Operating Instructions
in compliance with
Pressure Equipment Directive 2014/68/EU
and
Pressure Equipment (Safety) Regulation 2016,
UK Statutory Instrument 2016 No. 1105

AWA Change-over Valves

Please read these operating instructions carefully to ensure a safe operation and keep the same for further use.

Contents

Safety

The Change-over Valve, hereinafter referred to as valve, is designed for use in refrigeration/air conditioning systems referred to as systems hereinafter. It may only be put into service if installed into the system unchanged in accordance with these instructions and being compliance with the statutory provisions in its entirety.

The valve incorporates state-of-the-art technology and has been built according to the applicable regulations. Great valve has been set upon the user's safety.

These operating instructions are integral part of the contract and shall be kept throughout the entire life of the valve.

Authorized personnel

Only trained and instructed personnel shall be allowed to do any work on the valve and system. As regards the qualification and expertise of the personnel the applicable rules and guidelines shall apply.

Residual hazards

Unavoidable residual hazards may emanate from the valve. Every person working on this device shall therefore read these instructions carefully.

To be observed are for example:

- the generally accepted safety regulations,
- EC directives,
- Norms (e.g. EN 378) and all national provisions.

Symbols used for safety information

DANGER!
Instructions on preventing imminent serious danger to persons.
Imminent most serious injuries or death as a possible consequence.
Any non-observance may lead to an immediate failure of the valve.

WARNING!
Instructions on preventing potential serious hazard to persons.
Avoidable serious to very serious injuries or death as a possible consequence.
Any non-observance can cause the valve to fail.

CAUTION!
Instructions on preventing a minor hazard to persons.
Minor, reversible injuries cannot be excluded.
Any non-observance may lead to a medium-term failure of the valve.

ATTENTION!
Instructions on preventing potential hazard to equipment.
Minor, reversible injuries cannot be excluded.
Any non-observance may lead to a medium-term failure of the valve.

General safety information

These operating instructions are based on the safety requirements of EN 378-2 and EN 21922.

Instructions to prevent hazards in all cycles of service life:

DANGER!
Risk of bursting if operated beyond the technical parameters.
Most serious injuries and immediate system failure possible.
Observe the technical parameters.

WARNING!
Damage due to improper handling.
Serious injuries and system failure possible.
Never use the valve as transport, lifting or lashing point.

WARNING!
Any non-observance of the instructions may cause the valve to fail.
Avoidable serious to very serious injuries or death possible.
Installation, operation and maintenance by authorized personnel only.

WARNING!
Risk of service fluid to be released.
Depending on the kind of service fluid serious to very serious injuries or death possible as a consequence.
Wear personal protective equipment (e.g. respirators, gloves).

CAUTION!
Very cold or very hot surface temperatures possible.
Frostbites/burns possible.
Wear personal protective equipment (e.g. gloves, protective clothes).

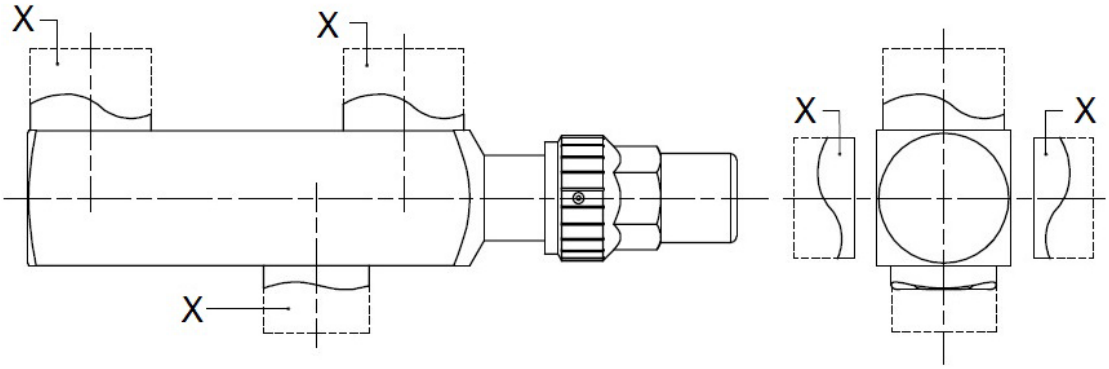
Other information

The information contained herein represents to the best of our belief our knowledge at the time when these instructions were prepared. It shall serve as code of practice to ensure a safe handling of the valve in transport, storage, installation, commissioning, maintenance and dismantling/disposal. A final decision as to whether the valve suits the purpose is to be taken by the user. This information shall not be deemed a warranty of quality.

