

Operating instructions

(Translation of the original operating instructions)

Filter device type **ECO-Cube**



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Wir bringen Luft in Bewegung



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1 <u>Partlist / Description of the system elements</u>

1.1 Parts list of supplied parts

Check whether the filter system has been fully supplied before starting assembly.



Z.Nr. 14252901



| | | | <image/> <image/> |
|--------|-------------------------------------|------------------|----------------------------------|
| Pos. 1 | Fan | Pos.11 | Discharge orifice with grille |
| POS. Z | pressed air tank inside) | Pos.12 Pos.13 | Display control |
| Pos. 3 | Filter housing | Pos.14 | Main switch |
| Pos. 4 | Service door for filter cartridges | Pos.15 | Cover plate |
| Pos. 5 | Dust collector housing | Pos.16 | Service plate of cleaning device |
| Pos. 6 | Dust collector | Pos.17 | Service door of suction support |
| Pos. 7 | Toggle clamping system for housings | Pos.18 | Hose nozzle |
| Pos. 8 | Control housing | Pos.19 | Drain cock |

1.2 Drawing / Description of the system elements

| | | | Districting of the second seco |
|--------|--------------------------------------|--------|--|
| Pos. 2 | Cleaning device housing (with com- | Pos.12 | Toggle closure of the dust collector |
| | pressed air tank inside) | Pos.13 | Display control |
| Pos. 3 | Filter housing | Pos.14 | Main switch |
| Pos. 4 | Service door for filter cartridges | Pos.15 | Cover plate |
| Pos. 5 | Dust collector housing | Pos.16 | Service plate of cleaning device |
| Pos. 6 | Dust collector | Pos.17 | Service door of suction support |
| Pos. 7 | Toggle clamping system for housings | Pos.18 | Hose nozzle |
| Pos. 8 | Control housing | Pos.19 | Drain cock |
| Pos. 9 | Spark labyrinth with suction support | Pos.20 | Earthing bolt |
| Pos.10 | Curved silencer | Pos.21 | Signal horn |
| | | Pos.22 | Cross brace |
| | | · | · |
| | | | |



1.3 System extensions / distinctions between versions

In addition to the basic version, the filter unit "ECO-Cube" can be ordered in an extended or modified version by adding different functionalities. This manual covers the basic version of the filter unit and the differences between versions in the required sections.

Please refer to chapter 13 "Versions of the ECO-Cube unit" to find out if the present filter unit differs from the basic version.

2 Preface

Congratulations on purchasing the filter system "ECO-Cube". Our engineers ensure that our filter systems reflect the state of the art through continuous development. Nevertheless, misuse or misconduct can endanger your safety.

Please observe the following for a successful use of the filter system:



Please read these instructions before operating the system, and observe the safety precautions to avoid injury!

Improper use of the equipment can cause serious injury or death!

Store this manual in a safe place! These instructions are to be regarded as a component of the product!

Adhere to all product notes!

Observe the local regulations in force at the installation site!

Observe the manufacturer's instructions. Contact the manufacturer in case of any uncertainty.

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We thank you for your confidence in us and wish you every success.

Errors and omissions in the document are reserved.



3 Intended use

The filter system is mainly used for the extraction and filtering of dust and fumes.

A lot of dust types as for example welding fume and cutting particles may burn when sources of ignition are supplied. The operator must take appropriate measures to avoid these specific risks.

Improper use of the equipment can lead to damage to individual parts and endanger life and limb!

The system must <u>**not**</u> be used for the extraction of oil containing welding smoke, explosive dusts and gases, hybrid mixtures, burning or glowing substances, gases, water, etc. The system must also not be operated in explosive zones.

The supplied step ladder (see chapter 8) may only be used to reach the control elements - but not for other purposes.

Please contact the manufacturer in case of doubt!

The polluted air is detected by detectors. A pipe line which is connected to the suction supports passes the air through the spark labyrinth into the filter device. The spark labyrinth reduces the risk of fire if, against the intended use, isolated spark-bearing particles are drawn in. In the filter housing the particulate pollutants are deposited on the surface of the installed filter cartridge. The cleaned air is guided by the fan via the exhaust pipe to the outside or back into the working space. The filter cartridges are automatically cleaned pneumatically. The cleaned dust falls downwards and collects in the dust collection container. The different dedusting methods are described in the enclosed operating manual of the control unit.

The service life of the filter cartridges depends strongly on the particular conditions of use. It cannot be determined beforehand.



4 Safety instructions / foreseeable misuse

The filter system is constructed according to the state of the art and the recognised safety regulations. Nevertheless, during use threats to life and limb of the user or other persons may arise. The impairment of the machine or other property are also possible. Read and observe the following safety precautions before using the product.

The work on the system and on electrical voltage components represent considerable danger to life and limb in the event of improper handling.

The operator must ensure that their authorised personnel are familiar with all the safety indications in this manual in advance. The operator is responsible for ensuring that all work is carried out by authorised and qualified personnel. We therefore recommend using the training protocol on the last page for that purpose.

Do not work on live electrical components and elements (electric motors , cabinets , etc.) if you are not sure that these are indeed disconnected. Electric shock represents a danger to life.

If necessary, disconnect the device from the mains.

