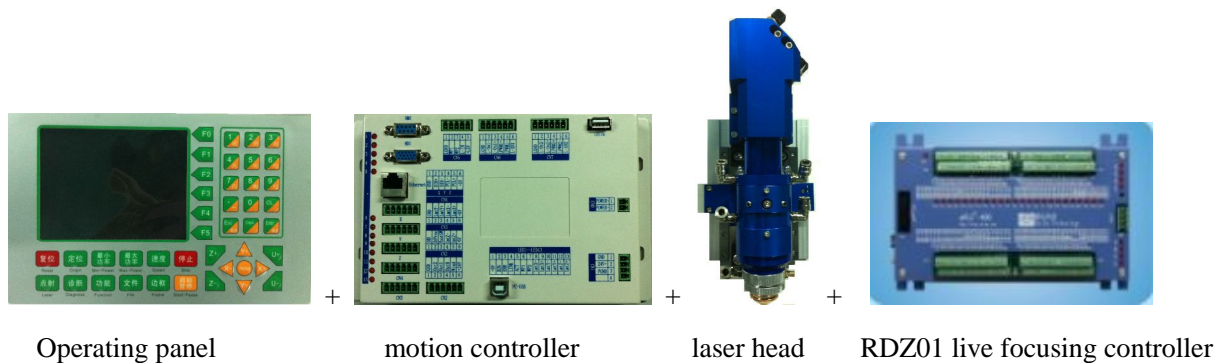# RDC633XM mixed cutting system

Supplementary manual

Product model: RDC6332M ；RDC6333M ；RDC6334M
(This manual is just for DSP Ver：6.30.32)

1 System Introduction

RDC633xM laser metal cutting control system is a high cost performance control system which is developed by RuiDa Technology specializing in sheet metal cutting market based on the mature RDC633xG hardware platform, It can control following head height sensing controller and auxiliary gas control. Form a complete set of application software designed for the special process of metal cutting of various extra functions. Including micro joints, ins and outs setting, internal model and external model process Settings etc, which improve the flexibility of the system application

Operating panel   +   motion controller   +   laser head   +   RDZ01 live focusing controller

Picture 1-1 system structure view

2 Hardware Descriptions

2.1 Electrical Connection

RDC633xM laser cutting system is especially for metal and non-metal. With the live focusing control and CO2 laser tube, it can cut metal which thickness not above 3mm. the operating method is just the same as RDC633XG product. So please refer the user manual of RDC633XG. And then read the supplementary specification in detail.

The most deference is the laser control, the auxiliary gas control and the laser head live focusing control. So we will described them in the following part .

2.2 Control the laser

This system is compatible with YAG and CO2 series medium-power laser control, Provide power control signal and laser switch signal. Laser power control signal include PWM and analog voltage.

2.3 Laser head auto-tracing control and auxiliary gas control

The interface for auto-tracing head and auxiliary gas control is described as follows：

1 Working status instruction OUTO

OUT0 is located in the CN2-PIN4

This interface is used to output the working status of the controller，when the controller is executing a cutting task， the OUT0 connect to the referenced ground (GND)。 When the cutting task finished，the node will disconnect from the Ground . The OUT0 is open-collector output .The signal can drive relay

RuiDa Technology Co.,Ltd
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen
TEL: 0755-26066687
E-Mail: support@rd-acs.com
Web: **www.rd-acs.com**
FAX: **0755-26982287**

2 Blowing control signal OUT1
OUT1 is located in the CN2-PIN3

When it need to blow, the output node and the reference ground (GND) will conduct, the node and the Ground will be disconnected after completed processing, The signal can drive the relay. Commonly used for the on and off operation of compressed gas.

The signal and laser switch are synchronous, when laser opened, the node conducted, and when laser closed, the signal closing synchronous.

3 Following control signal OUT2
OUT2 is located in the CN2-PIN4

Out2: following up/down signal, when the node is conduct, it will go down at the beginning and start following up when disconnecting.