Any modification of the valve and operation under other than the prescribed parameters shall not be allowed and will result in the loss of the conformity declaration and all liability claims.

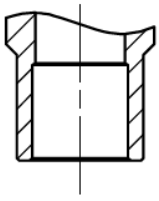
Description of Valve

Types (possible combinations of connections)

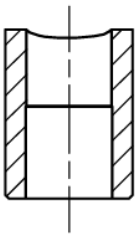


Variants of connection “X”

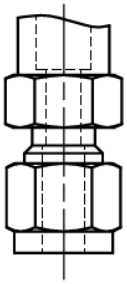
A
Lötanschluss
Solder connection
ODS



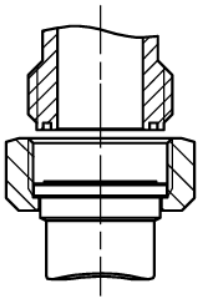
B
Stumpfschweißanschluss
Butt welding connection
WB und W/ODS



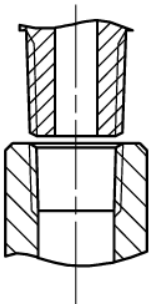
C
Rohrverschraubung
Pipe connection



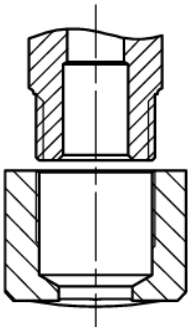
D
Rotalockanschluss
Rotalock connection
RLM / RLF



