

Installation and Operating Manual

Compressed air filter

KAESER FILTER F6 – F320; ECO-DRAIN 31 VARIO

No.: 901785 08 USE

Read this manual before using this product.

Failure to follow the instructions and safety precautions in this manual can result in serious injury or death.

Manufacturer:

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1 Technical Data

1.1 Options

The table contains a list of possible options.

➤ Enter options here as a reference.

Option	Option code	Available?
silicone-free (free of silicone)	F8	
Pressure differential gauge	F9	
Differential pressure transducer	F10	
Wall bracket kit	H22	
Electronic condensate drain	K5	—
Electronic condensate drain, floating relay contact	K6	✓
Manual condensate drain	K12	—
Automatic condensate drain	K13	—
Installed: ✓		
Not available: —		

Tab. 1 Options

1.2 Model designation of the compressed air filter

Compressed air filter

Product	Filter size	Degree of filtration
F: Air filter	6	KB: Basic: Coalescing filter KD: Dust Particulate filter KE: ExtraCoalescing filter KA: Adsorption Activated carbon filter KC: Cyclone Centrifugal separator
	9	
	16	
	22	
	26	
	46	
	83	
	110	
	142	
	184	
	250	
	320	
Example:		
F	22	KD
My compressed air filter:		

Tab. 2 Model designation of the compressed air filter

Filter element / cyclone insert

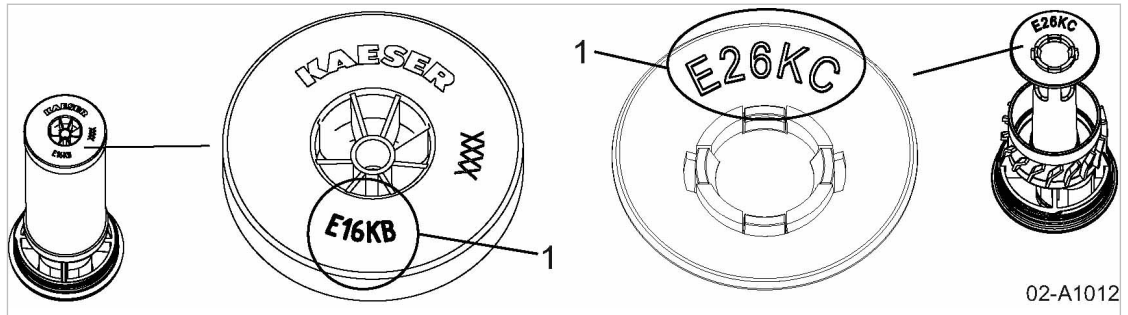


Fig. 1 Model designation of the filter element / cyclone insert (example)

① Model designation

Product	Filter size	Degree of filtration
E: Filter element	6	KB: BasicCoalescing filter
	9	KD: Dust Particulate filter
	16	KE: ExtraCoalescing filter
	22	KA: Adsorption Activated carbon filter
	26	KC: Cyclone Centrifugal separator
	46	
	83	
	110	
	142	
	184	
	250	
	320	
Example:		
E	16	KB
My filter element:		

Tab. 3 Model designation of the filter element

1.3 Operating limits



The compressed air filters can be used in various combinations.

Typical filter combinations:

- KBE:
Filter combination of filtration degree KB with downstream KE
 - KEA:
Filter combination of filtration degree KE with downstream KA
- Consult KAESER regarding the options you have.

Application: Compressed air filter KB, KE, KBE and KC

Degree of filtration	KB	KE	KBE	KC
Short description	Basic	Extra	Extra Combination	Cyclone
Suitable fluids	Air Nitrogen			
Fluid properties	non-corrosive incombustible non-toxic non-explosive stable			
Application	Simultaneous filtration of solid and liquid aerosols and solid particles	Same application as KB, but for higher compressed air quality	Same application as KE, but ensuring higher compressed air quality.	Removes condensate from the compressed air
Fluid quality at the inlet	Mostly free of condensate	Free of condensate	Mostly free of condensate	Contains condensate
Typical application near the compressor station	In contaminated compressed air lines (e.g., upstream of refrigerated dryers)	Downstream of compressed air dryers	In critical applications requiring a high compressed air quality standards (e.g., electronics, optics, etc.) Downstream of compressed air dryers Upstream of desiccant dryers	At high condensate levels in the compressed air (e.g., directly downstream of a compressor)
Typical application near the consumers	Compressed air filter for simple air quality	Compressed air filter for increased air quality Micro-particle filter according to degree of filtration KD	Compressed air filter for increased air quality	—
Direction of flow	From inside to outside			—

Tab. 4 Operating limits: Use of KB, KE, KBE and KC

Application: Compressed air filter KD, KA and KEA

Degree of filtration	KD	KA	KEA
Short description	Dust	Adsorption	Carbon Combination
Suitable fluids	Air Nitrogen		

1 Technical Data

1.4 Separation efficiency

Degree of filtration	KD	KA	KEA
Short description	Dust	Adsorption	Carbon Combination
Fluid properties	non-corrosive incombustible non-toxic non-explosive stable		
Application	Exclusively for the filtration of solid particles	Exclusively for the removal of oil vapors	Simultaneous filtration of aerosols, solid particles, and oil vapors
Fluid quality at the inlet	Free of condensate	Free of condensate and oil aerosols	Free of condensate
Typical application near the compressor station	Downstream of desiccant dryers and activated carbon adsorbers	—	—
Typical application near the consumers	Compressed air filter downstream of desiccant dryer and activated carbon adsorber	Downstream of compressed air filter with degree of filtration KE	Compressed air filter for the removal of odors and low concentrations of oil vapor
Direction of flow	From inside to outside		

Tab. 5 Operating limits: Use of KD, KA and KEA

Pressure and temperature

Degree of filtration	KB	KE	KBE	KD	KA	KEA	KC
Short description	Basic	Extra	Extra Combination	Dust	Adsorption	Carbon Combination	Cyclone
Permissible working pressure [psig] at the inlet	30 – 232						
Permissible fluid temperature [°F] at the inlet	40 – 150						
Permissible ambient temperature [°F]	40 – 120						
Compression stress	static						

Tab. 6 Operating limits: Pressure and temperature

1.4 Separation efficiency



The separation efficiency is often highly dependent on individual circumstances in the compressed air network (composition of the fluid, pressure and flow situation).

- Consult KAESER for advice on this subject.

Aerosol separation according to ISO 12500-1

Degree of filtration	KB	KE	KBE	KD	KA	KEA
Short description	Basic	Extra	Extra Combination	Dust	Adsorption	Carbon Combination
Differential pressure ¹⁾ in new state [psi]	<0.44	<1.02	<1.38	<0.58	<0.51	<1.23
Initial differential pressure at saturation [psi]	<2.03	<2.90	<2.90	—	—	<3.48
Residual aerosol content [mg/m ³]	<0.1	<0.01	<0.01	—	—	<0.01

¹⁾ at maximum volumetric flow

 Tab. 7 Aerosol separation (oil aerosol test concentration: 10 mg/m³)

Water separation according to ISO 12500-4

Degree of filtration	KC
Short description	Cyclone
Differential pressure ^{1) 2)} in new state [psi]	0.15 – 1.22
Degree of water separation ²⁾ [%]	97,0 – 99,7

¹⁾ at maximum flow rate

²⁾ type-dependent

Tab. 8 Water separation

Recommendation for suitable particle separation

We recommend degree of filtration KD in order to attain purity class 2 (acc. to ISO 8573-1).

In the case of more stringent requirements, we also recommend the degree of filtration KE as particulate filter.

Oil vapor adsorption

Oil (vapor): Hydrocarbon mixture from components with a chain length with more than six C atoms.

Measurement conditions:

- Clean fluid (for example, no oil vapors)
- Cooling oil approved by KAESER
- Maximum volumetric flow
- Working pressure: 101 psi
- Fluid inlet temperature: 68 °F
- Relative humidity: 0 %
- Oil aerosol test concentration: 10 mg/m³

If the aforementioned measuring condition is met, a residual oil content of <0.003 mg/m³ is to be expected.

**1.5 Option F10
Differential pressure transducer**

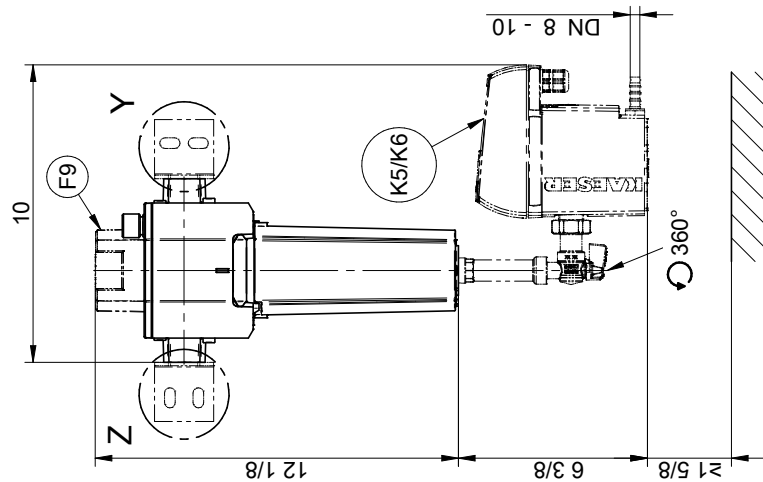
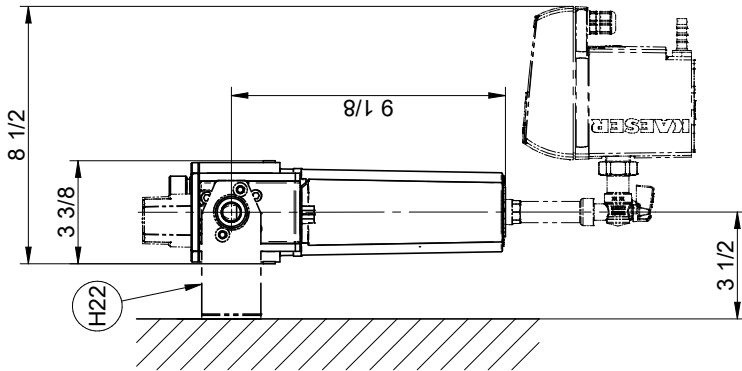
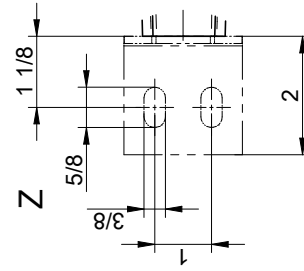
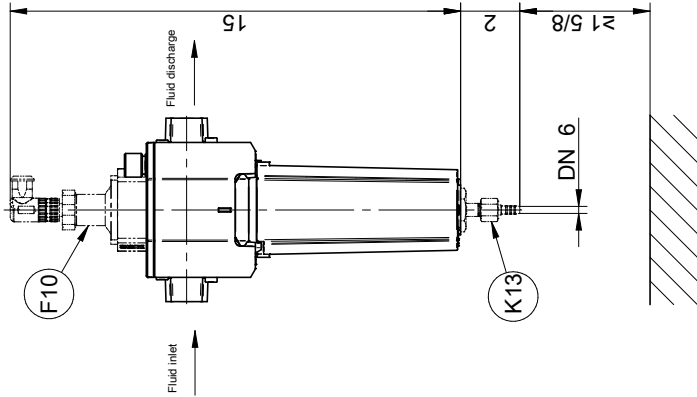
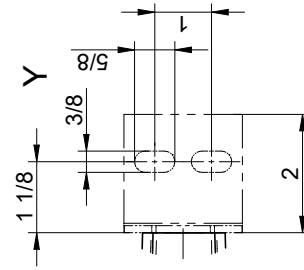
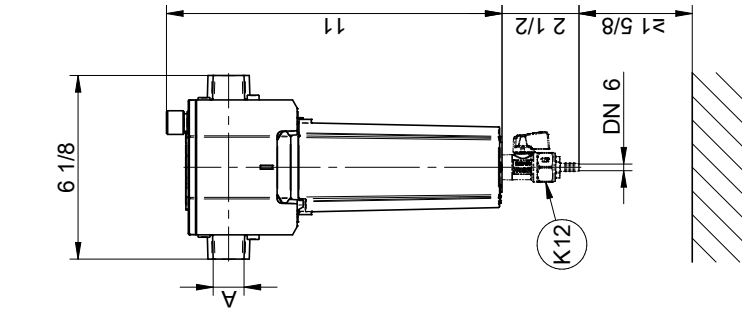
Input signals	Value
Differential pressure P_{Diff} [psi]	0.0 – 23.2
Relative pressure $P-$ [psi]	0.0 – 232.1

Tab. 9 Input signals

Output signals/auxiliary energy	Value
Differential pressure P_{Diff} [mA] (3-conductor)	4 – 20
Relative pressure $P-$ [mA] (3-conductor)	4 – 20
Supply voltage U_B [V _{DC}] (NEC Class2)	16 – 30
Maximum power consumption [mA]	52
Maximum permissible burden (measuring resistance) [Ω] $U_B = 16 \text{ V}$	250
Maximum permissible burden (measuring resistance) [Ω] $U_B = 21 \text{ V}$	450
Reverse polarity protection	Yes

Tab. 10 Output signals/auxiliary energy

1.6 Dimensions and type-dependent data



volume flow rate*	20	30
	Model	
	F6xx	F9xx
Volume:	0,16 US gal	
A	G/INPT**	3/8 ; 1/2 ; 3/4

xx = KA, KB, KD, KE

*at 100 psig relating to 20°C, 1 bar abs. and 0% relative humidity
**ISO 228/ANSI B 1.20.1

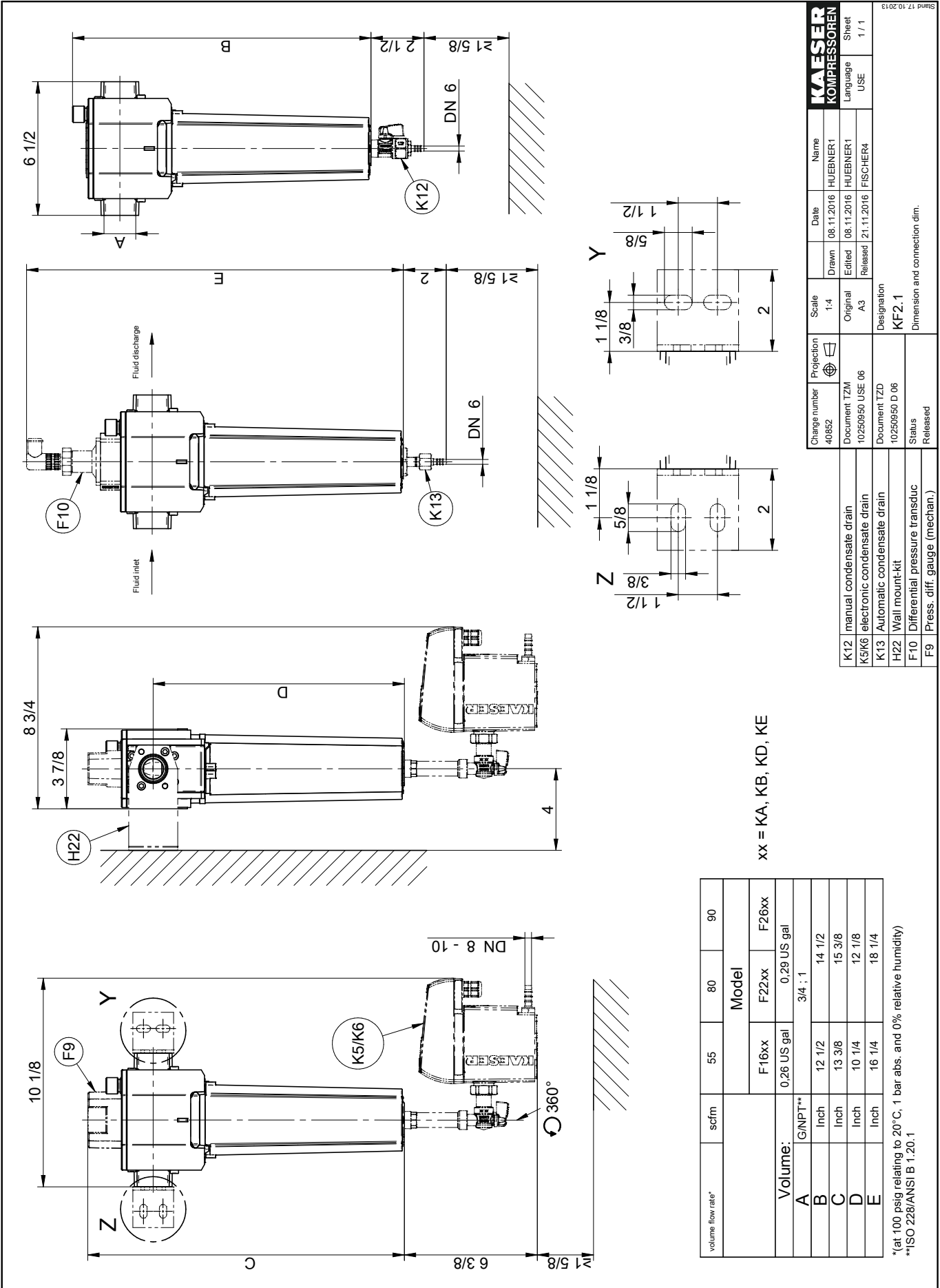
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Document TZM			Original	08.11.2016	HUEBNER1
10248689 USE 06			A3	21.11.2016	FISCHER4
Document TZD			Designation		
10248689 D 06			KF1.1		
Status			Dimension and connection dim.		
Released					

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10248689 D 06

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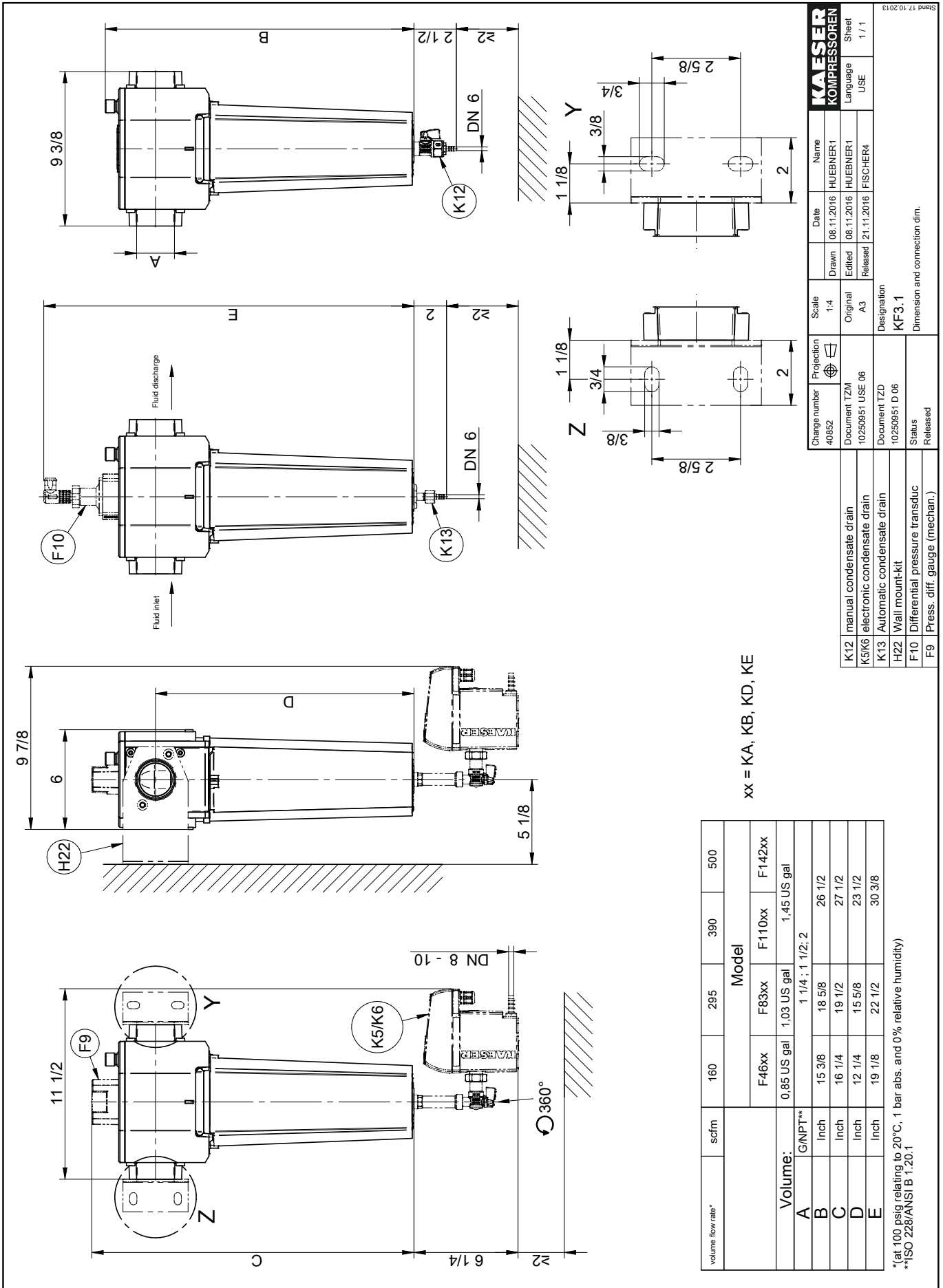


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10250950 USE 06	A3	Released	21.11.2016	FISCHER4	
10250950 D 06	Released				
Document TZM		Designation	KF2.1		
Document TZD		Status	Released		
Dimension and connection dim.					

