YAG Pulse Laser Power Supply For Cutting System

<Operation Manual>

Please read this manual carefully before installing and operating this product.

Shenzhen Anzhong Power Co.,Ltd
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Contents

Chapter I Preface--------------------------------------------------------------- 3
Chapter II Introduction and Features------------------------------------------ 5
  2.1 Application--------------------------------------------------------------- 5
  2.2 Product description------------------------------------------------------ 5
  2.3 Main Features:--------------------------------------------------------- 5
Chapter III Technical Parameters--------------------------------------------- 6
Chapter IV Principle Introduction-------------------------------------------- 7
Chapter V Wire Connecting---------------------------------------------------- 7
  5.1 The Safety Cautions for Circuit Connection----------------------------- 7
  5.2 Connection Between the Enclosure Rack and Equipment------------------- 8
  5.3 Connection Description of Power Boxes---------------------------------- 10
  5.4 Single-chip Board(back of LCD) Diagram--------------------------------- 13
  5.5 Power Box Electrical Diagram------------------------------------------- 13
  5.6 Connection Description Of Power Supply--------------------------------- 14
Chapter VI Power supply human-machine interface LCD screen--------------- 15
Chapter VII Starting and Stopping and Split Operation---------------------- 18
  7.1 To starting the power supply------------------------------------------- 18
  7.2 To stop the power supply----------------------------------------------- 19
  7.3 Split Operation-------------------------------------------------------- 19
Chapter VIII Protection Functions Description----------------------------- 19
Chapter IX Safety Protection And Cautions--------------------------------- 21
Chapter X Debugging Cautions---------------------------------------------- 22
Chapter XI Everyday Maintenance--------------------------------------------- 24
Chapter XII Fault Indication and Solution---------------------------------- 25
Chapter XIII Common problems and their solutions-------------------------- 27
Attachment (i) Accessories-------------------------------------------------- 28
Attachment (ii) Packing Photos--------------------------------------------- 28
Attachment (iii) Discarding------------------------------------------------ 28
Conclusion---------------------------------------------------------------- 29
Chapter I Preface

Thanks for using the YAG pulse laser power supply for cutting system of Shenzhen Anzhong Power. Before using the product, please read the guide carefully and put the manual in a safe place for future reference. This manual applies to all products of this series.

The beam of special properties (wavelength 1\textmu m, 10.6\textmu m etc.) generated by exciting a specific substance is what we call laser light, while the device that turns electric energy into the optical energy of the foregoing wavelength is laser generator; Devices provide power to the lasers to make it work, called laser power supply.

Shenzhen Anzhong Power Co., Ltd is a high-tech company who specializing in researching, manufacturing and sales for laser power supply and the laser machine key parts. The company has a great range of laser products, such as YAG solid laser cutting/welding power supply, the CO2 laser power supply, High-power & High-precision semiconductor laser power supply, High-power RF laser power supply, light source drive, DC power supply, machine tool operation power supply, UV power supply with UV curing, focusing controller, etc.

The company has leading talents and talents echelon who worked in the field of laser power industry, and rich experience in R&D and production. For the investment in R&D, we have a number of independent intellectual property rights and core technology, and the Annual R & D COST is more than 10% of sales volume. To ensure that the company has a number of innovative products on the market, Anzhong continues to invest personnel and funds, and these innovations meet demand of the market, at the same time, it also establishes the leading position in the laser power supply industry.

Customers’ demands are the power generator for our continuous exploration and development. Customers’ problems are the golden key for our continuous studies and innovation. The brand comes from quality, credibility is our life. Facing the future, Anzhong power will continue to provide a variety of solutions for customers, improve the technology level of laser application industry, and strive to become the frist brand of laser power supply industry.

Anzhong Power, with the professional attitude, provides professional products for you professionals.
Cautions before use

. Make sure the product is what you bought after unpacking it.
. Please read this manual before using the product!
. Please follow the safety precautions, warnings, cautions and safety signs before using the product!

<table>
<thead>
<tr>
<th>Verify the product is damaged or not during the transport.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please contact us or our sale agent for any inconformity or damage to the product. Email: <a href="mailto:laserpowersupply@163.com">laserpowersupply@163.com</a> (see details about unpacking and installation described herein).</td>
</tr>
</tbody>
</table>

Special statement

The hardware and software are subject to subsequent changes in connection with customized models or technical update without notice.