E
NPTF Gewinde
NPTF Thread
IG NPTF / AG NPTF



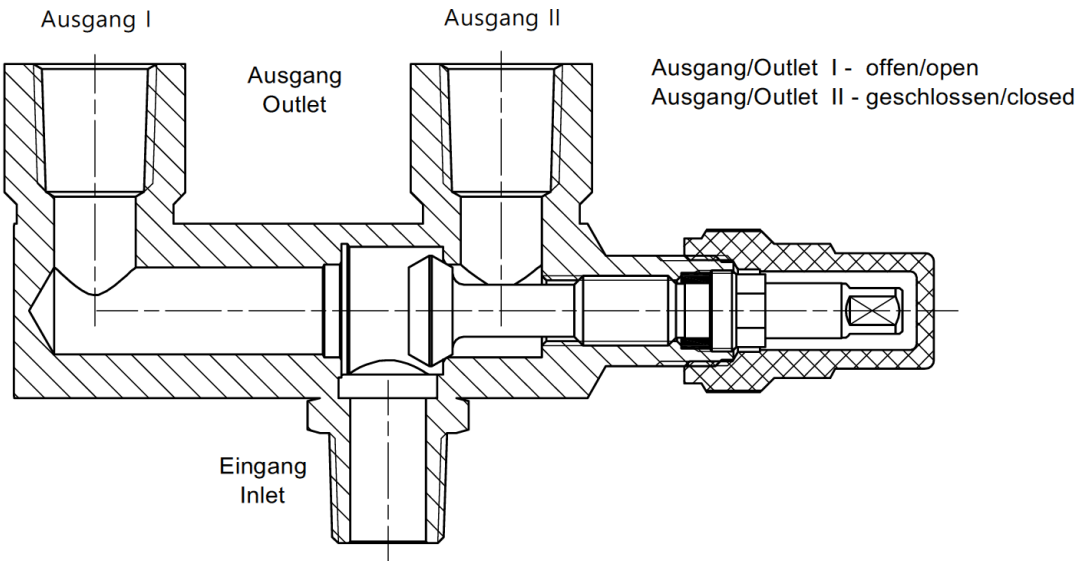
F
G Gewinde
G Thread
IG G / AG G



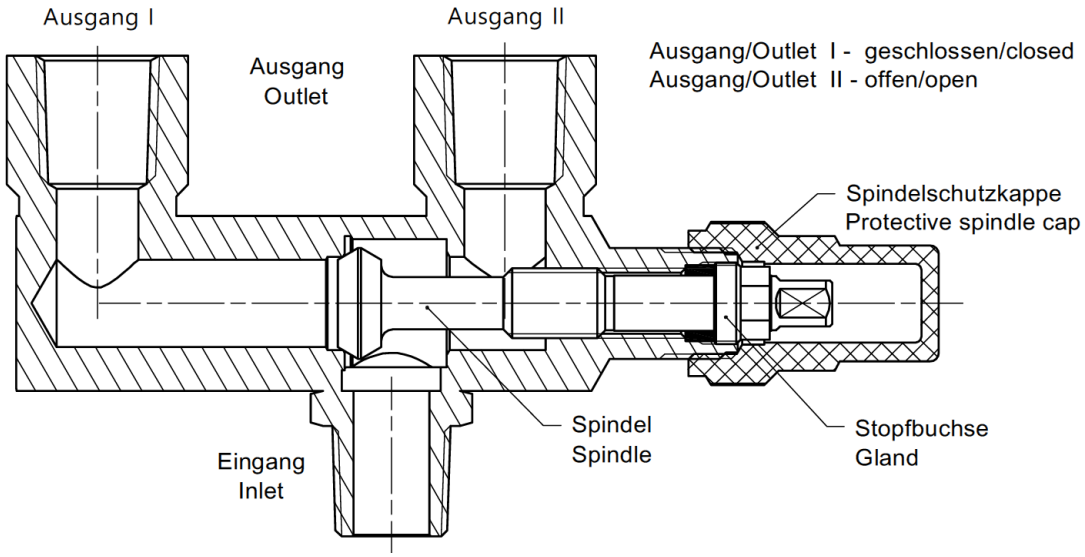
Installation dimensions can be gathered from the AWA product catalogue and technical documents respectively. The connecting options A through F are explained in more detail in "Design features".

Operating principle

Spindelposition "offen"
Spindle position "open"



Spindelposition "geschlossen"
Spindle position "closed"



Product description

The valve is a three-way shutoff valve for refrigerating or air-conditioning systems. The valve is a manual shut-off valve. It is designed e.g. for the installation of two safety valves in a system and makes it possible to replace the depressurized safety valve while the system continues running.

The prescribed flow direction is from the inlet to the outlets.

The valve is in compliance with EN 21922, the Pressure Equipment Directive 2014/68/EU and the Pressure Equipment (Safety) Regulation 2016, UK Statutory Instrument 2016 No. 1105.

Identification

The valve is marked in accordance with EN 21922 by lettering on the valve body:

- Manufacturer's logo
- Type type and size (e.g. S30W, E30W)
- AWA parts number
- Coded year of manufacture
- Maximum allowable pressure PS in bar
- Nominal size DN in mm
- Housing material
- CE / **UKCA** mark and identification number of the notified body (if applicable)

Technical parameters

Allowable pressure / temperature / service fluids:

Maximum allowable pressure PS:	As indicated in the technical documents.
Allowable temperature TS:	As indicated in the technical documents.
Permitted service fluids:	Refrigerants acc. to EN 378-1 (2020): As indicated in the technical documents.

Leakage test:
according to DIN 8964-3 (<4.1 g/a R-134a at 10bar)

Strength test:
according to EN 21922 at 1.5-fold PS

Cleanliness of interior:
according to DIN 8964-1

Classification pursuant to Pressure Equipment Directive 2014/68/EU and PE(S)R 2016:

See information in the technical documentation.

For products of category I components are provided with CE and UKCA mark.

For products of category II components are provided with CE 0090 and UKCA 1521 mark with indication of the notified body.

