Diode Laser Hair Removal Model

User Manual

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Preface

Welcome to use 808nm Diode Laser Hair Removal machine from Beijing Goldenlaser Development Co., Ltd. This manual applies to the standard Diode Laser Hair Removal machine.

Attention:

If this is the first time for you to use this Diode Laser Hair Removal Machine, please read the User Manual carefully before the operation.

1. Please do not use the machine in the environments which exist the inter-face, and vibration of electromagnetic wave, and more over, in case operation of the Hair Removal Machine interfaces the other equipments.
2. Please do not use the Hair Removal Machine in the environments which contain flammable anaesthetic and Oxidizing gas, such as N_2O and O_2. Some material, such as cotton or wool textile, will be ignited in the environment which is rich in oxygen during the operation of Hair Removal machine. Make sure that the combustible solution which used for clean and disinfection be evaporated before the operation of the Diode Laser Hair removal machine.
3. Please give the abandoned or replaced spare parts to the appointed administration or the manufacturer for the centralized management, in case the environment pollution.
4.

Special Attention

Caution

GL090 Diode Laser Hair Removal Machine could emit the high intensity infrared laser beam, in order to protect the eyes, according to the standard of NOHD, please wear the suitable protection glasses for operator and patient.

The following behaviors are forbidden:

※ Please do not point the laser at the eyes and skin directly.

※ Please do not power down the machine directly during the operation.

※ Please make sure to be familiar with the structure and manual before operation.

Note: Diode Laser Hair Removal Machine is only allowed to be used for the people who had got the enough safety and operation training.

Please turn off the cooling function, when the machine is under the condition of standby, otherwise the probe will be easily damaged.

1. Package

Please open the package and check the spares parts if there is any lack during the shipment, do not hesitate to contact us.

2. Clinical Application

2.1 Application

The 808nm Diode Laser Hair Removal Machine (hereinafter referred to as Hair Removal Machine) is applied for the Hair Removal.

Contraindication:

1. A history of keloid scarring and photosensitivity;
2. Any inflammatory skin condition e.g. eczema, active Herpes Simplex, etc. at the treatment site;
3. Waxing, plucking, 'sugaring' or 'threading' depilation treatment of the area in the previous 6 weeks;
4. Who are allergic to hydroquinone or other bleaching cream;
5. Who is pregnant; until periods return and end of breast feeding, Skin cancer or any other cancer;
6. Who takes 13- Lsotretinoin in the previous 6 months;
7. Tanned skin (active tan) through sun exposure or tanning bed use in the previous 30 days.

Note: The Hair removal machine does not have obvious effect for the white color hair.

2.2 Clinical features

2.2.1. Treatment features

The basic theory of Diode Laser Hair Removal Machine is the biological effect. The machine emits the 808 nm laser which could be absorbed easily by the pigment located in hair follicle while won't damage the normal surrounding epidermis. The light energy is absorbed by the pigment in the hair shaft and follicle then it is transformed into heat energy, thereby it rises the temperature of follicle, till the temperature is high enough, the follicle structure is destroyed irreversible, the destroyed follicle will be removed after a period of natural physical process, thus achieve the permanent hair removal purpose.

Modern Design, stable output, short time irradiation, permanent effect, easy to control, excellent clinical effect, high security.

2.2.2 Clinical effect:

Safety: 808 nm Diode Laser Machine has stable performance, long usage life: it is real time controlled by the intellectual CPU.

Fast: Fast coverage rate for hair removal with large 12x12 mm square spot, high efficiency,

Efficacy: 808nm wavelength laser, which is in the spectrum of near infrared (0.75-1.50μm), could be absorbed by the melanin best, penetrates through the depth of dermis and adipose tissue and then act on the hairs with different positions and depths.

Pain free: Sapphire cooling tip, cools the epidermis down to 0～4 ℃. Offers cooling all the way, comfort and without pain.

Convenience: Friendly use design, easy to operate man machine interface-- touch display, easy to operate.

Permanence hair removal: Applicable to all skin color, excellent result.

2.3 Possible Side Effect

1. Superficial damage may be found after the laser treatment.
2. Hyper pigmentation or depigmentation may occur. But this kind of complication is considered to be temporary and unusual; moreover, it could be recovered naturally after several months.
3. Mild pain may occur during operation, but it could be relieved by the local anesthesia ointment; while the anesthesia is not necessary.
4. Purpura (HSP) may occur on the treatment site within 1-3 days after treatment.
5. Minor swelling and redness will occur on the treated site, but normally it will disappear after several hours.

2.4 Clinical Application Attention.

1. Generally speaking, the treatment result and inflammation after the damage of skin relate to the energy density. The higher energy density will deliver the better

effect and more inflammation, while the similar epidermis damage will be more serious. During the operation, please begin with the conservative treatment, to increase the energy density gradually, till achieve the satisfied effect.

2. The allowed peak energy is in inverse proportion to the pigment of skin. As usual, the darker the skin, the lower the energy density need to set, which is in order to reduce the epidermis's absorption of laser and heat. The contact cooling could reduce the epidermis's temperature, it is necessary for avoiding the heat damage, especially for patient who has darker skin.
3. Please shave off the hair cleanly and carefully pre treatment, because the visible hair could absorb the energy of laser and then produce intense heat, thus cause the heat damage in the local epidermis, as well as damage of laser treatment head.
4. The contact cooling system could diminish the increase of epidermis' temperature. The cooled laser treatment head will enhance the allowed energy density, while offer the local anesthetic action. We strongly recommend all the patients use the cooling mode during the operation. Especially for the people who has darker skin, because their absorption of the laser energy is much stronger than the light skin people's.
5. Please make sure to contact the hand-piece with the skin before the output of the laser, this is very important, only the experienced beautician could use the repetition pulse function.
6. During the treatment, please must maintain the clean of the sapphire. Any martial on the treatment head will absorb the energy of laser and then increase the temperature, thus cause the damage of epidermis as well as pain.

