MILESTONE
HELPING CHEMISTS

ETHOS X

Advanced Microwave Extraction System

Operator Manual

MA205

MILESTONE
HELPING CHEMISTS

Thank you for selecting our microwave system.
We are sure that you will be completely satisfied with the performance of this new unit entering your laboratory. We invite you to read carefully this user manual and to keep it in reach for convenient and fast consulting. The person who will be using this unit should have received an appropriate training from a Milestone trained technician. For any possible clarification or any request for assistance, please contact either our Representative in your country:

or Milestone at the following address:

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MILESTONE ETHOS X – GETTING STARTED

Setting up your Milestone ETHOS X is simple. Just follow the following instructions. Once completed the setup, take some time to explore the features of your system. The user manual provides tips and instructions to help you learn the basics of your ETHOS X.

ETHICS	The instruments commercialized by Milestone are intended for the use in strict compliance with all applicable laws and in a manner that promotes public safety and/or linked to approved scientific or medical research purposes.Milestone does not endorse, encourage or promote the use of its instruments for any illegal activities.No liability for any consequences, direct or indirect, is accepted if the ETHOS X is used in any way in which the instrument is not intended to be used.

SETUP YOUR ETHOS X

Step	DESCRIPTION	PICTURE
1	Connect the power cord to the back side of the unit	

2	Plug the terminal cable in the "TERMINAL" port on the back side of the unit and then the other side in the "DEVICE" port of the terminal	 
3	Connect the exhaust tube to the unit and place the opposite side into the fume-hood (or any connection to it)	
4	Place the USB pen drive into the terminal	
5	Switch "ON" the unit	

START USING YOUR ETHOS X

Please, follow the guideline reported in the user manual of your own configuration.

1 SAFETY RULES

1.1 General Information

- Please read carefully this operator manual before starting the system and follow its prescriptions with the utmost care.
- In case the system has been delivered with additional accessories (i.e. the terminal is an additional accessory), also read carefully the instruction manuals of such accessories.
- This Operator Manual is part of the delivery, hence must be always kept together with the instrument on its working place.
- It is imperative that every person operating this system has read and fully understood this manual.
- The non-observance of the instructions contained herein or improper use may involve damages/injuries that are not covered by product liability!
- The national ruling and international safety norms in working environment shall in any case be observed under user's responsibility.
- It is also user's responsibility to keep constantly updated all safety norms ruling in the country or operation.

Information = indicates important information/recommendations for the user.

Attention = means that the non-observance of the warning may cause damages to unit or properties.

Warning means that the non-observance of the warning may cause injuries, even severe, to people.

1.2 Safety rules for Start-up

- The first start-up of the system must exclusively be carried out by authorized and trained service engineers appointed by Milestone.

1.3 Safety in operations

- The unit must exclusively be operated for its intended use, otherwise the protection can be compromised.
- The unit must only be operated within the power limits set forth by the technical specifications.
- The unit must be operated exclusively by specially trained people.
- All electrical parts must always be protected from wet and humidity.
- The unit must be kept clean.
- Disconnection from the power cord.

- Basic rules of chemistry will always apply. The basic rules of chemistry are valid also for handling chemicals in this unit. Working with chemicals, always take all those safety measures that are usually required (i.e. lab coat, protective gloves, protective glasses mask, exhausts hood, etc.)

1.4 Safety in service operations

- In case of failure or damage of the unit, the intervention of an authorized and trained service operator must be requested. The unit shall not be used until successful repair is completed. The unit includes components in which lethal high voltage of 4kV can be reached. Improper repairs by unauthorized people may cause microwave leakage and consequent injuries to personnel.
- Do not operate the unit, if a minimum doubt exists about its trouble-free operation and good functioning.
- Service can only be carried out by authorized and trained service engineers of the company Milestone. Works on the electrical and electronic components of the system must be carried out exclusively by specialized electrical/electronic engineers.
- Before every repair – service – installation, always make sure that the unit is disconnected from the power supply line and cannot involuntarily be switched on.

1.5 No manipulation of the unit allowed

- Constructive changes/modifications of the unit and its accessories are forbidden, in particular any openings in the sample chamber must be carried out, because microwaves can be released there.

1.6 Parts replacement

- In order to guarantee the good functioning of the unit and user's safety, all replacement parts must be exclusively original supplied by Milestone. Original spare parts are granted by high quality control on the material and during the production.

1.7 Customer support

- The Warranty and the Service Report are included in the documentation delivered together with the unit.
- After the installation, you are kindly requested to send us the filled in warranty card via fax or e-mail (form on the website).
- In case of required unit reparation, you should send us the filled in Service Report including precise description of the errors.
- For any request or order, please contact your local area representative or directly Milestone.

1.8 Other hints

- The microwave unit can be provided with several sensors and built-in devices, which are in part described in this user manual. This does not mean that all the options are installed in your unit, but the supply depends on your order.
- The unit must be connected to a socket with protective grounding.
- Be careful that voltage and frequency of the power supply match with the values indicated on the shield on the unit back.
- The system must be operated with the original power supply cable supplied together with the unit.
- The power supply cable must be in perfect conditions and must not show any damage.
- The unit must be operated only in upright position.
- Ventilation ports in the housing - for cooling the inside components – must not be covered or obstructed by any object.
- The unit must not be installed or stored in an explosive, corrosive or conductive atmosphere (dust, vapor, gases).
- During program runs, the unit must be carefully attended, to enable timely recognition of operator's improper use or error. The unit must under no circumstances (i.e. at night) run unattended.
- Metal parts in sample chamber

  No metal parts must be introduced in the sample chamber of the microwave unit (except for components incorporated in the original construction). The resulting arc effect can cause damages.
- Flanges in the sample chamber

  Unused flanges must be sealed with the provided screw or plug caps. In any case fingers or objects in operations should not be held during operations. Flanges should not be modified.
- The microwave unit is exclusively intended for heating materials destined to chemical and analytical laboratory applications.
- Magnetic stirrer/People with peacemakers

  If the unit is provided with the magnetic stirrer, then there is a strong magnetic field inside the sample chamber. Peacemaker wearers are at risk when in the immediate vicinity of the device.
- PC control device

  If the microwave unit is controlled from a terminal or a PC, no changes can be operated on the control unit. The installation of electronic cards or of additional software can compromise the function of microwave unit control software.

1.9 Instructions for safety operations

- All samples and chemicals can be used only in the tested and released accessories by MILESTONE.
- The use of flammable liquids and substances developing toxic and harmful gases depends on the user's requirement, who is responsible for his own care.
- The user is responsible for the correct and safe use of chemicals.
- When following Milestone application notes, all parameters, settings and equipment shall be noted and followed. The proposed application notes by Milestone are only to be considered as general guidelines and must be adapted to each single sample or used material.
- The pursuing of different application must be discussed with Milestone Application Specialist.

- Application requirements must be met.
- If damages occur to the microwave unit, in particular to the door, door frame, welded joints and ventilation openings, the microwave unit may no longer correctly work. The microwave unit must be shipped back to Milestone for a safety check.

1.9.1 Handling of unknown samples

When working with unknown samples, remember that the samples should react 10-15 minutes after reagent addition and before the pressure-tight closure of the vessel! After the reaction, samples should be stirred or homogenized a few minutes in an ultrasonic bath.

It is important to ensure that no explosive substance and compounds generate together with the reagents. The abreaction should in some case reduce the damages. Milestone does not guarantee and do not take any responsibility, if the user create explosive solvents and mixtures! Therefore, mixtures made of solvents (alcohol, ketone, hydrocarbon substance etc.) with concentrated acids such as HNO3, HClO4, H2SO4, etc. and strong oxidizing agents should be avoided.

1.9.2 Vessels number, weight, solvent quantity, program run, material

When approved applications are used, all parameters stated in the selected application must be followed, in order to achieve the same reaction conditions. If this is not possible, the parameters transgression must be avoided by means of a suitable control, i.e. pressure control. In practice you should try to generate the most similar conditions as possible in all samples. This means the same solvent quantity and mixture in a considered step. This is necessary, because otherwise the single vessel will reach different conditions by different microwave absorption. For example, consider fruit juice and dried fruit. In a single step, you should introduce the same organic weight of dried fruit and fruit juice and then dilute the sample with water, if you want to achieve the same volume (microwave absorption). Never use more vessels type in the heating step.

1.9.3 Samples type – spontaneous reactions

Low microwave absorbing samples can start burning by a partial overheating (i.e. oil, finely ground plastic, solvents). The tendency to strong exothermic spontaneous reaction is considerably higher in case of major sample quantity.

Organic substances always react with oxidizing chemicals (e.g. acids, etc.). In addition are originated CO_2 and H_2O and, depending on the elements, the corresponding oxidation products as well. Should digestions or reactions be performed without oxidizing chemicals, occurs a graphite formation by hydrolysis. Large quantities of carbon (graphite) enter in the microwave to flashovers between the graphite particles („light arcs"), resulting in extremely hot spots (up to over 1000°C). This in turns results in burns even at all PTFE parts and can cause serious damages to the unit. In addition there is very high pressure due to the extreme temperatures and gas expansion. Therefore always carry out digestions, according to Milestone Application examples. In case of unknown samples, it is necessary to analyze very limited sample weighing to develop a method application.

1.9.4 Chemical reactions

The chemical principles find applications also in the microwave field. The reaction conditions i.e. for digestion of different samples are to be considered as guidelines in MILESTONE applications. The user may be obliged to adapt the proposed guidelines in MILESTONE applications to his samples.

1.9.4.1 Basic principles for digestion, extraction or synthesis with the unit

- Check the vessels before and after a program run (or automatically by Q/P sensor).

- In case of method development, start firstly with little sample quantity.
- In case of digestion with unknown samples, start with basic program for reactive samples.
- Consider physical and chemical features of samples and chemicals. For example ignition temperature of a solvent (i.e. diethyl ether 170°C), or undesired dangerous by-products; when performing synthesis, clarify if the inert gas is necessary, in order to avoid accident reactions with oxygen, etc.

1.9.5 High microwave power for long time

In case of high power and/or long reaction last (> 45 minutes) and low microwave absorption (i.e. non polar solvents/substances), a heating of the plastic components, walls etc. occur, with the risk of burns or melts of several parts. This concerns particularly quartz or plastic vessels with low MW absorption features. In this or similar cases, you must absolutely work with weflon absorbers. Suitable control should be used (i.e. IR control of the shield external temperature).

1.9.6 High boiling point solvents

For high boiling point solvents, which do not build any pressure up to the application temperature (see solvents prospectus, physical-technical data), standard glass vessels must be absolutely used (no pressure vessel). This is particularly true for solvents not showing any high dipole moment; in this case too high microwave power is irradiated without weflon use. In case of pressure systems, this leads to heating and damages. In case of solvent, a dielectricity loss occurs at high temperature, therefore this can be compensated with weflon accessories.

1.9.7 Care of accessories

Accessories such as rotors, reactors etc. should be regularly checked and cleaned. Never use organic solvents for plastic parts cleaning (except for PTFE) (i.e. acetone attacks the PSU). Water residues must be thoroughly dried, because they heat in the microwave with the risk of damages. This is particularly true for water and acid residues located between the PTFE liner and the protection shield. For any request, contact Milestone or the authorized distributor in your country.

1.9.8 Control of accessories

Accessories considered important for safety must be tested before every run, in particular the protection shields. Strong yellow discolorations on the HTC protection shield mean increased diffusions during digestion, which considerably weaken the HTC protection shield. When the inner part of the shield is rough or even part of the HTC protection cover keeps stuck on the vessel PTFE surface, the protection shield must be urgently replaced. Milestone representative can help you in this evaluation.

1.10 Maintenance and care

- Please, be sure that the sample chamber is always clean. Contamination in the door area can obstruct the correct door sealing, letting out microwave irradiation.
- Before each run, check and remove eventual contamination in the sample chamber, in particular the area near the door and its wall.
- Sediments in sample chamber such as contamination and solvent residues etc. can cause burns and damages.
- Before starting a working step, test the protection cover for the camera in the inner chamber. In case it is dirty, clean it with a soft cloth wetted only with water.
- Contamination on the bottom can stop the rotor movement.
- Normally a gentle cleaning with a soft cloth or paper towel, dried or moistened with water, should be carried out.

- To remove strong contamination, you can use mild detergents.
- Do not use any abrasive cleaner on the sample chamber walls and on the door, because they could damage the PTFE coating.
- In case of extreme vent or vessel rupture after a spontaneous reaction, absolutely perform the following control: behind the barred opening of the sample chamber light, there is a disk. Check if the disk is not loose or splintered, by gently pressing with a blunt pointed object through the grids on the disk. If the disk is damaged, have absolutely it repaired.
- Contamination on the external side of the housing can be removed with a damp cloth and mild detergents.
- The unit life, in particular of the electrical and electronic parts, is mainly depending on the environmental conditions. The unit should not be installed under a hood, but in a well-ventilated room, free from acid vapors and corrosive atmosphere. Although the housing is stainless steel made and the critical parts are coated, components like plugs, electronic boards, etc. can be damaged by corrosion. These parts cannot be manufactured in more resistant materials. Thus the most common problems are due to corrosion and chemical attack to these components.
- All components in direct contact with samples, sample vessels, etc. must be handled with the utmost care, i.e. the parts must be free from chemical residues/traces and dried before use. This principle is of course well-unknown in the trace analysis, but not always properly taken into account.
- Dust in the laboratory atmosphere is very frequently responsible for deposits in the ventilation area (air inlet and exhaust, etc.) and must be removed, to prevent overheating and/or damages.
- Check that the exhaust tube is regularly introduced into its opening. If the pipe is disconnected, reintroduce it until it is firmly fixed.
- The unit microwave leakage is tested before the delivery. This leakage can be no longer acceptable, due to several factors and influences. The company MILESTONE suggests a yearly check with calibrated measuring unit. According to DIN EN 60335-2-25, VDE 0700-25:2007-04, during the life cycle (ca. 10 years) the microwave leakage in microwaves device at a distance of 5 cm from the unit should reach the allowable leakage rate no more than 5 mW/cm² (Milliwatt per square centimeter) with load (water).

2 UNIT DESCRIPTION

2.1 General overview

The ETHOS X is a microwave system destined exclusively to laboratory applications.

By contactless microwave irradiation it is possible to heat several kinds of material. The heating is different for all substances and depends on their dipole.

The irradiation of microwave occurs from the ceiling of the sample chamber.

The terminal is used to control and represent the parameters during the reaction. All parameters can be simultaneously pursued and actively optimized during the run.

The unit is equipped with a built-in suction and cooling fan with tube connection to an external exhaust.

2.2 Technical description

The microwaves irradiation is performed through two industrial magnetrons, connected to a power supply with 4 kV high tension and filament current. Both a pulsed and not pulsed (continued) microwaves irradiation are possible.

The high microwave power permits fast heating rates and in addition offers a homogeneous microwaves impact and temperature distribution.

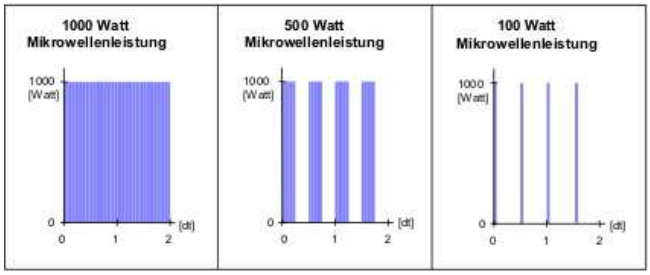
The microwaves are reflected in the sample chamber through a turntable field distributor. Thanks to it, a regular distributed microwaves field develops.

The microwave power can be set in steps of 1 Watt in the terminal.

The unit is designed, so that the power density near the irradiating microwave surrounding area is inferior to 1 mW/cm² in a distance of 50 mm.

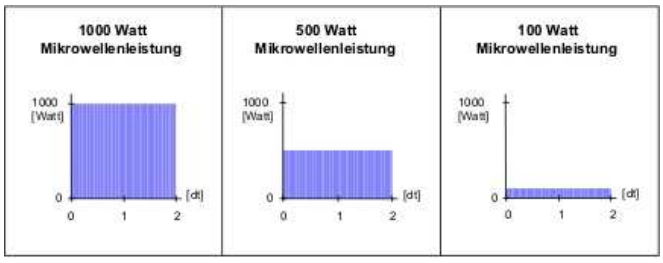
Pulsed microwave irradiation

Through changes of the magnetron on/off working phases, the power is regulated (Pulse Wide Modulation PWM). The power results in the moment of single pulse signals



Not pulsed microwave irradiation

Controlled microwave irradiation version without on/off phase. The power supply controls simultaneously both magnetrons. This technique offers particular advantages in photosynthesis applications for continuous stimulation of microwave plasma rays.



2.2.1 Technical data

Power supply	220-240 V; 50 Hz 220-240 V; 60 Hz
Fuses	2 x 16A reversible 500 mA, 250V Heating trafo
Built-in fuses	Cutout 16A with circuit breaker C or D
Power consumption at max. heating power	3500 VA
Microwave power	2 x 950 W
Microwave in heating room	Frequency: 2,45 GHz Wave length: 12,25 cm
Dimensions without terminal	Height: 665 mm Width: 540 mm Depth: 680 mm
Weight without terminal	ca. 85 kg
Required space with terminal	Width: 1,0 m Depth: 0,75 m
Temperature range	5 – 40°C
Max. altitude above sea	2000 m
Volume	75dB (A)

2.2.2 Sample chamber

Dimensions	Height: 400 mm Width: 430 mm Depth: 410 mm
Walls	Stainless steel, PTFE-plasma coated
Door	Left opening door
Lighting	6x LED
Control	Camera

2.2.3 Exhaust

The acid resistant exhaust unit in the upper housing of microwave unit sucks aggressive gases from the sample chamber and cools down the vessel shield during the microwave heating.

Suction capacity	180 m^3/h / or variable adjustable at 24 V suction
Operation temperature	Continuous use 60°C / up to max. 120 °C short time

Deviation of suction	Flexible tube to the exhaust port on the unit side

2.3 Delivery

2.3.1 Unit unpacking

The unit weighs ca. 85 kg, therefore two people, who should stay on the unit's left and right side, are required to lift the box.

1. Carefully cut the protective belts and open the box from above.
2. Remove the packed parts.
3. Lift the box up and away.
4. Remove any eventual additional packaging.
5. Slightly tilt the unit forward, until you can reach the instrument's back side.
6. Take the microwave unit with one hand on the front handle and with the other one on the unit back bottom. Lift it in twos from the box.

2.3.2 Scope of supply

At least the following parts are included in the supply together with the microwave unit:

- Flexible exhaust tube (Ø65 mm, Spiral, PVC), angle and two adapters included
- Power cord (16A)
- Terminal 660 with connection cable
- User manual

Check within 24 hours that the delivery is complete and, in case some of the items previously listed are missing, contact Milestone or Milestone authorized distributor in your country.

Check eventual transport damages of the unit. Damaged unit must not be operated. Any damage should be reported immediately in writing.

Keep the packing safely. In case of unit return to the factory for repair purpose, use only the original packing and secure it with protective belts. Inadequately packed unit could be considerably damaged during transport.

2.3.3 Installation

- The device must be operated only in an upright position on its foot
- The operation must be carried out only under the following ambient conditions:

  - ✓ Indoor
  - ✓ Max. altitude 2000 mt.
  - ✓ Temperature range 5°C-40°C
  - ✓ Relative humidity: 25 % up to 80 %

- Voltage fluctuation in the main power supply should be inferior to ±10% of the nominal value.
- The unit must not be installed nearby any source of heat (i.e. fan coils, heaters) or other equipment with heat outlet.
- On the device housing there are several ventilation openings serving for internal components cooling. The ventilation openings must not be obstructed. Keep at least 30 cm of clearance from other objects or surfaces.
- The back side of the ETHOS X must be at least 10 cm away from a wall, because there are connected cables there. Please be careful that there is free air access through the ventilation openings on the unit back.

The unit must not be placed in a fume-hood to avoid any risk of inner electronic parts corrosion.

The air sucked from the sample chamber of the microwave unit must be driven to a well-working hood or ventilation line.

- The microwave unit must be installed in a well-ventilated and acid vapors-free room, where the atmosphere must not be highly corrosive. In fact aggressive vapors could penetrate by the ventilation openings located on the housing, considerably damaging the circuit boards, connectors, plugs etc.
- Any damage to the electric and electronic parts caused by corrosive influences are not covered by any warranty. Thus follow the previous indications concerning the installation.

2.4 Exhaust

Connect the back outlet opening to the flexible tube in a hood or ventilation line.

The exhaust tube should be connected so that no acid condensation can accumulate near to the unit. See the picture on the right.

Installation of the angular item

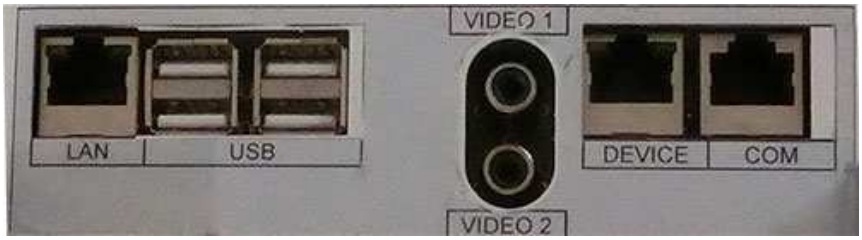
2.5 Connections

Microwave back side

Microwave back side connections

CONNECTION	
MAIN	**Power Supply**
COM	**Control connection 24 V** for external devices operation via relay box
Fuse 0.5AT	**Fuse** (500 mA, carry) heating trafo 250V
16A	2 pieces reversible **main fuses**
TERMINAL	Port for the connection with the control terminal
VIDEO 1	Output video signal for camera
VIDEO 2	Output video signal for camera (optional)

2.5.1 Connections to TERMINAL 660



Connections terminal 660 – back side -

CONNECTION	
LAN	Port for the connection to a Local Area Network. Interface cable RJ45.
USB	4 ports **USB connections**
VIDEO 1	Input **video signal** of camera
VIDEO 2	Input **video signal** of camera (Optional)

DEVICE	Port for the connection with the microwave unit and for the power supply of the terminal. Interface cable RJ45.
COM	Interface for external devices

Terminal 660 connections – Front side

CONNECTION	
USB	USB- Interface (for USB1.1 or USB2.0) for printers and media storage device.

How to connect the terminal to the unit

1. Connect the microwave unit to the power supply via the power cable. Check that the main switcher on the front side is set to OFF position.

Never connect the terminal when the microwave unit is switched on, otherwise this could damage the unit interface board.

2. Introduce the interface cable RJ45 in the DEVICE connection on the terminal front side.
3. Introduce the other end of the cable in the terminal connection on the microwave unit back side.

