



WELDEX FT

Stationary
Welding Fume Filtration Systems

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**



ESTA

Operating manual



WELDEX FT

WELDEX FT-150	(Order No.: 667.150)	Manual drawer
WELDEX FT-150	(Order No.: 667.151)	Pneumatic drawer
WELDEX FT-230	(Order No.: 667.230)	Manual drawer



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

Translation of the original instructions
667150-08-08

Edition notice

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Type of device: Modular welding fume filter system WELDEX FT
Item No.: 667.150 // 667.151 / 667.230 and variations

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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 system or perform maintenance on it must be provided with information, instructions and training on 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 system must be used only by persons who have been instructed in its handling and are explicitly authorized to use it.

Always keep the operating manual at the place where the system is being used, so that it can be seen by personnel at all times.

The system is intended only for dry cleaning and must not be used or stored outdoors or under wet conditions.

Only original ESTA replacement parts must be used; use of other products will void the warranty.

During exhaust, the volume flow returned from the system into the room must be no more than 50% of incoming air. With free room ventilation, the incoming airflow must equal the room volume every hour. This means that the rate of air replacement must be once per hour.

$$\text{Incoming airflow [m}^3\text{/h]} = \text{room volume [m}^3\text{]} * \text{air replacement rate [1/h]}$$

No liquids, aggressive gases, easily flammable materials or glowing particles (such as hot embers) may be aspirated. For example, it is prohibited to use the system in painting operations. It is forbidden to extract from work areas with processing machines giving off active ignition sparks or hot embers.

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

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 system must not be used if damage to the power cable is detected.



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

For the power supply and the power or connection cables, only original replacement parts must be used. This guarantees that they are spray-proof according to applicable standards and have the necessary mechanical strength.

The power cord must be plugged in only after the system has been successfully set up at its place of use. For this, a 32-amp CEE wall socket with a 32-amp support fuse must be in place.

Before moving the system to another site and before cleaning, maintenance, or replacement or removal of movable parts, the device must be unplugged and the compressed air disconnected.



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



According to work equipment user directives 2009/104/EC and TRGS 528, safety devices for prevention or removal of hazards must be regularly maintained and regularly inspected by an expert for safe, flawless operation.



The system must not be operated with the dust collection drawer open. During operation, and during the cleaning phase, the entire system must be kept closed. It is not possible to open the doors until at least 5 minutes after the system is shut off, because there is whirled, possibly toxic dust in the lower part of the system.

ATTENTION! Opening the upper door is permissible only if an appropriate waiting time has ensured that the impeller wheel inside is standing still — RISK OF INJURY!



In all emergencies, the system must be disconnected from the power supply immediately. Turn the system off at the emergency switch and pull the plug. If there is a fire, the fire department is to be alerted immediately, and the fire must be contained by appropriate means. The system has been provided for fire extinguishing holes for this purpose. A suitable extinguishing agent must be kept near the system before start-up and during operation.

2. Preventing mechanical hazards



CAUTION — RISK OF INJURY! Opening the upper inspection port is permissible only after the main switch has been shut off and an appropriate waiting time ensures that the fan inside is not moving.

At least 2 people are necessary for installing and removing the inspection port.

Closing the manual drawer

Pre-stress can cause the latches to snap shut suddenly. Be careful of your fingers when closing the drawer manually with the latches.



Beware of the injury risk! Never put your finger into the space between the drawer and the system, because it may get crushed!



Residual risk:

If a covering to be unfastened is removed, there is risk of injury if the system is running!

3. Preventing electrical hazards

All electrical parts must be covered by fixed, securely fastened protective covers that can be removed only with tools. The system complies with Protection Class I according to EN 60 335.



Residual risk:

If a covering that can only be unfastened with a tool is removed, a hazard is posed by electric current. The electrical connection and repair work must be done by a trained or appropriately qualified person (an electrical expert).

4. Preventing dust hazards

When removing the dust collection container, it is possible to inhale dust. Following the instructions in the “Disposal” section will minimize this hazard. During transport, the dust collection drawer, including the lifting mechanism, must be removed. The compressed air hoses must be clamped off ahead of time.

5. Preventing hazards Thermal hazard

If the system, especially the fan module, is opened after a long period of operation, shortly after shut-off, the motor surface may be hot. Do not touch the motor until it has cooled. In normal operation, the fan module is closed, and the motor may be hot and not directly accessible.

6. Preventing hazards — Noise

If the system — especially the cleaning module — must be opened during operation, during normal operation automatic cleaning can be triggered through the controls. The cleaning impulse can damage human hearing. For this reason, it is permissible to open the housing only during downtime, with the controls shut off and the compressed air tank discharged.

It is only permissible to open the housing of the device during downtime, when switched off (main switch on "0"), with the controls shut off and the compressed air tank discharged. The manometer attached to the compressed air tank is for checking the tank's pressure.

In order to avoid triggering an unwanted pressurised air pulse during maintenance and service work, the system must be switched off from the main switch and secured against reconnection. Interrupt the pressure supply and empty the compressed air tank. This is done by performing a "manual cleaning" or by discharging the compressed air at the discharge valve of the compressed air tank.

7. Preventing hazards Tripping, falling

For assembling the system, use only equipment (ladders, stairs) that meets safety requirements. If the dust collection drawer is pulled out of the system, make sure that no unauthorized people are moving about the area of the system; they may trip over this drawer.

8. Intended use

The welding fume filter system has been manufactured according to the state of the art and in compliance with safety regulations. It is suitable for commercial use, such as in industrial firms and workshops, for separation of dry, non-flammable welding fumes.

Other applications are considered unintended use. ESTA is not liable for damages due to unintended use!

The manufacturer sets up the welding fume filter system according to the operator's information.

8.1 Improper use

Aspiration of welding fumes is not permissible with welding of oil-moistened parts.

The welding fume filter system must not be used or stored outdoors or under wet conditions.

ESTA is not liable for damages due to unintended use!



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

9. Technical data and description

9.1 Technical data

We reserve the right to make technical changes.

Model: WELDEX		FT-150	FT-230
Filter type		Filter cartridge	
Number of filter elements	[unit]	6	
Filter area	[m ²]	150	230
Drive output	[kW]	11	
Connection voltage	[V]	400	
Nominal frequency	[Hz]	50	
Rated current	[A]	22	
Circuit breaker	[A]	32	
Max. vacuum Pa	[Pa]	2,000	
Max. volume flow	[m ³ /h]	15,000	
Min. volume flow	[m ³ /h]	12,000	
Dust collection container (per 40 litres)	[unit]	2	
A drawer for coarse dirt (per 27 litres)	[unit]	1	
Exhaust port	[mm]	324 x 1,142	
Dimensions			
Length	[mm]	1,380	
Width		2,055	
Height		3,700	
Max. air humidity	[%]	60	
Environmental conditions	[°C]	5 ≤ 9 ≤ 40	
Sound pressure level LpA (per DIN EN ISO 3744)	[dBA]	74	
Weight	[kg]	approx. 1,400	
Production year		See model plate.	