2.5 Treatment method

The following treatment procedure and methods are only for reference, the practical parameter and operation procedure are subject to the practical clinical usage.

2.5.1 Pre treatment preparation

1. For the patient who has the darker skin, please protect the skin from sun exposure, with suitable clothing and use of sun block before first treatment for 4-6 weeks, people who has the tend of hyperpigmentation could use the hydroquinone medicine.
2. Keep the area to be treated clean and dry, give a close shave to the hair, lipin and dirt.

2.5.2 Anaesthesia

The necessary for usage anaesthesia or not, depends on the treatment part (if it is in the sensitive site), area and patient's sensitivity to pain.

2.5.3 Treatment method

1. Operation and patient need to wear the protection glasses, in case the eyes damage s by laser. Smear gel on the treatment site in order to reduce the local epidermis's temperature well and release the pain, while offer the lubrication action for the treatment head.
2. Set the treatment parameter according to the "Parameter setting" operation method in Chapter 6.3.1, do the test treatment first, then do the formal treatment after get the best effect by the test of energy density.

   The treatment parameter is designed individual according to different clinic situations and treatment problems. Generally speaking, 2-3 spot should be tested first, if every hair follicle feels injection pain, it means that the power density is right. The power is low if feels nothing. Reduce some laser power when some parts have a high density of the hair follicle.
3. Press the laser handpiece during the treatment, that makes a perfect connection with the skin surface, drives the part blood and reduces hematoglobulin which to absorb the power of laser. In order to get a good skin surface cooling effect, there must be a 0.25-0.5s stop between the skin and the handpiece before the operation, and the handpiece moves to next treatment spot immediately.
4. Actually, overlapping should be keep appropriate. Because overlapping will damage the skin, so the rate should be controlled under 10‰. The over wide

interval pulse will weaken the treatment result.

5. During the treatment, In order to keep the safety and effect, the sapphire treatment head should be cleaned often, to avoid the parts hair and others.
6. As hair from different parts has different growth cycle, so the treatment interval changed accordingly. Like the hair on the head, relative short rest period, (about 12-16 weeks). The interval of two treatments is 30 days, which makes the hair to the growth period. The hair on the body and limbs, the rest time is 12-24 weeks; the interval of two treatments is 60 days. Generally speaking, the best time is when the hair begins to re-grow.
7. Use some chlorotetracycline eye ointment, erythrocin and others kind of antimicrobial ointment on the treatment part after every treatment, or wash lightly on the treatment surface to avoid the local infection. Use the sunblock (SPF>15: PA+++) to avoid direct sunshine and prevent the pigmentation.

2.6 Cleaning of the laser handpiece

Clean the laser head after treatment, with a soft, cleanser tissue, especially for the sapphire place, to put some press make sure no any spot or remnant.

3. Technique Parameter

3.1 Technique parameter:

Laser type: semiconductor laser

Laser wavelength: 808nm

Treatment spot: 12×12mm

Pulse width: 10～400ms(continuous adjustable)

Power density: 1～140J/cm^2(continuous adjustable)

Pulse frequency: 1～20Hz

Cooling way: sealed inner circled water cooling system, treatment head temperature -4～4℃

Power supply: ～220V/110V±22V,50Hz/60Hz

3.2 Working circumstance and condition:

Working circumstance:

a) Ambient temperature: 5℃～40℃；

b) Relative humidity: ≤80%

c) Atmospheric pressure range: 860hPa～1060hPa；

d) Power supply: ～220V/110V,50Hz/60Hz

Shipping and reserve condition:

a) Temperature range: -20～60℃

b) Relative density range: ≤100%；

c) Atmospheric pressure range: 500hPa～1060hPa。

4. Working principle

4.1 Host machine principle:

808nm diode laser hair removal machine, a kind of disease treatment device, through continuous high energy laser to achieve the transformation of power, light, thermal. It is also a laser treatment machine together with the laser, electronic,

computer science and medicine techniques.

The working principle for the machine: The microprocessor control the laser power, which can provide the constant current for the laser module. The inner high energy diode, from the laser module, transform the electronic to light energy, which output the constant laser with wavelength 808nm.The laser light on the skin by leaded crystal, penetrate into the deep tissue of the skin. The light energy is absorbed and then turned into the thermal energy, which can destroy the hair follicle tissue, make it gone and never grow again.

The parameter of the laser density should be designed by the actual condition.

4.2 Host element:

The diode laser machine consists with the power system, microprocessor controller system, operation and screen system, cooling system, laser module and security alarm system. Figure 4-1

