MILESTONE
HELPING
PATIENTS

Pathos Delta

Rapid Automatic
Microwave Vacuum Tissue-processor

Operator Manual

MM071

Thank you for having selected our system and welcome to the ever growing world club of users for Milestone laboratory instrumentation.
We are sure that you will be completely satisfied with this new tool entering your laboratory.
We invite you to read carefully this operator manual and to keep it in reach for convenient and fast consulting.
For any possible clarification or any request for assistance please contact either our Representative in your country:

Or contact

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e-mail medical@milestonesrl.com

Please read the user manual before using the device.

MM071-004 – Pathos Delta – Operator Manual
2014-07

SUMMARY

1. INTRODUCTION

1.1. Symbol used in this manual

Please read carefully this instruction.

An instruction accompanied by this symbol provides a cautionary statement: WARNING. Failure to follow the instruction may endanger the USER or cause damage to the instrument.

An instruction accompanied by this symbol provides a caution against electric shock. Be sure to follow the instruction to prevent accidents resulting from electric shock.

Biohazard.

Moving organs: please be careful when you run this step because there are moving parts.

Be careful: parts identified with this symbol zones with risks of crushing hand and/or finger(s).

Surface at danger temperature (more than 70℃, 158° F) do not touch.

Potentially flammable.

CE logo: this instrument complies to European Community directives.

IVD medical device according to 98/79/EC directive.

WEEE European directive symbol (2002/96/EC):
Electric/electronic device do not throw out in the environment.

The Reagents/WAX are suitable for use.

The Reagents/WAX are near expiration.

The Reagents/WAX are expired and need to be substituted.

FOR CANADA ONLY: Canadian Safety Standard Applied.

The mark guarantee the unit is tested according the UL61010-1 and certified by TUV Rheinland of North America, Inc.

Manufacturer.

1.2. Designated uses

The Milestone Pathos Delta and its accessories have been engineered for laboratory use and can therefore withstand the harshest laboratory conditions for continuous use in Histological sample preparation procedures.

The instrument is intended for **laboratory use** (indoor use) **only**.

The Milestone Pathos Delta is specifically designed to automatically execute these processes for histopathological applications:

- Fixation, Post-fixation
- Dehydration and Clearing
- Drying
- Wax infiltration

The Milestone Pathos Delta must be operated exclusively with the reagents listed in section “Compatible reagents” 1.8.

Any other use of the instrument is considered improper and may void the warranty provided by the manufacturer.

1.3. Technical specifications

REF PN 66016: Power supply input: 115V~±10%, 60Hz, 2500W
REF PN 66015: Power supply input: 230V~±10%, 50/60Hz, 2500W

Working Temperature: 15℃ – 30℃ (59℉ – 86℉)
Humidity (relative): up to 80%
Maximum altitude: 2000m
Fan air flow range: 42m^3/h (cube meter per hour).

Indoor use only.

This unit is developed to comply with the CAP-College of American Pathologists checklist of requirements for microwave instruments.

1.4. Touch Control Terminal

This picture shows the Touch Control Terminal of the Pathos Delta unit. It is possible to operate the unit by simply touching the icons on the screen.

Two USB ports are located on the right side of the Touch Control Terminal.

Specifications:	LCD color display: 300x190mm Resolution :800x600 pixels, 10.4'' Touch screen Mass storage CF 256MB RAM: 256MB CPU: 500MHz Windows™ CE.NET 6.0
Programs:	Multiple pre-stored programs, with customizable user defined programs.
I/O-Interface:	2 USB ports 2.0, 1x LAN Ethernet 10/100 Mbps RJ-45.

The manufacturer reserves the right to change and/or improve specifications without notice and without incurring any obligation.

1.5. Transportation and Storage

Temperature: –20°C up to +60°C
Humidity: up to 50% (at 40°C) non–condensing

Before turning Pathos Delta on (when coming from a storage room), let the unit reach working environmental conditions (at least half an hour).

1.6. Warning information

Should the equipment be used in different ways than those specified by the manufacturer, the warranty provided by the manufacturer may be void.
Main plugs are considered as disconnecting device. Disconnect all plugs from the socket outlet before assembling of the system, before connection of the accessories and before cleaning.
Equipment shall be connected to main socket outlet which is accessible and visible by the operator. Equipment is provided with replaceable fuses, however their replacement is to be performed by properly authorized service personnel. If the system is not properly working, please contact the local authorized and trained service representative of the manufacturer.
All parts of the equipment and all accessories must be supplied only by the manufacturer.

DO NOT OPEN THE CHASSIS. Failure to follow the instruction in the documentation might lead to a reduction of device safety. If the equipment is not working properly, please contact your supplier or the manufacturer.

DO NOT OPEN THE COVER while robotic arm is moving specimen or PATHOS DELTA is processing.

Do not remove the instrument, accessories, panels or cover. Only authorized and qualified SERVICE personnel may repair the instrument and access the instrument's internal components.

Use caution when handling hot, molten WAX.

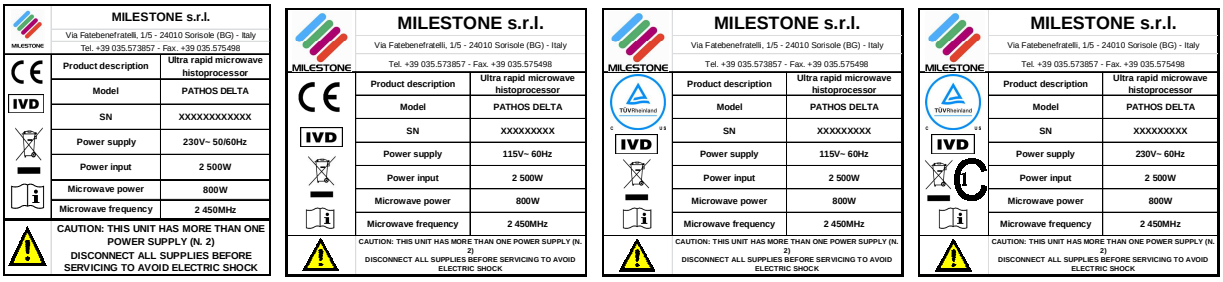
It is important that normal standards for safety and good laboratory practices are applied. Always use common sense and the best known practice when operating the instrument. Failure to follow the instructions in the documentation might lead to a reduction of device safety.
The Competent Authority owning the instrument has primary responsibility for accident-free operation together with designated personnel who operates SERVICE or repair it.

METAL PARTS
Never introduce metal parts into the MAIN CAVITY.
High voltage discharges may cause uncontrolled increases of temperature, which could damage the unit and result in incorrect tissue processing also. Failure to follow the instructions in the documentation might lead to a reduction of device safety.

To avoid damage to the instrument, use only the reagents listed in section 1.8 Compatible Reagents. Failure to follow the instructions in the documentation might lead to a reduction of device safety.

Be careful: reagent exhaust is toxic and carcinogenic.
Handle with care and follow the local standard regulations.

1.7. Instrument labeling explanation



For symbols explanation see Chapter 1.1.

1.8. Compatible reagents

Fixatives

1. Milestone Finefix®
2. Formalin, buffered or unbuffered

Dehydration – Clearing

3. Milestone JFC® solution
4. Milestone Prowave® solution
5. Ethanol
6. Isopropanol
7. Xylene

Impregnation

8. Paraffin, Histology grade

Other

9. Alcohol/Water (60/40) solution (Flushing reagent)
10. Alcohol/Water (70/30) solution (Holding solution)

Please refer to chapter 8.1 for purity grade of reagents.

DO NOT USE REAGENTS DIFFERENT FROM THOSE LISTED ABOVE.
In case of doubts please contact: application@milestonemedsrl.com.

Reagents other than those listed above may damage some components of the instrument.
Do not use acetone, benzene or trichloroethane in the instrument.

1.9. Waste disposal of the equipment

This instrument is an in-vitro medical device and it is usually installed in a laboratory where specimens and other biological tissues are present. For your safety, it is therefore required to clean and disinfect before entering in contact with it. You must also wear gloves when operating the system.
In case of return it is required that the unit is cleaned and disinfected before sending it back to Milestone. Non-disinfected devices will be no longer accepted and you will be contacted to pay the relative disinfection cost.
International health rules require that shipments of biohazard materials are not done in standard packages (risk of sanctions).

Do not remove the side panels of the unit during the cleaning operations.

Before doing any operation disconnect the power supply.
Do not use direct or high-pressure water to clean the instrument.

For safety reason, any operation without the individual protective devices must be avoided.

It is recommended to use enzymatic detergents and polyphenolic based disinfectants or chlorine substitutes to clean and disinfect the instrument. In alternative, to decontaminate the instrument, the use of a solution of 1:10 Bleach (recommended by the CDC for disinfecting) is also allowed.
For further information, please contact the manufacturer: **medical@milestonesrl.com.**
In addition, complying with directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE), the separate collection environmental managed of equipment is mandatory.
It is necessary to return the used equipment to the distributor or to inquire about the presence of a local empowered system for collection and disposal of WEEE.
The in-observance of Directive 2002/96/EC or of the local law which acknowledges it can have potential effects on the environment and human health.

This symbol indicates separate collection
for electrical and electronic equipment

If additional requirements on accident prevention and environmental protection exist in the country of operation, this instruction manual must be supplemented by appropriate instructions to ensure compliance to such requirements.

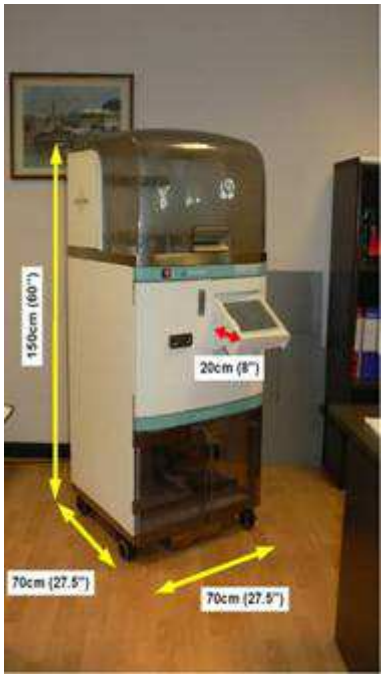
Waste disposal of reagents

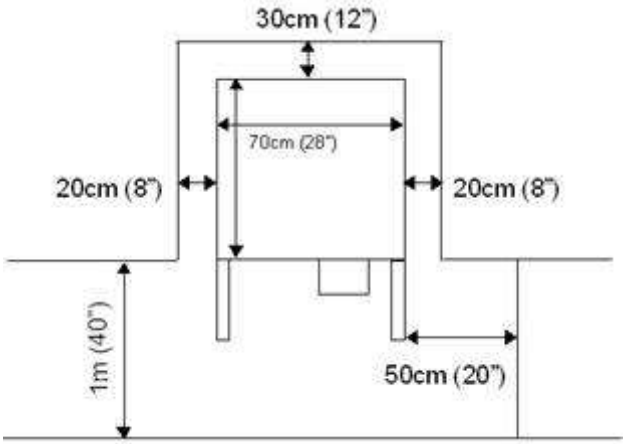
Handle with care and store in a cool dry space using a tightly closed container.
Vapors may collect in empty containers. Treat empty containers as hazardous.
Waste material should be disposed of in an approved incinerator or in a designated landfill site, in compliance with all federal, provincial and local government regulations.
Some reagents can have potential health effects and cause environmental pollution if not correctly disposed.

For further information please refer to the MSDS (Material Data Safety Sheet) provided by your supplier.

2. SETTING UP THE INSTRUMENT

Milestone Pathos Delta is a precision instrument that requires the utmost care when it is unpacked and installed. Move Pathos Delta to its final location. Make sure that the floor is level and is made of non-flammable material. The following pictures show the dimensions of Pathos Delta and the space required:





2.1. Space requirements

Pathos Delta is delivered in a wood box with these dimensions:

Width: 100cm / 40in	Height: 185cm / 73in	Depth: 85cm / 34in (minimum)

The space dimensions required to locate the unit are the following:

Width: 110cm / 44in	Height: 200cm / 80in	Depth: 100cm / 40in (minimum)

Pathos Delta is a heavy instrument. Contact a structural engineer before placing the unit (analyze the building structure).

PATHOS DELTA Weight (read carefully):

Pathos Delta FULL (all tanks): 310kg (684lb) (wax and all reagents loaded in proper tanks).
Pathos Delta EMPTY: 240kg (528lb) (no reagents; no Paraffin Wax histological grade).
Unit density 640kg/m^2 (0.9lb/in^2).

2.2. Unpacking and checking list

When unpacking, check that all parts correspond to the packing list included in the shipment. Utmost care must be made during unpacking of Pathos Delta, to avoid any scratches or damage to the external coating.

The **Pathos Delta COMPLETE PACKAGE** includes:

A. The Pathos Delta unit (with power supply cable) including the following items:

1. Q.ty 1 UPS Holder **REF PN 66738V**

2. Q.ty 1 WAX draining tube **REF PN 62499**

3. Q.ty 9 tanks with white cup **REF PN 66340/KIT** + Q.ty1 Overflow tank

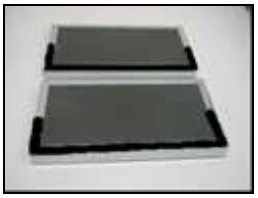
4. Q.ty 1 drawer reagents collection in tanks area **REF PN 66756**

5. Q.ty 2 Tanks labels **REF PN 66232**

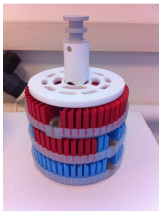
6. Q.ty 1 Pathos Delta Operation Manual (**MM071**) with Maintenance Instructions

B. The Starter Kit Pathos Delta **REF PN 66030** includes the following items:

1. Q.ty 2 Carbon Filter **REF PN 66492**



2. Q.ty 2 Split Racks for 210 cassette **REF PN 66165A/210**



3. Q.ty 1 Rack Transfer Kit (Rack Holder + Plastic Cover) **REF PN 66104**

4. Q.ty 1 Rack Cleaning Container **REF PN 66103**

5. Q.ty 1 Antiscratching Spatula to remove the wax traces from the unit work area **REF PN 62348**

6. Q.ty 1 Exhaust Vapors Tube complete and Plastic Connection **REF PN 66480**

7. Q.ty 1 Tank for reagent with white cap **REF PN 66340/KIT**

8. Q.ty 2 Tank Xylene Proof with label and black cup **REF PN 66340F**

9. Q.ty 1 USB Key with “Logviewer” software included **REF PN 62160**

10. Q.ty 1 Kit tubes for load/unload of reagents **REF PN 66909**

2.3. Power Supply

Power supply line must have a ground connection (yellow/green, green or bare wire). Do not use the blue/white wire (neutral of power line). Power supply neutral has to be referred to ground.
Carefully check that:

- **A strong Ground connection** is made available in the lab to assure the unit works correctly. Do not connect a Milestone unit without ground connection.
- **A Dedicated ground connection**, direct from the main electric box (cabinet) of the laboratory to our unit is ideal to eliminate any possible interference/electronic noise originated by other instruments supplied with the same line.
- **Power supply line wires** (their size and distance from the switch board) used in the laboratory are compliant with the label positioned on the back side of our units.
- **Plug/socket** is visible during the normal use and easily accessible.

Power line protection:

o 115V: Miniature circuit breaker curve C, 20A, interruption more than 6000A.

o 230V: Miniature circuit breaker curve C, 16A, interruption more than 6000A.

Residual current device: 30mA (Class I device).

Only for 230V version a schuko terminated power cord is provided.
The 115V version is not terminated.

2.4. Fumes extraction system

The instrument is equipped with carbon filters (REF PN 66492) to avoid releasing of fumes into the laboratory environment. The carbon filter absorbs reagent fumes to prevent them from entering the laboratory atmosphere.

The Pathos Delta is vented through the external exhaust outlet positioned on the back of the instrument, with a hose dedicated to the external fume extraction system (if any).

Either the carbon filters or an external fume extraction system should be properly installed at all times, according to safety laboratory regulations in force.

In case of connection to an external fume extraction system, the customer is required to adapt the hose connector. The plastic hose supplied has these characteristics:

- Length: 3m (118”)
- External diameter: 55mm (2.15”)
- Internal diameter: 50mm (2”)

The external fume extraction system must permit an air flux of at least 42m^3/h (cube meter per hour).

Insert the exhaust tube on the elbow as shown in the following picture:

Screw the metal tube clamp (REF PN 64757) to fix the tube to elbow.

Insert the elbow in the rear exhaust connection of Pathos Delta.
Now connect the other side of tube the fume extractor of the laboratory.

2.5. Electrical installation of Pathos Delta

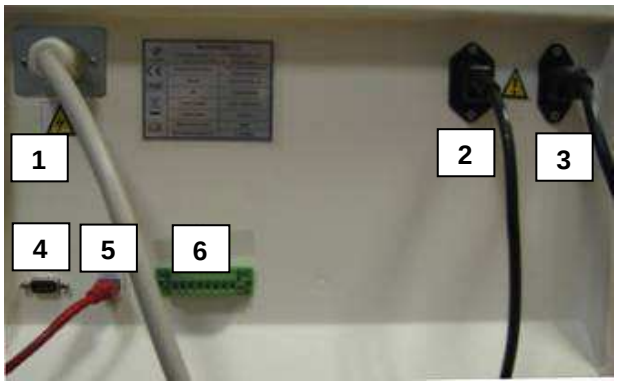
Before connecting the plug to the laboratory's socket CHECK that the power supply voltage of the unit matches the power supply line of the laboratory.
Damages occur when wrong power supplies the instrument.

2.5.1. Back side connection plate 115V Version

Connection plates are positioned on the back side of the Pathos Delta.

Descriptions:

1. Main power supply,
2. UPS supplier socket (energy output to local ups unit),
3. UPS power supply (controller power supply input),
4. Serial connection (not used),
5. Ethernet/LAN plug,
6. Remote/external alarm connector.



See also important information on the Label of the instrument like power supply and Serial Number. Always communicate the SN of the unit to Customer Support.

Add plug to the cable:

Connect the two black wires to power pins of the plug and the yellow/green to ground's pin.
Diameter approx 10mm, size of wires AWG12.

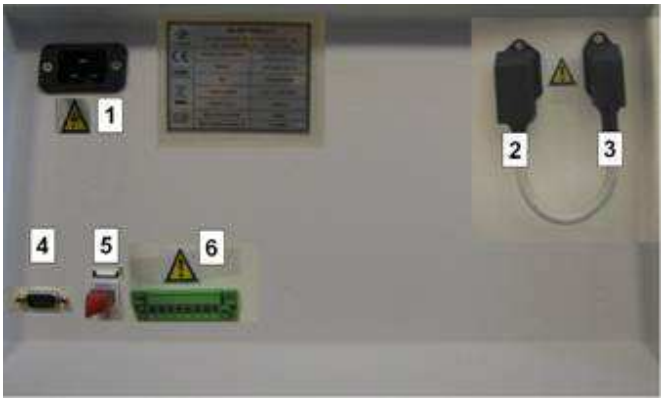
NEVER CONNECT DIRECTLY THE UNIT TO THE SWITCHBOARD.
IT IS REQUIRED TO USE A SEPARABLE PLUG, WITHOUT A LOCKING DEVICE to mate with the socket-outlet in the laboratory.

2.5.2. Back side connection plate 230V Version

On the back side of the Pathos Delta are positioned the connection plates:

Descriptions:

1. Main power supply,
2. UPS supplier socket (energy output to local ups unit),
3. UPS side supply (controller power supply input),
4. Serial connection (not used),
5. Ethernet/LAN plug,
6. Remote/external alarm connector.



See also important information on the Label of the instrument like power supply and Serial Number. Always communicate the SN of the unit to Customer Support.

Connect the cable REF PN 70304 to connector 1.

As separable power cord, it is strictly required to use power cord with wire size at least of 1.5mm² (equal to minimum AWG12). A size less of 1.5mm² (AWG12) cannot guarantee a proper functionality of the unit and overheating of the power cord.

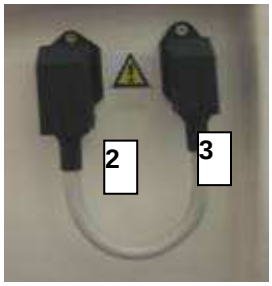
2.5.3. Power supply connection (NO UPS mode)

There are two ways to connect the Pathos Delta to power supply line.

Characteristic: This is the easier way to supply the Pathos Delta, but it does NOT protect the unit from power supply failure.

In fact, in case of power failure, user cannot remove samples from Pathos Delta nor do any other operations.

For this reason, Milestone s.r.l. does NOT suggest this type of connection.
Make sure to inform the customer that in this way a power supply failure inhibits any operation with Pathos Delta.



Connect the by-pass cable (REF PN 66643) from (2) UPS supplier socket to (3) UPS side supply.
Then connect the socket to main power supply (1): now it is possible to turn the Pathos Delta **"ON".**

Do not connect UPS supplier socket (3) directly to the laboratory socket power supply: this input power supply complies to CISPR 11 class A and may cause electromagnetic interference to other devices.

2.5.4. Power supply connection (UPS mode)

Characteristic: Milestone s.r.l. strongly recommends this type of connection as it protects the Pathos Delta from power supply failure. In this case, in fact, Pathos Delta cannot process, but can execute all other procedures. In fact "UPS side supply" provides energy at logic circuits.

Even when Pathos Delta is directly plugged into the main hospital UPS line or power emergency line, we observed occurring of delays or discontinuity of a few seconds/ minutes of the power supply. In this case, Pathos Delta stops working and the standard power failure procedure, that puts tissues in safety, is not activated. For this reason, we highly recommend to install a UPS module on any Pathos Delta unit.

Milestone can supply only UPS at 230Volt-50/60Hz (REF PN 66100) with the following technical specifications:

230V version (*REF PN *66100)

- Voltage input 230V 50/60Hz according to your power supply
- Power 1000VA/600W (minimum)
- Capacity 15 minutes @ 500W (minimum)
- Output 230V±10% 50/60±1Hz
- Transfer time 6ms (max)
- With cord set for connections
- DxWxH 405x205x145mm (if provided locally: footprint max 190×600mm)
- Weight: 9.6kg (if provided locally: max 15kg - 44lb)

Before using the UPS, charge the battery according to the manufacturer's specifications.

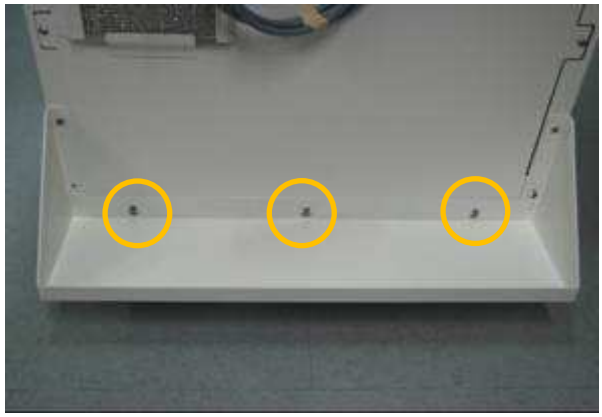
UPS unit at 115Volt-60Hz must be provided locally with the following minimum technical specifications:

115V version

- Voltage input 115V 60Hz according to your power supply
- Power 1000VA/600W (minimum)
- Capacity 15 minutes @ 500W (minimum)
- Output 230V±10% 60±1Hz
- Transfer time 6ms (max)
- With cord set for connections
- Footprint max 190×600 mm
- Weight max 15kg (44lb)

Before using the UPS, charge the battery according to the manufacturer's specifications.

Before connecting the UPS to the Unit, mount the UPS holder supplied with the Unit as shown below.



Do not load more than 15Kg on the UPS holder.

Unscrew the screws positioned on the back of the unit where the UPS holder has to be positioned. Make sure the holes of the UPS holder match with the corresponding holes on the back of the unit, insert the screws and tighten them.

Verify tightness of the UPS holder by exerting a slight pressure on it, before positioning the UPS module.

Connect the Pathos Delta “UPS supplier socket” (connector type IEC320–C13, number 2 reported in the picture shown in the paragraph 2.5.2) to the UPS power input. Maximum current 4A (230V), 6A (115V), frequency same as local power supply.

Connect the Pathos Delta UPS power output to the “UPS side supply” connector of the Pathos Delta (connector type IEC320-C14, number 3 reported in the picture shown in the paragraph 2.5.2).

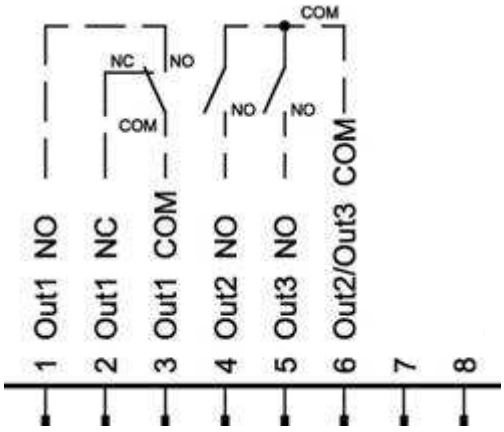
Wrong connections of UPS prejudice the functionality of safety procedures detailed in the chapter 5.

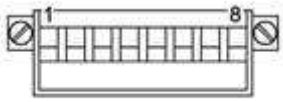
Then connect the plug of main power supply to socket, you are now able to turn the Pathos Delta “**ON**”.

2.6. Remote Alarm Connection

Pathos Delta is also provided with three auxiliary outputs in order to connect external devices that will be driven by the Pathos Delta.

Pin out is according to the following scheme:





Output	Contact	Status
1	1	Normally OPEN
	2	Normally CLOSED
	3	COMMON
2	4	Normally OPEN
3	5	Normally OPEN
2 and 3	6	COMMON 4+5
Not used	7	
	8	

OUT1: identifies the Pathos Delta alarm switches. When an **alarm appears**:
Contact 1 (normally open) **closes** and
Contact 2 (normally closed) **opens**.

OUT2: identifies the Pathos Delta running switch. When the Pathos Delta is in **running mode**, contact 4 (non-running unit open) will **close** (contact 4 **connected** to contact 6).

OUT3: identifies that Pathos Delta **finished** the program. When Pathos Delta finishes the process or the reagent exchange or the wax cleaning, etc, the contact 5 (normally open) will **close** (contact 5 **connected** to contact 6).

For safety reasons and to prevent any damage to the internal relays, the maximum external voltage of devices that can be connected to connectors must be lower than 40 VDC – 1A.

2.7. Internet Connection

It is necessary to connect Pathos Delta to Internet to get Remote Assistance services.

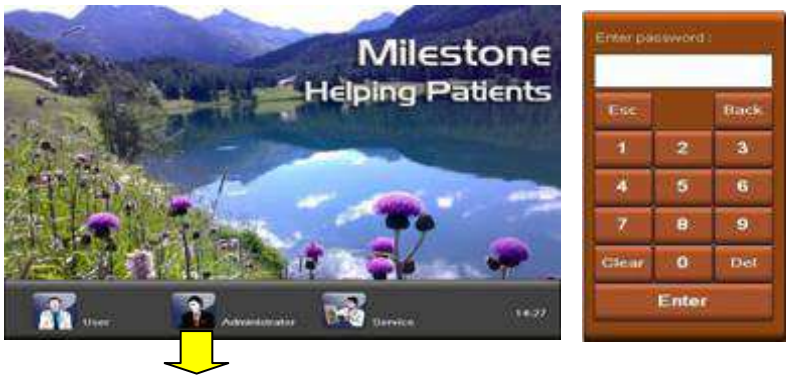
IT IS NOT ADVISED TO RUN PROGRAMS WITH PATHOS DELTA WHILE USING THE REMOTE ASSISTANCE CONNECTION.
PROCESSES IN REMOTE ASSISTANCE ARE FOR TESTING USE ONLY, NEVER PLACE SPECIMENS INSIDE PATHOS DELTA.

In order to access the remote assistance (as described in the chapter 7.7), you need to get the following data from the Information Technology Department/Network Administrator of the customer:

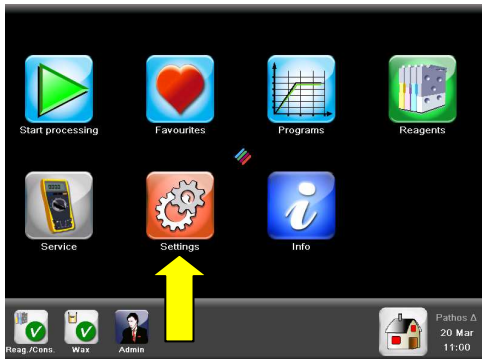
- LAN connection with standard RJ45 Ethernet cable and connector,
- Dedicated IP address and Subnet Mask; only port 80 has to be enabled without limitations,
- LAN gateway and DNS server addresses,
- At least 150kb/s real transfer rate (uploading and downloading).

When connecting Pathos Delta to remote assistance, it is necessary that Firewall, traffic data filters and all software are disabled.

From Log-in screen click on ADMINISTRATOR[1]. Insert ADMINISTRATOR password (issued as a separate document inserted in the Operator Manual) and press enter.

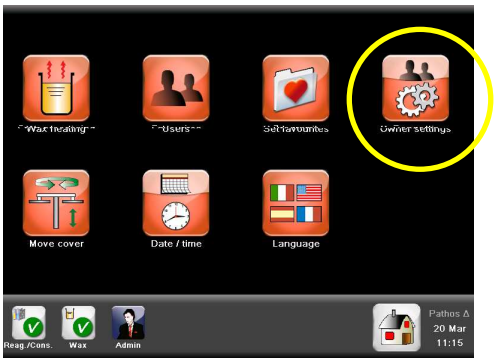


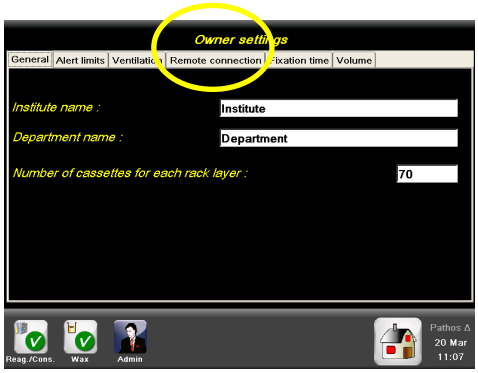
Press "**Settings**" to access the administrator screen:



[1] ADMINISTRATOR and SERVICE are enabled to setup this configuration.

Then press "**Owner settings**" and choose the "**Remote connection**" tab:



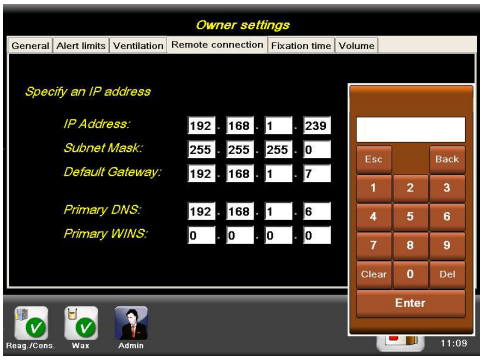


Enter data supplied by the Network Administrator.

For example:

IP Address	**192.168.1.235**
Subnet Mask	**255.255.255.0**
Default Gateway add.	**192.168.1.6**
DNS server address	**192.168.1.7**
Primary WINS	**Not required**

Each time you click on a white box, a num-pad appears; enter the number required and press enter. Fill all the white boxes with the data network.