TERMINAL	MICROWAVE
Device connection	Terminal connection

4. By switching on the MW device (main switcher set to I position), the lighting in sample chamber starts as well.

2.5.2 Connections to TERMINAL 480

Assembly parts:

#SG0010A	Silicon disc Ø40/6x4mm
#SR0069	Cylinder-hexagonal screw M6x16
#SR0166	External teeth lock washer M6

Terminal 480 connections – back side -

The terminal T480 is connected to the right side of the microwave unit. The silicon disc is positioned between the terminal and the unit.

CONNECTION	
USB	**Connection for service**
DEVICE	**RJ45 interface for the unit**. Interface cable RJ 45. Connection for communication between microwave unit - power supply of the terminal.

How to connect the terminal to the unit

1. Connect the microwave unit to the power supply via the power cable. Check that the main switcher on the front side is set to OFF position.

Never connect the terminal when the microwave unit is switched on, otherwise this could damage the unit interface board.

2. Introduce the interface cable RJ45 in the DEVICE connection on the terminal front side.
3. Introduce the other end of the cable in the terminal connection on the microwave unit back side.

TERMINAL	MICROWAVE
Device connection	Terminal connection

4. By switching on the MW device (main switcher set to I position), the lighting in sample chamber starts as well.

2.5.3 Upper flange

Upper flange

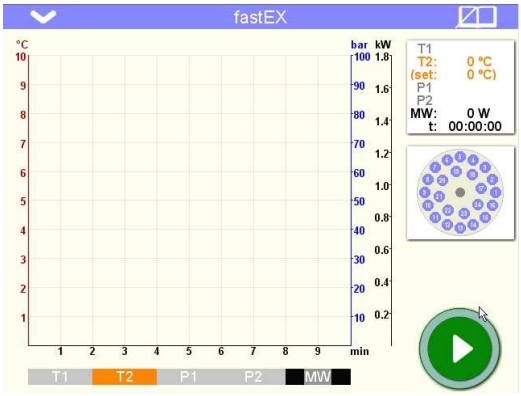
The upper flange of the sample chamber is secured by a screw locking and can be removed i.e. using the Venturi system.

2.6 Microwave door

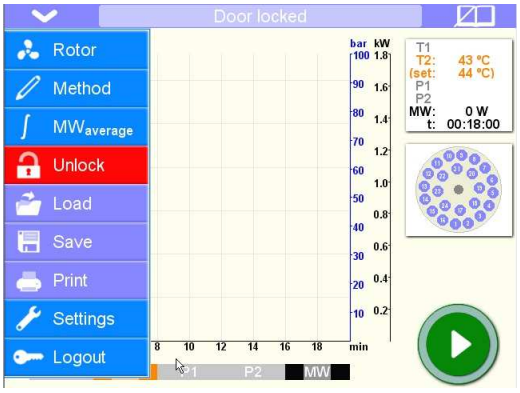
The microwave door is mechanically locked in the OFF status or when the temperature of sensor T1 is higher than 80°C..

Never try to force the microwave door closure or opening, when the locking device is closed, otherwise you could damage the locking device or the latch hook.

1 Connect the microwave unit to the power supply by the power cord.
2 Set the main switcher on the front side to **I** (ON). The microwave unit and the terminal should now be switched on.
3 If the temperature sensor (T1) is connected to the unit and the temperature is lower than 80°C, the door is UNLOCKED.
If there is no temperature sensor connected to the unit or the temperature of T1 is higher than 80°C, the door is LOCKED (a message appears on the top of the screen).



4 To unlock the door, open the scroll menu on the upper left of the screen and press the "Unlock" button (see the picture below).



5 Then open the microwave door.

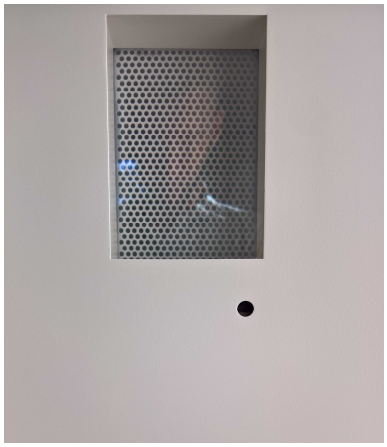
Microwave opening

2.6.1 Emergency release

Carefully open the microwave door, in particular when you do not know the rotor conditions. High temperatures and high pressure could be still present inside the rotor.

To open the door after a black-out, there is a hole with blind stopper in the housing on the right unit side.

For emergency release, remove firstly the blind stopper.



Introduce the touch-pen ca. 3,5 cm in the hole and press it down. Thereby a lever is activated inside the unit and the door is unlocked. Keep the touch-pen pressed and at the same time open the microwave door.

2.7 Camera (Only for Terminal 660)

Depending on the configuration, the camera for sample monitoring is installed in the ETHOS X. The pictures are represented in the terminal (see also the Terminal user manual). In addition it is possible to connect an external video camera as well. The camera picture is displayed on the terminal.

3 SENSORS

3.1 Temperature sensors

Ethos X is designed to work with different temperature sensor according to the used configuration. The sensor available are divided in two different classes, internal temperature probe (generally displayed in the software with “T1”) and contactless temperature probe (generally displayed in the software with “T2”). Ethos X is able to work with the following temperature sensor:

- Internal temperature control **T1**: Fiber Optic (**ATC**)
- Contactless temperature control **T2**(**easyTEMP**): Infrared sensor (**IRT0300**)
- Contactless temperature control **T2** Infrared sensor (**IRT0500**)

Ethos X could be equipped with one or both the sensors depending on the configuration, below a brief summary:

Ethos X configuration	**Temperature sensor**
Generic	T1+T2(optional) or T2 (easyTEMP)
Environmental Applications (fastEX24)	T2
Total Fat Determination	T1+T2(optional) or T2(easyTEMP)
Natural Products (Fragrances and Flavors)	T2

3.1.1 Internal temperature control (T1) overview

The ATC temperature control enables the automatic display and monitoring of the internal temperature (T1) of a reference vessel during a program run. The desired max. temperature limit value is set in the terminal. Thereby the limit values of each used vessel system should be respected. For each rotor you can consider a reference vessel, which is equipped with a thermowell where the sensor is introduced from outside.

- Temperature control helps in:
- Tracking and recording the kinetic of reactions
- Acceleration and optimization of extraction methods development
- Monitoring of reactions in routine
- Preventing vessel damages.

The temperature sensor must be fixed in the bore of vessels. Should the sensor slips outside the reference vessel during microwave operations, the microwave program must be absolutely interrupted. If the sensor tip is no more dipped into the thermowell tip, a correct temperature measuring of the internal temperature cannot be assured anymore. After the program end, you have to wait for one hour to open the microwave door, remove the rotor and open the vessels.

The measured temperature refers to the reference vessel. It can be assumed that the same conditions can be applied to the other vessels only if all the extraction mixtures have similar composition (sample type, grain size, weight, solvent quantity and mixture, vessel, etc.).

The ATC-Sensor is used for detecting the liquid temperature in a vessel. For this reason, the sensor tip must be introduced in the solution and cannot be free in the gas phase (temperature distortion).

The limit values of the ATC sensor must be absolutely observed.

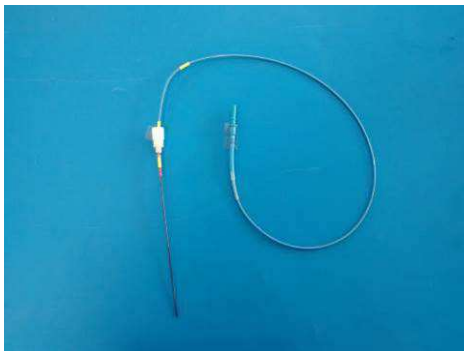
3.1.1.1 How to use the T1 Temperature sensor

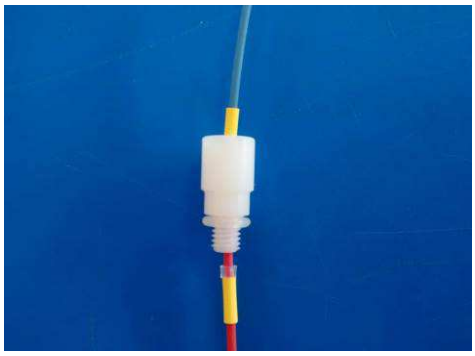
The ATC-FO sensor is used for temperature control for polar and non-polar solvents and therefore is suitable for extraction applications.

The ATC-FO sensor is composed by the electronic board and the fiber optic.

The fiber optic used for extraction are the following:

FO30026 (for Total fat configuration or SR12-Generic extraction)





FO30026

Threaded plug

FO30008 (for SK12-Generic extraction)

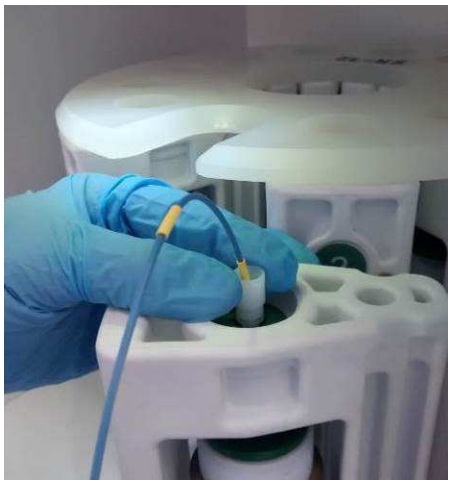
FO30008

Direct plug

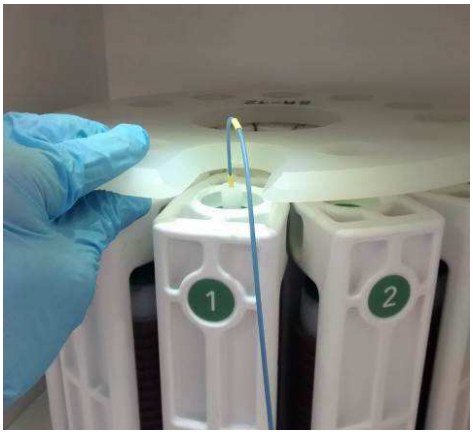
Introduce the fiber optic into the reference vessel, simply sliding-in the sensor through the hole of the reference segment.

This is aligned with the thermowell, therefore it allows the temperature sensor to be fully introduced in the vessel. Screw the plug to the reference segment (FO30026) or directly insert the plug into the reference segment (FO30008).

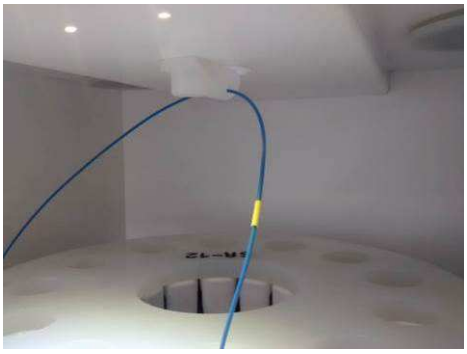
Since there is not enough space in the sample chamber of microwave unit, the sensor must be introduced in the vessel outside the sample chamber.

Introduce the segment into the rotor; fix the rotor plate to each individual polypropylene segment using the connectors located on the rotor plate. Lift up one side of the top plate to facilitate the introduction of the reference segment; then relocate back the top plate in its position.



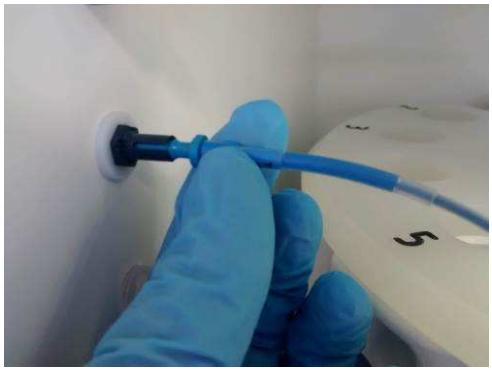
To prevent any ATC-FO damaging, caused by some accidental contact between rotor and fiber optic probe, an ATC-FO holder needs to be installed. Introduce the ATC-FO into the hole of the sensor holder and plug-in the sensor, as shown in the picture.



Warning

Before plugging-in the sensor introduce the reference vessel into the rotor.

Plug-in the temperature sensor, touching only the plastic plug.

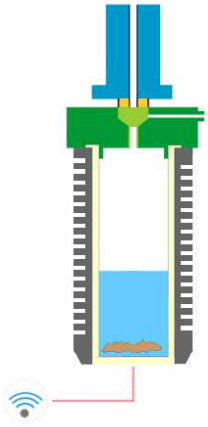


The TWIST function of microwave unit **must be activated** when ATC-FO is used. Otherwise the sensor will be damaged.

3.1.2 easyTEMP Contactless temperature control (T2)

The easyTEMP sensor is an infrared sensor able to directly detect vessel's internal temperature. This is possible thanks to the infrared frequency emitted by this special type of sensor which is completely transparent to PTFE.

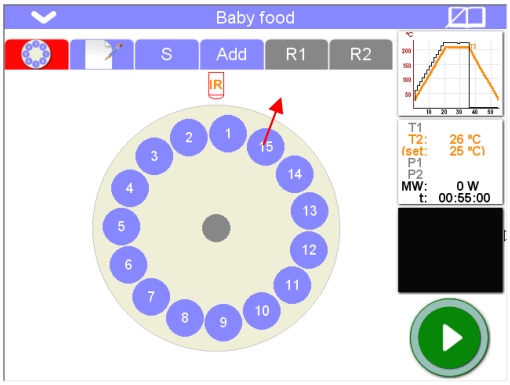
The easyTEMP sensor is placed on the bottom of the microwave cavity in order to read the temperature from the bottom of vessels:



Working with easyTEMP sensor, ETHOS X system is able to monitor the temperature in all vessels and to control the heating process according to the hottest position detected.

3.1.2.1 easyTEMP sensor (T2) for SR15 eT

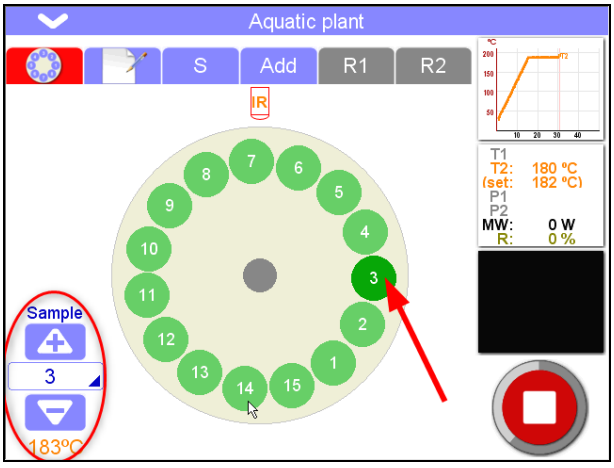
With SR15 (eT) rotor n°1 easyTEMP sensor is required (back position).



The easyTEMP sensor read the internal temperature of all vessels, and control the microwave emission according with the vessel at the highest temperature.

⚠	In order to have a good homogeneity of Temperature and Pressure conditions in all vessels, it's necessary to load the same sample type, sample amount, solvent types and volumes.

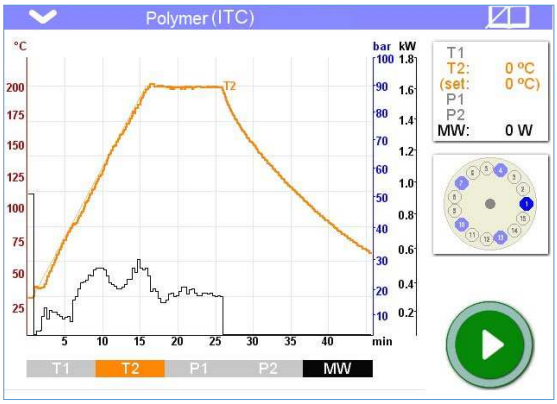
From the sample monitoring window of the software, it is possible to read the temperature inside each vessel selecting the position on the rotor.



The easyTEMP sensor start to read the temperature from 30°C. The system will not monitor the temperature below the 30°C.

3.1.2.2 START LOAD function

At the beginning of the run, the system delivers a fixed power according to the number of vessels that are being used. As soon as the internal temperature of the containers reaches 30° C, the power is delivered on the basis of the internal temperature read by the easyTEMP sensor.



3.1.2.3 Care and maintenance of IR (easyTEMP) sensor

The IR (easyTEMP) sensor calibration must be weekly tested following the instructions in chapter "EasyTEMP Calibration Test instructions" (see the following chapter).

In case the test is not passed, the IR sensor must be cleaned. Then the calibration test must be repeated.

To ensure a correct measuring by the IR sensor, **the sensor lenses must be periodically cleaned from impurities**.

In case of contamination, accidental liquid spillage or unusual program, the IR sensor must be cleaned after each run.

In case chemicals reach the sample chamber, the IR sensor must be properly cleaned and its functionality must be tested in accordance with test prescription.

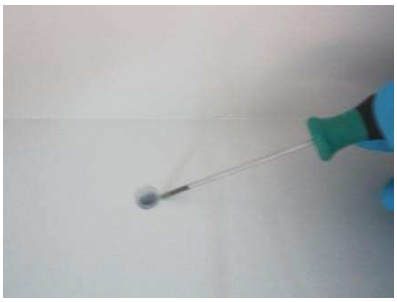
The IR sensor lens can be chemically attacked by HF vapors. The consequence of sensor lens corrosion is lower measuring values.

3.1.2.4 Cleaning of IR (easyTEMP) sensors

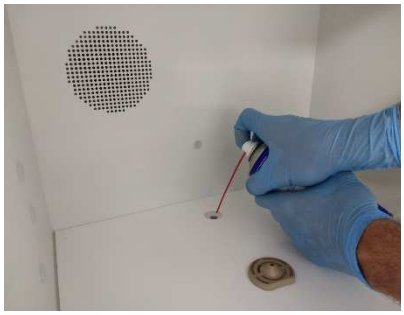
The recommended cleaning procedure of easyTEMP sensor housing and lenses is the following:

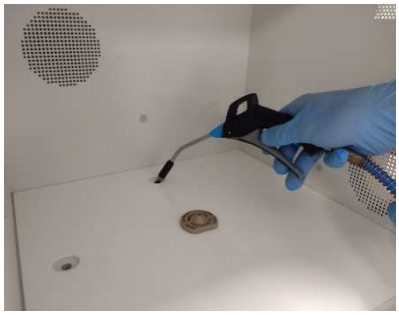
1. The eT sensor for SK eT rotor is located on the back side of the cavity bottom.

2. If present, remove the eT sensor protection cover (*SL0239C*). For this operation, a small flat-head screwdriver can be used, paying attention not to scratch the cavity coating.

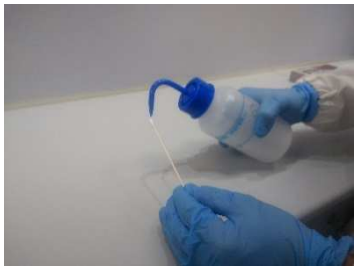
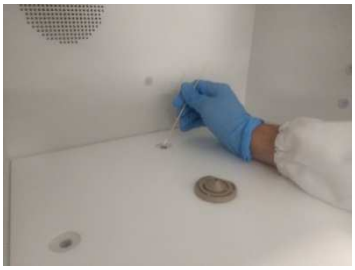


3. Remove dust or possible solid residues from the IR housing. It can be easily done gently using a gas duster or compressed air, if available.





4. Clean IR lenses with a cotton bud moistened with water. Cotton buds' package (p/n 70484 – 100 pcs) is included in the microwave system.

eT protection cover (SL0239C)

If used, eT protection cover conditions must be periodically checked and, in case, it must be replaced.

To check the conditions of eT protection cover, repeat the eT calibration test (explained above), placing the cover on eT sensor.

If both tests, with and without cover, are passed, the cover is in good conditions and it can be re-used.

In case the test with cover fails, the protection cover must be replaced with a new one.

3.1.2.5 easyTEMP Calibration Test instructions

eT sensor calibration test is based on the boiling point of water in an open vessel (atmospheric pressure). At this working condition, the boiling point of water is unique and it can be used as reference for sensor calibration check.

The boiling point of water depends on the elevation above the sea level. At sea level the boiling point of water is 100 °C; at 1200 m it lowers down to 96°C. For the calibration test, this variable data must be considered.

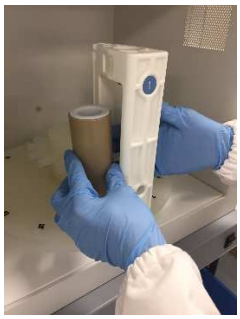
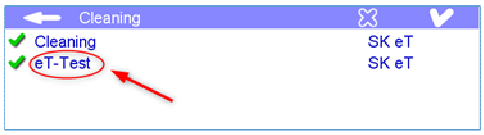
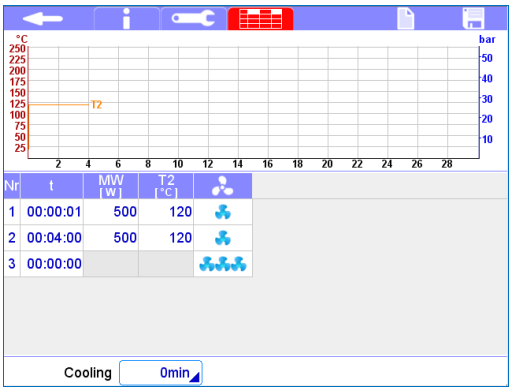
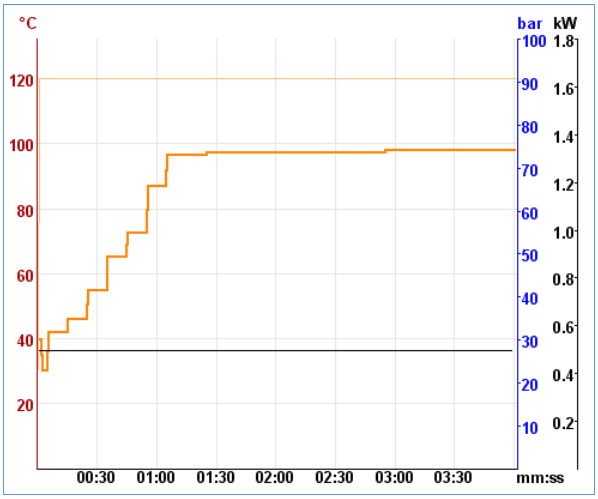
- **eT Calibration Test procedure (SR15 eT rotor configuration)**

For the calibration test, a single SR15 vessel is used.

Fill the vessel with 30 mL of DI water.

Insert the vessel into the safety shield and place it into the segment.