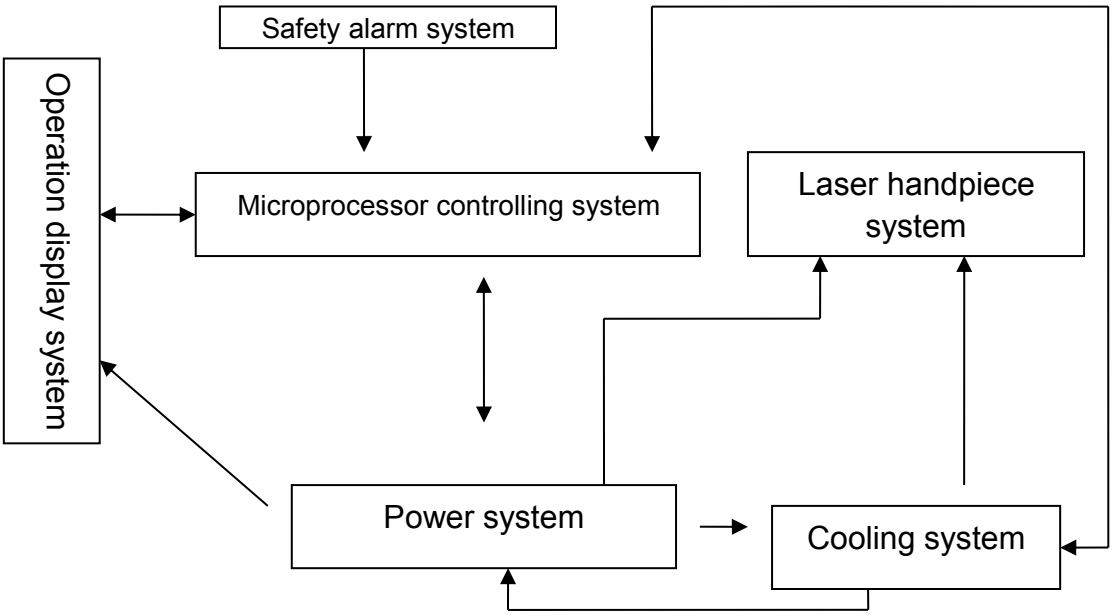


Figure 4.1 808nm diode laser machine system diagram

4.2.1 Power supply system

The power supply consists of net power, laser power, cooling power system and auxiliary power system. Figure 4.2

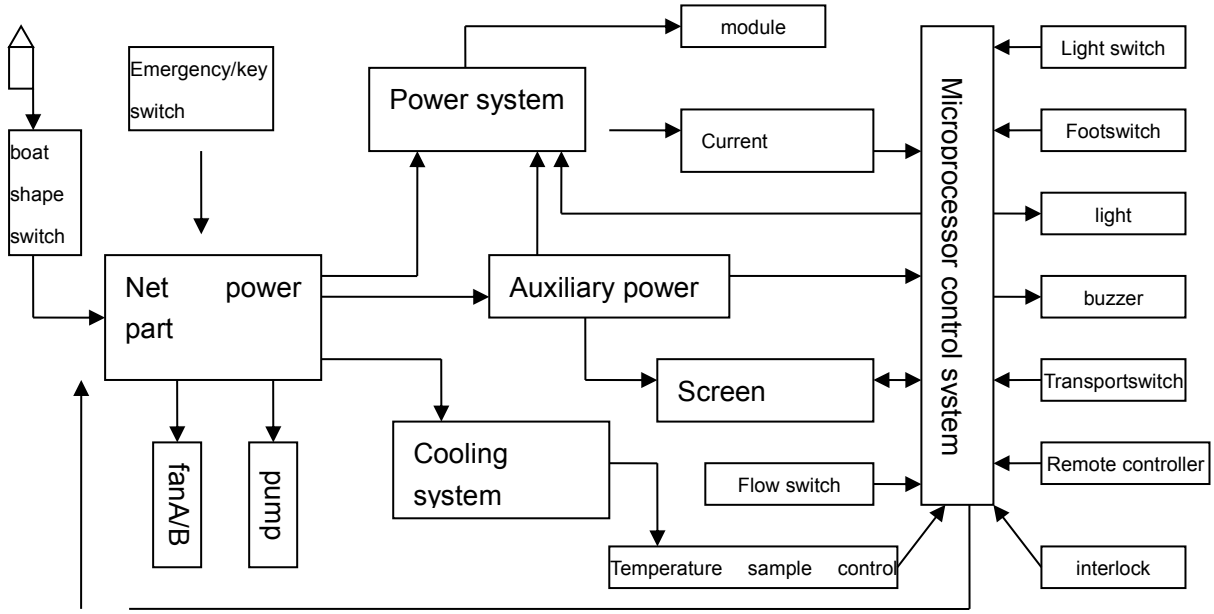


Figure 4.2 808nm electric circuit diagram

Power wire and the boat shape switch is the stop-go control for the machine with outer power supply. The key and the emergency switch used for the cut of the controlling net power supply, then provide current for microprocessor system, screen and other parts through auxiliary power system. The power system for cooling and laser is achieved by the microprocessor. The microprocessor control the host, ready and light output, so it also means control the hardware and make the machine more stable and more reliable.

The power system uses the power parts to make a current regulation loop. Laser device changes the size of output current through the regulation of microprocessor. Which can achieve the real-time monitoring by the control of output laser power and pulse energy, also send the current sampled signal by the feedback.

Most power supply parts of the machine are all reliable and have the CE certification. All can transform between direct and alternate. This is not only very safe for the user, but also can make the machine more effective and steady.

The power system has a perfect self-preservation function. It can send information

back to the microprocessor, which can show to the screen if there are something wrong with the data, and to then to protect automatically. The system begins to work when all the problems removed.

4.2.2 Microprocessor system

The diode laser hair removal machine uses the microprocessor system, which consists of microprocessor, control feedback and test feedback. figure 4.2

The machine is highly module automation. So it is very easy to operate. Users only need to turn on the boat shape switch, key switch, and emergency switch. The machine can check and adjust the parameters automatically.(including all the test which may have some damage to the machine.)

The system first to initialize, self-check and adjust the parameter. If there is something wrong during the self-check step, it will show on the screen, the user and service man understands fully what happened. They control the laser power supply, output laser parameter, laser working module and other operations through screen if there is no caution alert .

4.2.3 Operation display system

The operation display system consists of touchable screen, indicator light and buzzer.

The touchable screen directly linked with the host microprocessor. The user can control the microprocessor and get information about the host machine and relative parameter through it. The screen is reliable with the CE certification.