Press  to store data.

2.8. Final Placement

Pathos Delta unit can be positioned in its final place of use. When the instrument is positioned, push down the lever of the wheels to lock them.

Do not push down the lock lever of the wheel of the drawer.

Turn the Unit “ON”.
The main switch is located on the left lateral side of the control panel, as shown in the figure below.
The same switch must be used to switch the unit off.
Before turning ON the unit, make sure that you have followed all the instructions reported above in this chapter.

2.9. Reagents

Complete the set up with reagents, by providing at least:

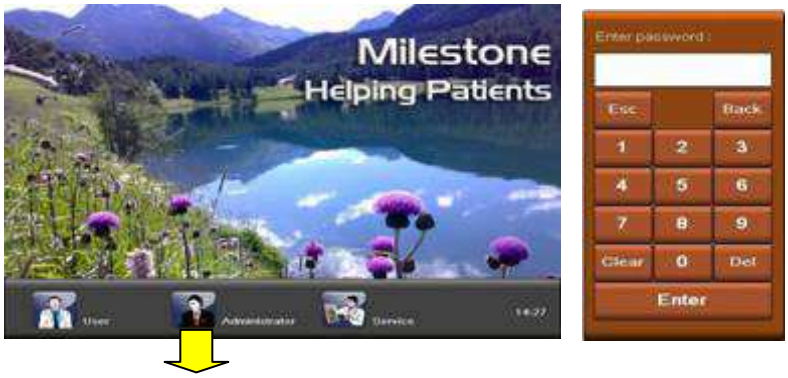
PROCESSING REAGENTS:

- 5l (or 1.4 US gal) Formalin 10%, Finefix
- 5l (or 1.4 US gal) Flushing solution (60% absolute alcohol / 40% tap water)
- 5l (or 1.4 US gal) Absolute Ethanol for rinsing 1
- 5l (or 1.4 US gal) Absolute Ethanol for rinsing 2
- 5l (or 1.4 US gal) Absolute Ethanol
- 5l (or 1.4 US gal) Absolute Isopropanol
- 5l (or 1.4 US gal) JFC* - for processing of larger fatty tissues (3mm and larger), use of Milestone JFC solution is recommended
- 4kg (8.82 lb) Paraffin, Histology grade

The above reagents must be onsite and available at time installation of unit.
Refer to chapter 8.1 for purity grade of reagents.

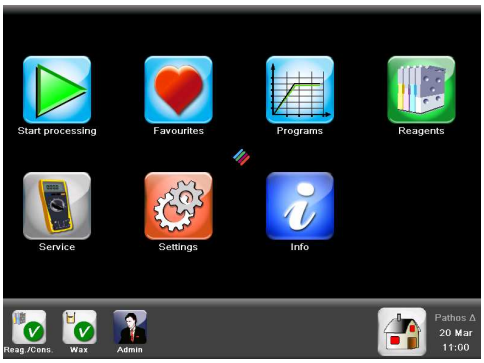
2.10. LOG IN and LOG OUT

As a default, when the system is switched on, the LOG IN screen appears. Press "**Administrator**" button, enter the password (issued as a separate document inserted in the Operator Manual) and press "**Enter**".



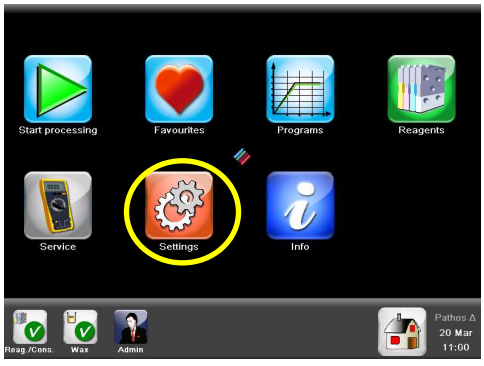
The Administrator HOME PAGE appears showing, as a default, the main functions grouped by different colors.

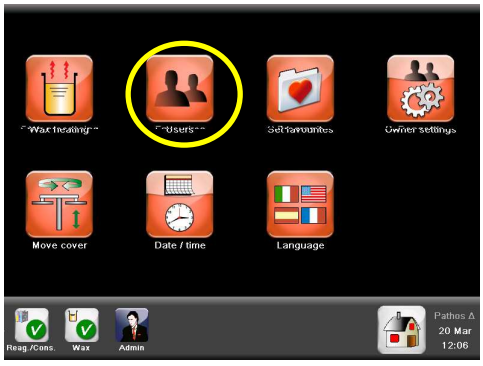
In whatever screen you are, press the "**Home**" button  to return to the HOME PAGE. You can customize the HOME PAGE under the USERS settings, choosing between "**Favorites**" and "**Main functions**" (see below).



SERVICE Log-in is available for authorized personnel only (ADMINISTRATOR can access to a restricted SERVICE functions. SERVICE has complete access to the unit functionalities).

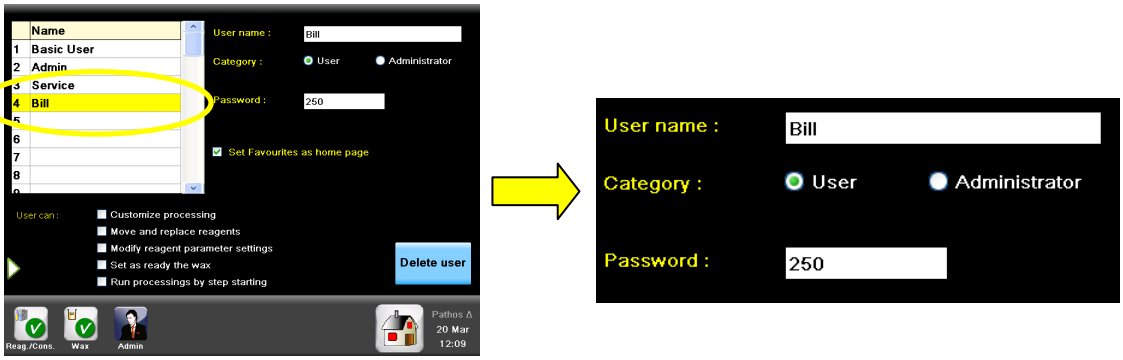
Go into the "**Settings**" screen and select "**Users**" to create a NEW USER, as shown below.



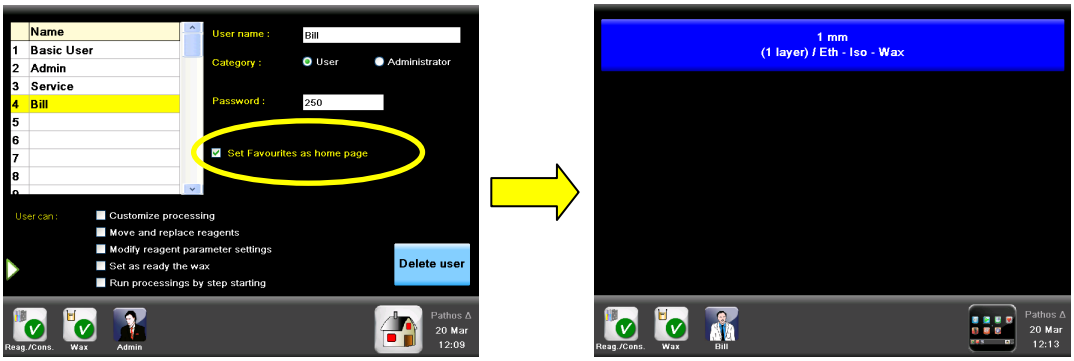


The USER setting screen appears.

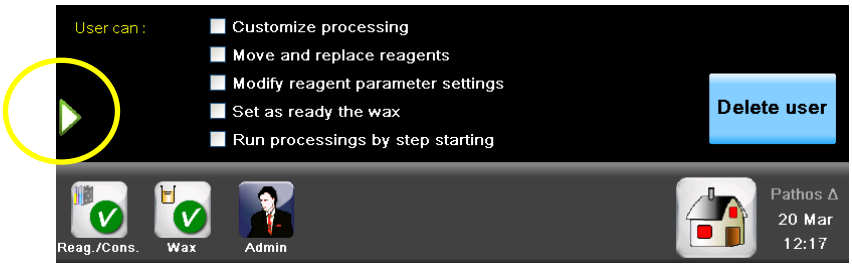
Enter the user NAME and PASSWORD in the fields shown below. Here it is also possible to choose the user CATEGORY. In the example reported in this chapter, User “Bill” is created, with “250” as Password and Category as “User”.



As mentioned before, selecting the checkbox “**Set Favourites as home page**” (see the circle in figure below), the HOME PAGE of the current user (Bill in this example) shows the FAVORITES PROGRAMS as default.



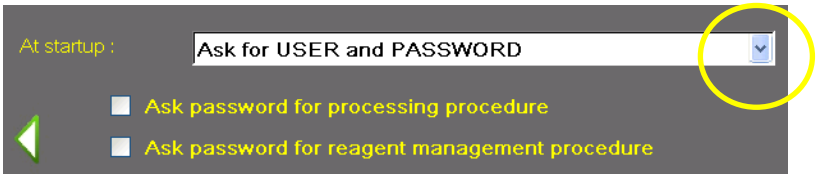
Select the appropriate FUNCTIONS for the new user:



Selecting:

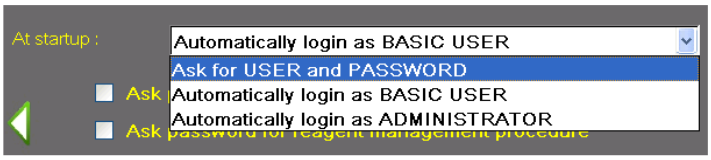
“Customize processing”:	The new user can copy and modify programs
“Move and replace reagents”:	The new user can replace the exhausted reagents manually or through the Automatic replacement procedure
“Modify reagent parameter settings”:	The new user can set the Tanks status (choosing between empty/fill the tank), open the Reagents list and modify the reagents details (Ex: max number of processed cassettes)
“Set as ready the wax”:	The new user can set as ready the WAX when the wax heating status icon becomes YELLOW
“Run processing by step starting”:	The new user can run a program starting from any phase, even not the first one of the list

Press the green arrow (see figure above, yellow circle), the following screen appears.

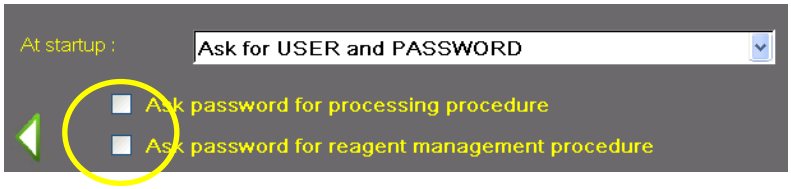


If you press the arrow (indicated by the circle in figure above), it is possible to choose the appropriate ACCESS LEVEL in the program startup between:

- "**Ask for USER and PASSWORD**" (set as default)
- "**Automatically login as BASIC USER**"
- "**Automatically login as ADMINISTRATOR**"



In the same screen:

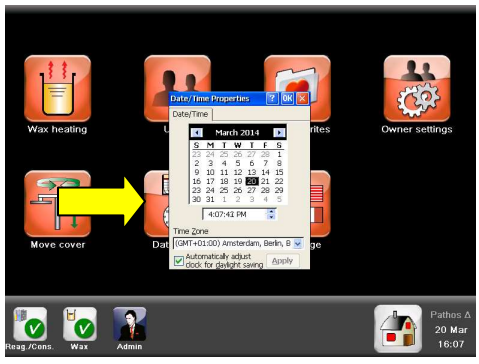


Selecting:

"**Ask password for processing procedure**"	The software recognizes (through a password system) who is performing some operations during the processing (who starts the program, unloads the cassettes, aborts the program).
"**Ask password for reagent management procedure**"	The software recognizes (through a password system) who is performing some operations during the reagent management.

2.11. Set system date and time

From the HOME PAGE, go into "**Settings**" screen and select "**Date/time**" (see the arrow).



In the time setting window, it is possible to set the TIME ZONE, thus activating the automatic update of time during the year.
After changing this setting, please reboot the system.

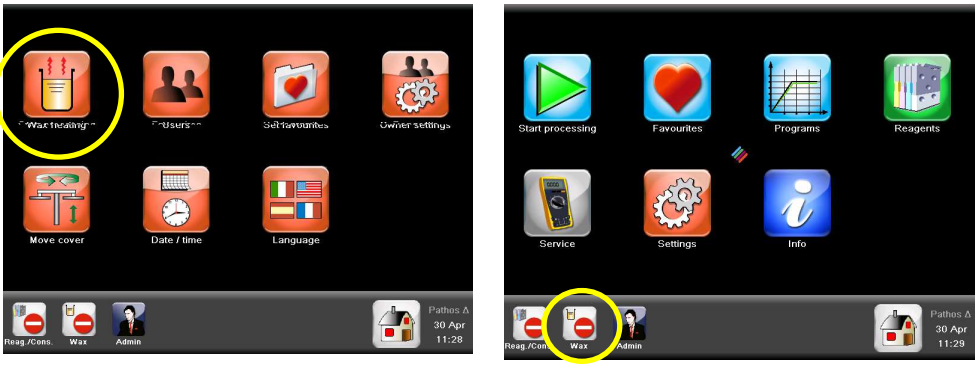
2.12. Set language

From the HOME PAGE, go into "**Settings**" screen and select "**Language**" (see figure below).

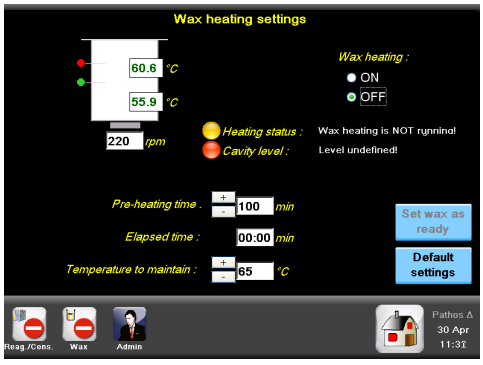
Choose the language required from the drop down menu. Press "**Yes**" and the system automatically reboots to enable changes.

2.13. Load Pathos Delta with Wax

From the "**Settings**" screen, select "**Wax Heating**" button (left figure below) or the WAX icon on the status bar (right figure below).



The "**Wax heating settings**" screen appears displaying information about the Heating Status and the Cavity Level.



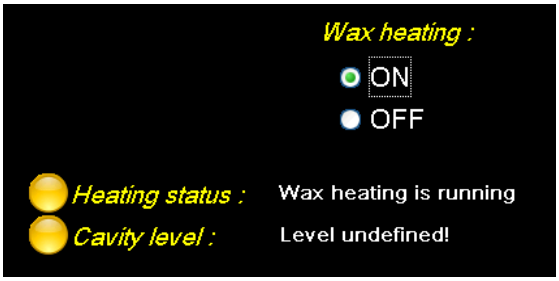
Put paraffin in the LEFT cavity, as shown below.

It is necessary to fill the pathos Delta WAX CAVITY (left side cavity) with approximately 4kg of histology grade WAX.

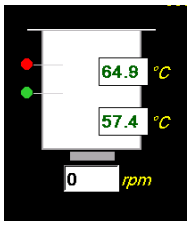
MAX and MIN levels for the MOLTEN WAX are etched on the Pathos Delta WAX CAVITY wall.
Strictly maintaining the molten WAX level between these markings assures the appropriate coverage of all three cassette layers of the rack during process.

Into the Heating settings screen the default value of HEATING WAX is: **OFF**.
Log in as Administrator to switch on the Wax heating power, as shown in the figure below.

ON: Power on (wax heating starts when the unit is switched on)
OFF: Power off



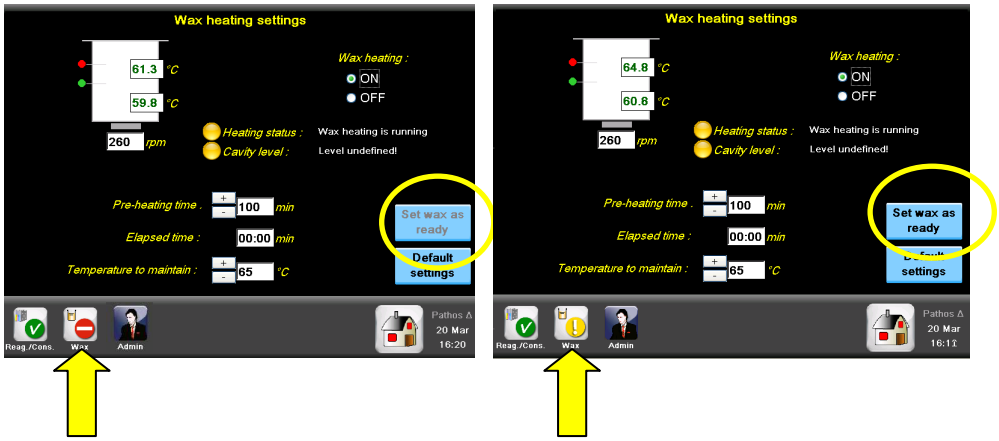
Only when the wax is ready for use (fully molten), the graph shows the lower level sensor as active (covered – green color) and the maximum level sensor as inactive (uncovered – red color), as shown in the figure below.



USER can only "Set as ready" the WAX (if allowed by the ADMINISTRATOR into the USER Settings) when the WAX heating status icon becomes YELLOW and the "Set as ready" button becomes active (see the figures below).

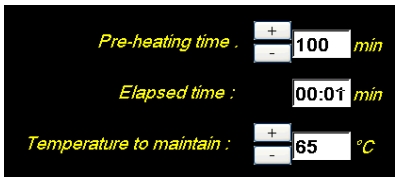
It is only possible to "Set as ready" the WAX when its temperature is 4℃ lower than the preset temperature value, so a process can be immediately started.

In any case, it is necessary that operator checks actual status of the WAX inside the CAVITY before setting "wax as ready" and starting a process.



OTHER FUNCTIONS:

- **Pre-heating time:** shows the time necessary to completely melt the paraffin.
- **Elapsed time:** shows the wax heating time remaining before use.
- **Temperature to maintain:** wax is kept at this temperature, when the unit is on.



The Pre-heating time is a pre-set value. Milestone s.r.l. strongly recommends NOT to modify it.
The temperature to maintain is a default value set according to Milestone s.r.l. standard programs. The modification of this value is only allowed under direct control of Milestone applicative support.

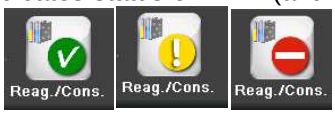
Pathos Delta software will indicate with an alarm if the WAX level is incorrect. See paragraphs 4.1 and 7.4.1 for how to manage the WAX, its reuse life and when proceeding with the WAX cleaning protocol.

ADMINISTRATOR/SERVICE can modify all parameters of these fields; incorrect use of these settings may lead to system malfunction. Use only under direct control of Milestone s.r.l. technical support.

The **WAX heating status icon** indicates through a change in color 

the:

- WAX levels.
- WAX “Temperature to maintain”.

The **reagent status icon** indicates status of WAX (and all the other reagents) used as a reagent and shows through a change in color 

the reagent status based on number of cassettes processed and/or cycles performed and/or expiration date. Please refer to chapter 4.1.

When WAX icon is yellow, set the wax as ready and enter in the reagents screen to reset the loading date of WAX because by default its reuse life is checked by number of days (maximum 14 days), as explained below.

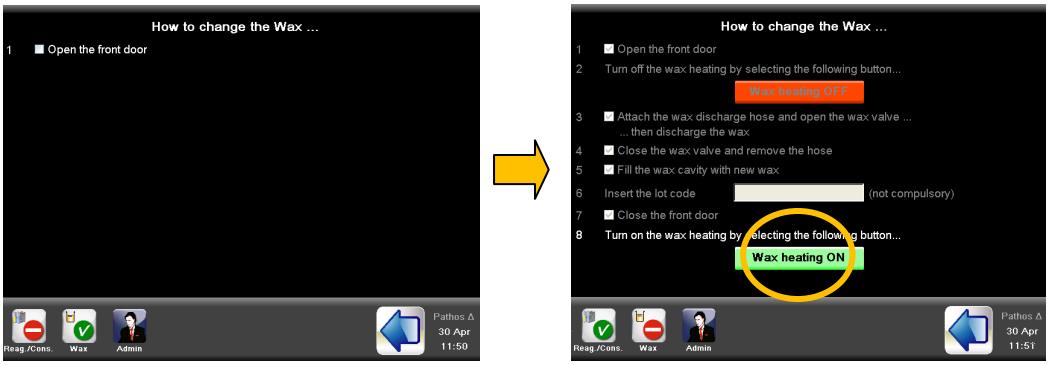
In the time that the wax is melting down (the wax color icon will change from red to yellow), it is possible to load the other reagents in the unit, as explained in the following chapter 2.14. Then it is required to come back to this point of the Operation Manual and finish the instructions reported in this chapter.

HOW TO RESET THE WAX LOADING DATE
Select "**Reagents**" from the MAIN FUNCTIONS screen, then "**Reagents/Consumables**".
In alternative, press directly the "**Reagents status**" icon on the STATUS BAR of the HOME PAGE.

The REAGENTS CONFIGURATION screen appears. Select the container of WAX (shown in the circle below), then "**Replace WAX**" (indicated by the arrow).

The following screen appears: follow the procedure up to the end, when the button "**Wax heating ON**" appears (as shown in the right figure below), press it to come back to the Reagents settings screen.

Follow the procedure only in the software, it is not required to physically replace the wax because it is new. It is only required to SIMULATE a wax replacement to reset its loading date.



Now the WAX loading date has been reset.

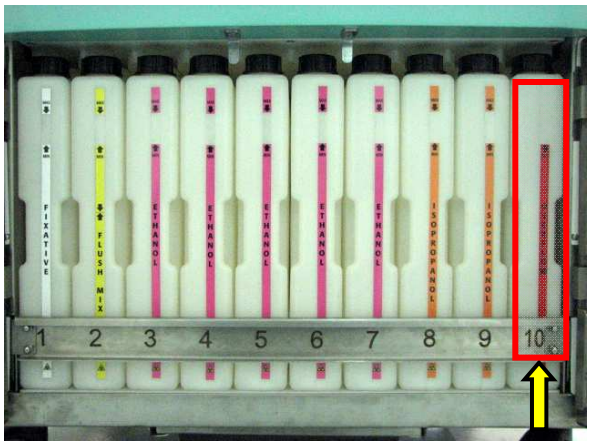
By default WAX reuse life is checked by number of days (maximum 14 days). If you want to change it, follow the instructions reported in the chapter 4.1.1.

2.14. How to load PATHOS DELTA with reagents

The Pathos Delta drawer hosts 9 TANKS for processing reagents, plus 1 OVERFLOW TANK in position number 10, indicated by the arrow in figure below.

Milestone application staff suggests the following use of the tanks:

	Reagent type	Reagent name
Tank nr. 1	Fixative	Formalin, FineFIX®
Tank nr. 2	Flushing	Mix Ethanol\Water (60\40)
Tank nr. 3	Rinsing reagent #1	Absolute Ethanol
Tank nr. 4	Rinsing reagent #2	Absolute Ethanol
Tank nr. 5	Dehydration	Abs. Ethanol \ Prowave® solution
Tank nr. 6	Dehydration	Abs. Ethanol \ Prowave® solution
Tank nr. 7	Dehydration	Abs. Ethanol \ Prowave® solution
Tank nr. 8	Clearing	Isopropanol \ JFC® \ Prowave® \ Xylene
Tank nr. 9	Clearing	Isopropanol \ JFC® \ Prowave® \ Xylene



It is necessary to first load the tanks with reagents before operating the unit.

Numbers 1-10 are etched on the tanks positioning bar to identify the corresponding tanks during the reagent loading.

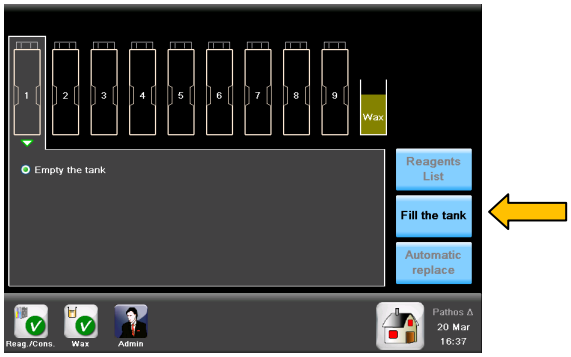
Each processing tank has a label with the MAX and MIN level. Only maintaining the reagents level between the level markings assures the appropriate coverage of all three cassette layers of the rack.

The OVERFLOW tank has only the **MAX** level. Periodically check the reagent level and empty the tank when the level overcomes the **MAX** level.

2.14.1. How to set up Pathos Delta with reagents: Manual procedure

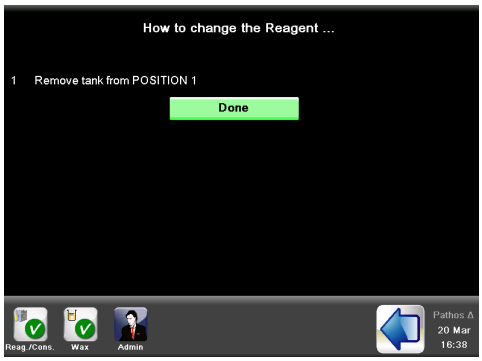
Select "**Reagents**" from the MAIN FUNCTIONS screen, then "**Reagents/Consumables**".
In alternative, press directly the reagents status icon **"Reag/Cons"** on the STATUS BAR of the HOME PAGE.

The REAGENTS CONFIGURATION screen appears (figure below), showing the default settings of the tanks. Select the tank in position NUMBER 1.

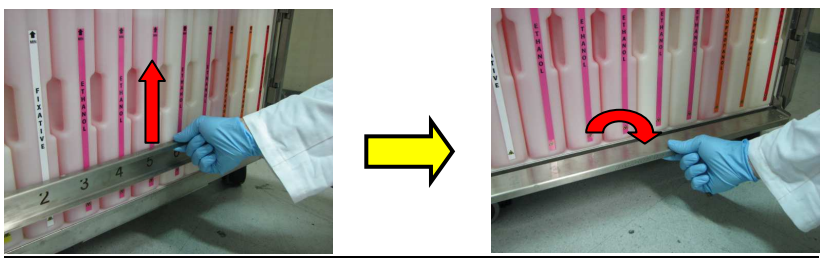


Before continuing with next operations, open the drawer where the processing tanks have to be inserted.

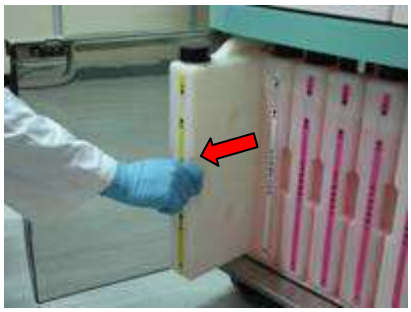
Set the tank status to "**Fill the tank"** by pressing the relative checkbox (see the arrow in figure above).
The screen below appears showing the REAGENT REPLACEMENT PROCEDURE. Follow the steps displayed:



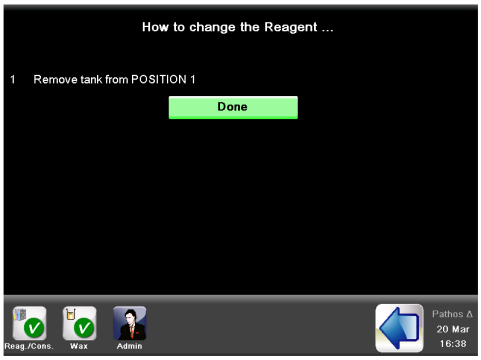
- Raise the TANKS POSITIONING BAR and pull back to horizontal position.



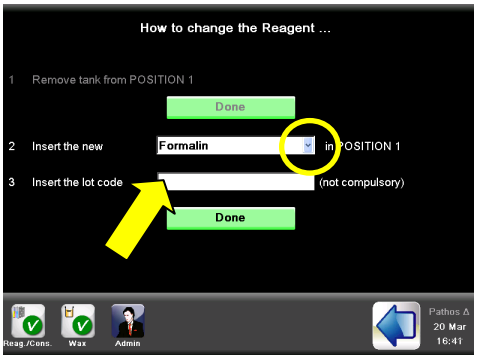
- Remove the empty tank from its position as indicated by the software (number 1 in this case).



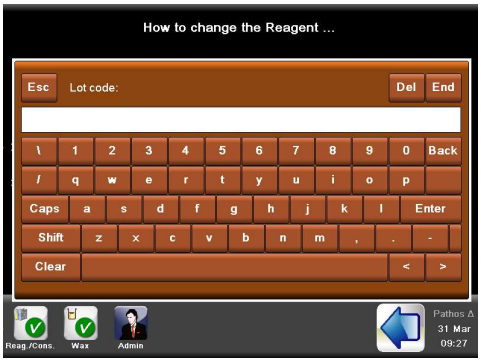
- Press **"Done"** to confirm.



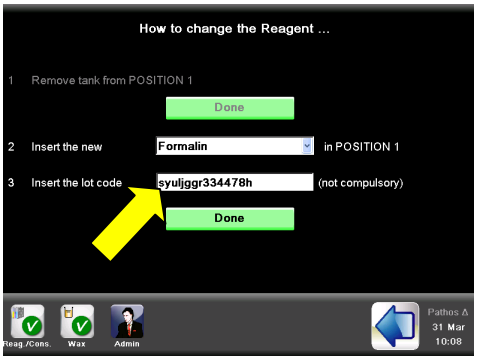
- Load the tank with FRESH REAGENT (Formalin in this case) and put it in its position as indicated by the software (number 1 in this case).
- Select the reagent (Formalin in this case) in the drop-down menu (see the circle in figure below).



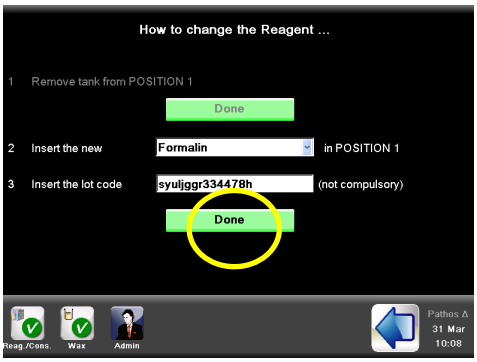
- It is possible to insert the REAGENT LOT CODE in the dedicated place indicated by the arrow in the previous figure. This function is not compulsory. If a bar code reader is connected to Pathos Delta, the LOT code can be automatically read. If not, press the field window, a keyboard appears to allow entry of the LOT number, then press "**Enter**".



When the code is inserted, the following screen appears: the lot number is shown into the field (see the arrow).

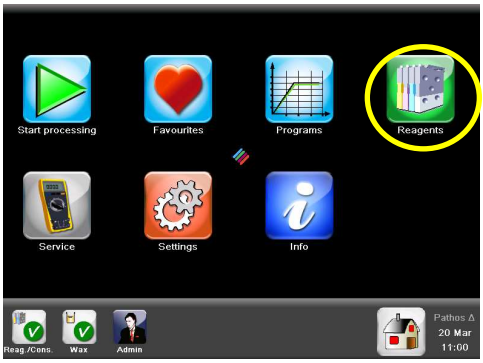


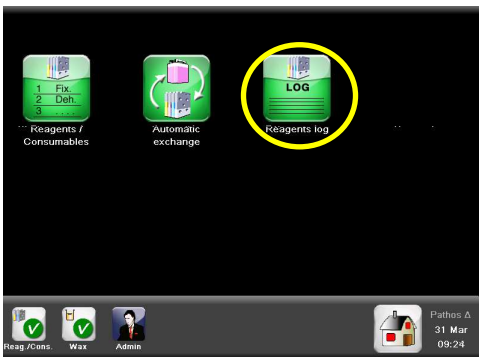
- Press "**Done**" to complete the replacement procedure (see the circle in the next figure).



