

# Manual Compressed Air Filter

Rev 01\_1024



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## **1. Introduction**

These installation and operating instructions are intended to help users become familiar with the product and use it in accordance with its specified applications. Moreover, these instructions provide important information on safe, correct and economical operation. All instructions contained in this manual must be implemented as specified in order to prevent danger and/or damage.

Additionally, the relevant regional regulations on accident prevention and the recognized technical code of practice for safe and correct operation must be applied. All persons engaged by the user with the installation, commissioning, maintenance, repair and monitoring of the product must have read and understood this manual. The manual must always be available at the operating site.

## **2. Guarantee**

KSI ECOCLEAN air filters are manufactured in compliance with the state of the art and are subjected to a comprehensive inspection, including safety features, before delivery. However, dangers to persons and property may still occur if:

- the operating personnel is not trained
- the product is not used in accordance with its intended use
- the instructions in this manual are not implemented
- the product is not maintained and serviced in compliance with the manufacturer's specifications
- no original parts from the manufacturer are used
- the filter continues to operate despite a demonstrable defect.

Any of these factors may lead to automatic invalidation of any claims under guarantee.

### 3. Used symbols



Warning: positive-/negative pressure!



Use hand protection!



Warning: biohazard!



General warning!

### 4. Operation



The personnel employed for installation, commissioning, maintenance, servicing and for daily operation must have the appropriate qualifications for their tasks. In particular, the personnel must have:

- Know-how and experience in handling compressed air and be aware of the corresponding dangers,
- full knowledge of the contents of this manual,
- the appropriate training or qualification.



Before starting any work on the device, the housing must be depressurized.



For safe operation, the product must always be used within the specified operating limits (in particular for operating pressure, operating temperatures, volumetric flow rates and material strength/resistance).

For versions with condensate drain, make sure that the device is designed for the specified compressed air or gas flow rate.

For safety and operating reasons, the compressed air supply must immediately be cut off in the event of any leakage, and the leak must be remedied.

In case of sterile filters, hygiene compliance measures should be taken.

The filters, including all accessories, must be regularly inspected. In particular, the correct functioning of the condensate drain must be verified.

## 5. Safety instructions

The filter has been built according to state-of-the-art technology and actual safety standards. However, there is a risk of danger that every person working with the filter must be aware of. In particular, improper handling of compressed air may result in serious injury or death. If you are not experienced in using pressure equipment, please ask the relevant experts for help.

- In order to prevent personal injury or damage to the equipment, the safety notes must be observed when using this filter.
- Observe the specific safety notes in the relevant chapters.
- Observe the legal guidelines and the accident prevention regulations.
- Observe the safety notes of the local site regulations.

### Overpressure

The filter is pressurised. Suddenly escaping compressed air may result in serious injury. Do not carry out mechanical work on the filter as long as the filter is pressurized.

### Hot surfaces

Depending on the temperature of the compressed air the filter surfaces may be very hot. Unprotected touching of these surfaces may cause burns. Avoid direct contact to these surfaces. Restrict access to the surfaces, if necessary, or install thermal insulation on the hot components. Never exceed the maximum allowable temperature of the filter.

### Overload

The filter must only be operated with compressed air within the operating conditions. Exceeding the maximum allowable operating conditions may result in serious injury or death. It is the duty of the operator to ensure that the connected pressure source is safeguarded that the maximum allowable operating pressure and the minimum and maximum allowable temperatures are not exceeded.

### Unauthorized modifications

Modifications to the filter may result in dangerous operating states. Violations may cause serious injury or death. Never modify the filter function by means of conversions. Never carry out welding work on pressure-bearing parts. Any modifications of the filter must be agreed on with the manufacturer and confirmed in writing.

### Suspected misuse

Using the filter for unintended purposes may result in dangerous situations. Violations may cause serious injury or death. Never use the filter as a climbing aid. Never use the filter as a support for external weight loads. Never use filter components for unintended application purposes.

