



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

FAS Refrigerant Filter



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



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Safety

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

The filter incorporates state-of-the-art technology and has been built according to the applicable regulations. Great value 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 filter.

Authorized personnel

Only trained and instructed personnel shall be allowed to do any work on the filter 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 filter. 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

	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 filter.
	WARNING! 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 filter to fail.
	CAUTION! 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 filter.
	ATTENTION! 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 filter.

General safety information

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

Instructions to prevent hazards in all cycles of service life:

	DANGER! Burst hazard 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 filters as transport, lifting or lashing point.
	WARNING! Risk of bursting in an environment causing stress corrosion cracking. Most serious injuries and immediate system failure possible. Observe the environmental conditions for brass!
	WARNING! Any non-observance of the instructions may cause the filter to fail. Avoidable serious to very serious injuries or death possible. Installation, operation and maintenance by authorized trained 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. 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. respirators, gloves).

Other information

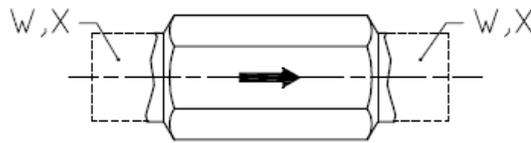
The information contained herein represents to the best of our belief our knowledge at the time when these instructions were prepared. It shall serve as code of practice to ensure a safe handling of the filter in transport, storage, installation, commissioning, maintenance and dismantling/disposal. A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

Any modification of the filter 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 filter

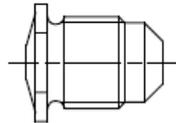
Construction types (combination options of connections)

FAS refrigerant filter
brass

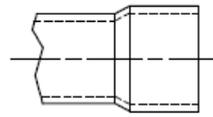


connections for refrigerant filter
brass

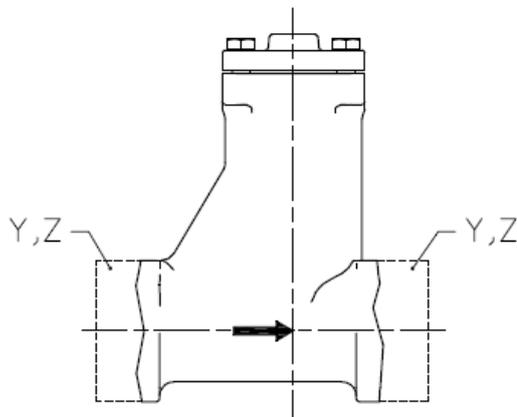
A
flare coupling
male for W



B
brazed connection
for X

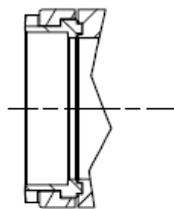


FAS refrigerant filter
cast iron

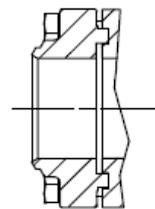


connection for refrigerant filter
cast iron

C
brazed flange
for Y



D
welded flange
for Z



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

Product description

The refrigerant filter has been specially designed for use in the suction line of a refrigeration or air-conditioning system and is to protect the compressor from contamination in a sustainable and reliable fashion. It may also be installed in other parts of the system (e.g. discharge line).

Three types of refrigerant filters are available:

- "Cast detachable" (filter cartridge can be replaced)
- "Brass detachable" (filter cartridge can be replaced/removed)
- "Brass non-detachable" (complete refrigerant filter needs to be replaced).

The arrow indicates the flow direction.

The filter is in compliance with DIN EN 12284:2003 and Pressure Equipment Directive 2014/68/EU.

Identification

The filter is marked in accordance with DIN EN 12284 by lettering:

- Manufacturer's logo
- Type designation
- Date of manufacture
- Permissible pressure in bar
- Nominal diameter
- Housing material

Technical parameters

Pressure/Temperature allocation:

Depending on the data given in the technical documentation.

Service fluids:

Refrigerants according to DIN EN 378-1-2012, PED fluid group 2 and associated refrigerator oils according to DIN 51503-1.

