

# **CO<sub>2</sub> Laser Tube - Model W**

## **Instruction Manual**



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## 1. Safety Information

Thank you for choosing Recipro CO2 laser tube. This user manual provides you with important information on safety, operation and maintenance. Please read it carefully before using the product. To ensure safe operation, please observe the following cautions, warnings and other information in this manual.

### 1.1 Safety Symbols



Cautions:

Refer to a potential hazard on products. It requires a procedure, if not correctly followed, may result in damage to the product or components. In order to ensure normal use of requirement, do not violate the requirement of the CAUTION Sign.

Table 1

### 1.2 Laser Safety Level



Cautions:

Refer to a potential hazard on people or products.

Table 2

This product belongs to safety level 4. It emits laser radiation with a wavelength around 10600nm and the laser power radiated by the output head is bigger than the rated power (depending on the model). The eyes or skin will be damaged if direct or indirect exposure to such light intensity. Although the radiant light is not visible, the beam still causes irreparable damage to the retina or cornea. Thus, appropriate and certified laser safety glasses must be worn throughout the operation.

### 1.3 Safety Symbols



Figure 1 Location of safety symbols

Figure 1 shows the product and the location of safety symbols. These safety symbols mainly include safety warnings, laser output warnings, and strong electric warnings. All is described in detail as follows:



	
<p>1. Avoid exposure visible and/or invisible laser radiation is emitted from this aperture.</p>	<p>2. Warning: Refer to a potential laser hazard. The symbol represents laser radiation. The symbol is pasted on laser output end.</p>

Table 3 Safety symbols

#### 1.4 Other safety precautions

Do not look directly at the laser output head while the laser is running;

Please strictly follow the product manual to operate the laser, otherwise any damage to the laser will not be responsible.

## 2. Product introduction

### 2.1 Features

**Technical advantages:** high product qualification rate, and the independent processing capacity for core components;

**Standardization:** The production process is highly automated;

**Power advantage:** the power is more than 10w higher compared with the same specification of other brands.

**Beam quality:** Beam quality of all laser tube can reach more than 95% of TEM00. The product consistency is good.

**Long warranty:** 12-18 months warranty, most can be used around 3 years, actually.

**Advantages of Optical Resonators:** The lithographic discharge tube for spatial filtering has been recently developed, which can improve power and product consistency. With the technology launched, it expands

the leading position in the industry.

**Advantages of optical coating:** After more than three years of review, the radiation safety license was successfully applied. Reciprocal is only one nuclear radioactive material coating company in Asia, and the second in the world. Reciprocal vacuum-deposits the radioactive isotope material from the crucible to the optical lens. This material has a very low absorption of 10.6um and is irreplaceable.

## 2.2 Unpacking and inspection

The company has designed specifically a wooden box to ensure that the laser is always protected during transportation. However, in order to prevent unpredictable situations during transportation, the user still needs to carefully check whether the package is correctly placed before unpacking, and there is no damage such as collision, cracking, rain and flooding on the outside of the box. Once you find that there is an abnormality in the external cabinet, please contact the sales manager in time to deal with it as soon as possible. After unpacking, please check if the packing list is consistent with the actual items. If you have any questions, please contact the sales manager in time.

