BIO-OPTICA AUS240

USER MANUAL

AUTOMATED SLIDE STAINER FOR HISTOLOGY

Type 40-400-300 40-400-350

INDEX

Before using the automated slide stainer, carefully read this Manual, paying particular attention to information regarding safety of the operator and the device.

The automated slide stainer described in this manual is for laboratory use. It is to be used exclusively for the staining of slides.

Do not use reagents that are not specified in this manual for this device, such use will make the warranty void and could cause damage to the automated slide stainer.

The automated slide stainer is only to be used by qualified operators.

The warranty shall not be applied if the automated slide stainer is used in an improper manner and ignoring the indications and recommendations contained in this manual; the manufacturer shall not be held responsible or liable for property damage and/or personal injuries caused by improper use or if the device is used by inexperienced and/or unskilled operators.

Designated Use

This automated slide stainer has been designed exclusively for the following applications:

1.Use in a histology laboratory;
2.Use by qualified personnel who have been specifically trained;
3.Slide staining;
4.Use following the instructions contained in this manual.

The AUS240 has been designed exclusively for the following laboratory applications:
□staining of histology slides
Any other type of use is strictly forbidden. **Ignoring the instructions contained in this manual could cause accidents and damage to the automated slide stainer as well as personal injuries.**

The information contained herein concerns only the slide stainer indicated on the title page of this manual. It is clearly identified by the label on the rear of the slide stainer.

Label symbols used

20xx	Date of manufacture
Rating	Indicates the various voltages at which the slide stainer can work (with the appropriate changes on the internal transformer) **a specific label, on the right side of the stainer near the connection to the mains, indicates the voltage selected on the transformer and to be used.**
	Name and address of Manufacturer.
CE	CE marking.
IVD	Dispositivo Medico Diagnostico in Vitro (Medical Diagnostic Device in Vitro).
	Caution, read the accompanying documents.
	See the instructions for use.
	Do not dispose in ordinary trash (not in domestic rubbish bins), use the special collection bins for electrical and electronic equipment.
TÜVRheinland C US	CTUVus: mark declaring conformity to UL/CSA standards issued by TUV Rheinland.
1C	Mark declaring conformity to Canadian national deviations (clause 5.1.5DV D2). Only for Canada.

✓**If during installation damage caused during transport is found, DO NOT use and DO NOT connect the automated slide stainer to the electrical system before making a careful internal inspection to detect any damage to electrical parts.**

✓**Always make sure the reagent bottles have been installed correctly.**

✓**The automated slide stainer is equipped with a system to handle the slides which is always to operate under protected conditions; therefore the front guard is to remain closed. However, to avoid invalidating the processing in progress, the guard can be opened briefly. This condition is signalled by an optical and an acoustic alarm, meanwhile the handling system continues to operate at slow speed assuring safety of the operator.**

✓**Always take the opportune precautions when handling inflammable and toxic/harmful reagents, for example: alcohol and xylene, protecting the hands with appropriate gloves and wearing safety goggles to protect the eyes.**

✓**The bottles are to be emptied and filled under safe conditions to avoid risks of fire, corrosion and poisoning linked to the properties of the reagents.**

✓**Since there are inflammable substances in the reagent containers, the following precautions are recommended:**

- ✓**Do not smoke near the slide stainer;**
- ✓**Do not use naked flames near the slide stainer : e,g, Bunsen burner;** ✓**Do not wear clothes that can create electrostatic charges.**

✓**Waste reagents and charcoal filters are to be disposed of in accordance with the laws in force in the country where the slide stainer is used.**

✓**Never extract the containers, replace the reagents or carry out other maintenance operations while staining is in progress**

✓**Serious damage can occur if the slide stainer is connected to a power source different to that indicated in this manual and on the identification label on the rear of the slide stainer.** ✓**NEVER use the slide stainer without it being correctly connected to ground.**

✓**Only skilled technicians are to have access to the slide stainer internal parts ; always make sure the main voltage source has been disconnected before removing any lid or hatch.**

✓**Never act on internal components before disconnecting the slide stainer from the power supply. If it should be necessary to measure electrical values on internal components, observe the safety standards and use appropriately insulated measuring instruments, ensuring they are in good condition.**

✓**Before replacing fuses, cut out the electric supply to the slide stainer and follow the instructions contained in the relevant chapter.**

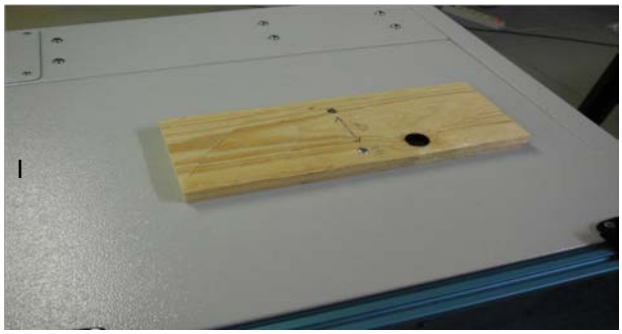
✓**For repairs, use only original spare parts supplied by the manufacturer or authorised dealers.**

✓**For further details regarding safety, see also the SAFETY DEVICES chapter at the end of this manual.**

Before moving and/or transporting the slide stainer, it is most important to carefully read this chapter, paying special attention to the instructions for the slide stainer set-up.
The warranty shall not be valid if the slide stainer is transported incorrectly ignoring the instructions and recommendations contained in this manual; likewise the manufacturer shall not be held liable for any property damage or personal injuries resulting from improper or careless handling of the device.
Carefully check the external conditions of the crate containing the slide stainer, if evident damage caused during transport is found, DO NOT unpack the slide stainer, immediately notify the carrier and contact the manufacturer/dealer to take the necessary steps.

Unpacking

Proceed as follows:
1.Open the top of the crate.
2.Remove the slide stainer accessories.
3.Remove the side walls.
4.Remove the protective plastic (Pluri-ball) sheets that cover the slide stainer.
5.Unscrew the bolts that fasten the slide stainer to the base of the crate.
6.Carefully check the external condition of the slide stainer, if there is evident damage caused during transport, DO NOT connect the device to the power supply mains, immediately notify the carrier and promptly inform the manufacturer/dealer to take the necessary steps.
7.Fit the 4 lifting handles (supplied in the shipment).
8.To set-up the slide stainer, please consult the chapter "Installation and set-up".
9.Save the crate and all the internal packaging at least until the expiry of the warranty.
10.Check that the following accessories and removable parts are included (see following Table):



Accessories supplied with the slide stainer		
Code	**Description**	**Qty**
……	Hose for water filling - 2 m - with quick connect fittings	**1**
7NL908	Hose tail 90° diam. 20 (Resca)	**1**
7EC960	Loose Remote alarm connector	**1**
7MCE06	Lifting handles	**4**
……..	Support to clamp X-axis	**1**
……..	Support to clamp Y-axis	**1**
8U1201	Tank holder basket	**4**
8U1102	Stain / reagent tanks (installed in slide stainer)	**33**
8U1103	Water tank (installed in slide stainer)	**5**
8U1101	Slide-holder basket (included in supply)	**8**
8U1244	Tank covering lids	**4**
9U0001	Charcoal filter	**1**
7TSM07	Touch Screen Monitor with cables kit (n° 1 VGA cable, n°. 1 power supply cable n°. 1 USB cable)	**1**
7EV998	Mains power supply cable 115-230V - 16A This can only be replaced by an equivalent cable with the following features : Preassembled power supply cable , 2m, Male connector CEE 7/4 (Shielded male connector 16 A to C19, 250 V)	**1**
PO 751.18	User Manual	**1**
IO 755.08	CHARCOAL FILTERS installation operating instructions	**1**

Packaging and/or preparation for transport

If the slide stainer has to be relocated, it is to be packaged and/or prepared carefully following these instructions:
1.Remove all the reagents from the tanks
2.Remove all the tanks from the baskets and baskets.
3.Remove the touch screen and place it, together with the cables, in the specific packaging.
4.Empty the water tanks.
5.Discharge the water filling circuit.
6.Make sure that the drainage tank is empty
7.Set X and Y axes in position for transport and clamp them with the supports supplied.
8.Keep the charcoal filter separate from the slide stainer for the transport, wrapped and sealed in a nylon bag.
9.To move the slide stainer use the handles supplied.
10.If the original crate has been saved, follow the unpacking instructions in reverse, use also all the internal packaging to prevent damage to the slide stainer during the transport.

Transport

During transport, bear in mind that:
1.It is delicate scientific equipment.
2.The slide stainer contains electronic components.

3.Contact with water and/or other liquids is to be carefully avoided (the correct use of the plastic covering which is part of the original packaging is indispensable).
4.Temperature during transport and storage is NEVER to exceed the following limits: -10°C +50°C
5.It is most important that the original crate is transported in horizontal position.

Introduction to the AUS240 stainer

General features

The AUS240 device is an automated slide stainer for laboratory use (Fig. 1). The slides are inserted into the slide stainer using the special slide-holders positioned in a sliding drawer (2 tanks for loading). In the same drawer the slide stainer returns the processed slides (3 tanks for unloading). For the staining there are 28 tanks available into which the reagents or liquid stains are poured. The 28 tanks are arranged in 2 rows and grouped into 4 removable baskets. Each basket has 7 tanks.

The slide stainer has an agitation system that sways the tanks and reagents contained. In this way the reagent can arrive more easily to touch all the surface of the slides. The agitation system consists of 2 motors that control the agitation of the tanks from 1 to 14 and the agitation of tanks from 15 to 28 respectively.

This slide stainer is equipped with a slides washing system that is connected to the water supply. The washing system has 5 stations each fitted with a specific solenoid valve.
The slide stainer has an active charcoal filtering system that retains the vapours that could be liberated by the reagents in the tanks.
Furthermore, the AUS240 slide stainer can be equipped with a 2-station drying system (optional), each station is provided with a heater and fan which are controlled separately.
The slides are to be housed in special slide-holders that are supplied with the slide stainer. The slide stainer can also run with slide-holders from other manufacturers using the specific adapter.

A touch screen is used to program and monitor the running of the slide stainer in a simple and user-friendly manner.

The slide stainer can accept up to 18 staining protocols (for each load) that can be permanently stored and simply and quickly updated at any time.

The operator assigns one of the 18 previously stored protocols available to each slide-holder introduced into one of the input stations. The running of the protocol is managed by a handling system (with 3 independent axes: x,y,z) That by means of 2 gripping hooks, picks up the slide-holder from a loading station, performs all the programmed movements and at the end of the protocol delivers it to an unloading station.

All the handling stages are shown on the display through a synoptic panel (fig.2) that provides all the information on the state of the slide stainer, for each protocol, as well as any alarm warnings.
In the case of a power failure, the computer that controls the slide stainer holds in memory the data necessary to resume the process exactly from the point where it was interrupted.

The slide stainer is equipped with a UPS unit called CPU-UPS. In case of power failure, and if the slide stainer is in operation (staining protocols in progress), the CPU-UPS keeps the CPU and the touch-screen activated. In this situation, the handling system is halted, but the protocols in progress are still monitored. When power supply is restored, it will once more be operational, the slide stainer will reset the axes to zero and will resume from the step where the power failed. This function is very useful to overcome rapid power failures, during which the staining in progress does not suffer delays that could damage and/or jeopardise the samples being stained.

If the failure lasts for more than 10 minutes, the program, in order to safeguard the battery, saves the state of staining and automatically closes down. In this situation the major part of the protocols running is certainly jeopardised and therefore not recoverable at the slide stainer restart.

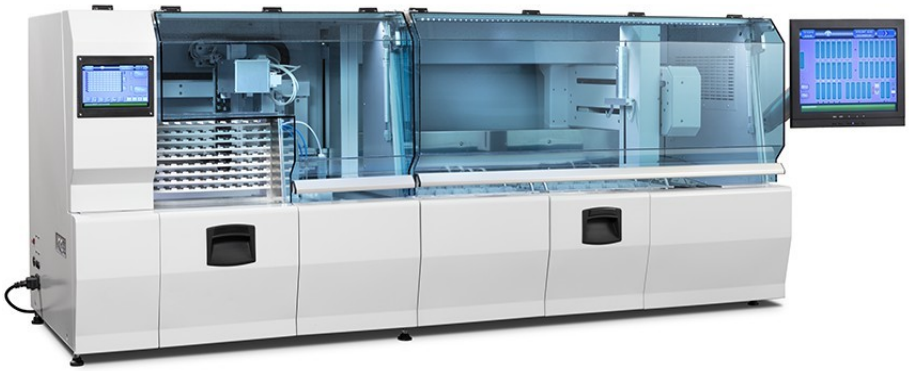
If the slide stainer is in stand-by, the CPU-UPS is not operative, therefore in case of power failure, the slide stainer will switch off completely.

