Laboratory Equipment Manufacturer
www.mrclab.com

OSM-1T
User's Manual

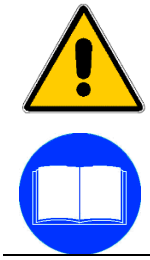
PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

3, Hagavish st. Israel 58817 Tel: 972 3 5595252, Fax: 972 3 5594529 mrc@mrclab.com

MRC.8.20

OSM-1T
User's Manual

WARNINGS



Carefully read this User Guide before using the equipment.

This manual is an integral part of the product and must be conserved for future consultations.
In it you can find important information regarding safety of use and maintenance.
Read the instructions contained in this manual carefully before installation, use and before processing any operation of adjustment or maintenance.

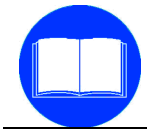
This equipment has been realized for the analysis of: biological liquids samples, solutions, suspensions and emulsions in water for food, pharmaceutical, cosmetic and homeopathic use; standard saline solutions for the calibration of the osmometer and for checking its accuracy.
Every use which differs from the description above, will be considered as "improper use" and will invalidate the warranty.

While analyzing biological liquids, please ALWAYS use all the necessary individual safety devices.

Even if this device is provided with protections, its use without following the described procedures could produce a wrong working and damages on the equipment.

The manufacturer is not liable for damages to people or things caused by improper use of the equipment and / or not respect of the laws, regulations and instructions described below.

SYMBOLS USED IN THIS MANUAL

	***Carefully read the instructions contained in the manual before using the equipment.***
	***Every action performed on the equipment must comply with the indications described in the manual.***
	***Suggestions and clarifications for a better functioning and a correct interpretation of the information contained in the manual.***
	***Presence of danger: injuries may occur. Please follow the instructions contained in the related paragraph.***
	***Biological hazard. Please follow the instructions contained in the related paragraph.***
	***Presence of danger: electrical shock may occur. Please follow the instructions contained in the related paragraph.***
	***Crush hazard.*** ***This symbol is located on the head of the equipment and warns the user about the risk of injury.***

FEATURES

OPERATING FEATURES

Features	**Description**
Sample Volume	From 50 to 200 µL (recommended sample volume: 100 µL)
Measuring range	From 0 to 3000 mOsm/Kg
Resolution	1 mOsm/Kg
Repeatability (measured with a 100 µL sample)	From 0 to 600 mOsm/Kg → ±2.5 mOsm/Kg From 600 to 3000 mOsm/Kg → ±0.5%
Calibration curves	3

MECHANICAL FEATURES

Features	**Description**
Dimensions (l x w x h)	285 x 485 x 360 mm
Weight	16.1 Kg

ELECTRICAL FEATURES

Features	Description
Electrical supply	115/230 V ~ 50/60 Hz
Max. variation of the tension	±10% of nominal tension
Transitory overload	II
Absorption	150 W
Safety Fuses	2 x 2 A, 250 V

CLIMATIC FEATURES, STORAGE, PACKAGING AND USE

Features	Description
Use	Internal use only
Working temperatures	from 5° to 36°C
Relative humidity	max. 80% for temperatures up to 31°C, with a linear decrease up to 50% at a temperature of 40°C.
Pollution degree	2
IP protection grade	20

STARTER KIT

The equipment is always provided with the following accessories and consumables:

Code	Description	Quantity
2030N	50 - 200 µL test tubes, 500 pcs	1
563	100 –places tube holder in ABS	1
63225/OSM	Check standard, 323 mOsm/Kg, 250 mL	1
STD2101	Calibration standard, 100 mOsm/Kg, 125 mL	1
STD2109	Calibration standard, 900 mOsm/Kg, 125 mL	1
67200	Cooling liquid, 250 mL	1

SAFETY

EMERGENCY PUSHBUTTON

The equipment is provided with an emergency pushbutton which interrupts the electrical supply when a dangerous situation is occurring. In order to deactivate the safety device turn the pushbutton in the direction of the arrows as displayed in the picture.

ELECTRICAL CONNECTION

Avoid placing the equipment near heating sources or windows hit by sunlight.
Place the instrument far from the wall: in this way it would be easier to operate both on the main switch and on the socket.
The equipment works with 230 V ~ ±10% and a frequency of 50 Hz or with 115 V ~ ±10% and a frequency of 60 Hz.

According to the electrical safety regulations, check that a good earth connection is provided. The manufacturer is not liable in case of damage due to a lack of compliance of this norm.

INSTALLATION

1. Remove the equipment from its package.

Always hold the equipment by its sides and its lower part with the help of another person.

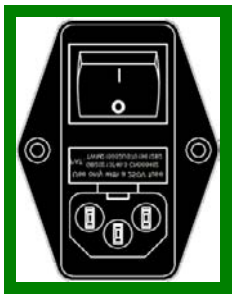
2. Place it on a perfectly horizontal bench to avoid vibrations or movements.
3. Check the tension selector located at the bottom: it must be in the correct position.

The arrow positioned on the selector must indicate the local tension available. If the position is wrong, rotate the selector by means of a proper screwdriver. Do not turn the osmometer on if you are not sure that the selector is in its correct position as it may damage the whole functioning of the equipment and a technical intervention would be necessary.

4. Connect the cable to the main socket positioned on the rear panel of the equipment.
5. Insert the plug in the electrical socket.

Before turning the equipment on connect the printer as described in the chapter "Printer".

6. Turn the equipment on by pressing the main switch positioned on the back.

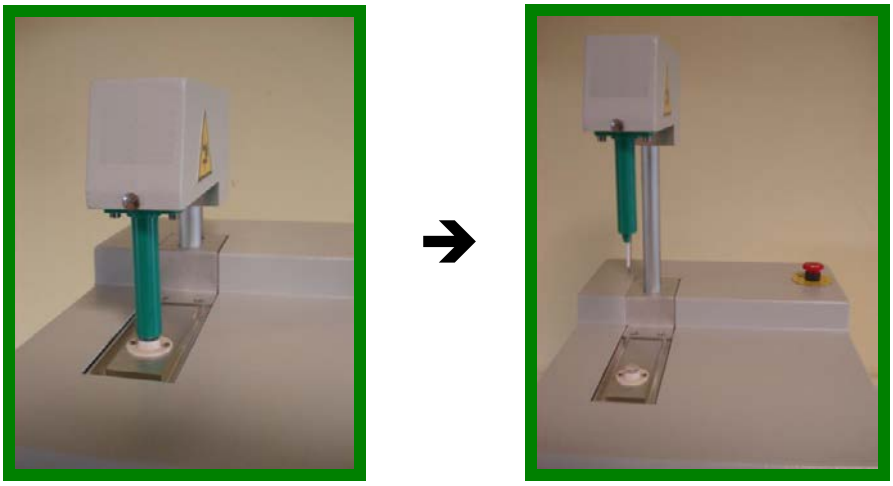


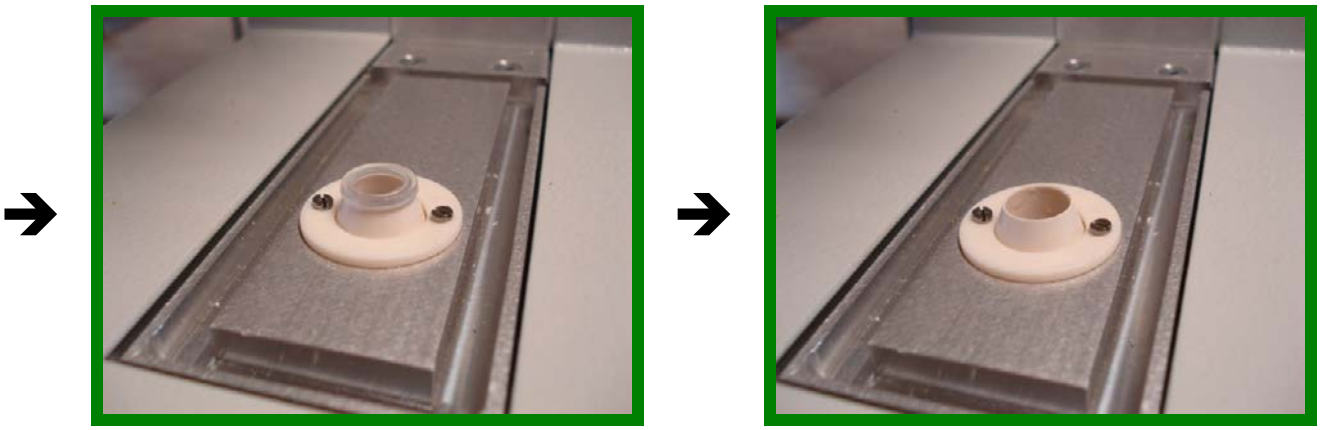
7. If the equipment does not turn on, verify that the emergency pushbutton is not pressed. In this case deactivate it by turning it in the direction indicated on the head.

8. Turn the equipment on.
9. If the equipment does not turn on, check the integrity of the fuses and replace them, if necessary.

Always turn the equipment off and disconnect it from the electrical socket before performing the check and replacement of the fuses.

10. Wait until the head lifted completely before removing the test tube.





Pay attention not to hit the reading thermistor!

11. Turn the equipment off.
12. Fill the vessel positioned on the back of the equipment with cooling liquid until the maximum level indication.

Check that the little pipe collects from the very bottom of the vessel and the waste tube is positioned over the maximum level indication. The wrong position of the pipes may generate errors during the analysis or inaccurate results.

12. Turn the instrument on again: the cooling bath will be filled automatically.
13. Wait until the bath reaches the correct working temperature and the display will show the message READY.

We suggest to wait at least 10 minutes before proceeding with the analysis as in this way the equipment will stabilize.

14. Verify that the osmometer is correctly calibrated by performing the analyses of **3** replicates of 323 mOsm/Kg standard. See chapter “Analysis”.
15. If the result differs for more than ±3 mOsm/Kg in comparison to the nominal value of the standard, proceed with the calibration according to the chapter “Calibration”.

E.g.:

	Analysis 323 mOsm/Kg	
	Case 1	*Case 2*
1	*326*	*323*
2	*323*	*319*
3	*323*	*320*
	OK	*NO*

The first reading may show wrong values, so do not consider the first sample reading.

1° Case	*Average = (323 + 323)/2 = 323* *Gap = Average - Expected value = 323 - 323 = 0* *THE CALIBRATION IS NOT NECESSARY!!!*
2° Case	*Average = (319 + 320)/2 = 319.5* *Gap = Average - Expected value = 319.5 - 323 = - 3.5* *A NEW CALIBRATION IS NECESSARY!!!*

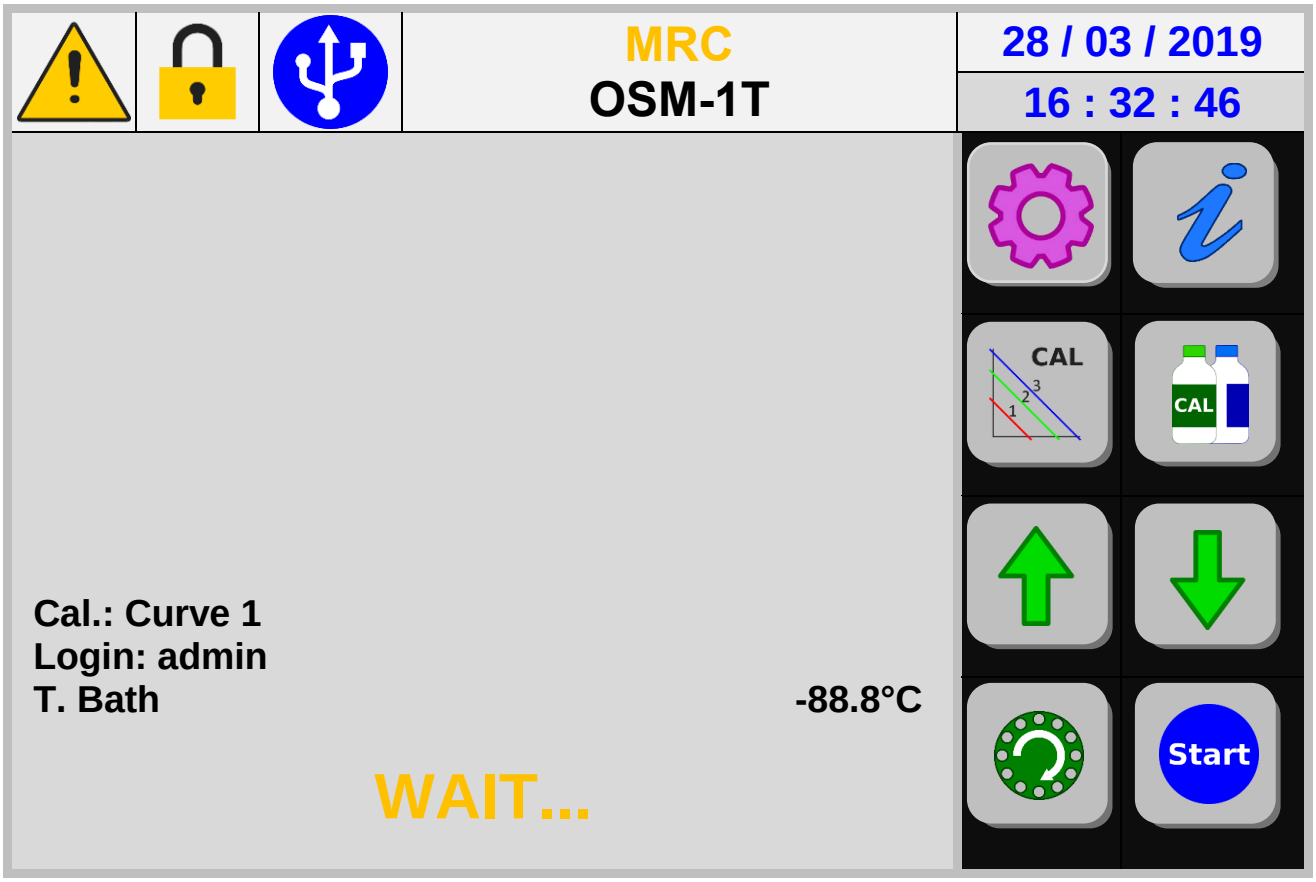
MAIN MENU

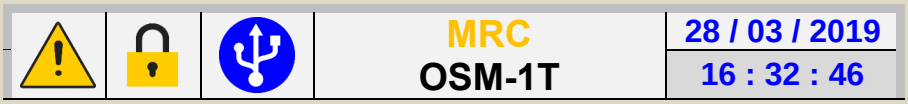
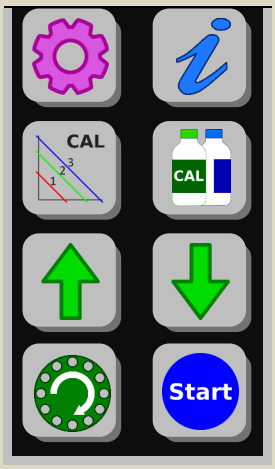
After turning the osmometer on and after uploading the program, the equipment shows its main menu, which is divided into 3 different sections: the information/warning bar; the tool bar and the main frame

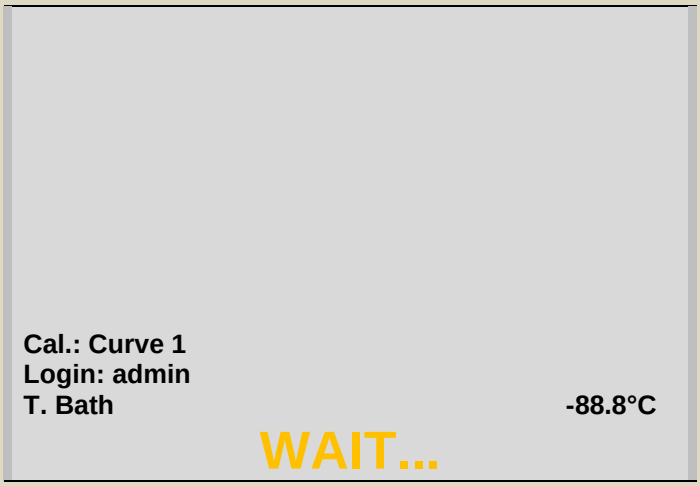
A. Information/warning bar
The information/warning bar located on the higher part of the equipment shows the current alarms, the password activation/deactivation, the pen drive connection, the name of the customer, the model of the equipment, date and time.

B. Tool bar
The tool bar is located on the right side of the screen: there you can find all the buttons that allow the user to: enter the set functions; enter the memory that contains the analysis performed; enter the basic information of the equipment and the selection menu and enter the menu for setting the reference values. Also, it contains the calibration menu, the analysis starting menu and the buttons for the manual up and down movement of the head.

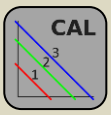
C. Main Frame
The main frame shows the main settings and the working condition of the equipment.
By showing the data of the calibration curve, there is no need to enter each menu to check the main settings that are necessary to perform the analysis.
The working condition indicates whether the equipment is ready to start the analysis or not (i.e. it may be necessary to wait that the cooling bath reaches the working temperature).



Frame	
Information/warning bar	
Button (Tool) bar	

Main Frame	

Entry	Description
Alarm 	It appears when an alarm is activated. See paragraph “Alarms” to get more information.
Password 	Some parameters are password protected to avoid modifications by unauthorized personnel. See paragraph “Password” to get more information.
USB 	It appears when a pen drive is connected to the equipment. See paragraph “Transferring the data on the pen drive” to get more information
Customer MRC	It shows the name of the customer.
Model OSM-1T	It shows the model of the osmometer.
Date 28 / 03 / 2019	It shows the current date.

