



Automatic Slide Stainer

NASS-100

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1. Safety Measures

- The instrument may only be transported or moved in an upright position; the tilt angle should not exceed 45°C.
- After installation, the fixed feet must be adjusted off the ground before transporting or moving. The input voltage has been preset at the factory; kindly check that this setting complies with your local power requirements before connecting the instrument to the mains power.
- Kindly use the power cord provided. If changing the power cord, ensure that the power cord has with earth wire.
- The instrument must be installed in a ventilated environment. Don't operate in rooms with an explosion hazard.
- The protective parts on the instrument and accessories must neither be removed nor modified, to avoid injury to the instrument or the human body.

2. Introduction

Automatic Slide Stainer NASS-100 offers a dyeing frame with 30 glass slides, improving efficiency. It can handle up to 400 slides per hour, providing rapid processing. This unit has a 500ml reagent tank, ensuring sufficient staining solution for continuous operation. It features a drawer-based mechanism for convenient loading and unloading of staining racks. Our slide stainer includes a color touchscreen display, allowing seamless data input and retrieval.

3. Features

- Adjustable staining settings
- Automated reagent management
- Rapid drying function
- Smart optimization technology
- High-speed processing
- Easy maintenance
- Low power consumption
- Durable and reliable build

4. Specifications

Model	NASS-100
Capacity of dyeing frame	30 glass slides
No. of sites	36
No. of reagent sites	26
No. of washing sites	5
No. of uploading sites	2
No. of downloading sites	3
Capacity of reagent tanks	500ml
No. of stored program	10 sets
Display	10.4-inch color touchscreen
Power consumption	200W
Power supply	AC220V±10%,50/60Hz
Product dimension	1050×600×600mm
Packaging dimension	1140×715×850mm
Net weight	125kg
Gross weight	150kg

5. Applications

Automatic Slide Stainer NASS-100 is used for staining of biological slides to ensure precise, consistent, and high-quality results in laboratories. It is commonly utilized in hospitals, research centers, pathology labs, and diagnostic facilities.

6. Instrument Introduction

6.1 Structure Description

The stainer is used for both normal and special dyeing of biopsies in pathology laboratories. It can process both types of dyeing simultaneously or independently, achieving high-quality staining results. It mainly consists of a rack transfer system, a reagent management system, and a washing system, among other components.

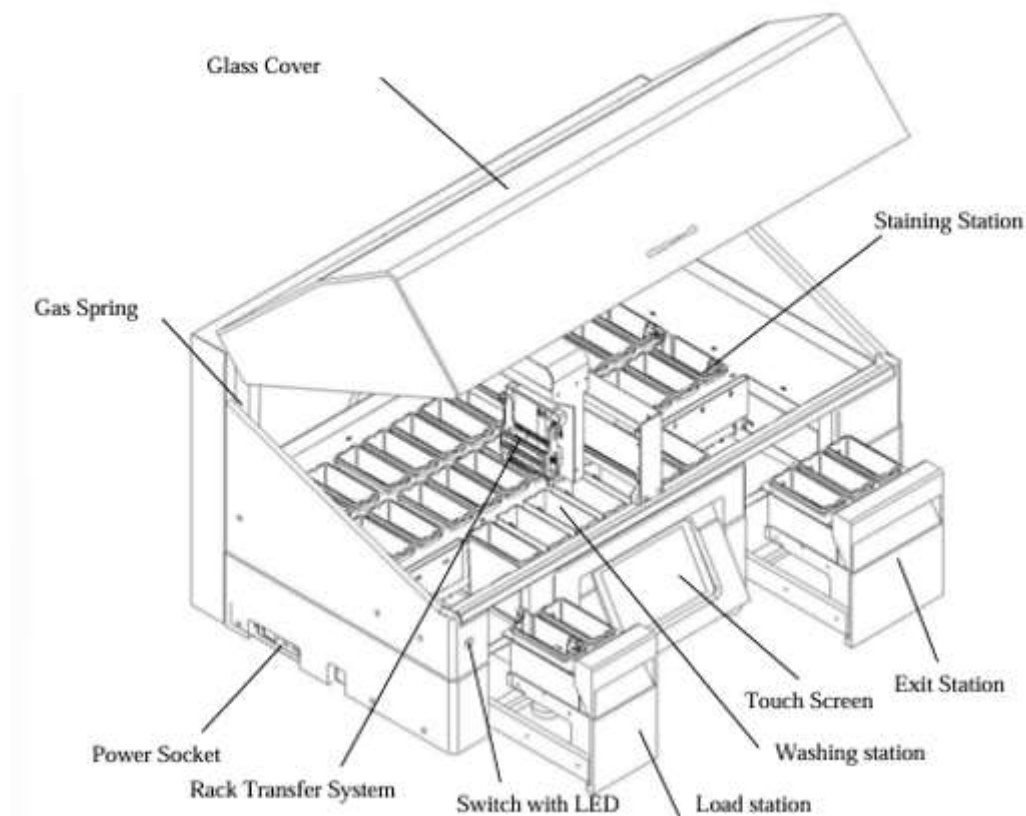


Figure-1

Staining Racks transfer system: Put the staining racks with slides into the dye of the corresponding station as the program set by the user.

Solution Management System : Solution management and its placed position and its setting of corresponding staining priority.

Washing system: To meet the automatic water washing function when multiple staining racks are running at the same time, there are five water washing stations in total.

Heating of staining station: The self-locking switch with lamp is used to control the heating of stations. Press this **control** button, and the light is on, and the heating is on. After about 1 hour, the station temperature can reach 30-35 °C. Press the button again, the button pops up, the light goes out, and the heating is off. The temperature of the reagent gradually returned to room temperature.

