TR Series Air Cooled DPSS Nanosecond Laser

User manual

V 1.0

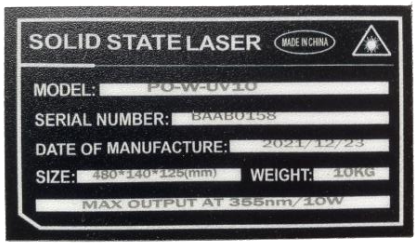
Table of contents

Chapter 1: Laser safety science

1.1 Laser class

Laser products are classified according to their output power level as Class I, Class II, Class IIIA, Class IIIB and Class IV. Class IV laser radiation can cause damage to eyes and skin, and the diffuse reflection of laser radiation is also dangerous, as it can ignite the material being irradiated and produce harmful radiation and fumes by interacting with the target material.

1.2 Hazard warning labels

	**Avoid exposure sign:** To prevent accidental exposure to laser or reflected laser light, protective laser glasses of a specific wavelength should be worn when using, maintaining or servicing this laser.
	**Laser radiation warning sign:** Wear appropriate goggles when operating the machine; keep the machine away from flammable objects; do not touch the laser head or lens as they can become hot; do not look directly into the laser beam as this may damage your eyes; in case of emergency, switch off the machine immediately.
	**Safety warning sign:** This product is a Class 4 laser radiation rating, avoid direct contact with eyes and skin.
	**Laser production label mark:** Contains laser power and model, serial number, factory date, dimensions and weight.

1.3 Precautions

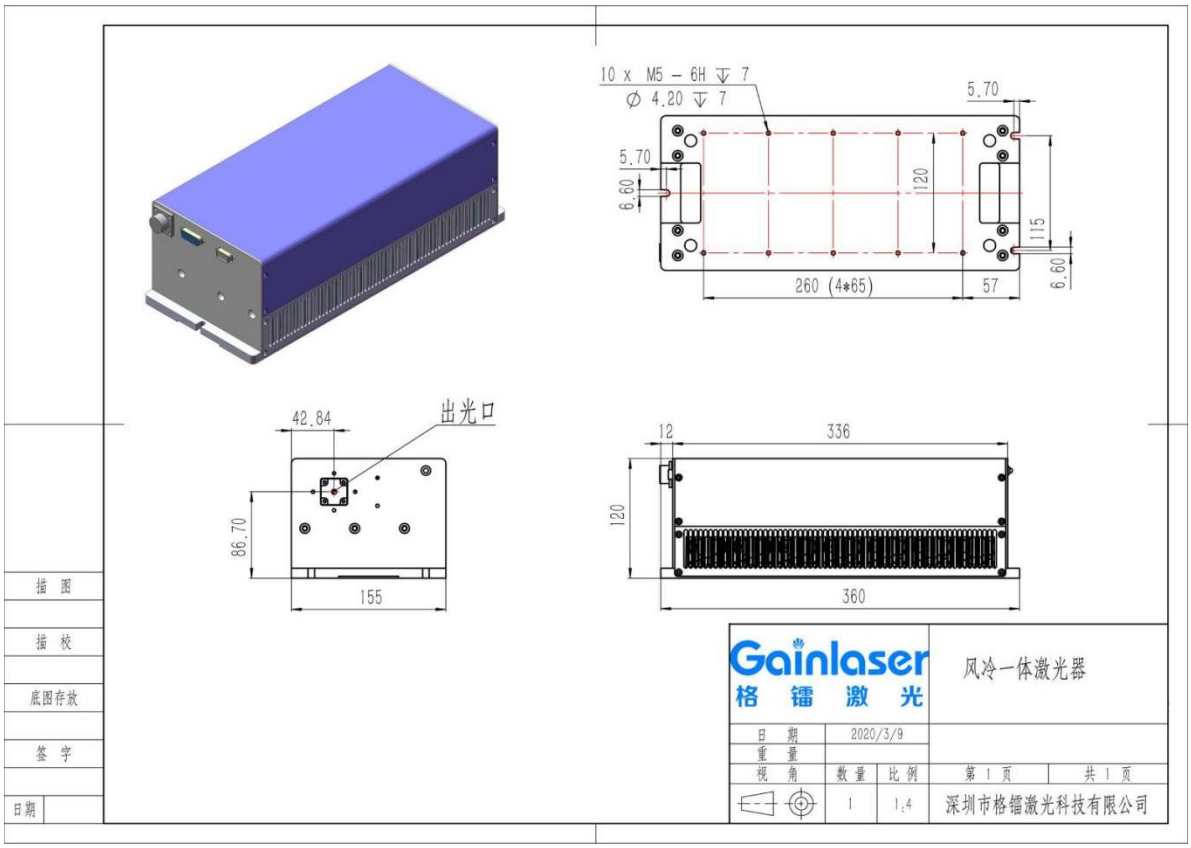
- Non-specialists are not allowed to turn on the power or the laser for any operation.
- When the laser is directed at a metal part to be machined, there may be strong reflections of the

laser beam, which must be shielded by means of measures or a work platform with Class IV protection.

