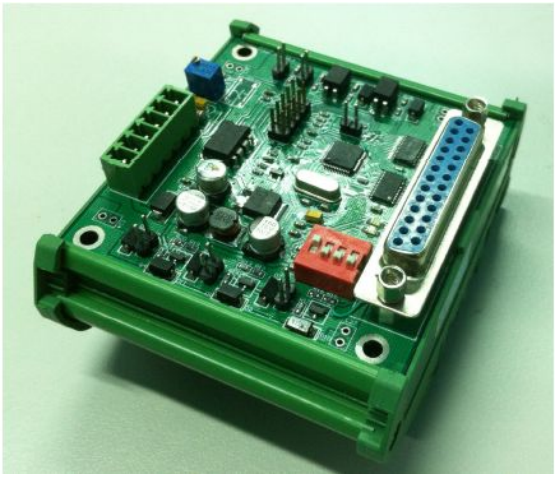
# Fiber Laser Terminal Operating Manual

Model：RDAcc_Fiber V1.2

**Shenzhen RuiDa Technology CO., LTD**
Tel: 86- 0755-26066687
Fax: 86-0755-26982287
Web: www.rd-acs.com
E-Mail: support@rd-acs.com
Add: 1B-1, Building 5, Tian'an Nanyou Industrial Area,
Dengliang Road, Nanshan District, Shenzhen, P.R.C.

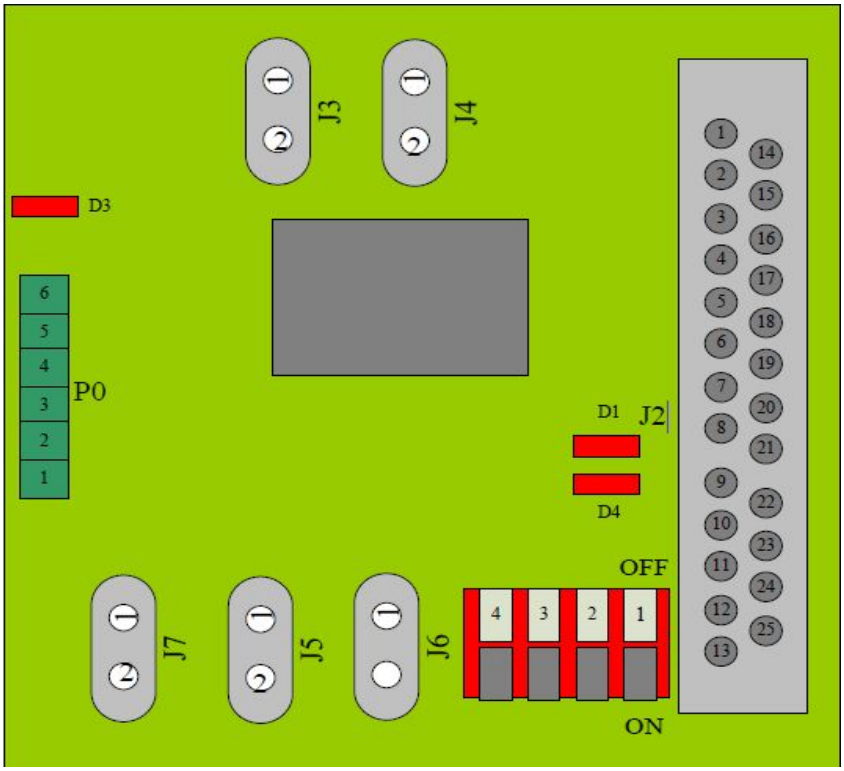
# 1. Picture of terminal



# 2. Function Description

This product is applied to low power fiber laser, such as IPG, Maxphotonics, and so on. Please read this manual and laser manual carefully before use, which make sure the interfaces could be compatible for connection correctly.

FIBER_ACC terminal is mainly applied to low power fiber laser interface, to provide repetition frequency and laser power control interface with 8-digital value. The schematic diagram showed as Picture 1.




