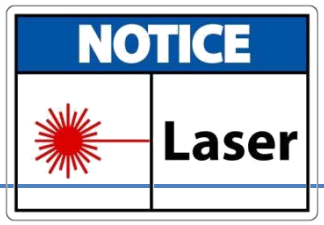
Operation Manual



Wavelength Tunable Fiber Laser

Keep this manual properly.
Read and follow the safety procedures before operation.

SIMTRUM China
Telephone: +86 133 2643 0008
Email:info@simtrum.com

SIMTRUM Singapore
Telephone: +65 6996 0391
Email: info@simtrum.com

SIMTRUM

Contents

SIMTRUM China
Telephone: +86 133 2643 0008
Email:info@simtrum.com

SIMTRUM Singapore
Telephone: +65 6996 0391
Email: info@simtrum.com

Safety Operation Warnings and Precautions

- Equipment operators must strictly comply with relevant safety regulations and preventive measures.
- Operators should regularly inspect the equipment and ensure that all relevant personnel comply with safety regulations.
- Please avoid getting the laser in your eyes or on your skin as it can cause damage to the eyes and skin.
- Please note that laser light can cause damage to the retina and conjunctiva.
- Please do not touch the end face of the optical fiber directly with your hands, so as not to get into the dust and affect the characteristics of the product.
- Please keep the equipment away from high temperature, high pressure and humid environment.

Laser Hazard Classifications for Products

Product Model	Laser Hazard Classifications
TFL-C/L-96/128-10/20-SM/PM-B	3R
TFL-C/L-96/128-100/200/300-SM/PM-B	3B

Scope of Application of the Operating Manual

- This operating manual applies to desktop B1 and B2-encased wavelength-tunable fiber lasers
- Manual Version: V2025.2
- Update Date: 2025-11-01

Product Description

The wavelength tunable laser covers C or L band, realizing up to 96 or 128 wavelengths of laser output (ITU-T standard wavelength). It integrates dual FP cavity tuning etalon and high - gain chips, featuring high output optical power, narrow linewidth, and high wavelength accuracy. It is equipped with a dedicated drive control circuit and a high - definition color LCD screen. A control keyboard and host computer software can also be optionally configured to conveniently monitor parameters such as wavelength. It can be used in the fields of DWDM system research and development, fiber laser, fiber optic link and optical device testing.

Features

- Wide Tunable Wavelength Range
- High Power Output
- Single-mode, Polarization-maintaining Fiber Output
- Long Service Life

Applications

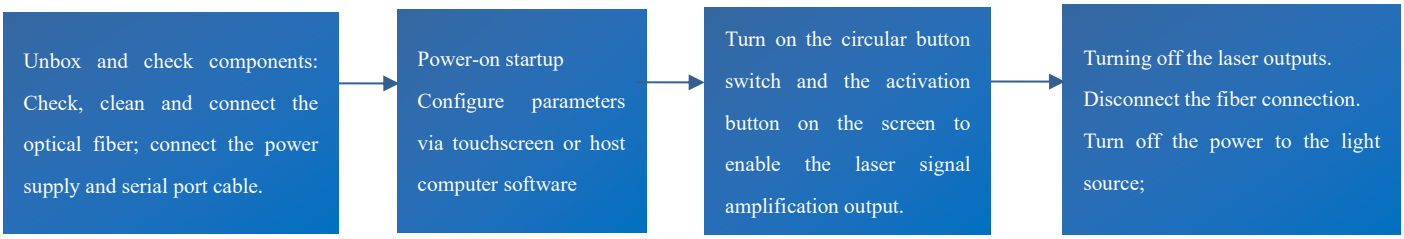
- Fiber Optic Communications
- Fiber Optic Sensing
- Manufacturing Testing
- Scientific Research

Standard Accessories List

	Name	Number
1	Light Source Main Unit	1
2	USB-RS232 DB9 Data Cable	1
3	AC Power Cable	1
4	Product Test Sheet	1
5	Product Operation Manual	1
6	Output Fiber	1 (pre-connected to the device by default)

Please check whether all accessories are complete upon receiving the goods.

