

# DIODE LASER SYSTEM

## User's Guide

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## 1. Laser Safety



Laser Model XXX is a Class IV laser product.

This laser emits more than 10 Watts of visible and/or invisible laser radiation in a wavelength of 400-1200nm.

Avoid eye or skin exposure to direct or scattered radiation emitted from the optical output.



This symbol indicates laser radiation. We place this symbol on products which have a laser output.

### Laser Classification IV

This device is classified as a high power Class IV laser instrument. This product emits visible and/or invisible laser radiation at, or around a wavelength of 400-1200nm invisible. The total light energy radiated from the optical output is greater than the nominal power of device model. This level of light may cause severe damage to the eye and/or skin. Despite the radiation being invisible, the beam may cause irreversible damage to the retina and/or cornea. Due to these risks a qualified laser safety representative should be present to ensure a safe working environment. Laser safety eyewear must be worn at all times while the laser is operational.

### WARNING:

**NEVER look directly into output end and make sure that you wear appropriate laser safety glasses at all times while operating the product.**

## 2. Description and Specifications

### 2.1 System Description

The XXX Series Diode Laser System was developed to meet industrial market demands. These lasers are compact and efficient providing dependable optical power at a wide range of wavelengths.

#### 2.1.1 Main Features:

- Various power outputs and wavelengths available
- Extensive laser diode protection
- Warranted for full rated power in either pulsed or continuous wave (CW) operation
- Options for no-cooling, air-cooling, water-cooling and heating
- External computer interface
- Compact designs
- Fiber delivery
- Ideal for OEM application

Part	Quantity	Note
XXX system	1	
Fiber		
Optics		
Coupler		
Power Cord	1	For connecting the laser device to 95-265V AC power source
Signal line		
User's Guide	1	This document

### 2.1.2 Front Panel Description



### 2.1.3 Rear Panel Description



## 2.2 Specifications

<b>Model</b>	DS3-51422-1411	
<b>Parameters</b>		<b>Test condition</b>
Series No.	EXMC00014/LEUB00709	
Output power	80W	
Center Wavelength	976nm	Rated output power
Rated Current	7A	
Output Power Instability	<3%	Rated output power
		Continuous running time: $\geq 5$ hrs
		Temperature: 25°C
Fiber Core	<input checked="" type="checkbox"/> 105 $\mu$ m <input type="checkbox"/> 135 $\mu$ m <input type="checkbox"/> 200 $\mu$ m <input type="checkbox"/> 400 $\mu$ m	
N.A.	<input type="checkbox"/> 0.14 <input checked="" type="checkbox"/> 0.15 <input type="checkbox"/> 0.22 <input type="checkbox"/> 0.27	
Connector	<input checked="" type="checkbox"/> SMA905 <input type="checkbox"/> FC <input type="checkbox"/> FC-APC	
Fiber length	160cm	
Fiber protection	3mm stainless steel Sheath	
<b>Laser control</b>		
Operating Temperature	25°C	
Temperature accuracy	$\pm 1^\circ\text{C}$	
Over-temperature setting	50°C	

Working mode	<input checked="" type="checkbox"/> CW <input checked="" type="checkbox"/> Pulse <input checked="" type="checkbox"/> Single Pulse	
Modulation	50Hz-20kHz	Rated output power
Operating current	<15A	
<b>Power Supply Requirement</b>		
Input	<input type="checkbox"/> AC220V, 50-60Hz <input checked="" type="checkbox"/> AC90-220V, 50-60Hz	
Power loss	< 560W	
<b>Mechanical Parameters</b>		
Dimensions (L×W×H)	<input type="checkbox"/> 307mm×295mm×135mm <input checked="" type="checkbox"/> 380mm×373mm×156mm <input type="checkbox"/> other dimensions	
Weight	< 10.2kg	
<b>Environment Requirement</b>		
Ambient temperature	10~40°C	
Ambient humidity	5~80%RH	
Storage Temperature	-10~65°C	
Cooling	<input checked="" type="checkbox"/> Air Cooling: A minimum of 10cm clearance for airflow through the fans <input type="checkbox"/> Water Cooling: Temp:20 °C -25 °C ,hydraulic pressure0.25MPa,water flow rate 7L/min	

### 3. Environment and Precautions



- During operation there is no need to remove any protective coverings. No operator serviceable parts inside.
- Do not expose the device to a high moisture environment.
- The XXX has equipment for active air cooling. Allow a minimum of 10cm clearance for airflow through the fans.
- Before turning the power to the device on, make sure the laser optical output is properly aligned and terminated.
- The output of the XXX is delivered through a more than 10watts power. Make sure that the end face of fiber is of good quality and clean. Any dust on the output can burn and damage the laser. Check the quality of the spot emitted from the laser output at low power levels using an infrared viewer and then gradually increase the output power.
- Important: The manufacturer will not be responsible for damage sustained to the device as result of dirty end faces.

