



OPERATING INSTRUCTIONS FOR 3-WAY VALVES

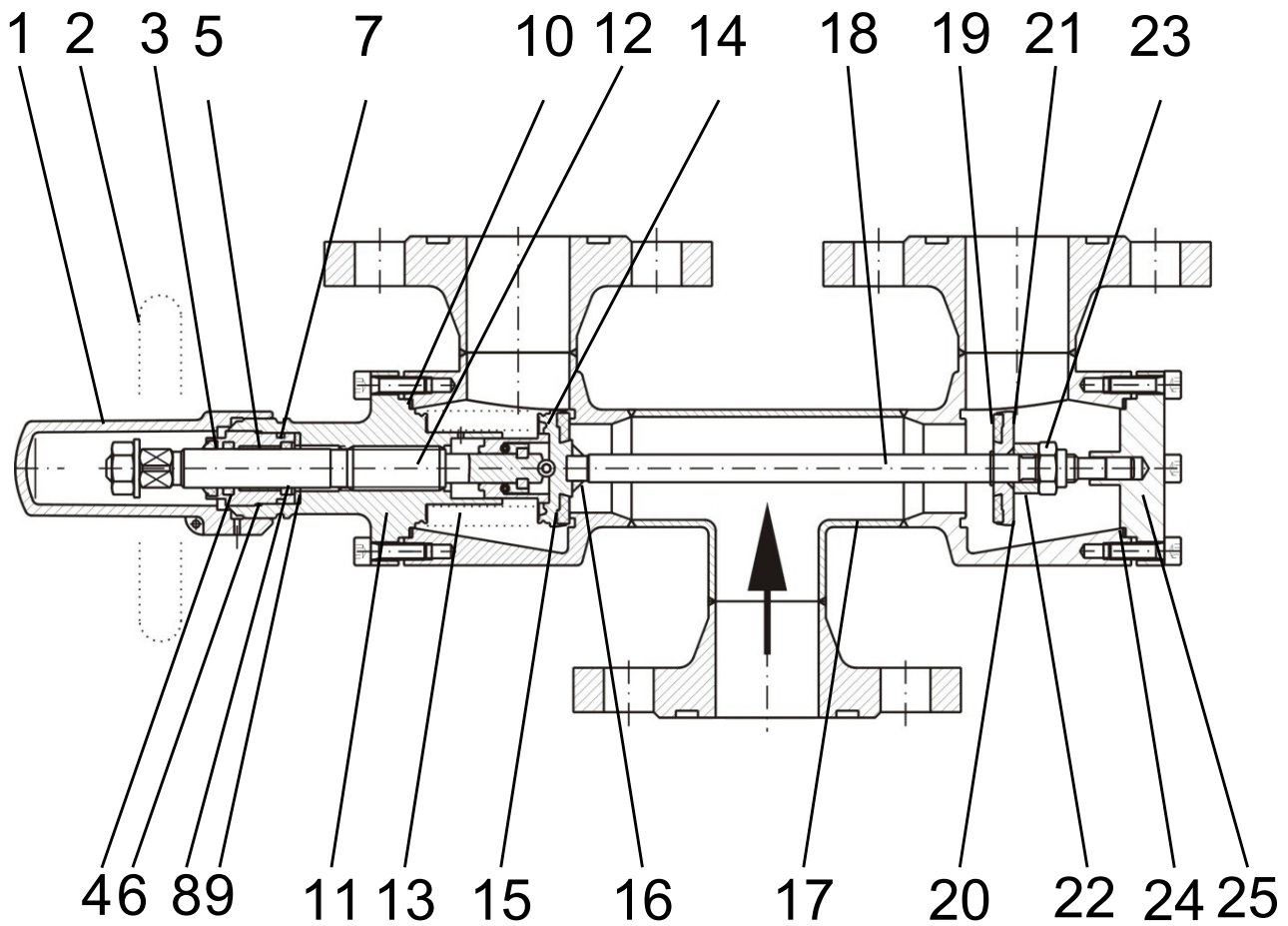
WVB (230)

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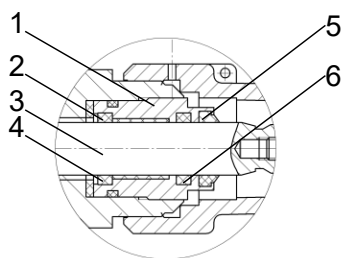
1 Overview of types

WVB type 230 (with flange and welding ends)



