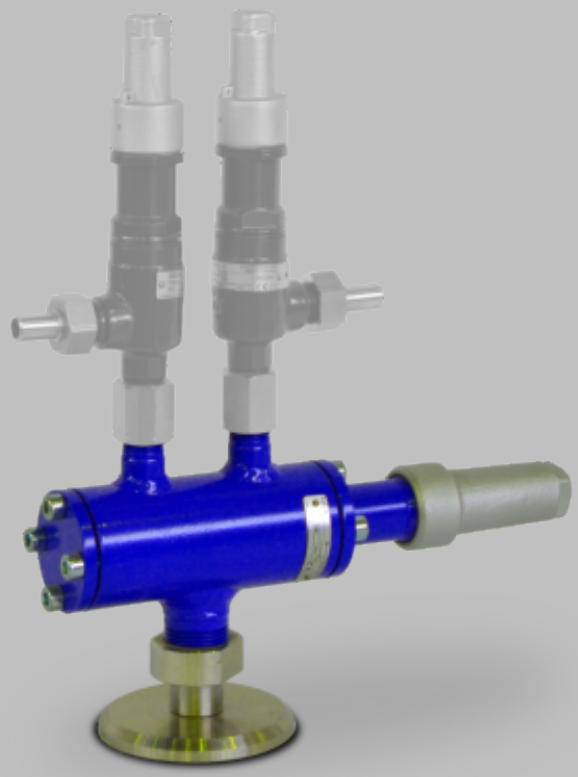

OPERATING INSTRUCTIONS FOR 3-WAY VALVES

WVR (240, 241)

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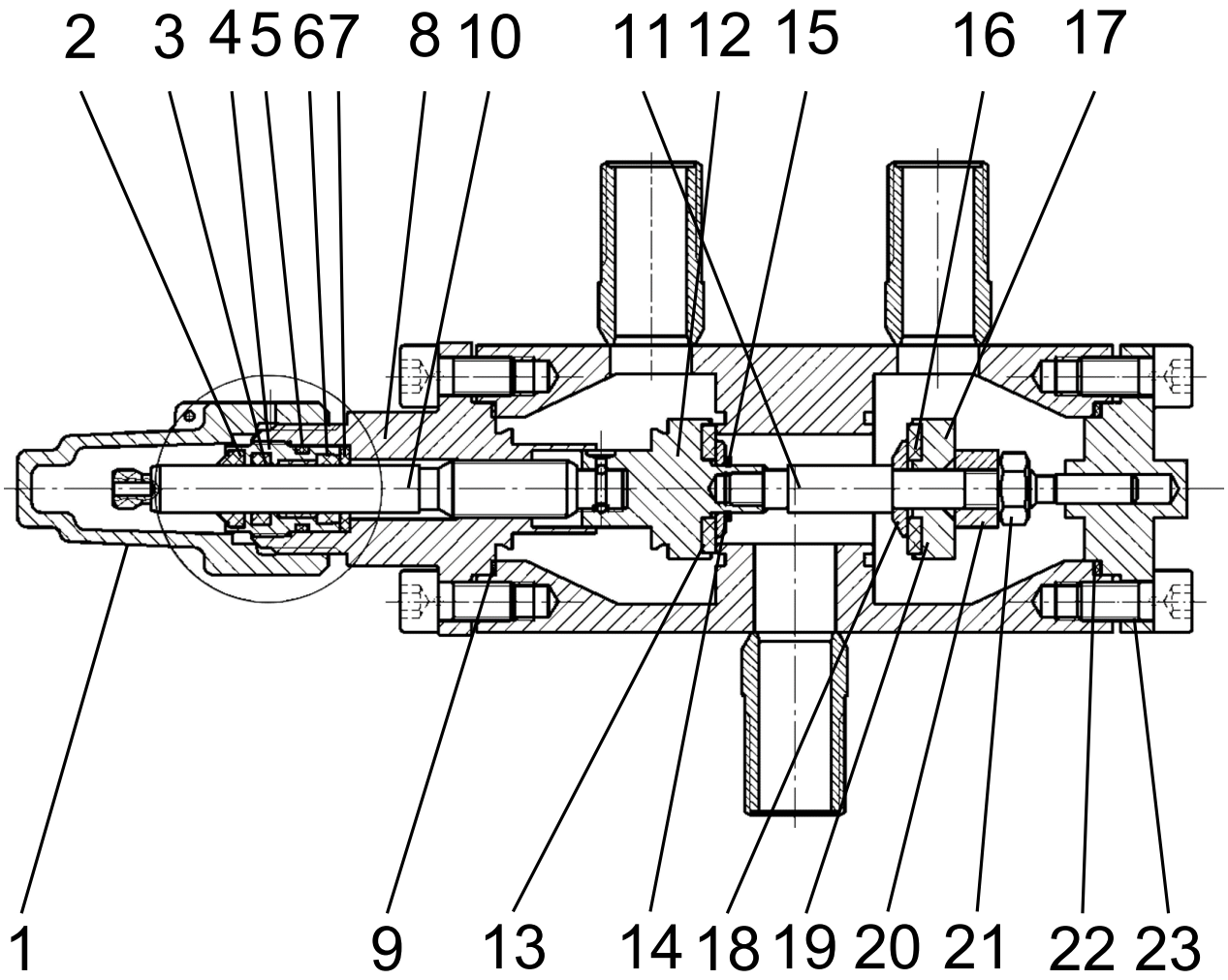
1 Overview of types