PS: OUT0, OUT1 and OUT2 are for OC output circuit, as shown in figure 2.Can drive the relay, the biggest drive current is 200mA.
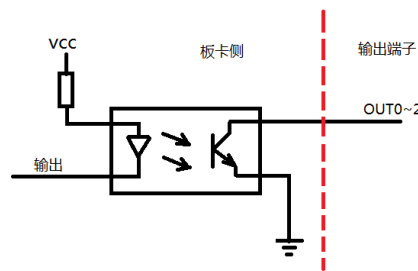

Figure 1   General output circuit diagram

4 Live focusing control crash alarm input DrProc
DrProc *is located in the CN3-PIN2*

DrProc is invalid for low. When the DrProc is disconnect to GND, then the RDC633XM will stop motion immediately and give the alarm information. So this pin can be used for "Open door" protection or for the live focusing head crash alarm protection.

The "open door protection" should be enabled in the machine parameters. If it is enabled, the machine will stop motion and give the protection information on the operation panel.

5 Following down signal FootSW
FootSW *is located in the CN3-PIN3*

This is an input. To accept the "falling in-position" signal from the live focusing controller. When the signal is LOW, the signal is valid.

6 Following up signal L-IN
FootSW *is located in the CN5-PIN4*

When Low level, said the following up in place, otherwise it is not in place.

This is an input. To accept the "rising in-position" signal from the live focusing controller. When the signal is LOW, the signal is valid.

3 Following control process specification

RDC6332M controller complete the control of the following unit in two ways.

（1）Interactive control method

This is just for the DSP VER 6.30.31.

（2）Delay Method

The Delay mode can be set in the laserWork software. It is popular for most kinds live focusing system.

Under this mode, the rise up length and the going down length are set by the parameters. when the head goes up, the longer the rising delay time, the higher the head going up. In a similar way when the head goes down, the delay time must be set long enough to make the head to reach the focus height, Both parameters can be set with the PC software.

Note:

There are two options for selecting the live focusing mode of the controller in the manufacture parameter.

In the delay mode, the parameters should be set as follows.
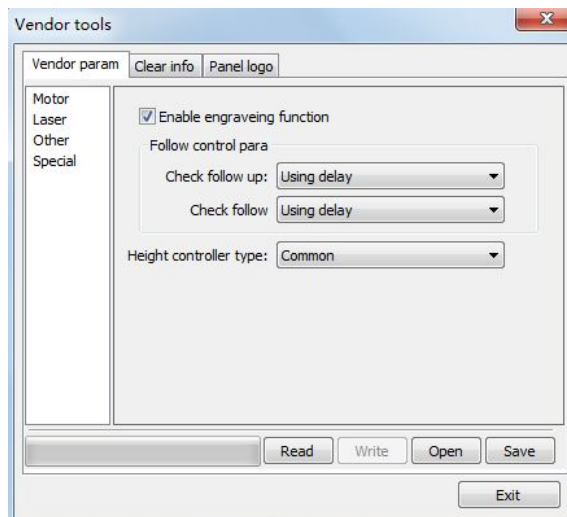
4 Description for Software

RDC633XM mixed cutting controller matched software version is LaserWorkV6---metalcutv1.00.07. This software is based on the LaserWorkV6 and add some functions for metal cutting. Detailed description as follows:

● lead in and lead out line

- automatically set inner mod or outer mod
- Add lead in and lead out line automatically
- Checking Lead in and lead out line automatically
- Add small connections(link near)
- set sequence of the graph element manually and automatically
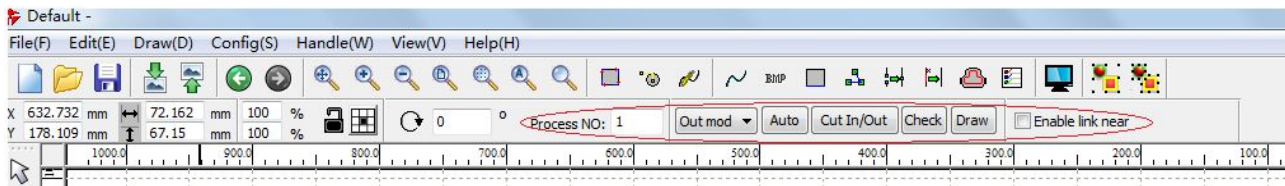
Function keys and menu as shown in figure 4-1.

Figure 4-1 metal cutting process menu

Inner mod/outer mod:

Inner mod refers to that inside of the graph unit is waste, and outside part of the graph unit is for process components. Graphics must be selected before perform this operation.