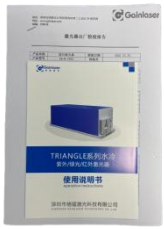
- Please read this manual carefully before using the appliance and follow the instructions in the manual to the letter.
- The operator of the equipment needs to be systematically trained. Please carry out regular maintenance on the equipment to eliminate potential faults.
- Use the equipment with a suitable power connection and ensure a reliable earth connection.
- If you have any questions about this product, please contact our after-sales maintenance staff.

Chapter 2: Laser Product Introduction

2.1 Mechanical dimensions



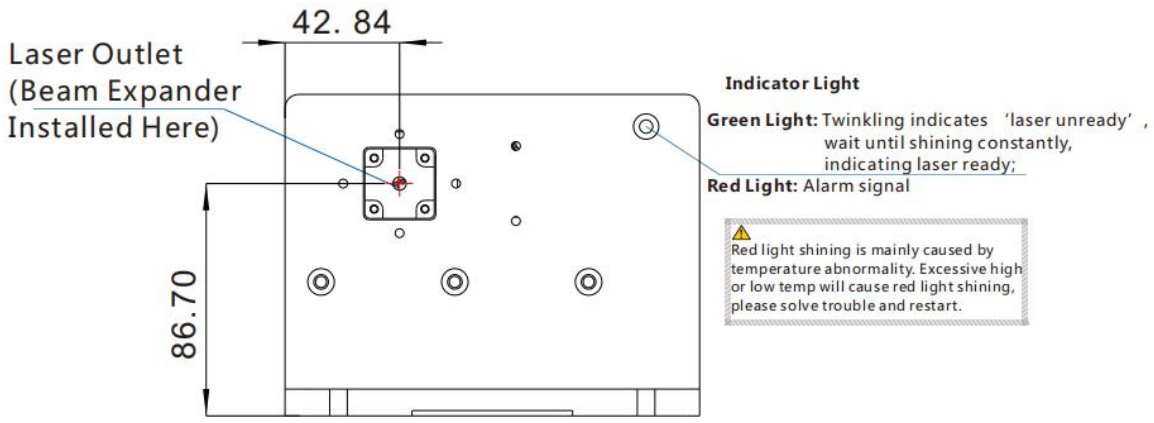
2.2 List of products and accessories

1		Air cooled laser
2		Test reports and instructions
3		Power supply
4		Power cable and external control plug
5		Round neck and adapter plate
6		Beam expander