***Failure to comply with the cautions and instructions in this document may lead to damage the laser and will void the warranty.***

## 4. Operation

### 4.1 Preparation for Use

- Remove cap from fiber connector, clean the fiber patch cord before fixed the fiber carefully.
- Wear laser eye safety goggles to protect against the radiation generated from the laser.
- Connect the AC power cord on the rear of the power supply, and installed the connector in a properly grounded outlet.

### 4.2 System Turn-on

- Power Button: Press the POWER button to activate the main power supply, at the same time the red indicator will light. It will enter the main menu after a boot screen.
- Turn Key switch ON: Verify the E-STOP (EMERGENCY STOP) is on, and then rotate the power key switch clockwise to activate the main power supply, make the screen enter into the main menu.

### 4.3 Menu Displays

- The front panel interface displayed Output Power, Temperature, Frequency, and Pulse Width.
- Click the above items of the screen to setup the parameters. Rotate the Parameter Adjust Knob to adjust the cursor “\_” to the desired position, and



then press the knob to select the digit. Rotate the knob again to get the desired values, clockwise for value increasing and anti-clockwise for value reducing. Press the Parameter Adjust Knob to return the status of cursor “\_”, and click the parameter area of the screen to finish the parameter setting.

#### 4.4 Controls, Indicators and Features

##### ➤ Operation mode

The front panel interface can operate in one of three modes. The modes are CW Mode, Pulse Mode and Single Pulse Mode. The Modes could be switched by select on the mode area of the screen.

##### ➤ Emission control

###### a. Single Channel System:

Press the Laser On button to activate the emission status. The green indicator lamp will light during laser emission. Real-time output power, operating current and temperature will display on the screen. The parameters could be adjusted to change the laser output during emission status.

###### b. Multi-Channel System:

- The system can control the laser channels separately, the screen will show the status of every laser channel, touch the related laser channel area to activate the laser channel. Refer to above control information for parameters adjustment.
- The system can control multiple laser channels at the same time. Select the desired laser channels, verify these laser channels with “On “status, press the laser emission button to make the selected lasers emit simultaneously, at the same time the red indicator will light.

###### c. Remote Control

- The default control setting is local mode. Click “Local/Remote” on the touch screen to change into remote mode.
- RS232 Control: Connect the system with PC by serial port line. Click “Local/Remote” on the touch screen to change into remote mode, control the system by sending commends from the computer.

##### ➤ Option : Red aiming laser

There will be an Aiming Beam switch On/Off button at the front panel. A red indicator will light during the aiming beam working.

#### 4.5 System Messages

- Click “System Setting” area of the touch screen to enter into the interface of system parameters.
- Click “Language “area to switch “Chinese / English”

- System parameters still displayed Laser Type No., Series No., Maximum power of power supply, Maximum Current, Threshold Current, Operating Temperature, Current Limitation, ect. User couldn't modify these parameters.

#### 4.6 System Turn-off

- Press down “Laser” button to off, at the same time the green indicator dimmed.
- Press down “Power” button to power off, the red indicator dimmed
- Put on the fiber protect cap, coil the fiber carefully and fixed to avoid fiber damage.

### 5. RS232 Communication

- Serial Port Configuration

Connector: DB9  
 Baud Rate: 9600bps  
 Stop Bit: 1bit  
 Data Bit: 8 bits  
 Parity: None

- Information format

Sending message

Byte	1	1	1	1	n
Content	Head information	Command word	Channel	Data length	Data segment

2、Response message

Byte	1	1	1	1	n
Content	Head information	Command word	Channel	Data length	Data segment

Sending Header information: 0x7E

Responding Header Information: 0x7F

Command

No.	Function	Sending frame	Receiving frame
1	Mode Setting	7E 0100 01YY	7F 0100 01YY