Picture-1 Fiber Laser Interface Board Diagram

In Picture-1, D1, D4 are laser fault indicator, D3 is power source indicator. D1 & D4 will be off when there is no fault.

# 3. Terminal Descriptions

## 3.1 J3, J4

J3 is external emergency stop input interface, this pin is N.C if no need to use, and default to emergency stop invalid. Laser can emit light normally. If user needs external emergency stop, the normally open switch should be connected. When the switch is not closed, the emergency stop pin output high level, laser emits light normally. When the switch is closed, the emergency stop pin output low level, laser stop laser outputting. The status of this pin will directly control the emergency stop pin of fiber laser.

**Sheet-1 J3 Terminal Pin Definition**

| PIN | Signal | Description |
|---|---|---|
| PIN1 | IN | From external switch input |
| PIN2 | GND | reference ground |

Wiring Description: If user connects to the mechanical contact switch, just needing the one terminal of mechanical switch connect to the Pin 1 of J3; the other terminal connects to Pin2 of J3.

If the switch is optoelectronic switch or other switch types which need power supply, so connecting the switch output to Pin1 of J3, but must make sure that the reference ground of the power supply and J3 common-ground link.

Notice: if J3 connects the optoelectronic switch or other switch types which need power supply, must use +5V standard, more than +5V are strictly prohibited, otherwise controller will be damaged.

The input ways of J4 is the same as J3, but the pin is reserved.

### 3.2 External Input Interface P0

P0 is input interface, the signal from laser control interface of Ruida technology controller.

Signal definition as below sheet-2:

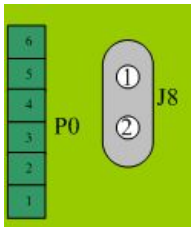
**Sheet-2 Input Terminal Signal Definitions**

| PIN | Signal | Description |
|---|---|---|
| PIN1 | +5V | +L5V control interface from Ruida technology controller, power supply |
| PIN2 | LASER ON | laser switching signal from Ruida technology controller laser control interface |
| PIN3 | MO | This pin is for controlling the fiber laser master oscillator (MO) to restrain fiber laser leakage. |
| PIN4 | NC | N.C |
| PIN5 | L_AN | power signal from Ruida technology controller laser control interface |
| PIN6 | GND | reference ground from Ruida technology controller laser control interface |

All signals of this terminal come from laser control output signal terminal of Ruida technology cutting & engraving system control card. The user must connect them reliably.

If there is no leakage problem, the PIN 3 of P0 is open, and short-circuits the two pins of J8. At this time, the input terminal of MO defaults to high level.

This module defaults MO always effectively when leaving factory, that is, J8 attached short circuit module. As below figure showed:




Picture-2 MO Jumper terminal

If there is leakage problem when turn off laser, which will deeply influence the light sensitive material process, so it should be eliminated when in standby, and now you should control MO by external signal.

The OUT0 output port of RUIDA controller is work state output, you can connect the OUT0 and PIN3 of P0. As Figure 3.1, 3.2, RDC6442G please refer to Figure 3.3, 3.4.

### 3.3 Fiber Laser Control Interface

J2 terminal is fiber laser interface, signal definition as below sheet 3 listed:

**Sheet-3 Fiber laser interface definition**

| PIN | Signal | Description |
|---|---|---|
| PIN1 | L0 | laser power digital value output |
| PIN2 | L1 | laser power digital value output |
| PIN3 | L2 | laser power digital value output |
| PIN4 | L3 | laser power digital value output |
| PIN5 | L4 | laser power digital value output |
| PIN6 | L5 | laser power digital value output |
| PIN7 | L6 | laser power digital value output |
| PIN8 | L7 | laser power digital value output |
| PIN9 | LATCH | laser power latch signal output |
| PIN10 | GND | GND |
| PIN11 | GND | GND |
| PIN12 | GND | GND |
| PIN13 | GND | GND |
| PIN14 | GND | GND |
| PIN15 | GND | GND |
| PIN16 | ALARM_IN1 | Laser alarm input, D4 indicator turns on when there is alarm input. |
| PIN17 | NC | N.C |
| PIN18 | MO | Master oscillator switch signal output, when PIN4 of PO is N.C, the pin output high level. Enable master oscillator. If PIN4 of PO connects switch control, so it will influenced by the switch. Must ensure high level of the pin when the laser working normally. |
| PIN19 | LASER ON | Laser switching signal output, connecting to the modulation input terminal, high level effective |
| PIN20 | FREQ | repetition frequency signal output, the parameter is: frequency is 20KHz; duty cycle 20% |
| PIN21 | GL | guide laser |

| | | |
|---|---|---|
| PIN22 | EMSSTP | Laser emergency stop signal output, this signal connects to laser emergency stop input interface directly, the pin must be high level. And must ensure high level of the pin when the laser working normally. |
| PIN23 | NC | |
| PIN24 | NC | |

# 4. Laser connection descriptions

The connection diagram of Laser and terminal as below **Figure 4.1** showed, which is applied to RDC633X series controller, and the wiring is used for laser MO which does not controlled by external. The MO signal input terminal output by terminal board is always effective. In this case, short circuit block of J8 must be effective; otherwise, the low power fiber laser cannot work normally.

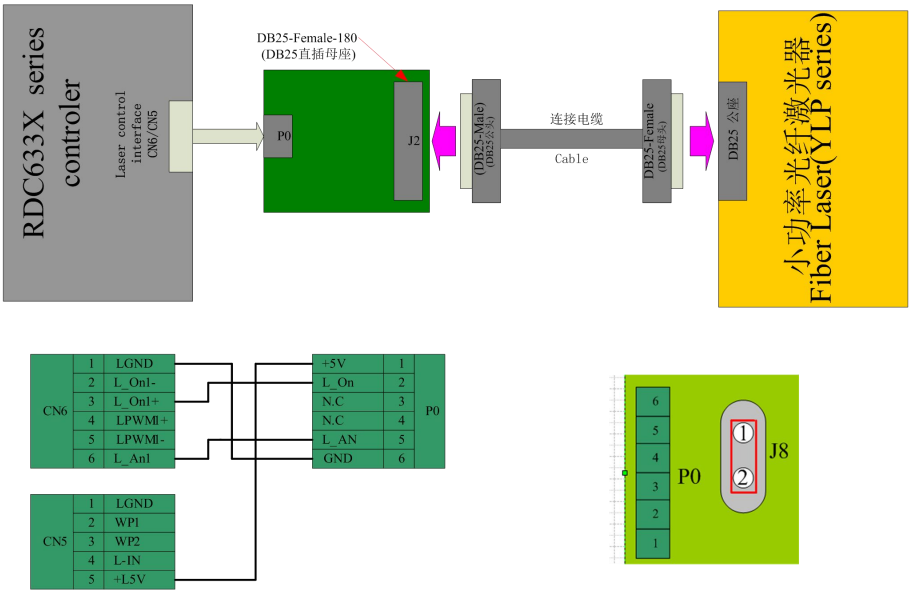



Figure 4.1 Schematic Diagram of RDC633X series controller and low power terminal board (MO internal control )

**Figure 4.2:** The Schematic Diagram is applied to RDC633X series controller, and the wiring is used for laser MO external controlled. The MO terminal receives signal output from OUT0 controller and controls MO dynamically. In this case, short circuit block of J8 must be cancelled; otherwise, the low power fiber laser cannot be controlled by external MO.