The direct lamp shows the working condition. Buzzer is a tip for the output of laser and fault alarm.

4.2.4 Cooling system:

The cooling system consists of cooling fan, cooling water circle and temperature controlling system.

When the device turns on, the cooling system begins to work and the water get to the appointed temperature. The fan is cooling for the host electric parts and heat sink, remove the heat by the air flow. When the machine is working, the inner circle water will take away the heat replacer to the radiator which to scatter the heat. That

makes the circle water and machine in a balance temperature condition. The control system, monitor the temperature, through the temperature sampling system. There is also an alarm degree, if the temperature is abnormal, the system will show the light to caught attention.

5. Installation and debugging

The installation and debugging of the machine must be completed by the professional training staff.

1. Put the device on the special area like figure 8.5.
2. Connect the handpiece then insert wire to the workable power supply.
3. Please read carefully about the chapter 6.
4. Turn on the machine by 6.2 step by step.
5. Test the machine by the professional staff. Please pay attention, in case of damage of the skin and eyes.

Attention: The customers must wear glasses to avoid hurting!

6. Operation Instruction

6.1 Host Machine Operation

Figure 6.1 the sketch map of the screen

Host control section includes a touch screen, key switch, button switch, emergency stop switch, and indicator six parts, some shown in Figure 6.1

Touch screen is the main operation and display part of the hair removal system. Besides the current working status and operating parameters, the touch screen also provides a simple, intuitive user interface as shown on Figure 6.2. Through the touch screen, you can achieve the functions include shutdown, laser parameter settings and ready and use the laser. You could only do the parameter setting, mode switch, refrigerator opening and shutdown under standby mode.

Figure 6.1 Standby screen

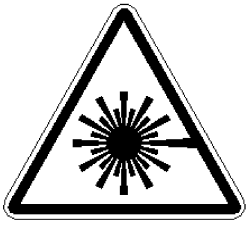
Indicator used to indicate the current working status of equipment, the green (POWER) light shows now the hair removal instrument has power, yellow (READY) light shows now the hair removal instrument is ready to use, when the blue (WORK) light is on and yellow (READY) light is off, the red light flashes on the handpiece shows now it is out putting laser which means it is under working condition.

Handpiece is the working part of the hair removal system, the laser comes from the handle according to the energy set by the host control screen.

The Red button with a yellow circle is the emergency stop switch. Press the emergency button to disconnect the power supply of control system and laser, then turn right the button will back to normal status.

Footswitch or buttonswitch (pick anyone of them) for the output operate under the ready status.

There is a KCD at the back side of the host used to control the main power off and on. When you do not use the equipment, you should turn the key to "OFF" and take off the key, then turn off the KCD in case of inappropriate use.



Warning: It will produce dangerous radiation exposure if you do not operate the control part, regulate part or operate the system in the required method before or during the treatment.

6.2 Turn on procedure

1. Check and make sure the handpiece is plugged in fiber optic connector. (Note: the handpiece must connect the above place during the operating, otherwise the machine running the error.)

2. Check and confirm the remote interlock switch has been inserted in the place marked "Remote interlock", and the foot switch is connected in the place marked "Foot Switch".

3. After the completion of the above step 1 and 2, plug the three core power cord into the corresponding currents in the AC220V power outlet;

4. Open the KCD on the back of the machine and turn the key from "OFF" to "ON" clockwise direction, turn right of the emergency stop switch to keep it in the release state, then the system start and the touch screen shows interface, as shown in Figure 6.3.

