User Manual

Picosecond Laser

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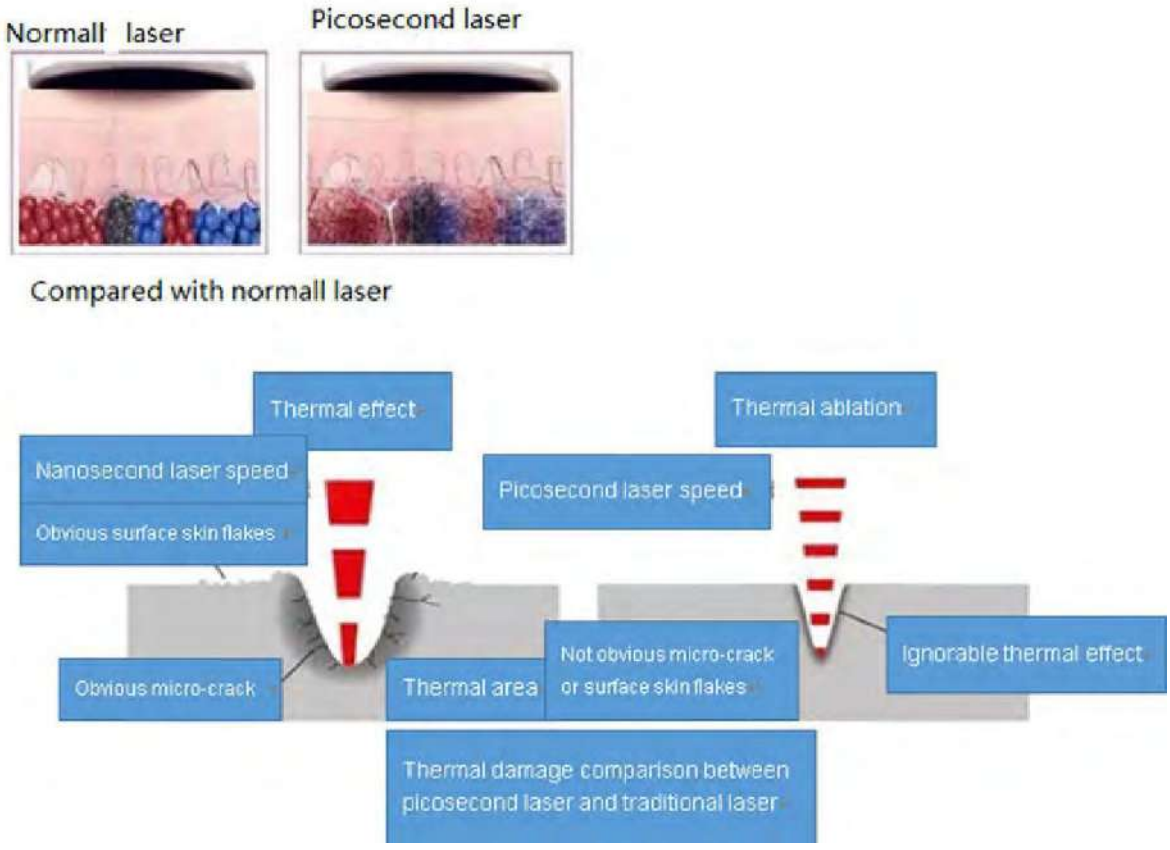
Preface: The picosecond laser is the new aesthetic & medical technology specially working for pigmentation removal and lightening & whitening skin. The laser energy directly shocked the melanin in a powerful and fast way, improving skin pigment, to achieve skin whitening.

1 picosecond = 10^{-12} seconds

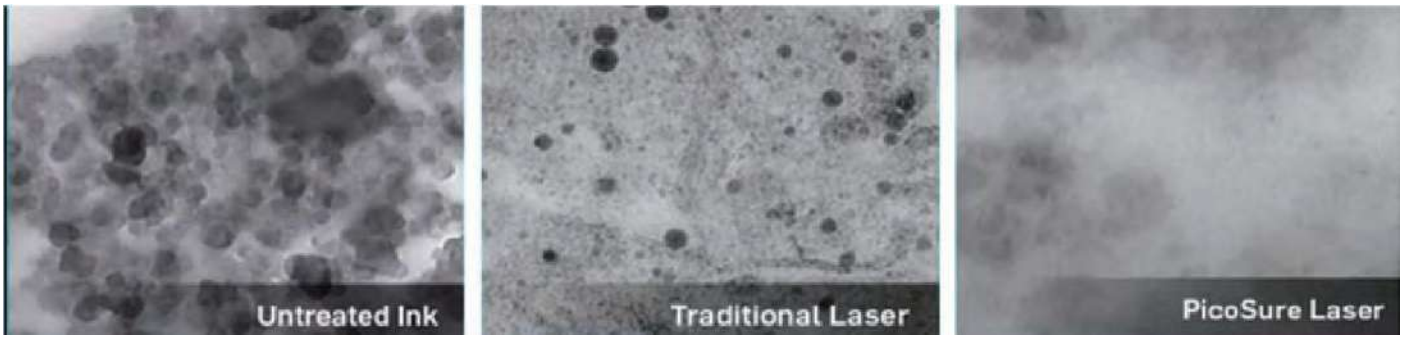
Picosecond laser and traditional laser are of with different width (pulse duration), the shorter pulse duration, the weaker photothermal effect and almost nothing photothermal effect. It won't affect the normal skin, but powerful acts on the target tissue. The picosecond laser can greatly shorten treatment times but better treatment effect than other lasers, quick treatment time and more safe.

I. Picosecond laser Theory



Picosecond laser adopts the principle of "light induced blasting". It can create ultra-short picosecond pulses that last mere trillionths of a second. Because the energy from the laser is emitted in such a brief period of time, the energy is concentrated into very powerful pulses, which can instantly go through epidermis and reach deep into skin, to shatter tiny fragments of ink or pigmentation particles and then be absorbed by macrophages and eliminated gradually.

5 advantages:



1): Picosecond laser FOCUS technology makes the honeycomb energy increasing 20 times than traditional picosecond laser focus, can be broken into melanin extremely small particles, more convenient on the metabolism of melanin, and greatly improves the removal rate of melanoma.

2): Melanin removal faster

The laser honeycomb treatment speeds up to about 90 times faster than traditional picosecond lasers, smashing the splash particles in a flash, dramatically reducing the healing time.

