

EXPERT II 355 Series UV Laser — Manual

RSD-SUNMAX Series
SUNMAX LASER

About this document: This is an English translation of the Japanese original prepared by SUNMAX LASER for reference purposes. In case of any discrepancy, the Japanese original shall prevail. Specifications are subject to change without notice.

EXPERT II 355 Series Laser

Installation and Operation Manual

— For water-cooled lasers

Introduction

Thank you for choosing the EXPERT II 355 series laser.

Built on a foundation of high quality, we offer lasers with high reliability and an excellent price-to-quality ratio. In addition to thorough after-sales service and prompt, on-time technical support, we can also help you set up your own laser system.

How to Use This Manual

This manual helps users understand the basic structure of the EXCELLENT355 laser and use it properly. It covers how to set up the power control system and how to carry out several basic operating procedures for the laser system.

Intended Audience

This manual is intended for engineers who have basic knowledge of the hardware and software related to the laser field.

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Chapter 1 Summary

1.1 Overview

This manual contains general user information for the EXPERT II 355 laser and its power supply (driver). It instructs the user on how to connect the laser head to the power supply, and also provides descriptions of the relevant laser parameters and notes on laser safety.

The features and specifications of the EXPERT II 355 series laser are as described below and are subject to change without notice.

1.2 Symbols

The following symbols are used in this manual. Pay attention wherever they appear and read those passages carefully.



Caution: This symbol warns the operator that improper operation may occur under certain conditions.

Warning: This symbol warns the operator of injuries that may be caused by the laser.

1.3 Unpacking and Parts Identification

Caution: Open the laser package carefully. The laser contains highly fragile optical components.

Caution: To prevent damage to the optical fiber cable, avoid bending the laser umbilical cable sharply.

Caution: When transporting the laser, do not use narrow or low-strength packing straps/belts.

Accessories of the EXPERT II 355 laser:

- Laser head
- Power supply (driver)
- Chiller
- Connection cables

- Cooling hoses
- AC power cable, 220 V 10 A
- Software package
- Factory test report

Keep the original packing materials. If the laser system ever needs to be returned to the factory, use the original packing materials to avoid damage during shipping.

Note: The label below is located on the top surface of the laser head. It shows the laser's basic parameters, such as the model number, serial number, and maximum power.

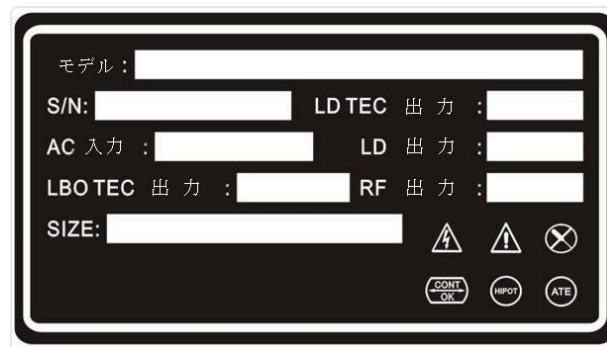


Figure 1.1 Serial number / model number label

1.4 Laser Safety

Warning: Read this manual carefully before installing and operating the laser.

The maximum output of this laser is 5 W at 355 nm (example). This label appears on the top of the laser head, near the laser output aperture.



1.4.1 Laser Safety Considerations

The EXPERT II 355 laser emits radiation at Class IV levels. Great care is required during operation. The output beam can create fire and safety hazards. Only personnel familiar with the safety precautions described in this manual should operate this laser system.

Danger: Direct eye exposure to the output beam of the laser will cause serious injury or blindness.

The greatest hazard when using a laser is eye injury. In addition to the main beam, numerous smaller beams are often present at various angles near the laser system. These beams are formed by specular reflections of the main beam off polished surfaces such as lenses, mirrors, and other optical components. Although these beams are weaker than the main beam, they can still be intense enough to damage the eyes.

Laser beams are powerful enough to burn skin, clothing, and various other materials. Even at some distance, laser light can ignite volatile substances such as solvents. Laser light can also damage the light-sensitive elements of video cameras and photodiodes. When using the laser, observe the following precautions and the contents of this manual.

The EXPERT II 355 laser comes with a 3 m power cable that connects the laser controller (power supply/driver) to the laser head. Because all control operations are performed on the laser controller, the operator can keep a distance of 3 m from the laser head while operating the driver.

1.4.2 Laser Safety Precautions

For safe use, follow these procedures:

1. Post laser warning signs in the laser beam area to alert anyone present. Post warning signs around Class IV laser work areas.
2. Make sure the laser beam is not at eye level, so that no one looks into the output beam. During debugging, position the laser at a low center height to avoid accidental eye injury.
3. Do not look directly at the laser source or at laser light scattered from reflective surfaces.
4. When processing materials with the laser beam, certain surfaces in the laser work area may deform and redirect the beam path; use extreme caution.
5. Avoid wearing jewelry when using the laser.
6. Always wear protective goggles rated for the appropriate wavelength range when using the laser. Operators should wear radiation-protective clothing.
7. Do not remove the laser beam block. Keep the laser cover in place at all times.
8. Keep inexperienced personnel out of the laser work area.
9. Install an interlock circuit around the laser. For example, set up an interlock break on the lab door, so that opening the door activates the interlock circuit and shuts the laser down, preventing accidental injury to inexperienced personnel entering the lab.
10. It is recommended to operate the laser in a closed or confined area to avoid beam leakage. Use an IR detector card to check for and prevent laser light leakage.