Safety caution

To keep the operator safe and avoid danger to the laser system or environment, please follow all the safety cautions, warnings and signs specified below and in subsequent sections herein whenever you start any of our series products.

Copyright

All rights reserved and protected by law. No part of this manual may be reproduced in any form or by any means without written consent from publisher.

Please contact our after service immediately for any question about the product.

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Chapter II Introduction and Features

2.1 Application

Applicable to YAG lamp pumped laser cutting equipment, processing materials of stainless steel (including pipe), stainless iron (including pipe), galvanized steel sheet, aluminum alloy (including pipe), aluminum, copper, rare metal materials, etc. Cutting thickness from 0.1mm to 8mm.

Application industries: mechanical and electrical equipment, sheet metal processing, chassis cabinets, stainless steel products, kitchen, lamps, ornaments, auto accessories, glasses, hardware tools, billboard, decoration and other industries.

2.2 Product description

AZ-GT series YAG lamp pump pulse laser power supply for cutting (constant voltage type) is controlled by DSP. User can cut different thickness of metal sheets through setting laser power (adjust voltage), working frequency, pulse width. There are kinds of optional power supply of different output power according to the different usage. Single-lamp Power ≤ 8kW, double-lamp Power ≤ 16kW (Laser Power: 500W), single-lamp Power ≤ 9kW, double-lamp Power ≤ 18kW (Laser Power: 600W) or Single-lamp Power ≤ 10kW, double-lamp Power ≤ 20kW (Laser Power: 800W) is the standard configuration.

2.3 Main Features:

- Xenon lamp power control is constant voltage control, current rising without delay, single pulse output laser energy large.
- Adjustable range of laser frequency, better high frequency laser output mode, longer life of xenon lamp, cutting speed faster and the kerf smaller.
- Mixed control of DSP and analog circuit, make power control easier and more stable.
- Multiple protection function of internal power supply, improves the product reliability greatly.
- Product operating fault detection and alarming. Simple faults can be debugged quickly by the users themselves.
- Power output parameter can be programmed and communicate with host computer. It can be also set and operated easily.
- Laser out by manual operating is convenient to test.
- Power supply is small in size and it is a modular construction, easier for installation and transportation.
## Chapter III  Technical Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td><strong>Input Voltage</strong></td>
<td>Three-phase four –wire AC 380V±10%, 47-63HZ</td>
</tr>
<tr>
<td><strong>Pumping Lamp Model &amp; Quantity</strong></td>
<td>Pulsed Xenon/2PCS</td>
</tr>
<tr>
<td><strong>Rated Power</strong></td>
<td>≤16kW (Optical Power: 500W) Single lamp Power ≤8kW</td>
</tr>
<tr>
<td></td>
<td>≤18kW (Optical Power: 600W) Single lamp Power ≤9kW</td>
</tr>
<tr>
<td></td>
<td>≤20kW (Optical Power: 800W) Single lamp Power ≤10kW</td>
</tr>
<tr>
<td><strong>Output Voltage Range</strong></td>
<td>400VDC~650VDC</td>
</tr>
<tr>
<td><strong>Trigger Voltage Range</strong></td>
<td>20KV<del>25KV; After the success of light, Xenon lamp maintaining voltage: 170VDC</del>250VDC</td>
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<tr>
<td><strong>Output Peak Current Range</strong></td>
<td>0~225A</td>
</tr>
<tr>
<td><strong>Working Mode</strong></td>
<td>Pulse</td>
</tr>
<tr>
<td><strong>Pulse Width</strong></td>
<td>0.1~1.5Ms</td>
</tr>
<tr>
<td><strong>Laser Frequency</strong></td>
<td>0.1~300Hz (According to the characteristics of the lamp, the maximum: 500 Hz)</td>
</tr>
<tr>
<td><strong>PF</strong></td>
<td>≥0.9 (with adjusting inductance), ≤0.7 (without adjusting inductance)</td>
</tr>
<tr>
<td><strong>Working Environment</strong></td>
<td>In the environmental temperature below 35 °C, dry conditions, air dust &lt;0.01 g/m³, no condensation.</td>
</tr>
<tr>
<td><strong>Display Control Mode</strong></td>
<td>LCD screen display and control</td>
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<tr>
<td><strong>Precombustion time</strong></td>
<td>real-time</td>
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<tr>
<td><strong>Continuous Working Time</strong></td>
<td>≥24hr</td>
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<td><strong>Cooling Type</strong></td>
<td>Forced air cooling</td>
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<td><strong>Net Weight of Power Boxes</strong></td>
<td>unit 1 = 34kg unit 2 = 33kg</td>
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<tr>
<td><strong>Enclosure Rack Net Weight</strong></td>
<td>59kg</td>
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<tr>
<td><strong>Size of Power Supply</strong></td>
<td>L<em>W</em>H=650mm<em>500mm</em>185mm (Charging Box)</td>
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<tr>
<td><strong>Size of Enclosure Rack</strong></td>
<td>L<em>W</em>H=545mm<em>500mm</em>185mm (Discharging Box)</td>
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<tr>
<td><strong>Packing Size</strong></td>
<td>L<em>W</em>H=730mm<em>630mm</em>980mm</td>
</tr>
<tr>
<td><strong>Mode of Packing</strong></td>
<td>Wooden Box Packing</td>
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</table>
Chapter IV Principle Introduction

