

Read this manual before operation

- The content include of electric connections and operating steps
- Read the manual to operate the systems

LFS-PM-T43

Live Focus System Operating Manual V1.3

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CERTIFICATION DECLARATION



CE

The product has been certified by the CE (Communate European) safety certification. It has passed the corresponding conformity assessment procedure and the manufacturer's declaration of conformity, in accordance with the relevant EU directive.



ROHS

This product has been certified by EU legislation (Restriction of Hazardous Substances) Safety certification; comply with relevant EU environmental regulations.



FCC

This product has been certified by the Federal Communications Commission for safety, Comply with us electronic safety regulations.

SAFETY INFORMATION

When using this system, please make sure the operation is correct and the usage is safe. Some signs or text will be used to remind you to pay attention to the dangerous matters and some important information.



Dangerous:

Indicates a serious danger. In the process of use, if the operation is improper or the way of use is wrong, it may cause serious injury or even death to the user. Please do not operate it easily until you have made sure that the operation method is correct and the way of use is correct.



Warning:

Danger. In the process of use, if the operation is improper or the use is wrong, which may lead to the injury of the personnel, please do not operate the personnel and related personnel easily, until ensure the correct operation method and use method is correct before use.



Cautious:

Represents the potential risk of the product. In the process of use, if the use method is wrong or improper operation, it may cause damage to the product or some parts. Please do not use it until you have made sure that the operation method is correct and the usage is correct.



Important:

Represents important information to be paid attention to during the use of the product. Please do not ignore this information, this information will provide effective operational help.



This sign indicates laser radiation, which is usually posted on products with laser output. Please be careful with laser and pay attention to safety when using this kind of equipment.

Sign in、Devanning、Examine cargo

The product itself with plastic or metal shell, can protect the external electrical components from damage. The products are packed in foam bags and anti-static bags. If there is any external damage to the package, check the equipment and notify the carrier and carrier in writing of the damage.

Important:



After receiving the product, please check whether the outer package is intact, check whether the product is complete after unpacking and whether all parts are intact. If any damage is found, please contact ruida immediately.

Remove all cargo from package and keep packing material and wiring parts. Please take care of the safety of the goods when unpacking them. After taking out the goods, please check whether the parts are complete and intact. If any missing parts or damaged parts are found, please contact ruida technology immediately. Do not install or debug the equipment if any obvious damage is found.

Contents

Chapter 1	Introduction.....	1
1.1	Product Introduction.....	2
Chapter 2	Functions.....	3
2.1	4.3” Touch Screen.....	4
2.2	Control Functions.....	5
2.2.1	Main Interface Introduction.....	5
2.2.2	Parameter Setting.....	5
2.2.3	Parameter Management.....	7
2.2.4	Alarm Information.....	8
2.2.5	Calibration.....	8
2.2.6	Auxiliary Gas Test.....	9
2.2.7	System Info.....	10
2.2.8	System Time.....	10
Chapter 3	Electrical Connection.....	12
3.1	Interface Of The Distance Controller.....	13
3.1.1	Sensor Interface.....	16
3.1.2	CN1----RS232 Interface.....	16
3.1.3	CN2----Analog Interface.....	16
3.1.4	CN3---General Input And Output.....	17
3.1.5	CN4---Control Input And Output.....	18
3.1.6	CN5---Power Input.....	19
3.1.7	CN6---External Power Input.....	19
3.1.8	CN7---General Input And Output.....	19
3.1.9	CN8---Motor Control Interface For Step Mode.....	19
3.1.10	MOTOR Control Interface For Servo Mode.....	20
3.1.11	HMI Interface.....	20
3.1.12	USB Interface.....	21
3.2	Led Indicator.....	22
Chapter 4	Test and Run.....	23
4.1	Distance Controller Test.....	24
4.2	Cutting Test.....	27
Chapter 5	Alarm Information.....	30
5.1	Description Of The Alarm.....	31
5.1.1	System Error.....	31
5.1.2	Upper/Lower Limit Trigger.....	31
5.1.3	Reset Error.....	31
5.1.4	Capacitance Smaller.....	31
5.1.5	Crash Alarm.....	32
5.1.6	Emergency Stop.....	32
5.1.7	Too Large Following Error.....	32

5.1.8 Multiple Error	33
Chapter 6 Installing	34
6.1 Size Of The Distance Controller	35
6.2 Size Of The Touch Screen.....	36
6.3 Size Of The Amplifier	37
APPENDIX: TROUBLE SHOOTS.....	38

Section 1 Introduction

CONTENTS:

- Product Introduction

1.1 Product Introduction

LFS-PM-T43 is a automatic distance control system that based on the capacity sensor. This system has a 4.3" TFT touch screen and can display the work status and detecting capacity value. An advanced capacity detecting technology has been applied to have a stable and anti-interference capacity result. With this sensor detecting technology, the responsibility and accuracy have been improved. The key functions are just like following:

- 1) Control servo or step motors, high responsibility and accuracy.
- 2) Support crash alarm, limit trigger protection and servo alarm protection.
- 3) Automatic calibration and can compatible with the third party's laser head.
- 4) Support focus distance modified on line. capacitor detecting scale is 0~9.9mm.
- 5) Work status of the laser head indicates and alarm indicates.
- 6) Support different setting of the rising height. Rising speed can be modified.
- 7) Auxiliary gas control. Support 3 channels auxiliary gas control.
- 8) Firmware updated by U disk.

Section 2 Functions

CONTENTS:

- 4.3” Touch Screen
- Control Functions

2.2 4.3” Touch Screen

This distance controller is included of a 4.3” touch TFT screen. The resolution is 480*272. the laser head work status is displayed in the monitor and parameters can be modified with the monitor. the display area is function button area, data display area, running status display area and alarm display area.

The main interface is just as the following:

- Function button area: touch the buttons can enter different function control menu.
- Data display: here is used to display the detecting value of the capacitor sensor and other set values.

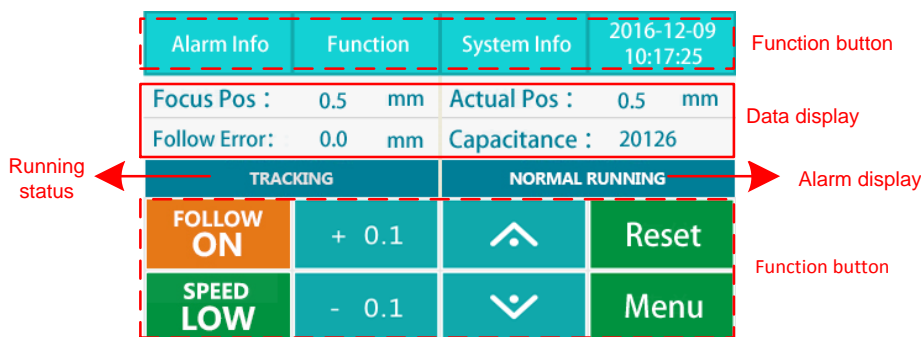
Focus position: the distance between the nozzle and the work piece.

Actual position: the actual value of the capacitor detected.

Following error: the error between the focus position and the actual position.

Capacitor value: the value that the controller has detect from the capacity sensor.