Chapter 2 Hardware Installation

1. Connect the laser head to the power supply/driver and the chiller properly. (See the connection diagram in Section 2.2.)
2. Install both power units in an easily accessible location, allowing ease of operation and unrestricted airflow. In particular, do not block the bottom of the laser driver; otherwise, problems will occur with LD temperature control.
3. Make sure the electrical/optical cables are long enough to reach the laser head. To avoid damage to the optical fiber cable, avoid sharp bends in the electrical/optical umbilical cable. During installation, keep the bend radius as large as possible; 70 mm is the minimum allowable bend radius.
4. Connect the AC power line correctly.
5. Verify that the driver's input AC voltage is within 10% of the nominal value.
6. Make sure the AC power switch is set to the "OFF" position.
7. The ground of the external control computer must be isolated from earth ground.

2.1 Back Panel

The back panel of the power supply provides several connectors for the power cables that connect to the laser head. See Figure 2.1 and Table 2.1 for details.

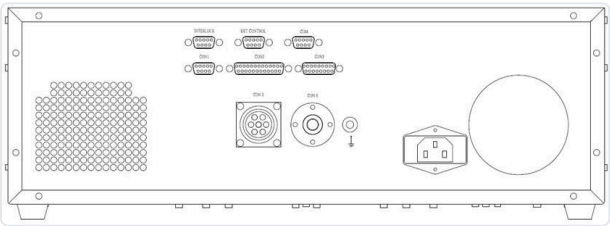


Figure 2.1 Back panel of the power supply

Warning: The AC power specification is 5 A / 50 Hz (60 Hz) / 220 V. The power supply must be properly connected to ground.

数	ネーム	機能
1	インターロック	インターロック
2	EXTコントロール	外部レーザー制御ポート
3	COM	COM
4	CON1	LBO駆動インタフェース
5	CON2	検査インタフェース
6	CON3	モーション制御インタフェース
7	CON4	LD/TEC駆動インタフェース
8	ファンアウトレット	ファン

9	RF出力インタフェース	RF
10	グラウンドポート	接地
11	電源スイッチファンコンセント	電源スイッチファン
12	AC50HZ/220V	AC電源インタフェース

Table 2.1 Terminal block descriptions

2.2 Connection Diagram

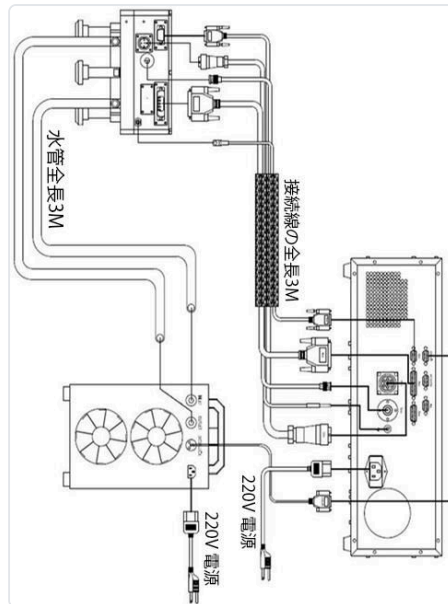


Figure 2.2.2 Hardware connection diagram

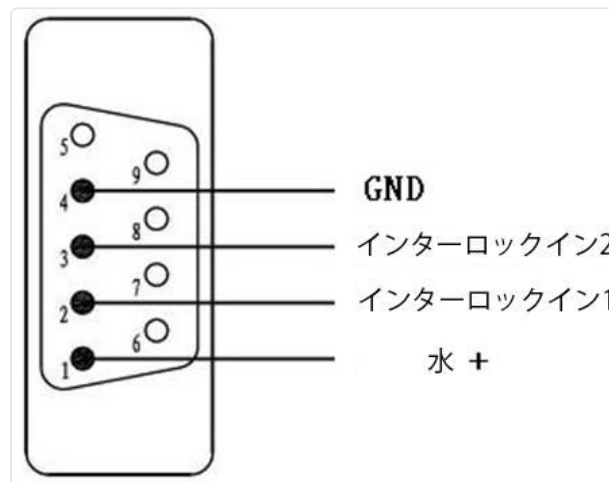


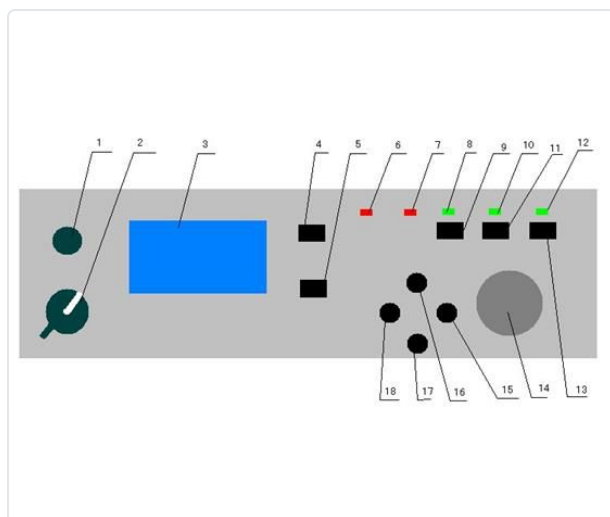
Figure 2.3 Interlock RS232 interface pin configuration

Chapter 3 Introduction to the Control Panel

3.1 Control Panel Layout

The operation panel includes an LCD screen, a key switch, a power switch, an adjustment knob, LEDs, and function buttons. A beep sounds whenever a button is pressed.

The layout of the driver's front panel is shown in Figure 3.1. Each part of the panel is described in Table 3.1.