The vessel must be used without cover.

Place the rotor body into microwave cavity. Place the segment into the rotor (Pos.1). Close microwave door.	 
Enter the software library and select "eT-Test" method from "Cleaning" application folder.  Cleaning	
eT-Test method.	
Start the MW program.	
When the temperature stops increasing, despite continuous microwave emission, the boiling point of the solution is reached.	

<u>The acceptability range of eT-Test is **±10°C** from the expected boiling point (generally, 100°C).</u>

If test result is out of the acceptability range, please check the vessel conditions for contaminations or repeat the test using a different vessel.

<u>If test repeatedly fails, please, contact the Service department.</u>

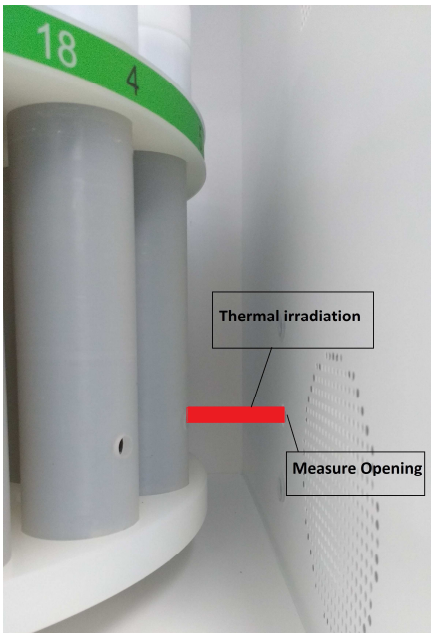
3.1.3 Contactless temperature control (T2)

The contact-less temperature control measures the infrared heating radiation from the reactor, located before the measuring port.

Milestone rotors have bores outside the height of the measuring port, so that the temperature radiation of the reactor can be measured directly by the sensor.

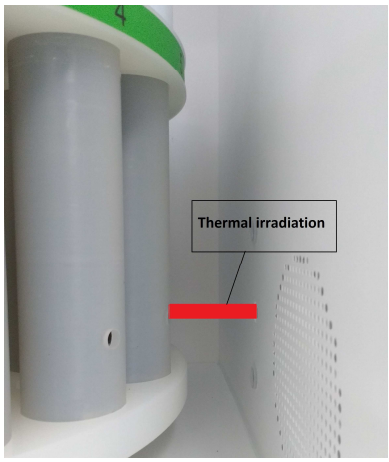
When measuring the infrared warm radiation from a body, the measuring depends on the following three factors:

- Emission factor of the material
- Surface nature
- Body distance and dimensions
- Body geometry



3.1.3.1 How to use the T2 contactless temperature sensor

For individual systems, i.e. in Fastex-24 rotor, and Fragrances and flavor configuration the IR control can be used for internal temperature control. In these systems the measuring is at best approximated to the current inner temperature by a **material factor**. The use as indirect inner temperature control requires a particular careful maintenance and regular control.



For other systems, such as SR12 for Total fat determination, even if the current temperature run is controlled by the inner temperature (T1), the control of the external temperature (T2) is of great benefit to reach an optimal lifetime of the vessel system. The option of the IR-TC often remains unused. The IR-TC controls all rotor vessels and enables, together with the inner temperature sensor, a perfect control of the extraction.

Please observe the following procedure for a correct use of the IR-TC.

1. To determine the correct relationship between indoor (T1) and outdoor (T2) temperature, use your rotor with only one vessel, which should include typical sample weight and acid mixture for the application.

2. Start the desired program to control the inner temperature (T1) and set T2 with the same value of T1. The external temperature (T2) is then recorded. Having only one vessel loaded, the run shows the current ratio of indoor-outdoor temperature.

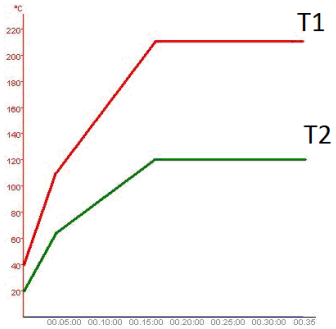
3. On the base of the T2 recorded you can use the following equation to calculate the T2 to be used during your work: $T2 = T2_{(recorder\ in\ the\ step\ 2)} + 20$.

4. Edit the new T2 value in the method

5. Save the optimized method and use it in the routine.

Each application and each vessel type should be considered separately.

On the right, you can find a typical ratio indoor-outdoor temperature for the PTFE vessel. In case the outside temperature reaches the limit value, you should not set a major limit value, but you should test the vessel system and the application. Possible reasons are:



- Vessels have received different microwave (see vessel maintenance in the rotor manual)
- Defective reference vessel
- Different samples

In this mode, the contact-less measuring of the vessel surfaces serves as safety measure, because it prevents the overheating, too high continuous pressure and enable i.e. a safe work on the material load limits. If a set limit value in the software is exceeded, microwave irradiation is stopped, until the temperature returns below the pre-set limit value.

In the software there is the option ROTOR-CONTROL. If this function is activated, it prevents that cold places such as the PP rotor wall are considered during the temperature analysis. Moreover, when ROTOR-CONTROL is activated, the recorded temperature curve is considerably more regular. When activated, the hottest vessel is considered for the regulation.

Milestone suggests to work always with **rotor control ON** when infrared sensor is installed.

3.1.3.2 Care and maintenance of T2 (IRT0500) sensor

To ensure a correct measuring by the IR sensor, **the sensor lenses must be periodically cleaned from impurities**.

In case of contamination, accidental liquid spillage or unusual program, the IR sensor must be cleaned after each run.

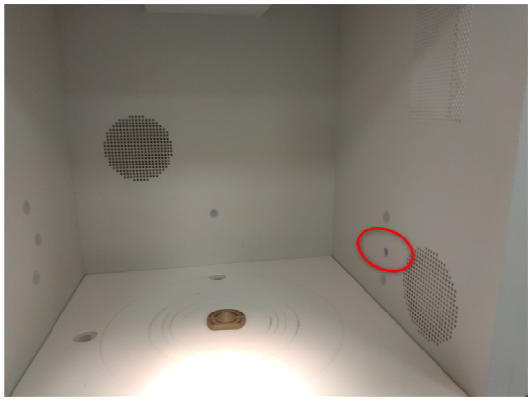
In case chemicals reach the sample chamber, the IR sensor must be properly cleaned and its functionality must be tested in accordance with Milestone prescription.

The IR sensor lens can be chemically attacked by HF vapors. The consequence of sensor lens corrosion is a lower measuring value.

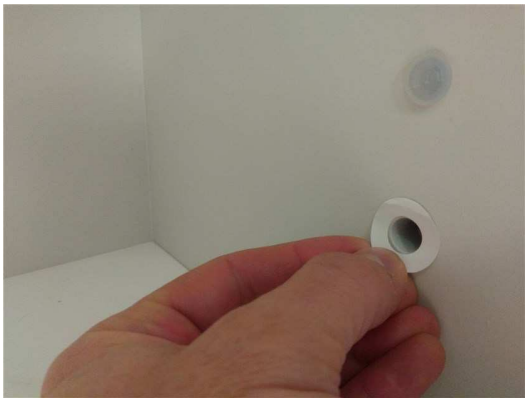
3.1.3.3 Cleaning of T2 sensors

The recommended cleaning procedure of IR sensor housing is the following:

1. The IR sensor (T2) is located on the right wall of the cavity.

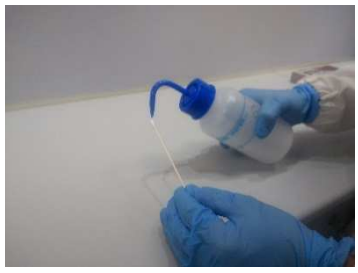


2. If present, remove the IR sensor protection sticker (KLEB007A). The sticker can be easily removed with your fingers. Otherwise, a small flat-head screwdriver can be used, paying attention not to scratch the cavity coating.

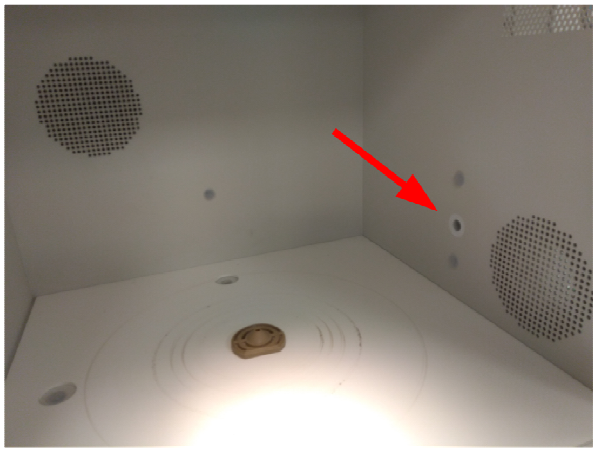


3. Remove dust or possible solid residues from the IR housing. It can be easily done by gently using a gas duster or compressed air, if available.

4. Clean IR lenses with a cotton bud moistened with water. Cotton buds' package (p/n 70484 – 100 pcs) is included in the microwave system.



5. Apply a new protective sticker paying attention to overlap the window with the opening of the IR. Place the PP bottom plate and the central rotor adapter.



	IR protection sticker (KLEB007A) If used, IR protection sticker conditions must be periodically checked and, in case of scratches or changes in the color of the window, it must be replaced.	

The IR sensor is calibrated by the manufacturer by means of the supplied accessory, while the recalibration can be performed by a service contract.

To ensure a correct measuring of the IR sensor, the sensor/the protection sticker must be weekly cleaned with a cotton bud (i.e. the measuring port and the sensor window located there). In case of unusual/abnormal program runs, the IR sensor/protection sticker must be cleaned after every run.

3.2 Pressure sensor

3.2.1 QP sensor - P2 (Optional)

QP sensors for organic solvents detect toxic and flammable gases in the air sucked from the sample chamber and contribute to the working safety conditions.

The respective gas sensor is installed between the exhaust opening in sample chamber and the fan. The gas detection is performed directly in the air flow.

When the detected gas overpasses a set concentration value, the microwave heating is stopped until the gas concentration returns below the set limit value. In connection with the reversible overpressure valve of the vessel, the QP sensors enables a contact-less automatic overpressure control in all reaction vessels.

The measuring with the QP sensors has a relative power and does not permit any measuring of gas concentration.

Sensitivity, software setting

The sensitivity and thus the response can be set in the control software. Follow the respective software user manual. A high sensitivity should be selected, so that the sensor can promptly responds to each incident.

3.2.2 QP-S for organic solvents (P2)

At higher sensitivity, the QP sensor detects the most frequently used solvents, including alcohol and non-polar solvents. Since organic solvent vapors are often explosive, the QP sensor contributes in a considerable way to the working safety conditions.

Test function of the sensor

The sensor must be tested with alcohol (ethanol) and a non-polar solvent. For this reason the open flask or open vessel with solvent is placed at the exhaust end. The exhaust must be running. A signal increase must be visible in the P2 sensor display. The test should be performed once a week.

Operation and safety instructions

If digestion is carried out in the microwave system, the function and life time of the solvent sensor can be compromised.

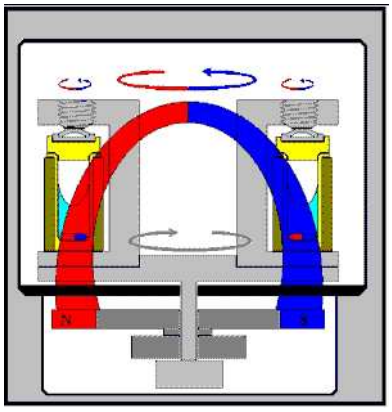
4 ADDITIONAL DEVICES

4.1 Magnetic stirring (Standard for Total Fat configuration / Optional for other configurations)

4.1.1 Function description

The automatic magnetic stirring is not visible under the sample chamber bottom plate. It is composed by a turntable disk, where two permanent magnets are secured one opposite to the other. The disk can be moved with variable speed. The magnetic poles in the vessel placed in the sample chamber receive the rotation impulse of both permanent magnets.

The magnetic stirring is controlled in the terminal.



Principle of magnetic stirring

People with peace-maker

Inside the sample chamber there is a value of magnetic field multiple than the max. limit (0,5 mT in frequency range 0 up to 1 Hz) for people with peace-maker.

Outside the unit, the value is below the permitted value (except for stirring with special magnet earths).

The magnetic field inside the sample chamber can cause damages for example to wristwatch on wrist.

4.1.2 Stirring in several vessels

When using Milestone rotor, it is possible to introduce a stirring bar in each vessel. The optimum stirring range is measured from the rotating axis at ca. 220mm. For an optimized stirring, the center of the stirring bars in each position should be placed in this range and can be used on the unit bottom up to ca. 80mm (optimal 35mm).

4.1.3 Stirring in only one vessel

A sole stirring bar can be operated in the middle of the microwave unit. In order to achieve a good stirring, the stirring bar should be placed not higher than 50mm from the unit bottom. A stirring bar in the center can have up to 100mm diameter, according to the reaction vessel.

For larger diameter, take care of the MW heating by the microwave coupling.

4.1.4 Applications

- Extractions

  The extraction last can be reduced and the extraction improved. With the help of Weflon stirring bar, non-polar solvents such as n-Hexane can also be heated in the microwave, or the heating time can be significantly shortened.

- Synthesis, esterification, alkaline hydrolysis

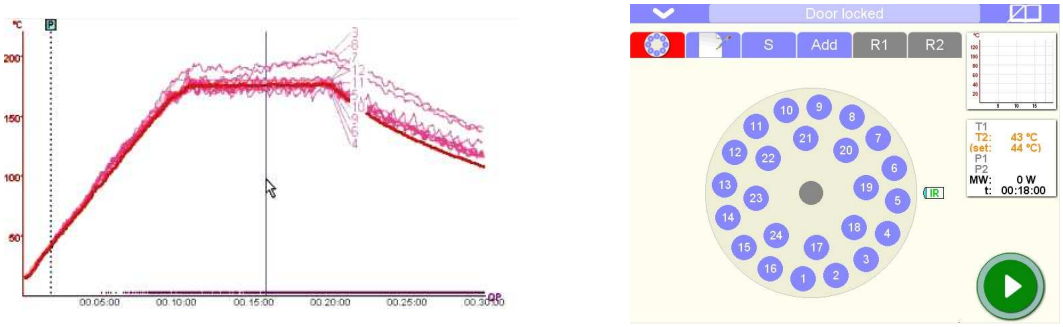
4.1.5 Stirring bars choice

In order to prevent stirring bar contamination, in particular for chemical digestion, Milestone has developed stirring bars, whose magnet is shielded with quartz. In this way during the digestions, no metal ions are diffused from the stirring bars. The quartz shielded stirring bar offered from Milestone are available also with PTFE or WEFLON cover (heating of non-polar solvents). For extraction with polar solvents we recommend quartz or glass shielded stirring elements.

Too high temperatures (above 250 - 260°C) can damage the stirring bars.

The special magnetic stirring of Milestone with quartz or glass shield of metallic bars have only a limited life time in case of corrosive effects due to media such as HF. This depends in particular on the temperature. The HF molecule has a high permeability in PTFE or PTFE/TFM, which is accelerated by the temperature rising. By lower gas embedding the PTFE coating can be damaged especially at high temperatures and the ceramic part (quartz/glass) is attacked. This is true also for the special parts coated with WEFLON with identical structure, In case of shield damage or break, a repair is absolutely necessary.

4.2 Automatic turntable plate with sample codification



Temperature run and positioning

The turntable plate with sample identification is a special step motor with codification for the absolute recognition of each sample position and automatic adjustment to each rotor type. Each sample is therefore codified. The codification serves for the recognition of each sample position. After introducing the rotor positions, the graphic adjustment occurs and enables the automatic position of the rotor i.e. for sample removal. A temperature measuring and regulation can be performed for each sample. With the positions introduction, the temperature run of each sample is automatically documented and graphically represented in the software.

Do not turn the turntable plate with the hands, otherwise you could damage the motor.

5 EASYCONTROL 660

The terminal 660 has a high-resolution color screen with touch-screen function. It is a working interface for creating, executing and storing microwave applications simultaneously.

Terminal 660

The operations are carried out by touching the buttons on the screen (touchscreen) or optionally via mouse and keyboard.

The software easycontrol is permanently installed in the memory of the terminal.

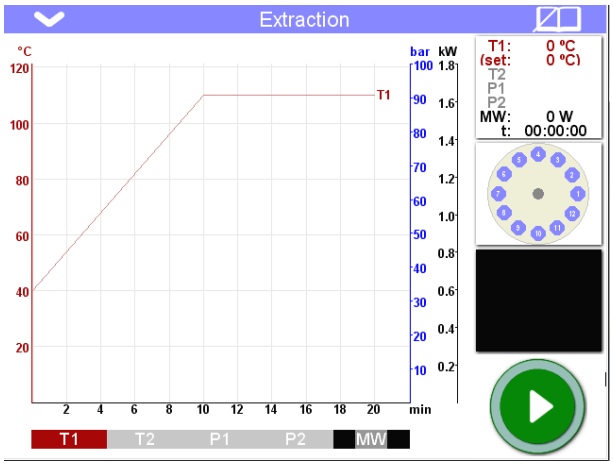
All control parameters with the desired and actual curves are displayed simultaneously in different colors.

A real-time representation of the real measured values are plotted on the predetermined curve parameters and enable the recording of all data samples.

5.1 Program start

Switching on the unit also the terminal is turned on and the program is initialized.

There are different levels of access authorization that are described in the following program description.



Start screen

At time of the unit shipment, the password represented here is assigned.

The password can be changed in the Control Panel.

Administrator:	123456

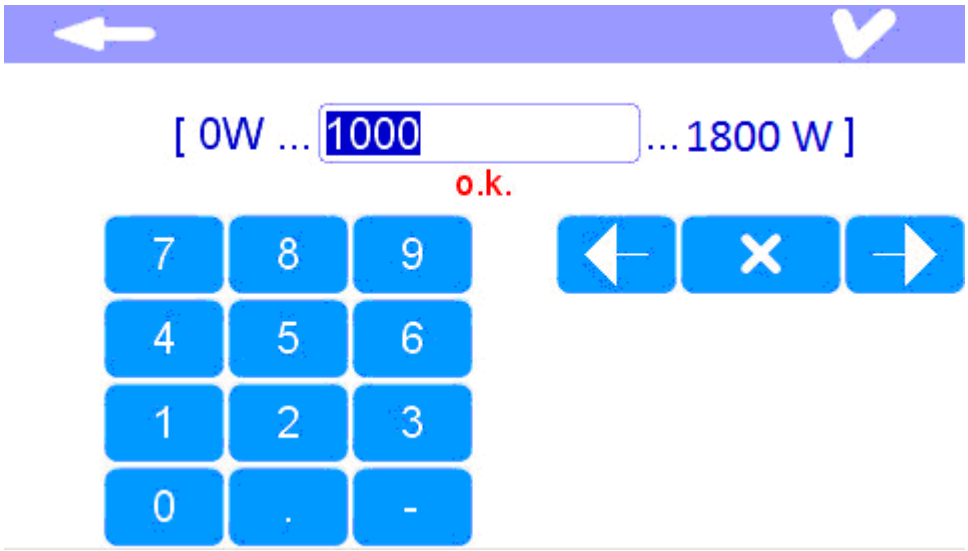
5.2 General operations tip

The software operations are carried out by a touch-screen. By touching the screen, the icons or the input fields are activated.

Activated fields are ready for input via a keyboard. By touching again the activated field, a numeric or standard keyboard appears on the screen.

5.2.1 Numeric input via touch-screen

In several steps of the program it is necessary to enter numbers. Touching twice on the field or on the number to be changed, a numeric keyboard will appear



Numeric keyboard

5.2.2 Text input via touch-screen

For steps requiring a designation/description, a standard keyboard will appear by double-touching the touch-screen.

Standard keyboard

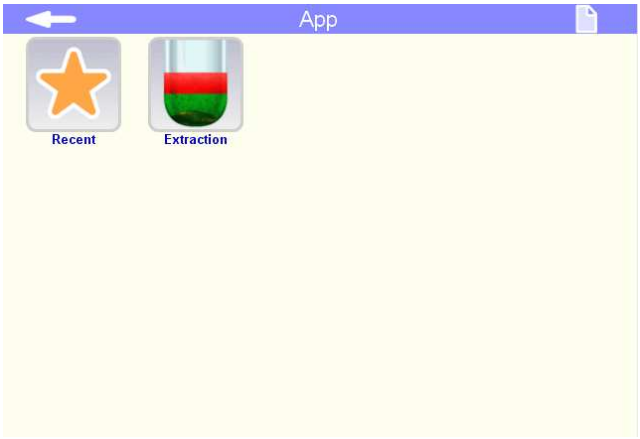
5.3 Generally used icons

	General Menu
	Methods menu
	Select - OK
	Delete - Cancel
	Save
	New
	Back to previous page
	START button

5.4 Methods

5.4.1 Method selection from Milestone database

By touching the upper right icon, you can enter into the select menu of applications. In each category, you can find a series of pre-installed methods.

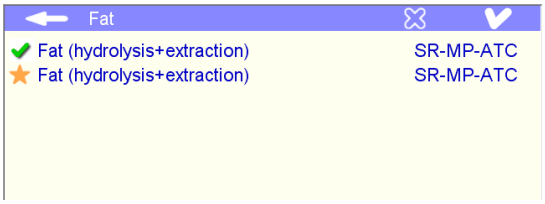
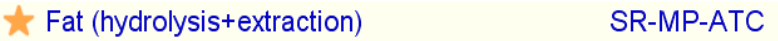
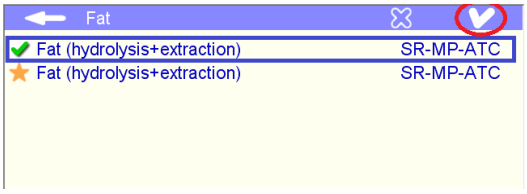


Applications

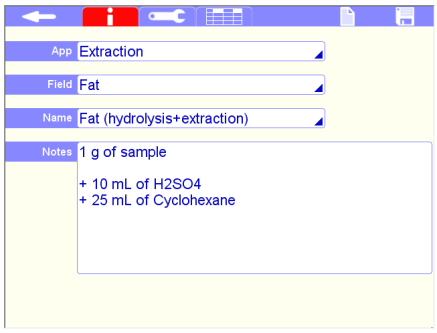
Categories

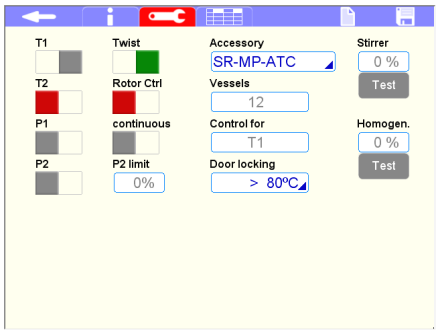
You require the Administrator access to open the categories (except for Recent).