Lot code is not compulsory. So if not needed, follow the regular procedure to replace a reagent, by pressing "Done" without inserting any code before.

The Lot Code is saved in the "**Reagents log**" under "**Reagents**" icon.





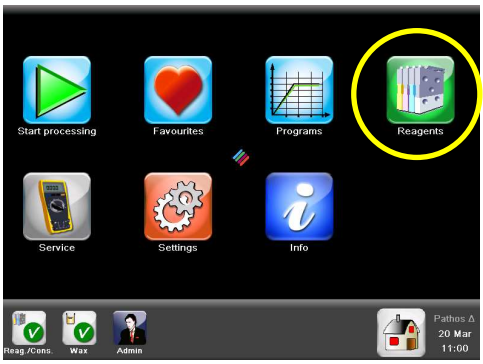
The Lot Code is reported under the column LOT CODE.

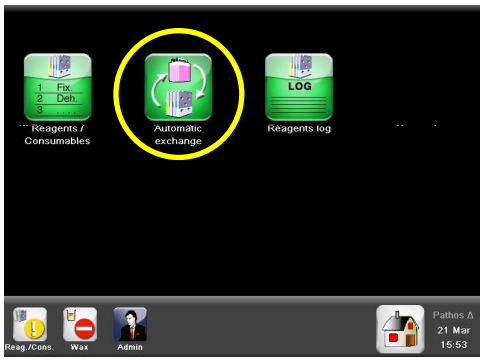
Refer to the chapter 9.5 to get instructions on how to export the Reagent log list.
Do not load the Overflow tank with fresh reagent.

- Repeat the same procedure for all other tanks. Now you are ready to process.
- If a tank is not loaded with reagent, do not modify the tank status, already set as empty.
- Lift the tanks positioning bar up and push it into vertical position. Close the tanks doors and go back to the main screen to confirm all the settings.

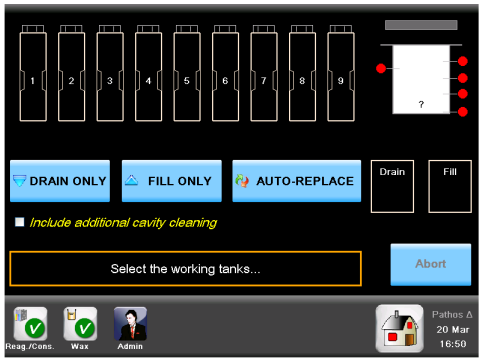
2.14.2. How to set up Pathos Delta with reagents: Automatic procedure

Select "**Reagents**" from the MAIN FUNCTIONS screen and then "**Automatic exchange**".





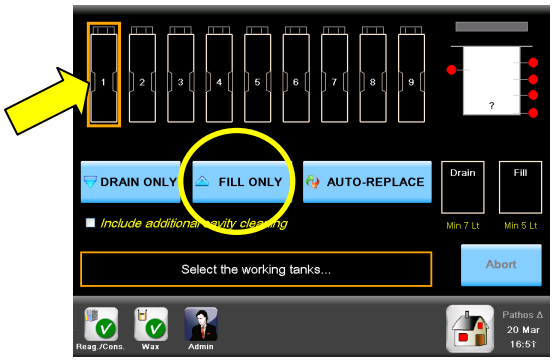
The screen below appears showing the automatic reagent EXCHANGE screen.



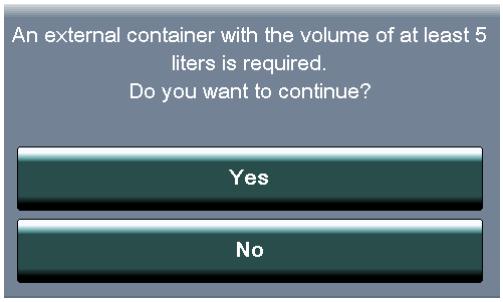
Plug the RAPID green INSERT with the tube (provided with the unit) into the UNIT green CONNECTOR and insert the TUBE into the tank with fresh reagent.

The rapid green connector is used to load reagents in the processing tanks. The rapid red connector is to be used also during an automatic reagents replacement procedure, as described in the chapter 4.2.2.

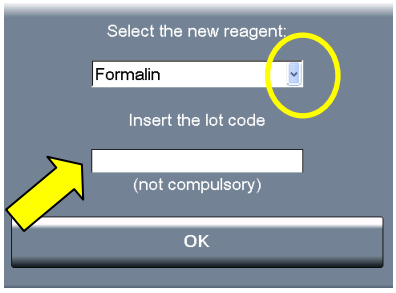
Select the TANK to be loaded with fresh reagent: the outline will be colored orange. Then press "**FILL ONLY"** to load the fresh reagent into the selected tank through the main cavity.



The following message appears, warning that it is required to have available minimum 5 liters of reagents to complete the loading procedure. Press "**Yes**" to continue.



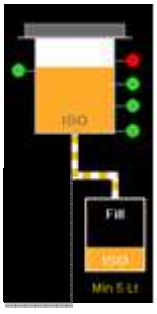
The following screen appears. Select the reagent (Formalin in this case) in the drop-down menu (see the circle in figure below).



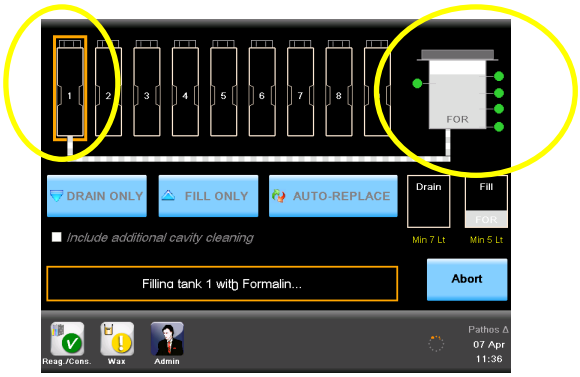
It is possible to insert the REAGENT LOT CODE (indicated by the arrow in the previous figure). This function is not compulsory. If a bar code reader is connected to Pathos Delta, the LOT code can be automatically read. If not, press the field window, a keyboard appears to allow entry of the LOT number, as explained in the previous chapter 2.14.1.

Press **"OK"** in the previous screen and the automatic loading procedure starts, as shown below.
The procedure is composed by 2 steps:

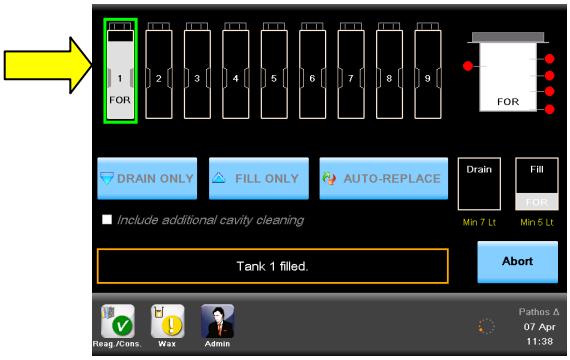
1) Fresh reagent in the external tank is first loaded into the main cavity of Pathos Delta, by the green tube connected to the Unit, as shown in the next figure.



2) When the loading is completed, the reagent is unloaded in the selected tank (in this case tank is number 1).



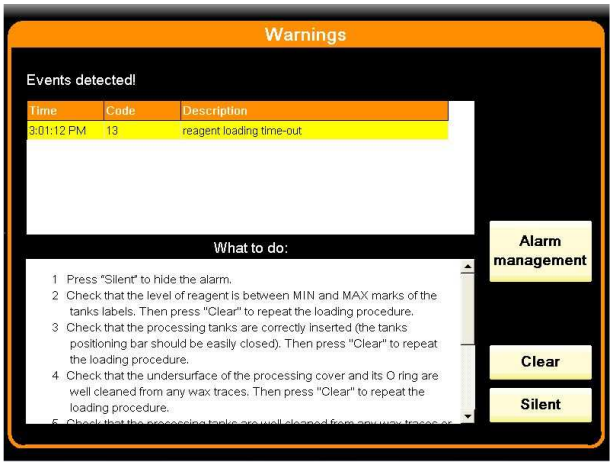
When the loading procedure is over, a sound is emitted; the tank is set up as full (in this example tank number 1) and its outline will be colored in green, as shown below.



Do not load the cassettes rack onto the Pathos Delta arm during reagent loading/unloading.

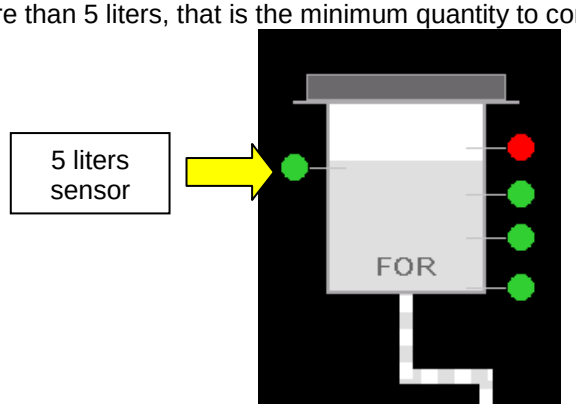
The Pathos Delta is programmed to load at least 5 liters of reagent to be stored in the tanks. If less than 5 liters are transferred, an alarm warns that reagent is insufficient to complete the transfer process, as explained below.

During the step number 1) of the loading procedure, when fresh reagent is pumped from the external tank to the main cavity, if that tank is of 5liters and the reagent will not be enough to complete the procedure, the message "**Reagent loading time-out**" below appears and a sound is emitted:



Below the explanation.

In the main cavity of Pathos Delta there are four level sensors on the right side and only one sensor (the "**5 Liters sensor**") on the left side, showed in the next figure. if this sensor is covered (green color) it means that in the cavity there are more than 5 liters, that is the minimum quantity to complete the procedure.

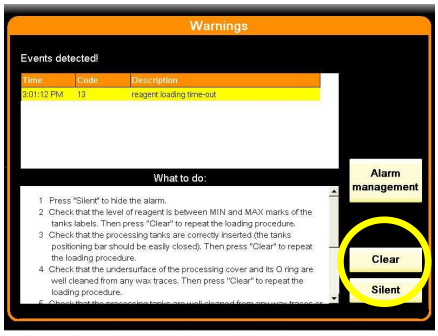


During the loading step, the Unit tries to load reagent up to the upper level sensor (right side of the cavity). If after 5 minutes those sensor is not covered, the Unit will check if the "**5 liters sensor**" is ON.

- If YES, it means that in the main cavity there are more than 5 liters of reagent. Therefore the loading can be considered completed and the reagent will be unloaded into the selected tank of Pathos Delta.
- If NOT, it means that in the main cavity there are minus than 5 liters of reagent. Therefore the loading procedure cannot be considered completed and the "**Reagent loading time out**" appears, as shown in the previous figure.

When the "**Reagent loading time out**" appears, it is possible to:

1. Reposition the tube into the tank, to load all residual reagent from it, then press "**Clear**" the alarm. The unit restarts loading and completes the loading step.



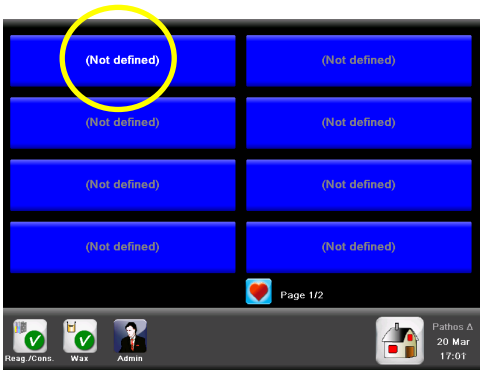
2. Remove the tank, insert a second tank with fresh reagent and press "Clear" the alarm. The unit restarts loading and completes the loading step.

2.15. Most Used Programs

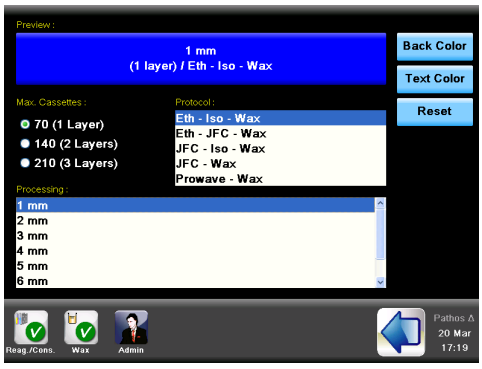
Insert FAVORITES programs in the HOME PAGE as follows:

1. From the MAIN FUNCTIONS screen press “**Settings**” and select “**Set favorites**”.

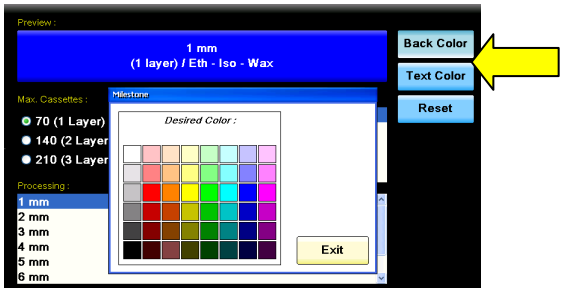
2. Press “**Not Defined**” button.



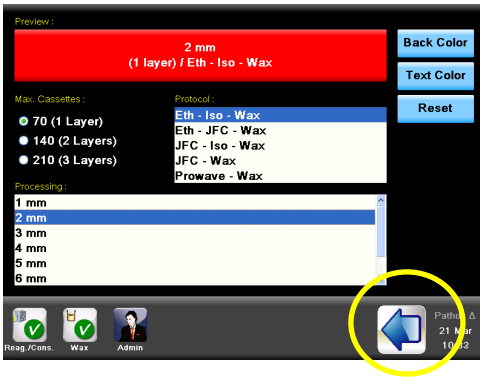
3. Select the “**Max Cassettes**”, the “**Protocol**” and the “**Processing**”.



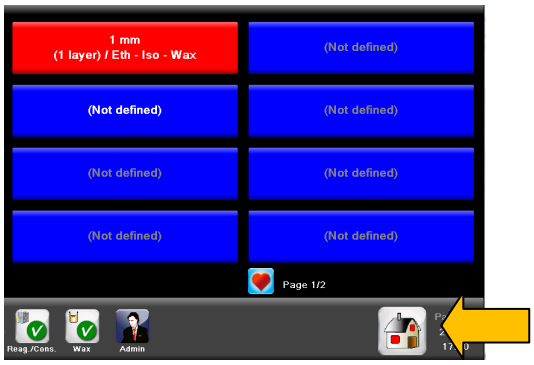
4. You can change TEXT and BACKGROUND COLOR by pressing “**Back Color**” and “**Text Color**” (see the arrow below).



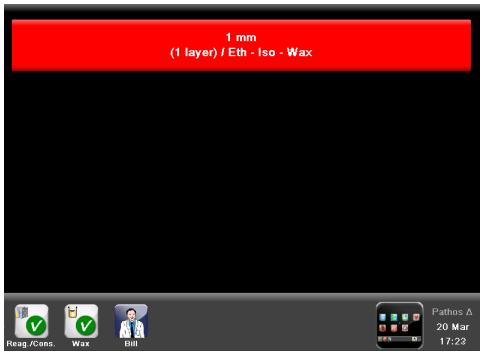
5. Press the blue arrow on the status bar of the page to go back and save changes.



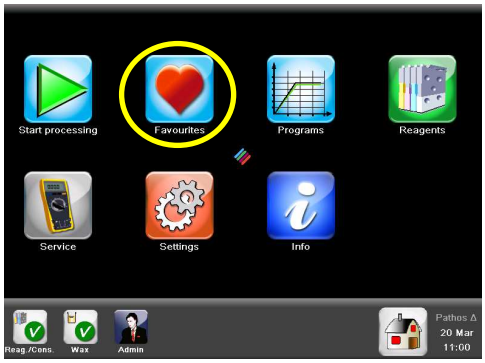
6. Now the program icon is listed in the **"Set Favourites"** screen.

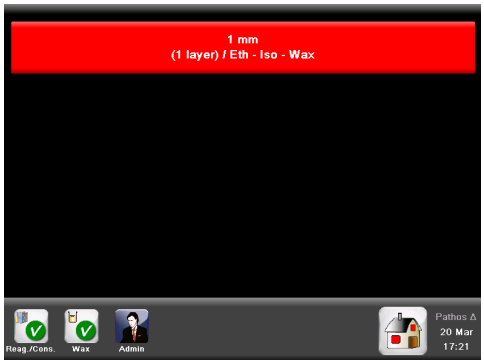


7. Press the "**Main Menu**" button (indicated by the arrow in figure above) to return to the HOME PAGE and view the Favourite protocol, if the user HOME PAGE is set as "**Favourites**".



8. If the HOME PAGE is set as "**Main functions**", press "**Favourites**" to open the FAVOURITES SCREEN.





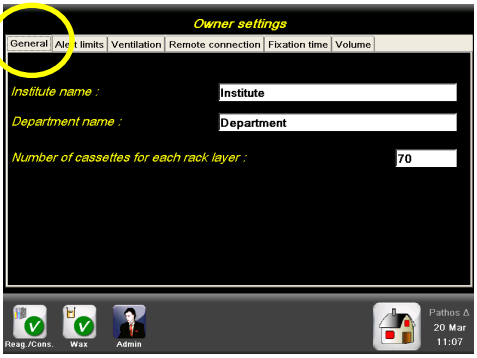
2.16. Owner Settings

Press "**Settings**" from the MAIN FUNCTIONS screen and select "**Owner settings**". This function is available only for Service and Administrator.

The "**Owner settings**" screen appears as shown in the picture below.

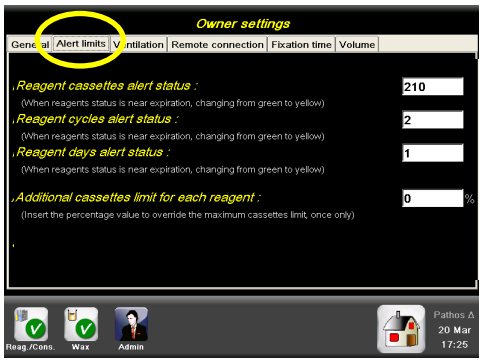
Select "**General**" to modify:

- Institute and Department name where unit is installed.
- Number of cassettes for each rack layer. This corresponds to the maximum number allowed for each rack layer. Default value: 70 cassettes.



Select "**Alert limits**" to modify:

- Reagent Cassettes Alert Status. This number indicates that the reagent status is near expiration (on the base of the number of cassettes processed) and the reagents status icon turns from green to yellow (see chapter 4.1 for further details).
- Reagent Cycles Alert Status. This number indicates that the reagent status is near expiration (on the base of the cycles run) and the reagents status icon turns from green to yellow (see chapter 4.1 for further details).
- Reagent Days Alert Status. This number indicates that the reagent status is near expiration (on the base of the days of use) and the reagents status icon turns from green to yellow (see chapter 4.1 for further details).
- Additional Cassettes Limit for each reagent (expressed in percentage): this value is checked by the software during the insertion of the cassettes to be processed, before starting a new program and allows to override the maximum cassettes limit (once only) without getting any message of warning, according to the reagents parameters edited in the REAGENTS LIST (see chapters 4.1.1 and 4.1.2). By default this value is set as zero and in this case when a process is started overriding the maximum number of cassettes set for a reagent, a warning message will appears.
  In both cases, when the value is zero or not, it is possible to override the maximum number of cassettes/cycles for a reagent only once.

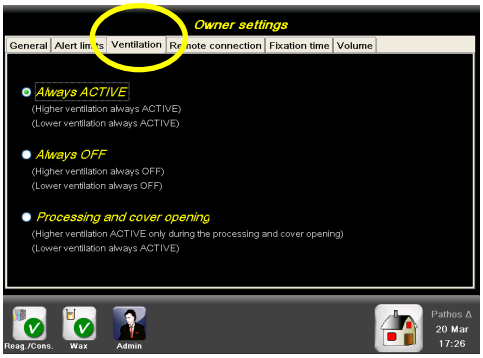


Select "**Ventilation**" to manage the upper (working area) and lower (drawer) exhaust fume fans, choosing between:

- Always ACTIVE. Both exhaust fans are activated at the switching on of the unit. **SUGGESTED**
- Always OFF. Both exhaust fans are always off, even during the processing.

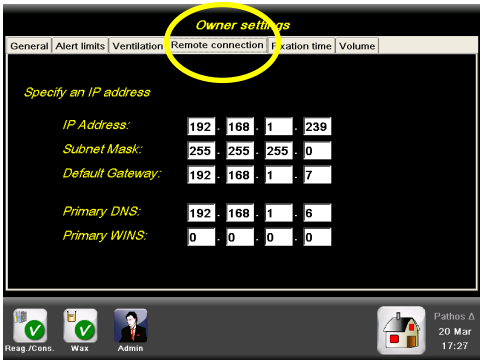
NOT SUGGESTED.
Risk of fumes in the laboratory environment.

- PROCESSING and COVER OPENING. The Upper ventilation is activated only during the processing and when opening the covers. The Lower ventilation is always active.

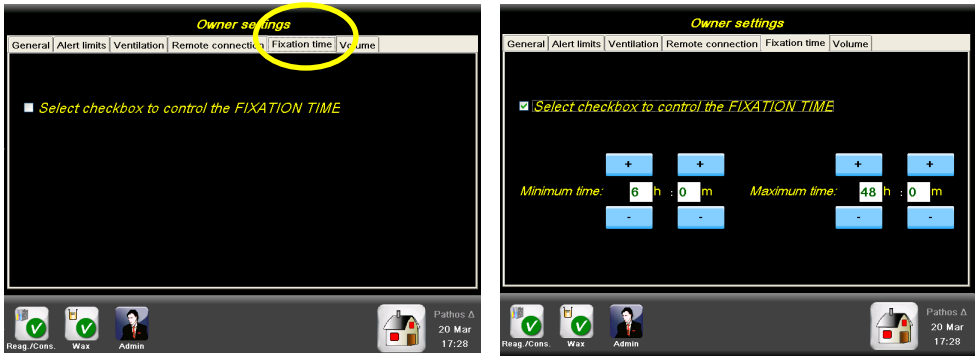


Select "**Remote connection**" to edit and modify the network settings for remote assistance. Data required must be supplied by the Laboratory Network Administrator (Primary WINS not required).
For example:

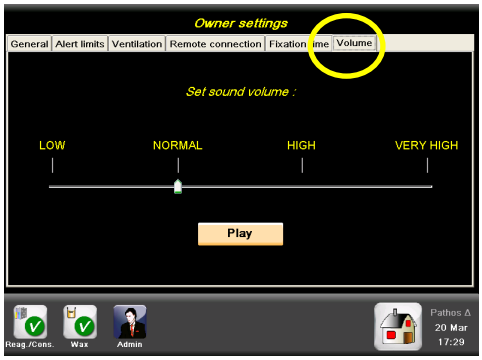
IP Address	**192.168.1.200**
Subnet Mask	**255.255.255.0**
Default Gateway add.	**192.168.1.1**
DNS server address	**192.168.1.6**



Select “**Fixation time”** to set Minimum and Maximum Fixation Time. When enabled, before starting a protocol, the software warns user if the total fixation time is under or over the limits set and manages the Holding solution. Refer also to chapter 3.2.4.



Select “**Volume**” to set and modify the volume of the Unit.
By default the settings is NORMAL, it is possible to lower or increase volume but for safety it is not possible to totally silence it.



3. OPERATING WITH PATHOS DELTA

Pathos Delta is controlled by the Touch Control Terminal, which is a Windows CE 6.0 based.
It is an **HYBRID SYSTEM** that can heat the specimens processing solutions by Microwaves or by Conventional or with combined Conventional/Microwave heating.

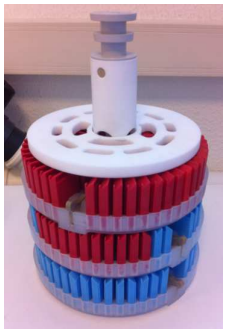
The **Microwave/Resistance power output is automatically controlled** by a PID (Proportional Integrative Derivative) system, which allows the operator to set up the desired real parameters (Time and Temperature) by simply drawing a curve. If a pre-stored program is used, it is only required to adjust the time of the procedure in relation to the application specifications.

Thanks to the **TIME at TEMPERATURE** working procedures, Pathos Delta allows consistency and reproducibility of high quality results. The unit will always reproduce the same conditions of temperature in the set times by automatically adjusting the Microwave/Resistance power level.

The following sections show how to create, store, modify and run a program with the Touch Control Terminal.

3.1. Loading cassettes into the Split Rack

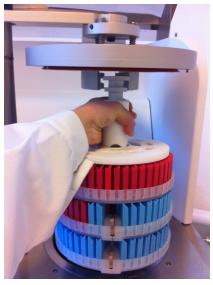
The Split Rack is made by 3 separate layers; each layer holds 70 cassettes for a total of 210 cassettes (figure below).
Load the 3 layers of the SPLIT RACK REF PN 66165A/210 with cassettes.
Each LAYER comes in a split design of two halves for simultaneous, convenient use in different grossing rooms and embedding stations.
Each layer is provided with a locking mechanism (circles in figure below) to assure perfect closing of the two halves.



Fully load each layer with cassettes, starting from the bottom layer first and avoid random placement of cassettes over the three layers.

Start loading cassettes into a new layer only when the layer in use is full, thus avoiding a possible “low reagent” situation in the cavity.

Position the **CASSETTE FIXING DISK** on top of the last layer in use and load the rack onto the Pathos arm.



The fixing disk must always be used, with either 1, 2 or full layer rack in order to avoid possible spilling out of cassettes from the rack during the processing.

3.1.1. Rack loading - unloading tool

Recommended to unload the rack at the end of the processing cycle, to avoid dripping of melted paraffin.

Recommended also to load rack with cassettes when it is wet, in order to avoid dripping of formalin or other solutions on the floor or on the Pathos Delta unit.

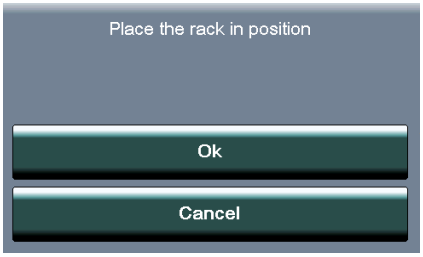
3.2. Run a program

3.2.1. Run of the most used programs

Select a **Favorite program** (figure below, yellow arrow) out of the list of FAVORITE PROTOCOLS (see chapter 2).

Wax and Reagent status bar: see chapter 4 how to set these warnings.

The following message appears. Hang the rack on the robotic arm and press "**Ok** " as indicated in the picture below.

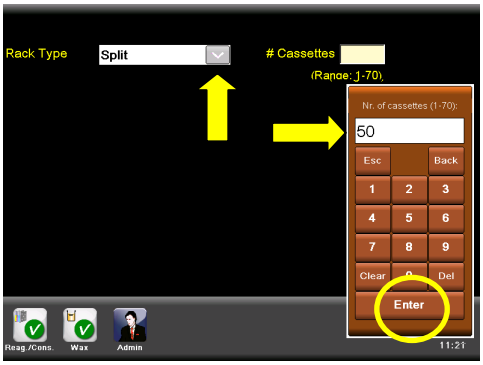


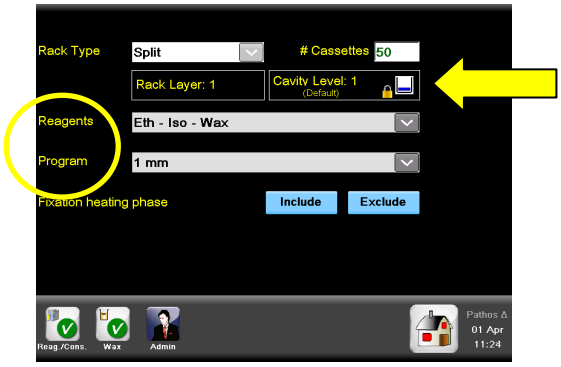
If you press "Cancel" you will come back to the Home screen.

Enter the number of cassettes to be processed (see the arrows in figure below), up to 70 if one layer has been selected (up to 140 or 210 for two and three layers respectively). Press "**Enter**".

In the example reported in this chapter, the Rack type is "Split", as shown in the next figure.

When a Favourite is opened, it is not possible to change the type of rack; this feature is available only for standard programs. If you need to use a different rack, change the type of Favourite.





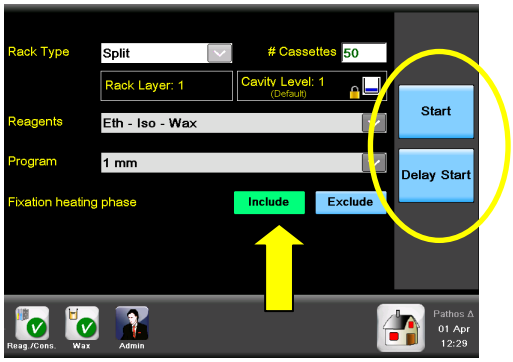
In this example, 50 cassettes have been selected, so the software automatically sets a process of 1 layer rack and the following posts appear (yellow arrow):

- "**Rack Layer**": 1
- "**Cavity Level**": 1

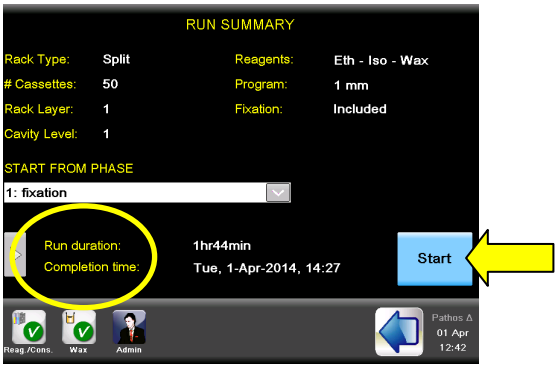
The "**Reagents**" (in this case: "Eth-Iso-Wax") and the "**Program**" (in this case "1mm") are automatically displayed (see figure above, yellow circle), according to the Favorite protocol selected (figure below).

It's suggested to include the heating fixation phase in the process to standardize the results.

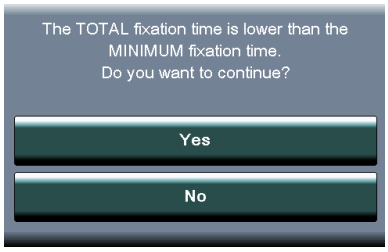
When you press "**Include**" or "**Exclude**" (in this example it is included, as indicated by the arrow below), the respective icon becomes green and the icons "**Start**" and "**Delay Start**" appear on the right side of the screen, as indicated by the circle below.



