

SMART ICE LASER THERAPY SYSTEM

USER MANUAL

Model: SMART-S60D/45D/60B/30B



Before operating this unit, please read this manual completely.

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1. Safety Instructions and Precautions

1.1 About the Company

Thank you for purchasing SMART ICE LASER THERAPY SYSTEM. Before using it, please read the user manual carefully to ensure correct usage. And please keep this manual safe for future reference.

Product Name: SMART ICE LASER THERAPY SYSTEM

Registrant/Manufacturer/After-sales Service Center: Rhein Laser Technologies Co., Ltd.

Registrant Address: Room 801, 8F, E2 Building, Future City, No.999 High-Tech Avenue, East Lake High-Tech Development Zone (Free Trade Zone, Wuhan Area), 430206, China.

Phone: 027-6527-9157

Production Address: Room 801, 8F, E2 Building, Future City, No.999 High-Tech Avenue, East Lake High-Tech Development Zone (Free Trade Zone, Wuhan Area), 430206, China.

Date of Manufacture: As indicated on the label

Issue Date of this User Manual: 2024-01-15, Version 1.0

1.2 Cautions and Warnings

Laser Classification and Warnings: This device is classified as a Class 4 laser. Pay attention to visible and invisible laser radiation, and avoid direct or scattered radiation exposure to your eyes or skin.

- Follow the user manual for safety of users and operators.
- Prevent hazards from laser beam emission during operation. Keep all flammable materials away.
- This device generates no waste or residue during use and should be disposed of properly according to relevant laws.
- Do not directly observe laser beams from the treatment window or any reflected or scattered beams, as this can cause retinal damage.
- Remember to wear laser protective glasses during treatment. The glasses should meet the following requirements: protective wavelength 800~1100nm, optical density of protective glasses for output wavelength $\geq OD4+$, visible light transmittance $\geq 35\%$.

1.3 Electrical and Mechanical Safety

Operators should pay attention to electrical and mechanical safety while using the device. Please follow these instructions:

- Note that the device contains delicate electronic components. Dropping, impacting, or collisions may cause severe damage. Proper maintenance is required when not in use. Rhein Laser is not responsible for any damage caused by dropping, misuse, abuse, or negligence.
- Note that the device is not waterproof. Do not use it in humid environment, and

- prevent liquid from entering the device when performing routine maintenance.
- Note that the device contains dangerous high voltage. Only technicians from Rhein Laser are allowed to repair the internal components, including the power supply and treatment handle.
 - Ensure there are no obstructions blocking the vents of the main unit before turning it on to guarantee good ventilation.
 - Note that no one else is allowed to disassemble any part of the device except for technicians designated by Rhein Laser.
 - Ensure the power supply is cut off when moving the device, place the treatment handle in a safe position, handle with care, and avoid putting pressure on the display screen.
 - Avoid placing the device near or stacking it with other equipment. Keep the device away from objects that emit electromagnetic interference, such as mobile phones and portable and mobile RF communication devices, which may affect the normal operation of the device.
 - Note that the device should not be left unattended after powering on. Please shut it down promptly after use.

2. Product Introduction

2.1 Brief Introduction

SMART ICE LASER THERAPY SYSTEM uses a diode laser to deliver treatment results. Users can choose single wavelength or multiple wavelengths for treatment according to their needs. It mainly utilizes the bio-stimulation effect produced by the laser as well as the diode laser beam to irradiate the damaged tissues of the human body, thus achieving the purpose of pain relief, improvement of local blood circulation, tissue repair and quick reduction in inflammation. This laser is in the near-infrared band, which can penetrate deep into the tissue and act on the body, so that the tissue can absorb light energy well and reduce pain.

2.2 Structure

SMART ICE LASER THERAPY SYSTEM consists of a main unit, treatment handle, and power cord.