番号	機能
1	キースイッチ
2	電源スイッチ
3	画面表示 (192X128, 文字型)
4	HOME ページ ボタン
5	メインメニュー表示ボタン
6	FAULT ステータス LED (赤)
7	LBO ステータス LED (赤)
8	LD 電流ステータス LED (緑)
9	LD 電流有効化ボタン
10	Q-SW 有効化 LED (緑)
11	Q-SW 有効化 ボタン
12	シャッターステータスLED (緑)
13	シャッター有効 (現在のバージョンでは適用されません)
14	ノブの調整
15	入力ボタン
16	前 (⏮) ボタン (カーソルが上に移動)
17	次 (⏭) ボタン (カーソル下降)

Figure 3.1 Control panel

Table 3.1 Front panel components

3.2 Button Operation

The power switch turns the AC power to the entire laser power supply on or off. The key switch can lock all the buttons on the front panel. When the key switch is in the OFF position, all front panel buttons are locked and cannot be operated, and the adjustment knob cannot be operated either; however, the power switch can still be turned off.

FAULT status LED ---- Indicates that a protection mode such as overcurrent, overvoltage, overtemperature, or chiller protection has been detected inside the power supply. The system then automatically shuts down the current supply. The protection condition must be cleared and the system reset before it can resume normal operation.

LBO status LED ---- Indicates the operating state of the LBO control system. If the LBO temperature is not within the operating temperature range, the LED lights up; when the temperature is within the operating temperature range, the LED turns off.

LDD button and its status LED ---- When the LDD button is pressed, the corresponding status LED lights up and the pump diode driver supplies current to the pump diodes. The LD current reaches the set value at the set ramp rate. Pressing the button again turns the status LED off and cuts off the LD current; the current then decreases at the set rate until it reaches zero.

Q-SW button and its status LED ---- Turns the Q-switch R.F. driver ON (the laser operates in pulsed/Q-switched mode) or OFF (the laser operates in continuous-wave or hold mode — without lasing), and the status LED lights up or turns off accordingly.

SHUT button and its status LED ---- While the system is operating, pressing the SHUT button opens the shutter (located on the front of the laser head where the laser beam exits) and the shutter status LED lights up. Pressing the SHUT button again closes the shutter and the status LED turns off. This function is available only on certain OEM versions of the laser.

Previous (▲) button / Next (▼) button ---- Move the non-blinking cursor to select the previous or next changeable parameter. After moving the non-blinking cursor to the desired item, the user must press the Enter button to display the submenu for that item, or to change the cursor to a blinking underline at the desired parameter. When the underline is blinking at the desired parameter position, the adjustment knob is used to increase or decrease the value of that particular parameter.

Chapter 4 Application Guide

Caution: While the laser is operating, do not shut down the laser by turning off the AC power. Keep the laser driver in its operating state. To turn the laser output on or off, simply enable or disable the LDD via the laser driver.

4.1 Initial Laser Startup

After properly connecting all hardware, the operator can turn on the laser driver. The procedure is as follows:

1. Turn ON the chiller's AC power switch to start the water cooling system.
2. Turn ON the AC power of the laser driver (turn the knob at the lower-left corner of the front panel to ON) to start the laser system.
3. Turn the key switch ON to enable the menus and button functions.
4. After allowing the laser temperature to stabilize for about 10 minutes, press the LDD button to supply current to the pump diodes.
5. Verify that the LD current and temperature values shown on the LCD screen are within the normal range (refer to the factory inspection report). If the values are within the normal range, press the LDD button to enable the LD current. If not, reset the LD temperature and current, then enable the LDD again.
6. Once the LDD is enabled, the current ramps up to the set value.
7. Enable the Q-SW switch.

Once the system has reached a stable state, the operator can turn the key switch to the OFF position to lock all buttons on the driver's front panel.

After long-distance transport, the operator must wait until the temperature of the laser cavity reaches ambient temperature before switching on the laser. When the AC power switch is set to the ON position, the driver starts operating. The LCD display then initializes, after which the HOME menu appears on the LCD screen.

When the power is on, current begins to be supplied to the LBO and LD. Since the LBO takes time to warm up to the set value, the LBO status LED on the front panel stays lit for a while. It takes 10–15 minutes for the system to reach and maintain the set temperature.

When turned on, the FAULT status LED lights up briefly and then turns off. This means the system is operating normally. If the FAULT LED lights up during operation, it indicates a system alarm has occurred. The problem must be checked and eliminated before the laser can be returned to its operating state.

If an alarm occurs, try shutting down the system (wait until the LD current reaches the 0 level), then restart the laser after a few seconds. If the alarm disappears, the system will operate normally again.

4.2 Laser Shutdown Procedure

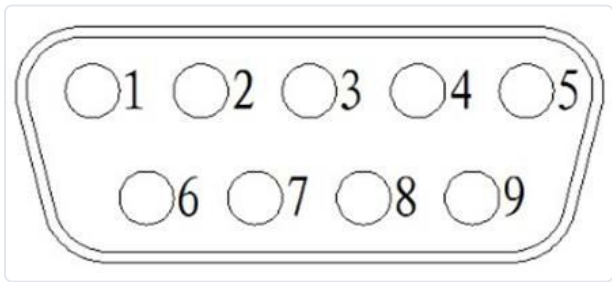
1. Press the Q-SW button to turn off the Q-SW switch. The green LED above the pressed button turns off.
2. Disable the LDD (press the LDD button) to shut down the laser diode driver, and observe the actual LDD current feedback (read the third line of the Diode Settings menu).
3. Once the LD current has dropped to the 0 level, turn OFF the driver's AC power.
4. Turn off the chiller's AC power.