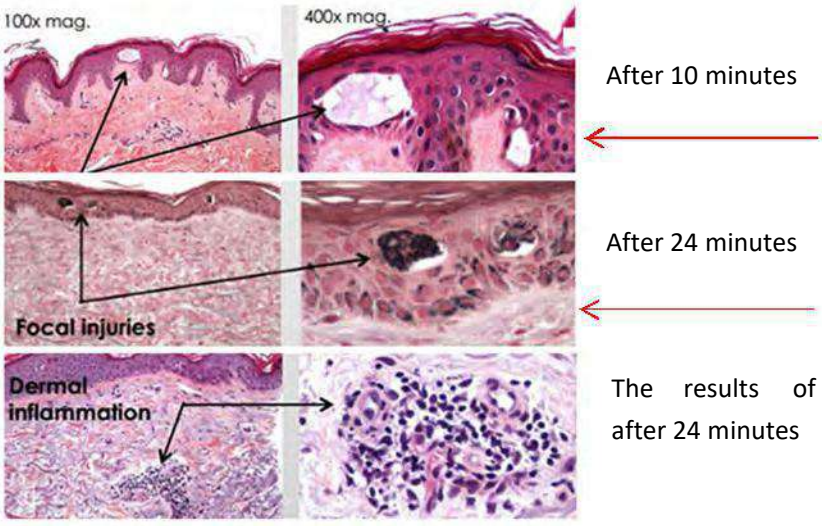
3): Refuse to return black risk

Based on picosecond mechanical light laser, the rapid and powerful deterrent ability, the probability of heat damage to the skin is greatly reduced, and the risk of stimulating the re - activity of melanin (re - Black) is relatively reduced.

4): Freckle start repair mechanism at the same time

In addition to the shock and reduction of melanin, the honeycomb instantaneous effect lens (FOCUS) can transmit the shock wave to the deep layer of the skin, initiate the repair mechanism, promote the regeneration and hyperplasia of collagen, and achieve the effect of removing the lines of whitening and softening.

5): No damage to normal tissue



After clarifying the laser irradiation of picosecond focus spot after 10 minutes, Shows LIOB in the epidermis Perfect dispel stains at the same time, through the skin healing mechanism, in the photo below the dermis layer

produced a new collagen and elastic fiber, synchronization to rejuvenation, firming excellence

AI. Introduction of skin as well as its structure function

1. What is skin?

The weight of our skin accounts for 5% to 15% of our body weight, with a total area of 1.5 ~ 2 square meters, and the thickness varies from people and parts, around 0.5 mm to 4 mm. The skin covers our whole body. It can protect all kinds of tissues and organs in our body from physical, mechanical, chemical and pathogenic microbial invasion. Skin is the largest organ of human body.

An adult has skin around 2 square meters, 1/20 of his body weight. The thickest skin in our sole is up to 4 mm, while the thinnest skin on the eyelids is less than 1 mm.

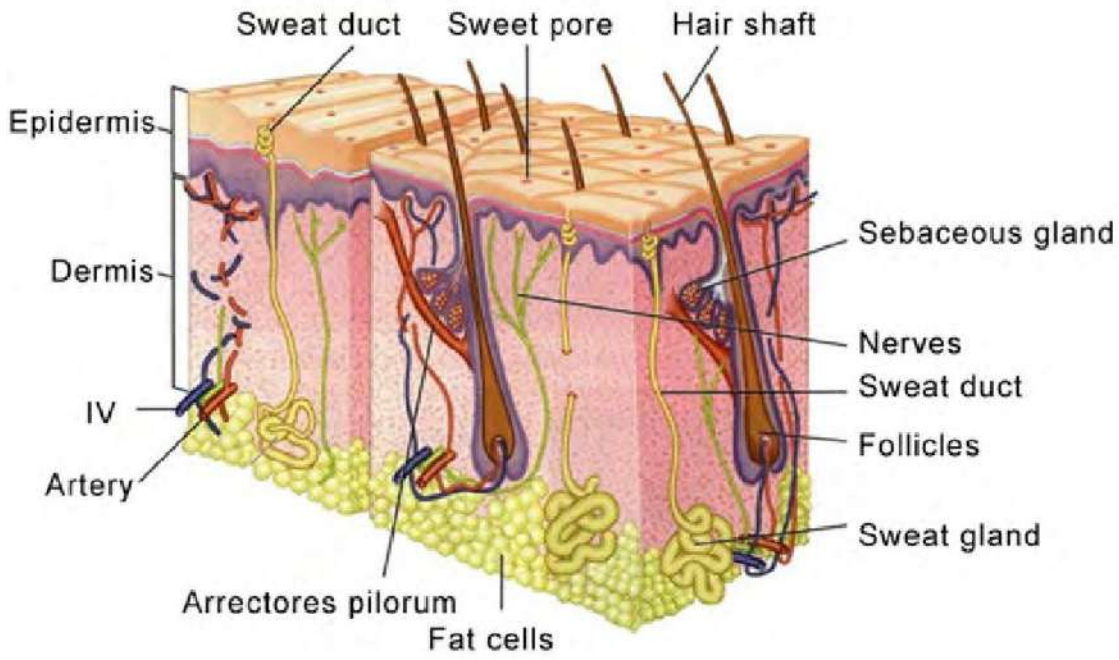
2. Function of Skin

Skin has two aspects of barrier effect:

1) Prevent the loss of water, electrolytes and other substances in the body;
2) Prevent the invasion of harmful substances. Skin maintains the stability of human body environment, while skin is also involved in the body's metabolic process. There are several kinds of skin color (white, yellow, red, brown, black, etc.), mainly vary from race, age and location.

3. Construction of Skin

Skin consists of 3 layers, the epidermis (uppermost layer), dermis (mid-layer) and subcutis (lower fat layer)



III. Principles and scope of treatments

Picosecond laser adopts the principle of “light induced blasting”. It can create ultra-short picosecond pulses that last mere trillionths of a second. Because the energy from the laser is emitted in such a brief period of time, the energy is concentrated into very powerful pulses, which can instantly go through epidermis and reach deep into skin, to shatter tiny fragments of ink or pigmentation particles and then be absorbed by macrophages and eliminated gradually.

1. Working theory

Picosecond laser adopts 1064nm&532nm wavelength laser as well as focus lens technology to collect and focus 70% of released laser energy. Each pulse energy can provide skin tissues 10% of effective shockwave, to shatter the melanocytes inside the epidermis and meanwhile transfer the shockwave deep to the dermis layer, stimulating growth factors to repair, promoting the renewal and new formation of collagen and elastic fibers, accelerating the metabolism of skin and excretion of melanin eliminate, so as to solve the problem of deep pigment from the root.