Do not use the system if parts of the system are faulty , missing or damaged. Do not operate the system without filter elements. A defective condition of the system could represent hazards to health.

Check the orderly condition of the system before switching on. Please refer to the information in this manual. Protect the wiring plug from heat, moisture, oil and sharp edges. Dispose of the filter elements according to the national statutory provisions.

4.1 Fire hazards

The formation of smoke and fire poses a considerable threat to life and limb.

In case of fire switch the unit immediately off or disconnect it from the power supply. Fire extinguishing measures which the operator is obliged to determine beforehand must be initiated immediately. Also refer to the security measures "behaviour in case of fire". The operator must determine appropriate measures beforehand.

NOTICE If the filter unit is equipped with the version "preparation for CO2-extinguishing installation", please refer to the instructions in chapter 13.2 "version preparation for CO2-extinguishing installation".

Behaviour in case of fire:

- 1. Keep calm.
- 2. Initiate the internal and/or external rescue chain (fire brigade, etc.).
- 3. Immediately instruct all unauthorized people to leave the danger area.
- 4. Disconnect the filter unit from the power supply.



5 Storage, Transport and installation of the system

WARNING

Overturning or not permanently fixed equipment may represent a danger to life and limb.

The system must be secured against overturning and sliding during the storage and transport. Do not stand under or next to the load when lifting and lowering. Lift trucks or forklift trucks or transport cranes must have sufficient minimum loading.

An assembly of the main components only is allowed after transport. Otherwise, the system may be damaged by transport actions.

Check before transport, that the main components (see picture) are not assembled together. If the system should be transported again after installation, the main components must be disassembled again.



The system may only be installed on suitable flooring. Falling over or functional impairments may otherwise represent a danger to life and limb.

The substrate must be vibration free and horizontally aligned. The operator has to verify the viability of the ground. The system must be secured to the substrate. For this use the lag bolts DIN 571 – M8x80, in connection with the dowels S10.

Alternatively, the mounting brackets at the inside of the feet can be used. Therefore the mounting brackets must be mounted outside to the feet.



NOTICE The dowels S10 are suitable for the following building materials: concrete, lime sandstone, natural stone with dense structure, solid brick of light concrete and solid brick. In the case of deviating building materials, different fastening materials must be used.

The system must be protected from the weather. Otherwise, the system functions may be impaired.

The system must be stored in a dry place and protected from moisture during transport.

If the plant is to be installed outdoors, a roof extension is required.



5.1 Installation of the system

The "ECO-Cube" filter system is delivered as a modular kit in separate system parts. These are assembled on site. The following should be noted:

• The final position of the filter system is determined with the setting up of the dust collector housing (pos. 5). The front side of the dust collecting housing is the one from which the dust collection container can be removed. The front side must later concord with the front of the filter housing (pos. 3) and the cleaning device (pos. 2). Note the representation in Chapter 1, "Description of the system elements."

NOTICE The cross braces (pos. 22) can be used to transport the unit to the final destination after the final assembly by means of a lifting implement (e.g. load platform). This can make sense when e.g. the final destination is not suitable for an assembly.

CAUTION But when the cross braces are used, it may only be transported a short distance. The unit can only be slightly lifted. Be careful - danger of tipping over!

- Before attaching the filter housing it must be checked that the seal in the dust collector housing ("A") is clean fitted all round. The lifting eyes ("B") must be used to attach the filter housing.
- In conclusion, the housing units must be connected by closing the toggle lever ("G"). These are supplied unassembled and must be assembled on site. These are to be screwed onto the filter housing of the locking hook ("E") and the dust collector housing of the toggle lever ("G"). The assembly of the toggle catches and closing hooks occurs with screws M6x12. The toggle closures finally have to be secured against accidental opening with safety screws M8x16 ("H") and matching nuts and washers.
- Before attaching the cleaning device housing it must be checked that the seal in the filter housing ("C") is clean fitted all round. The lifting eyes ("D") of the fan must be used to attach the cleaning device housing.



The crane openings ("D") may only be used for lifting the cleaning housing. The crane openings are not suitable to lift the weight of the entire ECO-Cubesystem.

- In conclusion, the housing units must be connected by closing the toggle lever ("G"). These are supplied unassembled and must be assembled on site. These are to be screwed onto the cleaning device housing of the locking hook ("E") and the filter housing of the toggle lever ("G"). The assembly of the toggle catches and closing hooks occurs with screws M6x12. The toggle closures finally have to be secured against accidental opening with safety screws M8x16 ("H") and matching nuts and washers.
- A measuring tube must be connected now. The measuring tube is located in the dedusting housing (pos.2). The loose end of the measuring tube must be attached to the bulkhead connection ("F") of the filter housing. Therefore loosen the threaded nut, throw it over the measuring tube, pull the measuring tube on the bulkhead connection, and screw the threaded nut back on the bulkhead connection.
- The service door (pos. 16) must be mounted on the dedusting housing. The mounting is effected using screws M6x12 and corresponding full face gaskets.
- The spark Labyrinth with suction supports (pos. 9) must be mounted on the required side left or right - of the filter housing. Assembly is with screws M6x12 and sealing shims.
 On the opposite side the opening has to be closed by mounting the cover plate (pos.15).
- The curved silencer (pos. 10) must be mounted to the vent opening of the fan. Therefore the curved silencer must be hung in the upper edging of the fan so that the 2 holes ("J") are positioned over the thread openings. Screw the curved silencer on these 2 holes with screws M8x20.
- The step ladder is equipped with a steel cable. This must be fixed with carabiner ("L") at the eyelet ("K") of the dust collector housing (pos.5).
- On the back of the filter housing 2 mounting brackets for supply lines ("M") have to be mounted,



1x left , 1x right . It is mounted at the upper and lower toggle levers ("G"). For this 2 screws M6x12 per toggle lever briefly have to be solved, then screw again including the mounting brackets.