The AUS240 slide stainer can be fitted with an external uninterruptible power supply unit (called UPS) that, in the case of a power failure, provides emergency power and assures complete operation of the slide stainer. This unit is installed separately and is interfaced with the slide stainer by RS232 serial line.

The AUS240 stainer is already arranged for interfacing to the CVR1 glass cover slipper.

Glass cover slipper type CVR

Slide stainer type AUS240



Slide stainer + Glass cover slipper Assy.

In the combined assembly, the AUS240 slide stainer can move the glass cover slipper, which has terminated the staining protocol, directly to the input station of the CVR glass cover slipper..

Both instruments (slide stainer and glass cover slipper) operate independently of each other and each one is controlled by a dedicated control unit. Both of them are equipped with a touch screen and a simple, user-friendly and intuitive operator's interface.

Both instruments are interfaced through digital signals.

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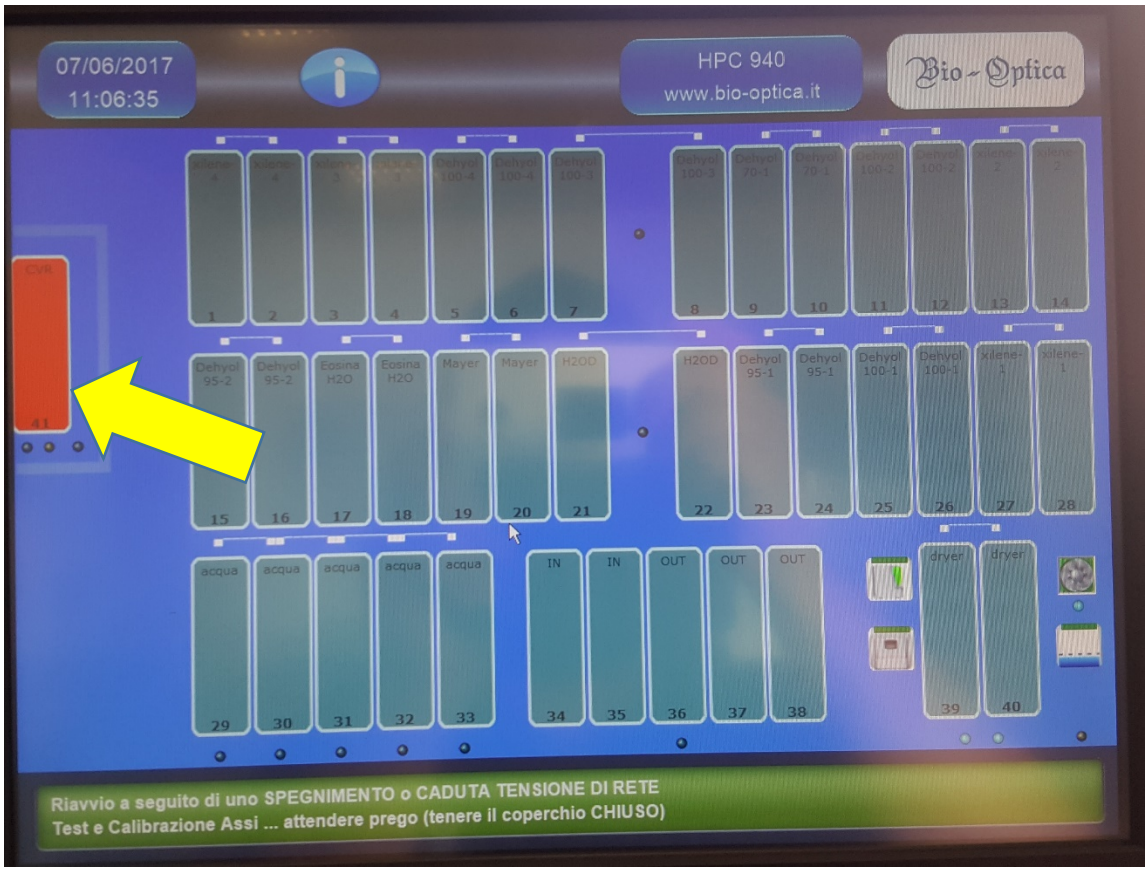
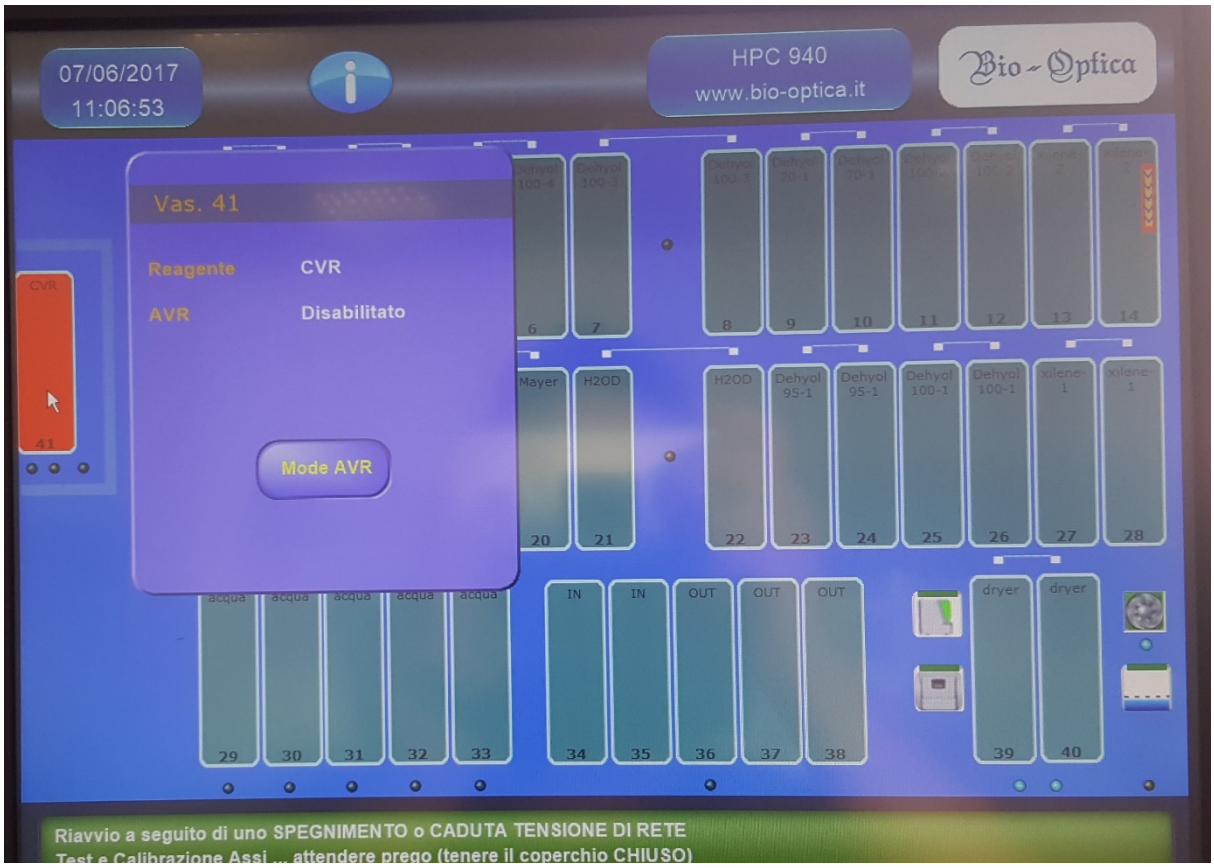
Operator interface

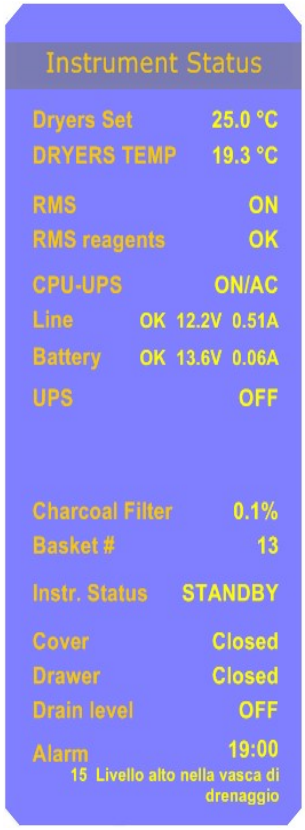


When the AUS240 slide stainer is coupled to the CVR glass cover slipper and is capable of operating in AVR mode, the tank 41 is displayed on the synoptic table. This tank represents the basket loading station which is present on the CVR glass cover slipper. This visualization allows the operator to know when the slide stainer moves a basket toward the CVR glass cover slipper and lays it down on the loading station.
The AVR operating mode can be activated or deactivated at any moment. Just click on tank 41 key. A window will appear showing a "MODE AVR" key which allows enabling or disabling this operating mode. If the tank is highlighted in "RED" , this means that the "AVR" mode is disabled.



3 LEDs are displayed at tank 41. These LEDs control the state of digital signals used to interface the AUS240 slide stainer to the CVR glass cover slipper.

User intface (HMI or GUI)



The user interface is Touch Screen type, which means there is no keyboard, but all the functions are available by pressing on the screen with a finger or a BLUNT plastic device.

Pressing key I (info), a window is displayed containing the following information:

- Dryer temperature set (if there is a dryer unit installed)
- Temperature read in the dryer (if there is a dryer unit installed)

- State of RMS (Reagent Management System) (OFF-ON)
- State of reagents (OK- FAULT) - (if RMS is ON)

- State of CPU-UPS (ON/AC – OFF -FAULT)
- Display of voltage and input current
- Display of voltage and current delivered by the battery

- State of UPS external continuity unit if installed (ON – OFF - FAULT)
- Display of voltage and current delivered by UPS unit

- State of charcoal filter (0% = new; 100% = exhausted)
- Progressive number of last protocol run.
- State of slide stainer (step running at that moment).
- State of lid (open/closed)
- State of drawer (open/closed)
- Any active alarms with indication of time and description of the alarm

Note: The INFO window is in English.

On the screen the synoptic panel is always displayed showing the layout of the slide stainer. The handling of the slide-holders is shown in real time with graphic display of the gripper and actual speed at which the handling system is operating.

The reagent / stain tanks are indicated with progressive numbers from 1 to 28. The 5 tanks of the washing system are marked “water”. The 2 drying stations are marked “dryer”. The inlet and outlet stations in the drawer are marked 'in” and “out” respectively.

The following indications are shown on the synoptic panel:

Water solenoid valves operating status (LED symbol under each water tank : green = ON)
Slide-holder inlet and outlet drawer opening enable (LED symbol under drawer = green = blocked)
Heaters and dryer fan status (LED symbol= green = active)
Lid status :door symbol (door closed = green) (door open = red)
Drawer status : drawer symbol (drawer closed = green) (drawer open = red)
Water level in tank (green symbol = level alarm OFF) (red symbol= level alarm ON) Agitation status tanks 1-14 and 15-28. green LED + bidirectional arrow = Agitation ON

Standby mode:

When the slide stainer is stationary with no staining taking place, the slide stainer SETUP can be accessed by means of the MENU key on the right side of the screen. When this key is pressed, the SETUP menu (ref. Fig. 3) is displayed on the right side of the screen. To close the SETUP menu touch the blue area of the screen.

Clicking on the picture of the tank (1-28), displays a window containing the following information: Reagent contained in the tank, Limit of N* Protocols (RMS), N*. Protocols that have already run, Last counters reset which usually corresponds to the date of the reagent replacement. To close the window, touch the blue area of the screen.

Clicking on the picture of the water tank (29-33) , displays a window that contain the button EV water ON_OFF By clicking it the valve is enabled or disabled. This operation is under the control of the operator. If a staining protocol is launched the valve are automatically closed.

Operating mode:

Each slide-holder inserted in the slide stainer is shown with a picture that contains 2 indications: Progressive number of protocol, Time remaining before end of step running.