Design features

- The material of the valve components and the manufacturing method are selected in conformity with the EN 21922, the Pressure Equipment Directive 2014/68/EU, the Pressure Equipment (Safety) Regulation 2016 and the RoHS Directive 2011/65/EU thus guaranteeing the reliability for the operating range indicated.
- The valves are made of one of the material given below:
  - Type “S__W”:

    The "S__W" type valves are made of steel components connected with each other by high-strength and high-density copper brazing and subsequent galvanic corrosion protection. This coating provides for temporary corrosion protection until installation if transported and stored in dry condition.
  - Type “E__W”:

    The "E__W" type valves are made of stainless steel components 1.4301 which are connected permanently by copper brazing and/or welding.
- The valve spindle comes with a square for operation and has a metal seat seal in the end positions of the respective outlet I or II (see figure shown in “Operating principle”). The mode of valve operation excludes a simultaneous closing of both outlets. A graphite packing and a gland seal are used for the sealing between the spindle and the housing.
- The valve comes as standard with a plastic high-density protective spindle cap. Depending on the admissible operating parameters the valve has a protective spindle cap of aluminum. Both types of protective spindle cap are provided with a relief hole.
- Types of connection:

  Because of the design principle the inlets and outlets of the valve may feature different connections or positions to each other.

  Connection "A" – Brazed capillary connection to render a brazed joint with copper pipes according to EN 12735-1 for dia. 6 to 54mm and relevant inch dimensions. Designed as connection for insertion of a copper pipe (ODS) or insertion of a brazed fitting (ODM).

  Abbreviated designation: ODS xx or ODM xx (xx stands for relevant size in mm or inch).

  Connection "B" – Welded connection for use of pipes according to EN 10220 and relevant inch-type dimensions. Designed as butt-welded connection (W or WB) or plug-in welded connection (WS).

  Abbreviated designation: WB xx, W xx and WS xx (xx stands for relevant size in mm or inch).

  Connection "C" – Detachable connection for compression joints and O-ring screw connections according to DIN 2353, DIN EN ISO 8434 or other.

  Connection "D" – Detachable threaded connection according to Rotalock principle using a PTFE seal ring designed as connection with male (RLM) or female (RLF) thread. Optimal results of this screw joint are achieved when no other than AWA components are used.

  Abbreviated designation: RLM xx and RLF xx resp. (xx stands for relevant size in mm or inch)

  Connection "E" – Detachable threaded connection with NPTF thread acc. to ANSI B1.20.3, designed as connection with male (AG NPTF) or female thread (IG NPTF).

  Abbreviated designation: AG NPTF xx and IG NPTF xx resp. (xx stands for relevant size in inch).

  Connection "F" – Detachable threaded connection with cylindrical pipe thread acc. ISO 228, designed as connection with male (AG G) or female (IG G) thread for use of a metal gasket as sealing element.

  Abbreviated designation: AG G xx and IG G xx resp. (xx stands for the relevant size)

  Other connections can be agreed separately and are described in the relevant technical documents of the product. Suitable adapters for other connections are available in the AWA product range.

Transport and Storage

Transport the valve by closed means of transport in the original packing protected against weather influences, and store it in a dry place.

Mounting

Principles

- The valve shall be arranged in the system so that it can be properly operated and maintained.

DANGER!
Damage of valve possible.
Serious injuries and system failure possible during operation.
Valve to be installed without additional loads (forces, vibrations).
Never use the valve as fixing points of pipes.

- The removal space for spindle actuation and the removal of the protective spindle cap shall be about 100 mm. Also observe the removal space for safety valves and adapters specified by the manufacturer.
- It must be possible to apply the necessary torques to operate the spindle (opening and closing) in a safe manner.
- Every safety valve attached to the change-over valve must be sufficiently dimensioned so that it can reach the necessary relief capacity.
- The preferred spindle position is "open". In this position the flow goes straight to outlet I and Outlet II is closed.
- The valve must be integrated into the pipe on both sides. An outlet side open to the outside is not permitted!
- Only authorized personnel shall be allowed to mount the valve.

DANGER!
Any non-observance of these instructions may cause the valve/system to fail.
Most serious injuries and death possible.
Mounting and operation by personnel trained in refrigeration systems only.

- No modifications of the valve are permitted. If modifications become necessary, they have to be agreed with the manufacturer beforehand.

WARNING!
Product features may change.
Avoidable serious to very serious injuries or death possible.
Any modification of the valve has to be agreed with manufacturer in advance.

Mounting preparation

- When supplied the valve can be closed and may come with additional protective means for transport. To avoid corrosion inside the valve and contamination, such protective means should be removed shortly before mounting.