9.2 Functional description

The system is equipped with a three-phase motor that drives a radial fan. The main switch supplies or cuts off the necessary power to the system, and the system is turned on and off at the control unit. The vacuum created by the fan draws air through the system's intake port. The coarse particles are separated by the upstream filter pre-separator in the filter housing. The permanent filter separates the dust / welding fumes contained in the suctioned air.

The cleaned air flows through the control filter and is returned to the room through the discharge openings. The control filter reliably prevents entry of welding dust into the room if the filter breaks.

With the filter cartridges used, the system is equipped with a vacuum monitor as a control device for overseeing minimum airflow volume. This monitoring device measures the vacuum behind the filter. With increased dust soiling of the filters, the flow resistance increases along with the vacuum behind the filter.

If the value set on the vacuum monitor is reached, the filter cartridges are automatically cleaned with compressed air. If this does not decrease the vacuum, an acoustic signal sounds. This means that the minimum airflow volume has fallen to the limit and that the filter must be cleaned immediately. See the "Maintenance" section.

The cleaning frees the filter elements of dust and reconditions them. The dust collection container underneath the filter catches the dust that is cleared.

For easier disposal of the collected material, the disposal drawer can be pulled out. However, this must be done only when the system is turned off and after it has been cleaned. The bag inserted into the container is for low-emission removal and disposal of the collected hazardous material. The optional dust bag is closed before removal, and removed by hand or with a lifting device, depending on weight. The coarse dirt bag can simply be removed from the cart and emptied. Disposal must be done in compliance with local regulations.



10. Delivery and start-up

10.1 Delivery and transport



Beware of crushing hazard!
Wear safety shoes when transporting the machine!

At delivery, the system is fastened to a pallet. After the protective cover and the bottom fasteners have been removed, the system can be lifted with a crane. Pay attention to the weight of the system and its high centre of gravity during all transport operations.

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



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When transporting the system, make sure the ground can support it and be driven over.

10.2 Start-up



Only persons authorized under “General safety instructions” must turn the system on.



Before setting up the cable connection between the system and the power grid, check to make sure the operating voltage shown on the model plate is the same as that of the grid.



When the system is turned off, the neutral line is not disengaged. The system is therefore intended only for use in TN networks.

The welding fume exhaust system must be placed on a level surface as near as possible to the source of welding fumes. Appropriately line up and adjust the adjustable feet.

10.2.1 Pulse-jet cleaning

The cleaning equipment for the filter elements requires oil- and water-free compressed air (max. 6 bar at the compressed air nozzle) at the attached coupling. The ¼-inch plug nipple can be connected with a DN 7.2 ¼-inch coupling to the compressed air network. For safety, the connection to the compressed air network should not be made until the device is at its set-up area.

Make sure that the red-yellow main power switch is set to position 'O'. Then regulate the pressure of the cleaning device to $> 3 \leq 4$ bar. The cleaning unit with a control valve is located inside the device, behind the inspection opening of the cleaning level. Open it and note the markings on the cleaning unit to regulate the pressure. The manometer on pressure tank indicates the pressure.



Before the system is first used, its operation must be tested.

To start up the welding fume extractor, first connect the device to the household power supply by means of the CEE plug. Then set the red-yellow main switch to position "I". This switch also serves as an emergency shut-off and can be secured with a padlock against unintentional reactivation. The integrated control unit is ready after about 10 sec. Then turn on the fan and immediately off again from the red-green ON/OFF switch. When shutting down, always switch the system off from the OFF switch first, wait for the post-cleaning to complete and then activate the main switch.



The fan's direction of rotation must be checked.

After turning on the system for the first time, check to see that the fan rotor's direction of rotation is correct. If the direction of rotation is wrong, this will be shown in plain text on the display, and the motor cannot be turned on. Then the power supply must be reversed.



The polarity of the power feed must be changed only by an electrical specialist. For this purpose, the CEE plug is equipped with a phase inverter. Using a screwdriver to turn the pole pin built into the insulated part of the plug changes the fan rotor's direction of rotation.

The operating speed of the fan impeller must not be exceeded. While using a frequency converter for operation of the fan, ensure that the values of the air-to-cloth ratio are within the allowable range.

Make sure that the welding fume filter system is turned on first, and then the welding machine. When switching off, follow the same procedure in reverse. This can be ensured by using optional potential-free contact equipment.

During operation, the welding fume filter system's location should not be changed.

10.2.2 General information for the control



Work in the switch box must be performed only by an electrical expert or an appropriately trained person.

The LOGO! Control unit is in the switch box. Turn off the system from the ON/OFF switch before opening the switch box. In this case, the main switch remains on "I/On". Wait for about 5 minutes for the automatic post-cleaning to complete and then open the door onto which the main switch is attached. The control cabinet is attached inside. Open this to make adjustments to the LOGO! Control. In case of a fault, the cause of the fault can be read in plain language on the LOGO! Control's display. The two vertical arrow keys can be used to switch between the text and status displays.



10.2.3 Pre-coating during commissioning or when installing new filter cartridges



Before starting work, the person performing the work must wear a particle filter class P3 respirator mask, protective clothing and gloves.



The precoating process absolutely must be performed before welding fumes are extracted with the system. Do not exhaust any foreign material during the precoating process.

The filtration aid (precoating powder) must be introduced before first use and after installation of new precoatable filter cartridges in the system. It forms a filter assist layer on the surface of the new filter cartridges and prevents dust particles from penetrating the filter cartridge. It increases the welding fume filter system's effectiveness, reduces caking, improves cleaning, and therefore lengthens filter cartridge life.

10.2.4 Precoating process



Work on the controls may only be carried out by an electrical specialist or by a person trained for the purpose.






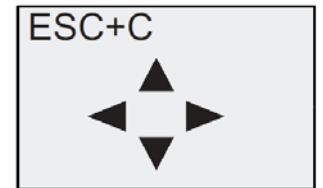
Keep the work area around the system clear during the precoating process!

This work should be done only by a professional! Keep all covers and inspection openings closed!

- Prepare the pre-coating powder.
- Turn the device off from the ON/OFF switch and wait for the automatically starting post-cleaning to complete. The main switch remains switched on (on pos. 'I').
- Open the door onto which the main switch is mounted. The control cabinet is attached inside. Open this to make adjustments to the LOGO! Control.



- Confirm on the LOGO! Control with the "ESC" key.
- Move the cursor with  (1x) and  (1x).
→ The right arrow appears in the display.
- Now confirm by pressing ESC + .
→ The text message "Pre-coating active" appears in the display.
- Close the switch box and the door.
- Ensure that the work area around the system is free!
- Feed the pre-coating powder into the system. For this there are the following options:
 1. Carefully pour the powder in the disposal drawer into the large dust collection container for fine particles, and close and lock the disposal drawer again, then start the suction operation by pressing the green button.
 2. Start the suction operation from the green button and let the powder to be carefully sucked over the fire extinguishing hole.
- The pre-coating process is completed.



10.3 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:

Motor output	Switch-on operations per hour
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
30 KW or more	Electronically controlled follow-up time

10.4 Troubleshooting at start-up

Problem	Possible cause	Possible solution
The motor assembly shuts off before reaching operating RPM.	Wrong or poorly installed switch.	Install the switch correctly or allow for heavy starting.
	Time for star / triangle start-up incorrectly set.	Check the time relay and reset, if necessary.
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 high.	Check suction performance
The desired air mass is not achieved.	The motor's rotation direction is wrong.	Change in direction of rotation when two phases are switched.
The fuse on the supply line triggers.	The motor has been turned on/off at short intervals too often.	Please comply with the "Switch-on operations for motors" chart.