YAG Pulse Laser Power Supply for Cutting System is in the parallel connection with DC-DC Boost Circuit and Chopper Output Circuit. The Boost Circuit consist of Three-phase Input Rectification, PFC Inductor, Filter Capacitor & Transformer, Bridge-IGBT and Resonant Inductor & Capacitor, which is to make the AC Input Rectification, Filter and Boost possible (the voltage maximum value is 650V). The output pulse current of the Chopper Output Circuit, which provide the electric energy for xenon lamps. The pulse wide and frequency of the pulse current can be adjusted.

✧ The schematic diagram in the Attachment(I)
✧ The main circuit diagram in the Attachment(II)

Chapter V Wire Connecting

5.1 The Safety Cautions for Circuit Connection

Please read the cautions carefully before connecting the circuit and follow them strictly.

➢ According to the safety regulation and to keep the operator safe and avoid damaging the equipment, safety earth is necessary as the power supply with the metal enclosure.
➢ All of the pins of plug should plug in correctly. There are different numbers on the plug and socket, find the same number and insert them corresponding please. Otherwise, the power supply will be damaged.
➢ Make sure that the cathode/anode wires are correctly connected!
➢ Don’t connect the three-phase voltage, until all of the connector wires have been connected correct.
➢ The charge wires of charging Box and discharging box should be minimum 10mm² in diameter each. In strictly accordance with the standard of our company supplies wires.
➢ The wires from the power supply to the xenon lamps should be minimum 10mm² in diameter each. In strictly accordance with the standard of our company supplies wires.

➢ The wire connector of power supply input-output should be securely pressed to
avoid loose connection that may cause sparking or heating in the conductor.

- Avoid binding the charge wire and discharge wire together with the lamp wire in case of serious heating in the conductor.
- Avoid binding the signal wire together with the input-output wire in case of interference.
- Don’t starting the power supply, until the water chiller or water cooling system work properly.
- A high-voltage pulse output when staring the xenon lamp, so the operator should stay away form the cable of xenon lamp electrode.
- The power voltage of the product is 380V three-phase AC, high-voltage is with several parts of the power boxes. Don't touch the charged metal parts of the connectors inside and outside of the machine when it is on "Power On" mode or within 30 minutes after the power is off.
- It was forbidden to open the power box by the non-professionals for safety.
- Check the insulation of instrument for measure is good, e.g. multimeter and oscilloscope etc.
- Ensure the gear position in the Voltage Grade in voltage measurement and the range of the meters and instruments larger than the testing point voltage.
- Ensure good ventilation and sufficient radiation space are provided when installing the power to keep the air duct well ventilated.

5.2 Connection Between the Enclosure Rack and Equipment

The power supply is in the black enclosure rack fitted with castors. The cables between the power supply and the enclosure rack have been connected before delivery. You don’t need connect the charging box with the discharging box. You have to do something to connect the enclosure rack with the laser equipment. Specific operation is as follows:

1. Connect the xenon lamp cables between the power supply and the laser equipment (the cables as shown in picture 5-1/5-2 below).

2. You can see a cable connector in a transparent plastic bags when you open the wooden box. Please connect this connector as: 1,2 feet with E-Stop Switch(Normally Closed); 4,5 feet with water protection; 6,7 feet with the laser output signal. When you finished the connection, you should connect the plug (7pins) to the corresponding plug-in (7pins) in the enclosure rack. (the cable connector 7(pin) as shown in picture 5-1/5-2 below)
Attention: The 7(pin) connector should not input any voltage and the E-Stop Switch should normally closed.

