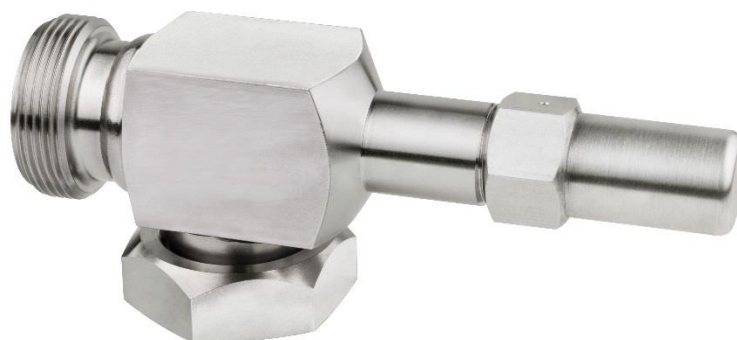




Operating Instructions  
in compliance with  
Pressure Equipment Directive 2014/68/EU

Steel Valves  
Stainless Steel Valves



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



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## **Safety**

The Steel Valve or Stainless Steel 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 as a whole is compliance with the statutory provisions.

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 dangers**

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

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**

	<p><b>DANGER!</b> 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.</p>
	<p><b>WARNING!</b> Instructions on preventing potential serious danger to persons. Avoidable serious to very serious injuries or death as a possible consequence. Any non-observance can cause the valve to fail.</p>
	<p><b>CAUTION!</b> Instructions on preventing a minor danger to persons. Minor, reversible injuries cannot be excluded. Any non-observance may lead to a medium-term failure of the valve.</p>
	<p><b>ATTENTION!</b> Instructions on preventing potential damage to equipment. Minor, reversible injuries cannot be excluded. Any non-observance may lead to a medium-term failure of the valve.</p>

## General safety information

These operating instructions are based on the safety requirements of DIN EN 378-2 and DIN EN 12284.

Instructions to prevent dangers in all cycles of service life:

	<p><b>DANGER!</b>            Risk of bursting if operated beyond the technical parameters.            Most serious injuries and immediate system failure possible.            Observe the technical parameters.</p>
	<p><b>WARNING!</b>            Damage due to improper handling.            Serious injuries and system failure possible.            Never use the valve as transport, lifting or lashing points.</p>
	<p><b>WARNING!</b>            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 trained personnel only.</p>
	<p><b>WARNING!</b>            Risk of service fluid to be released.            Depending on the kind of service fluid serious to very serious injuries or death possible.            Wear personal protective equipment (e.g. respirators, gloves).</p>
	<p><b>CAUTION!</b>            Very cold or very hot surface temperatures possible.            Frostbites/burns possible.            Wear personal protective equipment (e.g. gloves, protective clothing).</p>