ATTENTION!
Damage to interior components possible.
Malfunction due to oxidation/contamination of interior components.
Wait to remove the transport protection until shortly before mounting.

Connecting the pipe / vessel / safety valves

- Make the connection of the inlet and the outlets in compliance with the following connection-specific principles:

  The pipe must be of a dimension that fits the valve. If not, use adapters.

  Make sure there is no mechanical restraint.

- **For soldered/welded connections:**

  Prepare the system connections so (bare metal and grease-free) that a high-quality joint can be achieved.

  Scavenge the relevant pipe sections with shielding gas during soldering / welding. A cooling of the valve body is recommended.

  Then, cool down the system connection in the air.

  Clean the pipe connection made. Flux material residues from the soldering process are very corrosive and may cause long-term damage.

  For stainless steel valves observe the general rules to maintain the material properties (e.g. cleaning, passivation, tool selection).

WARNING!
Damage of valve due to excessive heating possible.
Serious injuries and system failure possible during operation.
Direct the heat source away from adapter (component temperature max. 850°C)!

WARNING!
Damage of valve (e.g. cracking) due to rapid cooling possible.
Serious injuries and system failure possible during operation.
Allow joint to cool down in the air.

CAUTION!
Risk of increased corrosion and component damage.
Serious injuries and system failure possible during operation.
Properly clean the joint after joining.

- **For screwed connections:**

  Make sure that the connections are in conformity in terms of type and dimension and the sealing elements that may be necessary are used.

  If available, use the wrench flats directly arranged at the connection to apply the necessary torques. The torques of the relevant screw connections have to be strictly observed.

  Especially when it comes to stainless steel connections it is essential to observe the general technical rules to avoid fretting (use release agents).

WARNING!
Excessive torques or non-observance of the mounting order may cause failures delayed in time.
Serious injuries and system failure possible during operation.
Observe the torques and mounting order.

- **Move the spindle to the preferred “open” position**.

  Before moving the spindle, loosen the stuffing box by ¼ turn.

  In this position the flow goes straight to the safety valve connected to outlet I.

  To avoid malfunctioning of the connected safety valves, intermediate positions of the valve spindle are prohibited.

  Then, tighten the seal gland applying the prescribed torque. Then screw on the spindle protection cap tightly.

  If the assembly is a subassembly, the pipe ends must be sealed with dust protection caps until further use.

WARNING!
Malfunction of safety valves possible.
Serious injuries and system failures possible during operation.
It is absolutely necessary that the spindle is in end position.

- The following torques apply to the valve assembly (Nm):

Valve size	Spindle „open“ / „closed“	Seal gland	Spindle protective cap
S30W / E30W	25 +10	15 +5	Plastic 14 +2 Aluminium 40 +10
S40W / E40W	40 +10	17 +5	
E50W	50 +10	17 +5	

- The following torques apply to the connections (Nm):

Connection	Designation	Connection size	Torque
D	Rotalock	1 1/4“	100 +10
E	NPTF	3/8“	42 +5
		1/2“	60 +10
		3/4“	90 +10
		1“	140 +10
		1 1/4“	190 +10
F	G	1/2“	65
		3/4“	90
		1 1/4“	240

For the NPTF connection thread sealants may be used.

For connection variants or connection sizes not listed here, the tightening torques or a description of the installation procedure are listed in the technical documentation or in a separate supplementary sheet.

Commissioning

Principles

- The valve has already been tested for leakage and strength by the manufacturer.
- The valve and the system into which it is installed, may only be commissioned if they have been checked, with due regard to the intended mode of operation, for proper condition as to assembly, installation, set-up conditions and safe functioning.
- After mounting and initial start-up according to EN 378-2 check again for leakage and strength and an effective corrosion protection.

Steps of commissioning

1. Check the system for leakage and pressure resistance by suitable means (e.g. helium, dry nitrogen).

DANGER!
Danger of bursting.
Most serious injuries possible.
The maximum allowable pressure (PS) must not be exceeded!
Strictly observe the safety information (e.g. DIN EN 378).

Exception: Exceeding a maximum of 1.1 x PS for a short period of time until the pressure relief device responds (see EN378-2, ISO 5149-2).