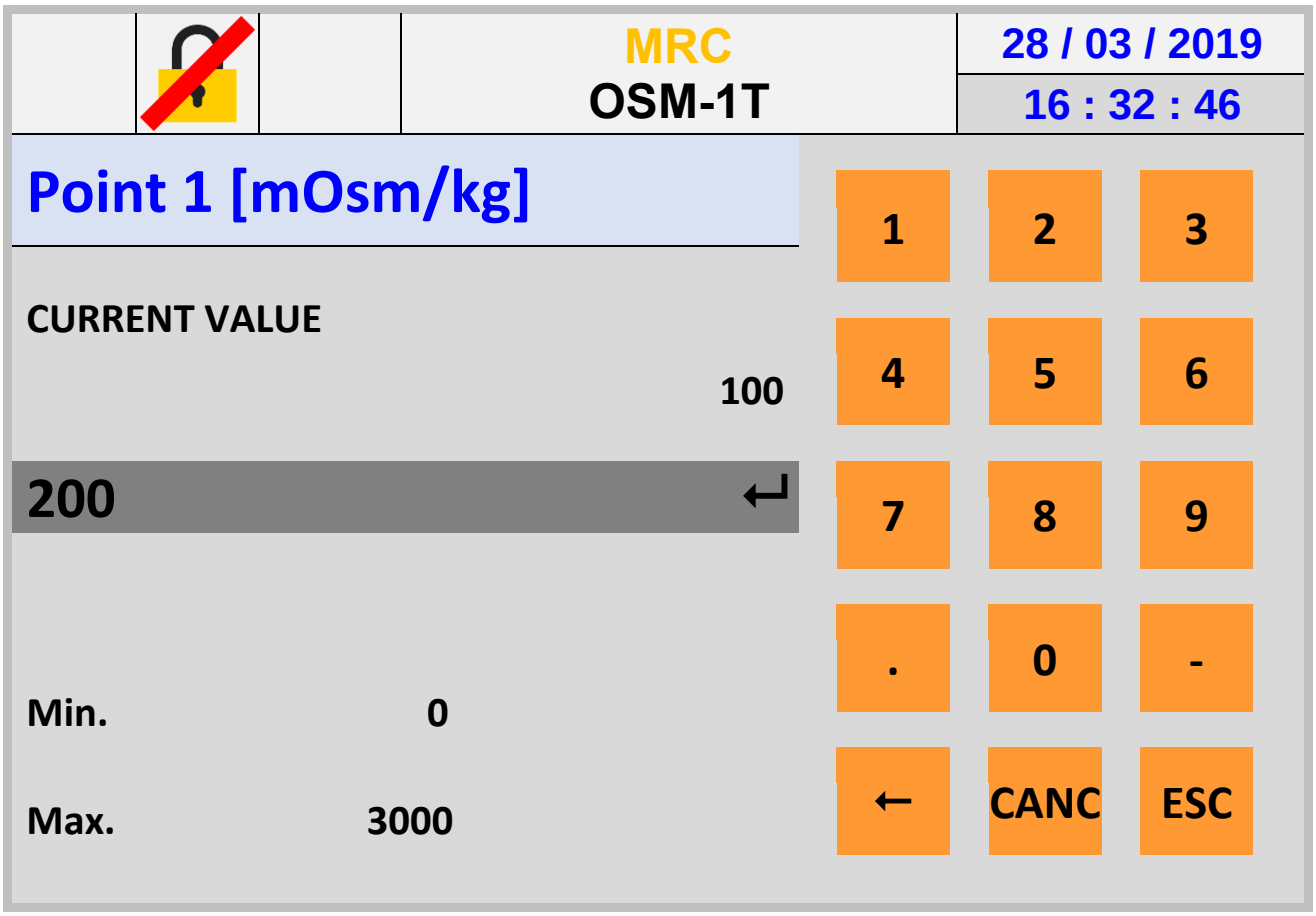
Time **16 : 32 : 46**	It shows the current time.
Selected calibration **Cal.: Curve 1**	It shows the calibration selected by the operator.
User log in **Login: admin**	It shows the name of the User.
T. Bath **T. Bath -88.8**	It shows the current bath temperature. This message disappears after reaching the correct working temperature.
Working condition **WAIT...**	It shows the current working condition.
Settings 	It enters the “Settings menu”.
Information 	It enters the “Information menu”.
Calibration curve 	It enters the calibration menu for each curve.
Calibration 	It enters the calibration function.
Head Up 	It allows the operator to lift the head manually.

Head Down 	It allows the operator to lower the head manually.
Start Analysis 	It enters the “Start Analysis” menu.

KEYBOARD

The operator may need to modify some functions and insert new values manually: in this case OSM-1T offers both numeric and alphanumeric keyboards

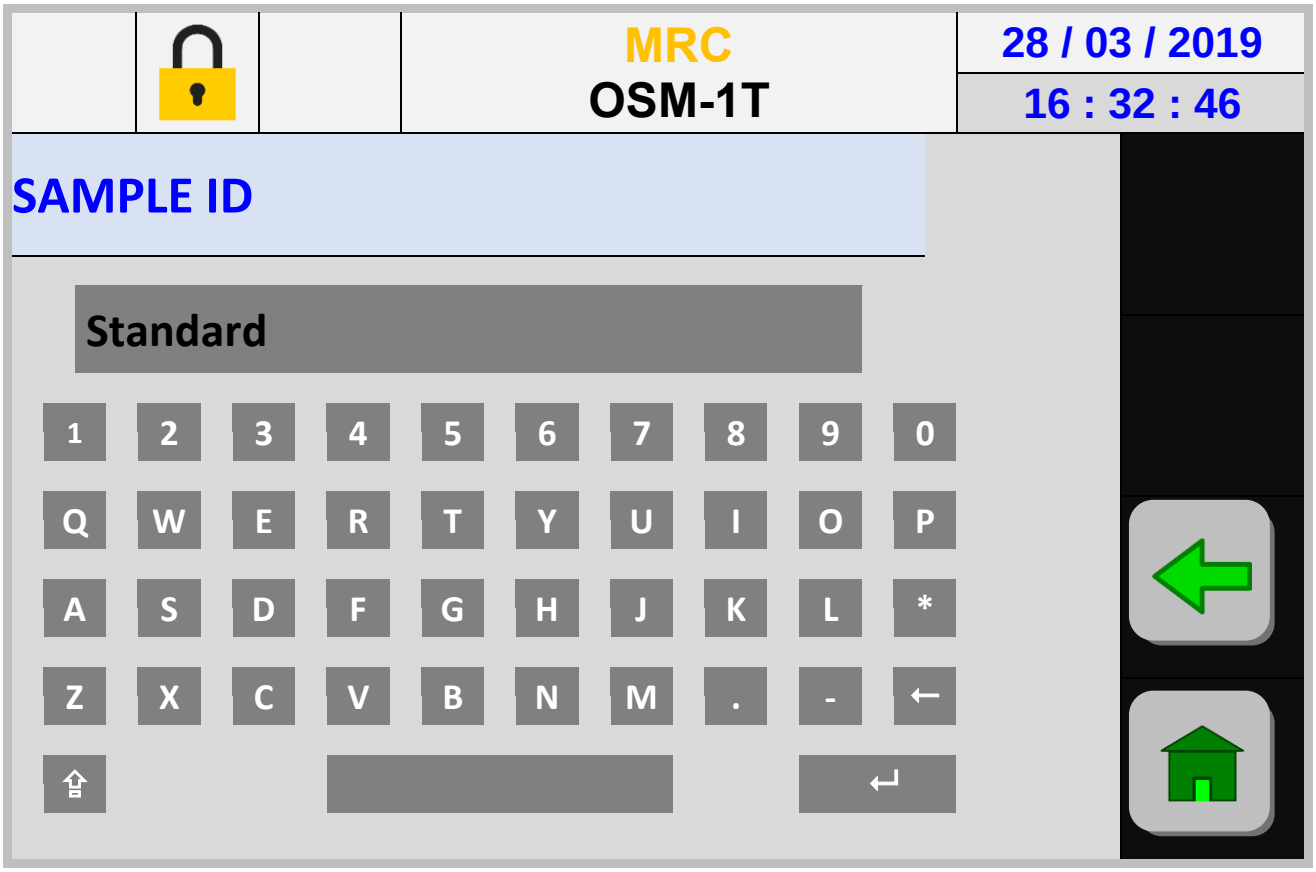
A. Numeric Keyboard
The equipment shows the numeric keyboard when the operator needs to insert a number.



Entry	Description
Parameter Name **Point 1 [mOsm/kg]**	It shows the name of the parameter to be modified.
Current Value **100**	It shows the current value set in memory.
Inserted value **200**	It shows the new value.
Confirming key ↵	It confirms the value.
Minimum value allowed **0**	It shows the minimum value permitted for the modification of parameter.
Maximum value allowed **3000**	It shows the maximum value permitted for the modification of parameter.
Insert key **1**	It inserts the new value.

B. Alphanumeric Keyboard

The equipment shows the numeric keyboard when the customer needs to insert digits and numbers.



Entry	Description
Parameter Name SAMPLE ID	It shows the name of the parameter to be modified.
Current value Standard	It shows the inserted data.
Key 2	It shows the insertion key.
Previous	It goes back to the previous menu.

Home 	It goes to the homepage.

PASSWORD

The operator can protect the setting functions by a password and prevent the access of unauthorized personnel.
OSM-1T also offers the possibility to connect every Username to the analysis performed.

ACCESS LEVELS

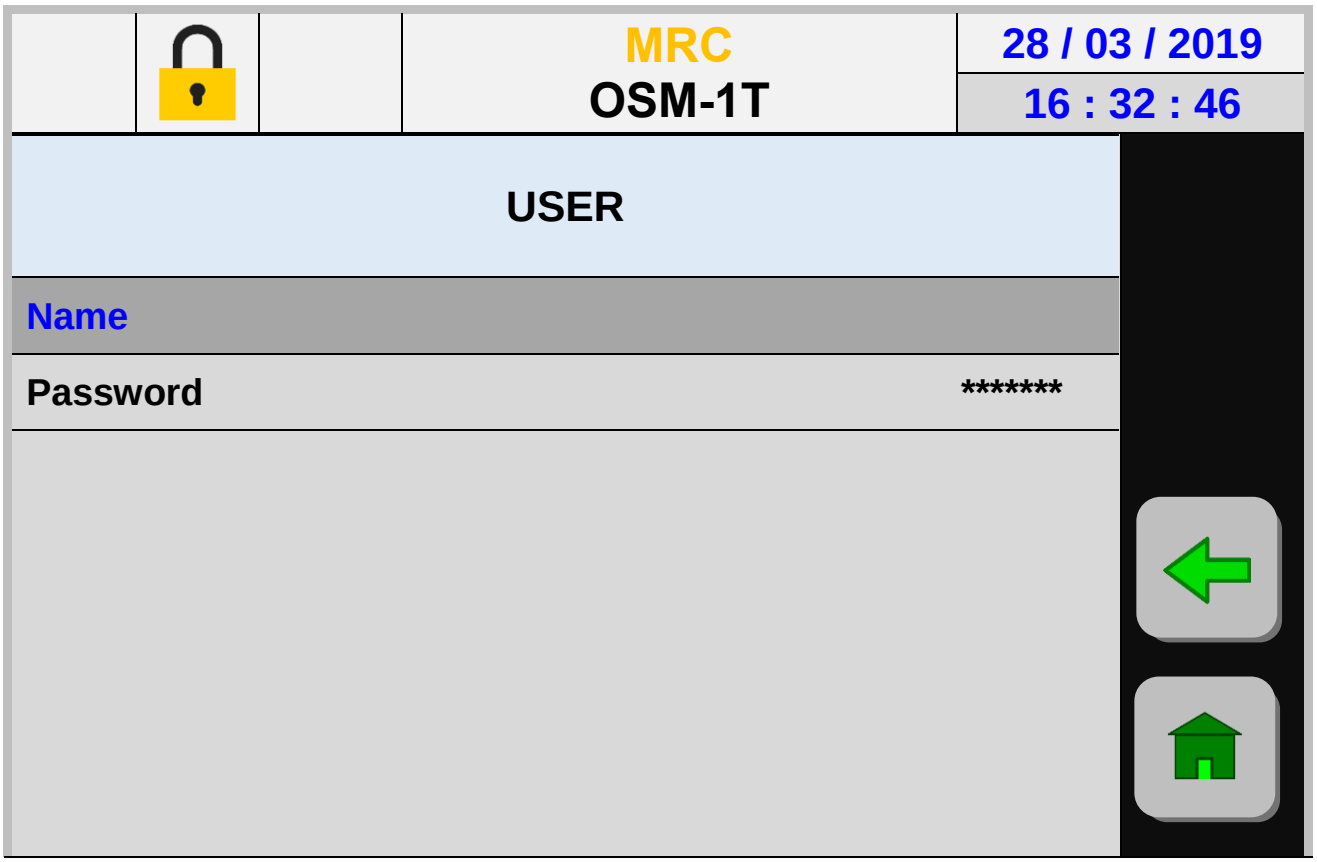
OSM-1T is provided with 4 access levels that restrict the access to the Users according to the authorization level set.

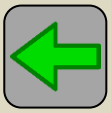
Level	Description
1 - Operator	It's the most restricted access. The Operator level cannot edit the settings.
2 - Supervisor	The Supervisor can create or authorize new operators or cancel the inactive users. This function get access to the data handling and to the most important parameters only.
3 - Distributor	The Distributor can enter the functions as the Supervisor does and, in addition, can enter also the most important modification parameters.
4 - Manufacturer	The Manufacturer can enter all the functions.

LOG IN

To perform the analysis or get access to the parameters editing the operator has to log in by typing its username and password.

To enter the Log In function press  and the following frame will appear:



Entry	Description
Previous 	It goes back to the previous menu.
Home 	It goes to the homepage.
Name 	It shows the name of the User.
Password 	It shows the password.

After the Log In the equipment will go back to the main frame where the icon  will appear and the name of the User will be displayed under the selected calibration curve (see “main Frame” paragraph).

OSM-1T is always supplied with a "Supervisor" User enabled; its username and password are as follows:

Name: admin
Password: 1234

We always recommend to change the password after the first access, while the user "admin" cannot be erased.

LOG IN ERRORS

When the inserted username and password are not correct, the equipment will show two error messages.

A. Incorrect User

Press the  key and type the correct one.

B. Wrong password

Press the  key and type the correct one.

USER CHANGE

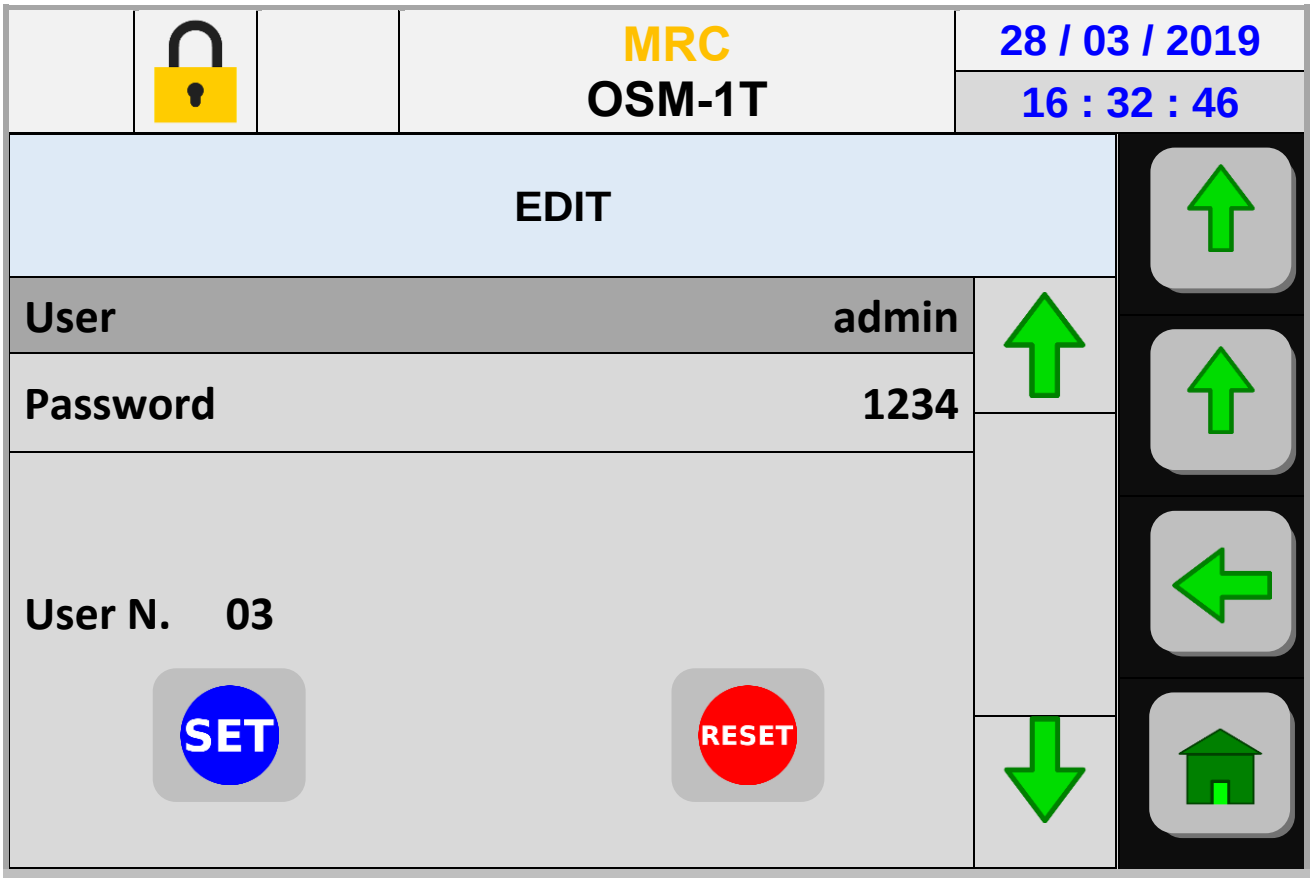
OSM-1T gives the possibility to change the user every time is needed by following these steps:

1. Press  .
2. Follow the Log In procedure (see "Log In" paragraph).

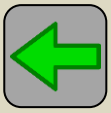
USER SETTING

This function permits the creation of a new User or edit or erase an existing one. This function can be entered by the ***Supervisor*** only or by a User with a higher access level.
To enter this function proceed as follows:
1. Be sure that the user corresponds to ***2 - Supervisor*** or a higher one. If not, log in as described in the related paragraph.

2. Press the  key from the main frame.
3. Scroll the functions until **Service** and press it.
4. Scroll the functions until **User List** and press it.

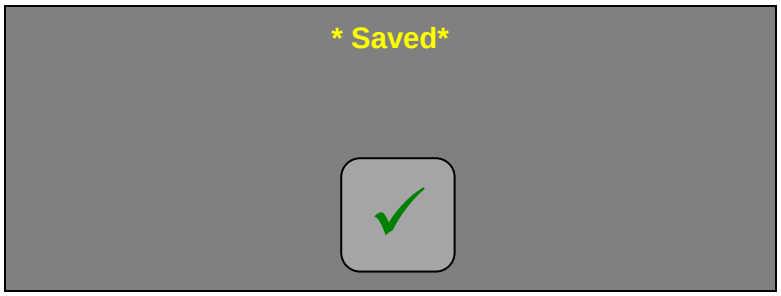


Entry	Description
Previous User 	It shows the previous user on the list.
Next User 	It shows the next user on the list.

Set 	It saves the selected user.
Reset 	It erases the selected user.
Previous 	It goes back to the previous frame.
Home 	It goes back to the homepage.
User 	It types the user name, if pressed.
Password 	It types the password, if pressed.