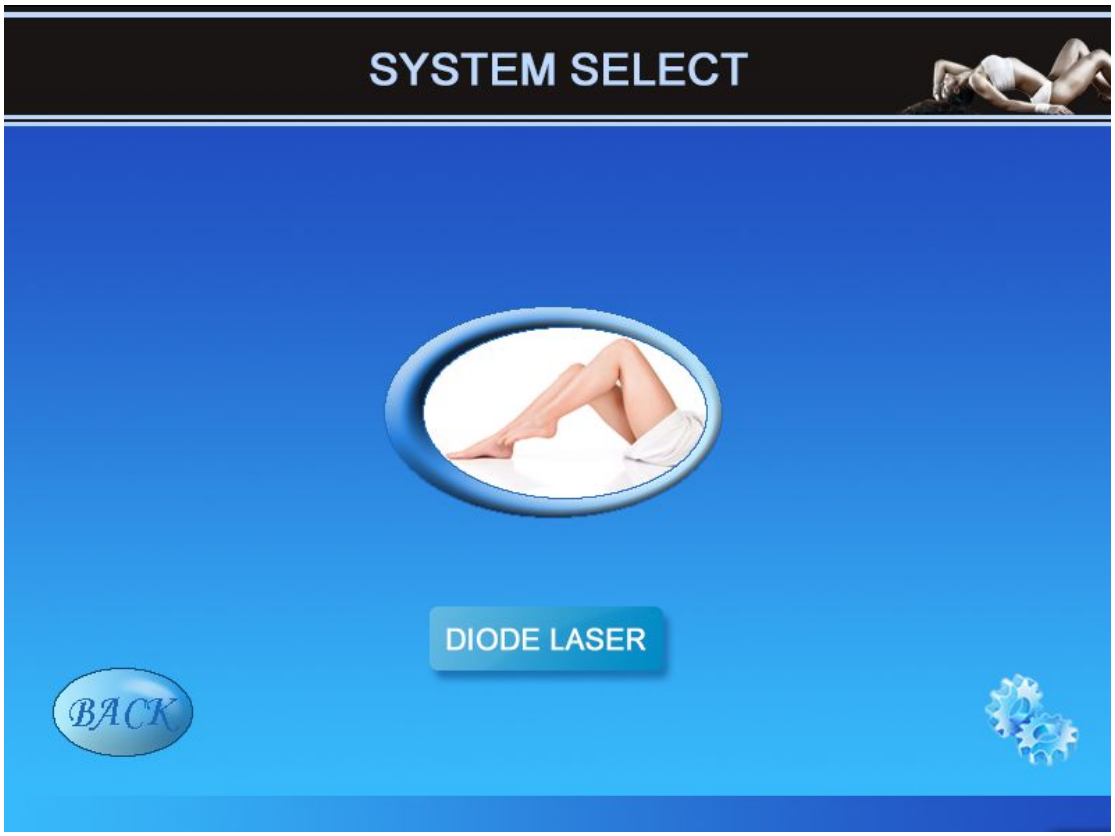


Figure 6.2 Starting screen

5. Wait a few minutes, after the machine finish the automatically detect procedure, the machine will enter the standby screen and it is now starting successfully and the display shown in Figure 6.2. (If the cooling system has problem and cannot keep the temperature at a given number, then the machine is failure, the machine cannot enter standby mode, will always remain in the initial splash screen).

6.3 System Control

6.3.1 Parameter setting

The parameter setting could only be done under the standby mode.

1. Setting of the energy density

Method 1: First click on "Energy", then click the two blue triangle button in the middle of the touch screen to adjust the energy by 1J/cm2 numerical increase or reduce the size of energy density, the range is 1 ~ 160 J / cm2.

Method 2: Click the numerical display area which is white part on the touch screen,

it will pop up a small numeric keypad, you can type the energy density, and then press "Enter" key; if you do not want the number, you can press the "ESC" key to exit the setting, the original number will be retained; if you enter the wrong number, you can press the "CLR" key to re-type again. The input energy density range is 1 ~ 160 J/cm2.]

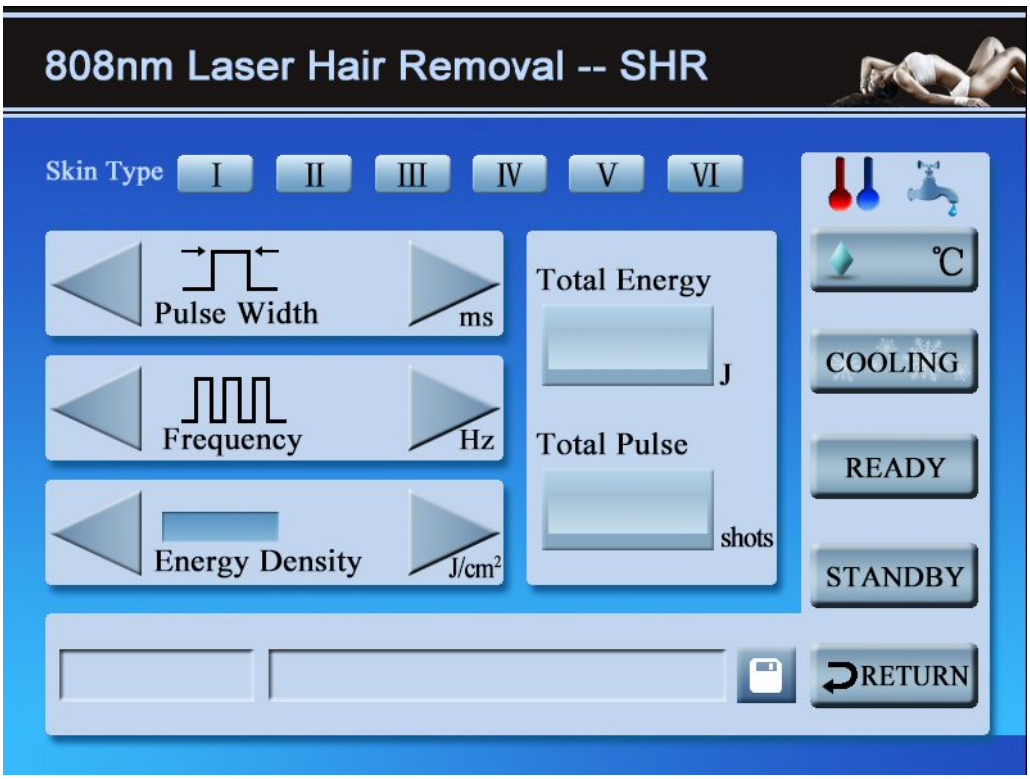


Figure 6.3 Energy density setting

2. Turn on and off the cooling system

When you turn on the machine, the system default state is cooler off, if you click "COOLING" button on the touch screen, the blue "COOLING" button will become to orange which shows the cooler is now open and it began to automatic refrigeration. If you click again the "COOLING" button to make it become blue, the cooler is off and the handle stop cooling.

3. Pulse width setting

Method 1: First click on "Pulse width" button, then click the two blue triangle button in the middle of the touch screen to adjust the Pulse width by 1ms every step, the range is 10 ~ 1400ms

Method 2: Method 2: Click the numerical display area which is white part on the touch screen, it will pop up a small numeric keypad, you can type the energy density, and then press "Enter" key; if you do not want the number, you can press the "ESC" key to exit the setting, the original number will be retained; if you enter the wrong number, you can press the "CLR" key to re-type again. The input energy density range is 10 ~ 1400 ms.

4. Set the frequency

Method 1: First click on " Rep Rate "button, then click the two blue triangle button in the middle of the touch screen to adjust the Pulse width by 1Hz every step, the range is 0.5～10Hz

Method 2: Click the numerical display area which is white part on the touch screen, it will pop up a small numeric keypad, you can type the energy density, and then press "Enter" key; if you do not want the number, you can press the "ESC" key to exit the setting, the original number will be retained; if you enter the wrong number, you can press the "CLR" key to re-type again. The input energy density range is 0.5～10Hz.