4.3 Humidity Alarm

The laser's optical components are extremely sensitive to humidity. It is therefore very important to control the humidity level inside the laser cavity. Under normal conditions, the humidity inside the laser cavity must be kept below 20%. If the humidity exceeds this level, the laser driver triggers an alarm alert (you should hear a "BEEP") to warn the user to replace the desiccant bag inside the laser head (in the circular groove on top). If the humidity inside the laser cavity exceeds 60%, the laser driver enters humidity protection mode and automatically shuts down the LD current.

4.5 External Control

The external control interface is shown in Figure 4.5.



Pin No.	定義	備考
PIN1	NC	"NC"- 接続無し
PIN2	NC	
PIN3	GATE	外部ゲート(アクティブハイ)
PIN4	FPS	最初のパルス抑制信号(入力、アクティブハイ)
PIN5	GND	アース(外部基板に接続)
PIN6	PULSE	Q-スイッチパルス(入力、R.F.オフタイム)
PIN7	NC	
PIN8	NC	
PIN9	NC	

Figure 4.5 External control interface

Table 4.1 Pin definitions

Chapter 5 Operation Menu

The operation menu consists of the following parts:

- Main information display (HOME page)
- Main menu
- Submenus

5.1 Main Display Interface

Press the HOME button to enter the main information display screen. This is the default page after system startup.

The display is shown in Figure 5.1.



Figure 5.1 HOME page

LD Real I ---- Shows the LD current values. One is the set current, and the other (the number on the right) is the actual current. The actual current is displayed in real time.

LD Real T ---- Shows the LD temperature values. The first is the set temperature, and the other is the actual temperature. The actual temperature is displayed in real time.

Laser Mode ---- Used to select the external trigger pulse or the internal trigger pulse. Setting "Int" indicates that the internal trigger pulse is being used. Setting "Ext" indicates externally triggered pulses.

Gate Input ---- Indicates the input source of the GATE signal. "Int" indicates a GATE signal from inside the power supply. "Ext" indicates that the GATE signal comes from the software of an external board.

Int PRF ---- Displays the internal pulse repetition frequency.

Shutter ---- Indicates whether the shutter is open or closed.

QS Status ---- Displays whether the Q-switch is open or closed.

5.2 Main Menu

Press the MENU button to enter the menu interface. The display is shown in Figure 5.2.

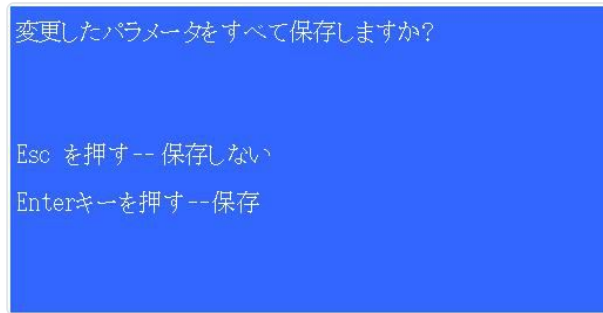


Fig. 5.3 Change-save confirmation page

Press ENTER: the changes are confirmed and the modified parameters are stored in the system's internal ROM.

Press ESC: confirms that the changes will not be saved. The parameters remain temporary; after the system is restarted, the parameters revert to their old, unchanged values.

Note: Pressing the HOME button on the main menu page or on any submenu page returns you directly to the HOME page. However, this operation does not save the modified parameters to ROM. If a parameter needs to be changed permanently, press the ESC button until the page shown in Fig. 5.3 appears, then press Enter to confirm the changes.

5.4 Submenus

The submenus can be entered from the main menu. The value of each item is displayed. Parameters can be set only after entering the corresponding item in the submenu.

5.4.1 Diode Settings Menu

Fig. 5.4 shows how to enter this page from the main menu and how to set the LD parameters.

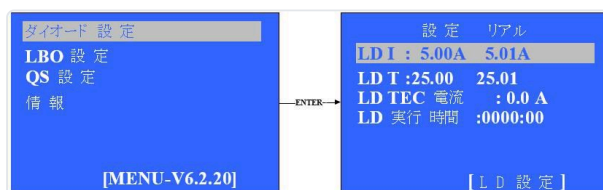


Fig. 5.4 Diode parameter setting screen

"LD I Set" — displays the set LD current value.

"LD T Set" — displays the set LD temperature.

"LD I REAL" — displays the actual LD current value.

"LD T REAL" — displays the actual LD temperature.

"LD TEC Current" — displays the actual operating current of the LD TEC.

“LD Run Time” — displays the accumulated operating time of the LD. The first part is in hours; the second part is in minutes.

When this page is entered, the first line is automatically highlighted. Only the first and second lines can be selected, and only the parameters of these two items can be changed. The parameters on all other lines are actual feedback values.

If a parameter needs to be changed, refer to the flow below:

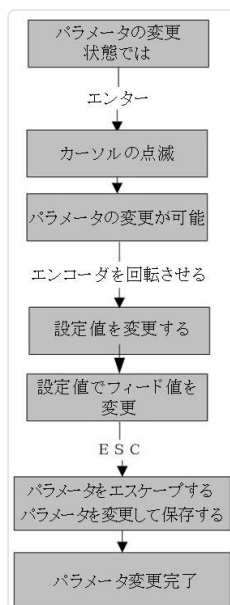


Fig. 5.5.5 Parameter setting flow

While a parameter is in edit mode, the up and down buttons do not operate. Exit edit mode and the up and down buttons become active again. In edit mode, turning the knob changes the parameter that is updated to the control system. When the ESC button is pressed to exit edit mode, the modified parameter is saved to the system's internal ROM.