- Running status : display the status of the laser head.
- Alarm display: alarm status display. If there are several alarm triggered at the same time, user can touch the “Alarm Info” to check the alarm information in detail.



Main interface



The communication between the controller and the touch screen monitor is by RS232.

If all the electrical connections has been done correctly, when power on the controller, the monitor of the controller will go to the main interface. If there are no error happened, that means the automatic distance controller work well.

But if the monitor indicate that connection failed because of the cable fault or other reasons, "connect failure" will be popped up. User should check the cable and the sensor devices.

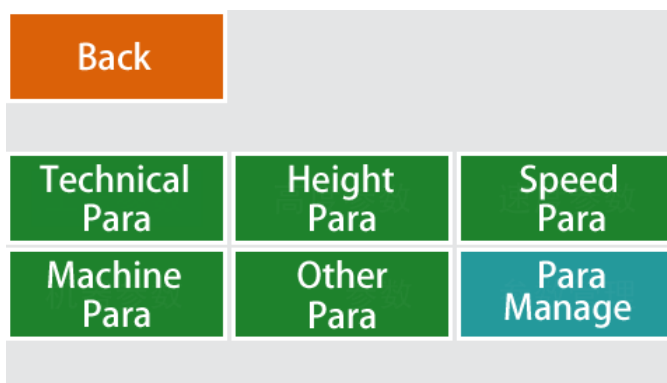
2.2 Control Functions

2.2.1 Main Interface Introduction

- ◆ **“FOLLOW ON/OFF”**: Enable or disable the tracing function. If it is tracing on, the color of the button will be changed into green, which means the controller is under the tracing status. If the height of work sheet changes, the laser head will tracing the movement of the work sheet and always keep the distance to be a constant value. If it is tracing off, the tracing function is disabled. If the height of the work piece changes, the laser head has no response to that during the motion of the cutting system.
- ◆ **“SPEED LOW/HIGH”**: is used to switch the manual speed to faster or slow.
- ◆ **“Menu”**: there are children menus in the menu to set some functions.
- ◆ **“Reset”**: To reset the distance controller. Before running reset function, be sure that the upper limit has been installed correctly.
NOTICE: There is danger during the reset operation because of the mechanical motion. So all the section should be checked before that and try to avoid of human harm.
- ◆ **“±0.1”**: modify the distance between the nozzle and the work sheet. Press one time, 0.1mm will increase or decrease.
- ◆  : to control the laser head to move up or move down. If the button is pressed, the laser head will be always moving until the button is released.
- ◆ **“Alarm Info”**: Press the button; user will go to the alarm information records interface. User can check the alarm information that happened recently. The maximum number of the alarm record is 9.
- ◆ **“Function”**: go to the auxiliary gas test and capacitor calibration menu.
- ◆ **“System Info”**: check the version of the controller and multi-language selection.
- ◆ **“System time”**: modify the system time.

2.2.2 Parameter Setting

Press “Menu” to enter the interface of craft parameter setting, height parameter setting, velocity parameter setting, machine parameter setting and other parameters.



Notice: Before operating the distance controller, be sure that the parameters has already set correctly.

The sense of the parameters is shown as the table:

Technical Para	Filter Factor	Increase the value will improve the responsibility of the laser head.
	Alarm Filter	Filter time for crash alarm protection. If the value is too small, the crash alarm will usually triggered because of the metal dross during cutting. If the value is too big, this will decrease the responsibility of the crash alarm protection.
	Blow Delay	Auxiliary gas release time before cutting or punch.
	Punch Gas	Auxiliary gas selection for punch. When cutting non-metal, this para is invalid.
	Cutting Gas	Auxiliary gas selection for cutting. When cutting non-metal, this para is invalid.
Height Para	Rise Height	The rising height for laser head during jump motion.
	Alarm Height	When the alarm triggered, the laser head is on the stop height.
	Standby Height	When the cutting task is finished, the laser head is on the position.
	Focus Position	The distance between the nozzle and the work piece.
	Reset Height	When reset the laser head, the laser head will trigger the limit switch and move reversely for this distance.
	Max Follow Error	During a close control, the error between the actual position and referenced poison should never beyond the value. If that happened, system protection will be executed and generate the alarm of following error over limit.
	Increment Height	The height of nozzle and plate when increment punching.
Speed Para	Rise Speed	Rising speed.
	Follow Speed	The maximum tracing speed.

	Reset Speed	Laser head reset speed.
	Manual Speed High	The manual fast speed.
	Manual Speed Low	The manual slow speed.
	Increment Speed	The speed of increment punching when cutting head go down.
Machine Para	Direction Polarity	Set the rotation of the motor.
	Acceleration	Motion acceleration.
	Screw Pitch	Screw pitch.
	Circle Pulse Number	When the motor rotate one round, the number of control pulse should sent to the motor drive.
Other Para	Enable Power On Reset	Enable or disable the reset when power on.
	Enable Crash Protect	If the crash alarm is enabled, when the laser head has touched the work piece for a certain time(over the filter time), system will rise up the laser head and stop the motion of the cutting system. If it is disabled, the crash alarm will be neglected.
	Limit Polarity	Set the sense of the limit switch. If a NPN limit switch is installed, user should set the polarity to be negative. If it is PNP, the polarity should be set to positive.
	Enable Limit	If the limit protection is enabled, when the limit is triggered, the motion protection will take affect such as rising the laser head and stop motion.

2.2.3 Parameter Management

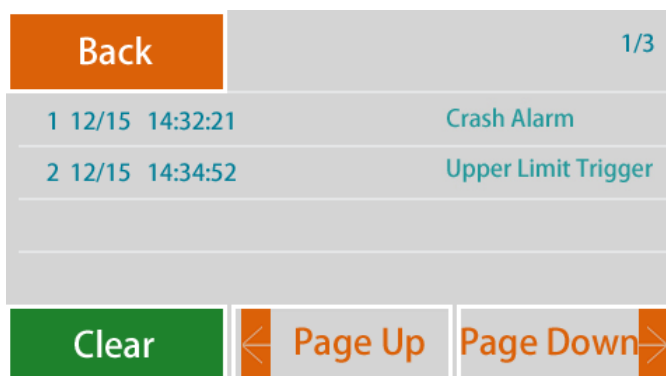
Parameters management is used to save and restore the parameters of the distance controller. Not everybody can operate this function. There are passwords for user to manage this function. When user has configured all the parameters correctly, then these parameters can be set to be default. So if the parameters have been changed, user can restore the right parameters from the default. We suggest that user must save the correct parameters to be default when all the parameters have been tuned correctly.



2.2.4 Alarm Information

On the main menu, press “ALARM INFO” to go to “ALARM INFO” interface.

User can check the alarm information. The information include of the alarm time and alarm source. The maximum records are 9 records that is saved. Press the “Clear”, all the information is cleared. User still can press “Page Up” or “Page Down” to check the information.



2.2.5 Calibration

In the main menu, press “FUNCTION” to go to “CALIBRATION” interface.

Calibration is very important for a correct application of the distance controller. If the laser head has stand by for a very long time or the environment has changed a lot, a calibration should be done. If user has change or replace some parts of the capacitor, the calibration must be done again.