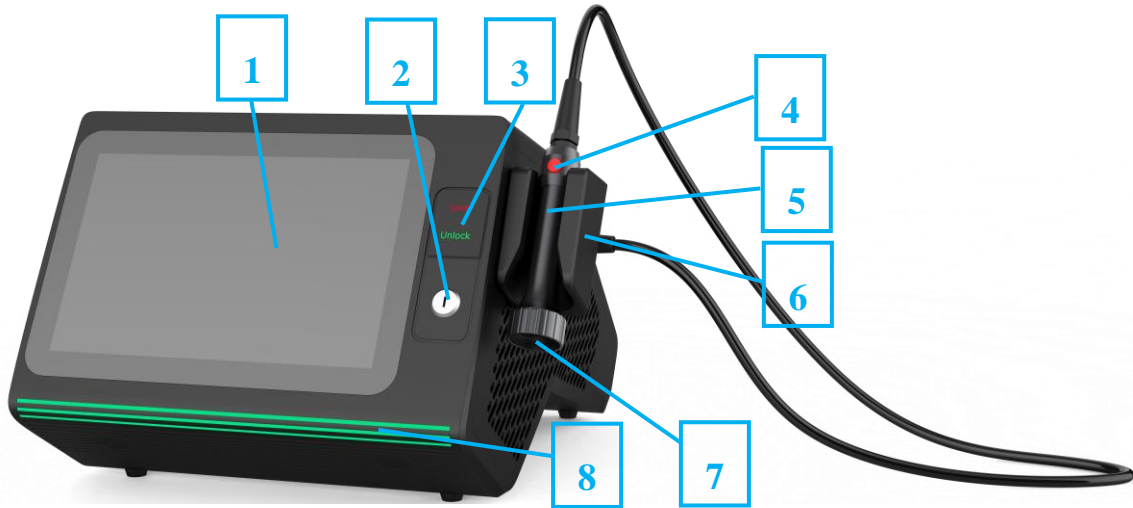


Figure 2.1 Front Side

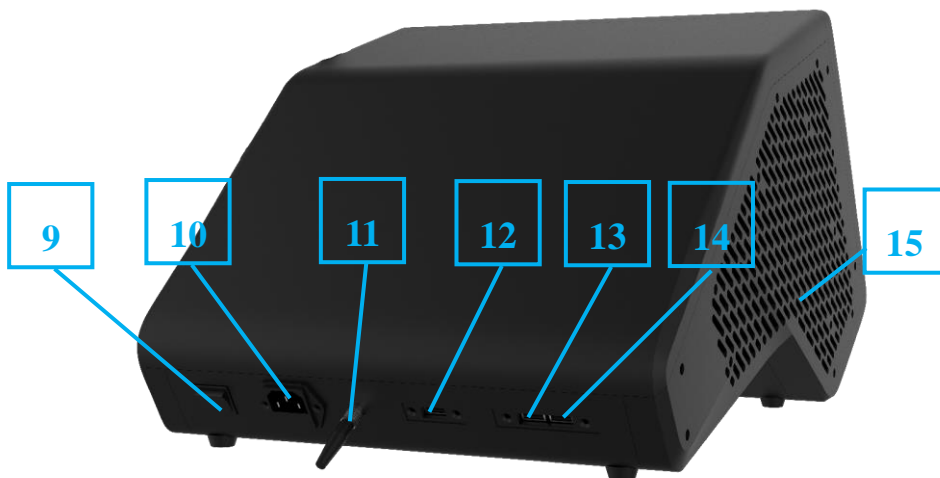


Figure 2.2 Back Side

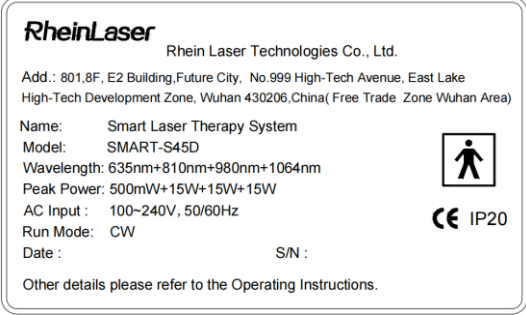



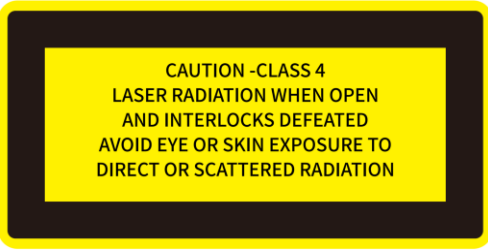





No.	Description	Function
1	Touch screen	Touch or click on the display interface icons to activate corresponding functions.
2	Key switch	Control the device's light emission system. Insert the key provided by Rhein Laser into the key switch hole. Rotate the key clockwise to the "ON" position to start light emission. Rotate the key counterclockwise to the "OFF" position to stop light emission.
3	Emergency stop switch	Control the device's light emission system. In case of an emergency, press "Lock" to stop light emission. To resume, press "Unlock."
4	Treatment handle button	Press the button to start/pause light emission.
5	Treatment handle	Include product optical components and application sections.
6	Treatment handle hanger	Place the treatment handle.

7	Treatment window	Emit laser for treatment.
8	Indicator light bar	Display the current device status. Green indicates standby/ready status, blue indicates light emission status, and red indicates alarm status.
9	Power switch	Turn the device's power on and off.
10	Power input	Insert the power cord to connect to the power supply, and power the device.
11	Safety interlock	Control the device's light emission system. Pull out the safety interlock to stop light emission. To resume, insert the safety interlock.
12	USB1 port	Mainboard upgrade.
13	USB2 port	Insert a USB flash drive for system upgrade.
14	USB3 port	Connect the thermal imager.
15	Vents	Internal heat dissipation of the device.

