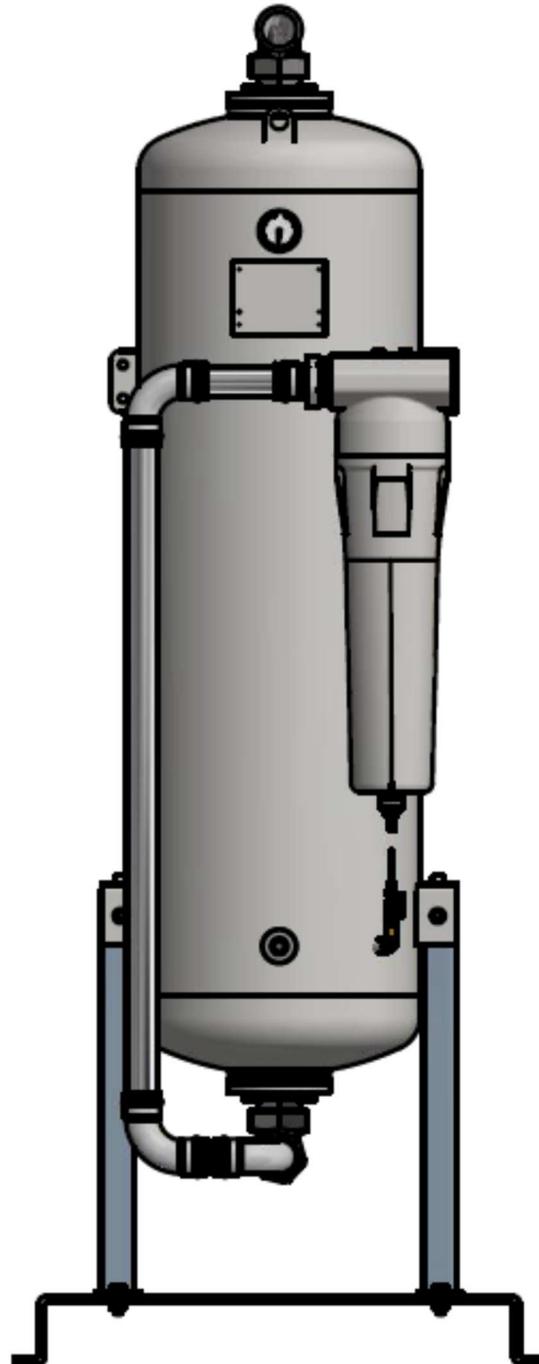


ECOTROC® CTN 200 - 705
Operating manual
Oil vapour adsorber
Rev 02_0324



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1 General information

Please complete the following information according to the type plate, vessel plate and contract documents. This enables the manufacturer to clearly identify the dryer and makes it easier to give advice if there are queries. It also simplifies the provision of spare parts and support. This may correspond to separate pieces of equipment for the individual devices.

1.1 System data

Model: _____

Order No.: _____

Vessel No.: _____

Serial number: _____

Year of manufacture: _____

Date of commissioning: _____

1.2 Contact data

Company: _____

Address: _____

Phone: _____

E-mail: _____

1.3 Accompanying documents

Applicable documents which are not provided with this documentation:

- Container documents
- Installation drawing
- Documentation for additional equipment parts

1.4 Warranty notes

For the conditions necessary for compliance with the warranty, please refer to our "General Terms of Sale and Delivery"

The warranty shall be void if:

- The oil vapour adsorber is used for anything other than its intended use.
- The instructions in this operating manual are not observed.
- External influences (e.g., aggressive substances) cause damage to the oil vapour adsorber.
- Maintenance intervals are not adhered to.
- Damage is caused due to incorrect or defective maintenance.
- The oil vapour adsorber is operated although defects are evident.
- An unfavourable or incorrect installation is selected.

1.5 Operating manual

This operating manual will help clarify any outstanding questions concerning the setup, installation, operation, maintenance, repair and disposal of the dryer. It contains useful tips and advice.

It is not only written for the operator who is responsible for monitoring the daily operation of the device, but also for the service personnel who performs the installation and service. Maintenance and repair work may only be carried out by qualified personnel!

This operating manual must be read before any installation and maintenance work is started. All safety instructions must be observed!

The operating manual must be kept in the vicinity of the dryer.

As already mentioned in the warranty notes, the manufacturer accepts no liability for damages resulting from disregard of the operating manual.

1.6 Signs and symbols used

The following symbols are listed in this manual and/or are affixed to the construction:

Symbol	Meaning
	Tip This symbol indicates tips for the efficient use of the adsorption dryer!
	Note This symbol indicates instructions for the safe handling of the adsorption dryer.
	Caution / Warning This symbol indicates general hazards or dangerous situations.
	Danger! Compressed air This symbol warns of dangers due to compressed air.
	Danger! High voltage This symbol warns of dangers due to electric voltage.
	Slip hazard This symbol warns of the risk of slipping.
	Personal protective equipment – Ear protectors Wear ear protectors
	Personal protective equipment – Respiratory protection Wear respiratory protection
	Personal protective equipment – Goggles Wear goggles

2 Intended purpose / use

The oil vapour adsorber is designed to be used to reduce the oil vapour fractions in the compressed air and reduce odorous and aromatic substances in industrial compressed air systems. It requires the supply of compressed air from a supply source.