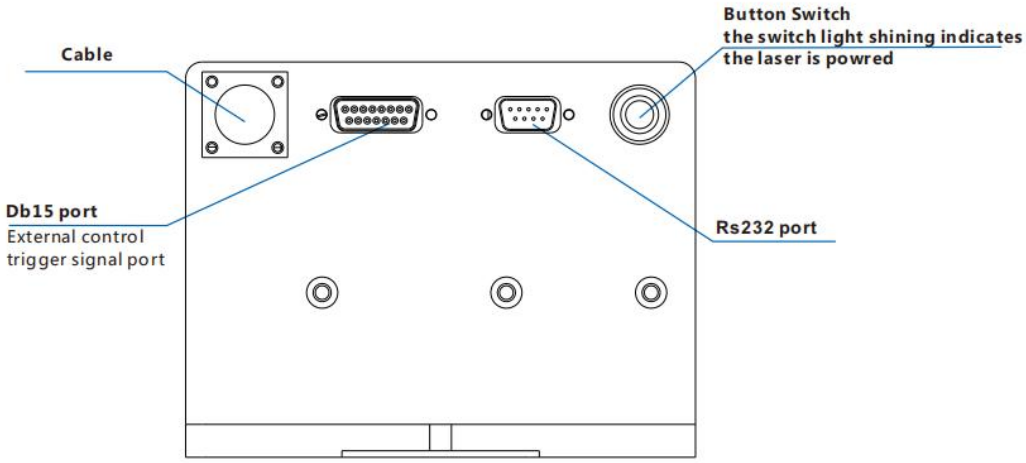
2.3 Product parameters

Type	UV Laser		Green Laser		Infrared Laser	
Model	GL-AC-UV03	GL-AC-UV05	GL-AC-GR07	GL-AC-GR12	GL-AC-IR10	GL-AC-IR15
Wavelength	355nm	355nm	532nm	532nm	1064nm	1064nm
Output Power	>3W@30KHz	>5W@40KHz	>7W@50KHz	>12W@50KHz	>10W@CW	>15W@CW
Max Pulse Energy	0.1mJ@30KHz	0.12mJ@40KHz	0.14mJ@50KHz	0.24mJ@50KHz	0.25mJ@30KHz	0.4mJ@30KHz
Pulse Repetitive Frequency	1-150KHz	1-150KHz	1-150KHz	1-150KHz	1-150KHz	1-150KHz
Pulse Duration	<15ns@30KHz	<18ns@40KHz	<20ns@50KHz	<20ns@50KHz	<15ns@30KHz	<15ns@30KHz
Average Power Stability	<3%	<3%	<3%	<3%	<3%	<3%
Spatial Mode	TEM00(M2<1.5)	TEM00(M2<1.5)	TEM00(M2<1.5)	TEM00(M2<1.5)	TEM00(M2<1.5)	TEM00(M2<1.5)
Polarization Ratio	>100:1 Horizontal	>100:1 Horizontal	>100:1 Vertical	>100:1 Vertical	>100:1 Horizontal	>100:1 Horizontal
1/e2 Spot Diameter at Outlet	0.7mm	0.8mm	0.7mm	0.8mm	0.7mm	0.8mm
Laser Spot Roundness	>90%	>90%	>90%	>90%	>90%	>90%

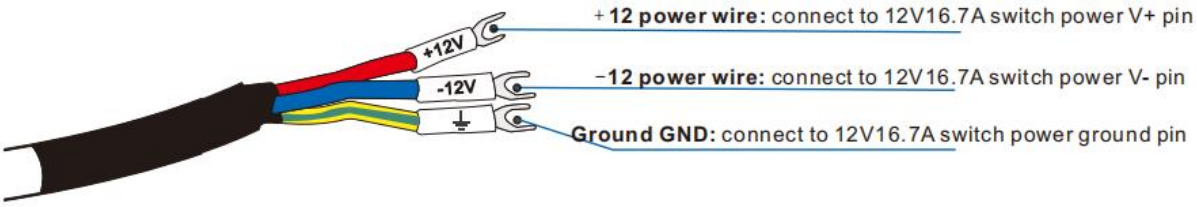
2.4 Cavity interface description



【Laser Front View】



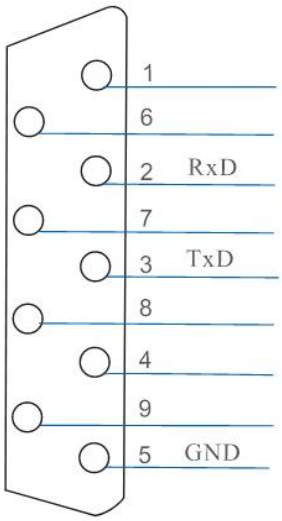
【Laser Back View】



【Power Wire Connecting Method】

2.5 RS232 interface pin description

Pin No.	Name	Instruction
1	Null	
2	RxD	
3	TxD	
4	Null	
5	GND	

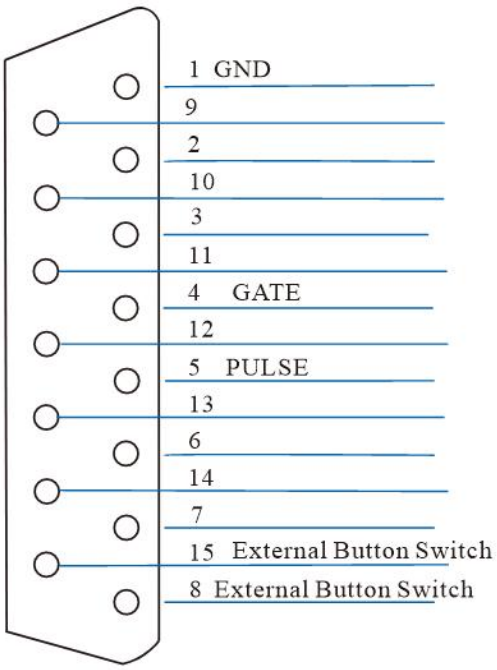


[DB9 communication interface]

