

# OPERATING INSTRUCTIONS



## **DUSTMAC**

Modular Extractor

## Welcome to the sphere of suction technology

Your purchase of an **ESTA** machine has been a good decision. The design of our quality products complies with the latest state of the art. **ESTA** products have been devised to provide for clean air at the workplaces at which they are applied. This results in an even more enhanced level of quality and longer machine times and, particularly, healthier working conditions. Should you have any questions pertaining to suction technology issues, please feel free to contact us at any time. Our experts will be gladly at your disposal.

Your **ESTA Absaugtechnik** Team

**DEDUSTING  
EXTRACTION  
CLEANING**



# Operating manual



DUSTMAC-P; -S; -F



Do not use this device unless you have read the user manual and understand it.

Translation of the original operating manual  
663064-08-07

## Edition notice

Original operating manual

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Warnings and safety instructions



Electrical current hazard



Note



Reference to ESTA customer service



Reference to legal regulations

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# 1. General safety notes

Before operation, all persons who are to use the suction system or perform maintenance on it must be provided with information, instructions and training in using the device and on the substances for which it is to be used, including the procedure for safe disposal of the collected material. Responsibilities must be clearly established for the following:

- **Installation**
- **Start-up**
- **Operation**
- **Maintenance and repair**



The device must be used only by persons who have been instructed in its handling and are explicitly authorized to use it.

The operating manual must always be available at the place of use, so that it can be consulted by technical personnel at any time. The manufacturer is not liable for any damages resulting from misuse of the equipment or failure to comply with technical documentation.



Besides the operating manual and the safety-prevention regulations that apply to its place of use, professionally recognized rules for safety and proper work must also be observed.



**Before maintenance and repair work, the main switch on the switch box and the corresponding safety switch should be turned to the off position and protected by a padlock against unauthorized activation.**



**Maintenance and repairs to the system must be performed only by an appropriately trained professional!**

The device must be used only for dry cleaning.

No liquids, aggressive gases, easily flammable materials or glowing particles (such as hot embers) may be aspirated.

Make sure that the power cable does not become damaged by being run over, compressed, pulled, etc.

The power cable must be examined regularly for signs of damage or ageing. The terminals must be tested and retightened at regular intervals.



**The device must not be used if damage to the power cable is determined.**



**The power cable and plug must be replaced only by an appropriately trained electrical specialist.**

The filter should be cleaned only with compressed air (approx. 6 bar) that is free of oil and water. It is recommended that a maintenance unit be connected in series.

Only original ESTA accessories and original ESTA parts must be used to operate or repair a device. This guarantees that they are spray-proof according to applicable standards and have the necessary mechanical strength.

**Attention: Risk of fire!**



**An increased risk of fire exists when extracting oil-covered components. Use in-house measures to ensure that no flammable deposits can build up in the connected system parts (pipelines, etc.). Shorten maintenance intervals if necessary.**



**According to directive 2009/104/EG and TRGS 560, safety devices for prevention or removal of hazards must be regularly maintained and regularly inspected by an expert for safe, flawless operation.**

The entire aspiration system must be visually inspected for damaged parts every day before it is started up.

Of course, when necessary, the device must be repaired.



**Installation and operation in dust-explosive or gas-explosive areas is forbidden.**



**From the first time it is used, the DUSTMAC contains dusts that pose a health hazard. Emptying and maintenance processes, including removal of the dust collection container, must be performed by expert personnel who are wearing appropriate protective gear. The dust extractor must not be operated without the complete filtration system!**



**In all emergencies, the device must be disconnected from the power supply immediately. The device is turned off with the emergency switch. If there is a fire, the fire department must be alerted immediately, and the fire must be contained by appropriate means!**

The system has been manufactured according to the state of the art and in compliance with safety regulations. Nonetheless, during operation, hazards to people's lives and physical safety or damage and impairments to the system and other property may arise.

The system must be operated only in technically perfect condition, for its intended purpose, with awareness of safety and hazards, and in compliance with the operating manual. Especially malfunctions affecting safety must be repaired immediately.

## 2. Preventing mechanical hazards

All movable machine parts driven by electric motors, as well as all other dangerous machine parts, must be covered by fixed, securely fastened protective covers that can be removed only with tools.



**Residual risk:**

If a covering that can only be unfastened with a tool is removed, there is risk of injury if the machine is running or equipment is turned on.

## 3. Preventing electrical hazards

All electrical parts must be covered by fixed, securely fastened protective covers that can be removed only with tools.



**Residual risk:**

If a covering that can only be unfastened with a tool is removed, a hazard is posed by electric current.



**Before maintenance and repair work, the main switch on the switch box and the corresponding safety switch should be turned to the OFF position and protected by a padlock against unauthorized activation.**



**Follow the safety rules for working with electrical devices!**

**Secure the device with a padlock against reactivation!**

**Only an electrical specialist is to work on the electrical grid and on voltage conducting parts!**



Note:

To guarantee flawless operation of the system, the factory default operating parameters can be modified only with the consent of the ESTA company.





The connections must be performed by an authorized professional.



The supply voltage and frequency data must correspond to those on the model plate.



**The power cable must be protected from damage and power input must be at an appropriate rate.**



**The safety equipment (motor protection relay, grounding resistance, etc.) must be checked and adjusted.**



The cooling air intake for the control cabinet must not be obstructed.



**High voltage! The connection must be made only when power to the grid is cut off.**

## 4. Intended use

Devices in the DUSTMAC line are suitable for single- and multiple-location aspiration and as centralized exhaust equipment. They are suitable for extracting dry, free-flowing and non-explosive dusts.

The S model with bag filter is particularly suitable for sucking up and separating agglomerating, sticky and fibrous dusts that have a tendency to stick to the filter medium.

The F model with cartridge filter is particularly suitable for sucking up welding fumes.



**Installation and operation in dust-explosive or gas-explosive areas is forbidden.**

## 5. Technical data and description of functions

### 5.1 DUSTMAC S line (standard)

Type		S-5	S-10	S-17	S-25	S-33
Filter area / number of tubes	[m <sup>2</sup> ] / [pcs.]	5/10	10,5/20	17/32	25/48	33/48
Max. vacuum	[Pa]	2.000	3.200	3.400	3.500	3.950
Max. airflow volume	[m <sup>3</sup> /h]	approx. 2.600	approx. 3.200	approx. 4.000	approx. 5.500	approx. 8.000
Drive output	[kW]	2,2	3	4	5,5	7,5
Dust collection container	[Ltr]	50	50	50	50	50
Inlet / Outlet diameter	[mm]	160/280	200/315	250/315	300/355	355/400
Dimensions (W/D/H) approx.	[mm]	1.310x 1.060x 3.070	1.400x 1.310x 3.600	1.820x 1.310x 3.960	1.820x 1.750x 4.030	1.800x 1.750x 4.650

### 5.2 DUSTMAC P line (standard)

Type		P-20	P-40	P-60	P-90
Filter area / number of cartridges	[m <sup>2</sup> ] / [pcs.]	20/2	40/4	60/6	90/9
Max. vacuum	[Pa]	2.000	3.400	3.400	3.950
Max. airflow volume	[m <sup>3</sup> /h]	approx. 2.600	approx. 4.000	approx. 7.000	approx. 8.000
Drive output	[kW]	2,2	4	5,5	7,5
Dust collection container	[Liter]	100	100	100	100
Inlet / Outlet diameter	[mm]	160/280	200/315	250/400	300/400
Dimensions (W/D/H) approx.	[mm]	1.310x 1.060x 3.250	1.310x 1.300x 3.380	1.750x 1.300x 3.740	1.750x 1.730x 3.820