6.2 Back Panel Cover Plate Instruction

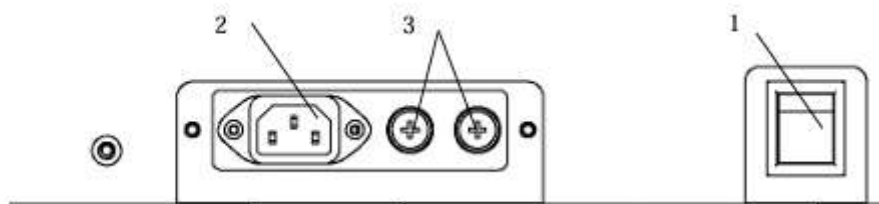


Figure-2

- 1) **Power switch:** AC220V power switch
- 2) **Power Socket:** AC220V socket (with Fuse10A)
- 3) **Fuse:** Equipped with 2 fuses bgdp-5a ($\Phi 5 \times 20$)

6.3 Heat Button

Stain Heat

The switch is used to control the heating of the staining tanks. Press this switch button, and the light will be on, and the heating will start. The reagent temperature will be reached at 30-35 °C in about 1 hour. Press the switch button again, the button pops up, and light goes off, and the heating is off. The reagent temperature gradually returns to room temperature.

Overheat

The switch is used to control the heating of the oven tanks. If you need to oven, kindly turn on the oven heating switch 10 minutes in advance. Turn off the control switch when you don't need to oven heat.

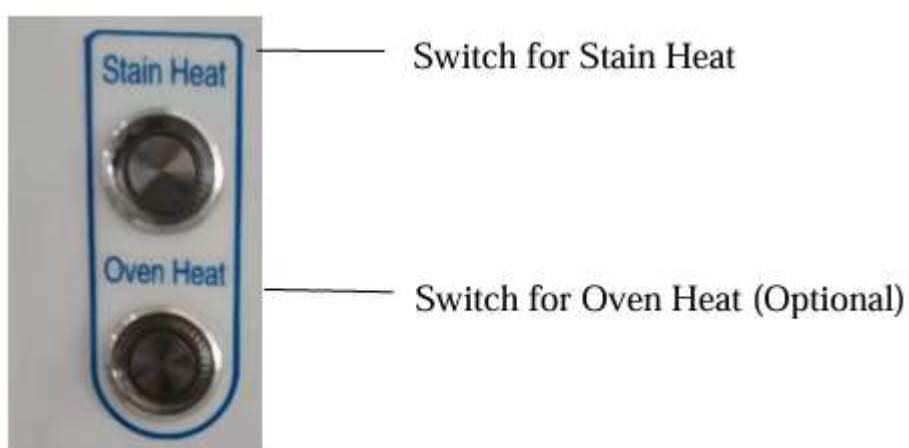


Figure-3

7. Installation

7.1 Unpacking

To unpack, use a slotted screwdriver to pry open the steel buckle securing the wooden box, then remove the top cover. Take out the box containing the LCD touch screen and bracket, the waste bottle, spare bottles, the tray, instruction materials, and other items. Next, remove the side plates. The machine is heavy and requires four people to lift it out of the wooden box. Place it on stable ground and carefully move it to the working area.

7.2 Preparing Installation

- 1) Put the instrument on a flat and solid working platform and connect the tap (**Figure 4**) to the water supply network with the connector accessories attached to the instrument according to the situation of the water pipeline on site.



Figure-4

- 2) First, turn off the water tap, insert one end of the water inlet pipe into the water tap, and connect the other end to the water inlet on the right side of the stainer.
- 3) Turn on the water tap and check whether there is water seepage at each connection of the water inlet pipe.

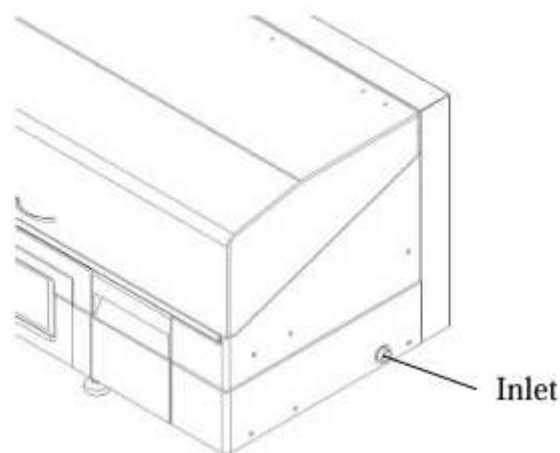


Figure-5

- 4) Place the drain in the sewer

Note: Combined with the use characteristics of the instrument, the working site needs to have a water pipe and be equipped with a water pipe. It is recommended that the user configure a special ventilation cabinet for the dyeing machine. To facilitate the placement of the drainpipe, the attached outlet pipe expansion joint can be placed at the outlet of the drainpipe.

7.3 Installation Guide

Open the box and put the machine on a flat and tight working platform. (The machine is heavy and needs 3-4 people to lift it out of the box)

Installation of water inlet and outlet pipes

- 1) Installation of Water Inlet and Outlet pipes

Check the situation of the faucet on site, The tap is connected to the water pipe using the connector accessories provided by the instrument



Figure-6

Automatic Slide Stainer NASS-100

First turn off the tap and connect one end of the water pipe to the tap and the other end to the water inlet on the right side of the machine



Figure-7



Figure-8



Figure-9

Turn on the faucet and check whether there is water leakage at each joint of the pipe. If there is water leakage, find out the cause and deal with it until there is no water leakage.

2) Installation of Water Outlet Pipes

Install one end of the drainage pipe accessories of the machine, and fasten it with hoops, and place the other end at the sewer pipe.



Figure-9



Figure-10

Do not bend and bend the sewer pipe to ensure a smooth launch.

Note:

- 1) Do not tilt to ensure its stability



Figure-11



Figure-12

Automatic Slide Stainer NASS-100

- 2) The rack should be placed in the drawer straight and not tilt, and the drawer's load and unload site should be in place.



Figure-13



Figure-14



Figure-15



Figure-16

- 3) It is forbidden to Hand into the machine when it is running. If there is any special situation, kindly pause first. When the hood is opened, you can operate by hand without hearing the buzzer.

7.4 Transportation and Storage

Transportation: Without the crash of direct rain or snow, the products after packing can adapt to different kinds of transportation modes.

Storage: The products after packing can be stored under (0~40)°C. Under the condition of no acid, alkali, and no corrosive gas, the products can be stored.

8. Operations

8.1 Preparation

According to different dyeing methods, the user configures the required dyes and places them into its tanks and marks them.

Note: The tank with BROWN color with a special material that is better suited for: Xylene, hydrochloric ethanol, alcohol, haematoxylin.

The White color is better used for alcohol.

