RLT-50系列
射频CO_2激光器使用说明书
RF CO_2 Laser User Manual

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1.激光安全

1.1 危险警示

RLT-50系列射频CO_2激光器会发出不可见的红外激光，其波长为9.3μm -10.6μm，直接的或扩散的激光辐射会引起严重的角膜受伤及皮肤伤害；如需暴露在激光辐射下，必须戴护目镜等保护装置。

1.2 安全条例

使用RLT-50系列射频CO_2激光器的设备应符合中华人民共和国 GB/T10320-2011《激光设备和设施的电气安全》和 GB7247.1-2012《 激光产品的安全第1部分：设备分类、要求》的国家标准。

2.准备工作

2.1 检查包装

2.1.1 检查包装箱是否有损坏或严重变形、受潮等现象。

2.1.2 检查封箱胶条是否完整。

2.1.3 开箱后检查激光器在箱内位置是否正确(在塑料泡沫包裹中是否松动)。

2.2 装箱清单

激光器*1　说明书*1　检测报告*1　568B 标准网线*1

2.3 可选配置

直流电源

3.安装

3.1 安装要求

3.1.1在机箱外壳上须装有排风装置，且机箱上须有通风孔，保证机箱内外空气可以循环，热量可以及时从机箱内排出，以保证激光器良好的散热性能。

3.1.2 激光器前后端板为激光器镜座，不得与机架等其它零部件有任何硬接触，否则会造成激光器的损坏。可使用软性材料与端板接触，以密封光路保护激光器窗口镜。

3.1.3 固定激光器的安装底板厚度应不小于10mm，以防止设备工作时震动对激光器光路的影响。

3.2 电源的选择及连接

RLT-50系列射频CO_2激光器的供电电源应使用直流开关电源，直流电压48V， 电流应不小于14A。电源和激光器之间的连接导线大于2.5mm²，正负极不得接反，否则会损坏激光器。

3.3 控制信号的连接

3.3.1 RLT-50系列射频CO_2激光器通过脉冲宽度调制信号(PWM)来控制激光功率输出。PWM信号的低电平电压范围应在0-0.5V (激光停止工作),高电平电压范围应在3.5-5V (激光正常工作),通过 PWM 信号占空比可对激光功率进行控制，PWM 信号由外部控制卡提供，PWM信号调制频率为0-25kHz，占空比0-100%。