2.3 Specification

Items	Description				
Model	SMART-S30D	SMART-S45D	SMART-S60D	SMART-S60B	SMART-S30B
Laser Type	GaAlAs Diode Laser				
Wavelength	635nm+810nm+915nm+980nm Or 635nm+810nm+980nm+1064nm			810nm+980nm	
Max Power	500mW+10W +10W+10W	500mW+15W+15 W+15W	500mW+20W+ 20W+20W	30W+30W	15W+15W
Spot Size	Φ9mm+Φ20mm+ spherical lens tube; optional Φ120mm				
Treatment Mode	CW /Pulse/Single /B Mode				
Pilot Beam	635nm, 500mW				
Cooling Method	Air-cooled				
Power Supply	AC100~240V ,50/60Hz				
Input Power	400W				
Dimension	425mmx465mmx310mm				
Weight	20kg				

2.4 Warning Signs

 <p>Product nameplate</p>		 <p>BF Type Application Section</p>		
		 <p>CE certificate</p>		
		<p>IP20</p> <p>Prevents solid foreign objects with a diameter of not less than 12.5mm from entering; no protection against water</p>		
				
Visible and invisible laser radiation warning labels and classification instructions		Failure indication for shields and safety interlock		
				
Emergency stop sign	Visible and invisible laser radiation warning sign	Caution electric shock	Warning sign	Laser window marking

2.5 Working and Storage Environment

Operating Environment:

- Temperature: 5°C to 30°C
- Relative Humidity: 20% to 80%
- Atmospheric Pressure: 860hPa to 1060hPa
- Keep this device away from heat vents and maintain a distance of at least 50 cm from other objects to ensure adequate heat dissipation space.

Transportation and Storage Environment:

- Temperature: 0°C to 50°C
- Relative Humidity: 10% to 90%
- Atmospheric Pressure: 700hPa to 1060hPa
- During transportation and storage, avoid heavy pressure, direct sunlight, and

exposure to rain or snow. Store it indoors in a clean, well-ventilated area free from corrosive gases.

3. Software Interface

3.1 Main Interface

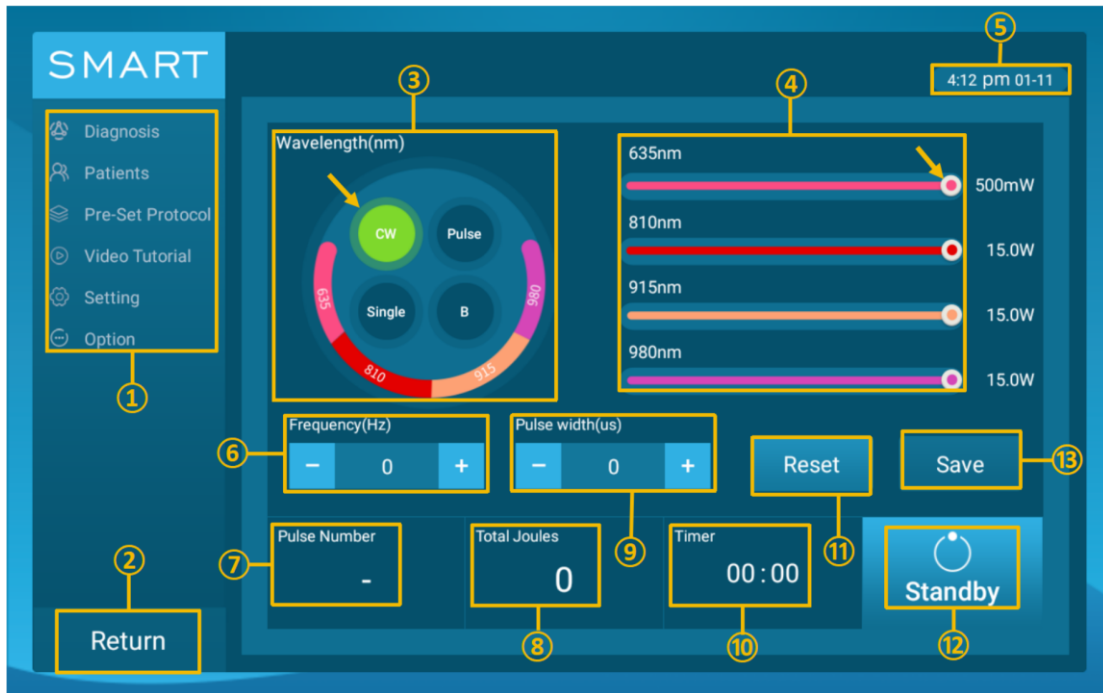


Figure 3.1 Main Interface

①Menu Bar: Contain all the functions of the device. Click to enter the corresponding function interface, such as Treatment Protocols for Medical Conditions, Patient Information, Custom Treatment Protocols, Video Tutorial, Settings, and Thermal Imaging.

②Return: Click the return button to return to the login interface and switch to other accounts.

③Treatment Mode Selection Box: Click the circular icon to choose the treatment mode, including CW, Pulse, Single, and B mode.

④Power Adjustment Slider: Drag the circular icon on the slider to individually set the power level for each wavelength.

⑤Time: Display the current time, automatically synchronized after connecting to WiFi.

⑥Frequency (Hz): Click the "+" and "-" icons or the middle number to adjust the frequency.

⑦Pulse Count: Display the cumulative number of pulses emitted by the current laser.