11. Maintenance & troubleshooting

11.1 Maintenance instructions

If the system 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 above 40°C. Before the system is stored, it must be emptied and cleaned.

If necessary, the system can be cleaned with a damp cloth. It must never be cleaned with flowing water.

For maintenance by qualified personnel, the system 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 removal of wearing parts. This includes locally filtered forced-air ventilation in the area in which the system is being maintained, and proper personal protective gear.

When removing the used filter cartridges, emptying the dust collection container or dust collection bag, as well as cleaning the process area, the person performing the work must wear a respirator mask for particle filter class P3, protective clothing and gloves.



ATTENTION! Opening the upper flap is permissible only if an appropriate waiting time has ensured that the impeller wheel inside is not moving — RISK OF INJURY!

At least 2 people are necessary for installing and removing the flap.

During maintenance or repair work, 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.



It is recommended that the operator have maintenance performed once per year. Depending on the mode of operation, the time intervals could be even shorter. During maintenance, the entire system is to be tested by a trained expert for correct operation. A written log is to be kept of the main annual inspection in the included maintenance book. 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 inspection plate installed on the system.



Insufficient cleaning and maintenance increases the risk of fire! Cleaning and maintenance must be performed regularly and carefully at the assigned intervals!

11.2 Inspection and maintenance intervals

Regular maintenance consists of 4 intervals:

1. Daily inspection includes:

➤ ***By the WELDEX's user***

Visual inspection

- for damage to the device or its parts,
- for mechanical damage to the power cable
- empty the dust collection container.

2. Weekly inspection includes:

➤ ***By the WELDEX's user***

Visual inspection

- of the filter pre-separator for adhered residue.
- Removing dust deposits on the system's roof

3. Monthly inspection includes:

➤ ***By expert maintenance personnel***

Functional and visual inspection

- for filter leaks (dust trails or deposits in the area behind the control panel)
- to guarantee operation of the minimum airflow volume monitor (siren). During inspection, the system's air intake must be closed. If the siren sounds, the equipment is in order.

4. The main annual inspection includes:

The last test by ESTA is documented on the system!

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

- Flow volume measurement
- Vacuum measurement
- Current consumption measurement
- Visual check of filters and filter pre-separator
- Seal inspection

After the main annual inspection, the system receives a new test plate to document that maintenance has been performed.



This inspection must be done at least once per year.



The maintenance work must be recorded in writing in the maintenance book provided. This must make clear the equipment inspected and, if necessary, the deficiencies found, along with the name of the inspector and the date of the inspection.

When there is a malfunction, switch the welding fume filter system off immediately and contact the responsible maintenance service!



Maintenance must be performed according to accident prevention regulations. The system 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 could be still pressurised! To empty the compressed air tank, press on "Start cleaning" with the compressed air supply shut off and wait until it is fully completed. Pay attention to the manometer on the compressed air tank!

To empty the compressed air tank, activate manual cleaning with the compressed air supply shut off from the control panel, and wait until it has been completed.



Get the most from ESTA's maintenance service!

A maintenance contract ensures a long life and top-notch operation for your welding fume filter system.

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

11.3 Troubleshooting



If dust escapes or clouds up from the air outlets, if smoke develops, or if the fan runs loud, the system must immediately be turned off from the main switch!

Problem	Possible cause	Possible solution
The housing is too hot Smoke coming from the exhaust gills	Filter fire	Stop the system / start extinguishing, even automatically, as an option
Suction too weak	Main filter dirty	Clean filter
Warning signal for low suction volume persists despite filter cleaning.	Filter pores clogged in main filter	Replace filter
Motor protection triggers	Fan frequently turned on and off	On systems with potential-free contact, motor protection must be reset manually.



Before opening the switch box, make sure to turn the main switch to the “0” position and pull the electrical plug! Work in the switch box must be performed only by an electrical expert or an appropriately trained person.

11.4 Replacement parts

Replacement parts	Item No.	
	FT-150	FT-230
Filter cartridge	30000806 1 Stück	30000805 1 Stück
Disposal bag Filter cartridge	30000575 (= 06000359	1 Satz 10 Stück)
Filter pad (in the side panels)	01000312	2 qm

11.5 Replacing the filter cartridges



When removing the old filter cartridges, the person performing the work must wear a particle filter class P3 respirator mask, protective clothing and gloves.

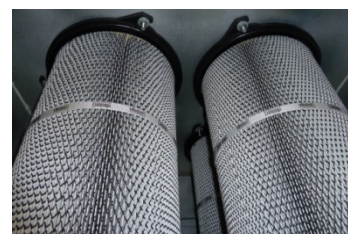
After an extended operation period, the filter cartridges' pores can be clogged by extremely fine dust. Even the cleaning equipment cannot remove this infiltrated dust. The filter cartridges must be replaced with new ones. This work should be done only by a professional!

The filter cartridges must be changed while the machine is shut down. The used filter cartridges collected must be discarded in compliance with local regulations. Always replace the entire filter cartridge set.

- Turn off the device from the ON/OFF switch and wait for the automatically starting post-cleaning to complete.
- Interrupt the compressed air supply to the house connection.
- Start at least 1x cleaning cycle via "Start cleaning" in order to empty the pressure vessel.
- Turn the system off (on pos. '0') at the main switch and wait 5 minutes.
- Use the square socket wrench to open the filter unit cover's sash lock.
- Remove the cover and set it aside.
- Sheathe the front row of filter cartridges with a disposal bag. (ESTA item No. 06000359)
- Use a cable tie at the top to secure the disposal bag on the filter cartridge.
- If an antistatic version of the filter cartridges is used, first also remove the earthing cable from the earthing screw.
- Loosen the fastening nuts on the front row of filter cartridges, but don't screw them completely out.
- Loosen the front row of filter cartridges one after the other by turning them left (counter-clockwise), and carefully remove them.
- Sheathe the back row of filter cartridges with a disposal bag. (ESTA item No. 06000359)



- Use a cable tie at the top to secure the disposal bag on the back row of filter cartridges.
- Loosen the fastening nuts on the back row of filter cartridges, but don't screw them completely out.
- Loosen the back row of filter cartridges one after the other by turning them left (counter-clockwise), and carefully remove them.
- Dispose of the filter cartridges according to local regulations.
- Now clean the accessible interior and drawer area toward the drawer (downward) with a broom or vacuum cleaner.
- Insert new filter cartridge and rubber seal upward.
- Turn the filter cartridge clockwise until the bayonet locks snap in.
- Hand tighten the fastening nut with disk.
- If an antistatic version of the filter cartridges is used, first attach the earthing cable to the earthing screw.
- Insert all filter cartridges one after the other and secure them.
- Insert the filter unit cover into the housing.
- Secure all of the cover's sash locks one after the other.
- Reconnect the compressed air supply.



