

MAX



Q-Switched Pulsed Fiber Laser(MFP5W-50W)

USER GUIDE

Maxphotonics Co.,Ltd.

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Preface

Thank you for using the Q-Switched Pulsed Fiber Laser (MFP5W-50W) Series products from Maxphotonics. We compile this document for you in order that the laser is used and maintained properly. Due to the limited level of the writers, coupled with time constraints, there are some careless mistakes in this document, and your understanding will be much appreciated. Thank you again for using Maxphotonics' products.

Please take time to read and understand this User' s Guide and familiarize yourself with the operating and maintenance instructions before you use the product. We recommend that the operator read the Section titled "Safety Information" prior to operating the product.

This User' s Guide should stay with the product to provide you and all future users and owners of the product with important operating, safety and other information.

We identify the parts to which you need to pay special attention in the document with underscore. Please notice those information to prevent the unnecessary damages.



Company Profile

As a large laser manufacturer founded in 2004, Maxphotonics Co., Ltd. specializes in research and development, production and sales of lasers and ancillary products. Maxphotonics owns a number of independent intellectual property rights and patents as well as high-power pulsed fiber laser, high-power fiber laser and high-power fiber amplifier etc.

So far, with intellectual property rights and patents, Maxphotonics owns industrial pulsed fiber laser series, fiber laser for scientific researches, tunable fiber laser, fiber amplifier, ASE light source, etc. Those products are widely applied to fields of laser marking, DTS system and scientific research.

Maxphotonics offers laser, relevant solution and ancillary facility to domestic and foreign customers. We adhere to the enterprise mission statement of "Maxphotonics leads the industry", take customer satisfaction as the start point, completely implement ISO9001 quality management system, introduce ERP information management system and provide all-round pre-sales and after-sales service for customers.

Relying on excellent ability of product design and development, we carry out all-round exchanges and cooperation with international famous laser companies and various research institutions of China, continuously increase the investment of science research, constantly update diversification of production types, lead the trend of the industry and create maximum value for customers, so as to strive perseveringly for the world-class laser manufactures and forge ahead.

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Chapter 1

Characteristic Explain

The Q-Switched Pulsed Fiber Laser (MFP5W-50W) Series products provide a wide range of lasers, the emission wavelength of which is centered at 1064nm. They are air-cooled and maintenance-free and deliver high efficiency, high reliability, and high performance on marking and engraving, which makes them ideal tools in this area.

Maxphotonics' Q-Switched Pulsed Fiber Laser (MFP5W-50W) Series are Class 4 laser products and are designed and tested with safety. By following this User Guide and applying sound laser safety practices, it will be a safe and reliable device.

Laser light exhibits unique characteristics that may pose safety hazards. Therefore, the laser light can't be normally associated with other light sources, and all operators and people near the laser must be aware of these special hazards.

In order to ensure the safe operation and optimal performance of the product, please follow all warnings and safety instructions in this guide during process of operation, maintenance and service.

For ensuring the safety of operators, operators are urged not to open the equipment privately at all times. There are no user serviceable parts, equipment or assemblies associated with this product. Lasers of unauthorized disassembly shall not be subject to warranty.

Chapter 2

Safety Information

1 –Safety Conventions

All safety warning symbols during operating process of the laser include:

SYMBOLS	DESCRIPTION
	<p>WARNING :</p> <p>Refer to a potential Electrical Hazards to human body; It requires certain procedures; otherwise, it may result in bodily harm to you and/or others. In order to ensure the personal safety of operators, do not violate the requirement of the WARNING sign.</p>
	<p>CAUTION :</p> <p>Refers to a potential hazard on product. It requires certain procedures; otherwise, it may result in damage to the product or components. In order to ensure normal use of equipment, do not violate the requirement of the CAUTION sign.</p>
	<p>WARNING :</p> <p>Refers to a potential Laser Hazard. The symbol represents laser radiation. The symbol is pasted on laser output end.</p>
<p>NO SYMBOL</p>	<p>IMPORTANT :</p> <p>Refers to any information regarding the operation of the product. Please do not overlook this information.</p>

NOTE :

⦿ This device is classified as a high power Class IV laser instrument .It may emit up to 5W/10W/20W/30W/50W average power near 1064nm wavelength. 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.

2-Laser Protection

1、 Laser Protection Requirements

You must wear the safety protective glasses while operating the laser, and rationally select the safety protective glasses according to the lasing wavelength of the laser. If the device is a tunable laser or Raman product, it emits light over a range of wavelengths and the end user should confirm the laser safety eyewear used protects against light emitted by the device over its entire range of wavelength.