After changing the parameter on the first line, use the up and down buttons to change the LD temperature. Only the parameters on these two lines can be changed; the other displayed parameters are actual values and cannot be modified.

5.4.2 LBO Settings Menu

Fig. 5.6 shows how to enter the LBO settings screen from the main menu screen.



Fig. 5.6 LBO settings screen

“SHG T Set” — displays the set SHG temperature.

“THG T Set” — displays the set THG temperature.

“SHG T REAL” — displays the actual SHG temperature.

“THG T REAL” — displays the actual THG temperature.

The set temperatures of the SHG and THG can be changed. The change procedure is as shown in Fig. 5.4. The other parameters are actual values and cannot be changed.

Move the cursor with the up and down buttons to select an item. Press ENT to confirm the selected item; the cursor starts blinking. Turn the knob to change the value; each modification takes effect immediately. The cursor can move between the first and second lines. Press ESC to exit edit mode; the modified parameters are saved temporarily (the changes remain available even after the system is restarted). If the changes need to be stored in the system ROM, press ESC to exit edit mode, press ESC again to return to the main menu, and press ESC once more to enter the data-save confirmation screen (see Fig. 5.3).

In non-edit mode, press ESC to return to the main menu. Pressing the MENU button takes you directly to the main menu.

5.4.3 QS Settings Menu

Fig. 5.7 shows the flow for entering the QS settings screen from the main menu.

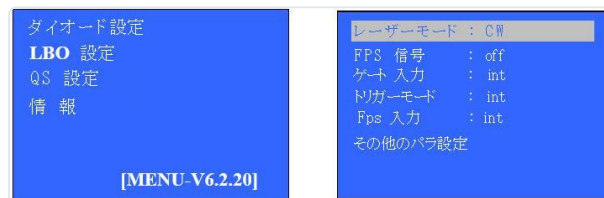


Fig. 5.7 QS settings screen

“Laser Mode” — indicates the operating mode of the Q-SW. CW means continuous output mode. OFF corresponds to HOLD mode. This mode refers to the output state of the Q-SW when the Q-SW function button is not enabled. In CW mode, the Q-SW is not enabled and the laser outputs a continuous wave at average power. In OFF mode, the Q-SW is not enabled; the Q-SW is held and there is no lasing. Once the Q-SW button is enabled, the current CW state changes to the pulsed output state.

“FPS Signal” — sets the first-pulse-suppression signal. It can be set to OFF (disabled) or ON (enabled). The default setting is “enabled.”

“Gate Input” — selects the source of the GATE signal. “int” indicates the internal GATE signal, TTL level, active high. “ext” indicates the external GATE signal, TTL level, active high.

“Trigger Mode” — indicates whether the Q-SW mode is internally or externally triggered. The default setting is internal triggering.

“FPS Input” — selects the source of the FPS signal. “int” indicates the internal GATE signal, TTL level, active high. “ext” indicates the external FPS signal, TTL level, active high.

Press the up or down button to move the cursor and select an item. Then press ENT to confirm the selected item and enter edit mode; the cursor starts blinking. Turn the knob to change the selected item, toggling between “cw” and “hold,” “int” and “ext,” and “on” and “off.” Changes take effect in real time. Press ESC to exit edit mode; the modified parameters are automatically saved to the system. Press ESC again to return to the main menu.

In edit mode, the cursor cannot be moved. After exiting edit mode, the cursor can be moved again.

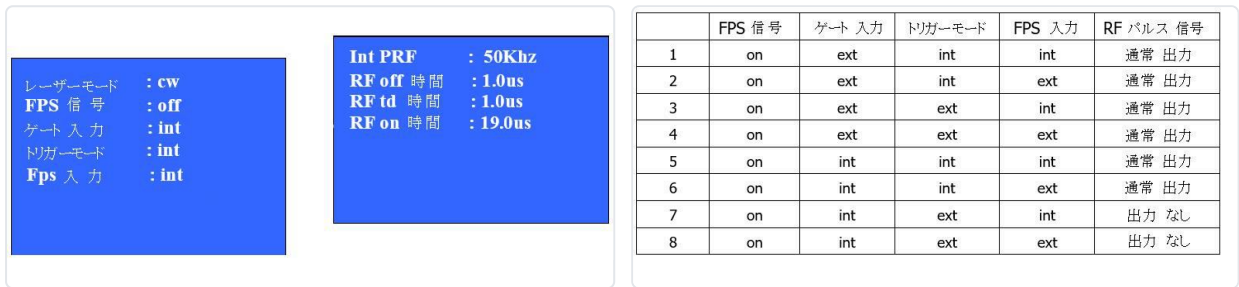


Fig. 5.8 Additional parameter settings

“Int RPF” — sets the repetition rate of the Q-SW pulses; the default setting is 30KHz.

“R.F. Off Time” — sets the output release time of the circulating laser at the currently set frequency. The default is 1 microsecond.

When the Q-SW button is not enabled, the laser mode can be set to CW or hold. When the Q-SW button is enabled, the laser enters the RF pulsed output state. Set the state of the FPS signal: when on, the FPS signal is enabled; when off, the FPS signal is disabled.

Eight function models can be realized by setting the gate input, trigger mode, and FPS input options.

Table 5.1: List of function models

5.4.4 Information Menu

Fig. 5.9 shows the flow for entering the information menu from the main menu.



Fig. 5.9 Information display page

The parameters displayed on this page cannot be changed. On this page, only the “Fault Reset” line is highlighted.