2. The application of an anticorrosive coating that suits the operating conditions is absolutely necessary for steel valves (type “S__W”) and may be necessary for stainless steel valves (type “E__W). Make sure that the fabrication data remain legible.

CAUTION!
Delayed failure due to corrosion possible.
Serious injuries and failure of system during operation possible.
Apply a suitable anticorrosive coating.

ATTENTION!
Loss of product conformity due to loss of lettering.
Loss of warranty.
Lettering must be legible.

3. Depending on which outlet is required the spindle has to be either fully open or fully closed. Before moving the spindle, loosen the stuffing box by ¼ turn. To avoid malfunctioning of the connected safety valves, intermediate positions of the valve spindle are prohibited. Then, tighten the seal gland applying the prescribed torque (see chapter “Assembly”). Then screw on the spindle protection cap tightly.

WARNING!
Potential malfunctioning of the safety valves.
Serious injuries and system failure in operation possible.
It is absolutely necessary that the spindle is in end position.

4. Evacuating and filling the system with refrigerant.

DANGER!
Danger of bursting if operated beyond the technical parameters.
Most serious injuries possible.
Observe the technical parameters of the valve.
Avoid excessive filling of the system with refrigerant.

5. Upon initial commissioning check the pipes for any abnormal vibration and record the operating data.

CAUTION!
Cracks of the piping and the valve due to dynamic loads possible.
Injuries and system failure during operation possible.
Avoid heavy vibrations. Take safety measures if need be.

Operation, Maintenance and Repair

Principles

- The valve is maintenance-free.
- As part of the regular system inspection it should be checked for corrosion/damage/tightness and operability and its proper condition restored if necessary.

WARNING!
Media contact possible, contact with hot/cold surfaces.
Burns, frostbites.
Wear personal protective equipment during maintenance and inspections as prescribed by national regulations.

- If the valve spindle is to be operated for system maintenance, carefully remove the protective spindle cap.

WARNING!
Protective spindle cap is pressure-tight and may be pressurized.
Serious injuries possible.
Slowly remove the cap. Allow any service fluid escape from inside the cap if necessary.

If it is not possible to achieve a pressure compensation, firmly screw the protective spindle cap again and apply the prescribed torque. If so, it indicates a malfunction of the valve and the system has to be stopped without delay.

- Then, arrange the spindle in the relevant position applying the necessary torque (see chapter “Mounting”) (loosen/tighten the gland seal). It is imperative to perform a leakage test. Put the protective spindle cap in place again after the work has been completed.

WARNING!
Exceeding the tightening torques can lead to damage.
Serious injuries and system failure during operation possible.
Observe the torques.

Maintenance / Repair

- If a proper functioning of the valve is no longer guaranteed, switch the system off, drain the refrigerant from the system (or system section) in an eco-friendly manner and vent the system (or system section).

DANGER!
Refrigerant may escape.
Leaking refrigerant may cause most serious injuries.
For repairs the system must have the right temperature, free from refrigerant and sufficiently ventilated.

- For repairs use no other than original spare parts. If the valve cannot be repaired, it must be replaced.

WARNING!
Valve damage due to defective spare parts/mounting.
Avoidable serious injuries and system failure possible.
Use no other than original spare parts for repairs.

- Install / commission according these instructions. It is imperative to carry out another leakage and strength test. No warranty is accepted by AWA for tightness in case of repair.

Dismantling and Disposal

Principles

- To dismantle the valve, shut off the system, remove the refrigerant from the system (or system section) in an environmentally friendly manner and sufficiently vent the system (or system section).

DANGER!
Refrigerant may escape.
Leaking refrigerant may cause most serious injuries.
For repairs the system must have the right temperature, free from refrigerant and sufficiently ventilated.

WARNING!
Media contact possible, contact with hot/cold surfaces.
Burns, frostbites.
Wear personal protective equipment during maintenance and inspection as prescribed by national regulations.

- The valve and its components can be recycled:

Valve body:	steel scrap / stainless steel scrap
Protective spindle cap:	plastics / aluminum
Dust caps:	plastics (PE)
PTFE seal:	plastics (PTFE)
	CAS number: 9002-84-0
	(observe country-specific regulations for disposal if necessary)

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