A. How to create a new level 1 User - Operator
To create a new user proceed as follows:

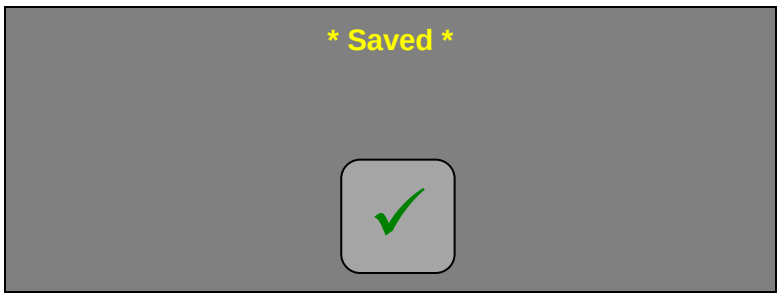
1. Scroll the user list by pressing  until the **User** and then **Psw** appear.
2. Press **User** and type the new username (see “Keyboard” paragraph).
3. Press **Password** and type the new one (see “Keyboard” paragraph).
4. Press  to save the new data.
5. The display will show:



6. Press the key.

B. How to edit an existing level 1 User – Operator
To edit an existing user proceed as follows:

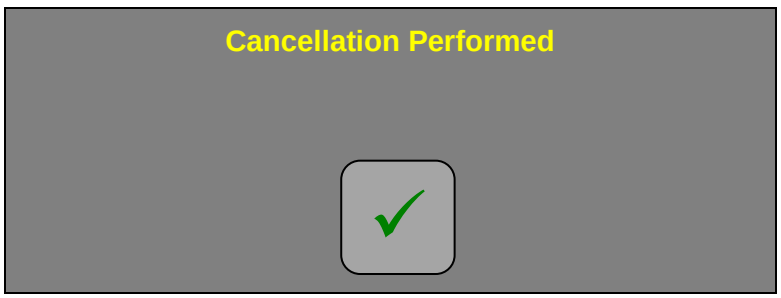
1. Scroll the user list by pressing or until you get the user to be modified.
2. Press **User** or **Password** and type the new name and the new password (see “Keyboard” paragraph).
4. Press SET to save the data.
5. The display will show:



6. Press the key.

C. How to delete an existing Level 1 User - Operator
To delete an existing user proceed as follows:

1. Scroll the user list by pressing or until you get the user to be deleted.
4. Press RESET to save the modifications.
5. The display will show:



6. Press the key.

PASSWORD VALIDITY

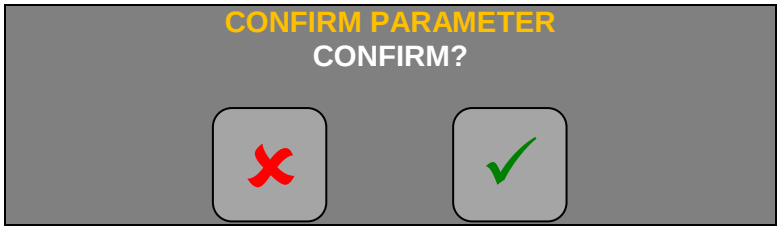
Passwords have a limited validity to grant the data security. The validity default is 90 days since their creation, but the ***2 - Supervisor*** can establish a new validity.

A. How to edit the password validity
To edit the password validity proceed as follows:
1. Log in as ***2 - Supervisor*** or a higher level User (see “Log In” paragraph).
2. Press the  from the main frame.
3. Scroll the functions until **Service** and press it.
4. Scroll the functions until **N. Password Days** and press it.
5. Digit the new value.
6. The new validity will be applied to all the existing and new passwords.

HOW TO ACTIVATE / DEACTIVATE THE LOG IN FUNCTION

The equipment is supplied with the Log In function activated, but it is possible to deactivate it if necessary.

A. How to activate the Log In function
Whenever the Log In function is deactivated, proceed as follows:
1. Press  from the main frame.
2. Insert the password **25** (see “Keyboard” paragraph).
3. Press the  key from the main frame.
4. Scroll the functions until **Service** and press it.
5. Scroll the functions until **Osmometer Safety** and press it.
6. Digit the value **1**.
7. The display will show:



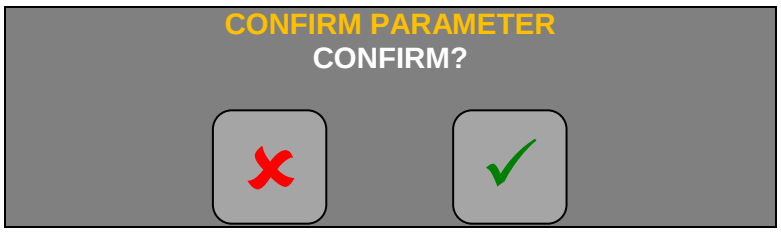
8. Press the  key to confirm.
9. The display will show:

10. The osmometer will restart and all the functions will be activated.

B. How to deactivate the Log In function

Whenever the Log In function is activated and you need to deactivate it, proceed as follows:

1. Press  from the main frame.
2. Activate the ***2 User - Supervisor*** or a higher one (see "Log In" paragraph).
3. Press the  key from the main frame.
4. Scroll the functions until **Service** and press it.
5. Scroll the functions until **Osmometer Safety** and press it.
6. Digit the value **0**.
7. The display will show:



8. Press the  key to confirm.
9. The display will show:

10. The osmometer will restart and all the functions will be deactivated.

ANALYSIS AND CALIBRATION

PREPARATION OF SAMPLES

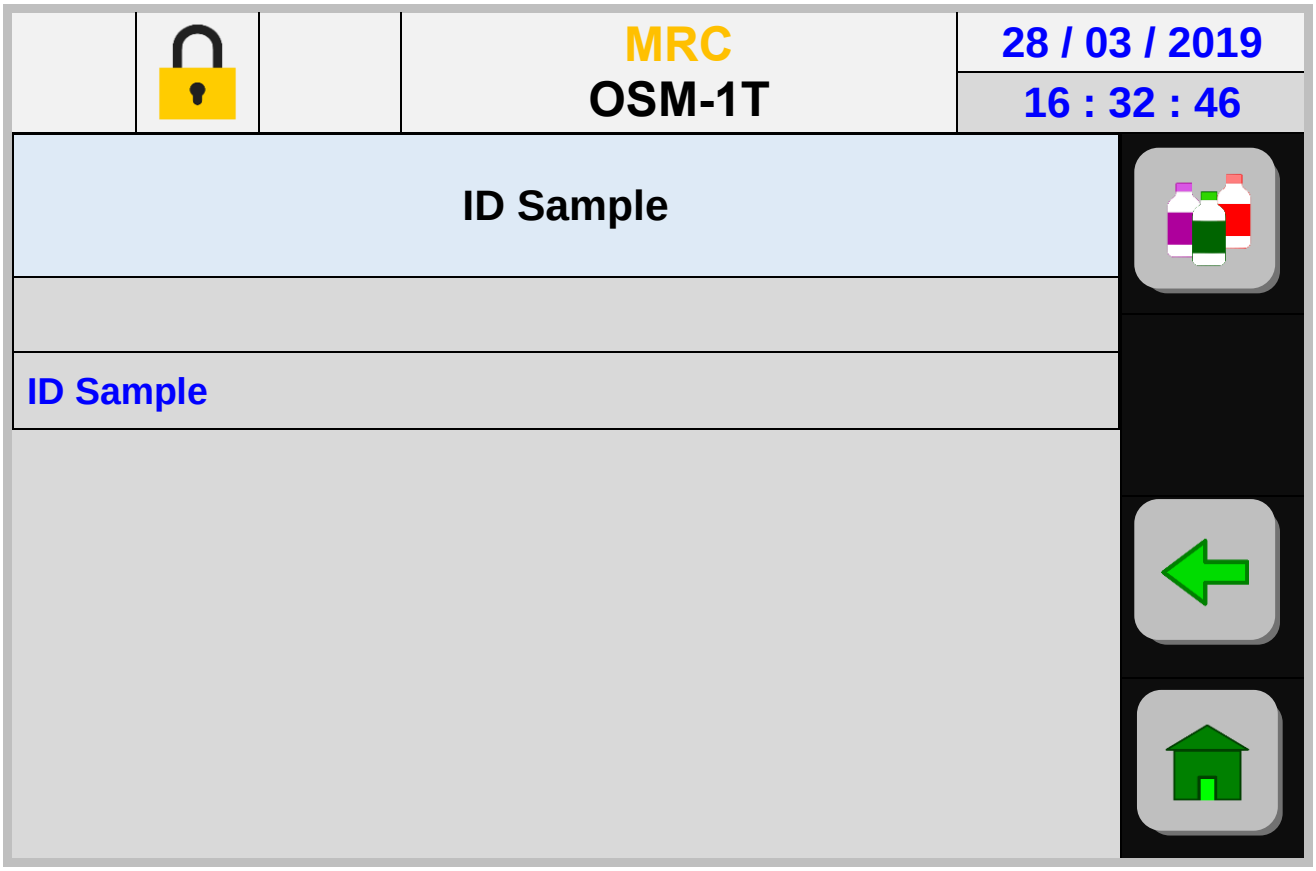
While analyzing biological liquids, please always use all the necessary individual safety devices.

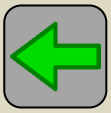
The temperature of the samples to analyze must be between 15°C and 30°C.
Do not analyze cool samples.
Analyze homogeneous samples only.

STARTING ANALYSIS FRAME

After the log in operation (see “Log In” paragraph), press the 

key, then the operator can digit the samples IDs (see “How to insert ID samples” paragraph), start the analysis (see “Analysis of samples” paragraph) or come back to the main frame.



Entry	Description
Analysis 	It starts the samples analysis (see “Sample Analysis” paragraph).
Previous 	It returns to the previous menu.
Home 	It returns to the homepage.
ID Sample 	If pressed, it allows the operator to digit the sample ID.

SETTING THE SAMPLES IDs

With OSM-1T it is possible to identify every sample to be analyzed.
During the analysis every result will be automatically matched to its ID.

The ID frame appears automatically after pressing the 

key.
The operator can insert the IDs manually or by using an optional barcode reader.

A. How to insert IDs manually
To insert the samples IDs manually, proceed as follows:
1. Press the key **ID Sample** from the analysis frame.
2. Digit the ID by using the keyboard that appears on the display (see "Alphanumeric Keyboard" paragraph ").

3. Confirm the value by pressing the  key.
4. After confirmation the equipment saves the value and exits from the digit frame.
5. After inserting the ID the operator can perform the analysis.

B. How to insert IDs with a barcode reader
To insert the samples IDs by using the barcode reader, enter the analysis frame (see "Analysis frame" paragraph) and the **ID Sample** will be automatically selected.
After reading the barcode, the ID will be confirmed and written in the selected box, then the equipment will scroll to the next ID.

ANALYSIS

While analyzing biological liquids, please always use all the necessary individual safety devices.

1. Before the analysis of the samples, gently clean the thermistor by using a dry and soft piece of paper.

Before carrying out the analysis of biological liquids, clean the thermistor by using an appropriate disinfectant solution with antibacterial and antiviral action (a non-aggressive one). Then, rinse with water copiously (see the "Thermistor cleaning" paragraph).
Do not use chlorine based detergents.

2. Be sure that the tubes are completely dry and clean.

Do not use test tubes which are not recommended by the manufacturer.

3. Verify that the message READY . appears on the display.
4. Be sure that the selected calibration curve is the correct one for the analysis to be performed (see "Calibration curves").
5. Pipet the desired quantity and dispense the liquid inside the test tube.
6. Insert the tube with the liquid inside the well (see "Well" paragraph).

7. Press the 

key.
8. Insert the name of the sample, if necessary (see “Setting the samples IDs”).

9. Press the  key.
The display will show the temperature diagram, the sample number and name and the selected calibration curve.

It is possible to stop the analysis manually by pressing the 

key located in the lower left corner of the frame.
10. At the end of the analysis the display will show the sample osmolality expressed in mOsm/Kg and its related value expressed in °C. All these data will be sent to the printer, if connected, or to the computer.

At the end of all the analyses the thermistor rises, the result is displayed and the automatic pump starts the refilling process

11. Remove the test tubes from the duct.

The results obtained from the analysis are stored in the internal memory of the equipment. The operator can consult these results by pressing the  **key and press List of Results.**

RAPID START

Whether there is no necessity to insert the sample IDs and all the analysis are performed by using the same calibration curve, the operator can start the analysis directly and save time.

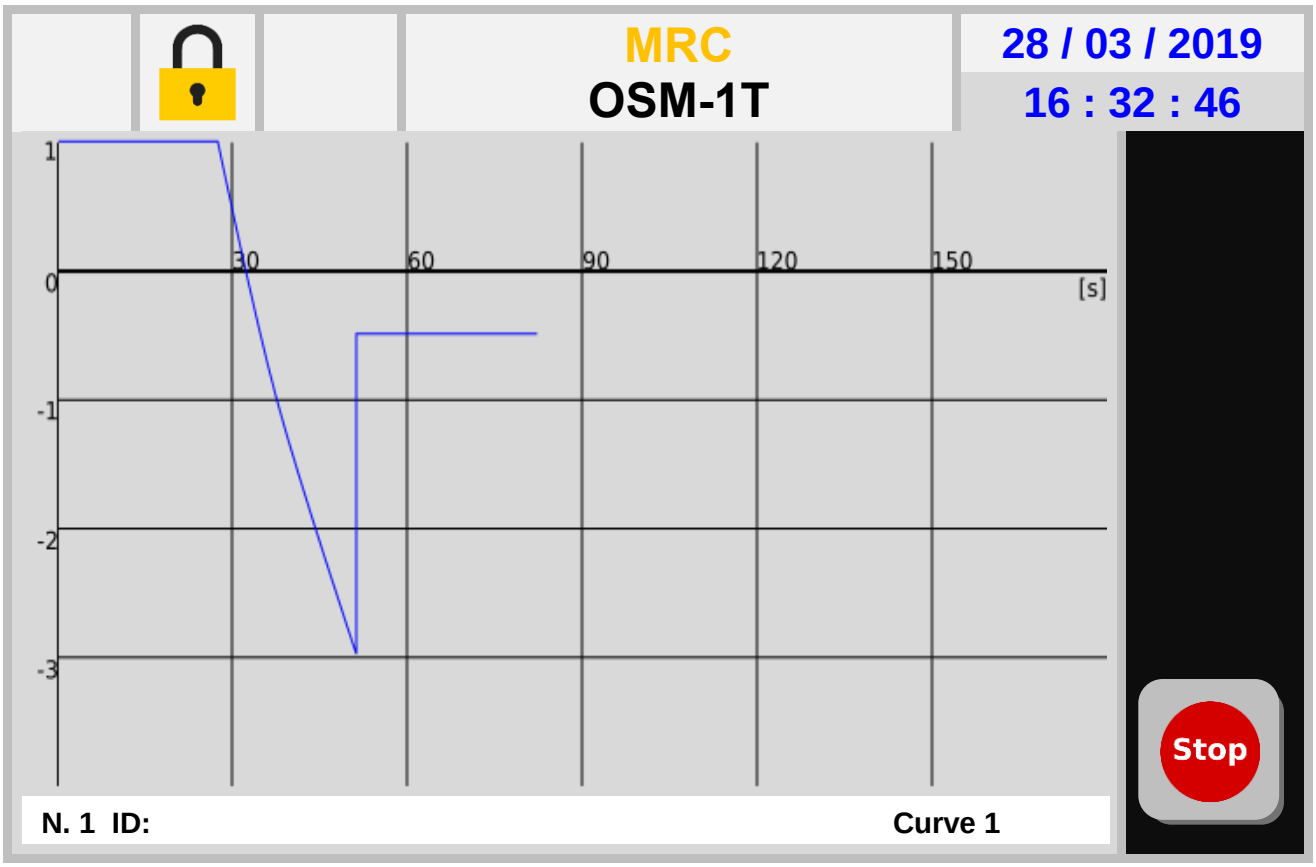
While analyzing biological liquids, please always use all the necessary individual safety devices.

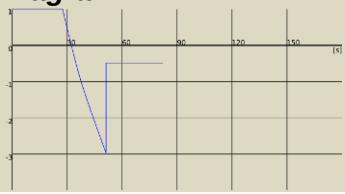
Before carrying out the analysis of biological liquids, clean the thermistor by using an appropriate disinfectant solution with antibacterial and antiviral action (a non-aggressive one). Then, rinse with water copiously (see the “Thermistor cleaning” paragraph).
Do not use chlorine based detergents.

To carry out the analysis under this mode press the 

key for 2 seconds, then release it: the analysis starts automatically.

ANALYSIS FRAME



Entry	Description
Diagram 	It shows the temperature diagram of the current analysis.
Stop 	It stops the current analysis.
Number **N. 1**	It shows the number of current analysis.
ID **ID:**	It shows the sample ID number related to the current analysis.

Curve **Curve 1**	It shows the curve used during the current analysis.

HOW TO SELECT THE CALIBRATION CURVE

The equipment is provided with three different calibration curves with a minimum of 3 and a maximum of 5 points each.
The operator can select the calibration curve according to the kind of analysis to be performed by following these steps:

1. Press the  key from the main frame.

2. Press the  key

The upper writing changes according to the selected curve and the values under each key will be modified according to the standards set.

A tick (✓) will appear under each standard, according to the calibration points of each curve (see "Thermistor calibration Menu").

HOW TO MODIFY THE CALIBRATION POINTS

The operator can modify the calibration curve according to his/her needs from a minimum number of 3 points to a maximum number of 5 points. It is also possible to modify the osmolality value and customize the calibration curve to the standards available.

After modifying the calibration points or their value a new calibration on the selected curve is necessary.

A. How to modify the number of points
In order to modify the number of calibration points related to each curve, please proceed as follows:
1. Insert the password to get access to the modification of parameters (see "Password").
2. Press the  key from the main frame.
3. Select the calibration curve to be modified, by pressing the key corresponding to the curve.
4. Press the **Points Number** key.
6. Enter the value by using the keyboard that appears on the display (see "A. Alphanumeric Keyboard").
7. Confirm the value by pressing the  key near to the inserted value.

B. How to modify the value of each point
In order to modify the value of each calibration point for each curve, please proceed as follows:
1. Insert the password to enter the function of modification of parameters (see "Password").
2. Press the  key from the main frame.

3. Select the calibration curve to be modified, by pressing the key corresponding to the curve.
4. Press the point to be modified.
5. Digit the value by using the keyboard that appears on the display (see “A. Alphanumeric keyboard”).

6. Confirm the value by pressing the  key near to the inserted value.

PREVENTIVE MEASURES FOR THE CALIBRATION PROCESS

1. Before performing the analysis with standard solution, turn the bottle upside down for a few times paying attention not to shake it excessively and avoiding the formation of bubbles.
Do not perform the tests in case the bottle containing the standard liquid is filled less than ¼ of its total volume.
Carefully clean the thermistor and the stirrer by sliding a soft and dry piece of paper from the top to the bottom.
2. Calibration process: in order to carry out a good calibration, read **3** replicates of each standard: the repeatability must be ±3.0 mOsm/Kg in a range of 0 to 600 mOsm/kg and this value corresponds to ±0.5% of the nominal value in a range of 600 to 3000 mOsm/Kg. The first reading may give wrong values, so it would be better not to consider the first result.
3. A new calibration process will be necessary in case there is a high variability of samples to be read, when a low reproducibility is seen, after replacing the reading thermistor, in case some errors during the calibration process occur or after modifying the number of points or values of the calibration curve.
4. After the calibration process it is possible to check its correctness by verifying the accuracy of the curve. Perform some analyses by using the check standard or an intermediate calibration standard or a standard that has not been used in the calibration process and verify the obtained results.

During the calibration process always check the repeatability of the values, not the read value. After confirming the calibration, the read value will be the same as the standard value.

I.e.:

	Analysis 100 mOsm/Kg	
	Case 1	***Case 2***
1	***105***	***97***
2	***104***	***105***
3	***105***	***99***
	OK	***NO***

Repeatability Case 1 = (104 - 105)/2 = ±0.5 OK

Repeatability Case 2 = (105 - 99))/2 = ±3 NO

If the repeatability is worse than ±3.0 mOsm/Kg in a range of 0 to 600 mOsm/Kg or higher than ±0.5% of the nominal value in a range of 600 to 3000 mOsm/Kg, check the amplitude of both agitation and freezing stroke.

If the problem persists, contact your local MRC Distributor.

It is possible to perform the calibration by using a different number of replicates for each standard (the number of replicates indicated in this manual must be intended as a minimum number).

