



MILESTONE
H E L P I N G
C H E M I S T S



Flavors

Microwave Green Extraction
of Natural Products

Operator Manual

MA218

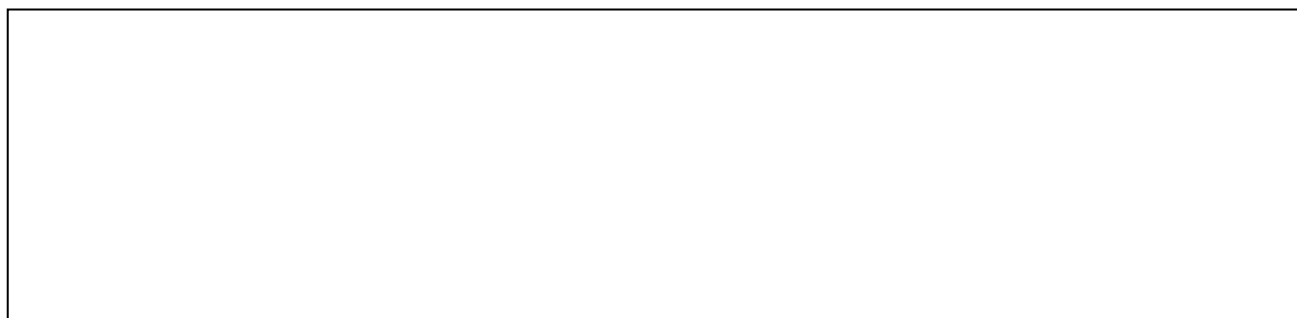


MILESTONE

H E L P I N G
C H E M I S T S

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:

Milestone Srl

Via Fatebenefratelli, 1/5

24010 Sorisole (BG) Italy

Tel +39 035 573857

Fax +39 035 575498

Website www.milestonesrl.com

E-mail analytical@milestonesrl.com

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 Flavors configuration is used in any way in which the instrument is not intended to be used.

Publication date (gg/mm/aaaa) 28/10/2020

INDEX

1	SAFETY RULES.....	4
1.1	General Information.....	4
1.2	Safety rules for Start-up.....	5
1.3	Safety in operations.....	5
1.4	Safety in service operations.....	5
1.5	No manipulation of the unit allowed.....	5
1.6	Parts replacement.....	5
1.7	Customer support.....	5
1.8	Other hints.....	6
1.9	Instructions for safety operations.....	6
1.10	Care of glassware and accessories.....	7
1.11	Maintenance and care.....	7
2	SENSORS.....	9
2.1	Temperature sensor.....	9
2.1.1	Contactless temperature control (T2).....	9
2.1.2	Care Instructions.....	9
2.2	Power.....	10
3	BASICS OF MICROWAVE EXTRACTION.....	12
3.1	Introduction.....	12
3.2	Preparation.....	12
3.2.1	Fresh Botanical.....	12
3.2.2	Dried Botanical.....	13
3.2.3	Frozen botanical.....	13
4	ADDITIONAL DEVICES.....	14
4.1	Chiller.....	14
5	FLAVORS KIT SET UP.....	15
5.1	Flavors kit set up when using the conical flange.....	15
5.2	Flavors kit set up when using the spherical flange.....	20
5.3	Applications.....	25
5.4	Technical notes.....	26
6	EASYCONTROL 480.....	36
6.1	Program start.....	36
6.2	General operations tip.....	37

6.2.1	Numeric input via touch-screen	37
6.2.2	Text input via touch-screen	37
6.3	Generally used icons	38
6.4	Editable fields with numeric values and defined range	38
6.5	Methods	39
6.5.1	Method selection from Milestone database	39
6.5.2	Create new methods	41
6.5.3	Graphical representation	43
6.5.4	Load control function	44
6.6	Setup	44
6.6.1	Access window	44
6.6.2	Settings window	45
6.6.3	Setup window	46
6.7	Create, Edit, Delete a User profile	47
6.7.1	First Steps	47
6.7.2	Overview of user profiles and access levels	48
6.7.3	Create a new ID user profile	49
6.7.4	Edit or Delete an existing ID user profile	51
7	MESSAGES AND INQUIRIES	52
7.1	List of queries and (error) messages	52
7.1.1	Login	52
7.1.2	Sensors, Settings and Twist	53
7.1.3	Program	53

1 SAFETY RULES

1.1 General Information



Flavors configuration

- 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.
- 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 correct functioning of the unit and user's safety, all replacement parts must be exclusively original supplied by Milestone. Original spare parts are guaranteed 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 by 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 must be processed only in the glass reactors tested and released by MILESTONE.
- The operator must carefully follow the appendixes 5.1 and 5.2 of this manual to set up the glassware correctly before starting the extraction.
- MILESTONE does not take up the responsibility for an accidental breakage of the glassware.
- The system is thought to perform solvent-free microwave extractions. The use of any organic solvent is therefore strictly forbidden.
- The system is thought to perform extractions at atmospheric pressure. Working under pressure is strictly forbidden.
- The boiling point of water imposes the maximum temperature reached during an extraction process (100°-110°C).

- 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.
- In anycase, the pursuing of different applications must be discussed with Milestone Application Specialist prior to be applied.
- 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.

1.10 Care of glassware and accessories

Glassware and accessories such as glass reactors, distillation module, holders etc. should be regularly checked and cleaned to avoid damages. 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. For any requests, contact Milestone or the authorized distributor in your country.

1.11 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.
- 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.
- If the microwave unit is equipped with a QP sensor for digestion, do not use cleaning agents containing alcohol or solvents, because such substances are responsible for the sensor output signal for several days, and the sensor cannot be used.
- 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.

2 SENSORS

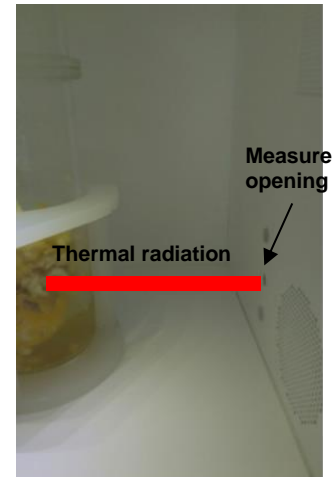
2.1 Temperature sensor

2.1.1 Contactless temperature control (T2)

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

The measuring of the infrared warm radiation from a body depends on the following factors:

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



IR-TC-Sensor

Even if the boiling point of water imposes the maximum reachable temperature, the control of the temperature (T2) is of great benefit to monitor constantly the extraction.

2.1.2 Care Instructions

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



To ensure a correct measuring of the IR sensor, the sensor 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 must be cleaned after every run.

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

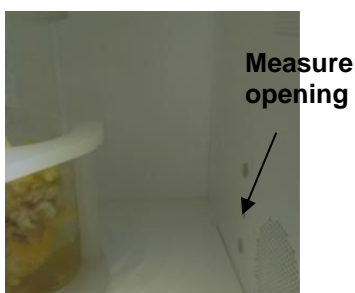
In case of contamination, accidental liquid spillage or unusual program, the IR sensor must be cleaned after each run.

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.

Cleaning of IR contactless sensor temperature control

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

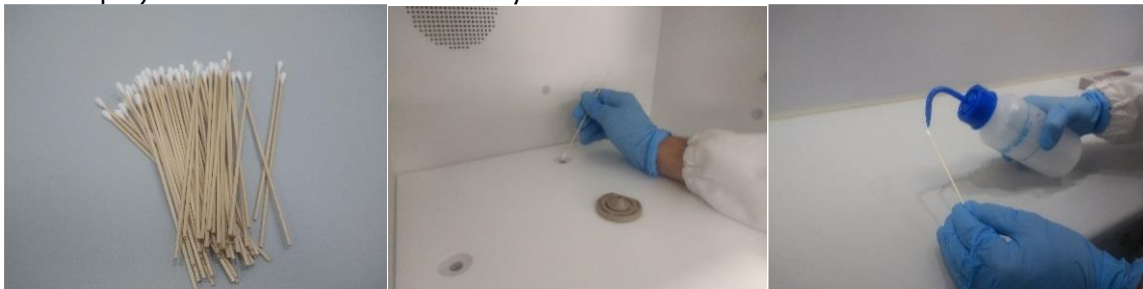
1. The IR sensor is located on the right side of the cavity.