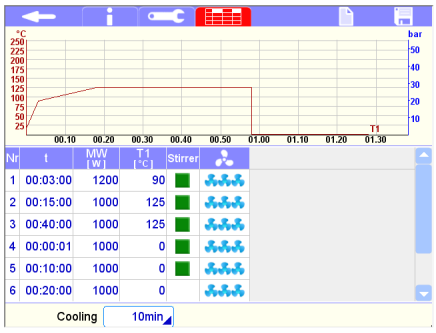
Log in with your administration password.	

Here you can open and run several methods. The methods are optimized for each rotor type. Select a method and click the upper right icon (check mark).	
The method can be directly started.	
This method is located as well in the category "Recent".	
Select a method and click the upper right icon (check mark).	

In the following registers, there are all method information and settings.

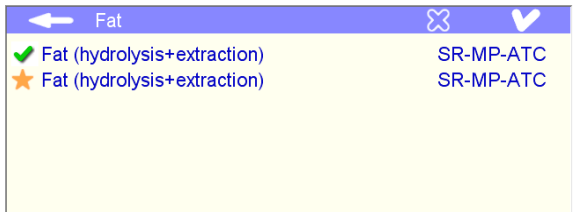






General information Setting Parameter

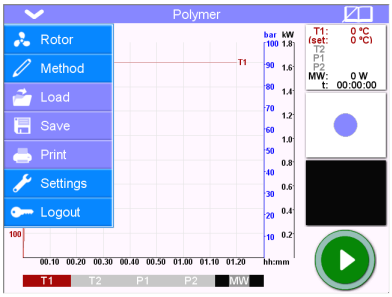
By clicking the check mark once again, you can open and run the method.

If a method is opened by the Administrator, this is automatically saved in the respective category with a star and in the category „Recent". The methods in the category „Recent" can be opened and run by all users. By the Administrator rights, the methods in the category „Recent" can be modified or deleted.	

Upon delivery, the configuration included in the supply is activated in the setup menu.

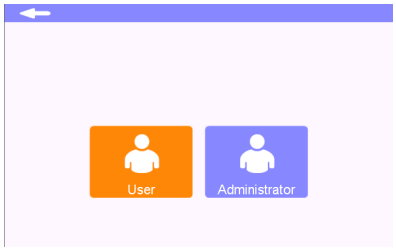
5.4.2 Create new method / modify esisting method

Press the upper left check mark and select "Method".

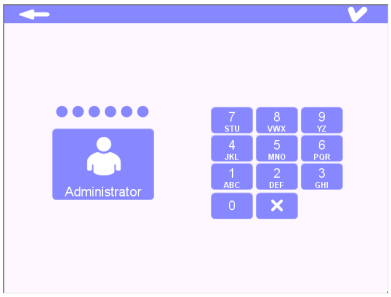


Log in as Administrator, in order to create a new method or to modify an existing one.

User cannot create, modify or delete methods.



Log in with your Administrator password.



To create a new method, click on the icon shown in the upper right side of the screen.

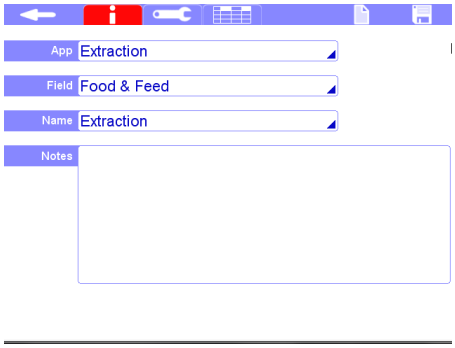
In the following registers, there are all method information and settings.

General information

Select the application type (i.e. Extraction) and the application field (i.e. Fat)

Enter the name for the new method.

In the Note box you can specify further info concerning the method.



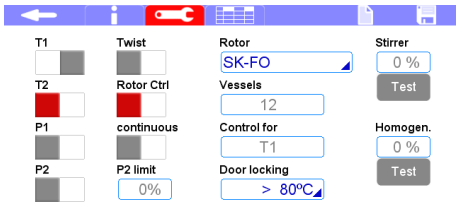
Parameters

Edit the setting for the new method.

Select the rotor type.

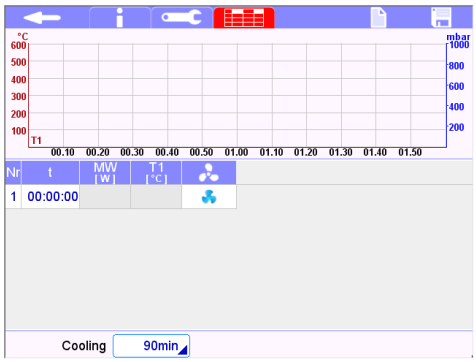
Unlock (turn to green color) the parameters that have to be monitored.

The shaded parameters are linked with the rotor and can not be changed.



Program

Set the heating program, the fan speed and the cooling time for the new method.



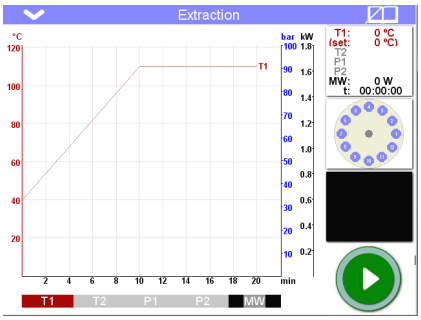
Save the new method by clicking on the icon on upper right side of the screen.

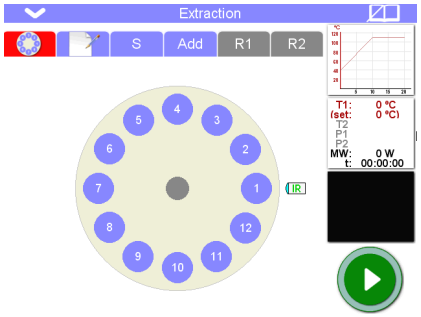
The new method will be saved into „Recent“ and into „Extraction“ folder under the respective application field.

5.5 Sample table

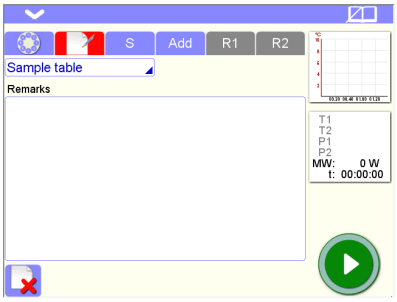
5.5.1 Open new sample table

In the right side of the screen, click on the thumbnail with the rotor illustration

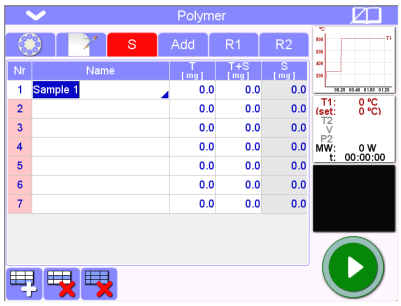




By pressing the icon  you open the „Remarks“ page. Here you can add comments and other info to the method.

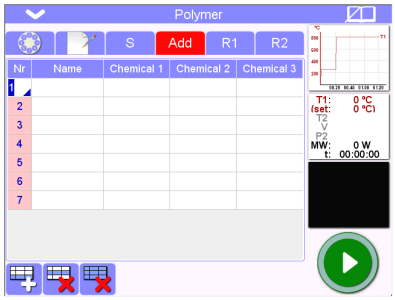


In the „S" (sample) page you can fill in the sample table.



Nr.	Number of the sample.
Name	Name of the sample. The sample name can be entered not only by the administrator but also by the user (max. 29 characters).
T(Tare)	Column for the weight of the vessels. If the sample is tared on the balance, enter here the weight of vessel.
T + S	Weight of sample container and sample. If the sample is tared on the scale, the weight of the sample can be entered here.
S (Sample)	Weight of the sample is calculated automatically from the values of Tare and T + S.

In the „Add" page the used chemicals can be added.



[ml] or **[g]**	Amount of chemicals used can be selected between milliliters and grams.	

5.5.2 Adding lines

Inserts a new line into the sample table.

The sample name in the Name column and the information on the chemicals are copied from the previous selected line.

5.5.3 Delete record

Delete the selected record in the sample table	
Delete the entire sample table.	

5.5.4 Direct connection with balance (optional)

The sample weight can be manually entered via the keypad / touch screen. However, the most convenient method is the direct transfer of data from the electronic balance on terminal via an interface cable.

If the cells Tare or T + S is selected, then the below table of new symbols appears, which are used for direct reading of the weight data from the connected balance.

These buttons  appear only when a balance is connected.

Balance brand Sartorius and Precisa Balances: the weight is updated constantly on the terminal. In the sample table, the value is entered into the active cell by touching the balance button. Other balances: by pressing the balance button, the weight is transferred into the terminal and entered in the active record. *(Please refer to Ethos X Service Manual for balance configuration and settings).*	

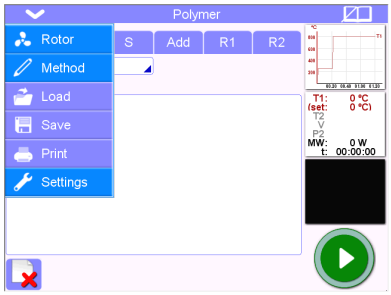
5.5.5 Automatic tare

Automatic tare Touching the T button, the display is set at the terminal to zero (tare). In case of Precisa balance, the balance is tared itself.	

5.5.6 Sample Table : open / save / delete

Press the check mark in the upper left corner to open the main manu.

Select <Load > to open a Sample Table file (.tbl) saved on the USB-Stick or on the Server.

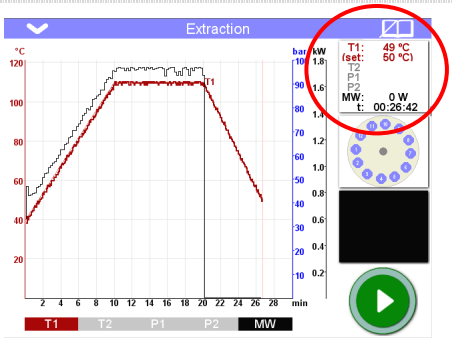


Select from the list the desired sample table. Tap the check mark right above, the selected table is loaded into memory and then close the window.

The name of the sample table appears in the Name field.

5.6 Parameters Monitoring page

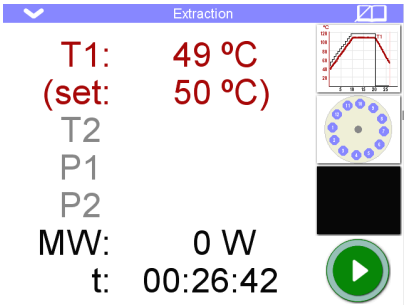
By clicking on the thumbnail in the upper right corner, the Parameters Monitoring page will be enlarged and displayed on the center of the screen.



This page shows all the control parameters :

- T1 : Fiber Optic Temp.
- T2 : IR sensor Temp.
- P2: QP(s) (%)
- MW : Power emission
- t : Elapsed time

The parameters showed in grey colour are not activated or not installed on the system.

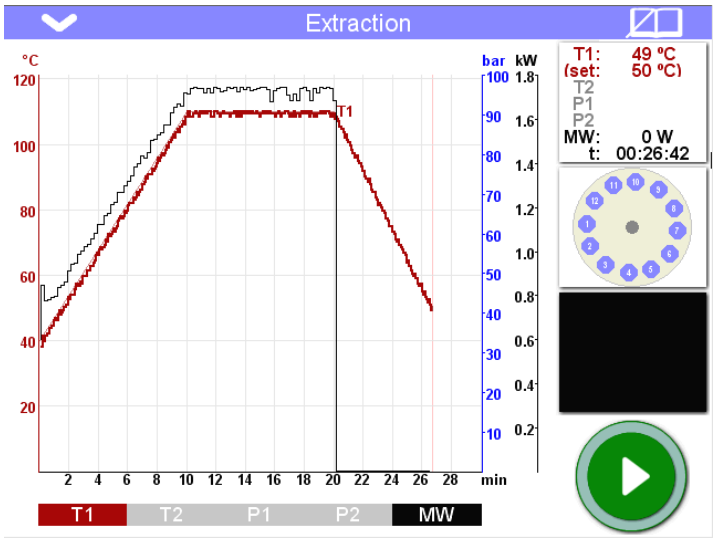


5.7 Program sequence

During the MW heating cycle, the software records all data of control parameters. The gradients of temperature and power are graphically displayed in real time on graph.

The recorded curves of temperature or pressure appear in darker of the given curves.

Once the run is completed, the graph can be printed or saved on the USB pen.



PAUSE

While the program is running, the pause icon appears to the right.

With the pause button, the process can be interrupted (the timer is stopped and the microwave irradiation is stopped also).

During the pause, the button changes to a split view. Now you can continue (by clicking on the right) or stop the program (by clicking on the left).

During the pause, the MW door can be opened by clicking „Unlock“ from the main menu.

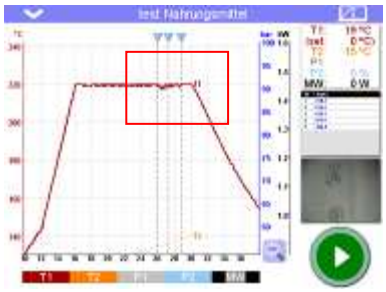
In the graph, a marker appears from the point of interruption (at the top of the graph, at the position where it was interrupted).

The opening of the sample chamber door has the same effect as pressing the pause button.

ZOOM

Touch the screen from the top left corner to the bottom right corner and you remain in the final position for about half a second before releasing.

The section will be zoomed on screen



ZOOM-OUT

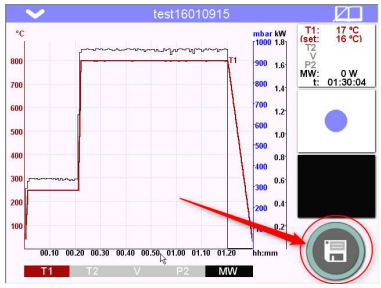
Below the graph the "Zoom Out" button appears. Tap this button to zoom out.

5.7.1 Graph opening / saving / deleting/printing

SAVE THE GRAPH

At the end of the run (heating + cooling), the „Floppy disk" icon automatically appears to the lower right corner of the screen.
By pressing it, you can directly save the run file.

In any case, it is always possible to save the run by selecting „Save" from the main menu.



ù

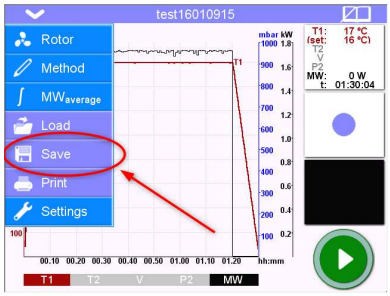
By clicking on „Save" or  the Saving page opens.

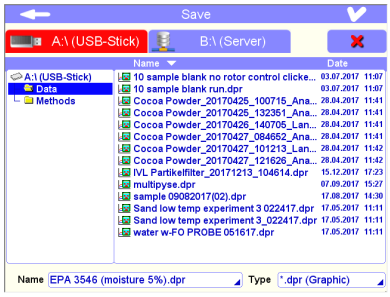
Enter a name (15 characters max.). The name is then automatically added to the ending .dpr.

Run files can be saved on USB-Stick or on a Server.

Tapping the  button, the current graph is stored.

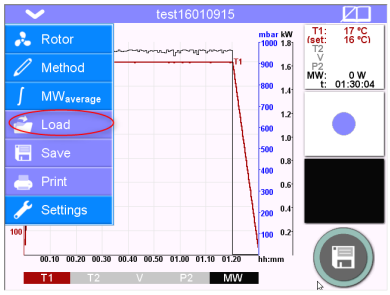
Method and sample table are stored in the same .dpr file.





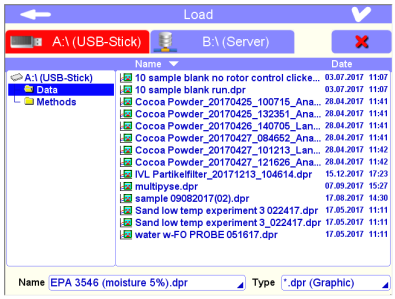
LOAD A GRAPH

In the left menu, press Load to open the saved runs.



Select from the list the desired file. The name of the graph appears in the Name field.

The method and table are loaded together with the flow.



DELETE A GRAPH

Select the graph to delete from the list on USB pen.

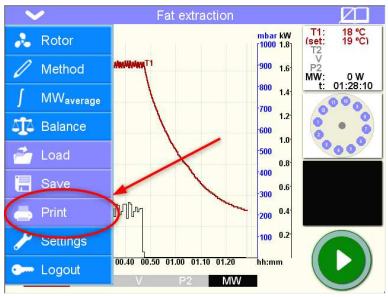
Tap the Delete icon and the selected .dpr file is

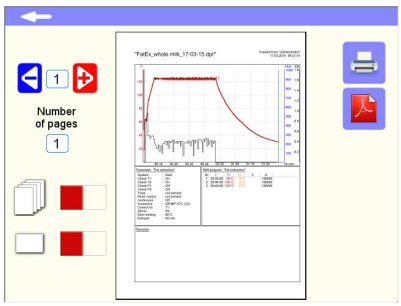
permanently deleted after a confirmation prompt.

PRINT A GRAPH/SAVE AS PDF FILE

In the left menu, press Print to print out or save a complete report as a PDF file.

The report will include graph profile, instrument setup, method details and additional notes.



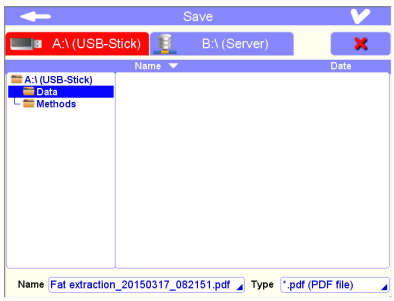


If a printer is connected to the terminal, the report can be directly printed out by clicking on the proper icon on upper right corner of the screen.

To create a pdf file, click on the icon  and enter a file name (15 characters max.).

Run files can be saved on USB-Stick or on a Server.

Tapping the  button, the report is stored.



5.7.2 Graphical representation

The individual graphs can be displayed or hidden from the screen by pressing the corresponding button.

T1, RED

The curves (setpoint curve and measured curve) for the ATC sensor (thermocouple).

T2, ORANGE

The curves (setpoint curve and measured curve) for the Infrared temperature.

E, BLACK

Curve of the Microwave emission

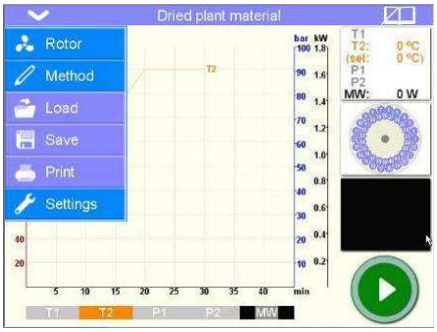
P1, BLUE

Curve of internal pressure

P2, LIGHT BLUE Curve of P2 (ex QP sensor) that detects venting of the vessels	

5.8 Setup

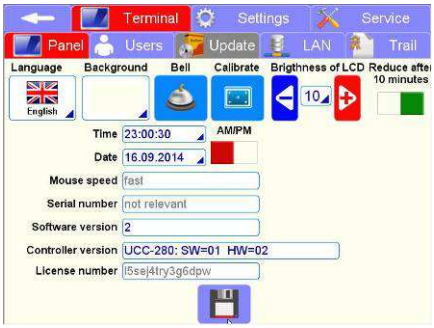
To enter the Setup, open the main menu, click on „Settings" and log in with the Administrator password.



5.8.1 Terminal page

Panel

Here you can edit the general setting of the terminal.



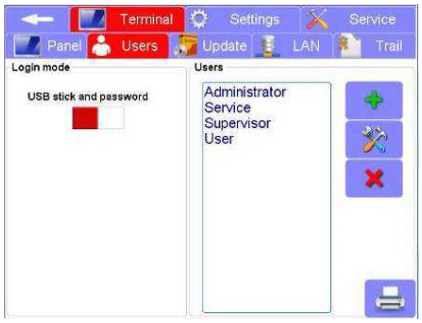
Users

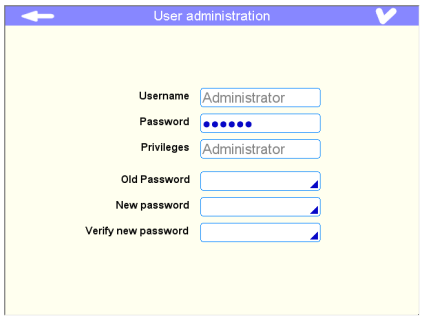
In this section you can create new administrators or edit existing ones

- to create new admin, click on the  icon

- to modify existing admin, click on  icon

A dedicated page to create/change password will appear on the screen.

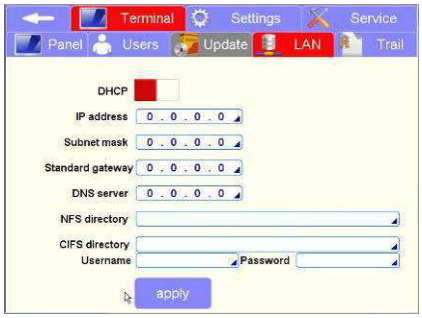




LAN

In this section you can configure your Network settings.

Main purpose of this page is to connect the terminal to the network so it is possible to save files directly on an external PC (server)



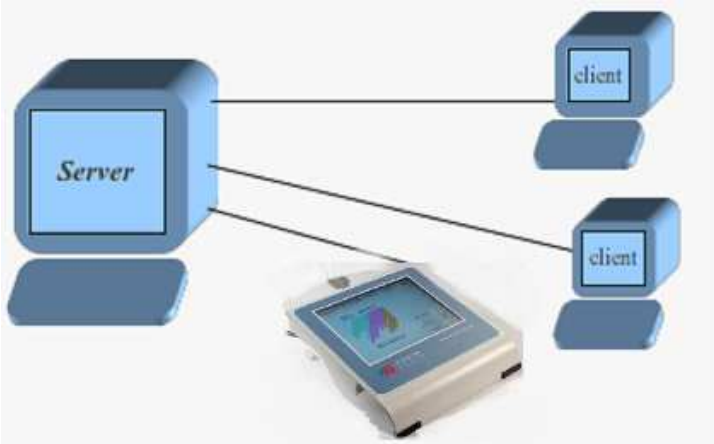
Below you can find the instructions to correctly set the connection between T660 and local network.