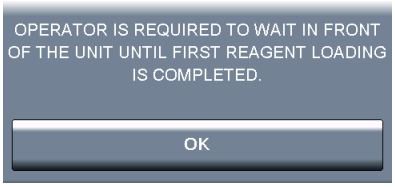
Press "**Start**" and the following screen appears. All the details of the process are shown, like the "**Run duration**" and the "**Completion time**" (indicated by the circle in figure below). Press "**Start**" to run the cycle NOW (indicated by the arrow).



When the control of the Total Fixation Time is activated under "Owner Settings" (see the chapter 2.16), if the MINIMUM fixation time is not reached, when you press "Start", the following message appears, as shown below. Press "Yes" to continue, "No" to abort the program.



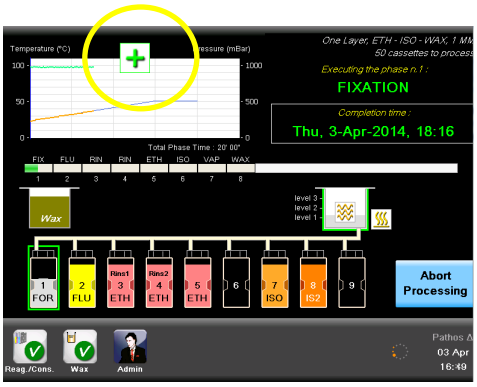
The following message appears, read carefully the message on the screen and press OK to start the process.



To assure safety of samples, in fact, it is necessary that operator stays close to the unit at the beginning of a new process until loading of the first reagent is completed and the graph is displayed on the screen.

Detailed processing information appears on the screen, while the program is running.

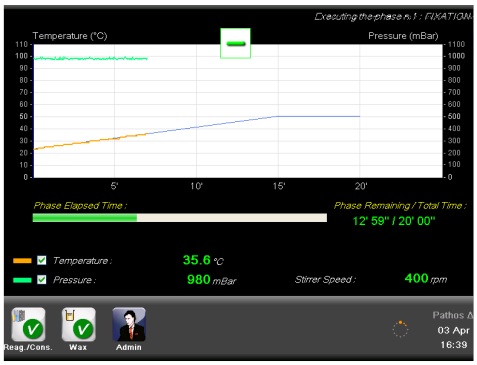
- In the Upper part of the screen shows the PHASE GRAPH with pre-set/real temperature and/or vacuum, the PROCESSING TYPE, the name of current phase and the “Completion time”.
- In the Central part of the screen, a status bar shows the ELAPSED TIME (highlighted in green) up to the end of each phase.
- In the Bottom part of the screen: a dynamic graph shows the TWO CAVITIES (Wax and Microwaves) and the REAGENTS TANKS CONFIGURATION with the relative reagent loaded (highlighted in green). The graph shows also the REAGENT LEVEL reached in the Microwave cavity during the processing and the type of heating (in this case both Mw/Resistance heating).



Press “Abort Processing” to abort the program and unload the cassettes.

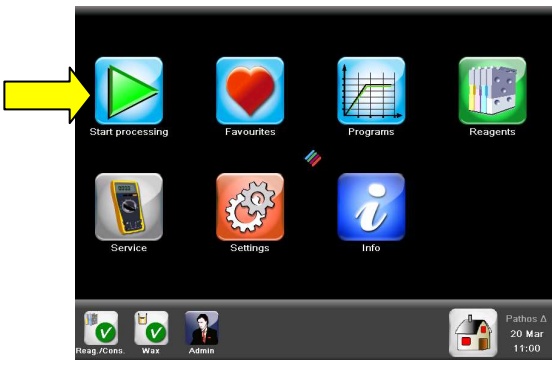
For further information, press “**Plus**” button (see the circle in the picture above):

Press “**PLUS / MINUS**” buttons during the processing program, to enlarge/restrict the graph with all phase parameters, the PHASE ELAPSED TIME and PHASE REMAINING/TOTAL TIME.

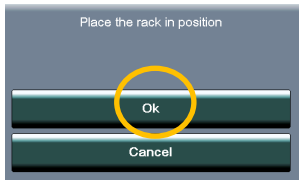


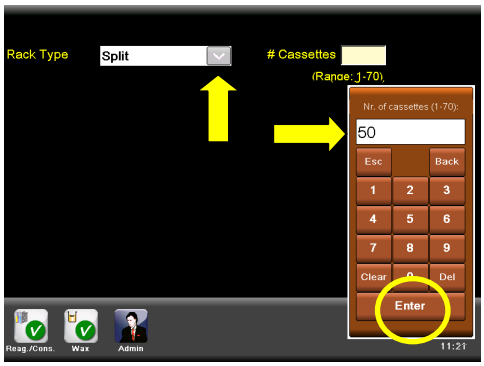
3.2.2. Run a standard program

Press "**Start processing**" from the MAIN FUNCTIONS page (figure below).

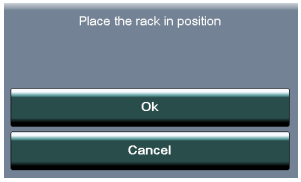


The following screen appears. Choose the rack (in this case: "**Split**"), then press "**OK**" to the message that warns to place the rack in position, then enter the number of cassettes (50 in this case) to be processed (see the figure below, yellow arrows), up to 70 if one layer has been selected (up to 140 or 210 for two and three layers respectively). Press "**Enter**" (red circle).





Selection of the rack type is required only the first time. After, just enter the number of cassettes, as the rack model is already set. If a change in the rack type is required, press "Cancel" to the message "Place the rack in position" shown in the previous picture.

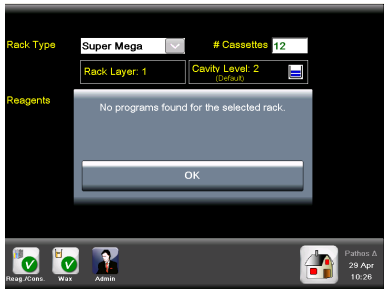


In the example reported in this chapter, 50 cassettes have been selected, so the software automatically sets a process of 1 layer rack and the following posts appears (figure below, arrow):

- "**Rack Layer**": 1
- "**Cavity Level**" (Default): 1

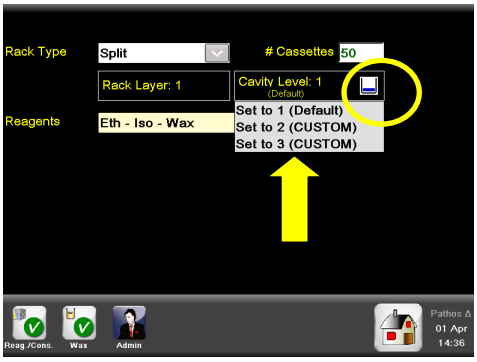
It is possible to force an upper custom level at the start of a standard program. This function is NOT available when starting a Favourite program. Below the instructions.

If you select a reagents group that does not contain any program for the selected rack, the following message appears "**No programs found for the selected rack**", showed below.



When starting a program in "**Delay Mode**", it is possible to add extra cassettes during the pre-soaking phase, as explained in the chapter 3.2.5 (remember that it is possible only in this phase). The number of cassettes, that is allowed to add, depends of the "**Cavity level**" of the process.
In the example reported in this chapter, the "**Cavity level**" is "1" and so it will be possible in the pre-soaking phase to add cassettes up to 70 cassettes (here 50 cassettes have been selected and so only 20 cassettes is allowed to add to arrive at 70 cassettes).

To force the cavity level press the Cavity icon, as shown in the circle below. The following screen appears.



Now it is possible to force the cavity level at an upper level, as indicated by the arrow in the previous figure, even if the number of cassettes is only 50.

- If you press "**Set to 1 (Default)**", the process will be executed with 1 level of reagent and so it will be possible to add cassettes during pre-soaking phase only to fill 1 layer of reagent. The tag "**Default**" means that the cavity level chosen ("1" in this case) corresponds to the number of cassettes inserted ("50" in this case).
- If you press "**Set to 2 (CUSTOM)**", the process will be executed with 2 levels of reagents and so it will be possible to add cassettes to fill 2 layers of reagent. The tag "**CUSTOM**" means that the cavity level chosen ("2" in this case) does NOT correspond to the number of cassettes inserted ("50" in this case).
- If you press "**Set to 3 (CUSTOM)**", the process will be executed with 3 levels of reagents and so it will be possible to add cassettes to fill 3 layers of reagent. The tag "**CUSTOM**" means that the cavity level chosen ("3" in this case) does NOT correspond to the number of cassettes inserted ("50" in this case).

If you insert a number of cassettes that corresponds to "Cavity level: 2", it will be possible to force the cavity level only to 3 layers.

Normally the software automatically sets a process with:

SPLIT RACK

- "Rack Layer: 1" – "Cavity Level: 1" if from 1 to 70 cassettes are inserted
- "Rack Layer: 2" – "Cavity Level: 2" if from 71 to 140 cassettes are inserted
- "Rack Layer: 3" - "Cavity Level: 3" if from 141 to 210 cassettes are inserted

SUPERMEGA RACK
- "Rack Layer: 1" – "Cavity Level: 2" if from 1 to 12 supermega cassettes are inserted
- "Rack Layer: 2" – "Cavity Level: 3" if from 13 to 24 supermega cassettes are inserted

RB300 (Random Basket 300)
- "Cavity Level: 3" if from 1 to 300 cassettes are inserted

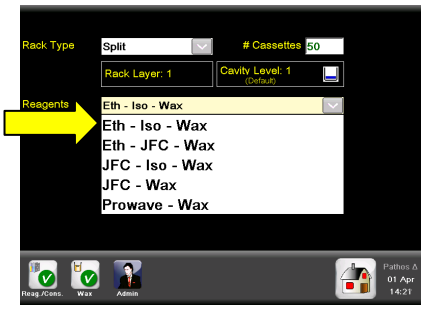
WMS (Whole Mount Slices)
- "Cavity Level: 3" if from 1 to 9 cassettes are inserted

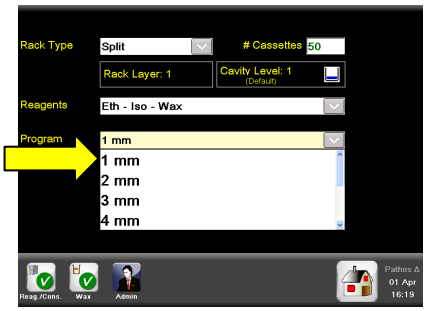
AEC (Automatic Embedding rack)
- "Cavity Level: 3" if from 1 to 160 cassettes are inserted

Therefore when using:
- o the SPLIT RACK, it is possible to force the Cavity Level at 2 or 3 (when starting a program with Cavity Level 1) and to force it at 3 (when starting a program with Cavity Level 2),
- o the SUPERMEGA RACK, it is possible to force the Cavity Level at 3 (when starting a program with Cavity Level 2),
- o the RB300, it is NOT possible to force the Cavity Level because it only works with 3 layers of reagent,
- o the WMS, it is NOT possible to force the Cavity Level because it only works with 3 layers of reagent,
- o the AEC, it is NOT possible to force the Cavity Level because it only works with 3 layers of reagent.

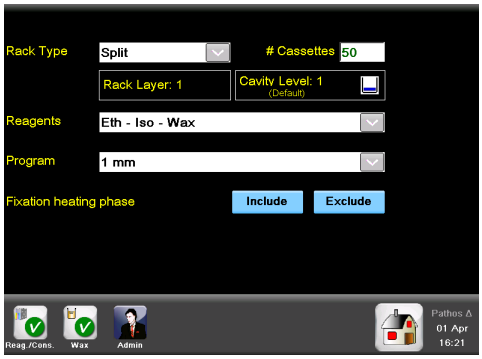
If you select a CUSTOM level (for example "Cavity Level: 2" as shown below), the color displayed is orange, indicated by the circle below.

The following description will be performed by using the "**Cavity level: 1 (Default)**".
When you insert the number of cassettes, the following screen appears. Choose the "**Reagents**" (for example "Eth-Iso-Wax") and the "**Program**" (in this case "1 mm"), as shown below.





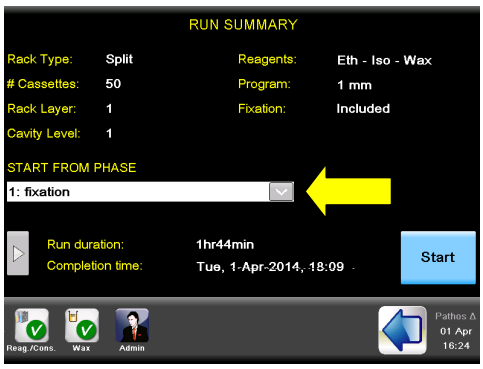
The following screen appears.

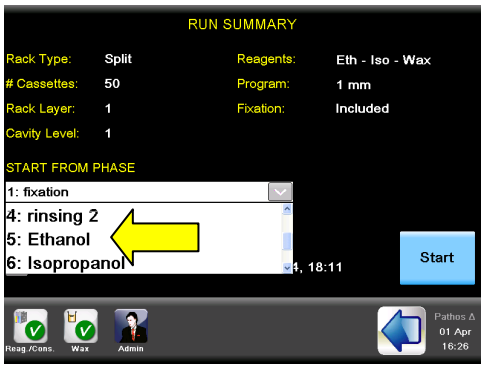


To run the process follow the instructions reported above, in the chapter 3.2.1.

3.2.3. Run a program using the STEP START function

In the starting screen listing all process details ("**RUN SUMMARY**"), select the starting phase you require, as shown below.

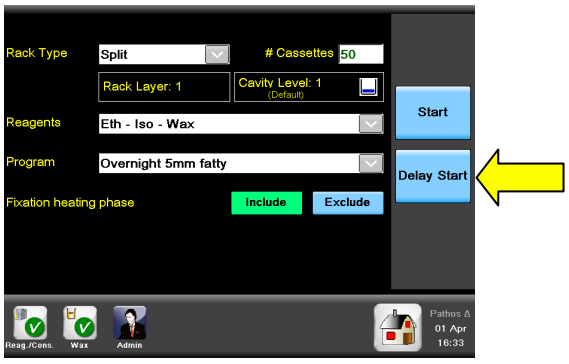




In the example, "**Ethanol**" is selected as the starting phase (the number 5), and then press "**Start**", as indicated by the arrow below.

3.2.4. Run a DELAYED PROGRAM

Press **"Processing"** from the MAIN FUNCTIONS screen. The window below appears, if either a Favorite program (see chapter 3.2.1) or a Standard program (see chapter 3.2.2) is selected. Enter the exact number of cassettes in the box, choose if fixation phase must be included or not and press "**Delay Start**" (figure below, arrow).



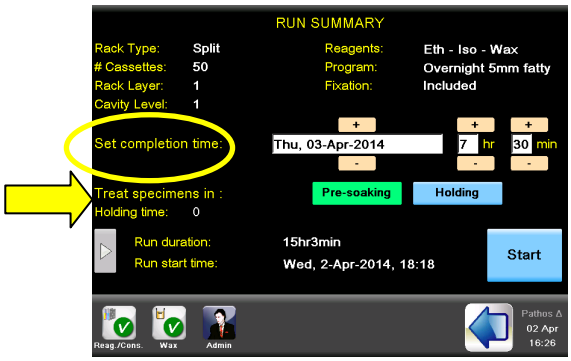
The following window appears: set the completion time (see the circle in figure below). In fact, "**Delay Start"** function allows setting when the program has to finish, without modification of the existing protocol. The system keeps samples immersed in:

- Pre-soaking reagent or
- Holding reagent

at ambient temperature and automatically calculates the starting time to complete the processing as set by user.

See the chapter 4.1.1 to set Pre-soaking and Holding reagent.

By default Pre-soaking reagent is selected, if you want to keep the specimens immersed in Holding, select its icon, as indicated by the arrow below.

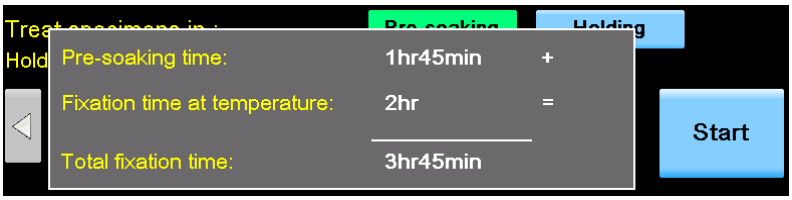


If you leave selected "**Pre-soaking**" (see below that is underlined in green) as reagent to keep the specimens:

o The "**Holding time**" is zero, as indicated by the yellow arrow below.

o If you press the grey arrow (figure above, yellow circle), the fixation protocol details are displayed:

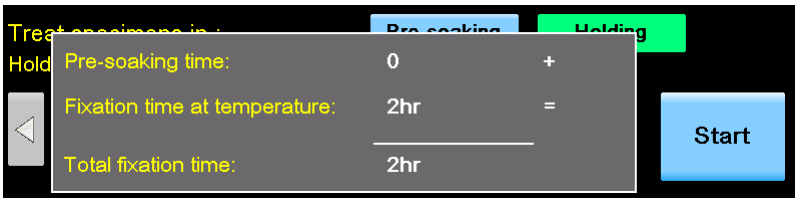
- "**Pre-soaking time**": it depends on the starting time to complete the processing as set by user.
- "**Fixation time at temperature**": the duration of the fixation phase of the protocol
- "**Total fixation time**": the sum of the two times above.



If you select "**Holding**" (see below that is underlined in green) as reagent to keep the specimens:

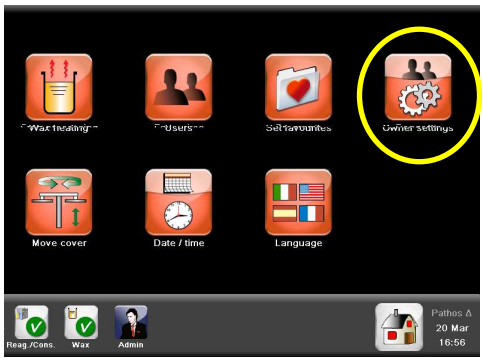
o the "**Holding time**" is NOT zero (as the previous case), but it depends on the starting time to complete the processing as set by user. The "**Holding time**" is indicated by the yellow arrow below.

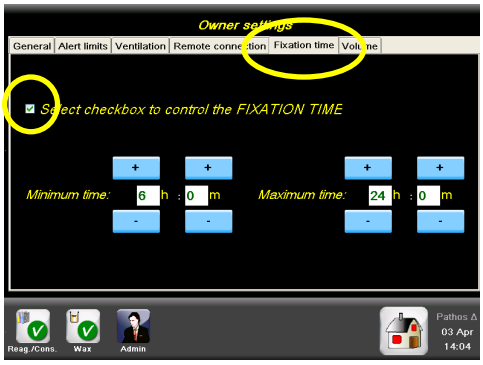
o If you press the grey arrow (figure above, yellow circle), the fixation protocol details are displayed:
- "**Pre-soaking time**": it is zero because "holding" is the reagent set to keep the specimens, not pre-soaking.
- "**Fixation time at temperature**": the duration of the fixation phase of the protocol
- "**Total fixation time**": the sum of the two times above.



When enabling the control of the "Total Fixation Time" in "Owner Settings", the specimens will be automatically kept in pre-soaking reagent and, only in case the Total fixation time is exceeded, the holding reagent will be used, as explained below in detail.

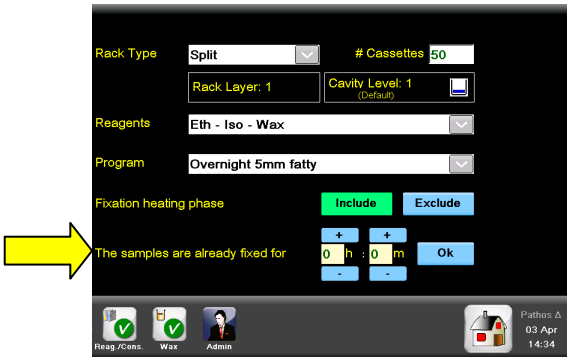
In "**Owner Settings**" – "**Fixation time**" tab, by selecting "Select checkbox to control the FIXATION TIME" and entering Min and Max fixation times (see chapter 2.16 and figure below right), when starting a program the system ask to enter the "External time in fixative" (if any).
In fact, on the base of the:
o external time in fixative (requested only if fixation limits are enabled) and
o fixation time at temperature (value set in the program)
the software calculates by difference the necessary pre-soaking time to reach the Max fixation limit set.
Moreover software keeps samples in HOLDING SOLUTION (default reagent is Flushing MIX) up to the start of the program.





In the example reported in this chapter (see the previous figures):
- The Minimum fixation time is 6hr,
- The Maximum fixation time is 24hr.

Below is shown the starting screen of a program in case the fixation limits are activated: the system asks to enter the external time in fixative "**The samples are already fixed for**" (if any), as indicated by the arrow.

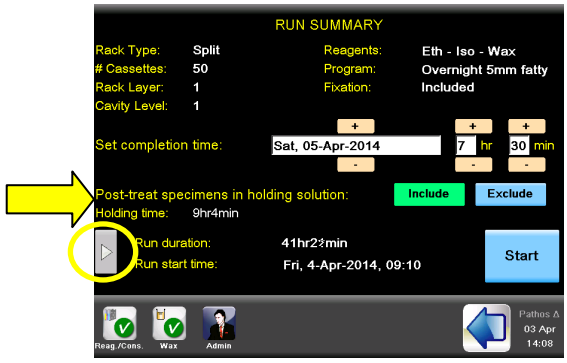


The numeric values reported in this chapter are only used as example.

WHAT HAPPENS IF THE MAXIMUM FIXATION TIME IS EXCEEDED.

In the following example the specimens are already fixed for 3 hours, as indicated by the arrow below. Then press "**Delay Start**" (see the circle in the next figure).

The following screen appears.



In this screen it is possible to set the completion time of the program.
The Maximum fixation time set up in "Owner settings" (24h in this case) will be reached and so the specimens will be kept in Holding solution (see the arrow in previous figure) up to the start of the program.
In fact if you press the grey arrow (indicated in the circle in the previous figure) the fixation details are shown:

- External time of fixative: 3hr
- Pre-soaking time: 19hr
- Fixation time at temperature: 2hr

and the sum of all the fixation times gives the Total fixation time that is 24h, like the maximum limit set up in Owner settings.

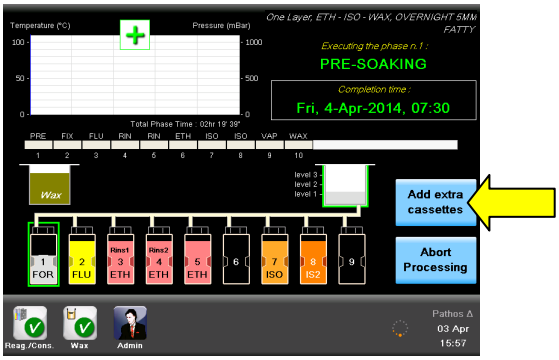
If the ending time of the program increases, the pre-soaking will not increase because the Total fixation time cannot excess 24hr but the Holding time will increase.

If the maximum fixation time is not exceeded, the specimens will be kept in pre-soaking up to the start of the program.

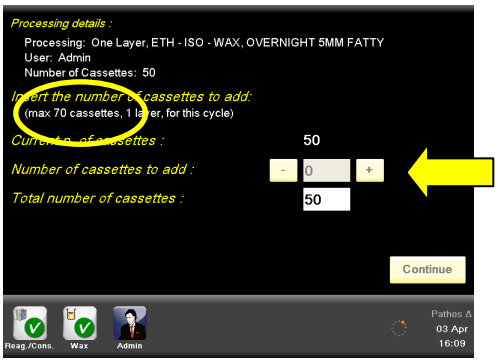
3.2.5. Add Extra Cassettes during the delayed start

By pressing "**Start**" in a delayed processing, the system shows the screen below.
"**Add extra cassettes**" feature allows the addition of further cassettes while in the delay start mode (yellow arrow).

This function is active ONLY in the pre-soaking phase.

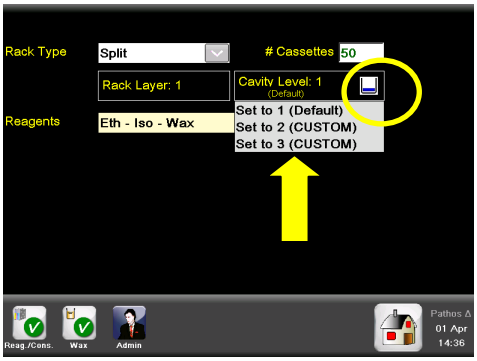


Press "**Add extra cassettes**", the following screen appears: enter number of cassettes to be added (figure below, arrow). The Maximum total number of cassettes is displayed (see the circle, in this case 70 cassettes, that is the maximum number of cassettes to be inserted in the first layer rack and a 1 layer program is running).
It is therefore possible to add extra cassettes up to reach the maximum total number of cassettes displayed.



Then press "Continue" in the lower part of the screen to continue processing.

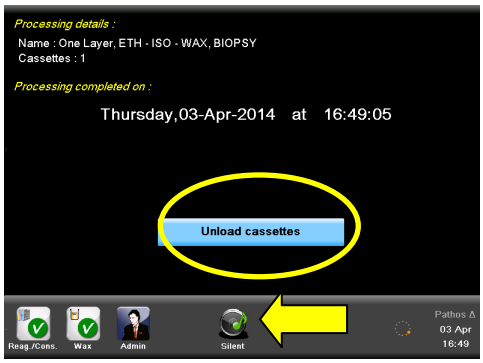
In case a level of a program is forced to a upper level, not dependent on the number of cassettes (see the example in figure below), it is possible to add more cassettes than those to fill the CUSTOM layer, as explained in the chapter 3.2.2.



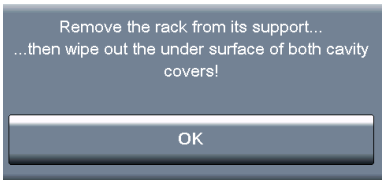
3.3. End of a program

At the end of a program, the following screen appears. An audio alarm warns that program is over; press "**Unload cassettes**" to silent the alarm and to unload the cassettes, as indicated by the circle in figure below.

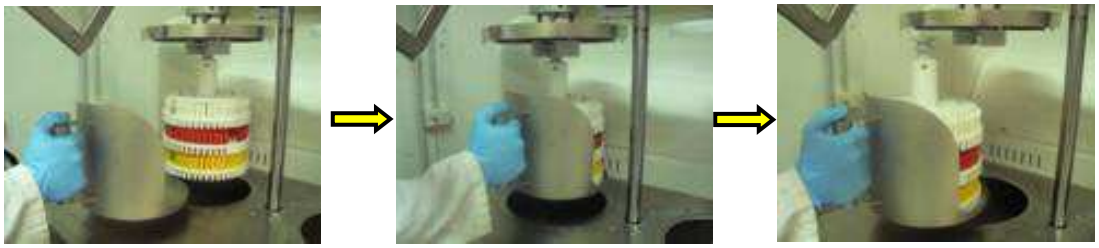
If you want only to silent the alarm press the icon "**Silent**" indicated by the arrow below.



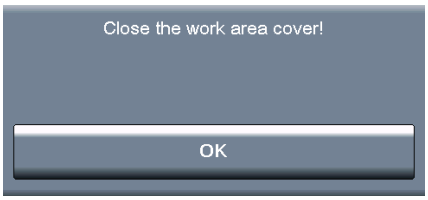
The data of the process are automatically saved under "Log Book" function, explained in the chapter 3.4.
When you press "**Unload cassettes**", automatically the following message pop-up appears.



Now it is possible to unload the rack from the wax cavity by using the unloading tool (see sequence of pictures below). Then wipe out the under surface of both cavity covers.

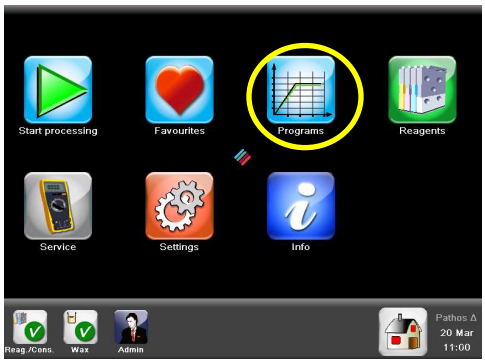


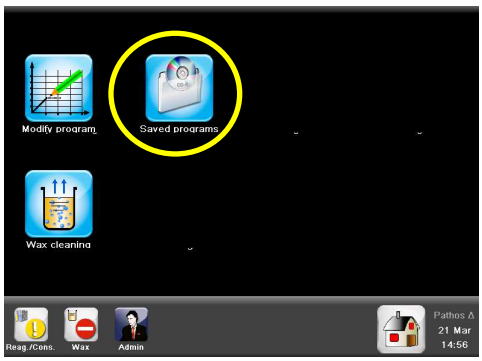
Then press "OK" to the message to continue.
Another pop-up appears: close the work area cover, press "OK" to the message and then press the home button to come back to the main menu.



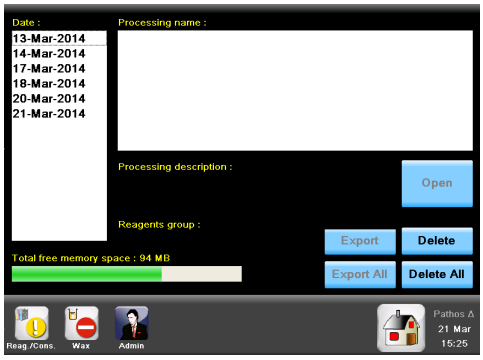
3.4. Retrieving saved processing results

Select “**Programs**” button from the MAIN FUNCTIONS screen and “**Saved programs**”.



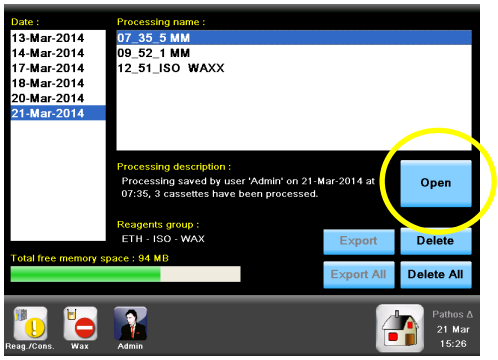


The following screen appears showing on the left all the SAVED PROCESSING FILES, sorted by DATE.
The dates are automatically created by the software.



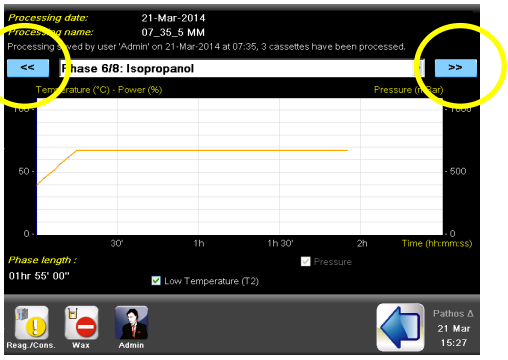
A green MEMORY BAR shows the memory space still available for further processing saving.
Select one date (in the example on the right “21-march-2014) and the cycle(s) saved that day will appear on the right. File name is determined by the time when the program finishes followed by its name.

Press “**Open**” to visualize the graphs of the highlighted file.



Click the buttons (yellow circles) to see the graphs of the saved processing.