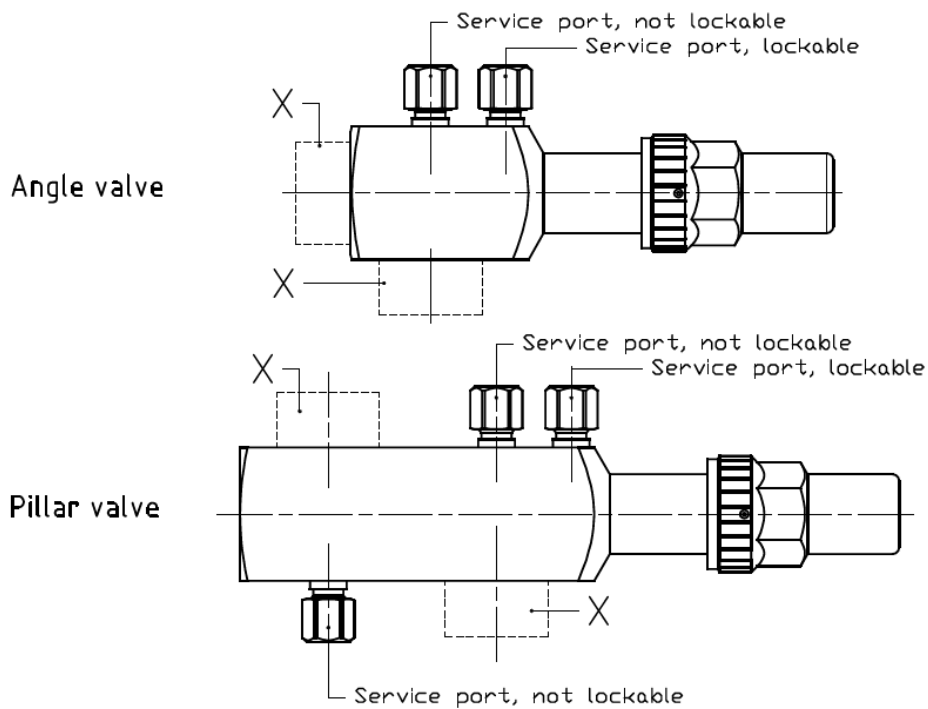
## Other information

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.

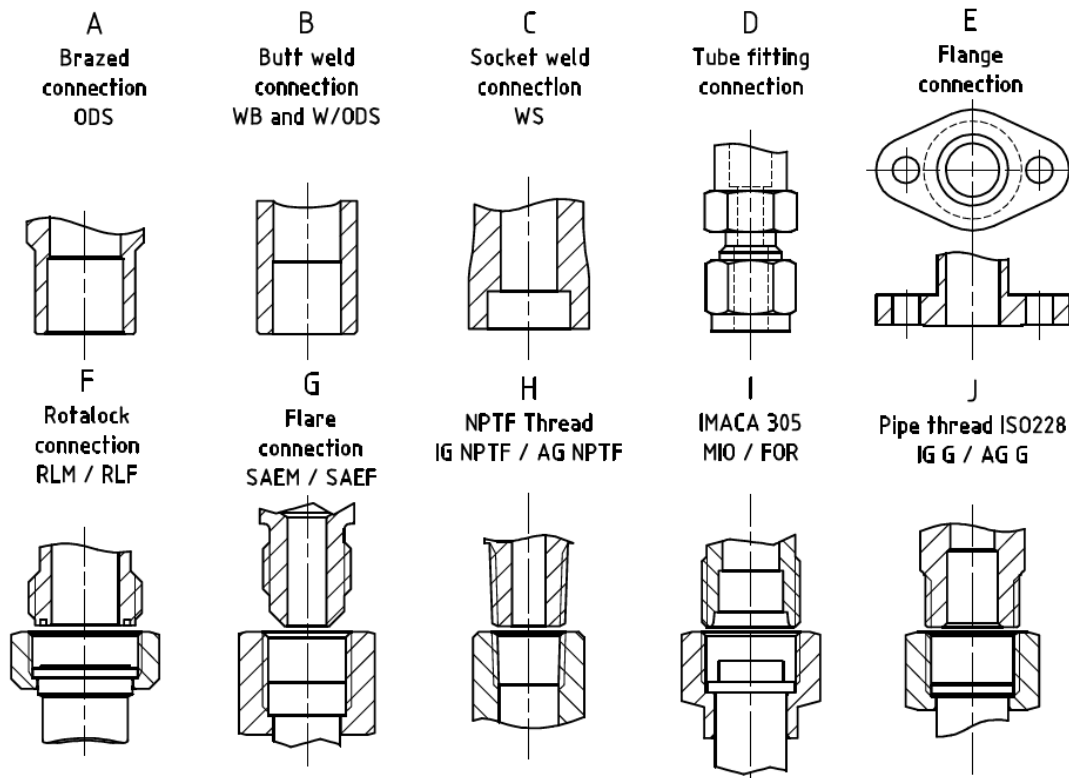
Any modification of the valve and operation under other than the prescribed parameters shall not be allowed and will result in the loss of the conformity declaration and all liability claims.