## 6. Installation & commissioning



The filters are carefully tested in the factory and are handed over to the shipping contractor in perfect condition. However, please inspect the goods for any visible damage and, if any such damage is observed, please enter a comment to this effect on the reception slip. The manufacturer is not responsible for any damage in transit (as a general principle, all deliveries are „ex works“).

### Performance data:

The filter housings may only be installed under the following operating conditions:

Maximum pressure:  $R_p \leq 2'' = 232 \text{ psi}$

$R_p = 2 \frac{1}{2}'' = 195,75 \text{ psi}$

$R_p > 2 \frac{1}{2}'' = 152,25 \text{ psi}$

Minimum pressure for all housings: 22 psi

Maximum operating temperature: 248 °F

Minimum operating temperature: 33,8 °F

Deviation in vacuum filters:

Maximum operating vacuum: -13,3 psi

Maximum operating temperature filter elements: 248 °F

Maximum operating temperature filter element CA: 122 °F



### Position:

The housing must be installed vertically. When installing, the specified flow direction must be observed (indicated by arrow). Any possibility of transmitting of vibration from piping networks to the filter housing must be eliminated. Make sure that there is sufficient space underneath the bottom of the housing to replace the filter elements. Please also comply with the maximum temperature specifications. Ensure sufficient clearance to the wall, so that e.g. you have space to insert a belt-type filter wrench.

### Installation:



After you have selected the position in the pipe according to the preparation stage and the given temperature conditions, fit the appropriate connectors for the filter connection type in order to couple the filter to the existing pipe. Depending on the size of housing, it is recommended to install the filter top first and then screw on the bottom of the housing after installation. For this purpose, unscrew the bottom half of the filter clockwise. Fit the filter top in the pipeline (which must of course first be depressurized) and then screw the bottom half of the filter counter-clockwise back onto the filter top. Make sure that the O-ring in the filter top is correctly positioned and the element is placed in the suspension in the filterbowl. We recommend the installation of a shut-off device upstream and downstream of the filter. By this, the filter housing can be removed separately for maintenance.

After installation, open slowly the inlet valve (not included in delivery). Check that all screwed connections are free of leaks. In the event of leakage, immediately shut off the pressure supply to isolate and seal all leaks. Please note that in case of float-type condensate drains the float may rise only up to a specified pressure limit. This must have occurred at 44 psi at the latest.

## 7. Transportation & storage



Even with precaution damages caused by transportation cannot be ruled out. Therefore, always check the filter for damages after transportation and packaging removal. The haulage contractor and the manufacturer or the sales partner must be informed about any damage immediately.

To maintain the filter quality the filter must be stored at a suitable location and properly prepared for storage.

Store the filter in the supplied transport packaging. If necessary, the filter should be protected against dust using an additional cover.

The place of storage has to fulfil the following requirements:

- indoors
- protected against weather impact (Frost-free)
- dry.

## 8. Technical data

Detailed information on the technical data can be found on our homepage in the downloads section:

Open the link

<https://ksi-technologies.com/downloads/technical-data-sheets/compressed-air-filters/>