		YY: 01 CW 02 Single pulse 03 Pulse		
		For example: Setting the laser working mode with single pulse mode		
		<table border="1"> <tr> <td>7E 01 00 01 02</td> <td>7F 01 00 01 02</td> </tr> </table>	7E 01 00 01 02	7F 01 00 01 02
7E 01 00 01 02	7F 01 00 01 02			
2	Emission control	<table border="1"> <tr> <td>7E 02 XX 01 YY</td> <td>7F 02 XX 01 YY</td> </tr> </table> XX: Channel 01~FF General control channel: 00 (when defined the general control channel); YY: 01 On 00 Off	7E 02 XX 01 YY	7F 02 XX 01 YY
7E 02 XX 01 YY	7F 02 XX 01 YY			
		For example: activate the second channel laser		
		<table border="1"> <tr> <td>7E 02 02 0101</td> <td>7F 02 02 0101</td> </tr> </table>	7E 02 02 0101	7F 02 02 0101
7E 02 02 0101	7F 02 02 0101			
3	Aiming beam control (Option)	<table border="1"> <tr> <td>7E 03XX 01YY</td> <td>7F 03XX 01YY</td> </tr> </table> XX: Channel 01~FF General control channel: 00 (when defined the general control channel); YY: 01 On 00 Off	7E 03XX 01YY	7F 03XX 01YY
7E 03XX 01YY	7F 03XX 01YY			
		For example: activate the second channel of aiming beam		
		<table border="1"> <tr> <td>7E 0302 0101</td> <td>7F 0302 0101</td> </tr> </table>	7E 0302 0101	7F 0302 0101
7E 0302 0101	7F 0302 0101			
4	Power Setting	<table border="1"> <tr> <td>7E 04XX02YY ...</td> <td>7F 04XX02YY ...</td> </tr> </table> XX: Channel 01~FF, Synchronous power channel Settings :00 (when the system include the function of Synchronous power channel Settings); YY ...: Power Value (hexadecimal code with unit mW, 2 bits)	7E 04XX02YY ...	7F 04XX02YY ...
7E 04XX02YY ...	7F 04XX02YY ...			
		For example: Setting the second channel of laser power with 1000mW		
		<table border="1"> <tr> <td>7E 04020203E8</td> <td>7F 04020203E8</td> </tr> </table>	7E 04020203E8	7F 04020203E8
7E 04020203E8	7F 04020203E8			
5	Temperature Setting	<table border="1"> <tr> <td>7E 05XX02YY ...</td> <td>7F 05XX02YY ...</td> </tr> </table> XX: Channel 01~FF YY ...: Temperature Value (hexadecimal code with the temperature plus 10, 2bits)	7E 05XX02YY ...	7F 05XX02YY ...
7E 05XX02YY ...	7F 05XX02YY ...			
		For example: Setting the second channel of temperature with 25°C		

		7E 05020200 FA	7F 04020200 FA
6	Frequency Setting	7E 060102YY ...	7F 060102YY ...
		YY ...: Frequency (hexadecimal code with unit Hz, 2bits)	
		For example: Setting the frequency with 10kHz	
		7E 06010227 10	7F 06010227 10
7	Pulse Width Setting	7E 070104YY ...	7F 070104YY ...
		YY ...: Pulse Width (hexadecimal code with unit $\mu$ s, 4 bits)	
		For example: Setting the pulse width with 2ms	
		7E 07010400 00 07 D0	7F 07010400 00 07 D0
8	Check Laser Status	7E 50XX0100	7F50XX01YY
		XX: Channel 01~FF YY: 01 On 00 Off	
		For example: When the second channel of laser status is "On", the check commands as below,	
		7E 50 02 01 00	7F50 02 01 01
9	Check Current	7E 51XX0100	7F51XX02YY ...
		XX: Channel 01~FF YY ...: Current Value (hexadecimal code with unit mA, 2 bits)	
		For example: When the second channel of laser current is 1000mA,the check commands as below,	
		7E 51 02 01 00	7F51 02 02 03 E8
10	Check Power	7E 52XX0100	7F52XX02YY ...
		XX: Channel 01~FF YY ...: Power Value (hexadecimal code with unit mW for <60W , with unit 10 mW for >60W, 2 bits)	
		For example: When the second channel of laser current is 1000mA,the check commands as below.	
		7E 52 02 01 00	7F52 02 02 03 E8
	Check Temperature	7E 53XX0100	7F53XX02YY ...

11		XX: Channel 01~FF ZZ: Data Length YY ...: Temperature Value (hexadecimal code with the temperature plus 10, 2bits)	
		For example: When setting the second channel of temperature is 25°C, the check commands as below	
		7E 53 02 01 00	7F53 02 02 00 FA
12	Error return	7F EE EE EE EE	

## 6. Warranty

### 6.1 General Warranty

All products are warranted against defects in materials and workmanship for the period of time as set forth on the applicable purchase order or in the specifications starting with the date of shipment. This product will meet applicable specifications under normal use. We shall, at its option, repair or replace any product that proves, in the reasonable opinion of RPMC, to be defective in materials or workmanship during the warranty period. All products repaired or replaced under warranty are only warranted for the remaining un-expired period of time in the original warranty for the particular defective product. We reserve the right to issue a credit note for any defective products that have proved defective through normal usage.

### 6.2 Warranty Limitations

This warranty excludes products, parts (including fiber connectors) or system which have been tampered with, opened, disassembled, opened, or modified by persons other than RPMC personnel, misused, neglected, or damaged by accident, used in applications which exceeds their specifications or ratings, used outside of environmental specifications for the product, used with buyer software or interfacing, improperly installed, maintained or otherwise abused or used other than in accordance with the information and precautions contained in this User's Guide. It is the customer's responsibility to understand and follow operating instructions in this User's Guide and specifications prior to operation—failure to do so may result in voiding this warranty. Accessories and fiber connectors are not covered by this warranty. Buyer must claim under the warranty in writing no later than 31 days after the claimed defect is discovered. This warranty does not extend to any third party, including without limitation Buyer's end-users or customers, and does not apply to any parts, equipment or other products not manufactured by RPMC.