

OPERATING INSTRUCTIONS FOR OIL-PRESSURE REGU- LATING VALVES

ORV 454

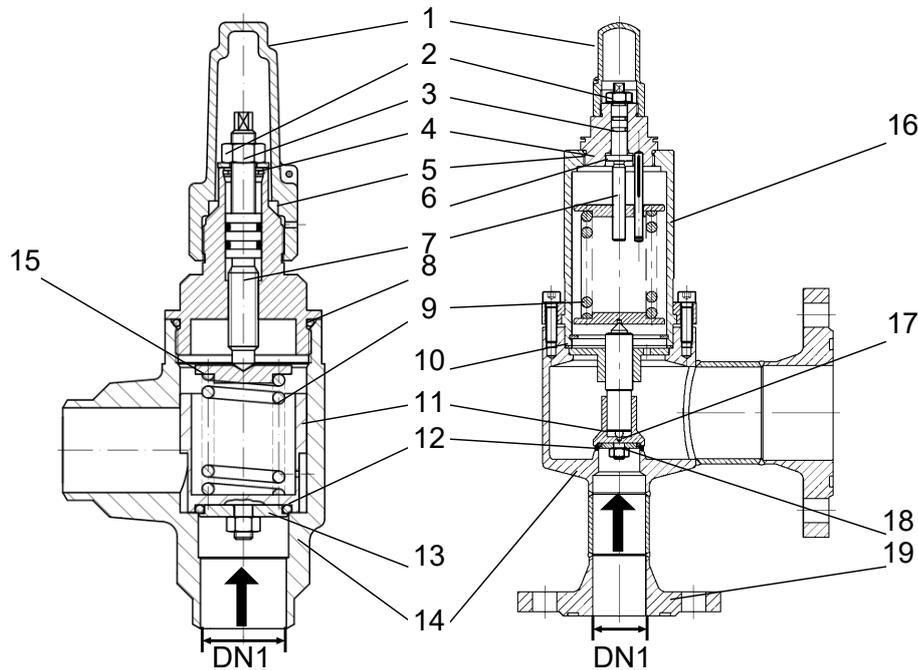
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1 Overview of types

Type 452... DN 25 - DN 32

Type 454... DN 40 - DN 50



1 Cap	2 Lock nut
3 O-ring SP	4 Bonnet
5 O-ring D	6 Sliding washer
7 Stem	8 O-ring D
9 Compression spring	10 Flat sealing ring K
11 Sealing piston	12 O-ring S
13 Seat washer	14 Body
15 Spring plate	16 Cover
17 Ball	18 Nut
19 Flange	

2 Technical characteristics

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

3 Pressure/temperature operating limits

ORV 452...							
PN	DN	TB (MWT) [C°]	-60 ²⁾	-60 ¹⁾	-10	+50	+150

ORV 452...							
25	25-32	PB (MWP) [bar]	18.7	25	25	25	25
40			30	40	40	40	40

ORV 454...								
When using screws of property class 8.8								
PN	DN	TB (MWT) [C°]	-60 ²⁾	-40 ¹⁾	-25	-10	+50	+150
25	40-50	PB (MWP) [bar]	6.25	12.5	18.7	25	25	25
40			10	25	30	40	40	40

ORV 452...							
When using screws of property class A2-70							
PN	DN	TB (MWT) [C°]	-60 ²⁾	-60 ¹⁾	-10	+50	+150
25	40-50	PB (MWP) [bar]	18.7	25	25	25	25
40			30	40	40	40	40

¹⁾ Load case I (TT, NIRO)
²⁾ Load case II (acc. to AD2000-W10, St)
 Permissible ambient temperature range (°C) -35 to +55

4 Operating media

Permitted refrigeration machine oils

- XK 43
- XK 57
- XK 100
- XK 250
- XKS 46
- XKS 68
- XKH 46
- KM 30
- CHA 30 GOST
- SHELL refrigeration oil 22-12
- Fuchs-Reniso
- Clavus G46
- Zeirice
- Mobil SHC
- Mobil Arctic EAL 222R
- Castrol-Icematic 299
- SW Baysilone oils KT

Narrowest flow cross-section [mm ²]	Pressure differential p [bar]
491 25	0.1-28
707 30	0.1-28
716 30.2	0.1-25
919 34.2	0.1-25

For spring pressure range, see spare parts list.

Installation position: vertical in accordance with AD2000 data sheet A2 and horizontal

External leakage <5g (refrigerant per year)

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 oil pressure regulating valves are suitable for oil pressure regulation within the oil circuit of refrigerant screw compressor units. They comply with the equipment regulations of the Technical Inspection Associations -TÜV-.

7 Functional description

AWP oil pressure regulating valves are automatic mechanically acting control devices that regulate a constant pressure differential. Extremes such as start-up phases of the compressor units are taken into account. The valves are designed in angle-way form with flanges or welding ends. They essentially consist of the welded or forged body, the sealing piston, the stem; the bonnet, the compression spring and the cap. The oil pressure regulating valve is located in the bypass line, which is arranged between the rear of the oil pump and the oil separator.