3.3.2 PWM信号通过激光器后面板上信号接口接入。

图1所示的波形是一个典型的0-5V 的PWM信号，占空比(或脉宽)可调，频率也可调：

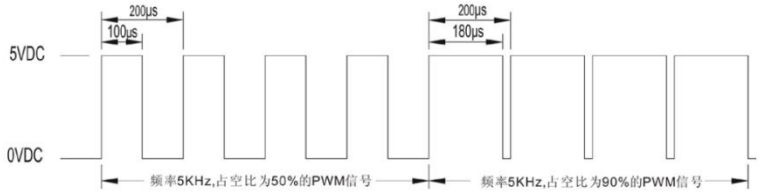


图1. 占空比频率示意图

3.4 关于预电离信号

RLT-50系列射频CO_2激光器自带预电离信号，故无需外加预电离信号，如果外加预电离信号，可能导致激光器漏光。

3.5 后面板说明

后面板包括：

直流电源输入接线端子48VDC+ / 48VDC -

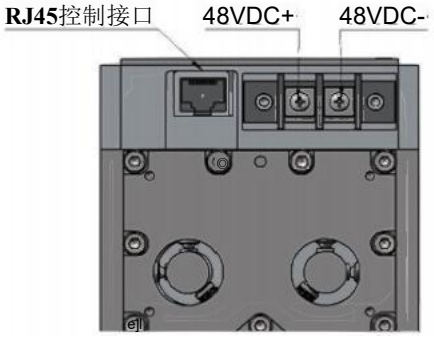
信号接口 (PWM信号输入口) RJ45 控制接口

具体操作步骤如下：

将48V直流电源+极与激光器电源输入接线端子48VDC+ 连接，

将48V直流电源-极与激光器电源输入接线端子48VDC-连接。

将外部控制PWM 信号连接到激光器信号接口 。


RJ45控制接口
48VDC+
48VDC-

4. RLT-50系列射频CO_2激光器参数表

型号	RLT-50i	RLT-50h	RLT-50m	RLT-50	RLT-50L
波长	9.3μm	10.2μm	10.6μm		
激光功率	35W	40W	55W	50W	
功率稳定性	≤±5%				
光束质量M^2	＜1.2				
光束直径 (1/ e^2)	2.2±0.2mm				
光束发散角（全角）	＜7.5mrad				
偏振性	水平线偏振，＞100:1				
调制频率	0-25kHz				
占空比范围	0-100%				
电输入	DC 48V/14A				
冷却方式	风冷				水冷
尺寸	435mmx92.6mmx145mm				467mmx92.6mmx93.1mm
重量	7.60kg				7.00kg
工作外壳温度	＜60℃（140℉）				＜50℃（122℉）
工作环境温度	＜15~40℃（59-104℉）				
湿度	非冷凝				
运输和存储环境温度	-10~40℃（14~104℉）				

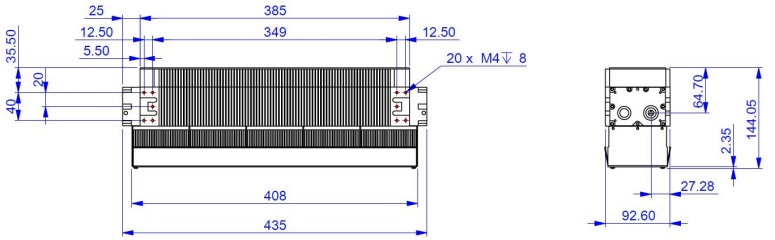
1)激光功率在激光器温度25℃下测得，高于25℃每上升1℃输出功率约降低1%
2)稳定度计算公式：稳定度=±(Pmax-Pmin)/(2Pmax)稳定度测试条件：正常运行环境下，开机预热5分钟，恒定控制占空比。

5. 信号接口描述和连接器引脚

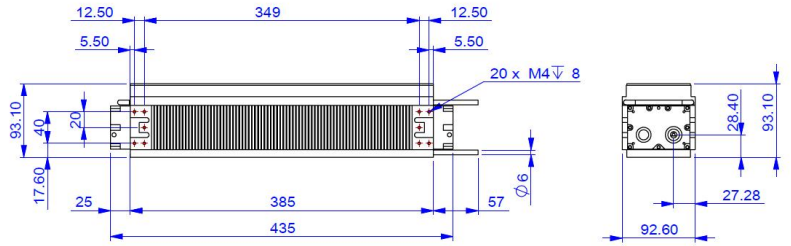
引脚	568B标准网线	信号说明
1	白橙	RF启用：PWM信号输入。
2	橙	电压输出15±0.5 VDC,最大电流0.25安培。
3	白绿	激光状态输出：TTL逻辑输出； 1=激光器正常，0=激光器故障。
4	蓝	温度状态输出：TTL逻辑输出； 1=温度正常，0=温度过高； 外壳温度在60℃以下时温度正常，高于60℃时温度过高。
5	白蓝	电源电压状态输出：TTL逻辑输出
6	绿	NC
7	白棕	控制启用，TTL逻辑输入； 1=激光器控制启用，0=激光器控制关闭；在打开激光器之前这个输入必须有效。无外部输入信号时，此引脚与3脚短。
8	棕	接地
注意：①连接器型号为RJ-45 ②控制卡单信号输入：1脚接PWM信号，8脚接地，3、7脚短接 ③无板卡检测：1、3、7脚短接可强制出光，为最大功率输出。		

6. 尺寸图

6.1 RLT-50i、RLT-50h、RLT-50m、RLT-50尺寸图



6.2 RLT-50L尺寸图



1.Laser Safety

1.1 Warning

RLT-50 Series RF CO_2laser emits invisible infrared laser beam with wavelengths of 9.3μm /10.6μm,direct or diffuse laser radiation can cause severe corneal injury and skin damage;The exposure to such laser radiation,wearing eye protection goggles or other protective devices is essential.