- “LP SN” — indicates the serial number of the laser head.
- “PS SN” — displays the hardware serial number of the power supply.
- “LH SN” — displays the version of the software installed in the power supply.
- “ERROCODE” — displays the current error code. For a description of the codes, see Table 7.1 in Chapter 7.
- “Fault Reset” — executes a fault reset. When the Enter button is pressed, the fault reset is executed immediately. The ERRORCODE value then changes to “00,” indicating that the fault reset is complete and no error is currently present.
- “Plate Temp” — displays the temperature of the base plate at the bottom of the laser resonator.
- “Humidity” — displays the humidity level inside the laser cavity.

Chapter 6 Serial Communication

6.1 Function Description

The operator can set the power supply parameters via the serial port. Working parameters and status are displayed in real time.

Serial communication uses the RS232 standard.

6.2 Hardware Interconnection

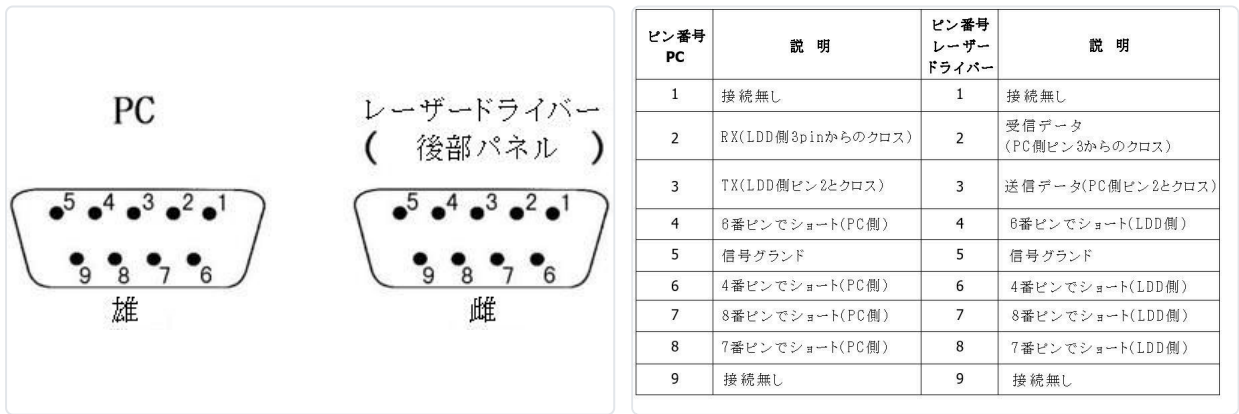


Fig. 6.1 Serial port diagram

Table 6.1 Pin descriptions

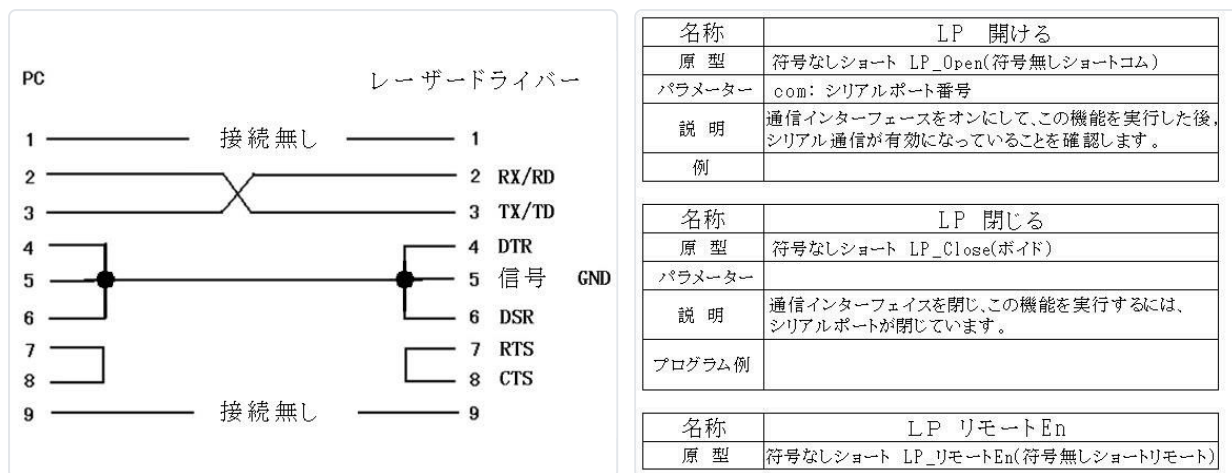


Fig. 6.2 Interconnection electrical diagram

6.3 RS232 Control Command Set

パラメーター	リモート0 シリアルポートの操作を無効にし、電源操作パネルのボタンを有効にします。 1 シリアルポートの操作を有効にし、電源操作パネルのボタンを無効にします。
説 明	リモートコントロールを有効にします。この機能を実行すると、電源操作パネルのボタンが機能不全になります。
例	

名称	LP LdEn
原 型	符号なしショート LP_LdEn(符号なしショートen)
パラメーター	en:0 LD の電流を無効にする 1 LD電流を有効にする
説 明	LD電流を無効にするか、有効にする。
例	

名称	LP QswtEn
原 型	符号なしショート LP_QswtEn(符号なしショートen)
パラメーター	en:0 Q 出力を無効にする 1 Q 出力を有効にする
説 明	Q信号を無効または有効にする
例	

名称	LP SetLdI
原 型	符号なしショート LP_SetLdI(二重電流)
パラメーター	電流/電流パルス。単位はアンペアです。
説 明	LD動作電流を設定する
例	

名称	LP SetLdTemp
原 型	符号なしショート LP_SetLdTemp(ダブルテンポ)
パラメーター	temp:温度値。単位は摂氏です。
説 明	LDの作業温度を設定します。温度は最大設定値と最大設定値の間で有効ですが、そうでない場合は無効です。
例	