2.6 External control trigger signal interface pin definition

Pin No.	Model name	Description
1	Common ground (GND)	GND
2	Null	
3	Null	

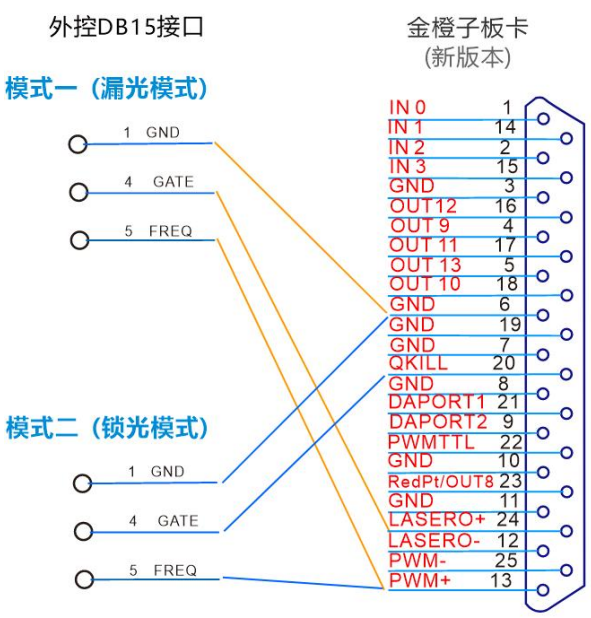
4	Switching signals	GATE
5	Frequency trigger signal	PULSE
6	Null	
7	Null	
8	External push button switch	
9	Null	
10	Null	
11	Null	
12	Null	
13	Null	
14	Null	
15	External push button switch	

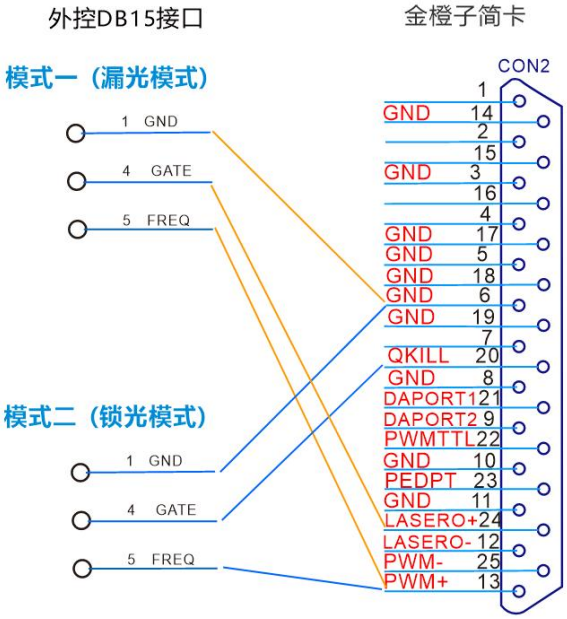


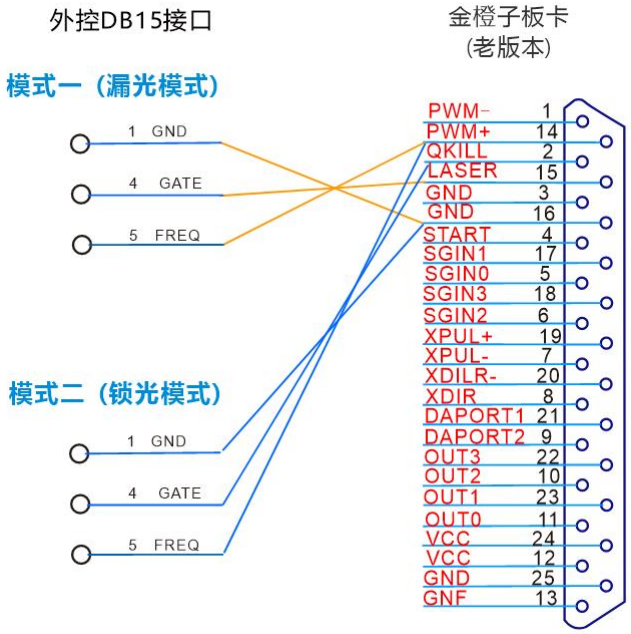
[DB15 External Control Interface]

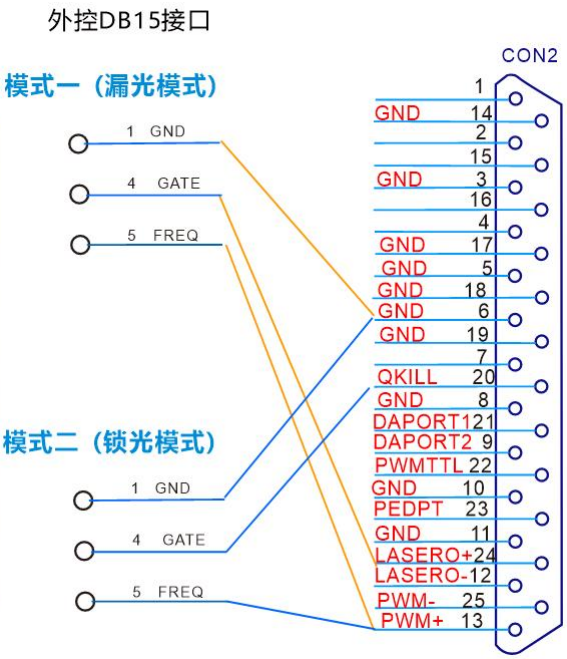
2.7 Schematic diagram of common control card wiring circuit