8.2 Setting up of the instrument

Reliable power connection and then turn on the instrument, the LCD touch screen will display the main menu after program initialization for several minutes, as shown in the figure.

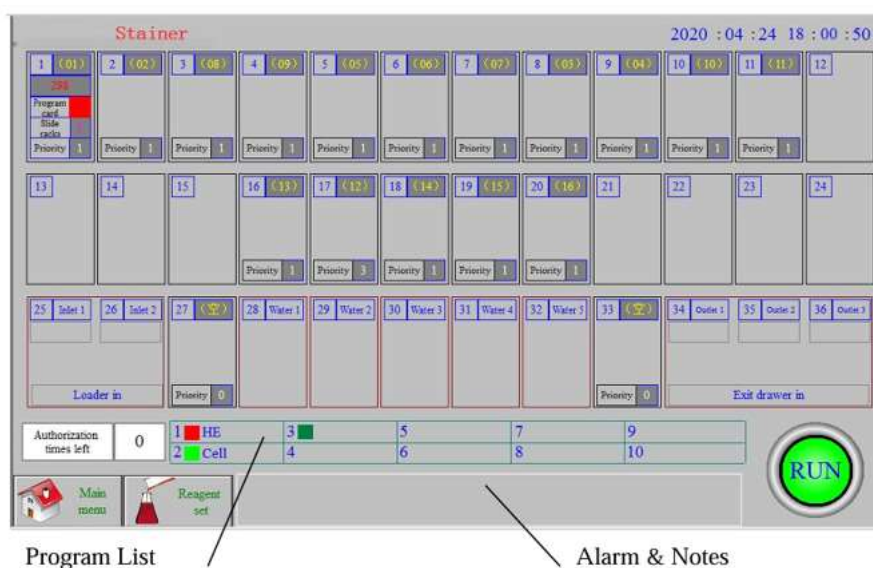


Figure-17

Note: If the buzzer sounds, kindly check the prompt information of the Alarm & Notes toolbar.

The Buzzer sounds possibly caused by

- The glass cover doesn't close properly in a good situation.
- The drawer of exit is not closed in a good situation
- The stations of exit are all occupied by staining racks.

8.3 Menu

Click "Main Menu" and go into the interface, which includes 8 management buttons.

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Figure-18

8.4 Reagent Management

Click “**Reagent Management**” and go into this window.

Reagent management

No.	Reagent name	Priority	Station number	No.	Reagent name	Priority	Station number
1-	Xylene1	1	1	14-	5% NaHCO ₃	1	18
2-	Xylene2	1	2	15-	5% Eosin	1	19
3-	85% Alcohol1	1	8	16-	Orange-G	1	20
4-	85% Alcohol2	1	9	17-	EA-50	1	21
5-	95% Alcohol1	1	5	18-		0	0
6-	95% Alcohol2	1	6	19-		0	0
7-	95% Alcohol3	1	7	20-		0	0
8-	100% Alcohol1	1	3	21-		0	0
9-	100% Alcohol2	1	4	22-		0	0
10-	100% Alcohol3	1	10	23-		0	0
11-	100% Alcohol4	1	11	24-		0	0
12-	1% HCL	3	17	25-		0	0
13-	Hematoxylin	1	16	26-		0	0

RGT used times

RGT alarm times

RGT set times

 Reagent set

 Main menu

Figure-19

In the figure, the designated site is displayed in gray font, and its station number is displayed in the table. The unspecified site is displayed in blue font, and its number is 0.

8.4.1 Reagent name and its priority

Edit the Reagent name as the figure shows.



Figure-20

Normal Reagent Name: Xylene I, II, III, VI, V, 95% alcohol I, II, III, IV, 100% alcohol I, II, III, IV, 80% alcohol I, II, 70% alcohol, distilled water, Hematoxylin, 1% Hydrochloric alcohol (1% ammonia water), 0.5% eosin, etc. Note: the reagent name cannot be repeated (the same kind of reagent can be distinguished by I, II, and III)

- **To modify or clear the reagent name: Press the backspace or clear keys.** The reagent name of the designated station position cannot be modified (gray character). If it needs to be modified, you can enter the reagent management interface, find its position to click, and delete the reagent (i.e., remove the reagent name in the station position), and return to the Reagent management interface (Figure 19) with a blue character at this time.
- **Reagent priority setting:** The Reagent has 1-3 priorities, which are mainly determined according to the soaking time of the tissue in stains. The shorter time and it's the priority. The highest level is 3. For example, 1% Hydrochloric alcohol is generally set as level 3. When more staining racks are running at the same time, the high-priority ones will be executed automatically.
- **Early warning of reagent used times:** When the number of used racks reaches the set number, users can be reminded to change the reagent in time. After the reagent is renewed, press the confirmation key, and the number of times in the used times column will return to zero. (The number of reagent early warning times and setting times can be set according to the usage of dye) .

8.4.2 Reagent Replacement (assign the station position to the reagent)

Click the Reagent Station number in Figure 19 and go to this Figure



Figure-21

The user puts the corresponding reagent in the station first and then places it in the corresponding position in the instrument. Click the corresponding position icon in the interface of **Figure 21** to enter the reagent management interface. At this time, the reagent name in the reagent management interface is blue, as shown in **Figure 22**.

Reagent list							
No.	Reagent name	Priority	Station number	No.	Reagent name	Priority	Station number
1-	Xylene1	1	1	14-	5% NaHCO ₃	1	18
2-	Xylene2	1	2	15-	5% Eosin	1	19
3-	85% Alcohol1	1	8	16-	Orange-G	1	20
4-	85% Alcohol2	1	9	17-	EA-50	1	0
5-	95% Alcohol1	1	5	18-		0	0
6-	95% Alcohol2	1	6	19-		0	0
7-	95% Alcohol3	1	7	20-		0	0
8-	100% Alcohol1	1	3	21-		0	0
9-	100% Alcohol2	1	4	22-		0	0
10-	100% Alcohol3	1	10	23-		0	0
11-	100% Alcohol4	1	11	24-		0	0
12-	1% HCL	3	17	25-		0	0
13-	Hematoxylin	1	16	26-		0	0

Figure-22

Click the raised button of the corresponding reagent, and the interface will return to the interface in **Figure 21**. The corresponding station has been added with the reagent. Repeat the above operations, the required reagent will be designated station.