Through measurement and analysis, the nominal output of laser hair removal instrument and the estimated output of laser hair removal instrument has a deviation less than 10%

6.3.2 Ready

For the **"ST / RY"** button, when the **"ST"** shows orange, **"RY"** shows blue, then it means the machine is now under **"standby"** state; when the **"ST"** shows blue and **"RY"** shows orange, it means the machine is under the **"ready"** state.

"ST / RY" button used to switch the **"standby"** and **"ready"** state.

The first time when the machine under standby state, the **"ST"** shows orange, **"RY"** shows blue, now click on the **"ST / RY"** button will be connected to laser power, now the **"RY"** shows orange and **"ST"** shows blue like shown in Figure 6.6.In the same time, the yellow indicator light turn on and during this time, it is forbid to adjust the system parameter.

Users have to click on the touch screen within the **"ST / RY"** button to start the laser

power, then press the foot pedal or press the button switch to start the laser output.

When the system is under ready state, you can click the **"ST / RY"** button switch to standby state, then you can see the **"ST"** is orange, and **"RY"** is blue, the yellow light is off, now you can set up the parameters but the laser power is still on.

Note: If the machine has problem, you cannot switch the machine from **"standby"** state to the **"ready"** state.

6.3.3 Foot switch, button switch

Foot switch or button switch used to output under the READY state.

When the system is under READY state and the self-detection is normal (including: interlock, water flow switch, water temperature, fiber interlock switch, current), then you can press the foot pedal or by pressing the button to make the output, the machine will output according to the setting parameters. When the machine is outputting, you can see red light flash shown on the screen, also you can hear the buzzer rhythmic sound and red flash shown on the handle. As shown in Figure 6.7, this time all the buttons on the touch screen is invalid. Release the foot switch (button) to stop the light operation.

6.4 Expert Reserves

The expert reserves are storable and changeable for clinic convenience use, the main functions as saving one to four series of universally adapted data to avoid the reiteration of inputting same parameters or data which associated with time consuming.

Using method:

1. Registering to set the data:

Click **“USER PROG”** to enter the expert reserves when the machine shows standby screen (as Figure 6.8.).

"10" "60" "10" "MODE 1" is the first set of parameters; likewise, the rest three sets are immediately followed.

Click the parameters, which managed to be changed ones, to open the digit keypad that to modify the determined parameters. The new changed parameters

must be saved by clicking **“SAVE”**. Click **“BACK”** to return the standby screen to finish the new changed settings.

2. Applying of the expert reserves parameters:

Show the new chosen parameters on the standby screen before the treatment.

The procedure is:

Click **“USER PROG”** to enter the expert reserves when the machine shows standby screen to chose the relevant button on **“MODE 1”“MODE 2”“MODE 3” “MODE 4”,** the red button indicates your chose successfully.

Then click **“BACK”** to return the standby screen to check whether the new chosen parameters are on the screen.

Start treatments with the new parameters.

6.5 Intelligent Counter for Pulse

The system uses Intelligent Counter to memory the amount of light pulse

On the standby screen, the figures below "Count" tab signify the current cumulative count of the light pulse. The figures below "Total Count" tab in the record the total optical pulse of the machine.

The pulse count will be cleared automatically when reboot the machine; the current pulse count can be cleared by clicking the "RESET" button when the machine is running.

6.6 Malfunction Alarm

The hair removal apparatus with multi-function protection features and malfunction alarm system: safety interlock switches, flow switches, water temperature, fiber interlock switch, current over-current.

Protection instructions on the touch screen display the lights to inform the current situation (The indicator light is green under normal circumstances, but shows red when fails). When there are the obstacles are detected to eliminate.

Please contact with after-sales maintenance staff if the same alarm initiates over three times.

1. Measures for dealing with safety interlock switch alarm

   Checking whether the shell is opened, safety interlock switch is loose, remote interlock is open or not. Please contact with after-sales maintenance staff if the alarm is continuing after checking and confirmation.

2. Measures for dealing with flow switches alarm

   Checking whether the water tank is lack of water, or if there is leaking water pipes and radiators. Please contact with after-sales maintenance staff if the alarm is continuing after checking and confirmation.

3. Measures for dealing with water temperature alarm

   Turn down or stop the light shooting for a while, then restart. Please contact with after-sales maintenance staff if the alarm is continuing after checking and confirmation.

4. Measures for dealing with fiber interlock switch alarm

   Checking whether the fibers on the optical output port has been connected.

   Please contact with after-sales maintenance staff if the alarm is continuing after checking and confirmation.

5. Measures for dealing with w current over-current alarm

   Stop current operation→ turn down the machine→ restart→ re-operation.

   Contact with after-sales maintenance staff if the alarm is continuing after checking and confirmation.

6.7 Shut down Procedure

Click the button at the left bottom on the touch screen to turn off the machine. The image “the machine can be shut safely now”(As image 6.10.) shows the safety of disconnection with the power. The system will automatically save the current treatment parameters for the promotion for next boot parameter setting.

Make sure the shutdown is before the disconnection of electricity to protect the machine.

1. Click the shutdown button on the touch screen will pop up a Shutdown Protection Pattern (To protect the laser) and the Shutdown will show after a period of time. (No power disconnection during this period of time.)
2. Rotating the key switch to "OFF".
3. Close hull switch on rear chassis, disconnect the external power supply.
4. Forced shutdown should lose the current treatment parameters; by pressing the emergency switch or turning off the key switch. (Notice: No forced shutdown without exceptional circumstances.)

Notice: In the course of treatment in cases of emergency need to quickly stop the lights shooting please press the emergency switch on the main screen.