2. Applications

Picosecond laser is mainly applied in the treatment of pigmented skin lesions, mixed hyperpigmentation, and traumatic pigmentation.

Moles and Spots

Nevus of Ota, Ito's nevus, Mongolia spot, naevus fusco-caeruleus zygomaticus, coffee spots, seborrheic keratosis, nevus spilus, junctional nevus

Body Tattoos, eyebrow tattoos

Pigmented skin lesions like body Tattoos, eyebrow tattoos, eyeline tattoo, lip line tattoo and traumatic tattoo.

IV. Classification and feature of spots

Pigmented spots refers to hyperpigmentation on partial skin, its color is obviously deeper than the surrounding skin. Some spots are innate, while others are acquired. Some are caused by sun exposure. There are also some not related to sun exposure. And some spots may recur after treatment.

1) Types of Pigment
    a) qualitative spots: the feature is stable, and does not change due to external factors, such as moles, birthmark, age spots
    b) Active spots: the feature is unstable, and change due to external factors, such as freckles, chloasma, sunburn, pigmentation after skin damage, Lead mercury spots.
    c) Epidermal pigmentation: melanin deposited in epidermis layer, which can be removed, such as freckles, nevoid lentigo, cafe-au-lait-spots.
    d) Dermal pigmentation: melanin deposited in dermis layer as grey, stone blue, brown color, e.g. ADM spots, nevus of Ota, etc.
2) Causes
    a) genetic factors-------freckles (not all freckles are genetically determined)
    b) endocrine balance interrupted or endocrine disorder------pregnancy, abortion, using contraceptive medicine or loop-shaped intrauterine device
    c) Body diseases-------liver and kidney dysfunction, gastrointestinal dysfunction, disease of gynecological ovary, uterine appendage, and mammary gland, etc.
    d) Chronic malnutrition -------chronic diseases, hepatitis B, tuberculosis, tumor, etc.
    e) ultraviolet radiation

1. Common pigmented spots

1) Freckles/Ephelides

Genetically determined or related, not related to body disease or endocrine disturbance. Quantity increases and color becomes darker with age and sun exposure.

Area	Shape	Age	Signs and Symptoms	Main causes
Symmetrically occurred on face, especially on both sides of nose, even whole face. Mainly on sun exposed area, not on hair area	Diameter 1-2mm spots	3-5 years old children	Scattered pigment spots(usually not link together), usually deep color dark brown	Major candidates are female, genetically determined. With age and sun exposure, the quantity increases and color also becomes darker

2) nevoid lentigo

Pathology shows increased density of melanocytes in the basal layer of epidermis

Area	Shape	Age	Signs and Symptoms	Main causes
Any body parts, not limited to sun exposure area	Spot size like needlepoint or millet	mostly occurred in childhood, high incidence at age of 16-40 years old	In flake shape or in lines, linking together like patches, slightly higher than	unrelated to sun exposure, no change in summer and winter

			epidermis, signs of desquamation	

3) cafe-au-lait-spots

Mild abundance of intracellular melanin in the formation of epidermal keratinocyte, but the number of melanocytes did not increase. Cafe-au-lait-spots is a hereditary skin disease. The overactivity of melanocytes in spots results in a large number of melanin and the formation of pigmentation spots.

Area	Shape	Age	Signs and Symptoms	Main causes
Any body parts, mainly on non exposed area	Size from a few mm to a few cm	New born or infants(incidence rate about 10-20%)	In light brown or brown patches, uniform color, with clear edge and whole existence.	Not affected by external factors\genetically determined

4) Aging spots- Seborrheic Keratosis

The basic feature is outward growth, hyperkeratosis, acanthosis, papillary hyperplasia, and pseudocyst. Some damaged skin , in the proliferation of keratinocytes, majority black particles shows severe thickening stratum corneum and highly active melanocytes.

Prevention: sunscreen, using whitening products

Area	Shape	Age	Signs and Symptoms	Main causes
Face, hands, arms and legs	Spot diameter around 1 cm, usually not linking up with each other	middle-aged female and male over 30's	light brown color and smooth surface at beginning; with age, color becomes darker, and thickening skin protrudes from skin surface.	Has clear boundary with healthy skin, related with aging and sun exposure

5) Chloasma / Melasma

It is a type of hyperpigmentation on face, mainly caused by endocrine disorders, mental stress, a variety of diseases(Liver and kidney dysfunction, gynecological diseases, diabetes, etc) or lack of vitamins or chemical stimulation.

Prevention: sunscreen, using skin protection barrier, avoiding excessive cleaning and rubbing skin, taking vitamin C, vitamin B.

Area	Shape	Age	Signs and Symptoms	Main causes
Cheek, forehead and area around mouth	Large colored patches, symmetrically occurs, with irregular edge	Occur after 20's, high incidence at age of 30-40's; 70% of postpartum women will have chloasma.	Brown, reddish brown, or chocolate brown color	Closely related to body diseases or endocrine disorders, also affected by sun exposure. Ultraviolet light can deepen the color.

6) Nevus zygomaticus

Also called naevus fusco-caeruleus zygomaticus or Acquired nevus of Ota, a type of melanin pigmentation which is prone to occur on cheekbone.

Area	Shape	Age	Signs and Symptoms	Main causes
Cheekbone area	Large colored patches, symmetrically occurs, with irregular edge	major candidates are female at age 16-40	Symmetrically distributed on cheekbones, spot diameter around 1-5mm,black grey color	Closely related to body diseases or endocrine disorders, also affected by sun exposure, Ultraviolet light can deepen the color.

7) Naevus flammeus

The histopathological changes shows the expansion and malformation of superficial capillary network in dermis layer.

Area	Shape	Age	Signs and Symptoms	Main causes
Face, neck and scalp, usually unilateral occurred	Irregular patch, diffused distribution	Newborn	Uncertain size, with clear edge and smooth surface, no inflammation response, not itching	congenital capillary malformation

8) Moles--- nevocellular nevus

Area	Shape	Age	Signs and Symptoms	Main causes
Any parts	Smooth surface, slow development	Infancy or puberty stage	Dark, brown or yellow color, with clear edge, higher than skin surface or flat on skin, with or without hairs	None

9) Sunburn or erythema

Caused by sun exposure, irregular flakes, occurred on sun exposed area

10) Lead mercury spot

Black or bronze color, redder than Chloasma, difficult to remove.