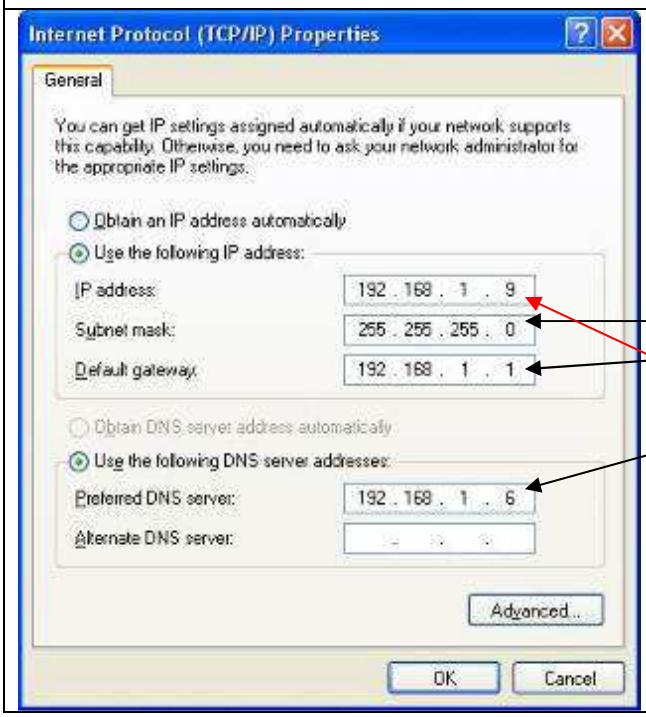
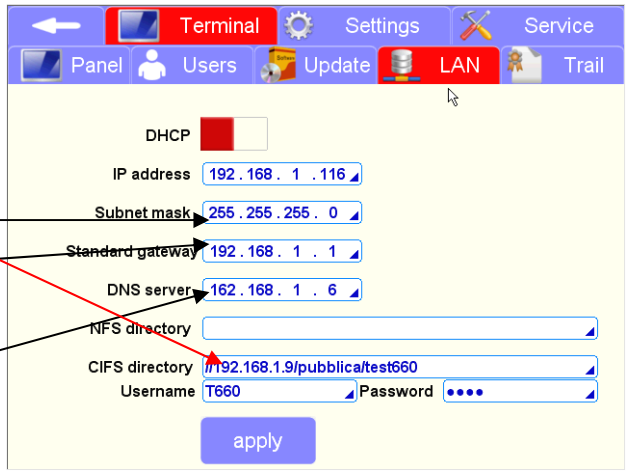
DHCP	If your network supports the automatically assigned IP address function for all customers connected to the network, you can select this option and your network will assign an automatic IP address to your T660.

If your network does not support the automatically assigned IP address, please set the following settings:

IP address 192 . 168 . 1 . 116	IP ADDRESS Insert the IP address dedicated for your T660
Subnet mask 255 . 255 . 255 . 0	SUBNET MASK Insert the Subnet mask of your network
Standard gateway 192 . 168 . 1 . 1	STANDARD GATEWAY Insert the standard gateway of your network
DNS server 162 . 168 . 1 . 6	DNS SERVER Insert the DNS server of your network
CIFS directory //192.168.1.9/pubblica/test660	CIFS DIRECTORY Insert the address of server and its shared folder where you want to directly save the file of your T660.
	ATTENTION //192.168.1.9/pubblica/test660 — T660 needs "/" (slash) as separator for the address. \\192.168.1.9\pubblica\test660 — Windows-server save the address using "\" (backslash).
Username T660 Password ••••	Insert the name and password that the network administrator has assigned to T660. Username and password must be set in the server, otherwise the server will not recognize/accept T660
apply	Press APPLY to confirm all the settings. The terminal will automatically restart.

Below an example to better understand the settings of the server and the settings of T660



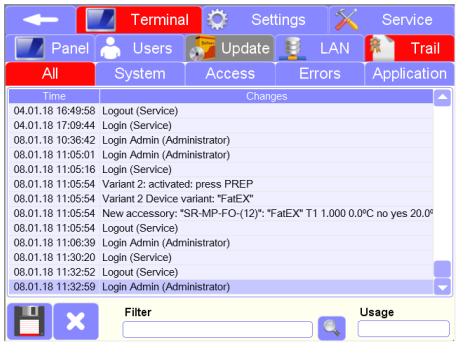
SERVER	T660
	

Trail

In this page you will find the hystory trail oft he unit.

According tot he type of message, the trail can be sorted out into four different categories:

- System
- Access
- Errors
- Application

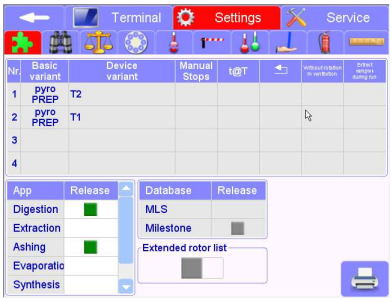


5.8.2 Settings page

In the following sections you can edit the system settings. The shaded settings can only be changed by the service. The Printer icon allows to print the setting.

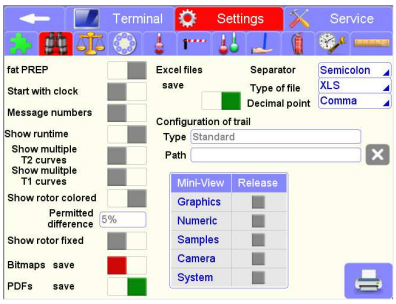
Applications

Here you have the possibility to unlock certain applications for editing.



View

In this section, you can choose what type of format file you want tob e saved along with the .dpr file.



Balance

In this section you can configure your balance.

(Please refer to Ethos X Service Manual for balance configuration and settings).

Rotor

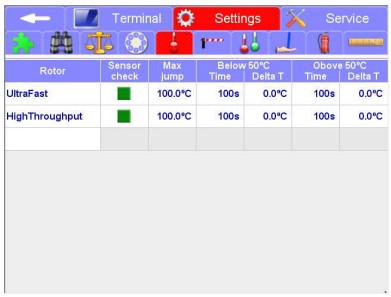
In this section you can set your rotor type.

Sensor Check

In this section, for each muffle type you can select which sensor should be checked.

In the Sensor Check column:

Empty field	No sensor is checked
	The main sensor is checked



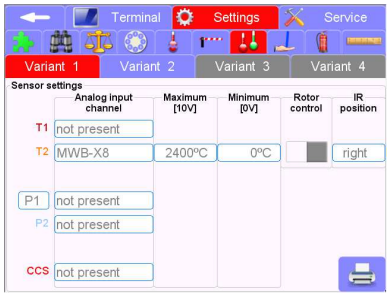
	All sensors are checked.

Maximum working conditions (Service only)

These limits can only be set by Service.

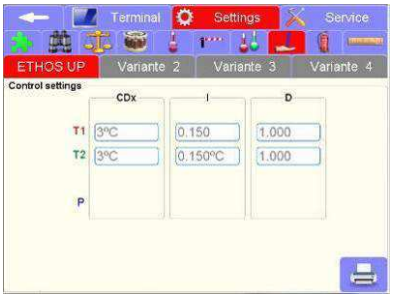
Sensor settings (Service only)

These settings can only be edited by Service.



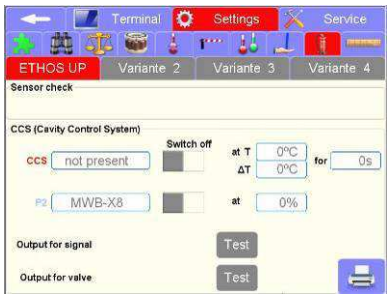
Control settings (Service only)

These settings can only be edited by Service.

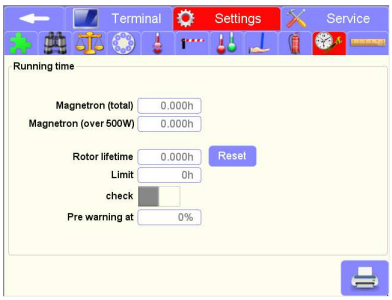


Cavity Control System (CCS) (Service only)

The settings of the cavity control system (CCS) can only be edited by Service.



Running Time (Service only)



Performance Test

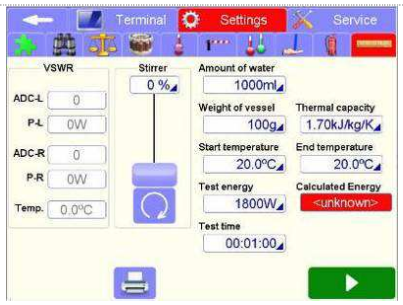
To run the performance test, place a container with a large surface area in the cavity. Fill the jar

with cold water (<10°C) and measure the starting temperature.

Enter all appropriate values and press the green START button.

After the testing period (1 min.), measure the final temperature and enter its value in the appropriate field.

The power is calculated automatically.



5.9 21CFR-11 Software

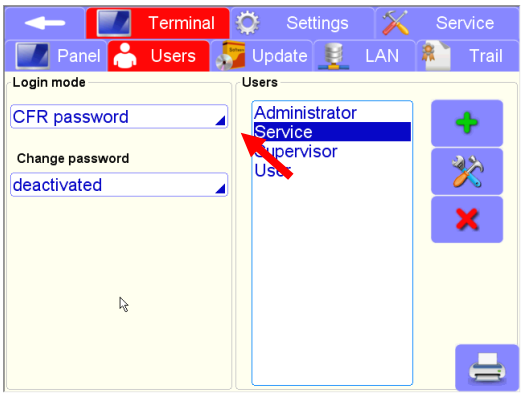
The U.S. FDA Code of Federal Regulations (CFR) Title 21 Part 11 (*Elettronic records: elettronic signatures*) defines the criteria under which electronic records and electronic signatures are considered trustworthy, reliable, and equivalent to paper records. The EasyCONTROL software is fully n compliance with this regulation.

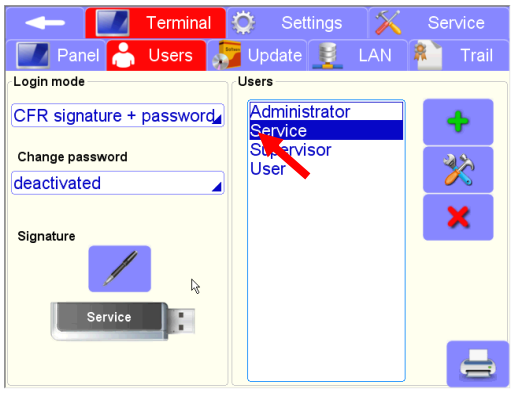
Thought the settings of the software it is possible to select the “CFR login mode” in order to switch on all the functions requires by the 21 CFR-11 regulation.

5.9.1 Activation of the 21CFR-part 11

The Login mode in accordance with the 21CFR-11, can be done in two different ways

CFR Password	Create new user profiles with different access privileges. Each profiles have a specific passwords to login.
CFR Signature + password	Create new user profiles with different access privileges. Each profiles have a specific passwords with a signed USB key, both necessary for the login.



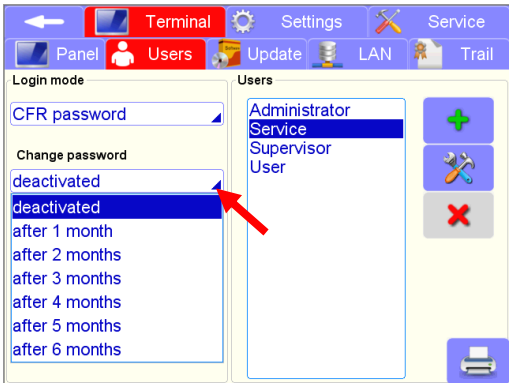


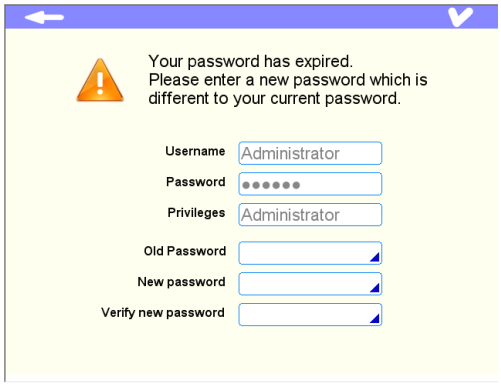
You can set a password expiration. At the end of its lifetime, the software will ask to change the old password with a new one.

Activating this function, the software immediately asks to change the old password with a new one.

The password expiration is not valid for the Service user profile.

Immediately after the activation of the CFR Signature + password, the local service engineer must create his own signed USB with access to the service profile.





The activation of the CFR access mode and Password expiration, can only be performed by a Service user profile that must access the software with a service password. The CFR cannot be activated by the administrator.

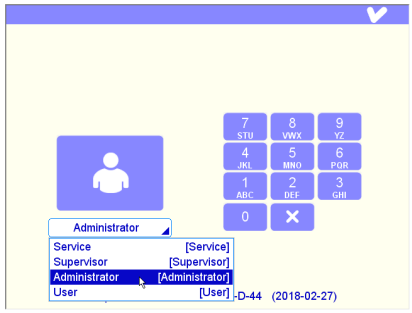
It is the user's responsibility to periodically check the functionality of the signed USB stick.

5.9.2 Create, Edit, Delete the User Profiles

5.9.2.1 First Steps

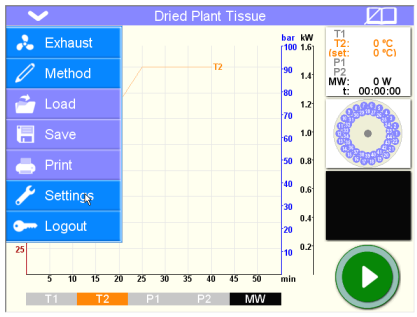
When the unit is turned on, the system will ask for the first access.

The first login MUST be done by the administrator of the lab and the default password is 123456.

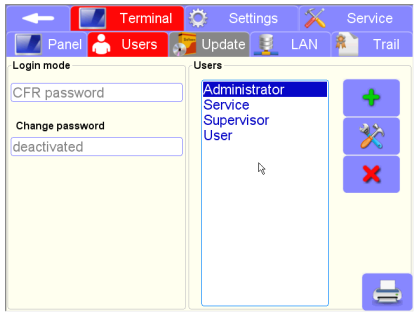


The default password MUST be changed after the first login. It's responsibility of administrator to change the default password with a new one. See the next chapters for more details on how to change the password.

Select the arrow at the top left of the screen and open the settings page.



Select the Terminal > Users window in order to get access to the Users list. From this page it is possible to Create, Edit or Delete a user profiles.

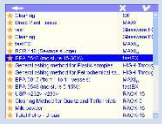


5.9.2.2 Overview of user profiles and access levels

From the Users window, you can create a new login name. There are three different types of users with different levels of accessibility (privileges) that can be created.

Login type	General Description	Access level
User	Can only open files selected by the administrator. The user cannot modify any parameter of the method.	Low
Manager	Can create User and Manager profiles. Can open and modify the methods.	Medium
Administrator	Can create User, Manager and Administrator profiles. Can open and modify the methods. It have access to the time and data of the software and other technical options.	High

Here below a table with more details concerning the privileges according with the login type

	Open and Run a method from the Recent folder	Open and Run a method from the Digestion Library	Create a new Method	Modify existing methods (not the one from the Milestone library)	Create a new Administrator account	Create a new Manager account	Create a new User account
							
User	☑	☒	☒	☒	☒	☒	☒
Manager	☑	☑	☑	☑	☒	☑	☑
Administrator	☑	☑	☑	☑	☑	☑	☑

	Change the Data and Time parameter	Access to the Trail	Data saving options	LAN network configurations	Balance Setup	Accessories Setup (Rotor configurations)	Power test window
							
User	☒	☒	☒	☒	☒	☒	☒
Manager	☒	☑	☒	☒	☒	☒	☑
Administrator	☑	☑	☑	☑	☑	☑	☑

There are two additional login levels that cannot be modified by the Administrator.

Login Type	General Description	Access level
Service	This access is only for the Milestone Service Engineer. It gives access to the sensor calibration and others technical feature of the unit.	High
Supervisor	This access is for Milestone	High

	Producer for software optimization (engineering, updates, etc.).	

5.9.2.3 Create a new ID user profile

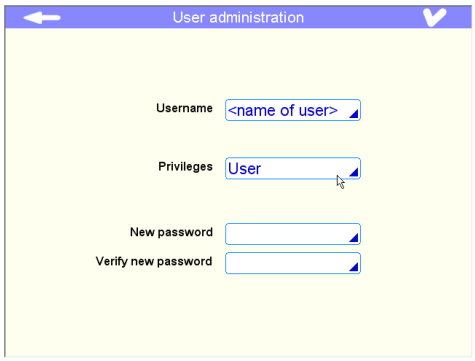
New ID profiles can be created by the Manager, Administrator, Service and Supervisor accounts.

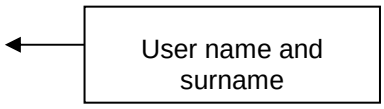
Each user must have one single ID profile and each ID profile has to be associated to no more than one person.

It's responsibility of the user (with a Manager, Administrator, Service or Supervisor account) to guarantee the uniqueness of each account to every single person.

For the above reasons, Milestone suggests to:

- Oblige the users to use their name and surname as ID Username.

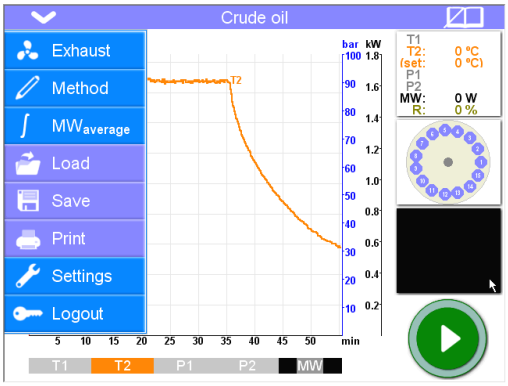




- Have a register (notebook or excel file) with list of all ID Username with the corresponding name and surname of users.

Here below all steps to create a new ID profile with the "CFR password" configuration activated.

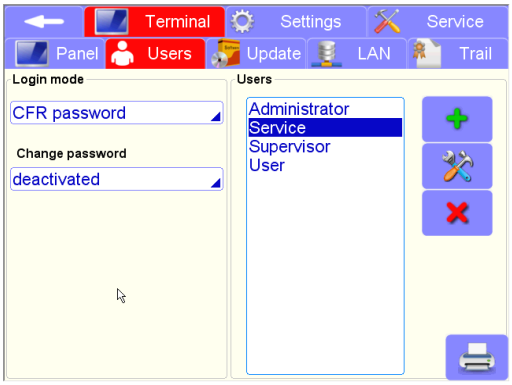
Open the scroll menu on the upper left side of the display and select "Settings".



Select "Terminal" page and "Users" tab.

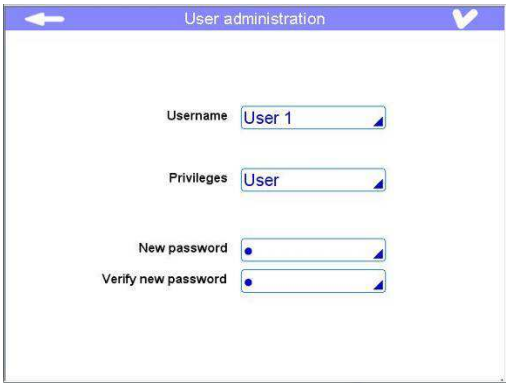
Create a new user changing the password.

Press  to add new User

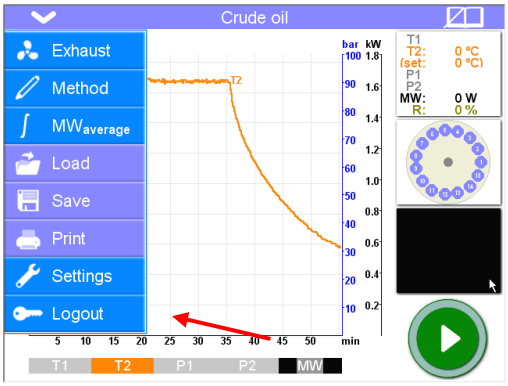


Insert Username, privileges and password.

> *The password must be at least 6 characters long*

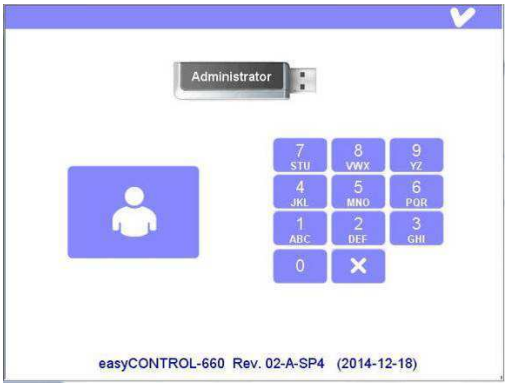


Go back to the Main page and log out.

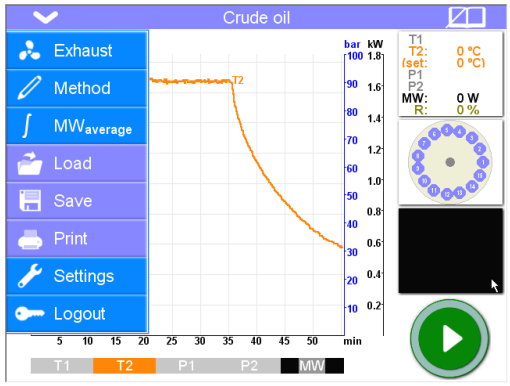


Here below all steps to create a new ID profile (and the signed USB stick) with the “CFR signature + password” configuration activated.

Insert the USB key in the terminal and login with the assigned password.



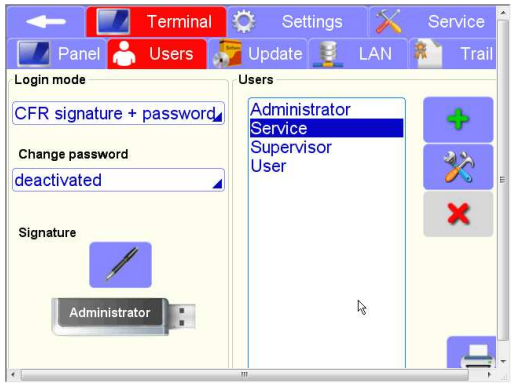
Open the scroll menu on the upper left side of the display and select “Settings”.



Select “Terminal” page and “Users” tab.