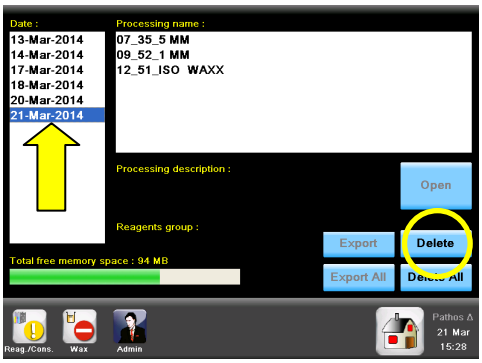
All graphs show up to 4 colored lines (when available) describing the Preset Temperature (blue), the Real Temperature (red), the Preset Pressure (black) and the Real Pressure (green) values about the current step (In this case: Isopropanol). Details are directly explained on the graph.

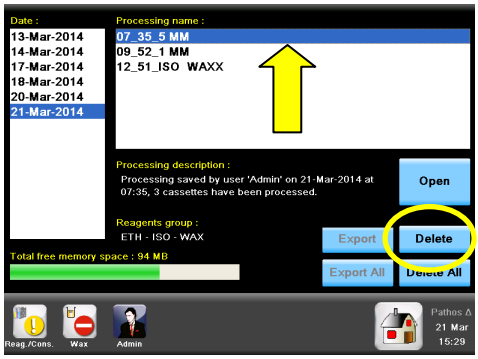


Press the icon  to go back to the saved processing screen.

3.4.1. How to delete a saved processing

Select a Date and press "**Delete**" to cancel all the processes saved that day (left figure).
Select a Process and press "**Delete**" to cancel ONLY the process highlighted (right figure).





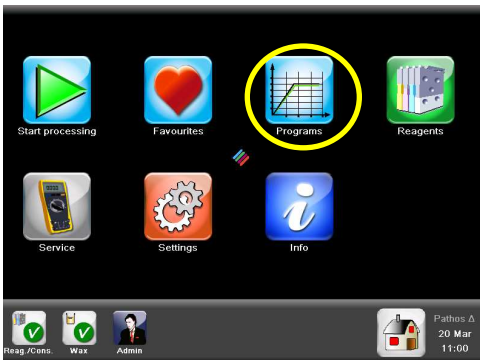
Alternatively press "**Delete All**" if you want to cancel ALL the programs stored on Pathos.

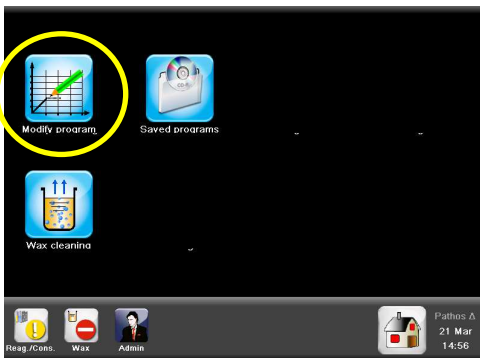
3.5. How to modify a program

This function does NOT create a NEW PROGRAM. For this, it is necessary to choose the default program that most fits your requirements, make a copy and modify its details.

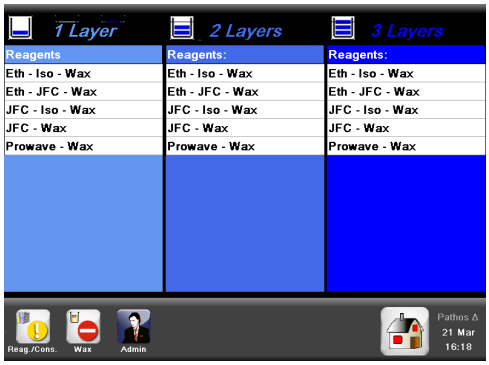
Before making any modifications to a program, please contact our Application Dept at application@milestonemedsrl.com.

Select "**Programs**" button from the MAIN FUNCTIONS screen and select "**Modify program**". Choose the program that most fits your requirements.





The following screen appears, listing all the existing programs for each processing layer: default protocols as well as protocols created by the user (if any).



To modify a Default protocol, select it, choosing the layer (in the following example “3 Layers”), the reagents (in this case “Eth-Iso-Wax”) and the program (in this case “Overnight 5mm fatty”).
Press “**Copy**” button (figure below, circle).

Modification of a user’s protocol does NOT require copying it before making the changes required.

The “Modify “and “Delete” buttons are made available only for already copied protocols.

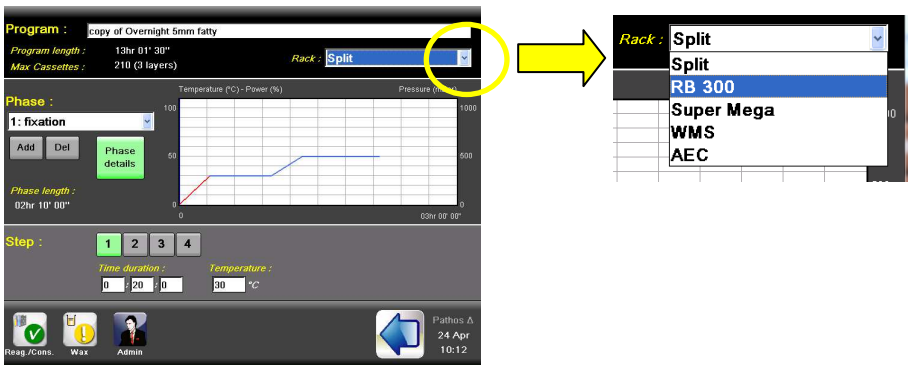
For safety reasons, the factory pre-stored protocols cannot be directly modified or deleted.

Take care to modify ONLY the Time At Temperature part of the curve. Do not modify the Ramp - up time.

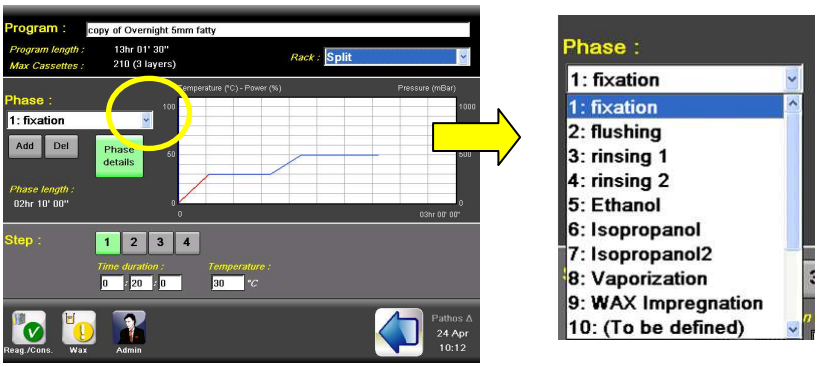
The copy program screen is open. Rename the program by pressing its name and using the keyboard that appears. Then press “**Enter**”. In the example below the program “copy of Overnight 5mm fatty” is renamed as “NEW”.

In the top right side of the editing screen, it is possible to choose the rack. If you modify a “1layer” program, it will be possible to only select the Split rack. If you want to choose the other racks available for Pathos Delta, you have to copy a “3 layers” program, as shown below. The SM rack is also available for “2 layers” programs.

Select the drop-box menu by pressing the arrow indicated in the circle below. In this case the program is of “3 layers” and so it is possible to choose all the racks available for Pathos Delta: Split, RB 300, Super Mega, WMS and AEC.

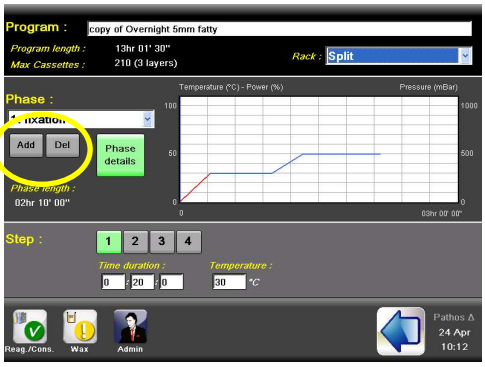


Then choose the parameters to be modified, as explained below.
Select the phase to modify by pressing the arrow indicated in the next figure: a list of all the phases appears.

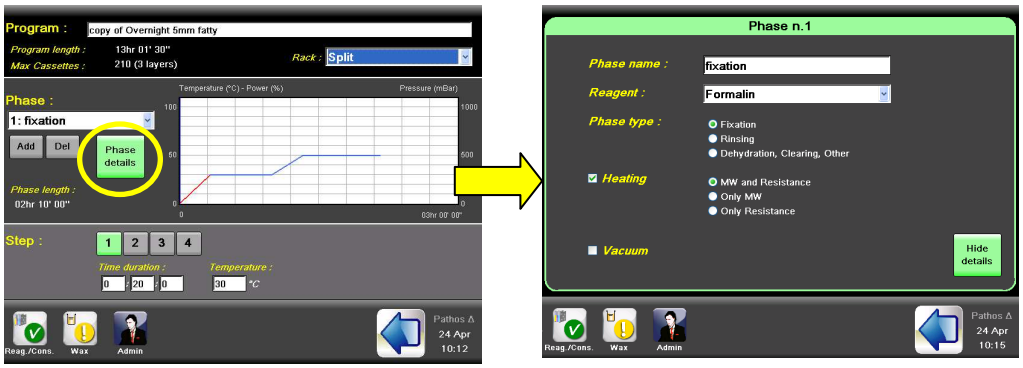


To ADD / DELETE a phase, use "**Add**", "**Del**" buttons indicated by the circle below.

- If you press "**Add**": the phase will be inserted BEFORE the current phase.
- If you press "**Del**": the current phase will be deleted.



Below the instructions on how to modify the details of a phase.
Select the phase of your interest (for example "Fixation"), then press "**Phase details**" as shown below. The following page appears.

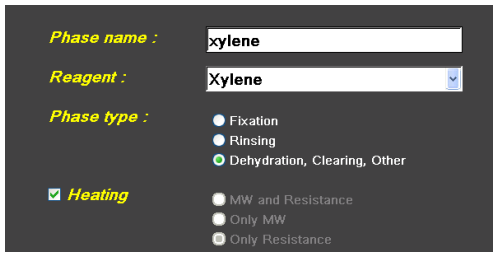


Here it is possible to modify the following fields:

- "**Phase name**". If you press the current name a keyboard appears.
- "**Reagent**". Press the arrow to visualize a drop- box menu showing all the reagents available from the "Reagents list" and select the reagent of your interest.
- "**Phase type**". Choose the correct category depending on the type of reagent used between: Fixation, Rinsing, Dehydration, Clearing, Other.
- "**Heating**". Check/uncheck the box to able/disable the heating in the current phase. If abled, choose the correct type of heating between: MW and Resistance, Only MW, Only Resistance.

If you modify a phase with "Xylene" or "Isoparaffin" as reagent, by default the type of heating is "Only resistance", as shown in the example in figure below.

If you create a phase with a NON POLAR reagent (substitutes of "Xylene" or "Isoparaffin"), you must select a type of heating "Only Resistance". For this type of reagents, it is required to use "Xylene proof" tanks REF PN 66340F (two tanks are supplied with the Unit, if you need more tanks, purchase them as accessory.



- "**Vacuum".** Check/uncheck the box to able/disable the vacuum in the current phase. By default only "Vaporization" and "WAX" phases have the vacuum box checked.

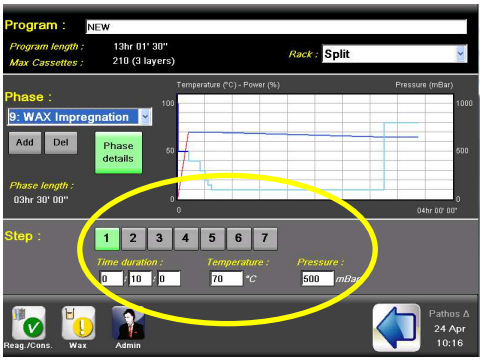
Then press "**Hide details**" indicated by the circle in figure below to save changes and to come back to the copy program screen.

In every phase it is also possible to:

- Add/ Delete a step of a phase by pressing the icons "**Add**" / "**Del**" shown below. To visualize the two icons, it is required to press the last step (in this case step number 4) because the new step will be added as the last step.

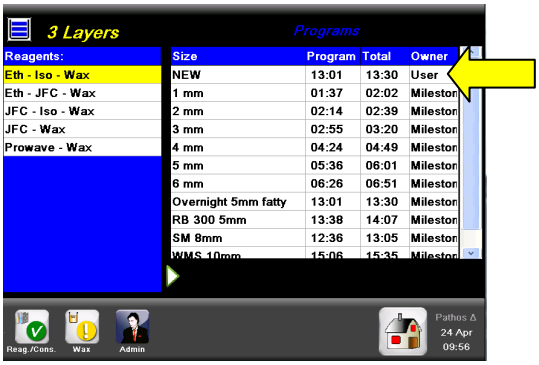
- Modify the details of the steps: time, temperature (if enabled) and vacuum (if enabled), as shown below.

In this example the phase is "**Wax impregnation**" and in every step it is possible to modify: time, temperature and vacuum, as indicated by the circle below.



When all the modifications are completed, press the arrow on the status bar of the screen and YES to save changes.

If you press again "**Programs**" - "**Modify program**" - "**3 Layers**" - "**Eth-Iso-Wax**", the program modified will be available in the list of all the default programs, as shown below.



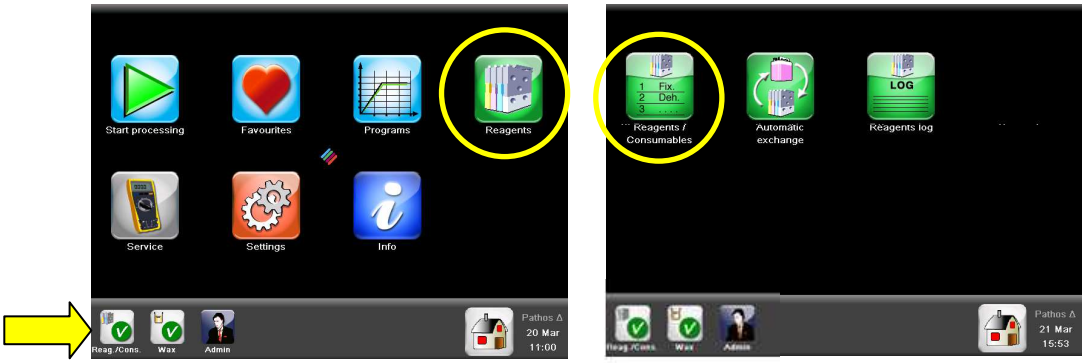
In the previous figure you can see that for every program is reported the field "**Owner**":

- DEFAULT PROTOCOLS: the Owner is MILESTONE and User can only COPY them.
- USER PROTOCOLS: the Owner is USER and he can MODIFY, DELETE and COPY them (if any).

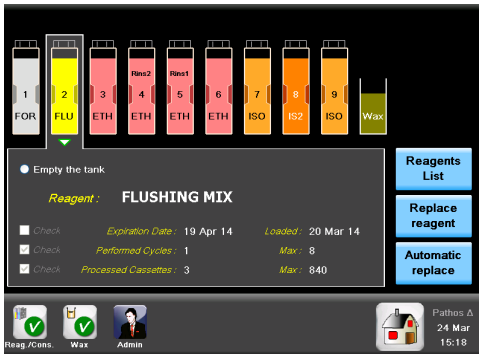
Then it is possible to insert the modified protocol in the Favourites screen, by following the procedure described in the chapter 2.

4. REAGENTS MANAGEMENT

Select "**Reagents**" from the MAIN FUNCTIONS screen, then "**Reagents/Consumables**" (see the circles below).
Alternatively press directly the "**Reagents status icon**" on the STATUS BAR of the HOME PAGE, indicated by the arrow below.

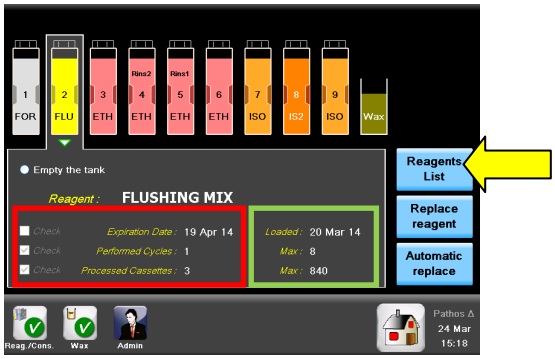


The REAGENTS MANAGEMENT window appears, showing the settings and the status of all the reagents loaded in the unit (Wax included). It is possible to check the reagents STATUS by selecting the relative TANK (or WAX CAVITY) in the upper part of the screen.



4.1. Reagents reuse life

The PARAMETERS of the reagent selected are shown in details (figure below) on the lower part of the screen.



The REUSE LIFE of the reagent can be checked by:

(1) **Expiration Date**. This date shows the reagent EXPIRATION DATE, according to requirements set into the Reagent List (red box, figure above). For further details see chapter 4.1.2.

(2) **Performed cycles.** This field automatically shows the CYCLES already COMPLETED (red square, figure above).

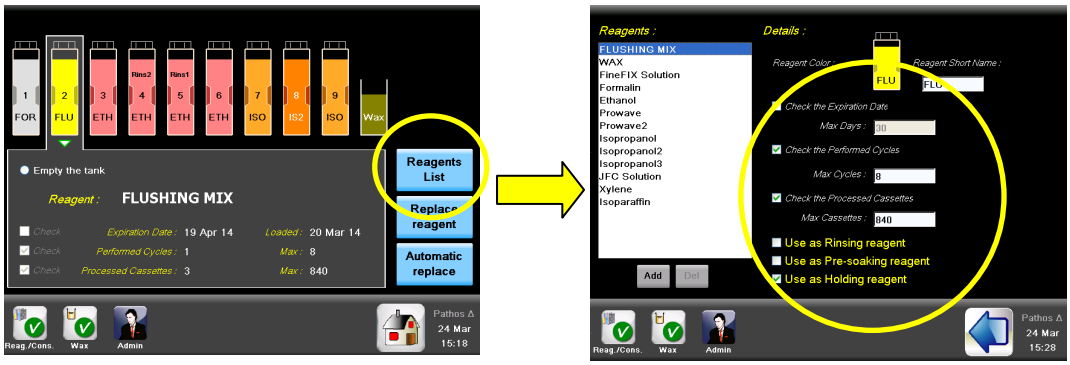
(3) **Processed cassettes.** This field automatically shows the CASSETTES already PROCESSED (red square, figure above).

Additional information is shown on the right side of the window (green box square) and refers to the REAGENT SETTINGS edited into the "**Reagent list**" (figure above, arrow). See chapter 4.1.2 for further clarifications.

4.1.1. Reagents settings

Default reagents settings of Pathos DELTA (expiration date, max number of cassettes and max number of cycles) refer to processing without papers and sponges. In any other case please contact our Application Dept at application@milestonemedsrl.com to get proper instructions.

From the REAGENT CONFIGURATION window, select the "**Reagent List**" icon: the LIST of preset reagent appears.



REUSE LIFE of each reagent can be defined using the check boxes (see in figure above the circle on the right):

(1) **Check the expiration date.** Tick this box to check the reagent expiration date, according to your requirements (not compulsory).

(2) **Check the performed cycles.** Tick this box to check the maximum number of cycles to be carried out with the reagent in use (checked by default, strongly suggested).

(3) **Check the processed cassettes.** Tick this box to check the maximum number of cassettes to be processed with this reagent (checked by default, strongly suggested).

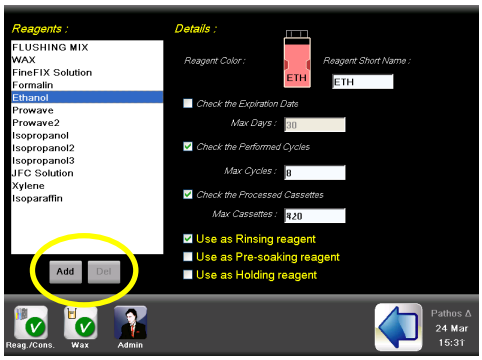
(4) **Use as RINSING reagent.** Tick this box to set the DEHYDRATION reagent to be used also as RINSING reagent.

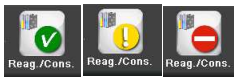
(5) **Use as PRE-SOAKING reagent.** Tick this box to set the reagent for fixation to be used as Pre-soaking reagent (refer to chapter 3.2.4).

(6) **Use as HOLDING reagent.** Tick this box to set the reagent to be used as HOLDING reagent (refer to chapter 3.2.4).

Click on the relative **Check boxes** to activate the settings described above (points 1,2,3) regarding date of next change, number of maximum processing runs and/or processed cassettes performed with any reagent, so that the system automatically warns before the process starts.

"**Add**" a new reagent or "**Delete**" it (figure below, circle) by pressing on the relative icon.
Default reagents cannot be deleted.



The REAGENTS SETTINGS makes the REAGENTS STATUS icon turn from GREEN to YELLOW to RED 

depending on the remaining reuse life of the reagents (for example 1 day, 1 cycle and/or 1 full cassette rack, as described in the chapter 2.16). For example, if you set 630 as max cassettes limit, the Reagents status icon is green until 410 cassettes (one full rack before reaching the limit); then turns to yellow from 411 to 630 and then to red at 631. When RED, processing cannot be launched.

Press the icon  to return to the Reagent Management screen and save any modification.

4.1.2. Recommendation for reuse life

The following recommendations are conceived as a guideline to ensure quality processing.

Default reagents settings are factory set, to assure optimal results. Don't modify them. For any possible clarification or any request for assistance please contact either our application support: application@milestonemedsrl.com to get proper instructions.

REAGENT CHECKED FOR:

REAGENT	MAX DAYS	MAX CYCLES	MAX CASSETTES	USE FOR
Flushing MIX	30	8	840	Holding
WAX	14	10	840	
FineFIX	30	8	1260	
Formalin	30	8	1260	Pre-soaking
Ethanol	30	8	420	Rinsing
Prowave	30	8	420	
Prowave2	30	8	630	
Isopropanol	30	8	630	
Isoparopanol2	30	8	630	
Isopropanol3	30	8	630	
JFC	30	8	630	
Xylene	30	8	630	
Isoparaffin		8	630	

4.2. Reagents replacement procedure

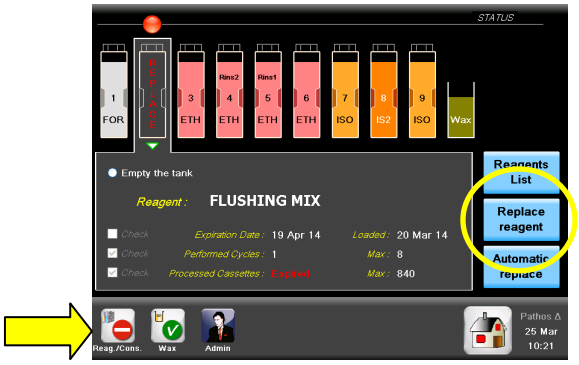
Handle with care and store in a cold dry space using a tightly closed container.
Vapors may collect in empty containers. Treat empty containers as hazardous.
Waste material should be disposed of in an approved incinerator or in a designated landfill site, in compliance with all federal, provincial and local government regulation.
Some reagents can have potential health effects and cause environmental pollution if not correctly disposed. For further information please refer to the MSDS (Material Data Safety Sheet) provided by your supplier.

4.2.1. Manual reagent replacement

See chapter 8.1 for purity grade of reagents.

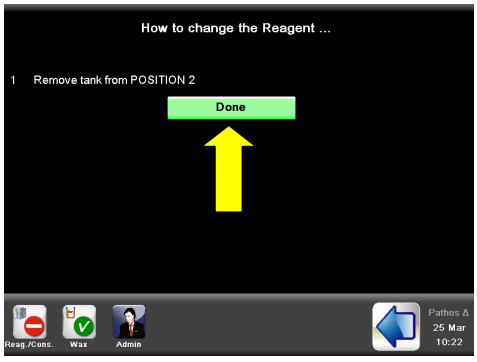
CASE A: When a reagent NOT used for rinsing has expired its reuse life (in this example: number of processed cassettes), a RED symbol appears over the corresponding tank and the word “REPLACE” blinks in red. The reagents STATUS ICON also turns from green to RED (figure below, arrow).

1) Select the reagent **EXPIRED** (in this case Flushing MIX) and press the “**Replace reagent**” button (see the circle, figure below).

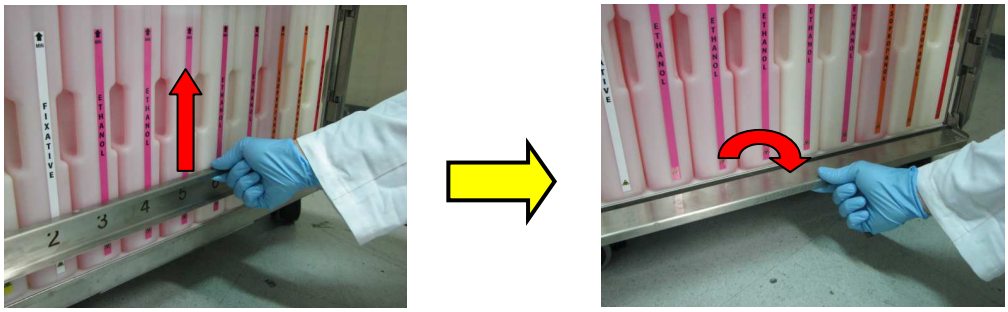


Before starting the procedure, a message reminds that this operation will reset reagent management count to zero. Press “Yes” to confirm.

2) The screen below appears, showing the reagent replacement procedure. Follow the procedure displayed on the screen.

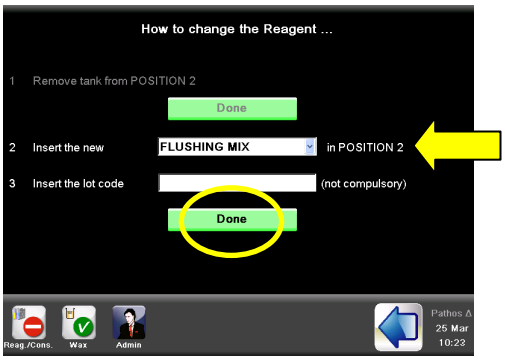


3) Open the tanks lower door where the processing tanks are positioned (figure below), raise the TANKS POSITIONING BAR and pull back to horizontal position.
4) Remove the tank from the position indicated by the software (number 2 in this case) and press “**Done**” to confirm (figure above, arrow).



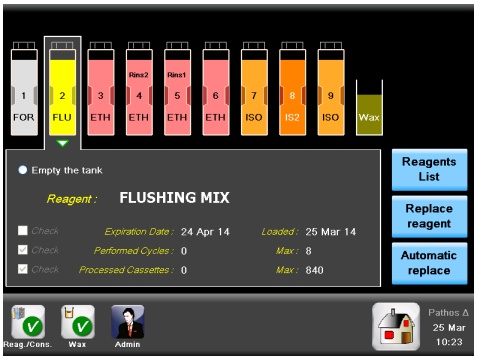
Drain the reagent expired in an appropriate container. Handle with care and store in a cool dry space using a tightly closed container.

5) Insert a tank containing fresh reagent (Flushing MIX in this case) in the position indicated by the software (number 2 in this case). The software, as a default, suggests filling with the same reagent already loaded into the tank. To load a different reagent, select it from the drop-down menu (figure below, arrow), press "**Done**" to confirm (circle) and return directly to the Reagent configuration screen.



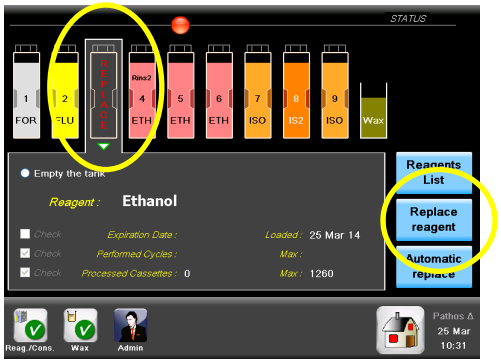
6) Lift the TANKS POSITIONING BAR up and push it into vertical position. Close the TANKS LOWER DOORS. The software automatically saves all the settings.

7) On completion of the replacement operation, the software RESETS the reagent management count to zero and the LOADING DATE automatically updates to the current date. The reagents STATUS ICON also turns from red to GREEN



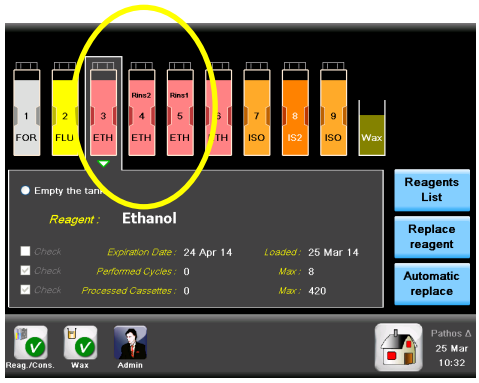
CASE B: When a reagent USED ALSO for rinsing (in this case Ethanol – tank 5) has expired its reuse life (in this example the number of processed cassettes) a RED symbol appears over the ETHANOL reagent (tank 5) BUT the word "Replace" blinks in red over the RINSING 1 reagent (tank 3) that is not expired.

1) Select the RINSING 1 reagent and press the "**Replace reagent**" button.



2) Follow the procedure how to replace the reagent described above, at points 2,3,4,5 and 6 for CASE A.

3) After the replacement, the software resets the reagent management count to zero and renames the old RINSING1 reagent as new DEHYDRATION reagent (figure below). The software renames the other tanks containing the reagent used also for rinsing as Rinsing 1 reagent and Rinsing 2 reagent, according to the number of cassettes already processed (the example below shows the old dehydration reagent renamed as Rinsing 1).



This procedure has been conceived to increase shelf life of Ethanol allowing more use as Rinsing despite the expiration as dehydration reagent.

4.2.2. Automatic reagent replacement

The automatic reagent exchange is used instead of the manual procedure (described in the previous chapter) to conveniently exchange reagents expired without extracting the reagents tanks. See the chapter 4.2.1 to check the REAGENT STATUS.
See chapter 8.1 for purity grade of reagents.

- Select "**Reagents**" from the MAIN FUNCTIONS screen, then "**Reagents/consumables**" (see the circles below). Alternatively press directly the "**Reagents status icon**" on the STATUS BAR of the HOME PAGE, indicated by the arrow below.

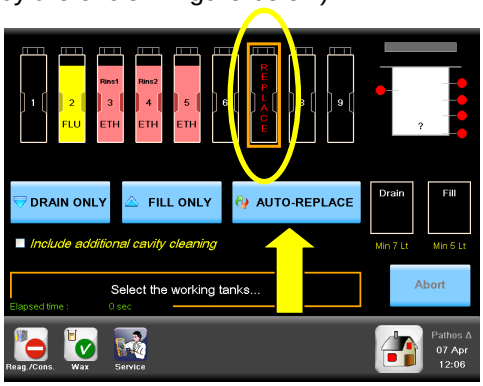
The Automatic reagent exchange screen appears.

Plug the RAPID INSERTS with the tubes (provided with the unit) into the UNIT CONNECTORS (red circle) and insert the TUBES into the reagent TANKS.

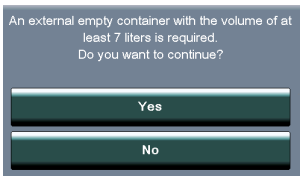
Plug the RED tube into the RED unit connector (OUTLET), then into an empty tank.
Plug the GREEN tube into the GREEN unit connector (INLET), then into the full reagent tank.