### 5.3 DUSTMAC F line (standard)

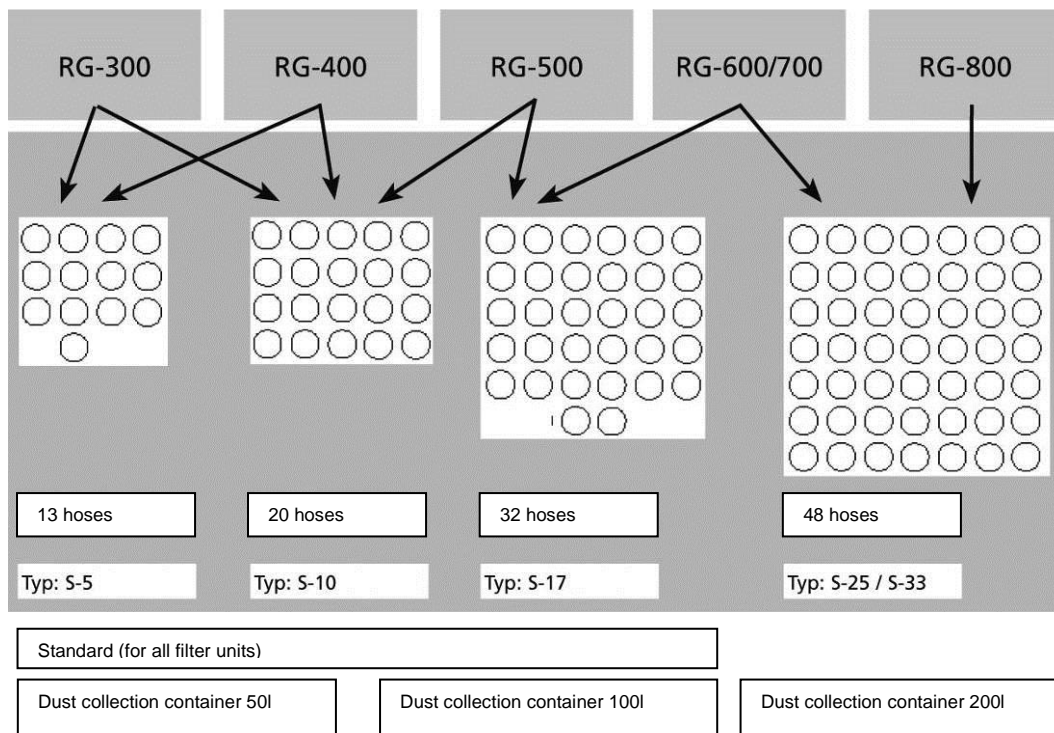
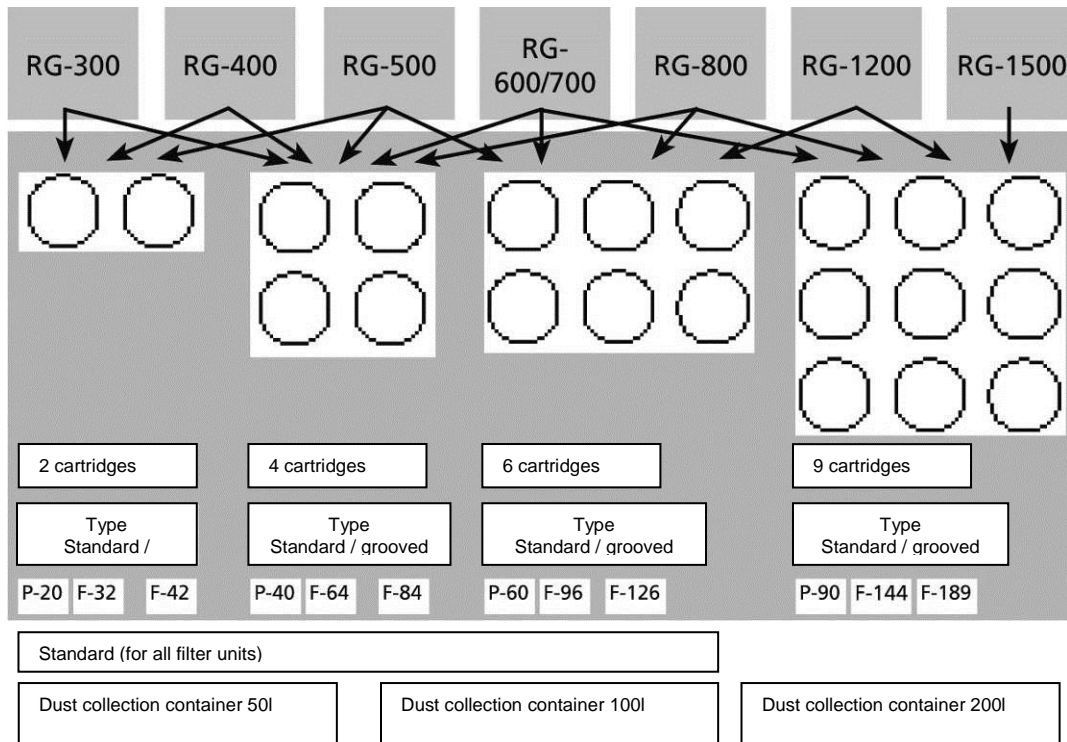
Type		F-42	F-84	F-84	F-126	F-189
Filter area / number of cartridges	[m <sup>2</sup> ] / [pcs.]	42/2	84/4	84/4	126/6	189/9
Max. vacuum	[Pa]	3.200	3.400	3.950	4.180	5.050
Max. airflow volume	[m <sup>3</sup> /h]	approx. 3.200	approx. 7.000	approx. 8.000	approx. 12.000	approx. 15.000
Drive output	[kW]	3	5,5	7,5	11	15
Dust collection container	[Ltr]	50	50	50	50	50
Inlet / Outlet diameter	[mm]	280/315	280/315	280/400	315/450	355/560
Dimensions (W/D/H) approx.	[mm]	1.300x 1.050x 3.380	1.300x 1.310x 3.450	1.300x 1.310x 3.460	1.730x 1.310x 3.910	1.730x 1.810x 4.110

We reserve the right to make technical changes.  
Observe the preliminary documentation.



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Combination possibilities for the modular design



## 5.4 Fans (modular)

Fan		<b>RG-300</b>	<b>RG-400</b>	<b>RG-500</b>	<b>RG-600</b>
Connection voltage	[V]	400	400	400	400
Drive output	[kW]	2,2	3,0	4,0	5,5
Max. airflow volume	[m <sup>3</sup> /h]	2.600	3.200	4.000	5.500
Max. vacuum	[Pa]	2.000	3.200	3.400	3.500
Exhaust port (dia.)	[mm]	280	315	315	355

Fan		<b>RG-700</b>	<b>RG-800</b>	<b>RG-1200</b>	<b>RG-1500</b>
Connection voltage	[V]	400	400	400	400
Drive output	[kW]	5,5	7,5	11,0	15,0
Max. airflow volume	[m <sup>3</sup> /h]	7.000	8.000	12.000	15.000
Max. vacuum	[Pa]	3.400	3.950	4.180	5.050
Exhaust port (dia.)	[mm]	400	400	450	560