2. Specific analysis of the classification and characteristics of spots

1) Active spots

- Chloasma: Brown, light brown or yellowish color, smooth and not protruded on skin ; Major candidates middle-aged women, irregular flake shape, occurred on cheekbones, around nose or forehead; caused by chronic diseases, gynecological diseases, or long term oral taking of contraceptives.
- cyasma: occurred after 2 or 3 months of pregnancy, yellow or dark color; irregular flake; disappear in 1 or 3 months after delivery, also possibly not disappear anymore or occur in lactational period.
- butterfly rash: butterfly-shaped patches on the skin, yellowish brown color, symmetrically on both sides of

nose or middle.

◆ sunburn spots: caused by ultraviolet radiation, irregular shape, gray or gray brown color; the area expands and the color deepens with sun exposure. May occur in summer and disappear in winter.

◆ blemishes: acquired, mainly on dry skin, not qualitative, but easy to become qualitative, difficult to remove.

2) qualitative spots

◆ freckles: usually occurs at age of 5 -7 years old; brown, light grey or light brown color, sesame-sized round spots, smooth and not protruded; genetically determined; treatment can lighten it but can't remove completely.

◆ Age spots: brown or light brown, occurs at age of 30-50 years old; not only on face also on back or hands. with age the color deepens and the number increases. The big ones will protrude on skin and become dark brown or black; It's regarded as lump in medicine, by unknown causes.

◆ Pigment spots: light brown, dark brown, black color; moles protruded on skin with rooted hairs(no treatments for such moles, to avoid mistreatment of skin cancer such as melanoma)

◆ Birthmarks: green, red, low occurrence of white, purple, blue and black.

V. Attentions

1. Taboo people

• Within first three months accept chemotherapy or cytotoxic drug treatment
• Hypertensive patients without a doctor's permission
• Cardiac patients without permission from a cardiologist
• Over the past four weeks to receive light-sensitive drugs
• Those who received steroids in the past 3 months (eg, asthma patients)
• Other patients who may cause dangerous injury to the disease
• Abnormal light sensitive, skin irritation
• Pregnant women, epilepsy
• Recently accepted sun exposure or indoor sunbathers
• Once suffering from herpes disease (after Zovirax treatment and agreed by the doctor, you can quasi-treatment)
• Over the past six months to receive oral administration of A acid (Accutane) treatment
• Who had received radiation therapy for patients with skin cancer
• Genetic albino patients, easy to produce scar of the customer

2. Pigment removal attention

(1) People who have recently done solar baths (including sun lights), because tanning or pigmentation will affect the penetration of the laser
(2) Pregnant women, breast-feeding (although not affected, but will cause psychological burden)
(3) Skin has any infection
(4) The use of skin medicine (mainly vitamin A, easy to cause skin pigmentation drugs)
(5) Freckles, sunburn, elderly spots should pay attention to sunscreen
(6) Pigmentation abnormal black skin disease, first try to do local, because some are permanent black disease, difficult to fall off
(7) Liver disease is sickness black, easy to relapse of pigment is easy to relapse, not recommended to do, to communicate with the guests clear
(8) Zygomatic spot after the hair is easy to black, need to be treated several times and the importance of moisture and sun protection
(9) Suggest the guests to play the surface spots

3. Operation attention

(1) 4 weeks before treatment, sunscreen, to avoid sunburn, no sunburn before doing laser treatment
(2) 4 weeks before treatment, such as laser, IPL, micro needle, fruit acid skin and other traumatic irritation treatment of skin need to recover after the rehabilitation period can be treated
(3) Clean the skin, the scope of treatment must not have any cosmetics, oil or hair, to avoid scrub; peeling and other care and do not use sponge, Eraser or other cleansing tools to stimulate the skin.
(4) Treatment before and after attention cannot do sauna, bath and other high-temperature sweating treatment, coated with sunscreen after treatment, to avoid sun and high temperature environment.
(5) If skin dry, need Hydrating and moisturizing before treatment within one week, and then do laser treatment
(6) Prepare ice packs because the skin temperature need be reduced after treatment
(7) Skin with moles, to cover with plastic, plastic cover lips, hair side, eyes, therapists and operators need to wear a special filter goggles to protect the eyes, the operator must wear disposable medical gloves.
(8) Treatment needs to adjust and test, to avoid any adverse reactions to the skin, treatment, if necessary to add a second treatment, to adjust the parameters of the device to do a clear record
(9) Start testing the skin reaction according to the standard parameters, does not repeat in the same position, and need to ascend slowly from low to high degrees. If the skin appears black, intense pain or deep red after testing, it needs to be lowered immediately and tested again.
(10) If the energy is too high, the skin wrinkles and gray phenomenon, at this time the skin has been burned, should immediately reduce the Joule energy, burn place cannot fight again,
At the same time, it is recommended to stop treatment, to be repaired.
(11) Carbon and tender skin treatment during the gun cannot be placed on the skin; near the skin 1-2 will be able to (the farther away energy stronger).
(12) Operation of carbon treatment must be combined with the use of carbon powder purification equipment, absorbing carbon dust to protect the operation of the end of the service life of the gun
(13) Skin treatment, treatment area does not point and overlap, such as mild swelling phenomenon is normal, the most ideal effect
(14) Deep Color spot treatment some slight redness and measles red blood sample, spot position will be darker; skin color does not turn white or feel special pain. This
is the ideal effect, do not put the gun pressure on the skin on the head, just lightly affixed to the skin to go "well" words one or three times is okay
(15) Superficial pigmentation treatment will have a micro-convex and pigment white after the deepening of the phenomenon (at the same time around the red), do not put the gun pressure on the skin, only
The word "Well" should be lightly affixed to the skin for one or three times.
(16) Superficial color spot (point shape) fixed point treatment once, if the spot has no change "white" reaction, you can adjust the parameter energy and then make up again,
But if the spot has changed to "white" after once, remember not to fight again, so as to avoid permanent skin scar
(17) After treatment may have the redness phenomenon, immediately uses the Cryo jet to repair the product repair specialized treatment
(18) Attention after treatment skin moisturizing, strengthen cell regeneration metabolism, prevent dryness sensitive.
(19) The whole treatment period is 4-5 weeks, and every a treatments need to be repaired before the next treatment can be accepted to prevent permanent injury.
(20) The operation of the room cannot be placed reflective objects, such as: Fish tank, wall mirror, large glass reflective objects.
(21) Operating room must maintain good ventilation conditions, air-conditioned air-conditioning device to maintain room temperature in 15 (ideal 25)
(22) Please note that the instrument body and wall should be kept at a distance of 60CM, to ensure that the instrument ventilation and heat is not hindered.