Depending on the various operating states, the oil quantities absorbed by the compressor vary, but are always lower than the oil quantity delivered by the oil pump. The excess oil quantity is returned to the oil separator via the bypass line (oil pressure regulating valve). The oil pressure regulating valve keeps the pressure differential between the oil pump discharge side and the oil separator nearly constant. If the oil quantity to the compressor decreases, this pressure differential increases, causing the oil pressure regulating valve to open further.

If the oil quantity to the compressor increases, the oil pressure regulating valve closes until the pressure differential set at the oil separator is reached again. By regulating the pressure differential between the oil pressure after the oil pump and the oil separator, a simple stable oil supply to the screw compressor is achieved under all operating conditions. The seal at the valve seat is provided by an O-ring. After a defined indentation depth of the seat into the seal, it is stopped by a metal-to-metal stop.

8 Installation

- 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).
- NOTICE! When using modern welding processes (e.g. TIG, CO2 arc welding), do not dismantle weld-in valves.**
- Befestigungsschrauben und -muttern über Kreuz und gleichmäßig anziehen.
- Install the oil pressure regulating valves in positions ranging from vertical (cap at the top) to horizontal. Installation must be carried out at easily accessible locations.
- Mount the valves so that they are protected against impact and are not subjected to axial forces, bending or torsional moments resulting from installation. **NOTICE! The valves must not serve as fixed points in the system.**
- Provide sufficient space on the bonnet / hood side for the disassembly of the bonnet / hood.

DN1/DN2	25/25	32/32	40/65	50/65
Mm	200	210	100	100

9 Maintenance

AWP oil pressure regulating 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 oil pressure regulating valves every 5 years.

9.1 Changing the O-ring

Type 452 DN 25-32

- Unscrew the cap from the bonnet.

Cap	
DN1	25-32
SW	24

- Loosen the nut anti-clockwise.

Nut ISO 4032	
DN	25 -32
M	8
SW	13

- Unscrew the stem by turning it anti-clockwise. **CAUTION! Only as far as the stop provided by the retaining ring.**
- Remove the retaining ring with suitable tools (e.g. screwdriver) and take out the stem.
- Replace O-rings SP according to the spare parts list.

When installing the O-rings, ensure that they are not damaged by the stem thread. Clean individual parts before assembly and grease the stem thread (e.g. with RENOLIT UNITEMP2). Reassembly is carried out in reverse order.

9.2 Replacing the O-ring S/sealing piston/compression spring

1. Unscrew the bonnet by turning it anti-clockwise.

Bonnet	
DN	25-32
SW	36

2. Remove the spring plate, compression spring and sealing piston.
3. Unscrew the valve disc nut and remove and replace O-ring S (see spare parts).

Nut ISO 4032	
DN	25-32
M	6
SW	10

4. Before assembly, replace all damaged parts according to the spare parts overview. Grease the stem and bonnet threads (e.g. with RENOLIT UNITEMP2).
5. Lightly oil the outside of the sealing piston (e.g. with ANTICORIT 5F). Reassembly is carried out in reverse order.

DN 1	25-32
SW	36
Tightening torque [Nm]	90

Re-adjust the differential pressure $[\Delta p]$ after every compression spring replacement. A dwell time of 48 hours must be ensured between assembly, where the compression spring is pre-tensioned, and setting.

9.3 Checking and correcting the differential pressure

1. Remove the seal.
2. Unscrew the cap from the bonnet and loosen the lock nut by turning it anti-clockwise.

	Cap	Nut ISO 4032	Stem
DN1	25-32	25-32	25-32
SW	30	8	5

3. Increase differential pressure by turning the stem clockwise. Decrease differential pressure by turning anti-clockwise. **CAUTION! Observe the set pressure range of the compression springs (see spare parts).**

DN1	25-32
SW	5

9.4 Replacing the O-ring S/sealing piston/stem guide

1. Loosen socket head cap screws ISO 4762. **NOTICE! The setting of the compression spring is not affected. Do not break the seal. Watch out for any residual refrigerant escaping. Leave the bonnet loose in the body until pressure is fully equalised. Only then unscrew completely.**

Screws ISO 4762	
DN1	40 50

Screws ISO 4762	
M	8 x 30
SW	6

2. Unscrew socket head cap screws and remove bonnet.
3. Remove the flat sealing ring K, stem guide and sealing piston from the body.
4. Unscrew the valve disc nut (hexagon nut ISO 4032) and remove and replace O-ring S (see spare parts).

DN1	40	50
	M8	M8
SW	13	13

5. Optional: If the old sealing piston is damaged, insert a new sealing piston with a new stem guide (see spare parts).

Clean individual parts before assembly and lightly oil the stem (e.g. RENOLIT UNITEMP2). Then insert a new flat sealing ring 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. The socket head cap screws must be tightened evenly and crosswise.