1 Cap	2 Handwheel (optional)
3 Wiper ring	4 O-ring A
5 Plain bearing	6 Threaded bush
7 O-ring B	8 PTFE ring
9 Flat gasket SB	10 Bonnet gasket 1 (flat gasket K)
11 Bonnet 1	12 Stem 1
13 Metal bellows	14 Valve disc 1
15 Seat seal 1 (flat gasket S)	16 Retaining ring
17 Body	18 Stem 2
19 Seat seal 2 (flat gasket S)	20 Valve disc 2
21 O-ring C	22 Washer
23 Hexagon nut (ISO 10511)	24 Bonnet gasket 2 (flat gasket K)
25 Bonnet 2	

1.1 Threaded bush, complete



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

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

Pressure/temperature operating limits:

PS: Max. allowable operating pressure in bar

TS: Permissible operating temperature in °C corresponding to the permissible operating pressures (PS)

PN: Nominal pressure rating

When using screws of property class 8.8:

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

When using screws of property class A2-70:

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

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

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

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

The following values apply to change-over valves in heating technology (type 230...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

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 10	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
230	8.6	12.9	14.3	17.6	24.3	38.2	51.6	82.0	178	204

Any installation position; the direction of flow (see arrow on nameplate) should be observed. In the event of reverse flow, the specified K_v 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 outlet connections in liquid lines in sequence to a vessel with gas volume.

4 Applications

AWP change-over valves are intended for use in the cooling circuits of industrial refrigeration systems. They are usually installed between pressure vessels or between pressure lines and two safety valves. The stem is sealed via a threaded bush and metal bellows for a completely hermetic seal.

5 Functional description

AWP change-over valves must be actuated by a handwheel. Turning the handwheel clockwise opens the outlet connection facing away from the handwheel. When one outlet connection is closed, the other is forced to open. Both outlet connections cannot be shut off simultaneously.

The valves are shut-off valves and must only be operated in a fully open or closed position. When opening the valve, the stem must be turned until it reaches the stop (fully open / fully closed). When the outlet connection facing the handwheel is fully closed, the threaded bush can be unscrewed without danger. In this way, either the complete threaded bush or the seals located on it (O-ring A, O-ring B, PTFE ring) can be replaced.

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. Before welding, use the handwheel to move the spindle to the center position (valve half-open). **NOTICE! When using modern welding methods (e.g., TIG, CO₂ arc welding), do not remove valves intended for welding.**
3. Tighten the mounting screws and nuts in a crisscross pattern 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 remove the valve insert, ensure there is sufficient space on the side where the valve cover is located—see the table below.

Nominal size	DN 10 – 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
Distance [mm]	200	215	215	240	240	300	360	420

7 Maintenance

AWP change-over valves operate maintenance-free. If functional defects occur, repair is possible. During the warranty period, repairs may only be carried out by the manufacturer (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 10 – 20	DN 25 – 32	DN 40 – 65	DN 80 – 100
Wrench size	17	22	27	32

2. Using the handwheel, turn the stem clockwise until the outlet connection facing away from the handwheel is fully open. The outlet connection facing the handwheel is then fully closed.
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:
5. Remove O-rings A, B, PTFE ring 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/valve insert

Replacing the seat 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.**

Nominal size	DN 10	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
Bonnet screws	M8x16	M8x16	M8x16	M8x25	M8x25	M8x25	M8x25	M8x25	M10x30	M12x35
	ISO 4762								ISO 4014	
Wrench size	6	6	6	6	6	6	6	6	16	18

2. After pressure equalisation, completely unscrew all bonnet bolts and remove bonnet 2 (item 25). Unscrew ISO 10511 hexagon nut (item 23), and remove the washer (item 22) and valve disc (item 20). Then pull out bonnet 1 (item 11), including all attached internal parts, using the handwheel.
3. Unscrew the handwheel from stem 1 (item 12) and unscrew the stem from bonnet 1 (item 11). For nominal sizes DN 80 and DN 100, the grub screw must be removed beforehand.
4. Remove the bonnet gaskets (item 10 and item 24) from the body. Unscrew stem 2 (item 18) from valve disc 1 (item 11). Remove the retaining ring (item 17) and valve disc washer from valve disc 1.
5. Insert the new seat seal into valve disc 1 (item 11) and secure it with the valve disc washer and retaining ring (item 16).
6. Before assembly, clean all individual valve components and grease the stems and bonnets.
7. Screw stems (item 12 and item 18) into valve disc (item 20).
8. Screw the stem back into the bonnet; for DN 80 and DN 100, then re-insert the grub screw and mount the handwheel onto the stem.
9. Insert bonnet gasket 1 (item 10), hold the bonnet with all attached internal parts by the handwheel and guide it into the valve body.
10. Valve disc 2 (item 20) with the valve disc washer and seat seal 2 (item 19) onto the stem. Slide on the washer (item 22) and fix it by screwing on the ISO 10511 hexagon nut (item 23).
11. Then fit bonnet 2 (item 25) and tighten all bonnet bolts evenly and in a crosswise pattern.