Clicking on the slide-holder picture , a window is displayed containing all the information regarding the assigned protocol: Protocol name, Start time, End time, step running, Time remaining, Next tank. Also the state of progess of the protocol is displayed to know the steps already run and the actual time of every step. To close the window, touch the blue area of the screen.

Clicking on the picture of the tank (1-28), displays a window containing the following information: Reagent contained in the tank, Limit of N* Protocols (RMS), N*. Protocols that have already run, Last counters reset which usually corresponds to the date of the reagent replacement. To close the window, touch the blue area of the screen.

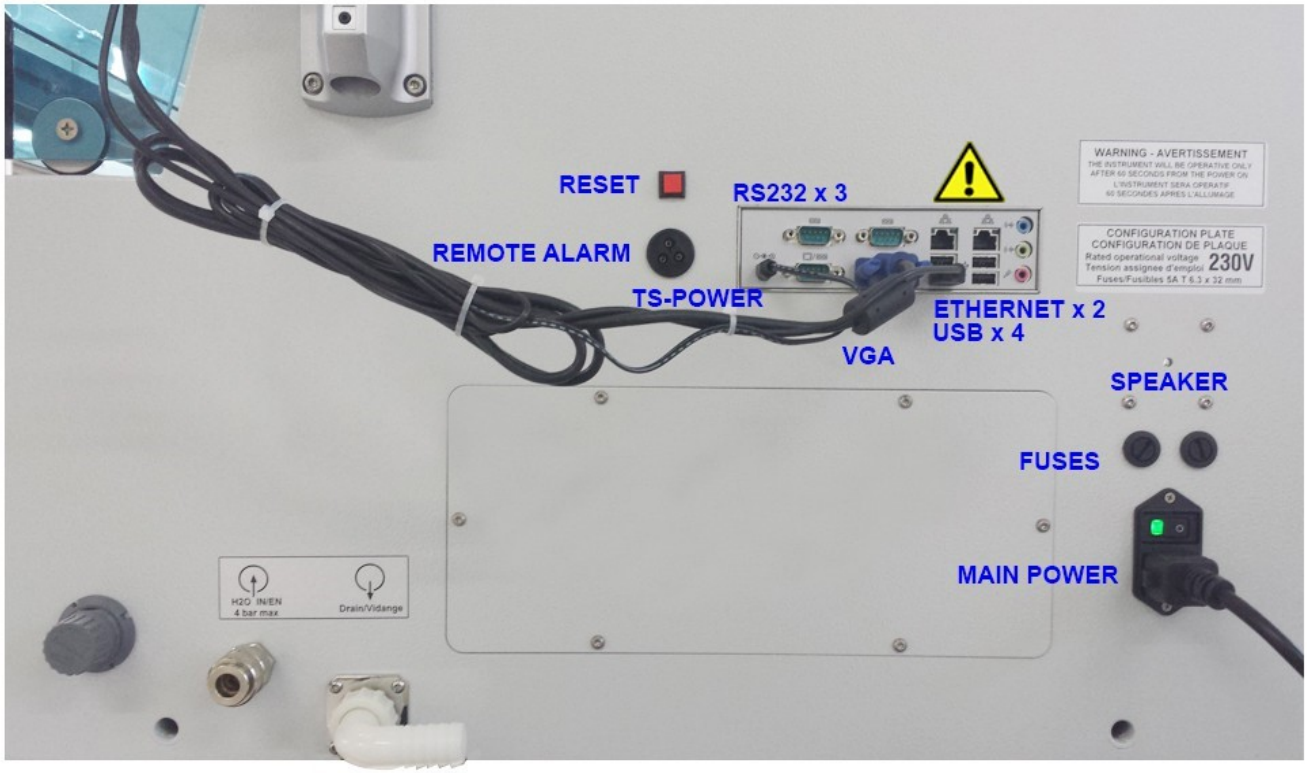
At the bottom of the display there window is always displayed showing any errors active at that moment and the description of the activity in progress; these messages guide and inform the operator regarding the operations that can/must be carried out. Always follow the indications of these messages with careful attention.

IMPORTANT NOTE: in the case of TOUCH-SCREEN malfunctioning, the interface can still be used by means of a MOUSE. The mouse is to be USB type, compatible with Windows XP, and can be connected to any USB port on the rear panel of the slide stainer.

Screen Saver

The LCD screens have a very long life, but the lamps that illuminate them have a shorter life. For this reason there is an energy saving device that increases the operating of the screen and switches it off when it is not used (when nobody touches the screen) for a time longer than the time indicated in the slide stainer SETUP. Obviously the slide stainer continues to operate perfectly and continues to run any process in progress (only the screen is switched off). Just touching any part of the screen automatically re-lights the screen within approx. 1 second. If this does not happen, it can be attempted to switch off the slide stainer from the main switch and then switch On again taking care to check that the power-on warning light of the screen activates. If, when the slide stainer is powered On again the screen power-on warning light remains off, try to activate it by pressing the specific key on the screen. Do not press several times to re-power the screen since the first touch will not be considered by the computer as a command, but those that follow will, therefore pressing several times before being able to see which portion of the screen is being touched, there is a risk of accidentally activating a function.

Right side panel



The following are present on the right side panel of the slide stainer :

MAIN POWER = Main power switch and connection socket to the electrical mains.
FUSES = Fuses (for the capacity see the table at the end of the manual)
RS232 = 3x Serial ports RS-232
RESET = Reset key (switch off the slide stainer, switch on again keeping this key pressed until the MAIN MENU is shown)
USB = 4x USB ports for connection to various external devices (keyboard, mouse, UPS, printer, touch screen) **VGA** = LCD monitor connector
TS-POWER = Touch Screen power supply (+12V) **REMOTE ALARM** = Remote Alarm socket.

- No alarm : contacts 1-2 closed, contacts 1-3 open.
- Alarm active : contacts 1-2 open, contacts1-3 closed.

There are no types of electrical voltages on these contacts, they are isolated from the rest of the slide stainer; therefore they can be used to pilot external alarm devices (for example our Auto Dialer device to dial telephone numbers and send alarm messages) . Maximum voltage allowed 48V ac/dc; Maximum current 1A.

ETHERNET = 2x ports for connection to Internet or Intranet

Installation and set-up

After unpacking the slide stainer proceed as follows:

1.Install the 4 handles (included in the supply) necessary for lifting.
2.Install the active charcoal filter Insert the filter in the housing on the upper wall of the slide stainer.
3.Lift the slide stainer and position it on a stable, robust table able to sustain a weight of 200 kg.
4.When positioning, check that the feet are intact.
5.Install the monitor, the monitor is not connected mechanically or electrically to the slide stainer for the transport. For mechanical connection use the 4 screws that clamp the monitor to the jointed arm anchored to the right wall of the slide stainer.

6.Make the electrical connection of the monitor connecting these cables: power supply cable, VGA cable, Touchscreen USB cable. The other end of each cable is to be connected to the sockets on the front panel of the PC, on the right side.
7.Open the lid and remove the wooden supports that block X-axis and Y-axis . The supports are fastened to the structure with screws.
8.Check that the tank holder baskets and related tanks are correctly housed.
9.Check that the water tanks are positioned correctly.
10.With a spirit level check that the slide stainer is level. For X-axis position the spirit level on the prismatic guide. For Y-axis the spirit level is to be placed over the axis cover. To adjust the levelling, act on the 4 adjustable feet using a 14 mm wrench.
11.Connect the slide stainer to the water supply - (**pressure range 2.5 - 4 bar)** and turn the pressure regulator knob half-way along its stroke.

It is recommended to insert an external filter to capture impurities that could jeopardise the functioning of the slide stainer water circuit (tubes and valves)

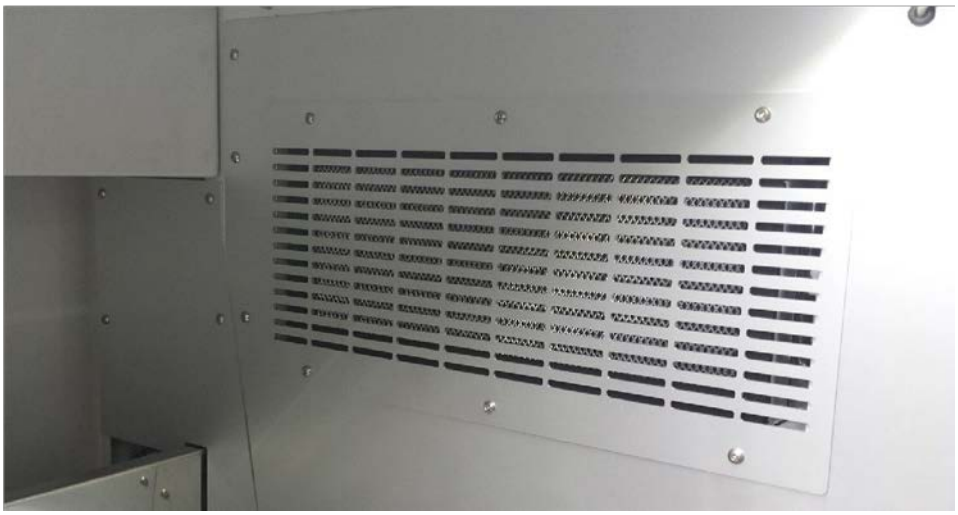
12.Connect the slide stainer to the sewer discharge.
13.Connect the electric power supply: before doing so, it is opportune to make an external visual check on the state of the device to assure that it has not suffered any evident damage during transport, if damage is found, DO NOT use the device, contact the Technical Service and notify the carrier in writing and carefully keep the packaging for any compensation claims. Connection to the electrical mains is to assure: **(a) adequate voltage and power according to the data on the slide stainer identification label (b) appropriate and efficient grounding.**

As for any electronic device, it is advised to place the slide stainer away from heat sources: radiators, stoves, direct sunlight.

Replacing the charcoal filter

Charcoal filter housing

To replace the filtering element, it is necessary to remove the grid which is placed on the right, inner, side wall of the slide stainer



Automated slide stainer positioning and disconnection from the electric mains

The slide stainer is to be positioned so that the right side is completely accessible. No objects are to be positioned in the area adjacent to the right side that could impede access to the electric panel containing the main switch and the current socket.

To disconnect the slide stainer from the electric mains, proceed as follows:
✓The slide stainer is to have completed all the staining (in stand-by)
✓Press the main switch, on the right side
✓Disconnect the plug from the socket on the right side.

If the slide stainer is switched Off and/or disconnected from the electric mains during a work session. The CPUUPS will keep the CPU and the touch-screen active.

If the slide stainer is connected to the external UPS unit, follow the instructions regarding the External UPS (page 31)

Check-list to be followed for the use of the slide stainer

Automated slide stainer power-on

✓Press the power supply switch on the right side of the slide stainer.
✓Wait approx.60 sec.
✓After this time, the slide stainer will start and the synoptic page will be shown on the screen with the request to confirm the reset of the axes.
✓Make sure the lid is closed.
✓Press the START key , the handling system will zero the axes, positioning on the LH side, and will then go to HOME position.

At first start-up

✓Check the system date and time.
✓Program and/or check the SETUP parameters.
✓Select the required bath
✓Program the names of the reagents.
✓Program the arrangement of the reagents in the selected bath.
✓Program any reagent equivalents ✓Program the RMS (if you wish to use it).
✓Program the staining protocols.
✓Install and adjust the use range of the charcoal filter.
✓Fill the reagent tanks up to the level indicated inside the tank itself and according to the bath layout defined in the RMS Setup function.
✓Fill the drawer tanks (max level: 6 cm from tank bottom).
✓Check that the inlet water circuit is connected and intact.
✓Check that the drainage water circuit is connected and not choked.

At each re-powering of the stainer before running a protocol

✓Check that all the tanks are installed and that the level of the reagents is correct.
✓Check there are no slide-holders in the tanks 1-33 and/or in the dryer (if present).
✓Check that the water is connected and the tap is open.
✓Check that the drainage tank is empty and that the drainage is not obstructed.

At stainer shut-down

✓Wait until the last protocol has finished.
✓The handling arm is to be in HOME position.
✓Press the power supply switch.
✓Remove any slide-holders from the outlet stations.
✓Open the lid.
✓Place the lids on the 4 tank holders.
✓Close the lid.
✓Close the water tap.