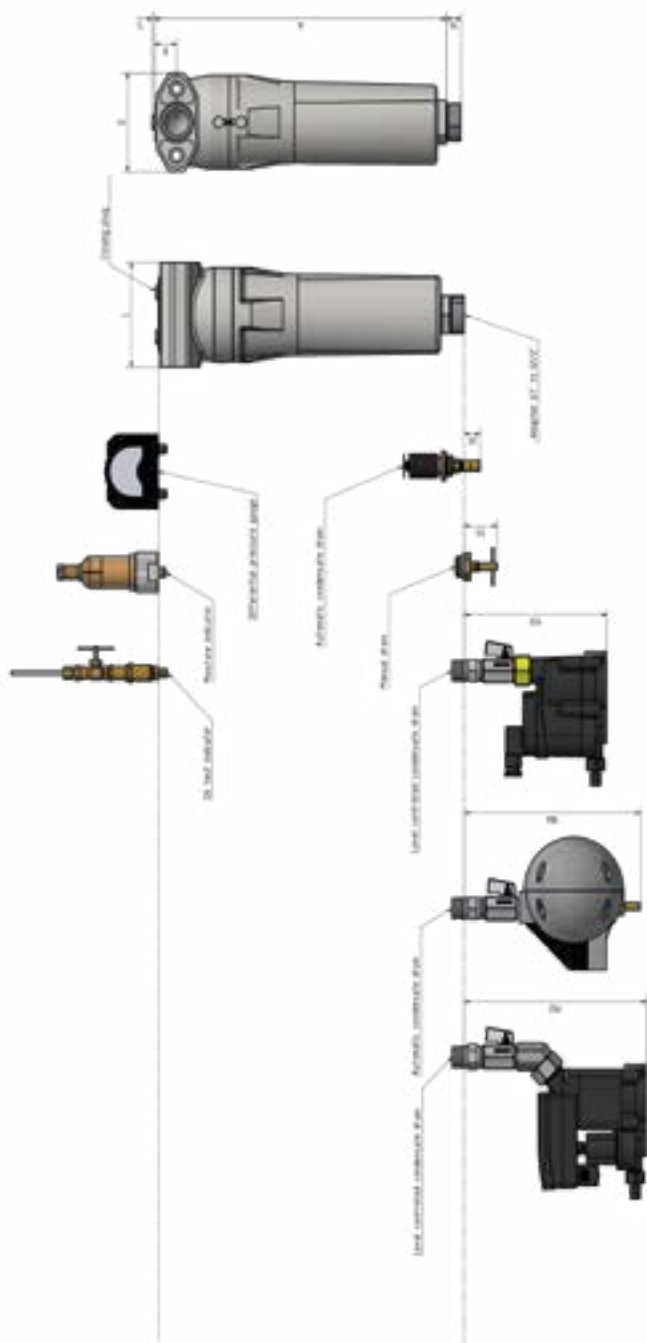
or scan the QR code!



## 9. Accessories

Accessories	Filter
wall mounting brackets, including filter connection set	•
filter connection set	•
differential pressure gauge DPN	•
manual drain HAM12	•
automatic condensate drain D150/D200	•
KONDRAIN series of fully automatic condensate drains	•
oil test indicator A4000-120	•
moisture indicator FI	•





## 10. Filter APF

### 10.1 Areas of application

KSI ECOCLEAN filters are designed to remove particulate matter, aerosols, oil vapours and odours from non-aggressive compressed air and technical gases. Depending on the specific application, different validated filter elements can be installed.

WS	Metal element with centrifugal effect for initial separation of water vapour and aerosols.
VF25	Coarse filter element for separating impurities up to 25 µm particle size
FF5	Pre-filter element for separating coarser dirt concentrations in a solid or liquid state
MFO	Fine filter element for separating aerosols up to 0,5 mg/m <sup>3</sup> and particulate matter up to 1 µm particle size
MF1	Fine filter element for separating aerosols up to 0,1 mg/m <sup>3</sup> and particulate matter up to 0,1 µm particle size
SMA	Ultra-fine filter element for separating aerosols up to 0,01 mg/m <sup>3</sup> and particulate matter up to 0,01 µm particle size
CA	Activated carbon filter element for separating oil vapours up to 0,003 mg/m <sup>3</sup>
DMF	Dust fine filter element for separating particulate matter up to 1 µm particle size
DSF	Dust ultra-fine filter element for separating particulate matter up to 0,01 µm particle size
VP MFO	Vacuum pump protection filter for a filtration of particles, humidity vapour and aerosols
V MFO	Vacuum pump exhaust filter for a filtration of particles and dust up to 1 micron, oil carry over at 68 °F 0,5 mg/m <sup>3</sup>
V SMA	Vacuum pump exhaust filter for for a filtration of particles and dust up to 0,01 micron, oil carry over at 68 °F 0,01 mg/m <sup>3</sup>
V CA	Activated carbon element for vacuum pump exhaust filters for separation of oil vapour and odours up to a value of 0,003 mg/m <sup>3</sup>
VMS	Medical sterile filter for vacuum devices to protect centralised hospital vacuum plant installations from liquid, solid and bacterial contamination up to 0,0001 % regarding to BS3928