3. Connect the 3-phase input wire and the earth wire. (as shown in picture 5-1 below)

**Picture 5-1 Accessory and Wires**

*Three-phase Input Cables and Earth wires*
(yellow-green cables are the Earth wires)
Finish the step from 1 to 3, you can read the chapter 6 to go on your operation.

- The connection diagram in the Attachment(III)

5.3 Connection Description of Power Boxes

The power supply can be used separately from the enclosure rack. When it is used separately, read the cautions carefully and please follow them strictly.

5.3.1 The External Structure Of Power Supply Introduction

There are two Boxes for the power supply. One is the charging box, another is the discharging box. Two boxes stack together, Unit 1 on bottom, Unit 2 on top, make sure the four edges are align to each other.
5.3.1.1 Charging Box Description

- Front of Charging Box
  - LCD DB25 Connector
  - Air Inlet
  - LCD DB9 Connector
  - Fan

- Back Side Of Charging Box
  Note: The water protection connector is a water protect control, key switch, laser output signal into one 7(pins) connector.

In the red ellipse, Top-Down:
Control Connector(12pins), Signal Connector (7pins),
Connector(7pins), 1, 2Feets connected with power key switch which is oversead with emergency stop button; 4, 5Feets are water protect plug; 6, 7Feets are optical signal output plug

DC output wiring copper bar,
output anode is red,
output cathode is back

Air Outlet
Air Switch/Power Switch

Connector(4pins),
three phase wiring
1 ~ 3Feet is Live(L);
4Feet is Null(N)
5.3.1.2 Discharging Box Description

- **Front Of Discharging**

  Front of Charging Box

  - LCD DB25 Connector
  - Air Inlet
  - LCD DB9 Connector
  - Fan

- **Back Side Of Discharging Box**

  Back Of Discharging Box

  - DC input wiring copper bar, input anode is red, input cathode is black
  - Air Outlet
  - Control Connector (12pins)
  - Xenon Lamp No.1 output Anode is red Cathode is black
  - Signal Connector (7pins)
  - Xenon Lamp No.2 output Anode is red Cathode is black
5.4 Single-chip Board (back of LCD) Diagram

Singlechip Board (back of LCD)

5.5 Power Box Electrical Diagram

Power box connection diagram
5.6 Connection Description Of Power Supply

1. A cable connector(4pins), three phase wiring 1~3feet is Live(L);4feet is Null (N).
2. A cable connector(7pins), 1, 2feets connected with power key switch which is cascaded with emergency stop button; 4, 5feets are water protect plug; 6, 7feets are laser output signal plug.
3. A signal cable connector 7(pin) to connect with the same one of discharging box.
4. A controlled cable connector 12(pin)to connect with the same one of discharging box.
5. Connect DC output wiring copper bar from charging box to the DC input wiring copper bar from discharging box. Please attention to the distinction between positive and negative.
6. Connect the DB9 connector, charging box to the display.
7. Connect the DB25 connector, charging box to the display.
8. A signal cable connector 7(pin) to connect with the same one of charging box.
9. A controlled cable connector 12(pin)to connect with the same one of charging box.
10. Connect DC input wiring copper bar from discharging box to the DC input wiring copper bar from charging box. Please note the distinction between positive and negative.
11. Connect pulse output copper bar No.1 of discharging box to the Xenon No.1.
12. Connect pulse output copper bar NO.2 of discharging box to the Xenon No.2.
Chapter VI Power supply human-machine interface LCD screen

The power supply is controlled by LCD, the control knob of LCD on the enclosure rack. The following words are the introduction about LCD display.

- **Home Language**: there are Chinese and English menu can be chosen.

- **The Main Menu**: It can set multiunit material using parameters. User can choose the internal storaged parameters for specific situation.
Ray debug: used for cutting other materials, the power output frequency, pulse width, voltage can be set, the specific parameters can also be stored to the internal memory.

≤3mm thick steel cutting: used for cutting other materials, the power output frequency, pulse width, voltage can be set, the specific parameters can also be saved in the internal memory.
➢ > 3mm thick steel cutting: used for cutting other materials, the power output
frequency, pulse width, voltage can be set, the specific parameters can also be saved
in the internal memory.