## 5.5 DUSTMAC S line (modular)

Typ		<b>S-5</b>	<b>S-10</b>	<b>S-17</b>	<b>S-25</b>	<b>S-33</b>
Intake port (dia.)	[mm]		250	250	315	355
Number of tubes	[pcs.]	13	20	32	48	48
Filter area	[m <sup>2</sup> ]	5	10	17	25	33
Dimensions (W/D/H) approx. (without fan)	[mm]	1.310x 1.060x 3.070	1.400x 1.310x 3.600	1.820x 1.310x 3.960	1.820x 1.750x 4.030	1.800x 1.750x 4.650

### 5.6 DUSTMAC P line (modular)

Typ		P-20	P-40	P-60	P-90
Intake port (dia.)	[mm]		250	315	355
Number of cartridges	[pcs.]	2	4	6	9
Filter area	[m <sup>2</sup> ]	20	40	60	90
Dimensions (W/D/H) approx. (without fan)	[mm]	1.310x 1.060x 2.650	1.310x 1.300x 2.650	1.750x 1.300x 2.950	1.750x 1.730x 3.020

### 5.7 DUSTMAC F line (modular)

Typ		F-42*	F-84*	F-84*	F-126*	F-189*
Intake port (dia.)	[mm]	250	315	355	355	400
Number of cartridges	[pcs.]	2	4	4	6	18
Filter area	[m <sup>2</sup> ]	42	84	84	126	189
Dimensions (W/D/H) approx. (without fan)	[mm]	1.300x 1.050x 2.650	1.300x 1.310x 2.650	1.300x 1.310x 2.650	1.730x 1.310x 3.010	1.730x 1.810x 3.030

\*= with scored filter cartridges

The height indication depends on the size of the dust collection container.  
We reserve the right to make technical changes. Observe the preliminary documentation.

## 5.8 Functional description

The radial fan has a rotor in which the axially incoming air is deflected in a radial direction. In the impeller wheel, the supplied energy is converted into mass flow and pressure increase of the conveyed medium.

In the standard version, the fan consists of a motor console onto which is bolted the drive motor, onto whose shaft ends the impeller wheel is attached at the hub. The hub's passage through the housing is closed with a shaft seal.

In the filtration chamber, the system separates the coarser particles from the aspirated air. The vertically placed filter cartridges and filter tubes are used for filtering out finer dust particles. The dust extractor's filtration rate is over 99%.

The filter cartridges and bags are cleaned by a compressed air blast from the fully automatic jet cleaner during and after operation in order to guarantee the dust extractor's aspiration performance.

The filtered dust is caught in the dust collection container, which can be decoupled with a few handles.



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## 6. Transport and commissioning

### 6.1 Delivery and transport

At delivery, the DUSTMAC is fastened to a pallet. After the protective cover and the bottom fasteners have been removed, the device can be lifted by a crane using the 4 loops attached to the support feet on the upper side.



Upon delivery, please inspect the device for transportation damage. Damage determined must be reported and documented immediately.



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## 6.2 Commissioning



**Observe the accident prevention regulations (UVV).  
The fan must not be used in an unassembled state.**



**The transport rope should never be attached to the wheel of the drive shaft.  
The wheel should always be freely movable with no contact anywhere.**

When attaching flanges, tighten the bolts alternately in several steps. Inlet nozzles that arrive loose must be exactly aligned. Turn the wheel with your hand and check to see if it turns without grinding noises.

Pay attention to the following points when connecting the electric motor:

- Applicable national electrical regulations.
- The connections must be performed by an authorized professional and according to the motor manufacturer's instructions.
- The supply voltage and frequency must correspond to the data on the motor's model plate.
- The circuit depictions in the motor terminal box must be observed.
- The power cable must be protected from damage, and power input must be at an appropriate rate.
- The safety equipment (motor protection relay, grounding resistance, etc.) must be checked and adjusted.
- The cooling air intake for the motor must not be obstructed.



**High voltage! The connection must be made only when power to the grid is cut off.**

To check that the fan is rotating in the right direction, switch it on very briefly and compare its direction with the direction of rotation arrow on the fan housing. The drive motor can be overloaded if the fan is moving in the wrong direction!



**All work on the fan must be done only when it is not running. It must be ensured that the motor cannot be turned on unintentionally. This can be achieved by using a lockable safety switch, for example.**



The drive motor must be connected according to the manufacturer's general electrical and connection instructions.

Freely accessible suction ports and pressure valves must be secured with an appropriate guard (e.g., wire mesh).

Before turning the device on, all safety equipment and cleaning flaps must be checked for proper installation.

After corresponding electrical installations, the direction of rotation and the safety measures employed must be checked.

When the fan is switched on for the first time, a built-in throttling device in the system should be closed, because the motor can be overloaded if the theoretically determined system resistances are too low compared to those actually present.

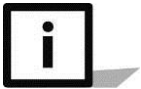
After the motor has ramped up, the choke should slowly be opened until the desired operating point has been reached. At this time, pay attention to the current consumption, above all. At operating RPM, the measured value must not exceed the rated current.

The operating RPM must not be exceeded.

Also note the fan's vibration behaviour. The permissible effective rate of vibration must not exceed 7.1 mm/s. Higher values lead to a rotor imbalance.

Twenty-four hours after commissioning, check or perform the following:

- Bolt tightness
- Tightness of the housing
- Quiet operation
- Bearing temperature



### 6.3 Working with the exhaust system

Before each time the dust extractor is started, a check must be made to ensure that the compressed air is connected, that the pressure (about 6 bar) is appropriate, and that the system is in safe, operational condition (see Point 7.1 "Daily inspection").



To start up the system, the red-yellow main switch is turned to the ON position. The system is now ready to operate. The rotary switch is for selecting the desired mode of operation. The red-yellow main switch serves as an emergency shut-off.

## 7. Troubleshooting

### 7.1 Maintenance instructions

Operational safety and durability greatly depend on proper maintenance. Operational malfunctions due to a lack of proper maintenance can lead to high repair costs and long downtime. Regular maintenance is therefore indispensable.

Maintenance should be performed after the first 500 operating hours and thereafter every 1,500 operating hours.



**Maintenance must be performed according to accident prevention regulations. The device must be disconnected from the electrical power and from the compressed air network. Even when the compressed air supply is turned off, the compressed air tank is still under pressure!**

Damaged or soiled parts must be replaced or cleaned by an expert. Incorrect settings must be corrected.

For maintenance by qualified personnel, the device must be opened, cleaned and inspected at the given locations, as well as possible, without any hazard being posed to maintenance personnel or other persons. Proper precautions must be taken before cleaning and replacement of wearing parts. This includes locally filtered forced-air ventilation in the area in which the device is being maintained, and proper personal protective gear.

If the device is not needed in its location of use for a long time, it must be stored in a dry room. The temperature should not be below 5°C or over 25°C.

Before the device is placed into storage, it is recommended that it be cleaned with a damp cloth, that the filter be cleaned, and that the dust container be emptied.

The device must never be cleaned with flowing water.



**Get the most from ESTA's maintenance service!**

---

## Regular maintenance consists of 3 intervals:

### 1. Daily inspection includes:

➤ **By the device's user**

Visual inspection

- for damage to the device or its parts,
- for mechanical damage to the power cable,
- for a full dust collection container (regulations require that the container be emptied if it is more than 2/3 full),
- an acoustic test to see if there have been changes from the normal condition during operation of the fan.

### 2. Monthly inspection includes:

➤ **By expert maintenance personnel**

Functional and visual inspection

- for filter leaks (dust trails or deposits on the air outlets)
- filter cleaning operation
- retightening externally accessible bolt connections
- the protection and safety equipment

### 3. The main annual inspection includes:

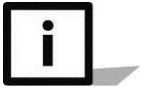
The last test by ESTA is documented on the device!