Change number	Document	Date	Name	Language	Sheet
K12	manual condensate drain	08.11.2016	HUEBNER1	USE	1 / 1
K5/K6	electronic condensate drain	08.11.2016	HUEBNER1	USE	1 / 1
K13	Automatic condensate drain	21.11.2016	FISCHER4	USE	1 / 1
H22	Wall mount-kit				
F10	Differential pressure transduc				
F9	Press. diff. gauge (mechan.)				

xx = KA, KB, KD, KE

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xx = KA, KB, KD, KE

volume flow rate*	scfm	160	295	390	500
		Model			
		F46xx	F83xx	F110xx	F142xx
Volume:		0.85 US gal	1.03 US gal	1.45 US gal	
A	G/NPT**	1 1/4 ; 1 1/2; 2			
B	Inch	15 3/8	18 5/8	26 1/2	26 1/2
C	Inch	16 1/4	19 1/2	27 1/2	27 1/2
D	Inch	12 1/4	15 5/8	23 1/2	23 1/2
E	Inch	19 1/8	22 1/2	30 3/8	30 3/8

* (at 100 psig relating to 20°C, 1 bar abs. and 0% relative humidity)
** (ISO 228/ANSI B 1.20.1)

Change number		Projection	Scale	Date	Name
40852		1:1	1:4	08.11.2016	HUEBNER1
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Document TZD		Designation		21.11.2016	FISCHER4
10250951 D 06		Designation			
10250951 D 06		Designation			
KF3.1		Designation			
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Press. diff. gauge (mechan.)		Released			

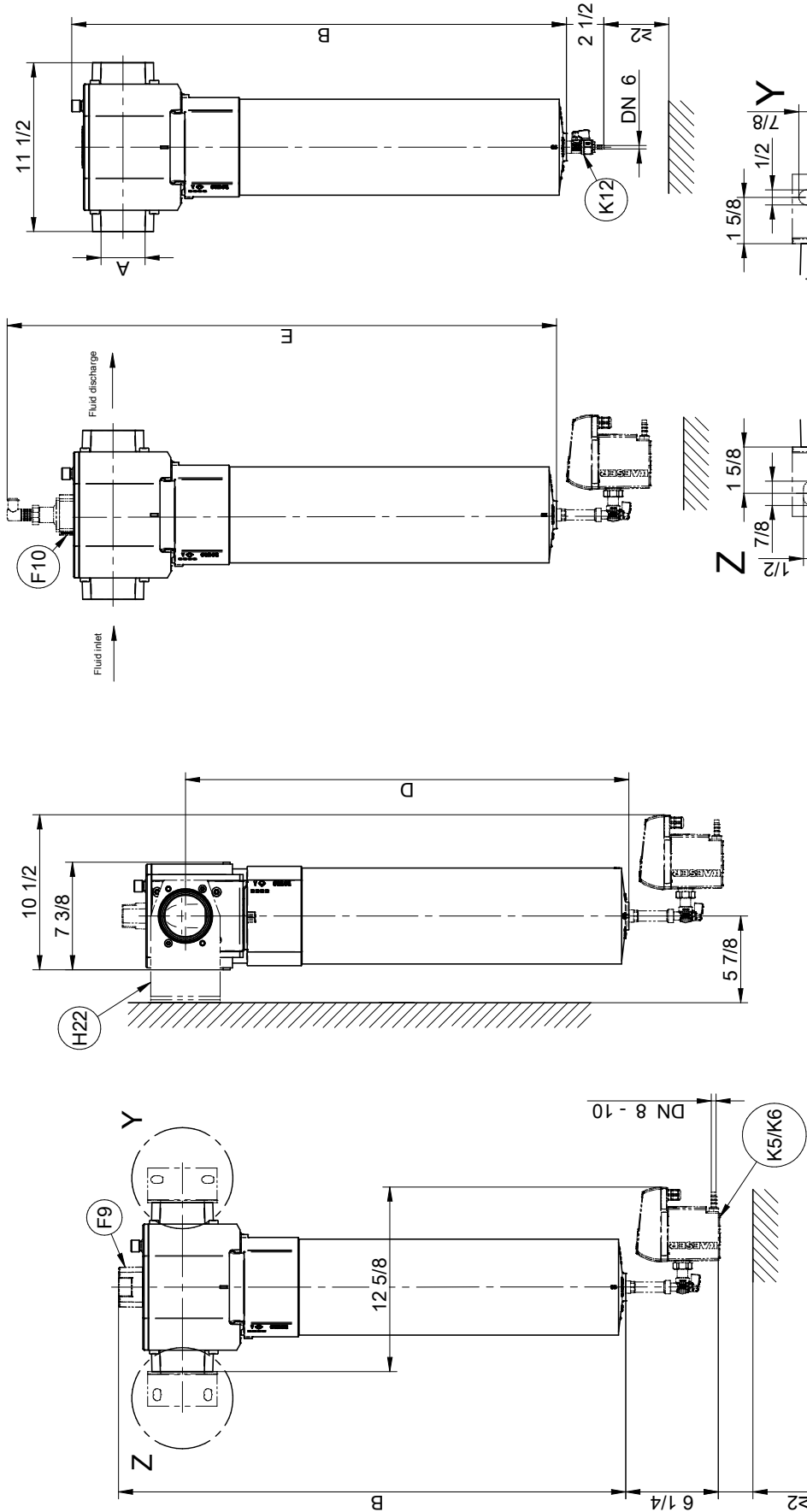
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10250951 D 06		Designation			
KF3.1		Designation			
Differential pressure transduc		Status			
Press. diff. gauge (mechan.)		Released			

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Document TZD		Designation		21.11.2016	FISCHER4
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10250951 D 06		Designation			
KF3.1		Designation			
Differential pressure transduc		Status			
Press. diff. gauge (mechan.)		Released			

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Dimension and connection dim.

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xx = KA, KB, KD, KE

volume flow rate*	scfm	650	883	1130
Model				
		F-184xx	F-250xx	F-320xx
Volume:		3.25 US gal	3.83 US gal	4.49 US gal
A	G/NPT**	2 - 2 1/2, 3	2 - 2 1/2, 3	2 - 2 1/2, 3
B	Inch	28 7/8	33 7/8	39 1/2
C	Inch	29 5/8	34 3/4	40 3/8
D	Inch	25 3/8	30 3/8	36
E	Inch	32 1/2	37 3/4	43 1/8

* (at 100 psig relating to 20°C, 1 bar abs. and 0% relative humidity)

** ISO 228/ANSI B 1.20.1

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Document TZN	10258386 USE 02	Document TZN	A3	Original	A3	Name	HUEBNER1	Drawn	22.11.2016
Document TZO	10258386 D 02	Document TZO	Designation	Designation	Designation	Name	FISCHER4	Edited	22.11.2016
Status	Released	Status	KF4.1	Designation	KF4.1	Name	FISCHER4	Released	22.11.2016
Released	Released	Released	Dimension and connection dim.	Dimension and connection dim.	Dimension and connection dim.	Name	FISCHER4	Released	22.11.2016
Released	Released	Released	Dimension and connection dim.	Dimension and connection dim.	Dimension and connection dim.	Name	FISCHER4	Released	22.11.2016

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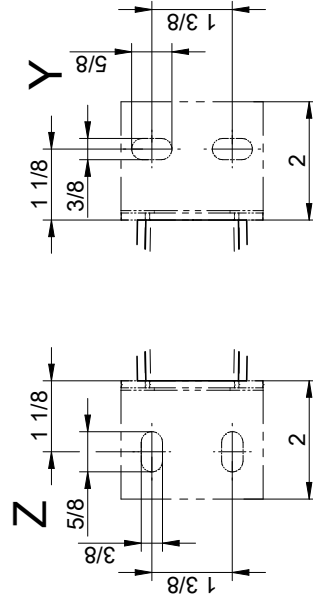
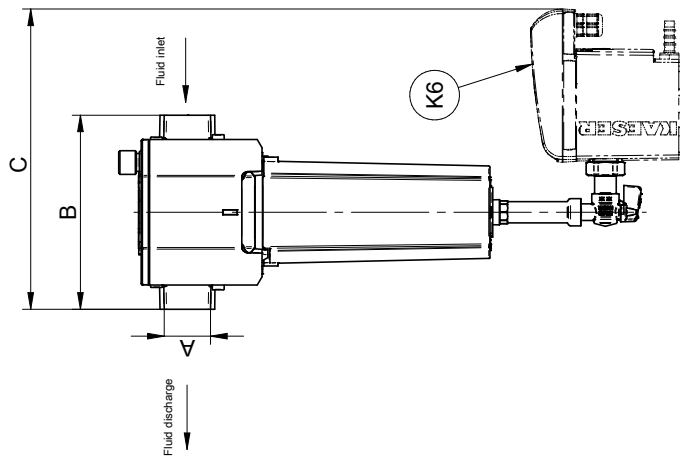
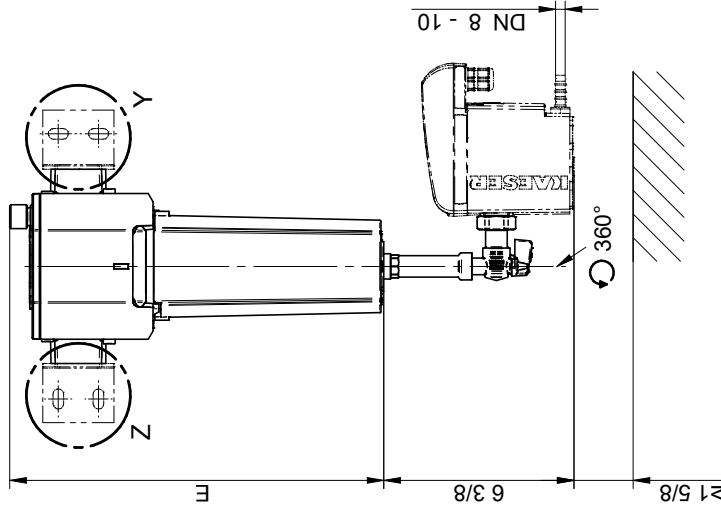
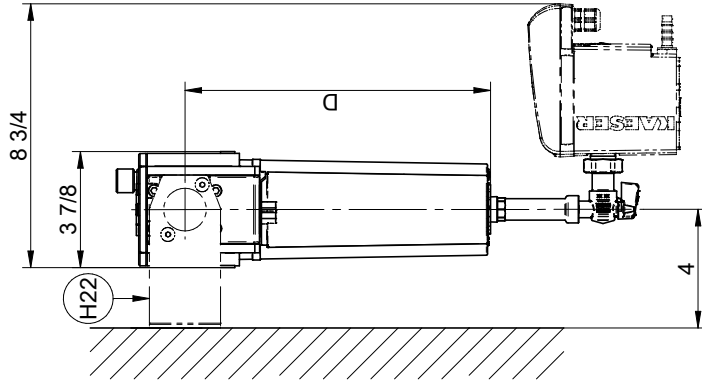
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volume flow rate*	scfm	30	90
Volume:	Model		F26KC
	F9KC		0.26 US gal
	G/NPT**	3/8 ; 1/2	3/4 ; 1
	Inch	6 7/8	6 1/2
	Inch	10 3/8	10 1/8
Inch	10 1/4	12 1/8	14 3/8
Inch	12 3/8	14 3/8	14 3/8

* (at 100 psig relating to 20°C, 1 bar abs. and 0% relative humidity)
** ISO 228/ANSI B 1.20.1

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10302973 USE 01	A3	Edited	08.11.2016	HUEBNER1
10302973 USE 01	A3	Released	21.11.2016	FISCHER4

Document TZM	Designation	Status
10302973 USE 01	KF2.1	Released
10302973 D 01	K5/K6 electronic condensate drain	
	H22 Wall mount-kit	

Language	Sheet
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2 Safety and Responsibility

2.1 Specified use

The compressed air filter is suited for the following gaseous fluids:

- Air
- Nitrogen

The compressed air filter is designed solely for the cleaning of the aforementioned fluids in an industrial environment. Any other use is considered incorrect. The manufacturer is not liable for any damages that may result from incorrect use. The user alone is liable for any risks incurred.

- Comply with the instructions in this operating manual.
- Use the compressed air filter only within its performance limits and under the permitted operating conditions.

2.2 Improper use

Improper usage can cause damage to property and/or (severe) injuries.

- Only use the filter as intended.
- Do not operate the compressed air filter in air networks with temperatures potentially exceeding 122°F. This may be the case downstream of heat-regenerated desiccant dryers.
- Do not operate the compressed air filter in areas in which specific requirements with regard to explosion protection are in force.
- Do not use the compressed air as breathing air.
- Do not modify the compressed air filter and/or its components.

2.3 Option F8 Ensuring silicon-free operation

Silicones are substances that interfere with paint adhesion and are the main causes for sporadic, funnel-shaped indentations in the paint coat. To avoid such defects, the surfaces of parts through which compressed air flows must be silicone-free.

Only correct and responsible machine operation will ensure that the components in contact with compressed air will be free from substances interfering with paint adhesion.

Installation, commissioning and maintenance

Commission the machine only when proper installation is ensured and it is impossible for substances interfering with paint adhesion to enter components containing compressed air.

- Do not allow anyone but an authorized KAESER service representative to perform installation, commissioning and maintenance.
- Use only compressed air filters and filter elements identified as "silicone-free", with undamaged packaging, and less than three months in storage.
- Wear only work clothes, gloves and shoes that do not emit any substances that interfere with paint wetting.
- For the installation and connection to the compressed air system, use only components not emitting substances interfering with paint adhesion.

The following materials must be free of substances interfering with paint adhesion:

- Cleaning agent
- Installation accessories (for example: adhesives, grease)
- Tools

Operation

- Ensure that the compressed air filter through which compressed air flows remains free of any substances that would interfere with paint wetting.

Packing and storing

- Wear work clothes, gloves and shoes that do not emit any substances that interfere with paint wetting.
- If necessary, clean the compressed air filter contaminated with substances that may interfere with paint wetting.
(e.g., Rivolta M.T.X. 60; 9.6808.00020)
- Tightly close the compressed air filter with silicone-free film and label with "silicone-free" (add date).
- Dispose of used filter elements as per environmental regulations. Do not reuse any filter element.
- Do not store longer than three months.

2.4 User's responsibilities

2.4.1 Observe statutory and universally accepted regulations

This is, for example, nationally applied European directives and/or valid national legislation, safety and accident prevention regulations.

- Observe relevant statutory and accepted regulations during installation, operation and maintenance of the compressed air filter.

2.4.2 Qualified personnel

These are people who, by virtue of their training, knowledge and experience as well as their knowledge of relevant regulations can assess the work to be done and recognize the possible dangers involved.

- Ensure that operating, installation and maintenance personnel are qualified and authorized to carry out their tasks.

2.4.3 Safely dealing with sources of danger

The following describes the various forms of danger that can arise during the operation of the compressed air filter.

Forces of compression

Compressed air/fluid is contained energy. Uncontrolled release of this energy can cause serious injury or death. The following information concerns work on components that could be under pressure.

- Close shut-off valves or otherwise isolate the compressed air filter from the air distribution network to ensure that no compressed fluid can flow back into the compressed air filter.
- Depressurize all pressurized components and enclosures.
- Do not carry out welding, heat treatment or mechanical modifications on pressurized components, as this adversely affects the components' resistance to pressure. The safety of the compressed air filter is then no longer ensured.

Compressed air quality

The composition of the fluid must be suitable for the actual application in order to preclude health and life-threatening dangers.

- Use appropriate systems for air treatment before using the compressed air as breathing air or for the processing of food products.

Temperature

High temperatures are generated during compression. Touching hot components may cause injuries.

- Allow the surfaces to cool down.
- Avoid contact with hot surfaces.
- Wear protective clothing.

Unsuitable spare parts

Unsuitable spare parts compromise the safety of the compressed air filter.

- Use only spare parts approved by the manufacturer for use in this machine.
- Use only genuine KAESER replacement parts on pressure bearing parts.

Conversion or modification of the filter

Modifications, additions to, and conversions of the filter or machine can result in unpredictable dangers.

- Do not convert or modify the compressed air filter!
- Obtain written approval by the manufacturer prior to any technical modification or expansion of the machine, the controller, or the control programs.

2.4.4 Safe operation of the compressed air filter

The following is information supporting you in the safe handling of the filter during individual product life phases.