Fig.: dust collector housing



Fig.: connecting the housings



Fig.: filter housing





Fig.: cleaning device housing with fan



Fig.: Installation of the curved silencer



Fig.: Installation of the steel cable

Fig.: Installation of the mounting brackets for supply lines



6 Commissioning

Improper work on the system and on electrical voltage components represent considerable danger to life and limb in the event of improper handling.

The operator is responsible for ensuring that all work is carried out by authorised and qualified personnel. The operator must ensure that their authorised personnel are familiar with all the safety indications in this manual in advance.

We recommend that each employee that operates the filter unit is trained with a training protocol in advance (see form attached).We recommend that each employee that operates the filter unit is trained with a training protocol in advance (see form attached).

A start up of the system in an inappropriate condition can lead to dangers to life and limb.

Before the system start-up the commissioning measures described in this chapter must be completed. In addition, all of the doors of the system must be closed and all necessary connectors attached before turning on. The filter unit must not be operated without the filter elements.

Protect all connection cables that lead away from the unit, from heat, moisture, and sharp edges. It must also be ensured that the connections are protected from damage caused by forklifts and the like.

6.1 Structure of the intake and outlet pipe

Unconnected pipes can lead to contamination of the ambient air and thus to the risk to respiratory tracts. Similarly, the potential accessibility of the fan impeller poses a danger to life and limb.

Only operate the system if the necessary pipelines are fitted. This also includes the connection of the curved silencer (Pos. 10).

Incorrectly dimensioned pipes can lead to disturbing air noise or poor monitoring or dust deposits in the pipeline.

The pipes must be laid according to the application. If this has not already been carried out, a suitably qualified employee must be consulted .If the suction line includes detection elements (e.g. welding fume exhaust tubes), these must also be included in the layout.

Inspection flaps shall be provided in the pipelines. They should be placed at key points in the pipelines (for example in front of conduit elbows). The number of inspection flaps depends on the length of the pipeline.

The intake pipe must be attached to the suction support (pos. 9) of the filter housing, and must be fixed by use of 4 screws 3,5x13.

When using a detection element with extraction hood, the extraction hood must track the welding seam, possibly taking advantage of the thermally induced welding fume movements. However, it is important to ensure that connections between the workpiece and the extractor hood (and generally between the workpiece and filter device) are avoided, so that, if necessary, the welding current cannot flow back through the protective conductor of the filter unit to the welding machine.

When connecting the suction pipeline to an upstream machine, the pipeline must be connected to the detection port of the upstream machine.



6.2 Electrical connection of the filter system

WARNING Work on electrical voltage components and attaching the power cable entails the risk of electric shock. Work on electrical components can lead to serious dangers to life and limb.

The operator is responsible for ensuring that all work on electric components is carried out by authorised and qualified personnel.

The operator is responsible for a potential-free balance of the filter systems. For this use the earthing strap (M8x200) and the 4 contact washers (M8) and the 2 nuts (DIN934 – M8). Finally you have to proof, if in cause of this a potential-free balance really has been created.

Risk of electric shock.

If the unit is equipped with a frequency converter, then it may only be operated on networks with an AC/DC sensitive RCCB. For frequency converter operation, the cross section of the protective conductor

- must be at least 10mm²,
- and must be at least equal to the size of the operator side outer conductor cross-section.

Connect the filter unit to the power supply with an approved power cable to the control housing (pos. 8).

NOTICE Pay attention to the admissible supply voltage.

An incorrect power supply may result in an electrical malfunction of the system.

CAUTION Once the controller is turned on, the cleaning function is in operation. This may result in unwanted cleaning processes.

Only switch the controller on when the plant is in working order.

NOTICE If the filter unit is equipped with the version "preparation for CO2-extinguishing installation", a particle sensor must be connected.

The procedure is described in chapter 13.2.2 "Mounting and connecting the particle sensor".



6.3 Compressed air supply connection

The filter cartridges of the system are automatically cleaned. Cleaning is carried out pneumatically via a built-in compressed air tank in the cleaning device housing (pos.2). The contents of the compressed air tank are sufficient for a cleaning process.

A check valve inside the cleaning device housing ensures that the compressed air also remains in the compressed air container when separated from the compressed air supply.

NOTICE Without compressed air supply the filter cartridges will become dirty very quickly.

- The external compressed air supply must be provided by the customer with an approved compressed air hose!
- The compressed air must be dry and oil free.
- Connect the compressed air hose to the hose nozzle (pos.18). For not generating too little pressure the connected pressure supply must be in the range of 5 – 10 bar (72,5 – 145 psi).