➢ **Ezcad control card wiring diagram:**

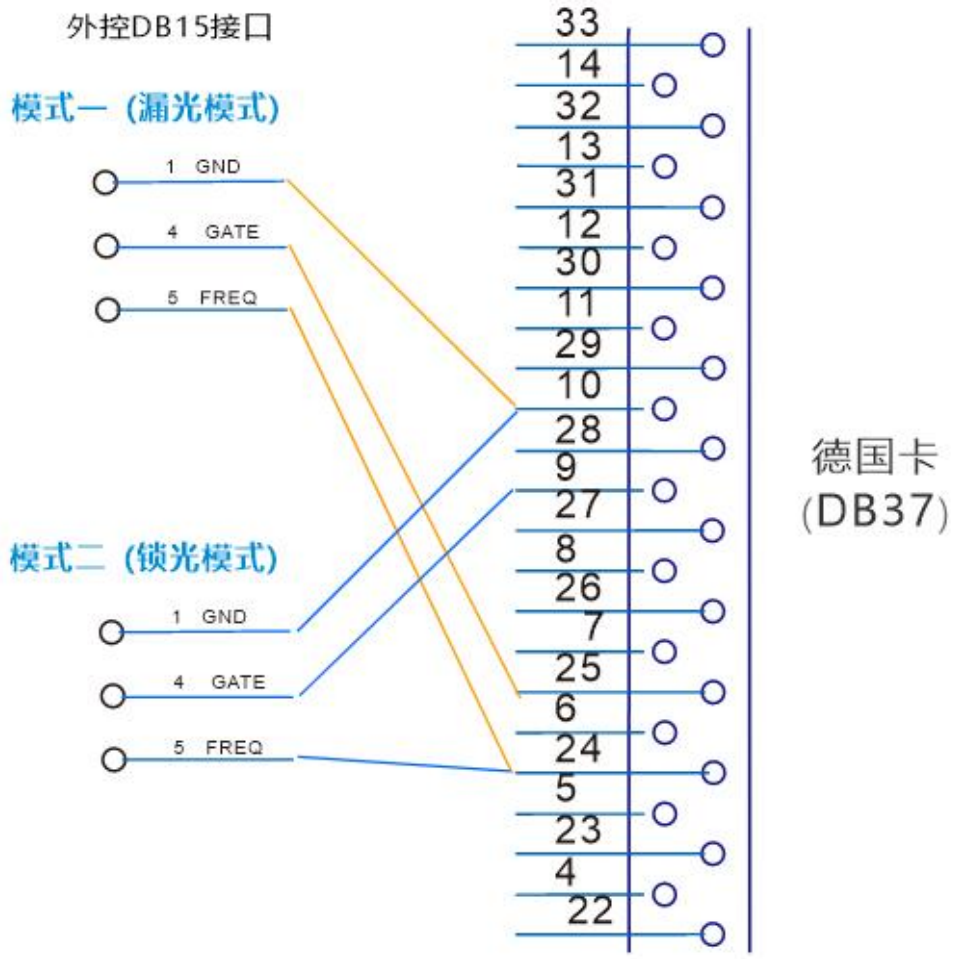




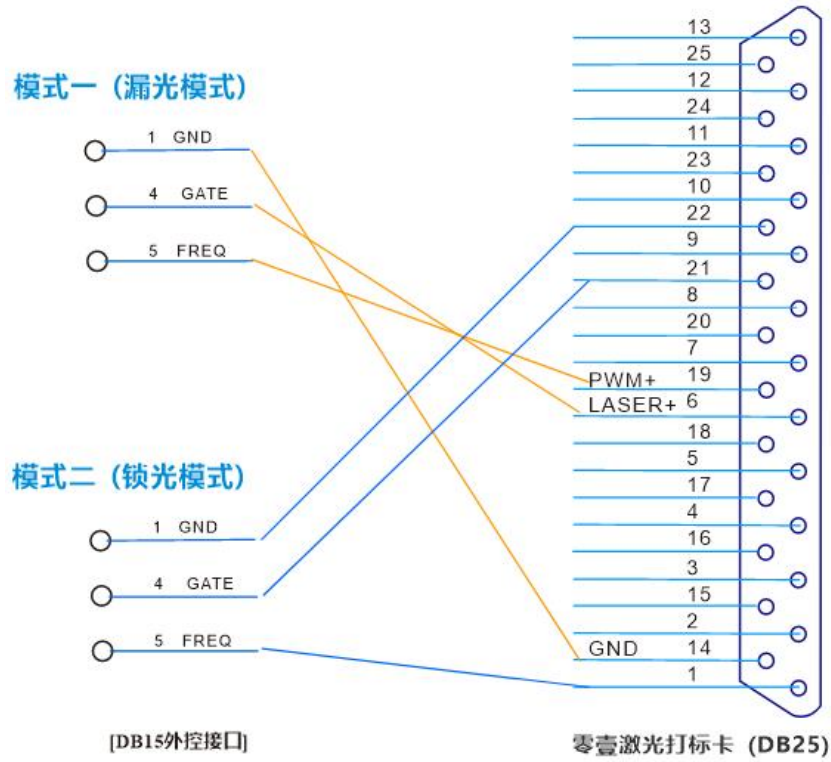




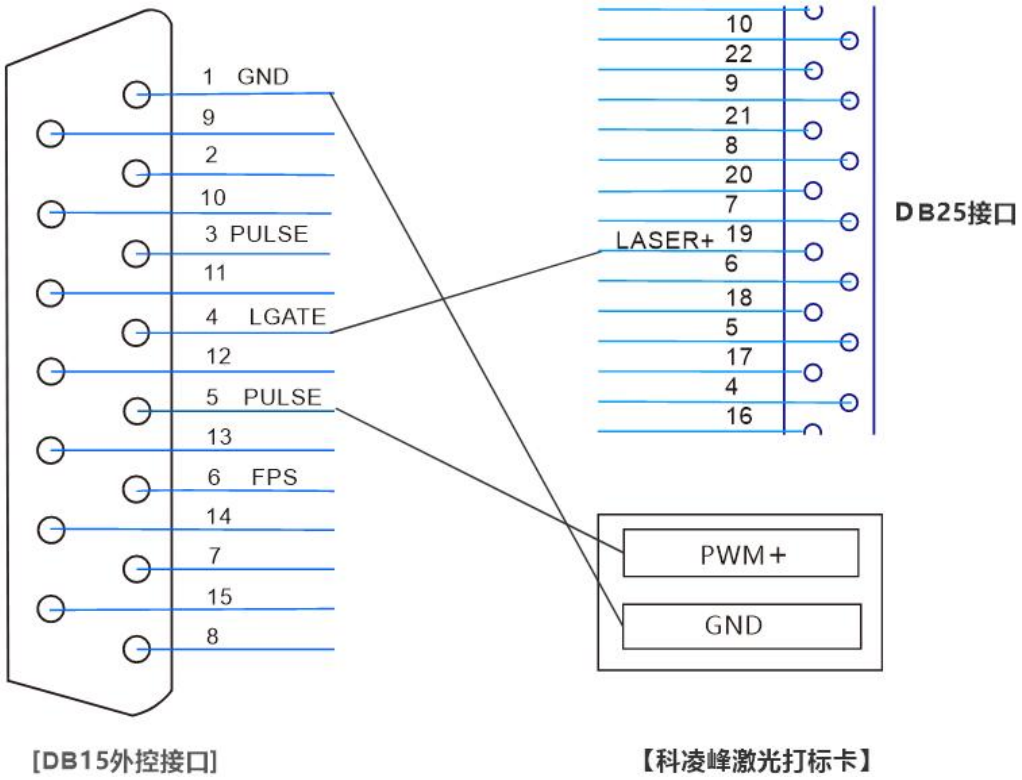