Automatically:

Automatic button is to set the inner mod and outer mod automatically. The software consider that the innermost curve unit is outer mod, then inner mod. The independent curve unit is outer mod in default. Graphics must be selected before perform this operation.

Lead in and lead out line:

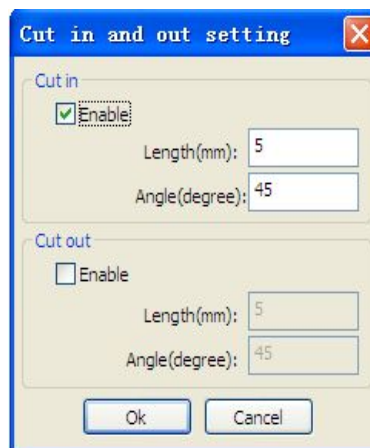Lead in and lead out setting as shown in figure 4-2.

Figure 4-2 ins and outs

Check:

Check function is for checking the legitimacy of lead in and lead out line. Graphics must be selected before perform this operation.

Draw:

Drawing function is add lead in and lead out line manually. Click the button, the mouse is in edit status. Click on any place in the graphical outline, the start point if the lead in/out line is set, and then click in arbitrary position in the graphic outline, the software will add a lead in/out line automatically. Graphics must be selected before perform this operation.

Add and delete small connection(link near):

After selected this icon, the system will set a small connection on the graphic outline automatically. This can prevent the cut pieces falling down.

This link near length is in the menu "output" under "ling near" option, as shown in figure 4-3.
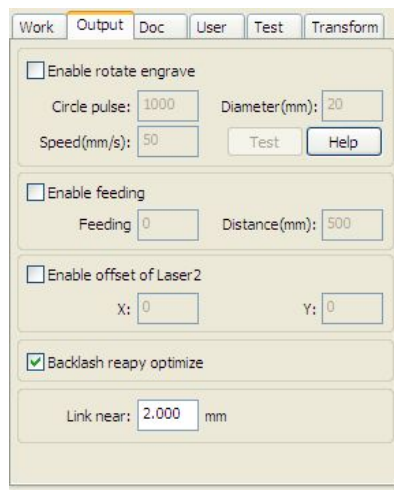

Figure 4-3 Micro Joints setting

Processing order setting:

After selected a graph unit, you can set the processing order manually. After the system import a graphic, will default a processing order. Users can manually change the processing sequence number for each graph unit. When graph unit is very long, the user can setting through the interface shown in figure 4-4, to meet the demand of the processing direction. This interface is located in the "processing" of the "path optimization". When using this function, found that not according to the desired path processing, It could be because the value for partitioned height setting is too big, to decrease the height appropriately, and test again. Can be observed through

"Simulation" .

RuiDa Technology Co.,Ltd   **E-Mail: support@rd-acs.com**
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen   **Web: www.rd-acs.com**
TEL: 0755-26066687   **FAX: 0755-26982287**
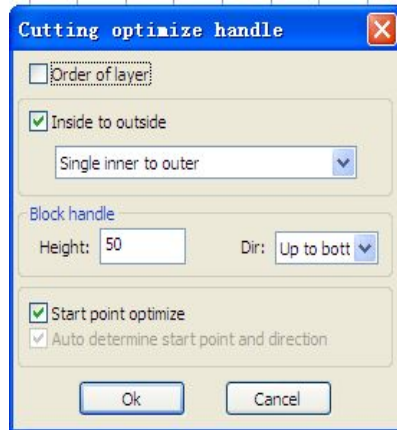
Figure 4-4 processing path setting

5 Height controller Connection instruction (CT8105 following)

Connection diagram With CT8105 following control module of spring photoelectric was shown below figure 3 .