CAUTION For the purpose of maintenance the compressed air supply sometimes must be disconnected. For this it is necessary to assemble a separator in the compressed air pipeline.

• The operating pressure inside the compressed air tank must be in the range of 4 – 5 bar (58 – 72,5 psi) so that the compressed air tank returns promptly to the required operating pressure after a cleaning cycle ready for the next cleaning time. For this the pressure reducing valve inside the cleaning housing (pos.2) factory-set is preset to 5 bar (72,5 psi).

NOTICE The pressure reducer is reached by opening the service plate (pos.16) on the cleaning housing. This is only necessary for the operator in case of doubt, e.g. in case of an insufficient dedusting.









7 Maintenance

WARNING

Work on the open system entails the risk of electrical shock or accidental restart the system. Both pose a danger to life and limb.

The operator is responsible for ensuring that all work is carried out by authorised and qualified personnel. When cleaning and servicing equipment during the replacement of parts or when changing to another function, the filter unit must be disconnected from the power supply and secured against restart.

To avoid accidental cleaning of the filter cartridges during the maintenance, the compressed air container must also be emptied beforehand (see chapter 7.2 "Disconnection from the mains / Emptying the compressed air tank").

During maintenance work there may be contact with contaminated filter elements. Inhalation of contaminants can lead to hazards to the respiratory tracts. All maintenance work must be carried out in well-ventilated areas and with appropriate protective facial masks only! We recommend: Half mask respirator with DIN EN 141/143 protection level P3.



In accordance with national regulations, the operator is obliged to carry out repeat and functional tests. A malfunction of the system may otherwise be hazardous.

Unless otherwise specified by national regulations, we recommend regular testing of the electrical and pneumatic lines according to our maintenance intervals (see chapter "Maintenance intervals").

Furthermore, we recommend a regular visual inspection and functional test of the system (see also chapter "Maintenance intervals").

The operator is obliged to store and dispose of the accumulated dust in accordance with national or regional regulations.

When carrying out any maintenance or cleaning work the applicable environmental regulations must be adhered to.Pollutants and filter elements must be properly disposed of or stored.

In case of doubt we recommend contacting a local waste management company.

Depending on the type of dust and amount of dust produced, the system should be cleaned at regular intervals. The degree of contamination strongly depends on the particular conditions of use and a cleaning interval can, therefore, not be determined in advance.



7.1 <u>Cleaning the filter cartridges</u>

Filter cleaning can be carried out in various ways. Please refer to the separately enclosed operating instructions for the system control.

NOTICE Without compressed air supply the filter cartridges will become dirty very quickly. The service life of the filter cartridge depends strongly on the particular conditions of use. It cannot be determined beforehand.

7.2 Disconnection from the mains / emptying of compressed air tank

- Switch the system off. Then disconnect the unit from the power supply.
- Secure the system against unauthorised reconnection during the maintenance period.
- Disconnect the external compressed air supply from the system.
- Empty the compressed air tank by opening the drain cock (pos.19) with a suitable screwdriver. Small amounts of condensation water can leak out when the drain valve is opened. Close the drain valve again when the compressed air tank is completely emptied.



72,5–145 psi 5–10 bar

CAUTION When opening the drain valve a blast of compressed air is possible! Dispose of the condensate according to the statutory provisions.

After completion of all maintenance work the system can be reconnected to the power supply and connected to the external compressed air supply.

7.3 Emptying the dust collector

The dust collection container must be cleaned after a certain number of operating hours. This range depends on the amount of dust. The filling level has to be proofed at least once a week.

CAUTION The filter cartridge must be cleaned before starting the emptying.

For this you have to proceed a manual cleaning via the system control (see separate manual) three times. The filter unit must be switched off beforehand but without disconnecting the unit from the power supply. After that the filter unit must be disconnected from the power supply and secured against restart. Please wait for 5 minutes after the cleaning of the filter cartridge.

 Before emptying the dust collecting container ensure a suitable container (e.g. plastic bag) is ready.

Caution

The filter unit is delivered with a few plastic bags. Further bags are optionally available (see spare parts list)! We recommend promptly stocking up on plastic bags.

Remove the toggle fasteners (pos.12), so that the rolls of the dust collector container (pos. 6) rest on the floor.



- Remove the dust collector container gently from under the dust collector housing (pos.5) to avoid disturbing the dust.
 CAUTION Ensure a dust free approach when transporting or disposing.
- Remove the dust collection bag with the accumulated welding dust. Before removing the bag must be closed using, for example, cable ties or similar.
- Properly store or dispose of the dust collection bag with the dust in a suitable container and according to the national or regional regulations.
- Lay a new dust collection bag in the dust collection holder so that the opening of the bag is placed over the edge of the dust collector container.
- Push the dust collector container under the dust collector housing until it reaches its original position.
- Hang the toggle clamps on the hook of the dust collection container and close so that the container is tightly sealed under the filter system. The seal upon the dust collection container must be checked for any damage and replaced if necessary.

CAUTION There is a threat of crushing when the toggle clamps are closed!

• After completion of all maintenance work the system can be reconnected to the power supply and connected to the external compressed air supply.