The main task is to reduce vaporous oil fractions in the compressed air. Upstream filters and dryers ensure that only particles and drop shapes are separated. By applying the pretreatment process of the active carbon which is specifically designed for this purpose, the long-chain hydrocarbons from the compressed air are stored in the open pores of the active carbon and the oil fraction of the compressed air is reduced to a minimum. Compressor oils are perfectly absorbed by the active carbon. Should you want to absorb other substances, please contact the manufacturer.

2.1 Intended use

The oil vapour adsorber is exclusively designed for cleaning compressed air! If the oil vapour adsorber is to be used with other gases, this must be agreed with the manufacturer. Other safety guidelines may apply here!

The oil vapour adsorber must be set up at a site indoors:



- which is suitable for the weight,
- weatherproof (exposure to sun should be avoided),
- dry,
- frost-free,
- vibration-free,
- not in potentially explosive atmospheres,
- which can be accessed for maintenance and servicing,



The oil vapour adsorber must only be operated within the allowable operating conditions. These are defined on the type plate and vessel plate. Any other use is considered improper and the manufacturer accepts no liability.

The oil vapour adsorber must not be converted in any way and its components must not be modified. The use of components other than the original ones from the manufacturer is not permitted, unless this has been agreed with the manufacturer.

The values shown on the vessel plate are the maximum permissible values as per the pressure equipment directive. These values are not directed at the operating conditions. The maximum operating conditions can be found on the type plate of the oil vapour adsorber.

For the nominal performance data of the oil vapour adsorber, please refer to the Section "Performance data".

Exceeding or even significantly undercutting the design data can lead to bad residual oil contents!

The compressed air supplied to the device must be of the following quality:

- Free from aggressive and corrosive substances
- Free from particles and solids
- Dry (technically dry)
- Must be within the temperature conditions for the design.



In principle, the oil vapour adsorber can also be operated without any pre-treatment, but this may be detrimental to the service life of the active carbon. Moisture and particles are stored in the open pores and reduce the adsorption capacity of the active carbon.



Where temperatures are above 131 °F, previously collected oil can be released again!

2.2 Performance data

The performance data of the individual types of devices is shown in the table below. The data is based on the operating conditions of the compressed air temperature + 95 °F and 102 psi operating pressure, and a moisture content < 30%.

Type	Nominal volumetric flow rate cfm	Connection
CTN 200	200	1 ½" NPT
CTN 285	285	1 ½" NPT
CTN 350	350	1 ½" NPT
CTN 480	480	2" NPT
CTN 590	590	2" NPT
CTN 705	705	2" NPT

Based on 14.5 psi(a) and 68 °F



Routine inspections must be carried out on the pressure vessels. The operator is solely responsible for the registration. Regional or national regulations may apply in addition. Please also refer to the additional vessel documentation!

3 Safety notes

The CTN oil vapour adsorbers have been built according to state-of-the-art technology and the latest safety regulations. However, there is still a risk of danger during operation, maintenance, installation and servicing, and during transport and setup. In particular, the disregard of safety regulations when handling compressed air may result in serious injury or death. Expertly trained personnel and those trained in safety should therefore only use the system.



- Observe the safety notes in this manual and on the adsorber.
- Observe all safety notes, even those in the individual chapters.
- Observe all legal guidelines and safety regulations (the latter may vary from region to region!)
- Observe all local site regulations which are stipulated for the field of application.

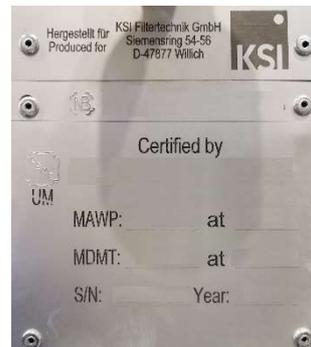
3.1 Signs and symbols

The following signs are affixed to the adsorber:

Vessel plate (on the front underneath the pressure gauge)
it includes details of the year of manufacture, vessel number, max. permissible temperature, maximum permissible pressure, volume, min. temperature, test pressure and test date.

Type plate (on the right side of the vessel)
It shows details of the type, year of manufacture, serial number of the device, performance data, weight and filters installed.