A. Preliminary operations

Before performing the calibration verify that the equipment is set on the correct calibration curve (see “Calibration curves”).

B. Calibration

The procedure described below must be carried out for each selected calibration point (see “How to modify the calibration points”).

1. Clean the mandrel, the thermistor and the stirrer with a dry and soft piece of paper.

After analyzing biological liquids, clean the thermistor by using an appropriate disinfectant solution with antibacterial and antiviral action (a non-aggressive one). Then, rinse with water copiously (see the “Thermistor cleaning” paragraph).
Do not use chlorine based detergents.

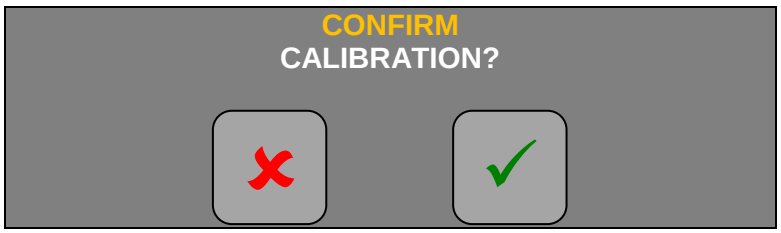
Calibrate the equipment starting from the standard with the lower osmolality value, then scroll to the very next one with higher value.

2. Be sure that the selected calibration curve is the correct one for the analysis to be performed (see “Calibration curves”).
3. Be sure that the equipment shows the message READY.
4. Prepare the first replicate of standard solution (i.e. 100 mOsm) and pour the desired quantity of liquid inside the tube.
5. Insert the tube with the liquid inside the duct.
6. Press the Start key.
7. Insert the name of the sample, if necessary (see “Insert the samples IDs”).
8. Press the key.
9. Wait until the end of the analysis.
10. Remove the test tube from the duct.
11. Prepare the second replicate of standard solution (i.e. 100 mOsm) and pour the desired quantity of liquid inside the tube.
12. Insert the tube with the liquid inside the duct.
13. Press the Start key.
14. Insert the name of the sample, if necessary (see “Insert the samples IDs”).
15. Press the key.
16. Wait until the end of the analysis.
17. Remove the test tube from the duct.
18. Prepare the third replicate of standard solution (i.e. 100 mOsm) and pour the desired quantity of liquid inside the tube.
19. Insert the tube with the liquid inside the duct.
20. Press the Start key.
21. Insert the name of the sample, if necessary (see “Insert the samples IDs”).
22. Press the key.
23. Wait until the end of the analysis.
24. Remove the test tube from the duct.
25. Verify the repeatability by checking the obtained results (See “Calibration” paragraph).

If the repeatability is worse than ±3.0 mOsm/Kg in a range of 0 to 600 mOsm/Kg or higher than ±0.5% of the nominal value in a range of 600 to 3000 mOsm/Kg, check the amplitude of both agitation and freezing stroke.

If the problem persists, contact your local MRC Distributor.

26. Press the CAL key to confirm the value.
27. Press the CAL key (the displayed bottle on the key may change according to the selected standard).
28. The display will show:



29. Press  to confirm.

30. Press  to return to the Homepage.
31. Repeat this procedure starting from point 1 using next standard (i.e. 900 mOsm).

C. Calibration recording
When the LOG IN function is on, the registration number will be shown in **orange** after confirming the selected calibration point.

# Curve	DATE	User ID	N	ANALYSIS
0000164 Curve 1	28/03/19 15:04:12	STD100 admin	01	-184.5 m°C 99 mOsm/Kg

In case the LOG IN function is off, the registration number will be shown in **bold black**.

CHECK THE CALIBRATION

After the calibration process, check the correctness of the curve before performing the analysis of the samples.

A. Choosing the check standard
To check the calibration, choose a standard liquid whose value finds itself in the middle of the curve.

I.e.:

Calibration standard 1: 100 mOsm/Kg
Calibration standard 2: 323 mOsm/Kg
Calibration standard 3: 900 mOsm/Kg

Suggested check standard: 500 mOsm/Kg

It is possible to use one of the average calibration standard liquids already used, in case there are no more standards available.

B. Calibration check
To check the calibration performed proceed as follows:
1. Clean the mandrel, thermistor and stirrer by using a dry and soft piece of paper.

After analyzing biological liquids, clean the thermistor by using an appropriate disinfectant solution with antibacterial and antiviral action (a non-aggressive one). Then, rinse with water copiously (see the "Thermistor cleaning" paragraph).
Do not use chlorine based detergents.

2. Verify that the test tube used s completely dry and clean.
3. Verify that the equipment is set on the correct calibration curve (see "Calibration curves").
4. Prepare the check standard (see "Choosing the check standard").
5. Prepare the first replicate of check standard solution (i.e. 323 mOsm) and pour the desired quantity of liquid inside the tube.
6. Insert the tube with the liquid inside the duct.
7. Press the 

key.
8. Insert the name of the sample, if necessary (see "Insert the samples IDs").
9. Press the  key.
10. Wait until the end of the analysis.
11. Remove the test tube from the duct.
12. Prepare the second replicate of check standard solution (i.e. 323 mOsm) and pour the desired quantity of liquid inside the tube.
13. Insert the tube with the liquid inside the duct.
14. Press the 

key.
15. Insert the name of the sample, if necessary (see "Insert the samples IDs").
16. Press the  key.
17. Wait until the end of the analysis.
18. Remove the test tube from the duct.
19. Prepare the third replicate of check standard solution (i.e. 323 mOsm) and pour the desired quantity of liquid inside the tube.
20. Insert the tube with the liquid inside the duct.
21. Press the 

key.
22. Insert the name of the sample, if necessary (see "Insert the samples IDs").
23. Press the  key.
24. Wait until the end of the analysis.
25. Remove the test tube from the duct.
26. Prepare the fourth replicate of check standard solution (i.e. 323 mOsm) and pour the desired quantity of liquid inside the tube.
27. Insert the tube with the liquid inside the duct.
28. Press the 

key.
29. Insert the name of the sample, if necessary (see "Insert the samples IDs").
30. Press the  key.
31. Wait until the end of the analysis.
32. Remove the test tube from the duct.
33. Prepare the fifth replicate of check standard solution (i.e. 323 mOsm) and pour the desired quantity of liquid inside the tube.
34. Insert the tube with the liquid inside the duct.

35. Press the  key.
36. Insert the name of the sample, if necessary (see “Insert the samples IDs”).
37. Press the  key.
38. Wait until the end of the analysis.
39. Remove the test tube from the duct.
40. Calculate the average value of the obtained results (except the first results) and verify the difference (accuracy) from the reference value indicated on the bottle.

- Whether the accuracy results to be ±3.0 mOsm/Kg in a range of 0÷600 mOsm/Kg it is possible to perform the analysis of the samples.

- Whether the accuracy results to be ±0.5% mOsm/Kg in a range of 600÷3000 mOsm/Kg it is possible to perform the analysis of the samples.

- Whether the accuracy results to be out of the range indicated above it is necessary to verify the quality and expiry date of the standard liquids and/or repeat the calibration process.

If you get wrong results after performing these remedial actions, contact your local MRC Distributor.

HANDLING THE ARCHIVES

DOWNLOADING OF THE DATA ANALYSIS / ALARMS ON THE PEN DRIVE

OSM-1T is equipped with a USB port, to which you can connect a *pen drive* and download the data of the analysis performed or the alarm list generated by the equipment.
The data contained in the “List of Results” schedule (see “List of Results menu”) and downloaded on the *pen drive* are nominated “Analisi.csv”.
The data contained in the “Alarm List” schedule (see “Alarm List menu”) and downloaded on the *pen drive* are nominated “Allarmi.csv”.
The data transferred on the pen drive will be available in the memory of the equipment until the user erases them.

We recommend to download the analysis and error archives on the pen drive or on the computer periodically. Always save a copy to avoid accidental losses of data.

A. Connecting the pen drive
To download the data on the *pen drive,* connect it to the osmometer by means of the **PEN DRIVE** port located on the right side of the equipment.

If the *pen drive* is connected properly, the symbol appears on the Information/warning bar (see “Main Menu” paragraph).

B. Transferring the data on the pen drive

To download the analysis data from the osmometer to the *pen drive* proceed as follows:

1. Verify that the *pen drive* is properly connected (see “Connecting the pen drive”).

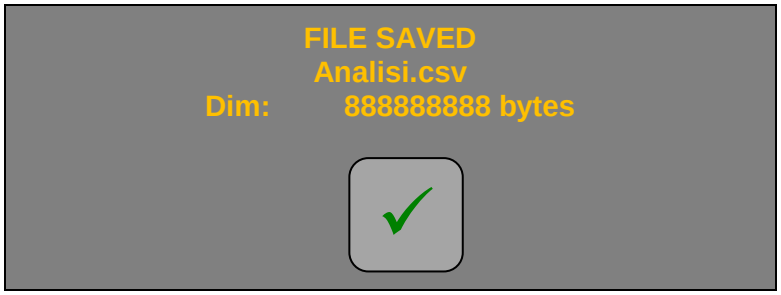
2. If the password is activated, press the key and insert the password (see “Password”).

3. Press the key from the Main Menu.

4. Press the **List of Results** case.

5. Press the key to start the download.

6. When the download is completed, this message appears on the display:



7. Press the to complete the operation and go back to the “List of Results” menu.

8. Remove the *pen drive*.

If the pen drive contains a file generated by a former download, this file will be overwritten.

C. Downloading the alarm list on the pen drive

To download the alarm list from the osmometer to the pen drive proceed as follows:

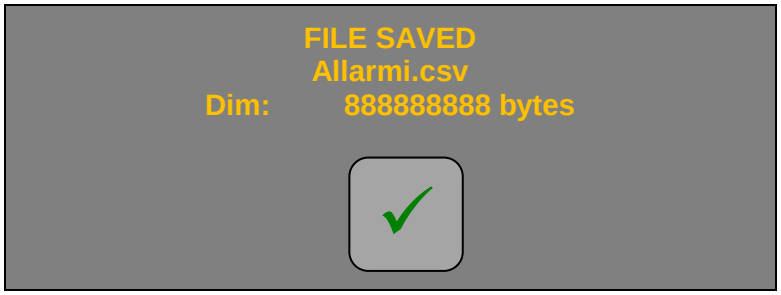
1. Verify that the pen drive is properly connected (see “Connecting the pen drive”).

2. If the password is activated, press the key and insert the password (see “Password”).

3. Press the key from the Main Menu.

4. Press the **Alarm List** case.

5. Press the key to start the download.
6. When the download is completed, this message appears on the display:



7. Press the to complete the operation and go back to the “List of Results” menu.
8. Remove the *pen drive*.

If the pen drive contains a file generated by a former download, this file will be overwritten.

HOW TO DELETE THE ARCHIVES

The data stored in the archives (list of results and alarms) can be deleted from the equipment memory.

Before deleting the archives content check that all the data have been properly saved on the computer or on the pen drive.

A. How to delete the list of results
To delete the list of results proceed as follows:

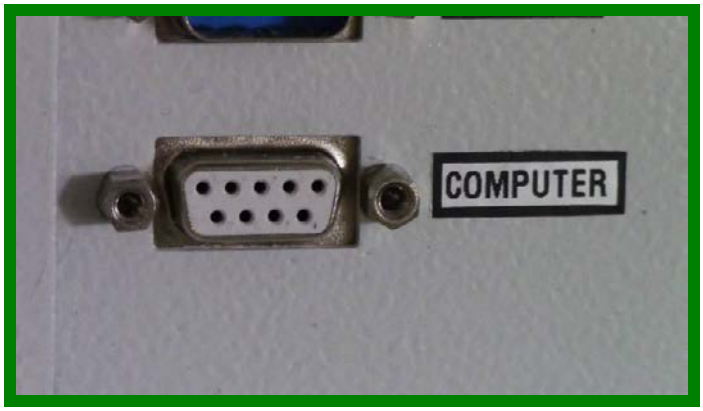
1. If the password is activated, press the key and insert the password (see “Password”).
2. Press the key from the Main Menu.
3. Press the **List of Results** case.
4. Press the key to delete the data.

B. How to delete the alarm list
To delete the alarm list proceed as follows:

1. If the password is activated, press the key and insert the password (see “Password” paragraph).
2. Press the key from the Main Menu.
3. Press the **Alarm List** case.
4. Press the key to delete the data.

CONNECTING THE OSMOMETER TO A PERSONAL COMPUTER

OSM-1T can be connected to a personal computer by using the **COMPUTER** port located on the rear, by means of a serial cable type RS232 or a USB-RS232 converter.



When the OSM-1T is properly connected to the *personal computer* it is possible to download the data during the analysis or download the data of the analysis performed.

To get more information about the connection / download operation, refer to the cable installation manual, to the driver installation manual and to the "CryoSoft Touch" installation and User's manual.

BARCODE READER

OSM-1T can be connected to a barcode reader by using the **SCANNER** port located on the rear.

To get more information about the connection operation, refer to the reader installation manual.

BARCODES

The equipment can scan barcodes of maximum 13 digits length.

Herewith below there are 6 types of barcodes that can be used for the calibration standards and to verify the correct functioning or the correct setting of the reader.

STD100

STD323

STD500

STD900

STD1500

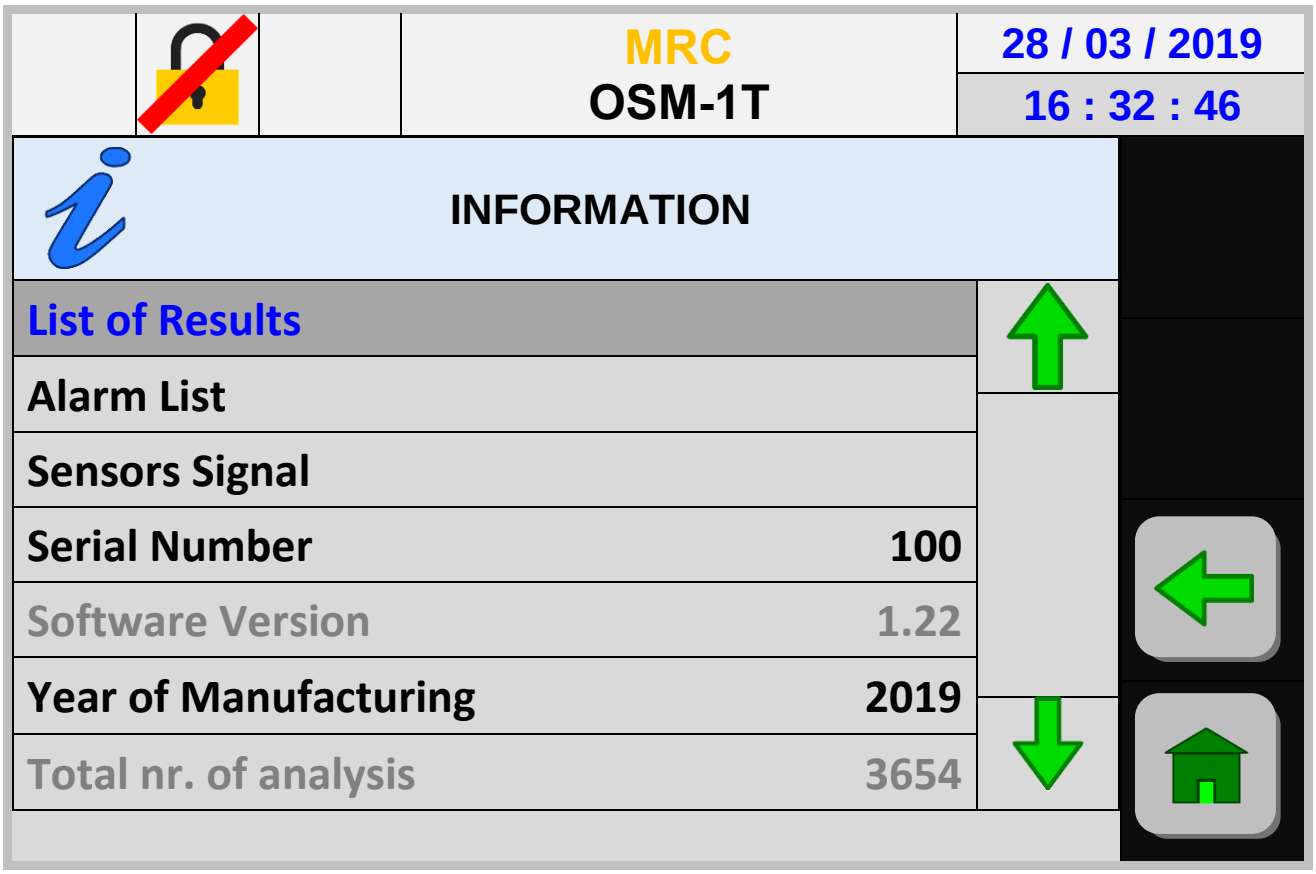
STD3000

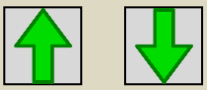
MENU

OSM-1T is provided with different menus that allow the operator to: get access to the osmometer information/setting; display/edit the reference type for the added water calculation; perform the calibration and adjustments.

INFORMATION MENU

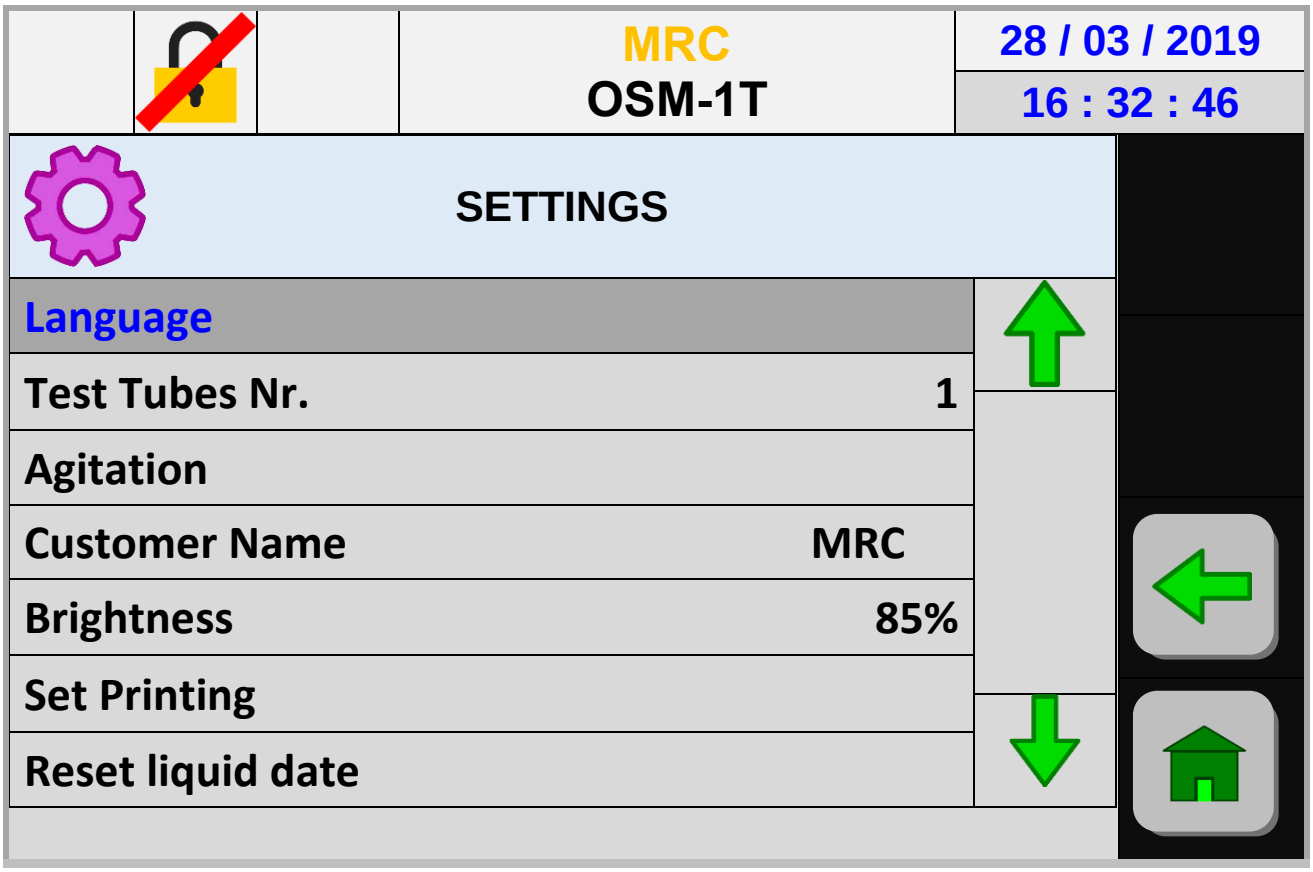
The menu contains the list of all the analysis performed, the list of alarms generated by the equipment and all the main information.