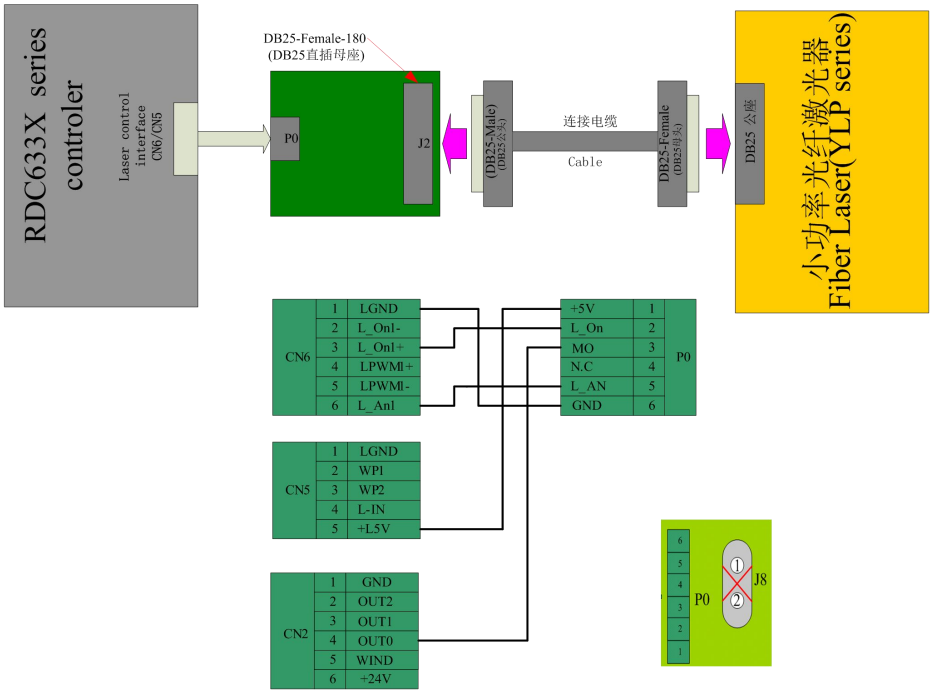



Figure 4.2 Schematic Diagram of RDC633X series controller and low power terminal board (MO external control)

**Figure 4.3:** The Schematic Diagram is applied to RDC6442 series controller, and the wiring is used for laser MO which does not controlled by external. The MO signal input terminal output by terminal board is always effective. In this case, short circuit block of J8 must be effective; otherwise, the low power fiber laser cannot work normally.