Note: When putting the reagent into the instrument, it suggests that the user can record the reagent name on each station in a form. After setting the data in the interface, check it in the interface with a form to prevent the reagent misplacing. When a reagent does not need or needs to change a station, you can directly delete the reagent in the interface of **Figure 21** and then reset its position (**Figure 23**).



Figure-23

8.4.3 Setting of Empty Station

When it is necessary to set the 27 and 33 positions as empty locations, click the 27 or 33 position icon in the reagent placement interface into the reagent management interface, as shown in Figure 10, and click the set as empty icon.

Reagent list

No.	Reagent name	Priority	Station number	No.	Reagent name	Priority	Station number
1-	Xylene1	1	1	14-	5% NaHCO ₃	1	18
2-	Xylene2	1	2	15-	5% Eosin	1	19
3-	85% Alcohol1	1	8	16-	Orange-G	1	20
4-	85% Alcohol2	1	9	17-	EA-50	1	0
5-	95% Alcohol1	1	5	18-		0	0
6-	95% Alcohol2	1	6	19-		0	0
7-	95% Alcohol3	1	7	20-		0	0
8-	100% Alcohol1	1	3	21-		0	0
9-	100% Alcohol2	1	4	22-		0	0
10-	100% Alcohol3	1	10	23-		0	0
11-	100% Alcohol4	1	11	24-		0	0
12-	1% HCL	3	17	25-		0	0
13-	Hematoxylin	1	16	26-		0	0

Free

Main menu

Figure-24

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Note: Other stations cannot be set as empty. No empty icon is set in the reagent management interface when clicking on other stations.
Quick access is set in each interface of reagent management.

8.5 Program Editing

Click **"Program edit"** to enter the editing.



Figure-25

There are 10 sets of procedures in the program List.

8.5.1 Program Editing

Click the edit icon to enter the program editing, as shown in **Figure 26**

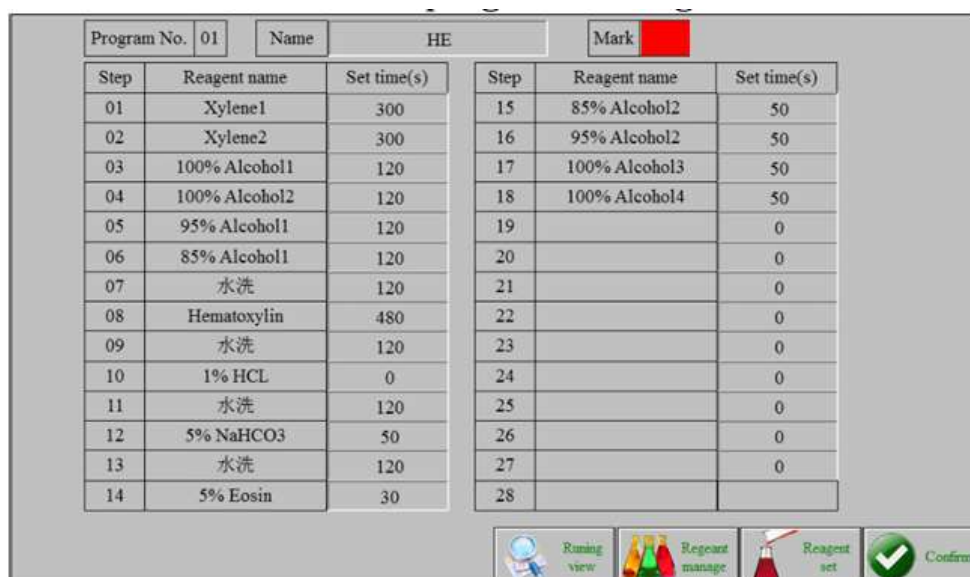


Figure-26

Enter the procedure name

Program No.	01	Name	HE	Mark	
-------------	----	------	----	------	--

Step	Reagent name	Set time(s)	Step	Reagent name	Set time(s)
01	Xylene1	300	15	85% Alcohol2	50
02	Xylene2	300	16	95% Alcohol2	50
03	100% Alcohol1	120	17	100% Alcohol3	50
04	100% Alcohol4	50	18		0
05	95% Alcohol2	0	19		0
06	85% Alcohol2	0	20		0
07		0	21		0
08	H	0	22		0
09		0	23		0
10		0	24		0
11		0	25		0
12	5% NaHCO3	0	26		0
13	水洗	120	27		0
14	5% Eosin	30	28		

Character: [Lowercase]

HE

1	2	3	4	5	6	7	8	9	0	<-
q	w	e	r	t	y	u	i	o	p	
a	s	d	f	g	h	j	k	l		
Caps	z	x	c	v	b	n	m	Del		
Symbol	Abc/2b	Blank space				退出	确定			

Running view
 Reagent manage
 Reagent set
 Confirm

Figure-27

Click the color code to enter the color code setting, as shown in Figure 28.

Program No.	01	Name	HE	Mark	
-------------	----	------	----	------	--

Step	Reagent name	Set time(s)	Step	Reagent name	Set time(s)
01	Xylene1	300	15	85% Alcohol2	50
02			16	95% Alcohol2	50
03			17	100% Alcohol3	50
04			18	100% Alcohol4	50
05			19		0
06			20		0
07			21		0
08			22		0
09	水洗	120	23		0
10	1% HCL	0	24		0
11	水洗	120	25		0
12	5% NaHCO3	50	26		0
13	水洗	120	27		0
14	5% Eosin	30	28		

ESC		Yes		

Running view
 Reagent manage
 Reagent set
 Confirm

Figure-28

Automatic Slide Stainer NASS-100

Select the corresponding color code and press confirm. Click the corresponding icon under the reagent name to select the reagent needed for each step

Program No.		01		Name		HE		Mark			
Step	Reagent name		Set time(s)		Step	Reagent name		Set time(s)			
1-	Xylene1	11-	100% Alcohol4	21-		85% Alcohol2	50				
2-	Xylene2	12-	1% HCL	22-		95% Alcohol2	50				
3-	85% Alcohol1	13-	Hematoxylin	23-		100% Alcohol3	50				
4-	85% Alcohol2	14-	5% NaHCO3	24-		100% Alcohol4	50				
5-	95% Alcohol1	15-	5% Eosin	25-			0				
6-	95% Alcohol2	16-	Orange-G	26-			0				
7-	95% Alcohol3	17-		27-		Water clean	0				
8-	100% Alcohol1	18-					0				
9-	100% Alcohol2	19-					0				
10-	100% Alcohol3	20-					0				
13	水洗		120		27			0			
14	5% Eosin		30		28						

Running view
 Reagent manage
 Reagent set
 Confirm

Figure-29

Note: The reagent of the defined station is displayed in the blue box. Select the reagent want and press Confirm. Or press the clear key to clear the reagent in the current column and select the reagent again. Click the corresponding icon under the setting time column to set the time for each step of staining.