Screws ISO 4762	
DN1	40 50
M	8 x 30
SW	6
Tightening torque [Nm] (8.8)	25
Tightening torque [Nm] (A2 - 70)	16

After each disassembly of the sealing unit, install a new O-ring S. Check the differential pressure $[\Delta p]$ after every parts replacement. A dwell time of 48 hours in the assembled state must be ensured before checking

9.5 Replacing the compression spring

1. Loosen socket head cap screws ISO 4762. **NOTICE! Leave the sealing unit, complete and stem guide and stem untouched. Watch out for any residual refrigerant escaping. Leave the valve screws loose in the body until pressure is fully equalised. Only then unscrew completely.**

Screws ISO 4762	
DN1	40 50
M	8 x 30
SW	6

2. Unscrew socket head cap screws and remove bonnet.
3. Remove seal, unscrew cap from the bonnet, loosen lock nut anti-clockwise and unscrew adjusting screw.

	Cap	Nut ISO 4032	Screw ISO 4762
DN1	40-50	40-50	40-50
		M20	M20 x 80
SW	60	30	30

4. Remove retaining ring DIN 472 with suitable assembly pliers DIN 5256 ZGJ.

Retaining ring DIN 472	
DN1	40 50
	70 x 2.5

5. Insert new compression spring acc. to the spare parts list, lightly oiled, and reassemble the bonnet.
6. Clean individual hood parts before assembly.
7. Lightly oil the bonnet in the sealing ring area.
8. Then insert a new flat sealing ring 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.
9. Tighten socket head cap screws evenly and crosswise.

Screws ISO 4762	
DN1	40 50
M	8 x 30
SW	6
Tightening torque [Nm] (8.8)	25
Tightening torque [Nm] (A2 - 70)	16

Re-adjust the differential pressure $[\Delta p]$ after every compression spring replacement. A dwell time of 48 hours must be ensured between assembly, where the compression spring is pre-tensioned, and setting.

9.6 Checking and correcting the differential pressure

1. Remove the lead seal, unscrew the cap from the bonnet and loosen the lock nut by turning it anti-clockwise.

	Cap	Nut ISO 4032	Screw ISO 4762
DN1	40-50	40-50	40-50
		M20	M20 x 80
SW	60	30	30

2. Increase the set pressure by turning the adjusting screw clockwise, and decrease the differential pressure by turning it anti-clockwise. **NOTICE! Observe the set pressure range of the compression springs.**

Screws ISO 4017		
DN1	40	50
SW	30	30

3. Check the differential pressure by loading the valve from the inlet side DN1 with compressed air or a permitted operating medium equal to the differential pressure.

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.

12 Spare parts

A spare parts order must contain the following information:

- Quantity
- Designation acc. to image for type
- Order number
- Nominal size of the valve
- Year of manufacture of the valve
- Response pressure

Type: 452 .. Flat sealing ring O-ring S		(Item 10) 452 – PTFE – 456 – PTFE –	DN	Type 454 .. O-ring S		(Item 10)
Order number	Dimensions		Order number	Dimensions	Material	
16301.13.2144003	∅ 20.2 x 38.8 x 3 x 3	25				
16301.13.2144003	∅ 20.2 x 38.8 x 3 x 3	32				
		40/65	73 76 13	∅ 26 x 3	HNBR 70	
		50/65	73 76 44	∅ 30 x 3	HNBR 70	

O-ring D HNBR 70		(Item 5)	DN	Sliding washer PTFE		(Item 6)
Order number	Dimensions		Order number		Dimensions	
73 76 28	∅ 45 x 3	25-32	443 51.10.2 342 00 3		∅ 12.1x20.4x2	
73 76 28	∅ 45 x 3	40-50	443 51.10.2 342 00 3		∅ 12.1x20.4x2	

O-ring SP HNBR 70		(Item 3)	DN	Compression spring		(Item 8)
Order number	Dimensions		Order number		Dimensions	
73 76 27	∅ 8 x 2	25-32	443 51.13.5 004 08 3	SVA DN25-32	4-8 bar	
73 76 27	∅ 8 x 2	40-50	443 51.14.5 004 05 3	SVA DN40-50	4-5 bar	

Ball DIN 5401		(Item 13)	DN	Nut ISO 4032		(Item 12)
Order number	Dimensions		Order number		Dimensions	
52 02 90	∅ 5 mm - III	25-32	51 01 17	DIN 934-M10-8Zn	M10	
52 05 16	∅ 6 mm - III	40-50	51 01 17	DIN 934-M10-8Zn	M10	

Flat sealing ring K 454 .. – Al –	(Item 2)	DN	Nut ISO 10511	(Item 8)
Order number	Dimensions		Order number	Dimensions
		25-32	51 06 52	DIN 985- M6-8Zn M6
		40-50	51 06 55	DIN 934- M8-8Zn M8
44331.14.314 600 3	∅ 70 x 79 x 2.0 (Al)	40/65		
44331.14.314 600 3	∅ 70 x 79 x 2.0 (Al)	50/65		

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