

*Histology Innovation for a NEW Generation*

Pub No.: OM SS2030-1  
August, 2014, Version 1.0  
SS-2030-120

## Operator's Manual

# SHURStain™ 2030 Linear Slide Stainer

Catalog #  
SS-2030-120





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### **Scope**

This document contains basic information on the use and operation of the SHUR**Stain**™ Linear Slide Stainer SS-2030, and assumes you have received basic training on the instrument. Please contact your General Data Healthcare representative for information not provided in this manual.

### **Intended Use**

Before operating the instrument, please read these instructions carefully to familiarize yourself with its proper operation and functions.

The SHUR**Stain**™ Linear Slide Stainer SS-2030 is a highly efficient Slide Stainer designed to for the processing and staining of tissue for analysis.

Only skilled or specially trained personnel must operate the instrument. The marked safety measures as well as the regulations of your respective lab must strictly be observed.

### **Installation Procedure**

The SHUR**Stain**™ Linear Slide Stainer SS-2030 must be installed, and instrument performance is to be verified, at the customer site by trained General Data Healthcare representatives.

### **Disclaimers**

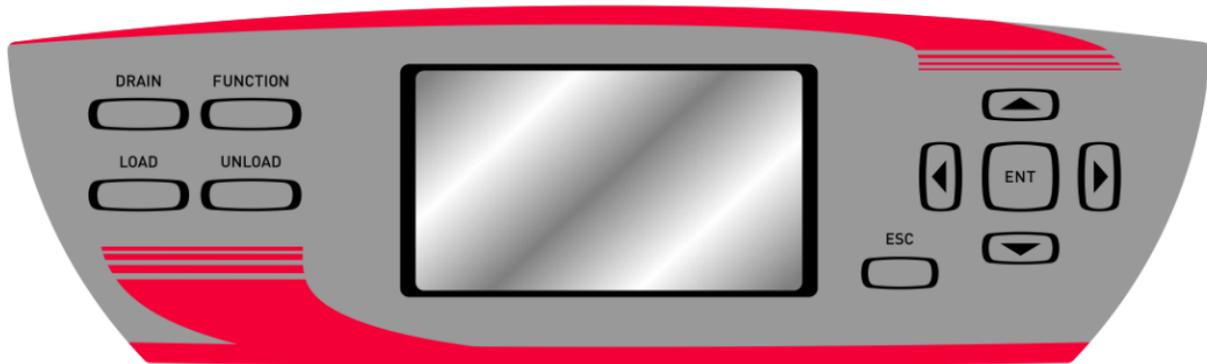
This manual is not a substitute for the detailed operator training provided by General Data Healthcare, or for other advanced instruction. A GDHC representative should be contacted immediately for assistance in the event of any instrument malfunction.

## **Instrument Compliance**

TBS – A Division of General Data Healthcare, Inc. hereby declares the equipment specified conforms to the Classifications(s), Directives(s), and Standard(s) set forth in this document.

Certifications: CE, UL/CSA

## Operator Controls



### DRAIN



The **DRAIN** key is used to enable or disable the draining of the racks as they leave each trough. If enabled, the word **DRAIN** appears on the monitoring screen. This function can only be enabled or disabled when the Stainer is not performing any processes.

### FUNCTION



The **FUNCTION** key is used to abort all staining processes and return the stainer to its starting position.

### LOAD

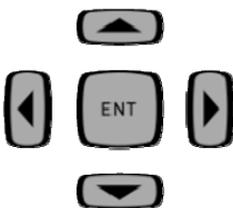


The **LOAD** key is used to confirm the steps of the loading process.

### UNLOAD



The **UNLOAD** key is used to confirm the steps of the unloading process.



The arrow keys are used for navigation (option selection) within the various menus and the middle **ENTER** key for confirming the chosen option.

### ESC



The **ESC** key is used to exit the various menus in which values and operation options are entered.

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## Section 1 | Safety

The installation and normal use of the Slide Stainer is simple and safe if you observe the instructions given in this manual.

Should the equipment be used for unauthorized purposes or uses not specified by the manufacturer, safety may be impaired.

Input and output circuits are isolated from the main power supply.

However, those situations which could be constitute a risk for laboratory personnel or equipment, are distinguished in this manual with the following symbols and warning messages:



This sign, symbolizing **DANGER**, means that injury to persons as well as material damage to the unit may occur if these instructions are not observed.

For your own safety, observe these instructions carefully.



This sign, symbolizing **CAUTION**, means that damage to the unit may occur if these instructions are not observed.

For a long service life of the unit, observe these instructions carefully.



This **INFORMATION** sign draws the user's attention to important details and additional information about the device, and should therefore especially be taken into account.



All persons who are required to operate and program the Slide Stainer should read and fully understand these instructions before using the device.



Warning of biological danger.



Warning of radioactive danger.

## Safety Precautions

The operator's safety is affected, when the instrument is not operated in accordance with this instruction manual.

Apart from the instructions given in this manual, the personnel involved in operating the Slide Stainer should know and observe the general guidelines and rules for safety and hygiene applicable to the workplace where the unit is installed.

Please observe the following general precautions during operation of this instrument. Failure to comply with these precautions violates safety standards and the intended use of the instrument. Especialidades Médicas General Data Healthcare is not liable for misuse of the instruments and failure to comply with basic safety requirements.

## Hazards



### Instrument grounding

The instrument is supplied with a 110/220 V AC mains adapter with a 12 V DC output transformer. The power outlet must be connected to the protective earth and must meet the International Electrotechnical Commission (IEC) regulations.



### Danger in explosive environment

The instrument must not be operated in the presence of flammable gases. Moreover, the instrument must not be exposed to conditions whereby dangerous gas concentrations can occur.



### Hazard of radio-active radiation

When working with radioactive specimens observe all applicable radiation safety procedures. When working with radioactive contaminated material, appropriate safety and disinfecting measures must be carried out. According to the rules and regulations concerning the handling of radioactive contaminated material of the respective laboratory, safety clothing (e.g. particle mask, gloves, protective shoe covers) must be worn. Radioactive contaminated waste must be disposed of according to the respective regulations.



### Chemical hazard

When working with the Slide Stainer, sometimes it is necessary to handle flammable, dangerous fluids. Only trained and qualified laboratory professionals, being aware of the potential dangers and being capable of handling those fluids properly, are allowed to use the instrument.

Before handling dangerous liquids, you must make sure to have read and understood the MSDS and specifically understood the safety instructions and the instructions for proper disposal.



When the instrument is not in operation, the reagent troughs should be covered with the two stainless steel covers supplied to minimize the evaporation of the solvents.



### Wastewater treatment

According to environmental regulations, the occurring waste water should be drained into a discharge channel with subsequent biological/chemical purification.



### Hazard of infection

Specimens used during the intended operation of the instrument might potentially be infectious. For this reason, it is recommended to observe the general laboratory regulations concerning protection against danger of infection. Information on decontamination media, their use, dilution and effective range of application can be read in the Laboratory Biosafety Manual: 1984 of the World Health Organization.

When working with infectious material, appropriate safety and disinfection measures must be carried out. According to the rules and regulations concerning the handling of infectious material of the respective laboratory, safety clothing (e.g. particle mask, gloves, protective shoe covers) must be worn. Infectious waste must be disposed of according to the respective regulations.