⑧Total Energy (J): Display the cumulative total energy emitted by the current laser.

⑨Pulse Width (us): Click the "+" and "-" icons or the middle number to adjust the pulse width.

⑩Treatment Time: Click the numbers to set the duration of the treatment session. The setting range is from 00:00 to 59:59, with a 1-second increment. When the light

emission starts, the time counts down, and when it reaches 00:00, the light emission stops.

⑪Parameter Reset: Click the icon to reset all settings on the current interface to the default values.

⑫Standby Key: Click the standby key to switch the icon to the ready key, indicating that the system is in the ready state.

⑬Save Key: Click the icon, follow the popup prompt to enter a name for the protocol, and save the current treatment parameters as a treatment protocol. In the Custom Protocols Interface, you can find this protocol.

3.2 Diagnosis Interface

Click on "Diagnosis" on the main interface to enter the Diagnosis Interface, as shown in the figure. Scroll up and down to find the target disease. Click on the expand icon on the right side of the disease to view detailed treatment parameters. Click the confirm button to enter the treatment parameters interface. You can either select the treatment protocol with default parameters or adjust the parameters based on your needs.

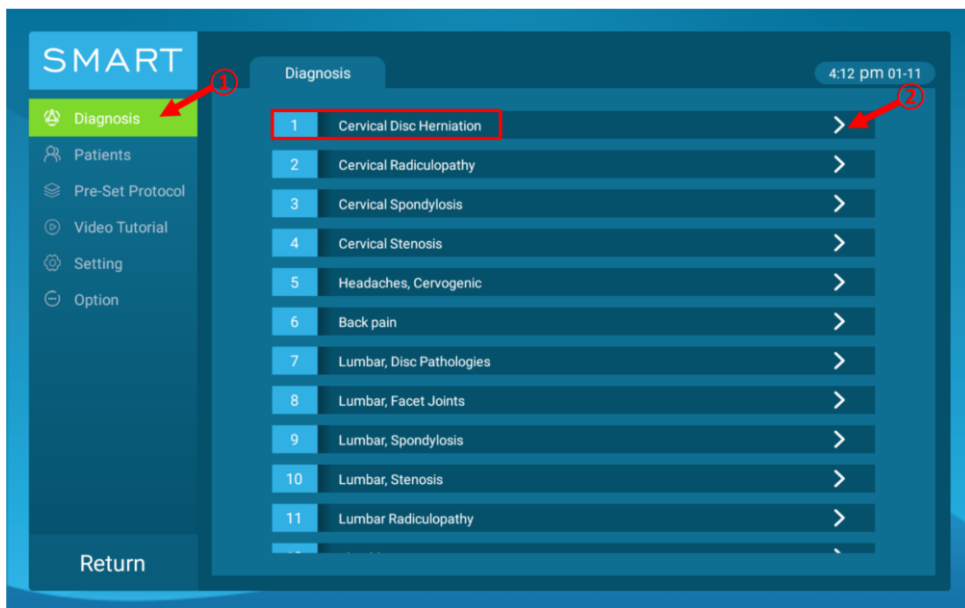


Figure 3.2 Diagnosis Interface

3.3 Patient Information Interface

①Click on "Patients—Entries" on the Main Interface to enter the patient list interface.

②In the search bar at the top of the interface, enter the phone number to search for the target patient.

③Click on the phone number icon to display detailed treatment information. In the Patient Information Interface, you can view the treatment records for each stage, such as treatment mode, duration, power settings, total joules, etc.

Note: Click on the delete icon in the top right corner of the patient's phone

number icon to delete the current patient information.

④Click on "Patients—New" on the main interface to enter the new patient information interface. Click on the rectangular box on the right side, enter the name and phone number, select gender (male, female), the time defaults to the current system display time, and click the "Save" icon to save.