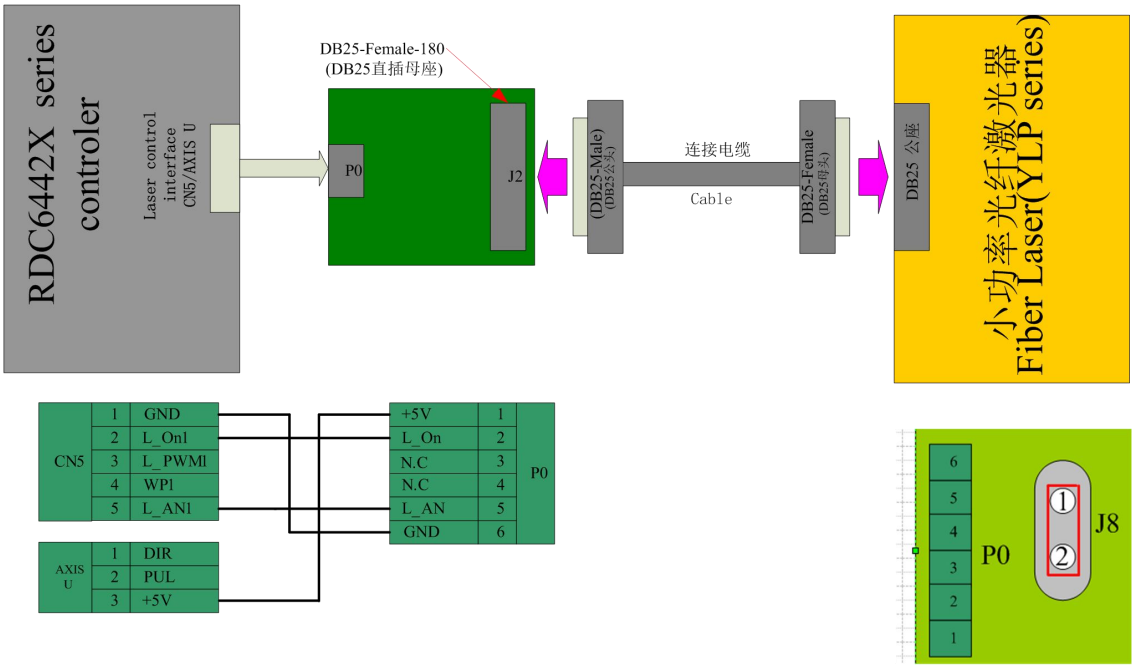



Figure 4.3 Schematic Diagram of RDC6442X series controller and low power terminal board (MO internal control )

**Figure 4.4**: The Schematic Diagram is applied to RDC6442 series controller, and the wiring is used for laser MO external controlled. The MO terminal receives signal output from OUT0 controller and controls MO dynamically. In this case, short circuit block of J8 must be cancelled; otherwise, the low power fiber laser cannot be controlled by external MO.

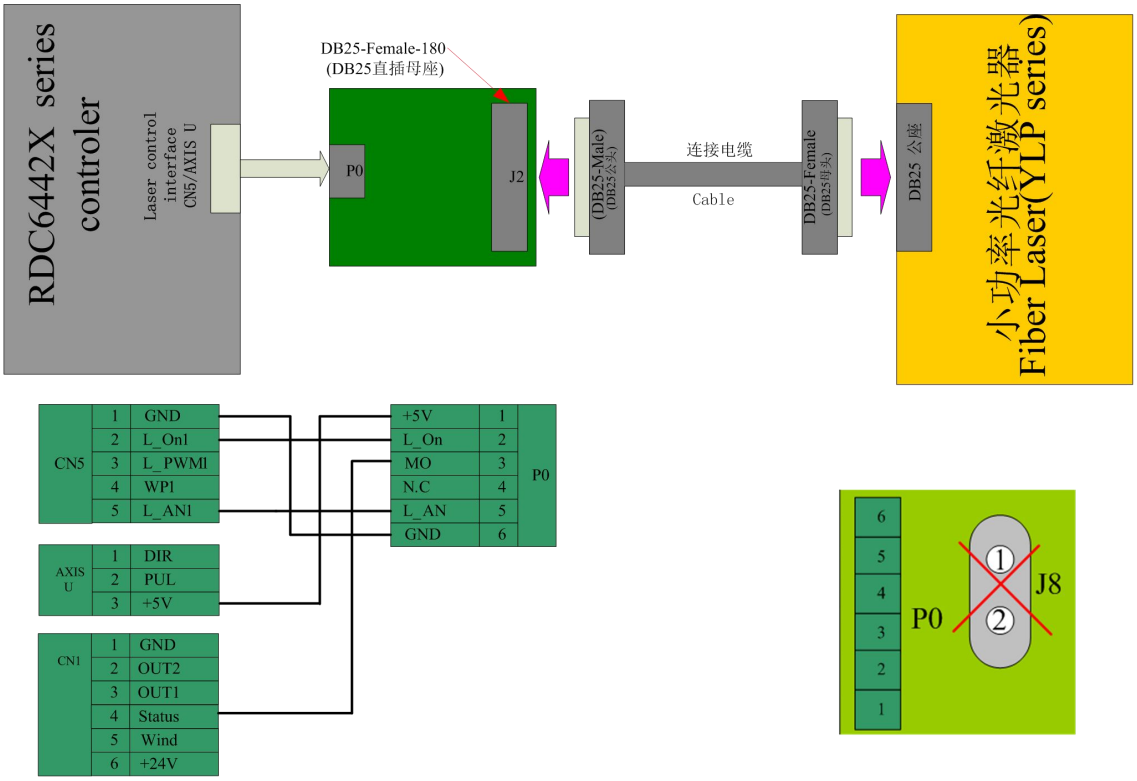
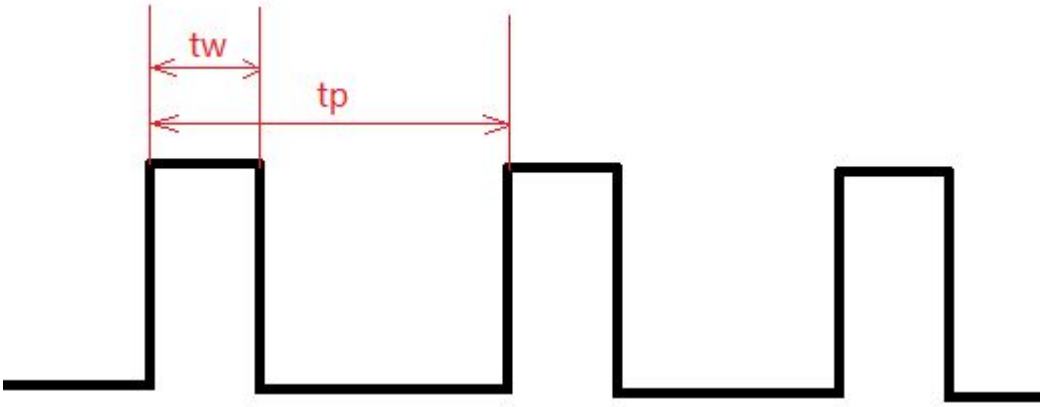