➢ **German control card wiring diagram:**



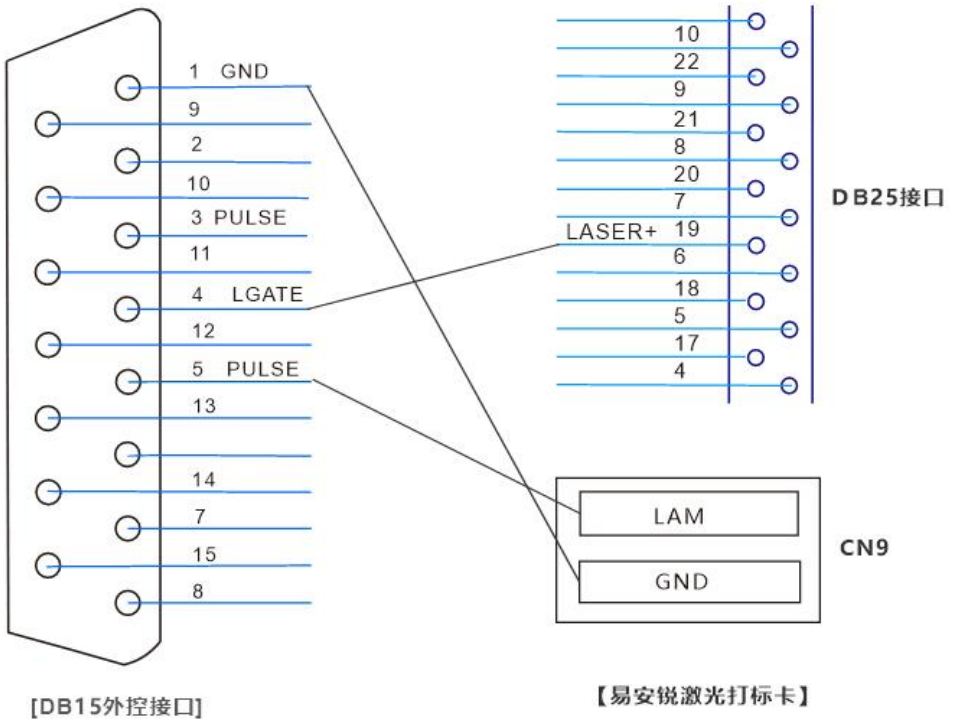
➢ **Zero one control card wiring diagram:**