1.2 Safety Regulations

The equipment utilizing our RLT-50 Series RF CO_2laser shall comply with the national standards of the People's Republic of China GB/T10320-2011 《"Electrical Safety of Laser Equipment and Facilities"》 and GB7247.1-2012 《 "Safety of Laser Products -Part 1: Equipment Classification and Requirements"》

2.Attention

2.1 Package Checking

2.1.1 Check if the packaging is damaged or serious deformation,damp and so on.

2.1.2 Check if the sealing tape is complete.

2.1.3 Check if the RF laser is in the correct package position (If the plastic foam is loose or damaged)

2.2 Packing List

RF Laser x1	User Manual x1
Test Report x1	568B Standard Ethernet Cable x1

2.3 Optional Device

DC power supply

3.Installation

3.1 Installation Requirements

3.1.1 The installation area has to equip with air exhaust device,and the ventilation holes are necessary,to ensure that the air can be circulating.So that to build up a good heat dissipation environment for the air-cooling of RLT-50 Series .

3.1.2 The laser optics mounts located at the front and back ends of the RLT Series,the continues heavy pressure on the front and back ends will cause damages to the laser.Thus, make sure NOT hold the laser front and back ends by the rack and other machine parts.A

soft material can be used to contact the end plate to seal the optical path to protect the laser optics.

3.1.3 The thickness of Laser installation holder should be more than 10mm,so that to avoid the equipment vibration negatively affects on the laser light path.

3.2 Power Supply Selection And Connection

RLT-50 Series RF CO_2laser power supply should use DC switching power supply,

DC voltage 48V,the current should not be less than 14A.

The connecting wire between the power supply and the laser has to be greater than 2.5 mm^2. The connections of positive and negative terminals are correct,otherwise the laser will be damaged.

3.3 Control Cignal Connection

3.3.1 RLT-50 Series RF CO_2laser controls the laser power output through a pulse width modulation signal (PWM).PWM signal low voltage range should be 0-0.5V(laser OFF);high voltage range should be 3.5-5V(laser ON),through the PWM signal duty cycle can control the laser power,PWM signal input from external control board,PWM signal modulation frequency of 0-25KHz,duty cycle 0-100%.

3.3.2 The PWM signal is transferred via the signal interface at the rear panel of RLT-50.The waveform shown below is a typical 0-5V PWM signal,duty cycle (or pulse width)and the frequency are both adjustable:

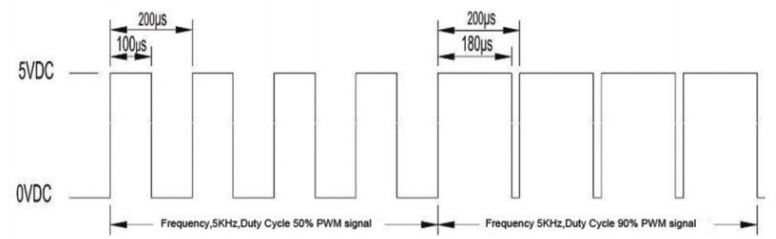


Figure 1.Schematic diagram of PWM modulation function realized by TTL control signal

3.4 About Pre-ionization Signals

RLT-50 Series RF CO_2 lasers come with pre-ionization signal,so please assure not control RLT-30 by the external pre-ionization signal,otherwise,may trigger the laser malfunction.

3.5 Rear Panel Instructions

The rear panel includes:

DC power input terminal 48V +-.

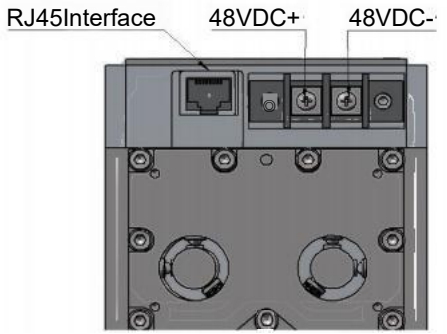
Signal interface (PWM signal input).

PWM Signal Connection Instruction:

Connecting the positive pole of 48VDC power supply to the 48VDC+,likewise,connecting

negative pole of 48V DC power supply to the 48VDC-of RLT Series.