The program can edit up to 28 steps. When a certain step doesn't set the reagent, the staining will not be performed. When two steps don't set the reagent, the staining program is finished. The staining steps that exist in this later step will not be performed.

After the program is edited, press the confirm key to save the program. If need to modify the program, kindly press the confirm key to save the program after modification.

8.5.2 Program Delete

Click "**Program Delete**" to delete.

8.6 (Morning Interface) Figure 30

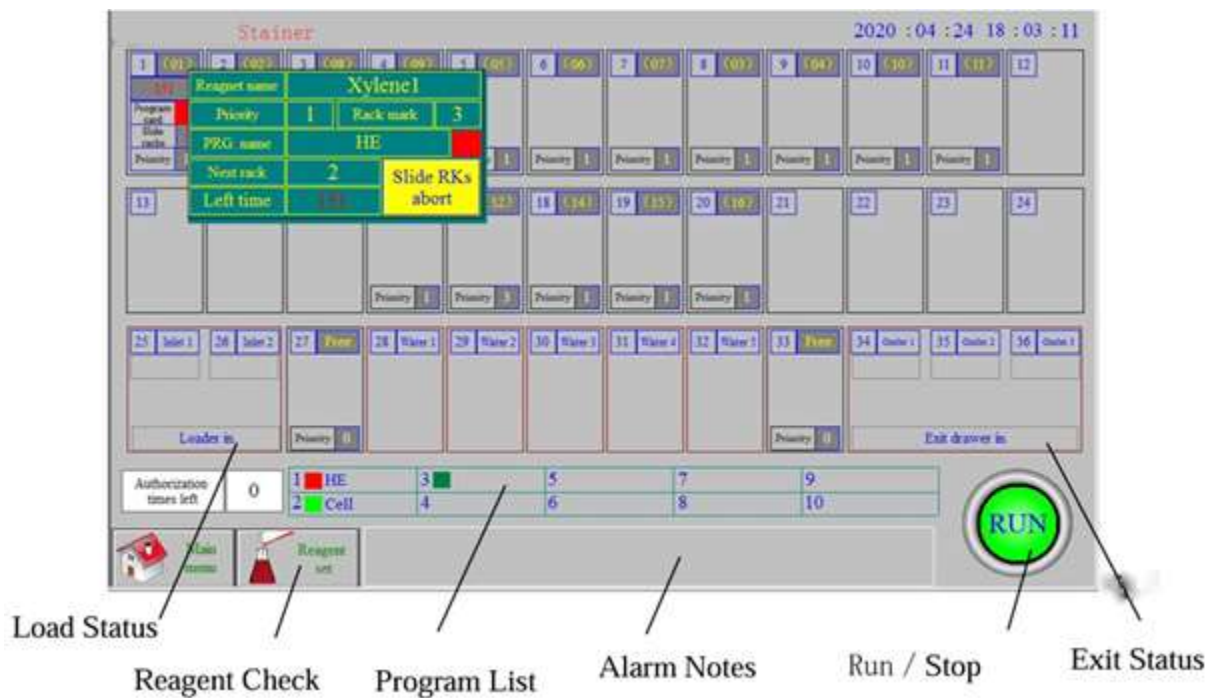


Figure-30

8.7 Wash Station Calibration/System Maintenance

The station calibration management key is mainly used for the initial station coordinate debugging and setting of the equipment. The system maintenance management key is mainly used for the setting of some variable position parameters and the indication of sensor status (including the indication of output status). Both management functions are provided with password management.