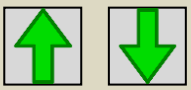
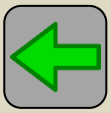
Entry	Description
List of Results	It displays the complete list of the analysis performed (see “List of Results” paragraph).
Alarm List	It displays the complete list of errors generated by the equipment. (see “Alarm List” paragraph).
Sensors Signal	It shows the real time value for the sensors located inside the instrument. - **Bath Temperature**: it displays the real cooling bath temperature. - **Thermistor Temperature**: it displays the real reading thermistor temperature. - **Test Tube Photocell**: it displays the status of the photocell reader (**0**-no tube detected; **1**-tube detected). - **High Limit Switch**: it displays the status of the limit switch. If closed, it means that the head finds itself in the upper position (**0**-open; **1**-closed). - **Low Limit Switch**: it displays the status of the limit switch. If open, it means that the head finds itself in the lower position (**0**-open; **1**-closed).
Serial Number	It shows the serial number of the instrument.
Software Version	It shows the software version.
Year of Manufacturing	It shows the year of manufacturing.
Total nr. of analysis	It displays the total number of analysis performed by the instrument.
Total nr. of analysis after reset	It displays the total number of analysis performed by the instrument after the “Subst. Cooling Liquid” reset message (see “Cooling Liquid Error Message” paragraph).
Scroll 	It scrolls the entries.
Previous 	It returns to the previous menu.
Home 	It goes back to the Homepage.

SETTING MENU

This menu contains all the setting entries of every parameter.

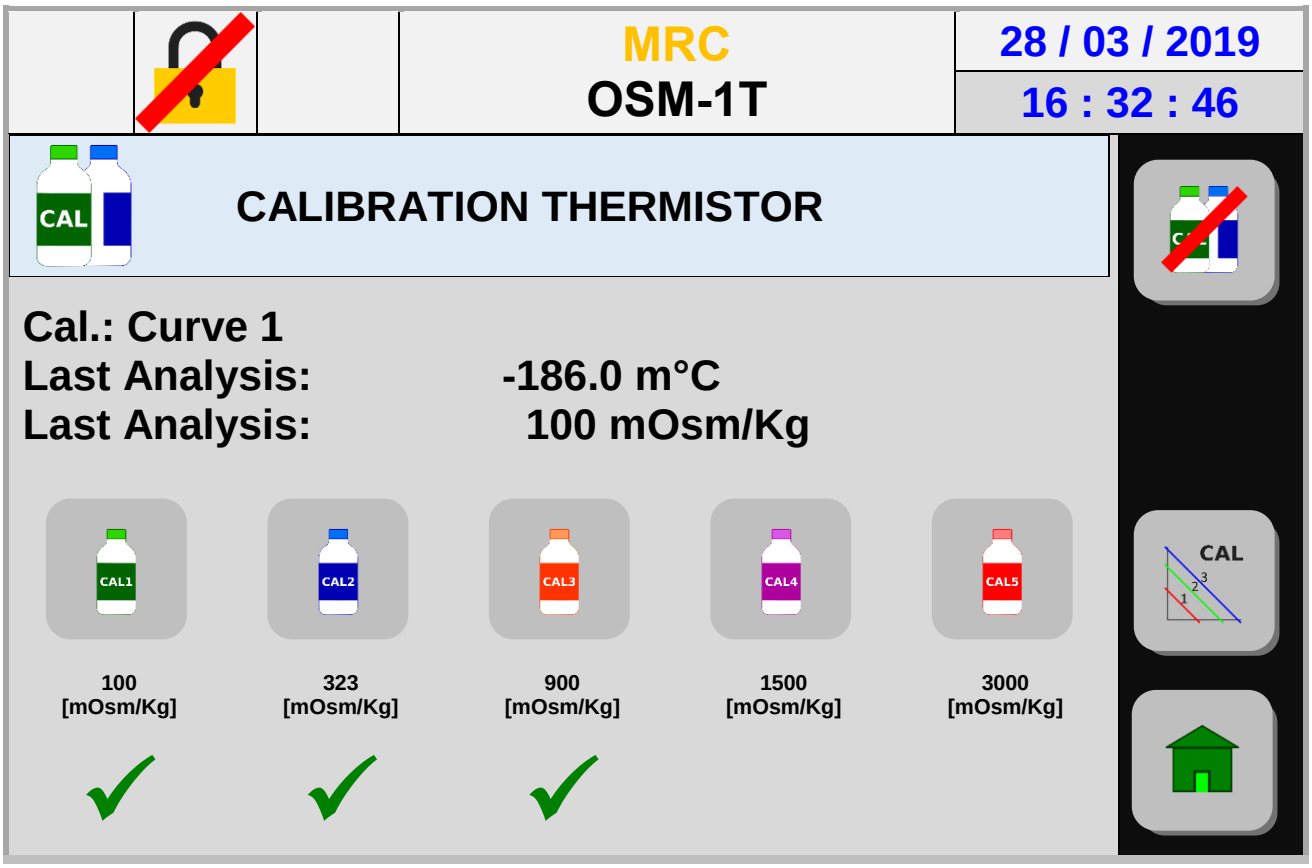


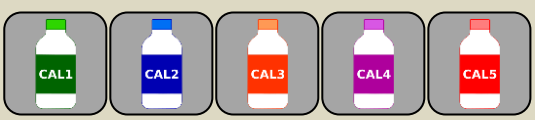
Entry	Description
Language	It selects the language to be used. Press the key according to the language you are going to select: - Italian - English - French - Spanish
Test Tubes Nr.	It modifies the test tubes number (see “Setting the test tubes number to be analyzed” paragraph).
Agitation	It adjusts the frequency of the electrical wave that reaches the stirrer during its agitation step. By means of agitation it is possible to perform the Freezing Stroke Test. (see “Agitation Menu”).
Customer Name	By means of this function it is possible to modify the name of the customer set.
Brightness	It adjusts the brightness.

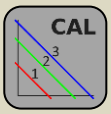
Set printing	It prints the setting data.
Reset liquid date	It resets and edits the bath alarm settings (see “Cooling Liquid Error Message”).
Options	It displays and edits the parameters of the external devices: - **Buzzer**: it enables the acoustic device (**On**-enabled; **Off**-disabled). - **Printer**: it enables the printer connection (**On**-enabled; **Off**-disabled). - **RTS Printer**: it keeps in memory the data that need to be sent to the printer and sends them automatically when the printer is connected. After turning the equipment off the data are not transmitted anymore. (**On**-enabled; **Off**-disabled). - **PC Download**: it enables the download on the computer (**On**-enabled; **Off**-disabled). - **Temp. Diagram**: it displays the temperature detected in real time by the thermistor (access: disabled). - **COM PC Port**: it sets the COM serial port for the download of the obtained results on the computer. - **COM Barcode Reader**: it sets the COM serial port for the data receipt from the barcode reader.
Edit password	It modifies the password set If the LOG IN function is on, it is possible to modify only the password related to the User who logged in.
Service	It enters the Service menu.
Scroll 	It scrolls the menu entries.
Previous 	It returns to the previous menu.
Home 	It returns to the homepage.

CALIBRATION THERMISTOR MENU

The calibration menu selects the calibration curve, acquires the analysis, modifies the linearity of the calibration curve and resets the calibration.

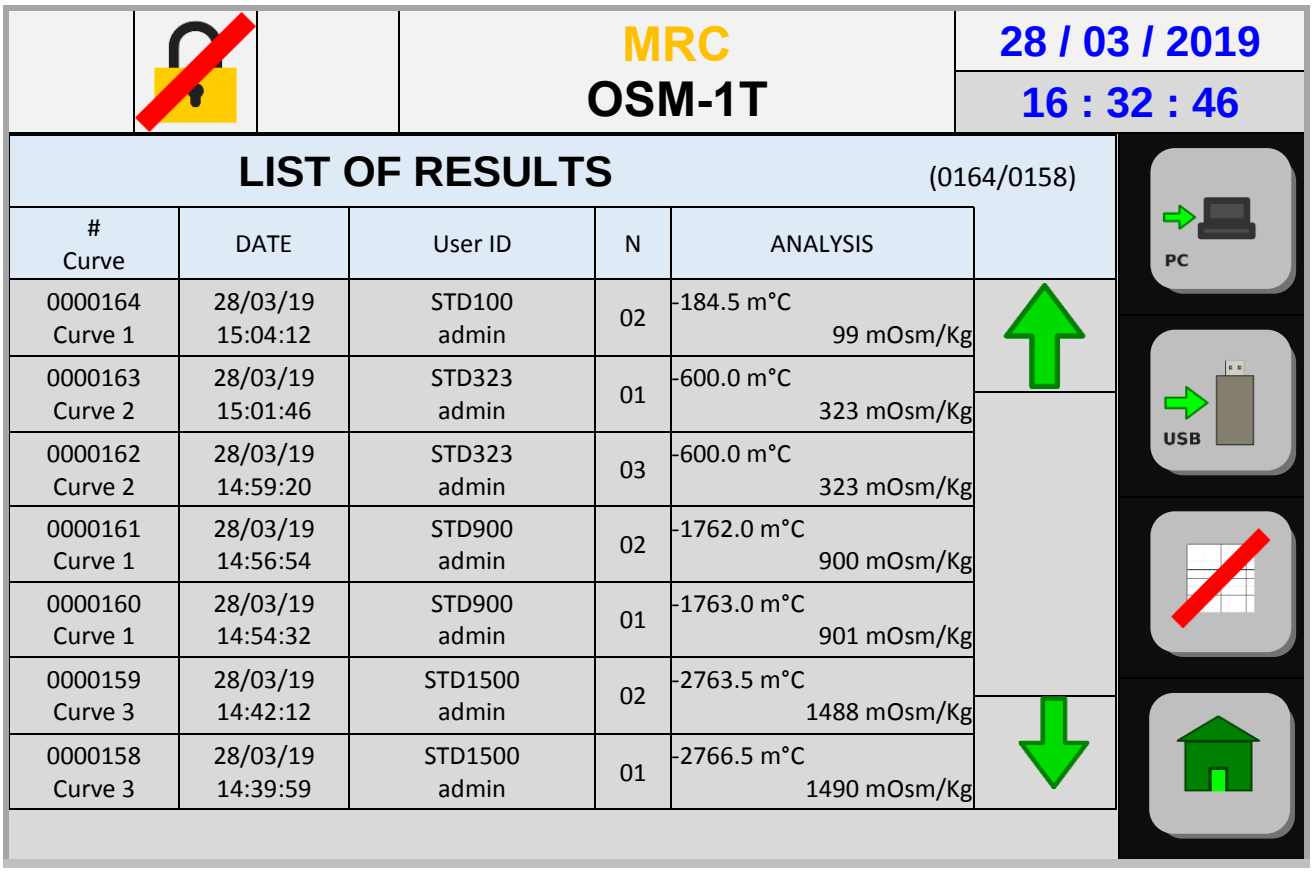


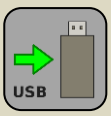
Entry	Description
Curve ***Cal.: Curve 1***	It displays the name of the selected curve.
Analysis in m°C ***Last Analysis: -186.0 m°C***	It shows the value of the last analysis performed. (in m°C)
Analysis in mOsm/Kg ***Last Analysis: 100 mOsm/Kg***	It shows the value of the last analysis performed. (in mOsm/Kg)
Calibration Standard 	You can use these keys to confirm the calibration standards. The keys marked with a tick are enabled.

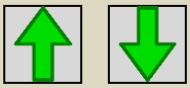
Setting Standard ***100 [mOsm/Kg]***	Calibration standard value.
Reset calibration 	It resets the calibration data.
Calibration curve selection 	It selects the calibration curve.
Home 	It returns to the homepage.

LIST OF RESULTS MENU

The “List of Results menu” consists of a schedule containing all the results of the analysis performed since the last reset.
Here the operator can send the data to the software (optional, installed on the computer), to the pen drive and erase all the analysis performed until that moment.



Entry	Description
Analysis Displayed (0164/0158)	It shows the number of the analysis displayed on the screen.
Analysis 0000164 Curva 1 | 28/03/19 15:04:12 | STD100 admin | 02 | -184.5 m°C 99 mOsm/Kg	It shows all the details referred to the last analysis performed (see “Analysis Details”).
PC 	It transfers all the results from the equipment to the computer (when connected).
USB 	It transfers all the results from the equipment to the pen drive (when connected).

Delete 	It deletes the memory of all the analysis performed (see “How to delete the archives”).
Scroll 	It scrolls to the previous / next page.
Home 	It returns to the Homepage.

A. Analysis Details
All the analysis results are stored in a schedule as follows:

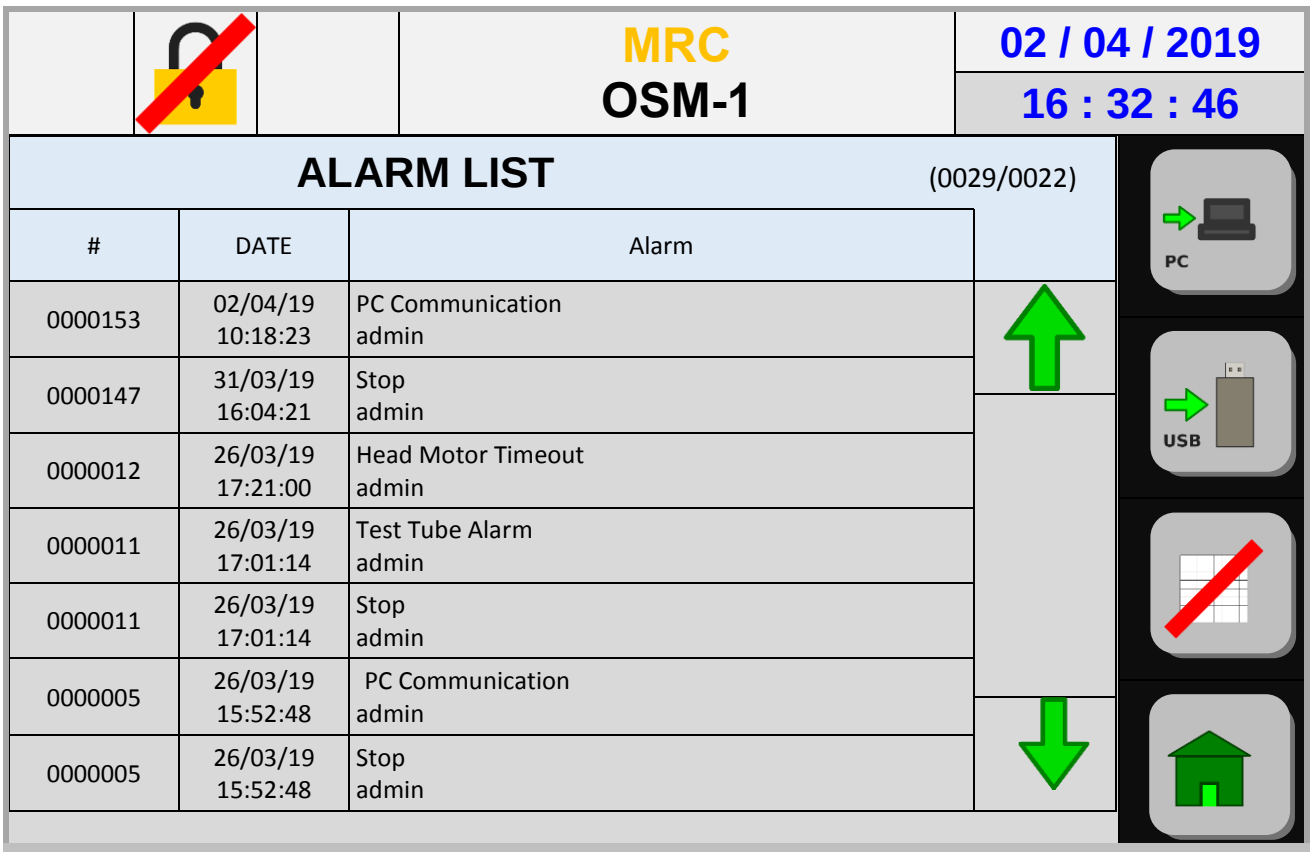
# Curve	DATE	User ID	N	ANALYSIS
0000164 Curve 1	28/03/19 15:04:12	STD100 admin	02	-184.5 m°C 99 mOsm/Kg

Entry	Description
# 0000164	Number of the analysis performed (since the installation of the equipment).
Curve Curve 1	It shows the calibration curve selected.
Date 28/03/19 15:04:12	It shows the date and time of the analysis.
ID STD100	It shows the analysis ID (see “Setting the samples IDs” paragraph).
User admin	It shows the name of the operator that performed the analysis (see “Log In” paragraph).

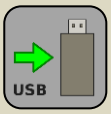
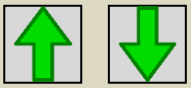
N 02	Number of the current analysis.
Anaysis -184.5 m°C 99 mOsm/Kg	It shows the result of the analysis and the related measuring scale. The final result will be shown both in m°C and mOsm/Kg

ALARM LIST MENU

The “alarm list” consists of a schedule containing all the alarms generated by the equipment since the last reset.
It is possible to transfer the data on the software (if installed on the computer), transfer them on the pen drive or cancel all the analysis performed.



#	DATE	Alarm
0000153	02/04/19 10:18:23	PC Communication admin
0000147	31/03/19 16:04:21	Stop admin
0000012	26/03/19 17:21:00	Head Motor Timeout admin
0000011	26/03/19 17:01:14	Test Tube Alarm admin
0000011	26/03/19 17:01:14	Stop admin
0000005	26/03/19 15:52:48	PC Communication admin
0000005	26/03/19 15:52:48	Stop admin

Entry	Description
Messages displayed (0029/0022)	It shows the number of error messages displayed on the screen.
Analysis 0000153 | 02/04/19 10:18:23 | Comunicazione PC admin	It shows the details related to the message (see “Alarm details” paragraph).
PC 	It downloads the alarm messages on the computer (if connected).
USB 	It downloads the alarm messages on the pen drive (if connected).
Cancel 	It erases the archives of the alarms generated (see “How to delete the archives” paragraph).
Scroll 	It shows the error messages on different pages.
Home 	It returns to the homepage.