➢ **Kelingfeng control card wiring diagram:**

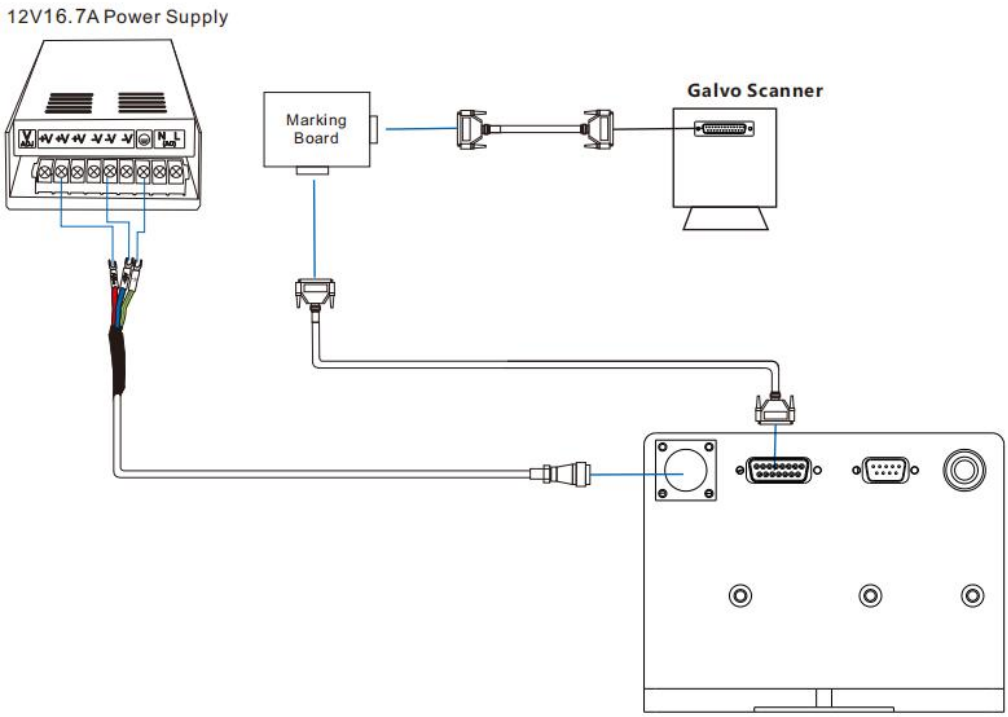


➢ **Yianrui control card wiring diagram:**



Chapter 3: Product installation instructions

3.1 General connection diagram

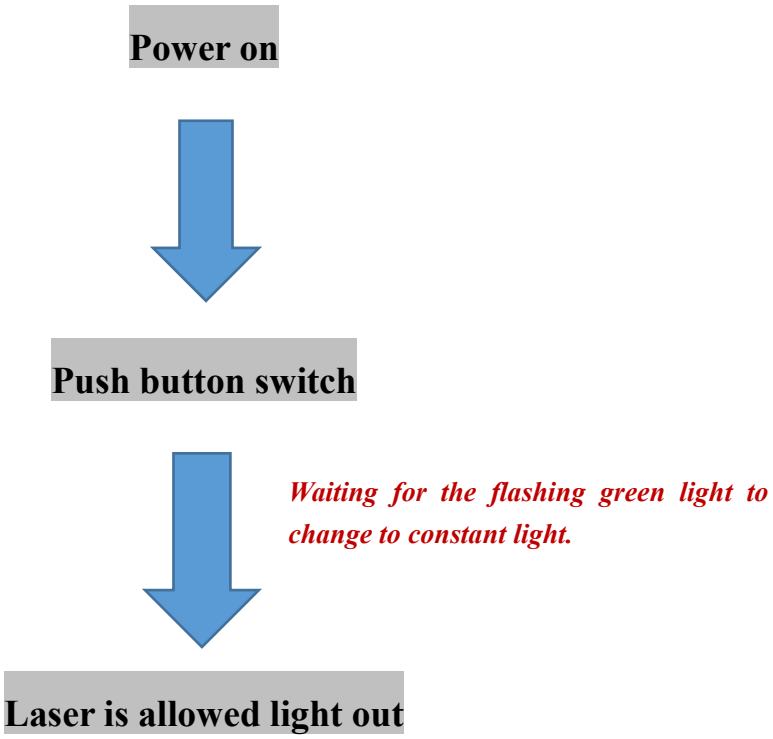


3.2 Laser installation requirements

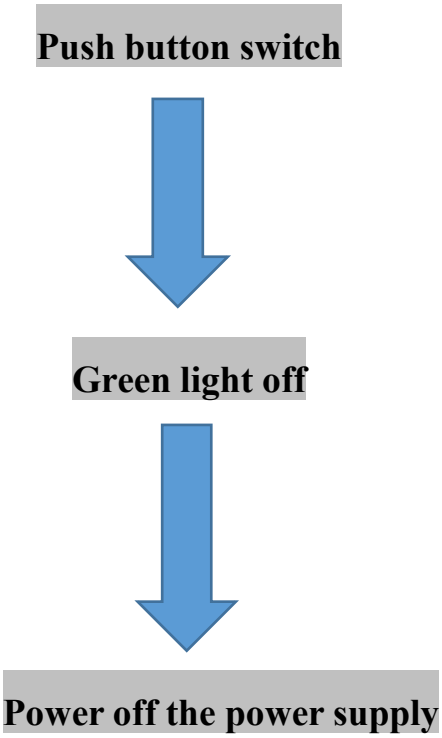
Projects	Installation conditions
Ambient temperature	15°C - 35°C
Storage temperature	0-50°C
Environment humidity	30-90%
Dust	Less than 0.2mg/m³
Oil mist	Not allowed
Power supply	AC220V (±10%)/50Hz (±1H)
Electromagnetic environment	National Standard Grade II

Chapter 4: Product operation instructions

4.1 Laser start-up step



4.2 Laser shutdown step



Chapter 5: Laser troubleshooting issues

5.1 Laser alarm prompt and processing method

Use the RS232 to USB serial cable to connect the laser to the computer, and install the LASERMATE software to determine the cause of the alarm.

Display of alarm contents	Meaning	Treatment
ERROR: BITO	No definition	
ERROR: BIT1	No definition	
ERROR: BIT2	No definition	

ERROR: TEMP LD	LD temperature	• Check the chiller pressure is

	control anomaly	normal and the whole water circuit pressure • Check if the chiller is cooling • Verify that the chiller has been on long enough • Check if the current temperature of the chiller is normal
ERROR: TEMP C1	Crystal 1 temperature control anomaly	Contact after-sales staff
ERROR: TEMP C2	Crystal 2 temperature control anomaly	Contact after-sales staff
ERROR: TEMP NOT READY	Power-up temperature not ready	Check that the chiller is running normally and that the TSW1 interface is on
ERROR: TEMP BS	BS port probe overtemperature	-Check the chiller pressure is normal and the whole water circuit pressure -Check if the chiller is cooling -Verify that the chiller has been on long enough -Check if the current temperature of the chiller is normal -If the room temperature is too low, turn on the air conditioning
ERROR: BIT8	No definition	
ERROR: TSW1	TSW1 port open	Check for loose TSW1 plugs Check plug shorting (15-pin shorting 10, 11)