名称	LP SetQFre
----	------------

原 型	符号なしショートLP_SetQFre(符号なしショート周波数)
パラメーター	周波数: Qスイッチパルスの周波数。単位はkHzです。
説 明	Qスイッチパルス周波数を設定する
例	

名称	LP SetQWidth
原 型	符号なしショートLP_SetQWidth(符号なしショート幅)
パラメーター	幅: Qスイッチパルスのパルス幅。単位はusです。
説 明	Qスイッチパルスのパルス幅を設定します。
例	

名称	LP SetSHGTemp
原 型	符号なしショートLP_SetSHGTemp(ダブルラ温度)
パラメーター	温度: LBO SHGの設定作業温度。
説 明	LBO SHGの動作温度設定用
例	

名称	LP SetTHGTemp
原 型	符号なしショートLP_SetTHGTemp(トリプルラ温度)
パラメーター	温度:LBO THGの設定作業温度。
説 明	LBO SHGの動作温度設定用
例	

名称	LP GateSel
原 型	符号なしショートLP_GateSel(符号なしショート源)
パラメーター	源: GATE信号源 0: 内部GATE 1: 外部GATE
説 明	GATE信号源の選択用。内部信号または外部信号に設定することができます。ハイオン。
例	

原 型	LP PulseSel
原 型	符号なしショートLP_PulseSel(符号なしショート源)

パラメーター	源 : Qスイッチパルス信号資源 0: 内部パルス 1: 外部パルス
説 明	Qスイッチパルス信号リソースを選択する場合、ユーザーは内部信号または外部信号を設定できます。ハイオン。
例	
名称	LP_SetLasMode
原 型	符号なしショートLP_SetLasMode(符号なしショートモト)
パラメーター	モード: Q出力モード 0: Q スイッチ平均出力モード 1: Q スイッチはモードを消します
説 明	Q ドライバの出力モードを設定します。
例	
名称	LP_SetLDRamp
原 型	符号なしショートLP_SetLDRamp(ダブルランプ)
パラメーター	ランプ: スロープ電流
説 明	LDの電流上昇率を設定するには、単位はアンペア/Sです
例	
名称	LP_GetPointInfo
原 型	符号なしショートLP_GetPointInfo(符号なしショートポイント数、符号なしショートsts、符号なしショートライブ)
パラメーター	Sts: 現在のLBOスポットの状態。1健全を意味する、0 は破損を意味する 寿命、労働時間 ポイント番号: 作業現場
説 明	LBOの作業スポットの状態とすでに作業した時間を読んでください。
例	
名称	LP_GetSts
原 型	符号なしショートLP_GetSts(符号なしショートsts)

パラメーター	Sts: レーザーの動作状態 STS : bit0 - LDD ON/OFF bit1 - シャッター ON/OFF bit2 - Q-SW ON/OFF bit3 - キーパッド編集有効/無効 bit4 - ***予約済み*** bit5 - ***予約済み*** bit6 - ***予約済み*** bit7 - 電源キー SW ON
説 明	レーザーの動作状態を取得します。
例	

名称	LP_GetLDIs
原 型	符号なしのショート LP_GetLDIs(ダブル * 電流)
パラメーター	電流 : 動作電流の設定
説 明	LD動作電流を得るため。
例	

名称	LP_GetLDIa
原 型	符号なしのショート LP_GetLDIa(ダブル * 電流)
パラメーター	電流 : 実際の動作電流
説 明	実際の LD 動作電流を得るために
例	

名称	LP_GetQPara
原 型	符号なしのショート LP_GetQPara (符号なしのショート * 周波数、符号なしのショート * 幅)
パラメーター	パラ: Qスイッチパルスの周波数とパルス幅を設定します。
説 明	Qスイッチパルスの設定周波数とパルス幅を取得します。
例	

名称	LP_GetQStg
----	------------

原 型	符号なしのショート LP_GetQPara(符号なしのショート * sts)
パラメーター	sts: 0:動作状態bit0 : ***予約済み*** bit1: ***予約済み*** bit2: ***予約済み*** bit3: ***予約済み*** bit4: QSW KEY 無効 ON/OFF bit5: ***予約済み*** bit6: 外部周波数 ON/OFF bit7: 外部ゲート ON/OFF
説 明	Qスイッチパルスの設定周波数とパルス幅を取得します。
例	

名称	LP_GetErrCode
	ErrCode(符号なしのショート * コード)
パラメーター	コード: エラー保護コード bit15: *** 予約済み *** bit14: *** 予約済み *** bit13: *** 予約済み *** bit12: 切断ケーブルの断線 警報 bit11: THG 過電流警報 bit10: SHG 過電流警報 bit9: LD TEC 過電流警報 bit08: インターロック bit07: 水の保護 bit06: 湿度警報器 bit05: VANADATE 温度警報 bit04: ベースプレート温度湿度警報 bit03: THG 温度警報 bit02: SHG 温度警報 bit01: レーザーダイオード過熱 bit00: レーザーダイオード過電流
説 明	エラーコードを取得します。
例	

名称	LP_GetTemp
原 型	符号なしのショート LP_GetTemp(ダブル * shgtemp、ダブル * thgtemp、ダブル * ldtemp)