**Hazards associated with faults caused by electromagnetic interference**

To avoid the hazard of malfunction of an instrument, it must only be operated in a controlled electromagnetic environment. This means that transmitters such as mobile phones must not be operated in their close vicinity.

In case of malfunctions and/or service work, please turn off the instrument and contact your local dealer.



**Hazards associated with the device's moving parts**

Due to the potential hazards associated with the operation of devices with moving parts, the Slide Stainer must only be used by professionals or properly-trained personnel. We recommend that the unit should not be handled with the cover open, except during loading and unloading, and in accordance with the safety conditions detailed below. To avoid danger, moving speed has been reduced.

## Documentation



This instruction manual will be supplied together with each instrument. Further copies can be ordered at the Technical Service Address by giving the serial number of the instrument, the version of the instruction manual and the date of issue.

This instruction manual is available in English and Spanish

Errors and omissions accepted. Subject to amendment and improvement without further notice.

## Conditions for the transportation of the instrument

Repair or maintenance work is normally carried out at the site of installation. If this is not possible for some special reasons, the instrument can be returned to General Data Healthcare. The contact address can be found at the end of this instruction manual.



For transportation outside closed buildings use the original packing. If the original packing is no longer available, please contact your local General Data Healthcare representation.

## Section 2 | Technical Data

<b>General information</b>	
Power Requirements	12V DC - 3A
Classification in accordance with IEC 1010	Protection class 1
	Pollution degree 2
	Overvoltage category II
Operating conditions	Operating temperature range: 10 - 40°C Relative air humidity: 10 - 80% non-condensing
	<b>FOR INDOOR USE ONLY</b>
<b>Dimensions and weight</b>	
Dimensions	1200 x 440 x 368 mm (W x D x H)
Weight when unloaded and without packaging	55 kg
Total weight with packaging	110 kg
<b>Operating capacity</b>	
Processing capacity	Up to 5 racks at a time, depending on the programs, load frequency and device configuration. Simultaneous performance of up to 5 different staining protocols
Load capacity per rack	30 slides
No. of programs in the memory	Stores up to 20 programs, each with up to 50 steps
No. of reagents in the memory	Maximum 52 (32 programmed and 20 user-configurable)
Immersion time	1 s - 59 m 59 s per step.
Number of stations	20
Reagent stations	Maximum 18
Reagent tray volume	300 ml
Cleaning stations	Maximum 3
Loading stations	Maximum 2
Unloading stations	Maximum 3
Fume extraction	Active carbon filter
Battery life	2 hours (lithium-ion batteries)

## Section3 | Preparation/Installation

Before removing the Slide Stainer from their shipping package, carefully inspect the wooden case for any damage which may have occurred during transport. Should you detect any sign of damage, do not open the case and immediately report the situation to the transport agency.

After removing instrument from its package, inspect it carefully for damage. Should any be noted, immediately notify the distributor from whom the unit was purchased.

Remove the protective pieces and elements used for transportation. Please keep the original packaging and protective pieces in case the device needs to be returned.

Check that the following items have been supplied:

Items included in the box

- Basic device
- 20 reagent troughs
- 3 complete water troughs with fittings.
- 3 water supply tubes with fittings for water troughs
- 1 tool to cut the trough water supply tubes
- 2 reagent trough covers (for 10 trough)
- 5 racks + supports (30 slides)
- 1 active carbon filter
- 1 mains adapter with 12 V DC output transformer
- 1 "D" power cable
- 1 "UK" ST-BU F5A power cable
- 1 "USA-C-J" power cable
- 1 USB cable for connection to PC
- 1 water supply hose (1.5 m) complete with  $\frac{3}{4}$ " connection fittings
- 1 corrugated drain hose (3 m)
- 1 set of clips for drain hose
- 1 spirit level
- 1 user manual



Remove the protective elements securing the robotic arm. Do not attempt to move it manually. The robotic arm will move to its starting position the first time the instrument is turned on.

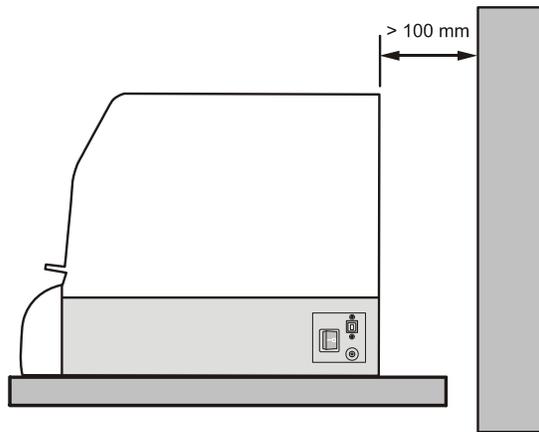
When choosing where to install the instrument, as well as its dimensions, also take into account its weight. See the dimensions and weight on page 10.

Place the instrument on a stable and level surface. Use the spirit level supplied to ensure that the Stainer is completely horizontal.

Make sure that there is enough space to fully lift the covers and allow air to circulate.



The fume extractor outlet is located at the back of the instrument. For correct ventilation of the instrument a minimum space of 100 mm from wall should be kept free.



## Connection

### Connecting to the mains

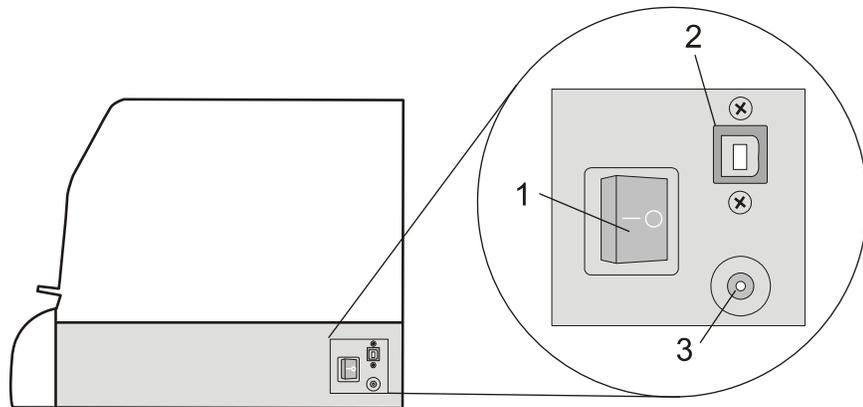


#### CAUTION

Electronics of the Slide Stainer are protected and screened. However, the instrument should not be sited near to heavy electrical machinery generating heat, vibrations or strong electrical noises.

The slide stainer is supplied with a power cable and transformer to be plugged into a standard socket with earth connection. The power supply socket is on the right-hand side of the device.

- 1 Power switch
- 2 USB port
- 3 Power supply socket



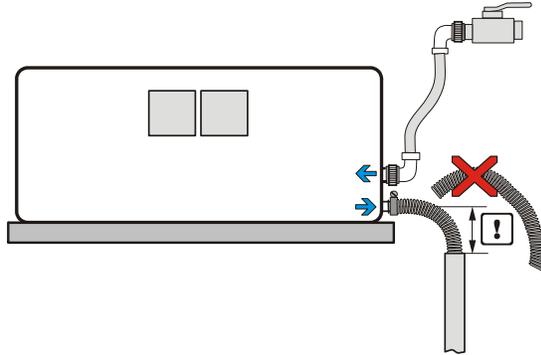
Mains adapter



USB cable

## Water inlet and outlet

The water inlet is connected to a standard household appliance hose with a ¼" threaded fitting supplied with the device. The water supply must be equipped with a stopcock (not supplied) to enable it to be turned off.