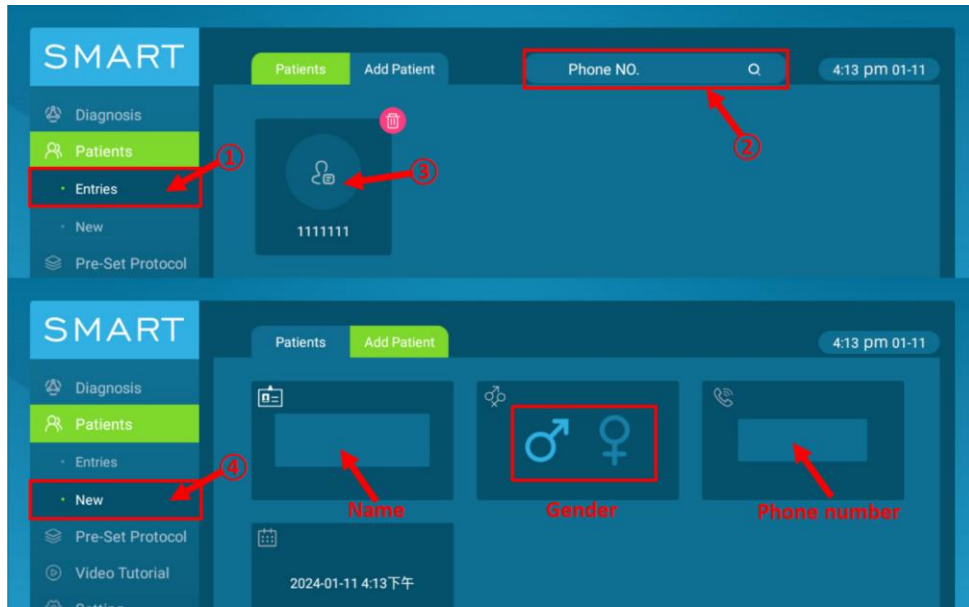


Figure 3.3 Patient Information Interface

3.4 Custom Protocols Interface

Click on "Pre-Set Protocol—Treatment Area" on the Main Interface to enter the treatment area selection interface. Based on the patient's medical condition, select the treatment area—body size—skin color—pain level, set treatment parameters, and establish a treatment protocol.

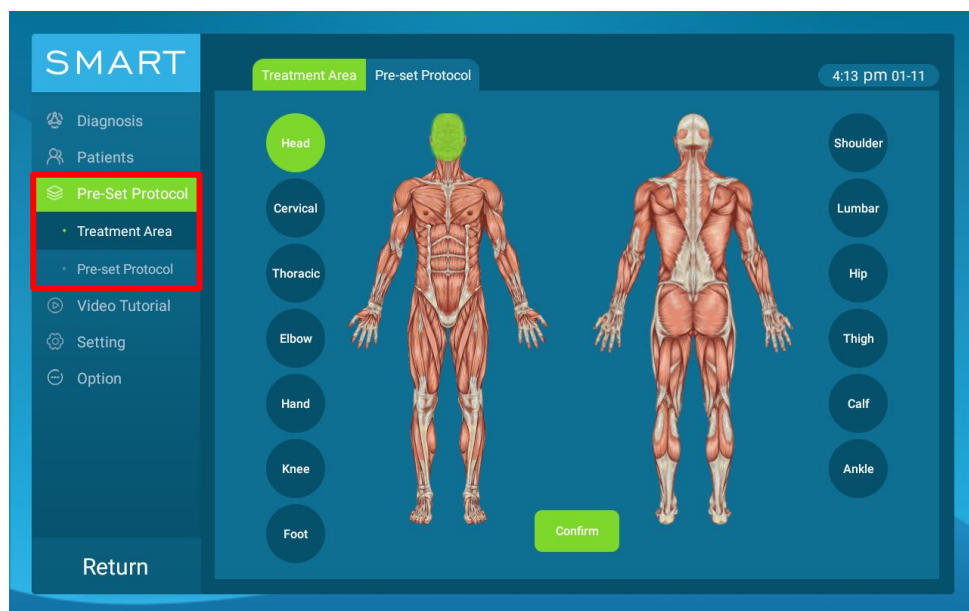


Figure 3.4 Treatment Area Selection Interface

Click on "Pre-Set Protocol—Pre-Set Protocol" on the Main Interface to enter the Custom Protocols Interface. Scroll up and down to find the target pre-set protocol, click on the pre-set protocol icon to select it. You can either directly initiate treatment with preset parameters or adjust the parameters based on your needs.

Note: Click on the delete icon in the top right corner of the pre-set protocol icon to delete the current protocol.

3.5 Video Tutorial Interface

Click on "Video Tutorial" on the Main Interface to watch the instructional video. On the Video Tutorial Interface, scroll up and down on the left side to adjust the screen brightness. Scroll up and down on the right side to adjust the video volume. Swipe left and right on the interface to adjust the video playback progress.

