OPERATING INSTRUCTIONS FOR REGULATING VALVES

HRAR (223, 224, 22G)

GEA Engineering for a better world.

GEA.com

Table of contents

1 Overview of types **4**
1.1 Type 223, 224, 22G 4
1.2 Threaded bush, complete 4
2 Technical Parameters **5**
3 Pressure / temperature operating limits **5**
4 Operating Mediums **6**
5 Flow coefficient **6**
6 Safety instructions **6**
7 Application **7**
8 Functional description **7**
9 Installation **7**
10 Maintenance **7**
10.1 Changing the stem seal 7
10.2 Replacing the seat seal/back seal 8
11 Transport, storage and disposal **9**
12 Garantie **9**
13 Spare parts **9**
14 Marking **10**
15 Hinweis auf Restgefahren entsprechend Druckgeräterichtlinie 2014/68/EU **10**

1 Overview of types

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

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	Auswahl nach AD-2000 Reihe W
Steel	P235GH, S235JR, S355J2
Low temperature steel (TT)	P215NL, P255QL, P355NL1, G20Mn5QT
NIRO	X5CrNi18-10, GXCrNiMoNb19-11-2 oder gleichwertige

3 Pressure / temperature operating limits

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

PN	TB (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	TB (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, NIRO)

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

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

Permissible ambient temperature range: -50 to +50 °C

The following values apply to control valves for heating technology (types 223...HT, 22G...HT, 224...HT) (for both valves with 8.8 and A2-70 screws):

PN	TB (MWT) [°C]	-10	+50	+150	+200
25	PS (MWP) [bar]	25	25	25	25
40		40	40	40	40
63		63	63	63	63
Permissible ambient temperature range: -50 to +50 °C					

4 Operating Mediums

Suitable for operation with refrigerants acc. to EN 378 Part 1, e.g. NH^3, R22, R134a or mixtures with refrigeration oil, as well as for neutral gaseous and liquid media and glycol-based cooling brine.

5 Flow coefficient

K_v-Wert des Ventils bei Nennhub (100 % Öffnungsgrad) in m^3/h

PN	TB (MWT) [°C]	-10	+50	+150	+200
25	PS (MWP) [bar]	25	25	25	25
40		40	40	40	40
63		63	63	63	63

Installation position: any; observe the direction of flow (see arrow on nameplate). Leakage at valve seat: <5 g refrigerant per year

6 Safety instructions

⚠ WARNING

Verbrennungsgefahr bei extremen Temperaturen!

Verbrennungen möglich.

- ▶ Ventil bei extremen Temperaturen mit Schutzhandschuhen bedienen.

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.

7 Application

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

8 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.

9 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).

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

2. Vor dem Schweißen die Spindel mittels eines Handrades in Mittelstellung bringen (Ventil halb geöffnet).
   NOTICE! Bei Anwendung moderner Schweißverfahren (z. B. WIG, CO2-Lichtbogenschweißen) Ventile zum Einschweißen nicht demontieren.
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

10 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.

10.1 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.

10.2 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	80	100	125-200	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	80	100	125-200	250
Bonnet screws	M8x25	M10x30	M12x32	M16x45	M20x60
	ISO 4762	ISO 4017			

Nominal size [DN]	25-65	80	100	125-200	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

11 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.

12 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**.

13 Spare parts

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

Nominal size (DN)	Handwheel		Cap	
	Item number	**Dimensions**	**Item number**	**Thread size**
25	16300E13.5280001	Ø120-11/14	16402.13.3180001	M36 x 2.0
32	16300E13.5280001	Ø120-11/14	16402.13.3180001	M36 x 2.0
40	16300E15.5280001	Ø140-12/16	16402.15.3180001	M52 x 3.0
50	16300E15.5280001	Ø140-12/16	16402.15.3180001	M52 x 3.0
65	16300E15.5280001	Ø140-12/16	16402.15.3180001	M52 x 3.0
80	16300E18.5280001	Ø175-14/20	16402.19.3180001	M60 x 3.0
100	16300E18.5280001	Ø175-14/20	16402.19.3180001	M60 x 3.0
125	16301.20.5280001	Ø315-22/28	16402.21.3180001	M76 x 3.0
150	16301.21.5280001	Ø400-22/28	16402.21.3180001	M76 x 3.0
200	16301.23.5280001	Ø630-28/46	16402.23.3180001	M80 x 3.0
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 (DN)	Threaded bush (CR), complete	Seal kit (CR)	Valve insert (Steel, CR), complete
25	16300E13.8142001	26302.12.5/00019	22300E13.5110001
32	16300E13.8142001	26302.13.5/00019	22300E13.5110001
40	16300E15.8142001	26302.14.5/00019	22300E14.5110001
50	16300E15.8142001	26302.15.5/00019	22300E15.5110001
65	16300E15.8142001	26302.17.5/00019	22300B17.5110001
80	16300E18.8142001	26302.18.5/00019	22300E18.5110001
100	16300E18.8142001	26302.19.5/00019	22300E19.5110001
125	16300E21.8142001	26302.20.5/00019	22300E20.5110001
150	16300E21.8142001	26302.21.5/00019	22300E21.5110001
200	16300E23.8142001	26302.23.5/00019	22300E23.5110001
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.

14 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		

15 Hinweis auf Restgefahren entsprechend Druckgeräterichtlinie 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.

Engineering for a better world.

GEA.com

GEA AWP GmbH
Armaturenstr. 2
17291 Prenzlau
Germany
phone: +49 3984 8559-0
fax: +49 3984 8559-18
e-mail: info@awpvalves.com

Latest revision: 02.02.2026
©All rights reserved. Subject to modifications. Printed in Germany.