The hose supplied for connection to the water outlet has an inner diameter of 20 mm and must be attached to the outlet nozzle with the hose clip supplied.



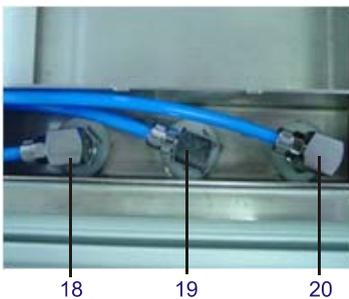
Be sure that the drain level is always at a lower level than the unit and the hose is always hanging downwards.

## Rinsing trough water connection

One of the main features of the Slide Stainer is its modularity and adaptability to user needs.

The Slide Stainer can have up to **three** rinsing troughs with water in any station between 3 and 17.

To determine in which stations the water troughs should be located, consult the person responsible for programming or the pathologist, who will determine the optimum positions for the type of process to be performed.



In stations 18, 19 and 20, there are **three** water outlets with rapid self-locking fittings, which have to be connected, with the flexible hoses supplied (cut to a suitable length), to the troughs in the stations that have been selected as rinsing troughs. The length of the tube (L) will depend on the position of the water intake station and the destination station.



Length L in mm is calculated with the formula:  $(Nt - Nc) * 55 - 16$

Nt is the number of the station in which the water inlet is located.

Nc is the number of the station containing the trough to be connected.

55 is the distance in mm between the troughs and water inlets.

16 is the measurement in mm taken up by the fittings.

It is recommended that you use the outlet of station 18 to feed the station closest to the beginning, station 19 for the middle one and station 20 for the one nearest the end.



Remember that the way that the water troughs are arranged will be determined by the processes to be carried out in order to optimize the performance of the Slide Stainer.

For the example processes shown here (Hematoxylin/eosin and Papanicolaou), the optimum stations are 6, 8 and 10, which correspond to lengths L of 644 mm, 589 mm and 534 mm respectively. See the reagent layout chart on page 22.

## Section 4 | Operation Introduction

If you are using the Slide Stainer for the first time, before you start any real staining processes, you are strongly advised to familiarize yourself with the handling and programming of the device. To do so, we suggest that you perform some process simulations **without samples or reagents**. You can allow the water troughs to be filled, which will also verify that they can fill up and drain correctly.

Before starting to work with the Stainer, it is advisable to perform a status check. Check the following:



### Power Requirements

Check that the power switch is on and that voltage is reaching the device. The window in the bottom left-hand corner illuminates, except when it is being powered by the backup battery (for more information about autonomous operation with the backup battery, see page 37). The display screen also illuminates.

### Water inlet and outlet

Check that the stopcock for the device's water supply is turned on and the drain connected. On page 19, you will find the procedure for forcing the entry of water into the previously-connected troughs and verifying that it is functioning correctly.

### Troughs

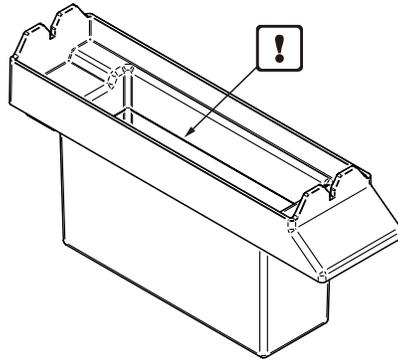
The Slide Stainer is equipped with 20 stations, which correspond to the location of 20 troughs. The first ones are used for loading racks and the last ones for unloading.



Check that the 20 troughs are positioned correctly and not inverted. If they are not positioned correctly, significant mechanical problems can occur.



To prevent the reagents from overflowing, the troughs should only be filled up to the level indicated on the inner recess.



Note that the reagent that each trough should contain is determined by the previously-established **reagent layout chart**. See page 22.



It is possible to have 1 or 2 loading troughs and 1, 2 or 3 unloading troughs. See Setup > Stations on page 20

The position of the water troughs is defined during installation. See page 13



#### Robotic arm

Check that the robotic arm is located on the left-hand side of device and in a raised position (starting position). If not, turn the unit's power switch off and then on.

#### Rack collection.

To check that the robotic arm is collecting the racks properly, see the **MOVEMENT** procedure on page 19.

## Slide stainer components

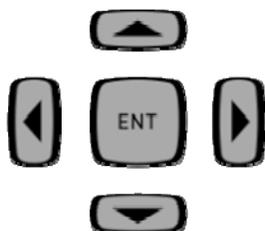
The figure below shows the Slide Stainer's different components.

1. Loading door
2. Central door
3. Unloading door
4. Robotic arm
5. Slide rack (maximum 5)
6. Troughs (20)
7. Display screen and keypad



## Menus and options

### Main menu



The main menu shows the four main options.

Use the arrow keys to highlight the option you wish and press **ENTER**.



**STAIN**

This is the normal operation option for performing processes. It enables you to select the program to run and control the loading and unloading of the racks in the troughs.



**EDIT**

This allows you to enter and edit programs with the keypad. Remember that you can also edit programs with a PC and then transfer them to the Stainer via a USB.



**SETUP**

This enables you to adjust the stainer settings, such as language, date, speed, agitation, etc.



**SERVICE**

Technical Support Service: This provides access to advanced functions which must only be modified by authorized personnel.

## Configurations and settings



**STAIN**

Before starting the **first staining process**, some parameters have to be configured in the **EDIT** and **SETUP** menus. Once the settings have been adjusted and the reagents and programs edited, the **STAIN** process can be started. See the details of how to run a staining process on page 26.



**EDIT**



**REAGENTS**

*This enables you to enter a numbered list with the reagents used. This list is merely informative and is used to facilitate the entering of the names of the reagents during program editing.*



**VIEW/EDIT**

*This enables you to enter the reagents. See an example reagent list on page 21.*



**DELETE**

*This enables you to selectively delete reagent positions.*



**PROGRAMS**

*Before starting a staining process, the Stainer needs to be provided with the sequence of steps that each rack must follow. The Programming Forms must be previously defined. See page 22.*



**VIEW/EDIT**

*This enables you to enter programs. View the editing procedure in detail on page 26.*



**DELETE**

*This enables you to selectively delete programs.*



**SETUP**

Some of these settings can only be configured during initial device start-up (e.g. language, clock). Others will only require changes if so decided by the pathologist responsible for the procedure (reagents, shake, speed, etc.) Also included here are the parameters that control the fume filter and ventilation. Each option includes a brief summary of its function.



**LANGUAGE**

Use the arrow keys to select the language and then press **ENTER**.



**SPANISH**



**ENGLISH**



**DEUTCH**



**FRENCH**



**ITALIAN**



**RUSSIAN**



Use the arrow keys to select each parameter and then press **ENTER**.  
 Within each option, use the arrow keys to increase or decrease the value and then press **ENTER** to confirm.

## CLOCK

### Clock edit menu

Edit date: DD/MM/YY

Edit hour: HH:MM:SS

Type: 12/24H



**DIP**

Dip of the rack within the trough.

The amplitude, number of agitations and agitation speed of the rack in the reagent and rinsing troughs can be adjusted.