2、 Laser Protective Equipment Suppliers

Maxphotonics recommends material or equipments provided by following laser protective equipment suppliers for you, including LaserVision USA, Kentek Corporation, Rochwell Laser Industries, etc. All the supplier information is provided by Maxphotonics only for the convenience to use, so Maxphotonics assumes no responsibility for any problem caused by using the products of abovementioned suppliers.

3- General Safety Instructions

In order to ensure the safe operation and optimal performance of the product, please follow these warnings and cautions in addition to the other information contained elsewhere in this document.

1、Specular Reflection

There are often numerous secondary laser beams produced at various angles in the output port of the laser. These divergent beams are produced when the primary beam of laser reflects off a smooth surface, and they are called specular reflections. Although these secondary beams may be less powerful than the total power emitted from the primary beam, the intensity may be great enough to cause damage to the eyes and skin as well as surface of materials.

WARNING: You must exercise caution to avoid/minimize specular reflections as these laser radiations are invisible!

2、Safety Instructions of Accessories

WARNING :

⊙ This device has an output optical head connected to the laser by a fiber cable. Please, be careful dealing with the output head.

3、Optical Operating Instructions

We strongly recommend that you read the following procedures before operating the laser:

(1) Never look directly into the laser output port when the power is turned on.

(2) Avoid positioning the laser and all optical output components at eye level.

(3) Ensure that all personal protective equipment is suitable for the

output power and wavelength ranges of the laser.

(4) Do not install or detach cutting heads or collimators when laser is active.

(5) It is forbidden to turn on the laser during the mounting of fiber or cutting head. Carry out commissioning, calibration and focusing at low output power and then increase the output power gradually when the calibrating and focusing work is done.

(6) Marking on highly reflective materials is feasible, but you must make the laser out of focus, or else you may damage the laser.

(7) For collimated outputs, maintaining a clean output lens is essential. Always close (re-cap) the collimator after use. Do not touch the output lens and do not clean it with any solvents. Cleaning with the special solvent and cleaning buds is allowed as described later on in this manual.

WARNING :

⊙ Make sure that the individual protective equipment meets the output power and wavelength range of the laser.

⊙ Never look directly into the optical fiber or the collimator, and use appropriate laser safety eyewear when operating this device.

⊙ Optical damage may result from failure to comply with the above instructions. Such damage is not covered by the warranty.

WARNING :

⊙ Use of controls or adjustments or performance of procedures other than those set forth in this User' s Guide and related documents may result in hazardous radiation exposure.

4 、 Electrical Operating Instructions

Q-Switched pulsed fiber laser (MFP5W-50W) Series supply voltage:24VDC.

Cable Color	Supply
BROWN	+24VDC
BLUE	GND
YELLOW-GREEN	SHELL

WARNING :

⊙ Make sure the shell of this equipment is properly grounded. Any interruption of the ground loop may result in personal injury

⊙ Make sure that the input AC voltage of the laser is the voltage of the normal AC mains, and wires are connected accurately. Any incorrect wiring method may cause damage to people or instrument.

⊙ Before supplying the power to the device, make sure that the correct voltage of the DC power source is used. Failure to use the correct voltage could cause damage to the device.

⊙ No operator serviceable parts inside. Refer all servicing to qualified Maxphotonics personnel.

⊙ To prevent electrical shock, do not remove covers, detach the laser without permission and damage the relevant signs. Any product with unauthorized dismounting shall not be subject to warranty.

5、Environment Conditions and Precautions

We strongly recommend that you read the following procedures before operating the laser:

(1) Do not expose the device to a high moisture/high temperature environment. Install the laser in the cabinet with the function of temperature-humidity control and dust free.

(2) Laser Module has three fans at the rear panel for active cooling. Make sure that there is at least 5cm between fan protector and external objects, and with sufficient airflow to cool the device.

(3) Before switching on the device make sure that environmental temperature and humidity are within a specified range.

WARNING :

© Optical damage may result from failure to comply with the above instructions. Such damage is not covered by the warranty.

6. Routine Maintenance

(1) Avoid the impaction on the shipper rod of worktable when the laser is working.

(2) The laser and optical lens are fragile, please handle with care.

(3) Stop running once device failure, and provide professional treatment.

(4) Please follow a set sequence of on-off.