CAUTION: Do not exceed maximum filling level of tanks present in the drawer (max. 6 cm from tank bottom). Exceeding the max level can cause reagents overflow during the opening and closing operation and damage the sensors.

Reagents

COMPATIBLE REAGENTS

The materials used to manufacture the AUS240 have been selected to allow the use, with no risk of damage, of the following reagents:
✓WATER
✓ETHANOL (pure or denatured) and METHYL ALCOHOL
✓XYLENE and XYLENE SUBSTITUTES with limonene base or other natural extracts)
✓DYES
Generally, it is also possible to use, besides those listed above, reagents that do not cause damage to the following materials used in the construction of the slide stainer and which come into contact:

STAINLESS STEEL	Slide stainer structure, reagents collection tank, miscellaneous fittings
ANTICORODAL ALUMINIUM	Basket holders, Tank holders Rotary valve, Air pump
KYNARFLEX	Water hoses
PET – Polyethylene terephthalate GF30%	Reagent containers and Slide-holder
DELRIN (acetal resin)	Supports
NICKEL	Miscellaneous air duct fittings, solenoid valves

The manufacturer shall **NOT** be held in any way liable for property damage or personal injuries caused by the use of reagents that are **NOT** listed here.

PROCEDURES FOR FAST SETUP AND FOR LAUNCHING A PROTOCOL

This chapter describes the essential operations for the slide stainer SETUP, to prepare a staining protocol and run it.

When powering the slide stainer <u>for the first time</u> the following operations are necessary :

1. **Reset the axes**
2. **Select bath A or B to be used (see RMS SETUP function – Bath Selection)**
3. **Define the names of the reagents (see NAMES OF REAGENTS function)**
4. **In the bath previously selected define the arrangement of the reagents and any equivalents (see RMS Setup function - Definition of reagents)**
5. **Prepare the staining protocol (see PROTOCOLS MODIFICATION function)**
6. **Run the protocol – open the drawer and place the slide-holder in work stations 1 or 2 indicated with green arrow)**
7. **The slide stainer will ask which protocol is to be assigned and after pressing the Start key the automated arm will pick up the slide-holder starting the staining protocol.**

When all the protocols have been defined, the use of the slide stainer is truly user-friendly. With the help of the above mentioned list as reference, you only need to run the operations indicated in step 1, step 6 and step 7.

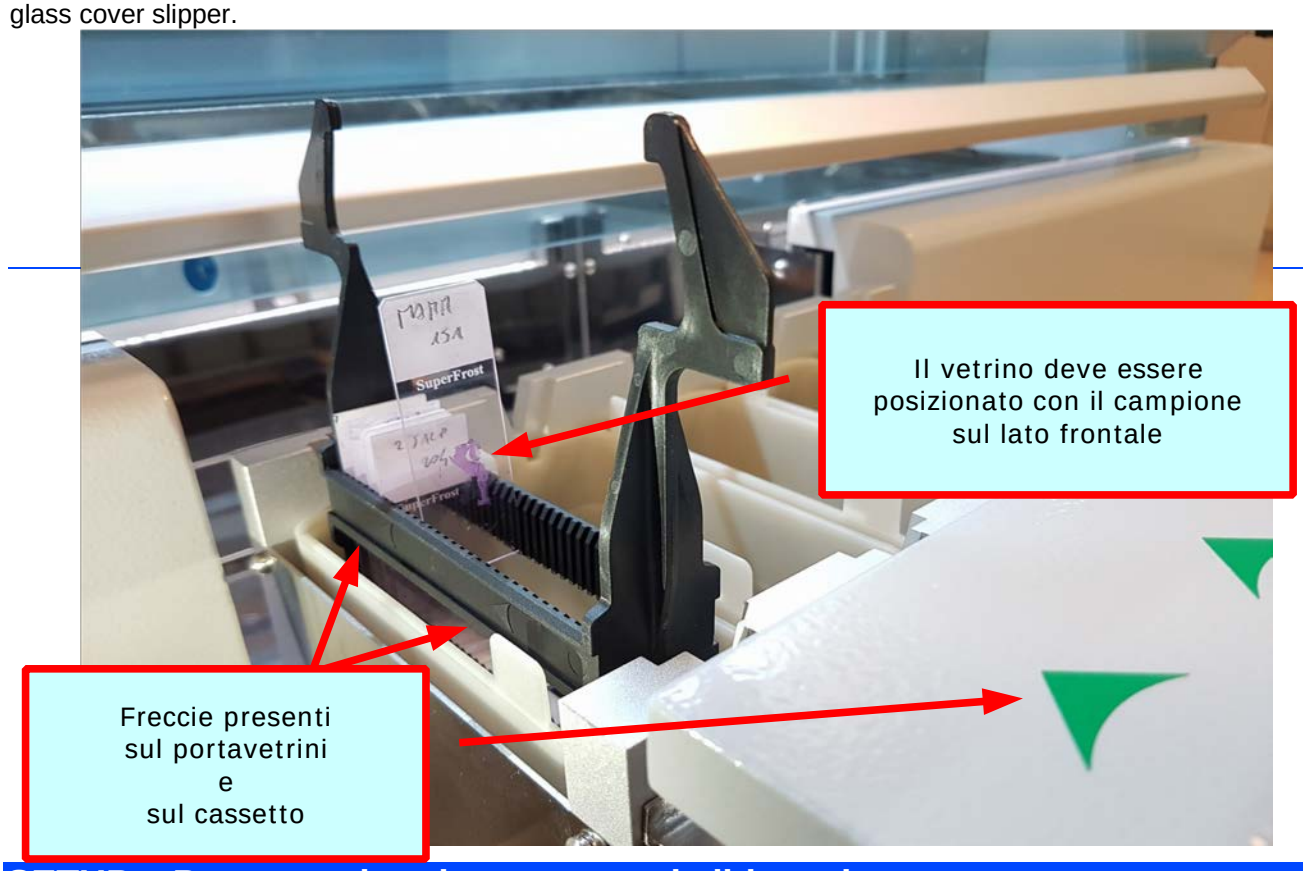
Important note regarding axes reset

1. At each power-On the slide stainer asks for the execution of the axes reset.
2. When the slide stainer is in stand-by, the operator can move the axes by hand, if reagents maintenance is required. After the maintenance operations, if the slide stainer is not switched Off then On again, it is necessary to remember to reset the axes (see SERVICE - AXLE INIT function)

POSITIONING THE GLASSES IN THE GLASS COVER SLIPPER AND INTRODUCING THEM INTO THE SLIDE STAINER

To insert the glass cover slipper into the loading stations 1 and 2, it is necessary to strictly observe the symbols shown on the glass cover slipper. The arrows of the glass cover slipper are to be oriented in the same way as the green arrow shown on the drawer.

It follows that glasses inside the basket are to be seated in such a way to greatly enhance glasses withdrawal from glass cover slipper.



SETUP – Programming the automated slide stainer

Pressing the SETUP key gives access to the menu (figure X). All the slide stainer parameters can be programmed from the SETUP menu

USER PARAMETERS MODIFICATION

Here the value is defined for the most important parameters of the slide stainer. Once the modifications terminated, pressing the SAVE key will confirm and store the modifications; if ESC is pressed, the modifications will NOT be stored. However, it is necessary to press ESC to exit from the function.
Activating the editing of the setup parameters on the first line on the top right, a message will appear that indicates the software version installed, for example: “SW version 0.6 – AUS240. The only parameter that is important for the user is the SW version, the other parameters have been used during the manufacture of the slide stainer.

Languages

There are 7 languages currently available: Italian, English, German, French, Spanish, Czech and Turkish.

Date Format

In the United States the date is indicated with the following format: month/day/year, whereas in Europe the format is: day/month/year. Here you can choose how the date is to be displayed.

Dryers setpoint (°C)

Working temperature in °C for the Dryers (when installed)

Dryers temperature maintenance (°C)

Holding temperature in °C for the Dryers (when installed)

L/L Alarming

To activate/deactivate the display of ALERTS (minor alarms) during the process.

EOP Signal

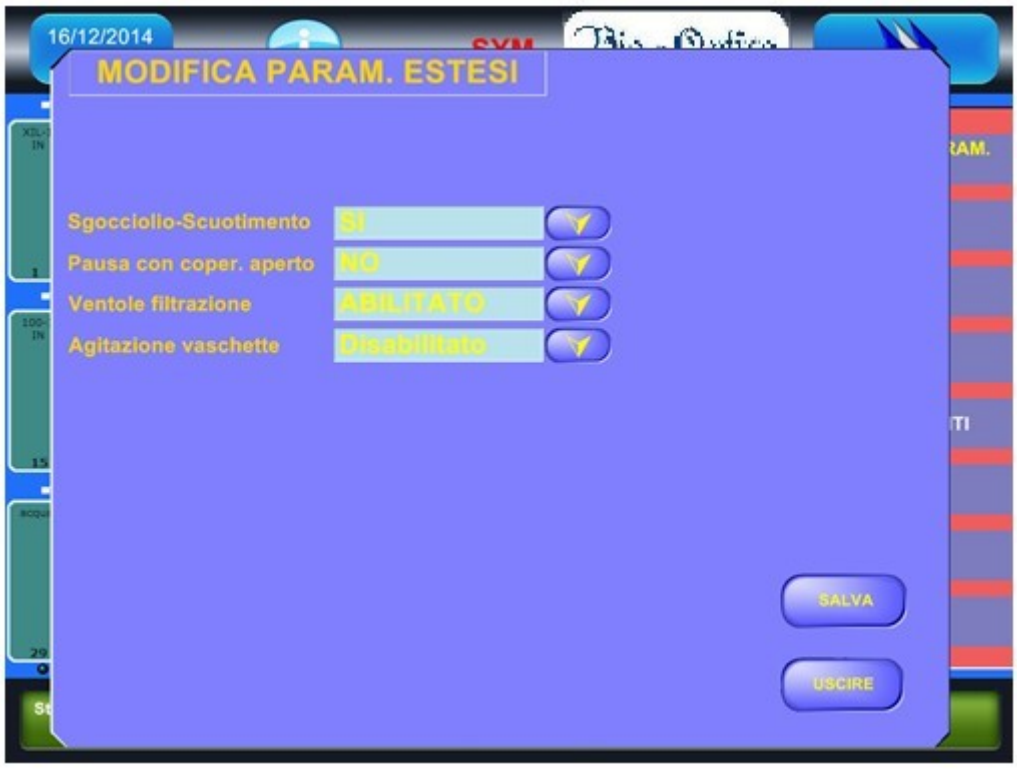
To activate/deactivate the acoustic end of protocol signal.

Panel On Time (min)

Function to determine how much inactive time is to pass after which the screen will switch Off to save energy and increase the operating life of the screen. Also with the screen Off, the slide stainer will continue to function and proceed with the processes running; touching any point of the screen will switch it back on again after approx. 1-2 seconds and the computer will sound a beep to confirm. We recommended that you do not press several times to repower the screen since the first touch will not be considered by the computer as a command, but those that follow

will, therefore pressing several times before being able to see which portion of the screen is being touched, there is a risk of accidentally activating a function.

Pressing the **EXT.PARAM** key gives access, after entering the password, to the EXTENDED PARAMETERS MODIFICATION where some operating modes of the slide stainer can be modified.



Drip with scroll

Enable or disable the dripping and shaking for the 33 stations (28 staining + 5 water + 2 drying)

Time scroll input (s)

It allows to enabble the dripping and shaking of the basket in the 2 INPUT station, the value it is set in seconds

Pause lid open

If enabled (YES), when the lid is opened the handling system stops and all the processes are suspended until the lid is closed again. If this option is not enabled (NO), and the lid is opened, the slide stainer will continue to operate but the handling system works at reduced speed. This assures the continuation of the protocols and at the same time safeguards the operator.

Fan filtration

To enable or disable the fans of the filtering system. The fans have to be disabled when the slide stainer is connected to a centralised fumes exhaust and filtering system.

Tanks Agitation

Used to enable or disable the tanks agitation. The agitation of the tanks sways the liquid contained and as a consequence favours the action of the reagent on the slides that are contained in the tank.