**REAGENT**

This affects the reagent stations.

It is possible to define up to **4 dip modes**, each with separate parameters.



With the   arrows, select the **Dip mode** to be defined (01...04).

Press **ENTER** to access each of the parameters and select the value using the  and  arrows.

The example shows the editing of Mode 01 parameters for the reagent stations.

#### REAGENT S. - [MODE 01]

Dip Amplitude (mm.)	20
Dip number	4
Dip speed	2

Dip amplitude (mm.) 10-20-30

*This value determines the vertical travel of the rack during dip within the trough. The standard value is 20 mm.*

Number of dips: 1-2-3-4-5-6-7-8-9-10

*This value determines the number of times the rack will be moved during dip within the reagent trough. The standard value is 4.*

Dip speed: 1-2-3-4

*Please note: value 1 is the highest speed and value 5 the lowest. The standard value is 2.*



This affects the cleaning stations.



With the **←** **→** arrows, select the **Dip mode** to be defined (01... 04). Press **ENTER** to access each of the parameters and

select the value using the **▼** and **▲** arrows.

The example shows the editing of Mode 01 parameters for the cleaning stations.

#### CLEANING S. - [MODE 01]

Dip Amplitude (mm.)	40
Dip number	4
Dip speed	2

Dip amplitude (mm.) 20-30-**40**-50-60

*This value determines the vertical travel of the rack during dip within the trough. The standard value is 40 mm.*

Number of dips: 1-2-3-**4**-5-6-7-8-9-10

*This value determines the number of times the rack will be moved during dip within the reagent trough. The standard value is 4.*

Dip speed: 1-**2**-3-4

*Please note: value 1 is the highest speed and value 5 the lowest. The standard value is 2.*



#### SPEED

This option enables the speed of the vertical movement of the rack to be determined.

##### Speed edit menu

Lift speed: 1-2-**3**-4-5

Lowering speed: 1-2-3-4-**5**

*Please note: value 1 is the highest speed and value 5 the lowest. The standard value is 3 (Lift) – 2 (lowering).*

*Note that the slowest lifting speeds (e.g. 4, 5) produce less reagent drag.*



#### WATER

##### Water flow menu

Water valve (closed/open)

*This enables you to manually open or close the solenoid valve that controls the entry of water into the Stainer. It is used to check trough filling time and to ensure that water flow does not exceed draining capacity. Check that the filling time is about 10 seconds per trough.*

Valve time: MM:SS

*This indicates how much time has elapsed with the valve open.*

Rinsing time: 30-**60**-90

*This determines how long water will continue circulating in the rinsing troughs after the rack leaves the trough.*



#### MOVEMENT

This option allows you to check the functioning of the robotic arm.

Select Setup > Movement.

The device requests you to place a rack in station 1 and to confirm the placement by pressing **ENTER** to perform a rack collection cycle. Press **ESC** to cancel the option.

If the rack is not collected properly, notify the person responsible for the device's maintenance.



### Fan edit menu

This option defines filter usage time and useful life, as well as fan usage time.



Programed Time (hr.) 0...250

*This time depends on how long the fan has been operating. It determines the operating time in hours (with the fan running). Its value will also depend on the reagents used and the type of filter (see the filter supplier's instructions).*

Remaining Time (hr.)

*This indicates the time remaining before the stainer emits a "change filter" alarm.*

Reset

*This option should only be enabled after a filter change. It resets the filter usage time.*



Fan On First Time (sg): 0 ... 300

*This establishes how long the fan should operate each time the device is turned on with the power switch. Once this time has elapsed, the fan switches off and then switches back on and off in accordance with the programed on and off times.*

Fan Off Time (sg): 0 ... 900

*Normal value 300 s*

Fan On Time (sg): 0 ... 120

*Normal value 60 s*



This option defines the codes for access to the different levels of changes in the stainer's parameters for 2 administrators and 4 users. (Grey icon disabled / Green icon enabled)



ADMIN1  
ADMIN2

### ADMINISTRATOR



USER1  
USER2  
USER3  
USER4

### USER



### STATIONS

Loading stations: 1-2

*This defines the number of stations that will be assigned for the loading of racks on the left-hand side of the Stainer. The normal value is 2.*

Unloading stations: 1-2-3

*This defines the number of stations that will be assigned for the unloading of racks on the right-hand side of the Stainer. The normal value is 3.*



### RACK PRIORITY

This menu allows you to establish whether the running of staining processes should be prioritized by **enter order** or **optimized time**.

Use the arrow keys to select the desired option and then press **ENTER** to confirm.

## Advanced configurations



Technical Support Service

This menu's options are reserved for technical support service.

## Programming

The two most outstanding features of the SHURStain™ Linear Slide Stainer SS-2030 are:

- Its ability to operate in multi-load mode.
- Its great versatility in determining operating parameters: almost all process parameters are freely configurable.

**Multi-load mode** This feature enables the Slide Stainer to perform up to 5 processes simultaneously. This means that it is possible to start other staining processes (up to 5) without the need to wait for processes to finish.

This feature greatly improves the performance of the Slide Stainer, enabling it to achieve high levels of productivity.

## Preparation

Before using the Stainer, the following must be prepared in advance:

- A list of reagents
- The staining program(s)
- The reagent layout chart(s)

### List of reagents

To facilitate the entering and documenting of programs in the Slide Stainer, it is recommended that you create a List of Reagents to enter into the Stainer. See page 26.

**This assignment of reagents is purely for illustrative purposes.**

No.	Reagent
01	Haematoxylin-Harris
02	Aqueous Eosin
03	Alcoholic Eosin
04	OG-6
05	EA-36
06	EA-65
07	EA-50
08	Xylene
09	Xylene Substitute
10	Alcohol
11	Methanol
12	Ethanol
13	Isopropyl Alcohol
14	Buffer
15	Tap H2O
16	Distilled H2O
17	Deionised H2O
18	Acid Alcohol

No.	Reagent
19	Acid H2O
20	Bluing Reagent
21	Ammonia H2O
22	Periodic Acid Solut.
23	Schiffs Reagent
24	Sulphite Rinse
25	Van Gieson Stain
26	Alcian Blue
27	Perls Reagent
28	Leishman Stain
29	May Grundwald Stain
30	Giemsa Stain
31	Wright Stain
32	Jenner Stain
33	
34	
35	
36	

No.	Reagent
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	
50	
51	Load (Xylene)
52	Unload (Xylene)

## Preparation of programs

Optimizing the functioning of programs in the Slide Stainer in multi-load mode (several staining processes simultaneously) depends on several factors:

- The order of the reagents in the troughs and having several troughs with the same reagent.
- The position and quantity of rinsing troughs (water).
- The possibility that the staining processes to be simultaneously performed share the same reagents.
- Dip times and the duration of agitation of the rack within each trough.
- Whether the dip time is critical or not. Meaning that the sample cannot be immersed for longer than specified.

This means that, at the same time as creating staining programs to be performed, a **Reagent Layout Chart** should also be created to maximize the resources, based on the points mentioned.