➢ Manual setting: used for cutting other materials, the power output frequency, pulse
width, voltage can be set, the specific parameters can also be saved in the internal
memory.
Chapter VII Starting and Stopping and Split Operation

There are LCD, LCD Control Knob, Laser-output Manual Button, Key Switch, E-stop Switch in the enclosure rack.

7.1 To start the power supply

After connecting all the wires and making sure they are correctly connected, turn on the chiller first, then turn on the Air Switch, the Key Switch of power supply in turn. The display screen will be on after a sound of AC contactor absorption;

1. The display screen shows: 【中文】<Chinese> and <English>. You can choose the language based on your requirements.
2. After step 1, it will appear main menu in screen. You can see <Preburn:OFF> in the top right of screen.
3. Now the preburn is in white letters against blue background, i.e. preborn is selected. Press the LCD control knob and set up preburn is “ON”.
4. That will be followed by another sound of AC contactor absorption together with “hiss”. The capacitance is charged, the lamp is successfully ignited and the power is normal (to turn off the preburn, press the LCD control knob and release it right away. Otherwise the lamp will be ignited once again).
5. The preburn is to igniting the lamp by the high voltage, causing ten thousands of high voltage will ignite the xenon lamp immediately. The ignition is completed within 1~2sec. A successful ignition will be followed by two sounds of AC contactor absorption and the preburn ON on the display will turn to preburn OFF. The lamp is successfully ignited and now it is in microvias. An unsuccessful ignition, on the other hand, will be followed by only one sound of AC contactor absorption (or no none at all) and the preburn OFF on the display will stay unchanged. Upon three consecutive ignition failures, turn off the power key switch and contact the technician.
6. If preburn failed, the display screen will show “Preburn fail”, it can be caused by these reasons:
   1) The chiller is not “turn on” or the flux or temperature of water cooling system alarm. Please ensure the cooling system work regularly.
   2) The high-voltage board for ignite xenon lamp was damaged. Please check if the high-voltage board is good.
7. When the lamp is successfully ignited, the user can turn the LCD control knob and select between voltage, frequency and pulse width. The Chinese characters displayed in
white against blue background are what you have chosen. Point press the LCD control knob to confirm your choice and move the cursor to the figure of this option. In the same way, you may modify the parameter of this option by turning the LCD control knob. Point press the LCD control knob after the modification to confirm and exit.

7.2 To stop the power supply

1. By the LCD control knob enter <manual setting>, then choose <voltage> option, set the voltage to 200V, press the LCD control knob for confirm, then press the laser—output manual button.

2. You can get the Voltage Parameter through the display after pressing the laser-output button. Turn off the Key Switch, Air Switch in turn until the voltage value down to 200V.

3. Turn off the power supply successful.

Emergency Shutdown Operation

Turn off the power supply directly upon any abnormality in the machine during the work like high noise or unusual smell (turn off the key switch or the E-Stop button).

7.3 Split Operation

Please according to the following order split the charge and discharge boxes.

1. Ensure the power supply is OFF before splitting.
2. Disconnect the three-phase input connector.
3. Check if the voltage output terminals of charging box are live.
4. Check if the voltage output terminals of discharging box are live.
5. As long as output voltage terminals of charging box (from item3) or of the discharging box (from item4) are not live, the boxes can be splitted.
6. Split other parts, according to the method when installing, no sequence.

Chapter VIII Protection Functions Description

8.1 Over & Under Voltage Protection

- If the supply voltage range of AC network more than ±10% of the nominal voltage (380VAC), protection is on, the power supply is turn to the protection status
- The display shows <Input UNV>
- Now, laser output signal is off, the knob operation is invalid.
- Until the AC network is back to normal state, the power supply can be used again
after restart it.

8.2 Over current Protection

8.2.1 Output Over-current Protection

➢ If the current input of Unit 2 Box over the current’s maximum output range, protection is on, the power supply is turn to the protection status.
➢ The current maximum output range is :18KW: 0～40A/22KW: 0～50A.
➢ The display shows <Output EXI>
➢ Now, laser output signal is off, the knob operation is invalid.
➢ The laser equipment should stop outputting the laser half an hour to prevent damage the power supply, after that, the power supply can be used again.

