between the suction side of the compressor and the condensing pressure is greater than the spring force. $p_c - p_1 > p_e$ $p_c > p_2$
When the compressor is started, the valve is in one of the two switching positions mentioned above, depending on the difference between the oil separator and condensing pressure. Three different start-up situations may occur.	
Start-up situation A	The condensing pressure is lower than the pressure in the oil separator. Start-up begins in switching position 1 and changes to switching position 3 as soon as the pressure differential between the oil separator and the compressor suction side overcomes the spring force.

Start-up situation B	The condensing pressure is higher than the pressure in the oil separator, but the difference between the two is less than the spring force. Start-up begins in switching position 1 and changes to switching position 2 as soon as the differential pressure between the compressor suction side and the condenser is greater than the spring force. When the oil separator pressure approaches the condensing pressure, the valve opens and switching position 3 is reached.
Start-up situation C Figure 3	The condensing pressure is greater than the oil separator pressure plus the spring force. Start-up begins in switching position 2. $p_c > p_2 + p_e$ When the oil separator pressure approaches the condensing pressure, the valve opens and switching position 3 is reached.
Switching position 3	The valve is fully open.
When the compressor is switched off, the valve remains in switching position 3 until the condensing pressure approaches the pressure on the compressor suction side and the spring closes the valve. The valve is then back in switching position 1.	

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. Tighten the mounting screws and nuts in a crisscross pattern and evenly.

To dismantle the valve insert, sufficient clearance must be kept free on the side where the valve bonnet is located. The disassembly dimensions are shown in the following table:

DN	40	50	65	80	100	125	150
mm	55	55	65	95	105	180	200

7 Maintenance

AWP pressure-maintaining 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.

7.1 Replacing the insert

1. 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 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
Bonnet screw	M8	M8	M8	M10	M12	M16	M16
	ISO 4762			ISO 4017			
Wrench size	6	6	6	16	18	24	24

2. Unscrew the bonnet screws and pull out the bonnet including internal parts and replace with a new insert.
3. Clean all individual valve parts before assembly. Grease the valve disc and bonnet.
4. Then insert flat sealing ring K and put on the bonnet.
5. Tighten screws evenly and crosswise.

Nominal size	DN 40	DN 50	DN 65	DN 80	DN 100	DN125	DN 150
Bonnet screw	M8x25			M10x30	M12x35	M16x45	
Wrench size	6	6	6	16	18	24	24
Tightening torque for 8.8 screw [Nm]	25	25	25	49	85	210	210
Tightening torque for A2-70 screw [Nm]	16	16	16	32	65	135	135

7.2 Checking and correcting the set pressure

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] = +/-10 %)

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.

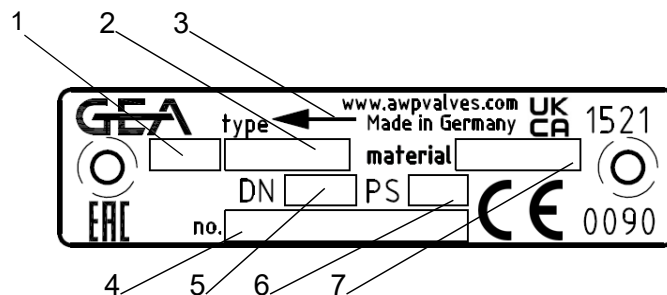
10 Spare parts

Spare parts acc. to **Overview of types** [► 4]

Nominal size	Valve insert			Bonnet gasket	
	PS25	PS40	PS63	Item number	Dimensions
DN 40	435xxE15.5110001	435xxE15.5110001	435xxK15.5110001	16301.15.4146003	⌀ 62 x ⌀ 68.8 x 1.5
DN 50	435xxE15.5110001	435xxE15.5110001	435xxK15.5110001	16301.15.4146003	⌀ 62 x ⌀ 68.8 x 1.5
DN 65	435xxB17.5110001	435xxE17.5110001	435xxK17.5110001	16301.17.4146003	⌀ 76 x ⌀ 84.8 x 1.5
DN 80	435xxE18.5110001	435xxE18.5110001	435xxK18.5110001	16301.18.4146003	⌀ 94 x ⌀ 105 x 1.5
DN 100	435xxE19.5110001	435xxE19.5110001	435xxK19.5110001	16301.19.4146003	⌀ 115 x ⌀ 129 x 1.5
DN 125	435xxE20.5110001	435xxE20.5110001	435xxK20.5110001	16301.20.4146003	⌀ 140 x ⌀ 159 x 1.5
DN 150	435xxE21.5110001	435xxE21.5110001	435xxK21.5110001	16301.21.4146003	⌀ 170 x ⌀ 188.5 x 2.0

11 Marking

The marking of AWP pressure-maintaining valves is carried out in accordance with Pressure Equipment Directive 2014/68/EU.



1 Type designation	2 Type no.
3 Flow direction	4 Serial number
5 Nominal size (DN)	6 Pressure rating (PS)
7 Material number	

PS [bar]	Max. permissible operating pressure
DN [mm]	Nominal size
DIN EN ISO 21922	Refrigerating valves, safety requirements, testing and marking

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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