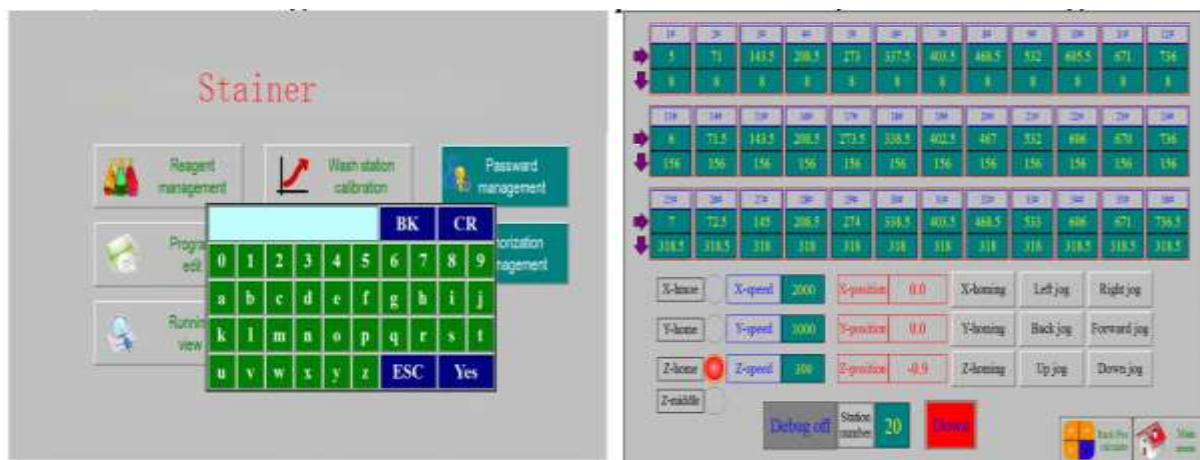


Figure-31

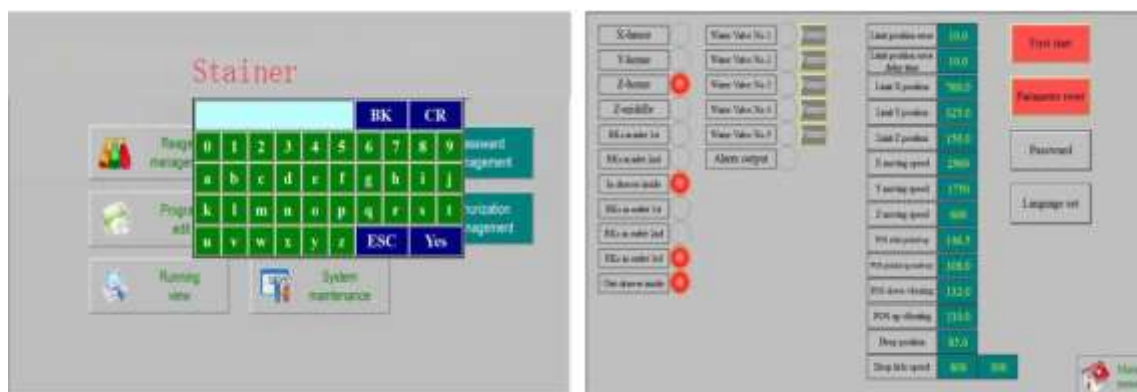


Figure-32

The system maintenance interface can be used for system password management and language setting (Figure 33)



Figure-33

Note: These two functions generally do not need to be used.

8.8 Function Setting

Click” **Function set**” in the Main Menu. It is mainly to set the critical time of the instrument.



Figure-34

- **Load waiting time:** Refers to the time (30-60s) reserved for changing the program after the rack is placed in the Loading drawer.
- **Priority waiting time:** Time between different priority intervals of reagent (3-5s).
- **Moving preparation time:** The moving time (4-6s) in advance when the actuator is ready for the position of the dye holder to be extracted.
- **Staining rack waiting time:** The waiting time (3-6s) at the current staining stations after rack extraction.
- **Alarm reset:** In case of a fault alarm, the alarm signal will reset after troubleshooting.
- **Alarm sound off:** Eliminate the alarm sound in case of beep and accident alarm. Cover opening operation/shutdown mode: control the operation/suspension of the mechanical arm when the cover is opened.
- **Water flow detection off/on** it is an optional function. When the water flow detection function is configured, the water flow detection is on (default: off).

8.9 Authority management/Authorization management

8.9.1 Authority management: Divided into administrator level and experimenter level

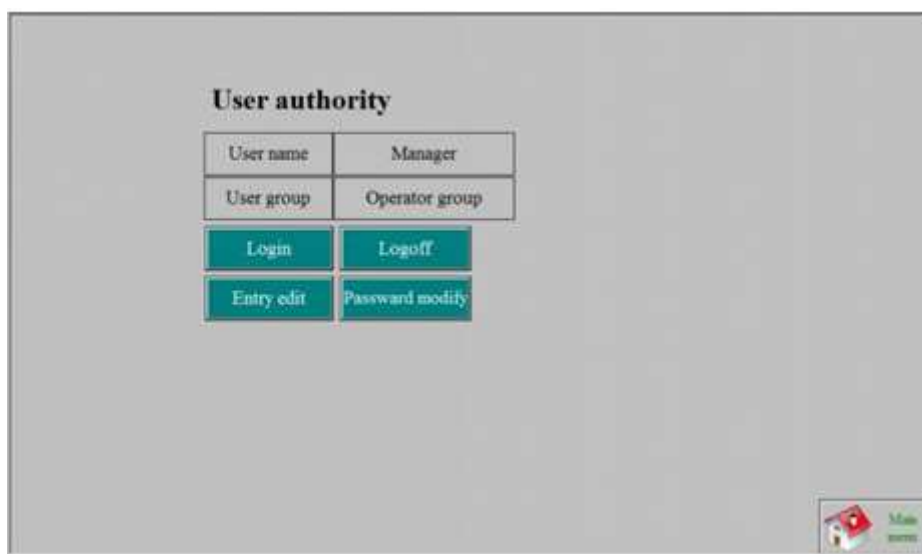


Figure-35

Administrator-level users can add and delete experimenter-level users. After administrator-level users add experimenter-level users, experimenter-level users can use all functions of the device, such as program editing, the Reagent management function, selecting existing programs for staining operation, etc. A password is required for login. The password is set and managed by the user. There is no password at the factory.

8.9.2 Authorization Management

The password is required for the login of authorization management. The password user is set in the password management interface (**Figure 33**). Enter the correct password and enter the **Figure 37** interface. There is no password when leaving the factory. The password is set and managed by the user.