## Description of Valve

### Types (possible valve combinations)



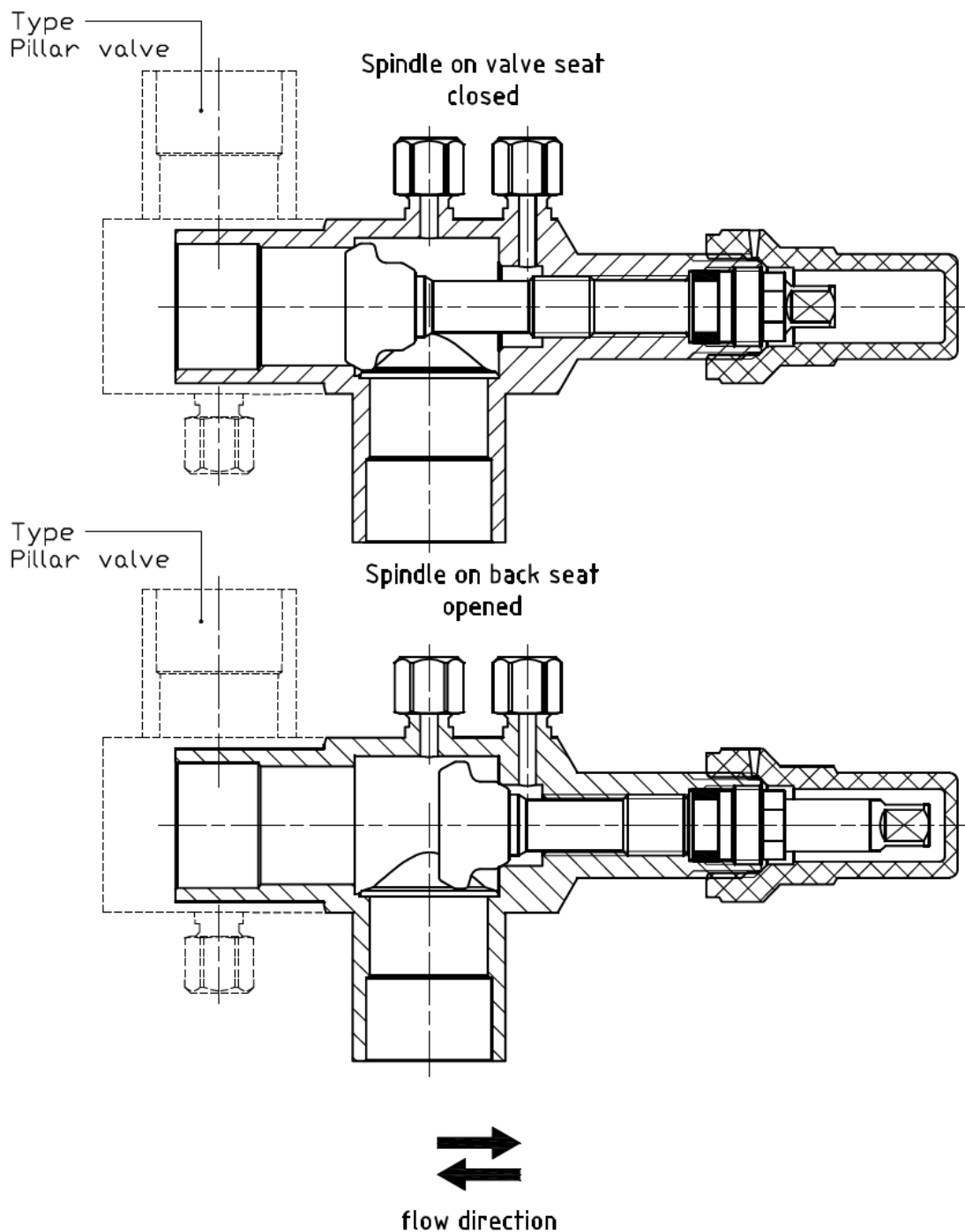
### Connections for system X



Installation dimensions can be gathered from the AWA product catalogue and technical documents respectively.

The connecting options A through J are explained in more detail in "Design features".