4. Attention after treatment

(1) After treatment the skin red-hot may maintain 2-24 hours, also may grow 72 hours, the guest at home can every 2-4 hours with ice or the ice towel to compress or the cold spray
Relieves symptoms, avoids high temperatures and makes hot showers or baths, usually with a 1-6-hour flush and searing sensation that can fade away.

(2) Some guests after treatment may appear local red rash, itching, and other symptoms of normal conditions, symptoms lasting 3-5 days can be their own retreat, can also comply with the doctor's orders
Use more water supplement products or take allergy medications to relieve symptoms.

(3) After treatment the local may appear the point ooze blood, the scab and so on reaction, needs to maintain the treatment spot skin clean, the dry as soon as possible scabs, the scab skin
The line falls off, not forcibly stripped. Usually in 3-7 days after the scab will fall off, the scab skin before the treatment area does not touch water, do not wear makeup, do not rub, not
Take part in vigorous exercise to avoid sweating and causing infection

(4) 3 days after treatment do not use to disable aspirin and alcohol-containing agents (including alcohol-containing cosmetics, such as: make-up water and foam, scrub washing
Facial milk,), irritating home maintenance products, as far as possible use of water, do not use a towel vigorously wipe the face, light print dry moisture can be, one week’s cannot row massage, note
The facial cleansing should be gentle and avoid stimulation. Prevent the scab from being removed and prevent unnecessary sequelae.

(5) Very few guests after treatment appear local redness, blister and other symptoms, should strictly avoid blister breakage, keep after treatment cleaning, cannot apply potions or
Ointment and contact the consultant and therapist in a timely manner.

(6) Laser treatment is done in superficial skin; color spots will gradually become darker within 24-48 hours after treatment, and may be converted to black coffee or black in the short term.

(7) After treatment the skin is slightly dry, coarse, the color spot scabs one week or so, the treatment range usually recovers in 7-10 days, the color spot will disappear after 2-4 weeks.

(8) After treatment, pay attention to sunscreen, avoid sunburn, such as out of the room should be added to add sunscreen.

(9) After treatment home maintenance remember to pay attention to skin moisturizing, use a mild anti-sensitive moisturizing lock aquatic products, one consecutive weeks of moisture moisturizing repair mask, to prevent skin moisture dry easily appear sensitive

(10) After treatment to avoid the use of convergence, as well as acid, salicylic acid and other stimulating products.

(11) Within one weeks after treatment, guests should avoid eating high calorie, greasy, fried, spicy, hot and sour, strong, pigmented food. For example: Spirits, strong tea,
Coffee, old smoking, beef, lamb, dog meat, seafood (shrimp, crab), barbecue, hot pot

(12) Two weeks after treatment cannot be done with electrical dye eyelashes, perm hair, hair color, and head of the oil, to avoid allergic reactions.

(13) Due to endocrine factors caused by skin pigmentation problems, after removing the possibility of recurrence, need to combine with other treatment, such as the use of faded drugs, oral vitamin C,
Vitamin E, and fruit, etc., at the same time adjust endocrine disorders.

(14) Because of different pigmentation problems, such as the size, type, depth and color of the pigments, as well as individual differences in skin color, metabolic capacity and age,
There were also differences in the fading, metabolic time and effect degree of pigment granules after laser treatment. Therefore, for different skin pigmentation problems, laser treatment each
The interval will vary, please follow the treatment.

(15) After the treatment effect, daily sun protection is still the whole course period and after maintenance work is one of the essential links. Suggest regular life and rest, avoid staying up late,
Exercise properly.

(16) Please follow the doctor's advice (including oral instructions), if you have any abnormalities, contact your therapist promptly.

The instrument must use a three-prong plug with a grounded foot and ensure that the instrument power outlet is grounded well.

VI. Operating parameters recommendations

Spot type	Handpiece	Wavelength choice	Spot size	Energy	Clinical Endpoint
Epidermis		532/1064	2-5	Matching energy selection based on spot area adjust from start	Epidermis whitish, inflamed, occasionally oozing blood
Epidermis-dermis		1064	6-8		Reduced skin tone, even with needling bleeding point, red complexion, elevated temperature (except chloasma)
Dermis		1064	6-8		White, with uniform bleeding point
Tattoo(Black, green,blue)		1064	2-8		White, the color fade
Tattoo(Red, coffee,brown)		532/1064	2-8		White, the color fade
Eyebrow removal		According to the color selection	2-8		
Skin whitening		1064	8		Micro-red, gentle heating

VII. Installation

1. Receipt of the goods :

shown in the following figure

Package for main frame

Package for Handpiece

2. Accessories

item	Description	Model	Quantity	Picture
1	Main frame	zhy-860	1	
2	User manual	zhy-860	1	
3	pedal	/	1	
4	Laser arm	/	1	
5	Power line	Y03	1	
6	Goggles for doctor	1064nm	1	
7	Goggles for patient	/	1	
8	funnel	/	1	
9	nozzle	/	3	
10	Treatment head	/	1	
11	fuse	20A	2	

3. Accessories & installation of laser arm

(1) Introduction of laser arm accessories

Name	Pictures	quantity		Name	Pictures	quantity
body of light guide arm		1		Hammer Seat		1

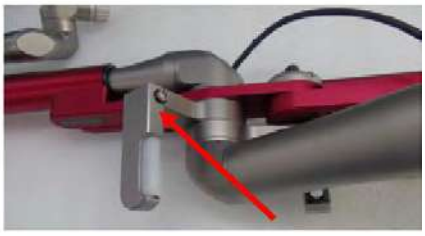
Treatment head		1	M6x75mm flathead hex screws hexagon screws		2
protective sleeve of the treatment head		1	M5x40mm heavy head six angle screws		1
hanging sleeve of the treatment head		1	M8X45mm flathead hex screws hexagon screws		1
safety block		1	M5X25mm heavy head six angle screws		4
Counterweight 1		3	M5X12mm heavy head six angle screws		1
Counterweight 2		1	4mmhexagonal wrench		1
Counterweight shell		1	5mmhexagonal wrench		1

(2) Security alert

The light transmitting arm should be moved gently to prevent falling, and pay attention to dust protection in the environmental!