Do not load the cassettes rack onto the Pathos Delta arm during reagent loading/unloading phase.

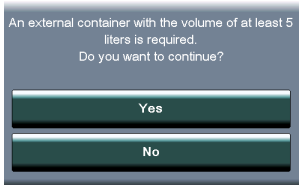
1) Select the tank containing the EXPIRED reagent (in this case number 7, Isopropanol: the outline will be colored orange, as indicated by the circle in figure below).



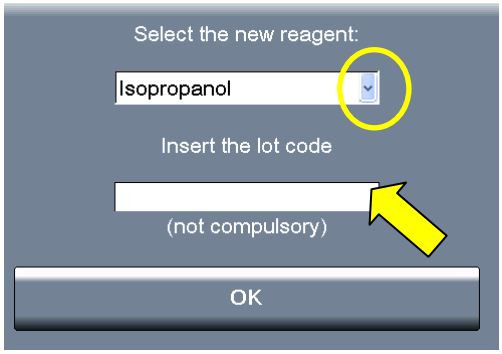
Select “AUTO-REPLACE”: the screen below appears (see the arrow in previous figure).
The following message appears. The volume of expired reagent to be unloaded into the external tank is approximately 6L (1.6 US gal) (in case of manual load). Please provide a 7L empty tank (1.86 US gal) to unload the expired reagent in safety conditions, then select “Yes”.



The screen below appears.
The volume of new reagent to be loaded into the tank must be at least 5l (1.33 US gal). Please provide a 5l tank (1.33 US gal) to load, then select “Yes”.



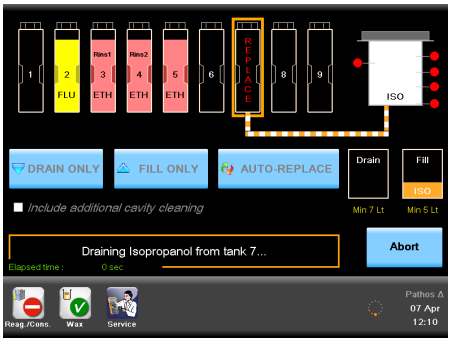
The following screen appears. Select the reagent in the drop-down menu (see the circle in figure below).



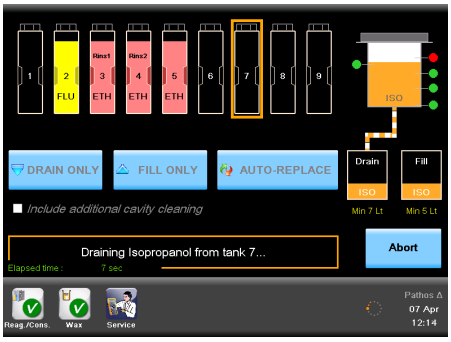
It is possible to insert the REAGENT LOT (indicated by the arrow in the previous figure). This function is not compulsory. If a bar code reader is connected to Pathos Delta, code can be automatically read. If not, press the field window, a keyboard appears to allow entry of the LOT number, as explained in the chapter 2.14.1.

The auto-replacement procedure is composed by 4 steps:

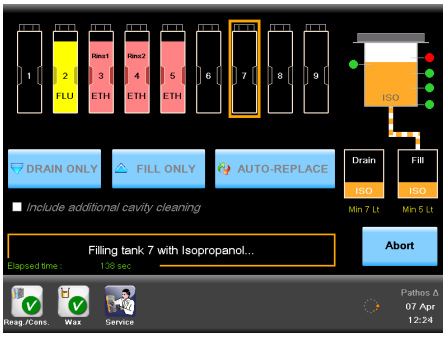
1) the expired reagent in the Pathos Delta tank is loaded into the main cavity,



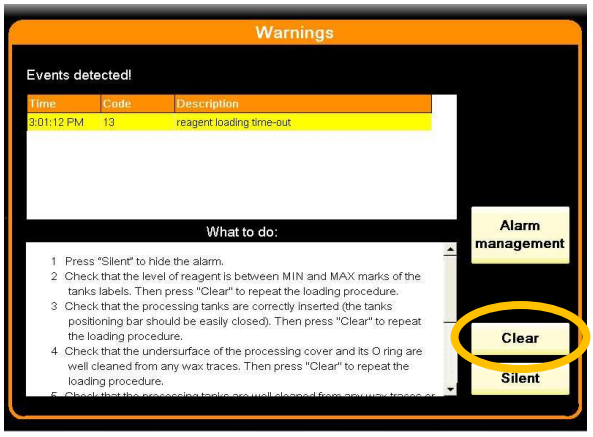
2) the expired reagent is unloaded from the main cavity to the external empty container by the red tube connected to the unit,



3) the fresh reagent is loaded from the new external tank to the main cavity.



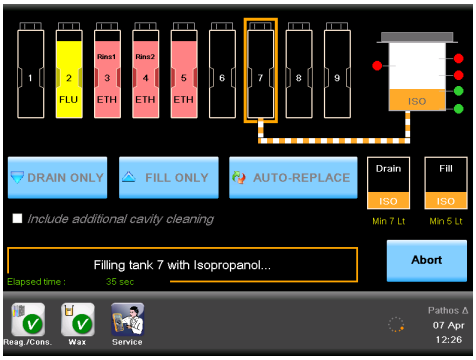
The Pathos Delta is programmed to load at least 5 liters of reagent to be stored in the tanks. If less than 5 liters are transferred, an alarm showed below warns that reagent is insufficient to complete the transfer process, as explained in the chapter 2.14.2.



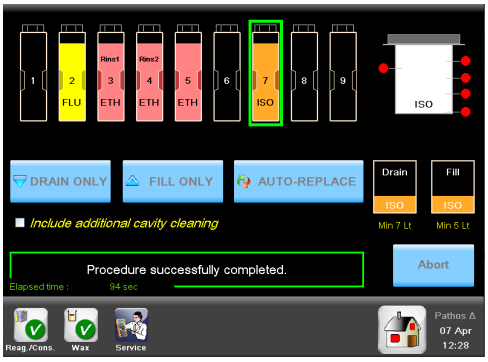
In this case it is possible to:

- Reposition the tube into the tank to load all the residual reagent from the new reagent tank and press "**Clear**" the alarm (see the circle in figure above). The unit restarts loading and completes the loading step.
- Remove the tank, insert a second tank with fresh reagent and press "**Clear**" the alarm. The unit starts a second reagent loading and will complete the loading step.

4) The fresh reagent is unloaded from the main cavity to the Pathos Delta tank.



When the procedure is over, a sound is emitted, the tank is set up as full and fresh (in this example tank number 7) and its outline will be colored green, as shown below.

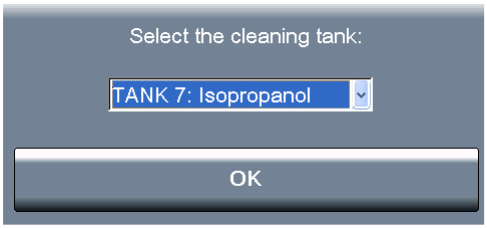


On completion of the exchanging procedure, remove the tubes from the EXTERNAL TANKS and drain the reagent expired in an appropriate container. Handle with care and store in a cold dry space using a tightly closed container.

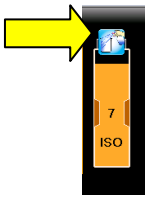
It is possible to run a cavity cleaning cycle after the exchanging procedure, as explained below.

Before running the Automatic replacement procedure, check the box "**Include additional cavity cleaning**", as shown below.

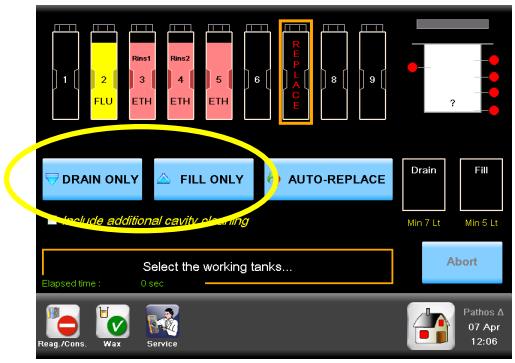
In this case, it is necessary to choose the tank with appropriate cleaning reagent. So when you press "**AUTO-REPLACE**", the first screen that appears is shown below. Select the cleaning tank by the drop-box menu and press "ok", then the procedure will continue as explained above in this chapter where the reagent "Isopropanol" has been replaced.



When the cleaning reagent has been chosen, a little icon appears up to the tank. In the example below the tank 7 "Isopropanol" is chosen.

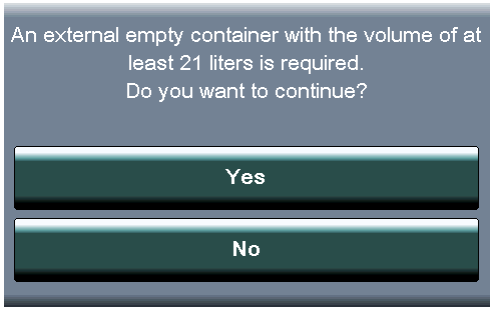


It is also possible to only load/unload reagent from the tanks by selecting "**DRAIN ONLY**" (to unload reagent) or "**FILL ONLY**" (to load reagent) respectively.

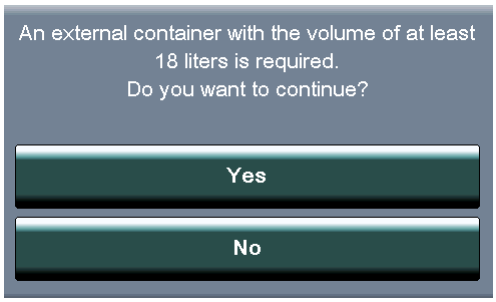


It is also possible to load/unload the same reagent to/from more than one thank at the same time (Ex Ethanol to/from tank 3-4-5) at the same time. The procedure is the same of that one described above for one tank.

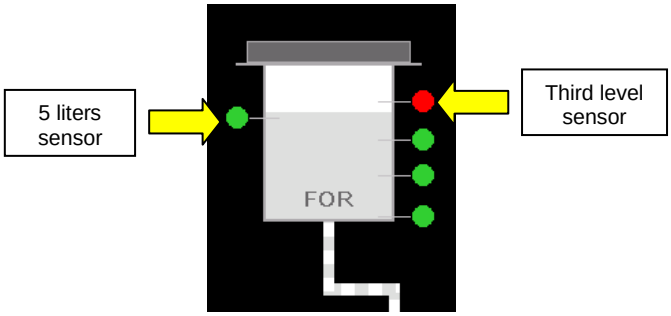
The system warns to make available an external empty tank with a suitable capacity (at least 7 liters capacity for each tank), to host all the reagent to be downloaded. In the example, capacity 21 liters to download N. 3 tanks of 7 liters each.



The system warns to make available an external container with fresh reagent, at least 6 liters for each tank. In the example, capacity 18 liters to load N. 3 tanks.



When selecting functions "AUTO-REPLACE" or "FILL ONLY" for 1 tank, only 5 liters are required to load the tank because the loading procedures ends if minimum the "5 liters sensor" is covered. Differently, when selecting more tanks together, it is required to have available 6 liters for each tank (not 5 liters) because when more than 5liters are available, the system loads in the main cavity a quantity of reagent up to the third level sensor, that is upper than the 5 liters sensor and so 6 liters is required for the replacement of each tank.

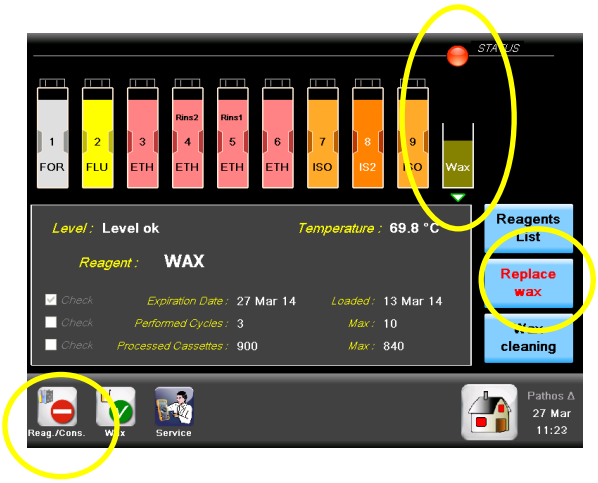


4.3. Wax Maintenance

When wax needs to be changed because it is heavily contaminated, dirty or smells of alcohols that a "wax cleaning cycle" (chapter 7.4.1).cannot eliminate, the replacement operation is possible as explained below in this chapter.

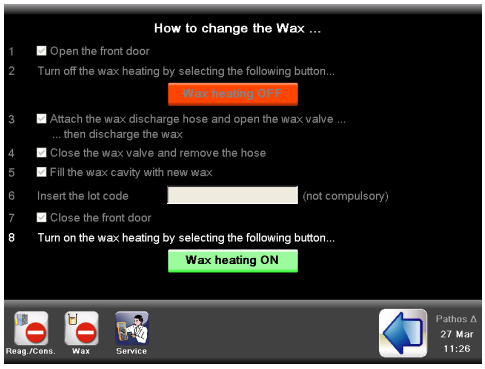
By default WAX reuse life is checked by number of days (maximum 14 days).

1) If wax expired its reuse life, a RED icon appears over the Wax Cavity (REAGENT CONFIGURATION screen), the "**Reag/Cons**" icon becomes red and the word "TO REPLACE" blinks in RED. Select the WAX CAVITY and press "**Replace Wax**" button that has started to blinks in red.



A message warns that this operation will reset wax management count to zero. Press "**Yes**" to confirm.

2) The screen below appears, showing the WAX replacement procedure. Follow the procedure displayed on the screen.



HOW TO OPERATE:

- Press the grey spring-lock to open the left front panel.
- Lock the tube on the unit as shown in figure and place the other end of the hose into a wax waste container, then turn the lever down to open.

The drainage system is heated in order to avoid wax blockage.

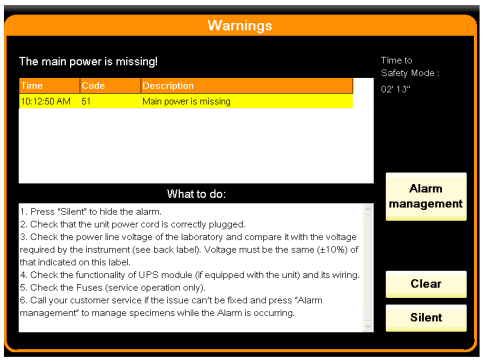
- When draining is completed, raise the lever to close the drainage.
- Wipe the retort from any residual wax, if necessary.
- Reload wax retort with either molten or solid wax (about 4kg) just above the lower level wax sensor, on the left side of the retort (MIN mark).
- On completion of the replacement operation, the software resets Wax management count to zero and the loading date automatically updates to current date.
- Wait until the new solid wax loaded has melted. If molten wax has been loaded, the Wax status icon becomes yellow. Check the wax status (fully molten) and press "Set as ready" button, as indicated in chapter 2.13.

5. POWER FAILURE MANAGEMENT

5.1. External Power Supply

The Pathos Delta can be equipped with an external UPS system, as described in the chapter 2.5.4, so that, in case of power failure, the software can put the specimens rack in “Safe mode”.

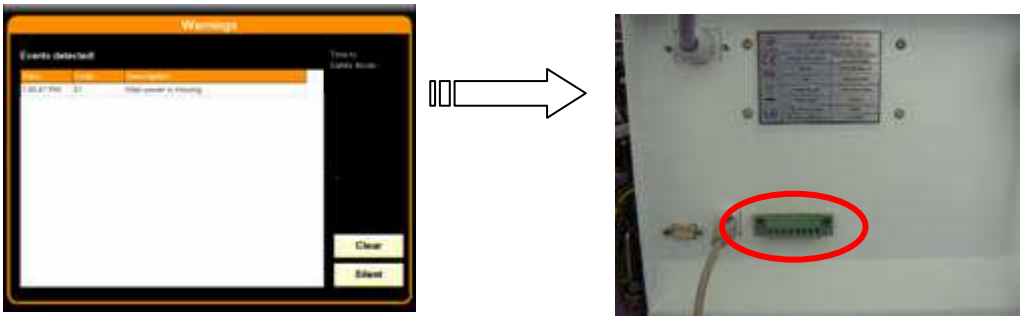
In case of power failure during any processing phase, the program turns to Pause mode and the following screen appears:



The MAIN POWER FAILURE ALARM is audible for **3 minutes** with an intermittent audio signal. The insulation of the cavities assures that the reagent loaded and the wax are kept warm during this period.

During the 3 minutes COUNTDOWN…

An auxiliary connector exit on the back of the unit is activated: here it is possible to connect an external light/sound alarm or a beeper to call the hospital service assistance to remove the specimens rack from the Pathos.



Should the main power supply turn on during the 3 minutes of Main Power Failure alarm mode, the program will automatically re-start from the point it was interrupted.

If you press “Alarm management”, the Appendix C.1 is displayed that gives you important information on how to manage the specimens while an alarm is occurring.

5.2. What happens during power failure?

In case of power failure, these functions are interrupted:

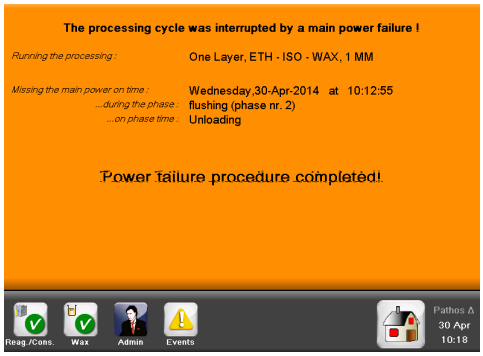
- Microwaves emission
- Wax heating
- Tissue processing

The terminal and the built-in stirrers remain operative in order to put the samples in the “safety position”.

The Terminal Computer remains active during the countdown, but:

- o If during this time the main power comes back on, the system will restart from the point the program stopped;
- o Instead, if the system goes in “Power failure procedure” at the end of the countdown (3 minutes), at the next start up the system will advise you of what happened, showing the details of the step where the program stopped, thus allowing, through a STEP START program, to end the interrupted program.

When the power supply comes back on after a power failure, the system will automatically reboot and the following screen appears.



The screen reports to the operator that a power failure occurred, with following details:

a) Processing Cycle - protocol name and size

b) Date and Time - when the program stopped

c) Phase step

d) Phase time

Press the HOME button in the previous screen. The operator is then able to UNLOAD THE CASSETTES and SAVE THE PROCESSING or CONTINUE the processing by step starting, according to the indications of the last step performed by the unit prior to power failure.

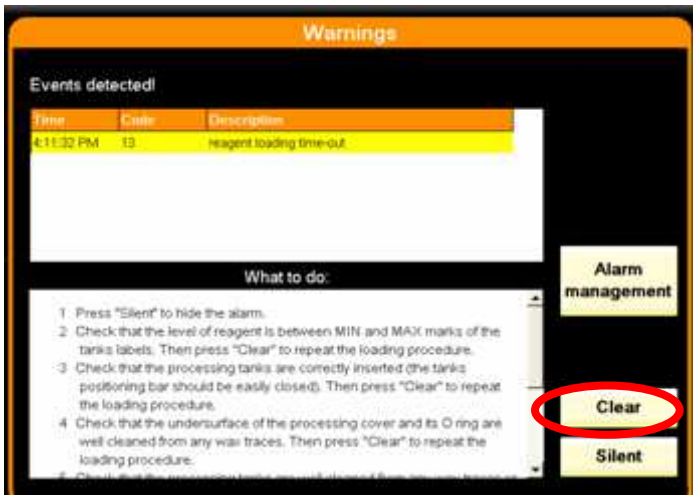
In case of power failure during the wax impregnation, the rack cannot be unloaded until the wax heating time is completed (by default 100 minutes melting time). The specimens are safe anyway in the solid wax, so there is no risk of damage if they are not removed.

AFTER THE 3 MINUTES WITHOUT POWER, WITH UPS
The system automatically puts the specimens rack in “Safe mode”, according to the following schedule:

PHASE	CONDITION	POWER FAILURE PROCEDURE PHASE1	POWER FAILURE PROCEDURE PHASE2	POWER FAILURE PROCEDURE PHASE3
• Fixation • Flushing • Rinsing1/2 • Dehydration • Clearing	LOADING	FINISH LOADING	N.A.	N.A.
• Fixation • Flushing • Rinsing1/2 • Dehydration • Clearing • Wax • Cleaning WAX	PHASE RUNNING	STOP THE PHASE	N.A.	N.A.
• Fixation	UNLOADING THE SOLUTION	FINISH UNLOADING	LOADING SAME REAGENT	N.A.
• Flushing • Rinsing1/2 • Dehydration • Clearing	UNLOADING THE SOLUTION	IF NEXT PHASE EXISTS AND IS NOT VAPORIZATION OR WAX IF NEXT PHASE EXISTS AND IS VAPORIZATION OR WAX	FINISH UNLOADING FINISH UNLOADING	LOADING NEXT REAGENT MOVING THE RACK IN WAX CAVITY
• VAPORIZATION	PHASE RUNNING	MOVING THE RACK IN WAX CAVITY		

6. LOADING TIME OUT MANAGEMENT

In case of reagent LOADING TIME OUT during processing, if a processing tank is empty or if the reagent quantity isn't enough to cover the appropriate level sensor, the program turns to PAUSE MODE and the following screen appears:



The LOADING TIME-OUT ALARM is audible for **30 minutes** with an intermittent audio signal. During this period the reagent loaded (if any) will be kept into the cavity.

During the 30 minutes COUNTDOWN…

If the operator is in the Laboratory during this phase, he can CLEAR the audio alarm (red circle) and ABORT the processing to unload the rack with specimens from the unit (see chapter 3.3 for details).

Check that the reagent level of the processing tank isn't below the **MIN** level and eventually fill the tank with new reagent (see chapter 2.14 for details). Only maintaining the reagents level between the level markings assures the coverage of all the three cassette layers of the rack.

After this check, the operator can continue the processing with the STEP START function, starting from the phase not executed (see chapter 3.2.3 for details).

If you press "Alarm management", the Appendix C.1 is displayed that gives you important information on how to manage specimens when an alarm is occurring.

6.1. Safety mode procedure (after 30 minutes)

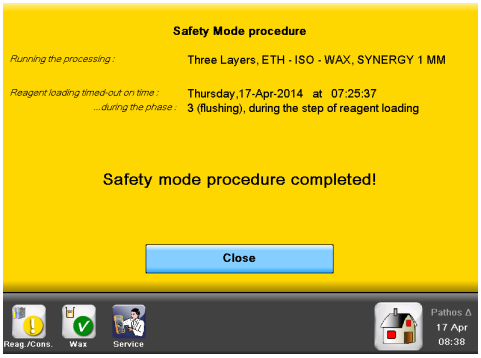
If Reagent Loading Time-Out occurs during overnight processing, when generally nobody is in the Laboratory, after 30 minutes the system starts the Safety mode procedure and automatically puts the specimens rack in "safe mode" according to the following points:

- In case of reagent loading time-out, the unit (after 30 minutes) will enter in SAFETY MODE procedure, unloading the reagent (if any) and loading the previous reagent of the Protocol used. The previous reagent and its fumes prevent samples from drying.
- In case of reagent loading time-out of the FIRST reagent of the Protocol used, the reagent movement will be stopped and the rack remains into the retort. The reagent and its fumes prevent samples from drying.

This function assures that samples are kept soaked in the reagent until the arrival of the operator and the software advises what happened and at which stage the process has been stopped.

The screen will display that Safety Mode Procedure has been activated, with following details:

1. Processing Cycle - protocol name and size
2. Date of Loading time-out - when the program stopped
3. Phase loading step



When the operator is back in the Laboratory (generally the next morning), he can "**Close"** the SAFETY MODE PROCEDURE screen, ABORTING the program.
The operator can now continue the processing with the STEP START function, starting from the phase not executed (see chapter 3.2.3 for details).

7. MAINTENANCE

7.1. Introduction

Maintenance of Pathos Delta is carried out at two levels:

The first is at laboratory level: a simple routine maintenance can prevent the likelihood of more serious problems. Minimal routine maintenance is required by laboratory personnel that use Pathos Delta. The following procedure is recommended to ensure optimal performance of Pathos Delta.

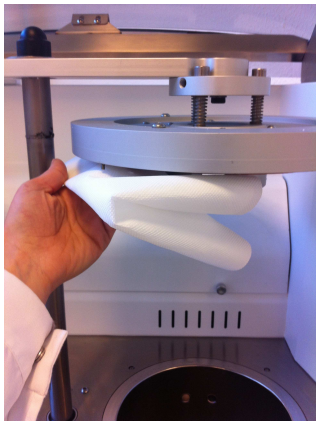
The second level of maintenance is technically more detailed and is beyond the scope of normal laboratory personnel. Preventative maintenance should be performed by an authorized service technician once per year to maintain performance and avoid malfunctions.

Contact annually your local distributor or Milestone offices directly (customersupport@milestonemedsrl.com) how to perform Preventive Maintenance and regular inspections in order to maintain your Pathos Delta within safe operative standards.

7.2. After each run

- Ensure that Pathos Delta is generally kept clean after each use. Do not use abrasives or sharp instruments that may damage the coating etc.
- Ensure that the wax level is between the MIN and the MAX (wax settings screen). For more details see the paragraph 2.13.

- Wipe off the undersurface of the cavities covers and the working area when the cassettes rack is unloaded from the wax.



Traces of solidified wax may interfere with correct closing of the cavity and may result in vacuum error.

- Check the reagent quality through the Reagents status icon "**Reag/Cons**".
- Keep the 4 switches around each cavity cleaned from wax traces.

Incorrect closing of the shield or of the cover can prevent correct operation of the unit.

- Clean as soon as possible the rack (by molten wax) after every processing cycle to completely remove the wax. For more details see the paragraph 7.2.1.

7.2.1. Rack Cleaning Procedure

There are two different ways to correctly clean wax traces away from the Pathos Delta rack after processing:

FIRST WAY:

1. Just after the "samples unloading" from the Pathos Delta, when the rack is still warm, remove cassettes and place the rack into the Rack cleaning container (REF PN 66103).

2. Fill it up with approx. 4 liters of cleaning solution (Isoparaffin or Xylene) enough to cover all the three layers (it should stay immersed minimum 20 minutes).
3. Now agitate the rack by moving it up and down a few times and then allow the rack to sit in the solution until it is completely clean. This may require 1-4 hours.
4. Take the rack out from the container and allow to air dry under a fume hood or dry it using normal laboratory wipes.
5. Alternatively, rinse the rack in an alcoholic solution to remove solvents and allow to dry.
6. Check that the rack is clean and, if required, repeat the sequence as described above.

SECOND WAY (HistosMATE instrument requested):

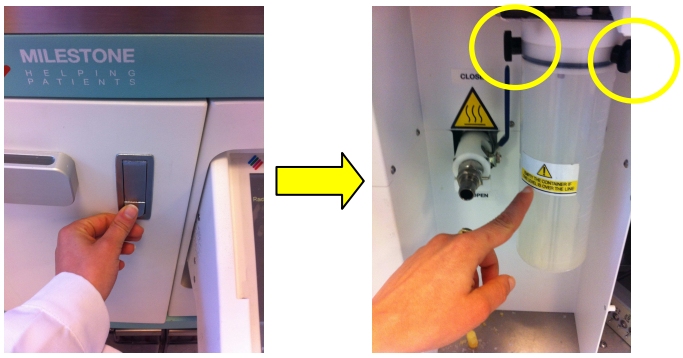
Xylene is NOT allowed when using the HistosMATE.

Milestone has developed an automatic rack cleaner: the HistosMATE.
For further info open our website page www.milestonemedsrl.com or contact our representative in your country.

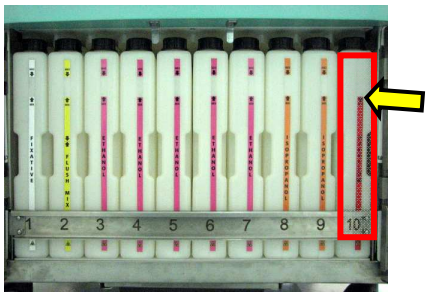
7.3. Weekly

- It's required to check the presence of any residual reagent in the drawer. In this case, empty it: take it out and pour the residual reagent in a dedicated container.

- It's required to check the level of reagents condensed in the condensation trap. Open the frontal door, as shown below. As you can see, the maximum level of liquid is labeled on the condensation trap. When the level is near the limit, remove the thumbscrews securing the cooltrap (indicated by the circles in figure below) and empty any collected fluid. Then reinsert the condensation trap and secure with thumbscrews. Make sure that the condensed liquid does not go over the limit indicated.



- It's also required to check the level of reagent in the Overflow tank (tank number 10). As you can see below, the maximum level of liquid is labeled on the tank (see arrow). When the level is near the limit, empty any collected fluid. Then reinsert the tank. Make sure that the liquid does not go over the limit indicated.



- Clean the level sensors using paper or soft gauze moistened with ethanol

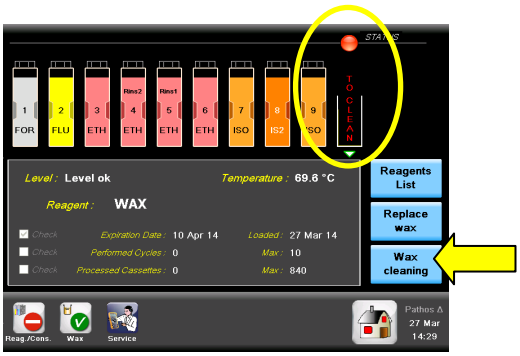
7.4. Twice a week

➢ It's required to clean the wax in order to extend its reuse life and avoid artifacts related to the impregnation step.

It's suggested to clean the wax twice a week in case Pathos Delta is working once a day without sponges. In any other case, like use of sponges or several runs per day, please contact our Application Dept at application@milestonemedsrl.com to get proper instructions.

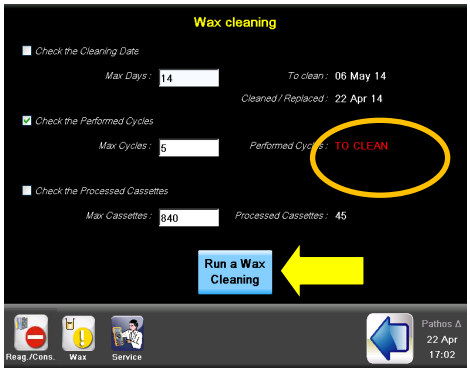
7.4.1. Wax cleaning

When the WAX reuse life for cleaning has expired, a RED icon is shown over the Wax Cavity and the word "TO CLEAN" blinks in red.



The icon "Reag/Cons"  **is red because it is required to clean the wax if not it will not be possible to run a new process.**

Select "**Wax Cleaning**", indicated by the arrow in previous figure.
The following screen appears. In the example below the performed cycles are "5" like the "max cycles" and so the word "TO CLEAN" blinks in red (see the circle in figure below).



REUSE LIFE for cleaning of wax can be defined using the check boxes reported in this screen:

- **Check the cleaning date.** Tick this box to check the wax cleaning date, according to your requirements.
- **Check the performed cycles.** Tick this box to check the maximum number of cycles to be carried out with the wax before cleaning.
- **Check the processed cassettes.** Tick this box to check the maximum number of cassettes to be processed with the wax before cleaning.