Personal protective equipment

When working on the compressed air filter, you may be exposed to dangers that can result in accidents with severe adverse health effects.

- Wear protective clothing as necessary.

Suitable protective clothing (examples):

- Safety workwear
- Protective gloves

- Safety boots
- Eye protection

Transport

Depending on the weight and size, specific safety measures must be taken during transport, in order to prevent accidents.

- Use suitable lifting gear that conforms to local safety regulations.
- Allow transportation only by personnel trained in the safe movement of loads.
- Attach lifting gear only to suitable lifting points.
- Make sure the danger zone is clear of personnel.



Assembly

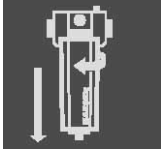
- Use only electrical cables that are suitable and approved for the surroundings and electrical loads applied.
- Never dismantle compressed air pipes until they are fully vented.
- Use compressed air conduits suited and approved for the maximum working pressure.
- Do not allow connection pipes to be placed under mechanical stress.
- Do not induce any forces into the compressed air filter via the connections, so that the compressive forces must be balanced by bracing.
- Ensure accessibility to the compressed air filter so that all work can be carried out without danger or hindrance.
- Ensure frost protection if the compressed air filter is to be installed in open air.
- Do not operate in areas in which specific requirements with regard to explosion protection are in force.
- Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- The lower the temperature of the fluid in the filter, the higher its degree of efficiency.
- In the event of a surface temperature of the compressed air filter expected to exceed 122°F: Shield the compressed air filter and/or use suitable labelling to warn against hot surfaces.

Commissioning, operation and maintenance

During commissioning, operation and maintenance you may be exposed to dangers resulting from, e.g., electricity, pressure and temperature. Careless actions can cause accidents with severe adverse effects for your health.

- Refer to the quick installation guide:

	Symbol	Meaning
1.		➤ Read and understand the operating manual and all safety instructions prior to use.
2.		<ul style="list-style-type: none"> ➤ Only loosen the locking screw manually! ➤ Wait until the compressed air filter is fully depressurized.

Symbol	Meaning
3. 	➤ Carefully remove the filter bowl

Tab. 11 Quick installation guide

- Allow maintenance work to be carried out only by authorized personnel.
- Wear tightly fitting clothing. Wear protective clothing as necessary.
- Check that there is no voltage on floating relay contacts.
- Depressurize all pressurized components and enclosures.
- Allow the compressed air filter to cool down.
- Use the compressed air filter only with a suitable condensate drain.
- Use only spare parts approved by KAESER for use in this compressed air filter.
- Carry out regular inspections:
 - for visible damages,
 - of the safety installations,
 - of the components requiring monitoring.
- Pay particular attention to cleanliness during all maintenance and repair work. Cover components and openings with clean cloths, paper or tape to keep them clean.

Decommissioning, storage and disposal

Improper handling of used filter elements may endanger the environment.

- Dispose of the old parts in accordance with local environmental regulations.

2.5 Environment protection

The operation of the compressed air filter may cause dangers for the environment.

- Do not allow cooling oil to escape to the environment or into the sewage system.
- Store and dispose of replaced parts in accordance with local environmental protection regulations.
- Observe national regulations.
 - This applies particularly to parts contaminated with cooling fluids or oil.

2.6 Copyright

This operator manual is copyright protected. Queries regarding use or duplication of the documentation should be referred to KAESER. Correct use of information will be fully supported.

3 Design and Function

3.1 General design

This section provides information on the design of the compressed air filter, using a filter combination KEA as example.

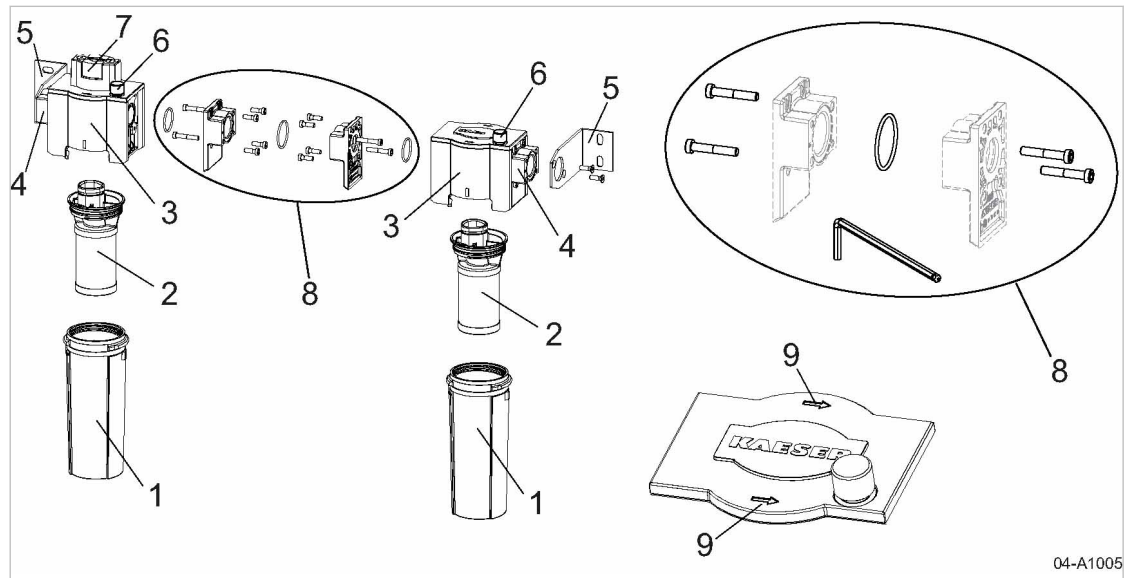


Fig. 2 General design

- | | | | |
|---|-------------------|---|-----------------------------|
| ① | Filter bowl | ⑥ | Locking screw |
| ② | Filter element | ⑦ | Differential pressure gauge |
| ③ | Filter head | ⑧ | Connection kit |
| ④ | Connection flange | ⑨ | Flow direction (example) |
| ⑤ | Wall bracket kit | | |

The filter bowl ① receives the filter element ②.

The connection flanges ④ at the filter head ③ connect the compressed air filter with the air network. The connection flanges have been designed in such a manner that you can extend the compressed air filter to a filter combination, using the connection kit ⑧.

The arrows ⑨ on the filter head indicate the direction of flow.

The wall bracket ⑤ bears the weight and relieves the compressed air lines. The flow direction may differ, depending on the filter grade.

The retaining screw ⑥ secures the filter housing against unintended opening. The compressed air filter is vented as soon as the retaining screw is loosened.

The pressure differential gauge ⑦ provides information regarding the pressure difference between fluid inlet and fluid outlet.

3.2 Condensate drain

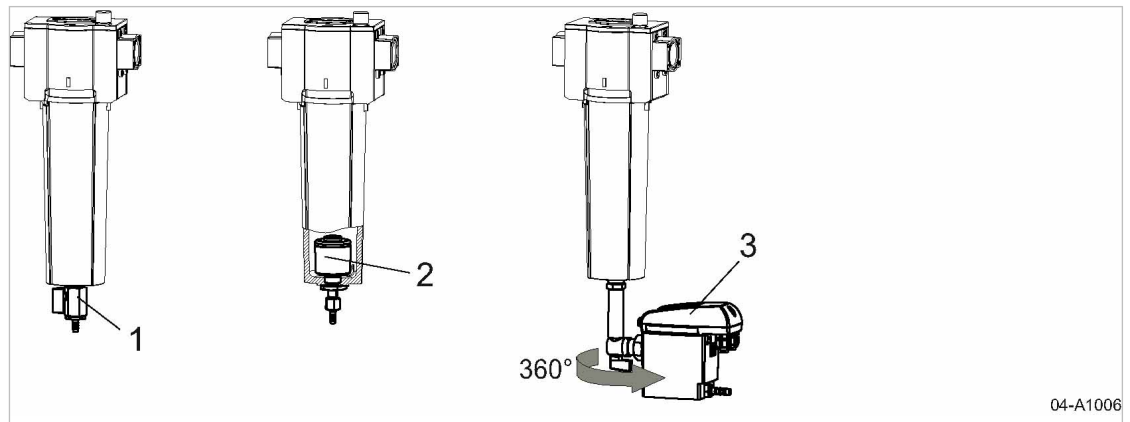


Fig. 3 Condensate drain

- ① Manual condensate drain (ball valve)
- ② Automatic condensate drain (internal float)
- ③ Electronic condensate drain

Option K12 Manual condensate drain

A manual condensate drain is provided in compressed air filters with degree of filtration KD and KA. It is only used for inspection as fluid is not removed from the compressed air flow. In a fault, oil or an oil-water mixture will escape.

Option K13 Automatic condensate drain

An automatic condensate drain with internal float is installed as standard in compressed air filters with degree of filtration KB and KE. It opens automatically as soon as sufficient liquid has accumulated in the filter bowl.

Option K5/K6 Electronic condensate drain

In compressed air filters with degree of filtration KB and KE, an electronic condensate drain is offered as alternative option (Option K5). The electronic condensate drain opens automatically as soon as sufficient liquid has accumulated in the filter bowl.

In the variant of an electronic condensate drain with alarm contact (Option K6), a floating relay contact will transmit a signal in the event of a fault. Compressed air filters with degree of filtration KC are supplied with this condensate drain as standard.

The electronic condensate drain works more precisely, more reliably, causes lower pressure losses, and has a longer maintenance interval. It can be tilted horizontally by 360 degrees.

Further information The operating instructions for the electronic condensate drain are supplied in chapter 8.2.

3.3 Option F9 Pressure differential gauge



The pressure differential gauge does not provide maintenance information. The filter material ages due to the continuous use, regardless of the value of the differential pressure shown.

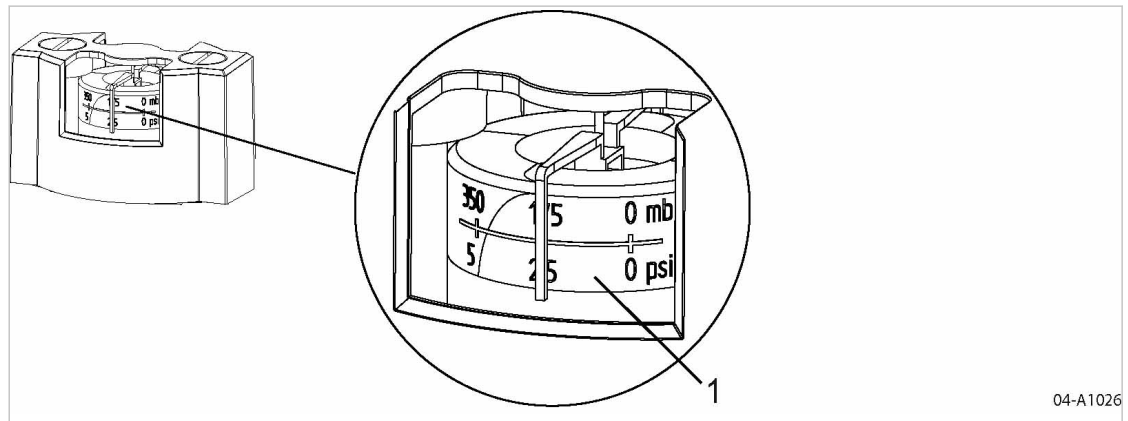
A significant change in the differential pressure indicates a fault.

- Clean the disk of the measured value display only with solvent-free cleaning agents.

The pressure differential gauge indicates the pressure difference currently existing between fluid entry and fluid outlet.

As a rule, the pressure differential of a new filter element will slightly rise within a short time, and then remain at this level for a long time.

KAESER recommends an early replacement of the filter element if the display changes into the red range (350 mbar / 5 psi) prior to the expiration of the regular maintenance interval for the filter element.



04-A1026

Fig. 4 Pressure differential gauge

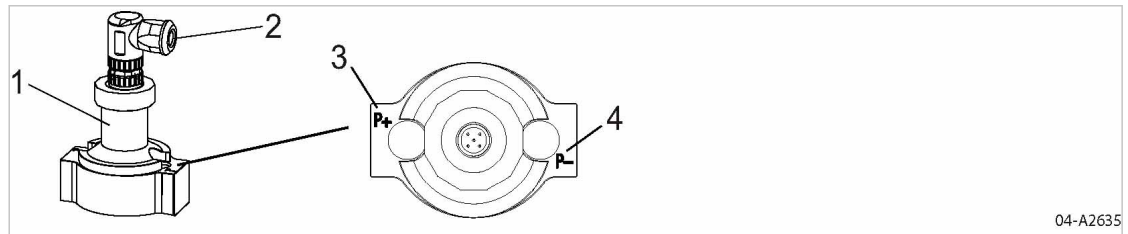
- ① Measured value display

3.4 Option F10 Differential pressure transducer



The differential pressure transducer does not represent service monitoring. The filter material ages due to continuous use, regardless of the value of the differential pressure calculated.

A significant change in the differential pressure indicates a fault.



04-A2635

Fig. 5 Differential pressure transducer

- ① Differential pressure transducer
- ② Electrical connection
- ③ P+: Fluid inlet
- ④ P-: Fluid outlet

The differential pressure transducer calculates the relative pressure at the fluid outlet (P-) and the current pressure differential between fluid inlet and fluid outlet. It returns electrical signals which may be processed by, for example, a master controller.

As a rule, the pressure differential of a new filter element will slightly rise within a short time, and then remain at this level for a long time.

KAESER recommends an early replacement of the filter element if the differential pressure exceeds 350 mbar (5 psi) prior to the expiration of the regular maintenance interval for the filter element.

The differential pressure transducer is maintenance-free.

3.5 Flange adapter

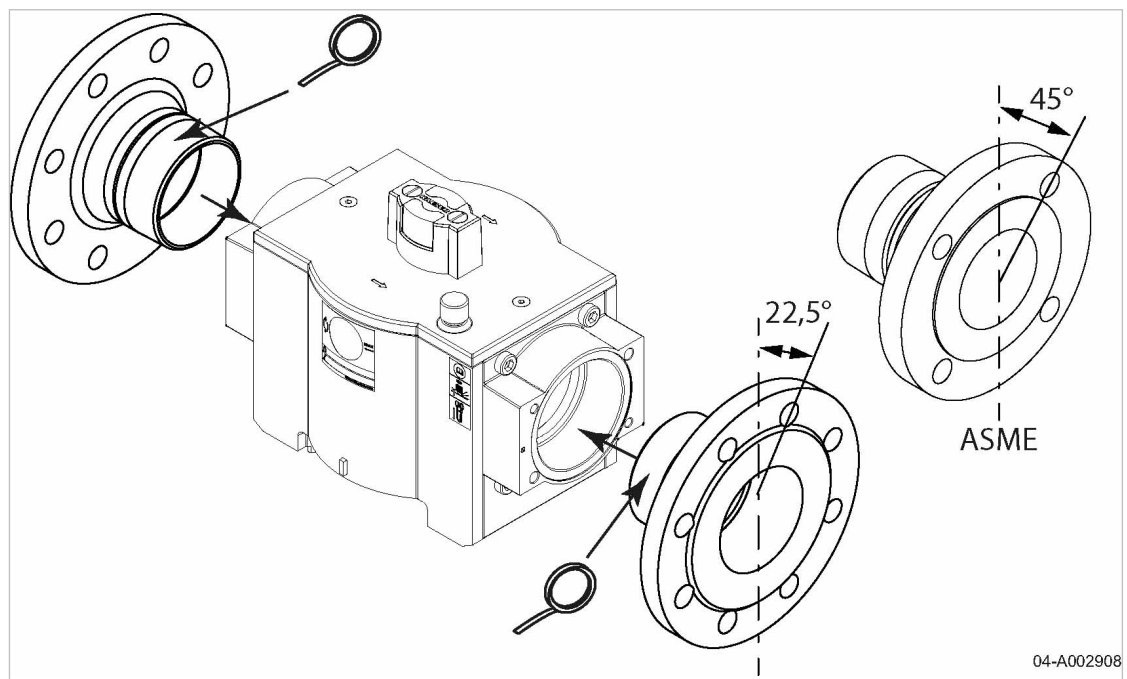


Fig. 6 Flange adapter

In the case of large thread diameters, you can request flange adapters for a flange connection to the compressed air network.

If using the wall-bracket kit (Option H22), first attach the wall bracket to the filter head. For the flange adapter use a suitable sealing strip or a low-adhesion thread lock adhesive.

4 Installation and commissioning

4.1 Reporting transport damage

1. Check the compressed air filter for visible and hidden transport damage.
2. Inform the carrier and the manufacturer in writing of any damage immediately.

4.2 Determining location and clearances

A suitable installation location has a decisive influence on the function of the compressed air filter.

- Select a location taking the various aspects into account.

4.2.1 Considering the air network

- Install the compressed air filter at a location at which the compressed air is coldest (free of frost). This is the case downstream of compressed air driers, air after-coolers, or storage tanks.
- If surface temperatures exceeding 122°F are to be expected, label the relevant components accordingly, and secure them against unintended contact.
- Maintain sufficient distance to the bottom, in order to be able to remove the filter bowl.
- Use KAESER wall brackets to ensure sufficient distance to the walls.
- Use the KAESER wall brackets to ensure that forces from the air network cannot be transferred to the compressed air filter.
- Do not install the compressed air filter at locations subject to severe and frequent fluctuations in pressure and flow rate.
- Load the compressed air filters as evenly as possible with their nominal flow rate.
- Ensure that air can flow through the compressed air filter only in the direction of flow.
- If you fit the compressed air filter with a bypass line, you must ensure the protection of downstream systems against contamination.
- If installed outdoors, the compressed air filter must be protected from frost, direct sunlight, and rain.
- If the design conditions for the air network change, please have an authorized KAESER service representative check as to whether the compressed air filter can still be used.

4.2.2 Considering the degrees of filtration

Compressed air filter degree of filtration KB must be protected from large quantities of drops of liquid, for example, in tropical regions.

- In such a situation, connect an upstream cyclone separator (degree of filtration KC).

Compressed air filters with degree of filtration KE must be protected from large quantities of drops of liquid and solid particles.

- In this case, install upstream a compressed air filter with degree of filtration KB.
- When using a compressed air filter with degree of filtration KBE, always install upstream a compressed air filter with degree of filtration KC.
- Prevent the introduction of drops of liquid in a compressed air filter with degree of filtration KA.
- If, downstream of a dry (oil-free) compressor, drops of liquid and dirt particles are to be filtered, use a combination of a compressed air filter with degree of filtration KB and a compressed air filter with degree of filtration KE.

4.3 Option H22 Installing the wall bracket kit



The weight of the compressed air filter increases if a fault causes the filter bowl to fill with condensate.

Suitable fixing elements depend also on the properties of the mounting surface.

- Select a sufficiently sized fixing element.

The wall bracket kit consists of two metal brackets and four screws.