Before calibration, slowly moving the laser head to close to metal work piece and let the laser head to be standby status. Make sure that the metal sheet has been connected to the EARTH well and the machine also connects to the EARTH well. Then we can start a calibration. If the metal sheet is not connected to the earth well, the calibration may be failed. If the laser head is always moving down to touch the metal sheet and never stop, user should check the metal sheet conduct with the machine well

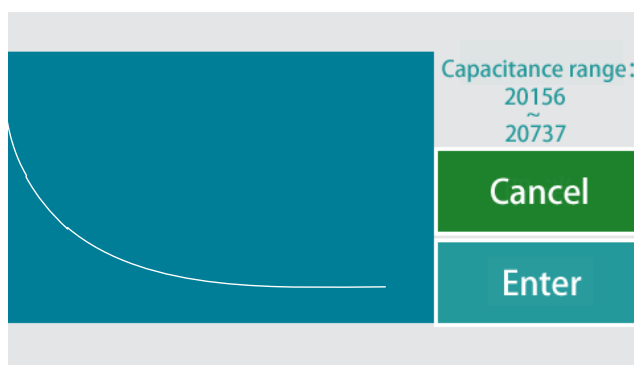
or not. If the conduction is ok, then check the electrical connection and the capacitor sensor is good or not.

The process capacitance calibration is as follows:

In the main interface, enter into the "capacitance calibration" interface from "function", click the "start" to start the process of capacitor calibration.

- The cutting head moves down will detect the plate first time.
- When detect the plate, the cutting head will go up 2mm and stop about one second.
- The cutting head moves downward again at a lower speed until a touch plate is detected;
- After detecting the plate, the cutting head capacitance value is detected and recorded in the upward movement
- After the capacitance detection is completed, move up to 10mm for safe distance;
- Finally if it show the capacitance calibration curve, if the curve is smooth, the results are ideal, then save the calibration results.

When the calibration is finished, a calibration curve will drew on the screen. The detection scale is also displayed. The curve indicates the response of the capacitor when the distance is changed. If the curve is smooth and the value is in the desired scale, that means the calibration is successful. User can press "ENTER" to save the calibration data. If the calibration is not smooth and there are noises on it, that means the calibration is failed. User can press "CANCEL" to ignore the result. User should not save the calibration data. User should check the reason that has caused this situation and do the calibration again and again until the curve is smooth.



Because the capacitor is a sensitive to temperature and humidity of the environment, user should wait 3~5 minutes when power on to let the sensor and amplifier to reach a stable temperature.

2.2.6 Auxiliary Gas Test

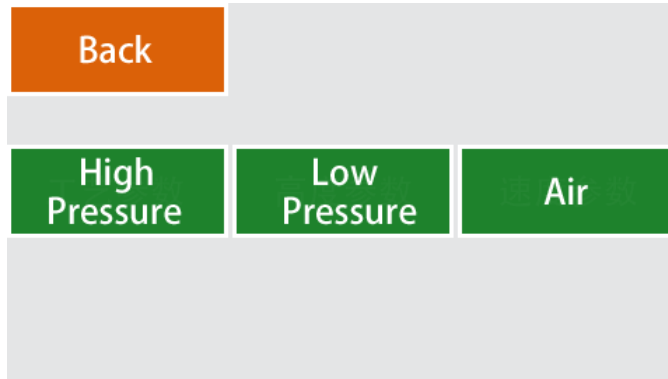
In the main menu, press "FUNCTION" to go to the "AUXI GAS" interface.

This function is used to test the auxiliary gas is good or not. Auxiliary gas testing include of 3 channels

auxiliary gas testing.

Testing steps: example for test the auxiliary gas with high pressure, press "High Pressure", then the auxiliary gas channel is turned on. Release the button, then turn of the channel.

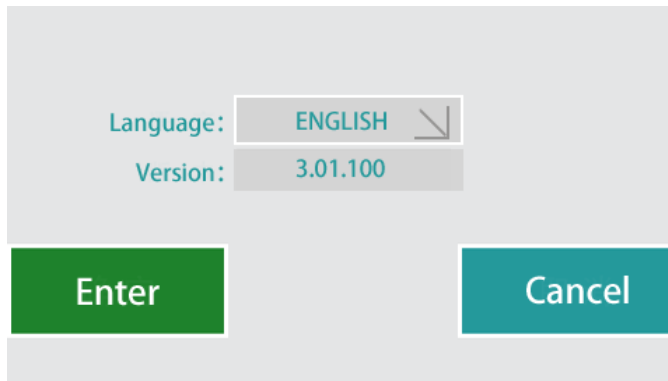
Notice: Before testing the auxiliary gas, make sure the control system is in the standby status. Or the testing can not be done.



2.2.7 System Info

Press "SYSTEM INFO" to go to system information interface.

This page include of the language selection and the version of the controller.



2.2.8 System Time

In the main menu, press the "date and time" to go to modify the date and time.