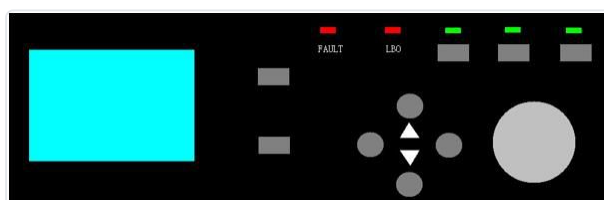
パラメータ	Shgtemp: SHG's作業温度 Thgtemp: THG's作業温度 LDtemp: LD's作業温度
説明	THG,SHG,LDの設定温度を取得する。
例	
名称	LP_GetTempa
原型	符号なしのショート LP_GetTempa(ダブル*shgtemp,ダブル*thgtemp,ダブル*ldtemp)
パラメータ	Shgtemp : shg's作業温度 Thgtemp : thg's作業温度 LDtemp : LD's作業温度
説明	THG,SHG,LDの実際の温度を取得します。
例	
名称	LP_GetLDTime
原型	符号なしのショート LP_GetLDTime(符号なしのショート*時間,符号なしのショート*分)
パラメータ	時間 : 時 分 : 分
説明	実際のLD稼働時間を取得します。
例	
名称	LP_GetHWVrsn
原型	符号なしのショート LP_GetHWVrsn(char*vrsn)
パラメータ	Vrsn:バージョン番号
説明	ハードウェアのバージョン番号を取得します。
例	
名称	LP_GetSWVrsn
原型	符号なしのショート LP_GetSWVrsn(char*vrsn)
パラメータ	Vrsn:バージョン番号
説明	ソフトウェアのバージョン番号を取得します。
例	

Chapter 7 Troubleshooting

When power is being supplied normally, the FAULT LED does not light. If an error occurs, the FAULT LED lights up. When this happens, the LD current is cut off and the laser power supply protection function is activated immediately, so laser emission stops.

When FAULT protection has been triggered, the operator must identify the cause of the error, correct the problem, and restart the laser.

Figure 7.1 FAULT LED status



As shown in Figure 7.1, the FAULT LED indicates that an error has occurred. This LED lights up when a protection is triggered inside the power supply. If protection has been activated internally, the FAULT LED is lit.

The main causes of faults are as follows:

- LD overcurrent
- LD overheating
- LD TEC overcurrent
- SHG overheating
- THG overheating
- SHG driver overcurrent

- THG driver overcurrent
- Humidity protection
- Baseplate temperature protection
- Water protection
- Interlock

7.1 Locating the Fault

There are two ways to trace the cause of a FAULT.

1: Select the "Information" item in the main menu and press the Enter button. Read the ERRCODE value to identify the source of the error.

2: Check the LEDs on the PCB (inside the laser driver) to identify the cause of the error.

The detailed relationship between the ERRCODE and the specific error source is shown in Table 7.1.

故障の源	エラーコード
LD 過電流	01
LD 過熱	02
LD TEC 過電流	03
SHG 過熱	04
THG 過熱	05
SHG TEC ドライバ過電流	06
THG ドライバ過電流	07

Table 7.1 Fault source index

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7.2 Fault Reset

After the fault source has been identified and eliminated, reset the FAULT LED (so that the LED turns off and goes dark); the laser can then be returned to its normal operating state.

FAULT LED: there are two reset methods:

2: Pressing the fault reset button on the PCB (inside the driver) can also clear the fault.

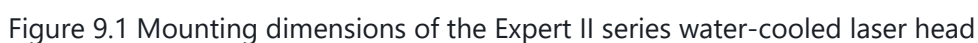
8.1 AC Input

8.2 Laser Control Ports (Input)

- ## 8.3 COM Port

Chapter 9 Mechanical Specifications

9.1 Mechanical Dimensions of the Laser Head



9.2 Mechanical Dimensions of the Power Supply

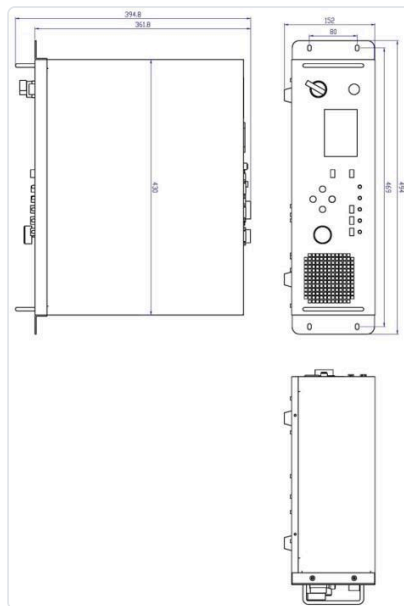


Figure 9.3 Power supply dimensions

9.3 Mechanical Dimensions of the Chiller

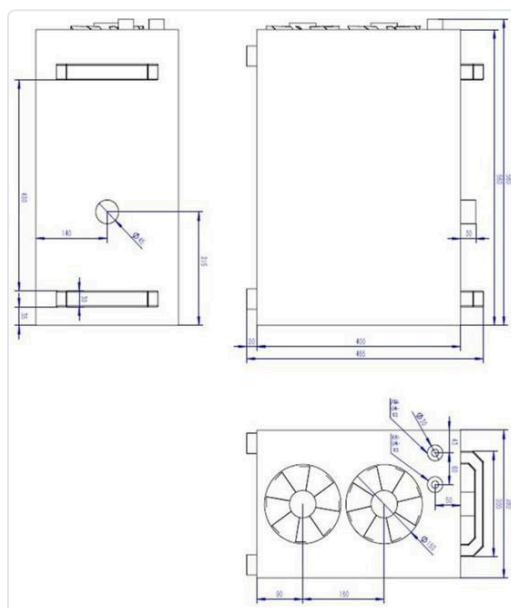


Figure 9.4 Chiller dimensions