First Use: Unpacking, Cleaning, and Inspection



Preparation of cleaning tools and testing equipment: dedicated cleaning kit for fiber optic connectors, fiber end-face inspection tool, optical power meter, and spectrum analyzer;

Step 1. Unboxing and Assembly. Before assembly, verify all accessories are complete, including the power cord/adapter, fiber jumper, operation manual, and test report. Inspect (using a fiber end-face inspection tool) and clean (using a dedicated fiber connector cleaning kit) the end faces of all fiber connectors involved. Connect the power supply; desktop light sources can be connected directly to an AC power source, while modular light sources should be connected to a DC switching power supply or regulated power supply that meets their power requirements. Connect the light source output port using a fiber patch cord. The light signal from this light source is transmitted via a fiber patch cord; the light source output port is typically equipped with a fixed, non-removable fiber patch cord. When connecting the fiber patch cord using a fiber adapter, ensure that the connector types of the patch cords being used are consistent;

Step 2. Power On: Turn on the power switch located on the rear panel. **Note**: The laser will operate using the last saved current and power settings. Adjust parameters via the touchscreen or PC software if needed. Factory defaults are set to the minimum current and output power.

Step 3: After setting the appropriate output power, press the circular button switch (**Enable**) on the panel and tap the activation button (**Active**) on the screen to initiate

laser output. During the experiment, the output power can be adjusted as needed. Measure the light power of the light source (using a power meter) and analyze its spectrum and wavelength (using a spectrometer); adjust the light power and observe whether the actual output power measured by the photometer changes accordingly.

Step 4: Upon completion, turn off the circular switch (**Enable**) to deactivate the laser output, and finally power down the system.

Note: While the light source is emitting light, do not perform any operations—such as inserting, removing, connecting, or cleaning—on the fiber optic patch cord connectors or fiber end faces. Otherwise, this may easily cause damage to the connector end faces and the light source itself, resulting in malfunction.

Operating Instructions

1. Design

Front Panel: Output fiber port | Touchscreen | Circular **Enable** switch (with indicator)

The label in the upper right corner includes the product model (PN), serial number (SN), date of manufacture (Date), and key parameters such as operating wavelength and output power. This model features an LCD touchscreen for controlling and displaying operating parameters;

Fiber Optic Interface: The fiber optic cable is permanently mounted on the

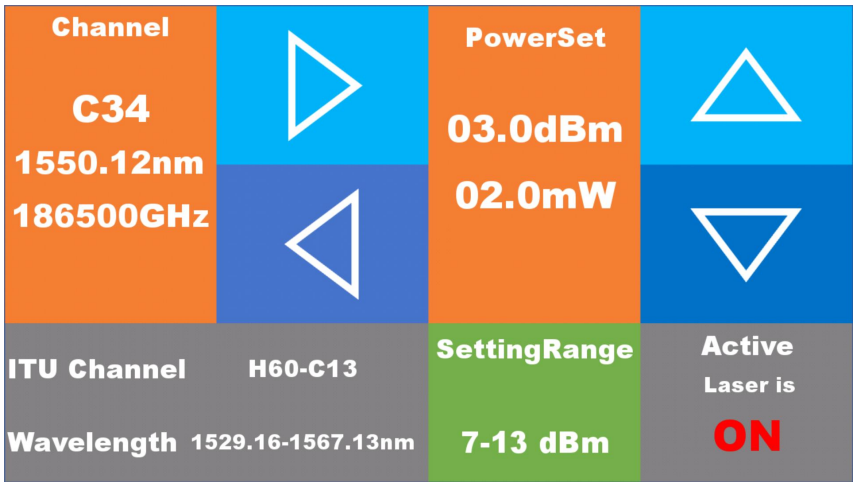
front panel by default and cannot be removed. It extends approximately 1 meter outside the chassis and is terminated with a fiber optic connector, typically an FC/APC connector. Extending the output fiber outside the chassis allows customers to easily inspect (using a fiber end-face tester) and clean the ceramic end-face of the fiber connector (using a dedicated fiber cleaning kit). This also prevents connector loss and significantly reduces failures and damage caused by contamination and dust on the connector's ceramic end-face.

Rear Panel: Cooling fan | RS232 DB9 port | AC power socket (100-240V) & Cooling fan

The power adapter supports a wide range of AC voltages (100–240 V), allowing it to be used directly in any country or region; it can be connected to a host computer via an RS-232 DB9 communication port to enable remote software control.

2. Display Content

The upper-right corner displays the current real-time output power; the upper-left corner displays the current real-time output wavelength and channel; the lower-left corner displays the wavelength and channel adjustment ranges, as well as the laser power adjustment range; the lower-right "Active" area contains the button for activating the laser output.