ERROR: OVER Ia	Current output overcurrent	Contact after-sales staff

5.2 Common troubleshooting methods for lasers

5.2.1 No light

Look at the indicator light status:

(1) **If the green light is always on**, it means that the laser is ready and can be used normally. If there is an indication of light but marking no strong light (no energy, no response to hit the product, no trace), most of the marking signal problems, need to

further measure whether there is a marking signal output. If there is no indication of light, marking also no light, or light weak, this situation to consider the laser failure.

(2) **Flashing green light** means that the laser is not ready and that a certain temperature has not reached the laser set temperature. First check whether the laser is encrypted, then check whether the button switch behind the laser is on, whether the water flow signal is normal, check the water tank and measure the power supply to the laser. The above check is no problem to consider the laser failure.

(3) **The red light is on**, same method as above, laser encryption not to be considered.

5.2.2 Weak light

(1) Check the software settings, select the YAG mode, the analogue output should not be ticked, otherwise it will result in a weak light.

(2) Look at the light spot. Remove the field mirror, out of the strong light, with white A4 paper placed below the vibrating mirror, blue spot for the solid circle for normal, spot around the star light, may be the expansion of the beam mirror failure, spot scattered, not round, there is a black circle, consider the laser failure. If the spot is good, check the beam expander mirror, vibrating mirror and field mirror to see if they are damaged or dirty, and then consider the laser failure.

(3) Look at the indication light, compared to the previous indication light is obviously much weaker or on the white paper basically invisible, consider the laser failure.

Note: The above is for reference only, and the specific problems should be properly handled according to the on-site usage.