7.4 Draining of the condensate

Operation with compressed air results in condensation water being gradually deposited in the compressed air tank. The maintenance interval depends heavily on the quality of the compressed air and cannot, therefore, be determined in advance.

• Open the drain valve (pos.19) with a suitable screwdriver and allow the escaping condensate to flow into a suitable container.

CAUTION When opening the drain valve a blast of compressed air is possible! Dispose of the condensate according to the statutory provisions.



- Close the drain valve.
- After completion of all maintenance work the system can be reconnected to the power supply and connected to the external compressed air supply.



7.5 <u>Changing the filter cartridges</u>

If the suction capacity is no longer sufficient for your purposes, you must check for causes of error (see chapter 10 *"Diagnostics and troubleshooting"*).

Otherwise it is possible that the filter cartridges are saturated so that a replacement of the filter cartridges is necessary. On the basis of experience the filter unit is preset in a way that for this case the horn (pos.21) will sound and on the Display control (pos.13) appears a message ("Filteralarm"). If, despite automatic cleaning of the filter cartridge the pressure continues not to fall short of the alarm value, the filter cartridge needs to be replaced.

CAUTION The filter cartridge must be cleaned before starting the changing.

For this you have to proceed a manual cleaning via the system control (see separate manual) three times. The filter unit must be switched off beforehand but without disconnecting the unit from the power supply. After that the filter unit must be disconnected from the power supply and secured against restart. Please wait for 5 minutes after the cleaning of the filter cartridge.



- The replacement of filter cartridges must be carried out by two people.
- Before changing the filter cartridge ensure a suitable container (e.g. plastic bag) is ready.
 CAUTION The dirty filter cartridges must be packed in an appropriate manner (e.g. plastic bags). Plastic bags are optionally available (see spare parts list)! We recommend promptly stocking up on plastic bags.
- Open the service door of the filter cartridges by opening the door handles. To do this, the door handle, which is equipped with a lock, must be unlocked using a double-bit key.



Remove the set screw (pos. A) of the cartridge holder (pos. B) and place the disposal bag over the cartridge holder and the filter cartridge (pos. C).



- Unhook the cartridge holder from the cartridge guide (pos. E) and remove from the unit together with the filter cartridge and the waste bag.
- Loosen the cylinder nut (pos. F) outside on the cartridge base. The cylinder nut is not to be gripped directly with hands, but from the outside through the bag.
- The cartridge holder is to be drawn dust-free past the filter cartridge from the disposal bag. Likewise, the displacer (pos. D) is be removed dust-free from the filter cartridge.
- Carefully seal the disposal bag (e.g. with cable ties) and dispose of the contaminated filter cartridge properly in a suitable container and according to the national or regional regulations.
- Do a visual control and clean the filter area if necessary.
- Place the displacer in the new filter cartridge so that the screw of the displacer is inserted through the opening in the cartridge base. Tighten the displacer with the cylinder nut from the outside.

NOTICE Only use original replacement filter! Dispose of the filter cartridges according to the statutory provisions

- Push the new filter cartridge with the displacer into the cartridge guide of the system and engage with the cartridge holder.
- Screw the locking screw tight in the cartridge holder.
- Close the service door by closing the door handles. Also the door handle, which is equipped with a lock, must be locked again.



• After completion of all maintenance work the system can be reconnected to the power supply and connected to the external compressed air supply.



7.6 Changing the filter mat of the control housing

The filter mat of the control housing (pos. 8) must be regularly inspected and changed if necessary. This check depends on the level of pollution. The filter mat is in the air grating.

We recommend promptly stocking up on filter mats (see spare part list).



Caution

Programme setting options, menus, etc. Please refer to the separately attached operating instructions of the system control.

The supplied step ladder must be used to reach the control elements (pos. 13). Keep the step ladder on getting close to the filter system.

CAUTION The step ladder only is allowed to be used on even, solid and nonslipped underfloors. The maximum total load of 150 kg (330 lb) is not allowed to be exceeded.

The step ladder may only be used to reach the control elements - but not for other purposes.



Figure: filter mat

9 **Dismantling/disposal**

WARNING The dismantling of the installation also entails the possibility of electric shock or breathing hazards. Likewise, there may be bruising and injury during the dismantling work.

Before disassembling, the machine must be disconnected from the mains and the external compressed air supply. Only authorised personnel may disassemble the machine. Respiratory protection and protective clothing must be used during all the work.

The operator is obliged to store and dispose of the accumulated dust in accordance with national or regional regulations.

In order to ensure you a trouble-free operation of your filter system as well as proper disposal of the deposited dust, we offer the following services:

A maintenance and repair contract

telephone customer service

Talk with our service department.

Tel: +49 28 63 - 92 82 - 0 Fax: +49 28 63 - 92 82 - 72



10 Diagnostics and troubleshooting

A list of system errors is provided in the table. Error messages of the control system are explained in their separate manual.

A recommissioning of the device must only occur if it is ensured that the filter system is functionally equivalent to the original state. Repairs may only be carried out by TEKA personnel or, after consultation with TEKA, by the personnel authorised by the operator.