## Operating principle



## Product description

The steel valve and stainless steel valve resp. is intended for refrigeration or air conditioning systems. Depending on the connecting option the valve can either be used as system or compressor valve. It is a manual shut-off valve to be operated with the spindle fully open or closed only. According to DIN EN 378-2 the valve can only be handled with a tool.

Any flow direction can be chosen.

The valve is in compliance with DIN EN 12284 and Pressure Equipment Directive 2014/68/EU. For details of approval under UL207 see the "Technical Parameters" chapter.

## Marking

The valve is marked in accordance with DIN EN 12284 by lettering on the valve body:

- Manufacturer's logo
- Valve type and size (e.g. S30, E30, E30NH3 etc.)
- AWA parts number
- Coded year of manufacture
- Maximum allowable pressure PS in bar
- Nominal size DN in mm
- Housing material
- Special data (e.g. additional refrigerant, customer-related details)
- UL mark
- CE mark and identification number of the notified body (if applicable)

## Technical parameters

### Pressure/Temperature allocation:

Depending on the data given in the technical documentation.

### Service fluids:

The allowed service fluids (incl. refrigerating machine oils according to DIN 51503-1) depend on the valve type and are given in the table below:

Refrigerant acc. to DIN EN 378-1:2012	Valve type "S" <sup>1</sup> / "6kt" <sup>2</sup>	Valve type "E" <sup>3</sup>	Valve type "E_NH3" <sup>4</sup>
PED fluid group 2	yes	yes	yes
and additionally acc. to safety group A3	on request	on request	on request
and additionally acc. to safety group B2	no	no	yes

On request other refrigerants can be permitted. It is explicitly indicated in the technical documentation.

### Leakage test:

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

### Strength test:

according to DIN EN 12284 at 1.43-fold PS

### Cleanliness of interior:

according to DIN 8964-1

### Classification pursuant to Pressure Equipment Directive (PED 2014/68/EC):

Ref. data given in the technical documentation.

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

For products of category II components are provided with CE mark and come with the number of the notified body (0090).

### Approval under UL 207

The valve types "S", "E" and "E\_NH3" are UL 207 approved for the US and Canadian market.

<sup>1</sup> Valid for: S19, S22, S22RV, S30, S30F, S30RV, S36, S36RV, S40, S40CO2, S50, S50CO2, S50RV

<sup>2</sup> Valid for: 6kt19, 6kt22, 6kt30

<sup>3</sup> Valid for: E22, E30, E40, E50

<sup>4</sup> Valid for: E22NH3, E30NH3, E40NH3, E50NH3

## Design Features

- The material of the valve components and the manufacturing method are selected in conformity with the EN12284:2003 and Pressure Equipment Directive 2014/68/EC thus guaranteeing the reliability for the operating range indicated.
- The valves are made of one of the material given below:
  - Type "S" and "6kt":  
The "S" type valves are made of steel components connected with each other by high-strength and high-density copper brazing and subsequent electroplated coating. The latter provides for corrosion protection until installation if transported and stored in dry condition.
  - Type "E":  
The "E" type valves are made of stainless steel components 1.4301 which are connected permanently by copper brazing and/or welding.
  - Type "E\_\_NH3":  
The "E\_\_NH3" type valves are made of stainless steel components and permanently connected with each other by welding.
- The use of temperature-resistant materials, connecting elements and jointing methods obviate the need of dismantling when the valve is installed (brazing and welding) in the system.
- The valve spindle comes with a square for operation and has a metal back seat. The latter is only operative when the valve is fully open. The sealing between spindle and housing is by a graphite packing and adjustable gland seal.
- 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 aluminium. 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 DIN 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: (W /) ODS xx or. ODM xx (xx stands for relevant size in mm or inch).

**Connection "B & C"** – Welded connection for use of pipes according to DIN 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 "D"** – Detachable connection for compression joints and O-ring screw connections according to DIN 2353 and DIN EN ISO 8434.