SE	Sterile filter for bacteria removal with sterilizable filter element according to BS3928; Contamination capability 0,0001 %
CAK	Activated carbon cartridge for separating oil vapours up to 0.003 mg/m <sup>3</sup> and odours.
MSK	Molecular sieve cartridge as final dryer stage for compressed air dehumidification by adsorption to a pressure dewpoint of -40 °F.

## 10.2 Function

### Filter WS

This type of filter is based on the principle of the „cyclone separator“. Due to the construction of the water separating element, the air is swirled in a rotary movement, centrifugating the water vapour molecules to the housing. In this type of filter, the air flows through the filter from the outside inwards.

### Filter VF25, FF5, MFO, MF1, SMA

Filter elements with the specifications VF25, FF5, MFO, MF1 and SMA, separate solid particles by collision and inertia effects, whilst oil and water aerosols are separated by the coalescence effect. Due to gravity, the filtered liquid particles accumulate at the bottom of the filter, from where they are manually or automatically drained. The flow direction is from inside to outside.

### Filter CA

The activated carbon element adsorbs oil vapours and odours, which are imbedded in the activated carbon. An SMA filter must be installed upstream of this CA element in order to reduce aerosols, water vapour and smallest particles before they reach the element. This upstream filtration increases the adsorption capacity of the activated carbon element. The flow direction is from inside to outside.

### Filter DMF, DSF

The dust filter elements with the specifications DMF, DF1 and DSF, separate solid particles by collision and inertia effects. Due to gravity, the filtered liquid particles accumulate at the bottom of the filter, from where they are drained. The flow direction is from outside to inside.

### Filter VP MFO, V SMA, V MFO

With the filter elements of specifications MFO and SMA solids are separated by impact and inertia effect, oil- and water aerosols by the coalescence effect. By gravity, filtered liquid particles accumulate in the lower filter container and are drained manually or automatically. The flow direction is from outside to inside.

#### Filter V CA

The activated carbon element adsorbs oil vapour and odours, which are imbedded in the activated carbon. Upstream sub-micro filtration is recommended to filter aerosols, water vapour and smallest particles. This prolongs the lifetime of the intake capacity of the element. The flow direction is from outside to inside.

#### Filter VMS

In the first step this filter element separates liquid particles by gravity and drops them into the lower parts of the filter. A dry operation is recommended. Fine layers of filter media separate bacteria.

#### Filter SE

This filter element is made with a very good sealing material to hold back bacteria. This bacteria is killed by hot vapour at a min. temperature of 280 °F. The element should be sterilized once a month in an autoclave. The sterilization process can be done up to 50 times. Never take the element into a disinfection bath!

#### Filter CAK

This filter element also adsorbs oil vapours and odours and imbeds them in the activated carbon. Again, an SMA stage must be installed upstream. The cartridge includes an integrated dust fine filter element of class DMF in order to separate any dust. The quantity of activated carbon in the cartridge is much greater than in the conventional CA element. Please pay attention to the design data of the cartridge series.

#### Filter MSK

In this cartridge solution, water vapour molecules are imbedded in the open pores of the desiccant, thereby dehumidifying the compressed air. These elements must be operated with SMA-stage prefilters. Installation downstream to refrigeration dryers is recommended. The cartridge includes an integrated dust fine filter element of class DMF in order to separate any dust. Please pay attention to the design data of the cartridge series.

## 10.3 Maintenance

### Replacement of filter elements:



Depressurise the housing. Secure the shut-off valves so that they cannot be accidentally opened. Check that the unit is unpressurized by manually opening the condensate drain. Use only a suitable tool to unscrew the bottom half of the filter.



Unscrew the bottom half of the housing anti-clockwise.

Take the element out of the filter bowl.