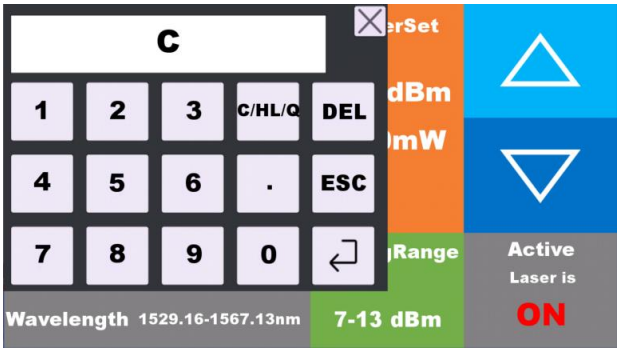


3. Fiber Connection

Open the dust cap of the optical fiber connector and carefully check the optical fiber end face with an optical fiber end face inspector. After confirming that there is no pollution or damage, connect the optical fiber to other optical fiber devices or test equipment. If there is pollution or damage, the connector of the output optical fiber must be cleaned or replaced first. For high-power light source models, it is recommended to use fusion fiber connection;

4. Adjusting the Laser Wavelength

You can directly tap areas  and  to adjust the wavelength channel; a long press enables quick adjustment, while a short press allows for slow, precise adjustment. Alternatively, tap area  to enter the desired wavelength channel using the on-screen keyboard, then press Enter  to apply the settings, as shown below. Tap area  to switch between C/H/L/Q (refer to the table included with the product for the relationship between wavelengths and ITU channels);



5. Power adjustment

For light source products with adjustable power, you can directly click  and  area to increase or decrease the power value. Long press for quick adjustment, short press for slow and fine adjustment. You can also click the **Power Set** area, enter the required optical power value in the pop-up keyboard, and click Enter to take effect after setting, as shown below; click mW, the power unit will switch between mW and dBm;

6. Output Activation

The output activation of the light source is dual controlled by the circular switch (**Enable**) on the right side of the panel and the Active button on the screen.The Active area in the lower left corner is used to control and display the current light source output activation status. OFF means no amplified light output, and ON means the amplified laser is outputting. Each time you click on this screen area, the light source output status switches between output and no output (it can only be switched to the ON state after the **Enable** switch is pressed. If the **Enable** switch of a light source in the output state is pressed, the light output will stop immediately).

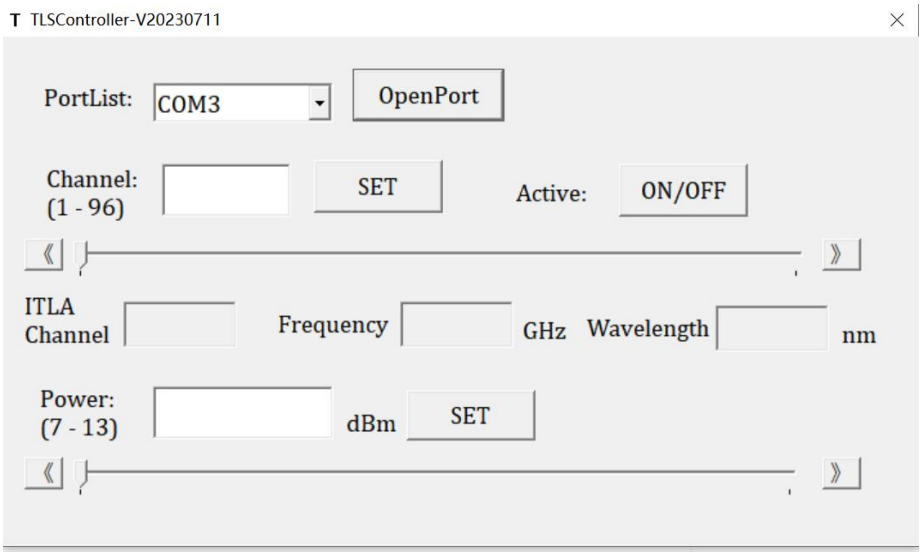
7. PC Software Control

This product supports PC software control. The default communication port is RS232 DB9, located on the rear panel. The dedicated PC software and

communication protocol code are included with the product.

Connection Procedure: Use the original USB-RS232 serial data cable (provided with the laser module) to connect the module to a computer. Note: The computer must first install the dedicated serial port driver to recognize the USB-RS232 cable. Without this driver, the software cannot establish proper communication with the laser module. Request the driver from our company.