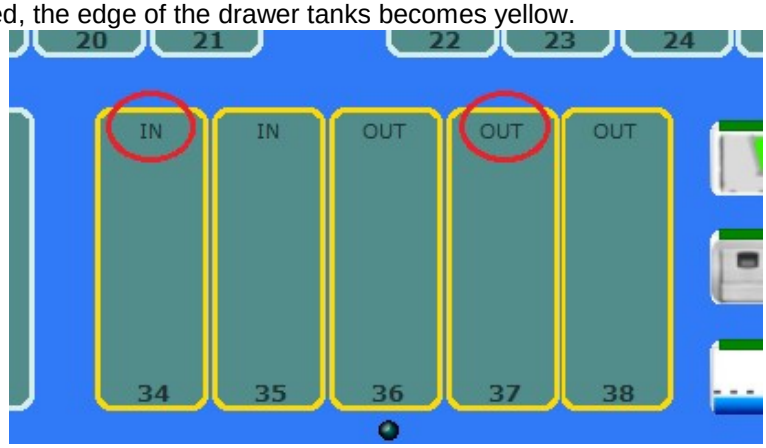
Delay EV water OFF (s) (0-10-20-30)

It allows to anable the water valves for an editable number of seconds at the end of a cleaning step. This function cleans the water inside the tank.

Drawer Sensors –

It allows enabling or disabling the sensors placed in the 5 stations (2 input and 3 output) of the drawer.

In case of a failure of these
sensors (which are used to detect the presence of the basket) the operator can disable them. The operation system of the stainer can operate without the sensors and allows the instrument to be used while waiting for the service technician for the reparation.
If the sensors are disabled, the edge of the drawer tanks becomes yellow.



The operating way with the sensors disabled is the following:

Launching a staining protocol

1.Open the drawer and insert the basket in one of the input tank.
2.Close the drawer.
3.Click on the word 2 “IN” inside the tank were you placed the basket.
4.The program will ask you to choose which protocol you want to use and to confirm it.

The instrument will start the staining protocol and to collect the slides following the scheduled time.

Cleaning step :

At the end of every cleaning step, the water flow inside the tank can be kept up to 30 sec.. this operation allows to clear the water inside the tank. .

Protocol finish and removal of the basket from the output station :

At the end of the staining protocol, the stainer will place the basket in one of the output station which it considers empty.
It is very important to follow this operation for the removal of the basket from the output tank.

1.Wait for the stainer to deposit the basket in one of the output tank
2.Open the drawer
3.Remove the basket
4.Close the drawer
5.Click on the word "OUT" on the tank were we removed the basket.
6.With this operation the icon disappear and the stainer consider that station EMPTY

The point 5 it is extremely important because it informs the stainer that the station it is empty and ready to be filled with the next basket.

OBSERVE CAREFULLY : IF FOR A MISTAKE THE POINT 5 OPERATION IS MADE, BUT THEN THE BASKET IS NOT PHYSICALLY TAKEN OUT THERE IS THE RISK TO SERIOUSLY DAMAGE THE MECHANICAL PARTS OF THE STAINER AND TO COMPROMISE THE INTEGRITY OF THE ALREADY STAINED GLASSES

RMS SETUP

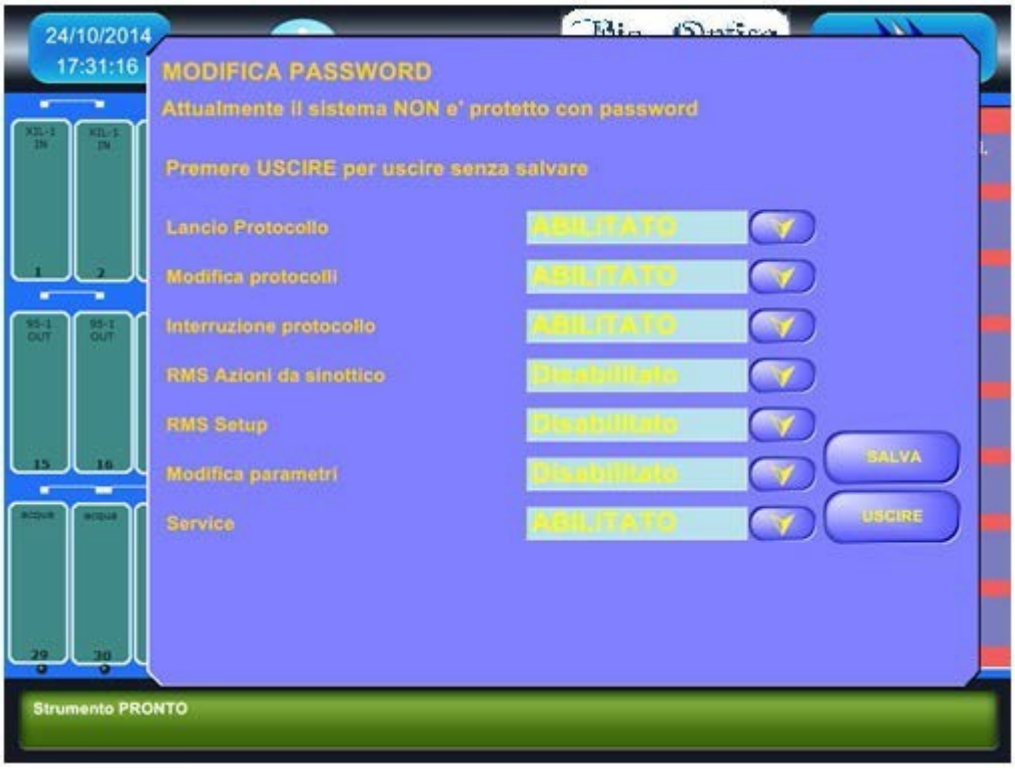
See the specific chapter further on in this manual.

TIME AND DATE

Activating this function displays a screen on which, using the different keys, you can choose what is to be modified: day, month, year, hours, minutes, seconds.
Using the "CONFIRM" key the modifications are saved.
Using the "ESC" the operation can be aborted with return to the previous menu.

PASSWORD MODIFICATION

The slide stainer has a password system that restricts access to all the main functions typing in an alphanumeric string. General rules:
-If the password entered is not correct, an error message is displayed together with an acoustic signal and the system waits until a new password is entered.
-The password can have a length up to 12 characters or numbers (also mixed). -Also empty spaces are allowed in the composition of the password.



Enable/Disable Password

This function is used to enable or disable the password.
If the password is not enabled, the system asks for one to be defined.
If the password is already enabled, the system only permits the disabling if the enabled password has been previously and correctly entered.
It is recommended to make correct note of the password before the activation, since, once enabled there is no way of knowing it except by requesting intervention of our Technical Service .

Password Modification

The password can be modified at any time using this function, but before being able to do so, it is necessary to enter correctly the current password. Follow the recommendations contained in the section Enable/Disable password

Protection Map

As can be seen in the figure, seven functions can be protected by Password. The laboratory manager shall decide which functions are to be protected based on the actual security requirements. The password will be requested at

every activation of a function, and in some cases will also be requested several times during the running of a function; as a consequence, enabling the passwords can cause slide stainer operations to slow down but it is necessary to assure proper protection of the specific function if the work carried out is multiple and complex. The protection levels that can be obtained differ according to the decision of which are to be activated, The most important are the following:

1)Protocols modification
2)Interruption of protocol(s)
3)Parameters modification

To have access to protection map modification it is obviously necessary to type in the current password.

REAGENT LABELS

The most common labels of reagent names are already prepared in the factory, however the operator can make modifications if required. From the main screen, choose SETUP. From the menu that is displayed, choose REAGENT NAMES. It will now be possible to change up to 40 labels for reagent names; these are simple labels that identify the reagents in the process screens and in the RMS.

SERVICE

From this function controls and checks can be made on the functioning of the slide stainer, a detailed explanation of the SERVICE is contained toward the end of the manual, after the section regarding alarms.

PROTOCOL MODIFICATION

From the menu, choose “PROTOCOL MODIFICATION”, a window is displayed that lists the 18 protocols available. From this window, pressing on the name of the protocol (which is highlighted in yellow) the following operations are possible:
1.Edit a protocol (Edit Protocol key)
2.Cancel a protocol (Canc. Protocol key) – After further confirmation.

1) **Edit a protocol**: A screen page is displayed where the chosen protocol is shown ready for any modification. Up to 25 staining steps can be edited and for each step the following data has to be defined:

- TK = tank number from 1-40
  (Selecting the tank displays the reagent previously associated : see RMS Setup function).
- TIME = Time the slides are to remain in the tank (2-2000 sec)
- TYPE = Can have 3 values
  (EXACT = Exact time , FLEX= Flexible time (Tolerance 5%) , OPEN (Undefined time) DRIP = >Dripping time with scrolling

To select a reagent, just click on the number appearing in the TK column (tank). The list of tanks / reagents is displayed in order to ease the selection. Tanks are visualized as they are arranged in the “bath” currently selected (see RMS Setup function). To select a reagent, click on the relevant item. (See figure above)

To access a field, just press on it through the touch-screen. The value can be changed with the "+" and "-" keys or using the numeric keypad on the right side.
Specific keys are provided to insert, add or cancel a staining step.

The name of the protocol can be edited by pressing one of them.

To facilitate programming it is possible to start from the copy of a protocol that has already been saved. Pressing the “Copy program” key will display the window with the names of 18 protocols. Clicking on the name of a protocol, the entire contents will be copied in the editing mask.

If a protocol is assigned a name that already exists, the program will automatically add the symbol (*) at the end of the name already during the editing.

With the “GRAPHIC” key the protocol entered can be viewed in graphic form.

With the "SAVE" key the modifications can be saved with return to the previous menu. With the "EXIT" key the operation can be aborted with return to the previous window.

With the “PRINT” key, a print-out is obtained in PDF format that lists the bath selected and the related layout of the reagents and all the protocols defined with that bath.

Notes regarding the compilation of the protocol:

A) An "OPEN" time can only be attributed to the first station.
B) Each tank defined in the 'bath" can only be used once within the protocol.

EXAMPLE OF A PROTOCOL

The correct configuration of a protocol needs correct arrangement of reagents as well as the use of equivalent tanks/reagents.

Here below you will find an example of a protocol:

Protocol: HAEMATOXYLIN-EOSIN (EQUIVALENT)

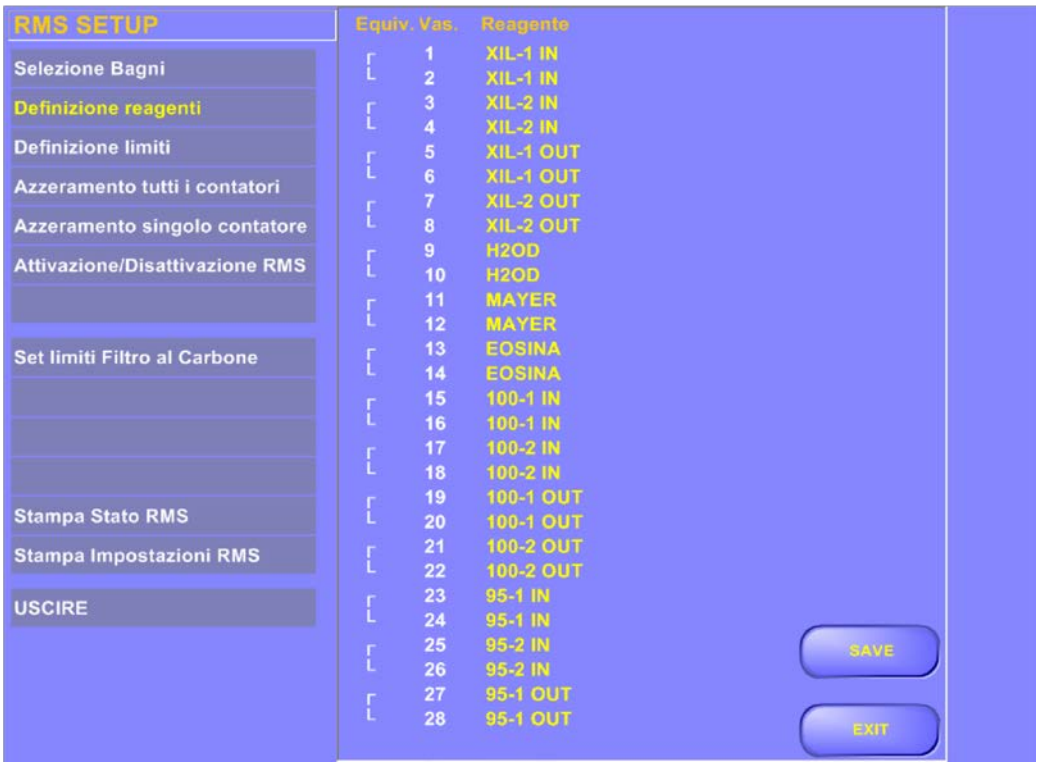
NR	Reagent	Time (sec)	Type	Dripping (sec)
1	DRYING	180	OPEN	0
2	XILENE 1 IN	300	FLEX	0
3	XILENE 2 IN	300	FLEX	10
4	ALCOHOL 100 1 IN	120	FLEX	0
5	ALCOHOL 100 2 IN	120	FLEX	0
6	ALCOHOL 95 1 IN	120	FLEX	0
7	ALCOHOL 95 2 IN	60	FLEX	10
8	H2O – DISTILLED	240	FLEX	10

9	MAYER	300	EXACT	10
10	WATER	300	FLEX	5
11	EOSINE	500	EXACT	10
12	ALCOHOL 95 1 OUT	60	FLEX	0
13	ALCOHOL 100 1 OUT	60	FLEX	0
14	ALCOHOL 100 2 OUT	60	FLEX	10
15	XILENE 1 OUT	60	FLEX	0
16	XILENE 2 OUT	180	FLEX	0

Here below are the 2 screens that show you how to set the protocol together with the arrangement pattern of reagents and equivalents.