Material Four suitable wall plugs and screws

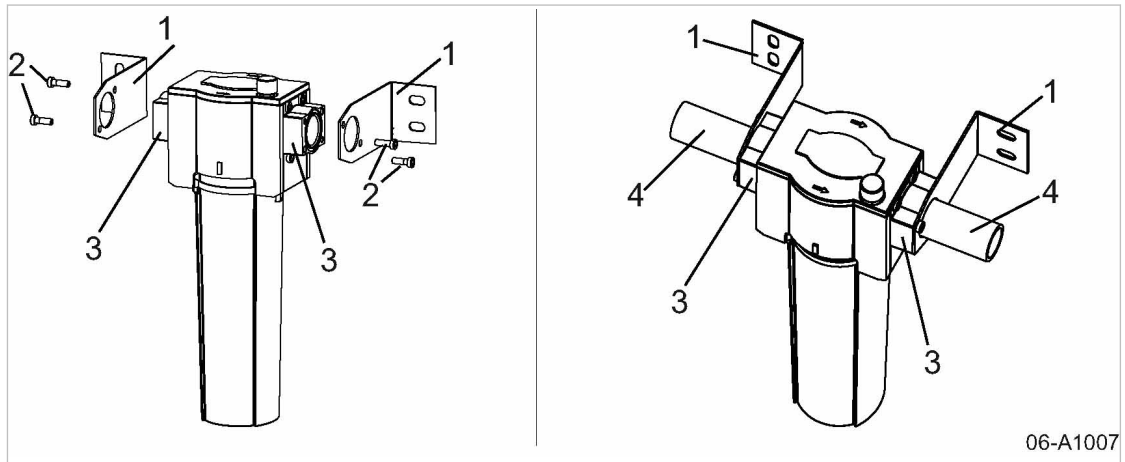


Fig. 7 Installing the wall bracket

- | | |
|-----------------|-----------------------------|
| ① Metal bracket | ③ Compressed air connection |
| ② Screw | ④ Compressed air line |

1. Install the metal brackets ① in appropriate distance at the wall.
2. Install the housing head with screws ② between the metal brackets.
3. Connect the compressed air line ④.

Further information The dimensions are provided in chapter 1.6.

4.4 Installing the compressed air filter in the compressed air network

In order to simplify the installation, the filter head, filter element and filter bowl are provided separately.

In the case of large thread diameters, you can request flange adapters for a flange connection to the compressed air network.

First, screw the flange adapters into the connecting flanges of the filter head, before connecting the pre-assembled filter head with the air network.



- Install shut-off valves upstream and downstream of the compressed air filter, in order to perform maintenance on the compressed air filter without having to depressurize the entire air network.

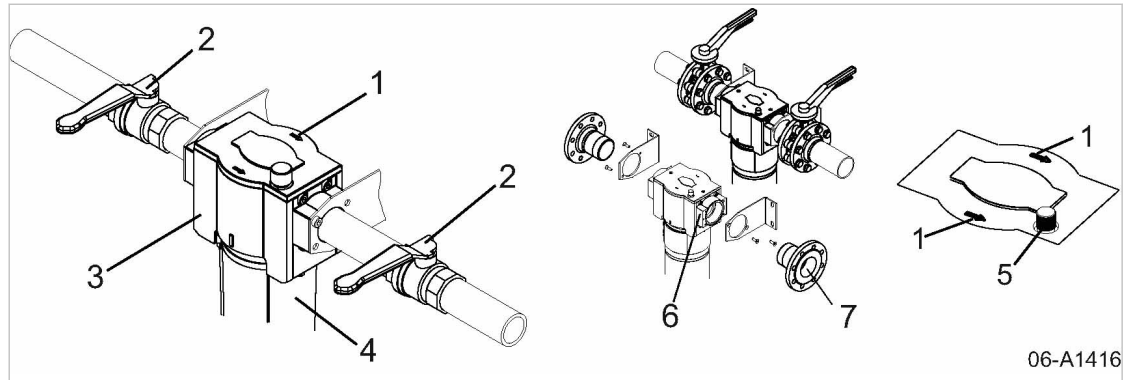


Fig. 8 Installing the compressed air filter

- | | | | |
|---|-----------------------------------|---|-------------------|
| ① | Direction of flow | ⑤ | Locking screw |
| ② | Shut-off valve | ⑥ | Connection flange |
| ③ | Filter head | ⑦ | Flange adapter |
| ④ | Filter bowl (with filter element) | | |

1. Ensure correct direction of flow.
2. Attach the filter head as fully as possible.
3. Properly attach the compressed air hose to the filter head.
4. Install the assembly between the shut-off valves.
5. Install the filter element and the filter bowl as described in chapters 5.2.2 and 5.2.3.
6. Tighten the locking screw.

4.5 Installing the connection kit

You need the connection kit only if you want to install at least two compressed air filters in series.



- Do not exceed the specified maximum tightening torque of the screws:
 - Filter size 6 – 9: 3.7 lbf-ft
 - Filter size 16 – 26: 3.7 lbf-ft
 - Filter size 46 – 142: 7.4 lbf-ft
 - Filter size 184 – 320: 11.1 (M8) / 18.4 (M10) lbf-ft
- Use only original screws supplied by KAESER!

Material Connection kit
Torque wrench

Precondition The compressed air filter is vented completely to atmospheric pressure.

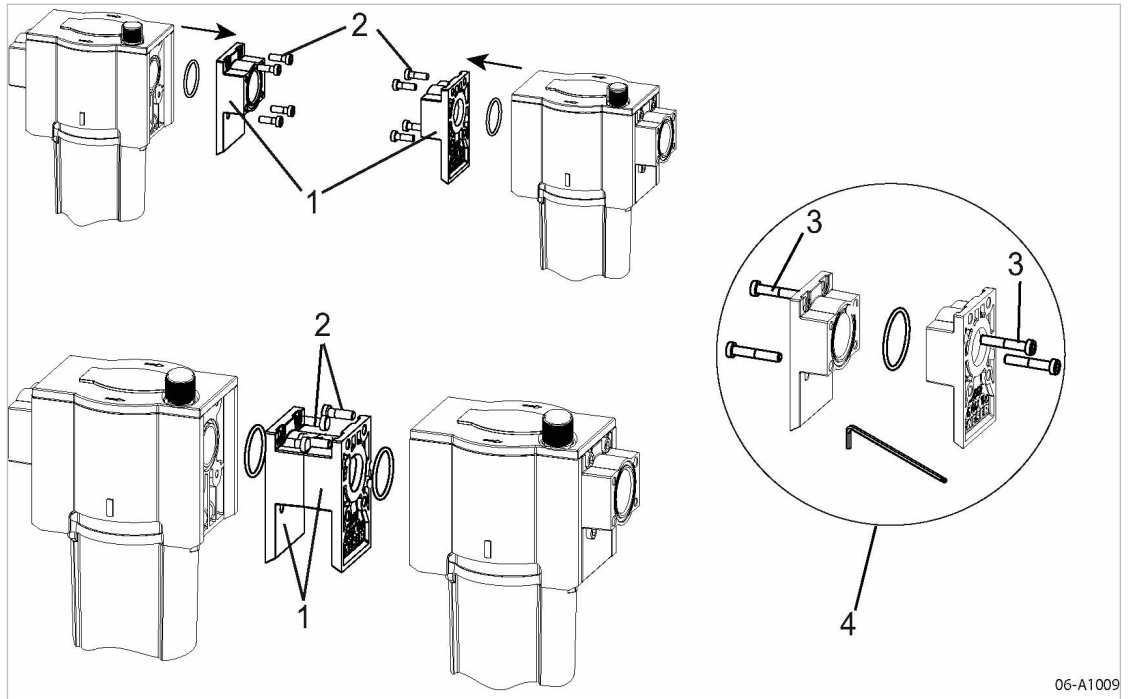


Fig. 9 Installing the connection kit

- | | | | |
|---|-------------------|---|----------------|
| ① | Connection flange | ③ | Screws |
| ② | Screws | ④ | Connection kit |

1. Loosen the screw ② and remove the connecting flanges ①.
2. Use the connection kit ④ consisting of an O-ring and screws ③ to connect the two connecting flanges ① with each other.
3. Use all screws ②, and install the connecting flanges ① with O-rings at the filter heads.

4.6 Option K5/K6/K13 Connecting the condensate drain



The condensate must be able to drain freely.

- If applicable:
Note the information provided in the operating manual for the electronic condensate drain in chapter 8.2.
- Reduce the delivery head for applications where only little condensate is separated.

Fig. 10 illustrates the recommended installation.

Condensate flows downward into the condensate manifold. This prevents condensate from the condensate manifold to flow back into the compressed air filter.

If condensate flows at several point points into the condensate manifold, you must install a shut-off valve in each condensate line to enable individual shut-off of the condensate lines before starting maintenance work.

Condensate line

Feature	Value
Max. length ¹⁾ [ft.]	50
Max. delivery head [ft.]	16
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastics Hose line

¹⁾ For longer lengths, please contact KAESER before installation.

Tab. 12 Condensate line

Condensate manifold

Feature	Value
Gradient [%]	>1
Max. length ¹⁾ [ft.]	65
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastics Hose line

¹⁾ For longer lengths, please contact KAESER before installation.

Tab. 13 Condensate manifold

Compressed air flow rate ¹⁾ [cfm]	Line cross-section ["]
<350	3/4
350 – 700	1
701 – 1400	1 1/2
>1400	2

¹⁾ Compressed air flow rate as guide for the condensate volume to be expected

Tab. 14 Condensate manifold: Line cross-section

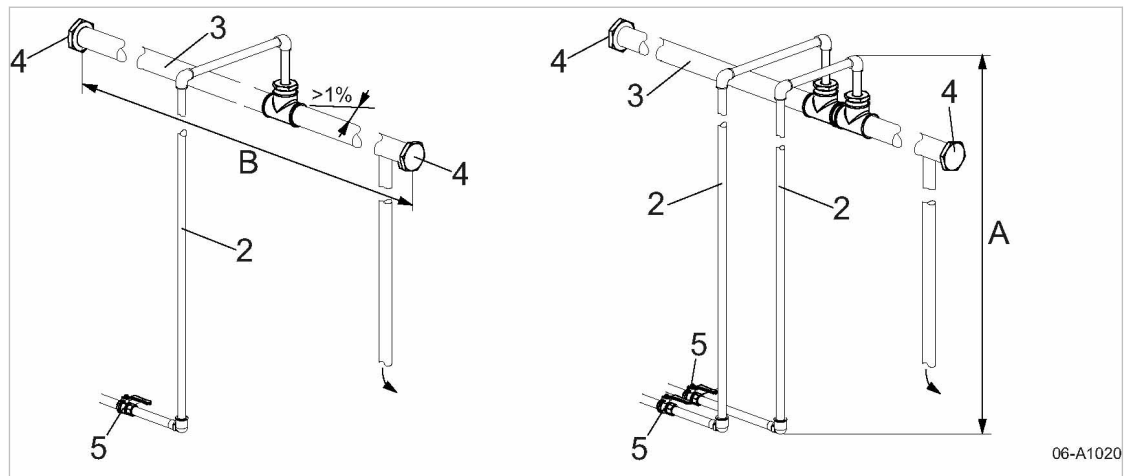


Fig. 10 Connect the condensate drain

- | | | | |
|---|---------------------|---|-----------------------------------|
| ② | Condensate line | ⑤ | Shut-off valve |
| ③ | Condensate manifold | Ⓐ | Delivery head |
| ④ | Screw plug | Ⓑ | Length of the condensate manifold |

➤ Directly connect every condensate drain to the condensate manifold.



➤ Collect the condensate in a suitable container and dispose of it in accordance with local environmental regulations.

4.6.1 Installing the electronic condensate drain

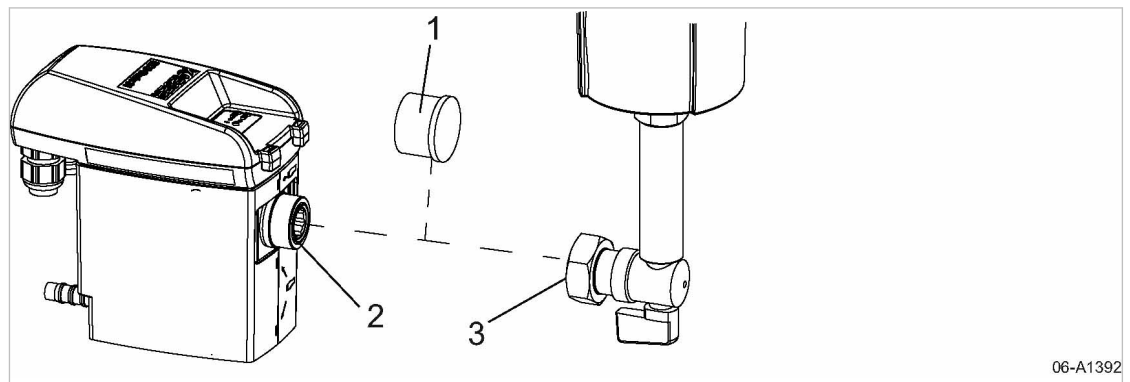


Fig. 11 Installing the electronic condensate drain

- | | |
|---|-----------|
| ① | Cap |
| ② | Gasket |
| ③ | Union nut |

1. Remove cap ①.
2. Verify that the gasket ② is present.
3. Attach the electronic condensate drain to the shut-off valve with the union nut ③, and connect electrically.

4.7 Option F10 Installing the pressure differential transducer

Material Shielded multi-core cable:
Connection cross-section max. 0.03 in²
External diameter 0.2–0.3 in.

Precondition The compressed air filter is fully vented to atmospheric pressure.
The electrical connection is de-energized.



Reverse polarity protection for interchanged connections:

- No damage
- No function

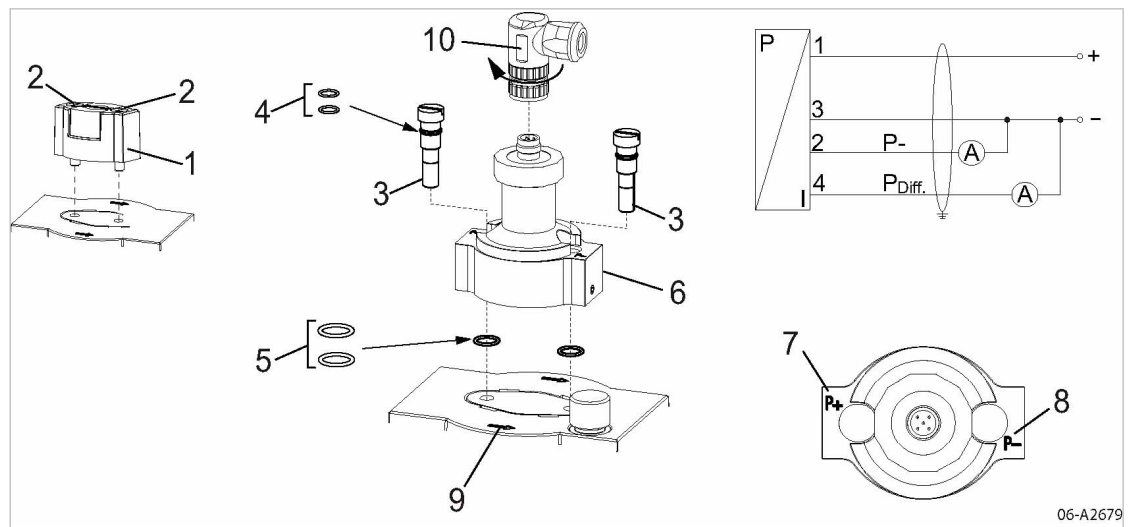


Fig. 12 Installing the pressure differential transducer

- | | |
|-------------------------------|-------------------------------------|
| ① Differential pressure gauge | ⑥ Differential pressure transducer |
| ② Self-sealing screws | ⑦ P+: Fluid inlet (higher pressure) |
| ③ Fastening screw | ⑧ P-: Fluid outlet (lower pressure) |
| ④ O-ring | ⑨ Direction of flow |
| ⑤ O-ring | ⑩ Connecting plug with knurl |

1. If required:
Remove the self-sealing screws ② and carefully remove the differential pressure gauge ①.
2. Place O-rings ④ in the groove of the fastening screws ③.
3. Use O-rings ⑤, ensure correct direction of flow ⑦, ⑧, ⑨ and place the differential pressure transducer ⑥ on the filter head.
4. Tighten the fastening screws ③ with a torque of max. 3 lbf-ft.
5. Electrically connect the connection plug.
6. Plug the connection plug onto the differential pressure transducer and tighten it with the knurl.

4.8 Commissioning the compressed air filter

High flow velocities are generated in all components of an air network when an empty air network is filled. Treatment equipment cannot work under these circumstances. Solid particles, aerosols and vapors will flow through the network without being filtered. These conditions could damage the material of the filter elements.



- Install an air main charging system from KAESER to fill your air network.
You will avoid subsequent damages caused by contaminated compressed air.

- Fill the air network slowly, in order not to exceed the permissible volume flow of the compressed air filter.



- Newly installed compressed air lines may be contaminated (by shavings or chips, for example). These contaminations can adversely affect the function of the filter and the condensate drain.
- Vent the compressed air filter after first use, clean the filter bowl, and check the functioning of the condensate drain.

5 Maintenance

5.1 Regular maintenance tasks

The table below lists maintenance tasks required.



The actually required intervals depend very much on the application conditions of the compressed air filter.

- Take these recommendations as a baseline and discuss with KAESER service representative the economically appropriate intervals.
- Carry out maintenance tasks in a timely manner and according to the operating conditions:

Interval	Maintenance task	see chapter
Weekly	Checking the compressed air filter for condensate. (only degree of filtration KD and KA)	5.4
	Electronic condensate drain: Check function.	8.2
see maintenance sticker Up to 1,000 h	Replacing the filter element: ■ KA	5.2
see maintenance sticker at least annually Option K6: Filter maintenance monitoring	Replacing the filter element: ■ KB ■ KD ■ KE	5.2
at least annually	Automatic condensate drain; Replace the float.	5.3
At the latest every 2 years Option K6: Condensate drain maintenance monitoring	Electronic condensate drain: Exchanging the service module.	8.2

h = operating hours

Tab. 15 Regular maintenance tasks

5.2 Replacing the filter element

The filter element of the cyclone separator (degree of filtration KC) does not require servicing.



- Carefully handle and manually install all components in order to avoid damages. This applies to sealing surfaces, in particular.