(3) Assembly Order

1. First install the safety block, pay attention to the light guide arm base first placed between the two safety block, the assembly of the safety gear, with the 4mm six angle wrench lock the heavy head M5x12mm six angle screws. (follow the red arrow directions)



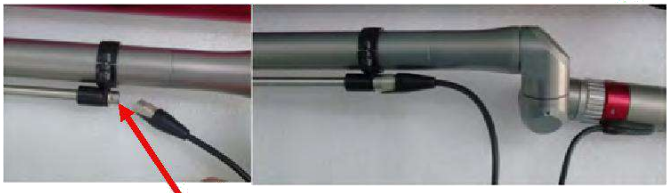
2. The installation of the counterweight, according to the picture, combination weight 1 and 2 weight, pay attention to counterweight sequence, lock tight two flat M6x75mm hexagon screws with 4mm hex wrench. A counterweight shell assembly, hammer seat, 5mm six angle wrench locking head screws M8x45mm inner six angles

3.In order to balance the light guide arm, need to pay attention to the regulation of the rear counterweight button, press the black button, rear counterweight to do 180 degrees to the direction of rotation, to achieve balance support effect. The rotation of the hand nut, the hammer moves up and down, to balance micro adjustment.

4. Install the light transmitting arm to the machine base, lift up the light transmitting arm, put the light transmitting arm connect the machine base ,screw it into screw holes. Retaining 4 pieces countersunk M5x25mm hex screws with 4mm hexagonal wrench.（two people cooperate

5.Install hanging sleeve of treatment head，pay attention to mounting direction of hanging sleeve. Then let hanging sleeve fix on the light transmitting arm, screw it into screw holes，Retaining countersunk M5x40mm hex screws with 4mm hexagonal wrench.

6. Install treatment head, Remove protective sleeve of the treatment head by rotating. Screw the treatment head and light transmitting arm together. Note the direction, plug wire. (Follow the red arrow directions)

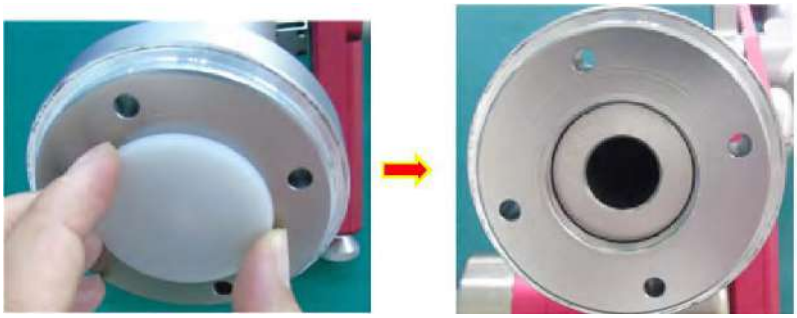


After installation of arm

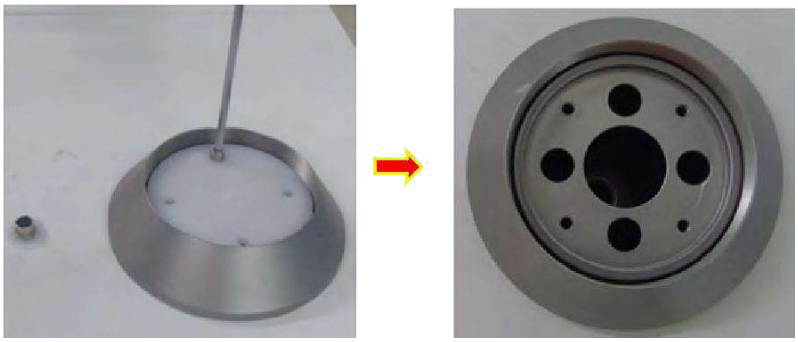
(4) Installation of laser arm

(a) Take off the laser arm from package with two hands:

(b) Remove the dust cover by turning counterclockwise



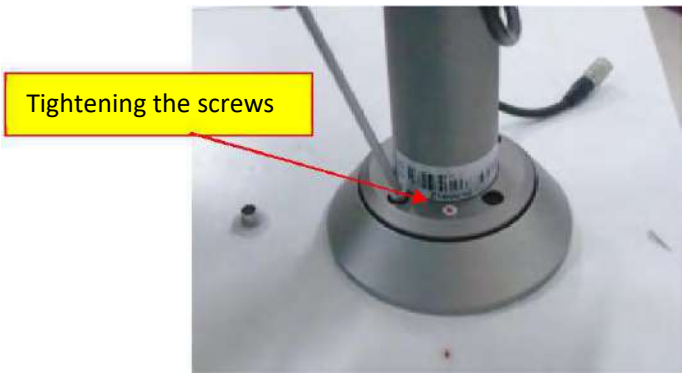
(c) Screw the dust cover bolts on the host seat with a 4mm wrench, and take down the dust cover



(d) Aim at the holes on main frame and insert the laser arm.

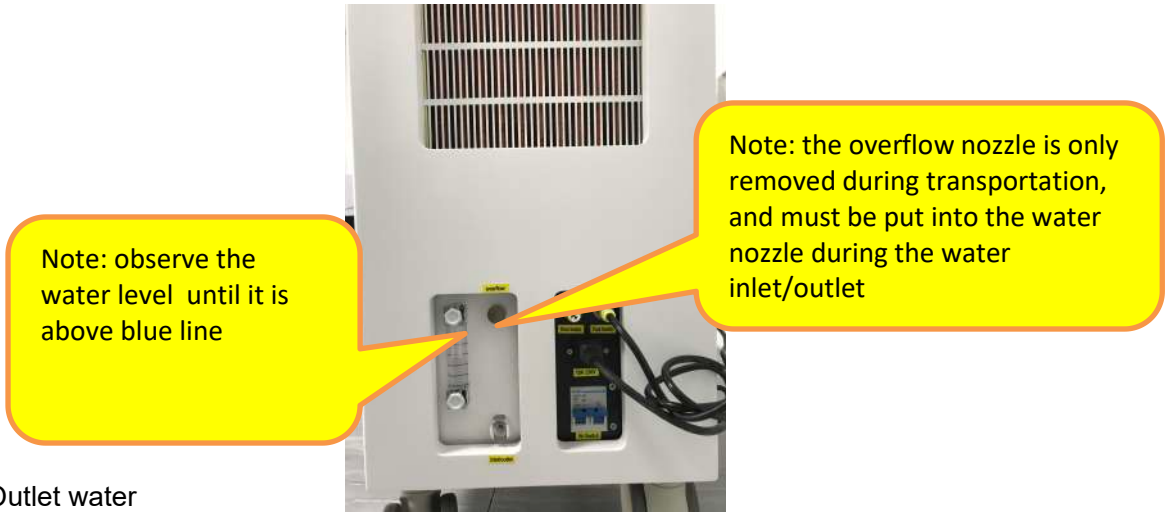
Notice: the label on arm must face to main frame back, show as following

(e) Tightening the screws



(f) Plug and play the signal line

3.input water



5.Outlet water

Insert the water funnel to the “water drain” ,then drain all the water.