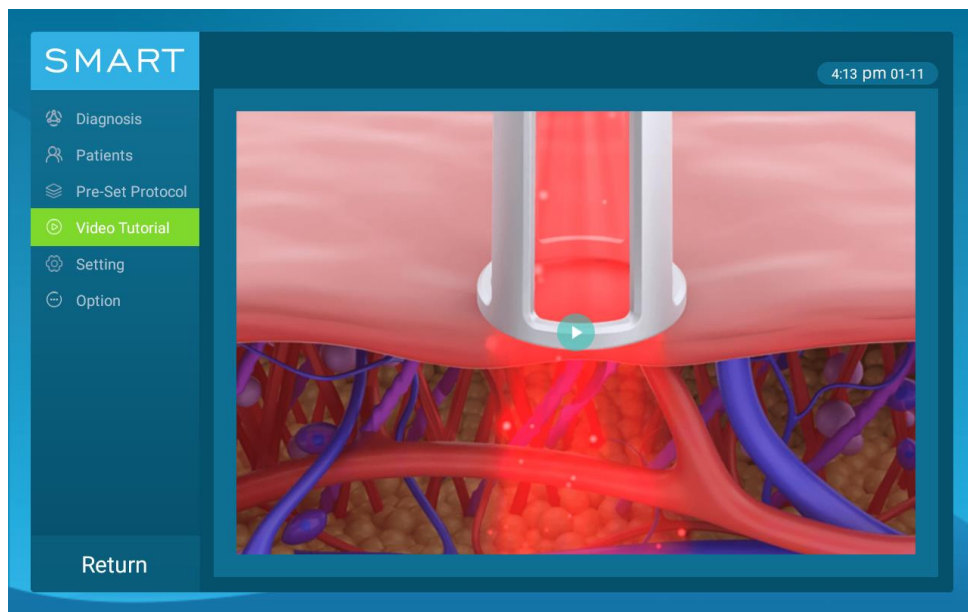


Figure 3.5 Video Tutorial Interface

3.6 Account Management Interface

Click on "Setting—Account" on the Main Interface to enter the Account Management Interface. Scroll up and down to find the target account. The system has a default administrator account. The administrator can create or delete doctor accounts, but doctors cannot perform this operation. Click on the "Return" key in the bottom left corner of the interface to return to the login interface and switch to other accounts.

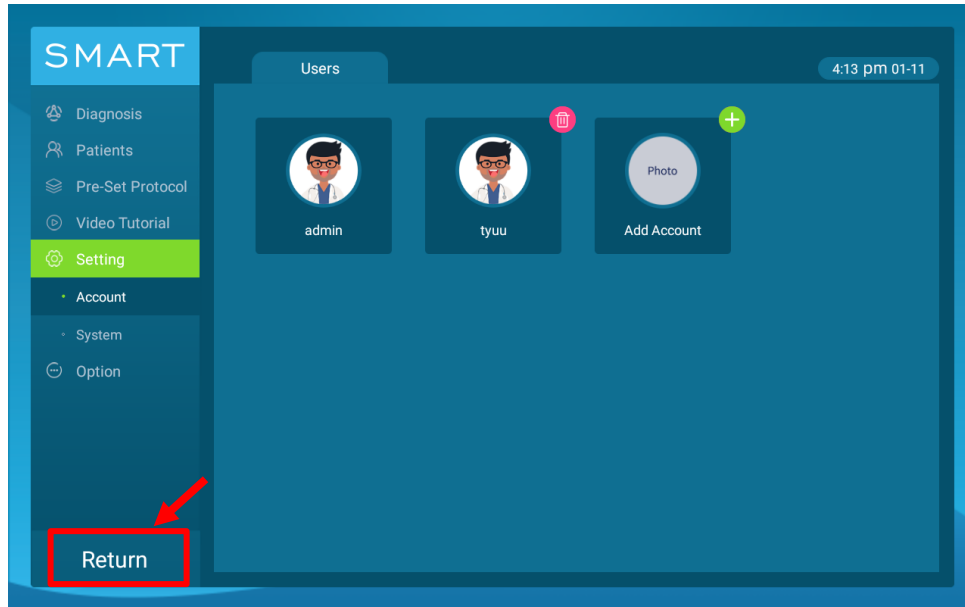


Figure 3.6 Account Management Interface

3.7 System Setting Interface

Click on "Setting—System" on the Main Interface to enter the System Setting Interface. The interface displays information such as device model, SN, and system software version number. "Sounds ON" indicates that the laser has been turned on to emit a "beep" prompt sound, which can be clicked to turn off the sound. Insert a USB flash drive into USB2 port on the back panel of the device and click "Update" to update the system. "Connected" indicates that the system is connected to a WiFi network, while "Unconnected" indicates that the network is not connected. Click the icon to enter the system WiFi connection interface, then click the target WiFi and enter the password in the popup window.