Tools needed:

- Square socket wrench (for sash lock)
- SW 17 open-end wrench (for fastening nuts)
- Cable tie
- Disposal bag (ESTA item No.: 06000359)

Broom or vacuum cleaner (e.g. ESTA EUROSOG industrial vacuum cleaner)



Cleaning the filter cartridge in a dismantled state by blowing it out or beating it is not permissible.



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

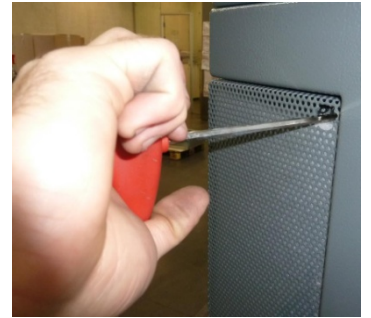
11.6 Changing the filter pads in the outlet grates



Before starting work, the person performing the work must wear a particle filter class P3 respirator mask, protective clothing and gloves.

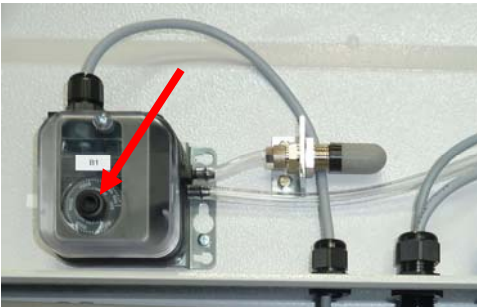
This work should be done only by a professional!

- Turn off the device from the ON/OFF switch and wait for the automatically starting post-cleaning to complete.
- Turn the system off (on pos. '0') at the main switch and wait 5 minutes.
- Remove the cover caps for the outlet grate's fastening screws.
- Loosen and remove the fastening screws of the lateral outlet grate.
- Remove the outlet grate.
- Now the filter material is visible and can be removed and disposed of according to local regulations.
- Cut the new filter material to size, lay it into the outlet grate and fasten it. Make sure no air gaps develop between the filter material and the edge of the grate.
- Re-insert the outlet grate.
- Secure the outlet grate with the fastening screws.
- Set the cover caps back onto the fastening screws.



12. Monitoring the minimum airflow volume

The welding fume filter system can centrally draw volumes of air in work areas and clean them of welding fume particles. In so doing, make sure that the exhausted airflow volume does not drop below the lower limit. The welding fume filter system's monitoring equipment (pressure controller) must be adjusted to this minimum airflow volume. As a standard, apply the values from the following chart:



Nominal air flow standard for pressure controller B1	[Pa]	1.100
--	------	-------



Changing the setting of the monitoring device may only be carried out in consultation with ESTA, by an appropriately trained person. The adjustment must be made at the monitoring equipment of the airflow control.

With changes at the monitoring equipment (pressure switch), the adjustment must be made so that the airflow is in all operating conditions within specified tolerance limits.



$$53 \text{ m}^3/\text{m}^2/\text{h} < \text{minimum airflow volume} / \text{filter surface} < 93 \text{ m}^3/\text{m}^2/\text{h}$$

[m³/h]
[m²]

Take into account also pressure losses due to eg contamination of the filter.



During operation, if the minimum airflow volume drops below that set on the pressure controller, even after cleaning, an optical-acoustic warning signal sounds. The welding fume exhaust device must be switched off, and the suction side must be checked for clogging or for a full dust collection container.

13. Cleaning



If necessary, the system can be cleaned with a damp cloth. It must never be cleaned with flowing water.

13.1 Pulse-jet cleaning the filter

The WELDEX FT has built-in pulse-jet cleaning, a pneumatic method of cleaning the filters. If the vacuum set at the differential pressure switch is reached during operation, filter cleaning takes place.

Additionally, the filters can be cleaned manually with the fan turned off (the main switch must remain on) by starting manual cleaning at the control unit. Each filter will now be cleaned twice by a compressed air blast. The manual cleaning process can be repeated as often as needed.

If the cleaning cycle starts all over again right after cleaning and start-up, check the amount of material in the dust collection equipment. If necessary, empty the container. If the cleaning is still active, you must replace the filter elements.

13.2 Cleaning the filter pre-separator

The filter pre-separator reduces entry of coarse particles into the filter chamber, thus reducing the risk of a filter fire from flying sparks. The separator must be checked regularly for adhered residue and cleaned.



Flammable adhered residue can be ignited by entry of sparks and cause a filter fire!

Depending on the application, weekly inspection of the filter pre-separator's exterior and interior is necessary. If adhered residue is found, it must be swept down into the collection container for coarse dust with an appropriate sweeping device or removed with a suitable industrial vacuum cleaner.

14. Disposal

For maintenance by qualified personnel, the system 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 removal of wearing parts. This includes locally filtered forced-air ventilation in the area in which the system is being maintained, and proper personal protective gear.



When removing the used filter cartridges, emptying the dust collection container or dust collection bag, as well as cleaning the process area, the person performing the work must wear a respirator mask for particle filter class P3, protective clothing and gloves.

14.1 Disposing of collected dust material

The dust collection container must always be appropriately emptied according to local regulations when it reaches the maximum fill level (approx. 2/3 of the container). Emptying intervals must be defined based on local logistics. To prepare for removal, and for removal itself, do as follows:

- Turn off the device from the ON/OFF switch and wait for the automatically starting post-cleaning to complete.
- Turn the system off (on pos. '0') at the main switch and wait 5 minutes.
- Release the disposal drawer using the two latches.
- Use the handles to pull the disposal drawer far enough out that all dust collection containers can be removed (dust collection containers for fine particles and the coarse dust collection containers).
- Clean the surface around the drawer.
- Remove and empty the dust collection container.
- Slide the disposal drawer completely into the system.
- Insert the latches and tense the drawer upward.



Dispose of the collected dust according to local regulations.

14.2 Disposing of the welding fume extraction device

Before disposing of the welding fume extraction device, empty the dust collection container, remove the filter cartridges, and dispose of both of them in compliance with local regulations.



Pack the system in a suitable manner and dispose of it in compliance with local regulations.

15. Optional equipment

15.1 Start-up with potential-free contact

Optionally, the system can be equipped with start-up through an external potential-free contact. This means there can be a coupling between the system and a welding machine connected to it. In this case, the welding machine starts and stops the system. Pins 1 and 2 of the external potential-free contact are connected to the plug (packaged with the device). PIN 3 is reserved for the neutral wire. This is needed only when using special ESTA accessories. Connect the potential equalization to the PIN with the earthing (ground) indicator. (Please follow the enclosed switching documentation!)



All electrical installations necessary to starting up the system, as well as electrical modifications and installation work to the welding machines, must be done only by an electrical specialist. As soon as the main switch is set to “ON”, the contacts to the system’s black socket carry live voltage! When the welding machine is connected, the welding fume filter system’s fan can start running by itself at any time!



During maintenance to the system, the control cable to the control box must be disconnected. The main switch must be set to “0” and secured with a padlock against unintentional start-up! The electrical plug must be pulled.

When maintenance work is being done to the connected welding machines or control units, the control cable to the system must be disconnected. All main switches must be set to “0” and secured, if possible, with a padlock against unintentional start-up! Additionally, the electrical plug must be pulled. If this is not possible, take appropriate measures to ensure that all machines are free of current. This applies to all welding machines connected to the system.