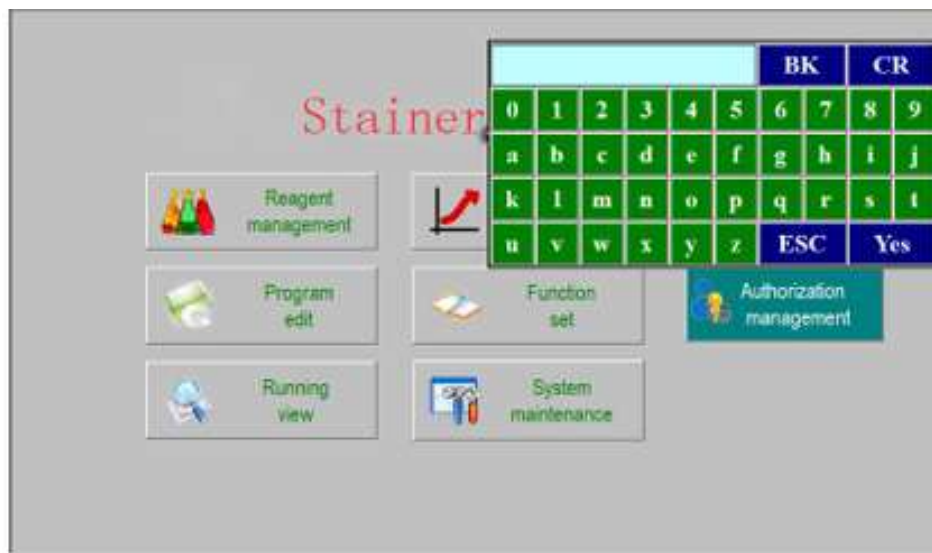


Figure-36

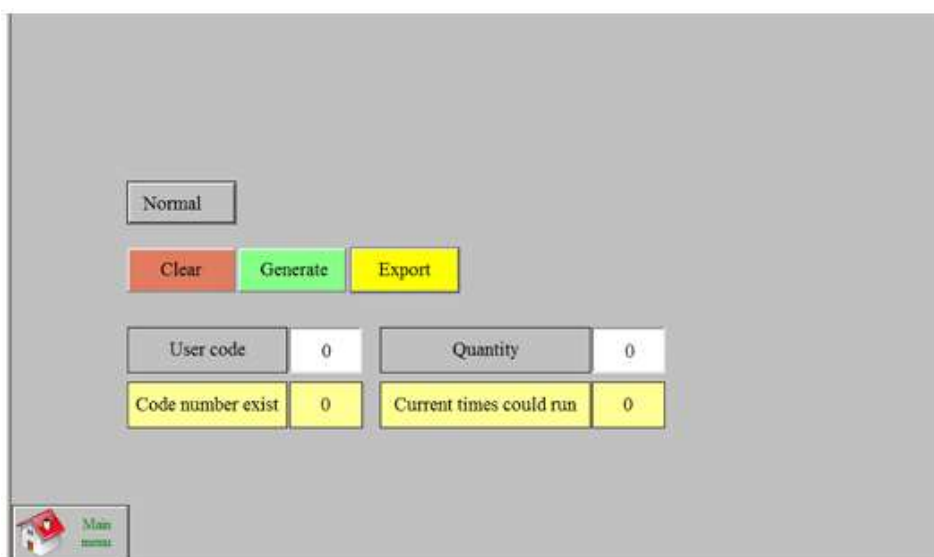


Figure-37

- There are two ways to choose (default: Standard) and authorization.
- The authorization way is optional. It is used for users who have strict management requirements for staining. Barcode scanning gun needs to be configured. The standard configuration is conventional.

8.10 Staining Preparation

8.10.1 Preparation

- 1) According to different staining methods, the user configures each reagent (500ml), adds it to the station attached to the instrument, and marks it.



Description: The brown VAT contains xylene, hydrochloric acid, alcohol, hematoxylin dye, and the white VAT contains gradient alcohol.

- 2) The station is placed on each position in the instrument after optimization according to the staining process, and all the required stations are designated through the reagent management interface.
- 3) Edit each staining program through the program editing interface (10 sets of programs can be edited in total).
- 4) Set the time required for normal operation of the instrument through the parameter setting interface.

8.10.2 Upload of Staining rack

- 1) Insert the slides into the racks as follows.

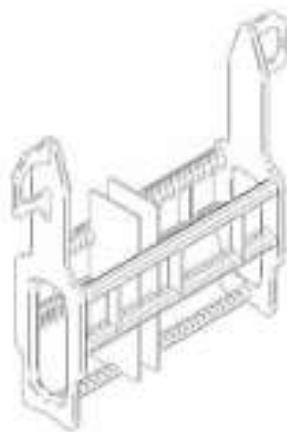


Figure-38



Figure-39

- 2) Open the upload drawer and place the rack on the load stations in the upload drawer.

Note: the rack should be aligned with the V-notch on the stations. There are 2 upload sites in the upload drawer.

- 3) Close the upload drawer, and the user selects the program (1-10). If the program does not need to be changed, the last running program will be executed after the waiting time.

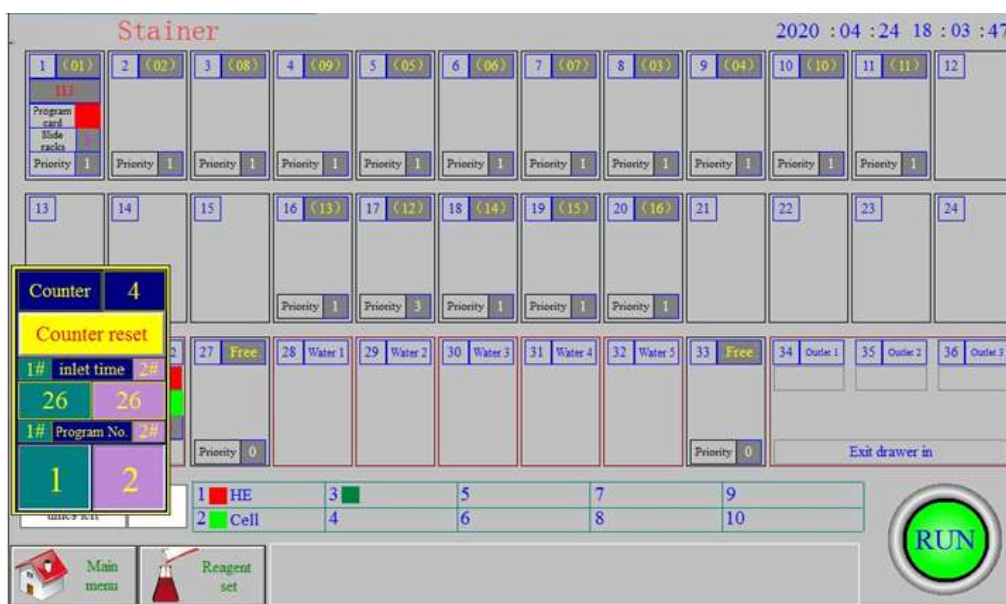


Figure-40

- 4) Press the run key in the monitoring interface to start the staining, and the rack will enter the corresponding tank according to the selected program and enter the next step of the tank after the time is up. The status displayed at the key is the status of the device. For example, if it is displayed as running, it means that the current device is streaming.
- 5) When the rack in the upload drawer enters the station in the first step, it can be put into the next rack again, to realize the continuous upload of the rack.

8.10.3 Exit the racks

After staining, the rack will automatically move to the exit drawer, and the buzzer will beep for 60 seconds. When all three exit sites are full, the buzzer will beep for a long time to remind the user to take out the rack in time, so as not to affect the subsequent rack to take out the chips. After the slides are completed, the slides can be covered.