A. Alarm Detail

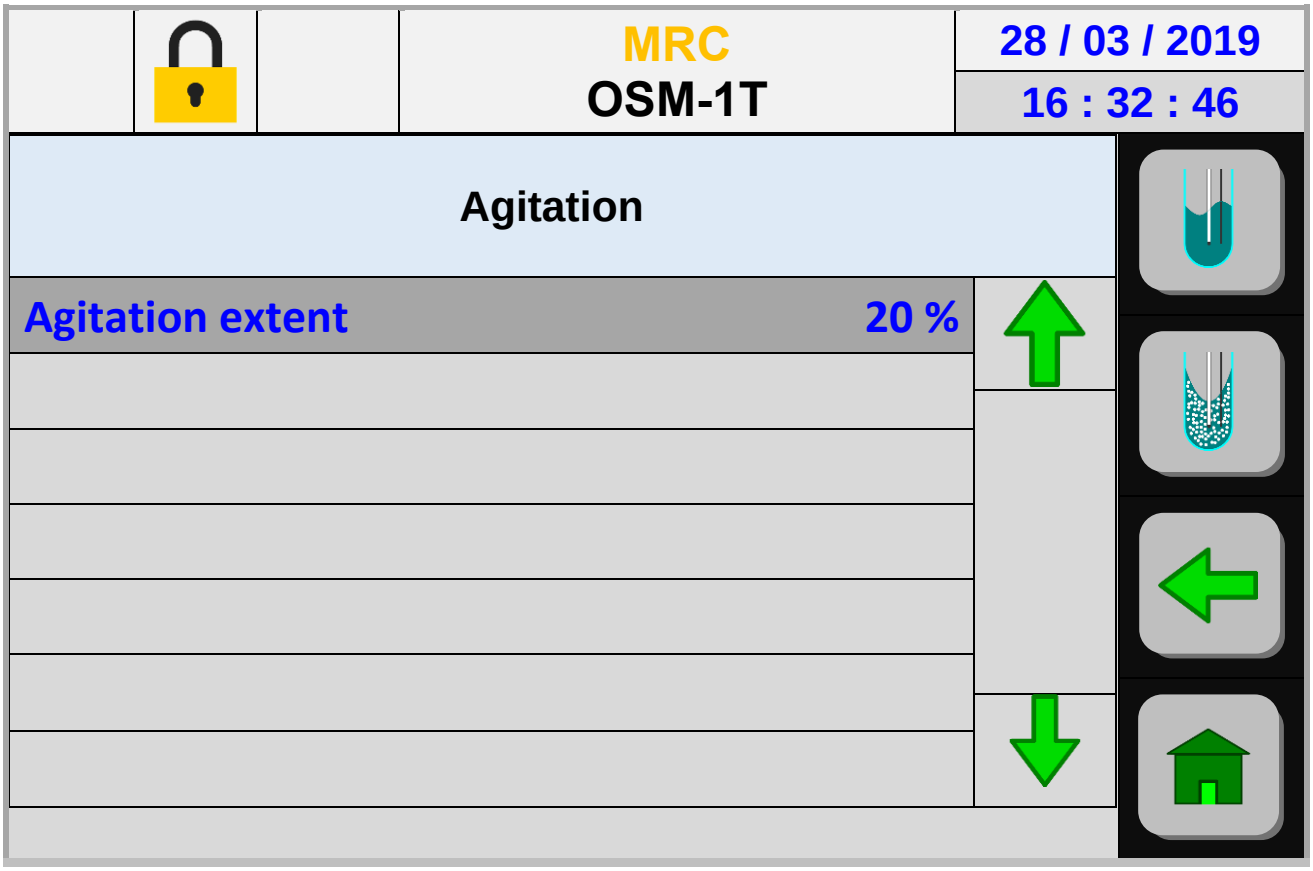
All the results of the analysis are saved as follows:

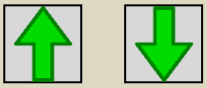
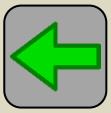
#	DATE	Alarm
0000153	02/04/19 10:18:23	PC communication admin

Entry	Description
# 0000153	Analysis ID number where the error occurred. In case the alarms are not strictly connected to the analysis (i.e. bath temperature too low), the ID number shown corresponds to the last analysis performed.
Date 02/04/19 10:18:23	Date and time of the alarm generated.
Alarm Comunicazione PC	It shows the name of the alarm generated (see “Alarm List” paragraph).
User admin	It shows the name of the operator who logged in when the alarm generated (see “Log In”).

AGITATION MENU

The agitation menu contains the agitation adjustment and the test key for the agitation test and freezing stroke test.



Entry	Description
Parameter Name Agitation extent	It shows the name of the parameter.
Current Value 47%	It shows the current value set.
Agitation Test 	By pressing this key the agitation is activated. Press it again to stop the test (see “Adjustments” paragraph).
Freezing Stroke Test 	By pressing this key the freezing stroke is activated. Press it again to stop the test (see “Adjustments” paragraph).
Scroll 	It scrolls the menu entries (function disabled).
Previous 	It returns to the previous menu.
Home 	It returns to the homepage.

ALARMS

In case of danger or malfunctioning the equipment generates alarms.

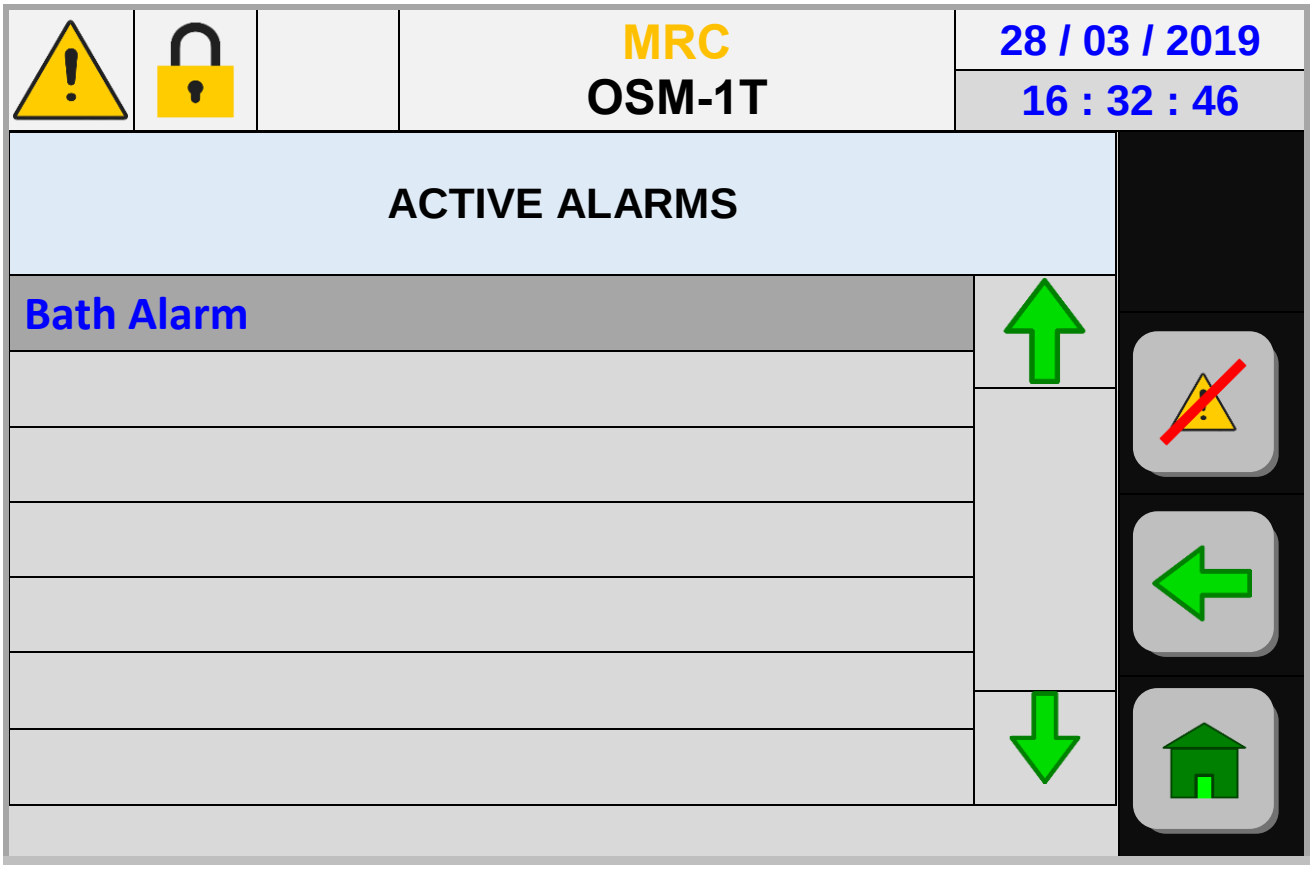
ALARM WARNING AND CANCELLATION

When an alarm is activated the display shows the icon  and makes an audible alarm signal too.
To erase the alarm, press the corresponding icon. When the warning frame opens, the alarm will be displayed.

To erase the alarm press the  key.

All the alarms generated by the equipment are saved in the internal memory.

It is possible to enter this memory by pressing the key and on the Alarm List *case.*



Entry	Description
Alarm 	This symbol indicates that an alarm is activated.
Active Alarm **Bath Alarm**	It indicates the active alarm (see “Alarm List” paragraph).
Alarm Cancellation 	It cancels the current alarm.

Previous 	It returns to the previous menu.
Home 	It returns to the homepage.

ALARM LIST

Entry	Description
Head Motor Timeout	The head is taking too much time to reach its upper / lower position. This alarm indicates that something is blocking the raise/fall of the head or that the motor is not working properly.
Failed sample	The equipment carried out the freezing stroke properly, but the temperature keeps lowering: - Some liquid residuals on the plate may have contaminated the sample. - The freezing stroke is too weak to start the freezing process. - The freezing stroke is too strong and the thermistor is no more immersed in the sample liquid. - The sample contains some particles that prevented the freezing process.
Cooling Liquid	After the analysis of 200 samples or after 93 working days the equipment generates an alarm (see “Cooling Liquid Error Message” paragraph).
CRC Alarm	The equipment generates this alarm when a problem occurs to the memory where the program has been saved.
Printer	This alarm indicates that a problem occurred during the communication with the printer. This alarm may be activated only if the option **Activate RTS printer** is enabled. In normal working conditions this function is unabled, as well as the alarm.
Broken/unstuck thermistor.	This alarm is activated when: - The reading thermistor is broken. - The reading thermistor is not connected. - The internal transmitting cable should be replaced.
Broken bath probe	The reading bath probe is: - Broken. - Damaged. - Disconnected.

PC communication	The equipment cannot communicate with the computer. This message appears only if the option **Activate PC Download** is active Check: - that the software CryoSoft Touch is enabled. - that there are no interruptions on the PC transmitting cable.
Bath Alarm	The equipment generates an alarm when the cooling bath does not reach the correct temperature in 15 minutes after turning on; or in case the cooling bath reaches the correct temperature and then increases.

If the problem persists, contact your local MRC Distributor.

COOLING LIQUID ERROR MESSAGE

After the analysis of 200 samples or after 93 working days the cooling liquid alarm is generated automatically.
In this case check the cooling liquid and the filter (see “Check and substitution of cooling liquid” paragraph and “Check and substitution of cooling liquid”) and replace them, if necessary.
After these operations, reset the **Cooling liquid** alarm and the countdown will be restored.
To cancel this message and restore the countdown proceed as follows:

1. From the main frame, press the  key.

2. Scroll the menu by using the  key until the entry **Reset data liquid**.
3. Insert the password (see “Password” paragraph).
4. Press the entry **Reset data liquid**.
5. Enter the visualization alarm menu (see “Alarm Warning and Cancellation” paragraph).
6. Press the  key.

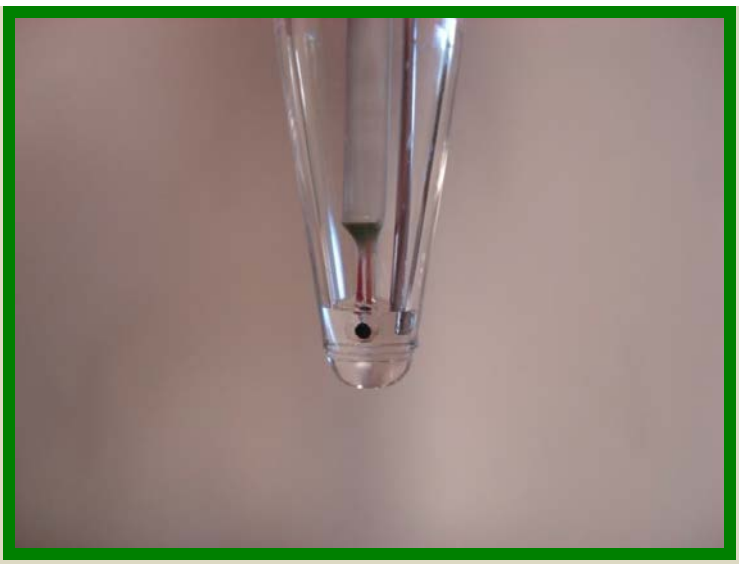
STIRRER ADJUSTMENT

In case some problems of bad agitation adjustment or bad freezing stroke adjustment occur during the analysis, it is possible to test these parameters and make a further adjustment if necessary.

AGITATION

The liquid should be shaken energetically, but no bubbles must be formed during the agitation test process: the stirrer must create a slow vibration.

I.e.



A. Check

To perform the test proceed as follows:

1. Fill a test tube with a calibration standard liquid.

2. From the main frame press the key.

3. Press the entry **Agitation**.

4. Insert the password (see “Password” paragraph).

5. Put the test tube under the mandrel as shown in the picture and press .

6. Press again to stop the test.

Avoid the formation of bubbles during the test and verify that the liquid moves uniformly and constantly.
In case of formation of bubbles, reduce the agitation amplitude.
In case the agitation is too weak, increase the value

B. Agitation Adjustments

In order to adjust the agitation amplitude proceed as follows:

1. From the main frame press the key.

2. Press the entry **Agitation**.

3. Insert the password (see “Password” paragraph).

4. Press the entry **Agitation amplitude**.

5. Insert the value by using the numeric keyboard.

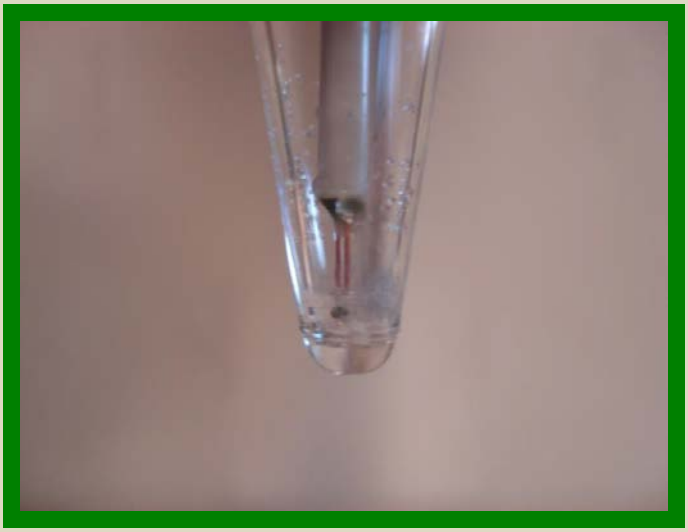
6. Confirm the value by pressing the key, located near the inserted value.

7. Check the correctness of the adjustment again.

FREEZING STROKE

The freezing stroke must hit the test tube walls and shake the liquid in order to form some bubbles that will protect the thermistor from the air and create the condition necessary to freeze the sample.

I.e.



A. Check

To perform the test proceed as follows:

1. Fill a test tube with a calibration standard liquid.

2. From the main frame press the key.

3. Press the entry **Agitation**.

4. Insert the password (see “Password” paragraph).

5. Put the test tube under the mandrel as shown in the picture and press .

6. Press again to stop the test.

When the freezing stroke is carried out properly, the liquid will form some small bubbles that cover the thermistor and protect it from the air. The dimension of these bubbles is also enough to create the necessary discontinuity to freeze the sample.

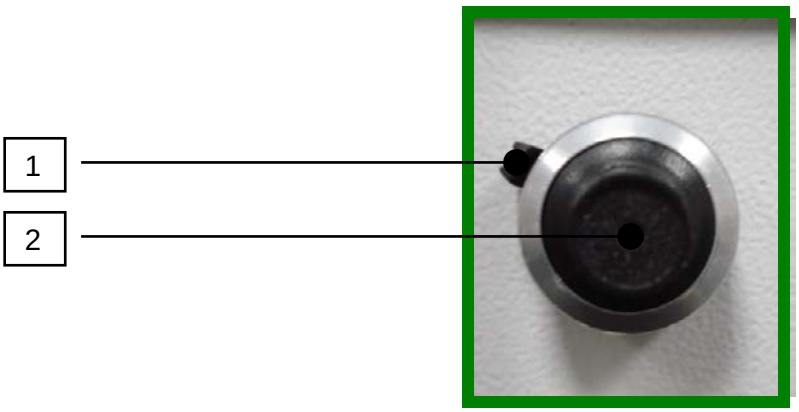
B. Freezing Stroke Adjustments

It is possible to perform an amplitude regulation of the stirrer (freezing stroke) by turning the trimmer located behind the instrument.

The adjustment is a technical operation and must be carried out only if the stirrer does not function properly.

1. Rotate the locking system anticlockwise.

2. Increase or decrease the stirrer strength by rotating in a clockwise or anticlockwise direction.
3. Lock the locking system.



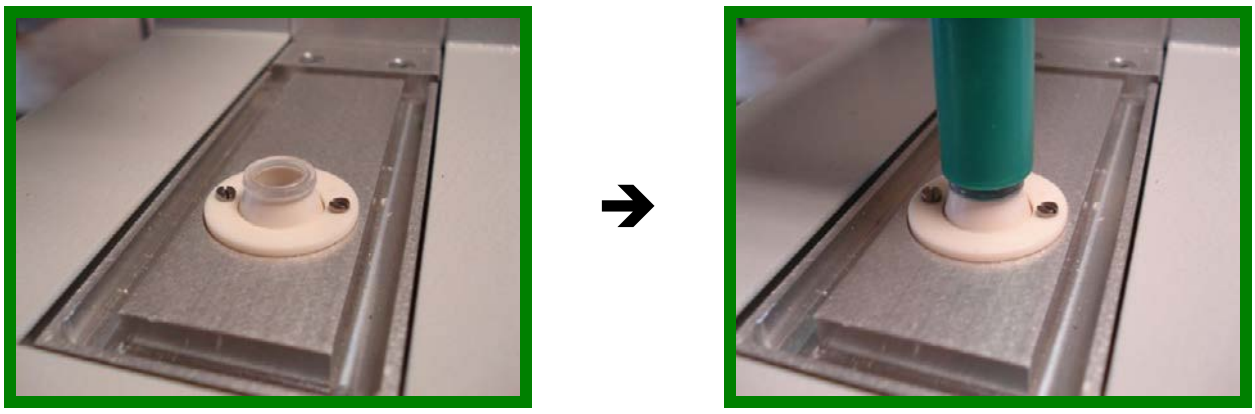
Nr.	Description
1	Locking System
2	Trimmer

After the freezing stroke adjustment check its correctness by performing new tests.