– WVR type 240 – DN 10 – DN 100

– WVR type 241 – DN 10 – DN 20 (with screwed ends only)



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

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 Pressure/temperature operating limits

Pressure / temperature operating limits:
PS: Max. permissible operating pressure in bar
TS: Permissible operating temperature in °C associated with the permissible operating pressures (PS)
PN: Nominal pressure rating
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

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
1) Load case I (low-temperature steel, NIRO) 2) Load case II (acc. to AD2000-W10) (Steel)						

The following values apply to change-over valves for heating technology (types 240...HT, 241...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

Type	DN 10	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
240	8.6	12.9	14.3	17.6	24.3	38.2	51.6	82.0	178	204
241	–	9.1	–	–	–	–	–	–	–	–

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 outlet connections in liquid lines in sequence to a vessel with gas volume.

7 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.

8 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.

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

Zur Demontage des Ventileinsatzes ist genügend Platz auf der Seite, auf der sich der Ventildeckel befindet, freizuhalten – siehe folgende Tabelle.

Nominal size	DN 10	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
Distance [mm]	200	200	200	215	215	240	240	300	360	420

10 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.

10.1 Changing the stem seal

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

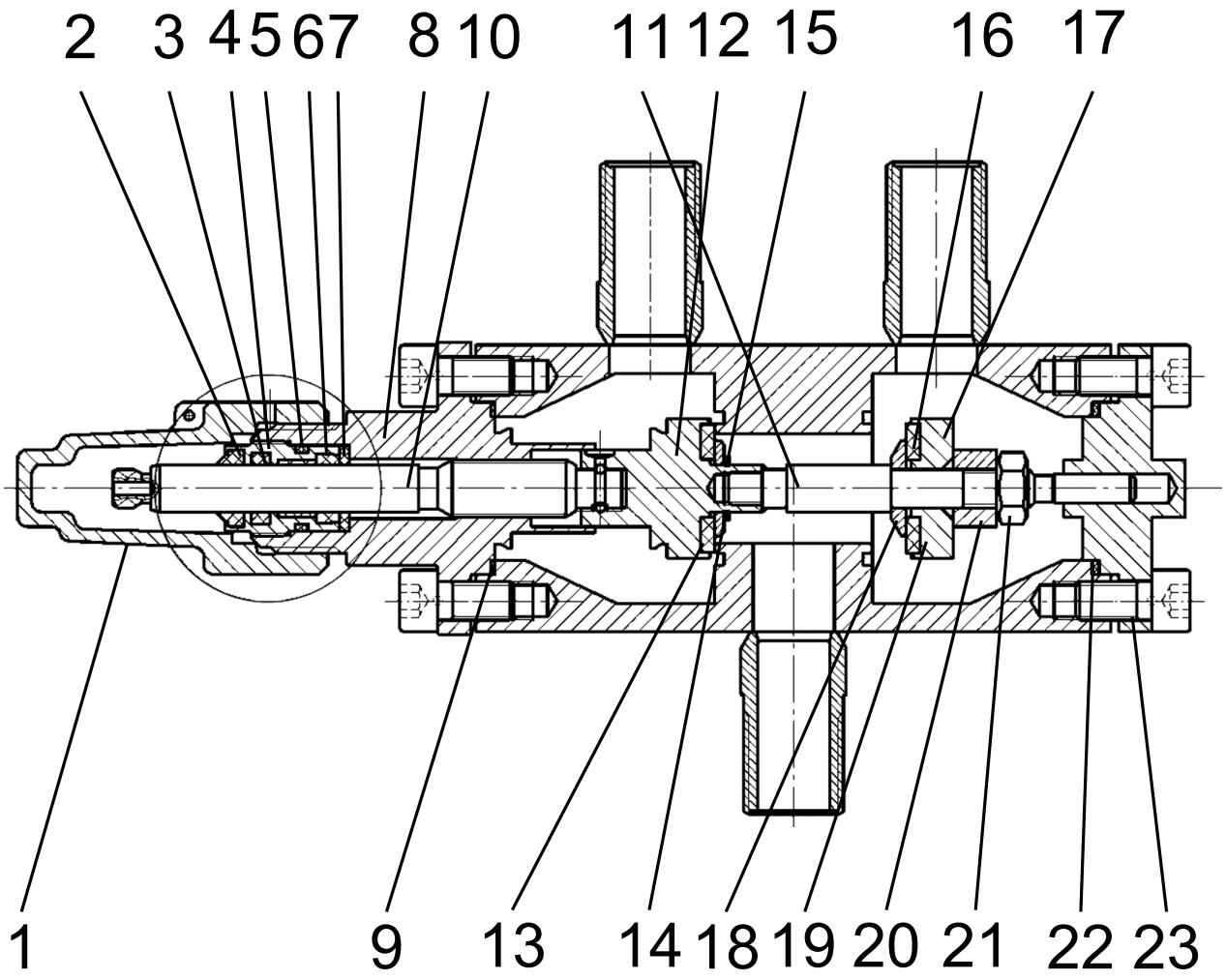
Nominal size	DN 10 – 20	DN 25 – 32	DN 40 – 65	DN 80 – 100
Wrench size	19	24	32	41

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:

Nominal size	DN 10 – 20	DN 25 – 32	DN 40 – 65	DN 80 – 100
Wrench size	17	22	27	32

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.