Adhere to the instructions in the chapter "Safety instructions" and " Maintenance" when carrying out any repairs. If in doubt, contact our service department:

Tel: +49 28 63 - 92 82 - 0 Fax: +49 28 63 - 92 82 - 72

| Fault | Cause | Removal |
|-------------------------|--|--|
| System does not start. | The main switch (pos. 14) is in the OFF position | Set the main switch in the ON position. |
| | Plug power supply is missing or incorrectly inserted. | Plug connector check power supply / plug in correctly. |
| | No power at outlet. | Check the mains, remove error if possible. |
| | There is too much dust in the dust collection container. | Empty the dust collection con- tainer. |
| Dust at the dust collec | The toggle closures are not closed. | Close the toggle closures. |
| tor (pos.6). | The seal of the dust collection con- tainer is damaged. | The seal must be renewed. |
| | The compressed air for the dedusting is set too high. | Reduce the compressed air. |
| | One or more of the door lever is not closed. | Close door lever. |
| | The seal between the service door and filter housing is damaged. | The seal must be replaced. |
| (pos.4). | The compressed air for the dedusting is set too high. | Reduce the compressed air (see chapter 6.3). |
| | Escape of dust at the hinge. | The hinge must be reoriented or replaced. |



| Suction power too low (smoke hardly extract- | Filter elements are saturated. | Filterpaket austauschen, Altfil- ter ordnungsgemäß entsorgen! |
|--|---|--|
| ed) | Filter elements are saturated because no compressed air is connected. | Connect compressed air. |
| | Damage at the capturing elements. | Replace the capturing ele- ments. |
| | The motor rotates in the wrong direction. | Contact our service depart- ment. |
| | Clean air outlet contracted. | Check clean air outlet, if nec- essary, fix error found. |
| | Suction line contracted. | Check suction line, if neces- sary, fix error found. |
| | Throttle valve in the detection element extraction hood is closed. | Open the throttle. |
| | The motor rotates in the wrong direction. | Contact our service depart- ment. |
| The unit is very noisy. | The curved silencer (pos.10) is not mounted. | Mount the curved silencer. |
| | The intake or exhaust air pipes are not mounted. | Mount the pipelines. |
| | The filter unit is untight. | Check where the unit is un- |



11 <u>Technical data</u>

| Filter device | ECO-Cube | | | | |
|--|------------|--------------------------------------|---------------------|-------------|--|
| Engine power | kW | 5,5 | 7,5 | 11 | |
| Air volume flow (possible operating point) | m³/h (cfm) | 3800 (2237) | 4200 (2472) | 8140 (4792) | |
| Under pressure (possible operating point) | Pa (psi) | 3250 (0,47) | 3800 (0,55) | 2700 (0,39) | |
| Mains voltage | V | 400 / 480 | | 400 | |
| Frequency | Hz | 50 / | 60 | 50 | |
| Type of current | Ph | | 3 | | |
| Protection type | | | IP 54 | | |
| ISO class | | | F | | |
| Control voltage | V | | 24 V DC | | |
| Duty cycle | % | 100 | | | |
| Width x Depth x Height (housing dimen- sions) | mm (in) | 800 x 800 x 3200 (31,5 x 31,5 x 126) | | | |
| Weight | kg (lb) | ca. 490 (ca. 1078) | | | |
| Filter insert | | | 4 filter cartridges | | |
| Filtration area of the filter system | m² (ft²) | | 100 (1080) | | |
| Dust filtration class (according to DIN EN 60335-2-69:2008) | | М | | | |
| Cleaning art | | Compress burst | | | |
| Sound pressure level | dB/A | 75 | | | |
| external pressure | bar (psi) | 5 to 10 (72,5 to 145) | | 5) | |
| Compressed air supply | | Dry / oil free | | | |
| Ambient temperature °C (°F) +5 to +35 (+41 to + | | 95) | | | |
| Max. air moisture | % | 70 | | | |



12 Spare part list

| Description: | Article n°.: |
|---|-----------------|
| Filter cartridge, "non-precoat", 25,3m² (269ft²) L = 1200mm (47in) | 1000501420250 |
| Plastic bag for disposal of filter cartridges L = 1200mm (47in), 4 pieces | 10030251702 |
| Plastic bag for insertion into dust collector, 10 pieces | 100302501 |
| Filter-mat for control-housing, 10 pieces | 200421120007079 |



13 Versions of the ECO-Cube unit

In addition to the basic version, the filter unit "ECO-Cube" can be ordered in an extended or modified version by adding different functionalities:

• Version "preparation for CO2-extinguishing installation"

13.1 Version "preparation for CO2-extinguishing installation"

The version "*preparation for CO2-extinguishing installation*" is equipped with an extinguishing installation that can support a manual extinguishing of a fire within the filter unit by means of CO². The service door of the filter cartridges (pos. 4) must be replaced by a special door with a fire-fighting pipeline.

NOTICE It is possible, that the service door still has been mounted by factory. In addition, the filter unit is equipped with a particle sensor that detects an excessive smoke development (fire, break of the filter, etc.) inside the filter unit.

When the particle sensor is triggered, the filter units switches off as a precaution, the signal hooter is activated and the error message "particle sensor" is shown on the display of the control.

CAUTION In this case the operator must immediately switch off the upstream machine tool.