2. Remove the 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 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

eT protection sticker (KLEB007A)

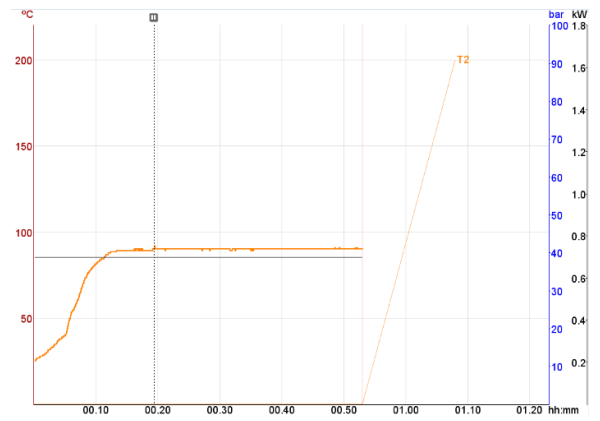


If used, eT protection sticker conditions must be periodically checked and, in case of scratches or changes in the color of the window, it must be replaced. To check the conditions of eT protection sticker, repeat the eT calibration test (explained above), placing the cover on eT sensor. If both tests, with and without sticker, are passed, the sticker is in good conditions and it can be re-used. In case the test fails, the protection sticker must be replaced with a new one.

2.2 Power

The system can reach a maximum power of 1800W, accomplished by the presence of two magnetrons of 900 W each. The power must be set at the beginning and remains constant during the extraction process. It is extremely important to set the right power before starting the extraction process, since it is a function of the amount of the sample loaded. To understand how to set the power properly, please refer to the Application Book.

On the right, you can find a typical temperature curve of a performed extraction. As shown, the power remains constant during the whole run, while temperature reaches approximately the boiling point of water.



3 BASICS OF MICROWAVE EXTRACTION

3.1 Introduction

Flavors can be extracted from several botanical sources using the ETHOS X Flavors Package. For the extraction of flavors there are not any particular solvent requires. There are differing conditions based on the material being extracted. The categories of botanical are Fresh, Dried, and Frozen. The main factor in utilizing the ETHOS X for extraction is water content. The material needs to have enough moisture for the microwave assisted hydro-diffusion to work properly without degrading the plant material.



The suitable method to perform extraction of flavors and flavors is included in the control software. With these tested programs, a large variety of samples can be successfully extracted.

Specific method are described in the Application book as well as the general guideline to optimize and prepare new methods.

Essential oil extracted from the flavors kit shown in same case strong solvent properties. Store the essential oil in glass vials and use the proper PPE.

3.2 Preparation

The material being extracted should be pre-treated prior to extraction in the ETHOS X. The material should be weighed and placed into a large mixing container. For some samples, for example orange peel, a grinding could improve the extraction efficiency. Next water will need to be measured by weight and added at the appropriate proportion based of the category of material being used as described below. The contents of the mixing container are then mixed thoroughly. Using gloved hands for this works extremely well as the material can be kneaded like dough which causes water to incorporate within the plant material. After mixing, the soaked contents will need to sit for 15-20 minutes to be certain the water is completely throughout the plant material prior to introducing it to the vessel of the Falvors package for the ETHOS X. The amount of water will be determined based off the material being utilized of the three categories above, the water amount is critical in successful flavors extraction.

Most of the flavors will be extracted and isolated from the plant material when the botanical is processed through the ETHOS X Flavor Package. Below are some general guidelines to follow for the differing materials being used as the starting material based on the above categories.

3.2.1 Fresh Botanical

Fresh material is material that has been harvested from the plant without any further processing. The material is still moist with the natural water content of the plant. Freshly harvested material should have about 75% water content naturally. Fresh will be considered material that has been harvested not long ago and has not had much time to dry out; thereby still incorporating the moisture naturally from the growing season. Anything else will fall into another one of the categories to follow.

Fresh material should be pre-treated with 1 gram of water to 1 gram of material (for example: 500g of Fresh material should have 500g of water should be added to it).

The ratio is 1 to 1 Fresh to water, respectively.

3.2.2 Dried Botanical

Dried material is plant material that has had its' moisture removed either on purpose or naturally by time after harvest. This material has had the water removed, one way or another, and will need substantial water to be added with it to induce the extraction of the flavors using microwave hydrostatic distillation. Please read below carefully:

Dried material needs to be pre-treated with 3 grams of water to every 1 gram of plant material (for example: 500g of Dried material needs to have 1500 g of water added to it). Soaking time might be increased to 30 minutes with larger batch sizes to help offset the lack of water within the material.

The ratio is 1 to 3, Dried to water, respectively

Dry material will require more soak time and excess water for good extraction. Be certain to mix this material extremely well, using the fingertips to break up any larger clumps until a fine, spongy, completely soaked material is obtained in the mixing container. Before the appropriate soak, be certain to tamp the soaking material down so that it is level along the top. It will be correct when at the beginning of the soak, pressing a thumb into the material will leave an indentation that has a small pool of water at the lowest point. At this point re-flatten the top to remove the indentation created and let soak for the appropriate time. Each batch might be different, so soak at least 30 minutes to be certain that moisture is incorporated throughout all plant material. Unfortunately, as each batch of this material will be slightly different, an exact time nor amount of water can not be pre-deduced. This material will require a little experimentation, however, 1 to 3 is a good starting ratio of Dry material to Water, respectively, with a 30 minutes soak. Slight adjustments might be necessary.

3.2.3 Frozen botanical

Material that has been harvested and immediately frozen. If it has been processed in any way prior to freezing (ground or dried, and then frozen), treat it as Dried material. Frozen material normally will have ice crystals collected on the outside of the buds during the freezing process. These crystals add water into the mixture, so a lesser amount of moisture needs to be reincorporated. Allow this material to warm to room temperature prior to soaking to allow efficiency when utilizing the microwave energy. This material should soak just like the other forms prior to extraction.

Frozen material should be allowed to warm to room temperature, then pre-treated with 1 grams of water to every 1 gram of plant material (for example: 500g of Frozen material should have 500 water added).

The ratio will be 1 to 1, Frozen to water, respectively.

NOTE: Again; this is for immediately frozen material after harvesting. TREAT ALL OTHER FROZEN MATERIAL AS DRIED MATERIAL.

4 ADDITIONAL DEVICES

4.1 Chiller

Depending on the amount of material treated per batch, two different water chillers are suggested: H150-1000 and H150-2100 (both developed and manufactured by LabTech), or equivalent. They differentiate by the maximum power they can supply, since the amount of water to be cooled down strictly depends on the amount and the water content of the plant material in input. In each application note it is clarified how to choose the right chiller for material treated. Please find below the technical specifications of the two chillers.

Tech-Specs	H150-1000	H150-2100
Temperature range	8°C ~ 35°C	8°C ~ 35°C
Temperature stability	±0.1°C	±0.1°C
Temperature control mode	PID	PID
Cooling capacity	1500 W	2100 W
Pump flux	6L/min@60psi	13L/min@60psi
Pump power	120 W	250 W
Pump type	Magnetic	Magnetic
Heat exchanger model	BOARD	BOARD
Dimension mm(LxWxH)	670x385x625	735x460x703
Weight	78Kg	92Kg



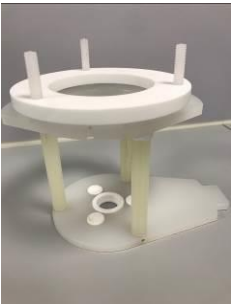
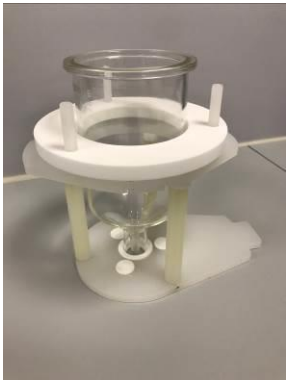
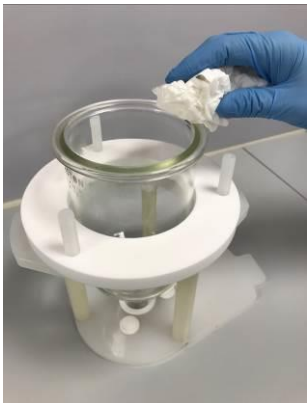
Before to connect the chiller to the glass modules, be sure that the output pressure is max 3 bar