HOW TO PROTECT THE THERMISTOR

Place a tube inside the empty well in order to protect the thermistor when the instrument is not working; then lower the head by pressing the  key.

Do not lower the head down to its lowest position, but stop it when the mandrel fills the well completely.



ORDINARY MAINTENANCE

THERMISTOR CLEANING

While analyzing biological liquids, please always use all the necessary individual safety devices.

For the thermistor cleaning, prepare a container for collecting the washing liquids.
Clean the thermistor by using an appropriate disinfectant solution with antibacterial and antiviral action (a non-aggressive one). Then, rinse with water copiously.
Use a wash bottle to pour the washing solution and the water on the thermistor.

EQUIPMENT CLEANING

While analyzing biological liquids, please always use all the necessary individual safety devices.

Before starting the cleaning process, always turn the equipment off and unplug it from the electrical connection.

Do not pour water on the equipment, but use a dump cloth instead.
Clean the equipment with a neutral detergent.
Do not use alcohol or aggressive detergents.

CHECK AND SUBSTITUTION OF THE COOLING LIQUID

While analyzing biological liquids, please always use all the necessary individual safety devices.

Check the level and the clearness of the liquid every day.

Replace the cooling liquid if one of the following situations occurs:

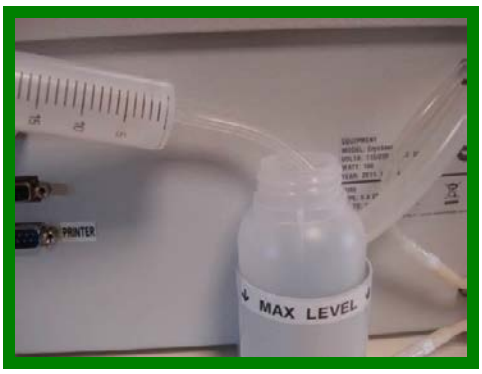
1. After a breakage of a tube inside the bath duct.
2. When the liquid becomes turbid.
3. When some deposits are present on the bottom of the liquid tank.
4. When the filter is dirty.

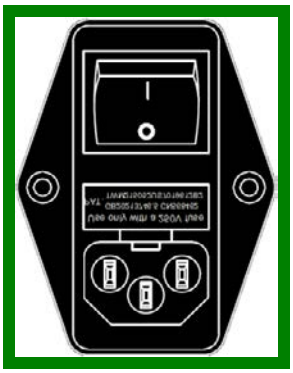
In order to replace the cooling liquid proceed as follows:

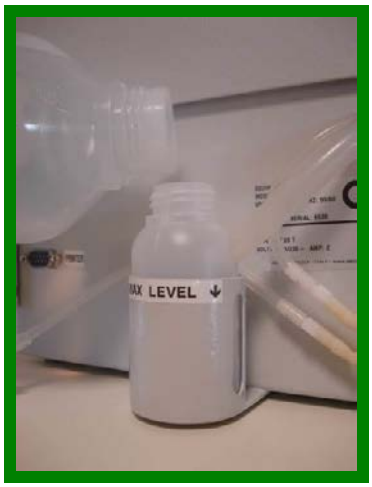
1. Turn the equipment off.
2. Empty the vessel that contains the cooling liquid located on the back of the instrument.
3. Draw the remaining liquid from the cooling bath by using a syringe.
4. Turn the equipment on.
5. Wait around 60 seconds in order to complete the emptying of the automatic refilling system.
6. Draw the liquid from the duct again.
7. Clean the cooling liquid vessel.
8. Fill the vessel with new cooling liquid.

Refill the tank paying attention not to exceed the indicated quantity.
After the replacement of the liquid check the position of the waste tube as it

must be located over the maximum level indication.







CHECK AND SUBSTITUTION OF THE FILTER

While analyzing biological liquids, please always use all the necessary individual safety devices.

Check the filter condition every day.

The filter cleaning is necessary when:

1. The message “Subst. Cooling Liquid” appears on the display.
2. The filter is very dirty.

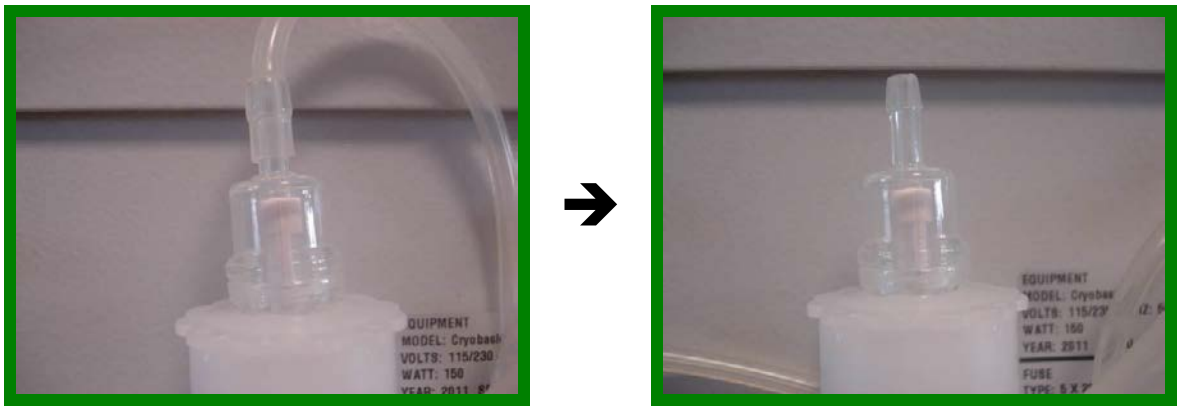
Replace the filter after having cleaned it up for a few times.

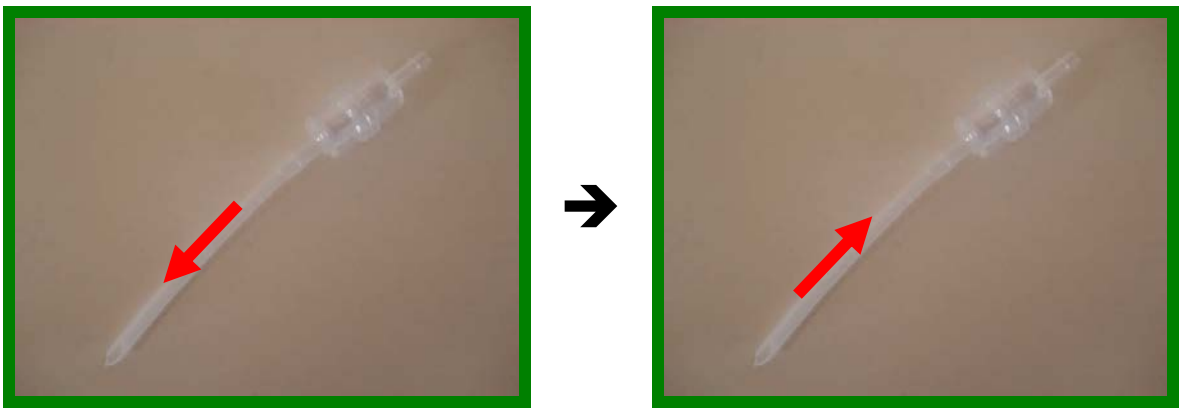
In order to replace the filter please proceed as follows:

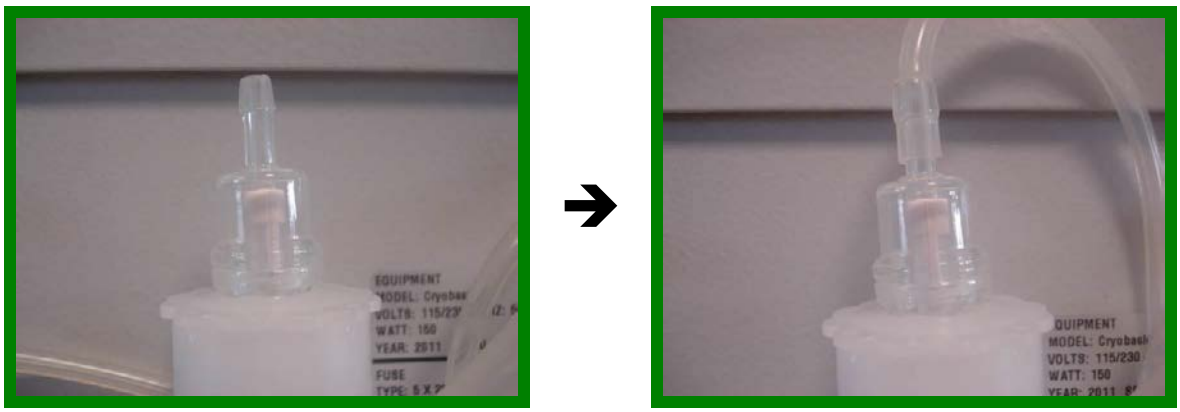
1. Disconnect the pipe which connects the filter to the aspiration pump.
2. Disconnect the filter from the inlet pipe.

Connect the filter paying attention to its direction: the arrow impressed on this element must point to the pipe which connects the filter to the aspiration pump.

3. Connect the filter to the inlet pipe.
4. Connect the new filter to the connection pipe of the aspiration pump.







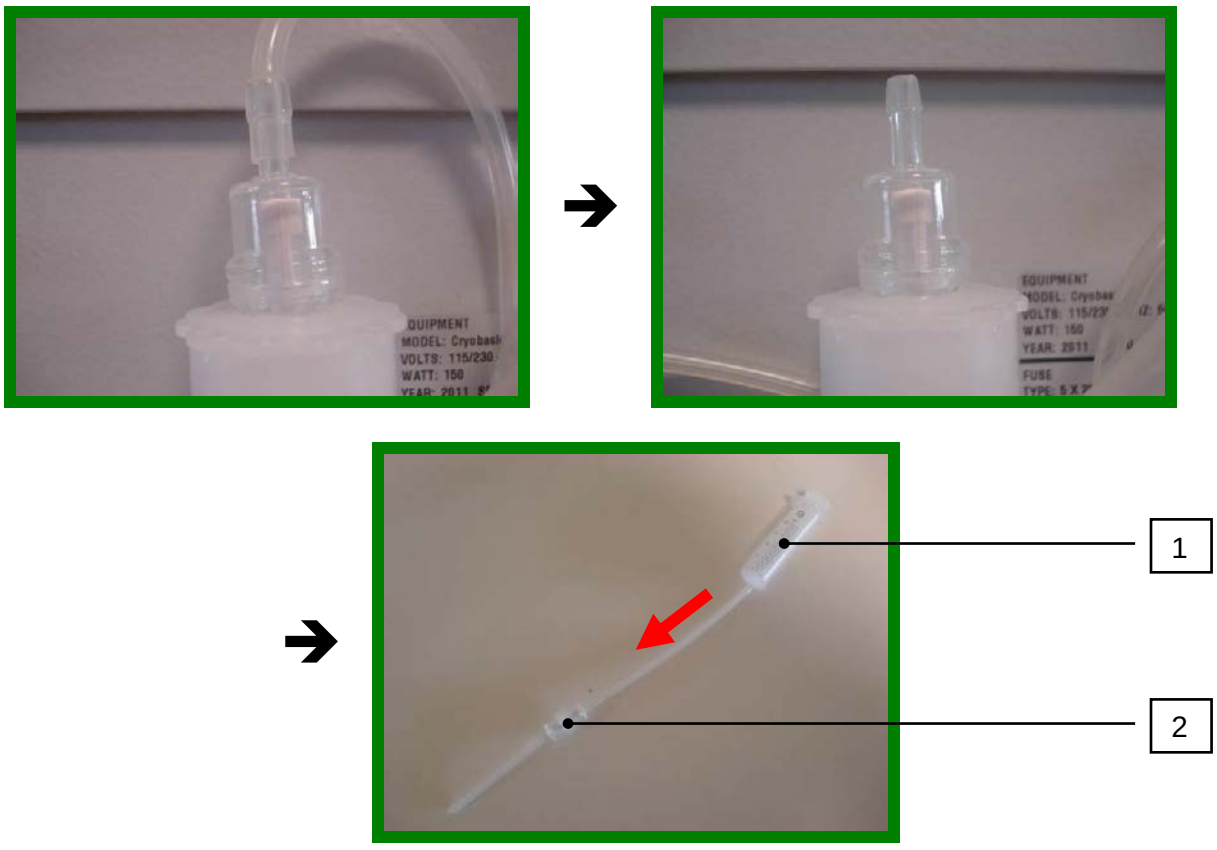
HOW TO CLEAN THE FILTER

While analyzing biological liquids, please always use all the necessary individual safety devices.

In order to clean the filter please proceed as follows:

1. Disconnect it from the pipe which connects it to the aspiration pump.
2. Let warm water flow through the filter in the opposite direction than to the one indicated by the arrow.
3. Repeat this operation a few times.

4. Connect the filter paying attention to the direction. The arrow printed on it must point to the top.



Nr.	Description
1	Syringe
2	Filter

DAILY MAINTENANCE

Always use all the necessary individual safety devices.

1. Dry the wet parts thoroughly, absorbing all the cooling liquid.
2. Carefully clean and dry the mandrel.
3. Check and restore the cooling liquid level, if necessary.
4. Check and replace the filter, if necessary.
5. If any sediment appears in the cooling liquid, please replace it along with its filter (clean the bottle before filling it with the new cooling liquid).

EXTRAORDINARY MAINTENANCE

We warmly suggest to subscribe a yearly maintenance agreement with our local Service Center for a complete cleaning operation to the heat exchangers and a general check of the good conditions of all electric and electronic parts. In this way, you can prevent serious damages to the equipment.

Every maintenance operation which is not mentioned in this manual must be carried out by qualified personnel authorized by the manufacturer only.

TUBE BREAKAGE

Biological liquids.

Always use all the necessary individual safety devices.

When a tube containing biological liquids breaks inside the duct, proceed as follows:

1. Verify that the head is in its upper position.
2. Turn the equipment off.

3. Draw the liquid inside the well by using a syringe and eliminate it according to the disposal procedures of potentially infected biological samples.
4. Remove all the fragments by using tweezers and eliminate them according to the disposal procedures of potentially infected biological samples.

5. Remove the content of the liquid tank (situated on the rear of the equipment) and treat it according to the disposal procedures of potentially infected biological samples.
6. Clean the tank by using an appropriate disinfectant solution with antibacterial and antiviral activity (a non-aggressive one). Then, rinse with water copiously.

Do not use chlorine based detergents.

7. Fill the tank with the disinfectant solution until the maximum level indication. Be sure that the little pipe reaches the very bottom of the vessel.
Check that the waste tube is **over** the indicated maximum level.
8. Turn the equipment on. It will vacuum the liquid contained in the tank automatically.
9. When the pump stops automatically, turn the equipment off.
10. Repeat steps nr. **8** and **9** for a few times.
11. Remove the content of the liquid tank (located on the rear of the equipment) and treat it according to the disposal procedures of potentially infected biological samples.
12. Vacuum the liquid which remains inside the cooling bath duct by means of a syringe and eliminate it according to the disposal procedures of potentially infected biological samples.

13. Turn the equipment on.
14. Wait about 60 seconds to allow the complete emptying of the automatic top up circuit.
15. Vacuum the liquid in the duct once again and treat it according to the disposal procedures of potentially infected biological samples.
16. Remove the content of the liquid tank (located on the rear of the equipment) and treat it according to the disposal procedures of potentially infected biological samples.
17. Replace the filter. Treat it according to the disposal procedures of potentially infected biological samples.
18. Clean the tank and fill it with new cooling liquid until the maximum level indication.
Be sure that the little pipe reaches the very bottom of the vessel.
Check that the waste tube is **over** the indicated maximum level.
19. Clean the thermistor by using an appropriate disinfectant solution with antibacterial and antiviral activity (a non-aggressive one). Then, rinse with water copiously.

Do not use chlorine based detergents.

20. Turn the equipment on and wait until the bath reaches the correct working temperature (the display will show the message READY).
21. The equipment is ready for the analysis.

Other NON potentially infected liquids.

In case the tube breaks inside the duct, proceed as follows:

1. Turn the equipment off.
2. Vacuum the liquid which remains inside the bath by means of a syringe and eliminate it.
3. Remove all the fragments from the tube by using, if necessary, tweezers.
4. Remove the content of the liquid tank located on the rear of the equipment.
5. Turn on the equipment.
6. Wait about 60 seconds to allow the complete emptying of the automatic top up circuit.
7. Vacuum the liquid inside the duct again.
8. Clean the tank and fill it with new cooling liquid until the indicated maximum level.
Be sure that the little pipe reaches the very bottom of the vessel.
Check that the waste tube is **over** the indicated maximum level.
9. Clean the thermistor and the stirrer by using soft paper.
10. Turn the equipment on and wait until the bath reaches the correct working temperature (the display will show the message READY).

HOW TO MOVE AND SHIP THE OSMOMETER

MOVING THE OSMOMETER

Every time you need to move the instrument in your laboratory, pay attention to keep it in horizontal position to avoid a liquid loss.

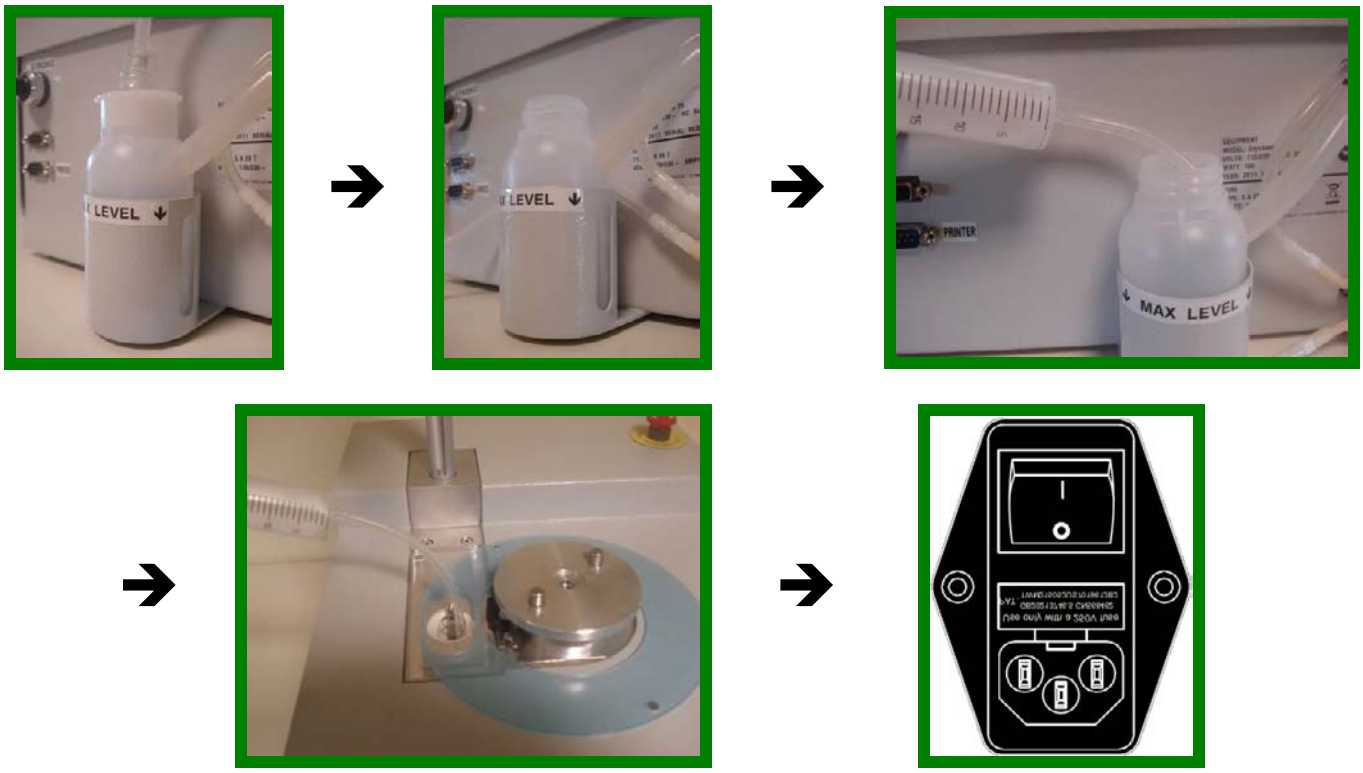
Always hold the equipment by its sides and its lower part with the help of another person.