RuiDa Technology Co.,Ltd   **E-Mail:** support@rd-acs.com
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen   **Web:**   www.rd-acs.com
TEL: 0755-26066687   **FAX:**   0755-26982287

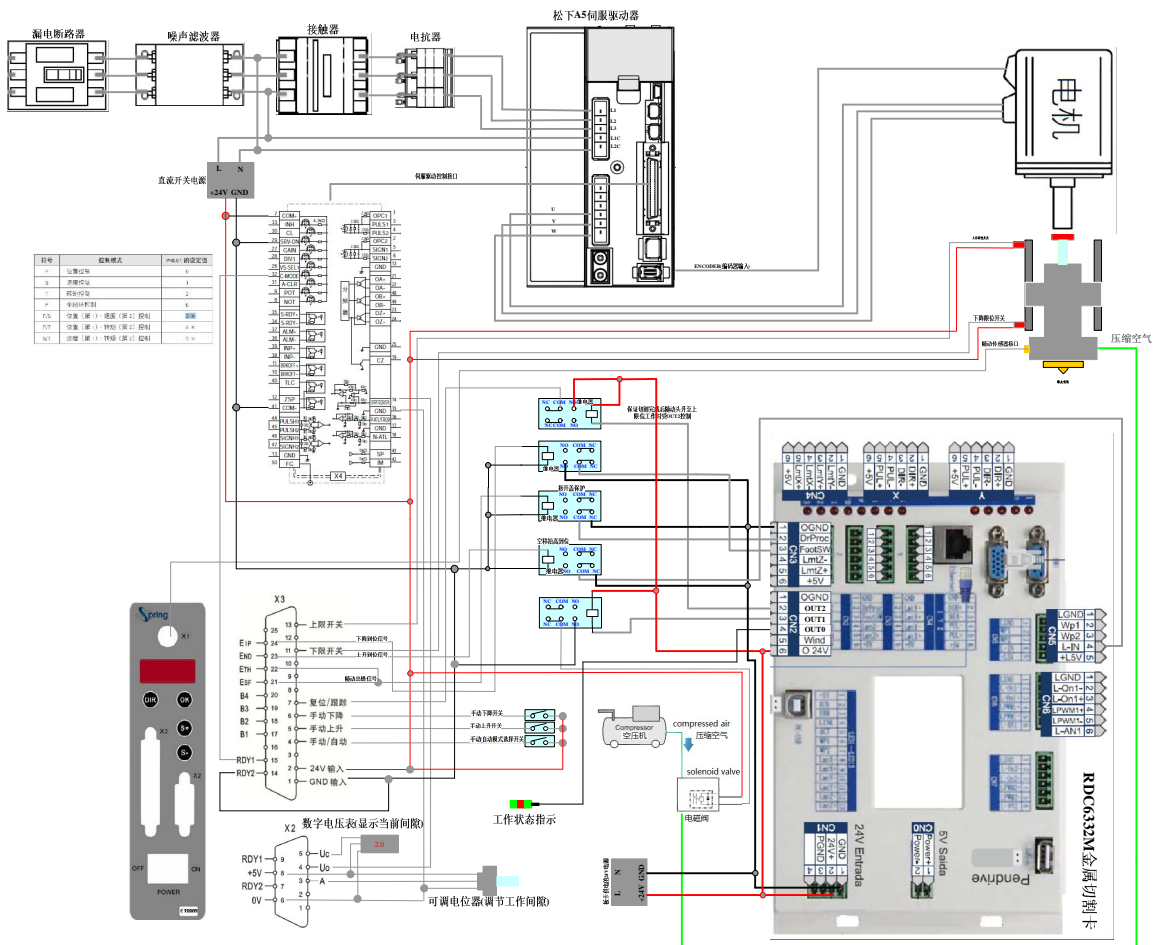Figure 2: System connection diagram

Description:

For CT8105 following control module, the X2 port is analog interface

- X2(5) pin is work interval instruct voltage output, users can choose to detect by connected to the digital voltmeter.
- X2(4) pin is following control analog voltage output, here connect speed command signal input of servo drive (14 pin of servo drive control terminal).
- X2(3) is Analog input, which is used to set the size of working interval , here can be connected potentiometer to adjust manually