**Connection "E"** – Detachable flange connection designed as 2-hole oval flange (hole distance 35 to 70mm) or 4-hole rectangular flange (hole distance 40 to 70mm) for use of a metal bead or fibre gasket.  
Abbreviated designation: F xx (xx stands for relevant size in mm or inch)

**Connection "F"** – 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 "G"** – Detachable threaded connection with 90° sealing cone according to flare connection principle (SAE J516, DIN 3866), designed as connection with male (SAEM) or female threads (SAEF) to connect a copper pipe or mount the valve on a mating piece.  
Abbreviated designation: SAEM xx and SAEF xx resp. (xx stands for relevant SAE size)

**Connection "H"** – 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 "I"** – Detachable threaded connection with cylindrical inch-type thread according to IMACA Standard 305, designed as connection with male (MIO) or female thread (FOR) for use of an O-ring as sealing element.  
Abbreviated designation: MIO xx and FOR xx resp. (xx stands for the relevant size)

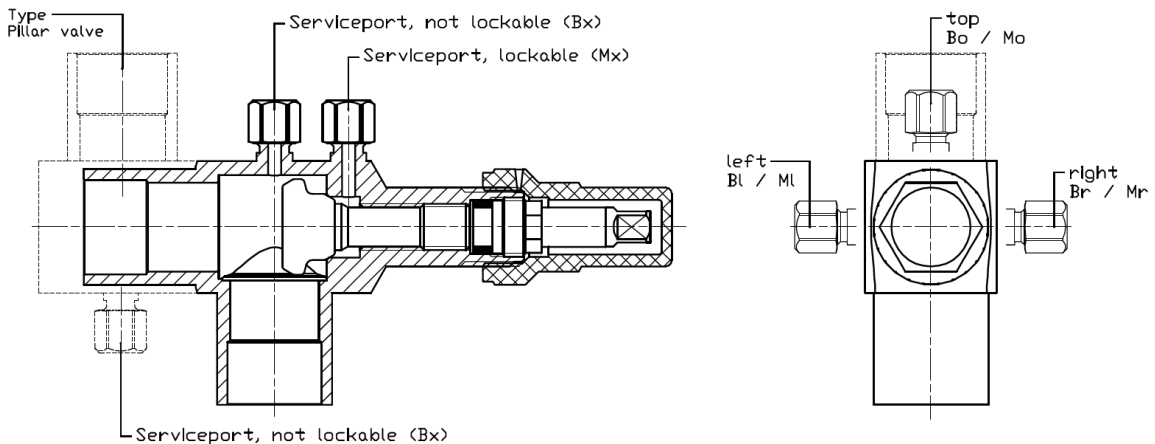
**Connection "J"** – Detachable threaded connection with cylindrical pipe thread acc. ISO 228, designed as connection with male (AG G) or female (IG G) thread for use of a metal gasket as sealing element.  
Abbreviated designation: AG G xx and IG G xx resp. (xx stands for the relevant size)

Other connections can be agreed separately and are described in the relevant technical documents of the product.

- Design, function and arrangement of service connections:

The valve can be provided with shut-off and/or non-shut-off connections for measuring or filling devices. As standard the connection comes as detachable threaded connection with a 90° sealing cone of SAEM ¼" size and closed with a metal-seal blind plug. Other designs, e.g. ODS, NPTF, etc. are available on request.

Function and arrangement:



- The valve is supplied with a temporary galvanic corrosion protection. The coating provides for a corrosion protection until installation if transported and stored in dry condition.

## 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 service connections.
- A safe actuation of the spindle (opening and shutting off) at the required torques must be possible.
- 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

- Unless specified otherwise in the technical documentation the supplied valve is 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!**

Possible damage of interior components.  
 Malfunction due to oxidation/contamination of internal components.  
 Remove the transport protection shortly before mounting.


- For connections A through C only: The spindle must be in center position. Before moving the spindle, loosen the gland seal by ¼ turn. Do not put on again the spindle cap and keep it until mounting is complete.



**ATTENTION!**


Possible damage of interior components.  
 Malfunction of the valve thermal overload.  
 Spindle must be in center position for thermal joining methods.