(5) The limitation on surface of marking machine is within the working area.

(6) Keep the device clean and indoor.

7. Safety Labels and Labeling Locations

The following shows the pictures of tags and their positions on the product:

Pictures of label	Label name	Label location
	Light Emission	Top Cover
	CAUTION	Top Cover

4-Additional Safety Information

For additional information regarding Laser Safety, please refer to the list below:

Laser Institute of America(LIA)

13501 Ingenuity Drive, Suite 128

Orlando,Florida 32826

Phone:407 380 1553,Fax: 407 380 5588

Toll Free:1 800 34 LASER

American National Standards Institute

ANSI Z136.1, American National Standard for the Safe Use of Lasers

(Available through LIA)

International Electro-technical Commission

IEC 60825-1,Edition 1.2

Center for Devices and Radiological Health

21 CFR 1040.10 – Performance Standards for Light-Emitting Products

US Department of Labor – OSHA

Publication 8-1.7 – Guidelines for Laser Safety and Hazard Assessment.

Laser Safety Equipment

Laurin Publishing

Laser safety equipment and Buyer' s Guides

Chapter 3

Product Description

1-Property Introductions

Q-Switched Pulsed Fiber Laser (MFP5W-50W) Series are maintenance-free fiber lasers based on the Q-switched technology and MOPFA. These lasers deliver light centered at 1064nm and guided to the work piece via a flexible metal-sheathed fiber cable. It provides a set of pulse durations, repetition rates and peak powers. The optical head may be equipped with an opto-isolator, that makes it possible to mark directly on non-metallic materials (plastic, wood, paper, etc.) and some metal with low reflectivity.

Features:

- (1) High beam quality fiber output
- (2) Superior reliability, long lifetime.
- (3) No shadow or virtual open circuit phenomenon when processing on special materials .
- (4) Universal DB-25 interface.

Applications:

- (1) Industrial applications
- (2) Scientific research

2-Laser Model Designation Codes

Model	Model Coding Rules
MFP-5W	Maxphotonics Q-Switched Pulsed Fiber Laser 5W
MFP-10W	Maxphotonics Q-Switched Pulsed Fiber Laser 10W
MFP-20W	Maxphotonics Q-Switched Pulsed Fiber Laser 20W
MFP-30W	Maxphotonics Q-Switched Pulsed Fiber Laser 30W
MFP-50W	Maxphotonics Q-Switched Pulsed Fiber Laser 50W

3-Certification

Maxphotonics certifies that this equipment has been thoroughly tested and inspected and meets published specifications prior to shipping. Upon receiving your equipment, check whether the packaging and accessories have been damaged in transit. If damage is apparent, please contact Maxphotonics immediately.

Chapter 4

Specification

1-Optical Characteristic Parameters

NO.	Characteristics	Test Conditions	Min.	Typical	Max.	Unit
1	Mode	Pulse				
2	Polarization	Random				
3	Beam Quality M^2	Pout=Pnom	1.1	1.3	1.6	
4	Center Wavelength	Pout=Pnom	1055	1064	1070	nm
5	Spectrum Width(3dB)	Pout=Pnom		5	10	nm
6	Average Optical Power(Pnom)	MFP-5W	4.5	5	5.5	W
		MFP-10W	9.5	10	10.5	W
		MFP-20W	19.5	20	20.5	W
		MFP-30W	29.5	30	30.5	W
		MFP-50W	49	50	51	W
7	Power Range		10		100	%