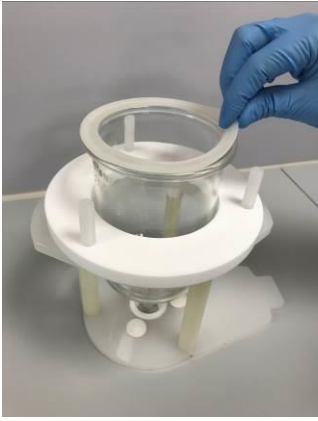
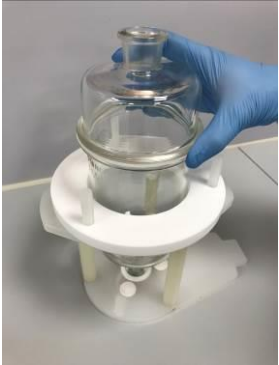
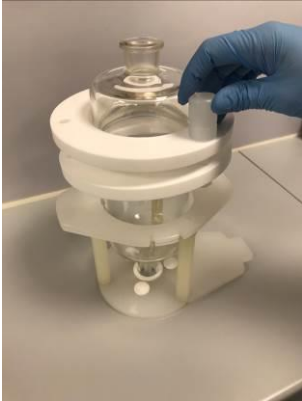
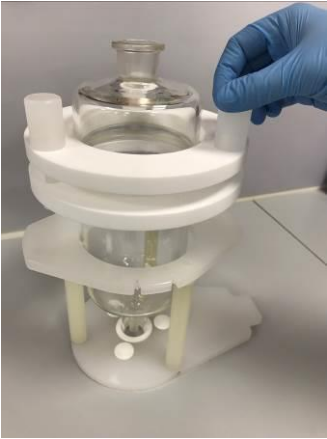
5 FLAVORS KIT SET UP


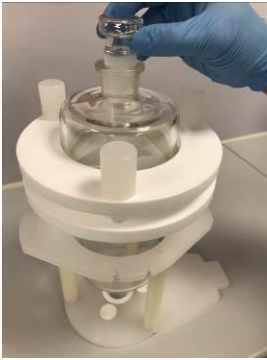



A very efficient extraction process can be achieved thanks to the selective heating of microwaves to materials, through molecular interactions with the electromagnetic field via conversions of electromagnetic energy into thermal energy. The high quality flavors are obtained through Microwave Hydrodiffusion and Gravity (MHG) technique, please refer to the: for more info on this technique, please refer to the Application Book. Please find below the steps to properly set up the flavors configuration, depending on the type of starting raw material.




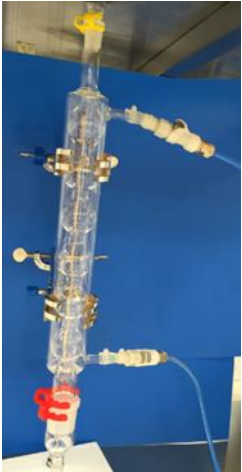
There are two different setting up procedures to follow, depending whether the flange section that connects the glass reactor to the glass condenser is conical or spherical.


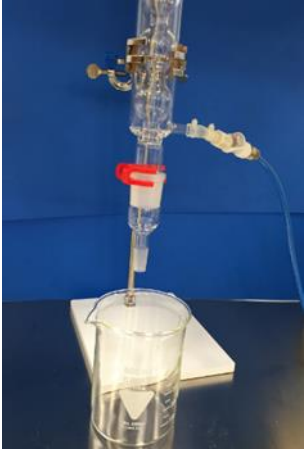
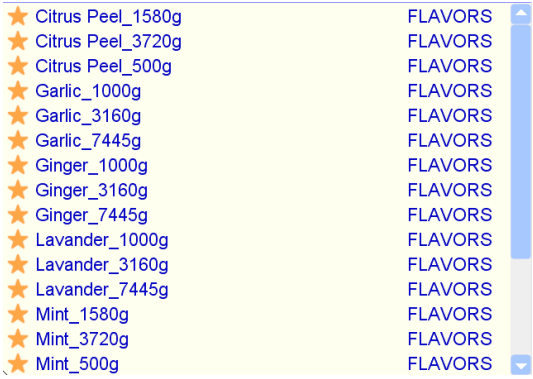
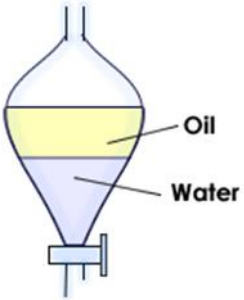
5.1 Flavors kit set up when using the conical flange

Step	PICTURE	DESCRIPTION
1		Place Bottom Ring of the Sealing Clamp onto the Vessel Holder
2		Place the loaded Vessel into the Vessel Holder
3		Dry carefully the upper flange of the reactor with paper

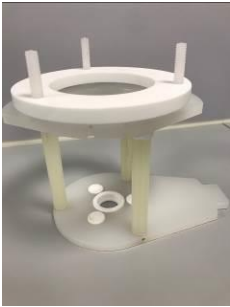
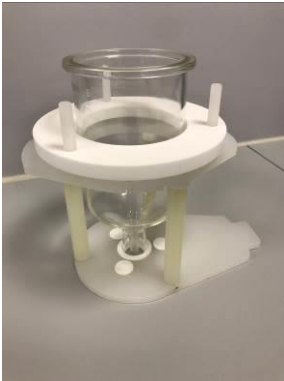
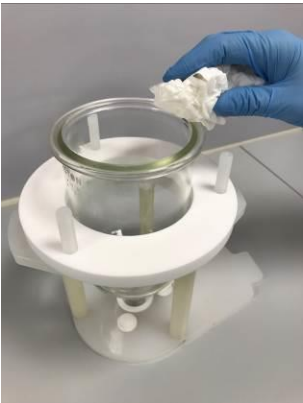
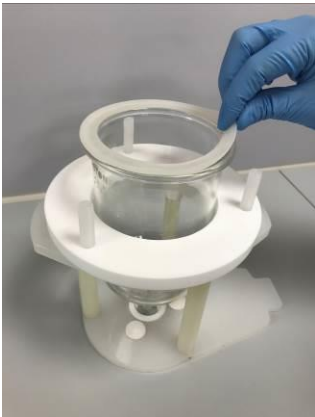
4		<p>Place Silicon Gasket onto the ground-glass lip of the Vessel</p>
5		<p>Place Vessel Lid centred onto the top of the Silicon Gasket</p>
6		<p>Place Top Sealing Ring onto the Vessel Lid</p>
7		<p>Use the four Poly Tightening Nuts to Secure the Top and Bottom Ring together which seals the Lid to the Vessel</p> <ul style="list-style-type: none">• Do not deform ring during this step• Hand tighten to slight tension; tighten across, not in a circle

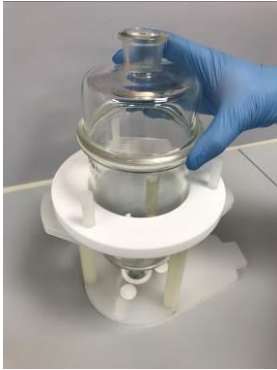
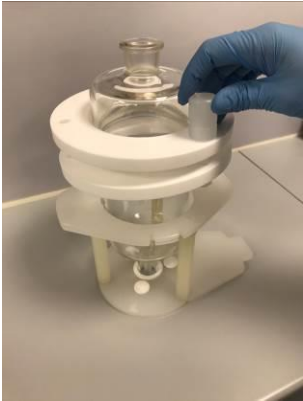
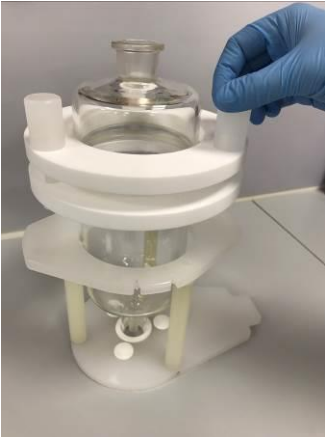

8		Place the PTFE sleeve on the glass cap
9		Place the glass cap on the reactor lid
10		Install the Cavity Positioning Plate into the back to the Ethos X cavity
11		Place assembled Vessel into the cavity of the Ethos X
12		Place the holder inside the positioning plate