For CT8105 following control module, the X3 port is analog interface

- **X3(4) is Automatically/Manually switch control, here can connect with a manual switch, to switch the control mode between automatically and manually**
- **X3(5) is manually up control, this signal must be set as automatic mode it will valid. Connect with manual switch.**
- **X3(6) is manually down control, this signal must be set as automatic mode it will valid. Connect with manual switch.**
- X3(7) is Reset/Tracking signal, when this signal is impending, the following head up, when this signal connecting with 24 v the following head will go down follows. Must be set as automatic mode is valid, this signal connected with the port of following control signal OUT2 of mainboard.
- X3(24) EIP is down signal, through the down in place input port FootSW connection of the relay and mainboard.
- X3(23) END is up signal, through the up in place input port L_IN connection of the relay and mainboard, this signal will change when the it is from the workpiece is 6~10mm.It means that the controller in the process of controlling the following head up to 6 mm -10 mm, started to empty movement. In the process of empty movement, the following head according to the size of the distance may be up again, until it is touching the up limit.
- X3(21)，X3(22) is following alarm signal output, the two signals can be paralleled by relay connect with the protection input interface DrProc of the mainboard. After there is one way or two way alarmed, can through relay input to protect input port, at this time, the controller stop movement and close the laser.
- In addition, CT8105 also provides two relay contact signal, RDY1 and RDY2, among them, the RDY2 connect 24 v of Ground, the other port connect C - MODE of servo drive (control mode control port), which is used to switch the control model of the servo drive. When it doesn't need following head movement, let the drive work in position mode, and need to following head movement, switch to the speed mode. For Details please refer to the CT8105 instructions.
- OUT0 As work state instructions, some audio and video equipment can be used to control the user.
- OUT1 **is** Fan control output interface, here used to connect relay, through relay connection can control the electromagnetic valve of compressed air. The output maximum driving capacity the board provided is 300mA, the user must ensure this point when used.

RuiDa Technology Co.,Ltd   **E-Mail: support@rd-acs.com**
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen   **Web:**   **www.rd-acs.com**
TEL: 0755-26066687   **FAX:**   **0755-26982287**

5 HM laser ZT3 following module

RDC6332M mixed cutting control system support the following control module of HaiMu, the connection is simple. Diagram as shown in figure 2.
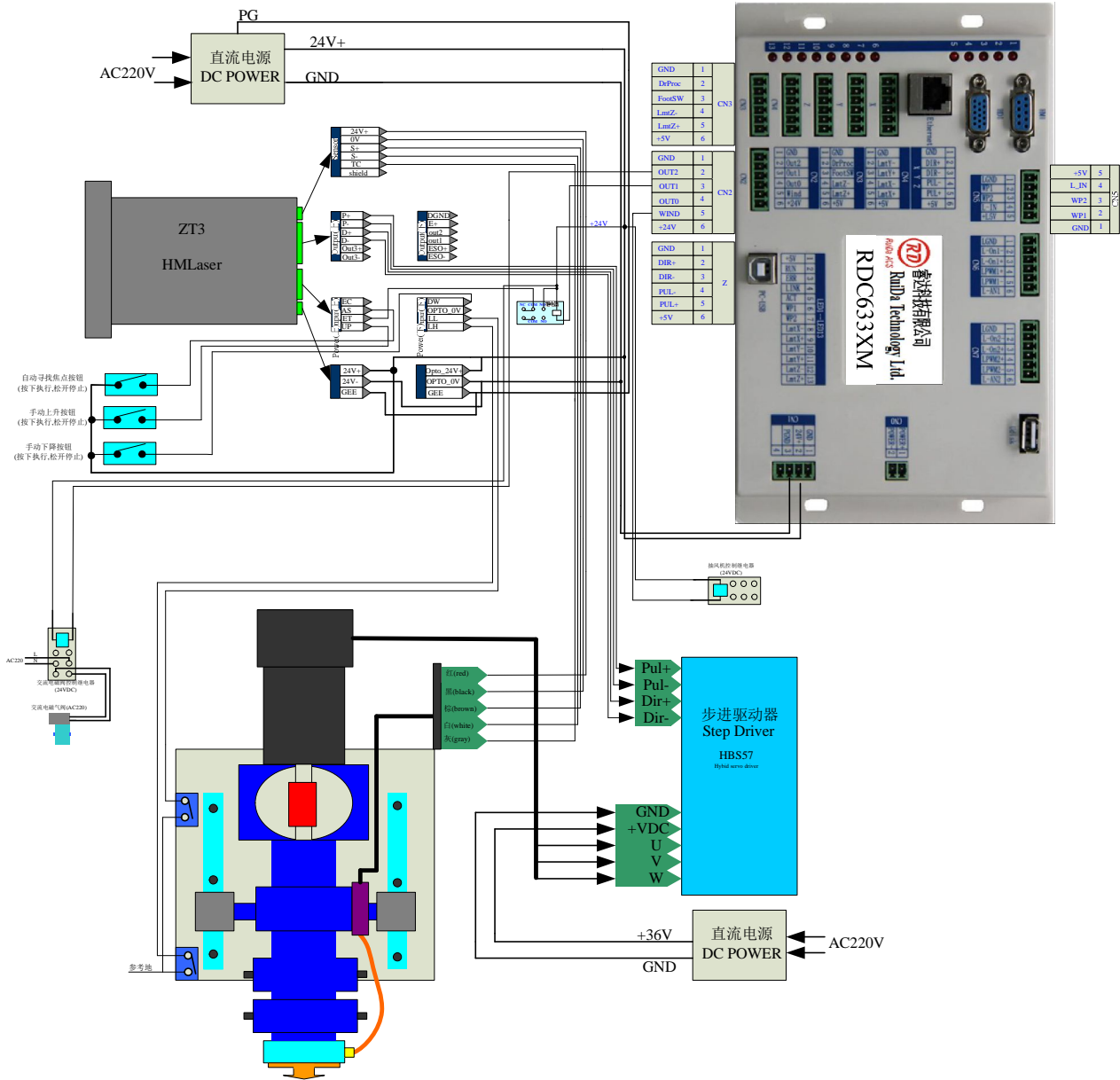