Screen showing the protocol programming for haematoxylin-eosin (equivalent).

Screen showing the reagents arrangement for Haematoxylin-Eosin (Equivalent) Protocol.



Reagents management system (RMS)

Basic functioning concepts of RMS

The use of an RMS in a slide stainer is necessary to:
- assure the best use of the reagents to obtain high quality of the stains
- optimise consumption of the reagents
- avoid the need to replace them periodically all at the same time
- avoid boring and potentially unreliable hard copy notes

Good use of the RMS allows the best management of the 3 steps that define a staining protocol

- Dewaxing = Elimination of the paraffin wax that impregnates the section of the histologic tissue
- Staining = According to the type chosen.
- Differentiation= Necessary to remove the excess stain from the tissue

The most important features of the RMS system are:

- To select one of two alternative baths (Bath A and Bath B) Assignment of the reagents to the bath in use.
- To set limits of use to each reagent for the bath use.
- To define equivalent bottles for the bath in use.
- Enable or disable the RMS system.

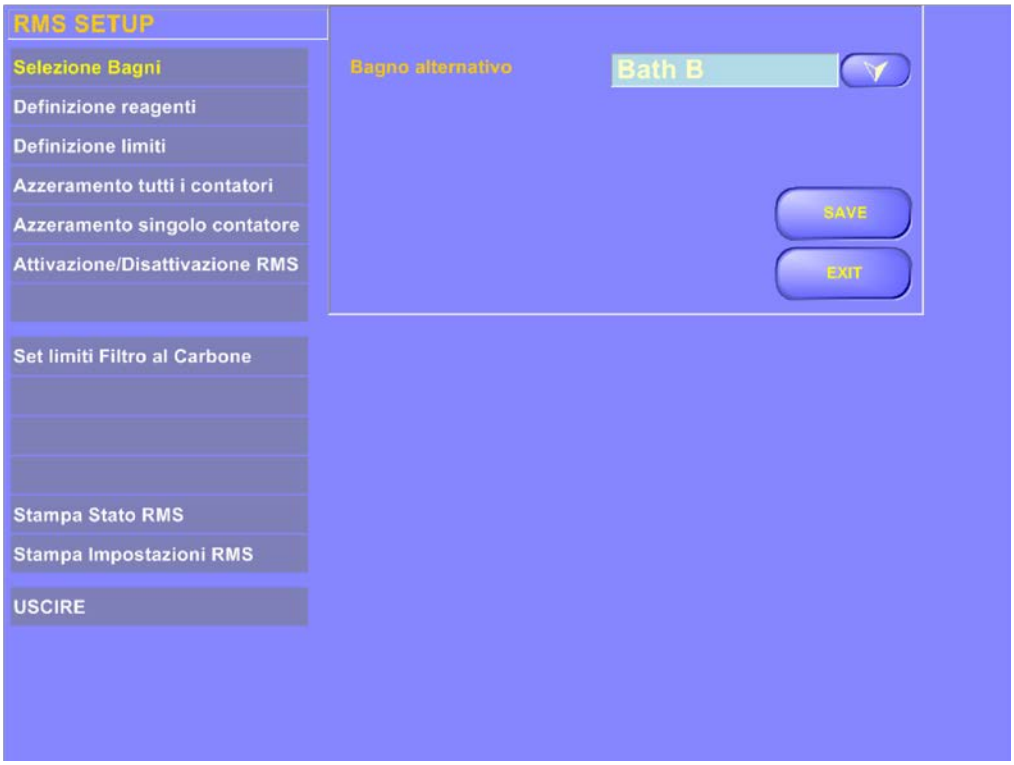
Note: The term “Bath” is intended as the arrangement of the reagents in the tanks 1-28

RMS Setup

With RMS a correct and punctual replacement of reagents is possible assuring continual quality of the staining and therefore of the samples. Use of the system eliminates the need to make boring notes of data regarding replacement of reagents. with a considerable saving of time and elimination of possible errors which at times are crucial when the slide stainers are used by several persons. As explained further on in detail, at the end of every session of protocols, the system automatically requests the replacement of reagents that have reached/exceeded the pre-fixed limits.

Bath selection

On the page containing the definition of the reagents, the bath can be selected (A or B). Changing the bath it is necessary to re-arrange the tanks and at the same time reset the RMS counters to zero.



Definition of Reagents

The definition of the reagents makes it possible to assign, and therefore identify the type of reagent that is used in the separate tanks. The label, with the name of the reagent, is prepared/modified with the “Reagent Names” function. It is to be noted that assigning a reagent name to a tank in RMS **automatically** causes the updating of the reagent name in the process programs.

Important note: the operation of assigning reagents in RMS is in any case carried out regardless of whether the RMS is then enabled/used with the result that it is impossible to use a container that has not been assigned any reagent.

Equivalents definitions

To optimise the scheduling of the staining, equivalent tanks can be defined (containing the same type of reagent and that carry out the same function within the staining protocol). The equivalents are to be positioned contiguously from a minimum of 2 to a maximum of 28. An example of correct programming of equivalent tanks is shown in the previous figure. As can be seen the equivalents have been defined so as to associate for the specific staining step, the same type of reagent.

In tanks 1 and 2 there is the same reagent “Xylene – Xil1_In” that is used in the first stage of “Dewaxing”, in tanks 3 and 4 there is the same reagent “Xylene – Xil2_In” that is used in the second stage of “Dewaxing”. This logic is applied also for the subsequent steps of Staining and Differentiation

With this example it is inferred that the correct positioning method of the reagents and the definition of the equivalents is fundamental to optimise the scheduling of the protocols abbreviating in practice the time for the completion of the protocols and assure common degradation of the reagents that are part of the same group.

Definition of limits

The definition of the limits controls the frequency for replacement of the reagents. For each reagent a limit can be set ,for the number of dipping in the relevant tank. When the limit is reached or exceeded the RMS highlights this on the synoptic panel (tank coloured red) and asks for the replacement of that reagent. If the limit is set at zero for that reagent, replacement will NEVER be requested. It is recommended to set the same limit in a homogeneous group since setting different limits could cause an unbalanced reagent replacement request. Furthermore, as can be seen from the example, the length of a homogeneous group can allow a limit to be set in proportion to this, i.e. the longer a group, the higher the limit may be.

Reset of all counters

With a complete reset all the counters relating to the number of processes run and the number of cassettes processed, including the DAF counter are set to zero. This can be useful when, for any reason, you decide to replace/renew all the reagents and restart the RMS. In the complete reset the charcoal filter and washing reagents are **not** included. **Complete reset is always run automatically each time the RMS is enabled/disabled.** This does not take place, however, when modifications are made to the definition of the reagents or the limits; this choice has been made to leave more freedom of action to the operator, who can, if wished, request resetting of all the counters through the relevant function or reset a single counter through the function described in the next subsection.

Single Counter Reset

Resetting of a single counter sets to zero the separate counters of each reagent. This is useful when, for any reason, you decide to replace/renew a single reagent regardless of whether or not it has reached the preset limit. To reset a counter, click on the number of the tank and press the RESET key

RMS enable/disable

With this function the RMS can be enabled or disabled. Each time the RMS is enabled/disabled, the process and processed cassettes counters are set to zero. If this is used, it is recommended to change all the reagents before reusing the process.

Other functions of the RMS menu

Set limits of charcoal filter

Also the charcoal filter is managed by the RMS. The filter saturation indicator can be consulted from the “Info” window; when the number of processes exceeds the set limit, during the reagents replacement, you will also be requested to replace the charcoal filter.

The limits range from a minimum of 60 to a maximum of 700 working hours of the slide stainer.

N.B.: if you wish to replace the charcoal filter before the planned frequency interval, meaning before that the RMS automatically prompts you for filter replacement, you have to reset the filter counter through the "Charcoal filter pre-set limits

RMS Service Print-out

From the RMS menu the following print-outs can be obtained:

- ❑Situation of RMS
- ❑RMS Setup Parameters

We recommend that you print the RMS Setup every time a significant variation is made. The situation of the RMS print-out can be useful if there are doubts that something has not functioned properly in the reagents replacement cycles. In this case, it is necessary to check the state of the reagents and the limit counters.

OPERATION IN AVR MODE

(AUS240 slide stainer connected to the CVR1 coverslipper)

Basic description

To set the AVR working mode (staining and automatic passage of the basket from the AUS240 slide stainer to the CVR glass cover slipper), the AUS240 lide stainer and the CVR glass cover slipper are interfaced via electrical signals. This interfacing provides that the slide stainer informs the glass cover slipper that AVR operating mode is On (has been activated) (as described in the chapter "AUS240 SLIDE STAINER CONNECTED TO THE CVR (AVR) GLASS COVER SLIPPER". In this mode the glass cover slipper sees the request from the AUS slide stainer and gets ready to automatically accepts the baskets

Here below you will find the description on how the AUS240 and CVR instruments behave when they are working together in the following modes: (AVR mode enabled) or Stand alone (AVR mode disabled)

"AVR" MODE ENABLED	
The AUS240 slide stainer has terminated the staining protocol of a basket	
IF **CVR glass cover slipper ready and in stand-by state**	**IF** **CVR glass cover slipper engaged**
The AUS240 slide stainer directly moves the basket to the CVR system (tank 41) and terminates the task relevant to that basket.	AUS240 slide stainer temporary moves the basket to one of the three (3) output stations and keeps the actions concerning that basket open.
	As soon as the CVR system is ready again (stand by) the **AUS240** slide stainer, consistently with the task scheduling in progress, withdraws the basket previously laid down on the output station and moves it to CVR (tank 41). Thus, the task concerning that basket will be terminated
	If more than one basket is present on the output stations, waiting to be moved to the CVR system, the oldest one will be taken by the AUS240 slide stainer

"AVR" MODE DISABLED	
The AUS240 slide stainer has terminated the staining protocol of a basket	
Glass cover slipper in stand-alone mode. It cannot accept any baskets from the AUS slide stainer	The AUS240 slide stainer is in Stand-alone mode. The basket will be moved to one of the three output stations . Thus, tasks relevant to that basket will be terminated.
The CVR glass cover slipper only operates in manual mode. The basket must be manually placed onto the loading station	The basket is to be removed manually

Important warning:

If the AVR Mode is disabled, all baskets present on the stations coming out from the AUS240 slide stainer are to be manually removed by the technician and manually inserted into the CVR system.

It follows that only baskets worked out in AVR enabled mode shall be automatically moved from the AUS240 slide stainer to the CVR system.

ALARMS

Non-blocking alarms (ALERTS)

01 – Current supply failure

EXPLANATION – No power supply from mains; when the electric power is re-established, the slide stainer resumes the process from where it was interrupted.
CAUSE – Mains voltage drop, the device protection fuses trigger, manual shut-down of the slide stainer.

SOLUTION – If the electric power supply is not re-established: check the electric power supply line including also the socket and mains cable to which the slide stainer is connected; check and, if necessary, replace the slide stainer fuses. Obviously this alert will only be seen on the screen when the cause that created it has been removed. If the slide stainer is running (when power returns this takes place spontaneously), but this type of alarm takes place too frequently (for example more than once a month), it would be opportune to provide the slide stainer connection to an electrical line that is under control of an uninterrupted power supply unit.