15.2 Control filter

Optionally, a control filter can be used downstream from the main filter. This functions as both a final cleaning and a backup. This is especially an advantage if toxic dusts are being extracted and an upstream filter element is damaged and can no longer filter properly.

Replacement parts	Item No.
Filter cassette Ultra-fine filter	01000457 1 unit

15.3 Alternative filter cartridges

Optionally, filter cartridges not suitable for precoating can be used. After installation (see replacement of filter cartridges) of new not precoatable filter cartridges, no precoating process must be performed.

Replacement parts	Item No.
Filter cartridges (for FT-150)	01000513 1 unit
Filter cartridges (for FT-230)	01000005 1 unit

15.4 Alternative control (ESTA control unit)

15.4.1 ESTA control unit

The system is switched in and out of manual mode by pressing the ON/OFF button.



ON/OFF button

Main switch



15.4.2 Operation through the ESTA control unit

Once the system has been turned on at the main switch, it is ready to operate. The extractor fan is not turned on in this case.

WELDEX
Ready to operate



Turning on suction operation with the ON/OFF button

Display in suction operation.

Extractor fan: ON
DP filter= - __. __ mbar



Turning off suction operation with the ON/OFF button

Post-cleaning in progress
Valve number = 2

After shut-off, filter post-cleaning starts automatically. Then the controls go back into “ready to operate” mode.



MODE button

1. Enter operating menu
2. ESC function for menu entries



UP/DOWN button

1. Navigation to menus
2. Value setting
Pressing and holding launches automatic value setting adjustment.
The value increases if the button is held for another 5 seconds.



ON/OFF button

1. Outside the menu functions:
Extractor fan ON/OFF / Start post-cleaning
2. Within the menu function:
Selection / ENTER function

15.4.3 Menu selection

The ordinary user only comes to the operating menu, in which he can operate further functions or call up other information. The other menu items can be accessed only by ESTA production or service.

Operating menu:

The operating menu is entered using the MODE button.

OPERATING MENU	
1.	Sensor selection
2.	Cleaning test
3.	Drawer
4.	Precoat. Function
5.	Operating hours
6.	Maintenance
7.	Error messages
8.	On/Off button tone
9.	Language selection
10.	Software version
11.	Code entry



ON/OFF buttons: Navigate through the menu



ON/OFF button: Menu item selection



MODE button Cancel menu function

Sensor selection

- change? -> ^
1. DP filter
 2. DP control filter
 3. DP vacuum

Differential pressure sensor selection is displayed.

Cleaning test

Cleaning: OFF
Test start with ON / OFF

Cleaning valve = 1
Test stop with ON / OFF



The cleaning valves are activated with the current pulse time and pause time. Cleaning continues until the test is stopped with the ON/OFF button or until the menu is exited.

Precoat. function (optional)



Precoating inactive
activate? -> ON / OFF

With the precoating function, the upper cleaning threshold is replaced one time by the higher precoating threshold. This is only for preparing new filter cartridges after replacement.



Do you really want to
activate? -> ON / OFF

The precoating function is deactivated only by exceeding the precoating threshold, therefore the new query.

MODE button



1. Enter operating menu
2. ESC function for menu entries

Operating hours

Operating hours
= 2 h

The operating hours tell the fan's run time.



MODE button Cancel menu function

Maintenance

1998 h
until maintenance

The "Maintenance" menu shows the hours set under "Maintenance interval" minus the operating hours.



MODE button Cancel menu function

Error messages

No system
malfunctions

The system monitors the valve exits for short circuits and interruptions. Monitoring does not start until valve activation.

Wrong rotating field
Operation prohibited

Every time the main switch is turned on, the controls check the feed's rotating field. If the rotating field is wrong, this message appears and the system cannot be operated. The rotating field must be changed. To do this, shut the system off again at the main switch and change the rotating field at the feed line.

Valve number: 1
Excess current error

Valve number: 6
Interruption error



The system proceeds with the cleaning operation when these error messages occur.
The message is confirmed with the ON/OFF button.

Other malfunction reports are: wrong direction of rotation, motor malfunction, max. fill level, vacuum too weak, suction performance too weak.

On/Off button tone



Button tone: OFF
Switch with ON/OFF

Button tone: ON
switch with ON/OFF

There is a normal “good” tone and a “bad” tone that indicates unexecutable commands, such as selection and navigation at the end or beginning of menus or value ranges.

Language selection

- | | |
|----|---------|
| | Change? |
| 1. | German |
| 2. | English |
| 3. | Spanish |
| 4. | French |

This is where the menu language is selected.

Software version

Software version
Vx.xx, x. MONTH 20xx

Displays the software version and date.

Code entry

So that parameter settings can be made without a hardware key, access to the service menu “Settings” is possible by entering a code. For this, a 4-digit access code is needed. When necessary, you can get this access code from ESTA customer service. The access code is valid for at least one and no more than two operating hours after it is entered.

Please enter code
v ^ → 1111 → ON/OFF

Code is accepted!
→ MODE or ON/OFF



UP/DOWN buttons: Value setting
Pressing and holding launches the automatic value adjustment, which is accelerated again after 5 sec.



ON/OFF button: Selection of number or menu item



MODE button Cancel menu function

If the access code is entered incorrectly, the following message appears.

Wrong access code!
→ MODE or ON/OFF



ON/OFF button: Menu item selection



MODE button Cancel menu function



ESTA customer service: +49 (0) 7307 804 – 0

Settings

After “Code Entry” has been activated successfully, the following settings can be made.

Do this only with support from ESTA customer service!

The following settings are associated with the error messages after them:

SETTINGS	
1. Type of cleaning	
2. upper threshold	
3. lower threshold	
4. Number of valves	
5. Pulse time	
6. Pause time	
7. Jet alarm threshold	← Jet alarm threshold exceeded
8. Precoat threshold	
9. Post-cleaning threshold	
10. Brushing wait	
11. Brushing duration	
12. Repeat	
13. Start-up	
14. Start-up time, star	
15. Wait → delta	
16. Failsafe malfunction	→ Control filter full Operation prohibited
17. Drawer assistance	
18. Police threshold	
19. Vacuum threshold	→ Suction performance check
20. Motor regulation variable	
21. Remote cont. follow-up	
22. Maintenance interval	
23. Maintenance reset	
24. Parameter reset	
25. System report	



UP/DOWN buttons: Numbers up/down



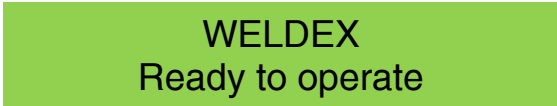
ON/OFF button: Selection of number or menu item



MODE button Cancel menu function

15.4.4 Precoating process on the ESTA control unit

- Prepare the precoating powder
- Turn the system on at the main switch.
- Select the operating menu on the control panel.
- Select the precoating function.
- Use the ON/OFF key to select the function.
- Once reconfirmation is made with the ON/OFF key, the precoating process is activated.
- Press the ON/OFF key again to confirm the activation.
- Feed the precoating powder into the system. For this there are following options:
 3. Carefully pour the powder in the disposal drawer into the large dust collection container for fine particles, and close and lock the disposal drawer again.
 4. Carefully have the powder sucked in through the open fire extinguishing port.
- If the work area around the system is clear, start the system from the control panel.
- Change to the system's basic display.
- Start the system with ON/OFF.
- After about 15 minutes, switch the system off from the ON/OFF on the control panel.
- The precoating process is completed.