SHIPPING THE OSMOMETER

In case you need to ship the equipment proceed as follows:

1. Turn the equipment off.
2. Empty the vessel containing the cooling liquid located on the back of the equipment.
3. Vacuum the liquid which remains inside the bath by means of a syringe.
4. Turn the equipment on.
5. Wait around 60 seconds in order to complete the emptying of the automatic refilling system.
6. Vacuum the liquid inside the bath again.
7. Place an empty tube inside the duct.
8. Lower the head by pressing the button.

Do not lower the head down to its lowest position, but stop it when the mandrel is completely inserted in the tube.



CAUTION!
Should you send the equipment, the use of original MRC package or a strong box filled with styrofoam is mandatory. The use of a pallet would be strongly appreciated.

CAUTION!
- In case you need to ship the equipment (used for the analysis of biological liquids) to an authorized service centre, this MUST be decontaminated.
- The decontaminated equipment MUST be shipped with a decontamination certificate.
- In case the equipment is shipped without this decontamination certificate, the service centre will decide whether to proceed with the repair or not.

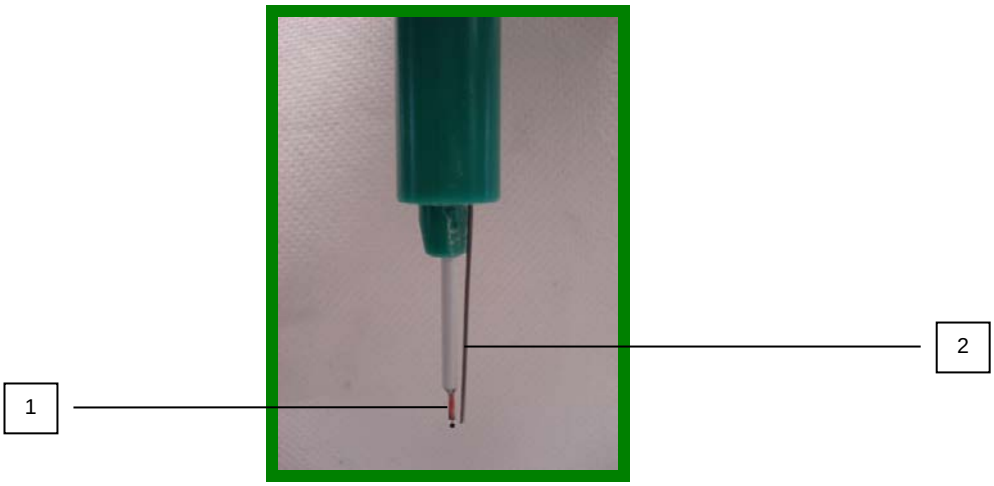
MAIN SPAREPARTS

COOLING BATH

The bath is cooled by using Peltier cells with a temperature of -11°C.

HEAD

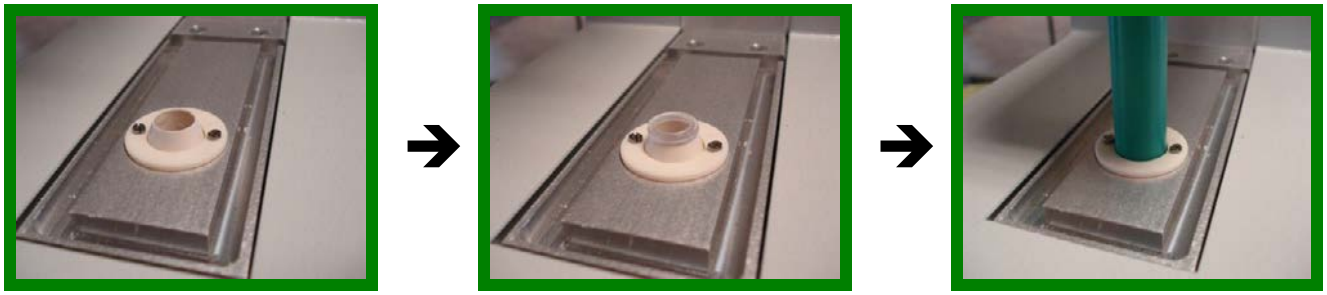
The head holds the sample–tube mandrel along with the reading thermistor and the stirrer.



Nr.	Description
1	Reading thermistor.
2	Stirrer.

WELL

The tube must be allocated inside the well.
When descending the mandrel, the tube will be pushed inside the duct.



READING THERMISTOR

This is the most fragile part of the equipment: protect the glass from hits or it may be damaged. It must be correctly positioned in order to keep the temperature sensor at the same precise distance from the walls and from the bottom of the test tube.

STIRRER

The stirrer must be positioned parallel to the thermistor holder keeping a distance of 1 mm. It must vibrate back and forth symmetrically in comparison to the thermistor axis.

REAR PANEL

Nr.	Description	Nr.	Description
1	Automatic refilling tube.	7	Cooling liquid tank.
2	Barcode reader serial port.	8	Exhaust tube.
3	Trimmer.	9	Main switch.
4	Filter.	10	Fuses compartment.
5	Printer serial port.	11	Supply socket.
6	Computer serial port.	12	Pump.

DRAIN

The drain is located on the left part of the equipment and its purpose is to drain the exceeding liquid through the **DRAIN** hole located on the left side.

The drain is a safety device and can be useful if the customer does not clean the equipment properly, according to the cleaning procedure described in the manual.

PRINTER

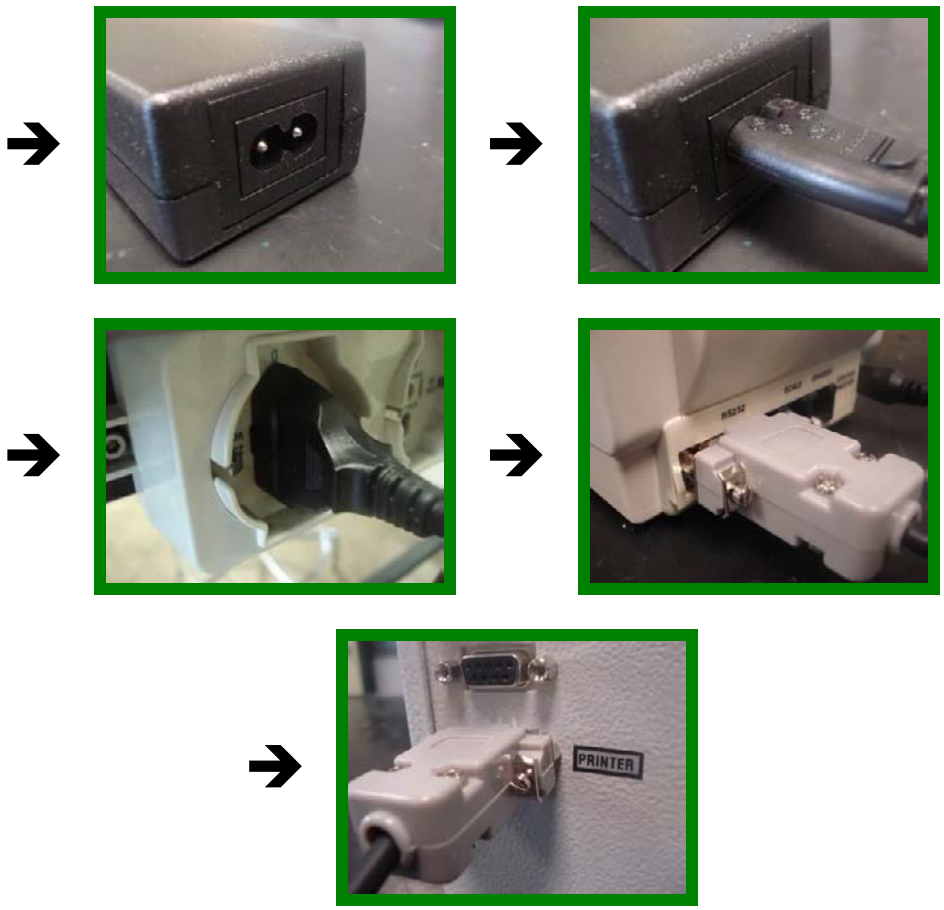
```
06/03/19 - 14 : 07 : 13
User: admin
N. SERIE. 888888888 – Curva 1
N. !        mOsm/Kg ! Temp. m°C
-----!--------------------!--------------
ID: 8888888888888
   1 !               100 !       -186.0
   2 !               100 !       -186.0
   3 !               100 !       -186.0

06/03/19 - 14 : 12 : 13
User: admin
N. SERIE. 888888888 – Curva 1
N. !        mOsm/Kg ! Temp. m°C
-----!--------------------!--------------
ID: 8888888888888
   1 !               323 !       -600.0
```

Entry	Description
Date 06/03/19	It indicates the date of the analysis performed.
Time 14 : 07 : 13	It indicates the time of the analysis performed.
User User: admin	It indicates the name of the user who performs the analysis.

Serial Nr. N. SERIE 888888888	It indicates the serial number of the equipment.
ID Sample ID: 8888888888888	It indicates the ID number of the sample.
Calibration Curve ISO	It indicates the calibration curve used during the analysis.
Analysis Nr. 1	It indicates the number of the analysis.
mOsm/Kg 100	It indicates the osmolality.
Temp. mC -521.0	It indicates the freezing point of the sample.

A. Printer connection
In order to connect the printer to the osmometer, please proceed as follows:

1. Take off the printer and the cables from the box.
2. Verify that the main switch is in the **OFF** position.
3. Connect the power cable to the printer.
4. Connect the AC – DC adapter to the electrical socket by using the proper cable.
5. Verify that the main switch of the osmometer is in the "**O**" position.
6. Connect the printer to the osmometer by using the proper cable.
7. Turn the printer on.
8. Turn the osmometer on.



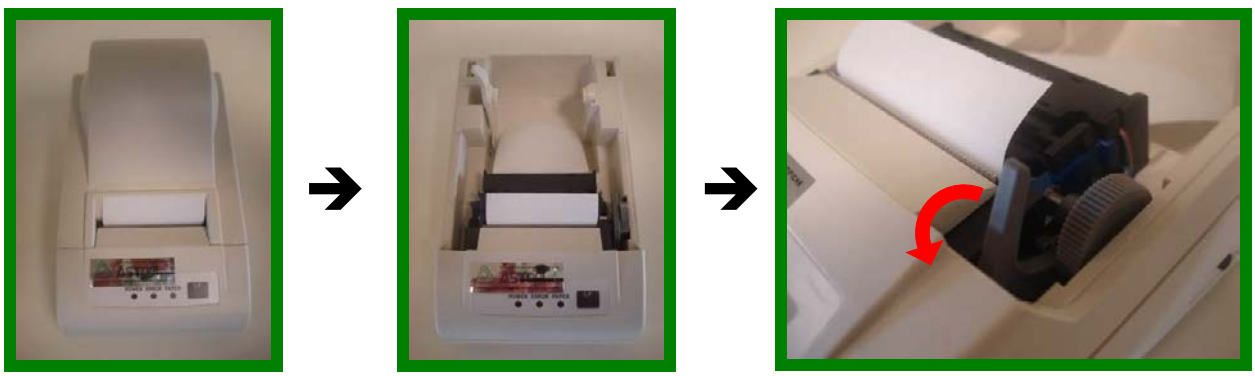
B. Paper feeding

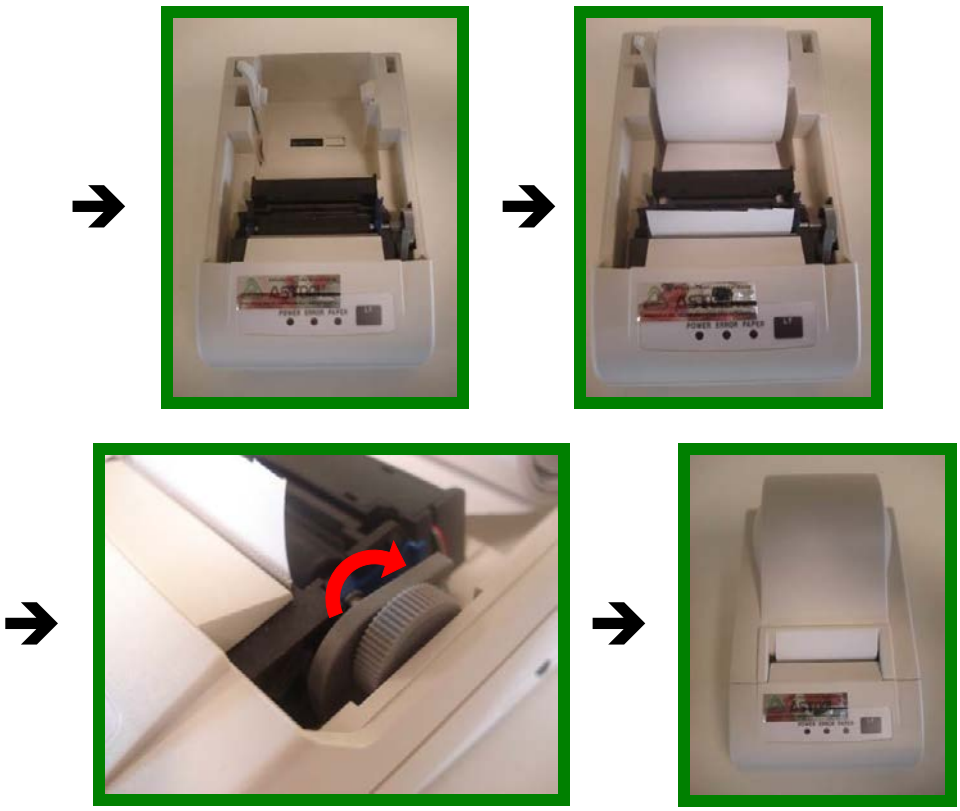
In order to scroll the paper, press the LF key located located on the right side of the front panel of the printer.

C. Change the paper roll

In order to change the paper roll proceed as follows:

1. Open the plastic cover.
2. Lift the printing head by using its lever.
3. Remove residuals of the old roll.
4. Place the new roll in the holder, by positioning the beginning part towards the front of the printer.
5. Roll the paper under the cylinder.
6. Lower the printing head by using its lever.
7. Close the lid.
8. Turn the printer on and press the LF key until the paper comes out from the split.





ACCESSORIES, CONSUMABLES AND MAIN SPARE PARTS

A. Accessories

Code	Description	Quantity
NPX2-200	Automatic micropipette, from 20 to 200 µL	1
37468	Pipette tips, 1000 pcs.	1
EP-50	Thermal printer	1
67233	Printer cable	1
563	Eppendorf tube holder, 100 places	1

B. Consumables

Code	Description	Quantity
67219	Thermal paper roll	1
63225/OSM	Certified check standard for osmolality, 323 mOsm/Kg, 250 mL	1
STD2101	Certified calibration standard for osmolality, 100 mOsm/Kg, 125 mL	1
STD2105	Certified calibration standard for osmolality, 500 mOsm/Kg, 125 mL	1
STD2109	Certified calibration standard for osmolality, 900 mOsm/Kg, 125 mL	1
STD2115	Certified calibration standard for osmolality, 1500 mOsm/Kg, 125 mL	1
STD2120	Certified calibration standard for osmolality, 2000 mOsm/Kg, 125 mL	1
STD2125	Certified calibration standard for osmolality, 2500 mOsm/Kg, 125 mL	1
STD2130	Certified calibration standard for osmolality, 3000 mOsm/Kg, 125 mL	1
67200	Cooling liquid, 250 mL	1
67210	Cooling liquid, 1 litre	1
2030N	50 - 200 µL test tubes, 500 pcs.	1

C. Spareparts

We recommend to keep the following spare parts in your stock.

Code	Description	Quantity
08103	Filter for liquid Cryobasic/OSM-1T	1
9052101011	Stirrer for OSM-1T/Cryobasic 30 µL	1
67257	Reading thermistor, 30 µL, 3000 mOsm/Kg	1

DOCUMENT VALIDITY

MRC reserves the right to review and modify this document without any notice. Please note that any variation will not affect the respect of the directives.

The images used in this manual must be considered as examples and may differ from the reality.

WARRANTY

The warranty period lasts 12 months starting from the date stated on the Packing List and it covers manufacturing faults only.

It does not cover: malfunctionings, damages or faults appeared after the warranty terms or resulting from an improper use of the equipment; from neglicence or carelessness; from wrong installation or wrong maintenance; from technical assistance carried out by unauthorized personnel; from transport or corrosion damages; from the use of consumables (tubes, cooling liquid, calibration and check standards) not supplied by MRC or not original replacement parts.

Warranty will be instantly invalidated in the event that the serial number of the product is found to be modified or cancelled.

Warranty does not cover damages originated by overvoltages caused by the electrical net, where the equipment is connected to.

N.B.: WARRANTY DOES NOT INCLUDE THE READING THERMISTOR

DISPOSAL

The symbol of the crossed garbage collector indicates that the product at the end of its useful life should be collected separately from normal garbage.
The user will give the equipment to specialized centers for collection of electronic and electro technical garbage according to rules and laws.

The proper collection of the disused equipment, the recycling, treatment and disposal contribute to avoid possible negative effects on the environment and human health and encourages the recycling of the materials that compose the equipment.

COOLING BATH FORM

Assembling date: Testing date:

Serial number: Testing surveyor:

Notes .....

.....

.....

.....

NOTE: this form is an essential part of the bath and must always be kept with it.
If returned for any damage without this form, the repairs and the replacement under warranty conditions will not be possible. In this case the manufacturer reserves the right to apply the warranty conditions or not.

MRC's Technician

_____

DECLARATION OF CONFORMITY

Product name: **OSM-1T**

Type of product: **Osmometer**

Manufacturer: **MRC LTD.**

Address: **HAGAVISH 3 ST**. **ISRAEL**

The above-mentioned equipment is in compliance with the EU harmonized standards:

2014/35/UE
2014/30/UE
2011/65/UE

By using the following harmonized norms:

EN 61010-1
EN 50366+A1
EN 61326-1