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

Mesh size of filter cartridges:

Refrigerant filter brass: 0.12mm

Refrigerant filter cast DN 15 to DN 25: 0.15mm

Refrigerant filter cast DN 32 to DN 50: 0.27mm

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/EU):

See information given in the technical documentation.

From category I components get the  mark (and number of notified body if required).

Design Features

- The material of the filter components and the manufacturing method are selected in conformity with the EN12284:2003 and Pressure Equipment Directive 2014/68/EU thus guaranteeing the reliability for the operating range indicated.
- The use of heat-resistant materials and connecting elements obviates the need of dismantling the filters when the system is installed. The "cast detachable" and "brass non-detachable" types come tested for leak tightness. The "brass detachable" type comes pre-assembled finger-tight.
- Types of connection

Connection "A" – Detachable flared flange 90° with male connection to render a joint with copper pipes (OD 10 to 22 mm or 3/8" to 7/8") and cap nut.

Connection "B" – Brazed capillary connection to render a brazed joint with copper pipes according to DIN EN 12735-1:2010 for outside diameters of 10 to 22 mm or inch-type pipes 3/8" to 7/8".

Connection "C" – Detachable capillary connection to render a brazed joint with copper pipes according to DIN EN 12735-1:2010 for diameters of 12 to 54 mm. Inch-type pipes on request. The flanged connection is a tongue and groove joint with fibre gasket.

Connection "D" – Detachable welded connection for use of steel tube dimensions according to DIN EN 10220:2003-03. The flange connection is a tongue-and-groove system with fibre gasket.

- The "Cast detachable" type comes with a 2-component prime coat, grey. If transported and stored in dry condition this coat protects the filter against corrosion until installation.
- The "Cast detachable" type comes with steel or stainless steel internals. It is thus possible on request to use ammonium as refrigerant.
- Because of the service-friendly design of the types "detachable" spare parts (e.g.r filter cartridges, gaskets, flanges) can be purchased separately.

Transport and Storage

Transport the filter by closed means of transport in the original packing protected against weather influences and store it in dry rooms.

Mounting

Principles

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

	DANGER!
	Damage of filter possible. Serious injuries and system failure possible during operation. Filter to be installed without additional loads (forces, vibrations). The filters must not be used as fixing points of pipes.

- For the "cast detachable" type it is necessary to provide a nominal size-dependent space for cleaning and replacement of the cover flange assembly with filter cartridge as given in the table.

Nominal dia.	Cover flange assembly Filter cartridge
DN 15	> 100 mm
DN 20/25	> 140 mm
DN 32/40	> 150 mm
DN 50	> 200 mm

- For the "brass detachable" type it is necessary to provide a nominal size-dependent space for cleaning and replacement of the assembly with filter cartridge as given in the table.

Nominal dia.	Filter cartridge assembly
DN 6/10	> 50 mm
DN 12	> 60 mm
DN 15/16/18	> 70 mm
DN 22	> 90 mm

- Only authorized personnel shall be allowed to mount the filter.

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

- No modifications of the filter permitted. If modifications become necessary, they have to be agreed with the manufacturer prior to mounting.

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

Mounting preparation

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

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

- Connections C & D only: Remove connecting parts (flange bolts, connecting flange, gasket). Safekeep these components for future use.

Connection the pipe

1. The pipe must be of a dimension that fits the filter. If not, use adapters.
2. Prepare the system connections so (bare metal and free from grease) that a high-quality joint is possible.
3. Scavenge the relevant pipe sections with shielding gas during brazing and welding. A cooling of the filter casing is recommended for the B-type connection. Then, cool down the system connection in the open air.


WARNING!

Damage of filter due to excessive heating possible.
 Serious injuries and system failure during operation possible.
 Never heat up system connection above 700°C.
 Direct the flame away from filter.


WARNING!

Damage of filter (e.g. cracks) due to rapid cooling possible.
 Serious injuries and system failure during operation possible.
 Allow the joint to cool down in the open air.


ATTENTION!

Damage of internal components possible.
 Malfunction due to oxidation of internal components.
 Scavenge with shielding gas while doing the joining.