8.2.2 Input Over-current Protection(IGBT Over-current Protection)

➢ If the peak current of power supply over the IGBT rated current, protection is on , the power supply is turn to the protection status.
➢ The display shows <Input EXI>
➢ Now, laser output signal is off, the knob operation is invalid.
➢ Turning the key switch of power supply to "off", check the Main Circuit and check if IGBT Modules is broken after cut off the power. If it isn’t, the main control board and the display board are likely to be changed. The maintenance work must be operated by the person who authorized by the manufacturer or assign professional maintenance personnel.

8.3 Output Overvoltage protection

➢ If the output voltage of power supply over 750V, protection is on , the power supply is turn to the protection status.
➢ The display shows <Output OV>. 
➢ Now, laser output signal is off, the knob operation is invalid.
➢ Turning the key switch of power supply to "off", check the output voltage of power supply after cut off the power (Multimeter at DCV to test). Restart the power supply until the output voltage value is “zero”. Then, enter to < manual setting > of LCD by display knob, if the “voltage” shows normal, the power supply can be used again; Turn off the power supply immediately if the voltage value≥750V, then contact the after-sales service personnel.
8.4 Overheat Protection

- If the surface temperature of Charging Box power unit radiator inside the power supply over 75°C, protection is on, the power supply is turn to the protection status.
- The display shows <Over Temp>
- Now, laser output signal is off, the knob operation is invalid.
- When the temperature is similar to the ambient temperature, the power supply can be used again after restart it.

8.5 Lake Phase Protection

- If there is no input voltage of any phase of three phases, protection is on, the power supply is turn to the protection status.
- The display shows <Input Fail>
- Now, laser output signal is off, the knob operation is invalid.
- Make sure the three-phase input is correct, the power supply can be used again after restart it.

8.6 Cooling System Protection

- If any one alarm signal of flux or temperature be received of cooling system, protection is on, the power supply is turn to the protection status.
- The display shows < Cooler fault 1> or < Cooler fault 2> randomly.
- Now, laser output signal is off, the knob operation is invalid.
- Make sure the cooling system is normal, the power supply can be used again after restart it.

Chapter IX Safety Protection & Cautions

Operating personnel must carefully read the following issues.
1. Don’t turn on the power supply if the xenon lamps unconnected, or the tens of thousands HV of the High Voltage Ignition circuit would damage the electronic components and the power supply.
2. Make sure the connecting of cathodes and anodes from charging box to discharging box are correct, or the electronic components will be damaged, the power supply will not be able to work properly.
3. Make sure the terminals contact well and tighten. Poor contact may cause the failure of igniting of xenon lamps and insulation damaged by the contact point over heat or the power supply will not be able to work properly.

4. Keep people away from the lamp pole wire as there is HV output from the pole when is being ignited.
5. There is HV electricity in the Power Box, non-professional, shouldn’t open it;
6. For guaranteeing the safety of human life, well earthed of the whole equipment is necessary.

Chapter X  Debugging Cautions

The laser resonant cavity, the model of the xenon lamp and the YAG rod are different in every company. If the power supply and xenon lamp are unmatched, the YAG Rod will be broken usually. Please read the cautions carefully and follow them strictly, if you use this product for the first time.

1. When the power supply is used for the first time, the power should be increase gradually. Users can adjust the output voltage, laser pulse wide, laser frequency to control the laser power. If the laser power is 800W, the output electrical power of power supply should less than 21KW, or the xenon lamp and YAG Rod will be damaged.

   ♦  Electrical Power=Output Current*Output Voltage

   Get the current value: Use a AC/DC Digital Clamp Meter with the DC current 100A position to test the current between the Charging Box and the Discharging Box. Reading range is 0-50ADC.

   Get the voltage value: Use a multimeter with the DC voltage 1000VDC position to test the voltage of pulse output copper bar from the Discharging Box.

2. According to the test data of Chinese Users, the laser output frequency be set in connection with the quality of xenon lamps. The laser output frequency of China-made xenon lamps should better less than 150HZ, or the xenon lamp lifetime will decay quickly. If the xenon lamp made in other country, before use, communicate
with the manufacturer please. The frequency should better less than 300HZ.

3.Use the 22KW pulse laser power supply, the maximum power output of power supply can reach 22KW. So the refrigerating capacity of chiller should more than 24KW, or is likely to cause optical path thermal saturation and the laser output power unstable.

Please read the cautions carefully and follow them strictly. As long as you need, please contact us promptly, we will sincerely serve you, to do our best!