Vessel plate:



Type plate:



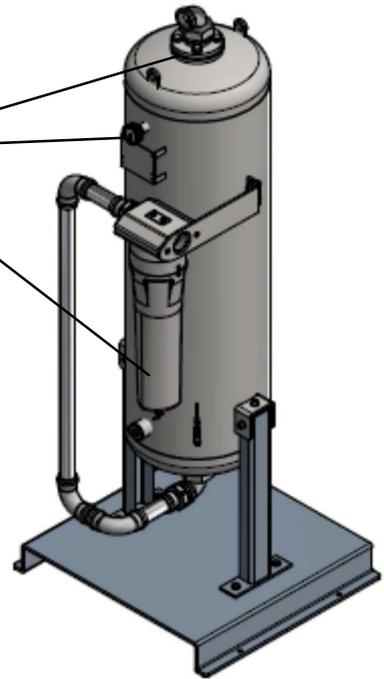
The type plates on the device show important information. Please make sure that they are always legible and that they can be accessed.

3.2 Danger zones

Risk from pressure-bearing parts



Risk of slipping due to spilt active carbon on the floor



- Never operate the oil vapour adsorber outside of the load limits shown on the vessel plate.
- Never carry out work as long as the oil vapour adsorber is under pressure.
- Do not modify the structure of the oil vapour adsorber or change its function.
- Only use the oil vapour adsorber for its intended purpose.
- Do not climb onto the device.
- Do not carry out welding work on pressure-bearing parts.
- Wear respiratory protection and eye protection when changing the active carbon.
- Risk of slipping due to spilt active carbon.
- Always check that the indicator pipe is secure before you open the needle valve and remember to wear eye protection.
- Never operate the device if there is apparent damage.
- Avoid sparks and naked flames in the vicinity of the active carbon as it is combustible.
- Never lift the oil vapour adsorber by the equipment parts, only use the lifting lugs.

Active carbon

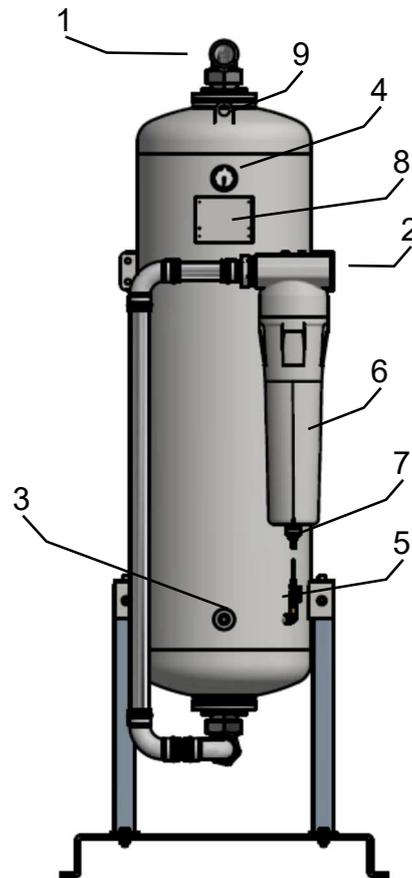
The active carbon used does not fall into the hazardous substances group and is therefore not subject to labelling requirements. Nevertheless, please observe all common safety measures with regard to using chemicals. Please also note that the material accumulates contaminants, in particular oil. This can cause additional dangers.

Should you require further information, contact the manufacturer to obtain a copy of the safety datasheet.

4 Technical product data

4.1 Equipment overview

- 1 Compressed air inlet
- 2 Compressed air outlet
- 3 Filling and draining nozzle
- 4 Pressure gauge
- 5 Oil check indicator
- 6 After-filter
- 7 Manual drain cock
- 8 Vessel plate
- 9 Lifting lugs



4.2 Function description



From the filled adsorbent material, (active carbon in this case), oil vapours and odorous and aromatic substances are stored in the open pores of the active carbon, thus reducing its content in the compressed air.

Through the joining pipe and possible pre-treatment, the compressed air is fed via the inlet into the diffuser (flow distributor and sieve). The compressed air is hereby distributed over the whole vessel cross-section for optimum efficiency. Based on the laws of physics and a predetermined contact time, the abovementioned contaminations are stored in the open pores of the active carbon. The cleaned air then exits the vessel again through a sieve on the outlet.

As the temperatures rise, the performance of the active carbon is reduced since the hydrocarbon chains (oils) become shorter and shorter and cannot be absorbed as effectively.

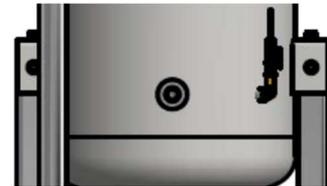
The contaminations collected in the active carbon gradually saturate the material. It cannot be regenerated in the process and must be replaced. With the appropriate compressed air quality at the inlet, it is possible for the service life to exceed 10,000 hours.

5 Monitoring the operation

The following components are provided for regular monitoring:

The pressure gauge shows the operating pressure.

The oil check indicator is used to regularly measure the residual oil. The needle valve is only opened for the duration of the measurement. Based on the discolouration, the indicator provides information about the saturation of the active carbon.