## Connecting pipe / system


- For connections A through C only:  
 The pipe must be of a dimension that fits the valve. If not, use adapters.  
 Prepare the system connections so (bare metal and free from grease) that a high-quality joint can be achieved.  
 Scavenge the relevant pipe sections with shielding gas during brazing and welding. A cooling of the valve body is recommended. Then, cool down the system connection in the air.

	<b>WARNING!</b>
	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)!


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

	<b>ATTENTION!</b>
	Possible damage of interior components. Malfunction due to oxidation of internal components. Scavenge with shielding gas while joining.

Clean the pipe connections made. Flux material residues from brazing 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).

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

- For connections D through J only: Principles 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.  
 Provide for a mechanically unrestrained mounting. If available, use the wrench flats directly arranged at the connection to apply the necessary torques. For the rest use the housing wrench flats. 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).

	<b>WARNING!</b>
	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.

- For connection D only: Rendering screwed pipe union  
 For mounting the cap nut and the die ring and clamping ring resp. at the pipe and mounting the pipe at the valve follow the instructions by the component manufacturer.

4. For connection E only: Rendering flange connections  
Mount the valve using the relevant gasket (bead or fibre gasket) to the mating piece with the dimension matching the connection. Tighten the screw joint in a criss-cross manner in min. 2 steps applying the indicated torques.

Thread	Tightening torque (in Nm) at strength class 8.8
M8	25 ±5
M10	50 ±5
M12	100 ±10

5. For connection F only: Rendering a Rotalock connection  
Place the PTFE seal ring fitting the screw joint into the groove of the adapter. Then, tighten the Rotalock connection applying the specified torque.

Rotalock size	Thread	Tightening torque (in Nm)
RL 3/4"	3/4-16 UNF	30 +10
RL 1"	1-14 UNS	60 +10
RL 1 1/4"	1 1/4-12 UNF	100 +10
RL 1 1/2"	1 1/2 -12 UN	125 +10
RL 1 3/4"	1 3/4 -12 UN	150 +10
RL 2	2 -12 UN	160 +10
RL 2 1/4"	2 1/4-12 UN	170 +10

6. For connection G only: Rendering the flared coupling

Nominal outer diameter EN 12735	Tightening torque (in Nm)
6 mm / 1/4"	14 +4
10 mm / 3/8"	33 +9
12 mm / 1/2"	50 +12
15 /16 mm / 5/8"	63 +14
18 mm / 3/4"	90 +20

7. For connection H only: Rendering screw joints with NPTF thread  
Tighten the valve and the relevant mating piece apply the following torques.


Thread	Tightening torque (in Nm)
1/8 NPTF	10 +3
1/4 NPTF	20 +3
3/8 NPTF	42 +5
1/2" NPTF	60 +10
3/4" NPTF	90 +10
1" NPTF	140 +10

For the NPTF connection thread sealants may be used.

8. For connection I only: Rendering a screw joint according to IMACA 305  
Fit the right O-ring onto the cylindrical connecting piece of the female connection component. Initially fasten the cap nut finger-tight. Then, tighten the connection apply the specified torques.

IMACA SIZE	Thread	Tightening torque (in Nm)
4	7/16-20 UNF	7 +3
5	9/16-18 UNF	11 +3
6	5/8-18 UNF	15 +3
8	3/4-16 UNF	20 +5
10	7/8-14 UNF	30 +5
12	1 1/16-14 UNS	40 +5

9. For connection J only: Rendering the screw connection with cylindrical pipe thread  
Mount the mating piece as specified by the component manufacturer.
10. For service connections only: If necessary, use the service connections for the installations of other system components.

	<p><b>WARNING!</b> Possible malfunction of safety devices. Serious injuries and system failures possible during operation. No connection of safety devices at shut-off service connection.</p>
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The following torques apply to the service connection:

Connection	Torque in Nm
Connection "G" SAE 1/4	Cap nut 5 +5 Flare cap nut 14 +4
Connection "G" SAE 3/8	Cap nut 15 +5 Flange nut 33 +9
Connection "H" 1/8"-27 NPTF	15 +5
Connection "D" CEL6 (24° cone ISO8434)	Blind plug 8 +2Nm

For the NPTF connection thread sealants may be used.