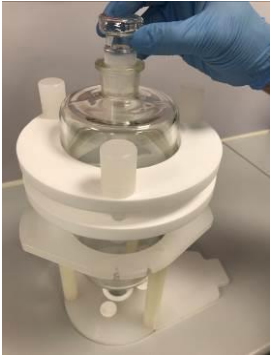

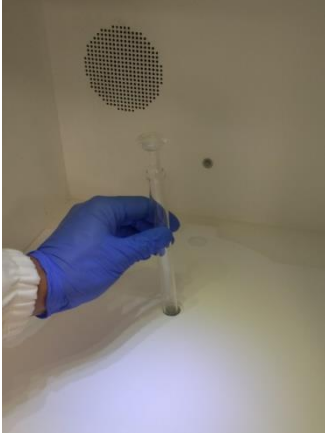
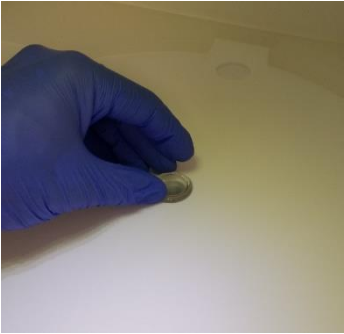
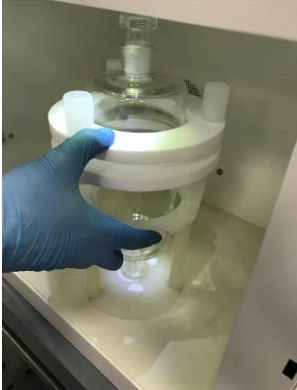
13		Assemble glass condenser, glass connection and glass joint through the clips
14		Connect the previous assembled condensing system to the glass reactor using the glass joint
15		Properly fasten the condenser to the external glassware support
16		Connect the inlet and outlet chiller tubes

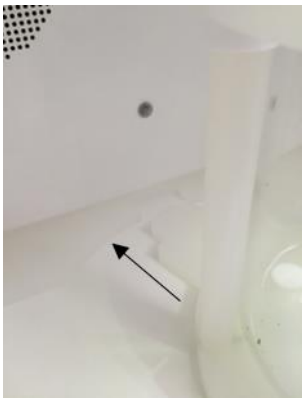



17		Set the Chiller at 8°C
18		Place the collecting Becker on the bottom of the condensing system
19		Set one of the following method the following method and press start
20		At the end of the extraction, collect the flavor product or place the extract in a separating funnel for the recovery of volatile

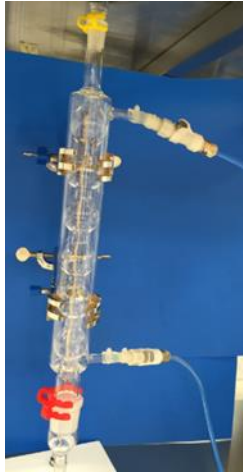

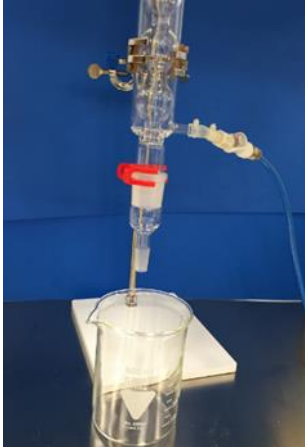
5.2 Flavors kit set up when using the spherical flange

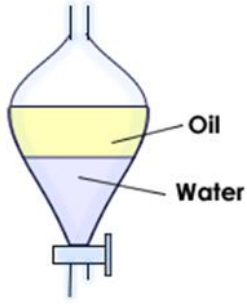
Step	PICTURE	DESCRIPTION
1		Place Bottom Ring of the Sealing Clamp onto the Vessel Holder
2		Place loaded, Vessel into the Vessel Holder
3		Dry carefully the upper flange of the reactor with paper
4		Place Silicon Gasket onto the ground-glass lip of the Vessel

5		<p>Place Vessel Lid centred onto the top of the Silicon Gasket</p>
6		<p>Place Top Sealing Ring onto the Vessel Lid</p>
7		<p>Use the four Poly Tightening Nuts to Secure the Top and Bottom Ring together which seals the Lid to the Vessel</p> <ul style="list-style-type: none">• Do not deform ring during this step• Hand tighten to slight tension; tighten across, not in a circle
8		<p>Place the PTFE sleeve on the glass cap</p>

9		Place the glass cap on the reactor lid
10		Install the Cavity Positioning Plate into the back to the Ethos X cavity
11		Insert the glass joint into the dedicated hole
12		Ensure that it lays down properly
13		Place the assembled vessel into the cavity of the Ethos X

14		Place the holder inside the positioning plate
15		Connect the glass condenser to the glass joint
16		insert the female head of the glass joint in the male flange of the reactor by lifting it up through the glass condenser
17		Properly fasten the condenser to the external glassware support

<p>18</p>		<p>Connect the inlet and outlet chiller tubes</p>																														
<p>19</p>		<p>Set the Chiller at 8°C</p>																														
<p>20</p>		<p>Place the collecting Becker on the bottom of the condensing system</p>																														
<p>21</p>	<table border="0"> <tr><td>★ Citrus Peel_1580g</td><td>FLAVORS</td></tr> <tr><td>★ Citrus Peel_3720g</td><td>FLAVORS</td></tr> <tr><td>★ Citrus Peel_500g</td><td>FLAVORS</td></tr> <tr><td>★ Garlic_1000g</td><td>FLAVORS</td></tr> <tr><td>★ Garlic_3160g</td><td>FLAVORS</td></tr> <tr><td>★ Garlic_7445g</td><td>FLAVORS</td></tr> <tr><td>★ Ginger_1000g</td><td>FLAVORS</td></tr> <tr><td>★ Ginger_3160g</td><td>FLAVORS</td></tr> <tr><td>★ Ginger_7445g</td><td>FLAVORS</td></tr> <tr><td>★ Lavander_1000g</td><td>FLAVORS</td></tr> <tr><td>★ Lavander_3160g</td><td>FLAVORS</td></tr> <tr><td>★ Lavander_7445g</td><td>FLAVORS</td></tr> <tr><td>★ Mint_1580g</td><td>FLAVORS</td></tr> <tr><td>★ Mint_3720g</td><td>FLAVORS</td></tr> <tr><td>★ Mint_500g</td><td>FLAVORS</td></tr> </table>	★ Citrus Peel_1580g	FLAVORS	★ Citrus Peel_3720g	FLAVORS	★ Citrus Peel_500g	FLAVORS	★ Garlic_1000g	FLAVORS	★ Garlic_3160g	FLAVORS	★ Garlic_7445g	FLAVORS	★ Ginger_1000g	FLAVORS	★ Ginger_3160g	FLAVORS	★ Ginger_7445g	FLAVORS	★ Lavander_1000g	FLAVORS	★ Lavander_3160g	FLAVORS	★ Lavander_7445g	FLAVORS	★ Mint_1580g	FLAVORS	★ Mint_3720g	FLAVORS	★ Mint_500g	FLAVORS	<p>Set one of the following method the following method and press start</p>
★ Citrus Peel_1580g	FLAVORS																															
★ Citrus Peel_3720g	FLAVORS																															
★ Citrus Peel_500g	FLAVORS																															
★ Garlic_1000g	FLAVORS																															
★ Garlic_3160g	FLAVORS																															
★ Garlic_7445g	FLAVORS																															
★ Ginger_1000g	FLAVORS																															
★ Ginger_3160g	FLAVORS																															
★ Ginger_7445g	FLAVORS																															
★ Lavander_1000g	FLAVORS																															
★ Lavander_3160g	FLAVORS																															
★ Lavander_7445g	FLAVORS																															
★ Mint_1580g	FLAVORS																															
★ Mint_3720g	FLAVORS																															
★ Mint_500g	FLAVORS																															





22	 <p>The diagram shows a pear-shaped separating funnel with a stopcock at the bottom. It is divided into two horizontal layers. The upper layer is colored yellow and has a label 'Oil' with a line pointing to it. The lower layer is colored blue and has a label 'Water' with a line pointing to it. The funnel has a narrow neck at the top and a stopcock at the bottom.</p>	<p>At the end of the extraction, collect the flavor product or place the extract in a separating funnel for the recovery of volatile</p>
----	---	--

5.3 Applications



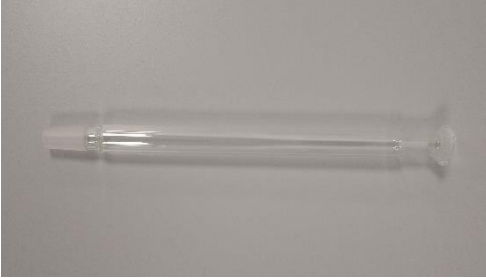

Please refer to the Application Book for applicative issues.