➤ **In collaboration with the ESTA maintenance service**

- Flow volume measurement
- Vacuum measurement
- Current consumption measurement
- Visual check of filters
- Seal inspection
- Stress fractures on housing
- Quiet operation
- Bearing temperature
- Bolts
- Rotor distortion
- Wearing parts



The operator is obligated to have maintenance performed once per year. During maintenance, the device is to be tested by a trained expert for correct operation. A log is to be kept of the main annual inspection. It must document the date of inspection, deficiencies determined and the name of the inspector. The date of the next inspection can be read from the test plate installed on the device.



If there is a malfunction, the device must be switched off immediately and the responsible maintenance service notified!



According to directive 2009/104/EC and TRGS 560, safety devices for prevention or removal of hazards must be regularly maintained and regularly inspected by an expert for safe, flawless operation.



Get the most from ESTA's maintenance service!

A maintenance contract ensures a long life and top-notch operation for your dust extractor.

We'll make you a great offer — just call us up:



ESTA maintenance service: +49 (0) 7307 804 – 0  
ESTA replacement part service: +49 (0) 7307 804 – 0

## 7.2 Troubleshooting

Use the following charts if a malfunction is evident. Call ESTA maintenance service if there is a malfunction that is not discussed in this list. Do not perform any repairs on the device yourself if they are not explicitly specified.



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### 7.2.1 System

Problem	Possible cause	Solution
The system does not start; the red "Malfunction" light goes on.	System overload tripped.	Notify ESTA customer service.
The system has insufficient suction performance. The red "Filter dirty" light goes on.	The filters may be so clogged with dust that jet cleaning can no longer recondition them.	The used filters must be replaced by ESTA customer service.
No compressed air blasts were heard during cleaning.	Compressed air interrupted.	Check to see if the compressed air line is connected to the filter.
Insufficient suction during filter cleaning; the "Filter dirty" light goes on.	Not enough pressure in the compressed air network. Cleaning device malfunction.	Check to see if the compressed air network has enough pressure (min. 6 bar) Notify ESTA.
Yellow maintenance light is on.	The maintenance interval is up.	Have ESTA customer service perform system maintenance.

### 7.2.2 Motor

Problem	Possible cause	Possible solution
The motor shuts off before reaching operating RPM.	Wrong or poorly installed switching devices.	Install the switching devices correctly or allow for heavy starting.
The motor's current consumption is too high.	The motor's rotation direction is wrong.	Change in direction of rotation when two phases are switched.
	The resistance in the system is too low.	Close the throttling device until the desired air mass is reached.
The desired air mass is not achieved.	The motor's rotation direction is wrong.	Change in direction of rotation when two phases are switched.
	Throttling device is closed.	Open the throttling device appropriately.
The rate of vibration is too high.	Fan is installed warped.	Check the bolts.
	The wheel is off balance.	Have a professional check the wheel and re-balance it, if necessary.

### 7.2.3 Fan

Problem	Possible cause	Possible solution
Fan runs rough.	Rotor is off balance due to build-up.	Cautiously and carefully remove the build-up. If necessary, have an expert re-balance. Check the bearing.
	Imbalance due to material degradation on the rotor, e.g., from handling aggressive materials.	Consult with ESTA; replace rotor if necessary; check the bearings.
	Imbalance from rotor deformation due to overheating.	Consult with ESTA; replace rotor if necessary; check the bearings.
	Imbalance due to rotor wear.	Consult with ESTA; replace rotor if necessary; check the bearings.
Temperature rise in bearings.	Increased flexing in the bearing due to fresh lubrication or new bearings.	Continue operating the fan. The temperature normalizes by itself after a certain time.
	Lubrication intervals not complied with.	Replace the bearings and lubricate according to the intervals.
	Bearings installed tense.	Replace the bearings.
	Excessive heat transfer with fans handling hot materials.	Decrease the temperature of the conveyed medium. If the bearings are already damaged, replace them.
Leaky shaft passage.	Sealing element worn.	Replace sealing element.

## 8. Cleaning

Cleaning work or filter changes must be performed in a well-ventilated room or outdoors. The people assigned to this work must be instructed on the aspirated toxic materials and wear a breathing protection mask with a class P3 particle filter, as well as protective gloves. All distractions by uninvolved persons must be prevented.



During cleaning work or filter replacement, all soiled objects that can no longer be adequately cleaned must be disposed of. Such objects must be disposed of in a dustproof bag in compliance with applicable regulations for disposal of such refuse.



When the housing is open, the device must not be turned on!

### 8.1 Emptying the dust collection container

The dust collection container is flange mounted to the filter with four quick-tension locks. For emptying the dust collection container, the four quick-tension locks are released crosswise in pairs, while the container's locking lever rotates upward and away. The hooks of the quick-tension locks are folded under. Now the container can be emptied. To attach the container to the filter, follow the same sequence in reverse.





## 8.2 Cleaning the cartridges or tubes

The exhaust system automatically cleans the dirty filter during operation. In addition, after the fan is turned off, the filters are cleaned sequentially in two passes. During suction operation, as soon as the filters have been soiled to a certain degree (i.e., the differential pressure measured before and after the filter exceeds the limit value set on the differential pressure monitor) filter cleaning is activated. After activation, individual cartridges or tubes are cleaned with compressed air blasts. If the suction performance nonetheless diminishes, the filter cartridges or tubes are probably heavily soiled. This is shown by a red warning light. In this case, try to clean the filter again. For this purpose, turn the suction assembly on for about 5 minutes. After the suction assembly is shut off, the system automatically cleans twice. If suction performance does not improve after such a cleaning, the filters are worn out and must be replaced.

## 8.3 Replacing the filters / tubes



Once the device is isolated and the compressed air is turned off, the sash lock of the maintenance doors can be released using an appropriate tool (8 mm square spanner) and the filters/hoses replaced.



Only original ESTA filters or tubes must be used; use of other products will void the warranty.



Before the filter is replaced, it must first be cleared of loose dust using the available cleaning system.



Always disconnect power to the device before making the replacement. The main switch must be secured by a lock against activation.



Disconnect the compressed air and allow the remaining pressure to drain from the compressed air valve.



It should not be worked on with an electric device! Fine dust particles may explode!



If the “optimum fit” is not achieved, performance can reduce considerably and perfect air filtration cannot be guaranteed.

### 8.3.1 Filter replacement

To change the filter, loosen the filter's three connecting screws and remove them one after another. They must be disposed of in a dustproof bag in compliance with applicable regulations for disposal of such refuse.



**Due to a danger of slippage, the seals must be correctly adhered when the filter is reinstalled. Improper installation leads to considerably reduced performance, and perfect air filtration cannot be guaranteed.**

When installing the original ESTA filter, follow the same sequence as for removal, but in reverse. With antistatic filters, remember to attach the earthing (ground) strap to the provided screw connection.

### 8.3.2 Hose replacement

To replace the tubes, press them each upward, one after the other, out of the socket. They must be disposed of in a dustproof bag in compliance with applicable regulations for disposal of such refuse.



**When reinstalling the tubes, you must fit them flush to the socket. Improper installation leads to considerably reduced performance, and perfect air filtration cannot be guaranteed.**

When installing the original ESTA tubes, follow the same sequence as for removal, but in reverse. Press the tubes together at the opening in order to get them into the socket. Grip through the sockets that are still empty so that the hose fits flush.