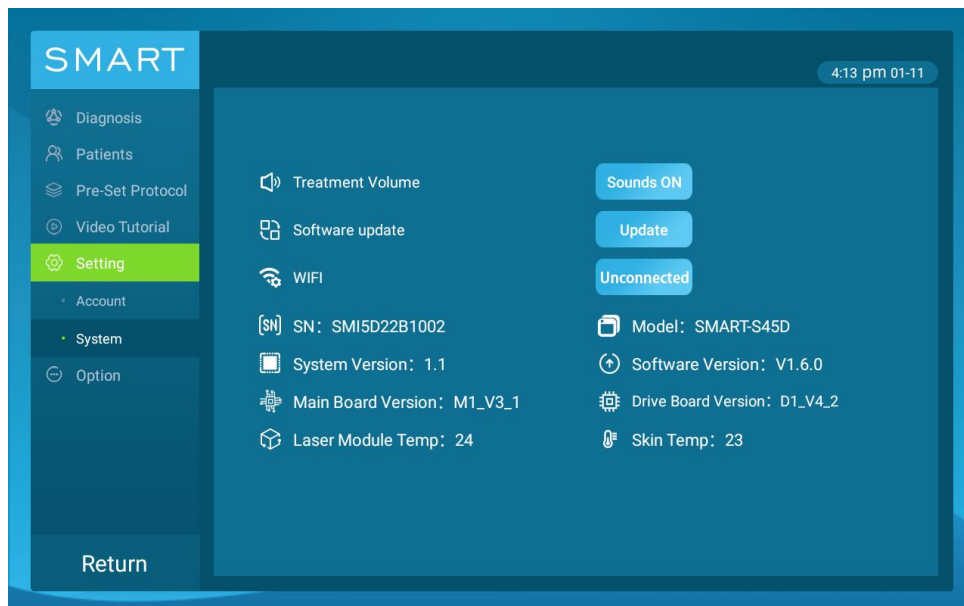


Figure 3.7 System Setting Interface

3.8 Thermal Imaging Interface

Connect the thermal imager handle to the USB3 port of the device, then click on "Option" on the Main Interface to enter the Thermal Imaging Interface. You can click on the "Fahrenheit" or "Celsius" icon at the top right of the interface to choose to display temperatures in Fahrenheit or Celsius. With the help of the thermal imager, doctors can preliminarily determine the location of a patient's injury or inflammation.

Note: When the thermal imager is not connected to the device's rear panel, a text prompt will appear on the interface.

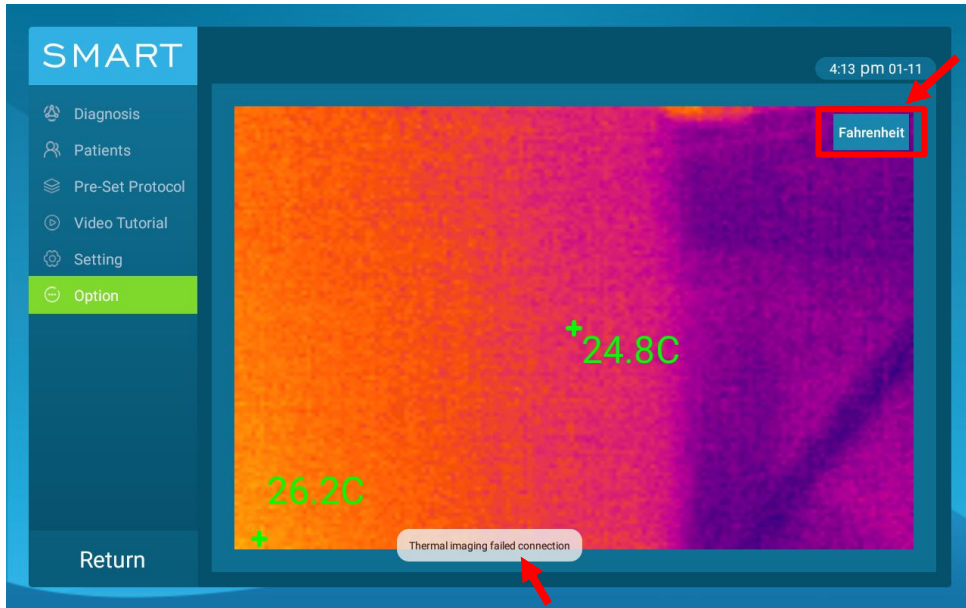


Figure 3.8 Thermal Imaging Interface

4. Operating Instructions

4.1 Starting the Device

Step 1: Take out the key switch and safety interlock from the special transparent package. Insert the key into the key hole on the front panel of the main unit and insert the safety interlock into the safety interlock port on the back panel of the main unit with the red dot facing upward as shown in the figure below.



Figure 4.1 Key



Figure 4.2 Safety Interlock

Step 2: Insert the power plug into the AC100~240V wall outlet, then press the power switch on the back panel of the main unit to "I" to turn on the device. Turn the key clockwise to "ON" position, and click "Unlock" on the front panel of the main unit to ensure that the emergency stop switch is open and the system starts working.

After the startup animation, as shown in Figure 4.3, the device will enter the login interface. Enter the username and password provided by Rhein Laser, then click the "Login" button. The default username is "admin", and the password is "admin123456".