Change date and time

Date: Year Month Day

Time: Hour Minute Seconds

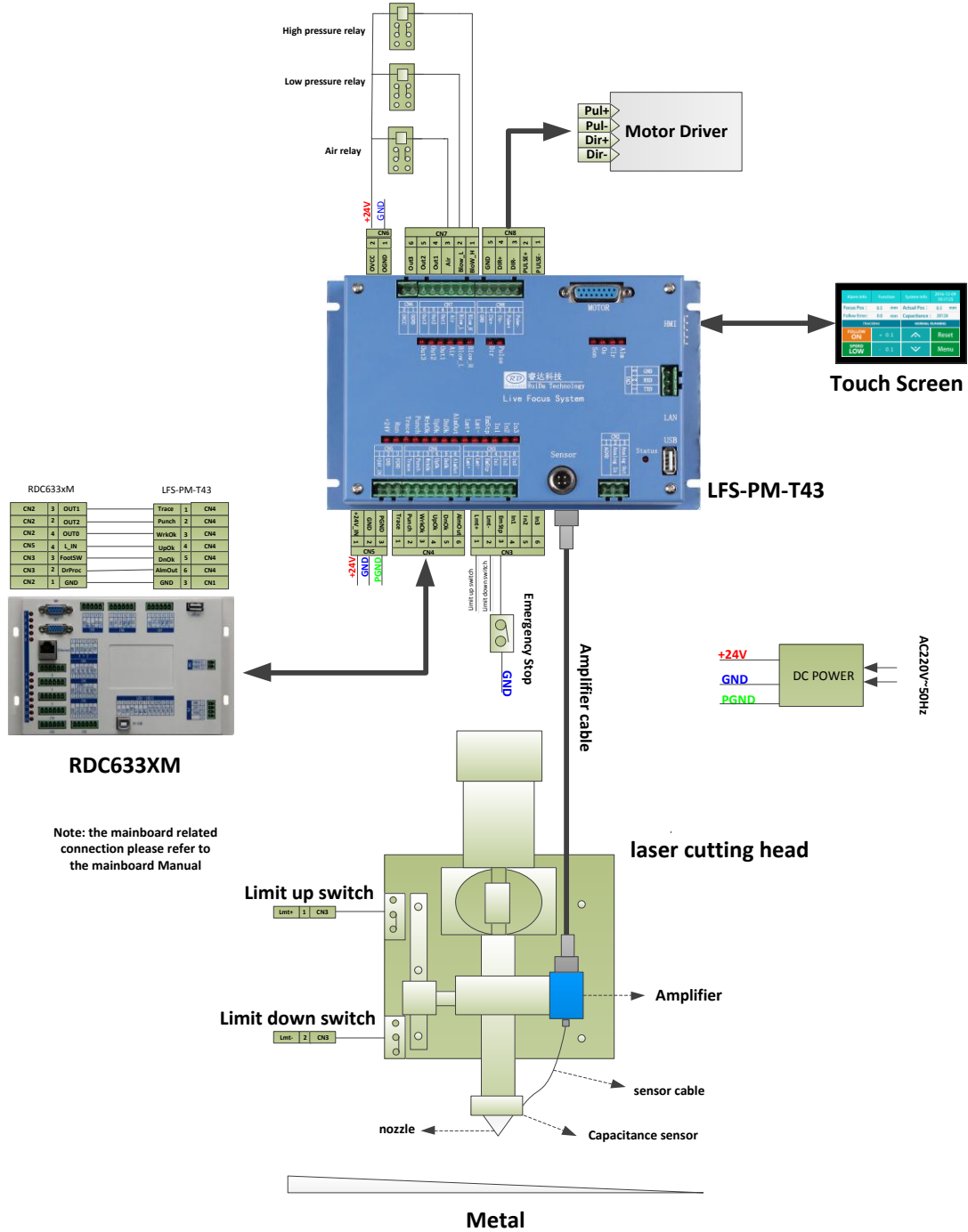
Section3 Electrical Connection

CONTENTS:

- Interface Of The Distance
Controller
- Led Indicator

3.1 Interface Of The Distance Controller

Take RDC6332M for instance, integrated system wiring diagram as follow:



The auxiliary gas wiring instructions are as follows:

When cutting Non-metal (Follow OFF), the air is always controlled.

When cutting metal (Follow ON), the punching and cutting gas can be selected by the parameters of

the channel blowing.

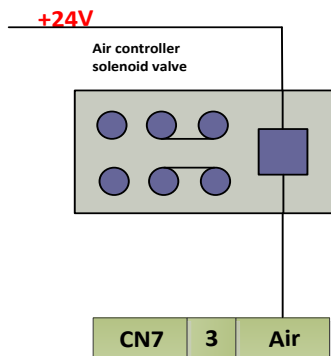
◆ The first Program:1 relay wiring

Parameter setting: If punching gas is air and cutting gas should be the air;

When cutting Non-metal (Follow OFF), LFS will control the air channel outlet all the time.

In the mode of cutting metal (Follow ON), LFS will control the High-pressure air channel outlet

When punching and cutting.



Cutting type	Gas channel of punching	Gas channel of cutting
Non-metal	Air	
Metal	Air	

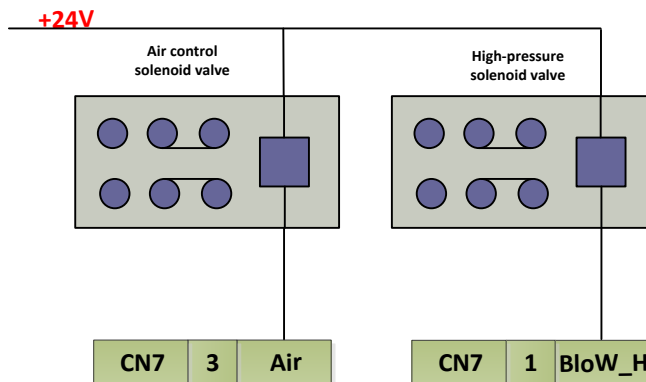
◆ The second Program:2 relay wiring

Parameter setting: If punching is high pressure gas and cutting is High pressure gas.

When cutting Non-metal (Follow OFF), LFS will control the Air channel outlet all the time.

In the mode of cutting metal (Follow ON), LFS will control the High-pressure gas channel outlet

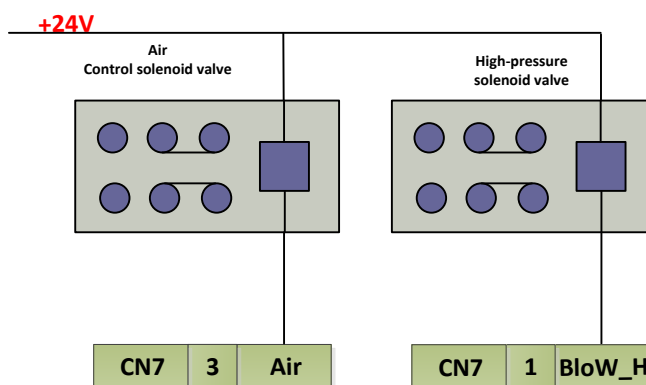
When punching and cutting.



Cutting type	Gas channel of punching	Gas channel of cutting
Non-metal	Air	
Metal	High-pressure gas	

Non-metal	Air
Metal	High-pressure

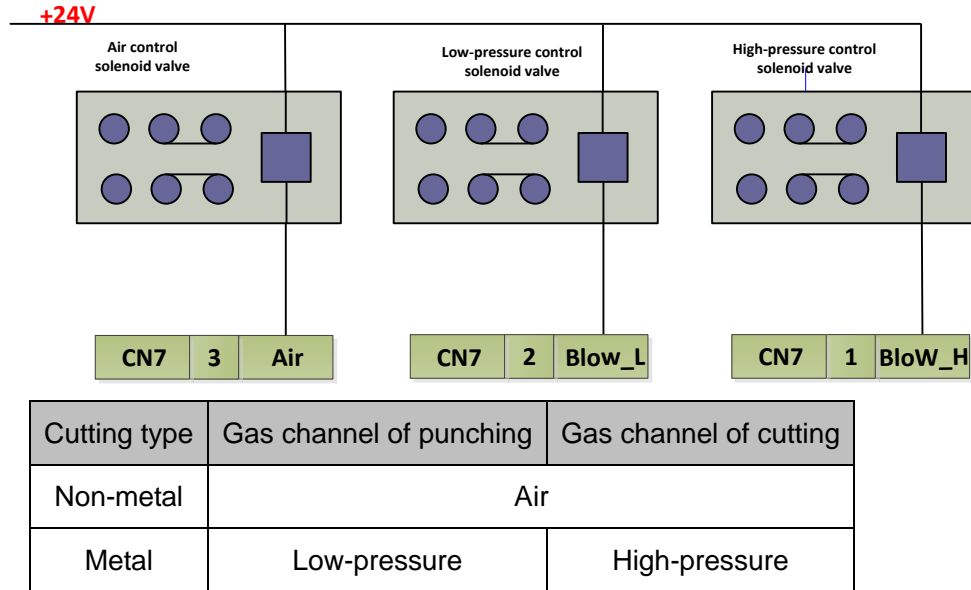
Parameter setting: If punching is air and cutting is High pressure gas (or Low-pressure).
 When cutting Non-metal (Follow OFF), LFS will control the air channel outlet all the time.
 In the mode of cutting metal (Follow ON), LFS will control the Air channel outlet when punching and control High-pressure channel outlet when cutting.