For adjustable power models: The output optical power can be adjusted via the PC software. Use the SoftActive button in the software to enable/disable the laser output. The software displays the following information: the set output optical power, pump current, and temperature monitoring status. For lasers with constant power, the Softactive button in the software can be used to turn the laser output on and off, but it cannot be used to adjust the power level;



8. Detailed PC Software Operation

Launch the PC Software: After starting the software, select the correct serial port number from the PortList dropdown. Click the OpenPort button to establish communication. The Current Read and LDTemp windows will display the module's operating current and laser diode temperature.

Set Target Power: Enter the desired target optical power value in the

TargetPower field. Click the SET button to apply the settings.

Activate Output: Ensure both the hardware switch (Emission) on the laser module and the SoftActive button in the software are turned ON. The laser will now output light at the configured power level.

Critical Notes:

Driver Requirement: The computer must first install the USB-232 serial port driver; otherwise, communication between the software and laser module will fail. Contact our company for driver support.

Software Version: Ensure the software version matches the one specified in the product test report (attached with each unit).

Automatic Saving: Parameters and status configured via the software are automatically saved within the laser module.

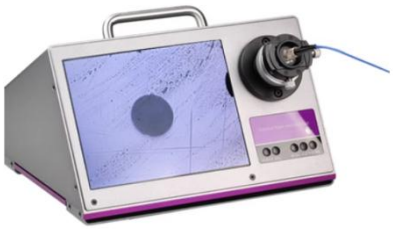
Connection Optional: If no parameter adjustments are needed, connecting to the PC is unnecessary.

Precautions and Maintenance

1. For single-mode fibers (e.g., Hi-1060, PM980, SMF-28e, PM1550), the theoretical continuous light power tolerance of their end-faces (when structurally intact and clean) is approximately 200mW. Therefore, for light source models with output power below 200mW, you can connect other fibers of the same type (right image below) via a movable adapter (fiber optic flange, left image below).

Before connecting fiber optic connectors:

1. First, confirm the light source output is turned off.
2. Use a special fiber optic cleaning tool (left image below) to thoroughly clean the connector's end-face: press the end-face against the cleaning cloth surface, then slide it flatly 2–3 times.
3. Use a fiber optic end-face inspector (right image below) to carefully check the end-face.

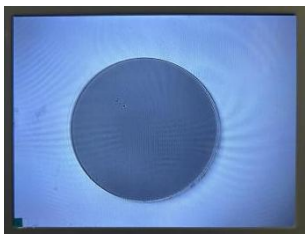


Only after confirming the end-face is completely free of dust and contamination (left image in the following set) should you connect via the fiber optic flange, then turn on the light source.

The reason for this standardized operation: When a contaminated fiber connector end-face (middle image in the following set) is exposed to laser (even at low power),

the connector's end-face is highly likely to be burnt and damaged (right image in the following set).

The three images below were captured by a fiber optic end-face inspector at 400x magnification.



Clean & Undamaged Connector

Contaminated Connector

Damaged Connector

4. When cleaning, inspecting, or connecting fiber optic connector end-faces, **ensure the light source is in the output-off state** — do not operate with the light active. After use, once disconnected from other fiber connectors, **cover the fiber connector with its dust cap immediately**; do not leave it exposed to air for extended periods.
5. Standard light source models come with an **FC/APC fiber connector by default**. For light source products with an output power of 200mW or higher:

- We recommend using this fiber connector **only for output power detection** (connected to an optical power meter).
- You can also connect it directly to an **FC-port fiber collimator** (left image below) to output a collimated beam for free-space use (right image below).
- **Do not use a flange to directly connect it to other fibers or device pigtail connectors** (this risks damaging the fiber connector and the laser itself).

If connection to other fibers is required, **fiber fusion splicing (thermal fusion with a fusion splicer) is recommended**. Ensure the connected fiber types are compatible; otherwise, significant optical power loss will occur.