10.2 Replacing the seat seal/valve insert



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

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 23). Unscrew ISO 10511 hexagon nut (item 21), and remove the washer (item 20) and valve disc (item 17). Then pull out bonnet 1 (item 8), including all attached internal parts, using the handwheel.
3. Unscrew the handwheel from stem 1 (item 10) and unscrew the stem from bonnet 1 (item 8). For nominal sizes DN 80 and DN 100, the grub screw must be removed beforehand.
4. Remove the bonnet gaskets (item 9 and item 22) from the body. Unscrew stem 2 (item 11) from valve disc 1 (item 12). Remove the retaining ring (item 15) and valve disc washer from valve disc 1.
5. Insert the new seat seal into valve disc 1 (item 12) and secure it with the valve disc washer and retaining ring (item 15).
6. Before assembly, clean all individual valve components and grease the stems and bonnets.
7. Screw stems (item 10 and item 11) into valve disc 1 (item 12).
8. Screw the stem back into bonnet 1; 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 9), hold the bonnet with all attached internal parts by the handwheel and guide it into the valve body.
10. Valve disc 2 (item 17) with the valve disc washer and seat seal 2 (item 16) onto the stem. Slide on the washer (item 20) and fix it by screwing on the ISO 10511 hexagon nut (item 21).
11. Then insert bonnet gasket 2 (item 22), fit bonnet 2 (item 23) 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 (8.8) [Nm]	25	25	49	85
Tightening torque (A2-70) [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. 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.**
14. After pressure equalisation, completely unscrew all bonnet bolts and remove bonnet 2 (item 23). Unscrew ISO 10511 hexagon nut (item 21), and remove the washer (item 20) and valve disc (item 17). Then pull out bonnet 1 (item 8), including all attached internal parts, using the handwheel.
15. To guide the new valve insert into the body, first remove the hexagon nut (item 21), washer (item 20), valve disc 2 (item 17), seat seal 2 (item 16) and valve disc washer 2 (item 18) from the new valve insert.
16. Insert bonnet gasket 1 (item 9), hold bonnet 1 with all attached internal parts by the handwheel and guide it into the valve body.

17. Slide valve disc 2 (item 17) with valve disc washer 2 (item 18) and seat seal 2 (item 16) onto the stem. Slide on the washer (item 20) and fix it by screwing on the ISO 10511 hexagon nut (item 21).

18. Then insert bonnet gasket 2 (item 22), fit bonnet 2 (item 23) and tighten all bonnet bolts evenly and in a crosswise pattern.

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

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.

	Handwheel		Cap	
Nominal size	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 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 cap, pre-assembled.

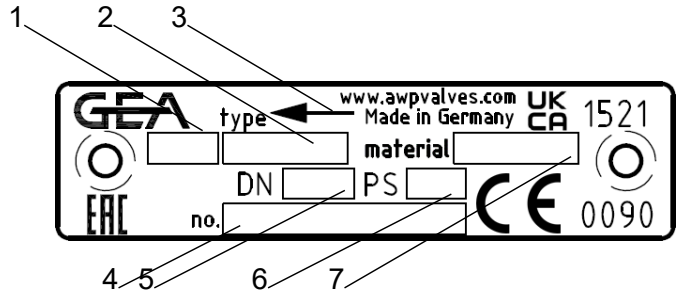
Nominal size	Threaded bush	Seal kit	Valve insert (type 240)	Valve insert (type 241)
DN 10	96300E11.8142001	24000.10.5/00019	24000E10.5110001	–
DN 15	96300E11.8142001	24000.10.5/00019	24000E10.5110001	24100E10.5110001

Nominal size	Threaded bush	Seal kit	Valve insert (type 240)	Valve insert (type 241)
DN 20	96300E11.8142001	24000.10.5/00019	24000E10.5110001	–
DN 25	16300E13.8142001	24000.12.5/00019	24000E12.5110001	–
DN 32	16300E13.8142001	24000.12.5/00019	24000E13.5110001	–
DN 40	16300E15.8142001	24000.14.5/00019	24000E14.5110001	–
DN 50	16300E15.8142001	24000.14.5/00019	24000E15.5110001	–
DN 65	16300E15.8142001	24000.17.5/00019	24000E17.5110001	–
DN 80	16300E18.8142001	24000.18.5/00019	24000E18.5110001	–
DN 100	16300E18.8142001	24000.19.5/00019	24000E19.5110001	–

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.

14 Marking

The marking of AWP shut-off 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 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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