Cutting type	Gas channel of punching	Gas channel of cutting
Non-metal	Air	
Metal	Air	High-pressure

◆ The Third Program:3 relay wiring

Parameter setting: If punching is low pressure gas and cutting is high pressure gas.
 When cutting Non-metal (Follow OFF), LFS will control the Air channel outlet all the time.
 In the mode of cutting metal (Follow ON), LFS will control the Low-pressure gas channel outlet When punching and control High-pressure gas outlet when cutting.



3.1.1 Sensor Interface

This interface is to connect the amplifier and distance controller.

When installing the amplifier, the shield of the amplifier should be have good conduction with the laser head (sensor and nozzle). There a wiring terminal on the shield of the amplifier. User can connect the terminal to the laser head. The metal sheet should still have a good conduction with the machine. Or the capacity sensor will not work normally.

3.1.2 CN1----RS232 Interface

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN 1	TXD	Send data	—
PIN 2	RXD	Receive data	—
PIN 3	GND	GND	—

3.1.3 CN2----Analog Interface

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	AGND	Analog GND	—
PIN2	Analog In	Analog input	Input scale: 0—10V
PIN3	Analog Out	Analog output	Output scale: 0—10V

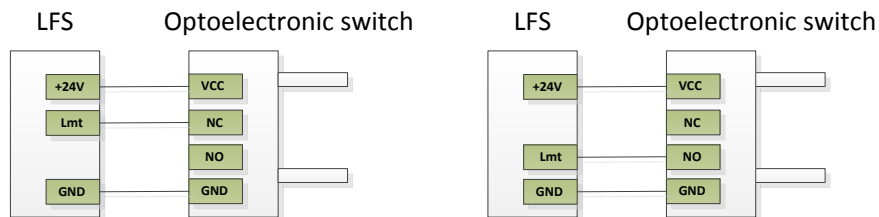
3.1.4 CN3----General Input And Output

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	Lmt+	UP limit	24V level
PIN2	Lmt-	Down limit	24V level
PIN3	EmStp	Emergency input	Low level valid
PIN4	In1	General input	Increment punching signal input
PIN5	In2	General input	It can be used for open cover protection or other functions, when low-level, trigger will alarm.
PIN6	In3	General input	It can be used for open cover protection or other functions, when low-level, trigger will alarm.

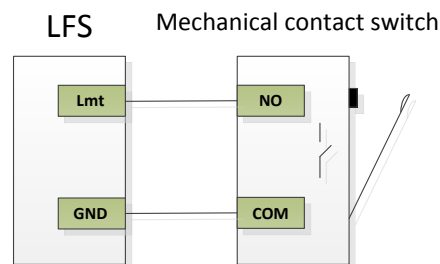
Limit switches include upper limit, lower limit switch. It is support connections of open and closed normally. When using normally open mode, change the polarity of the booster to negative polarity. When using the normally closed, change the polarity of the booster to positive polarity.

- **Different types of limit switch wiring instructions**

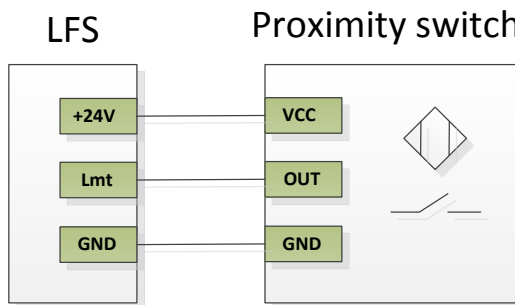
Two types of optoelectronic switch wiring instructions:



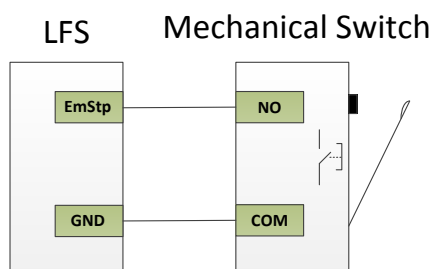
Mechanical contact switch wiring instructions as follow:



Proximity switch wiring instructions as follow:

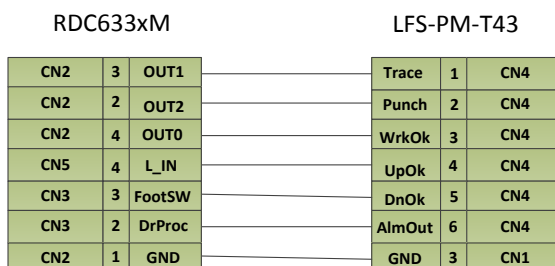


- Emergency switch wiring instructions as follow:



3.1.5 CN4---Control Input And Output

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	Trace	Trace signal	When low level, the LFS will control the laser head to trace down. When high level or open, the LFS will rise the laser head.
PIN2	Punch	Punch signal	Come from the controller When high level (+24V), that means the controller is punching.
PIN3	WrkOk	Work status indicator	controller work status. The signal comes from the controller.
PIN4	UpOk	Rising up status	Low level valid
PIN5	DnOk	Going down status	Low level valid
PIN6	AlmOut	Crash alarm output	When the laser head crash to the metal plate, the AlmOut output 24V.



3.1.6 CN5----Power Input

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	+24V_IN	+24V Power	+24V, Drive ability above 2A
PIN2	GND	GND	—
PIN3	PGND	EARTH	—

3.1.7 CN6----External Power Input

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	OGND	OGND	—
PIN2	OVCC	External +24V Power	—

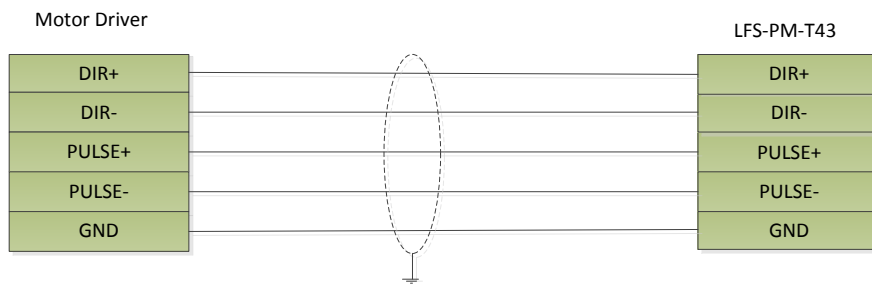
3.1.8 CN7----General Input And Output

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	Blow_H	High pressure gas control	Drive relay
PIN2	Blow_L	Low pressure gas control	Drive relay
PIN3	Air	Air control	Drive relay
PIN4	Out1	General output	Increment punching signal output
PIN5	Out2	General output	—
PIN6	Out3	General output	Output follow switch status,when follow on,low voltage output,when follow off,high voltage output

3.1.9 CN8----Motor Control Interface For Step Mode

PIN	SIGNAL	DEFINITION	DESCRIPTION
PIN1	Pulse-	—	—
PIN2	Pulse+	—	—
PIN3	Dir-	—	—
PIN4	Dir+	—	—
PIN5	GND	—	—

- 1) To control step motor, differential mode and common-anode mode can be applied. We recommend user to select differential mode .