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ESTA replacement part service: +49 (0) 7307 804 - 0

## 9. Optional equipment

### 9.1 Filter unit only (without fan)

At customer request, a system can be delivered without a fan. In this case, the filter unit remains. In this instance, a suction assembly and energy supply designed for the specific application must be properly connected to the system.

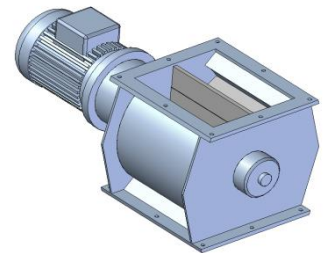


**The connections must be performed by an authorized professional.  
The operator is responsible for proper assembly and start-up!**

### 9.2 Discharge through a cellular rotary valve into a Big Bag

The system can optionally be equipped with a cellular rotary valve. This is installed on the discharge cone. Follow the separate operating manual for the cellular rotary valve.

Furthermore, instead of the dust collection container, a Big Bag can be installed on the discharge cone for collecting larger dust quantities.



### 9.3 Discharge with double shutter valve

The system can optionally be equipped with a double shutter valve. This is installed on the discharge cone. Follow the separate operating manual for the double shutter valve.

## 9.4 Discharge with slide shutter

The system can optionally be equipped with a slider at discharge. This is for separating the dust collection container, so that it can be emptied while the system is operating. Note, however, that while the shutter is operating, it is possible to reach into the shutter if no container is connected underneath. If there is risk of injury, further measures must be taken to remove the injury hazard.

## 9.5 Material pre-separator

The system can optionally be equipped with an optimized raw gas collection container with a material pre-separator. This reduces entry of coarse particles into the filter chamber, thus reducing the risk of a filter fire from flying sparks. The air is sucked in, and the suction speed is reduced by the increased space in the raw gas collection container and rerouted. This makes the medium sink downward and fall into the integrated coarse dust collection drawer. Then the air is sucked further into the filter in the opposite direction from that of the dust.

Disposal: When the system is stopped, the raw gas collection container's coarse dust collection drawer can be pulled out, and the material can be disposed of. The material pre-separator must be checked regularly for adhered residue and cleaned. If necessary, adhered residue must be removed with an appropriate tool (such as an industrial dust extractor).

### 9.5.1 Cleaning the material pre-separator manually



**Before cleaning, always disconnect the system from the power source. The main switch must be secured by a lock against activation.**

Depending on the application, weekly inspection of the material pre-separator's exterior and interior is necessary. For this, the material pre-separator must be pulled out of the raw gas collection container laterally. If adhered residue is found, it must be swept downward with an appropriate sweeping device or removed with a suitable industrial vacuum cleaner.



**Because the material pre-separator is very heavy, this must be done by 2 people.**



Loosen the inspection cover's fastening screws, and remove both cover and screws.



Check to see how much dirt is on the material pre-separator's lamellas.



To clean the material pre-separator, pull the roll out of the filter. Now you can use a compressed air gun, screwdriver or brush to remove all soil. Never use a high-pressure washer, because this can damage the surface and create a corrosion risk!

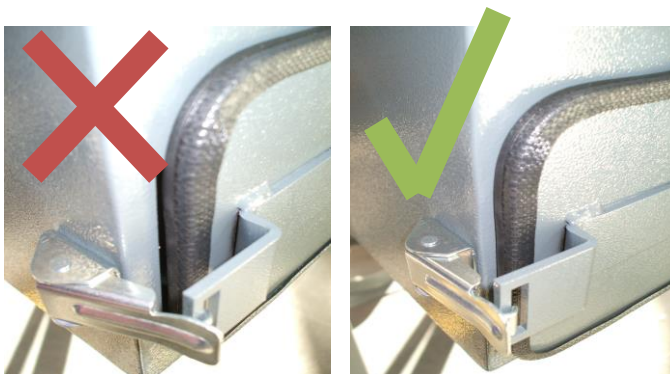
After cleaning, installation follows the reverse sequence.

### 9.5.2 Emptying the coarse dust collection drawer

The contents of the coarse dust collection drawer must be disposed of regularly according to local regulations.



To do this, release the quick-tension locks on the drawer. Then the drawer can be removed and vacuumed out with an appropriate industrial dust extractor. After that, slide the drawer completely back into the raw gas collection container, and engage the quick-tension locks. The drawer must close firmly.



Dispose of the dust according to local regulations.

### 9.6 Fire extinguishing equipment

The system can optionally be equipped with spark detection. This notices potential ignition sparks and gives off a signal. This signal can be processed by extinguishing equipment (supplied optionally or provided by the customer) and sets off an extinguishing process.

More information is available in the spark detection manufacturer's documentation.



There is danger of setting off the signal when opening the inspection ports during maintenance, cleaning and repair work.  
 Before opening the inspection ports, always deactivate the spark detection so that entering light does not set off a signal.  
 After closing the inspection openings, always reactivate the spark detection.

### 9.6.1 Extinguishing equipment

Optionally, the spark detection can be connected to extinguishing equipment. This puts out any sparks that may occur, so that they do not reach the filter and set it on fire.

More information is available in the extinguishing equipment manufacturer's documentation.

### 9.7 Switch-on operations for motors

Higher-performance motors without a frequency converter must not be switched on and off at too short an interval, because this places a heavy load on the electro-technical components. Please comply with the chart for switch-on operations:

<u>Motor output</u>	<u>Switch-on operations per hour</u>
1 – 4 KW	Up to 8 starts
4 – 7.5 KW	Up to 6 starts
7.5 – 15 KW	Up to 4 starts
15 – 30 KW	Up to 3 starts
More than 30 KW	Electronically controlled follow-up time

## 9.8 Standard control cabinet

The control unit has the following controls and warning lights:

**Main switch (red-yellow rotary switch)**

Switches off the entire system and serves as emergency shut-off. During maintenance or repair work, the main switch can be secured with a lock against unintentional activation.

**Rotary switch 0 -1**

For turning the suction assembly on and off.

**Green "Operation" warning light:**

Shows when the suction assembly is running.

**Red "Motor protection" warning light:**

Shows when the motor protection relay has tripped.

## 9.9 Convenience control cabinet

**Start-up:**

During start-up, the main switch must be on.

A "I 0 Auto" rotary switch puts the system into operation. The system is turned on by moving the rotary switch to the "I" position. In the "Auto" position, the external controls must be on for the suction assembly to run. If there is no malfunction, the "Motor operation" glows green. If there is no other external requirement, the exhaust system runs 5 minutes later. If the "I 0 Auto" rotary switch is turned to the "0" position, the system shuts down after the follow-up time has expired.

If the system has been turned off by an emergency shut-off, or if the voltage has been interrupted due to a fault in the feed line, the recurring voltage must be dismissed at the operation mode switch. To do this, turn the toggle switch to "0". Then the operating mode can be selected again. This is to prevent the system from starting up on its own after a power outage or malfunction.

A programmable control relay takes over the system. This contains a switch timer with 3 adjustable on/off times (weekday block arrangements are supported) and a maintenance counter. Additionally, this component monitors the filter configuration and controls cleaning. To set the clock time and the cleaning period, see the control relay operating manual included with the documentation.



Note:

The preset cleaning period on the control relay should be modified only with ESTA approval.

Control unit operation:

The control unit has the following controls and warning lights:

Main switch (red-yellow rotary switch)

Switches off the entire system and serves as emergency shut-off. During maintenance or repair work, the main switch can be secured with a lock against unintentional activation.