Figure 4.4 Schematic Diagram of RDC6442X controller and low power terminal board (MO external control)

The connecting cable supports DB25 cable with box and pin connector. The control signal of terminal and pin signal of fiber laser are compatible. The terminal is compatible with fiber laser –IPG laser and Maxphotonics laser.

# 5. Repetition frequency of fiber laser

Repetition frequency is a adjustable parameter for fiber laser. The change of repetition frequency will impact the emit-light effect of fiber laser. Actually, the repetition frequency is a PWM impulse wave.




Picture-3 Repetition frequency schematic diagram

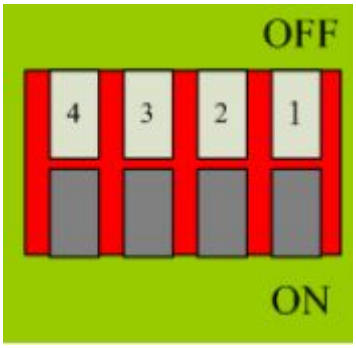
In Picture 3: tw is the pulse width of repetition frequency; tp is the cycle time of repetition frequency.

This terminal can adjust 2 parameters, one is duty cycle, and the other one is frequency.

duty cycle = *tp/ tw**100%

repetition frequency =1/*tp* Hz

The dial switch of the terminal can set the two parameters, 1, 2 can set up repetition frequency, and 3,4 can set up duty cycle. The dial switch as Picture 4 showed, the meaning of dial switch showed in Sheet 4 & Sheet 5.




Picture-4 Dial switch

**Sheet-4 Repetition Impulse Frequency Setting**

| DIAL **2** | DIAL **1** | DESCRIPTION |
|---|---|---|
| ON | ON | 20KHZ |
| ON | OFF | 30KHZ |
| OFF | ON | 40KHZ |
| OFF | OFF | 50KHZ |

**Sheet-5 Repetition Pulse Duty Factor Setting**

| DIAL **4** | DIAL **3** | DESCRIPTION |
|---|---|---|
| ON | ON | 10% |
| ON | OFF | 20% |
| OFF | ON | 30% |
| OFF | OFF | 40% |