Nominal size	DN 10-20	DN 25-65	DN 80	DN 100
Bonnet screws	M8x16	M8x25	M10x30	M12x35
	ISO 4762		ISO 4014	
Wrench size	6	6	16	18
Tightening torque for 8.8 screws [Nm]	25	25	49	85
Tightening torque for A2-70 screws [Nm]	16	16	32	56

Replacing the valve insert

A valve insert contains all internal parts including seals, i.e. stems, valve disc, threaded bush, bonnet with screws, nameplate (with new serial number!) and cap, pre-assembled.

12. First, remove the old internal parts of the change-over valve and remove the bonnet gaskets.
13. To guide the new valve insert into the body, first remove the hexagon nut (item 23), valve disc 2 (item 20), seat seal 2 (item 19) and valve disc washer 2 from the new valve insert.
14. Insert bonnet gasket 1 (item 10), hold the bonnet with all attached internal parts by the handwheel and guide it into the valve body.
15. Valve disc 2 (item 20) with the valve disc washer and seat seal 2 (item 19) onto the stem. Slide on the washer (item 22) and fix it by screwing on the ISO 10511 hexagon nut (item 23).
16. Then fit bonnet 2 (item 25) and tighten all bonnet bolts evenly and in a crosswise pattern.

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

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		Handwheel		Cap	
	Item number	Dimensions	Item number	Dimensions	
DN 10	96300E10.5280001	⌀ 60 x 6/9	96300E10.3180001	M27x2.0	
DN 15	96300E10.5280001	⌀ 60 x 6/9	96300E10.3180001	M27x2.0	
DN 20	96300E10.5280001	⌀ 60 x 6/9	96300E10.3180001	M27x2.0	
DN 25	16300E13.5280001	⌀ 120 x 11/14	16402.13.3180001	M36x2.0	
DN 32	16300E13.5280001	⌀ 120 x 11/14	16402.13.3180001	M36x2.0	
DN 40	16300E15.5280001	⌀ 140 x 12/16	16402.15.3180001	M52x3.0	
DN 50	16300E15.5280001	⌀ 140 x 12/16	16402.15.3180001	M52x3.0	
DN 65	16300E15.5280001	⌀ 140 x 12/16	16402.15.3180001	M52x3.0	
DN 80	16300E18.5280001	⌀ 180 x 14/22	16402.19.3180001	M60x3.0	
DN 100	16300E18.5280001	⌀ 180 x 14/22	16402.19.3180001	M60x3.0	

A seal kit contains all O-rings and flat gaskets shown in Chapter 1 suitable for the respective nominal diameter. A valve insert contains all internal parts including seals, i.e. stem, valve disc, threaded bush, metal bellows, bonnet with screws and cap, pre-assembled.

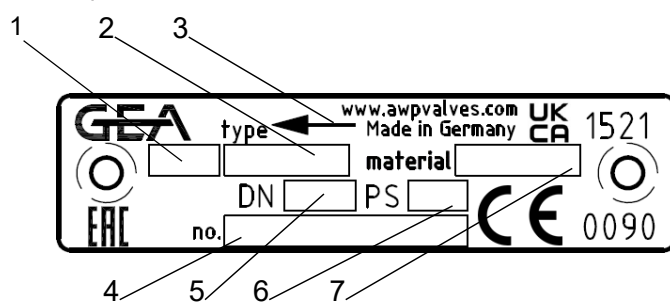
Nominal size	Threaded bush	Seal kit	Valve insert
DN 10	96300E11.8142001	23000.10.5/00019	23000E08.5110021
DN 15	96300E11.8142001	23000.10.5/00019	23000E10.5110021
DN 20	96300E11.8142001	23000.10.5/00019	23000E11.5110021
DN 25	16300E13.8142001	23000.12.5/00019	23000E12.5110021
DN 32	16300E13.8142001	23000.12.5/00019	23000E12.5110021
DN 40	16300E15.8142001	23000.14.5/00019	23000E14.5110021
DN 50	16300E15.8142001	23000.14.5/00019	23000E15.5110021
DN 65	16300E15.8142001	23000.17.5/00019	23000E17.5110021
DN 80	16300E18.8142001	23000.18.5/00019	23000E18.5110021
DN 100	16300E18.8142001	23000.19.5/00019	23000E19.5110021

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. Different spare part numbers may 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 change-over valves is carried out in accordance with Pressure Equipment Directive 2014/68/EU by means of a nameplate.



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

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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