7. Routine Maintenance

Routine maintenance on equipment must be needed to ensure the normal use. Laser machine is a kind of precision device; particularly careful maintenance must be mentioned.

1. Check or replace the power fuse tube.

Turn off all power switch, unplug the power cord; using a small flat screwdriver to open fuse light jacket with counterclockwise rotation, then take out the fuel tube from the jacket.

The fuse tube only can be replaced by the manufacturer authored standard type (10A/250VAC.).

Put the new fuel tube into jacket and screw back; reconnect the power cord into the back of the machine; turn on the power switch and key lock; to check the machine can run smoothly or not.

2. Maintenance of the mainframe.

Clean, dry, dust-free, ambient temperature as 4 ~ 40 ℃ are seriously desired for the equipment installation sites. The equipment must be shielded if quits from using for long time; dust, water vapor and other pollutants should attack the machine which maybe decrease laser output energy or even damaged the whole device.

Dry, ventilated, non-corrosive gas, no direct sunlight restoration is needed.

In the temperature regions which are below 0 ℃, on the situation of quit from using for long time and transportation the cooling water must be drained from the mainframe (Suggestion: Professional operators marked as qualified from the training that offered by the manufacture or engineers from the manufacturer have the recommend to do the drain).

3. Laser handles maintenance

Avoid falling, hitting, clashing and non-authorized opening of the laser handles which formed by precision optical components.

Optical crystal face should be checked and properly cleaned before using.

Cleanliness impacts the output quality critically.

Avoid handle transmission system damage that caused by extreme bending when in use.

4. Cooling system maintenance

Regular checks of the cooling fan must be needed. Laser should not be working properly, or even the whole machine is damaged due to the cooling fan ruins which cause the accumulation of heat inside the device.

Regular inspections of water storage tank, the cooling capacity and water quality must be mentioned. Maintenance personnel should add or recharge the cooling water in time.

Notice: The cooling water for this hair removal has special requirements

which offered by the manufacturer. Please contact for re-fulfillment.

5. The point of load must be the rack when carrying the machine.

Handles play only the role of movement; External-force should not be pressured on the handles and the shell. The machine cannot be moved when in use (when lights shooting.), and not too much inclination (Tilt angle ≤ 5 º).

6. Non-professional maintenance personnel shall not install or disassemble the instrument mainframe, laser handle, foot switch or other accessories. Please turn to local agent if anything wrong.

7. Check the on-off power supply situation about the "Power Switch", "key switch" and "emergency stop switch" once a week during restoration. Please contact with manufacturer if there is problem.

8. Safety Protection

8.1 Laser safety

808nm diode laser hair removal equipment could emit high-intensitive infrared laser radiation, which will do harm to tissues, especially for ocular tissue. To avoid harm to people, all the doors and windows of the treatment room should be covered by high-density shading material. There must be warning sign outside of the treatment room.

808nm diode laser hair removal equipment emphasizes function and safety. This system has all-sided safety testing procedures. Because of its high intensity and high energy, all of the related people should abide by the following matters. Before the treatment, please check whether the spare parts are installed right, whether insulated part of the wire is complete. Please make sure you have worn something to protect your eyes.

Avoid eye or skin irradiated.

Laser Wavelength: 808nm

Fluence: 160 J/cm^2

Class Ⅳ laser product

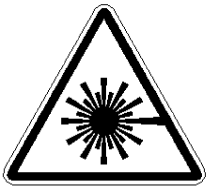
Please don't look directly at the laser or reflected laser. Both of them will do serious harm to your eyes.

People who do not wear protecting glasses are forbidden to be close to the laser when the machine works.

Do not repair anything which is not shown in the instruction book. Manufacturer or the distributor that is authorized by manufacturer should be responsible for the maintenance.

Do not put the machine under the flammable circumstance. Keep it away from anaesthetic and oxygen. By the way, please make sure the flammable liquid which is used to clean the diamond of the handpiece evaporates before usage.

Do not make the laser points at any areas that are not for treatment. Make sure the output end points at safe direction.



Attention: You need to follow our instructions to use the control component and accommodation component before or during the treatment. Or, you and your customers will be in danger.

8.2 System characteristics of laser safety

Diode laser hair removal equipment has different electron and mechanical safety design for different parts. The following instructions are safety devices designed for wrong operation:

1. Key switch: It control's the power supply of the machine. Very necessary. Green

light shows whether it is on or off.

2. Emergency switch: It is used to stop immediately. Only if the power switch connects with the main switch correctly, the machine could be used. Therefore, it is very safe. When you press emergency switch, the machine will be turned off. Of course, all of the operations will be stopped. Turn off the main power, turn emergency switch according to clockwise direction until it rises. Then press it again to restart the machine.
3. To prevent changing the parameter because of wrong operation, the machine has “standby/ready” function. Only when you press “ready”, you could change the parameters.
4. Foot switch: It controls the output. There’s a protective cover outside of the foot switch. It could prevent wrong operation. The protection grade is IPX1. Do not sprinkle any liquid on it or make it under moist environment.
5. Transmission system detector switch: It is used to test whether the handpiece is connected well with transmission system. If they are not connected well, the machine won’t let laser output.
6. Remote interlock control: It is used to keep other people who enter the treatment room away from laser radiation. When the door of the treatment room is opened, machine will stop outputting laser.
7. There are four rollers beneath the machine. If it is not necessary for the machine move, you should press down the lock catch to prevent movement.
8. There are two pairs of protection glasses, type SD-4. Its protection wavelength is 800~1000nm. The glasses accord with European standard EN207: 1998+A12002. They have CE certificate. Please make sure the operator have worn the glasses before laser output.
9. Diode laser machine has many tips when it works. Including: flicker shows the laser output, red light flickers and buzzer repeats buzzing.

