



# OPERATING INSTRUCTIONS FOR CONSTANT PRESSURE VALVES

RVR 436



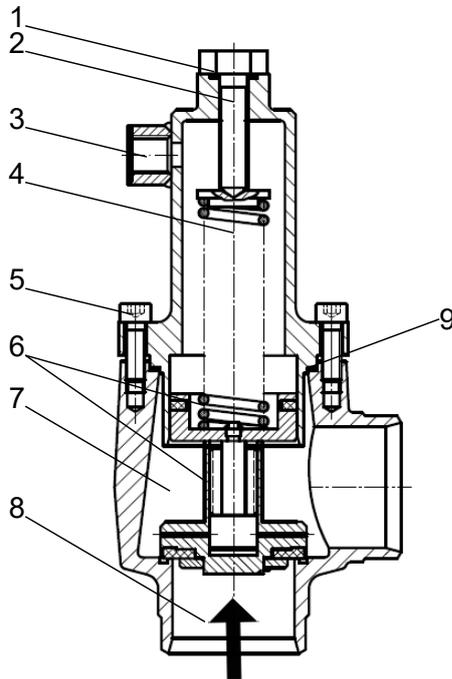
## Table of contents

<b>1 Overview of types</b> .....	<b>4</b>
<b>2 Technical characteristics</b> .....	<b>4</b>
<b>3 Operating media</b> .....	<b>4</b>
<b>4 Flow coefficient</b> .....	<b>5</b>
<b>5 Safety instructions</b> .....	<b>5</b>
<b>6 Application</b> .....	<b>5</b>
<b>7 Functional description</b> .....	<b>5</b>
<b>8 Installation</b> .....	<b>7</b>
<b>9 Maintenance</b> .....	<b>7</b>
9.1 Replacing the insert .....	7
<b>10 Transport, storage and disposal</b> .....	<b>8</b>
<b>11 Garantie</b> .....	<b>8</b>
<b>12 Spare parts</b> .....	<b>8</b>
<b>13 Marking</b> .....	<b>9</b>
<b>14 Note on residual hazards in accordance with Pressure Equipment Directive 2014/68/EU</b> .....	<b>9</b>

# 1 Overview of types

DN 40 - DN 150

Type 435, 436



1 O-ring	2 Adjustment screw
3 Reference pressure connection	4 Insert
5 Bonnet screw	6 Compression spring
7 Space above the valve disc	8 Space below the valve disc
9 Insert, complete	

Item number 4 consisting of:

- Bonnet
- Valve disc
- Compression spring
- Adjustment screw
- Bonnet screws
- Flat gasket K

## 2 Technical characteristics

Body material	Selection acc. to AD-2000 Series W
Steel	P235GH, S235JR, S355J2
Low-temperature steel	P215NL, P255QL, P355NL1
NIRO	X5CrNi18-10 or equivalent

## 3 Operating media

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

## 4 Flow coefficient

DN	40	50	65	80	100	125	150
435	37.1	53.5	80.0	159.0	231.0	360.0	530.0
436	39.0	57.0	86.0	164.0	242.0	373.0	541.0

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.

## 5 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.

## 6 Application

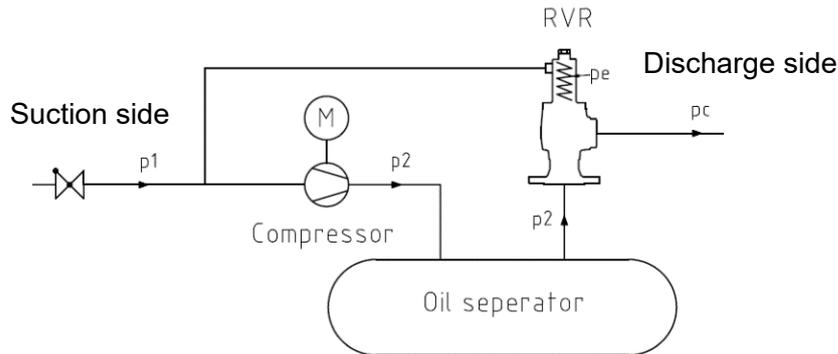
AWP pressure-maintaining valves are automatic control devices which, within the refrigerant circuit of refrigerant compressor units in the start-up phase, immediately ensure a defined pressure in the oil separator and thus build up the necessary oil pressure. The pressure-maintaining valve is equipped 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 (pe). 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