Operation mode switch (black rotary switch)

“Auto” position: Start-up with potential-free contact for starting with processing machine or a side chart.

“Manual” position: Suction assembly starts immediately.

“O” position: Suction assembly is off.

Green “Operation” warning light:

Shows when the suction assembly is running.

Red “Motor protection” warning light:

Shows when the motor protection relay has tripped.

Red warning light “Filter heavily soiled”:

Glow for worn-out filters or when the cleaning equipment malfunctions.

Yellow “Maintenance” light:

Signals that the system should undergo inspection and maintenance.

Malfunctions: at convenience control cabinet

If malfunctions occur in the system, these are shown by the red light on the control cabinet.

Malfunction repairs should be entrusted only to experts or to a person instructed by an expert. When opening the controls or during maintenance, it is also necessary to ensure that power to the system is cut off and cannot be switched on by unauthorized third parties.

Some malfunctions are not indicated by the red warning lights on the control cabinet door, but directly inside the cabinet on the display of the LOGO control.

If the system has been turned off by an emergency shut-off, or if the voltage has been interrupted due to a fault in the feed line, the recurring voltage must be dismissed at the operation mode switch. To do this, turn the toggle switch to “0”. Then the operating mode can be selected again. This is to prevent the system from starting up on its own after a power outage or malfunction.

Malfunction!  
Filter  
dirty

Malfunction!  
Motor  
protection

Malfunction!  
No air  
pressure

The system mandatorily shuts off when the following malfunctions occur:

- Motor protection is triggered.
- No compressed air (5 min.).

### 9.9.1 Setting the clock

- Press the ESC key.
- Select the “Set Clock” item on the menu and press **OK** to confirm.

(Example: Set the time to T=12:00 minutes.)

1. Move the cursor to the first position:

Key ◀ or ▶

2. Choose the number “1”:

Key ▲ or ▼

3. Move the cursor to the second position:

Key ◀ or ▶

4. Choose the number “2”:

Key ▲ or ▼

5. Move the cursor on the unit:

Key ◀ or ▶

6. Choose the “m” unit for minutes:

Key ▲ or ▼



## 9.9.2 Setting the weekly timer

Entering the switching times:

1. Place the cursor on a timer parameter number (e.g., No. 1).

2. The **OK LOGO!** button opens the counter parameter window.

The cursor is on the day of the week. (B008)

3. With ▲ and ▼ choose one or more days of the week.

4. Move the cursor with ► for the switch-on time.

5. Set the switch-on time.

Change the value at the appropriate position with the

keys ▲ and ▼

Move the cursor among the individual positions with the

Keys ◀ and ▶

You can only select the value -- : -- at the first position.

( -- : -- indicates no on/off switching time).

6. Move the cursor with ► to the first position for the shut-down time.

7. Set the shut-down time (as in step 5).

8. Once you have entered the time value, press **OK** to confirm.

The cursor will be on parameter No. 2 (counter 2). Now you can set the parameters for another counter.



### 9.9.3 Day of the week

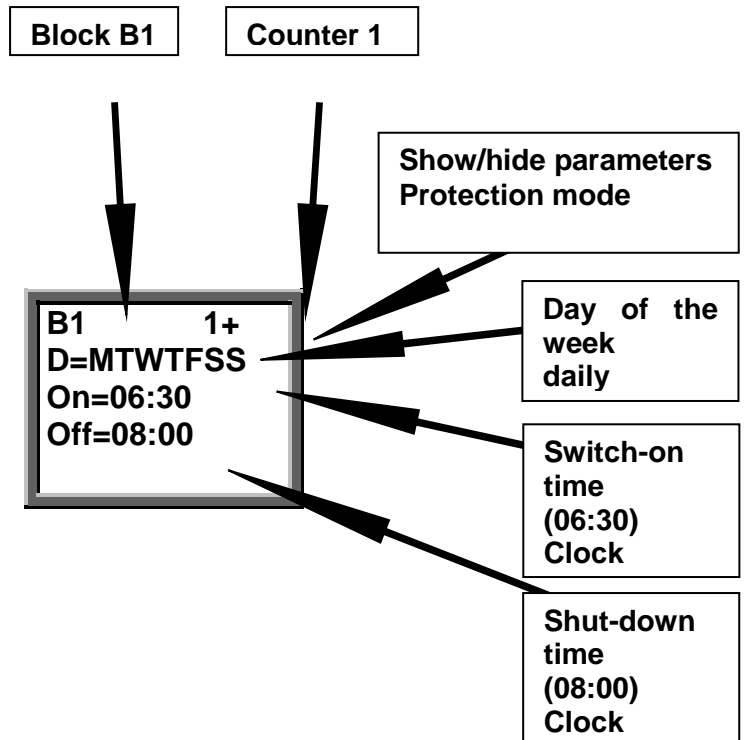
The letters after "D=" (day) have the following meanings:

#### 9.8.2. Setting the weekly timer

- **M**: Monday
- **T**: Tuesday
- **W**: Wednesday
- **T**: Thursday
- **F**: Friday
- **S**: Saturday
- **S**: Sunday

A capital letter means: Day of the week selected. A dash means: Day of the week not entered.

Here is a sample parameter window for Counter 1 and the pulse setting:



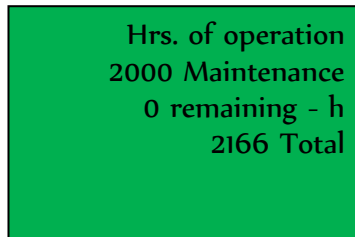
### 9.9.4 Maintenance

Operational safety and durability greatly depend on proper maintenance. Operational malfunctions due to a lack of proper maintenance can lead to high repair costs and/or long downtime. Regular maintenance is therefore indispensable.

Annual retests according to VDE 0701 – 0702, VDE 0600 must be performed.

During maintenance, make sure the rotor does not move! Observe the accident prevention regulations (UVV)!

When 2,000 operational hours have been reached, the yellow warning light on the control cabinet goes on. Then this message appears on the display of the LOGO control:



```
Hrs. of operation
2000 Maintenance
  0 remaining - h
2166 Total
```

#### Meaning of message:

##### **2000 Maintenance:**

Hour interval between maintenance.

##### **Remaining - h:**

Remaining hours counter, shows in hours how long the system can be operated before maintenance is needed.

##### **Total:**

Counts the system's total operating hours (active when the motor is on).