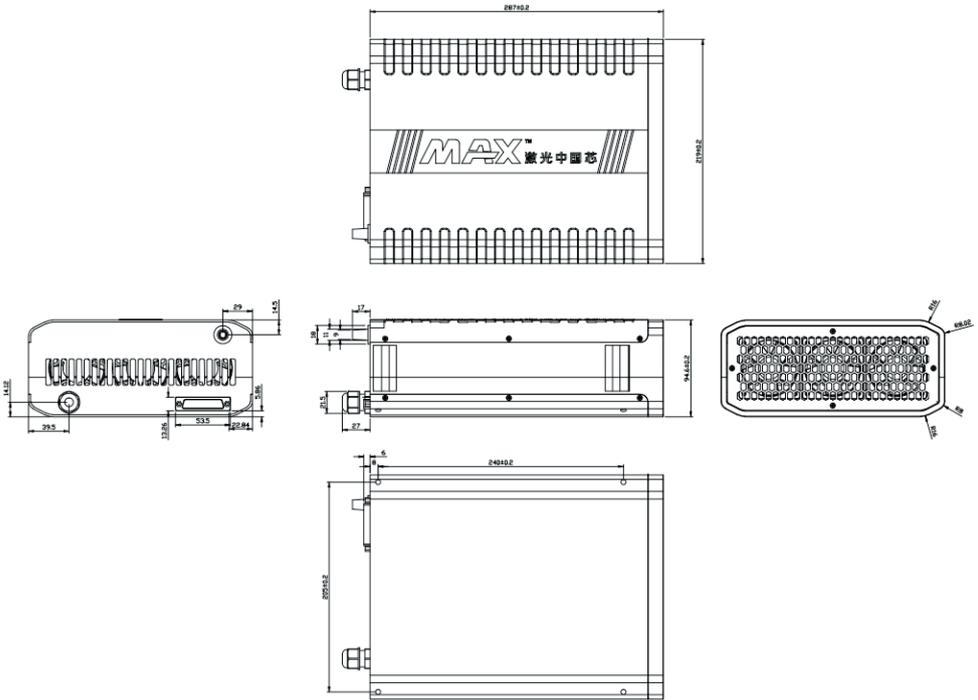
8	Single Pule Energy	MFP-5W		0.45		mJ
		MFP-10W		0.56		mJ
		MFP-20W		0.67		mJ
		MFP-30W		1		mJ
		MFP-50W		1		mJ
9	Optical Pulse Width(FWHM)		90	100	110	ns
10	Pulse Repetition Frequency (PRF.)	MFP-5W	10		30	KHz
		MFP-10W	22		50	KHz
		MFP-20W	30		60	KHz
		MFP-30W	30		60	KHz
		MFP-50W	50		80	KHz
11	Output Power Stability	Pout=Pnom			5	%
12	Beam Diameter	1/e2	6	7.5	9	mm
13	Beam Ellipticity		90			%
14	Delivery Cable Length		1.9	2.5	3	M
15	Laser Startup Time	Pout=Pnom, 10%~90%		110	140	us
16	Laser Shutdown Time	Pout=Pnom, 90%~10%		110	150	us
* For reference only. Other beam diameter available by order.						

2 –General Characteristic Parameters

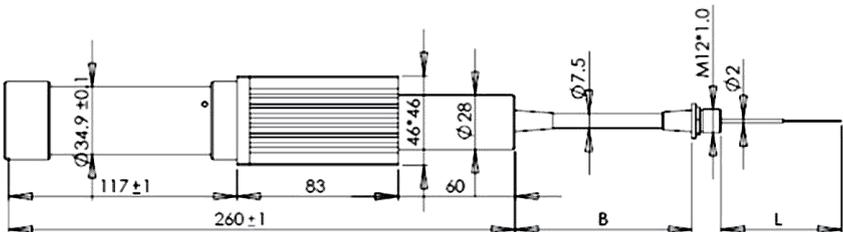
NO.	Characteristics	Test Conditions	Min.	Typical	Max.	Unit
1	Operating Environment Tem.		10		42	°C
2	Storage Temperature		-10		60	°C
3	Cooling Method	Air-cooling				
4	Warm Up Time	-Operate			1	min
		-Stable			10	min
5	Operating Environment humidity		10		95	%
6	Dimensions	345.5*266.2*120				mm
7	Weight	MFP-5W		7.5		kg
		MFP-10W		10		kg
		MFP-20W		10		kg
		MFP-30W		12		kg
		MFP-50W		12		kg
8	Power Supply		23	24	25	VDC
9	Power Consumption	MFP-5W		90		W
		MFP-10W		120		W
		MFP-20W		150		W
		MFP-30W		240		W
		MFP-50W		360		W

3 – Structural Layout

Laser module dimensions (Unit mm):



Standard isolated output head dimensions: (Unit: mm)



Chapter 5

Operation Guide

Packing List:

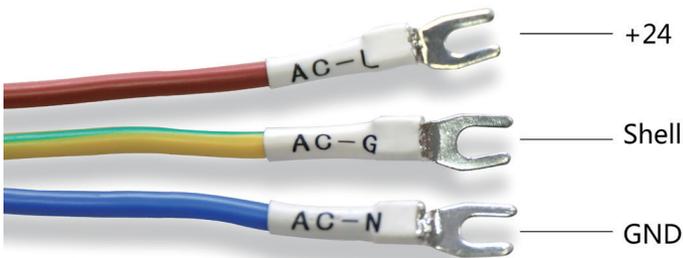
Contents	Quantity
User Guide+ Qualified Test Result	1
Power Wire (Option)	1