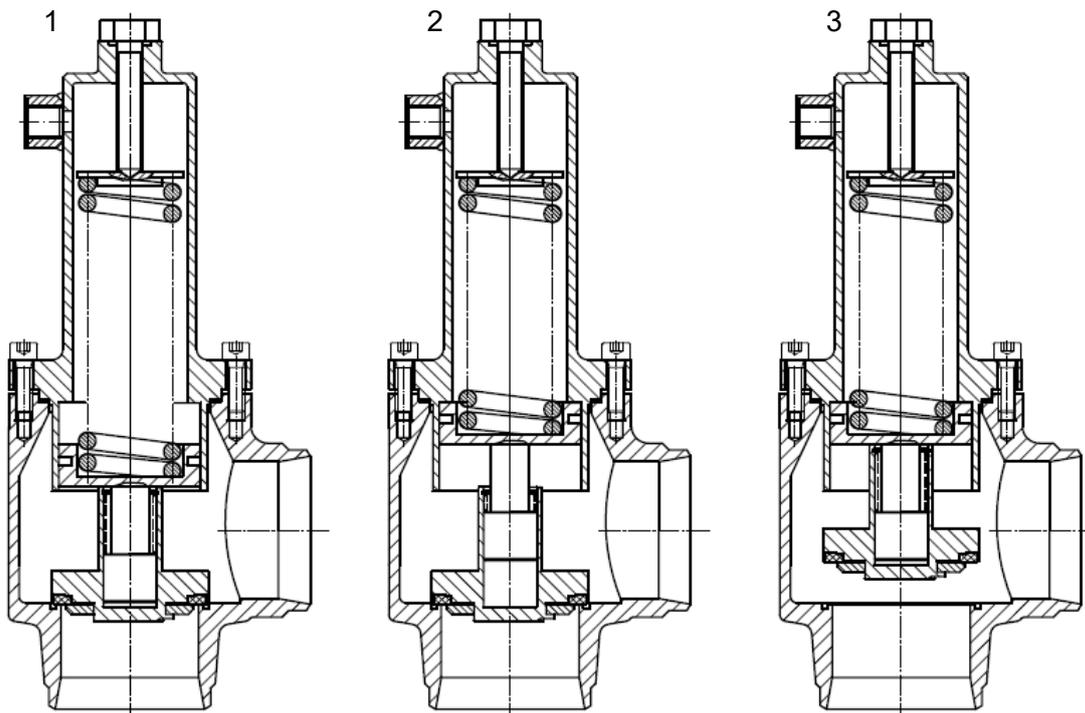
## 7 Functional description

### Functional diagram



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

**Switching positions.**



Switching position 1 Figure 1	<p>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> <p><math>p_c - p_1 &lt; p_e</math> <math>p_c &gt; p_2</math></p>
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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.	

## 8 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 and 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 nameplate).**

2. Befestigungsschrauben und -muttern über Kreuz und gleichmäßig anziehen.

Dismantling dimension:

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

## 9 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.

### 9.1 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.**

DN	40	50	65	80	100	125	150
M	8	8	8	10	12	16	16
ISO 4762				ISO 4017			
SW	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.

DN	40	50	65	80	100	125	150
M	8x25			10x30	12x35	16x45	
SW	6	6	6	16	18	24	24
Tightening torque [Nm] 8.8	25	25	25	49	85	210	210
Tightening torque [Nm] A2-70	16	16	16	32	65	135	135

## 10 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.

## 11 Garantie

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](http://awpvalves.com).

## 12 Spare parts

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

Spare parts orders must contain the following information:

- Quantity
- Designation acc. to **Overview of types [▶ 4]**
- Order number
- Nominal size of the valve
- Year of manufacture of the valve
- Opening pressure

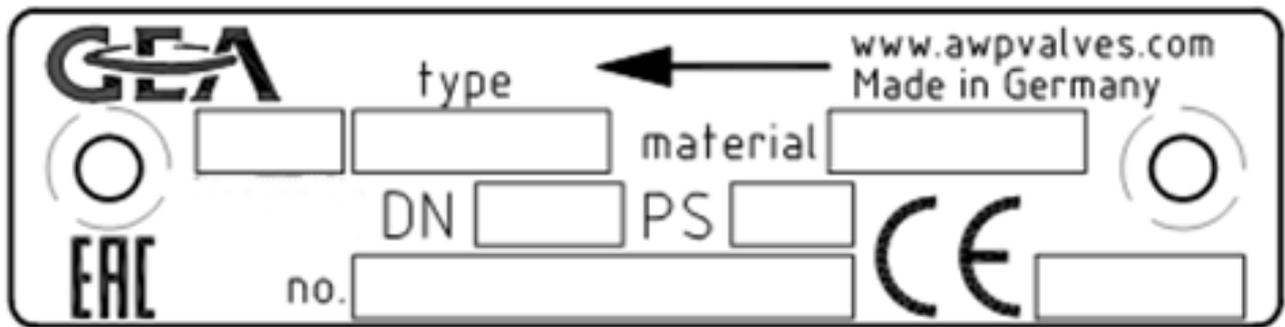
– Refrigerant

PS 25	PS40	PS63	DN	Order number	Dimensions
435xxE15.5110001	435xxE15.5110001	435xxK15.5110001	40	163 01.15.4 146 00 3	∅ 62 x ∅ 68.8 x 1.5
435xxE15.5110001	435xxE15.5110001	435xxK15.5110001	50	163 01.15.4 146 00 3	∅ 62 x ∅ 68.8 x 1.5
435xxB17.5110001	435xxE17.5110001	435xxK17.5110001	65	163 01.17.4 146 00 3	∅ 76 x ∅ 84.8 x 1.5
435xxE18.5110001	435xxE18.5110001	435xxK18.5110001	80	163 01.18.4 146 00 3	∅ 94 x ∅ 105 x 1.5
435xxE19.5110001	435xxE19.5110001	435xxK19.5110001	100	163 01.19.4 146 00 3	∅ 115 x ∅ 129 x 1.5
435xxE20.5110001	435xxE20.5110001	435xxK20.5110001	125	163 01.20.4 146 00 3	∅ 140 x ∅ 159 x 1.5
435xxE21.5110001	435xxE21.5110001	435xxK21.5110001	150	163 01.21.4 146 00 3	∅ 170 x ∅ 188.5 x 2.0

### 13 Marking

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

Nameplate on body



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

### 14 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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