11. Depending on the intended condition the spindle must be fully open or closed. Then, tighten the gland seal apply the torque specified. Now, firmly tighten the spindle cap. In case of a module assembly, shut the pipe ends using dust caps until further use.
12. The following torques apply when it comes to the operation of the spindle and screwing of the protective spindle cap depending on the valve size (in Nm):

Valve size	Spindle position		Gland	Protective spindle cap	
	closed	open		Plastics	Aluminium
S19 / 6kt19	15 +5	12 +2	12 +5	14 +2	40 +10
S22 / E22 / 6kt22	20 +5	12 +2	12 +5	14 +2	40 +10
S30 / E30 / 6kt30	25 +10	15 +2	15 +5	14 +2	40 +10
S36	40 +10	17 +5	17 +5	14 +2	40 +10
S40 / E40	40 +10	17 +5	17 +5	14 +2	40 +10
S50 / E50	50 +10	17 +5	17 +5	14 +2	40 +10

## **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 resistance to pressure by suitable means (e.g. helium, dry nitrogen).



### **DANGER!**

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

2. The application of an anticorrosive coating that suits the operating conditions is absolutely necessary for steel valves (valve series S and 6kt) and may be necessary for stainless steel valves (series E and E\_NH3). Make sure that the manufacturer's instructions remain legible.



### **CAUTION!**

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



### **ATTENTION!**

Loss of product conformity due to loss of lettering.  
Warranty becomes null and void.  
Lettering must be legible.

3. 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.

4. Depending on the intended operating condition the spindle must be fully open or closed (loosen/tighten gland seal). Then tighten the protective spindle cap apply the torque specified (see chapter "Mounting").



### **WARNING!**

Any excessive torque or non-compatible connections may cause failures.  
Serious injuries and system failures possible during operation.  
Observe the torques.

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



### **CAUTION!**

Cracks by vibration load in pipe system and on the valve possible.  
Serious injuries and system failure during operation possible.  
Avoid strong vibrations, take protection measures if necessary.

## Operation, Maintenance and Repair

### Principles

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



**WARNING!**

Media contact possible, contact with hot/cold surfaces.

Burns, frostbites

Wear personal protective equipment as prescribed by national regulations during maintenance and inspections.

- If the valve spindle has to be operated for system maintenance, carefully remove the protective spindle cap. If no pressure compensation can be effected, put the protective spindle cap in place again and tighten it. If so, it indicates a malfunction of the valve and the system has to be stopped without delay.



**WARNING!**

The protective spindle cap is pressure-tight and may be pressurized.

Serious injuries possible.

Slowly remove the protective cap of the spindle. Allow any service fluid to escape from inside the cap if necessary.

- Then, put the spindle in the correct position applying the necessary torques (see chapter Mounting) (loosen/tighten the gland seal). A leak test is absolutely necessary. Upon completion of work put the protective spindle cap in place again.



**DANGER!**

Danger of valve bursting.

Most serious injuries possible.

The test pressure must not exceed the allowable pressure (PS).

Always observe the safety regulations (e.g. DIN EN 378).

### Repair

- If the valve needs repair, shut down the system, drain the refrigerant from the system (or system section) in an environmentally friendly manner and vent the system.



**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 AWA spare parts. For mounting/start-up follow these operating instructions. It is indispensable to do a leakage and strength test once again. AWA assumes no warranty for tightness after repairs.



**WARNING!**

Valve damage due to defective spare parts/mounting.

Avoidable serious injuries and system failure possible.

Use no other than original AWA spare parts for repairs.

## 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!**

Possible escape of refrigerant.  
Escaping 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 as prescribed by national regulations during maintenance and inspections.

- The valve and its components can be recycled:

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







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