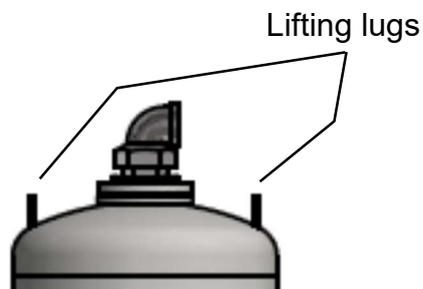
6 Transport, storage and setup

6.1 Transport



Although great care is taken, please check immediately whether the adsorber has been damaged in any way. Any kind of transportation damage must be pointed out immediately to the deliverer and manufacturer.

- Suitable hoisting equipment must be provided for the transportation, loading and unloading process.
- The device must only be lifted at the designated points: crane hook or transport pallet.
- Take the weight of the adsorber into account and provide suitable assistive equipment.
- Secure the adsorber against tilting using suitable means.
- Do not remove the packaging material until the device is moved to its place of installation.
- Only appropriately qualified personnel may carry out the abovementioned tasks.
- Observe all regulations on accident prevention.



6.2 Storage



If the device needs to be stored before being commissioned, ensure that the storage site fulfils the following requirements:

- Indoors only
- Dry
- Frost-free
- Protected against weather impact.



If the device is stored after having been commissioned, please proceed as follows:

- Depressurise the adsorber.
- Disconnect the adsorber from the compressed air system.
- Close the compressed air inlet and outlet.

6.3 Setup



Please refer to the setup conditions described in Section 2.1. The basic data required for the setup can be found in the Performance data in Section 2.2.

When setting up, make sure

- that the ground is level and capable of carrying the weight. Please also take into account that the vessel will be filled with water during the routine inspection.
- Make sure there is enough space around the adsorber to carry out the servicing and maintenance work. We recommend at least 0.8 m.
- Make sure that the adsorber can be reached and accessed by the lifting gear.
- The adsorber must not be accessible to non-experts, or warning signs should be affixed for inexperienced persons.
- The adsorber cannot be rammed by haulage vehicles.
- The signage is clearly visible at all times.

There are mounting holes in the base section of the adsorber. These should be used to anchor the device into the ground, as long as the ground allows it.

7 Installation

7.1 Recommendations for installation



Proper installation is the basic prerequisite for the safe and problem-free operation of the CTN series.

We recommend the installation of shut-off devices both upstream and downstream of the adsorber. The adsorber can thereby be disconnected from the compressed air system during maintenance.

If operation cannot be interrupted during maintenance, then a by-pass line must be provided. It should at least include an active carbon filter to prevent a contamination of oil downstream of the adsorber.



We recommend installation after a corresponding pre-treatment. The oil vapour adsorber is usually installed behind an air cauldron and dryer (compressed air refrigeration dryer or adsorption dryer).

A filter with a separation degree of 0.01μ must be installed immediately in front of the oil vapour adsorber to collect any possible additional liquid drops and solids which would otherwise cause the active carbon to become saturated more quickly.

Installing the device behind an air cauldron also has the advantage in that pulsating compressed air is buffered and the temperature at the inlet of the adsorber is lower.

Choose a place of installation with the lowest possible compressed air temperature and with the highest level of dry air. This then increases the service life of the active carbon and the adsorber works most efficiently.

7.2 Demands on the installation



Prior to installation, check the following points:

- The compressed air system and the adsorption dryer must be free from pressure.
- For compressed air systems which need to remain under pressure, shut-off devices have to be protected against unintentional opening.
- The operating pressure in the system cannot be higher than the maximum permissible overpressure of the adsorber.
- There must be no pressure surges in the system in the adsorber (e.g., from valves which open abruptly).
- The pipelines are designed for the operating pressure, nominal width and volume.
- No possible vibration transmission or vibration.
- No residue left in the pipeline from mechanical processing.

7.3 **Elimination of hazards**

Please be aware of the risks associated with the installation of the device:



- Do not work on parts which are under pressure.
- The pipelines must be kept in place with brackets, the adsorber is not designed to act as a support for the pipes.
- The adsorber must only be used in the predetermined operating conditions (see vessel plate), it is the operator's duty to observe these values.

8 **Commissioning**



All work on CTN adsorbers and on the feeder and drainage systems must only be carried out by expertly trained persons and by those with experience in the field of compressed air!

8.1 **Commissioning prerequisite**

The following points must be checked immediately prior to commissioning:



- The maximum operating values must not be exceeded.
- Upstream and downstream shut-off devices are closed.
- All connections and screw connections are secure. Check this and tighten if necessary, using a suitable tool.
- Visually check again for any signs of damage. Do not use the adsorber if it is damaged in any way.

8.2 **Pressurisation**



Only once you've successfully completed all of the checks listed in Section 8.1 can you perform the following steps in the specified order.