This is the 800W laser test date of the Chinese users for reference.

<table>
<thead>
<tr>
<th>800W laser test date for Chinese Users</th>
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Cavity Optics: 800W
The material of Cavity optics is plated metal.
YAG Rod: φ9mm*150mm*280mm

Laser debug parameters is: Frequency 50HZ, Pulse Wide 0.9mS, Voltage 330V-350V

<table>
<thead>
<tr>
<th>Test conditions</th>
<th>Frequency(HZ)</th>
<th>Pulse Wide(mS)</th>
<th>Voltage(VDC)</th>
<th>Current(ADC)</th>
<th>Voltage</th>
<th>Electrical Power(KW)</th>
<th>Optical Power(W)</th>
<th>Photoelectric Conversion (%)</th>
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<td>120</td>
<td>1.2</td>
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</table>

Note: The test Data below for reference only.
Chapter XI Everyday Maintenance

1. The power supply uses three-phase-five-wire system, the Null Line and Earth Wire should be reliable connected to make sure electrical safety.

2. The power supply by the fans cooled, cross ventilation, air convection design. Leaving enough space around the power supply, so that heat dissipation quickly.

3. Should be maintained around the power supply clean and dry.

4. In the environmental temperature below 35 °C, dry conditions, air dust <0.01 g/m³, no condensation.

5. Regular cleaning the dust of power supply, the air cover of the cabinet, the fan cover of power supply, well-ventilated.

6. The Air Switch, AC Contactor, Fans and all kinds of terminal blocks are the critical electronic components that affect the power supply service time. Please clean the dust of them half a year.

7. Service time of Xenon lamp is short. When the xenon lamp power and laser power drop obviously, replace the xenon lamp as soon as possible please. Don’t increase the Output Power of power supply unlimited to improve the Laser Output Power, it can cause the further damage of power supply and YAG Laser Rod.
## Chapter XII Fault Indication and Solution

<table>
<thead>
<tr>
<th>Art.</th>
<th>Fault Indication</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input fail</td>
<td>Phase missing (more than one phase missing) 380VAC three-phase AC</td>
<td>Check the three-phases 380VAC, please.</td>
</tr>
<tr>
<td>2</td>
<td>Input EXI</td>
<td>IGBT of charging box over-current, laser output signal is off and the power supply stop working.</td>
<td>Turn off the power supply, check the IGBT absorb panel of charging box, the capacitor in the absorb panel usually broken.</td>
</tr>
<tr>
<td>3</td>
<td>Cooler fault1</td>
<td>There are some problems with the xenon lamp 1 or chiller.</td>
<td>Check the pulse xenon lamp 1 or the chiller.</td>
</tr>
<tr>
<td>4</td>
<td>Cooler fault2</td>
<td>There are some problems with the xenon lamp 1 or chiller.</td>
<td>Check the pulse xenon lamp 2 or the chiller.</td>
</tr>
<tr>
<td>5</td>
<td>Preburn fail1</td>
<td>Xenon Lamp 1 preburn fail.</td>
<td>Check the pulse xenon lamp 1 and the wiring system. If the xenon lamp wire is good, the high-voltage board is broken. Try it again after replacing the high-voltage board.</td>
</tr>
<tr>
<td>6</td>
<td>Preburn fail2</td>
<td>Xenon Lamp 2 preburn unsuccessful.</td>
<td>Check the pulse xenon lamp 2 and the wiring system. If the xenon lamp wire is good, the high-voltage board is broken. Try it again after replacing the high-voltage board.</td>
</tr>
<tr>
<td>7</td>
<td>Output/IGBT EXI</td>
<td>The actual current is greater than the limited current. Protect function is on, laser output signal is off and the power supply stop working.</td>
<td>Turn off and restarting the power supply. If the problem still exists, please adjust the IGBT driver board potentiometer RW1 of auxiliary power supply under the direction of the maintenance staff.</td>
</tr>
<tr>
<td>8</td>
<td>Input UNV</td>
<td>If the supply voltage range of AC network more than ±10% of the rated voltage(380VAC), protection is on, the power supply is turn to the protection status</td>
<td>Use the voltage regulator or other instrument to make the voltage stability.</td>
</tr>
<tr>
<td>9</td>
<td>Output OV</td>
<td>The voltage of capacitor more than 750V, laser output signal is off and the power supply stop working.</td>
<td>Turn off and restarting the power supply. If the problem still exists, the main control board of charging box usually broken.</td>
</tr>
<tr>
<td>----</td>
<td>-----------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10</td>
<td>Over Temp</td>
<td>If the surface temperature of Charging Box power unit radiator inside the power supply over 75℃, protection is on, the power supply is turn to the protection status.</td>
<td>Turn off and restart the power supply. Don’t trun on preburn until the fan cooling for 15 minutes. Please make the power supply work in the ventilated environment.</td>
</tr>
<tr>
<td>11</td>
<td>Always output laser (No error display on the screen)</td>
<td>Power supply laser output uncontrolled after pre-burning.</td>
<td>Turn off the power supply, check the J7 voltage of MCU board. If the voltage value is 0V, the laser output signal is sent by mistake. If the voltage value is 13V or so, the IGBT of discharging box is broken.</td>
</tr>
<tr>
<td>12</td>
<td>Preburn is ok, the knob operation is invalid. (No error display on the screen)</td>
<td>The power supply didn’t received preset signal or have received the preset signal but not working.</td>
<td>Check the board card, electric relay (on the laser equipment), cables (from the power supply to the laser equipment) of xenon lamp if damaged or not. If not, the main control board of charging box is broken.</td>
</tr>
<tr>
<td>13</td>
<td>Preburn is ok, laser output is faint. (No error display on the screen)</td>
<td>The three-phase input voltage is too low, or the three-phase input voltage is normal but the power supply abnormal.</td>
<td>Check the three-phase AC if too low or not, if not, check the Resonant inductance, rectifier diodes, if they are normal, the main control is broken.</td>
</tr>
</tbody>
</table>
### Chapter XIII Common problems and their solutions