Automatic Slide Stainer NASS-100

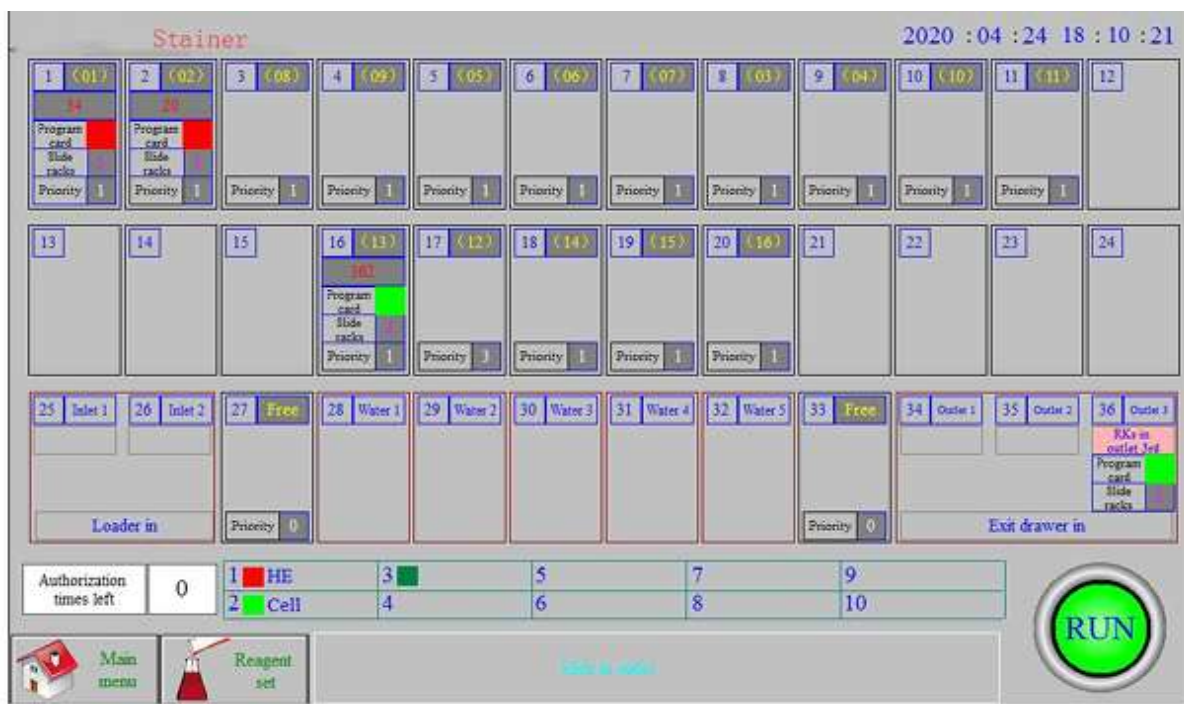


Figure-41

8.10.4 Turn off

When the instrument is not used for a long time, turn off the power switch.

When the current staining program is running, there is a short-term power failure (or press the pause key manually). After the power is called or the pause is cancelled, the instrument will continue to run the current program, but the staining time will be extended appropriately, which may affect the stain effect.

9. Troubleshooting

Trouble	Reason	Solving Method
No display after powering on.	The power cord is not plugged in, or the socket is damaged after powering on.	Plug in the power cord or replace the socket.
	5A fuse is an open circuit.	Replace the fuse.
	The 24V switch power supply has no output.	Replace the switch power supply.
		Open the left cover plate to check whether the power module works normally and whether the main control PLC power wiring is loose.
The startup display is normal, but the hook and the mechanical arm do not move.	The 48V switch power supply has no output; the motor driver has no power.	Replace the 48V switch power supply.
	The PLC reports "error" and the "error" indicator flashes.	Open the right cover plate to check whether the PLC status is in a good state.
The startup display is normal, the hook moves to the top, but the mechanical arm does not move	The engagement clearance of the gear in the carrier lifting mechanism is too large, and the Z axis (up and down) does not return to the zero position. Currently, the zero-position indicator light is in the gray state.	Adjust the gear engagement clearance.
	The motor and driver that control movement left and right or forward and backward are broken or the driver is dead.	Open the right cover plate to check whether the motor driver status is in a good state.
After the staining rack is lifted, the hook stops at the top end, and the mechanical arm does not move.	The reason is the same as above.	
During the staining procedure, the arm without the rack stops at the lower end, and the mechanical arm	The z-axis center detection switch is broken, and the center indicator light is in a gray state.	Replace the detection switch.

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does not move.		
The mechanical arm moves in one direction only, left and right, or forward/backward.	The motor and driver in a certain direction that control forward/backward or left and right movement are broken, or the driver is dead.	Open the right cover plate to check whether the motor driver status is in a good state.
The mechanical arm moves normally, and forward/backward or the left and right positions of the The interface displays are out of tolerance	Check whether the coding wiring is loose	Fixed it again.
	The encoder is broken	Replace a new one
No water in the water washing station	The tap doesn't turn on, or the water volume is too small.	Turn it to a large volume.
	The filter at the water inlet is blocked.	Clean the filter.
	The water valve is broken.	Replace a new valve.
The rack fails to lift	There is a deviation in the cylinder position coordinate in the X/Y direction.	Check the cylinder again and place it in a good situation.
	The cylinder is not placed flat but tilted.	
The machine doesn't identify the rack position after the drawer is seated in place.	The sensor of drawer inlet is damaged, or the wiring is loose.	Open the right cover plate, check whether the wiring is loose, or replace the sensor.
	The sensor of the rack in the cylinder is damaged or the wiring is loose.	
The program is completed, and the rack fails to enter the exit position correctly.	The detection switch of the Exit drawer is broken, or the wiring is loose	Check it to fix or replace the new wire.
There is one rack already in the exit position, but the other one continues to go into.	The sensor of the Exit position is damaged, or the wiring is loose.	Open the right cover plate, check whether the wiring is loose, or replace the sensor.
Wastewater tank overflows.	The drain hose bends and bends, straightens the drain hose.	Ensures that the drainpipe is unobstructed.

10. Accessories

Standard Accessories

Accessories	Quantity
Main control PLC	1pc
Photoelectric switch	1pc
Plastic cylinder	1pc
Timing belt	1pc
PU tube (3m)	1pc
X-axis motor	1pc
Y-axis motor	1pc
Z-axis motor	1pc
Display touch screen	1pc



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