5.4 Technical notes

Flavors extraction kit (PN 70980) includes the following parts :



P/N	Picture	Description
70981		Glass condenser 415mm (flavors)
70982		Glass connection
70983		Clips for glassware 19/23
91209		Clips for glassware 29/32

90076		Glass cap
70196		Silicon tube 6 x 10 (length: 2m)
SL0050		PU tube for cooling water (blue), 1m – 6m required
91210		Female connectors (x2)

91211		Male connectors (x2)
70984 or 70984A	 	Glass joint F-M 250mm for conical flange Glass joint F-M 250mm for spherical flange
70985		Becker 1000 mL


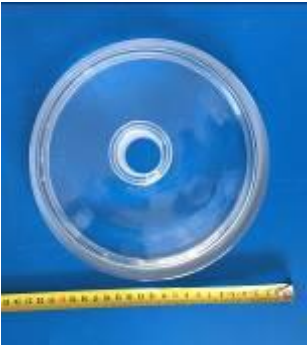
70963		Silicon grease
-------	---	----------------

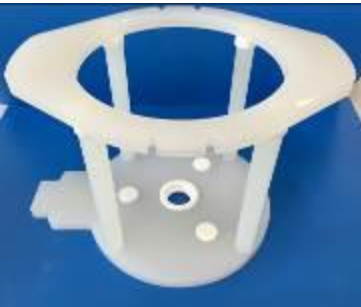
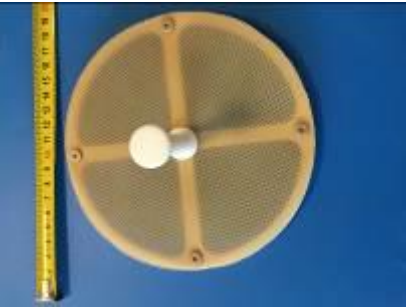



Cone-shaped glass reactor S complete with glass cover, filter net and dedicated holder (PN 70900A) includes the following parts :

P/N	Picture	Description
70901		Cone-shaped glass reactor S (max 2L) with conical flange
or		
70901A		Cone-shaped glass reactor S (max 2L) with spherical flange

70932	 A clear, circular glass cover with a central hole, shown next to a yellow ruler for scale on a blue background.	Glass cover for S reactor
70933	 A white plastic holder with a circular top and four vertical legs, shown on a blue background.	Holder for S reactor
70902	 A circular, orange-colored filter net with a central white cap, shown next to a yellow ruler for scale on a blue background.	S filter net mesh 460 microm
90023	 A white, square-shaped PTFE sleeve, shown on a blue background.	PTFE sleeve for joint 29/32
70925	 A white plastic kit containing three cylindrical sealing rings, shown on a grey background.	Sealing rings kit, S
70926	 A white, circular silicon sealing ring, shown on a grey background.	Silicon sealing ring

Cone-shaped glass reactor M complete with glass cover, filter net and dedicated holder (PN 70910A) includes the following parts :

P/N	Picture	Description
70911 or 70911A		Cone-shaped glass reactor M (max 5L) with conical flange Cone-shaped glass reactor M (max 5L) with spherical flange
70942		Glass cover for M reactor

70943		Holder for M reactor
70912		M filter net mesh 460 microm
90023		PTFE sleeve for joint 29/32
70975		Sealing rings kit, M
70974		Silicon sealing ring


Cone-shaped glass reactor L complete with glass cover, filter net and dedicated holder (PN 70920A) includes the following parts :

P/N	Picture	Description
-----	---------	-------------

70921 or 70921A		Cone-shaped glass reactor L (max 12L) with conical flange Cone-shaped glass reactor L (max 12L) with spherical flange
70952		Glass cover for L reactor
70953		Holder for L reactor
70922		L filter net mesh 460 microm

90023		PTFE sleeve for joint 29/32
70959		Sealing rings kit, L
70954		Silicon sealing ring

Other components :

P/N	Picture	Description
70960		Positioning Plate

70961	 A tall, thin, silver metal rod stands vertically on a white rectangular base. The background is a solid blue color.	External glassware support
91206	 A pair of silver metal pliers with a yellow circular grip on one handle, lying horizontally on a blue background.	Pliers
91207	 A silver metal clamp with a long handle and a curved, adjustable grip, lying horizontally on a blue background.	Clamps
FS0240	 A stainless steel table with a flat top surface and four legs. It has a lower shelf and is mounted on casters. The background is a plain, light-colored wall.	Working station

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

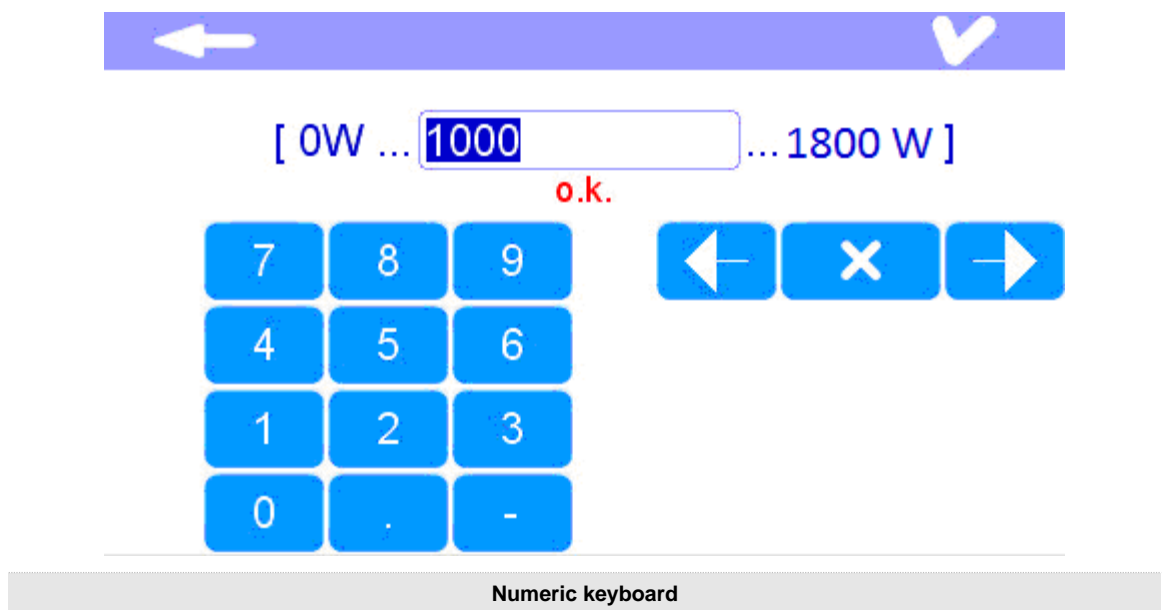
6.2 General operations tip

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.

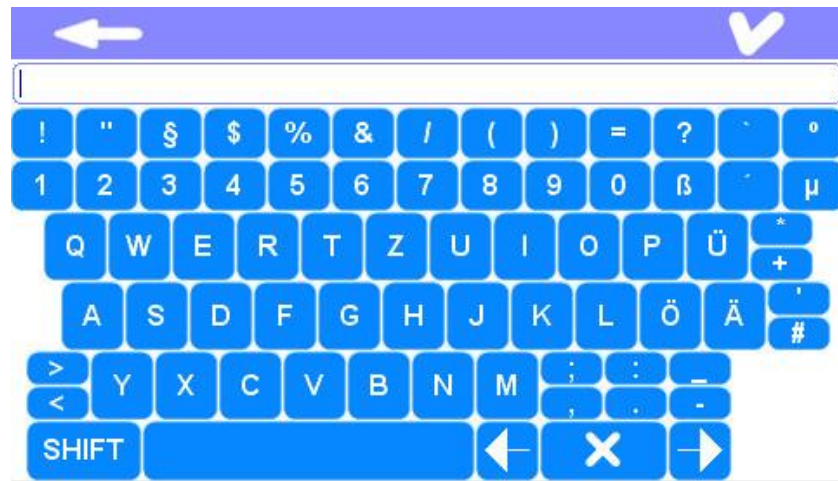
6.2.1 Numeric input via touch-screen

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











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.