2) To control servo motor, please set the parameters correctly according to the operation manual of the servo drive.

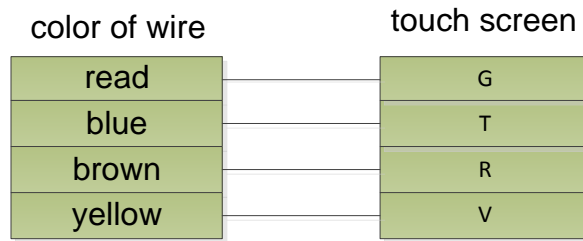
- ◆ Set the servo drive to work at the position mode.
- ◆ The polarity of the pulse and direction.
- ◆ The number of pulse/per round.

3.1.10 MOTOR Control Interface For Servo Mode

PIN (color of wire)	signal	definition
PIN1 (yellow)	SPEED	+/-10V speed command
PIN2 (blue)	OS	Zero speed
PIN3 (black)	A+	Encoder A+
PIN4 (orange)	B+	Encoder B+
PIN5 (red)	Z+	Encoder Z+
PIN6 (green)	SON	Servo on
PIN7 (green/white)	CLR	Alarm clear
PIN8 (brown)	+24V	+24V output
PIN9 (yellow/white)	AGND	Analog GND
PIN10 (blue/white)	GND	GND
PIN11 (black/white)	A-	Encoder A-
PIN12 (orange/white)	B-	Encoder B-
PIN13 (red/white)	Z-	Encoder Z-
PIN14 (purple)	ALM	Servo alarm input
PIN15 (brown/white)	GND	GND

3.1.11 HMI Interface

The connection between the distance controller and the displayer is shown as follows:



3.1.12 USB Interface

USB is a U disk interface that used to upgrade the firmware.

LAN is a ETHERNET interface.

1.2 Led Indicator

LED name	Description
+24V	24V Power indicator
Run	System running indicator
Trace	Tracing signal indicator
Punch	Piercing indicator
WrkOk	Work finish indicator
UpOk	Rising up ok indicator
DnOk	Tracing down ok indicator
AlmOut	Alarm indicator
Lmt+	Up limit indicator. Low level input will turn on the led
Lmt-	Down limit indicator. Low level input will turn on the led
EmStp	Emergency stop input. Low level input will turn on the led
In1	Low level input will turn on the led
In2	Low level input will turn on the led
In3	Low level input will turn on the led
Status	U disk status
Alm	Servo alarm input. Low level input will turn on the led
Clr	Servo alarm clear. Low level input will turn on the led
Os	Zero speed status. Low level input will turn on the led
Son	Low level input will turn on the led
Pulse	Pulse signal indicator. Low level input will turn on the led
Dir	Direction signal indicator. Low level input will turn on the led
Blow_H	High pressure gas control output. Low level input will turn on the led
Blow_L	Low pressure gas control output. Low level input will turn on the led
Air	Air control output. Low level input will turn on the led
Out1	Low level input will turn on the led
Out2	Low level input will turn on the led
Out3	Low level input will turn on the led

Section 4 Test and Run

CONTENTS:

- Distance Controller Test
- Cutting Test

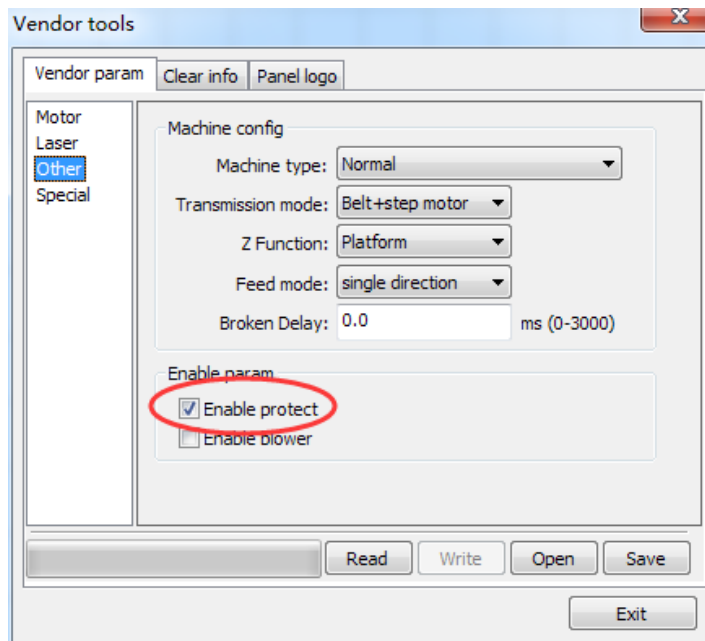
Test and run is based the RDC6332M cutting controller and the control software is Metal Cut.

4.1 Distance Controller Test

Before we start the distance controller test and run, the cutting control system and the distance controller should be wired correctly.

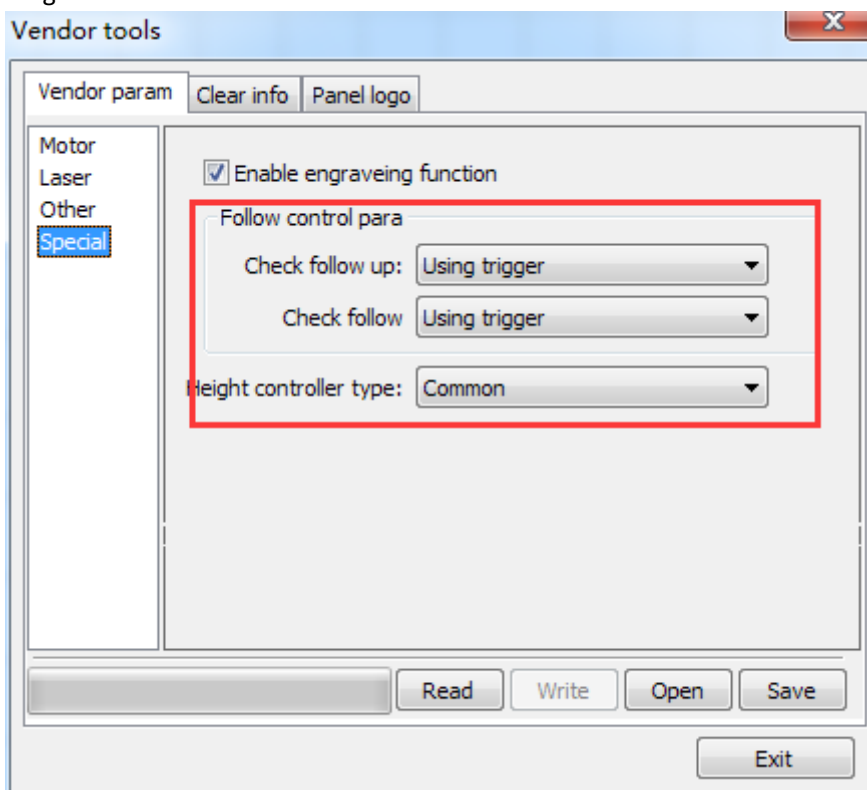
When you want to start a normal testing, the user parameter and vendor parameter should be configured correctly. Shown as the following:

MetalCut→FILE→VENDOR SETTING→OTHERS→ to enable “ENABLE PROTECT”:



MetalCut→VENDOR SETTING→SPECIAL→(the password is rdtsmm)→height controller type(common)→check follow up(use trigger)→check follow(use trigger).