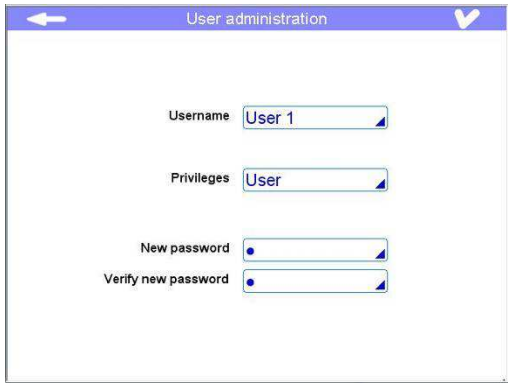
Remove your USB key and insert the USB key of the user that you want to create.

Press  to add new User



Insert Username, privileges and password.

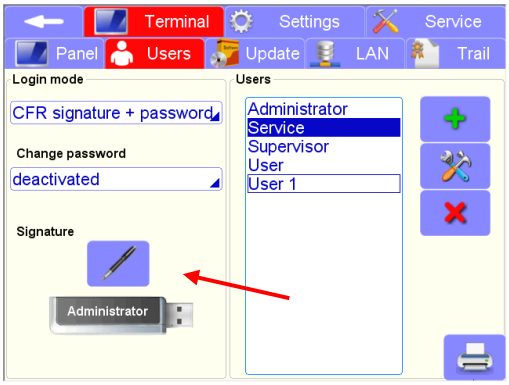
	*The password must be at least 5 characters long.*



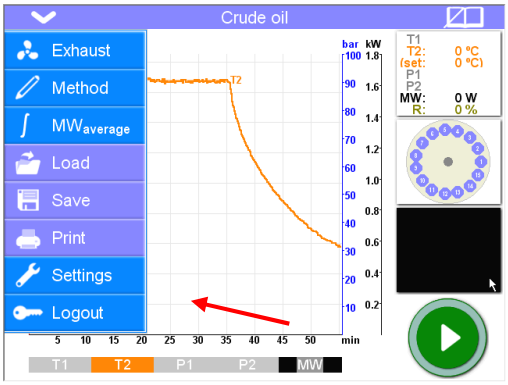
Select new user in the Users list.

Press “Signature” icon.

The USB-key is now signed with the new user signature and can be removed from the terminal.

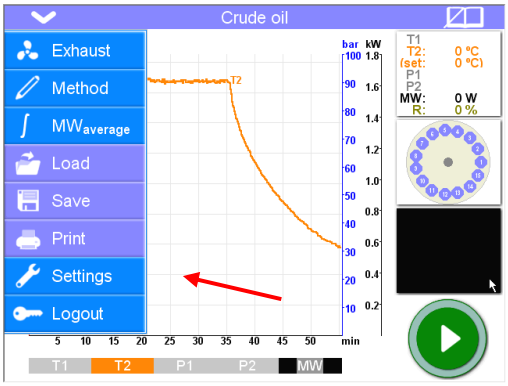


Go back to the Main page and log out.



5.9.2.4 Edit or Delete an existing ID user profile

Open the scroll menu on the upper left side of the display and select “Settings”.

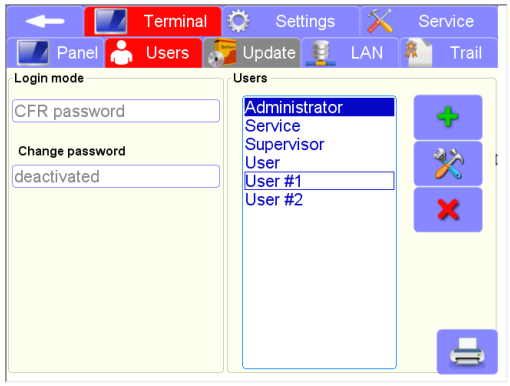


Select “Terminal” page and “Users” tab.

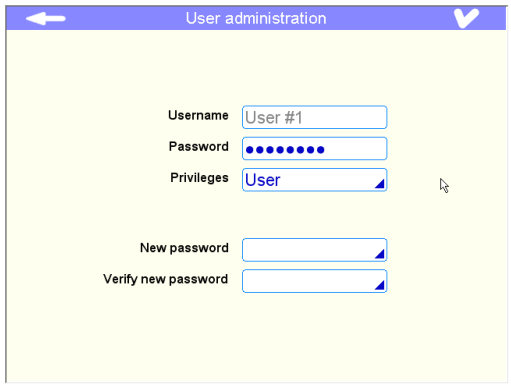
Select the user to edit or delete from the list.

1. Press  to edit existing User

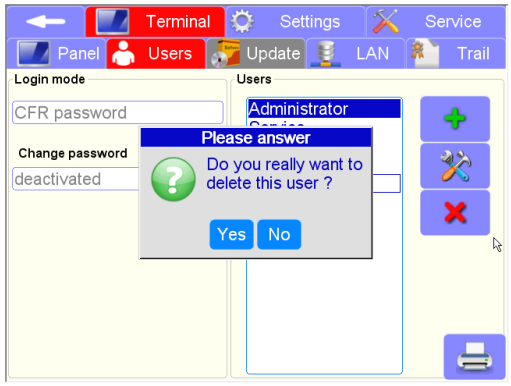
2. Press  to delete existing User



1. Pressing the edit function, you can change the privileges and the login password



2. Pressing the delete function a message will appear for confirmation. Press YES to remove the account.



The above instructions are valid also for the CFR Signature + password configuration (USB Stick).

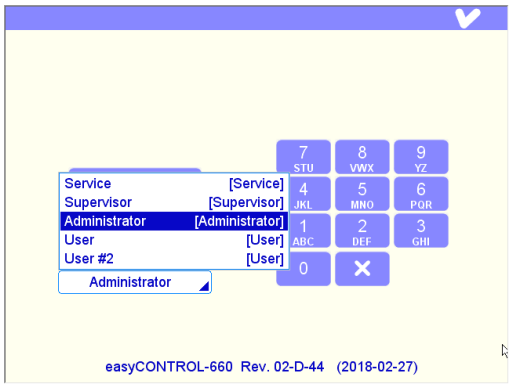
5.9.3 Switch on the unit and create new microwave method

The working of the system with the 21CFR-11 function activated is in accordance with the access person and the privileges related to him (see the above tables for more details).

After switching on the unit, the system ask to login introducing your ID access and Password.

If you have the *CFR Signature + password* configuration, remember to connect your signed USB stick.

If the system remains in standby for more than 10 minutes, the software prompts you to reenter the password.



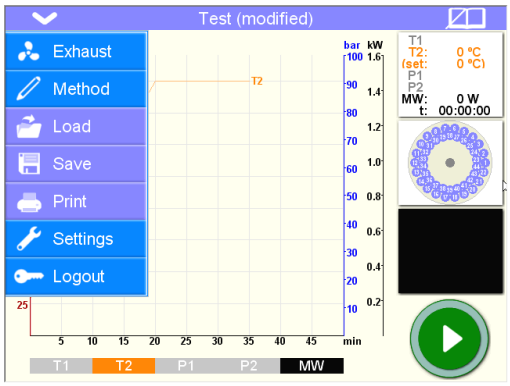
After three errors of entering the password, the account will be locked and the unlocking can only be performed by a higher-level user or after 24 hours.

Leaving the unit stopped for more than 10 minutes, the software automatically log out itself and asks to log in with a password.

If the system is running a digestion method, the software will not log out. It is the logged user's responsibility to supervise the unit while it is operating.

Here below all the steps to create a new microwave method. The User profile access cannot create, modify or delete the methods.

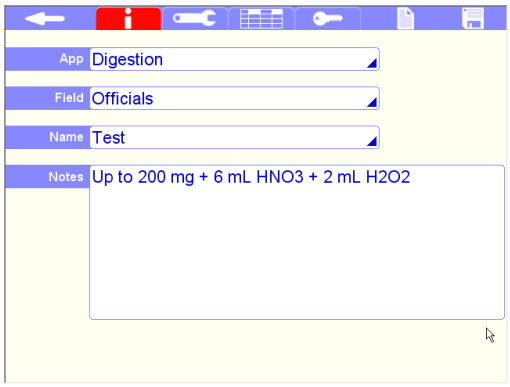
Open the scroll menu on the upper left side of the display and select “Method”.



The method window is divided in others 4 different windows.

- Information
- Rotor configurations
- Microwave digestion method
- Signature (only with CFR mode)

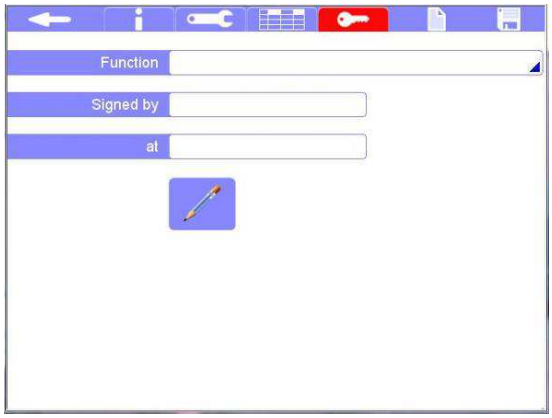
See the above chapters for more details about the settings of all the microwave options.



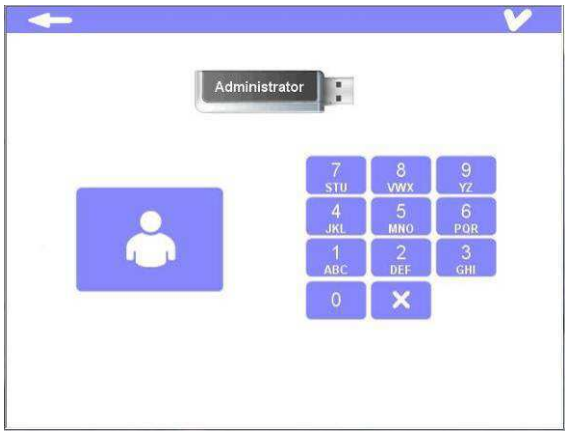
All methods must be signed by the person how create it.

⚠	*Users access profile can only open and run the methods signed by the admin, manager, service or supervisor.*

- **Function**: Write your name or your position (lab manager, user, safety responsible, others…). This is not a mandatory request.
- **Signed by**: ID profile of the person how created the method.
- **At**: Date and time of creation.
-  To sign the method.



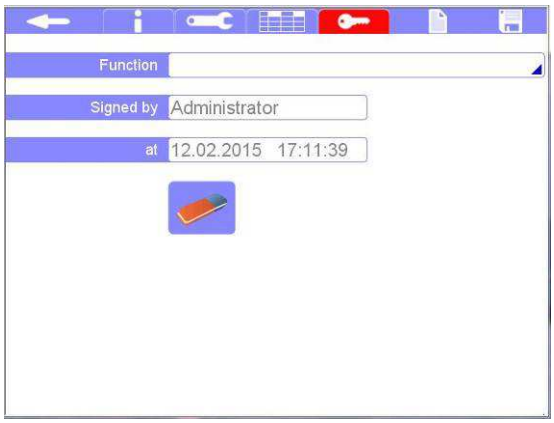
When you sign a method, the system asks for the login password (and USB stick if you are working with *CFR Signature + password* option).



After entering the password, the method is signed by date and time;

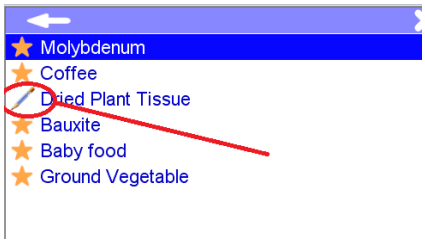
Press the “Floppy disc” icon to save the method.

The method will be save on an internal hard disk inside the terminal.



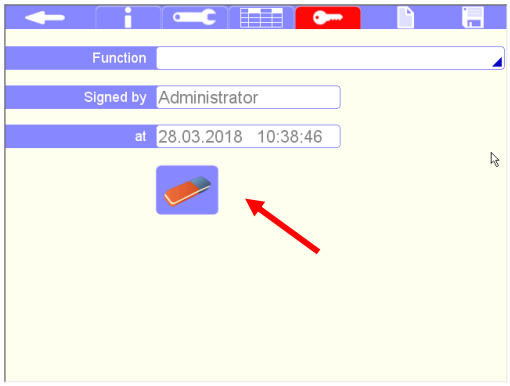
Signed methods will be saved in the library and marked by the  icon.

The users will find all signed method in the “recent” folder.



If the users select a not signed method, an error message is displayed on the screen.

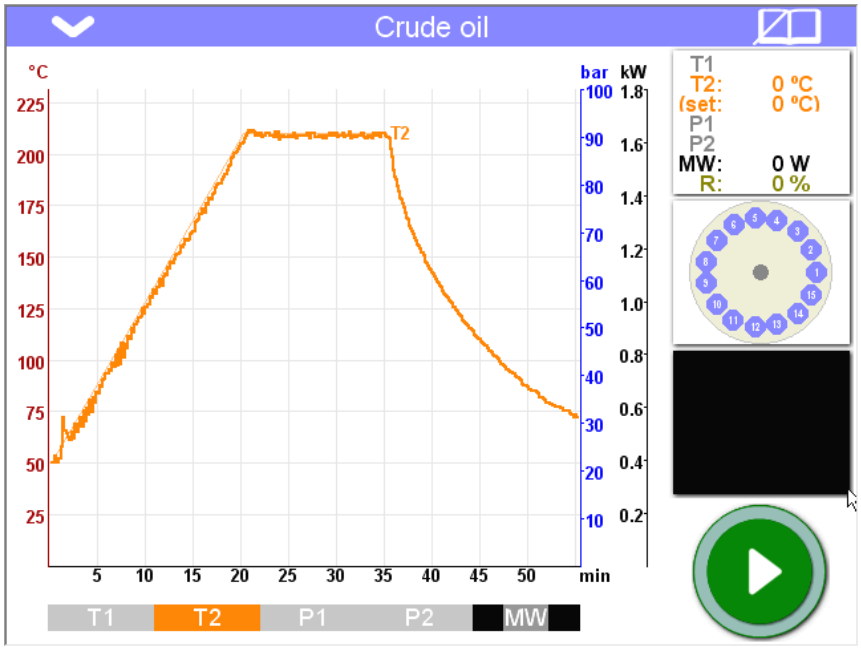
The sign an a method can be removed pressing the “eraser” icon.



If you create, edit, or delete a method, all steps are tracked and recorded in the audit trail list with the name of the user profile and date.

5.9.4 Save and export the final digestion temperature profiles

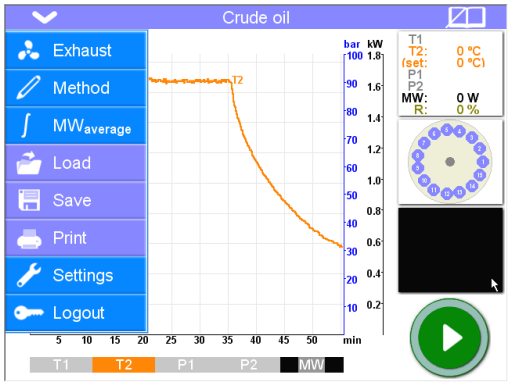
The final digestion runs (the temperature profiles) can be exported and saved on an external device.



The software recognizes that the terminal is connected to an external device for saving the final temperature profiles. If no device is connected, the software does not allow you to proceed with the microwave program (only with the 21CFR-11 option activated).

5.9.4.1 How to save a temperature digestion profile

To save a the microwave run open the scroll menu on the upper left side of the display and select “Save”.

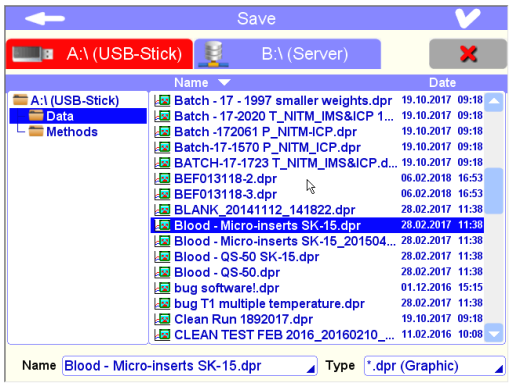


Choose the directory where to save the run.

- A:\(USB-Stick)
- B:\(Server)

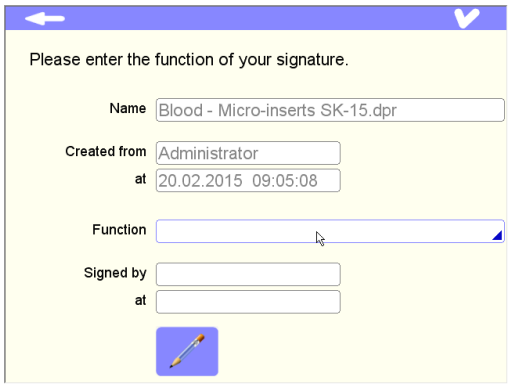
> *It is the user's responsibility to save the microwave runs on a device (USB, Computer, Server) validated by GMP, in order to preserve the integrity and reliability of the exported files.*

Write the name of the file that you are saving and press the upper right side of the display to confirm the operation.

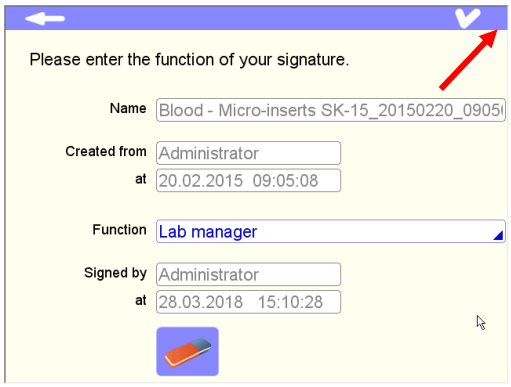


Sign the method by pressing the “pencil” icon.

Write your name or your position (lab manager, user, safety responsible, others…) in the function line. This is not a mandatory request.



Press the icon in the upper right part of the display to confirm the saving.



5.9.5 Files format and auto-save option (Administrator, Service)

There are two different ways of automatic saving:

- Continuous recording

- Saving of the final temperature profile

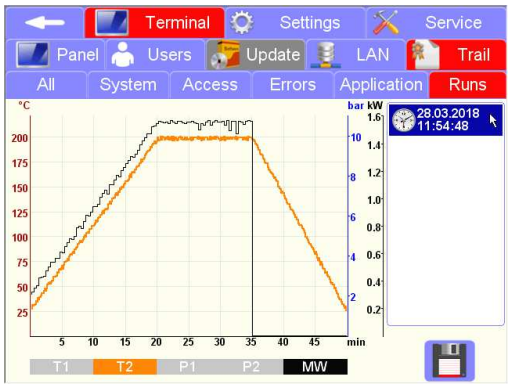
Here below the description of both automatic saving:

Continuous recording

The system constantly save the temperature profile during the digestion run. All temperature profiles can be visualized in the trail page under the “Run” folder.

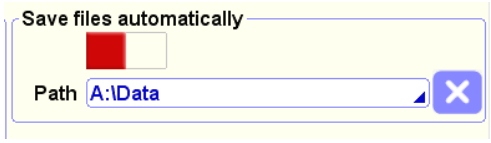
It’s possible to export these files in excel (.xls) or bitmaps (.bmp).

This type of auto-save is default of the software and cannot be switched off.



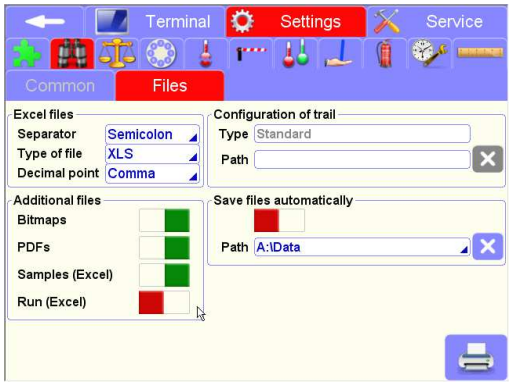
Save of the run file

You can activate automatic software saving. The software automatically saves temperature profiles on USB or Server at the end of the run.



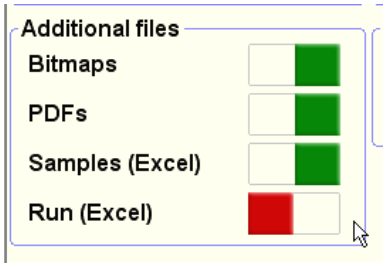
It is possible to choose the type of file that you want to save on the external device.

You can find the selection of file types in the Setting window under the “binoculars” icon and Files.



In the "Additional files" box you can choose the type of file. You can choose more than one type and the software will save multiple files.

- **Bitmaps (.bmp)**: Picture of the final temperature profile.
- **PDFs**: Picture of final temperature profile with microwave method description, userdetails, signature, sample list, notes.
- **Sample (Excel)**: List of samples taken from the sample list of the software (is not mandatory to fill the sample list).
- **Run (Excel)**: Excel file of the final temperature profile. This file includes all details about the run including the microwave energy emitted moment by moment, the values of other sensors installed and any errors.



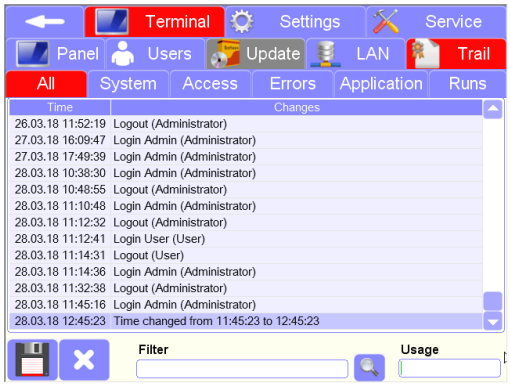
5.9.6 The Audit Trail

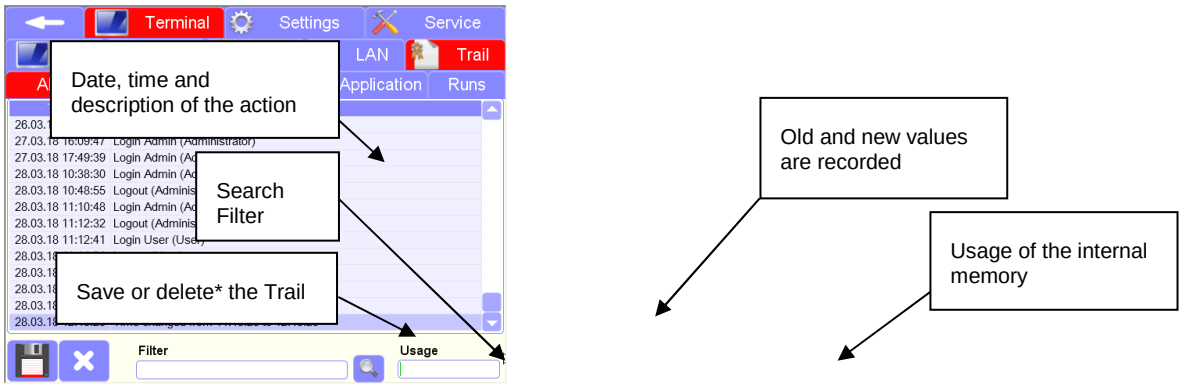
An audit trail (also called audit log) is a chronological record that provide documentary evidence of the sequence of activities related to the access, profiles, settings and methods modifications.