Material KAESER filter element (including silicone-free sealing grease and O-ring)

5.2.1 Removing the filter element

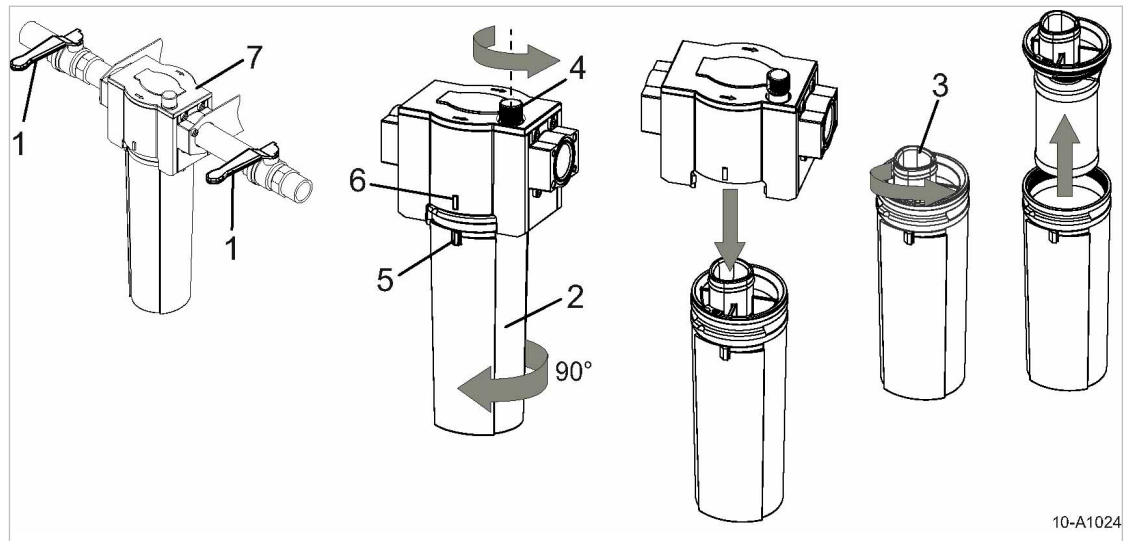


Fig. 13 Removing the filter element

- | | |
|--|--|
| ① Shut-off valve | ⑤ Installation mark at the filter bowl |
| ② Filter bowl | ⑥ Installation mark at the filter head |
| ③ Filter element | ⑦ Filter head |
| ④ Locking screw (secured against full removal) | |

1. Close the shut-off valve ①.
2. Loosen the locking screw ④ manually until you feel again resistance.
If the compressed air filter was pressurized, the residual compressed air will escape.



The equipment emits persistent whistling?

The compressed air filter is pressurized!

- Disconnect the compressed air filter from the air network, or depressurize the entire air network.

3. Gently jiggle the filter bowl ② and then turn by 90° until the installation markings at filter bowl ⑤ and filter head ⑥ face each other.
4. Remove the filter bowl and the screwed-in filter element vertically downward.
5. Unscrew the filter element ③ (approx. 1 1/2 turns) from the filter bowl.
6. If required: Drain and dispose of the condensate.
7. Check the filter bowl for corrosion.



The filter bowl is clearly corroded?

- Determine the cause (e.g., composition of the compressed air, operating conditions)
- Replace the compressed air filter completely.



Dispose of the contaminated filter element according to environmental regulations.

5.2.2 Installing the filter element



- Do not touch the surface of the filter material.

Precondition The inner surfaces of the filter head and the filter bowl are clean.

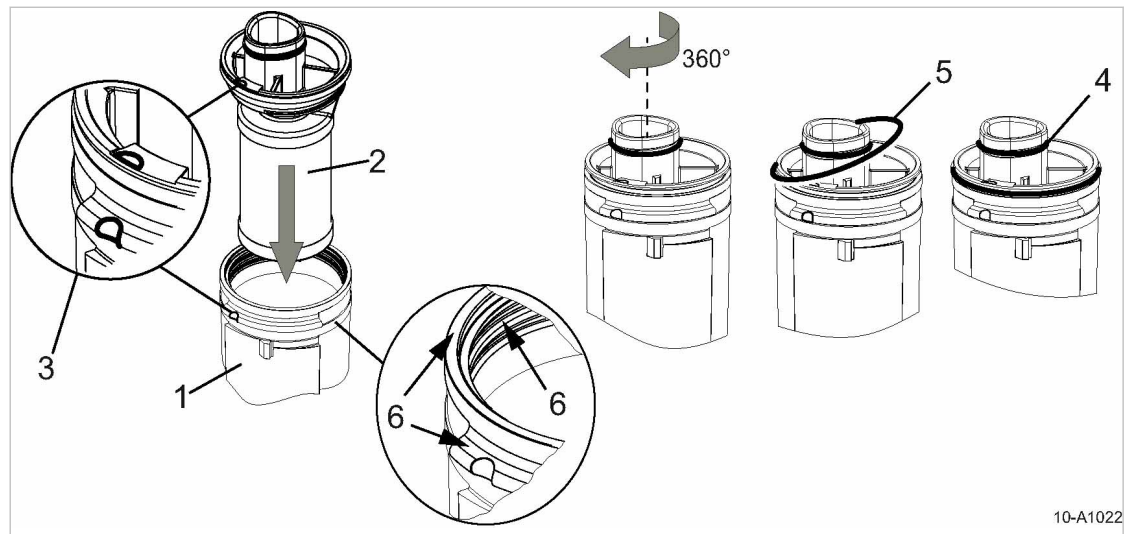


Fig. 14 Installing the filter element

- | | | | |
|---|--------------------|---|-----------------------|
| ① | Filter bowl | ④ | O-ring |
| ② | Filter element | ⑤ | O-ring |
| ③ | Installation marks | ⑥ | Surface to be greased |

1. Grease the thread, front surface, and bayonet catch of the filter bowl (item ⑥).
2. Push the filter element ② into the filter bowl ① in such a manner that the installation marks ③ are aligned to each other.
3. Use one turn to screw the filter element into the filter bowl.
4. Fully grease the O-ring ⑤ and insert between filter element and filter bowl.
5. Grease the O-ring ④.

5.2.3 Installing the filter bowl

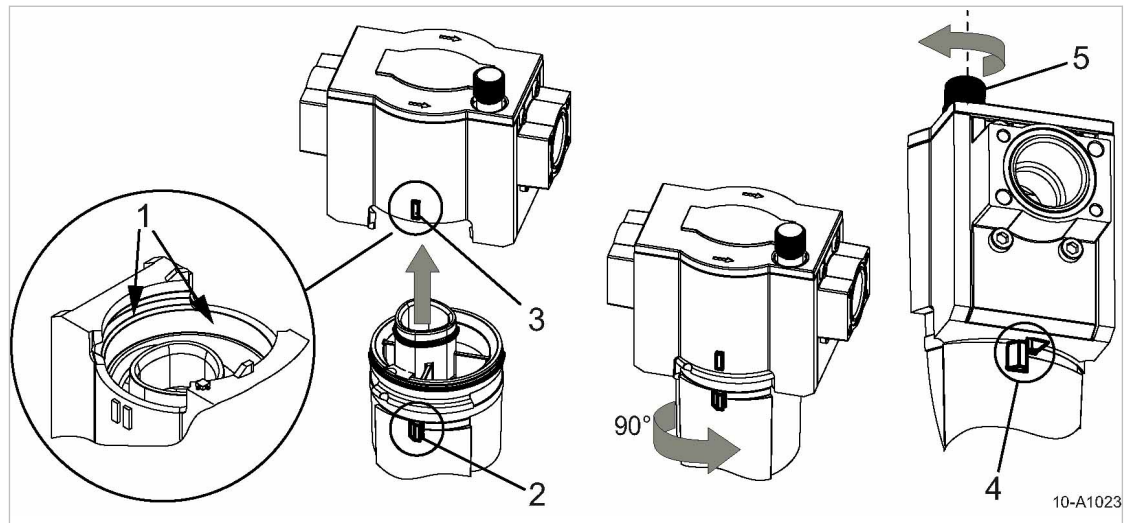


Fig. 15 Installing the filter bowl

- | | |
|--|---------------------------|
| ① Surface to be greased | ④ Stop at the filter head |
| ② Installation mark at the filter bowl | ⑤ Locking screw |
| ③ Installation mark at the filter head | |

1. Grease the interior of the filter bowl (item ①).
2. Align the installation marks (②) and (③) at filter bowl and housing head to each other.
3. Insert the filter bowl into the filter head.
4. Turn the filter bowl 90° to the stop ④.
5. Manually tighten the locking screw ⑤.



You cannot tighten the locking screw?
The bayonet catch of the filter bowl is not fully closed.
➤ Turn the filter bowl to the stop.

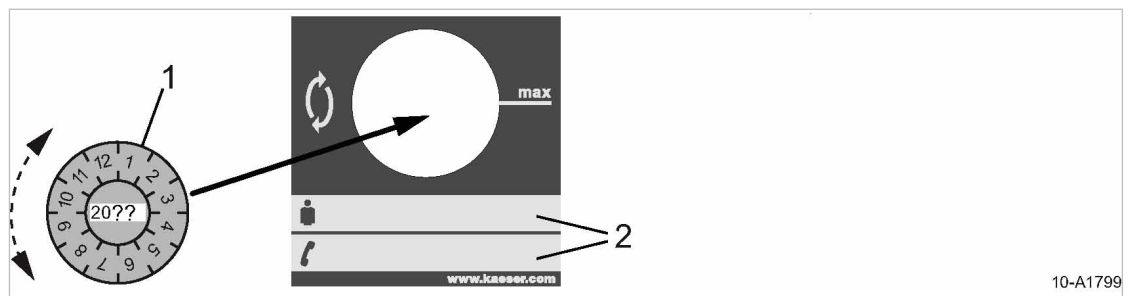


Fig. 16 Amending the maintenance sticker

- | |
|-------------------------------|
| ① Maintenance sticker |
| ② Service contact information |

6. Inscribe the maintenance sticker with the year for the next maintenance.
7. Attach the maintenance sticker in such a manner that the marking *max* points to the month for the next maintenance.

5.2.4 Pressurizing the compressed air filter

A high flow rate of the fluid may damage the filter material.

1. Check as to whether the locking screw was properly tightened manually.
2. Slowly open the shut-off valve at the **fluid inlet**.
3. Slowly open the shut-off valve at the fluid outlet.

5.3 Option K13
Automatic condensate drain; Replacing the float

See chapter 5.2 for information on the removal and re-installation of the filter bowl.

Precondition The filter housing is fully vented.

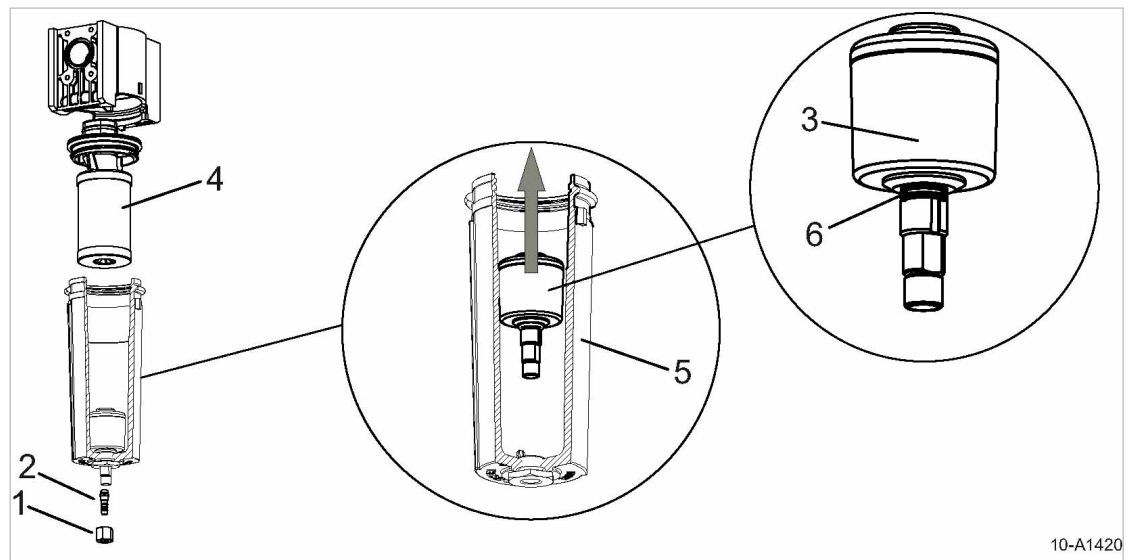


Fig. 17 Replacing the float

- | | |
|-----------------|------------------|
| ① Union nut | ④ Filter element |
| ② Hose coupling | ⑤ Filter bowl |
| ③ Float | ⑥ O-ring |

1. Undo the union nut ① and remove the hose coupling ②.
2. Remove the filter bowl ⑤ and the filter element ④.
3. Turn the float ③ clockwise until it is fully removed from the filter bowl.
4. Check whether the O-ring ⑥ at the bottom of the new float is fully inserted in the groove.
5. Manually screw the float drain into the filter bowl and finally tighten with 3 lbf-ft.
6. Install the filter element and the filter bowl.
7. Install the hose coupling with the union nut.

5.4 Option K12
Checking the compressed air filter for condensate

This inspection is only required for compressed air filters with filtration degrees of KD or KA.

Precondition The filter bowl is pressurized.
Wear safety glasses.



Fig. 18 Checking the compressed air filter for condensate

- ① Shut-off valve
- ② Hose coupling

1. Place a suitable container under the condensate drain.
2. Install a sufficiently long, transparent, and pressure-tight hose at the hose coupling and the collection container.
3. Carefully open the shut-off valve and close immediately when fluid escapes.



- In case of a fault, oil or an oil-water mixture will escape first.
- Examine and eliminate the cause of this fault.

6 Spares, Operating Materials, Service

6.1 Note the nameplate

The nameplate contains all information to identify your filter. This information is essential to us in order to provide you with optimal service.

- Please give the information from the nameplate with every inquiry and order for replacement parts.

6.2 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

- authorized KAESER service representatives with KAESER factory training,
 - increased operational reliability ensured by preventive maintenance,
 - energy savings achieved by avoidance of pressure losses,
 - optimum conditions for operation of the compressed air system,
 - the security of genuine KAESER spare parts,
 - increased legal certainty as all regulations are kept to.
- Why not sign a KAESER AIR SERVICE maintenance agreement!

Result Your advantage:
lower costs and higher compressed air availability.

6.3 Ordering replacement parts and operating materials

KAESER replacement parts are original KAESER products. They are specifically selected for use in KAESER compressed air filters.

Unsuitable or poor quality consumable parts and operating materials may damage the filter or impair its proper function.

Damage to the filter can also result in personal injury.

⚠ WARNING

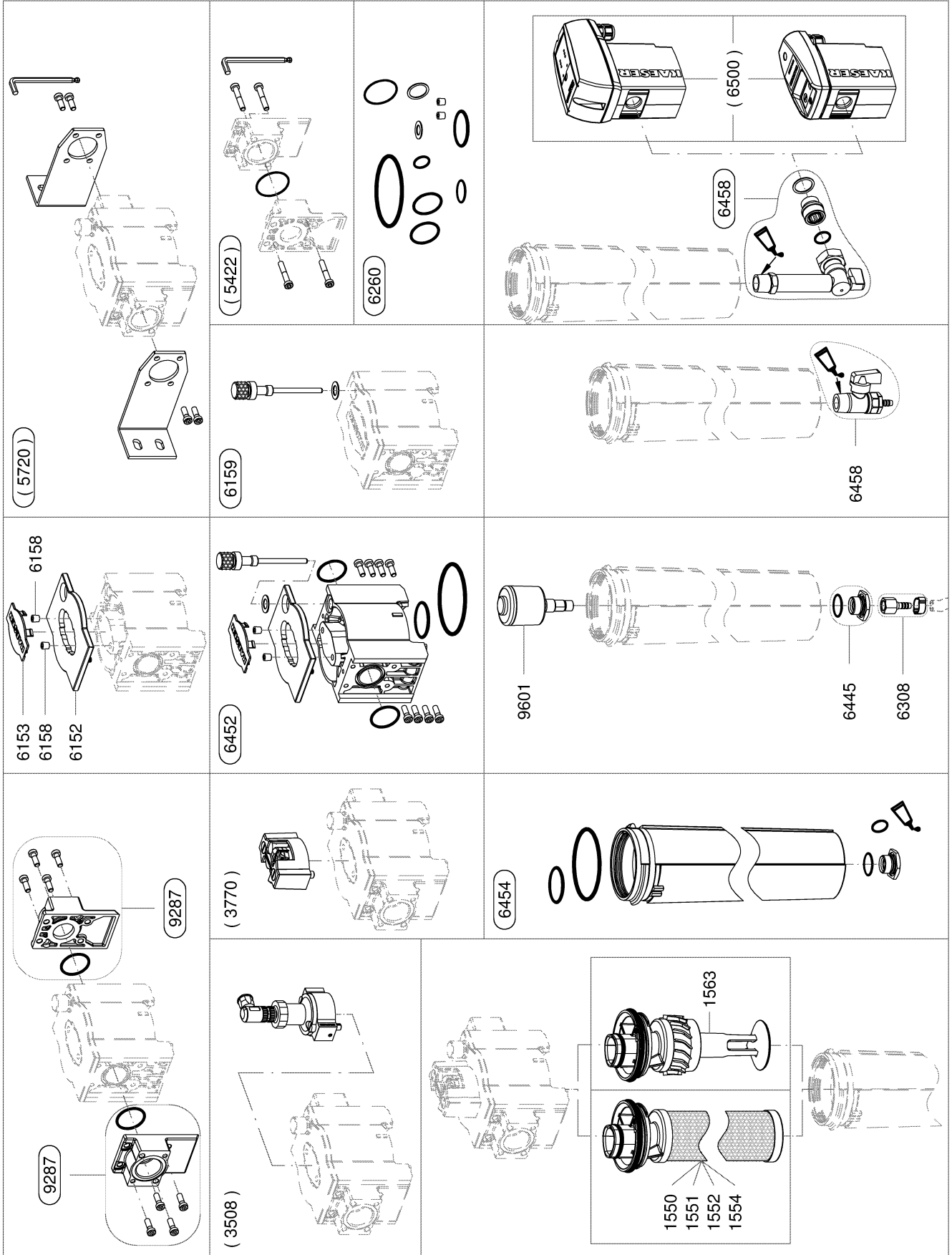
There is risk of personal injury or damage to the machine resulting from the use of unsuitable replacement parts or operating materials.

- *Use only original KAESER parts and operating materials.*
- *Have an authorized KAESER service representative carry out regular maintenance.*
- *Do not attempt any tasks other than those described in this manual.*

Service-Kit
(Option)

KAESER FILTER

SEG-4912_03



Legend		KAESER
KAESER FILTER		SEL-3642_03 E
Item	Description	Option
1550	Filter element KB	
1551	Filter element KE	
1552	Filter element KA	
1554	Filter element KD	
1563	Centrifugal insert KC	
3508	Diff. pressure transducer	X
3770	Pressure diff. indicator	X
5422	Connecting kit	X
5720	Filter support	X
6152	Filter cover	
6153	Filter cover, covering	
6158	Threaded plug	
6159	Locking screw	
6260	Gasket kit	
6308	Hose connection	
6445	Reduction piece	
6452	Upper housing	
6454	Lower housing	
6458	Stop valve	
6500	Condensate drain	X
9287	Adaptor	
9601	Maintenance kit, condens.drain	

Please quote the part number and serial number of the machine together with the item number and the description of the part when ordering.