Inappropriate handling of the extinguishing installation may lead to significant risks. There is a threat of icing and asphyxiation. The operator must clarify in advance which measures must be taken in case of fire. The CO2-extinguishing installation must only be used when detecting a fire <u>inside</u> the filter unit if there is no danger outside the filter unit that contradicts it. Follow the instructions in chapter *"Behaviour in case of fire"*.

The particle sensor must not be used as basis of a fire protection concept. It is \underline{not} indented to be a part of a fire detection system.

The particle sensor is intended to detect excessive smoke or dust development. This does not necessarily mean that the cause is a fire. Therefore an activation of the particle sensor may not automatically trigger the CO2-extinguishing action. It must be checked via visual inspection through the window of the service door if there is a fire, flames or pockets of embers.



13.1.1 <u>Replacing the filter door</u>

The filter door for the CO2-extinguishing installation is not factory-mounted, but must be mounted at the point of destination.

NOTICE It is possible, that the service door still has been mounted by factory. This can be seen in the fact that the door is equipped with viewing windows and a connecting hose.



• Therefore, demount the original filter door (pos. 4) by loosen the filter door from the hinges.

NOTICE The original filter door is not needed anymore and can be disposed of.

Mount the new filter door. The new filter door is already equipped with a fire-fighting pipeline to which a CO² bottle must be connected.

NOTICE A CO² bottle is not part of the delivery of the filter unit. Use a suitable CO² bottle.

The CO^{2} bottle must be protected against tilting. A 3/8" internal thread serves as an interface for the CO^{2} bottle.

• A laminated DIN-A4 notice-board is part of the delivery. Attach it to the CO2extinguishing installation.



13.1.2 <u>Mounting and connecting the particle sensor</u>

Mount the particle sensor in the cleaning device housing (pos. 2). A plug-in connection is located there.

- Open the service door (pos. 16).
- Disassemble the protective plate (pos. A) by loosening the wing nut (pos. B).
- Mount the particle sensor (pos. D) on the sensor base (pos.C). The mounting is carried out by placing and turning a bit clockwise.
- In the basic version a "cable bridge" (pos. E) is installed in the control housing (pos. 8). It must be <u>removed</u> when using the particle sensor.



13.1.3 <u>Behaviour in case of fire</u>

- 1. Keep calm.
- 2. Initiate the internal and/or external rescue chain (fire brigade, etc.).
- 3. Immediately instruct all unauthorized people to leave the danger zone.
- 4. Disconnect the filter unit from the power supply.
- 5. Remove the lock pin of the extinguishing bottle.
- 6. Now actuate a rush extinguishing of 2-3 seconds by pulling the lever of the extinguishing bottle.

WARNING Do not discharge the CO² bottle at once! Extinguishing in intervals is more effective! A permanent blow off may lead to icing of the fire-extinguishing equipment and to excessive release of CO² gas.

- 7. Wait during the reaction period, carry out visual inspection through the door window of the service door (pos. 4), (visible pockets of embers or flames), then repeat number 6 if necessary until the extinguishing is fully completed.
- 8. After the flames are extinguished the doors of the filter unit may only be opened by authorized persons. Wait at least 5 minutes before the opening.

WARNING Excessive release of CO² gas may lead to asphyxiation! Ventilate the room after making sure that the fire has been extinguished.



14 Declaration of conformity for "ECO-Cube"

TEKA Absaug - und Entsorgungstechnologie GmbH Industriestraße 13 D - 46342 Velen Tel.:+49 2863 92820 Fax:+49 2863 928272

Device function: Extraction and filtering of dry dusts and fumes.

We hereby declare under our sole responsibility that the above named product with the machine n° .: A16000010011001, complies with the following standards:

| Machine guidelines: | 2006/42/CE |
|--------------------------------|------------|
| Electromagnetic compatibility: | 2014/30/EU |
| Pressure equipment directive: | 2014/68/EU |

This declaration loses its validity if any modifications are carried out on the suction and filter system without the written agreement of the manufacturer.

Authorised representative for technical documentation: TEKA GmbH, Technical department

(Jürgen Kemper, Manager) Velen, on 3rd January 2018



15 <u>Training protocol for system users</u>

(This form can be used by the operator to document the training of the employees. Training should be performed by authorized personnel only. Refer to the instructions in Chapter 4, "Safety Instructions")

The signature of the employee instructed confirms that they have been instructed on the following points:

| Introduction | completed |
|--|-----------|
| Description of the filter system | |
| Mode of operation and applications of the filter system | |
| Explanation of safety indications | |
| Procedures in case of fire | |
| Explanation of the operating elements of the filter system | |
| Maintenance, changing and cleaning of the filter elements | |
| Maintenance of the compressed air supply | |
| Emptying the dust collector | |
| Appropriate disposal | |

| Name of employee (legible) | Signature |
|------------------------------|-----------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Introduction through (legible):

<u>Signature</u>:



16 Maintenance intervals

16.1 Usage-related maintenance

The described maintenances become necessary through the demands of the system operations. The maintenance intervals are recommendations. Depending on the application (multi-shift operation, dust generation, ...) it may make sense for the operator to change the maintenance intervals.

Maintenance work must always be documented by means of a protocol.