Take the new filter element from its cartonnage, grease the O-ring (we recommend food industry grease), and put the element in the filter bowl. Please make sure that the three wings are positioned in the respective spots inside the bowl. Check the O-ring in the filter housing and apply grease here too if necessary. Also grease the thread of the lower part of the filter.

Remove any dirt from the bottom half of the filter, and then rescrew it clockwise to the filter head.

Reopen the compressed air supply slowly and check for leaks. In the event of any leakage, immediately depressurize the system and fix the leaks.

### Replacement of condensate drain:



Due to adhesion and rust and dust particles, the condensate drain may have to be regularly replaced. In this case, first proceed as described above.

Turn the condensate drain clockwise at the flats (metric wrench size 15) to remove it. Then screw in the new condensate drain counter-clockwise in the same way.

**Please note that the removed components, in particular filter elements, are contaminated with compressor oils. These must be safely disposed in accordance with regional waste disposal guidelines and regulations for materials contaminated with oil!**

## 10.4 Maintenance schedule

Year	Filter type (see type plate)								Signature	Date	
	WS	VF25	FF5	MFO	MF1	SMA	CA	SE			
1/2	-	-	-	-	-	-	-	•	W		
1	-	•	•	•	•	•	•	•	E		
1 1/2	-	-	-	-	-	-	-	•	E		
2	-	•	•	•	•	•	•	•	K		
2 1/2	-	-	-	-	-	-	-	•	L		
3	-	•	•	•	•	•	•	•	Y		
3 1/2	-	-	-	-	-	-	-	•			
4	-	•	•	•	•	•	•	•	S		
4 1/2	-	-	-	-	-	-	-	•	T		
5	-	•	•	•	•	•	•	•	E		
5 1/2	-	-	-	-	-	-	-	•	R		
6	-	•	•	•	•	•	•	•	I		
6 1/2	-	-	-	-	-	-	-	•	L		
7	-	•	•	•	•	•	•	•	I		
7 1/2	-	-	-	-	-	-	-	•	Z		
8	-	•	•	•	•	•	•	•	A		
8 1/2	-	-	-	-	-	-	-	•	T		
9	-	•	•	•	•	•	•	•	I		
9 1/2	-	-	-	-	-	-	-	•	O		
10	-	•	•	•	•	•	•	•	N		

- = no maintenance  
• = maintenance

Year	Filter type (see type plate)							Signature	Date
	DMF	DSF	VP MFO	V MFO	V SMA	V CA	VMS		
1/2	-	-	-	-	-	•	-		
1	•	•	•	•	•	•	•		
1 1/2	-	-	-	-	-	•	-		
2	•	•	•	•	•	•	•		
2 1/2	-	-	-	-	-	•	-		
3	•	•	•	•	•	•	•		
3 1/2	-	-	-	-	-	•	-		
4	•	•	•	•	•	•	•		
4 1/2	-	-	-	-	-	•	-		
5	•	•	•	•	•	•	•		
5 1/2	-	-	-	-	-	•	-		
6	•	•	•	•	•	•	•		
6 1/2	-	-	-	-	-	•	-		
7	•	•	•	•	•	•	•		
7 1/2	-	-	-	-	-	•	-		
8	•	•	•	•	•	•	•		
8 1/2	-	-	-	-	-	•	-		
9	•	•	•	•	•	•	•		
9 1/2	-	-	-	-	-	•	-		
10	•	•	•	•	•	•	•		

- = no maintenance  
• = maintenance

Year	Filter type (see type plate)		Signature	Date
	CAK	MSK		
1/2	•	•		
1	•	•		
1 1/2	•	•		
2	•	•		
2 1/2	•	•		
3	•	•		
3 1/2	•	•		
4	•	•		
4 1/2	•	•		
5	•	•		
5 1/2	•	•		
6	•	•		
6 1/2	•	•		
7	•	•		
7 1/2	•	•		
8	•	•		
8 1/2	•	•		
9	•	•		
9 1/2	•	•		
10	•	•		

- = no maintenance  
• = maintenance