Only if all of the following conditions are met, the machine could work normally:

※The machine is connected well with the power supply

※Turn on key switch

※Emergency switch is released

※The machine is "ready" and no abnormal situation is found by itself

Operator must pass the training and have operating experience. Or, he is forbidden to do the treatment.

8.3 Nominal ocular hazard distance (NOHD)

This diode laser machine is class Ⅳ laser product. Do not look directly at the laser or reflected laser. Both of them will do serious harm to your eyes. The NOHD is 30.1m during normal use.

8.4 Mark for laser safety

There are some warning marks on the machine as followed:

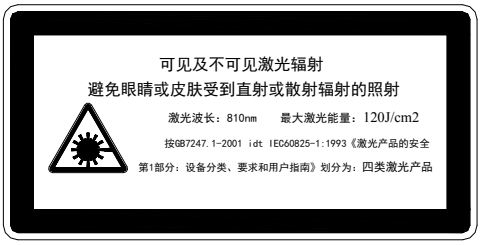


Figure 8.1 Laser class mark

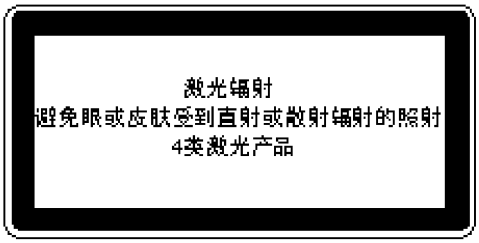


Figure 8.2 Laser radiation mark

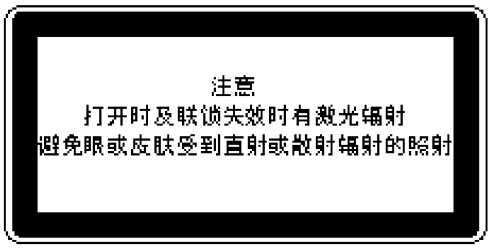


Figure 8.3 Interlock mark

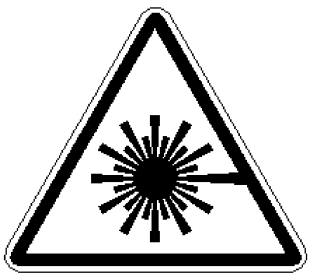


Figure 8.4 Warning mark

Figure 8.5 Laser windowoftube mark

Figure 8.6 BF mark for application part

Figure 8.1 Laser class mark: It is below the product nameplate, which is at the back of the machine. This mark shows maximum output of the laser radiation, laser wavelength and standard classification. It should accord with term 5.8 of GB7247.1-2001.

Figure 8.2 Laser radiation mark: It is on the top of the machine. This mark shows the machine belongs to class Ⅳ laser product so that it has certain radiation. People should avoid direct radiation or scattering radiation to eyes and skin. The mark should accord with term 5.6 of GB7247.1-2001.

Figure 8.3 Interlock mark: It is at the both sides of the machine. This mark shows that once the side cover plate is moved away or knocked down, people may be radiated after canceling the function. It should accord with term 5.9.2 of GB7247.1-2001.

Figure 8.4 Warning mark: It is below the output end of the transmission system at the front of the machine. This mark shows the machine is laser product. You could refer figure 14 of GB7247.1-2001 for this mark.

Figure 8.5 Laser windowoftube mark: It is on the right of the out end of transmission system. This mark shows that laser outputs from here. It should accord with term 5.7 of GB7247.1-2001.

Figure 8.6 BF mark for application part: It is on the left of the out end of transmission system. This mark shows application part’s shock proff grade is BF type. It should

accord with term 5.7 of GB7247.1-2001.

Light path of laser is entire closed. This design could prevent leakage of laser radiation effectively. Do not use the machine when the closed hood is open.

8.5 Safety protection measures

1. You'd better put up "laser warning" "danger" or other warning board specially for laser safety at the conspicuous place.
2. Please put up" Authorized Personnel Only" outside of the treatment room.
3. Move away any reflectors in the treatment room to avoid the reflection of laser. The reflection will hurt surrounding people.
4. You'd better ask certain person to take care of the laser machine.
5. After using the machine, the operator should pull the key.
6. The operator should wear protection glasses that are suitable for the laser wavelength and power.
7. Do not point the laser directly at eyes or reflect laser to eyes.

8.6 Electrical safety

1. We have marked the ground connection end according to related standard. After the debugging, maintenance person should check whether the ground connection is well connected. When the machine doesn't work, please don't make it power on.
2. There's high voltage in the inner part of the machine and laser handpiece. Do not open them if you are not trained by us. Maintenance people should pay attention to all the marks to avoid electric shock.
3. There's strong electric current when the machine works. Do not touch electrode when it powers on.
4. This machine adopts 220V ac single-phase power. 2000VA. the treatment room should use corresponding power supply.

5. The operator should know basic knowledge about using electricity safely. They should also know how to operate the machine correctly.
6. This machine should be used under the right circumstance.
7. Diode laser machine is: shock proof class Ⅰ. Application part's shock proff grade is BF type.

8.7 Fire safety

1. Do not pile up sundries around the machine. Make sure there are enough capability for the power supply when you install the machine.
2. Do not put explosive and flammable materials in the laser option path or the place that the laser beam could irradiate. Or, it may catch fire or even explosion.
3. Do not use flammable anesthetic or oxidizing gas, like N_2O or O_2.Because some material will be light up by the high temperature caused by using the machine normally. Make sure the flammable liquid which is used to clean and sterilize the crystal evaporates before usage.
4. It is necessary to prepare fire extinction appliance.