The example shown here is based on two simultaneous staining programs:

- Haematoxylin / Eosin - Program 01, H&E
- Papanicolaou - Program 02, PAP

PROGRAM NO.: 01

NAME: H&E

STEP	STATION	REAGENT	TIME	EXACT TIME	SHAKE MODE
1	1	Load (Xylene)	00:00	NO	0
2	3	Alcohol 100	05:00	NO	1
3	4	Alcohol 96	05:00	NO	1
4	5	Alcohol 70	05:00	NO	1
5	6	Water	01:00	NO	2
6	7	Hematoxylin-Harris	05:00	YES	1
7	8	Water	01:00	NO	2
8	9	Hydrochloric acid	00:01	YES	1
9	10	Water	01:00	NO	2
10	11	Ammoniacal	00:04	YES	1
11	10	Water	01:00	NO	2
12	12	Alcohol 96	01:00	NO	1
13	13	Eosin	00:15	YES	1
14	15	Alcohol 96	01:00	NO	1
15	17	Alcohol 96	01:00	NO	1
16	18	Alcohol 100	02:00	NO	1
17	20	Unload (Xylene)	00:00	NO	0
			29:20		

PROGRAM NO.: 02

NAME:PAP

STEP	STATION	REAGENT	TIME	EXACT TIME	SHAKE MODE
1	2	Load (Xylene)	00:00	NO	0
2	4	Alcohol 96	05:00	NO	1
3	6	Water	00:10	NO	2
4	7	Hematoxylin-Harris	05:00	YES	1
5	8	Water	01:00	NO	2
6	9	Hydrochloric acid	00:01	YES	1
7	10	Water	01:00	NO	2
8	11	Ammoniacal	00:01	YES	1
9	10	Water	01:00	NO	2
10	12	Alcohol 96	02:00	NO	1
11	14	Orange	03:00	YES	1
12	15	Alcohol 96	02:00	NO	1
13	16	EA-50	03:00	YES	1
14	17	Alcohol 96	02:00	NO	1
15	18	Alcohol 100	02:00	NO	1
16	19	Unload (Xylene)	00:00	NO	0
			27:12		

The meanings of the different fields are shown below:

**PROGRAM NO.** (1 ... 20) The Slide Stainer's memory has capacity for up to 20 different processing programs. Each program must have a number from 01 to 20.

**NAME** (ABC) Each program can have a three-digit identification name as a reminder of its function.

**STEP** (1 ... 30) This column is simply a sequence of numbers to indicate the order in which the steps are executed. The program allows up to 30 steps and there should not be any empty steps.

**STATION** (1 ... 20) This refers to the station or trough number (1 to 20) in which each stage of the process is performed.

**REAGENT** (Name) This indicates the reagent contained in the corresponding trough in each station determined by the **Reagent layout chart**.



The troughs containing water have been defined during installation and cannot be freely configured. See page 13.

**TIME** (MM:SS) This is the time in minutes and seconds that the sample remains immersed in the trough. 00:00 indicates an indeterminate time (for example, for the loading and unloading troughs).

**EXACT TIME** This indicates whether the immersion time shown is **critical** or not, i.e. whether it should be exact.  
(YES - NO - 50%)  
YES means that the sample may be damaged if it remains for a longer time than that indicated. This time will not be exceeded under any circumstances by the stainer.  
50% means that the sample can remain immersed for a maximum of up to 50% more than the time specified without becoming altered.  
NO means that the sample can remain immersed for a maximum of up to 100% more than the time specified without becoming altered.



In anticipation of optimum multi-load utilisation (5 simultaneous processes), it is not advisable to use the 'YES' option indiscriminately, but reserve it **exclusively** for **very critical** immersion times. Failure to follow this recommendation may lead to situations that hinder optimum multi-load operation.

**DIP MODE** This column indicates the **Dip mode** to be used.  
(0 - 1 - 2 - 3- 4)  
0 No agitation  
1 Dip mode 1  
2 Dip mode 2  
3 Dip mode 3  
4 Dip mode 4

The **Dip modes**, which refer to the dip amplitude, the number of dips and the dip cycle time, can be independently configured for the reagent and water troughs (see page 18).



Note that a determining factor in the amount of time that the arm will remain occupied (agitating the rack) is also the number of agitations defined in Settings > Dip > Reagent/Cleaning (see page 18). The amount of time that the rack remains in the trough takes precedence over the time resulting from the dip mode (speed x number of dips). This means that the rack can be removed from the trough without having completed the number of programmed dips.

Page 38 features a blank programming form that can be photocopied.

## Reagent layout chart

<b>REAGENT LAYOUT CHART (Example)</b>						
STATION	REAGENT	REAGENT NO.	Program			
			H&E	PAP		
1	Load (Xylene)	51	H&E			
2	Load (Xylene)	51		PAP		
3	Alcohol 100°	33	H&E			
4	Alcohol 96°	34	H&E	PAP		
5	Alcohol 70°	35	H&E			
6	Water	15	H&E	PAP		
7	Haematoxylin-Harris	1	H&E	PAP		
8	Water	15	H&E	PAP		
9	Hydrochloric acid	36	H&E	PAP		
10	Water	15	H&E	PAP		
11	Ammoniacal	37	H&E	PAP		
12	Alcohol 96°	34	H&E	PAP		
13	Eosin	38	H&E			
14	Orange	39		PAP		
15	Alcohol 96°	34	H&E	PAP		
16	EA-50	7		PAP		
17	Alcohol 96°	34	H&E	PAP		
18	Alcohol 100°	33	H&E	PAP		
19	Unload (Xylene)	52		PAP		
20	Unload (Xylene)	52	H&E			

This **Reagent layout chart** example shows the reagent that each trough should contain to perform programs 01 H&E and 02 PAP, the reagent number (to facilitate its inclusion when entering the program into the stainer) and the program that each trough uses (H&E or PAP), thus clearly demonstrating the troughs shared by both programs.

The **Reagent layout chart** is closely related to the programming forms and will be a characteristic of each laboratory. Different reagent layout charts can, of course, be defined to be used with different programs.

Page 39 features a blank layout chart template, which can be photocopied.

## Reagent and program editing

The reagent and program edit menu enables you to enter the information required for the operation of the stainer.



From the main menu, using the arrow keys, select **EDIT** and press **ENTER** to confirm.



Remember that it is also possible to edit the reagents and programs with a PC and transfer them to the Slide Stainer via USB. See page 29.

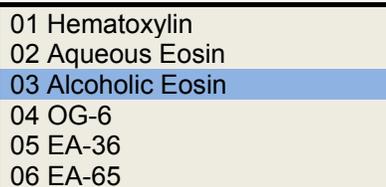
### Editing reagents



Using the arrow keys, select **REAGENTS** and press **ENTER** to confirm.



Using the arrow keys, select **EDIT** and press **ENTER** to confirm.



The numbering is fixed. Using the arrows, select the name of the reagent that you wish to assign to each number and press **ENTER** to edit it.



Remember that the name and number of the reagent are merely informative and do not affect the operation of the stainer.

The following figure shows the appearance of the edit screen.

Alcoholic Eosin										
q	w	e	r	t	y	u	i	o	p	
	a	s	d	f	g	h	j	k	l	
^	z	x	c	v	b	n	m	Del		
123	,						.	Ent		



Navigate around the virtual Qwerty keyboard to select the letters, numbers or symbols that you wish to insert and then press **ENTER**.

On the virtual Qwerty keyboard, use “^” to select upper and lower case, “123” to access the numerical keypad and “Del” to delete incorrect entries.



Once the reagent name has been edited, select “Ent” and then press **ENTER** to finish editing.