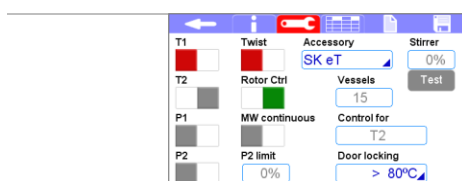


Standard keyboard

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



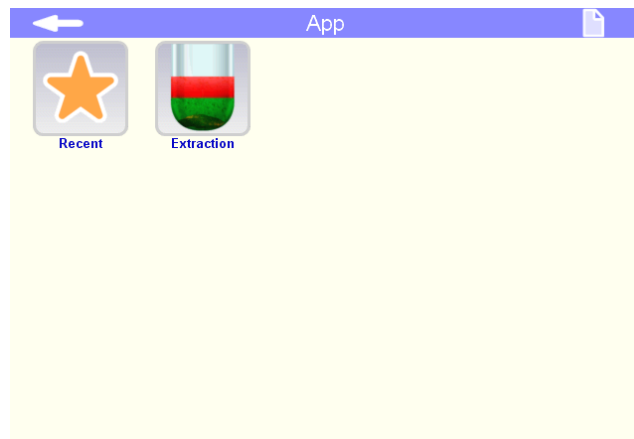
- P2 limit: %
- Door locking: °C

	<ul style="list-style-type: none"> t (time): hh:mm:ss MW (power): W T2 (temperature 2): °C P1 (pressure optional): bar Cooling:min
	<ul style="list-style-type: none"> Number of vessels loaded on the rotor plate: Number of vessels
	<ul style="list-style-type: none"> Background <ul style="list-style-type: none"> Red Green Blue
	
	<ul style="list-style-type: none"> Number of positions on the rotor plate: Samp.
	<ul style="list-style-type: none"> Max jump: °C Above 50°C: <ul style="list-style-type: none"> Time: s Delta T: °C
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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



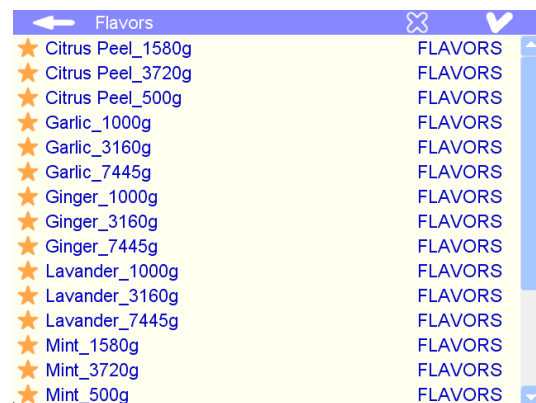
Categories

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

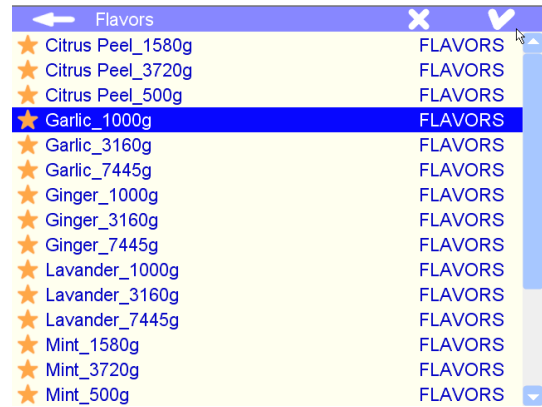
Log in with your administration password.



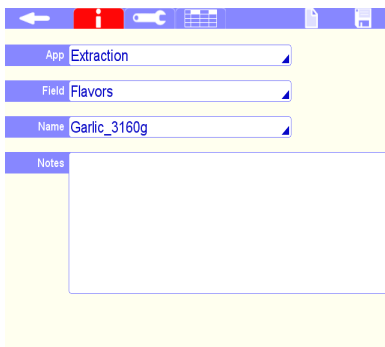
Here you can open and run several methods. The methods are optimized for each sample weight. For this reason, there are three different methods for each sample weight, which correspond to the three glass reactor sizes (Small, Medium and Large).



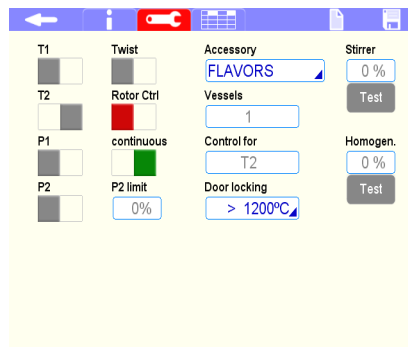
Select a method and click the upper right icon (check mark).



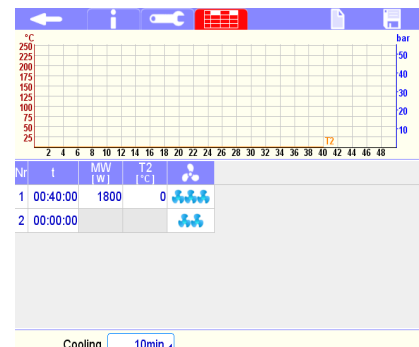
In the following registers, there are all method information and settings.



General information



Setting

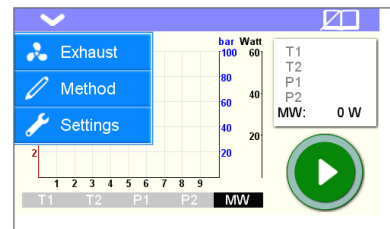


Parameter

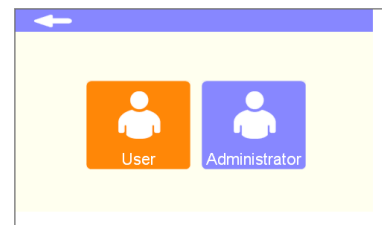
By clicking again the check mark, you can open and run the method.

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.



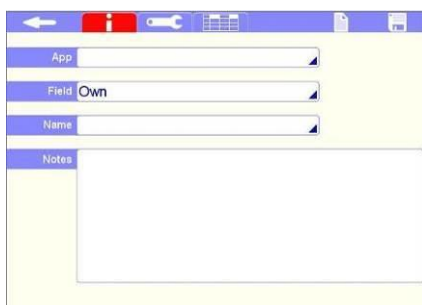
Log in with your Administrator password.



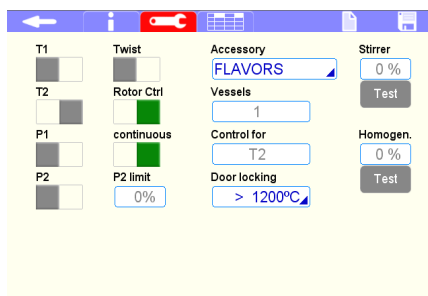
To create a new method, click on the icon shown in the upper right side of the screen.



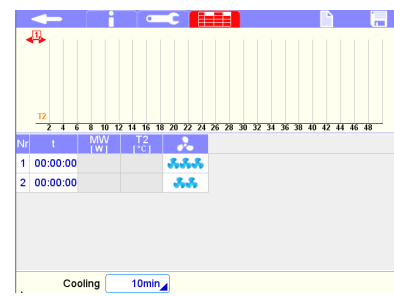
In the following registers, there are all method information and settings.



General information



Setting



Parameter

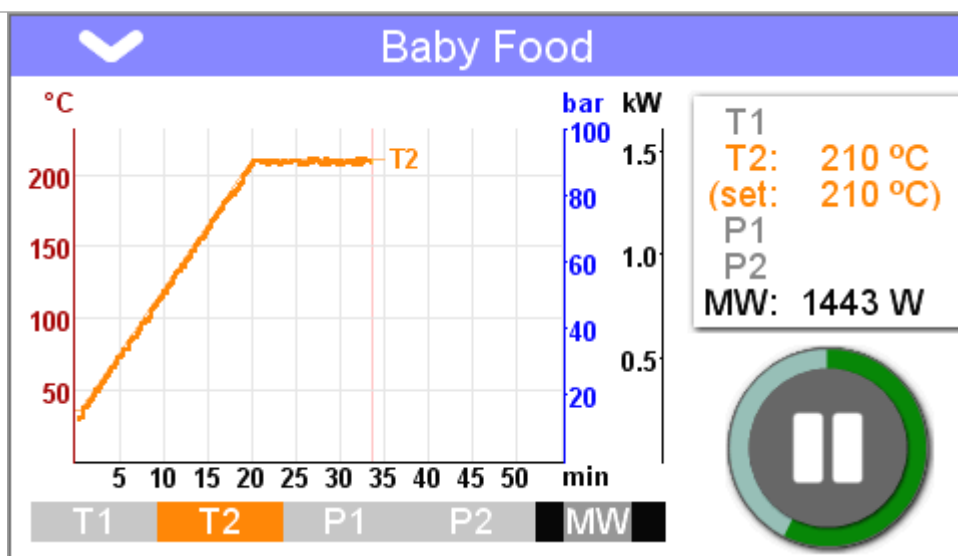


Many methods for flavors require to work at constant power. In this case edit 0 in the T2 column and the desired time and power according to your development or to the application notes.