### 9.9 Troubleshooting at start-up

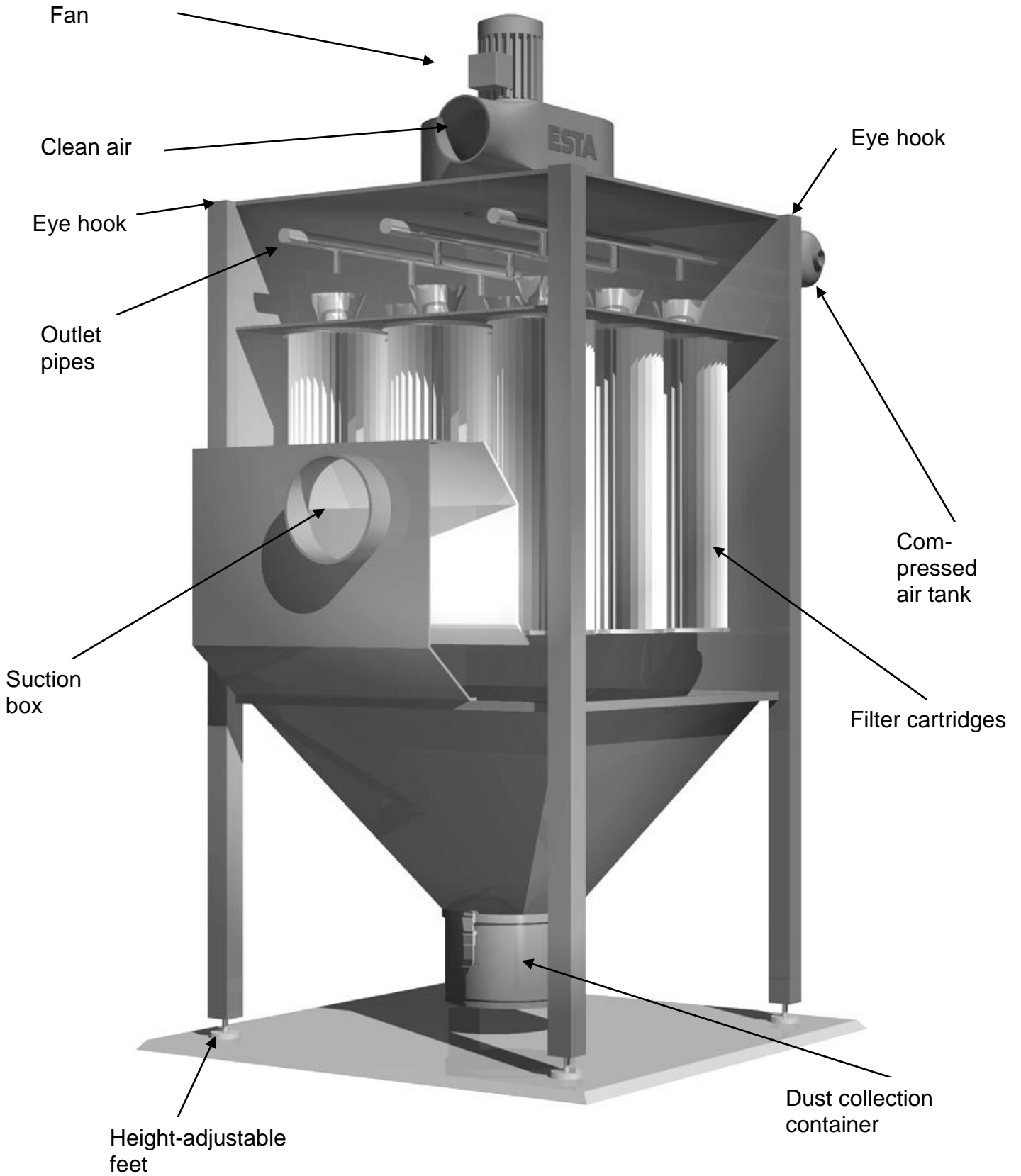
<b>Problem</b>	<b>Possible cause</b>	<b>Possible solution</b>
The motor assembly shuts off before reaching operating RPM.	Wrong or poorly installed switching devices.  Time for star / triangle start-up incorrectly set.	Install the switching devices correctly or allow for heavy starting.  Check the time relay and reset, if necessary.
The motor's current consumption is too high.	The motor's rotation direction is wrong.  The resistance in the system is too low.	Change in direction of rotation when two phases are switched.  Close the throttling device until the desired air mass is reached.
The desired air mass is not achieved.	The motor's rotation direction is wrong.  Throttling device is closed.	Change in direction of rotation when two phases are switched.  Open the throttling device appropriately.
The fuse on the supply line triggers.	The motor has too often been turned on/off at short intervals.	Please comply with the "Switch-on operations for motors" chart.
After a power outage (malfunction) on the system, or maintenance, or after the system is shut off, the suction no longer starts up.	Toggle switch setting not reset to "0".	Set the toggle switch to "0" position and then reset the operating mode.

### 9.10 Troubleshooting and repair

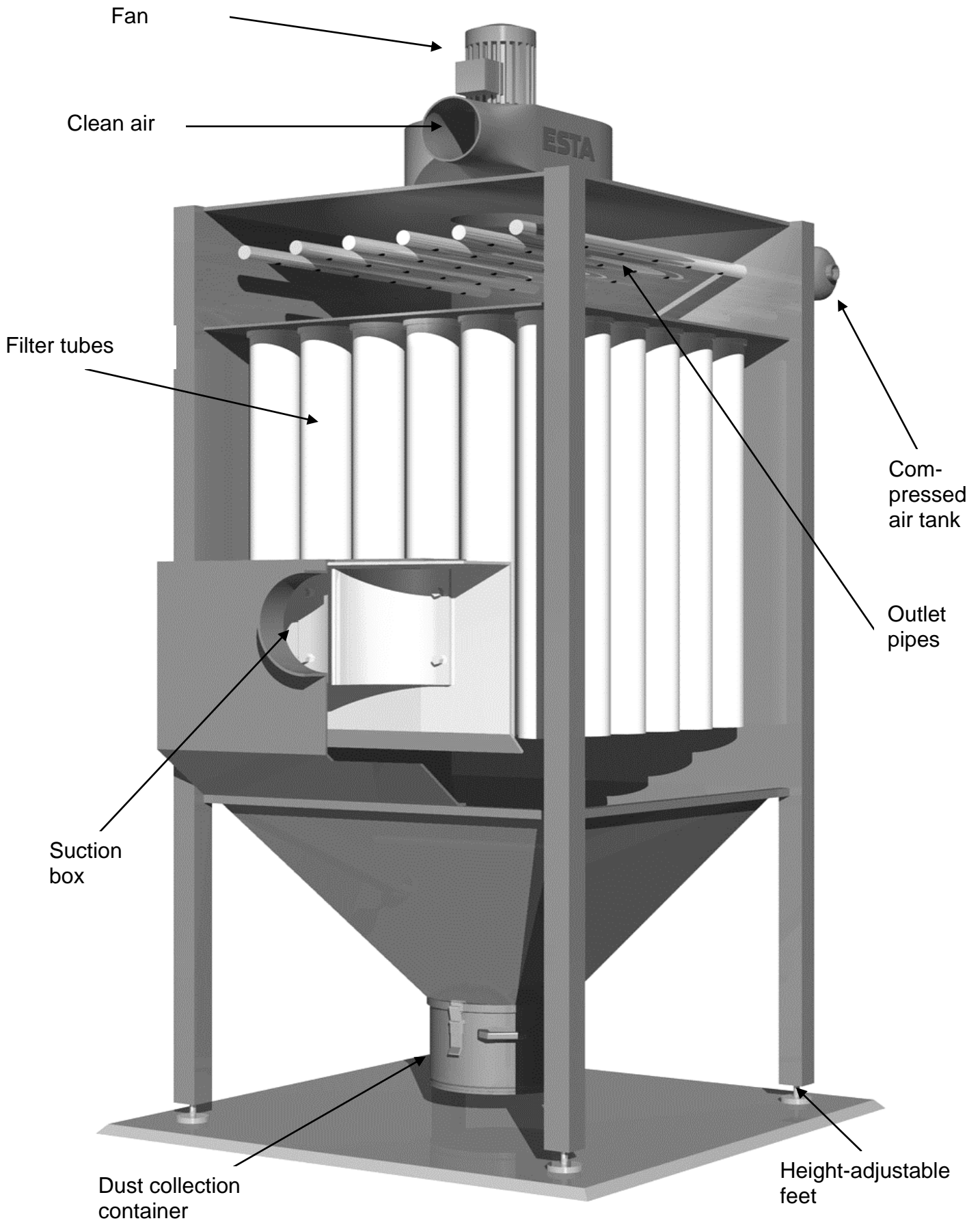
In the event of a malfunction, consult the following checklist. If a malfunction occurs that is not mentioned in the list, contact ESTA directly.