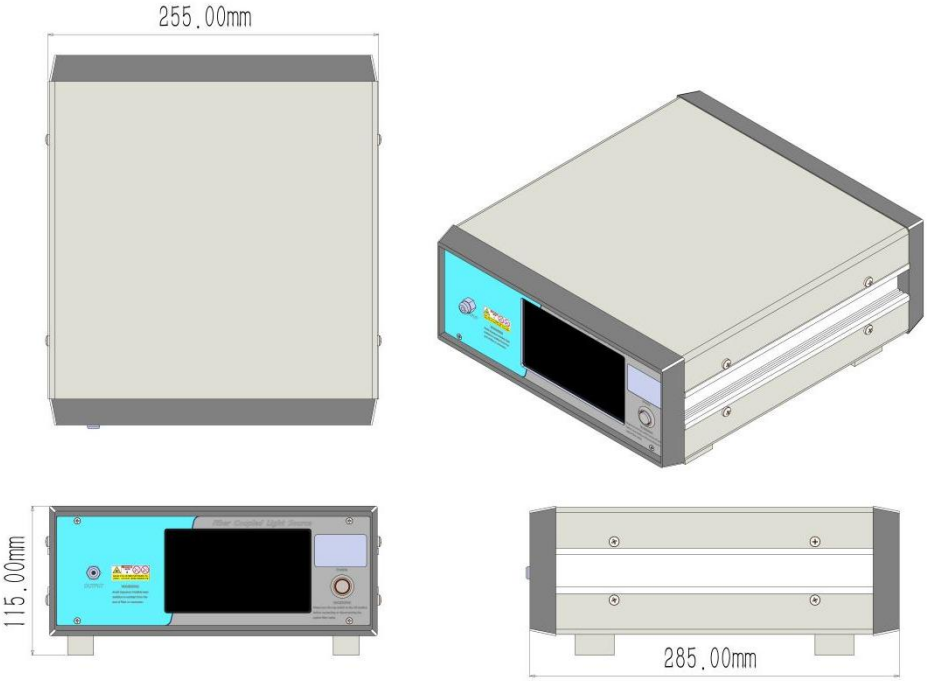
6. Frequent plugging/unplugging of the output-end fiber connector is not recommended. This avoids dust contamination, which can increase insertion loss or cause burning of the connector end-face.
7. When starting up, first ensure the power switch and activation key switch are off before connecting the power supply to prevent damage from sudden light emission after energization. When shutting down, first turn off the key switch or push-button switch, and disconnect the power supply only after the output indicator light has extinguished. Never directly cut off the power supply while the laser is operating.
8. Take precautions against moisture, dust, and corrosion. Keep light source equipment away from high-temperature and high-humidity environments.

Common Troubleshooting for Benchtop Light Sources

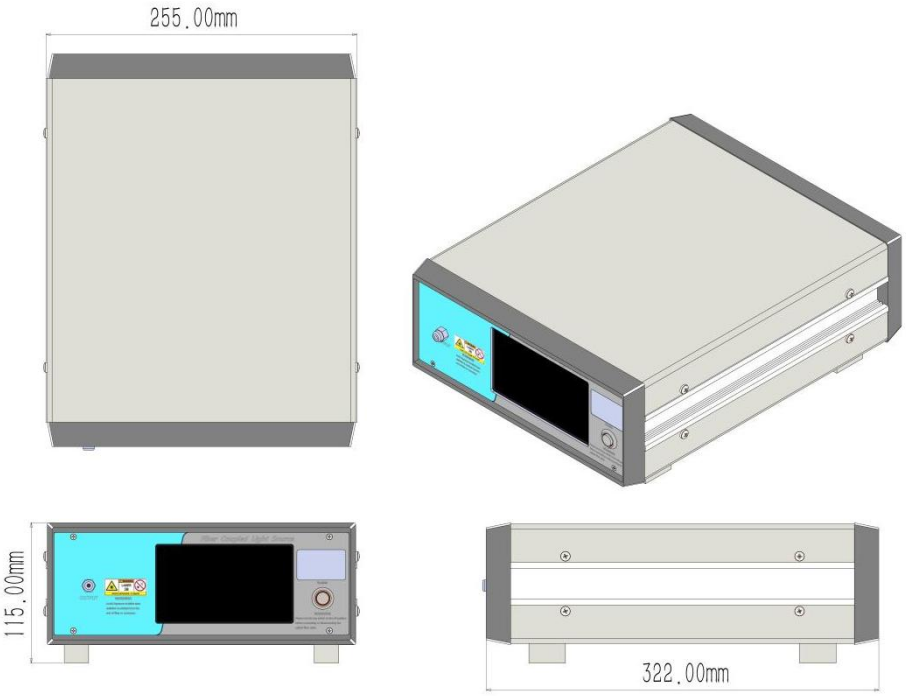
Fault	Possible Causes	Troubleshooting & Resolution
Output beam is not circular	Output fiber connector end-face is contaminated or damaged	Inspect the output fiber connector end-face; return to factory for repair
Output power is slightly low	Measurement error of the optical power meter	No action needed (±10% range is normal)
Output power is significantly low	Exceeded the optical power meter's range	Replace with an appropriate optical power meter model
	Incorrect wavelength selection on the optical power meter	Select the correct wavelength for the optical power meter
	Output fiber is bent or damaged	Inspect the integrity of the output fiber
	Output fiber connector end-face is contaminated or damaged	Inspect and clean the output fiber connector end-face
No output power	Enable physical key & screen Active button are not turned on	Inspect and activate the corresponding buttons
	Output fiber is bent or damaged	Inspect the integrity of the output fiber
	Fiber connector end-face is severely contaminated or damaged	Inspect the output fiber connector end-face; return to factory for repair
	Light source detected high temperature and activated self-protection shutdown	Restart after the temperature returns to normal
	Laser chip is damaged	Return to factory for repair
Output power stability is significantly degraded	Output fiber connector end-face is contaminated or damaged	Inspect the output fiber connector end-face; return to factory for repair
	Internal circuit fault	Return to factory for repair
	Heat dissipation channel is blocked	Avoid blocking the cooling/heat dissipation channel

