



OPERATING INSTRUCTIONS FOR REGULATING VALVES

HRAR (223, 224, 22G)

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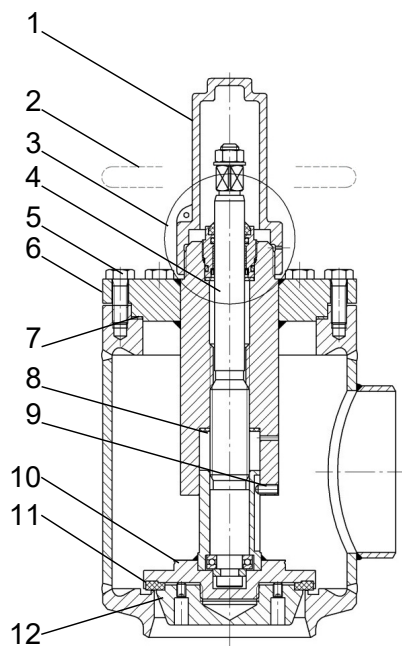
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1 Overview of types

223	Straight-way regulating valve, Y-pattern
224	Angle control valve
22G	Straight-way regulating valve, T-pattern, only DN 25-65

1.1 Type 223, 224, 22G

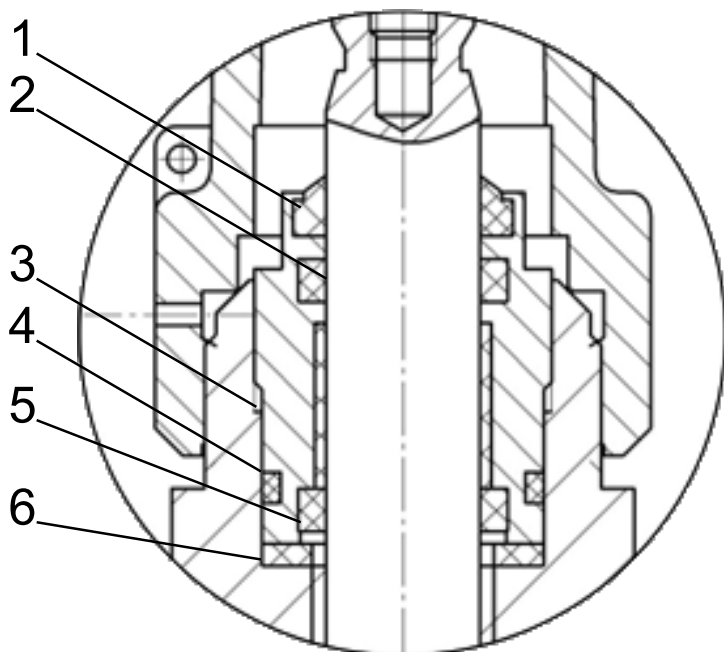
DN 25 – DN 250



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 Grub screw (DN 80 - DN 200)	10 Valve disc
11 Seat seal (flat gasket S)	12 Regulating cone

1.2 Threaded bush, complete

Item 3 in preceding overview.



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

2 Technical Parameters

Body material	Selection acc. to AD-2000 Series W
Steel	P235GH, S235JR, S355J2
Low-temperature steel	P355NL1, G20Mn5QT
Stainless steel	X5CrNi18-10, GXCrNiMoNb19-11-2 or equivalent

2.1 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 ³⁾

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 ³⁾

1) Load case I (low-temperature steel, stainless steel)

2) Load case II (acc. to AD2000-W10) (Steel)

3) G20Mn5QT = 43bar/ GXCrNiMoNb19-11-2 = 50bar

The following values apply to control valves in heating technology (type 223...HT, 224...HT) (for both valves with 8.8 and A2-70 screws):

PN	TB (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

2.2 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.

2.3 Flow coefficient

K_v-value of the valve at rated stroke (100% opening) in m³/h

Type	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250
223	12.2	16.5	27.9	30	51	80	144	485	736	1085	1370
22G	12.2	16.5	27.9	30	51	–	–	–	–	–	–
224	14	19.4	42.9	38.4	59	80	144	485	736	1085	1370

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

3 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.

4 Application

AWP control valves are suitable for use in refrigerant circuits for industrial refrigeration systems. They regulate the medium flow by means of a cone mounted on the underside of the valve disc. The stem seal is provided by a threaded bush.

5 Functional description

AWP control 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 both regulating and shut-off valves. The regulating function is made possible by a cone on the underside of the valve disc. The maximum diameter of the cone corresponds to the nominal diameter of the valve. 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.

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).

Reverse flow direction is permissible; however, the performance specifications do not apply in this case.

2. Before welding, use the handwheel to move the spindle to the center position (valve half-open). **NO-TICE! When using modern welding methods (e.g., TIG, CO₂ arc welding), do not remove valves intended for welding.**

3. Tighten fastening screws and nuts crosswise and evenly.

4. After installation, check the smoothness of the stem throughout the entire lift range.

⇒ The thread for screwing on the cap must remain free of paint and must be greased (e.g. with RENOLIT UNITEMP 2).