CAUTION :

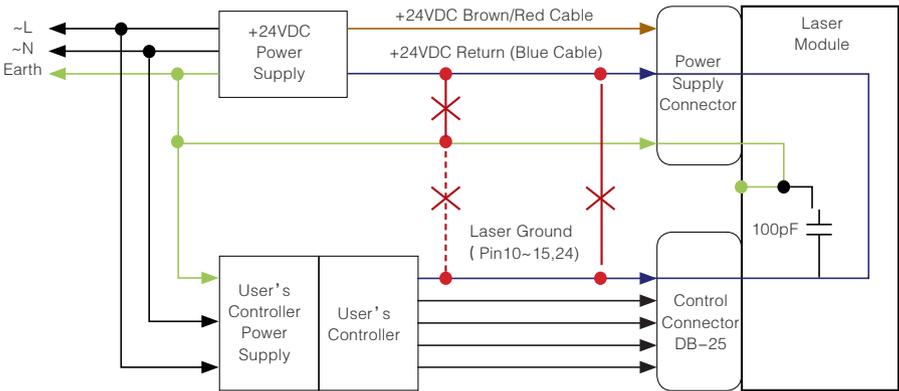
◎ If any damage of the external package and internal parts has been found upon receipt of product, please contact Maxphotonics Co., Ltd. or designated agent immediately.

1-Electrical Power Connection

Power wire



Recommend Electrical Power Connection



Note:

◎ Main power supply (24VDC) should be capable to permanently supply operating current (refer to the maximum current consumption in the laser specification) and supply 50% higher peak current for short periods up to 250 μ s. Typical models of the laser consume less than 10A current, consequently peak current consumption for such models is less than 14A.

◎ Power supply should hold the voltage, measured on the laser cable leads, within a specified range (refer to the laser model specification) both for the steady and for the peak current consumptions. Supply voltage undershoots and overshoots out of the specified range may lead to an unstable laser operation. Power supply transient load regulation should be carefully investigated to choose a suitable power supply model.

◎ Wires in the cable connecting main power supply and the laser supply cable should have appropriate length and cross section to ensure negligible voltage drop (especially for the peak current consumption).

◎ The main 24VDC supply should have floating outputs. Its return wire should be connected only to the laser 24VDC return terminal (BLUE CABLE). Wrong connections, which may create current loops should be

avoided.

☉ Laser ground (DB-25 pin 10-15,24) and laser 24VDC return (BLUE CABLE) are connected inside the laser module. No connections are allowed between these terminals outside of the laser module.

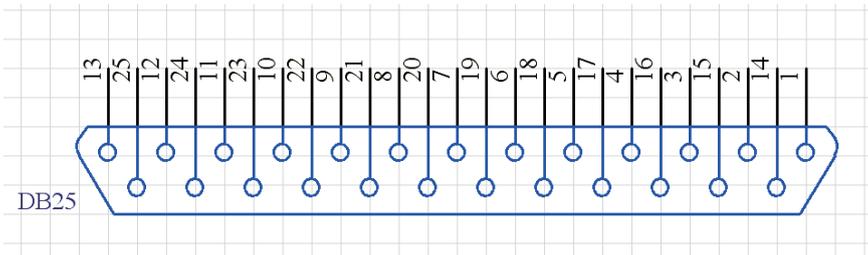
2 – Control Connector Pin Assignment, DB–25 plug

1、 Pin Function

All control pins are TTL compatible, unless otherwise noted in the pin description. For the interface designs ranges of the TTL standard level should be taken into consideration.

Pin#	Description		
1–8 (D0–D7)	(1) Power setting (16–bit bus. 0–FFh in hexadecimal or 0–255 in decimal formats. (2) Least significant bit (lsb) (D0) corresponds to Pin number 1, Most significant bit (msb) (D7) corresponds to pin 8. – 00h(0): Minimum output power – FFh(255): Maximum output power		
9	Latch (Latches power setting into the laser at the rising edge)		
10–15	Ground		
16, 21	Floating		
	Pin16	Pin21	Situation
	L	L	Laser Temperature higher than normal
	L	H	Normal
	H	H	MO Abnormal
18	Master Oscillator (MO) switch signal HIGH: MO on LOW or disconnected: MO off		
19	Emergency Stop Input High: OK (Normal operation) LOW or disconnected: STOP		

20	Pulse Repetition Rate (Synchronization) input, square wave. Refer to PRR range, Allowing range of on-off ratio is 0.1~0.9.
22	Guide Laser (red diode) ON/OFF input HIGH: ON LOW or disconnected: OFF
23	Emergency Stop Input High: OK (Normal operation) LOW or disconnected: STOP (The laser will turn off automatically)



2、Digital Control Interface (DB-25) Description

(1) The laser is controlled via signals applied to the DB-25 connector. Please refer to the connector interface description table above for 5.2.1 pin designation and operating levels.