A green rectangular box containing the text "WELDEX" in bold uppercase letters, with "Ready to operate" in a smaller font below it.

WELDEX
Ready to operate

15.4.5 Maintenance display on ESTA control unit

Operating menu:

The operating menu is entered using the MODE button.

- | OPERATING MENU | |
|----------------|--------------------|
| 1. | Sensor selection |
| 2. | Cleaning test |
| 3. | Drawer |
| 4. | Precoat. Function |
| 5. | Operating hours |
| 6. | Maintenance |
| 7. | Error messages |
| 8. | On/Off button tone |
| 9. | Language selection |
| 10. | Software version |
| 11. | Code entry |



ON/OFF buttons: Navigate through the menu



ON/OFF button: Menu item selection



MODE button Cancel menu function

Operating hours

Operating hours
= 2 h

The operating hours tell the fan's run time.



MODE button Cancel menu function

Maintenance

1998 h
until maintenance

The “Maintenance” menu shows the hours set under “Maintenance interval” minus the operating hours.



MODE button Cancel menu function

15.4.6 Possible error messages at the ESTA control unit

Motor malfunction

Emergency OFF
Motor malfunction



The motor malfunction entry on the performance unit is activated. The collective malfunction and horn relays are triggered. The network, star and delta contactor relays are shut off. The suction operation cannot be turned back on until the motor malfunction has been resolved. The error must be confirmed with the ON/OFF button.

Collective error



An external contact with clamp 45, 46 leads to an EMERGENCY OFF message. Operation is interrupted and can only be confirmed with the ON/OFF button. If the external error message no longer exists, operation resumes.

Emergency OFF Entry
Collective error

Valve error ,F

XXXX ,F!
XXXX

After a successful cleaning in “jet cleaning” mode, if F! appears on the display, a valve error has been detected during the cleaning. A more detailed description of the error can be called up in the “Error messages” submenu of the “Operating menu”. If a valve error occurs, cleaning will continue despite the error. The cause of the error should be resolved immediately.

MODE button



1. Enter operating menu
2. ESC function for menu entries

Valve number: X
Interruption error

The cause of this error may be a severed cable or a defective valve.

Valve number: X
Excess current error

The cause of this error may be a short circuit in the cable or valve.

Jet alarm threshold exceeded

Jet alarm threshold exceeded



This error message appears if the differential pressure through the filter continues to rise despite cleaning activation. The message must be confirmed with the ON/OFF button. Then cleaning must be started through the operating menu under the “Cleaning test” item.

Control filter full

Control filter full
Operation prohibited



This message appears when the set threshold has been exceeded. The collective malfunction and horn relays are switched on. The message can be confirmed with the ON/OFF button as soon as the threshold has been exceeded.

Check suction performance

Suction performance
check



This message appears when the vacuum threshold has been exceeded. The collective malfunction and horn relays are switched on. This message is automatically reset when vacuum goes below the threshold. The message can be confirmed with the ON/OFF button. After 10 seconds have passed, the pressure is checked again. If the threshold is still exceeded, the error message appears again.

Vacuum exceeded

vacuum
exceeded



This message appears when the vacuum threshold has been exceeded on the separate pressure switch. The system turns off. Then the suction line must be checked. The message must be confirmed with the ON/OFF button.

Please check your Parameter settings

PLEASE CHECK YOUR
PARAMETER SETTINGS

One or more parameters are outside the valid range, and the error prevents suction operation from turning on. In the Settings menu, the factory defaults can be set or completely recreated. This requires the appropriate hardware key or entry of a code.



Cancel with the MODE key.

EepromParmeterFailure

**EEPROM PARAMETER
FAILURE**

The parameters are corrupted, and the error prevents suction operation from turning on. If this error appears, the operator can do the following:



Press the MODE button, and under Item 1 select a another differential pressure sensor.



Use the Up/Down arrow keys to select Item 1.

Use the Up/Down arrow keys to choose another differential pressure sensor.



Confirm the selected differential pressure sensor with the ON/OFF button.



Press the MODE button to leave the menu again.

If the error message still shows up, shut the system off and on again from the main switch. If, after that, the error message still appears, contact ESTA customer service.

Calibration data failure

**CALIBRATION DATA
FAILURE**

The calibration data are corrupted. Only the manufacturer can fix this problem. The controls can no longer be operated.



Cancel with the MODE key.

15.5 Alternative control (Siemens-control)

15.5.1 Siemens control unit

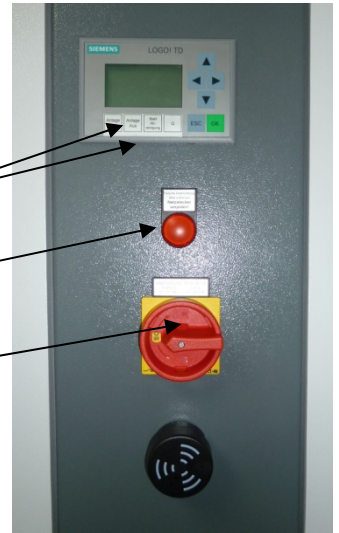
The system is switched into manual mode by pressing the "System ON" button and out of manual mode by pressing the "System OFF" button.



ON/OFF button

Rotating field indicator

Main switch



15.5.2 Operation through the Siemens control unit

Once the system has been turned on at the main switch, it is ready to operate. The fan is not turned on in this case.



Device ready to operate

ESTA
Apparatebau
Gotenstr. 2-6 Senden 89250
Tel.: 49(0) 7307 804 0



Turn on suction operation with the "System ON" button

Display in suction operation:

Hrs. of operation
 2000 Maintenance
 XXXX Remaining h
 XXXX Total



Turn off suction operation with the "System OFF" button

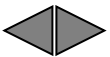


Start cleaning manually



Q key

1. Confirm message



Arrow key

1. Menu navigation



Arrow key

1. Menu navigation
2. Change value



ESC key

1. Enter menu
2. Exit menu



OK key

1. Confirm

Wrong rotating field

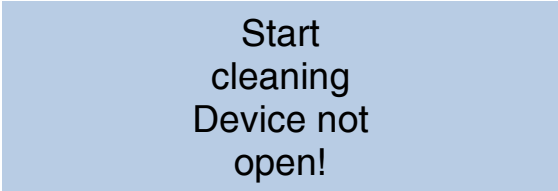
Wrong rotating field
 Operation prohibited!

Every time the main switch is turned on, the controls check the feed's rotating field. If the rotating field is wrong, this message appears, the horn activates, and the system cannot be operated. The rotating field must be changed. To do this, shut the system off again at the main switch and change the rotating field at the feed line.

Time lag

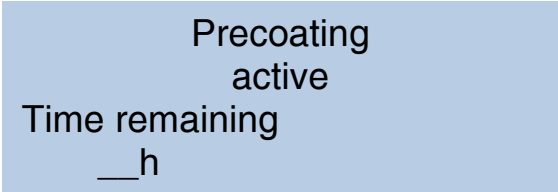
After shut-off, filter post-cleaning starts automatically. Then the device goes back into “ready to operate” mode.