6.Exchange filter

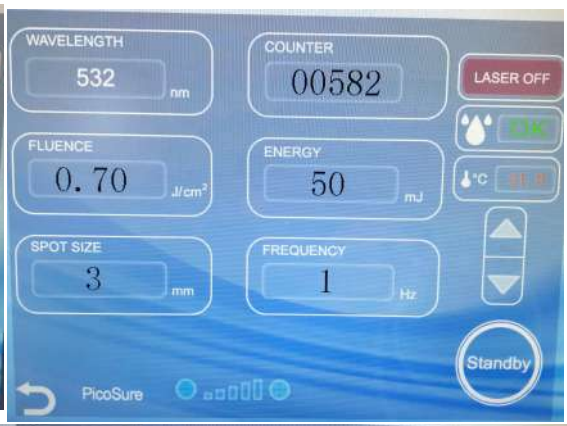
① Take the filter cover down

② Screw the four screws of the fixed strainer with 3MM wrench

VIII. Software operation

1. After we switch on the key switch, the machine will show the self-check screen. (as the photo below)

2. **choose 1064 and 532 switching to treatment main menu**



3.3 Switch between wavelengths

choose waves in the first pages 1061 and 532nm

3.4 Energy set

Under standby condition, we set the laser energy as per treatment demands to press the energy adjusting menu 【▼】【▲】(under 532nm wavelength, the energy scope is 50mj-250mj, 50mj as one step; under 1064nm wavel ength, the energy scope is 50mj-500mj, 50mj as per step).

3.5 Setting the frequency Under standby condition, we set the laser frequency as per the treatment demand to press the energy adjusting 【▼】【▲】(frequency scope 1HZ-10HZ, 1HZ as one step)

3.6. Standby/ready

Under Standby condition, press READY menu, then the READY menu will switch to STANDBY menu, the system will go to ready condition, at this time we press pedal, and hear the "bip bip bip" alarming sound, then the laser will shot, and stop once we release the pedal.

3.7 Return

Under Standby condition, press the "Return" menu to return to the function selection menu.

3.8 Temperature

Under the treatment menu, the screen shows the water temperature, when the temperature is over 55℃, the system will goes to water temperature alarm surface, and alarm, please shut off the power and fix the malfunction, then restart the machine.

3.9 Water flow

In the treatment surface, it show the water flow influence, when the water influence is less than 2L/min, the system will turn to the water flow alarm surface and make alarm sound, please shut off the power and fix the malfunction, then restart the machine.

4.0 Instruction after using the machine

a. After using the machine, we suggest return to pause surface before switch off the machine.

b. Turn the key switch to “off” position, to switch off the machine

c. Put the light guide arm to a safe place, in case to cause laser deflection.

d. Disconnect the probe and other tools, to clean and disinfect

should be authorized by the company to complete the technical staff;

② **must be shut down before the maintenance of the machine and pull out the power cord, live maintenance of personal and electrical equipment are harmful.**

Fault repair

accident information	Cause of failure and troubleshooting method
There is no display when the machine is powered up	1. the machine is not connected to the AC power: check the power cord is plugged into the power outlet, the main control switch, emergency stop switch is open, the connection is connected to the line 2. low-voltage switching power supply failure: check low-voltage switching power input, output socket, input and output voltage is 3. the control panel is faulty: contact the company's technology department
Flow switch failure	1. the flow switch sensor position offset 2. the cable is not connected
Operation is normal, the LCD is not displayed	12V power supply is damaged or the connection plug is in poor contact
Aiming light is too weak	1. the mirror fell too much dust, wipe the dust 2. indicating light damage or light source damage, should contact the company's technical department
The laser does not coincide with the indicator light	Adjust the laser output coupling mirror
When the foot switch is pressed, there is no laser output	Poor connection of the foot switch
Frequency adjustment out of control	electricity failure
When working, the output laser energy is low	1. xenon lamp weak 2. power or storage capacitor failure 3. Laser light path polarization or optical mirror damage.
The control panel is out of control	Turn off the power, and then re-boot, troubleshooting
When working, the output laser Energy suddenly rises	1. power failure 2. the control panel failure

Precautions:

(1) cannot be naked eye observation, cannot be used except skin treatment.
(2) When the machine is running, in order to avoid eye accidentally exposed to the laser, all the personnel involved in surgery should wear goggles.
(3) Do not use lasers in environments where flammable anesthetics or volatile organic compounds are stored.
(4) Since the laser device built-in high-pressure parts, the operation should pay special attention.
(5) Part of the machine radiator should be away from the wall more than 20cm.
(6) When using anesthetic ointment, use surgical ointment.

(7) Do not touch the machine with wet hands.
If you suspect any problems, please immediately commission the company after-sales service, please do not repair them.

IX. Security

Laser security

Picosecond laser treatment instrument issued high-intensity infrared laser radiation, will lead to the organization, especially the eye tissue damage; therefore, in order to avoid accidental observation of the laser beam on the human body injury, all the treatment room doors and windows to use high density The shading material blocks the propagation of the laser. Treatment must have a warning sign outdoors.

The treatment instrument focuses on both functional and safety aspects. The system has designed a comprehensive safety testing program. In view of the laser high-strength, high-energy output during operation, all relevant personnel must follow the following precautions and precautions. Before use, check that the accessories are installed correctly and that the power cord insulation skin is complete and that the eye protection device is worn. Avoid direct or scattered radiation from the eyes or skin.

Do not look directly at the laser or reflected light, direct and reflective output lasers contain enough energy to cause serious damage to the eye.