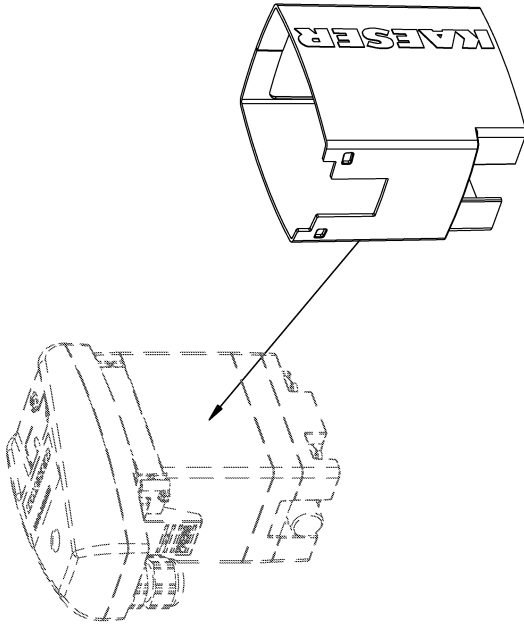
Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!

Kondensatableiter / Condensate drain

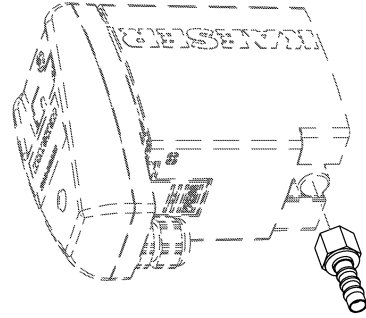
Service-Kit

(Option)

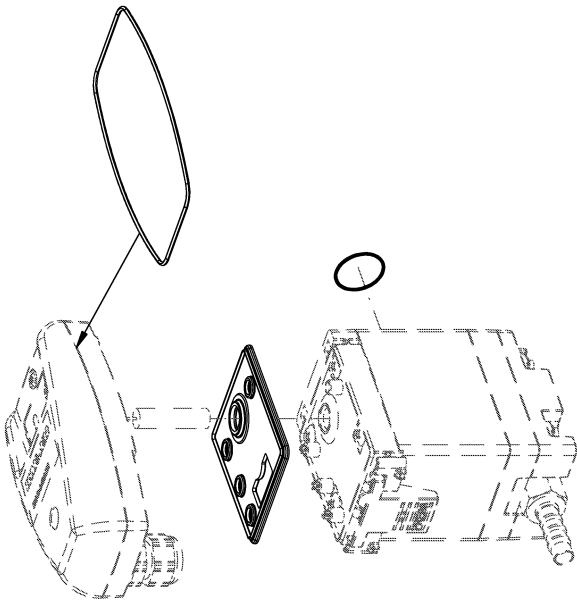
SEG-5405_01



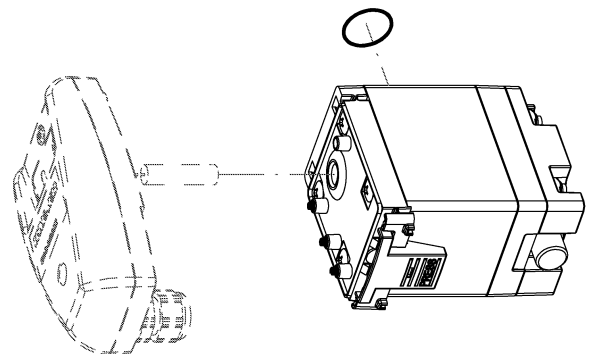
9022



6307



9603



9602

Legend		KAESER															
Condensate drain		SEL-3886_01 E															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Item</th> <th style="width: 65%;">Description</th> <th style="width: 20%;">Option</th> </tr> </thead> <tbody> <tr> <td>6307</td> <td>Hose connection</td> <td></td> </tr> <tr> <td>9022</td> <td>Panelling</td> <td></td> </tr> <tr> <td>9602</td> <td>Condensate drain service-unit</td> <td></td> </tr> <tr> <td>9603</td> <td>Condensate drain gasket kit</td> <td></td> </tr> </tbody> </table>			Item	Description	Option	6307	Hose connection		9022	Panelling		9602	Condensate drain service-unit		9603	Condensate drain gasket kit	
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7 Decommissioning, Storage and Transport

7.1 De-commissioning

1. Isolate the compressed air filter from the air network.
2. Open the locking screw until the filter housing is fully vented.
3. Remove the compressed air filter from the air network.
4. Remove the filter element, and clean and dry the filter bowl.



Dispose of the used filter element according to environmental regulations.

7.2 Storage

Moisture can lead to corrosion.

Freezing moisture can damage components, valve diaphragms, and gaskets.



Please consult with KAESER if you have questions to the appropriate storage and commissioning.

- Store the compressed air filter in a dry, frost-proof room.

7.3 Transport

Weight determines the most suitable method of transportation.

Precondition Transport only by personnel trained in the safe transportation of loads.

1. **NOTICE** *Damages caused by incorrect lifting!*
Pressure differential gauge or condensate drain can be damaged.
 - *Lift the compressed air filter only at the filter head and the filter bowl.*
2. Secure the compressed air filter for transport.

7.4 Packing

Appropriate packaging is required for overland transport to protect the product from mechanical damage.

Other measures must be taken for the transport of the product by sea or air. Please contact KAESER SERVICE for more information.

Material Desiccant
Rigid carton as transport packing

Precondition The compressed air filter is dry.

1. Place sufficient desiccant (silica gel or desiccant clay) in the packaging.
2. Use a rigid carton to protect the compressed air filter from mechanical damages.

7.5 Disposal

- All components of the compressed air filter must be sent to a certified waste disposal company.



- Components contaminated with condensate or cooling fluids must be disposed of in accordance with local environmental protection regulations.

8 Annex

8.1 Declaration of Conformity

The declaration of conformity confirms the compliance with any applicable directives.

Manufacturer's Declaration

KAESER KOMPRESSOREN SE herewith declares that the compressed air filters shown below have been designed and manufactured according to good engineering practices as they are applicable in the EU member states.

KAESER FILTER: F6Kx, F9Kx, F16Kx, F22Kx, F26Kx *)
Compressed air device: Filter housing
Fluid group: 2
Category: Article 4, Para. 3

Declaration of Conformity

KAESER KOMPRESSOREN SE herewith declares that the compressed air filters shown below meet the conformity assessment procedures stipulated in the EU guidelines shown below:

2014/68/EU Pressure Equipment Directive

KAESER FILTER: F46Kx, F83Kx, F110Kx, F142Kx, F184Kx *)
Compressed air device: Filter housing
Fluid group: 2
Category: I Module: B+D

KAESER FILTER: F250Kx, F320Kx *)
Compressed air device: Filter housing
Fluid group: 2
Category: II Module: B+D

Notified body: DNV GL AS, Veritasveien 1, 1363 Høvik, NORWAY
Ref. No.: 0575
Certificate No.: PEDB000000V, Module: B
PEDD00000006, Module: D

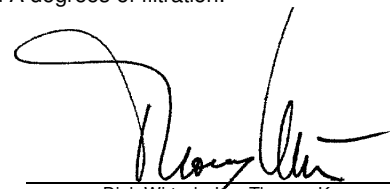
2014/30/EU Directive concerning electromagnetic compatibility

KAESER FILTER with FDPS (Option F10): F6Kx, F9Kx, F16Kx, F22Kx, F26Kx, F46Kx, F83Kx, F110Kx, F142Kx, F184Kx, F250Kx, F320Kx *)
Standards met: EN 61326-1:2013

*) The "x" suffix of the filter size stands for the different C, B, E, D and A degrees of filtration.

Coburg
Town/city

01.01.2017
Date


Dipl.-Wirtsch.-Ing. Thomas Kaeser
Signature / Chairman of the Board



TCE/TCE-KFILTER_05E

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Bank Information
Commerzbank AG, Coburg Acc. No. 85 06 230
IBAN: DE97 7834 0091 0850 6230 00
HypoVereinsbank, Coburg Acc. No. 14 312 18
IBAN: DE33 7832 0076 0001 4312 18
Deutsche Bank AG, Coburg Acc. No. 86 88 889 00
IBAN: DE63 7607 0012 0868 8889 00

Bank code 783 400 91
BIC: COBADEFFXXX
Bank code 783 200 76
BIC: HYVEDEMM480
Bank code 760 700 12
BIC: DEUTDEMM760

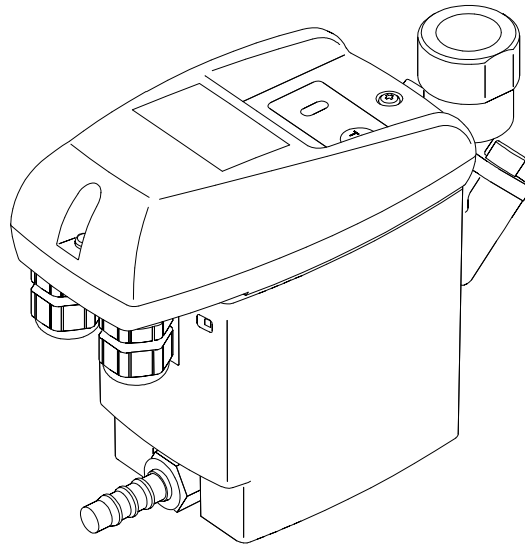
Chairman of the Supervisory Board
Dipl.-Ing. (FH) Carl J. Kaeser
Management Board
Dipl.-Wirtsch.-Ing. Thomas Kaeser (Chairman)
Dipl.-Wirtsch.-Ing. T.-M. Viantoussi-Kaeser
Registration court Coburg, HRB 5382
VAT ID: DE 132460321

8.2 ECO-DRAIN 31 VARIO condensate drain – operating instructions

EN - english

Instructions for installation and operation

Condensate drain **ECO-DRAIN 31 Vario**



01-2381

ECO-DRAIN31-VARIO 06 E

Dear customer,

Thank you for deciding in favour of the ECO-DRAIN 31 Vario condensate drain. Please read the installation and operating instructions carefully before mounting and starting up the ECO-DRAIN 31 Vario, and follow our directions. Perfect functioning of the ECO-DRAIN 31 Vario, and thus reliable condensate discharge, can only be guaranteed when the provisions and notes stipulated here are strictly adhered to.



KAESER KOMPRESSOREN SE
Carl-Kaeser-Str. 26
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Tel.: +49 (0)9561 640 0
Fax: +49 (0)9561 640 130
Mail: info@kaeser.com
Web: <http://www.kaeser.com>

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Pictograms and symbols

1 Pictograms and symbols



Observe the installation and operating instructions



Observe the installation and operating instructions
(on the type plate)



General danger symbol (danger, warning, caution)



General danger symbol (danger, warning, caution) for supply voltage and supply voltage-carrying plant components

2 Safety instructions



Please check whether or not these instructions correspond to the device type.

Adhere to all advice given in these operating instructions. They include essential information which must be observed during the installation, operation and maintenance. Therefore it is imperative for the service technician and the responsible operator / technical staff to read these operating instructions prior to installation, start-up and maintenance.

The operating instructions must be accessible at any time at the place of application of the ECO-DRAIN 31 Vario .

In addition to these operating instructions, local or national regulations must be complied with, if necessary.

Make sure that the ECO-DRAIN 31 Vario is operated only within the permissible limit values indicated on the type plate. Any deviation involves a risk for persons and materials, and may result in malfunction and service failures.

If you have any queries regarding these installation- and operating instructions, please contact KAESER KOMPRESSOREN GmbH.



Danger!

Compressed air!

Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting plant components or plant components which are not secured.

Measures:

- Do not exceed the maximum operating pressure (see type plate).
- **Only carry out service measures when the system is pressureless.**
- Use pressure-resistant installation material only.
- The feed pipe must be tubed firmly. Discharge pipe: short, fixed pressure hose onto pressure-resistant pipe.
- Make sure that persons or objects cannot be hit by condensate or escaping compressed air.

Safety instructions**Danger!****Supply voltage!**

There is the risk of an electric shock involving injury or death when coming into contact with non-insulated components carrying supply voltage.

Measures:

- During electric installations, all regulations in force need to be adhered to (e.g. VDE 0100 / IEC 60364).
- **When the control unit is open, service and installation works must only be undertaken when the system is deactivated.**
- **The removed control unit has no IP degree of protection.**
- All types of electrical works must be carried out by authorised and qualified personnel only.

Further safety instructions:

- For installation and operation, the national regulations and safety codes in force must also be adhered to.
- Do not use the ECO-DRAIN 31 Vario in hazardous areas.
- Regarding the inlet screw joints, excessive tightening forces must be avoided. This applies in particular to conical screw joints.
- The ECO-DRAIN 31 Vario will only function when voltage is applied.
- Do not use the test button for permanent drainage.
- Use genuine spare parts only. This is imperative to ensure perfect functioning.

Additional advice:

- The removed control unit has **no IP degree of protection**.
- During installation, use spanner flat at the feed pipe (wrenchsize SW27) as a back rest.
- The service unit must not be dismantled.

**Caution!****Malfunction during operation!**

Through incorrect installation and poor maintenance, malfunction may occur at the ECO-DRAIN .

Condensate which is not discharged may cause damage to plants and in production processes.

Measures:

- Condensate drainage which is reliable in performance directly optimises the compressed-air quality.
- To prevent damage and breakdowns, it is imperative to observe the following:
 - Exact compliance with the specifications of use and with the performance parameters of the ECO-DRAIN, in connection with the case of application (see "Proper use" section)
 - Exact compliance with the installation- and operation instructions in this manual
 - Regular maintenance and control of the ECO-DRAIN in accordance with the instructions in this operating manual

Proper use





3 Proper use

- The ECO-DRAIN 31 Vario is an electronically level-controlled condensate drain for compressed-air plants.
- The device is employed within the permissible performance parameters (see "Technical data").
- The ECO-DRAIN 31 Vario is able to drain condensate under operating pressure from the plant components virtually without compressed-air loss.
- For its function, the ECO-DRAIN 31 Vario requires an supply voltage and an operating pressure (see "Technical data").
- As far as the employment in plants with increased demands on compressed air is concerned (food industry, medical technology, laboratory equipment, special processes etc.), the operator must decide on measures for the monitoring of the compressed-air quality. These have an effect on the safety of the subsequent processes and may prevent damage to persons and plants.
- It is the task of the operator to ensure that the indicated conditions are met during the entire operating time.
- The ECO-DRAIN Vario is a condensate drain whose properties are adjusted especially to prescribed applications.
- ECO-DRAIN Vario devices must not be employed at drain points other than those prescribed by the supplier, as this may result in malfunction and damage in the compressed-air system and at the compressed-air consumers.
- ECO-DRAIN Vario devices must not be replaced by other ECO-DRAIN-types, as this may result in malfunction and damage in the compressed-air system and at the compressed-air consumers.

4 Exclusion from the scope of application

- The ECO-DRAIN 31 Vario as a condensate drain **alone cannot** guarantee a defined compressed-air quality, for this purpose, other additional technical devices are required.
- ECO-DRAIN 31 Vario is **not** suitable for use in plants carrying vacuum or atmospheric ambient pressure or in ex-areas.
- The ECO-DRAIN 31 Vario must not be exposed to permanent direct solar or thermal radiation.
- The ECO-DRAIN 31 Vario must not be installed and operated in areas with an aggressive atmosphere.
- The ECO-DRAIN 31 Vario is not heatable and, therefore, not suitable for the use in areas where frost is likely to occur.
- The ECO-DRAIN 31 Vario is not suitable for CO₂ plants.

Technical data
5 Technical data

   	
min./max. operating pressure (see type plate)	0,8...16 bar (12...230 psi) or 1,2...16 bar (17...230 psi)
min./max. temperature (see type plate)	+1...+60 °C (+34...+140 °F) or +1...+70 °C (+34...+158 °F)
Condensate inflow	G ½ (NPT ½) internal max. screw-in depth 13,5 mm (½")
Condensate outflow	G ¼ Ø 8 ... 10 mm hose connector
Condensate	oil-contaminated + oil-free
Housing	aluminium + plastic, glass fibre-reinforced
Weight (empty)	1.0 kg (2.2 lbs)

This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1-12, third edition, including a later version of the same standard incorporating the same level of testing requirements.

Electrical data
6 Electrical data

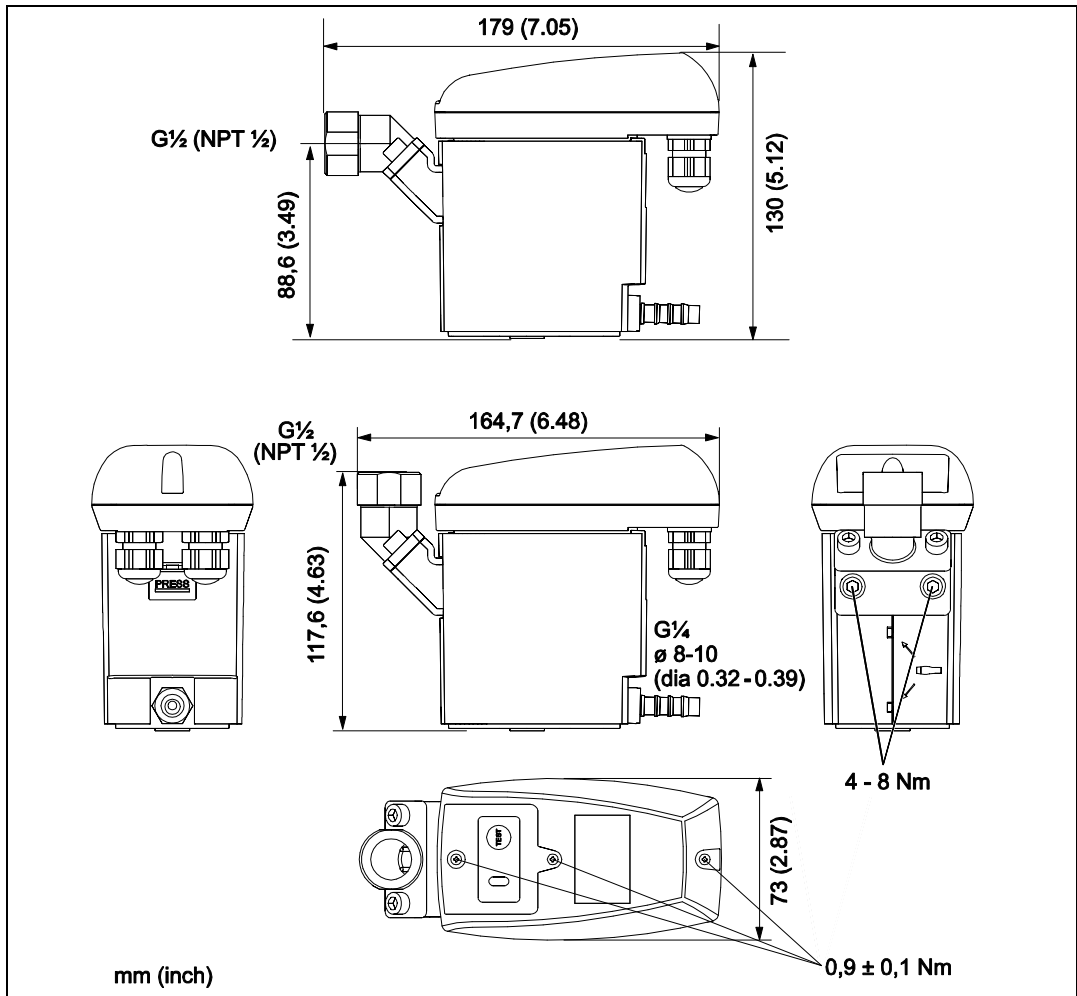
Supply voltage (see type plate)	95...240 VAC ±10% (50...60 Hz) /100...125 VDC ±10% or 24...48 VAC ±10% (50...60 Hz) / 18...72 VDC ±10%
Power consumption	P = 0.6 ... 3 VA (W)
Recommended cable-jacket diameter	Ø 5.0...10 mm (0.20"...0.39")
Recommended wire cross-section Spring-loaded terminal (voltage supply/relay)	0.75...1.5 mm ² (AWG 16...20)
Recommended wire cross-section Screw terminal (voltage supply)	0.75...2.5 mm ² (AWG 14...20)
Recommended wire cross-section Spring-loaded terminal (external test)	0.75...1.5 mm ² (AWG 16...20)
Recommended wire cross-section Screw terminal (relay/external test)	0.75...1.5 mm ² (AWG 16...20)
Recommended stripping of cable jacket (voltage supply/relay)	~ 30 mm (~ 1.18")
Recommended stripping of cable jacket (external test)	~ 90 mm (~ 3.54")
Recommended length of the wire end tube Spring-loaded terminal	8 mm (~ 0.31 inch)
Recommended length of the wire end tube Screw terminal	~ 6 mm (~ 0.24 inch)
Connection data of the potential- free contact Switch to load *)	AC: max. 250V / 1A DC: max. 30V / 1A
Connection data of the potential- free contact Switch to low signal *)	min. 5 VDC / 10 mA
Connection data of the external test contact	on the unit side 5 VDC; switching current ≥ 0,5 mA
Protection class	IP 67
Overvoltage category (IEC 61010-1)	II

VAC = V alternating current
VDC = V direct current

*) The switching of loads means that the properties of the contact are no longer suitable for the switching of low signals.