07 – File not found

EXPLANATION - A file that is compulsory for computer functioning is faulty or cannot be found; the error recovery systems have compensated the lack of the file.
CAUSE – Computer memory malfunctioning.
SOLUTION – There are NO solutions that can be carried out by the operator, contact the Technical Service , In the meanwhile the slide stainer can probably be used with success.

08 - No axes initialisation

EXPLANATION– The operator has not initialised the axes as requested each time the slide stainer is powered-on. **CAUSE** – This alarm is generated by the control system because the axes have not been reset **SOLUTION** – Confirm axes initialisation from the synoptic panel or the service menu.

14 – Thermocouple failure

EXPLANATION - The dryer temperature sensor does not respond.
CAUSE - Dryer thermostatic devices malfunctioning .
SOLUTION - There are NO solutions that can be carried out by the operator, contact the Technical Service

15 – High level in drainage tank

EXPLANATION – The water level in the drainage tank has reached maximum level.
CAUSE – Tank drainage hole clogged and/or drainage pipe clogged, crushed or badly positioned.
SOLUTION – Check that the drainage hole in the tank and the drainage pipe are free. When this alarm occurs the program stops the water delivery in the washing tanks until the level drops below maximum level.

20 – Voltage drop

EXPLANATION - Electric power supply to the slide stainer is interrupted.
CAUSE - Interruption on the electrical line or the power cable has been removed or the slide stainer has been switched off from the switch located on the right side.
SOLUTION - The voltage drop does not create any problems if the CPU-UPS is functioning and the battery is charged.

21 – UPS – insufficient battery charge

EXPLANATION - The UPS unit battery is not sufficiently charged.
CAUSE – Battery low and/or not functioning
SOLUTION – Check condition of battery and, if necessary, replace.

22 – Protocol interrupted due to voltage drop

EXPLANATION - When the electric power supply is interrupted, the staining protocol/protocols that are running are stopped. The handling system stops but the CPU-UPS keeps the CPU and the touch-screen in operation.
CAUSE - - Interruption on the electrical line or the power cable has been removed or the slide stainer has been switched off from the switch located on the right side.
SOLUTION – Acknowledge the alarm on the screen and wait until the power supply returns.

23 – Protocol with syntax errors

EXPLANATION – An attempt has been made to assign a staining protocol that is not correct to a slide-holder inserted in the inlet station.
CAUSE – The program contains an error or is empty .
SOLUTION – Open the protocol and correct the wrong data, save and try to re-run the protocol.
EXPLANATION – When executing the protocols, if necessary the program reschedules the steps to be run; it is during this activity that the error could occur.
CAUSE – Overlaying of steps.
SOLUTION – Usually the program automatically corrects this error. If this alarm happens often, notify the Technical Service describing the characteristics of the protocol in question.

24 – Protocol scheduling error

EXPLANATION - The program internal scheduler has not been able to allocate a protocol in the context of the protocols already scheduled.
CAUSE - Software anomalous functioning condition .
SOLUTION – Eliminate the protocol that has caused the problem and inform Technical Service of the fault.

25 – Protocol empty

EXPLANATION – It has been attempted to assign an empty staining protocol (that does not have defined staining steps) to a slide-holder inserted in the inlet station.
CAUSE – The program cannot be used. **SOLUTION**
– Select another protocol.

26 – Touch screen driver not found

EXPLANATION – Not finding the touch screen driver, the program cannot receive commands from the operator
CAUSE – Possible touch screen malfunctioning or driver files lost.
SOLUTION – Try switching Off the slide stainer then switching On again and if the problem persists call the Technical Service . It is possible to compensate the touch screen malfunctioning by connecting a keyboard and a mouse to the USB ports on the right side of the slide stainer.

27 – UPS - Failure

EXPLANATION - The external UPS unit is not functioning.
CAUSE – UPS failure or communication cable between UPS unit and slide stainer CPU is disconnected **SOLUTION –** Check functioning of the UPS unit and integrity of the communication cable.

34 – Wrong Password (not managed)

EXPLANATION/CAUSE – The password has been typed in wrongly more than three times, the alert is stored in the alarms archive so that this event is saved.
SOLUTION – Type the correct password. If the password has been forgotten, you must contact our Technical Service to unblock the system.

37 – No language dictionary

EXPLANATION – The dictionary in use has been deleted from the memory.
CAUSE – Corrupted file and/or mistakenly deleted.
SOLUTION – Ask for intervention from authorised assistance. It is possible to continue working selecting another dictionary

39 – Stand-by – Dryer holding temperature not reached

EXPLANATION – To obtain correct functioning of the dryer (optional) the holding temperature has to reach the set value. If the value is not reached and/or held, this error occurs.
CAUSE – Possible failure on dryer resistor(s) or temperature sensor failure.
SOLUTION – There are NO solutions that can be carried out by the operator, contact the Technical Service

41 – AUX axes alarm

EXPLANATION – Malfunctioning on one of the three handling axes .
CAUSE – This alarm is generated when one of the axes remains blocked due to internal mechanics or an external impediment.
SOLUTION – The error message indicates the axis that has generated the alarm. Make a note of the indications on the screen. The alarm is not blocking, but Technical Service has to be informed.

43 – Wrong setting of equivalents

EXPLANATION – The configuration of equivalent reagents requires that the smallest group consists of at least 2 reagents that are to be contained in adjacent tanks. If you attempt to save a wrong equivalents configuration in the RMS Setup / Reagents definition function, the program generates this error.
SOLUTION – Complete the equivalents configuration correctly

45 – Slide-holder sensor not detected (optional)

EXPLANATION - When there is a slide-holder sensor installed, the program checks that at each rising or lowering movement of Z-axis the slide-holder is correctly positioned on the gripping hooks.
CAUSE – The slide-holder has not been hooked correctly and the axes movements are inhibited.
SOLUTION - Open the lid, reposition the slide-holder on the gripping hooks, close the lid and acknowledge the alarm. The slide stainer will resume operation and will complete the interrupted task.

46 – Drawer slot sensor not detected

EXPLANATION - The program does not detect the functioning of the sensor on the front drawer, used to load and unload the slide-holders.
CAUSE - Probable failure on the proximity sensor
SOLUTION – There are NO solutions that can be carried out by the operator, contact the Technical Service

47 – Outlet stations occupied

EXPLANATION – When the 3 outlet stations are occupied, the slide stainer cannot complete a protocol therefore this alarm is displayed.
CAUSE – Outlet stations occupied
SOLUTION – Free them

48 – Drawer open

EXPLANATION – With the drawer open the handling unit arm is unable to have access to pick-up and/or lay-down the slide-holders.
CAUSE – It may just be open or if the alarm occurs with the drawer closed it is caused by malfunctioning of the sensor
SOLUTION – Close the drawer, if the alarm persists contact the Technical Service .

49 – Lid open

EXPLANATION – The slide stainer has to operate with the lid closed to confine the vapours of the reagents and to avoid injuries to the operator caused by impacts with the handling system. In any case to avoid blockage of the slide stainer, when this alarm occurs, the handling system operates at a reduced speed.
CAUSE – The lid may have been left open, but it could be caused by sensor malfunctioning. **SOLUTION** – Close the lid and if the alarm persists contact the Technical Service.

Blocking alarms

54 – Dryer overheated

EXPLANATION – The system has detected that the temperature in the dryer has exceeded the maximum limit.
CAUSE – The causes may be due to malfunctioning of the temperature sensor or a failure on the resistors piloting system .
SOLUTION – Contact the Technical Service .

58 – File not found

EXPLANATION – A failure on a file that is indispensable for computer functioning or the file cannot be found; the error recovery systems have overcome the omission of the file.
CAUSE - Computer memory malfunctioning.
SOLUTION - There are NO solutions that can be carried out by the operator, contact the Technical Service , in the meanwhile the slide stainer can probably be used successfully.

70 – IOB2 board error

EXPLANATION – Problems related to I/O devices inside the slide stainer **CAUSE**
– Hardware failure .
SOLUTION – Try switching the device off, then switch on again. If the problem persists contact the Technical Service .

70 – Errore scheda IOB2 - communication error

EXPLANATION – The IOB board does not dialogue with CPU.
CAUSE – Hardware mulfunctioning and/or serial CPU-IOB cable broken
SOLUTION
If the instrument is in stand-by mode, switch off and then switch on the unit. If the problem persists, contact the After Sale Service.
If the instrument is running (staining protocols in progress), it shuts down as it cannot go on working. All protocols in progress are interrupted and cannot be re-established.

71 – Axes board error

EXPLANATION – Problem related to the handling system functioning, the axes are unable to reach the programmed position and/or have been displaced manually during the process.
CAUSE – The handling system is unable to position itself correctly (physical impediment that blocks the movement) or they have been moved while the slide stainer is running.
SOLUTION – Check and remove any impediments that could block the axes; switch the device Off then switch it On again. If the problem persists contact the Technical Service .

71 – Axes board error - communication error

EXPLANATION – The axes control boards do not dialogue with CPU. **CAUSE** – Hardware malfunctioning and/or serial CPU-Axes boards broken.
SOLUTION
If the instrument is in stand-by mode, switch off and then switch on the unit. If the problem persists, contact the After Sale Service.
If the instrument is running (staining protocols in progress), it shuts down as it cannot go on working. All protocols in progress are interrupted and cannot be re-established.

Alarms generated by commands in the EXTENDED SERVICE menu

88 – Software update - File not found

EXPLANATION – During the software updating operation (function: SW UPDATE) the program has not found the loadable file in the USB device.
CAUSE– No file or with incorrect name.

SOLUTION – Check that the file is contained in the USB and if it is, check that the name is correct.

35 – Watch dog test failed

EXPLANATION – This alarm is generated when the Watch Dog test fails
(function: WATCH DOG TEST)
CAUSE – Hardware malfunctioning between CPU and IOB
SOLUTION – It is important to immediately restore this function because if a failure should occur on the communication line between CPU and IOB, the Watch-Dog resets the IOB board, disabling all outputs.

SERVICE (basic level)

The service menu has 2 levels.

Basic level : Includes a series of useful functions to manage the slide stainer
Extended level : Includes a series of functions to manage the slide stainer setup and therefore the use is reserved for the authorised Technical Service

Note: The SERVICE menu is only in English.

ALARM FILE

Displayed from left to right: date, time, alarm number, description
30 alarms at a time are shown, starting from the most recent. To view the subsequent alarms, just scroll the page using the touch screen
On the same page there is the “Alarms Reset” key to delete all the stored alarms and the “Print” key to create a PDF file with the alarms history.

FILES TRANSFER

This function is used to save all the data of protocols run by the slide stainer on an external memory. After selecting this function, it is obvious that a memory is to be available and inserted in the USB port. To assure backup functioning, the USB memory has to be completely empty. A folder is created on the external memory indicating the date of creation. (example. AacList2014-05-30)

DATA BACKUP

This function is used to save all the data of the slide stainer on an external memory. Subsequently, if required, this data can be restored in the slide stainer memory with the DATA RESTORE function in the Extended Service menu. After selecting this function, it is obvious that a memory is to be available and inserted in the USB port. To assure backup functioning, the USB memory has to be completely empty. A folder is created on the external memory indicating the date of creation (example: AacBkp2014-05-30)

AXLE INIT

This function is used to reset the axes to zero.
After selecting and opening the function, click on the “Axle Init” key and in the next window press the "Start". key .
This function moves the axes at a reduced speed to the 0 (located near tank 1) then returns to Home position (located at the side of station 38)
Initialisation is necessary if the axes have been moved manually to have access to the area underneath (for example maintenance on reagents, tank cleaning etc...)
Before starting initialisation, make sure that there are no impediments inside the slide stainer that could obstruct movement of the axes, and that the lid is closed.

TOUCH CALIBRATION

This function is used to calibrate the TOUCH SCREEN in relation to the LCD screen. After starting the function follow the procedure with care. At the end of calibration, the system will be restarted automatically. CAUTION: any errors in calibration could put the Touch Screen out of use.

TOUCH CLEANING

This function is used to facilitate touch screen cleaning. During this operation, that lasts 180 secs. (3 min), the operator can clean the screen and during this time the touch function is deactivated.