Connecting the PWM signal cable to the RJ45 interface.



4.RLT-50 series RF CO_2 Laser Specifications

Mode	RLT-50i	RLT-50h	RLT-50m	RLT-50	RLT-50L
Wavelength	9.3μm	10.2μm	10.6μm		
Rated Power	35W	40W	55W	50W	
Power Instability	≤±5%				
Beam QualityM^2	＜1.2				
Beam Size (1/ e^2)	2.2±0.2mm				
Beam Divergence	＜7.5mrad				
Polarization	Horizontal Linear Polarization,＞100:1				
Modulation Frequency	0-25kHz				
Duty	0-100%				
Electrical Input	DC 48V/14A				
cooling method	Air Cooling				Water Cooling
Size(L*W*H)	435mmx92.6mmx145mm				467mmx92.6mmx 93.1mm
Weight	7.60kg				7.00kg
Maximum Case Temperature	＜60℃（140℉）				＜50℃（122℉）
Ambient Temperature at Work	＜15~40℃（59-104℉）				
Humidity	Non-condensing				

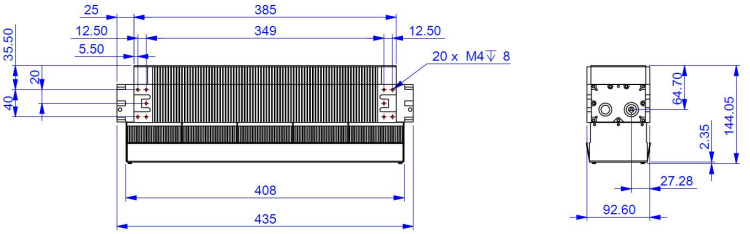
Transportation and Storage Environments Temperature	-10~40℃（14~104℉）
1)Output power measured at a laser temperature of 25°C. Higher than 25°C,1°C increase will cause output power deduction about 1% 2)Stability Formular:Stability =±(Pmax-Pmin)/(2Pmax) Stability test conditions:In normal operating environment,preheat the laser for 5 minutes and constant control the duty cycle	

5.Signal Interface Description and Connection Pins

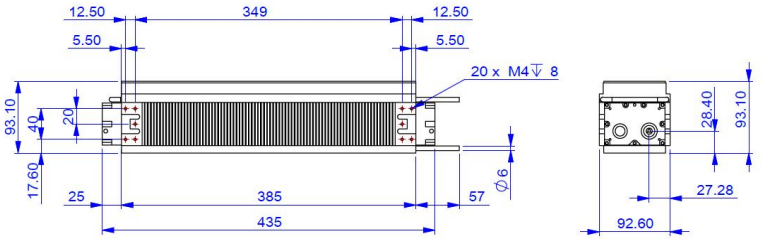
Pins	568B Standard Ethemet Cable Wirin	Signal Description
1	White/Orange	RF enabled:PWM signal input
2	Orange	Voltage output +15±0.5 VDC,the maximum current is 0.25 amp
3	White/Greer	Laser status:TTL logic outputi 1 =laser normal,0 =laser failure;
4	Blue	Temperature status:TTL logic output;1 =normal temperature,0=Over temperature;when the shell temperature above 60 ℃ output is invalid.Below 60 ℃ is normal.
5	White/Blue	Power supply voltage status:TTL logic output;1 = voltage is normal,0=voltage exception;output is active when 44VDC<VDD<51VDC.Voltage is normal
6	Green	NC
7	White/Brown	Control enabled,TTL logic input;1 =laser control on,0 =laser control off;This input must be activated before turning on the RF laser
8	Brown	Ground line
NOTE: 1.Interface type:RJ-45 2.Control board single signal input:Pin1-PWM signal,Pin8-Ground,Pin3 &Pin7 short connect. 3.Without control board test:Pin1,3 &7 short connect also can emit laser beam (Max Output)		

6.Dimensional Drawing

6.1 RLT-50i、RLT-50h、RLT-50m、RLT-50 dimensional drawing



6.2 RLT-50L dimensional drawing



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