(2) Pins 1 to 8 are the 8 bit bus for the output power setting. Pin 1 is the least significant bit and pin 8 is the most significant bit. Codes in the range 0...255 (0...FFh) should be applied to these pins, which correspond to the power setting of 0...100% of the specified nominal value, such as:

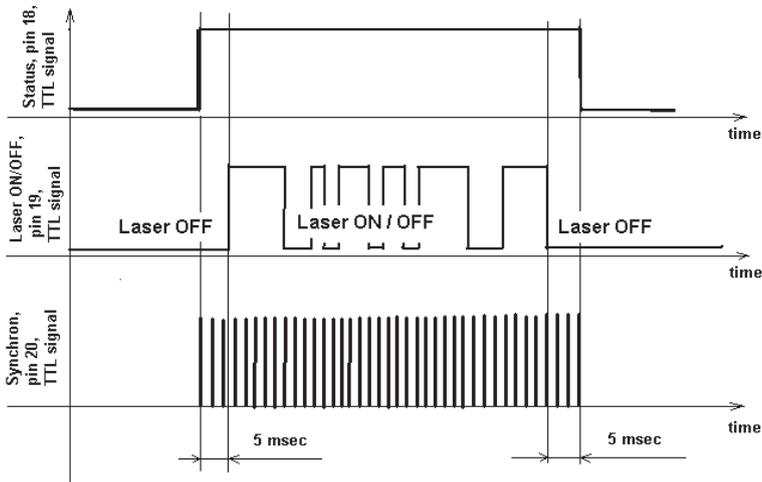
	Set 1	Set 2	Set 3	Set 4	Set 5
Pin 1	0	0	0	0	1
Pin 2	0	0	0	0	1
Pin 3	0	0	0	0	1
Pin 4	0	0	0	0	1
Pin 5	0	0	0	1	1
Pin 6	0	0	1	1	1
Pin 7	0	1	1	1	1
Pin 8	1	1	1	1	1
Current	50%	75%	87.5%	93.75%	100%
Power	35%	65%	85%	92%	100%

(3) Pins 16 and 21 are the alarms. These pins indicate the following device states:

Pin 16	Pin 21	Alarm description
L	L	Temperature alarm Laser temperature is out of the operating temperature range.
L	H	Normal Operation
H	H	MO Alarm

(4) Pin 18 is the Master Oscillator(MO) control signal. MO should be switched ON at least 5ms earlier than the Booster is switched ON. Once the MO is switched ON, the laser starts to consume more electrical power.

(5) Pin 19 is the Booster(BS) control signal. HIGH means switching the amplifier ON and LOW means switching it OFF. The laser starts to emit light within specified delay time after the pin 19 is set HIGH and stops emitting when the pin 19 is set LOW.



(6) Pin 20 is the Synchronization input. Pulse train with a repetition rate (PRR) within specified operating range should be applied to the pin (refer to the optical specification for PRR limits). The laser emits pulses simultaneously with the rising edge of the signal.

CAUTION:

⊙ If the PRR is out of the specified range (or no PRR signal is supplied) the laser safety circuit will substitute the missing pulses or limit the PRR.

⊙ The laser emission is not allowed simultaneously with the guide laser. The Booster is closed internally during the guide laser operation. If the pin 19 is set HIGH but the guide laser is ON, the laser will not emit light unless the guide laser is switched OFF. The MO signal can be set ON or OFF while the guide laser is ON.

(7) Pin 23 is the “Emergency stop” input. It should be set to HIGH for normal operation. In case of dropping this pin to LOW state (even for a short period of time) the laser automatically switches OFF (similar to the state when both MO and Booster are OFF) independently of other control

signals. It is necessary to drop both MO and Booster pins to LOW (if they were in HIGH state) before restarting the laser.

3 –Laser Operation Using Digital Interface

1、 Operation Steps

(1) Remove the protection cap from the laser output optical head.