To dismantle the valve insert, sufficient clearance must be kept free on the side where the bonnet is located! See the following table:

DN	25	32	40	50	65	80	100	125	150	200	250
Distance [mm]	115	115	130	130	145	170	170	240	270	425	600

7 Maintenance

AWP control 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 Changing the stem seal

1. Unscrew the cap! Use a wrench with the size specified in the following table.

Nominal size	DN 25-30	DN 40-65	DN 80-100	DN 125-150	DN 200-250
Wrench size	24	32	41	50	60

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 25-32	DN 40-65	DN 80-100	DN 125-150	DN 200-250
Wrench size	22	27	32	46	55

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.

7.2 Replacing the seat seal/back seal

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.**
2. To unscrew, use a wrench or screwdriver with the sizes specified in the following table:

Nominal size	DN 25-65	DN 80	DN 100	DN 125-200	DN 250
Bonnet screws	M8x25	M10x30	M12x32	M16x45	M20x60
	ISO 4762	ISO 4017			
Wrench size	6	16	18	24	30

3. After pressure equalisation, unscrew all bonnet bolts and pull out the bonnet, including all internal parts attached to it, by the handwheel.
4. Unscrew the handwheel from the stem and, after removing the grub screw (from DN 125), unscrew the stem from the bonnet.
5. 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.
6. Unscrew the regulating cone with the grub screw and remove the seat seal (flat gasket S) from the valve disc.
7. Insert a new seat seal, screw on the regulating cone and secure with the grub screw.
8. Clean all individual parts before assembly.
9. Then insert a new bonnet gasket (Flat gasket K).
10. Put on the bonnet and tighten bonnet bolts evenly and crosswise. See the following table for this:

Nominal size	DN 25-65	DN 80	DN 100	DN 125-200	DN 250
Bonnet screws	M8x25	M10x30	M12x32	M16x45	M20x60
	ISO 4762	ISO 4017			

Nominal size	DN 25-65	DN 80	DN 100	DN 125-200	DN 250
Wrench size	6	16	18	24	30
Tightening torque for 8.8 screws [Nm]	25	49	85	210	425
Tightening torque for A2-70 screws [Nm]	16	32	56	135	275

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

The following spare parts are available for AWP control valves in accordance with the overviews in **Overview of types** [► 4].

Nominal size	Handwheel		Cap	
	Item number	Dimensions	Item number	Thread size
DN 25	16300E13.5280001	Ø120-11/14	16402.13.3180001	M36 x 2.0
DN 32	16300E13.5280001	Ø120-11/14	16402.13.3180001	M36 x 2.0
DN 40	16300E15.5280001	Ø140-12/16	16402.15.3180001	M52 x 3.0
DN 50	16300E15.5280001	Ø140-12/16	16402.15.3180001	M52 x 3.0
DN 65	16300E15.5280001	Ø140-12/16	16402.15.3180001	M52 x 3.0
DN 80	16300E18.5280001	Ø175-14/20	16402.19.3180001	M60 x 3.0
DN 100	16300E18.5280001	Ø175-14/20	16402.19.3180001	M60 x 3.0
DN 125	16301.20.5280001	Ø315-22/28	16402.21.3180001	M76 x 3.0
DN 150	16301.21.5280001	Ø400-22/28	16402.21.3180001	M76 x 3.0
DN 200	16301.23.5280001	Ø630-28/46	16402.23.3180001	M80 x 3.0
DN 250	16301.23.5280001	Ø630-28/46	16402.23.3180001	M80 x 3.0

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.

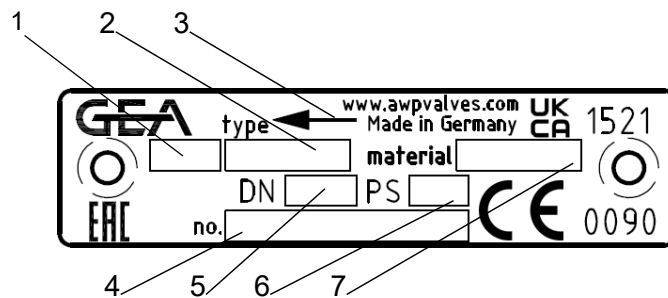
Nominal size	Threaded bush (CR), complete	Seal kit (CR)	Valve insert (Steel, CR), complete
DN 25	16300E13.8142001	26302.12.5/00019	22300E13.5110001
DN 32	16300E13.8142001	26302.13.5/00019	22300E13.5110001
DN 40	16300E15.8142001	26302.14.5/00019	22300E14.5110001
DN 50	16300E15.8142001	26302.15.5/00019	22300E15.5110001
DN 65	16300E15.8142001	26302.17.5/00019	22300B17.5110001
DN 80	16300E18.8142001	26302.18.5/00019	22300E18.5110001
DN 100	16300E18.8142001	26302.19.5/00019	22300E19.5110001
DN 125	16300E21.8142001	26302.20.5/00019	22300E20.5110001
DN 150	16300E21.8142001	26302.21.5/00019	22300E21.5110001
DN 200	16300E23.8142001	26302.23.5/00019	22300E23.5110001
DN 250	16300E23.8142001	26302.24.5/00019	22300E24.5110001

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 nameplate (with new serial number!), as well as 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.

11 Marking

The marking of AWP control valves is carried out in accordance with Pressure Equipment Directive 2014/68/EU by means of a nameplate on the side edge of the bonnet.



1 Type designation

2 Type no.

3 Flow direction

4 Serial number

5 Nominal size (DN)

6 Pressure rating (PS)

7 Material number

12 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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