Wear ear protection for this as the flow noise can get very loud.

- Make sure that the compressed air system is under pressure upstream of the adsorber.
- Slowly open the cut-off valve upstream of the adsorber until you hear the flow noise.
- Keep an eye on the pressure gauge on the vessel. Pressurisation must rise slowly.
- At 58 psi close the inlet shut-off device again. Check all connections for leaks. If leaks are found, the adsorber must be rendered pressureless again and the leaks must be repaired.
- If no further flow noises can be heard and if the pressure gauge does not indicate any further increase in pressure, you can open the cut-off valve completely.

8.3 Mains operation



Pressurisation has been successful. Check whether the compressed air system downstream of the adsorber can be opened safely. Then proceed as follows:



- Slowly open the cut-off valves at the outlet of the adsorber until you hear the flow noise.
- Keep an eye on the pressure gauge. Should the pressure suddenly drop, check whether any tapping points are still open.
- If the pressure remains stable and you no longer hear any flow noise, the cut-off valve downstream of the adsorber can be opened completely.
- The oil vapour adsorber is now ready for operation.

8.4 Disconnecting from the mains



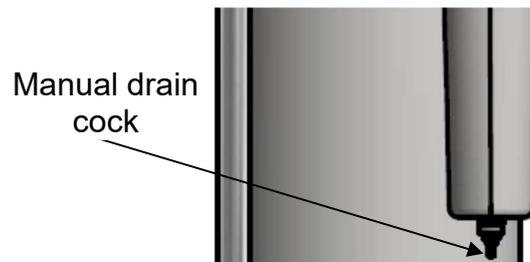
Should you have to disconnect the oil vapour adsorber from the mains, e.g., for a maintenance operation, make sure that this work is only carried out when the device is free from pressure.



Wear your personal protective equipment. Proceed as follows:



- Close the cut-off valves at the inlet and outlet of the adsorber.
- Open the manual drain on the after-filter housing.
- Keep an eye on the pressure gauge and wait until it displays "0" psi before starting work.
- Then close the manual cock again.



The oil vapour adsorber is now disconnected from the mains.

9 Maintenance



Maintenance work may only be carried out by suitably qualified personnel! Make sure that the device is free from pressure before starting work and observe the applicable accident prevention regulations for the place of installation!

9.1 Regular maintenance work

The following table gives an overview of the intervals and scope of the maintenance work:

Maintenance	Activity	Every day	Every month	Every year
Adsorber and filters	Visual check, functional check	X		
Oil check indicator	Residual oil content measurement		X	
Oil check indicator	Replace pipe if discoloured		if necessary	
After-filter element	Replace the filter element			X
Active carbon	Replace			rec. after 4.000 Bh / or 1 year
Seals	Replace			X
Sieves	Clean, replace if necessary			X

9.2 Daily checks

The following points should be checked every day:

- The difference in the operating pressure upstream and downstream of the adsorber is not more than 7.3 psi.
- Open the manual drain cock slightly on the after-filter. It must not drip.
- Check if you can hear any unusual or loud noises.
- Check for leaks.
- If prefilters are installed, check that the condensate drains work properly.

9.3 Checking the residual oil content

The residual oil content should be measured on a regular basis. Proceed as follows:

- Check that the indicator pipe is secure.
- Record the date and time when measurements start.
- Record the operating pressure (it should be constant during the measurement).
- Record the scale value where the obvious red discolouration can already be seen. (Ignore any slight pink-coloured discolouration)
- Open the needle valve completely.
- Allow the measurement to run its course until there is a discolouration of a scale unit of at least 0.2. Use the following tables with the corresponding measurement pressure to determine the ppm content for the corresponding measurement time.
- If your measurement value is within the table values (e.g., 0.5 scale units are discoloured), you can interpolate this value.
- Multiply this value by 1.2 to obtain the residual oil content in mg/m³.
- Also assess the discolouration rate by recording the values at regular intervals. This provides you with information about the service life of the active carbon.
- You can use the test pipe until it is completely discoloured, then replace it.
- An example at the end of the table clarifies the selection.
- Close the needle valve again. If more measurements need to be taken, continue to measure from the obvious red discoloured area.
- Replace the completely discoloured test pipe when the device is depressurised.