Anyone who does not wear suitable protective glasses should not approach the laser when the laser is working.

Do not do maintenance work other than the system drawings in the manual. The repair should be done by the manufacturer or the agent authorized by the manufacturer.

Do not allow the system to be in a flammable environment like anesthetic, oxygen, etc.

In addition to the treatment area, do not point the laser fiber to it, before the output laser, please confirm the fiber output in a safe direction.

Caution: Your patient and staff will be in a dangerous radiation before or during the operation of the laser system, if you do not use the control device, adjust the device, or operate it as specified.

Laser safety system characteristics

The components of the treatment instrument have different electronic and mechanical safety designs. The

following are safety devices designed to prevent inadvertent and improper operation.

1. "Key switch" control the instrument power supply on and off, is a necessary tool

Note: When the system is not used, remove the key and securely save to prevent non-standard operation of the laser system.

2. The use of the "emergency stop switch" provides a convenient emergency stop function for the user. Unless the power switch and the main switch connection is correct, otherwise, the laser system can not be used, so the clinical use is very safe. When the "emergency stop switch" is pressed, all the operation will be paused and the instrument will be turned off. Turn off the main power, turn the "emergency stop switch" clockwise until it rises, then turn on the switch again and restart the system.

3. In order to prevent the wrong set and operation process to change the operating parameters of the treatment device, the host designed the "standby / ready" switch function, only in the standby state, the system allows parameter settings.

4. "Foot switch" is the control of the instrument to work the switch, switch plus protective cover to prevent malfunction, the enclosure protection class IPX1 (anti-drip equipment), do not spill liquid or use in a more humid environment.

5. The "remote interlock switch" is used to prevent unwanted personnel from entering the laser working area while the instrument is working and subject to laser radiation. When the operating room or laser isolation door is opened, the hair removal device will terminate the laser output.

6. The instrument is equipped with a pair of "protective glasses", its optical safety performance fully meets the European standard EN207: 1998 + A12002 all the requirements and through the EU CE certification, the output of the laser, please confirm that the protective glasses have been matched.

7. Only the following conditions have a laser system to work properly

※The instrument is connected to the power supply ※Turn on the key controller switch

※The emergency control switch is in the released state

※The instrument is in a ready state and has no abnormality

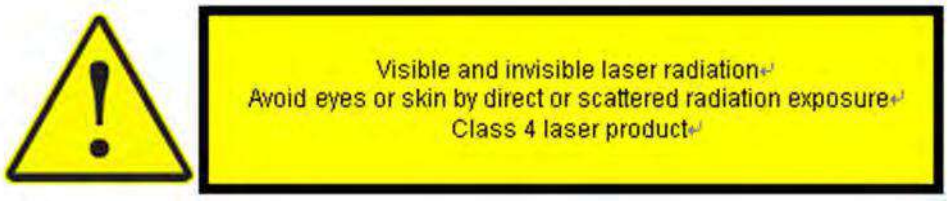
The user must be trained and have practical experience, otherwise it can not be any operation

Normal Nominal Eye Damage Distance (NOHD)

The treatment instrument is four types of laser products, in the output of the laser process, it is strictly prohibited to use eyes directly to the laser or reflex laser, to prevent damage to the eyes. The nominal eye hazard (NOHD) of the treatment was normal at 30.1 m.

Laser safety mark

In front of the device panel, both sides and the laser light window, etc. are the following warning signs:



Picture 1: Laser classification mark

Picture 2: warning mark

Picture 3: Laser windows

Picture 4: Type B application mark

Picture 1: Laser classification mark, at the top of the equipment, indicate that such equipment is a Class 4 laser product with a certain degree of radiation to prevent exposure to direct or scattered radiation from the eye or skin, and the markings shall comply with the requirements of 5.6 of GB7247.1-2012

Picture 2:: General laser warning mark below the output system in front of the equipment, indicating that such equipment is a laser product.

Picture 3: Laser window mark: Laser window mark, on the right side of the equipment transmission system output, indicating that the laser from the injection, marking should be consistent with GB7247.1-2012 5.7 requirements.

Picture 4: Type B application mark: Apply part of the anti-shock type mark, in the equipment transmission system output on the left, indicating that the application part of the device anti-shock type B, marking should be consistent with the relevant requirements in GB9706.1-2007.

Laser optical path is fully enclosed design, can effectively prevent the laser radiation leakage, prohibit the use of the seal in the open state of the instrument.

Safety precautions

1. It is recommended to set up a dedicated work area, in a prominent place posted "laser warning", "dangerous" words laser safety warning signs.
2. Work area door to have "non-staff members do not enter the" warning signs
3. In the work area and around to avoid reflexes, so as to avoid laser beam accidental reflection, injury personnel
4. It is recommended that the laser equipment be kept by hand
5. When the user leaves the device, remove the key from the device

6. The user should wear a goggles that are compatible with the laser wavelength and power of the depilator

7. Do not direct the human eye or reflect the laser!

Electrical safety

1. Product protection grounding terminal has been marked according to the relevant standards, maintenance personnel before the end of debugging, check whether the protective grounding wire is connected. Do not turn on the power when the device is not working

2. Equipment, internal and light guide arm with high pressure, non-trained qualified maintenance personnel do not open privately; maintenance personnel should pay attention to the process of repair the relevant mark,

3. The device is working with a large current, so the device is not allowed to touch the electrode after power

4. The device uses single-phase 220V AC power supply, power supply 1500VA; the hospital must use the department to provide the appropriate power supply conditions

5. Requires the staff to master the basic knowledge of safe electricity, master the performance and operation of laser therapy instrument

6. Laser equipment to work under the conditions of permission and the environment

7. The electrical safety of the treatment device classification: anti-shock type: Class I; application part of the anti-shock degree for the BF-type application part

Fire Safety

1. around the device to prohibit the accumulation of debris. Install the equipment to ensure that the power supply system has sufficient capacity

2. Should not be flammable, explosive materials placed on the laser light path or laser beam can shine to the place. If the laser beam is exposed to flammable and explosive materials, it may cause a fire or even an explosion

3. Must avoid the use of flammable anesthetics or oxidizing gases such as nitrous oxide (N2O) and oxygen. Some of the material as usual cotton wool in the rich

Oxygen will be used when the normal use of laser equipment to produce high temperature ignition. Solvents and combustible solutions for cleaning and disinfecting should be volatilized before using the laser equipment.

4. The work room should be equipped with firefighting equipment.