(2) Connect the laser module to the control system via DB–25 connector. Use pins according to the description above. Refer to 5.2.2 Digital Control Interface (DB–25) Description.

(3) Recommended initial state of control pins:

Pins 18, 19 are LOW

Pin 20 is within the specified range

(4) Connect power supply sources (housekeeping and main) to the laser as described above.

(5) In 120 seconds (warm–up time) the laser is ready for operation.

CAUTION :

☉ It is allowed to supply +24VDC before initialization of the control signals.

(6) EE – Pin 23 is set to HIGH.

(7) Set desired power via pin 1–8.

(8) Switch the MO ON applying HIGH to the pin 18.

(9) Wait 5ms.

(10) The laser can be fast modulated via Pin 19. It is possible to apply HIGH and LOW sequence to switch the laser ON and OFF respectively. The laser has finite ON/OFF rise/fall times (refer to the specification for the particular model). The time of the modulation should

not be less than the sum of rise and fall times, otherwise laser optical response may not be as expected. The typical rise/fall times is 250us, so the modulation period is greater than 500us (corresponding to 2kHz).

(11) If the EM OFF time between subsequent ON/OFF batches (jobs) is more than 20ms, it is recommended to switch OFF the MO. This will reduce the power consumption, avoid unnecessary aging of the laser and eliminate the residual MO power at the laser output.

(12) After finishing the laser operation, switch OFF the BS and MO (set LOW to pin 18 and pin 19).

(13) Remove all supply voltages.

2、 Operation Features

(1) PRR can be changed during laser operation via the pin 20. The time between two adjacent rising edges should be within the specified range of PRR period. It should be less than 50us when the laser operated at the minimum specified PRR 20kHz. Otherwise the protect circuit will add the missing pulses automatically. If the PRR is higher than the upper limit, the laser will operate at the maximum specified PRR.

(2) The power setting can be changed during the laser operation by applying updated values to pin 1–8 and latching them into the laser via pin 9. The laser will respond to the changes on the subsequent specified rise time.

(3) If pin 18 is in HIGH state and Pin 19 is in LOW state, there is laser radiation with the power of less than 20mW.

(4) If the temperature of the laser module exceeds +45°C , the laser will be automatically switched OFF and the alarm signal will appear on pins 16 and 21. Even if the temperature drops back to under +45 °C , the laser will not resume the emission and keep the alarm pins unchanged until it is re-started.

4- Common Control Card And Parameter Setting

Please equip with high-speed galvanometer for the excellent performance of the laser.

Software	SAMlight			
NO.	Name	Parameter-Recommend	Typical Parameter	Unit
1	Standby delay	50 ~ 100		Us
2	Resume Delay	50 ~ 100		Us
3	Redirection Delay	50 ~ 100		Us
4	Turn On Delay	-60 ~ -150		Us
5	Turn Off Delay	60 ~ 150		Us

Software	EzCad			
NO.	Name	Parameter-Recommend	Typical Parameter	Unit
1	Finish Delay	50 ~ 150		Us
2	Redirection Delay	50 ~ 150		Us
3	Turn On Delay	-50 ~ -200		Us
4	Turn Off Delay	20 ~ 150		Us

Software	Max Marking			
NO.	Name	Parameter-Recommend	Typical Parameter	Unit
1	Standby Delay	50 ~ 100		Us
2	Marking Delay	50 ~ 100		Us
3	Redirection Delay	20 ~ 100		Us
4	Turn On Delay	-50 ~ -200		Us
5	Turn Off Delay	50 ~ 150		Us

CAUTION :

◎ Any driver software provided now or in the future is provided solely under nonexclusive license from Maxphotonics. By using the software, you agree to the terms herein.

◎ The driver software is protected by trade secret laws, United States copyright laws and international treaty provisions. Maxphotonics reserves all ownership rights. The owner of the device may only use the driver software only with the product(s) identified by Maxphotonics, and may make duplicate copies of the software solely for archival backup purposes. Any alterations of the driver software will void the warranty on the equipment provided by Maxphotonics.

◎ The driver software is provided “as is” with no warranties whatsoever, whether express or implied, including the warranties of fitness for a particular purpose. Maxphotonics does not warrant that the functions contained in the software will meet the user’s requirements or that the operation of the equipment or driver software will be uninterrupted or error free. Not all driver software has gone through Maxphotonics Laser’s normal quality control or product purposes, but is provided to users as an accommodation to respond to their requests. End-user support is not implied or provided, and you are assumed to have working knowledge of a particular development language. Maxphotonics may make changes to the driver software and has no obligation to distribute newer versions.