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).

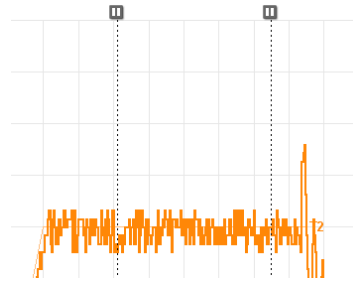


During the pause, the button changes to a split view. Now you can continue or stop the program.



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

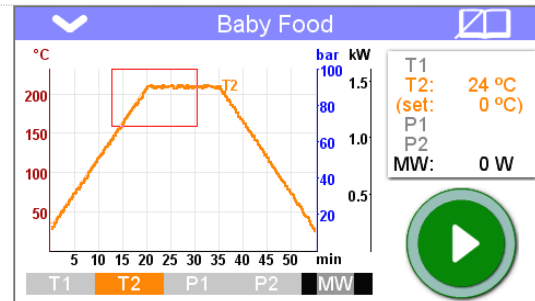
The opening of the chamber door has the same effect as pressing the pause button.



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

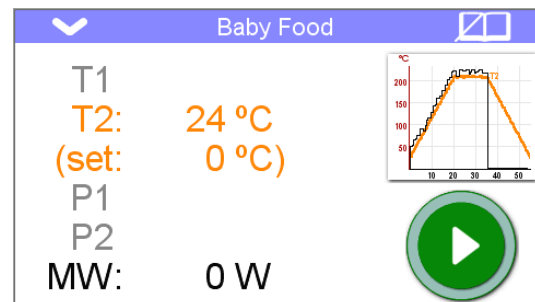


ZOOM-OUT

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



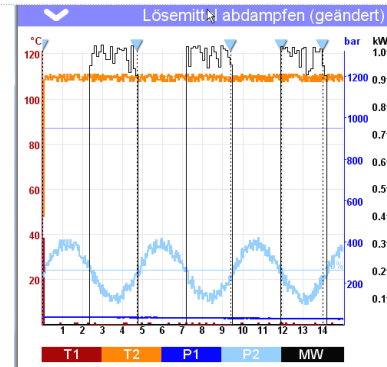
P2, LIGHT BLU

Curve of P2 (QP sensor) that detect venting of the vessels by detecting the amount of NOx or Cl₂ 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

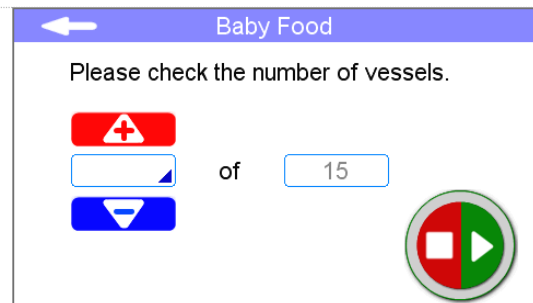
For rotors which are directly controlled by the easyTEMP, the load control function is activated.

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.



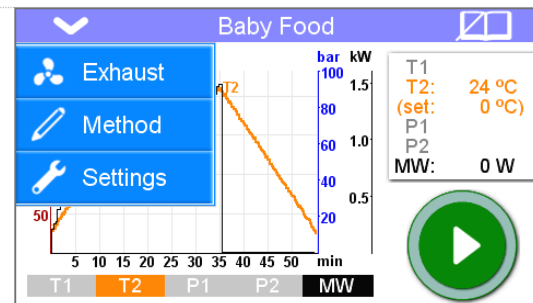
6.6 Setup

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.

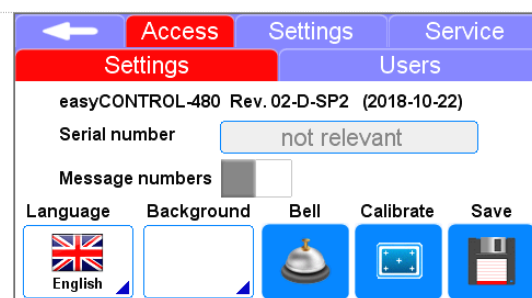
Here you have to log with the administrator password.



6.6.1 Access window

Settings

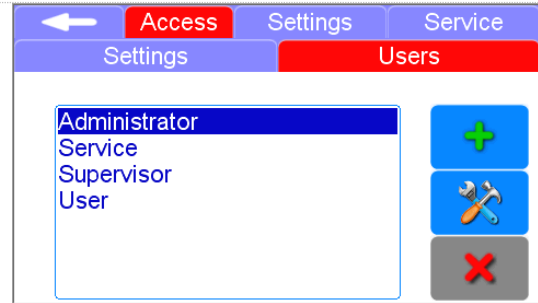
Here you can edit the general setting of the terminal.



Users

In this section you can :

- Create new users or administrators or edit existing ones;

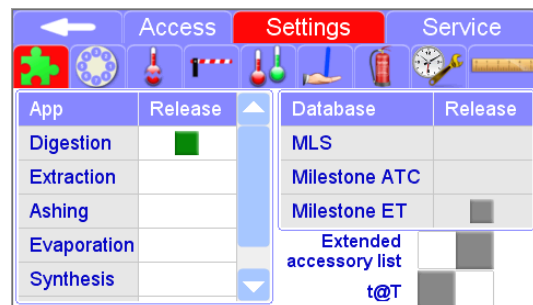


6.6.2 Settings window

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.

Accessory	Samp.	Variant	Sensor	T2-M factor	T2-M offset	Load control
MAXI eT	44	press PREP	T2	1.100	-3°C	<input type="checkbox"/>
SK eT	15	press PREP	T2	1.000	0°C	<input type="checkbox"/>

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.

Accessory	Sensor check	Max jump	Below 50°C Time	Delta T	Above 50°C Time	Delta T
MAXI eT	<input type="checkbox"/>	50.0°C	180s	0.5°C	80s	0.5°C
SK eT	<input type="checkbox"/>	50.0°C	180s	0.1°C	80s	0.5°C

Maximum working conditions

These limits can only be set by Service.

Maximum power	1600W	RCT	12s
Maximum temp. 1	260°C	TCT	12s
Maximum temp. 2	140°C	Puls width of control	1.0s
Maximum pressure	55.0bar	eT gap control	5°C
Maximum vacuum	1200mbar	eT gap display	5°C

Sensor settings

These settings can only be edited by Service

	Analog input channel	Maximum [10V]	Minimum [0V]	Rotor Ctrl
T1	X9-TC	1250°C	0°C	<input type="checkbox"/>
T2	X3	310°C	30°C	<input type="checkbox"/>
T2-I	X7			
P1	n.c.			
P2	n.c.			

Control settings

These settings can only be edited by Service

	CDx	I	D
T1	5°C	0.200	0.600
T2	10°C	0.050	0.100
P			

Cavity control system (CCS)

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

Switch off at T for

ΔT

P2 at

Output for signal

Output for valve

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.

Rotor lifetime

Limit

check

Pre warning at

MW energy test

This window is for the microwave energy test. Contact your service engineer for more details about the test.

Amount of water

Weight of vessel

Thermal capacity

Test energy

Test time

Ambient temperature

Start temperature

End temperature

Energy

6.6.3 Setup window

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




6.7 Create, Edit, Delete a User profile

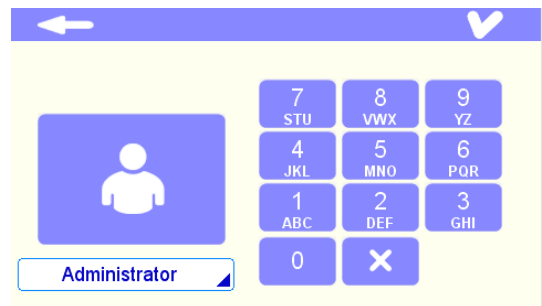
6.7.1 First Steps

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

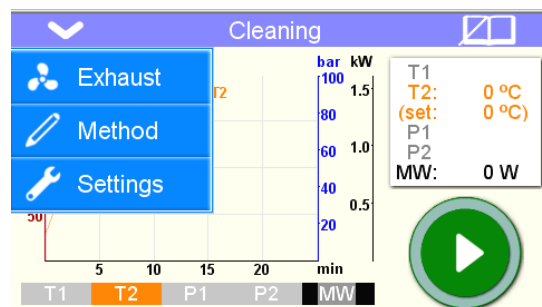
The first login MUST be done by the administrator of the lab and the default password is 123456.