4. Clean the pipe connections rendered. Flux material residues are very corrosive and may cause long-term damage.


CAUTION!

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

5. Connections A to D only in connection with detachable filters: Mount the pipes and connecting parts. Make sure there is no mechanical constraint. Tighten the mounting flanges crosswise at min. two steps applying the prescribed torques (see chapter "Operation").


WARNING!

Excessive torques or non-observance of the mounting order may result in failures.
 Serious injuries and system failure during operation possible.
 Observe the torques

6. For pipe installation the following torques (Nm) apply to the "brass detachable" type (flanged screw fitting)

Flanging size	Threads	Copper pipe inch-type / metric	Torque Union nut
SAE 3/8"	5/8" - 18 UNF	3/8" 10	33 +9
SAE 1/2"	3/4" - 16 UNF	1/2" 12	50 +12
SAE 5/8"	7/8" - 14 UNF	5/8" 16	63 +14
SAE 3/4"	1 1/16" - 12 UNF	3/4" 18	90 +20
SAE 7/8"	1 1/4" - 12 UNF	7/8" 22	110 +20

7. The "brass detachable" type requires the following torques (Nm) to screw the filter casing:

Nominal dia.	Brass union nut
DN 6/10	3/4 UNF 50 +12
DN 12	7/8 UNF 63 +14
DN 15/16/18	1 1/16 UNS 90 +20
DN 22	1 ¼ UNF 110 +20

8. The "cast detachable" type requires the following torques for screwing.

Nominal dia.	Bolts Flanges	Bolts Cover flange
DN 15	M12 85 +10	M6 10 +3
DN 20/25	M12 85 +10	M8 25 +5
DN 32/40	M12 85 +10	M10 45 +5
DN 50	M12 85 +10	M12 85 +10

Commissioning

Principles

- The filter has already been tested for leakage and strength by the manufacturer.
- The filter 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 DIN EN 378-2:2012 check again for leakage and strength and an effective corrosion protection.

Steps of commissioning

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

	<p>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).</p>
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2. Filter type "cast detachable": A corrosion protection adapted to the operating conditions is indispensable because the filter comes with a temporary corrosion protection only. Make sure the manufacturing data remain legible.

	<p>CAUTION! Delayed failure due to corrosion possible. Serious injuries and failure of system during operation possible. Apply a suitable anticorrosive coat.</p>
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	<p>ATTENTION! Loss of product conformity due to removal of name plate. Loss of warranty claims. Name plate shall remain legible.</p>
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3. Evacuating and filling the system with refrigerant.

	<p>DANGER! Danger of bursting if operated beyond the technical parameters. Most serious injuries possible. Observe the technical parameters of the filter. Make sure the system is not filled with an excessive amount of refrigerant.</p>
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4. Upon initial commissioning check the pipes for any abnormal vibration and record the operating data.

	<p>CAUTION! Cracks of the piping and the filter due to dynamic loads possible. Injuries and system failure during operation possible. Avoid heavy vibrations. Take safety measures if need be.</p>
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Operation, Maintenance and Repair

Principles

- The filter 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.

	<p>WARNING! Media contact possible, contact with hot/cold surfaces. Burns, frostbites Wear personal protective equipment as prescribed by national regulations during maintenance and inspections.</p>
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- If maintenance shows that a proper flow is no longer guaranteed, remove and clean the filter cartridge or replace the entire filter (type non-detachable).

Repair

- If the filter needs repair or cleaning or changing of filter elements, shut down the system, drain the refrigerant from the system (or system section) in an environmentally friendly manner and ventilate the system.

	<p>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.</p>
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- For repairs use no other than original 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.

	<p>WARNING! Filter damage due to defective spare parts/mounting. Avoidable serious injuries and system failure possible. Use no other than original spare parts for repairs.</p>
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Dismantling and Disposal

Principles

- To dismantle the filter, shut off the system, remove the refrigerant from the system (or system section) in an environmentally friendly manner and sufficiently ventilate 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 filter and its components can be recycled.

Casing:	depending on the type: brass scrap, grey cast scrap
Internal parts of filter:	stainless steel or steel scrap
Dust caps:	plastics (PE)



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