By default only "Check the performed cycles" is activated and the maximum number of cycles allowed is 5.

Select "**Run a Wax Cleaning**" icon, indicated by the arrow in the previous figure and the program starts immediately.

It is also possible to select "**Programs**" from the MAIN FUNCTIONS screen and then "**Wax cleaning**" (see the arrow below) to start immediately a wax cleaning program.

When a wax cleaning cycle has been COMPLETED, the wax cleaning values reported in the previous screen (Wax cleaning Configuration screen), as number of cassettes processed and performed cycles and cleaning date will be RESET to zero.

DO NOT load the Pathos Delta rack during the "WAX cleaning procedure"
Wax must be completely replaced (and NOT cleaned) at least once a month, depending on the use of Pathos Delta. See the chapter 4.3 for the wax replacement procedure.

7.5. Every six months

- It is required to clean the processing tanks.

CLEANING PROCEDURE FOR THE PROCESSING TANKS

Reagents Required
Hot Water, Alcohol 100% Denatured or equivalent, Xylene

Purpose of Cleaning
The cleaning procedure is performed on all containers that have potential contamination from various sources such as blood and protein precipitates, fats and wax residues that can interfere with fluid level sensors and interrupt the processing run.

Which Containers to Clean
Recommended for all containers #1 through to #9

Removal of Containers
Open the two front transparent doors of the reagent section, now raise/lower the positioning safety bar.
Remove the desired tanks to be cleaned by pulling the container straight out and remove the container screw cap.
Dispose residual reagent according to lab practices appropriate for that reagent.
Commence cleaning as described below.

Cleaning Procedure for removal of:

- **Salts derived from buffers, protein precipitates and bloods**. Rinse the container with hot water twice: first to remove surface contaminants, and the second to remove residual salts. If they still remain traces of salts, it is recommended to use a commercial product capable of removing residuals, precipitates and calcifications. Then rinse with water followed by alcohol and allow to dry.
- **Deposits of fat**. Rinse twice with hot water, as described in the previous point, do a quick wash with ethanol to remove traces of water, and then a further wash with Xylene (close the container and shake for a few minutes). Dispose of the used Xylene and proceed with two quick rinses in ethanol. Now let the tank dry before reusing.

Reinstalling of containers
Once the containers have been cleaned, reloaded with fresh reagents and the reagent caps firmly screwed on, slide containers into the reagent drawer, raise the safety poisoning bar into position and close the transparent doors.
The enter in “Reagents screen” and reset the regents parameter, as described in the chapter 4.2.1.

The tanks cleaning described above has to be performed every six months when the reagents are exchanged manually. When the Automatic reagent exchange procedure is used, the tanks clenaing should be performed monthly.

7.6. Yearly

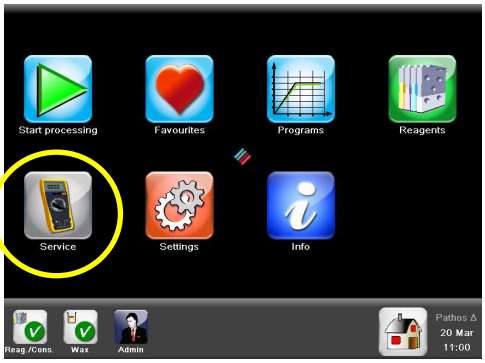
➢ Call your service support for preventive maintenance contract.

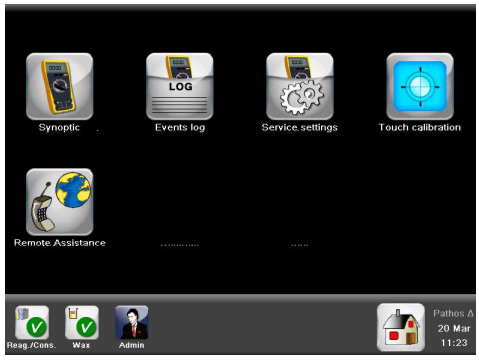
7.7. How to start the Remote Assistance

This procedure explains how to activate the Remote Assistance in case of request by Service Department.

It is necessary to connect Pathos Delta to Internet in order to allow Remote Assistance services (for further details see the chapter 2.16.

In administrator screen, press “**Service**” icon to get Service Screen.





Press “**Remote Assistance**” to start the connection.

At this point remote service works with your instrument. The Remote Assistance will be disabled by remote service.

Do not disconnect nor restart the instrument during the remote connection.

ALWAYS COMMUNICATE THE SERIAL NUMBER (S.N.) OF THE UNIT.
MILESTONE CANNOT CONNECT TO UNIT WITHOUT THE S.N.

THE SERIAL NUMBER IS AVAILABLE IN “INFO” ICON IN MAIN SCREEN.

8. GOOD TISSUE PROCESSING PRACTICE

Specimens

Size

1. Processing times are a direct function of specimens size.
   Milestone factory stored protocols are based on following standardized sizes (for standard cassette of 30x25x5mm):
   - Transplant (<1mm)
   - 1mm (Small biopsy cylinders of about 1mm diameter)
   - 2mm (Biopsy 10 x 5 x 2mm)
   - 3mm (Biopsy 15 x 10 x 3mm)
   - 4mm (Surgical 20 x 25 x 4mm)
   - 5mm (Large 30 x 25 x 5mm)
   - 6mm (Large 30 x 25 x 6mm)

2. As a general rule, user must take in consideration that each additional 1mm thickness will require about 1 hour processing. (for example: 1mm takes 1 hour; 2mm takes 2 hours etc..)
3. Universal biopsy cassette can accommodate up to 5mm thick samples. Make sure that the thickness is the one specified for the processing protocol selected.
   Milestone has developed the CheckLITE, a user-friendly, non-contact device that automatically signals with a green light when the specimen is cut at the desired thickness. For further information on CheckLite, contact Milestone srl at medical@milestonesrl.com or your local distributor.

Protocol and Type of specimen

Select the appropriate protocol in relation to the size of specimens to be processed.

1. With Milestone technology, different types of specimens can be simultaneously processed (Kidney, heart, colon, Liver) in the same run. The time at temperature pre-stored protocols are suited for the **most sensitive tissue.**
2. Specimens with different thickness but all up to 5 mm can be simultaneously run. While the temperature is set for the most sensitive tissue, the processing time is set for the thickest specimen. This means that, if 2, 3, 4 mm thick specimens are to be processed together, the 4mm protocol must be selected.
3. Biopsies of ≤ 1 mm thickness (like renal or gastric biopsies) require separate processing, because of their small size.

Fatty tissues

Fatty tissues are some of the most difficult tissues to process. Milestone has patented a very effective reagent, the JFC solution (Ethanol, Isopropanol and long chain Hydrocarbon) which, in combination with microwaves technology, assures best results. For further information on JFC Solution, contact Milestone srl at medical@milestonesrl.com or your local distributor.

Fixation

Fixation is the all important first step of tissue processing. Tissues that have not been optimally fixed can give bad morphology and processing artifacts.

Before starting the Dehydration/clearing steps, tissue must be properly fixed.
Fixation can be carried out either using formalin or Milestone formalin-free FineFIX solution.
For further information on FineFix, contact Milestone srl at medical@milestonesrl.com or your local distributor.

Tissue can be fixed overnight at room temperature.
For faster fixation result, Milestone microwave units have a preset protocol.
The Microwave time required for each mm of thickness is of about 10 minutes at 50°C.

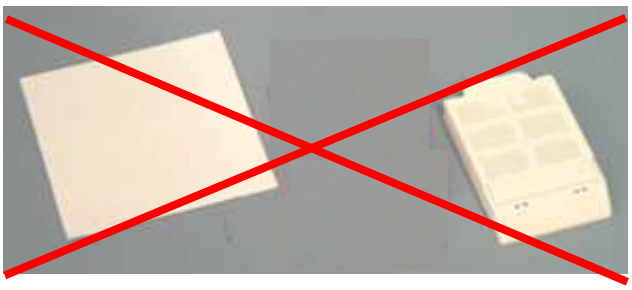
Beware

The use of inserts like **thick paper** or the use of **small mesh cassette** negatively influences the correct flow of the reagent through the cassette. Use only histology papers or cassette with large mesh to allow proper unobstructed flow of reagent.

In case sponges are used, increasing of the Ethanol, JFC, Isopropanol and Wax processing time by half of the preset time is recommended.
Use ONLY Histology sponges.

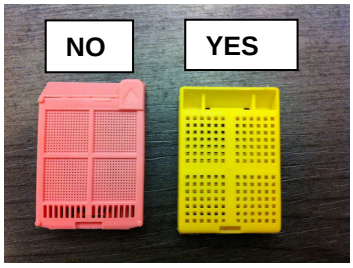
Histology paper – Biopsy large mesh cassette

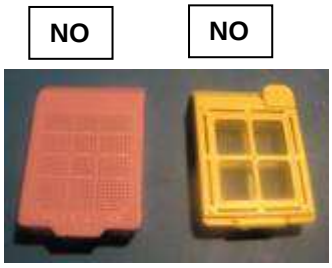
YES



Thick paper – small mesh cassette

NO





The use of **Nylon made** cassettes (like Mesh Cassettes shown in the picture below) in our microwave units must be avoided. For this reason, we suggest you contact your customer/s to advise that the use of Nylon made cassettes in our microwave units must be avoided.

NO

If the Laboratory is already using particular kind of cassettes, please contact either our application support: application@milestonemedsrl.com with details of the type of cassettes utilized, so that we can check whether they are suitable to be used in our microwave units.

Reagents

Alcoholic reagents loaded must be 99% reagent grade.

Make sure to follow the software reagents' reuse settings. Check them daily to minimize inconsistent results.

Purity of reagents:

1. When the water concentration in the reagents is more than 3% volume, a progressive loss of dehydrating effect takes place. This problem can be caused by an overshooting limit of "maximum number of cassette to process" or "Max number of processing cycle to use" for the respective reagents.

2. Insufficient cleaning of the rack after processing can contaminate reagents with traces of paraffin.

Wax can be reused several times because is left uncontaminated after every protocol.
Make sure to follow the software Wax' reuse settings.

Be sure to run the wax cleaning cycle at least weekly. However if the wax is dirty or contaminated by reagents (alcohol smell), it must be replaced.

Milestone has collected some cause/effect scenarios that affect tissue quality:

8.1. Microwave alcohols quality

Introduction

The purpose of this document is to recommend procedures to overcome issues associated with inconsistency of microwave tissue processing brought about by water contamination of the microwave ethanol, at a few laboratory sites, employing SPONGE BIOPSY PADS.

Background

Feedback from laboratory sites employing a combination of tissue cassettes, with and without sponge biopsy pads, showed that the processing artifacts are a result of water contamination of the microwave ethanol step. Sponge biopsy pad cassettes have the effect of retaining more fluid (formalin) than without sponges and therefore easily raising the water levels in the subsequent alcohol steps.

A secondary effect of sponge use is that retention of fluid occurs for other reagents in use and will impact on the process time (under processing) necessitating longer times to remove fluids: in this case, the action would be to select the next longer processing program time available, after the small biopsy program.
The quality of tissue processing results is a reflection of effective fixation and quality of reagents used, whether for conventional or microwave processing, noting that even with conventional processors the last alcohol of the processor must be 100% (reagent grade), to avoid processing artifacts.

Conclusions:

1. Introduction of sponges into cassettes increases retention of formalin may necessitate a reduction of reagents expiration limits.
2. Use the NEXT SIZE up processing time program, when dealing with sponges present in cassettes, to avoid under processing.
3. If the first phase of the process in Pathos Delta is alcohol and not formalin, introduce an extra (third) sequential Rinsing Alcohol (100% Reagent Grade):- as a first rinse in the grossing room, for accumulating wet tissue cassettes containing sponge biopsy pads for processing.

8.1.1. Tissue processing selection guidelines

Ethanol - Isopropanol - Wax

1. Ethanol-Isopropanol recommended as the standard routine method for small to medium-large size biopsies.
2. Fat content of the tissue is kept to a minimum (< 4mm thickness).
3. Very Cost effective for general tissue-processing.
4. Strongly recommended for processing of Renal/Gastric, breast core biopsies and equivalent tissue size.

JFC – Isopropanol - Wax

1. JFC - ISO sequence is strongly recommended for high fat content such as Breast / Lipoma up to full size cassette in less than 4 hours.

PROWAVE - Wax

1. PROWAVE is a “one step” dehydration and clearing solution.
2. Ideally suited for non-fatty tissues (up to 5 mm thick) or moderate lipid content tissues (up to 2 mm thick).

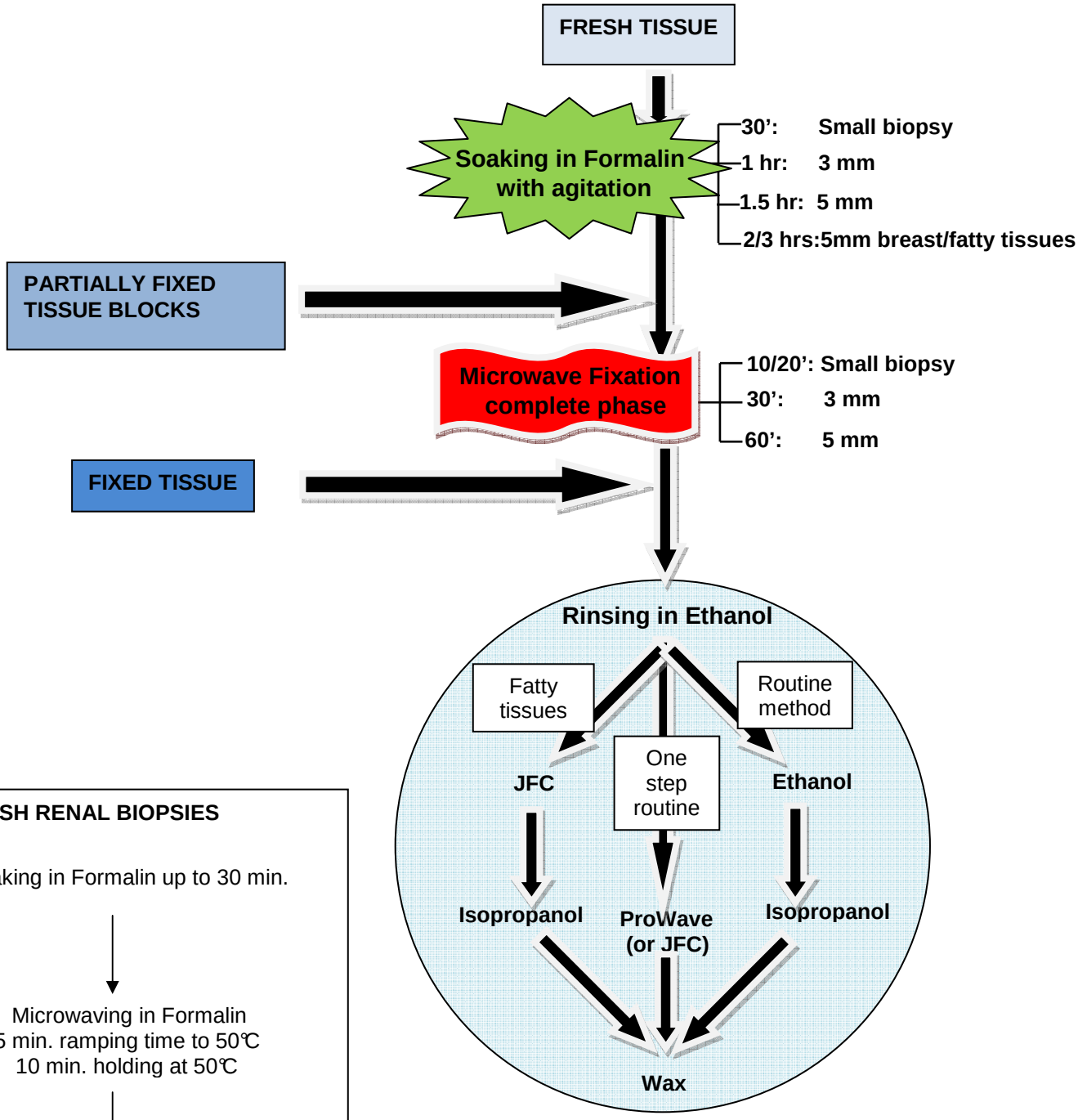
Ethanol - JFC - Wax

1. Ethanol–JFC for tissues where overnight fixation of tissue is uncertain and or partially fixed tissues.
2. Ethanol acts as a secondary fixative step since JFC is not a fixative.
3. Especially suited for routine use and for very fatty tissues admixed with normal parenchyma.
4. Ethanol step will extend the reuse life of the JFC.

JFC - Wax

1. JFC solution is strongly recommended for tissues known to be well fixed, generally at least overnight.
2. Ideally suited for tissues containing a high lipid content, e.g. skin and brain admixed with normal parenchyma.

TISSUE PROCESSING SELECTION GUIDELINES



FRESH RENAL BIOPSIES

Soaking in Formalin up to 30 min.

↓

Microwaving in Formalin
5 min. ramping time to 50℃
10 min. holding at 50℃

↓

Washing in Ethanol 1 min

↓

Ethanol 100% - 10 min total time.

↓

Isopropanol 100% - 10 min total time.

↓

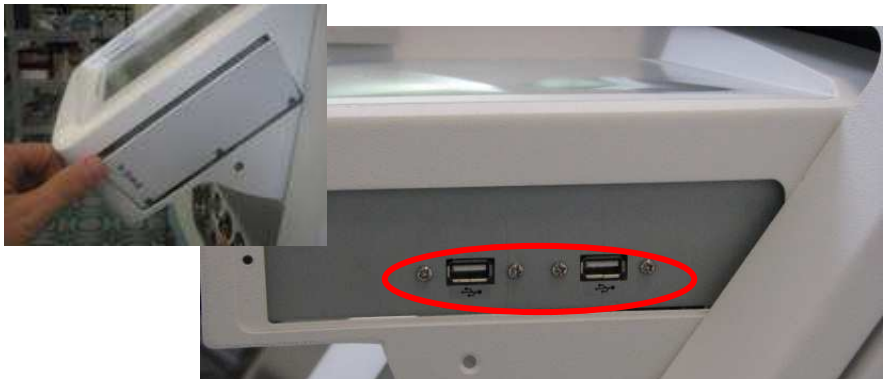
Wax 15-20 min.

9. REPORTING

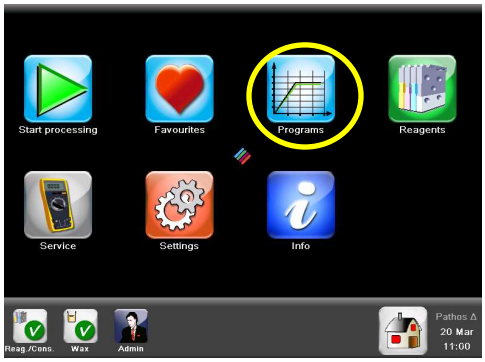
Pathos Delta provides the documentation necessary for the report activity of the Laboratory. In fact it is possible to export a document including all necessary information like the real time and temperature performed by the unit, the reagent management and the Events Logs.

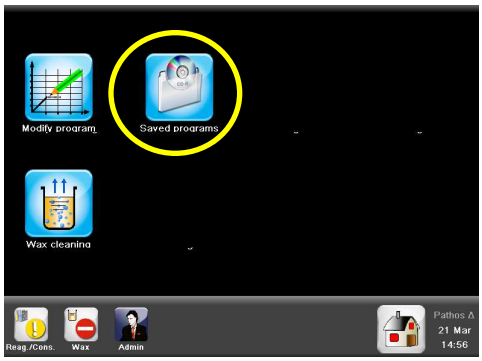
9.1. Export processing reports from the terminal to the USB key

Open the lateral cover and insert the USB memory stick in one of the USB port placed on the right side of the terminal.

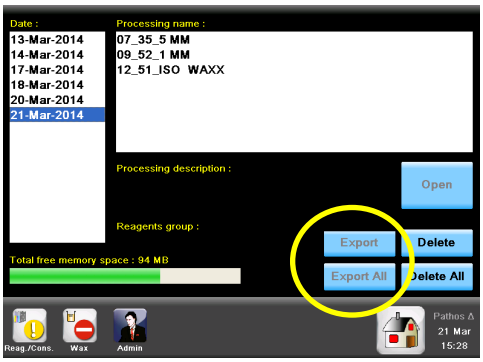


Select "**Programs**" button from the MAIN FUNCTIONS screen and then select "**Saved programs**".





This allows exporting of all the saved processed graphics: select the file/s of interest and press "**Export**" or "**Export All**" to copy the whole Hard Disk content.



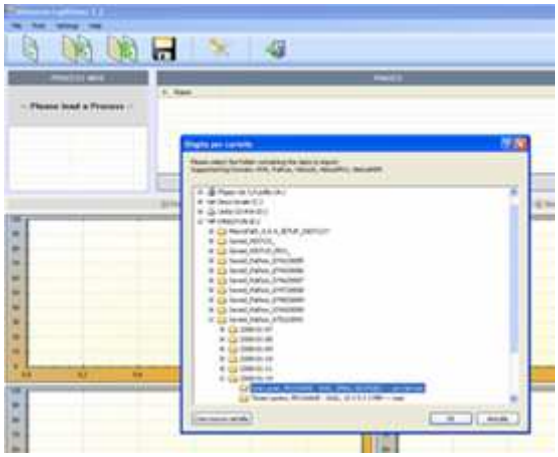
Alternatively choose "**Delete**" or "**Delete All**" if you want to definitely eliminate one file only or every file saved, respectively.

9.2. Install the Log Viewer

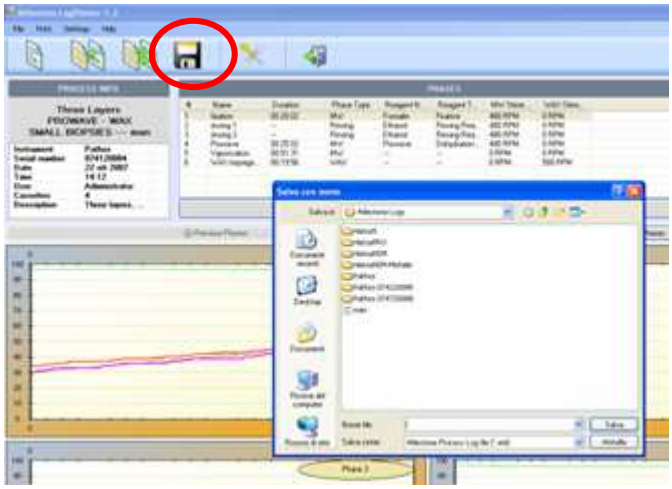
The USB key stick provided contains the **LogViewer folder**, double click on the "**Setup.exe**" icon to install the program, then double click on the "**ReportViewerSP1Eng.exe**" icon in the LogViewer folder to install the printing data program. The LogViewer software is now ready to work.

9.3. From Pathos Delta to the PC

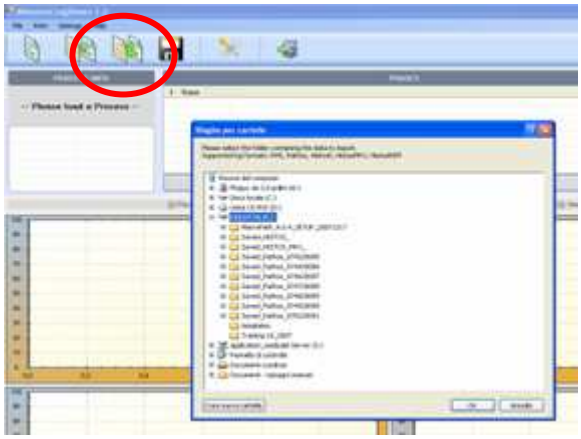
- Plug the USB memory stick on the terminal where all processes are stored and copy them on the key, as described in Chapter 9.1.
- Open the LogViewer software (going to "Start Menu\All programs\Milestone srl\Milestone LogViewer" or clicking on the "LogViewer" icon created on your desktop).
- Plug the USB key in your PC and select "**Import single log**" icon to import a single process.



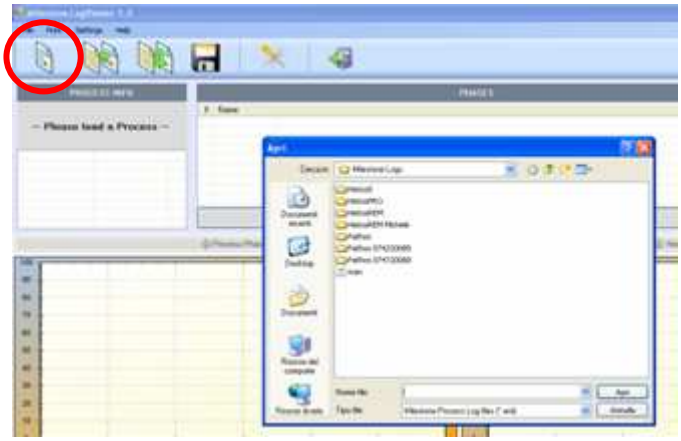
- To store the process, select "**Save as**" icon and insert the name of the process. The software creates a Milestone Process Log File (*.xml) into the "…\Documents\Milestone Logs" folder. This folder is automatically created by the LogViewer software on your PC Hard Disk Drive.



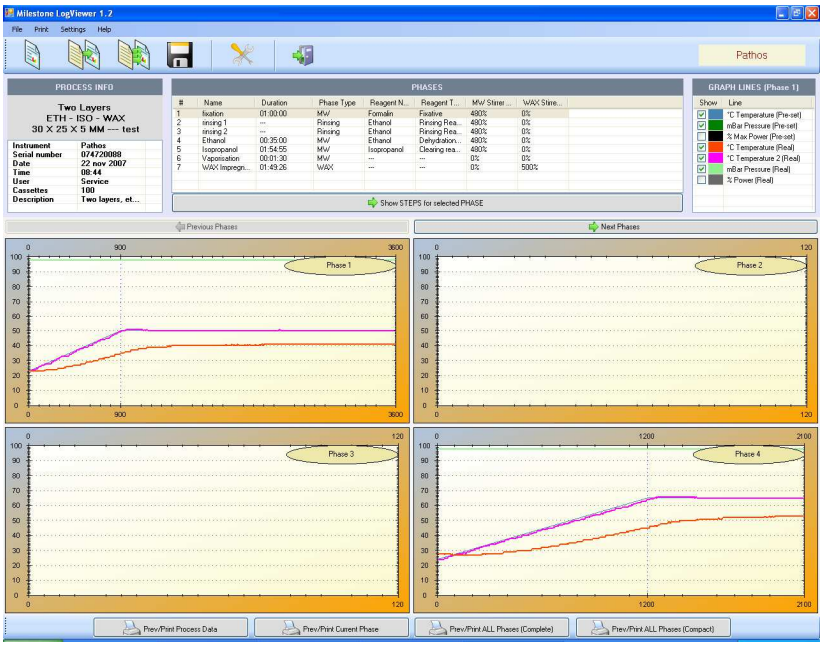
- To import multiple processes, select "**Import multiple logs**" icon and choose the folder containing all the processes. Using this function the software automatically stores all the processes into the "**Milestone Logs**" folder.



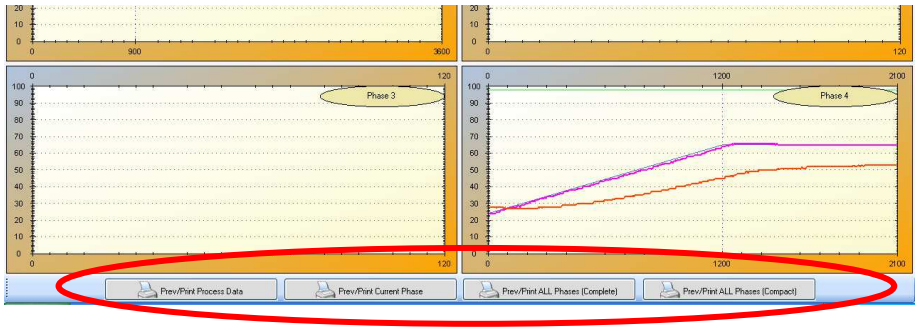
- Select “**Open**” icon to view the file of interest already stored on the PC Hard Disk Drive.



- The processing curves will be shown like in the picture below. Click directly on a curve to enlarge it or on the arrows to view next phases. The fields describe data of interest such as: phases done, starting time, reagent used, number of cassettes, etc…



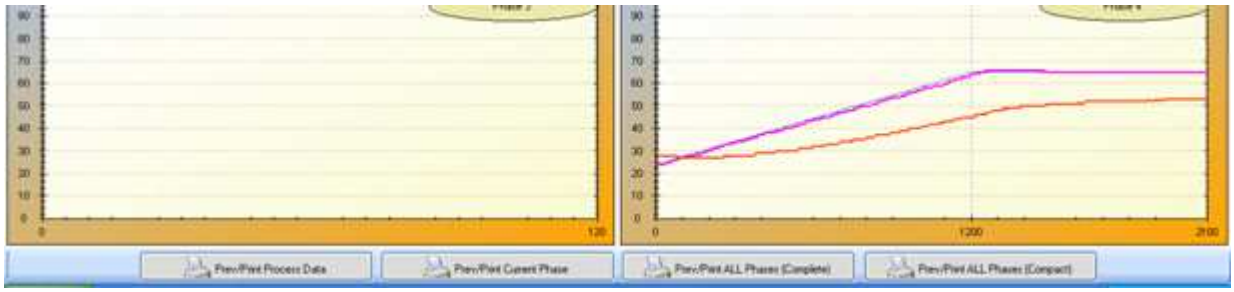
- When the file has been opened, preview/printing of the curves is possible by selecting the appropriate buttons as shown below:



- Printing of Process Data, Current Phase, All Phases in full or compact view is possible by pressing the respective button.

9.4. How to print the process

- Before printing the process, choose "**Printing options**" under "**Settings**" menu and customize the settings, if necessary.
- Modification of the page heading, edit of the label is also possible under "**Printing options**" menu.

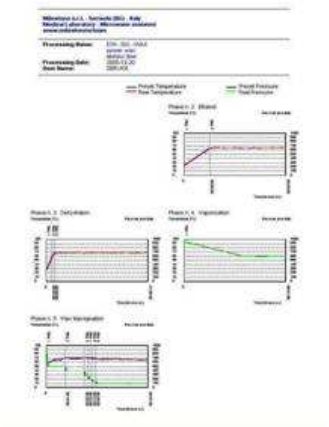


- Select the run to be printed and press:

1) **"Print process data"** to get a printout of all data of that process (one run).

2) **“Print current phase”** to get a print out only of the current phase of the process

3) **“Print all phases”** to get a printout of all phases of the current process, either in a COMPACT (all phases in one pag) or in a COMPLETE (one phase for each page) format.