⚠	*It is the user's responsibility to verify that the software time and date are correct.* *It is the user's responsibility to synchronize the software clock according to local time also in case of solar-legal time change.*

The audit trail records all the following actions (the trail records the old and the new values):

- All login events
- Error messages
- Changes of settings (in the Setting panel)
- New users profiles
- LAN settings
- Rotor configurations
- Sensor values
- Data and time
- Changing of Methods
- Saving
- Modifications
- Deleting
- Saving of the final run file

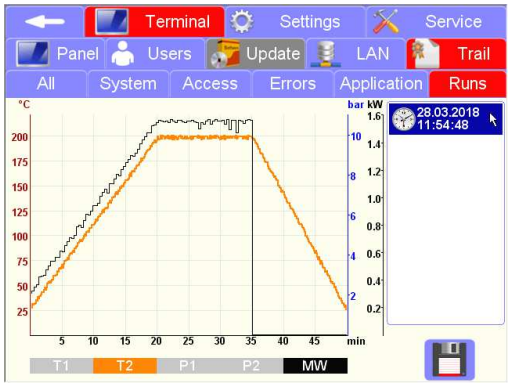




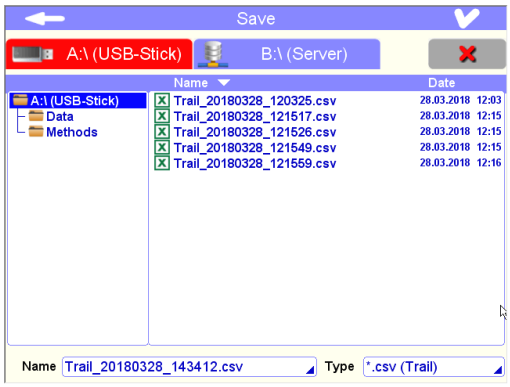
⚠	**The Trail cannot be deleted from the terminal if it has not previously been saved on an external media.* *If the trail file is deleted, this event is reported in the first line of the new trail file*

The Trail consultation can be simplified by selecting different search filters.

- **All**: shows all the messages and records.
- **System**: shows only the messages related to the system / software modifications.
- **Access**: shows the name and the data / time of login and log out of each users.
- **Errors**: all error messages
- **Application**: all method modifications
- **Runs**: chronological sequence of all the microwave runs with the temperature profile. The temperature profiles can be exported in .bmp or . xls format.



It is possible to export and save the Audit trail in a .csv (excel) file. The audit trail can be saved on a USB stick or directly on an external computer or server.



It's not possible to import an audit trail file on the software.

It is the user's responsibility to periodically save the audit trail file (create a Backup) and to preserve the integrity and reliability of the exported .csv trail saving the file on a device (USB, Computer, Server) validated by GMP.

It is the user's responsibility to periodically check the functionality of the external storage device.

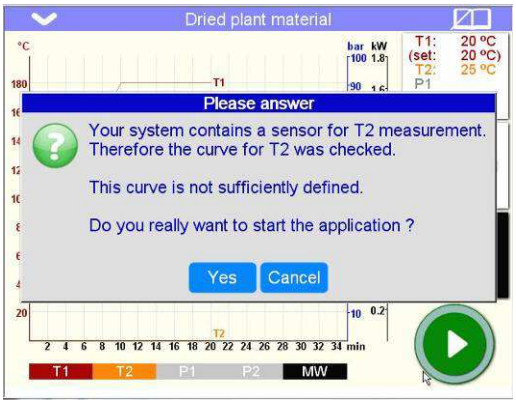
5.10 Messages and queries

Security query

To avoid accidental modifications to the method, the system performs security queries.

If the user starts a program which is not entitled or not possible, a message appears.

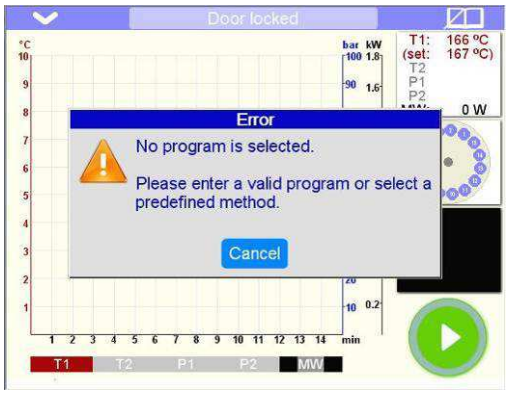
Messages are acknowledged by pressing the OK button.



Error messages

If an error is detected by the software, a window appears with the error message.

Error messages are acknowledged by pressing the Cancel button



List of queries and (error) messages

In this chapter, most queries and (error) messages and their meanings are listed. They are sorted by the following keywords:

Login
Sensors, Settings and Twist
File and data
Program
Sample table
Internal memory, disks and signature

5.10.1 Login

Text	Meaning / Comment
The password you entered is incorrect. Please repeat your entry or cancel the login.	The password you entered is invalid for the selected user.
You have no permissions for this device. Please contact your administrator.	The device has the login mode "with disk". The signature of the disk is part of a user who has no access to this device.
The registered name already exists. No name can be used twice. Choose a different name.	The name of the user must be different.

5.10.2 Sensors, Settings and Twist

Text	Meaning / Comment
In your system are no sensor inputs configured. Please contact your local service partner.	There are no configured sensors. The configuration of the sensors can be made only by the service (see Chapter sensor data).
Your system contains a sensor for pressure measurement. Therefore the pressure curve was checked. This curve is not sufficiently defined. Do you really want to start the application ?	The curve of a sensor is not completely defined. During the program the measuring of this parameter is not verified. This can lead to uncontrolled power output (see chapter description of the program parameters).
The control of the temperature sensors checked an error. The value of T1 (T2) has changed in one second of 25.0 ° C to 100.0 ° C and thus exceeded the limit of 50.0 ° C.	The sensor check has detected an error in the temperature measurement (see chapter Sensor Check). This message depends on the actual and nominal values and can vary according to the appearance.

	Check the temperature sensor and the placement of the sample (infrared sensor).
Your have not entered a value for the element "Control for". Please select one of the available sensor inputs.	You do not have defined the parameter according to which power has to be controlled. In the register Method \ Parameters you must specify which parameters you want to control (see Section parameters).
Twist function will be disabled. Temperature and pressure sensors can be damaged. Are you shure to deactivate the twist function ?	Security check when disabling the twist function (see also Chapter Twist)
Twist error A twist error occurred. Check the twist mode of your system.	No change of direction of rotation is detected by the system. Check the twist function or contact service.

5.10.3 File and Data

Text	Meaning / Comment
You have modified the current data collection. Do you really want to ignore these modifications and load the new data collection ?	You have not saved the current method. When you load a method, the current methods settings are overwritten, including the microwave program.
You have modified the current data collection. If you leave this page all data will be lost. Do you really want to ignore these modifications and leave this pages ?	You have not saved the current method. When you exit the application pages, an unsaved method is lost. The method can be stored in the register method.
File open error.	When opening a file, an error has occurred.
File read error.	When opening a file from disk an error has occurred. Old file formats are basically always readable.
Please enter a valid file name.	When you open or save a file, a file name must be specified (either by typing in the appropriate box or by selecting an existing file).
The file already exists. Do you want to overwrite the existing file ?	If a file is saved under the same name as an existing file, the existing file is overwritten.
File write error.	When writing a file on the disk, an error has occurred. Cause may be a full, missing or "destroyed" disk.
Do you really want to delete this file ?	Confirmation request before deleting a file. A deleted file is permanently lost.

5.10.4 Program

Text	Meaning / Comment
You have already executed a microwave application without storing these data. Do you want to ignore the recordings and start a new program ?	You have not saved the program file. During a restart, all unsaved data of the last run will be lost. The program file can be stored in the sequence register.
The program time of all segments is zero. Please specify a valid program or select a predefined method.	You have not yet defined a program. In the register, method \ program allows you to create a program or load from disk (see Chapter program).
Your microwave program is longer than 2 hours. Is it correct ?	In all applications, an examination of the length of the program takes place. With a length of more than 2 hours, this prompt appears. The program is not limited to 2 hours.
You have already run a microwave program without saving the data. By leaving this page, all the data will be lost. Would you really want to exit this page?	You have not saved the program file. When you exit the application pages, all unsaved data of the last run will be lost. The program file can be stored in the sequence register.
You have already executed a microwave application without storing these data. Do you want to ignore the recordings and load an old graphic file ?	The method and sample table are stored with the program file. When loading a sequence, the current method, sample table and chart of the course will be

Text	Meaning / Comment
	overwritten.

5.10.5 Sample table

Text	Meaning / Comment
You have made changes on your sample table. If you load an old sample table your modifications will be lost. Do you want to ignore these modifications and load an old sample table ?	When loading a sample table, the current sample table is overwritten
With this command all lines of your sample table will be deleted. Do you really want to delete all samples ?	Confirmation request before deleting a modified sample table from memory.

5.10.6 Internal memory, disks and signature

Text	Meaning / Comment
The internal memory is filled to over 90%. There is still enough available space for the recording.	The internal memory is almost full. The administrator should truncate the log. After shortening still remain 100 entries.
You have your drain signed, without saving it. Do you want to leave this page?	The signature is maintained until after the storage.
The disk already has a signature. The signature of the disk will be overwritten.	Security check before writing a signature on a disk that already has a signature. The existing signature is overwritten.
Error when writing the signature.	When writing the signature to the disk an error has occurred. Cause might be a defective or full disk.
Your disk has no signature. Please contact your administrator.	The device has the login mode "with disk". However, the inserted disk has no signature.
You can only activate this mode if you have a flash card with a signature for service or administrator.	The login mode can be selected only with a data carrier with service or administrator signature.
The image could not be saved. Verify that a disk is inserted and whether this has enough space for the image.	When you save the current program to disk an error has occurred. The disk is not connected, faulty or full.

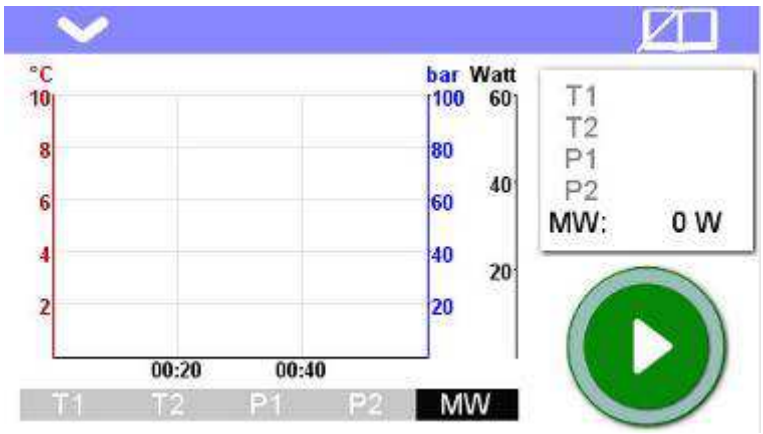
6 EASYCONTROL 480

6.1 Program start

Switching on the unit, also the terminal is turned on and the program is initialized.

There are different levels of access authorization that are described in the following program description.

Display during start procedure



Start screen

The green button in the lower right part of the screen is to start the method. By clicking the right thumbnails, they will be enlarged and displayed on the centre of the screen.

At time of the unit shipment, the password represented here is assigned.

The password can be changed in the Control Panel.

Administrator:	123456

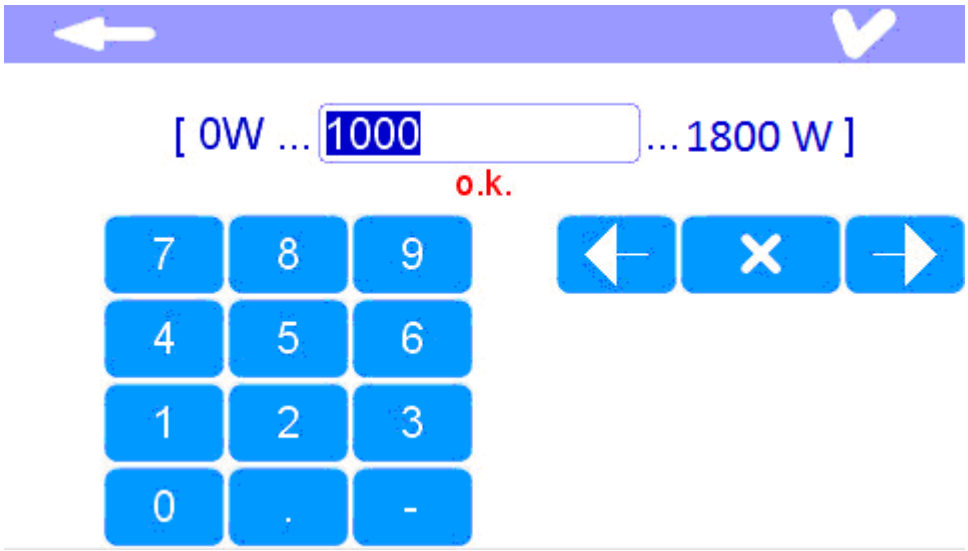
6.2 General operations tip

The software operations are carried out by a touch-screen. By touching the screen, the icons or the input fields are activated.

Activated fields are ready for input via a keyboard. By touching again the activated field, a numeric or standard keyboard appears on the screen.

6.2.1 Numeric input via touch-screen

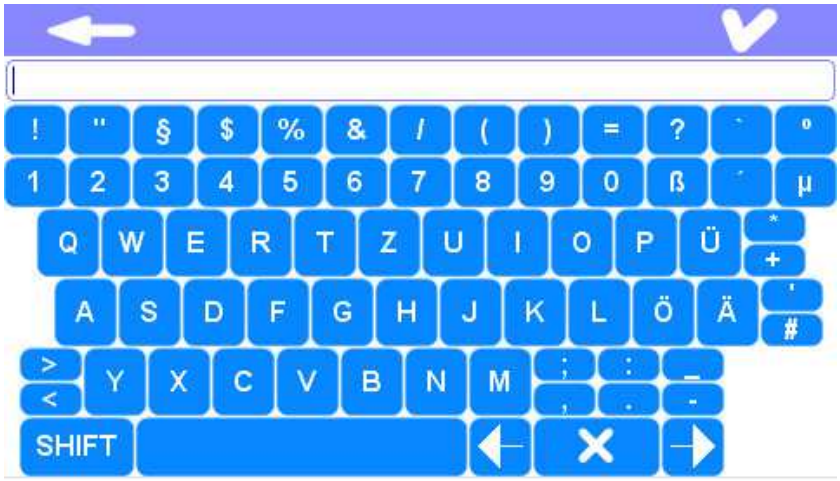
In several steps of the program it is necessary to enter numbers. Touching twice on the field or on the number to be changed, a numeric keyboard will appear



Numeric keyboard

6.2.2 Text input via touch-screen

For steps requiring a designation/description, a standard keyboard will appear by double-touching the touch-screen.

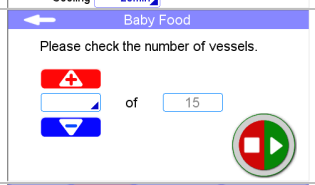
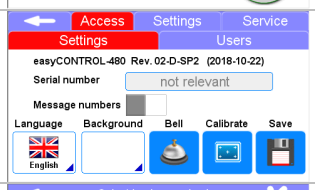
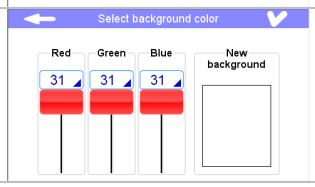


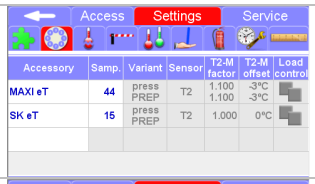
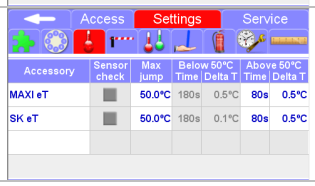
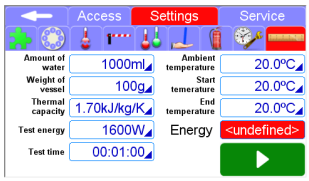
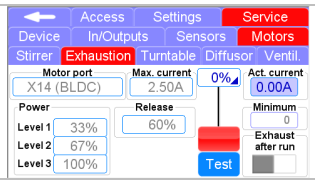
Standard keyboard

6.3 Generally used icons

	General Menu
	Methods menu
	Select - OK
	Delete - Cancel
	Save
	New
	Back to previous page
	START button

6.4 Editable fields with numeric values and defined range

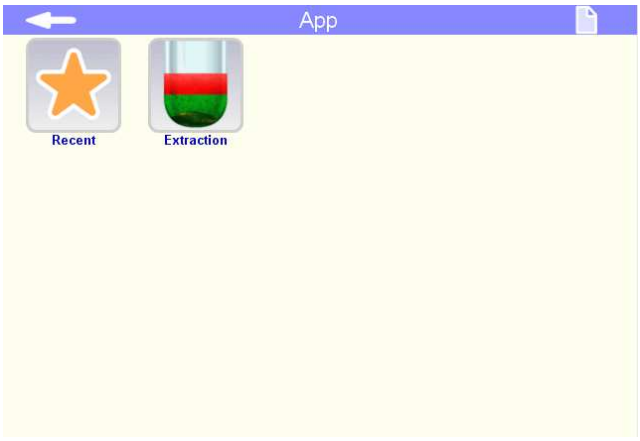
	• P2 limit: % • Door locking: °C
	• t (time): hh:mm:ss • MW (power): W • T2 (temperature 2): °C • P1 (pressure optional): bar • Cooling:min
	• Number of vessels loaded on the rotor plate: Number of vessels
 	• Background o Red o Green o Blue

	• Number of positions on the rotor plate: Samp.
	• Max jump: °C • Above 50°C: o Time: s o Delta T: °C
	• Amount of water: ml • Ambient temperature: °C • Weight of vessel: g • Thermal capacity: kJ/Kg/K • Start temperature: °C • End temperature: °C • Test energy: W • Test time
	• Exhaust fan speed: %

6.5 Methods

6.5.1 Method selection from Milestone database

By touching the upper right icon, you can enter into the selecting menu of the applications. In each category, you can find a series of pre-installed methods.



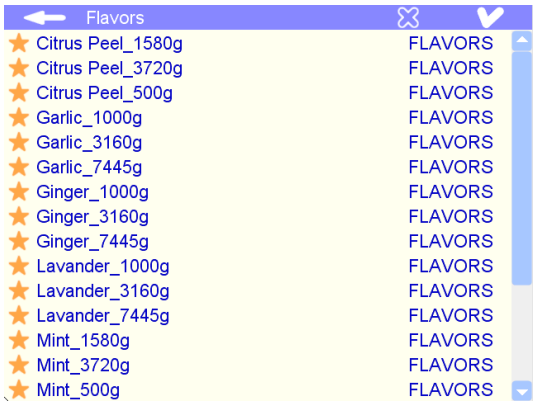
Applications

Categories

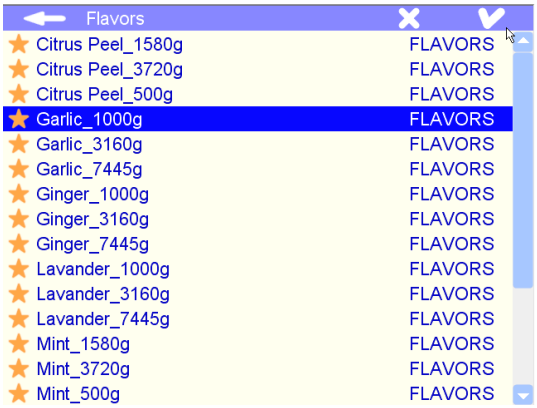
You require the Administrator access to open the categories (except for Recent).

Log in with your administration password.

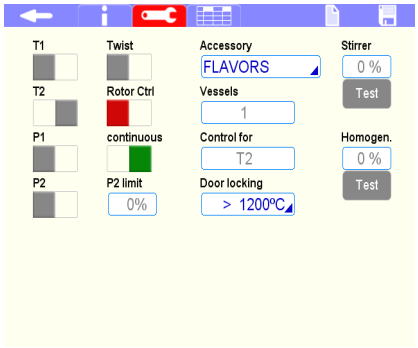
Here you can open and run several methods. The methods are optimized for each sample weight. For this reason, there are three different methods for each sample weight, which correspond to the three glass reactor sizes (Small, Medium and Large).

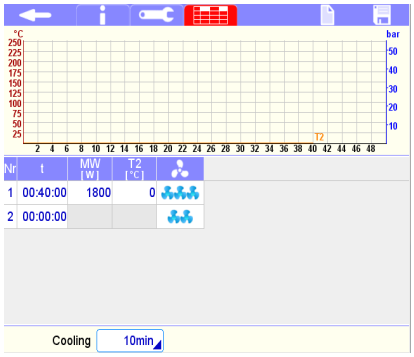


Select a method and click the upper right icon (check mark).



In the following registers, there are all method information and settings.



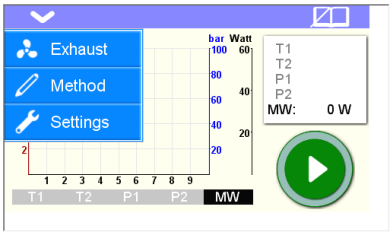


General information Setting Parameter

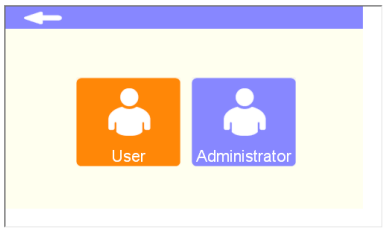
By clicking again the check mark, you can open and run the method.

6.5.2 Create new methods

Press the upper left check mark and select the icon methods.



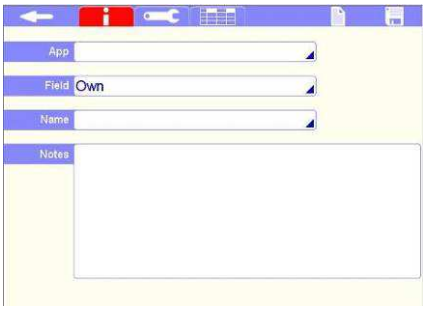
Log in as Administrator, in order to create a new method.