◎ Except for the limited warranties expressly set forth above, Maxphotonics specifically disclaims any and all other warranties to buyer, including without limitation, any and all implied warranties, such as freedom from infringement, merchantability and fitness for a particular purpose.

Chapter 6

Common Fault Treatment

1 – Laser Emission Failure

(1) Make sure the connection of power supply is correct.(+24VDE and GND connect correctly? Earth the ground wire?)

(2) Make sure the E–STOP switching is released , Emergency Stop inputs a high voltage signal when the laser system is activated.

(3) Make sure the power supply is in proper working condition, and check its output without and with load(connected with the laser).

(4) Software set correctly.

(5) Interface DB–25 connect correctly under specified guide.

(6) Normal Signals of Pins 18 and 19.

(7) Normal signal and supply power of control card (please refer to 5.2 DB–25 control interface pin function).

(8) Make sure the guide light signal is LOW during marking (Pin22 is “0”). The device’ s first priority is to emit the guide light when the guide light signal is HIGH.

2 – Power Drops

(1) Check whether the power supply outputs steady, and the current is at its rated value.

(2) For collimated outputs, maintaining a clean output lens is

essential. Cleaning with lens tissue is allowable as required. Do not scratched the film layer.

(3) Inspect whether other optical lens are clean, such as red light combiner, galvanometer, field lens.

(4) Inspect whether optical output is uncovered, isolator output terminal and galvanometer are at grade.

(5) Normal loss of power from using for 20,000 hours.

(6) There may be breakage while marking resulted from by signal interference or ground connected incorrectly. The leads of weak and strong current cannot be linked together or at the same side. Use the signal wire with shielded function.

(7) Make sure the range of pulse width, frequency are set within the specified range.

Chapter 7

Service and Maintenance

1 – Maintenance Notes

CAUTION :

⦿ No operator serviceable parts inside. Refer all servicing to qualified Maxphotonics personnel.

⦿ For ensuring that the repairs or replacement within the warranty scope can be carried out, and perfectly maintaining your interests, please submit application to the Maxphotonics or the local representative after finding the faults. Upon receiving our authorization, you need to pack the product in a suitable package and return it.

⦿ You should keep the proof when finding any damage after receiving the product, so as to claim the rights to shippers.

IMPORTANT :

⦿ Do not send any product to Maxphotonics without RMA.

⦿ If the product is beyond the warranty period or the warranty scope, customers shall be responsible for the repairing cost.

CHANGE :

⦿ We have the rights to change any design or structure of our product, and the information is subject to change without notice.

2 – Service Statements

More problems regarding the safety, set-up, operation or maintenance can be solved by carefully reading this "User Guide". Please call the Customer Service Department for other questions.

If your problems cannot be solved over the telephone with our technical support group, you may need to return the product to Maxphotonics for further troubleshooting.

Chapter 8

Warranty Statements

1-General Items

Maxphotonics carries out warranty for any defect of the product caused by its material and production technology within the warranty period agreed in contract, and ensures that its product meet the relevant quality and specification requirements specified in the document under normal use condition.

Maxphotonics rationally determines to repair or replace the products with faults caused by its material or production technology within the warranty period, and repairs or replacement of all the products within the warranty scope are carried out according to the rest of the warranty period of primary products.

2- Warranty Limitations

Under the following circumstances, the products, parts (including the fiber connectors) or equipment are not within the warranty scope:

- (1) Tampered, opened, detached or reconstructed by personnel outside Maxphotonics;
- (2) Damaged from misuse, neglect or accident;
- (3) Used beyond the specifications and technical requirements of the product;
- (4) Indirectly damaged from users' software or interfaces;

(5) Improper installation or maintenance, or operating under conditions not included in this manual;

(6. The fittings and the fiber connectors are not included in the warranty scope.

Customers are obligated to understand the information above and follow the instructions contained in the User Guide, or the faults arising therefrom are not included in the warranty scope.

IMPORTANT :

◎ Within the warranty scope, purchasers must feedback within 31 days after finding the product defects. Maxphotonics has no responsibility for warranty claims more than 30 days after the Buyer discovers or becomes aware of the claimed defect.)

◎ Maxphotonics does not grant any Third Party rights to repair or replace the parts, the equipment or other Maxphotonics products.



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