Shown as following:





User still can select the “check follow up” to be “use delay” and the “check follow” to be “using trigger”.

The first operation should be careful. The following step should be noticed:

- 1) If the drive is servo drive, please set the parameters correctly according to the operating manual of the servo drive.
- 2) Then power on the distance controller, go to the “MENU”→“Setting”. Configure the parameters correctly.
- 3) To check the limit switch is good or not. User can trigger the limit manually. If it work well , the information of up limit trigger or down limit trigger will be displayed in the screen. That means the limits are working well.

If the polarity of the limit is wrong, please check and modify the polarity of the limit in the menu.

Then check the crash alarm is good or not. Just move the laser head or the work piece to keep they touch each other. If there are crash alarm information displays in the screen, which means the crash alarm is ok.
- 4) Press  , check the moving direction of the laser head, if the direction is not the desired direction, then modify the “motor polarity”.
- 5) Calibration. If the calibration result is good, then save the data.
- 6) Press “trace off”, the button will changed into green and the text will change into “trace on”. Press the “.” on the operating panel of the cutting system. The laser head will tracing down to the work piece and enter the tracing mode. Press “.” again, the laser head will rise to a certain position.
- 7) If all the steps is ok, that means the distance controller work well.



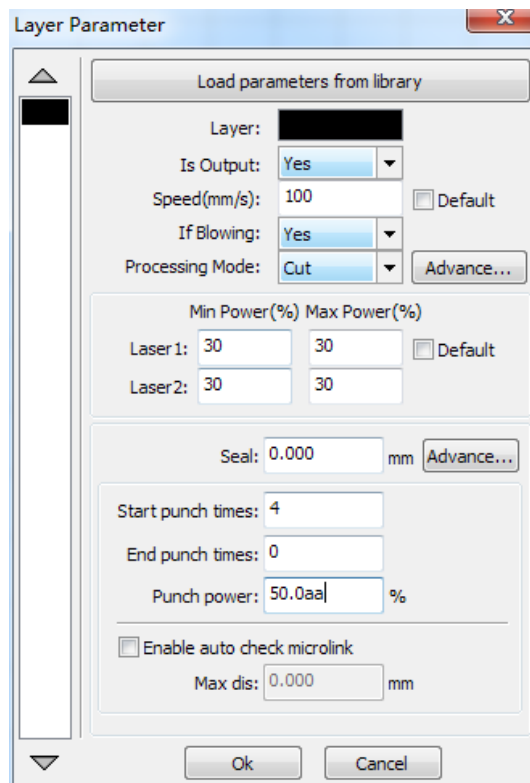
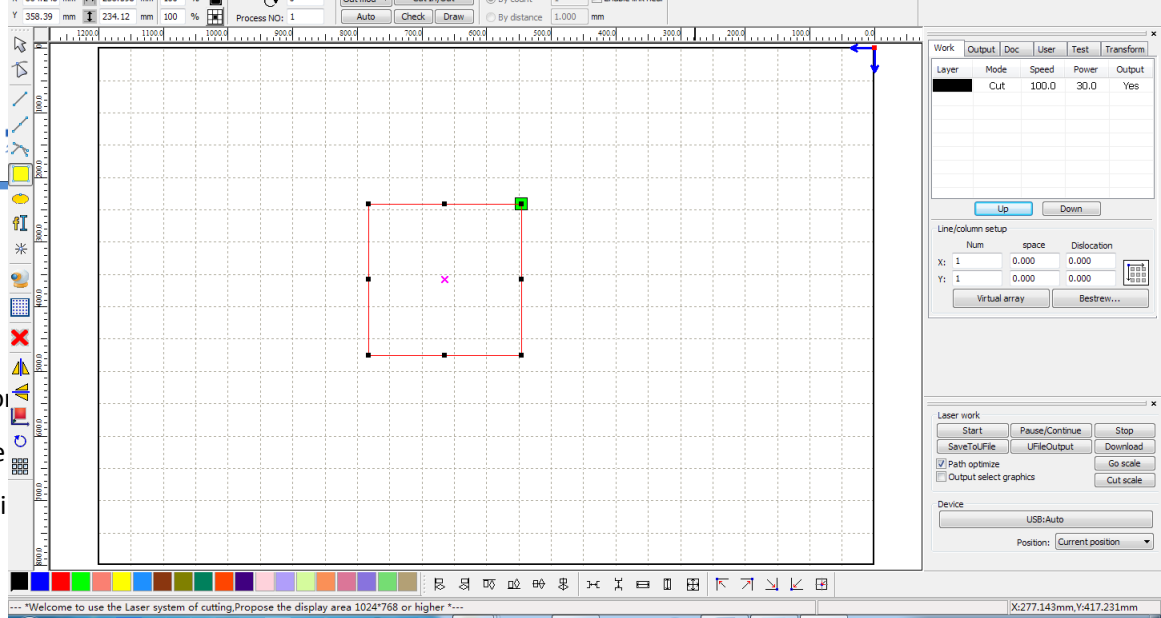
1.3

Before reference

Cutting

1)

2) Set the layer parameter



For laser piercing, the motion controller support CW piercing and pulse piercing mode. To set the piercing mode in the user parameters and layer parameters.

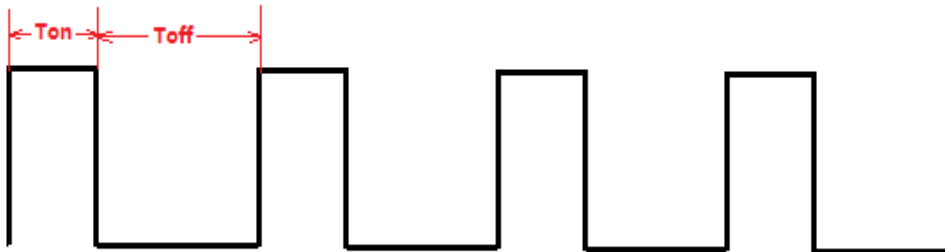
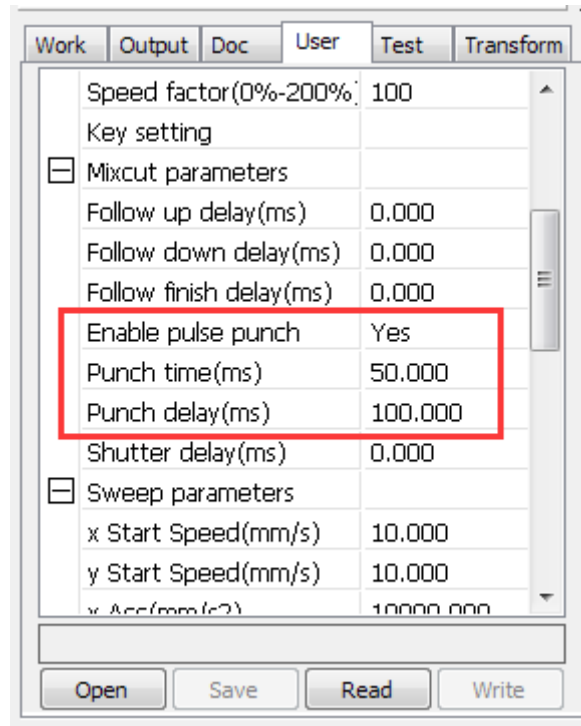
The piercing time is decided by the piercing times (n) and single piercing time (Ton).

$$\text{Piercing time} = n * T_{on}$$

If laser CW piercing has been enabled, there is a continuous laser on the metal work piece for a certain time and then start a normal cutting.