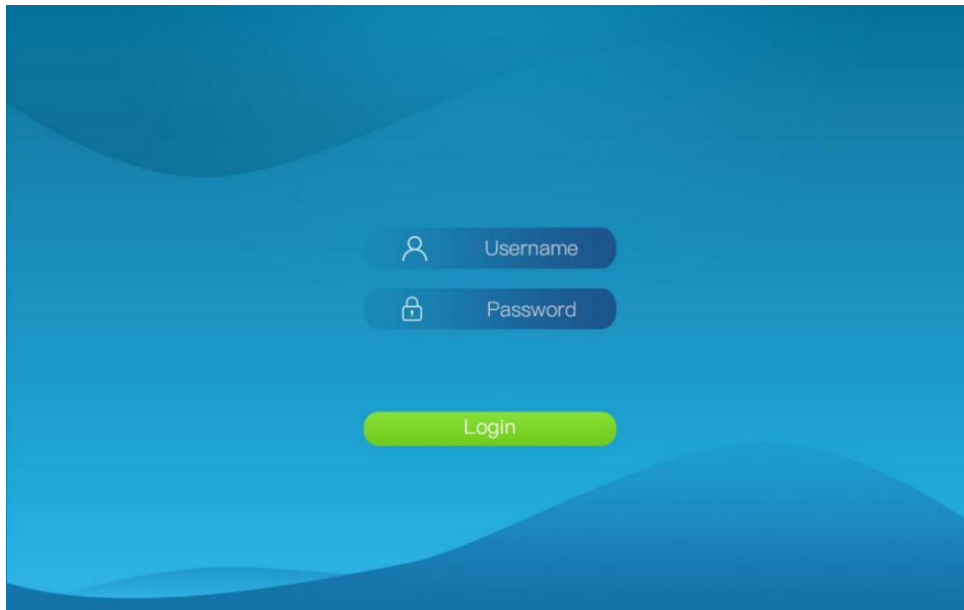


Figure 4.3 Password Login Interface

4.2 Setting Treatment Parameters

There are three ways to set treatment parameters:

Method 1: Click on Section 3.1 Main Interface to set the treatment parameters.

Method 2: Click on Section 3.2 Diagnosis Interface, select treatment protocols based on the disease and adjust parameters for treatment.

Method 3: Click on "Pre-Set Protocol" on the Section 3.4 Custom Protocols Interface, then select pre-set protocols and set treatment parameters for treatment.

Note: The table below indicates whether treatment parameters for the four treatment modes can be set and displayed.

	Power	Frequency(Hz)	Pulse width(us)	Timer	Pulse Number	Total Joules
CW	Yes	No	No	Yes	No	Yes
Single	Yes	No	Yes	Yes	Yes	No
Pulse	Yes	Yes	Yes	Yes	Yes	Yes
B	Yes	Default 5	Default 100000	Yes	No	Yes

4.3 Starting the Treatment

After setting the parameters, click on the "Standby" button to enter the standby state. Keep the treatment window of the treatment handle against the treatment area, then press the treatment handle button to emit the laser and start the treatment.

Note:

①In the "Standby" state, one cannot change the parameters or enter other interfaces. Treatment can be paused by pressing the treatment handle button during the treatment process.

②When in the light-emission state, the indicator light bar will turn blue.

③After the treatment begins, the "timer" will count down to display the remaining treatment time, and the total energy will be accumulated.

4.4 After the Treatment

When the treatment time countdown reaches 00:00, or by clicking the "Ready" button, the light emission stops and the treatment ends. You can save this treatment record through a popup prompt.

5. Maintenance and Trouble Shooting

Regular cleaning, inspection, and maintenance ensure the efficient use of the device and the reliability of safety features. The suggested routine inspection and maintenance plan are as follows:

Once it has been confirmed that the product and its accessories are no longer usable, it should not be discarded at will. Instead, it should be disposed of in accordance with local regulations, preferably by hospitals or nursing institutions.

5.1 Equipment Cleaning

Please ensure the device is cleaned both before and after each treatment. Before cleaning, ensure the device is powered off and unplugged, allowing it to cool down naturally. Use a soft, clean, lint-free cloth soaked in 75% concentration alcohol to wipe the surface of the device. Avoid spraying or pouring cleaning agents directly onto the treatment head or display screen, and take care to prevent liquid from penetrating into the device.

5.2 Regular Inspection

Please check the device handle cable for looseness, the exterior surface of the device for damage, and the touch response of the display screen weekly. Refer to the troubleshooting section for guidance, and verify its functionality by plugging and unplugging the safety interlock, pressing the emergency stop switch, and turning the key to ensure proper operation.

5.3 Trouble Shooting

Phenomenon	Possible Reason	Solution
No display	Power cord is not properly connected	Check if the power cord is well-connected to the device and if the power plug is properly inserted into the outlet.
	Power outlet malfunction	Try testing by replacing the power outlet
	Display screen malfunction	Please contact our Customer Service Department
	Power switch is not pressed.	Press the power switch on the rear panel of the main unit to the "I" position
Click the button on the screen, the system does not respond	/	Please contact our Customer Service Department
The system cannot enter the main interface		
The screen shows E-STOP	Emergency stop switch is locked	Click unlock button on the front panel
The screen shows E-KEY	Key Switch is not on	Rotate the Key Switch to the ON position
The screen shows E-LOCK	Safety Interlock isn't inserted	Insert the Safety Interlock into the Safety Interlock port on the rear panel of the main unit
The screen shows E-SKIN	Skin temperature is too high	Pause the light emission and use it after the temperature drops
The screen shows E-LD	Laser module temperature is too high	

Note: If there are any issues with the device that cannot be resolved, you can scan the QR code on the device with mobile phone to submit a warranty form. We will handle it as soon as possible.

6. Equipment List

No.	Material Name	Quantity
1	Device	1
2	Treatment handle	1
3	Spherical lens tube	1
4	9mm lens tube	1
5	30mm light spot lens tube	1
6	Key	2
7	Safety interlock	1
8	Double-headed USB extension cord	1
9	Laser protective glasses	2
10	Power cord	1
11	USB flash drive	1