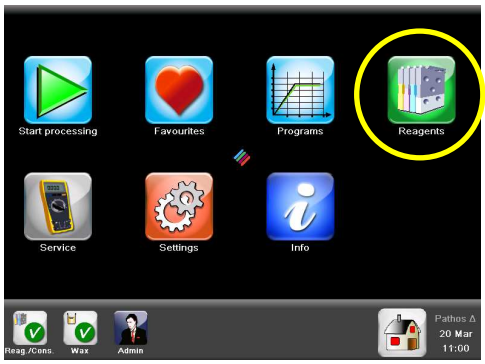


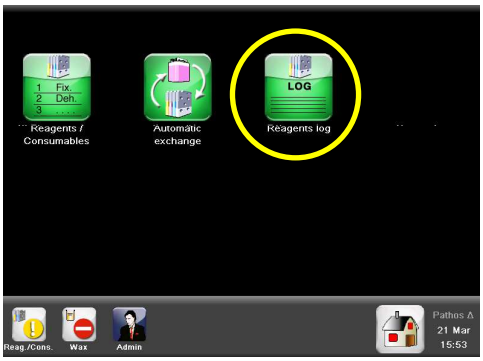
COMPACT FORMAT

COMPLETE FORMAT

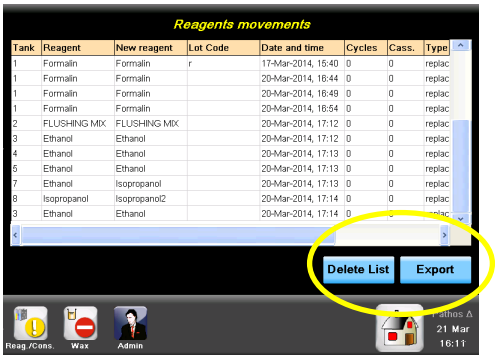
9.5. How to export the reagent log

- Click on “**Reagents**” icon and then “**Reagent Log**”.

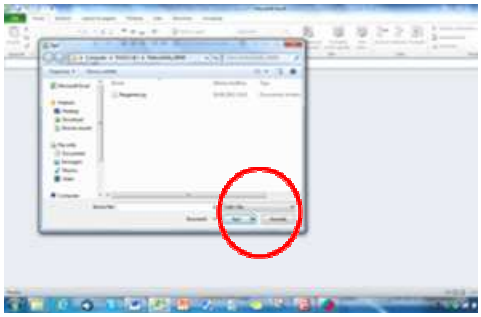




- Open the lateral cover of the terminal and insert a memory stick in one of the USB ports available: the “**Export**” button changes color.
- Select “**Export**” to download the reagents movements list on the USB key.
- Select “**Delete list**” to cancel the list, if required.



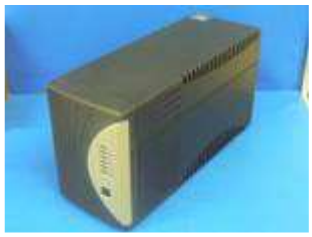
- Reagents movements list is a **.txt** file; it is possible to open it also with Microsoft Excel selecting **“all files”.**
- On completion of copying, exit Reagent Log program and remove the memory stick.



10. PATHOS DELTA OPTIONAL ACCESSORIES

Not included, to be ordered apart:

- Q.ty1 UPS module (REF PN 66100), Option valid only for units at 230V – 50/60Hz.
  The Pathos Delta can be equipped with an external UPS system so that, in case of power failure, the software will put the specimens rack in “Safe mode”, according to the schedule of chapter 5.
  For UPS technical specifications see Chapter 2.5.4.



- Q.ty1 Rack for 24 Supermega Cassettes on 2 layers for Pathos Delta (REF PN 66130).

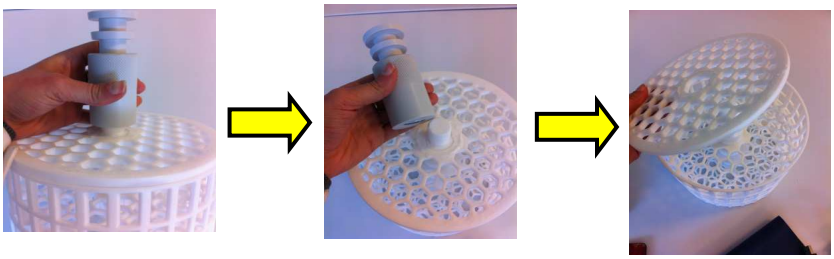
- Q.ty1 Random Basket Rack for 300 standard cassettes (REF PN 66175).

Below are reported the instructions on how to load cassettes into the RB300 rack. It is possible to:

1. load cassettes randomly (less than 100 cassettes per layer) or
2. load cassettes in vertical position up to the complete filling of a layer (100 cassettes per layer), as explained below.

It may be necessary to increase the processing times when using the default programs optimized for the Split rack because the reagent penetration is lower due to the cassettes organization. In this case contact the application department at: application@milestonemedsrl.com.

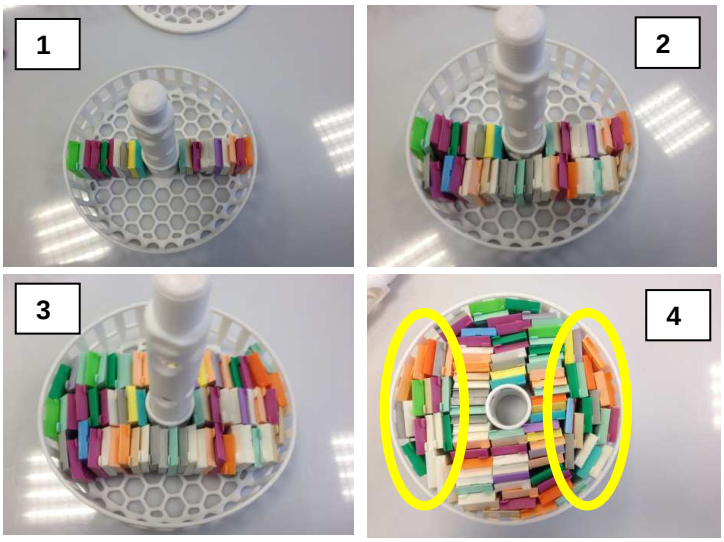
To load cassettes, unscrew the top holder of the rack to separate the three layers, as shown below.



Load the cassettes and then it is required to close it completely before loading into the Pathos Delta. Even in case the cassettes fill only 1 or 2 layers, it is always necessary to work with the total rack (3 layers) to close the rack.

When you select RB300, only 3 layers programs are displayed.

HOW TO LOAD 100 CASSETTES IN ONE LAYER OF THE RB300 RACK.
It is necessary to load cassettes in vertical way to arrive at number 100, they will keep the vertical position by sustaining themselves. Below are reported the 4 steps that shows a simple way to load the cassettes.
STEP 1: start loading 1 line of cassettes into the center of the rack, from one side to the other,
STEP 2: load a second line of cassettes next to the first,
STEP3: load a third line of cassettes next to the other two, always from one side to the other side of the layer,
STEP4: load the two missing lateral halves with vertical cassettes, to complete the loading (see the circles in figure below).



When possible, clean the rack by having the holder top unscrewed to improve the quality.

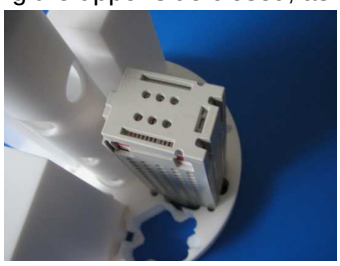
- Q.ty1 Whole Mount Slices Rack WMS: for 9 organ whole slices (up to 10 mm thickness), for Pathos Delta (REF PN 66155).

- Q.ty1 Automatic embedding cassettes rack AEC Rack for 8 magazines (compatible with Autotec) (REF PN 66160).

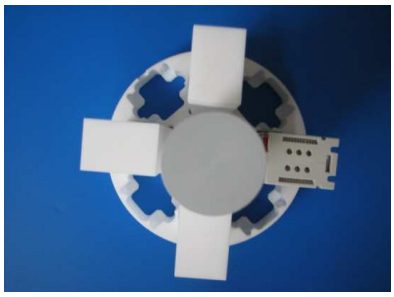
Below are reported the instructions on how to load magazines into the AEC rack.

In the Automatic Embedding Cassettes Rack (AEC) for Pathos Delta it's possible to insert only the 20 cassette Magazine type of Sakura racks and it's possible to enter up to 8 magazines, in total 160 cassettes.

- Enter the magazine vertically, leaving the upper side closed, as shown below.



- If you insert only 1 magazine, enter the three spacers at the opposite sides to balance the structure and to avoid a possible "low reagent" situation in the cavity, as shown below.

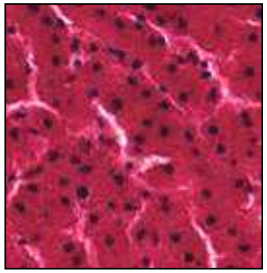


- If you have 2 racks or more (up to 8), enter the magazines starting from the opposite sides and then insert the spacers if you have empty positions.
- If you have 5 magazines or less, remember to insert the three spacers too.
- Start loading cassettes into a new magazine only when the one in use is full.
- After entering the magazines/spacers (starting from the opposites sides), enter the fixing disk on the top. See below.

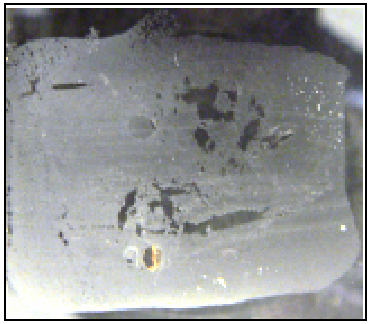
During the cleaning procedure, remove the spacers and the magazines to improve the cleaning.

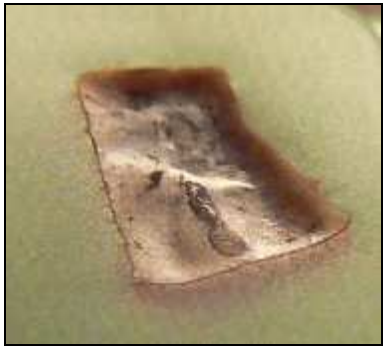
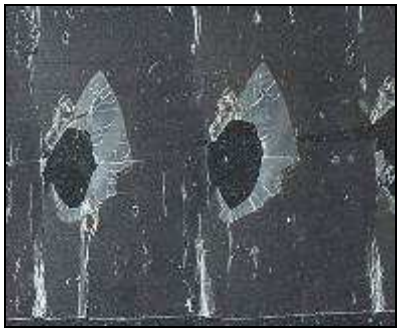
A. Appendix

A.1. MW TISSUE PROCESSING TROUBLESHOOTING GUIDE

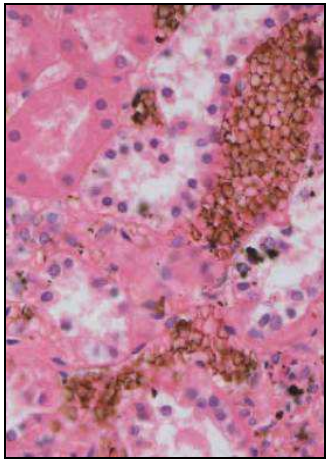
PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
Pyknotic nuclei and severe cytoplasmic distortion of the tissue section. **Poor dehydration.** Tissue sections have the microscopic appearance of pyknotic nuclei and severe cytoplasmic distortion (overheated appearance). Opaque white surface appearance and softness of some areas of the block after the trimming.	  	**1.** Tissue has been poorly fixed and processed exclusively with JFC solution (JFC is NOT a fixative). **2.** Water contamination of microwave ethanol step due to carry over of water from rinsing alcohols or the quality of ethanol in use with microwave is less than 100% (poor dehydration). **3.** Water carry over is increased in rinsing alcohols by the use of sponge biopsy pads (poor dehydration). **4.** For small biopsy samples: inadequate dehydration due to use of paper wraps that restricts the flow of reagents. For larger biopsies: processing time selected is inadequate for dehydration. **5.** Additives used in some commercial formalin fixative preparations interfere with JFC, even though tissues are well fixed in formalin (rare occurrence).	**1.** Tissues to be fixed overnight in formalin, if using JFC exclusively. Introduce an ethanol microwave step to post fix tissues with ethanol, prior to using JFC. **OR** Use Ethanol-Isopropanol processing. **2.** Replace used microwave ethanol with fresh 100% ethanol (pure or reagent grade). **AND** Implement regular checks of ethanol with a Hydrometer, to ensure that microwave ethanol is 100% quality (water free). **3.** Introduce an extra (third) ethanol rinse to ensure sponge pads are well cleansed. **4.** For small biopsies with biopsy wraps: do not use the small biopsy run but instead increase the processing time in the ethanol and Isopropanol to compensate for the wraps restricting reagent flow. **AND** For larger samples sizes: increase the processing time. **5.** Introduce an ethanol microwave step to wash out the contaminants from the tissues, prior to using JFC.

PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
Specimens partially or completely detached from surrounding WAX. Tissue block surface appears to collapse “Dry back” and samples appear partially or completely detached from surrounding WAX when the tissue is observed the next day. Tissue block very difficult to section.	 	**1.** Processing time is inadequate for the tissue size selected, resulting in incomplete dehydration/clearing and WAX impregnation. Tissues that retain any of the solvent will escape by next day, producing this effect, varying according to the size.	**1.** Select the correct processing time, or select longer processing time for the sample size.

PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
Inadequate Clearing of fat. The block face has a “greasy” feeling. Tissue block difficult to section. When section placed on water bath the section breaks up. Softness of some areas of the block after the trimming.	  	**1.** Processing time for tissue is inadequate for the size selected, resulting in incomplete removal of fats, especially from fatty specimen blocks, such as breast. This can be seen when processing the larger blocks, where processing times become more critical to accommodate the larger sizes. **2.** Use of isopropanol as clearing agent for fatty tissues is inefficient for the removal of fats, especially the larger blocks of breast. **3.** Reuse life of dehydration or clearing reagent has been exceeded.	**1.** Select the correct processing time, or select longer processing time for the sample size. **AND** Reduce tissue thickness when preparing wet tissue blocks, if reducing processing times is not desired. **2.** Use JFC as the alternative clearing agent. **AND** Significantly reduce tissue block thickness (50%) as well as increase WAX impregnation time (compromise method, not recommended as it may be impractical to implement routinely). **3.** Replace the dehydration/clearing reagent or reduce the number of times the solution is reused.

PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
Collapse of block upper face after sectioning. Tissue block surface appears to collapse “Dry back” when the tissue is observed the next day. This occurs even though a section of the block have been easily cutted the previous day. Tissue block not difficult to section the same day.	  	**1.** Tissue has been sufficiently dehydrated and cleared (dry tissue) allowing sections to be cut, however WAX impregnation is not entirely complete with residual amounts of the previous solution remaining. Indicated by continued bubbling originating from the tissue blocks in the final stage (near the end) of the WAX program. Does not occur in smaller blocks, but may appear as tissues increase in size. The result is that tissues that retain any of the solvent will escape by next day, producing this effect, varying according to the size.	**1.** Retrospectively increase WAX impregnation time by melting the block down and placing it into molten WAX in a WAX oven for convenience. At least an hour. **AND** Prospectively increase standard WAX impregnation times. Approx. 30 minutes for the longest processing program. For the shorter processing programs approximately 15 minutes increase in WAX time.

PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
White appearance of block face. Tissue block surface looks unprocessed after trimming the block (opaque white surface). Section can be easily cut and when placed on water bath it does not explode. “DRY” feel of block face in unprocessed areas, usually in the centre of the larger blocks.	  	**1.** Tissue has been sufficiently dehydrated and cleared (dry tissue), however WAX impregnation is not complete. Indicated by continued bubbling originating from the tissue blocks in the final step of the WAX program. Can be seen when processing larger blocks, where times become more critical to accommodate the larger sizes.	**1.** Retrospectively increase WAX impregnation time by melting the block down and placing it into molten WAX in a WAX oven for convenience. **AND** Increase standard WAX impregnation times for future processing runs.

PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
Pigment deposits in microscopic section. Microscopic picture shows pigment deposits (black/brown) at sites of hemorrhagic deposits (Blood vessels, Spleen and products of conception).		**1.** Hemorrhagic tissue that has not been adequately fixed (stabilized) will display deposits of formalin pigment at sites where there are abundant red blood cells. Present in tissues with hemorrhagic sites such as major blood vessels, where there are abundant red blood cells and related breakdown deposits, this especially includes the Spleen.	**1.** Confirm that the pigment is actually formalin pigment and not hemosiderin (Iron break down products of red blood). **AND** To remove pigment retrospectively, if it interferes with diagnosis, then use the standard formalin pigment removal treatment method that uses Picric Acid. **AND** Prospectively, to avoid this from occurring is to ensure that hemorrhagic tissue is well fixed before by microwave fixation or conventional fixation, before microwave processing.

PROBLEM	BLOCK/SLIDE	POSSIBLE CAUSES	RIMEDIAL ACTION
Fatty tissue collapses in block and microscopic section. **Macro**: fatty tissue block structure size looks much smaller than the original piece placed in the cassette (appears collapsed). **Micro**: the fatty section does not that honeycomb appearance of fatty cells and instead the fat cells are collapsed into themselves (squashed together).	BEFORE  AFTER 	**1.** Tissue size is too large for adequate fixation to occur and stabilize the tissue to withstand subsequent exposure to reagents, such as JFC. **2.** Present in larger fatty tissue blocks where there is an absence of connective tissue parenchyma to hold fat cells in place: connective tissue provides a framework to support fatty cells in place. More likely to be seen in larger fatty tissue blocks and not in smaller fatty biopsies such as breast core biopsies.	**1.** Ensure that tissue fixation for the larger tissue blocks has been performed conventionally for at least overnight, or with microwave fixation prior to microwave processing: don't assume tissue is well fixed when dealing with larger size samples. **AND** If using JFC as the only processing agent, then change to a program that utilizes JFC followed by Isopropanol, where Isopropanol helps stabilize fatty cell structure. **2.** Use of Isopropanol as the last reagent step before WAX infiltration will reduce the risk of fatty cell collapse, so a preset protocol for fatty tissue should employ Isopropanol or ProWave as the last reagent step prior to WAX infiltration

A.2. OVERVIEW OF MICROWAVE HISTOPROCESSING TROUBLE SHOOTING

Problem	Cause	Remedy
Pyknotic nuclei and severe cytoplasmic distorsion	Poorly fixed.	→Extend fixation time.
	Poor fixation/JFC reaction.	→Use JFC/Isopropanol program.
Poor Dehydration	Alcohol contamination (water).	→Replace alcohol.
	Use of sponge Pads/ inefficient biopsy Pads.	→Extend processing time. →Use sponge alternatives.
	Processing cycle too short.	→Use appropriate size processing cycle.
Specimens detached from surrounding WAX	Processing cycle too short.	→Use appropriate size processing cycle. →Reduce tissue block thickness.
Incomplete Clearing of fat	Processing cycle too short.	→Use appropriate size processing cycle. →Reduce tissue block thickness.
	Isopropanol inefficient for fat clearing.	→Use JFC as alternate clearing agent. →Reduce tissue block thickness.
	Dehydration/Clearing agent reuse life exceeded.	→Replace Dehydration or Clearing reagent.
Collapse of block face after sectioning	WAX infiltration not entirely complete.	→Increase WAX infiltration time.
White appearance of block face	WAX infiltration not entirely complete.	→Increase WAX infiltration time.
Pigment deposit in sections	Incomplete fixation of blood.	→Perform pigment test to exclude whether formalin pigment or hemosiderin deposits. →Include MW fixation or extend conventional fixation time.
Fatty tissue collapse in blocks & microsections	Inadequate fixation of tissue, reacting with JFC.	→Fix tissue conventionally overnight or include MW fixation. →Use JFC followed by Isopropanol protocol for processing.
	Absence of connective tissue parenchyma to support delicate fatty network structure.	→Use JFC followed by Isopropanol protocol for processing.

B. Appendix

B.1. HOW TO MANAGE AN ALARM

CODE	DESCRIPTION	WHAT TO DO
1	Watch dog HMI fault	1. Press “Silent” to hide the alarm. 2. Reboot the system (wait 2 minutes before the rebooting). 3. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
2	HW communication fault	
3	HW socket fault	
4	Watch dog HW fault	
12	Rotary valve time out	
10	MW stirrer non running	1. Press “Silent” to hide the alarm. 2. Call your customer service to fix the issue and press “Alarm management” to manage specimens while the Alarm is occurring.
11	WAX stirrer not running	
20	Not consistent sensors	
22	Sensors missing during cover positioning	
13	Reagent loading time-out	1. Press “Silent” to hide the alarm. 2. Check that the level of reagent is between MIN and MAX marks of the tanks labels. Then press "Clear" to repeat the loading procedure. 3. Check that the processing tanks are correctly inserted (the tanks positioning bar should be easily closed). Then press "Clear" to repeat the loading procedure. 4. Check that the undersurface of the processing cover and its O ring are well cleaned from any wax traces. Then press "Clear" to repeat the loading procedure. 5. Check that the processing tanks are well cleaned from any wax traces or salts deposits on the bottom of them. Then press "Clear" to repeat the loading procedure. 6. Check that the tanks back connectors are not bent or occluded by anything and cleaned from wax traces. Then press "Clear" to repeat the loading procedure. 7. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
14	Reagent unloading time-out	1. Press “Silent” to hide the alarm. 2. Check that the caps of the processing tanks are firmly closed. Then press "Clear" to repeat the unloading procedure. 3. Check that the processing tanks are correctly inserted (the tanks positioning bar should be easily closed). Then press "Clear" to repeat the unloading procedure. 4. Check that the bottom of the MW cavity (drainage hole) is not occluded by anything and cleaned from wax traces. Then press "Clear" to repeat the unloading procedure. 5. Check that the tanks back connectors are not bent or occluded by anything and cleaned from wax traces. Then press "Clear" to repeat the unloading procedure. 6. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
15	Tanks bar open	1. Press “Silent” to hide the alarm. 2. Check that the tanks positioning bar is properly closed. Then press "Clear" to repeat the procedure. 3. Check that the processing tanks are correctly inserted (the tanks positioning bar should be easily closed). Then press "Clear" to repeat the procedure

		4. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
21	Cover movement time-out	1. Press "Silent" to hide the alarm. 2. Reboot the system (wait 2 minutes before the rebooting). 3. Close the work area cover. Then press "Clear" to repeat the procedure. 4. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
23	Safety switches missing	1. Press "Silent" to hide the alarm. 2. Check that the undersurface of the processing cover and its O ring are well cleaned from any wax traces. Then press "Clear" to repeat the procedure. 3. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
24	Work area cover open	1. Press "Silent" to hide the alarm. 2. Check that the work area cover is properly closed. Then press "Clear" to repeat the procedure. 3. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
30	MW temperature too high	1. Press "Silent" to hide the alarm. 2. Check the presence and rotation of the stirrer. 3. Have you modified the Time at Temperature part of the curve? Remember that the unit can quickly warm up the reagent but not cool it down. Wait at least 20 minutes and then press "Clear" to continue the program. 4. Has the unit just completed a step in which the same solution has been warmed up to a temperature value above of what you need now? Wait at least 20 minutes and then press "Clear" to continue the program. 5. When possible, check the cleaning of the MW cavity. The temperature sensors might be dirty. 6. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
31	MW temperature too low	1. Press "Silent" to hide the alarm. 2. Have you shortened the Ramping part of the curve? If the ramping part is too short, the magnetron cannot correctly warm up the reagent. Refer to a factory program to set the correct value. 3. Check the power line voltage of the laboratory and compare it with the voltage required by the instrument (see back label). Voltage must be the same (±10%) of that indicated on this label. 4. When possible, check the cleaning of the MW cavity. The temperature sensors might be dirty. 5. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
32	MW pressure too high	1. Press "Silent" to hide the alarm. 2. Check that the undersurface of the processing cover and its O ring are well cleaned from any wax traces. Then press "Clear" to repeat the procedure. 3. Check that the processing cover is correctly positioned over the Mw

		cavity. Then press "Clear" to repeat the procedure. 4. Check the cleaning of the work area, it might be dirty. Then press "Clear" to repeat the procedure. 5. Have you modified the program? If the vacuum value is too low, the instrument cannot correctly follow the pre-set curve. Refer to a factory program to check the value. 6. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
33	MW pressure too low	1. Press "Silent" to hide the alarm. 2. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
34	WAX temperature too high	1. Press "Silent" to hide the alarm. 2. Check the presence and rotation of the stirrer. 3. Have you modified the Time at Temperature part of the curve? Remember that the unit can quickly warm up the reagent but not cool it down. Wait at least 20 minutes and then press "Clear" to continue the program. 4. Has the unit just completed a step in which the same reagent has been warmed up to a temperature value above of what you need now? Wait at least 20 minutes and then press "Clear" to continue the program. 5. When possible, check the cleaning of the Wax cavity. The temperature sensors might be dirty. 6. When possible, check the cleaning of the Wax. It might be heavily contaminated. 7. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
35	WAX temperature too low	1. Press "Silent" to hide the alarm. 2. Check the presence and the correct level of wax inside the cavity. When completely molten, the wax level must be between the MIN and MAX markers etched on the cavity wall. 3. Have you shortened the Ramping part of the curve? If the ramping part is too short, the system cannot correctly warm up the wax. Refer to a factory program to set the correct value. 4. Check the power line voltage of the laboratory and compare it with the voltage required by the instrument (see back label). Voltage must be the same (±10%) of that indicated on this label. 5. When possible, check the cleaning of the Wax cavity. The temperature sensors might be dirty. 6. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.
36	WAX pressure too high	1. Press "Silent" to hide the alarm. 2. Check that the undersurface of the processing cover and its O ring are well cleaned from any wax traces. Then press "Clear" to repeat the procedure. 3. Check that the processing cover is correctly positioned over the wax cavity. Then press "Clear" to repeat the procedure. 4. Check the status of the wax, it might be highly contaminated by

		Isopropanol residuals. Clean the wax or replace it if heavily dirty. 5. Check the cleaning of the work area, it might be dirty. Then press “Clear” to repeat the procedure. 6. Have you modified the program? If the vacuum value is too low, the instrument cannot correctly follow the pre-set curve. Refer to a factory program to check the vacuum value. 7. Check that the front cool trap is clean and firmly closed. Then press “Clear” to repeat the procedure. 8. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
37	WAX pressure too low	1. Press “Silent” to hide the alarm. 2. Check that the front cool trap is clean and firmly closed. Then press “Clear” to repeat the procedure. 3. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
38	Safety switches missing	1. Press “Silent” to hide the alarm. 2. Check that the processing cover is correctly positioned over the cavity. Then press “Clear” to repeat the procedure. 3. Check that the 4 switches around each cavity are well cleaned from any wax traces. Then press “Clear” to repeat the procedure. 4. Reboot the system (wait 2 minutes before the rebooting). 5. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
39	Reagent level too low. Abort the program!	1. Press “Silent” to hide the alarm. 2. When possible, check that the processing tanks are well cleaned, without any salt deposits. 3. When possible, check the status of the level sensors and eventually clean them from any wax traces or other deposits. 4. Call your customer service to fix the issue and press “Alarm management” to manage specimens while the Alarm is occurring.
40	Microwaves level too high (high threshold)	1. Press “Silent” to hide the alarm. 2. Check the presence of reagent inside the cavity. 3. Did you load a non-polar reagent like Xylene? If you did so, the microwaves can’t heat the reagent and are reflected inside the Mw cavity. Change the reagent type or eventually set a different heating modality (“Resistance heating” in case of Xylene). 4. When possible, check the cleaning of the level sensors and eventually clean them from any wax traces or other deposits. 5. Call your customer service if the issue can’t be fixed and press “Alarm management” to manage specimens while the Alarm is occurring.
41	Microwaves level too high (low threshold)	1. Press “Silent” to hide the alarm. 2. Check the presence of reagent inside the cavity. 3. Did you load a non-polar reagent like Xylene? If you did so, the microwaves can’t heat the reagent and are reflected inside the Mw cavity. Change the reagent type or eventually set a different heating modality (“Resistance heating” in case of Xylene). 4. When possible, check the cleaning of the level sensors and eventually clean them from any wax traces or other deposits. 5. Call your customer service if the issue can’t be fixed and press

		"Alarm management" to manage specimens while the Alarm is occurring.
51	Main power is missing	1. Press "Silent" to hide the alarm. 2. Check that the unit power cord is correctly plugged. 3. Check the power line voltage of the laboratory and compare it with the voltage required by the instrument (see back label). Voltage must be the same (±10%) of that indicated on this label. 4. Check the functionality of UPS module (if equipped with the unit) and its wiring. 5. Check the Fuses (service operation only). 6. Call your customer service if the issue can't be fixed and press "Alarm management" to manage specimens while the Alarm is occurring.

C. Appendix

C.1. HOW TO MANAGE SAMPLES WHILE AN ALARM IS OCCURRING

1. Never leave samples in open air or under fume hood, to avoid drying
2. Put samples as quickly as possible into an external container with one of the following reagent in a quantity sufficient to cover all samples:

   Either ETHANOL (90-100%) or ISOPROPANOL

3. Check the wetness level of at least 10% of samples (in different parts of the rack). If wetness level appears:

GOOD WITH NO DOUBTS

A. Let samples in reagent.

B. Check the step when the emergency situation occurred.

C. Check if the unit can be used for a new cycle (*).

D. Follow the instructions on how to resume an interrupted cycle and restart the cycle with samples using step start procedure.

E. For Pathos Delta see chapter 3.2.3 operation manual.

Select the correct step to start from in the following table:

NOT GOOD

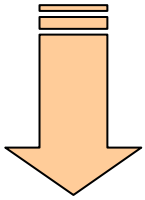
A. Follow the recovery laboratory internal protocols for air dried samples.

If not available, follow Milestone suggested recovery protocol.

B. Check if the unit can be used for a new cycle (*).

C. Restart the processing cycle.

(*) If necessary, contact your local customer support



ALARM OCCURRED DURING THE FOLLOWING PROCESSING STEP	STEP START. RESTART FROM:
• LOADING FIXATIVE • FIXATION	Fixation step (fixation uncertain)
• UNLOADING FIXATIVE • LOAD/UNLOAD RINSING • RINSING	Rinsing or Ethanol step if at least one rinsing step has been performed
• LOADING ETHANOL • ETHANOL	Ethanol step
• UNLOADING ETHANOL • ISOPROPANOL	Isopropanol step
• UNLOADING ISOPROPANOL • VAPORIZATION	Wax impregnation step
• MOVING SAMPLES TO WAX • WAX IMPREGNATION	Wax impregnation step

MILESTONE SUGGESTED RECOVERY PROTOCOL FOR AIR DRIED SAMPLES

1. Absolute alcohol 2 changes, 1 hour each
2. 95% alcohol 2 changes, 1 hour each
3. Running tap water for 30 minutes
4. Place in formol-glycerol solution (*) until tissue become soft and pliable with gentle pressure. Tissues may remain in formol-glycerol for up to 8 hours without adverse results.
5. Reprocess on tissue processor in usual manner.

If samples have been put in paraffin, it is necessary to start with the dewaxing step:

Xylene, 3 changes, 1 hour each

Formol-Glycerol Working Solution:

Formalin- Sodium Acetate, (Stock)	*90ml*
Glycerin (Glycerol)	*10ml*

Formal-Sodium Acetate (Stock):

Formaldehyde, 38-40%	*10ml*
Sodium Acetate	*2.0 gm*
Tap Water	*90ml*

(*) Should Formol-Glycerol not be available, use tap water, even if the quality of the recovery is lower.

If samples have been put in formalin while checking of the unit, it is necessary to start from the rinsing steps.

CE IVD

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