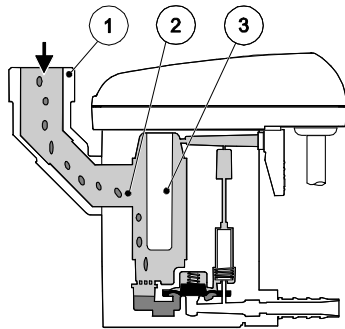
Dimension drawing

7 Dimension drawing



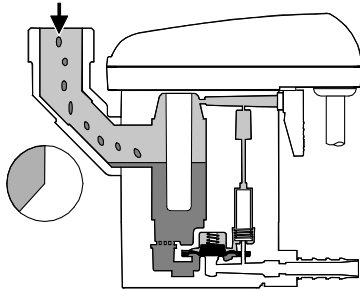
Function

8 Function



Via the inlet line (1), the condensate flows into the ECO-DRAIN 31 Vario and accumulates in the housing (2).

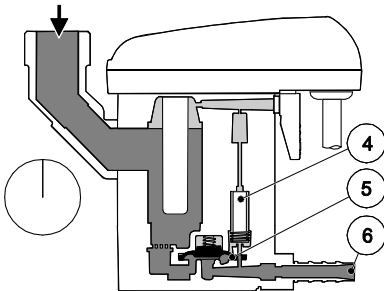
A capacitively functioning sensor (3) continuously registers the filling level.



As soon as the condensate has reached a certain level, a fixed waiting time starts.

During this period, further condensate flows in and continues filling the ECO-DRAIN .

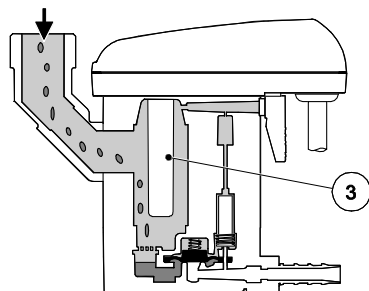
ECO-DRAIN and upstream units must be adjusted to each other.



After the waiting time has expired, the condensate may have risen up to the inlet area (1). The solenoid valve (4) is switched over now and the zone above the valve membrane is vented.

The valve membrane (5) lifts off from the valve seat, the overpressure in the housing forces the condensate into the outlet line (6).

The total amount of accumulated condensate is discharged.

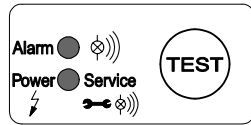


When the sensor (3) is "free", meaning that the total amount is discharged, the solenoid valve re-switches and the valve membrane is re-closed tightly through the overpressure which builds up above the latter membrane.

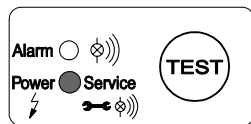
A new cycle starts with the inflow of condensate (1).

Function

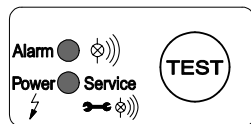
At the ECO-DRAIN 31 Vario, two LEDs indicate the individual operating states.



When applying supply voltage, the ECO-DRAIN 31 Vario carries out a **self-test**. Both LEDs are lit for approximately 1 second, subsequently, the device changes over to the "ready-to-operate" state.

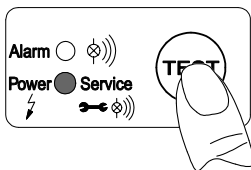


Ready to operate, voltage is applied.



In the event that the condensate discharge is disturbed, an alarm mode will start which is indicated by the flashing of the red alarm LED.

Malfunction/alarm



Test of the valve function (manual drainage): press and hold the button for approximately 2 s.
Test of the alarm function (see below): press and hold the button for at least 1 min.

Do not use for permanent drainage.

Alarm mode:

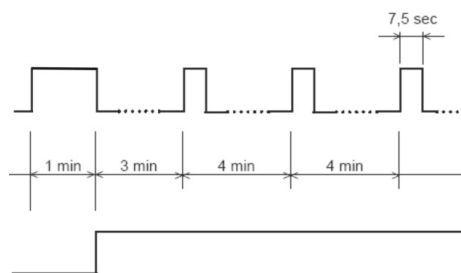
In the event that the ECO-DRAIN is not empty after one minute, a trouble indication is released:

- The alarm LED flashes.
- The alarm relay switches over (the signal can be picked off potential-freely).
- The valve opens every four minutes for 7.5 seconds.
- When the malfunction has been eliminated, the ECO-DRAIN will switch back automatically into the normal mode.

Possible trouble sources include :

- Mistakes during installation
- Dropping below the minimum pressure
- Excessive accumulation of condensate (excess load)
- Blocked / obstructed outlet line
- Extreme amount of dirt particles
- Frozen pipework

Switching sequence of the valve in the alarm mode



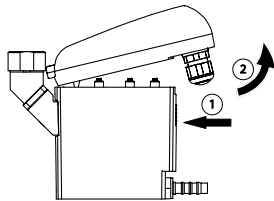
Trouble indication via a potential-free contact

Function

The ECO-DRAIN 31 Vario offers the possibility to display a maintenance message for the maintenance measures that need to be implemented.

When being delivered, this display of the ECO-DRAIN 31 Vario is inactive, and no maintenance message is indicated.

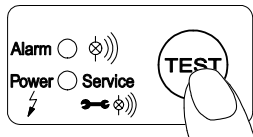
In the event that it is "active", it will appear after 1 x 8.760 operating hours or 1 million switching cycles.



The status as to whether the maintenance message is "active" or "inactive" can be checked as follows:

1. The control unit is removed while under voltage.

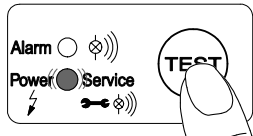
"inactive" press the test button < 5 s



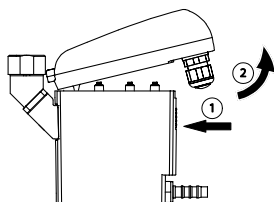
2. Press the test button < 5 s

→ If the green "Power" LED is not on, the status is "inactive".

"active" press the test button < 5 s



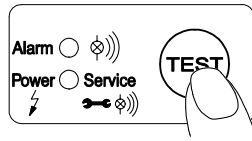
→ If the green "Power" LED shines very brightly, the status is "active".



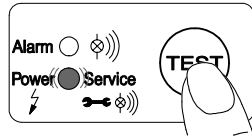
The "active" or "inactive" status can be modified as follows and, with it, the maintenance message can be activated or deactivated:

1. The control unit is removed while under voltage.

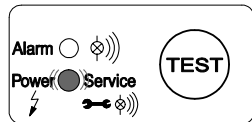
"inactive" press the test button > 10 s



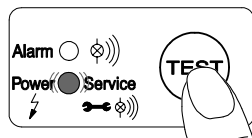
"active" press the test button > 10 s



Maintenance message



Press reset via the test button 5 ... 9 s



2. Press the test button > 10 s

→ The status is now inverted, meaning from "active" to "inactive" or vice versa.

→ If the green "Power" LED is not on, the status is "inactive".

→ If the green "Power" LED shines very brightly, the status is "active".

In the "active" status, the maintenance message is indicated by the flashing supply voltage "Power" LED.

The status of the timer will be maintained at a power outage or when the energy supply is deactivated.

The maintenance activities are described in the "Check and maintenance" chapter.

Prior to the replacement of the service unit, a reset needs to be carried out.

The control unit is released by actuating the arresting hook.

When removed, the TEST button must be pressed and held for at least 5 s, but maximally for 9 s.

The green "Power" LED flashes while the test button is being pressed and held.

If the flashing stops, the maximum actuating time was exceeded and, with it, the "active/inactive" status was inverted.

By re-actuating the test button (> 10 s), the status can be re-inverted.

Installation

9 Installation

**Danger!****Compressed air!**

Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting plant components or plant components which are not secured.

Measures:

- Do not exceed the maximum operating pressure (see type plate).
- **Only carry out service measures when the system is pressureless.**
- Use pressure-resistant installation material only.
- The feed pipe must be tubed firmly. Discharge pipe: short, fixed pressure hose onto pressure-resistant pipe.
- Make sure that persons or objects cannot be hit by condensate or escaping compressed air.

**Caution!****Malfunction during operation!**

Through incorrect installation and poor maintenance, malfunction may occur at the ECO-DRAIN .

Condensate which is not discharged may cause damage to plants and in production processes.

Measures:

- Condensate drainage which is reliable in performance directly optimises the compressed-air quality.
- To prevent damage and breakdowns, it is imperative to observe the following:
 - Exact compliance with the specifications of use and with the performance parameters of the ECO-DRAIN, in connection with the case of application (see "Proper use" section)
 - Exact compliance with the installation- and operation instructions in this manual
 - Regular maintenance and control of the ECO-DRAIN in accordance with the instructions in this operating manual

**Note:**

It is imperative to observe all hazard statements and warnings listed here.

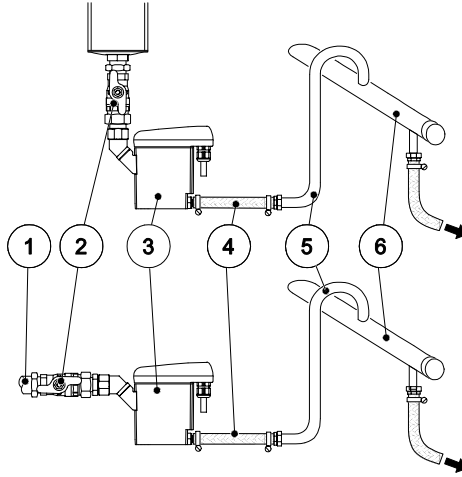
Please also observe all regulations and notes regarding industrial safety and fire prevention at the place of installation.

As a matter of principle, only use suitable and appropriate tools and materials in a proper condition.

Do not use aggressive cleaners and improper devices such as high-pressure cleaners.

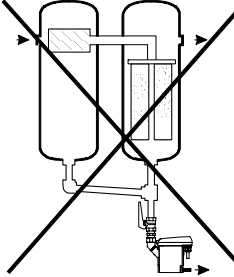
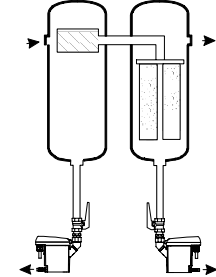

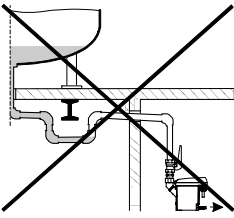
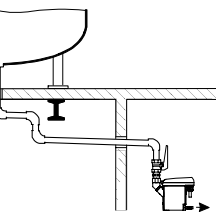

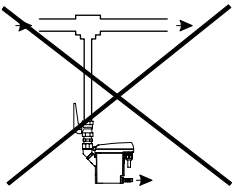
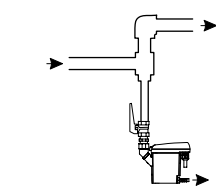

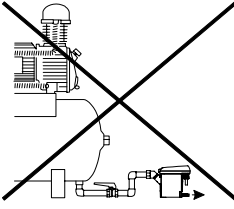
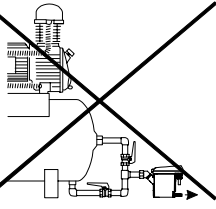

Please note that condensates may contain aggressive or harmful components. Therefore, skin contact should be avoided.

Condensate is subject to mandatory waste disposal. As such, it must be collected in suitable containers, and disposed of or processed properly.

Installation instructions:

- Only the displayed installation position of the ECO-DRAIN (3) is permissible. Never install in a horizontal or any other tilted position.
- Feed pipe (1) and ball valve (2) at least G $\frac{1}{2}$.
- No filter or screen in the inlet line.
- Slope in the inlet line >1%.
- Use ball valves (2) only.
- Operating pressure: min. 0,8/1,2 bar (12/17 psig), max. 16 bar (230 psig). See type plate.
- Short pressure hose (4) fixed on a pressure-resistant pipe.
- The required minimum pressure increases by 0,1 bar (1,4 psi) per metre gradient in the discharge pipe (5).
- Discharge pipe (5) rising by max. 5 m (16,4ft).
- Install manifold (6) $\frac{3}{4}$ " with a slope of 1%.
- Introduce the discharge pipe (5) from the top into the manifold (6).
- Prior to the start-up, always carry out a leak test and verify the correct engagement of the control unit.

Installation

wrong	correct	
		<p> Pressure differences!</p> <p>Each condensate accumulation point must be drained separately.</p>
		<p> Continuous slope!</p> <p>Avoid a water pocket when installing the feed pipe</p>
		<p> Deflector area!</p> <p>If drainage is to be carried out directly from the pipe, deflection of the air flow will be useful.</p>
		<p> No venting line!</p> <p>Do not install a venting line for a ECO-DRAIN 31 Vario! Installations, where a venting line is normally required, are impossible in this case. Another suitable ECO-DRAIN must be used.</p>

Electrical installation

10 Electrical installation

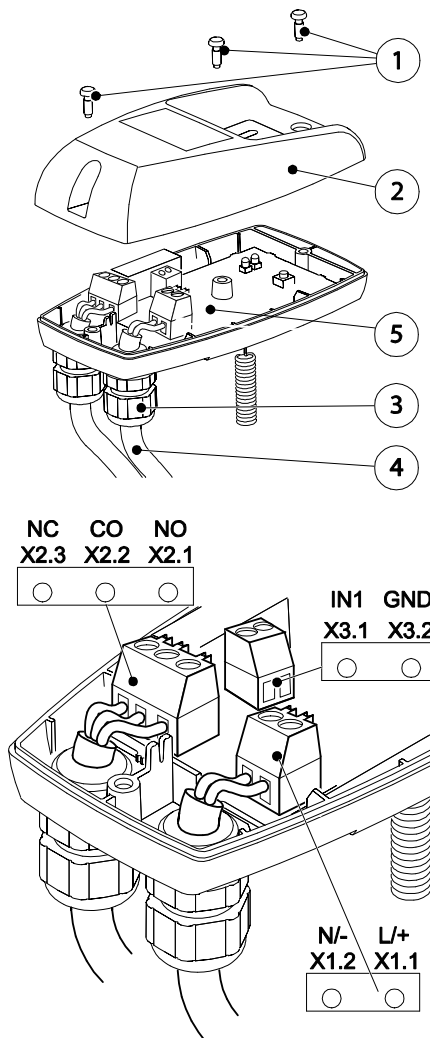


Danger!
Supply voltage!

There is the risk of an electric shock involving injury or death when coming into contact with non-insulated components carrying supply voltage.

Measures:

- During electric installations, all regulations in force need to be adhered to (e.g. VDE 0100 / IEC 60364).
- **When the control unit is open, service and installation works must only be undertaken when the system is deactivated.**
- **The removed control unit has no IP degree of protection.**
- All types of electrical works must be carried out by authorised and qualified personnel only.



Note:

Power supply connection:

1. Read the permissible supply voltage on the type plate and make sure this voltage is observed.
2. For the supply voltage, a reliably accessible separator must be provided close-by (e.g. power plug or switch), which separates all current-carrying conductors.
3. At a low-voltage supply (< 50 VAC / < 75 VDC), only use a protective extra-low-voltage.
4. Carry out installation in accordance with VDE 0100 / IEC 60364.
5. Observe the terminal assignment.
6. Do not install when the device is energised.
7. Unscrew the screws (1) and remove the upper part of the cover (2).
8. Unscrew the threaded cable connection (3), remove the plug (if there is one), and lead the cable (4) for the power supply through.
9. Connect the cable (4) with terminals X1 (1.1, 1.2) (5).
10. Install the cables as shown (see also terminal assignment in the following text).
11. Tighten the threaded cable connection (3) with a slightly sealing effect.
12. Put on the upper part of the cover (2) and tighten the screws (1) fingertight.

Electrical installation
Connection of the potential-free contact and of the external test:

1. Selection of the suitable cable.
2. Connection to X2 and X3, as shown in the adjacent illustration.
3. The installation steps are the same as for the power supply connection.
4. If the potential-free contact carries voltage that is dangerous in the case of contact, a corresponding separator must also be provided, as described above.
5. When using the potential-free contacts and the connection external test, sufficient clearance to the other parts of the unit, or suitable insulation in accordance with EN 60664-1 must be ensured.
6. When using a multiwire, common line for the connection of the potential-free contact and the external test, this line must be suitable for the highest occurring voltage and the intended temperature range with regard to its nominal ratings.