## 3. Installation

### 3.1 Installation diagram of model W laser tube

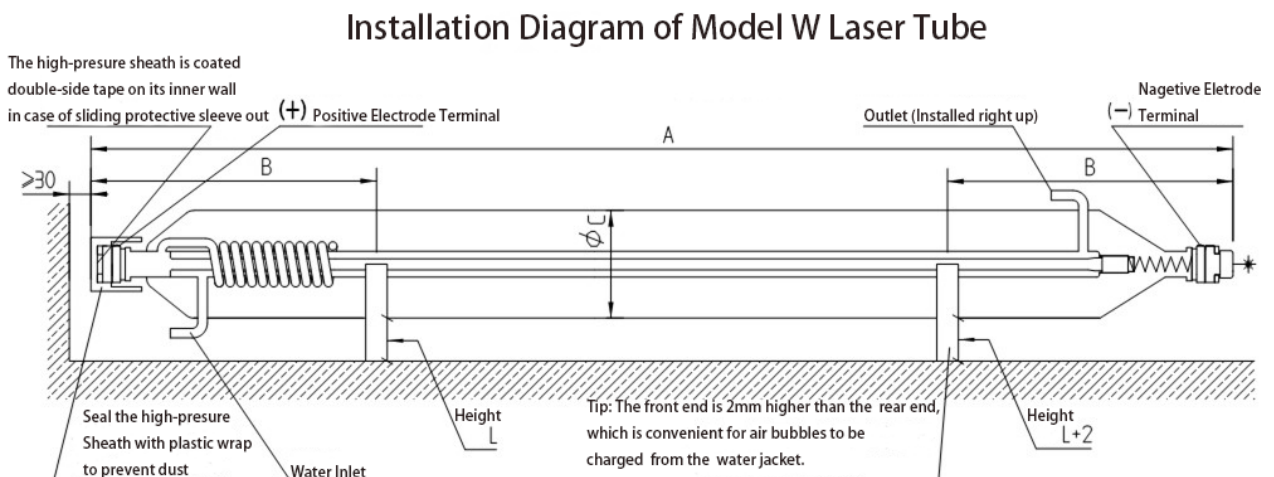


Figure 2 Diagram

Length A: Length of the tuber

Length B: The recommended distance from the ends of laser tube where pipe rack be placed.

Length C: The Diameter of Laser Tube

Unit: (mm)

### 3.2 The Parameters of Model W CO2 Laser Tube

Model Name	Length (mm)	Mounting Position (mm)	Diameter (mm)	Ignition Voltage (KV)	Recommended Current (mA)	Target Power (W)	Max Power (W)
W1	1100	240	80	19	22	75	90
W2	1250	260	80	19	24	90	100
W4	1400	280	80	24	26	100	130
W6	1650	320	80	28	28	130	160
W8	1850	320	90	30	28	150	180

Table 4

### 3.3 The Parameters of Power Supply

Model W		W1	W2	W4	W6	W8
Input	Voltage	AC220V (110V Customized)				
	Frequency	47---440Hz				
	Max Power	550W	550W	1000W	1000W	1200W
	Max Current	5A	5A	10A	10A	12A
Output	Max Voltage	DC 40KV	DC 40KV	DC 50KV	DC 50KV	55KV
	Max Current	DC 28mA	DC 28mA	DC 38mA	DC 38mA	35mA

Table 5

Notice: All paras above only for reference.

### 3.4 Requirement for Installation

Please follow the above installation diagram. The specialized power supply should be matched with the specific tube. And the positive electrode carries a high voltage, and the ignition voltage should be reached to the specific parameters above. If not follow the above, fire, inner tube breakdown and water leakage will be caused.

### 3.5 Working Conditions

**Water cooling:** The cooling liquid is pure water with standard water temperature from 10°C to 50°C. And the flow rate is 2-5 liters per minute.

Application environment: temperature from 2°C to 40°C, humidity from 10% to 60%.

**Current:** The detection current is 28mA. The max operating current must be controlled at 28mA or less. And the long-term operating current must be controlled at 26 mA or below. Working life can reach 8,000 hours if the current is 24 mA or less. All current above must be based on the actual current of the ammeter connected in series on the cathode line. The undesired consequences by illegal operation may as below.

**Tips:** The negative electrode will turn yellowish if long-term overcurrent. What's more, it will shorten the life.

Please keep the plastic wrap around the high-pressure jacket to prevent dust from entering the vicinity of the electrode.

### 3.6 Working Functions

Working functions include cutting and engraving. Taking engraving as an example, 4mA is recommended to produce pulse with high frequency under preionization state for better engraving.

### 3.7 Notices

The surface of beam output lens cannot be scrubbed with any tools such as cotton balls, otherwise the power will be serious affected. Here are several methods for cleaning.

- (1) When the lens is contaminated, do not use the laser tube;
- (2) Blow the lens surface obliquely with balloon;
- (3) If the above no effect, user needs to remove the lens and use a cotton ball with a little alcohol to rotate the lens.
- (4) No need too much alcohol, but the glue layer of the adhesive lens cannot be touched in case of gas inside escaping.
- (5) The laser cannot be used till alcohol evaporating.
- (6) Do not scrub the lens with acetone. The best way to protect the lens is keeping the environment clean.
- (7) When testing the beam on plexiglass, please keep it 300mm from the mirror.

### 3.8 Safety

Goggles are necessary when debugging because the laser belongs to invisible beam. Positive electrode carries high voltage. By the way, users must pay attention to the safety signs.

### 3.9 Storage and transportation requirements

The cooling liquid must run out in storage or transportation;

The output must be covered with a dust-proof plastic wrap;

The storage temperature should be kept between 2-40°C and the humidity between 10-60%.

Packing: original package. Be sure to stick the sponge and laser tube with tape to prevent the laser tube from sliding longitudinally during transportation. The output lens should have a protruding sponge of 70 mm and the reflective lens 50 mm.