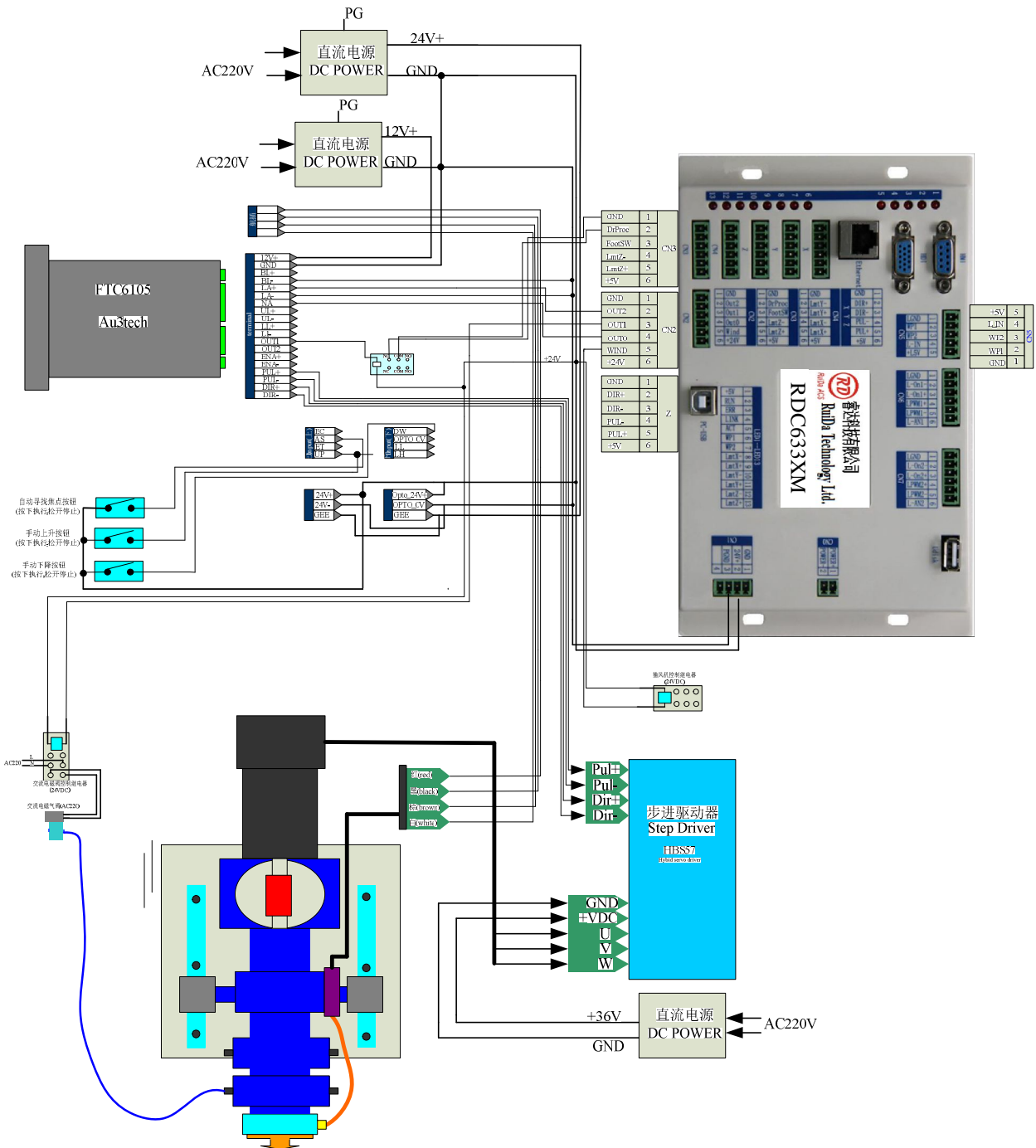Figure 2 ZT3 following module wiring diagram