Table for measurement pressure **greater than 102 psi (g)**, residual oil content in ppm

Scale	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
Duration in h								
4	0.548	1.096	1.644	2.192	2.740	3.288	3.836	4.384
4.5	0.496	0.992	1.488	1.984	2.480	2.976	3.472	3.968
5	0.452	0.904	1.356	1.808	2.260	2.712	3.164	3.616
5.6	0.404	0.808	1.212	1.616	2.020	2.424	2.828	3.232
6.3	0.358	0.716	1.074	1.432	1.790	2.148	2.506	2.864
7.2	0.312	0.624	0.936	1.248	1.560	1.872	2.184	2.496
8.4	0.270	0.540	0.810	1.080	1.350	1.620	1.890	2.160
10	0.224	0.448	0.672	0.896	1.120	1.344	1.568	1.792
12.5	0.180	0.360	0.540	0.720	0.900	1.080	1.260	1.440
16.6	0.136	0.272	0.408	0.544	0.680	0.816	0.952	1.088
25	0.090	0.180	0.270	0.360	0.450	0.540	0.630	0.720
33	0.068	0.136	0.204	0.272	0.340	0.408	0.476	0.544
50	0.045	0.090	0.135	0.180	0.225	0.270	0.315	0.360
56	0.040	0.079	0.119	0.158	0.198	0.238	0.277	0.317
63	0.036	0.072	0.109	0.145	0.181	0.217	0.253	0.290
72	0.032	0.064	0.096	0.128	0.160	0.192	0.224	0.256
84	0.027	0.055	0.082	0.110	0.137	0.164	0.192	0.219

100	0.023	0.045	0.068	0.090	0.113	0.136	0.158	0.181
125	0.018	0.036	0.055	0.073	0.091	0.109	0.127	0.146
166	0.014	0.028	0.041	0.055	0.069	0.083	0.097	0.110
250	0.009	0.018	0.026	0.035	0.044	0.053	0.062	0.070
500	0.004	0.009	0.013	0.018	0.022	0.026	0.031	0.035
1000	0.002	0.004	0.006	0.008	0.010	0.012	0.014	0.016

Table for measurement pressure **87 psi (g)**, residual oil content in **ppm**

Scale	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
Duration in h								
4	0.640	1.280	1.920	2.560	3.200	3.840	4.480	5.120
4.5	0.580	1.160	1.740	2.320	2.900	3.480	4.060	4.640
5	0.524	1.048	1.572	2.096	2.620	3.144	3.668	4.192
5.6	0.454	0.908	1.362	1.816	2.270	2.724	3.178	3.632
6.3	0.416	0.832	1.248	1.664	2.080	2.496	2.912	3.328
7.2	0.364	0.728	1.092	1.456	1.820	2.184	2.548	2.912
8.4	0.312	0.624	0.936	1.248	1.560	1.872	2.184	2.496
10	0.266	0.532	0.798	1.064	1.330	1.596	1.862	2.128
12.5	0.210	0.420	0.630	0.840	1.050	1.260	1.470	1.680
16.6	0.160	0.320	0.480	0.640	0.800	0.960	1.120	1.280
25	0.105	0.210	0.315	0.420	0.525	0.630	0.735	0.840
33	0.078	0.156	0.234	0.312	0.390	0.468	0.546	0.624
50	0.053	0.106	0.158	0.211	0.264	0.317	0.370	0.422
56	0.047	0.093	0.140	0.186	0.233	0.280	0.326	0.373
63	0.042	0.083	0.125	0.166	0.208	0.250	0.291	0.333
72	0.037	0.074	0.110	0.147	0.184	0.221	0.258	0.294
84	0.032	0.064	0.096	0.128	0.160	0.192	0.224	0.256
100	0.027	0.054	0.080	0.107	0.134	0.161	0.188	0.214
125	0.020	0.041	0.061	0.082	0.102	0.122	0.143	0.163
166	0.016	0.032	0.048	0.064	0.080	0.096	0.112	0.128
250	0.011	0.021	0.032	0.042	0.053	0.064	0.074	0.085
500	0.005	0.010	0.016	0.021	0.026	0.031	0.036	0.042
1000	0.003	0.005	0.008	0.010	0.013	0.016	0.018	0.021

Table for measurement pressure **72.5 psi (g)**, residual oil content in **ppm**

Scale	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
Duration in h								
4	0.700	1.400	2.100	2.800	3.500	4.200	4.900	5.600
4.5	0.700	1.400	2.100	2.800	3.500	4.200	4.900	5.600
5	0.636	1.272	1.908	2.544	3.180	3.816	4.452	5.088
5.6	0.568	1.136	1.704	2.272	2.840	3.408	3.976	4.544
6.3	0.500	1.000	1.500	2.000	2.500	3.000	3.500	4.000
7.2	0.438	0.876	1.314	1.752	2.190	2.628	3.066	3.504
8.4	0.380	0.760	1.140	1.520	1.900	2.280	2.660	3.040
10	0.316	0.632	0.948	1.264	1.580	1.896	2.212	2.528
12.5	0.254	0.508	0.762	1.016	1.270	1.524	1.778	2.032
16.6	0.190	0.380	0.570	0.760	0.950	1.140	1.330	1.520
25	0.126	0.252	0.378	0.504	0.630	0.756	0.882	1.008
33	0.096	0.192	0.288	0.384	0.480	0.576	0.672	0.768
50	0.062	0.124	0.186	0.248	0.310	0.372	0.434	0.496
56	0.057	0.114	0.172	0.229	0.286	0.343	0.400	0.458
63	0.050	0.101	0.151	0.202	0.252	0.302	0.353	0.403
72	0.044	0.088	0.132	0.176	0.220	0.264	0.308	0.352
84	0.038	0.076	0.114	0.152	0.190	0.228	0.266	0.304
100	0.032	0.064	0.096	0.128	0.160	0.192	0.224	0.256
125	0.026	0.051	0.077	0.102	0.128	0.154	0.179	0.205
166	0.018	0.037	0.055	0.074	0.092	0.110	0.129	0.147
250	0.013	0.027	0.040	0.054	0.067	0.080	0.094	0.107
500	0.006	0.012	0.018	0.024	0.030	0.036	0.042	0.048
1000	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024