<b>Problem</b>	<b>Possible cause</b>	<b>Possible solution</b>
Fan runs rough.	<p>Rotor is off balance due to build-up.</p> <p>Imbalance due to material degradation on the rotor, e.g., from handling aggressive materials.</p> <p>Imbalance from rotor deformation due to overheating.</p> <p>Imbalance due to rotor wear.</p>	<p>Cautiously and carefully remove the build-up. If necessary, have an expert rebalance. Check the bearing.</p> <p>Consult with ESTA; replace rotor if necessary; check the bearings.</p> <p>Consult with ESTA; replace rotor if necessary; check the bearings.</p> <p>Consult with ESTA; replace rotor if necessary; check the bearings.</p>
Temperature rise in bearings.	<p>Increased flexing in the bearing due to fresh lubrication or new bearings.</p> <p>Lubrication intervals not complied with.</p> <p>Bearings installed tense.</p> <p>Excessive heat transfer with fans handling hot materials.</p>	<p>Continue operating the fan. The temperature normalizes by itself after a certain time.</p> <p>Replace the bearings and lubricate according to the intervals.</p> <p>Replace the bearings.</p> <p>Decrease the temperature of the conveyed medium. If the bearings are already damaged, replace them.</p>
Leaky shaft passage.	Sealing element worn.	Replace sealing element.
After a power outage (malfunction) on the system, or maintenance, or after the system is shut off, the suction no longer starts up.	Toggle switch setting not reset to "0".	Set the toggle switch to "0" position and then reset the operating mode.

# 10. Device diagram







# 11. EC Declaration of Conformity (for machines)

**Name of manufacturer:** ESTA Apparatebau GmbH & Co. KG  
**Address of manufacturer:** Gotenstraße 2 - 6  
 89250 Senden  
 Germany

Person in charge of documentation: ESTA Apparatebau GmbH & Co. KG  
 Gotenstraße 2 - 6  
 89250 Senden  
 Germany

**We hereby declare that the design of the machine**

**Machine:** Dust removal system for extracting dust  
**Series:** DUSTMAC  
**Model:** DUSTMAC-P, -F, -S

**conforms to the following regulations:**

<b>2006/42/EG</b>	EC Machine Directive
<b>2004/108/EG</b>	EC Directive on Electromagnetic Compatibility
<b>2006/95/EC</b>	EC - Low Voltage Directive

**Reconciled norms used:**

<b>DIN EN ISO 12100:2011-03</b>	Safety of machinery – General principles for design – Risk assessment and risk reduction
<b>DIN EN ISO 13857:2008-06</b>	Safety of machinery, devices and systems; safety distances to prevent hazard zones from being reached
<b>DIN EN 349:2008-09</b>	Safety of machinery; minimum distances for preventing body parts from being crushed
<b>EN 60 204-1:2011-01</b>	Safety of machinery – Electrical equipment of machines – General requirements
<b>DIN EN 61000-6-1:2007-10</b>	EMC - Generic standards - Immunity for residential, commercial and light-industrial environments
<b>DIN EN 61000-6-2:2006-03</b>	EMC – Generic standards – Immunity for industrial environments
<b>DIN EN 61000-6-3:2011-09</b>	EMC – Generic standards – Emission standard for residential, commercial and light-industrial environments
<b>DIN EN 61000-6-4:2011-09</b>	EMC – Generic standards – Emission standard for industrial environments
<b>DIN EN 61000-3-2:2010-03</b>	EMC – Limits – Limits for harmonic current emissions (equipment input current ≤16A per phase)
<b>DIN EN 61000-3-3:2009-06</b>	EMC – Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16A per phase and not subject to conditional connection
<b>DIN EN 61000-3-11:2001-04</b>	EMC limits – Limits; limitation of voltage changes, voltage fluctuations and flickers in low-voltage public supply systems; devices and equipment with a rated current ≤75A subject to a special connection
<b>DIN EN 61000-3-12:2012-06</b>	EMC limits – Limits for harmonic current emissions caused by devices and equipment with an input current > 16A and ≤ 75A per conductor that are intended for connection to low-voltage public grids

**National norms and technical specifications used:**

Based on the principles for assessment and certification of dust-removal machinery and equipment (SBM).  
 For further norms, see the technical documentation of the EC Conformity Declaration according to Machinery Directive Appendix V.

Senden, 16.11.2015



Dr. Peter Kulitz  
 CEO

## 12. Manufacturer's declaration for partially completed machinery

**Name of manufacturer:** ESTA Apparatebau GmbH & Co. KG  
**Address of manufacturer:** Gotenstraße 2 - 6  
 89250 Senden  
 Germany

Person in charge of documentation: ESTA Apparatebau GmbH & Co. KG  
 Gotenstraße 2 - 6  
 89250 Senden  
 Germany

**Here we explain that the design of the incomplete machine**

**Machine:** Filter unit for extracting dust  
 (without fan unit)  
**Series:** DUSTMAC  
**Model:** DUSTMAC-P, -F, -S

**conforms to the following regulations:**

<b>2006/42/EG</b>	EC Machine Directive
<b>2004/108/EG</b>	EC Directive on Electromagnetic Compatibility
<b>2006/95/EC</b>	EC - Low Voltage Directive

**Reconciled norms used:**

<b>DIN EN ISO 12100:2011-03</b>	Safety of machinery – General principles for design – Risk assessment and risk reduction
<b>DIN EN ISO 13857:2008-06</b>	Safety of machinery, devices and systems; safety distances to prevent hazard zones from being reached
<b>DIN EN 349:2008-09</b>	Safety of machinery; minimum distances for preventing body parts from being crushed
<b>EN 60 204-1:2011-01</b>	Safety of machinery – Electrical equipment of machines – General requirements
<b>DIN EN 61000-6-1:2007-10</b>	EMC – Generic standards - Immunity for residential, commercial and light-industrial environments
<b>DIN EN 61000-6-2:2006-03</b>	EMC – Generic standards – Immunity for industrial environments
<b>DIN EN 61000-6-3:2011-09</b>	EMC – Generic standards – Emission standard for residential, commercial and light-industrial environments
<b>DIN EN 61000-6-4:2011-09</b>	EMC – Generic standards – Emission standard for industrial environments
<b>DIN EN 61000-3-2:2010-03</b>	EMC – Limits - Limits for harmonic current emissions (equipment input current ≤16A per phase)
<b>DIN EN 61000-3-3:2009-06</b>	EMC – Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16A per phase and not subject to conditional connection

**National norms and technical specifications used:**

Based on the principles for assessment and certification of dust-removal machinery and equipment (SBM). For further norms, see the technical documentation of the EC Conformity Declaration according to Machinery Directive Appendix V.

**Note:** The incomplete machine can be operated only once it has been determined that the building's capacities meet the specifications in the directives mentioned above.

Senden, 16.11.2015



Dr. Peter Kulitz  
 CEO





## **Notes**

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[www.esta.com](http://www.esta.com)

ESTA-FAX: **+49 (0) 73 07 - 80 45 00**

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- Welding Fume Filters
- Oil Mist Separators
- Extraction Fans
- Extraction Arms
- Central Extraction Systems
- Pipe Systems

### **ESTA Apparatebau GmbH & Co. KG**

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