Key Point:

- After power on, shift the panel buttons to "RUNNING" of the height controller, manually press the button of "up" and "down". Cutting head must be move in accordance with the desired direction.

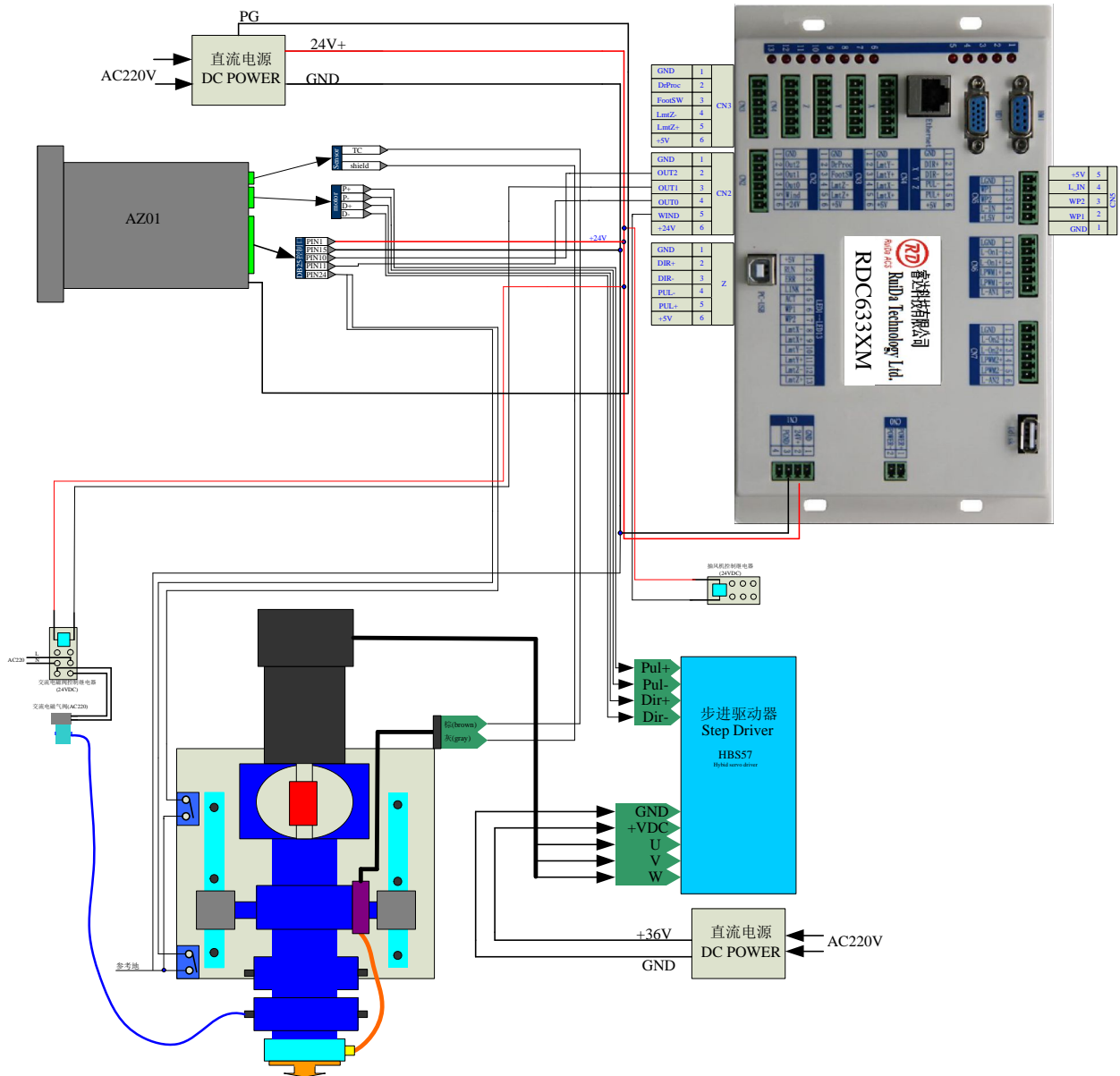Press the down key, will move to the direction of the platform.