Example of determining the ppm rate:

The measurement is taken at an operating pressure of 87 psi over a period of 50 hours. 0.5 scale units of discoloration have been added.

Using Table 87 psi, select 50 hours. To interpolate to 0.5 scale units, calculate:

$0.106 + 0.158 = 0.264 \text{ ppm} / 2 = 0.132 \text{ ppm}$ based on the measurement time of 10 hours

Converted into mg/m^3 , this means:

0.132×1.2 (factor for compressor oils) = 0.158 residual oil content in mg/m^3

9.4 Overview of maintenance parts

Type	Component	Designation	Interval	Measure
CTN 200	APE-CTN 200-350	After-filter element	Every year	Replace
	A-4000-121	Oil check pipe	Every year / when required	Replace
	F-CTN 200	Filling active carbon	recommended after 4.000 working hours or 1 year	Replace
CTN 285	APE-CTN 200-350	After-filter element	Every year	Replace
	A-4000-121	Oil check pipe	Every year / when required	Replace
	F-CTN 285	Filling active carbon	recommended after 4.000 working hours or 1 year	Replace
CTN 350	APE-CTN 200-350	After-filter element	Every year	Replace
	A-4000-121	Oil check pipe	Every year / when required	Replace
	F-CTN 350	Filling active carbon	recommended after 4.000 working hours or 1 year	Replace
CTN 480	APE-CTN 480-705	After-filter element	Every year	Replace
	A-4000-121	Oil check pipe	Every year / when required	Replace
	F-CTN 480	Filling active carbon	recommended after 4.000 working hours or 1 year	Replace
CTN 590	APE-CTN 480-705	After-filter element	Every year	Replace
	A-4000-121	Oil check pipe	Every year / when required	Replace
	F-CTN 590	Filling active carbon	recommended after 4.000 working hours or 1 year	Replace
CTN 705	APE-CTN 480-705	After-filter element	Every year	Replace
	A-4000-121	Oil check pipe	Every year / when required	Replace
	F-CTN 705	Filling active carbon	recommended after 4.000 working hours or 1 year	Replace

9.5 Replacing the filter element

The job of the after-filter is to stop any abrasion dust that has built up from the active carbon. Proceed as follows to replace this filter element:

- Close the cut-off valves upstream and downstream of the adsorber.
- Open the manual drain cock on the filter and wait until the pressure gauge on the adsorber shows "0" psi.
- Turn the bottom part of the filter in a clockwise direction to open it. Unscrew it completely and carefully put it down.
- Now you can remove the filter element out of the filter.
- Use a damp cloth to clean inside the filter housing.
- Check whether the O-ring in the filter head is OK. Replace if necessary.
- Please fit the new filter element into the three pockets, on the inside of the filter bowl.
- Screw the bottom part of the filter back in again and close the manual drain cock.
- Slowly open the shut-off device at the outlet and check for leaks.
- Once the pressure is back to normal again, slowly open the shut-off device at the outlet.

9.6 Replacing the active carbon



When replacing the active carbon, make sure to wear your personal protective equipment, namely the respiratory protection and goggles.



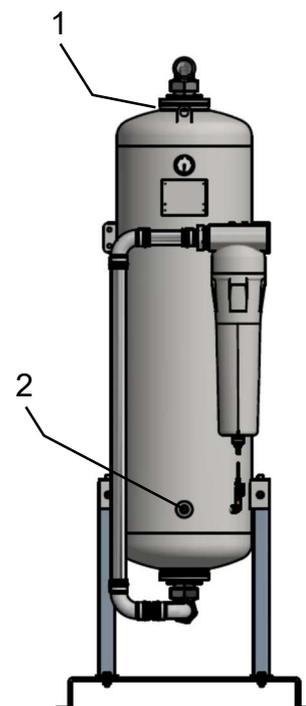
Risk of slipping if material is spilled!