Start cleaning



Once filter cleaning has started, the device must not be opened. After the cleaning cycle is complete, the device can be opened.

Precoating function




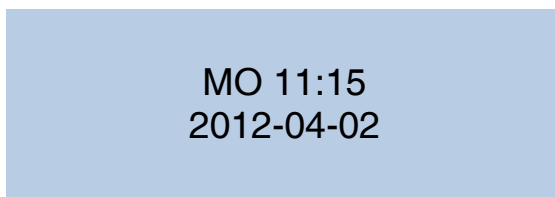
If the precoating function is active, no cleaning can be done during this time (the time remaining).


To activate this function:

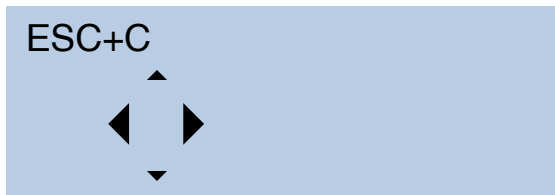
1. The “Ready to operate” display must show on the screen.





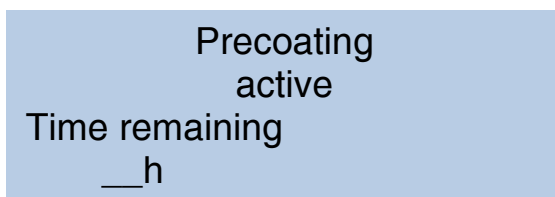
2. Press  once. The date and time appear.



3. Press  once. This display appears:



3. Press  and  at the same time. This display appears:





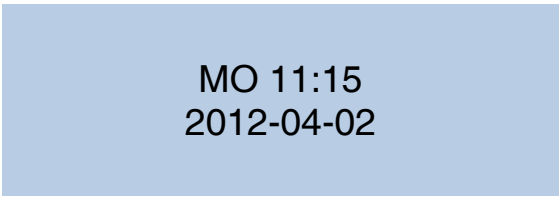
The precoating function is activated, and the precoating process can be performed.

15.5.3 Menu selection

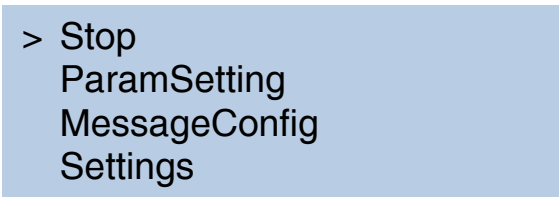
The user has access to the operating menu. Here other functions can be operated, information can be called up, and settings can be made. Other menu items can be accessed only by ESTA production or service.

Operating menu:

 To enter the operating menu, press the  button. The day, clock time and date will appear.



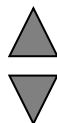
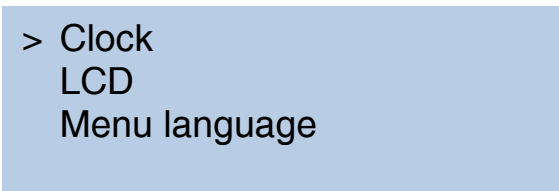
The ESC key takes you to the operating menu.



Navigate the operating menu using the arrow keys.

Settings:

Under Settings, the settings for clock time, display and menu language can be changed.



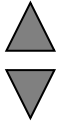
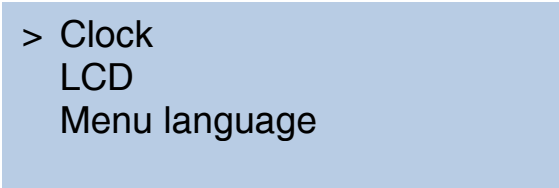
Use the arrow keys to select the setting.



Confirm the selection using the OK key.

Clock:

Here the date and time settings can be changed.



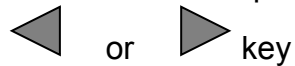
Use the arrow keys to select the setting.



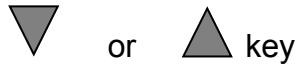
Confirm the selection using the OK key.

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

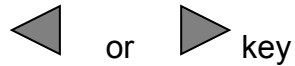
1. Move the cursor to the first position:



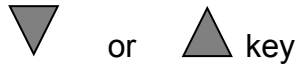
2. Choose the number "1":



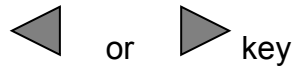
3. Move the cursor to the second position:



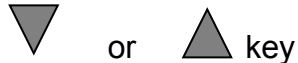
4. Choose the number "2":



5. Move the cursor on the unit:

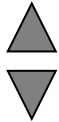
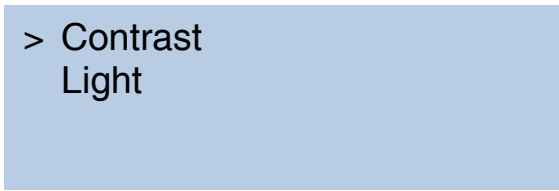


6. Choose the "m" unit for minutes:



LCD:

Here the display settings can be changed.



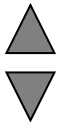
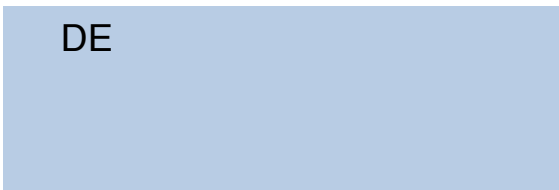
Use the arrow keys to select the setting.



Confirm the selection using the OK key.

Menu language:

This is where to select one of the preset languages for the menu controls.



Use the arrow keys to select the language.



Confirm the selection using the OK key.

DE - German
TR - Turkish
RU - Russian
JP - Japanese
EN - English

IT - Italian
NL - Dutch
ES - Spanish
FR - French
CH - Chinese

15.5.4 Precoating process on the Siemens control unit (optional)

- Prepare the precoating powder
- Turn the system on at the main switch.
- Activate the pre-coating function from the control panel.
- Feed the precoating powder into the system. For this there are following options:
 1. Carefully pour the powder in the disposal drawer into the large dust collection container for fine particles, and close and lock the disposal drawer again.
 2. Carefully have the powder sucked in through the open fire extinguishing port.
- If the work area around the system is clear, start the system from the control panel.
- After about 15 minutes, switch the system off from the control panel.
- The precoating process is completed.

15.5.5 Maintenance display on Siemens control unit

After 2,000 operating hours have passed, the following message appears on the text display:

```
Hrs. of operation  
2000 Maintenance  
XXXX Remaining h  
XXXX Total
```

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:

The device's operating hour indicator. (active when the motor is on).



Reset the maintenance hours counter after maintenance has been completed.

15.5.6 Possible error messages at the Siemens control unit

Motor protection:

! Malfunction !
! Motor protection!
has
triggered

The motor malfunction entry on the performance unit is activated. The collective malfunction and horn relays are triggered. The system goes off and an acoustic signal sounds.