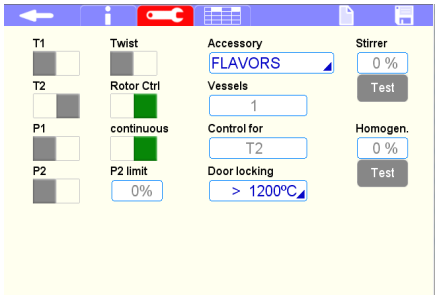


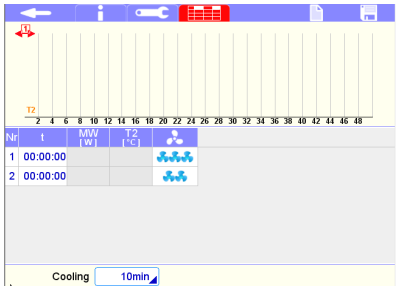
Log in with your Administrator password.

To create a new method, click on the icon shown in the upper right side of the screen.

In the following registers, there are all method information and settings.







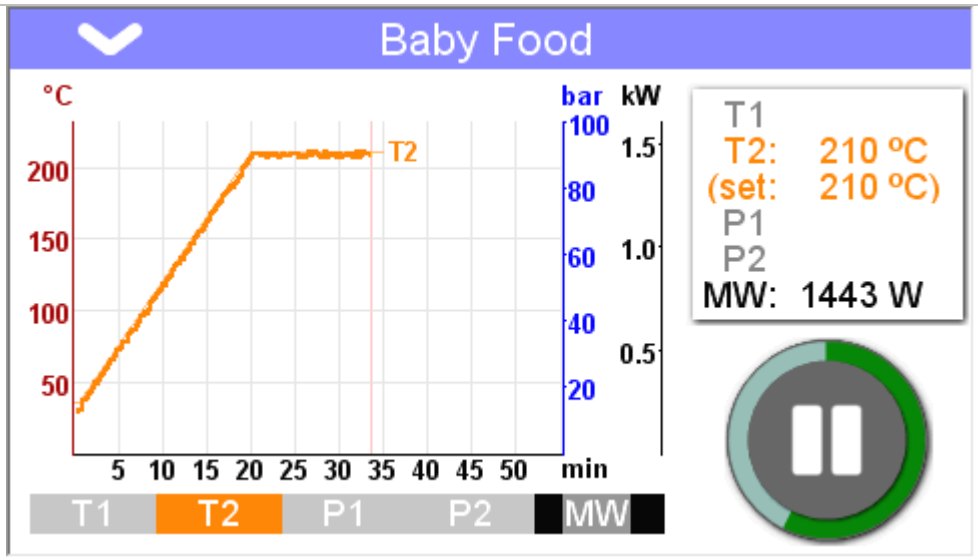
General information Setting Parameter

Many methods for fragrances require to work at constant power. In this case edit 0 in the T2 column and the desired time and power according to your development or to the application notes.

During the MW-cycle, the software records all data of control parameters. The gradients of temperature, pressure and power are displayed graphically in real time on graph.

The recorded curves of temperature (and pressure) appear in darker of the given curves.

After the program, the graph can be printed or saved on the USB pen.



Program sequence

PAUSE

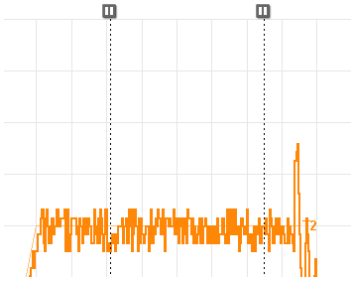
While the program is running, the pause icon appears to the right.

With the pause button the process can be interrupted (the timer is stopped and the microwave irradiation is stopped).

During the pause, the button changes to a split view. Now you can continue or stop the program.

In the graph, a marker appears from the point of interruption (at the top of the graph at the position where it was interrupted).

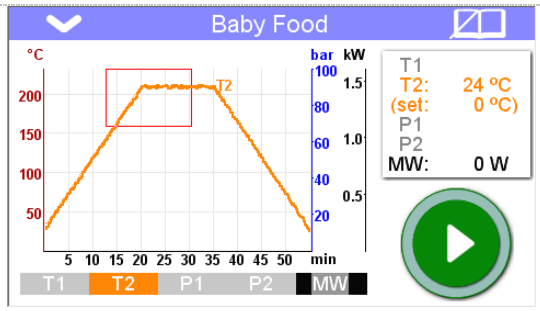
The opening of the chamber door has the same effect as pressing the pause button.



ZOOM

Touch the screen from the top left corner to the bottom right corner and you remain in the final position for about half a second before releasing.

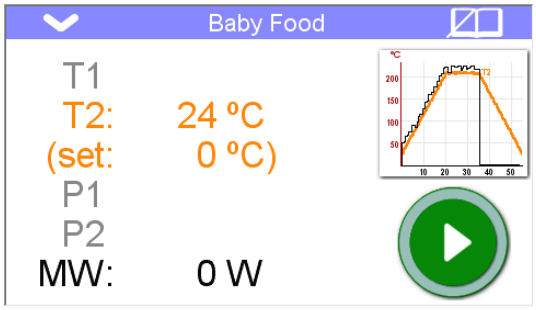
The section will be zoomed on screen



ZOOM-OUT

Below the graph the "Zoom Out" button appears. Tap this button to zoom out.

It's possible to follow the run selecting the window. Here there are all details about the actual internal temperature (set point and readed temperature), external temperature, pressure, microwave energy.



6.5.3 Graphical representation

The individual graphs can be displayed or hidden from the screen by pressing the corresponding button.

T1, RED

The curves (setpoint curve and measured curve) for the ATC (thermocouple) sensor, internal temperature.

T2, ORANGE

The curves (setpoint curve and measured curve) for the easyTEMP / Infrared temperature.

P, BLU

Curve of internal pressure

E, BLACK

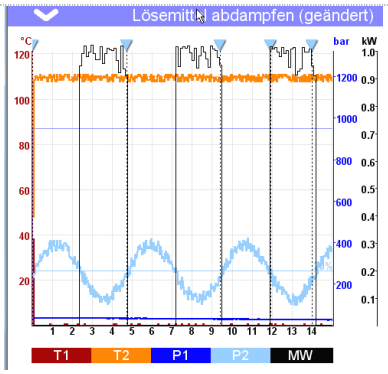
Curve of the Microwave emission

P2, LIGHT BLU

Curve of P2 (QP sensor) that detect venting of the vessels by detecting the amount of NOx or Cl_2 in the cavity.

SELECTION OF P2

When this button is activated, marks appears on graphic, if the P2-limit is exceeded. When pressing the button again, the P2 signal is shown as a line.



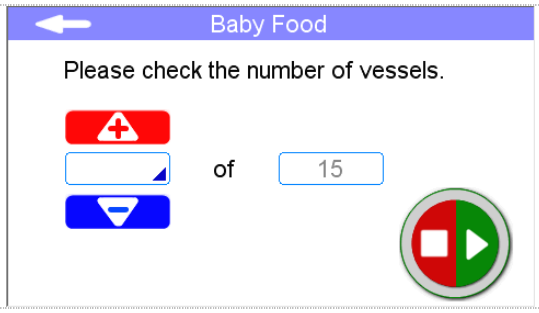
6.5.4 Load control function

For rotors which are directly controlled by the easyTEMP, the load control function is activated.

This function regulates the supplied microwave power depending on the number of vessels in the rotor to avoid temperature overshooting during the run.

According to the rotor configuration, when you start the digestion program, the software asks to indicate the number of vessels that you are using.

With a MAXI-44 rotor, a minimum of 10 vessels must be indicated to have a better functionality of the system.



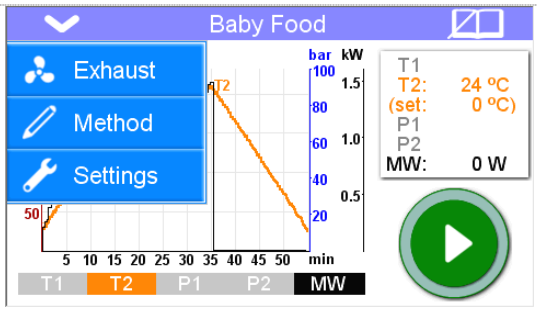
6.6 Setup

This part of software is dedicated for the setup of the system and only the Service login profile can change all parameters.

Administrator and Manager can change few parameters form this page.

To enter the Setup menu, click on the upper left icon of the screen and then on the settings icon in the menu.

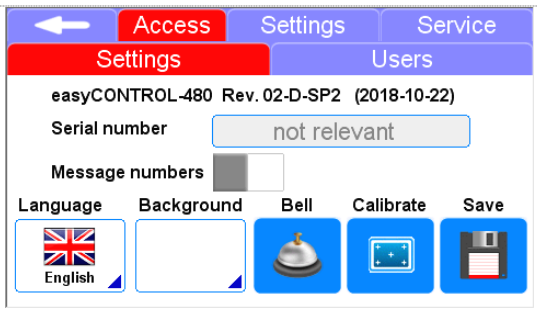
Here you have to log with the administrator password.



6.6.1 Access window

Settings

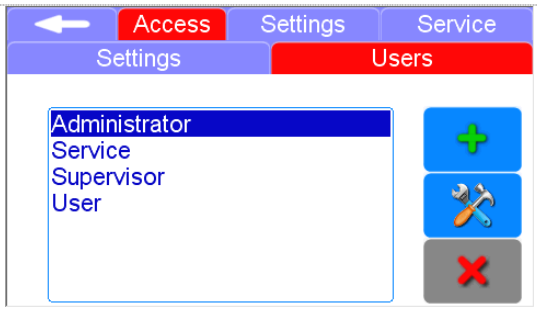
Here you can edit the general setting of the terminal.



Users

In this section you can :

- Create new users or administrators or edit existing ones;

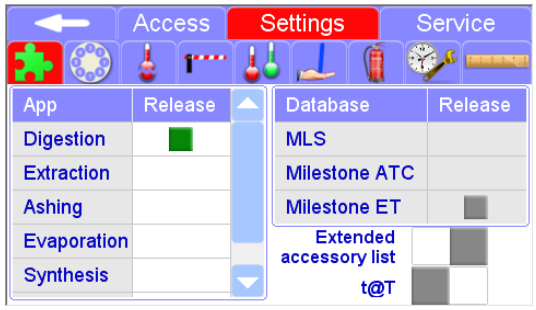


6.6.2 Settings window

In the following sections you can edit the system settings. The shaded settings can only be changed by the service. The Printer icon allows to print the setting.

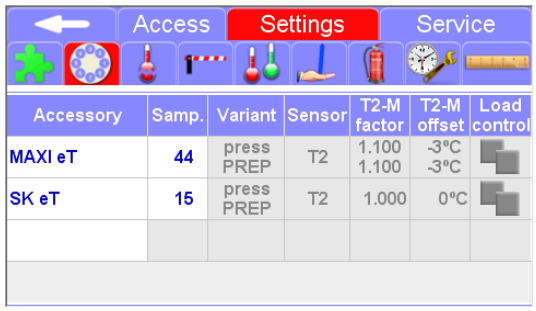
Applications

Here you have the possibility to select the application library according with your configuration.



Rotor

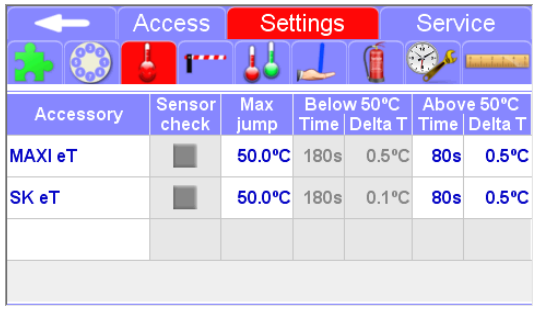
In this section you can set the number of vessels for each rotor type or add new rotor types.



Sensor Check

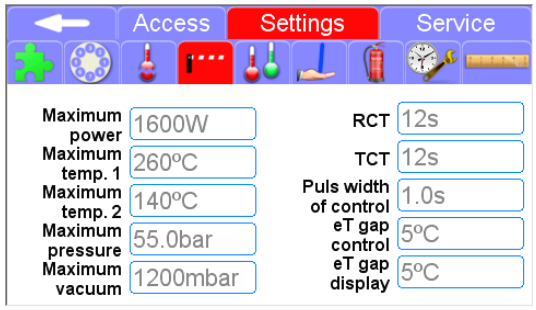
In this section, for each rotor type it is possible to set a different temperature and time range of the sensor check alarm.

Contact your service engineer for more details about these values.



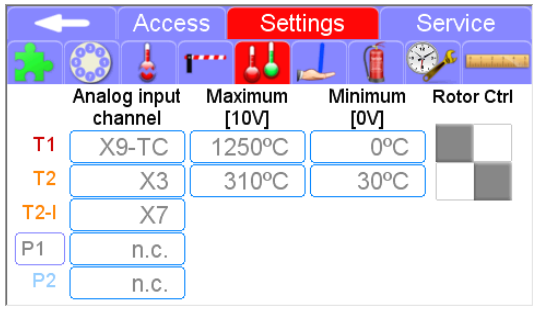
Maximum working conditions

These limits can only be set by Service.



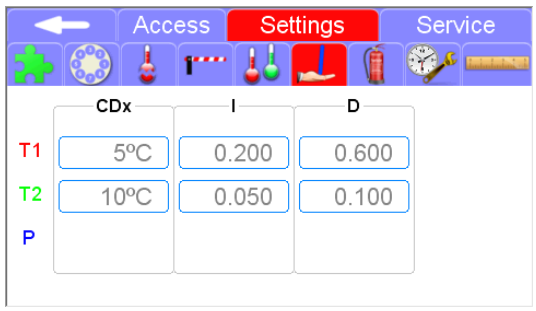
Sensor settings

These settings can only be edited by Service



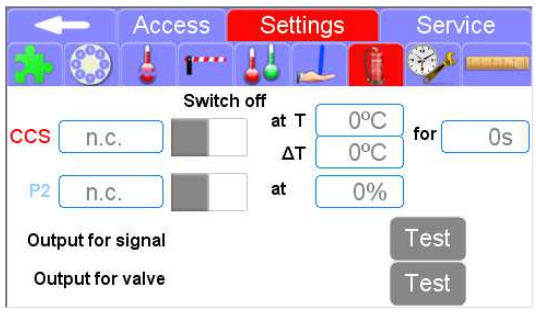
Control settings

These settings can only be edited by Service



Cavity control system (CCS)

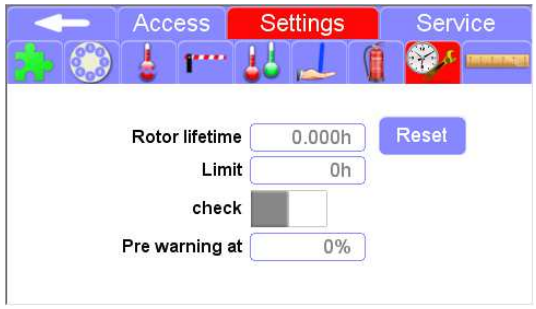
The settings of the cavity control system (CCS) can only be edited by Service.



Rotor lifetime

Here is an automatic countdown of the number of digestion cycles. at the end of the number of cycles, a message will appear to remind you to replace the consumable parts of the rotor.

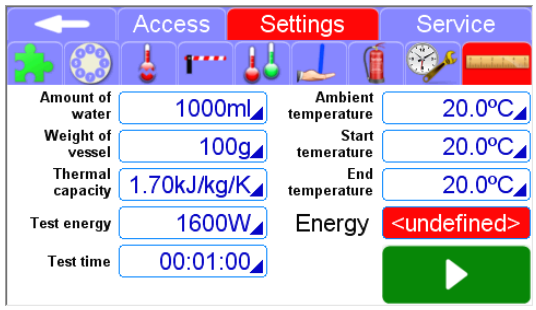
The administrator can at any time reset the countdown.



MW energy test

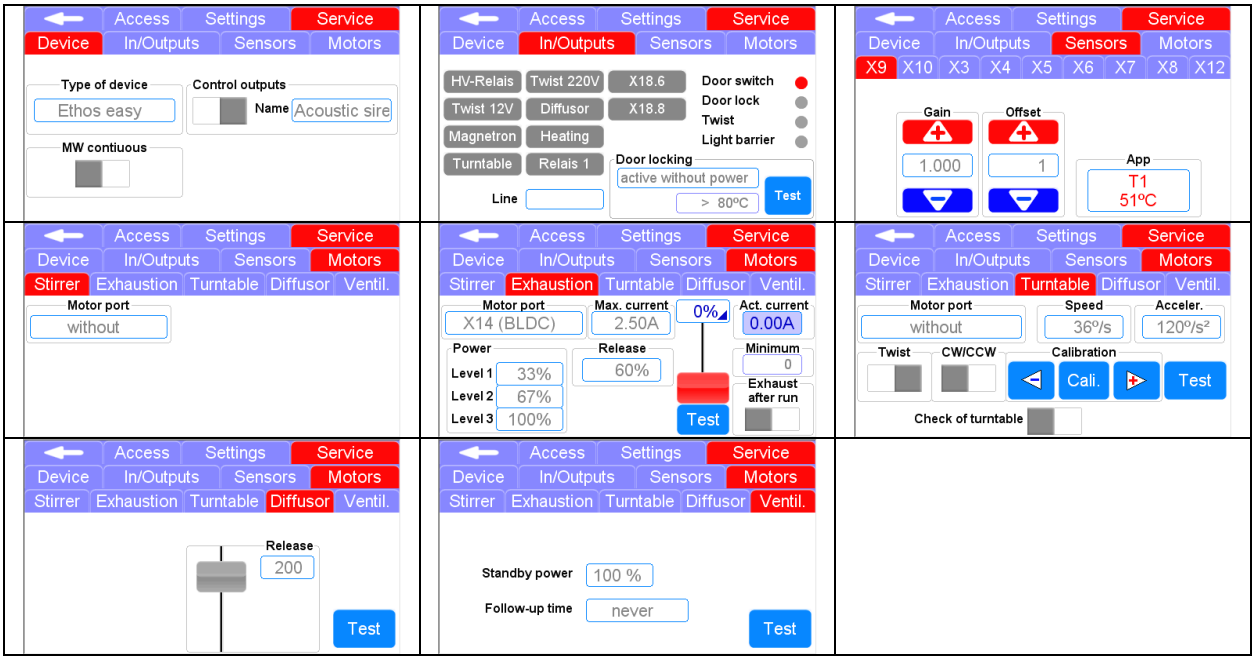
This window is for the microwave energy test.

Contact your service engineer for more details about the test.



6.6.3 Setup window

The below parameters can be modified only by a Milestone service engineer.


Access
Settings
Service
Device
In/Outputs
Sensors
Motors
Type of device
Ethos easy
Control outputs
Name
Acoustic sire
MW contiuous
HV-Relais
Twist 220V
X18.6
Twist 12V
Diffusor
X18.8
Magnetron
Heating
Turntable
Relais 1
Door switch
Door lock
Twist
Light barrier
Door locking
active without power
> 80°C
Test
Line
X9
X10
X3
X4
X5
X6
X7
X8
X12
Gain
Offset
1.000
1
App
T1
51°C
Stirrer
Exhaustion
Turntable
Diffusor
Ventil.
Motor port
without
X14 (BLDC)
Max. current
2.50A
0%
Act. current
0.00A
Power
Level 1
33%
Level 2
67%
Level 3
100%
Release
60%
Minimum
0
Exhaust after run
Speed
Acceler.
36°/s
120°/s²
Twist
CW/CCW
Calibration
Cali.
Check of turntable
200
Standby power
100 %
Follow-up time
never

6.7 List of queries and (error) messages

In this chapter, most queries and (error) messages and their meanings are listed. They are sorted by the following keywords:

6.7.1 Login

Text	Meaning/Comment
The password you entered is incorrect. Please repeat your entry or cancel the login.	The password you entered is invalid for the selected user.
You have no permissions for this device. Please contact your administrator.	The device has the login mode "with disk". The signature of the disk is part of a user who has no access to this device.
The registered name already exists. No name can be used twice. Choose a different name.	The name of the user must be different.

6.7.2 Sensors, Settings and Twist

Text	Meaning/Comment
In your system no sensor inputs are configured. Please contact your local service partner.	There are no configured sensors. The configuration of the sensors can be made only by the service (see Chapter sensor data).
Your system contains a sensor for pressure measurement. Therefore the pressure curve was checked. This curve is not sufficiently defined. Do you really want to start the application ?	The curve of a sensor is not completely defined. During the program the measuring of this parameter is not verified. This can lead to uncontrolled power output (see chapter description of the program parameters).
The control of the temperature sensors checked an error. The value of T1 (T2) has changed in one second of 25.0 ° C to 100.0 ° C and thus exceeded the limit of 50.0 ° C.	The sensor check has detected an error in the temperature measurement (see chapter Sensor Check). This message depends on the actual and nominal values and can vary according to the appearance. Check the temperature sensor and the placement of the sample (infrared sensor).
You have not entered a value for the element "Control for". Please select one of the available sensor inputs.	You do not have defined the parameter according to which the power has to be controlled. In the register Method \ Parameters you must specify which parameters you want to control (see Section parameters).
Twist function will be disabled.	Security check when disabling the twist function (see also

Temperature and pressure sensors can be damaged. Are you sure to deactivate the twist function ?	Chapter Twist)
Twist error A twist error occurred. Check the twist mode of your system.	No change of direction of rotation is detected by the system. Check the twist function or contact service.

6.7.3 Program

Text	Meaning / Comment
You have already executed a microwave application without storing these data. Do you want to ignore the recordings and start a new program ?	You have not saved the program file. During a restart, all unsaved data of the last run will be lost. The program file can be stored in the sequence register.
The program time of all segments is zero. Please specify a valid program or select a predefined method.	You have not yet defined a program. In the register method \ program allows you to create a program or load from disk (see Chapter program).
Your microwave program is longer than 2 hours. Is it correct ?	In all applications, an examination of the length of the program takes place. With a length of more than 2 hours, this prompt appears. The program is not limited to 2 hours.
You have already run a microwave program without saving the data. By leaving this page, all the data will be lost. Would you really want to exit this page?	You have not saved the program file. When you exit the application pages all unsaved data of the last run will be lost. The program file can be stored in the sequence register.
You have already executed a microwave application without storing these data. Do you want to ignore the recordings and load an old graphic file ?	The method and sample table are stored with the program file. When loading a sequence, the current method, sample table and chart the course will be overwritten.

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