Contacting the manufacturer’s Technical Service

Before contacting our Technical Service, please make a note of the following:
✓type of automated slide stainer
✓serial number
✓software version

✓any number of alarm that has caused the need to contact us, then pass over this data to the person who receives your call.

Safety devices

Protections against overheating

The thermostatic devices have an additional safety check to control the maximum temperature that can be reached in the heater. These devices do not avoid the alarms occurring, but prevent overheating if there are malfunctions on primary temperature control devices; therefore it is fundamental that the slide stainer is NOT used when there are alarms that indicate anomalous increases in temperature. In such cases it is better to completely shut down the slide stainer and isolate it from the mains disconnecting the power supply cable!

Network fuses

The network fuses are located in the rear panel over the socket of the network cable and the main switch,
It is recommended that the replacement is carried out by qualified technicians (preferably technicians of our Technical Service , also because usually the triggering of a main fuse takes place when there is a serious failure).

IN ANY CASE IT IS COMPULSORY TO DISCONNECT THE DEVICE FROM THE ELECTRICAL MAINS!

There are 2 fuses 6,3 x 32 mm. - Type T

Slide stainer AUS with heater - Model 920.001 – 115/230V – 850W (115V = 10A – 230V = 5A)

Slide stainer AUS without heater - Model 920.002 - 115/230V - 500W (115V = 10A – 230V = 5A)

NEVER USE FUSES HAVING A DIFFERENT CAPACITY AND WITH OTHER CHARACTERISTICS AND NEVER TRY TO REPAIR THE FAULTS.

Remote alarm

The Remote Alarm socket has 3 contacts as follows:
- No alarm = contacts 1-2 closed, contacts 1-3 open.
- Alarm in progress = contacts1-2 open, contacts 1-3 closed.

For the layout of the contacts on the connector, see the paragraph “Rear panel” in the first pages of this manual. These contacts do not have any type of electrical voltages, they are isolated from the rest of the slide stainer; therefore they can be used to pilot external alarm devices such as Auto-Dialer devices to dial telephone numbers and send alarm messages. Maximum voltage allowed 48V ac/dc, maximum current 1A.

Slide stainer maintenance

Daily maintenance

For the slide stainer daily maintenance :
✓Check and if necessary top-up or replace reagents ✓Check that the drainage hole of the tank is not clogged.

Periodical maintenance

For the periodical maintenance, to be carried out at least once a month, besides a more attentive control of the daily maintenance operations, the following is recommended:

✓Replace the charcoal filter with the frequency indicated in the specific section and in all cases when there is environmental pollution presumably caused by the vapours of the reagents used in the slide stainer. ✓Check that on the bottom of the reagent tanks there is no solid residue of any type, if there is, remove it. ✓If the reagents are replaced completely, thoroughly clean the tanks ✓Use TEFLON grease to grease the cams of the agitation shafts. ✓Check that the drainage pipe is not bent and/or broken. ✓Check
that the loading pipe is not bent and/or broken.
All the indications regarding replacement of Reagents, Charcoal Filters indicated in this paragraph are not necessary if the RMS is used; in this case, before changing a reagent or a filter it is necessary to wait until this is requested by the slide stainer.

Charcoal filter replacement

Charcoal filter replacement is requested by the slide stainer every time the limit pre-set in the RMS Setup is exceeded. The automatic management of the charcoal filter limits is executed even if the RMS is deactivated, but it will only display the percentage of filter consumption in the Main Menu. In this case, when the charcoal filter is replaced, to reset the percentage it is necessary to enter the RMS Setup from the Main Menu and declare that the replacement has taken place, resetting the relevant counters. Disposal of the old filters is to take place in full observance of the laws in force in the country where the automated slide stainer is used.

Slide stainer cleaning

Before clearing, the slide stainer should be switched off.

Structure cleaning (before starting, remove the 4 tank holder baskets)

STRUCTURE CLEANING		
Part	**Products to be used**	**Personal protections to be worn**
Plexiglass lid	Water - Degreasing detergent	Gloves
Painted structure	Aviation spirit - Degreasing detergent	Gloves + Mask
Steel parts	Detergent for steel	Gloves + Mask
Aluminium parts	Detergent for aluminium	Gloves
Tank	Water and descaling product	Gloves
Touch Screen	Water and glass detergent	Gloves
CLEANING OF PARTS IN CONTACT WITH REAGENTS		
Part	**Products to be used**	**Personal protections to be worn**
Tanks used with xylene	xilene	Gloves+ Mask
Tanks used with alcohols	Water	Gloves

Tanks used with alcohol based dyes	Water	Gloves
Tanks used with water based dyes	Water	Gloves
Slide-holder	Water	Gloves
Aluminium tank holder baskets	Detergent for aluminium	Gloves

Accessories and Optionals

Printer

The automated slide stainer AUS240 is equipped with USB ports that can be used to connect a printer. For use of the printer see the relevant Manual.

External UPS (continuity unit)

General description

The external UPS is an optional. The AUS240 can be powered by external UPS devices or by electrical lines under uninterrupted power supply unit or may have the optional Bio-Optica UPS. With the latter, the slide stainer computer can "dialogue" with the UPS and hence monitor and display the condition of battery charge, check correct functioning of the UPS (if there is a failure on the electric line), display on the screen that the UPS is powering the 240 indicating the residual charge of the battery.

The UPS also acts as the electric power supply filter, eliminating network disturbances and fluctuations. The autonomy of the integrated UPS varies according to the charge status and running of the batteries, consumption of the AUS240 (minimum in stand-by, medium during process without oven heating, high during process with oven heating)

It also protects the electronic systems against potentially hazardous oscillations of the electric power supply: strangely a very short interruption is more damaging to a computer rather than a long one; an interruption of a fraction of a second can cause blockage of a computerised system, whereas a longer interruption does not create problems, but only the complete reset of the system with subsequent resumption of the process from the point in which it was interrupted.

Power-on and Shut down

To shut down devices equipped with UPS units <u>it is not sufficient</u> to act on the main switch or unplug the connection cable to the mains upstream of the UPS, since the UPS will keep the entire slide stainer powered for all the duration of the battery charge. To shut down the slide stainer it is necessary to use the switch located on the right side of the slide stainer and, to be more sure, unplug the connecting cable from the UPS unit!

To re-power, proceed as follows:
-reconnect the slide stainer to the UPS.
-set the power switch of the slide stainer to ON (I.

If it should be necessary to remove the rear panels of the slide stainer to operate on internal parts, be very careful to switch Off the UPS.

Just switching Off from the main switch and unplugging the mains connection cable upstream of the UPS is not sufficient to assure the electrical safety of those who have to operate on internal parts of the automated slide stainer!

To be certain that in the electric circuits of the automated slide stainer there are no hazardous electrical potentials, disconnect the UPS from the slide stainer.

UPS installation and maintenance

For all operations regarding the UPS: installation, start-up, maintenance, replacement of batteries, etc. please consult the specific Manual.

Important note: the optional UPS, to be recognised by the system, has to be enabled by SETUP, if there is malfunctioning of its display system status it can be disabled. The enabling or disabling only concerns the data communication system between UPS and processing computer. Even if disabled the UPS will continue to supply electrical power to the slide stainer but its status will not be displayed, nor considered by the processing computer, If you attempt to enable the UPS when not present, the command will not be accepted.

Important notes

If the UPS is used for long periods, until the batteries are almost discharged (less than 20% of the charge remaining), it will shortly stop supplying the slide stainer and will switch itself Off. When the network power supply is re-established it will take some time before the batteries recharge completely. If they do not, this could indicate a UPS malfunctioning (Faulty batteries or fault in the recharging system), wait another couple of hours, if the problem persists, contact our Technical Service .

When the electric power supply returns, the UPS will reactivate autonomously, without the need to act on any switch or press any key , unless the UPS has been deliberately switched Off. In this case, to re-power it, act on its specific key /switch (see UPS Manual).

It is reminded that to shut down devices equipped with UPS it is not sufficient to act on the main switch or unplug the connection cable to the mains upstream of the UPS, since the UPS will keep the entire automated slide stainer powered for all the duration of the battery charge. To shut down the slide stainer it is necessary to unplug the connecting cable from the UPS!

For further information see the specific UPS Manual.

Technical data and main features

Functional features	
Operating capacity:	Continual loading of a basket containing 30 slides, with throughput depending on the staining protocol.
Operating mode:	Random staining procedure that can be freely assigned to each basket (30 slides), with simultaneous running of a number of processes limited only by the availability of tanks and the type of staining.
Process stations:	Total of 40 stations
Reagent stations:	28 reagent resistant plastic tanks, with capacity 485 ml; the tanks are mounted on racks of 7, that can be easily removed from the slide stainer for reagent topping-up and replacement operations and for periodical cleaning
Washing stations:	5 tanks, with pressure regulator and flow timing
Drying stations:	2, with hot air forced ventilation at 60°C, electronic control, discretion 1°C (optional)
Loading and unloading stations:	2 for loading and 3 for unloading, accessible keeping the slide stainer closed
Agitation:	Vertical movement separate from the transfer arm
Dripping:	Can be set by software
Vapours neutralisation:	Aspiration and integrated active charcoal filter system
Remote alarm	48V AC/DC, 1A maximum
Printer	On USB port – optional
Characteristic control and command functions	
Saveable programs:	18 programs, with 25 steps for each program.
Optional baths:	2 alternative baths – for each bath the names and arrangement of the reagents can be defined.
Equivalent bottles:	To associate equivalent bottles to optimise scheduling of protocols.
Immersion time:	Programmable from 1” to 99’59””, discretion 1”. Possibility to define times as OPEN (no limit) - FLEX (with 10% tolerance) - EXACT (exact)
Interface:	Touch screen monitor, with 15” colour display 1024 x 768 able to show graphically the state of progress of the programs running, the diagram of the process baths and all important staining data.
Languages:	Italian-English-French-German-Spanish-Portuguese-Chinese-Turkish
Reagents quality check:	RMS (Reagent Management System) this system provides an accurate control of the reagents work load; possibility to produce hard copy reports of staining executed, complete with all the real parameters of the process, data transfer directly to printer or by magnetic support.
Password system:	1 level, with protection of the different software functions that can be set by the operator
Backup system:	on external/removable flash memory via USB ports on right side, easily accessible
Internal continuity group (CPU-UPS)	In the event of mains failure only the CPU and Touch.Screen are kept in operation
Uninterruptible power supply (UPS)	In event of mains failure assures functioning of the slide stainer (Optional)
General features	
Dimensions (LxDxH):	1.150 x 770 x 780 mm - monitor overall dimensions: + 400 mm
Weight:	190 kg (excluding reagents)
Electric power supply	115 / 230V 50/60Hz (cannot be selected by operator)
Maximum power installed	Version with heater: 850 W Version without heater : 500 W
Network fuses	115V = 2 x 10A - 230V = 2 x 5A / (T) (dim. 6.3 x 32 mm)
Water supply connections:	Load – Running water supply from 2.5 to 4 bar to wash products quick coupling for 10 mm tube Discharge - Connection with Resca 90° for 18 mm tube (3/4”)

Maximum operating height above sea level	2500 metres
Operating environment temperature	10° / 35° C
Storage temperature	-10° / 50° C
Allowed relative humidity	Maximum 80% with no condensate
Classification IEC1010	Protection class 1 Transient electrical resistance: 800V impulse (version 115V) 1500V impulse (version 230V)
Classification 98/79/EC – IVD	Other general devices – Annex III (without 6)
Certifications:	CE/IVD/UL

Measure unit and abbreviations

RMS	Reagent Management System
W	Watt – power measurement unit
A	Ampere – electric current measurement unit
V	Volt – electric potential measurement unit
IOB2	Input Output Board
TSM	Monitor Touch Screen
PS	Power Supply
CPU	Control Processing Unit board
CF	Compact Flash memory
TS	Temperature Sensor
CPU-UPS	Internal continuity group (keeps CPU and Touch-Screen active– in a power failure.
UPS	Uninterruptible power supply (optional)

Appendixes and other useful documents

AUS240 – Technical Manual PO 751.21
Video Touch Screen – Use and Maintenance Manual
UPS optional – Use and Maintenance Manual

Software versions

The management software of the slide stainer could be subject to modifications and updating other than modifications externally visible to the slide stainer.

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