Terminal assignment supply voltage (operating voltage)

X 1		X 2			X 3	
L/+	N/-	NO	CO	NC	IN1	GND
phase	neutral	normally open	common	normally closed	external test (IN1)	GND
1.1	1.2	2.1	2.2	2.3	3.1	3.2

Power supply

- X 1.1 L/+
- X 1.2 N/-

L = Outer conductor

N = Neutral conductor

Terminal assignment low voltage (operating voltage)

X 1		X 2			X 3	
L/+	N/-	NO	CO	NC	IN1	GND
power	power	normally open	common	normally closed	external test (IN1)	GND
1.1	1.2	2.1	2.2	2.3	3.1	3.2

Power supply

- X 1.1 L/+
- X 1.2 N/-

Electrical installation

Terminal assignment of the potential-free contact and of the external test

X 1		X 2			X 3	
L/+	N/-	NO	CO	NC	IN1	GND
power	power	normally open	common	normally closed	external test (IN1)	GND
1.1	1.2	2.1	2.2	2.3	3.1	3.2



Fault indication/potential-free contact:

- X 2.1 n.o.
- X 2.2 com.
- X 2.3 n.c.

n.c. - com. closed in the event of malfunction or power failure
n.o. - com. closed during normal operation
(closed current principle)

The contacts X2.1 - 2.3 are potential-free.

External test / remote control:

- X 3.1 external test (IN1)
- X 3.2 GND

Contacts connected = test active = discharge

Contacts open = test inactive

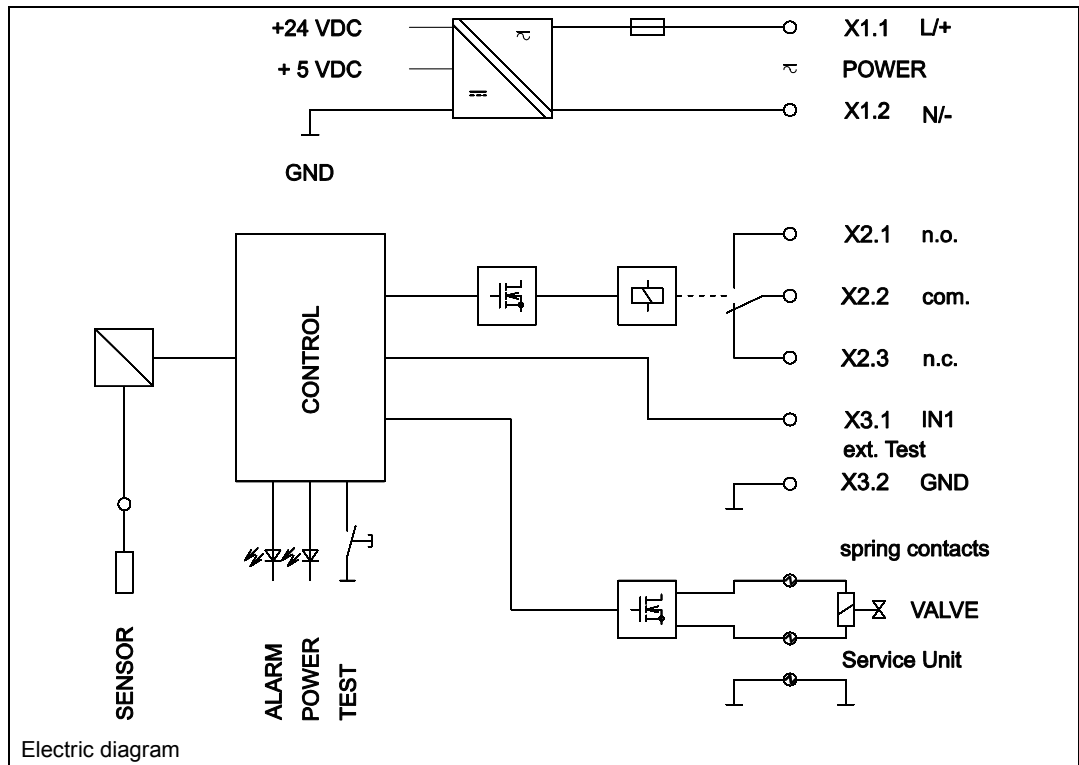
The contacts X 3.1 -3.2 are not potential-free.



Note:

At a low-voltage supply (< 50 VAC / < 75 VDC), only use a protective extra-low-voltage.

Tighten the threaded cable connection with a slightly sealing effect.



Control and maintenance

11 Control and maintenance

**Danger!****Compressed air!**

Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting plant components or plant components which are not secured.

Measures:

- Do not exceed the maximum operating pressure (see type plate).
- **Only carry out service measures when the system is pressureless.**
- Use pressure-resistant installation material only.
- The feed pipe must be tubed firmly. Discharge pipe: short, fixed pressure hose onto pressure-resistant pipe.
- Make sure that persons or objects cannot be hit by condensate or escaping compressed air.

**Danger!****Supply voltage!**

There is the risk of an electric shock involving injury or death when coming into contact with non-insulated components carrying supply voltage.

Measures:

- During electric installations, all regulations in force need to be adhered to (e.g. VDE 0100 / IEC 60364).
- **When the control unit is open, service and installation works must only be undertaken when the system is deactivated.**
- **The removed control unit has no IP degree of protection.**
- All types of electrical works must be carried out by authorised and qualified personnel only.

**Caution!****Malfunction during operation!**

Through incorrect installation and poor maintenance, malfunction may occur at the ECO-DRAIN .

Condensate which is not discharged may cause damage to plants and in production processes.

Measures:

- Condensate drainage which is reliable in performance directly optimises the compressed-air quality.
- To prevent damage and breakdowns, it is imperative to observe the following:
 - Exact compliance with the specifications of use and with the performance parameters of the ECO-DRAIN, in connection with the case of application (see "Proper use" section)
 - Exact compliance with the installation- and operation instructions in this manual
 - Regular maintenance and control of the ECO-DRAIN in accordance with the instructions in this operating manual

Control and maintenance



Note:

It is imperative to observe all hazard statements and warnings listed here.

Please also observe all regulations and notes regarding industrial safety and fire prevention at the place of installation.

As a matter of principle, only use suitable and appropriate tools and materials in a proper condition.

Do not use aggressive cleaners and improper devices such as high-pressure cleaners.

Please note that condensates may contain aggressive or harmful components. Therefore, skin contact should be avoided.

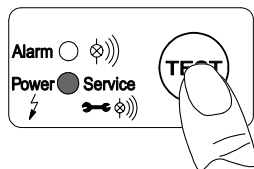
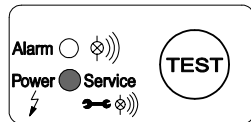
Condensate is subject to mandatory waste disposal. As such, it must be collected in suitable containers, and disposed of or processed properly.

Maintenance recommendation:

The ECO-DRAIN 31 Vario offers the possibility to display a maintenance message for the maintenance measures that need to be implemented.

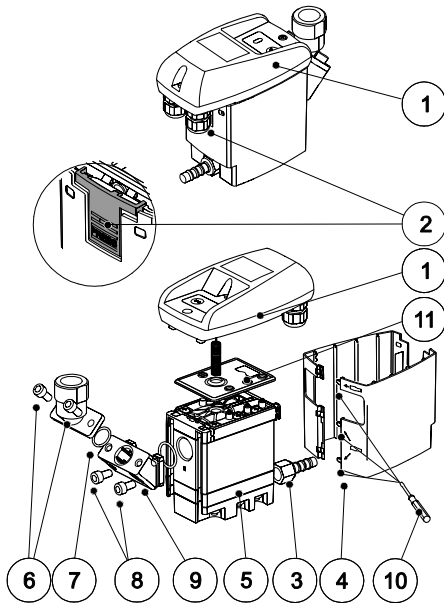
When being delivered, this display of the ECO-DRAIN 31 Vario is inactive, and no maintenance message is indicated.

In the event that it is "active", it will appear after 1 x 8.760 operating hours or 1 million switching cycles. Afterwards, or at the latest after one year (8 760 operating hours), the service unit (5) needs to be replaced.

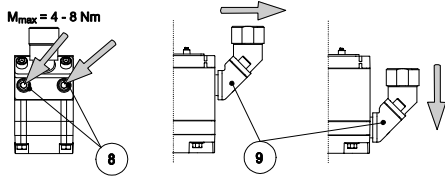


1. Prior to the replacement of the service unit, a reset needs to be carried out. The control unit is released by actuating the arresting hook. When removed, the TEST button below the LED must be pressed for at least five seconds.

Control and maintenance

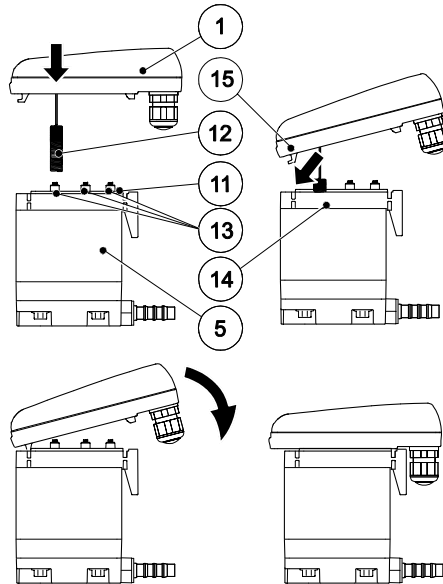


2. Remove the control unit (1) by pressing the arresting hook (2).
3. ECO-DRAIN 31 Vario Unfasten from the outlet (3).
4. Remove the design shell (4) (if there is one) using a screwdriver (10).
5. Detach the service unit (5) from the tubing at the inlet by removing the union nut.
6. **or** remove the screws (6) from the angle nozzle (7).



7. **or** remove the screws (8) at the intermediate adapter (9) and remove the latter from the service unit by pulling it downwards.
8. Check whether or not the new service unit (5) goes with the control unit (1). (model designation and colour of the arresting hook (2)).
9. Installation of the new service unit (5) in reverse order.

Control and maintenance



Installation of the control unit on the service unit:

1. Check whether or not the service unit (5) goes with the control unit (1) (model designation and colour of the arresting hook (2)).
2. Check whether or not the sealing mat (11) and the contact springs (13) are clean, dry, and free from impurities.
3. Introduce the sensor (12) into the sensor tube plate (14).
4. Hang the hook (15) of the control unit (1) in the sensor tube plate (14).
5. Press the control unit (1) against the service unit (5) and snap into place.

Start-up subsequent to maintenance measures:

Always carry out prior to the start-up:

- Leak test of the screwed connector
- Check of the electrical connections
- Check of the correct engagement of the control unit

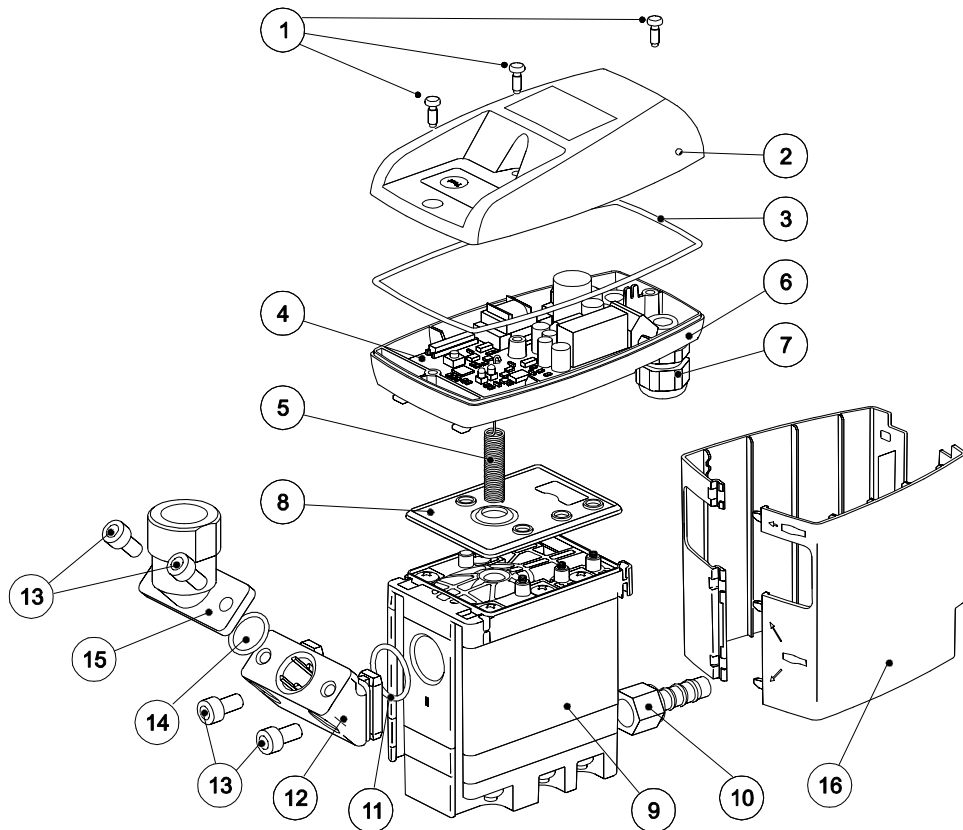
Troubleshooting and fault elimination

12 Troubleshooting and fault elimination

Symptoms	Possible reasons	Measures
<p>No LED lights up</p>	<p>Supply voltage incorrect Circuit board defective</p>	<p>Check voltage on the ID plate Check the connections and the supply voltage Check the circuit boards for possible damage</p>
<p>All LEDs are continuously on</p>	<p>Failure during the start of the programme Circuit board defective</p>	<p>Separate the device from the supply voltage and reactivate after > 5 s Check the circuit boards for possible damage</p>
<p>Test button pressed, but no condensate discharge</p>	<p>Feed pipe and/or discharge pipe blocked or obstructed Wear and tear Circuit board defective Service unit defective Minimum pressure not reached Maximum pressure exceeded</p>	<p>Check feed and discharge pipe Check whether or not the valve opens audibly (press the test button several times for >2 seconds) Check the circuit board for possible damage Check the operating pressure</p>
<p>Condensate discharge only when the test button is pressed</p>	<p>Feed pipe without sufficient slope Cross section not large enough Condensate accumulation too high (surge) Service unit extremely dirty</p>	<p>Install feed pipe with a slope Replace the service unit</p>
<p>Device blows off continuously</p>	<p>Service unit defective or dirty</p>	<p>Replace the service unit</p>

Elements and components

13 Elements and components



- | | |
|---------------------------|-------------------------|
| 1 Screw 3.5 x 10 | 9 Service unit |
| 2 Upper part of the cover | 10 Hose connector |
| 3 Moulded gasket | 11 O-ring 20 x 2 |
| 4 Circuit board | 12 Intermediate adapter |
| 5 Sensor | 13 Screw M6 x 12 |
| 6 Lower part of the cover | 14 O-ring 14 x 1.78 |
| 7 Cable bushing | 15 Angle adaptor |
| 8 Sealing mat | 16 Design shell |

14 Recommended spare parts

Available sets of spare parts	Contents	Order number
Service unit Vario	8, 9, 11*	see type plate
Gasket kit	3, 8, 11*	8.2474.10390
Design shell*	16*	8.2474.10410
Connection adapter*	11*, 12*, 13*, 14*, 15*	8.2474.00420

* Not for ECO-DRAIN Vario 31 built-in

Declaration of conformity**15 Declaration of conformity**

BEKO TECHNOLOGIES GMBH
41468 Neuss, GERMANY
Tel: +49 2131 988-0
www.beko-technologies.de

**EG-Konformitätserklärung**

Wir erklären hiermit, dass die nachfolgend bezeichneten Produkte den Anforderungen der einschlägigen Richtlinien und technischen Normen entsprechen. Diese Erklärung bezieht sich nur auf die Produkte in dem Zustand, in dem sie von uns in Verkehr gebracht wurden. Nicht vom Hersteller angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt.

Produktbezeichnung:	Kondensatableiter
Modelle:	ECO-DRAIN 30, 30 WA, 31, 31 Vario, 31F, 31F Vario, 32, 32 CO
	Die Produkte werden hergestellt für: KAESER KOMPRESSOREN SE Carl-Kaeser-Str. 26 D-96450 Coburg
Spannungsvarianten:	95...240 VAC $\pm 10\%$ (50...60 Hz) / 100...125 VDC $\pm 10\%$ oder 24...48 VAC $\pm 10\%$ (50...60 Hz) / 18...72 VDC $\pm 10\%$
Betriebsdruckbereich:	0,8...16 bar(g) oder 1,2 - 16 bar(g)
Produktbeschreibung und Funktion:	Kondensatableiter zur elektronisch niveaugeregelten Ableitung von Kondensat im Druckluftnetz.

Niederspannungs-Richtlinie 2006/95/EG

Angewandte harmonisierte Normen:	EN 61010-1:2010
Anbringungsjahr der CE-Kennzeichnung:	13

Die Geräte mit einer Betriebsspannung von 24...48 VAC und 18...72 VDC fallen nicht in den Anwendungsbereich der Niederspannungs-Richtlinie.

EMV-Richtlinie 2004/108/EG

Angewandte harmonisierte Normen:	EN 61326-1:2006
	EN 55011:2009 + A1: 2010, Gruppe 1, Klasse B

RoHS Richtlinie 2011/65/EU

Die Vorschriften der Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten werden erfüllt.

Neuss, 25.08.2015

BEKO TECHNOLOGIES GMBH

i.V. Christian Riedel
Leiter Qualitätsmanagement

Declaration of conformity

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**EC Declaration of Conformity**

We hereby declare that the products indicated hereafter, in the delivered performance, comply with the stipulations of the relevant standards. This declaration only refers to products in the condition in which they have been placed into circulation. Parts which have not been installed by the manufacturer and / or modifications which have been implemented subsequently remain unconsidered.

Product designation:	Condensate drain
Types:	ECO-DRAIN 30, 30 WA, 31, 31 Vario, 31F, 31F Vario, 32, 32 CO
	The product is manufactured for :
	KAESER KOMPRESSOREN SE
	Carl-Kaeser-Str. 26
	D-96450 Coburg
Voltage options:	95...240 VAC $\pm 10\%$ (50...60 Hz) / 100...125 VDC $\pm 10\%$
	or
	24...48 VAC $\pm 10\%$ (50...60 Hz) / 18...72 VDC $\pm 10\%$
Pressure options:	0.8...16 bar (12...230 psi)
Product description and function:	Condensate drain for the electronically level-controlled discharge of condensate in the compressed-air system.

Low-Voltage Directive 2006/95/EC

Harmonised standards applied:	EN 61010-1:2010
Year of CE labelling:	13

The devices with a supply voltage of 24...48 VAC and 18...72 VDC do not come under the scope of the Low-Voltage Directive.

EMC Directive 2004/108/EC

Harmonised standards applied:	EN 61326-1:2006
	EN 55011:2009 + A1: 2010, group 1, class B

RoHs Directive 2011/65/EU

The stipulations of the 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment are observed.

Neuss, 25 August 2015

BEKO TECHNOLOGIES GMBH

p.p. Christian Riedel
Head of Quality Department

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Translation of the original manual/instructions.
Original instructions are in German.
Subject to technical modifications without notice / errors excepted.
eco-drain_31_new_v_uc_manual_en_01-2381_1508_v00.

ECO-DRAIN 31 Vario