The suction operation cannot be turned back on until the motor malfunction has been resolved by an electrical specialist. The error must be confirmed with the Q key.

Motor malfunction:

! Malfunction !
! Motor!

Confirm with Q key.

The motor malfunction entry on the performance unit is activated. The collective malfunction and horn relays are triggered. The network, star and delta contactor relays are shut off. The suction operation cannot be turned back on until the motor malfunction has been resolved.



The error must be confirmed with the Q key.

Maximum vacuum:

maximum
vacuum
exceeded
Confirm with Q key.

This message appears when the vacuum threshold has been exceeded on the separate pressure switch. An acoustic signal sounds. Check the intake side for clogs.



If the problem has been resolved, dismiss the error message with the Q key.

Filter dirty:

! Malfunction !
! Cleaning !
Filter dirty
Confirm with Q key.

This error message appears if the differential pressure through the filter continues to rise despite cleaning activation. An acoustic signal starts after a preset time. Turn off the system and replace the filter.



Press the Q key to confirm the malfunction report after installing a new filter cartridge.

Control filter dirty:

! Malfunction !
! Control filter !
Operation
prohibited

This message appears when the set threshold has been exceeded. The system switches off and an acoustic signal sounds. The control filter must be changed.



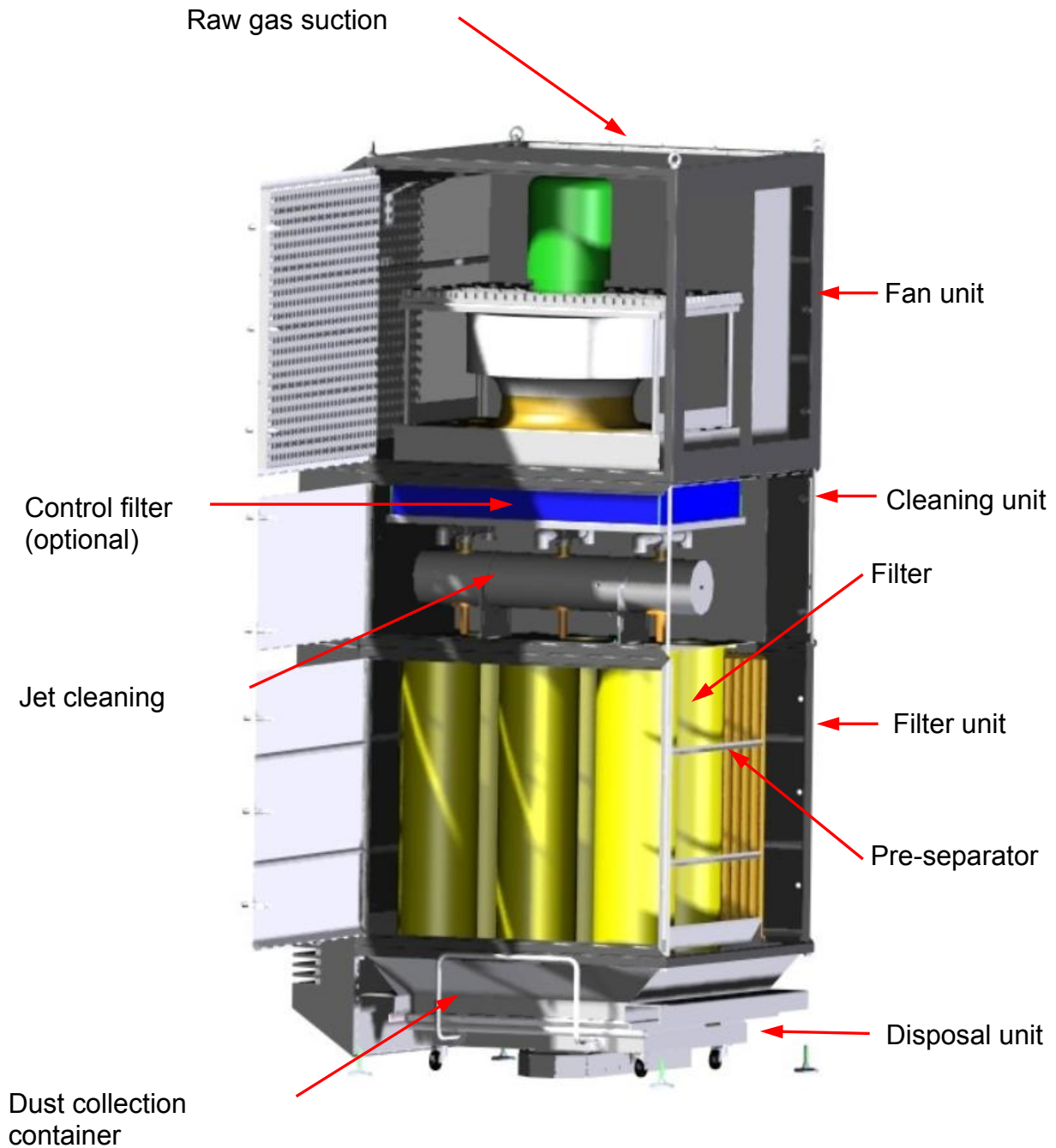
The error must be confirmed with the Q key immediately once below the threshold.

15.6 Check valve at the suction opening

The device can be optionally equipped with an automatic check valve at the suction opening. This closes automatically if there is too little volume flow, thus preventing dust from escaping from the opening during off-line cleaning.

16.Representation

WELDEX FT



17. EC - Declaration of conformity

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

Person in charge of documentation: Ramona Pflum
 Gotenstr. 2 – 6
 89250 Senden

We hereby declare that the design of the machine

Machine: Dust extractor for collection, transport and elimination of dry dusts and welding fumes.
Series: WELDEX
Model: **WELDEX FT-150**
WELDEX FT-230

conforms to the following regulations:

2006/42/EG	EC Machine Directive
2004/108/EG	EC Directive on Electromagnetic Compatibility
97/23/EG	EC Pressure Equipment Directive
2006/95/EG	EC Low Voltage Directive Niederspannungsrichtlinie

Reconciled norms used:

DIN EN ISO 12100:2011-03	Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN ISO 13857:2008-06	Safety of machinery, devices and systems; safety distances to prevent hazard zones from being reached
DIN EN 349:2008-09	Safety of machinery; minimum distances for preventing body parts from being crushed
DIN EN 60335-1:2012-10	Household and similar electrical appliances - Safety - General requirements
DIN EN 60335-2-69:2012-08	Household and similar electrical appliances - Safety - Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use
DIN EN 61000-6-1:2007-10	EMC - Generic standards - Immunity for residential, commercial and light-industrial environments
DIN EN 61000-6-2:2006-03	EMC - Generic standards - Immunity for industrial environments
DIN EN 61000-6-3:2011-09	EMC - Generic standards - Emission standard for residential, commercial and light-industrial environments
DIN EN 61000-6-4:2011-09	EMC - Generic standards - Emission standard for industrial environments
DIN EN 61000-3-11:2001-04	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
DIN EN 61000-3-12:2012-06	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:

VDI 3677 Filtering separators

Senden, November 25, 2014



Dr. Peter Kulitz
 CEO

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We reserve the right to make technical changes

**DEDUSTING
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CLEANING**

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