Bright spot appears at the end of the output fiber and moves toward the light source	Irregular operation caused fiber core melting	Shut down immediately (do not restart); return to factory for repair
Touch screen is unresponsive	Host computer software is controlling the light source	Normal phenomenon (no action needed); disconnect the host computer then operate the touch screen
	Touch screen malfunction	Return to factory for repair
Host computer software cannot control light source parameters	Incorrect serial port COM port selected	Confirm and select the correct COM port
	Serial data cable driver not installed properly	Install the correct serial data cable driver
	Poor connection of the serial data cable connector	Inspect or replace the serial data cable
	Incorrect version of the host computer software used	Replace with the correct version of the host computer software
Air-cooling noise is significantly loud	Fan malfunction or foreign object intrusion	Return to factory for repair
Temperature display shows "ALARM"	Abnormal internal temperature	Return to factory for repair
Cannot power on	External power supply failure	Inspect the rear panel power switch and external power supply
	Internal power supply fault	Return to factory for repair

Product Dimensions



B1 Package Desktop Light Source Dimensions: 255(W)×285(D)×115(H)mm



B2 Package Desktop Light Source Dimensions: 255(W)×322(D)×115(H)mm

Warranty and After-Sales Service

1. Product Quality Assurance Period

From the date of delivery, if there are quality problems (non-human-induced) with the product within one year, the customer can request the manufacturer to replace parts or the entire unit free of charge. After one year, the manufacturer will provide paid repair services.

2. Product Warranty Scope

During the free warranty period, free repair or replacement services will be provided for malfunctions caused by product quality issues.

During the warranty period, our company reserves the right not to provide free repair services in the following situations:

1) The product is damaged or impaired due to natural factors or environmental influences (such as electric shock, dust).
2) The product is damaged due to non - standard operation by the user.
3) The product has obvious signs of human - induced damage.
4) The product has been disassembled, modified, or repaired without the authorization of our company.
5) The quality - assurance label on the light source housing has been tampered with or is incomplete.
6) The product is damaged or lost during transportation.

Product Warranty Card	
Product Name	
Product Number(PN)	
Product Serial Number(SN)	
Purchase Date	
Description of Product Defects	
User Name	
Contact Address	
Contact Phone	
E-mail	

Appendix 1: Product Optical Radiation Risk Classification

Laser Wavelength	Optical Power	Laser Hazard Rating
400~700nm	≤0.39 mW	1；1M
	≤1 mW (Collimated beam)； ≤67 mW (Non-collimated beam)	2；2M
	≤5 mW	3R
	≤500 mW	3B
	>500 mW	4
700~1050nm	≤0.39 × C_4C_7 mW	1；1M
	≤2.0× C_4C_7 mW	3R
	≤500 mW	3B
	>500 mW	4
1050~1400nm	≤0.39 × C_4C_7 mW	1；1M
	≤2.0 × C_4C_7 mW	3R
	≤500 mW	3B
	>500 mW	4
1400~4000nm	≤10 mW	1；1M
	≤50 mW	3R
	≤500 mW	3B
	>500 mW	4

Correction Factors C_4 and C_7 in the Table Above

Laser Wavelength λ	Correction Factor C_4	Laser Wavelength λ	Correction Factor C_7
700~1050nm	$10^{0.002\,(\lambda-700)}$	700~1150nm	1
1050~1400nm	5	1150~1200nm	$10^{0.018\,(\lambda-1150)}$
		1200~1400nm	$8+10^{0.04\,(\lambda-1250)}$

*Reference Standards:

- Chinese National Standard GB44703-2024 *Technical Specifications for Optical Radiation Safety*

- International Standard IEC 60825-1 *Safety of laser product*