The service life of the active carbon does not need to be determined with accuracy as there are many factors which can reduce or increase the service life. In favourable conditions, the service life can exceed 10,000 hours. Proceed as follows to replace the active carbon:



- Depressurise the adsorber.
- Open the sealing plug on the top (1).
- Place a collecting vessel underneath the bottom sealing plug (2) and remove it.
- Collect the active carbon as it runs out.
- Empty the vessel completely.
- Blow through the sieves inside the vessel.
- Close up the bottom sealing plug again and pour the active carbon material through the top opening.
- Fill in the activated carbon material to the lower edge of the upper diffuser. At higher filling may lead to increased dust content in the afterfilter.
- Screw the top sealing plug back in again.



We recommend that you only change the filter element after the active carbon has been changed. To do so, allow the adsorber to run for half an hour. The dust particles that accumulate are hereby captured in the after-filter element which is to be replaced. Only then replace the filter element.

It can happen that the compressed air which has already been dried by an adsorption dryer, becomes moist again (rising pressure dewpoint). This is due to the moisture stored in the active carbon which is rinsed again after a few days.



Contaminated active carbon material must be disposed of in accordance with the local regulations! As a rule, the disposal code is:

"Used active carbon" with the disposal code number: 06 13 02

If other toxic or hazardous substances have been stored, then this must be determined by the operator and the active carbon must be disposed of taking the type of contamination into consideration!

10 Faults

The following faults may occur:

Fault	Cause	Measure
Oil in the compressed air downstream of the adsorber	<ul style="list-style-type: none"> • Volumetric flow via the adsorber exceeds the intended parameters • Inlet temperature is too high • Operating pressure is too low (reduction of flow rate) • Active carbon is saturated • Large quantity of oil has broken through the compressor • Pipes / consumer downstream of the adsorber were already contaminated with oil • By-pass line is open / not sealed • Highly pulsating compressed air 	<ul style="list-style-type: none"> • Adapt to operating conditions • Upstream cooling • Replace active carbon • Close by-pass • Replace or clean pipes / consumer
Significant differential pressure	<ul style="list-style-type: none"> • Filter elements saturated • Cut-off valves not fully open • Dust fraction too high due to pressure shocks • Clogged pipes • High levels of turbulence at inlet 	<ul style="list-style-type: none"> • Replace elements • Check shut-off devices • Stop pressure shocks • Remove active carbon from the vessel until the top dust sieve is exposed

11 EU Declaration of conformity

EU - Declaration of conformity

Manufacture: KSI Filtertechnik GmbH
Siemensring 54-56
D-47877 Willich

Hereby we as responsible manufacture declare that the products supplied by us meet the requirements of the relevant directives and standards. Especially:

2006/42/EC Machinery Directive
2014/35/EU Low voltage Directive
2014/68/EU Pressure Equipment Directive

Fluid group 2 according to the Pressure Equipment Directive, Article 13 for devices and protective systems for the intended use in the processing of compressed air and gases (compressed air & nitrogen).

Generally in accordance with ASME VIII Div.1 Rules for construction of pressure vessels

Compliance with the following harmonized standards is given:

DIN EN ISO 12100-1-2
DIN EN ISO 14121-1
DIN EN 55011
DIN EN 61000-6-2, 61000-3-2, 61000-3-3

This declaration applies to the products:

Oil vapour adsorber CTN 200 to CTN 480				
Pressure Vessel				
Dryer	Qty. Pressure Vessel	Max. admissible pressure psi (g)	Volume in L	CRN
CTN 200	1	232	69	E5582.612357890YTN
CTN 285	1	232	76	
CTN 350	1	232	112	

Oil vapour adsorber CTN 200 to CTN 480					
Filter					
Dryer	Filter Type	Quantity	Max. admissible pressure psi (g)	Volume	Category to PED
CTN 200	APF410(Type)	1	232	See operating manual filter	
CTN 285	APF410(Type)	1	232		
CTN 350	APF410(Type)	1	232		

Oil vapour adsorber CTN 590 to CTN 705				
Pressure Vessel				
Dryer	Qty. Pressure Vessel	Max. admissible pressure psi (g)	Volume in L	CRN
CTN 480	1	232	168	E5583.612357890YTN
CTN 590	1	232	213	
CTN 705	1	232	228	

Oil vapour adsorber CTN 590 to CTN 705					
Filter					
Dryer	Filter Type	Quantity	Max. admissable pressure psi (g)	Volume	Category to PED
CTN 480	APF765(Type)	1	232	See operating manual filter	
CTN 590	APF765(Type)	1	232		
CTN 705	APF765(Type)	1	232		

The pressure vessels belonging to this pressure equipment were manufactured in accordance with the ASME VIII Div.1 Rules. The manufacturer has created separate declarations of conformity for the pressure vessels.

All other components of these products correspond to the specifications of the AD2000 data sheets and are intended by the respective manufacturers for the corresponding purpose. The design at this point corresponds to good engineering practice.

In the event of any changes to the product not agreed with the manufacturer, this declaration loses its validity.

Signed:



Holger Krebs,
General manager
02.01.2023