A confirmation message will appear.



Press **ENTER** again to confirm the changes. Press **ESC** to leave the edit menu without saving changes.



To delete a reagent, use the same procedure but, this time, select **DELETE**. A confirmation message will also appear.

## Entering programs

The programs that were previously determined on the programming form can be entered into the Stainer by means of the display screen and keypad, or a PC connected via a USB (page 29).

To enter them with the keypad, perform the following steps.

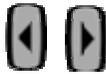
Using the arrow keys, select **PROGRAMS** and press **ENTER** to confirm.



Using the arrow keys, select **EDIT** and press **ENTER** to confirm.



N PROGRAM:		01	<b>General Data Healthcare</b>		
NAME:		H&E			
Step	Station	Reagent	Time	Exact	Shake
01	01	Load	00:00	No	0
02	03	Alcohol 100	05:00	No	1
03	04	Alcohol 96	05:00	No	1
04	05	Alcohol 70	05:00	No	1
05	06	Tap H2O	01:00	No	2



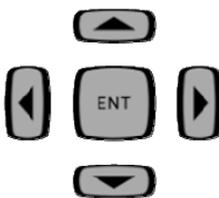
Using the **horizontal** arrows keys, select the program number to edit (01... 20).



Press the down arrow key to access the program name. If you wish to modify it, press **ENTER** to access the virtual Qwerty keyboard.



Press the down arrow again to access the program edit fields.



Use the arrow keys to navigate to the field that you wish to edit (highlighted in **BLUE**) and press **ENTER**. The background color of the field that you are about to edit changes to **RED**. Use the vertical arrow keys to change the value of the field and press **ENTER** again. The field returns to being highlighted in **BLUE**.



Remember that the **Reagent** field is merely informative. The reagent contained in each station is determined by the **Reagent layout chart**, which determines which reagent should actually be contained in each trough.



**DELETE**

To delete a program, select **DELETE**.  
A list of programs entered into the Stainer will appear.

01 H&S
02 PAP
03 PST
04 NOP
05 NOP
06 NOP

Using the arrow keys, select the program you wish to delete and press **ENTER**.  
A confirmation message will appear.

<b>Save changes?</b>	
<b>YES Enter</b>	<b>NO Esc</b>

Press **ENTER** to confirm the deletion of the program.  
Press **ESC** to cancel the deletion of the program.

## Editing reagents and programs with a PC

You will shortly have at your disposal a PC program that will enable you to edit all of the Stainer's parameters and programs more easily.

Stainer Processor Software

Fichero Edición Conexión Ayuda

Programas Reactivos Info Ajustes MYR Registros

Número: 1  
Nombre: PTR

	Estación	Reactivo	Tiempo	Tiempo Extra	Agitación
Paso 1	1	Load	00:00	No	0
Paso 2	3	Acid Alcohol	00:10	No	1
Paso 3	4	Alcohol	00:10	No	1
Paso 4	6	Tap H2O	02:00	No	2
Paso 5	7	Haematoxylin	05:00	Si	2
Paso 6	9	Distilled H2O	01:00	No	1
Paso 7	14	Alcoholic Eosin	00:01	Si	1
Paso 8	16	Ethanol	02:00	Si	2
Paso 9	17	Alcohol	01:00	No	3
Paso 10	20	Unload	00:00	No	0
Paso 11					

Añadir fila Borrar programa

Desconectado

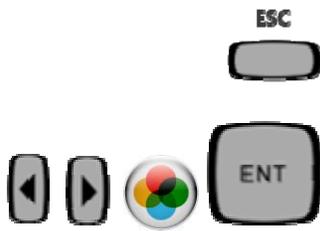
## Running a process

On page 14, it is recommended that you perform some assays without samples or reagents to familiarize yourself with the device. Perform the checks that are shown, carry out some test processes to verify the programs **before filling the troughs** with reagents and run processes with real specimens.



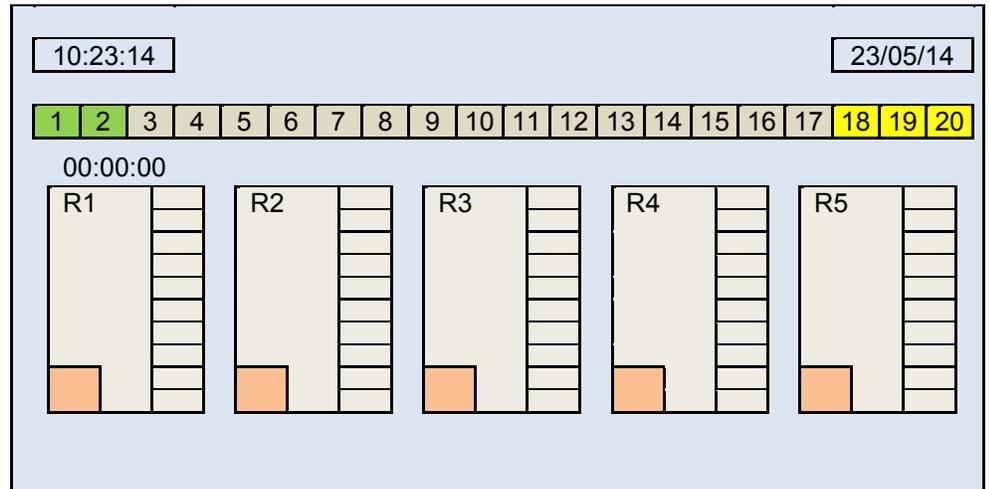
For the tests, you can use programs with non-critical times of 01:00 (one minute) per stage, respecting the critical times, e.g. 00:01 for the troughs that contain hydrochloric acid or ammonia Cal. This will help you to familiarize yourself in a little over 10 minutes with processes that in reality take more than 30 minutes.

## Loading procedure



Press **ESC** to return to the main menu.

Using the arrow keys, select the **STAIN** option and press **ENTER** to confirm. The monitoring screen appears showing the status of the staining programs.



If no process is in progress, you can choose to enable/disable the drain function by pressing **DRAIN**. The screen will show the word **DRAIN** as shown on page 33.



Press **ENTER** again. A screen appears with a list of programs previously entered into the stainer.



- 01 H&E
- 02 PAP
- 03 PST
- 04 NOP
- 05 NOP
- 06 NOP
- 07 NOP
- 08 NOP

Select the name/number of the program that you wish to run and press **ENTER** to confirm.