- Press automatic search for surface, the cutting head move to the direction of platform with low speed. Until meet with the platform, the direction move to focus position and stop.

- At this time, can be tested by RDC6332M, in RDC6332M standby mode, press the "." (Decimal point) on the panel, the cutting head is reduced to the focus position, press again, the cutting head lift up.

- If all above operation are normal, you can perform a cutting task.

6 Interface with au3Tech   FTC6105

RuiDa Technology Co.,Ltd   **E-Mail: support@rd-acs.com**
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen   **Web: www.rd-acs.com**
TEL: 0755-26066687   **FAX: 0755-26982287**

Picture 3   Interface with FTC6105

8   AZ01 tracing module interface

RuiDa Technology Co.,Ltd   **E-Mail: support@rd-acs.com**
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen   **Web: www.rd-acs.com**
TEL: 0755-26066687   **FAX: 0755-26982287**

Picture 4 Tracing module wiring diagram

Power on test:
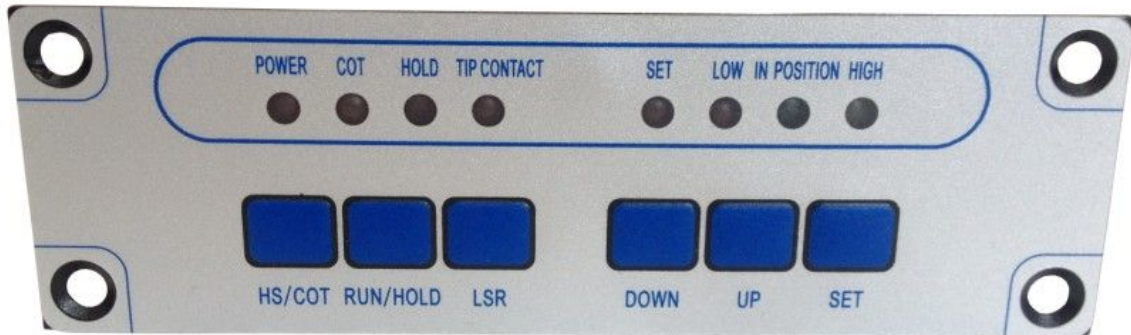
When power on, power led will light, wiring diagram of power supply is correct.

Calibration：

If the hold led is not on, then press RUN/HOLD key to make the tracing module into the HOLD status. And then down or up key can be used to adjust the height of laser head until you have decided the focus point. After that, press down the SET for a long time until the SET led is on. And then release SET. The calibration is finished when the SET led is off.

Working:

When the COT led is off after power on, then press HS/COT key，switch automatic focus module to the external control(COT light). Finish set the height controller parts.

Exit from limit state:

If up delay set too long, the laser head will trigger the up limit. It needs to close the machine power supply of machine and rotate the axes of tracing-axes manually to make the head away from limit switch, then power on, press "work" to use the height controller. (Generally rising time delay is set to 100 milliseconds is appropriate.)

RuiDa Technology Co.,Ltd   **E-Mail:** support@rd-acs.com
1B,Building 5,Nanyou Tian'an Industry zone,Nanshan District,Shenzhen   **Web:**   www.rd-acs.com
TEL: 0755-26066687   **FAX:**   **0755-26982287**