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD No Indication</td>
<td>The air switch unclosed</td>
<td>Close the air switch</td>
</tr>
<tr>
<td></td>
<td>The power supply is not connected well</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DB9 cable is not connected well</td>
<td>Check cables, ensure every cable correct</td>
</tr>
<tr>
<td>Xenon Lamp can not be ignited</td>
<td>A poor contact between the connection lug(s) of xenon lamp cable(s) and the high-voltage terminal</td>
<td>Check the cables and ensure them are touched well</td>
</tr>
<tr>
<td></td>
<td>A faulty insulation between the xenon lamp electrode and the optical bench</td>
<td>Check the insulation</td>
</tr>
<tr>
<td></td>
<td>The tube was broken</td>
<td>Replace the tube</td>
</tr>
<tr>
<td></td>
<td>The fuse F1 (250V/3A) in the High-Voltage Board was broken</td>
<td>Replace the fuse F1</td>
</tr>
<tr>
<td>Stop Working Automatically</td>
<td>When the operational parameters of power supply greater than or equal to the kinds of the protection function's, The power supply is off</td>
<td>See protections Description Parts or contact the after-sales service personnel</td>
</tr>
<tr>
<td></td>
<td>The cooling system has poor ventilation</td>
<td>Check the exhaust air passage</td>
</tr>
</tbody>
</table>

**Note:** To prevent the power supply overheating, the environment temperature should not be too high, better ventilation is necessary. The operational parameters should not exceed the range limit please.
Attachment (i) Accessories

The accessories are:
1. One Three-phase input cable (one end has been connected to the enclosure rack)
2. One earth wire (one end has been connected to the enclosure rack)
3. Two xenon lamp cables (one end has been connected to the enclosure rack)
4. One 7(pin) cable connector

Attachment (ii) Packing Photos

Attachment (iii): Discarding

Any discarding of the equipment should be as per the local law and regulations!
Conclusion

The laser power supply plays a vitally important role in the operation of the laser equipment. With the constant development of laser technology, the new power supply are born at the right moment. Our company produced power supply, not only meet market requirement, but also develop new, professional, stable products according to the customer request. Our team has always been adhering to the” Actively open up, Bold Innovation.”

Please read the cautions carefully and follow them strictly. Don’t exceed the parameters are limited. Please contact us immediately for any failure in your unskillful operation instead of trying to handle it by yourself in case of any negative result. Sincerely welcome you to give valuable comments and suggestions to us, if this manual not comprehensive. We will actively improve every job, to do its utmost to meet our customer demand! The request of the customer, will be a direction that we work hard. Thanks again for the selection of our products. Company staff sincerely look forward to working with you for your cooperation again!

Best regards for you!