The approach of the maintenance measures is described in chapter "Maintenance".

| | Chapter | Maintenance interval | | |
|---|------------|--|---------------------------------|--|
| Maintenance work | | recommended | determined by the ope- rator | |
| Cleaning of filter cartridges Replacing the filter cartridges | 7.1 7.5 | The cleaning of the filter cartridges is automatically carried out by the filter unit and thus is not subject to a maintenance interval. | | |
| | | The saturation of the filter cartridges is automatically monitored by the filter unit and thus is not subject to a maintenance interval. The filter unit triggers an alarm when a replacement of the filter cartridges is necessary. | | |
| Check of fill level/emptying of the dust collection container | 7.3 | weekly | | |
| Draining of the condensation water | 7.4 | weekly | | |
| Check the filter mats at the air gratings of the control housing for pollution and replace them if necessary. | 7.6 | weekly | | |

16.2 General maintenance

The described maintenances are independent from the demands of the system operations.

The operator is obliged to carry out repeated inspections and functional tests according to national regulations. If not otherwise covered by national regulations, the described maintenance intervals must be respected.

Maintenance work must always be documented by means of a protocol.

Hinweis When using a CO2-extinguishing installation the CO² bottle must be checked for proper operation and if necessary refilled or replaced at predefined intervals by a skilled person. The operator must determine the intervals for the applied CO² bottle.

| Maintenance work | Chapter | Maintenance interval |
|---|---------|----------------------|
| Visual inspection of the filter unit | 15.2.1 | weekly |
| Visual inspection of the pipelines for dust deposits | 15.2.2 | weekly |
| Visual inspection of the pneumatic pipes | 15.2.3 | weekly |
| Functional test of the unit | 15.2.4 | weekly |
| Electrical test of the electrical lines and earthing connections | 15.2.5 | annually |



16.2.1 Visual inspection of the filter unit

Visual inspection: Make sure that there are no visible safety-related defects.

WARNUNG Disconnect the filter unit from the power supply and secure it against unauthorised switching on (see chapter 7.2).

The following steps must be carried out in the course of the visual inspection:

- Check the unit for completeness and damages.
- Check if all required pipeline elements, cable connections and hoses are connected to the filter unit.
- Check all electrical earthing connections and cables for visible damages.
- Ensure that all parts are firmly connected.
- Check all connection points of the filter unit for escaping dust.
- Check all metal parts for corrosion or damages/changes of the coating.
- Check the inner filter area and the filter housing.
- Check the hinges of the maintenance door for damages.
- Visual inspection of the control and operating elements as well as the outside running cables for damages.
- Check the dust collection container for tightness, check the sealing rubber of the container.

16.2.2 <u>Visual inspection of the pipelines for dust deposits</u>

Visual inspection: Observe if there are no visible safety-related defects.

WARNUNG Disconnect the filter unit from the power supply and secure it against unauthorised switching on (see chapter 7.2).

The following steps must be carried out in the course of the visual inspection:

- Open the inspection flaps of the pipeline and check the pipeline for dust deposits. Dust deposits must be eliminated.
- Open the service doors (pos.17) at the suction support to check the spark trap. Dust deposits must be eliminated.



16.2.3 <u>Visual inspection of the pneumatic pipes</u>

Visual inspection: Observe if there are no visible safety-related defects.

WARNUNG Disconnect the filter unit from the power supply and secure it against unauthorised switching on (see chapter 7.2).

The following steps must be carried out in the course of the visual inspection:

- Open the service door (fig. 3).
- Carry out a visual inspection of the pneumatic parts (fig. 4).
- Check the parts for visible damages.



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16.2.4 Functional test of the unit



Carry out a visual inspection before the functional test of the unit. In case of observations that endanger the safety of the unit these must be eliminated before the functional test of the unit.

The following steps must be carried out in the course of the functional test:

- Switch the unit on.
- Pay attention to failures or error messages of the operating elements. Also refer the separated operating manual of the control.
- Pay attention to extraneous noises or vibrations during the plant operation.
- Carry out a manual dedusting of the filter cartridges. Also refer to the separated operating manual of the control.
- Check if within one interval of the filter dedusting the number of dedusting shocks is equal to the number of filter cartridges (in each interval successively every filter cartridge becomes dedusted once).
- Check if dust is escaping from the unit during the dedusting cycle.
- A functional test should always be carried out with a connected/producing machine tool. Check if the collection of the fume or dust is sufficient. (Visual inspection)



16.2.5 <u>Electrical test of the electrical lines and earthing connections</u>

WARNUNG Working on electrical voltage components and attaching the power cable entails the risk of electric shock. Working on electrical components can lead to serious dangers to life and limb.

The operator is responsible for ensuring that all work on electric components is carried out by authorised and qualified personnel.

The filter unit is a "stationary electrical systems" from an electrical point of view. Those systems are subject to regular electrical checks by the operator of the unit and are subject to national standards of the different countries.

The here recommended maintenance interval complies with the in Germany applying "Regulation 3 of the German Social Accident Insurance - Electrical plants and equipment" (formerly known as BGV-A3).

The check must only be carried out by a qualified electrician or a person trained in electrics using suitable measuring and test devices. The scope of testing and the methods must be in line with the respective national standard. All contacts in the control cabinet must be checked for tight fit, and must be readjusted if necessary.