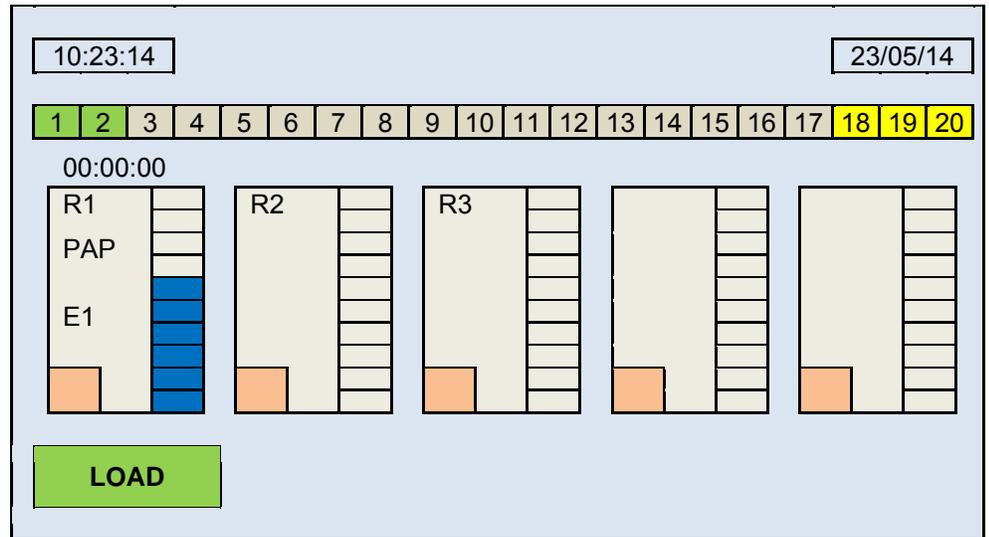
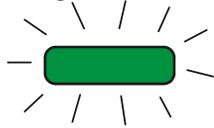
**These instructions must be followed carefully since the processor can only obtain its information if the key presses confirming the loading and unloading operations performed are made in the correct order.**



**For your safety, do not lift the loading or unloading doors when the indicator light is RED. Wait for the light to turn GREEN before lifting the door and placing the rack in the trough.**

Once the program number has been confirmed, the instruction **LOAD** flashes on the screen and the indicator light on the loading side blinks **GREEN**.

The indicator light on the loading side blinks



**LOAD** flashes ►



Press the **LOAD** key

Red pilot light



If the indicator light is illuminated **RED**, wait before you lift the door to load the rack.

Green pilot light



When the **GREEN** indicator light stops blinking, open the loading door and place the rack in the trough (station) indicated by the screen. S1 and S2 refer to Stations 1 and 2 respectively.



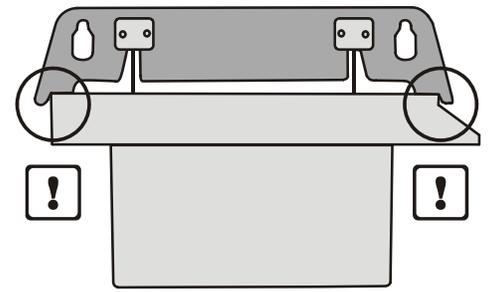
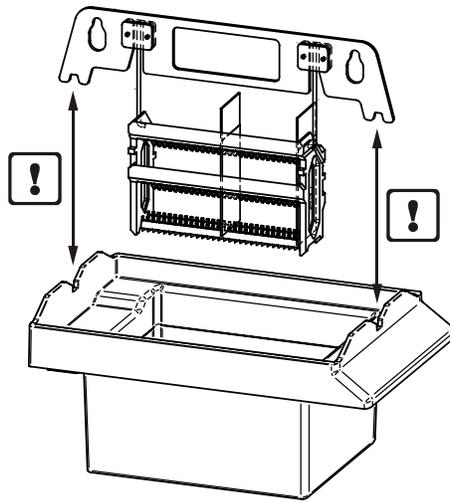
The Stainer may suggest that you use a different trough to the one programmed in order to optimize the processing time.

This message only appears when two loading troughs have been programmed.

You can accept the newly-suggested trough if both loading troughs contain the same reagent.



Make sure that the rack **fits perfectly into the notches of the trough**, otherwise the robotic arm will not collect it properly and a collision will occur.



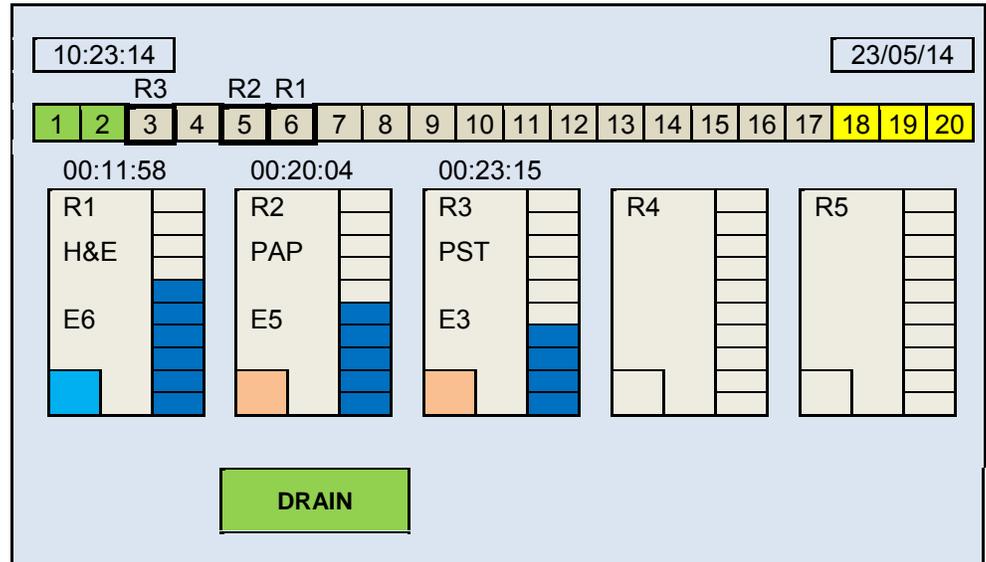
Once the rack has been placed into the corresponding trough, close the loading door and press **LOAD** again to **confirm** that the loading operation has been completed.

The **GREEN** indicator light goes out and the **LOAD** message disappears.

## Monitoring the process

The screen shows an example of how monitoring of the processes is displayed in the Slide Stainer.

This example shows 3 staining processes in multi-load mode.



At the top, the current time and date are displayed. R1, R2, R3, R4 and R5 are the rack numbers.

The line of squares (1 to 20) indicate the stations:

Green: Loading station  
 Yellow: Unloading station  
 Highlighted squares: Stations containing racks. The rack number is displayed above. In the example, R3, R2 and R1.

The status of each of the 5 racks is displayed:

Top: Time remaining to complete the process in HH:MM:SS.  
 H&E, PAP, PST: Programs that are running in each rack.  
 S6, S5, S3: Station where the rack is located. The colour of the box in the lower left-hand corner shows the contents of the tray in the corresponding station:  
 Green: Loading station  
 Blue: Station with water trough  
 Pink: Station with reagent trough  
 Yellow: Unloading station  
 The blue rectangular boxes on the right indicate the percentage of the process completed. In the example, rack 1 is at 60%, rack 2 at 50% and rack 3 at 40%.



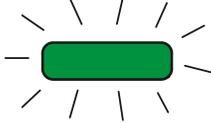
The **DRAIN** box is ENABLED / DISABLED with the **DRAIN** key and indicates the state of activation of the draining operation when the arm has lifted the rack from the station.

The enabling/disabling of this option is only possible when no staining process is underway.