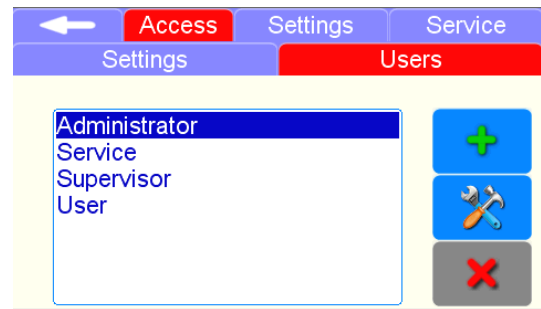
The default password MUST be changed after the first login. It's responsibility of administrator to change the default password with a new one. See the next chapters for more details on how to change the password.



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 profile.



6.7.2 Overview of user profiles and access levels




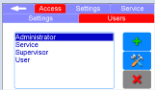
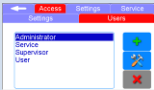
From the Users window, you can create a new login name. There are three different types of users with different levels of accessibility (privileges) that can be created.

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

User	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manager	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Administrator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

	Accessories Setup (Rotor configurations)	Power test window	Sensor check settings	Create a new Manager account	Create a new User account
					
User	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manager	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Administrator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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

6.7.3 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.

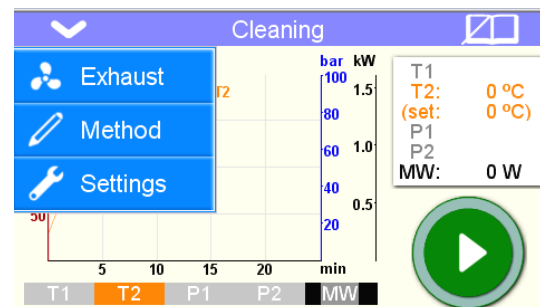
For the above reasons, Milestone suggests to:

- Mandatorily use name and surname of each users 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".

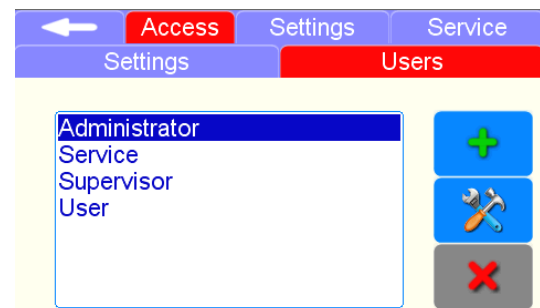


Select "Access" page and "Users" tab.



Create a new user changing the password.

Press  to add new User

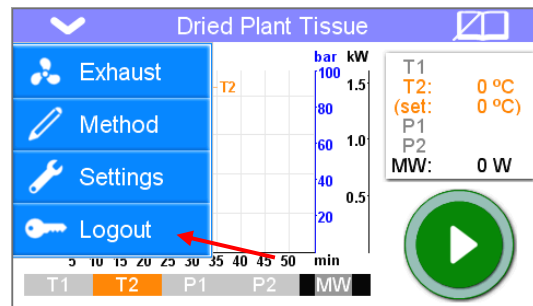


Insert Username, privileges and password.



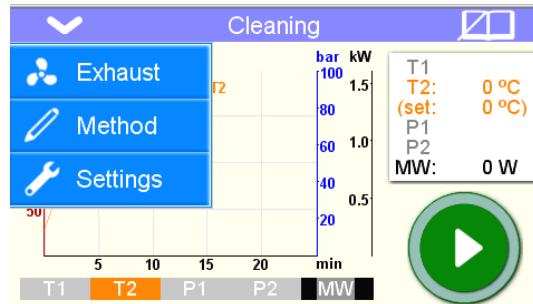
The password must be at least 6 characters long

Go back to the Main page and log out



6.7.4 Edit or Delete an existing ID user profile

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

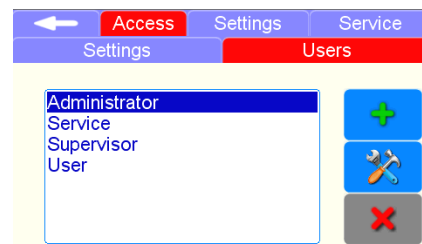


Select "Access" page and "Users" tab.



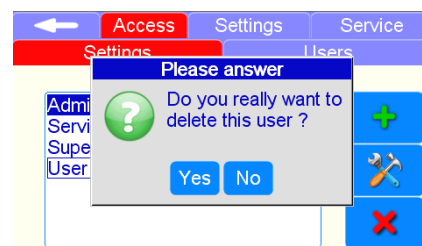
Select the user to edit or delete from the list.

1. Press  to edit existing User
2. Press  to delete existing User



Pressing the edit function you can change the privileges and the login password

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



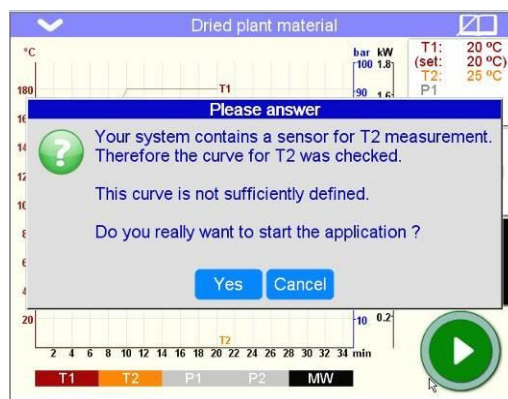
7 MESSAGES AND INQUIRIES

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 is not possible, a message appears.

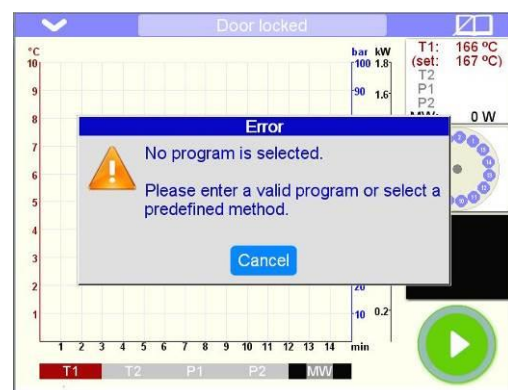
Messages are acknowledged by pressing the OK button.



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



7.1 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
- Program

7.1.1 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.

7.1.2 Sensors, Settings and Twist

Text	Meaning/Comment
<p>In your system no sensor inputs are configured. Please contact your local service partner.</p>	<p>There are no configured sensors. The configuration of the sensors can be made only by the service (see Chapter sensor data).</p>
<p>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 ?</p>	<p>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).</p>
<p>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.</p>	<p>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).</p>
<p>You have not entered a value for the element "Control for". Please select one of the available sensor inputs.</p>	<p>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).</p>
<p>Twist function will be disabled. Temperature and pressure sensors can be damaged. Are you sure to deactivate the twist function ?</p>	<p>Security check when disabling the twist function (see also Chapter Twist)</p>
<p>Twist error A twist error occurred. Check the twist mode of your system.</p>	<p>No change of direction of rotation is detected by the system. Check the twist function or contact service.</p>

7.1.3 Program

Text	Meaning / Comment
<p>You have already executed a microwave application without storing these data. Do you want to ignore the recordings and start a new program ?</p>	<p>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.</p>
<p>The program time of all segments is zero. Please specify a valid program or select a predefined method.</p>	<p>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).</p>
<p>Your microwave program is longer than 2 hours. Is it correct ?</p>	<p>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.</p>
<p>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?</p>	<p>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.</p>

Text	Meaning / Comment
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.



Milestone Srl - via Fatebenefratelli 1/5 - 24010 Sorisole (BG) - Italy
Phone +39 035 573857 - Fax +39 035 575498
e-mail: analytical@milestonesrl.com - web: www.milestonesrl.com