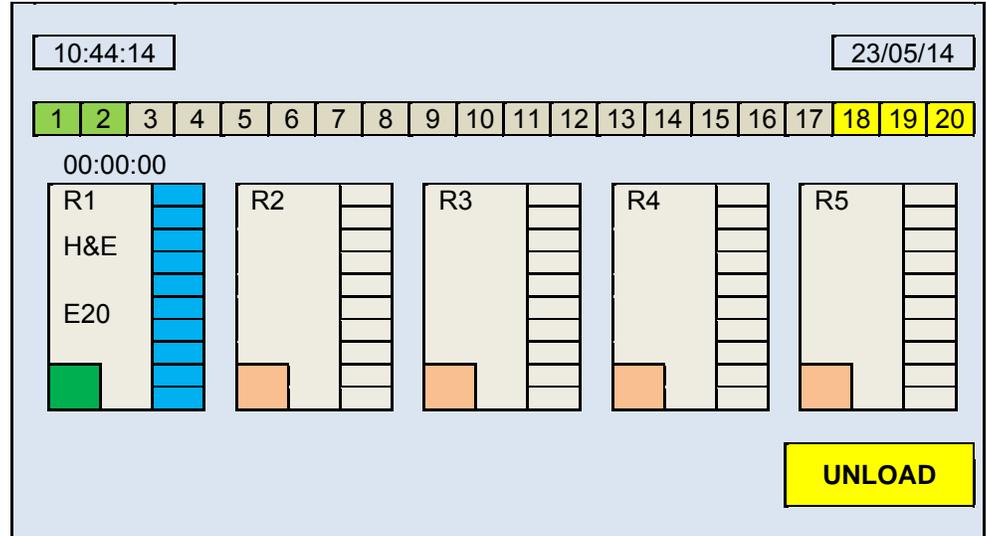
## Unloading procedure

On completion of a rack staining process, the device beeps intermittently and the indicator light on the unloading side blinks **GREEN**.

The indicator light on the unloading side blinks



**UNLOAD** flashes ►



In the example, rack R1, which is located in station S20, has completed 100% of the process and requires unloading. The **UNLOAD** message **flashes**.

**LOAD**



Red pilot light



Green pilot light



**UNLOAD**



Press the **UNLOAD** key.



If the indicator light is illuminated **RED**, wait before you lift the door to load the rack.

When the **GREEN** indicator light stops blinking, open the unloading door and remove the rack from the trough (station) indicated by the screen. S18, S19 and S20 refer to stations 18, 19 and 20 respectively.

Once the rack has been removed from the corresponding trough, close the unloading door and press the **UNLOAD** key again **to confirm** that the unloading operation has been performed, otherwise the device will freeze and emit an error message.

The **GREEN** indicator light goes out and the **UNLOAD** message disappears.

## Section 5 | Cleaning & Maintenance

### Annual routine maintenance

To secure optimum performance of the instrument, it is recommended that a routine maintenance be performed by a trained service technician once a year.

#### Cleaning



#### **DANGER**

In the event of a major spillage of reagents, switch off and disconnect the unit from the mains supply immediately and dry it carefully. Before starting again, check that no parts of the robotic arm have been in contact with the spilled fluid. In case of doubt, have the unit checked by a service engineer before further use.



#### **CAUTION**

Only the listed reagents (see page 21) are suitable for use in the Slide Stainer.

The use of any other reagent will be the responsibility of the user.



- Reagents are to be disposed according to the lab specifications.
- Solvents (reagents) that have been spilled over the instrument should be cleaned immediately. Otherwise, the surface may be affected.
- Coated surfaces and display area are resistant neither to xylol nor to acetone.
- Do not use alcohol, cleaning agents containing alcohol (i. e. glass cleaners), abrasives and solvents with acetone or xylol to clean the unit.
- Hood, display and housing should be cleaned with conventional mild cleaning agents.
- When using cleaning agents, the security advices of the manufacturer and the security regulations of the country where the instrument is operated should be observed.
- When operating or cleaning the instrument, no liquid should contact the electrical connections or the inner part of the instrument.

Please observe these instructions when cleaning the instrument:



- Switch off and unplug the unit from the main power before cleaning.
- Open the fume hood and remove all reagents troughs.
- Pour and clean them.
- Reagents and water troughs may be cleaned in the dishwashing machine.

Wash the reagent troughs and water trough in the dishwashing machine at max. +65 °C.

Standard washing agents can be used.

- The stations **should never be washed** at higher temperatures (i.e., using industrial dishwashing machines that work at **+85 °C**) to avoid deformations.
- The hood and the coated pieces of the housing should be cleaned with a mild cleaning agent.
- Check for the presence of dirt in the drain hose and clean it regularly.

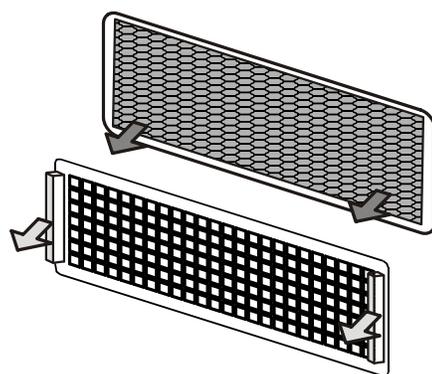
## Replacing the filter



When the display screen shows the following message:

**Filter life expired**

It is necessary to replace the filter and *reset* the Programed Time (see page 20).



The grill that covers the filter is attached with magnets. Pull it away from the magnets by the handles.

Replace the filter with a new one and discard the used filter following the laboratory's established rules.



Do not throw the filter out with the rubbish!  
It contains toxic and flammable products that must be disposed of properly.

It is essential to replace the filter at the end of its useful life because, as well as causing unpleasant odors; a clogged filter can represent a fire hazard.

## Alarm and attention messages

Here is a list of the alarm and attention messages that can appear during the staining process.

Time exceeded in Rack X Box X

This indicates that the programed immersion time of the indicated rack (1... 5) in the indicated station (1...20) has been exceeded. Check the immersion time assigned in the program.

Programs abort?

This confirmation message appears after pressing the  key to interrupt a staining process. Press **ENTER** to confirm or **ESC** to cancel.

Low battery	This indicates that the battery level is below the minimum required for operation. Turn off the instrument with the power switch and complete the staining process manually. Turn on the device and check that it has power.
Communications Error	This message may appear if there is no communication between the both control cards of the Stainer. Contact your distributor for service.
Load station X?	This message appears when the stainer detects that loading to a different station to that which has been programmed (1 or 2) would better optimize the time. This message only appears when two loading troughs have been programmed. You can accept the newly-suggested trough if both loading troughs contain the same reagent.

## Battery operation

The SHURStain™ Linear Slide Stainer SS-2030 is equipped with a backup battery in case a power failure occurs during operation.

In the event of a power failure, the illumination of the window located on the lower left-hand side with the General Data Healthcare logo will go out. The device will continue to operate for a period of about two hours.



At the bottom of the display screen, a battery symbol will appear indicating its charge percentage.



We recommend that you do not start any new staining processes after two hours have elapsed since the power failure.

If you anticipate that the power failure will be prolonged, we recommend that you terminate all processes, turn off the device with the power switch and replace the protective covers to prevent reagent evaporation.

When the power supply is restored, the Stainer will return to normal operation and the battery will automatically start charging.

## Disposal of the instrument after final shutdown



**Separate taking back of electrical and electronic instruments in the European Union countries:**



This is to be applied in the countries of the European Union and other European countries with a separate collecting system within the waste management. This product, being an electro and/or electronic instrument, must be treated separately within the waste management process (WEEE).

# PROGRAMMING FORM

PROGRAM NO.:            NAME:

STEP	STATION	REAGENT	TIME	EXACT TIME	DIP MODE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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19					
20					
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30					



## More Information

PH: 844.643.1129

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