Pulse piercing is used to be applied for thick metal sheet cutting.

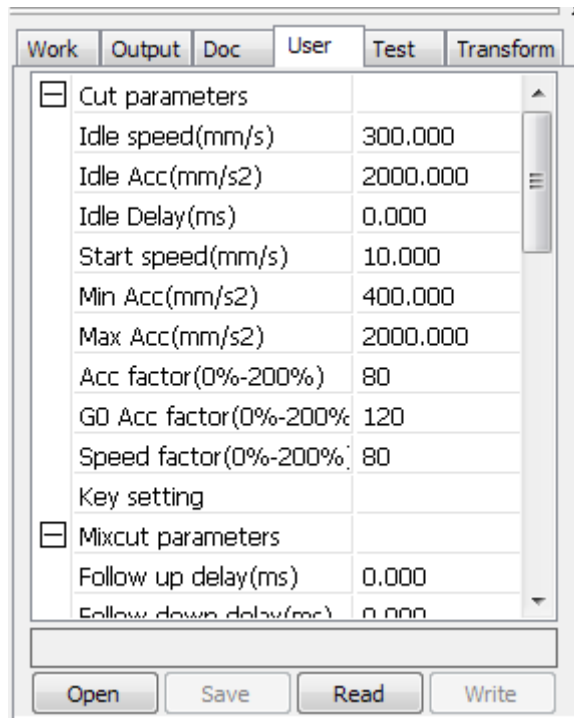
The following is a example for pulse piercing. The piercing times are 4 and the single piercing time is Ton. The interval time between 2 pulse is Toff.



The total piercing time = $50 * 4 = 200\text{ms}$;

User can set the laser power for laser piercing and the laser power for cutting.

3) User parameter setting



4) Auxiliary test

Press the “function” to go to “auxiliary test” page. This used to test the piercing gas and the cutting gas.

5) Laser emission test

In the operating panel of the motion controller, press “pulse” to test the laser.

6) Reference position

Move the laser head to a referenced position. Press “reference” and the current position is set to be the zero position.

7) Frame

After set the referenced poison, press “Frame” to execute a frame motion.

8) Start cutting

Press “start” to start a normal cutting.

Section 5 Alarm Information

CONTENTS:

- Description Of The Alarm

5.1 Description Of The Alarm

During the running, there maybe some alarm happened because of some undesired conditions. The alarm information will be considered and some protection should be executed. The alarm information include of upper limit trigger, lower limit trigger, reset error, crash alarm, too large following error, emergency stop and capacitance smaller. When one or several alarm happened, the information will be displayed on the displayer. User should check the reasons that have caused the alarm and clear the alarm.

5.1.1 System Error

It is a system fault. When the hardware or the firmware is failed, the alarm happened. When the alarm happened, the system will stop motion. User should check the distance controller and power on it again. If the alarm is still there, user should take a new controller to replace that one.

5.1.2 Upper/Lower Limit Trigger

When the limit protection has been enabled, the system will display the limit trigger information once the limit is triggered. If there are limit triggered, there may be the following reason:

- ◆ The sense of the limit switch is set incorrectly.
- ◆ Wrong wiring.
- ◆ Limit switch fault or the voltage level is not 24V.

5.1.3 Reset Error

There may be the following reasons to cause the reset error:

- ◆ When resetting, the laser head have no motion or the speed is too low and has caused a timeout action. Please check the parameters of the distance controller.
- ◆ The polarity of the motor is wrong. When resetting, the laser head move down to trigger the down limit.

5.1.4 Capacitance Smaller

If the current detected capacity value is too small, then the capacity fault will displayed. There may be the following reasons:

- ◆ Do not do a calibration for a long time or the humidity and temperature has changed a lot. Do a calibration again to clear this fault.
- ◆ Part of the sensor has been replaced and installed again. Do a calibration again to clear this fault.
- ◆ There are bad connections of the wire. Check the wire connections.
- ◆ Work piece do not have a good conduction with the shield of the amplifier. Check the wire to the earth and the wire on the amplifier shield.
- ◆ Parts of the laser spot are located on the capacity sensor and cause the temperature rising. Please check the optical path and the optical devices.

5.1.5 Crash Alarm

When the laser head has touched the metal work piece for a certain time, the crash alarm will be displayed on the displayer. If the laser head do not touch the metal sheet, there is still crash alarm displayed. There may be the following reasons:

- ◆ There is a short between the nozzle and the shield of the amplifier.
- ◆ The axial cable between the amplifier and the capacity sensor is damaged or the amplifier does not work.
- ◆ The capacity value of the sensor has been out of the detecting range of the distance controller.

5.1.6 Emergency Stop

When a low level signal is input to the emergency port, system will stop all the motion immediately. If the input is keep high level and there is still a emergency triggered, the following reasons may cause that.

- ◆ Wrong wiring.
- ◆ Machine electrical interference. Please check the wiring connection to the EARTH.

5.1.7 Too Large Following Error

There is big error between the referenced distance and the actual distance of the laser head. Please modify the filter factor parameters or increase the limit value.

5.1.8 Multiple Error

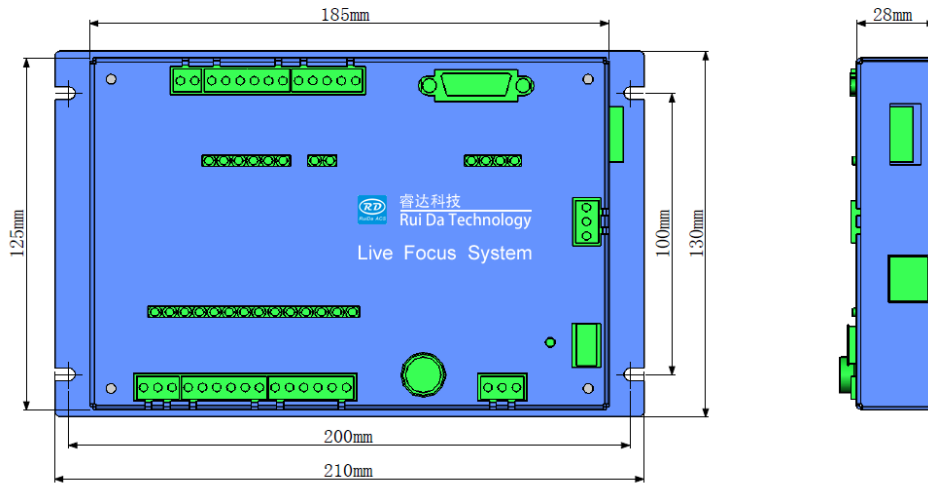
When there are several alarm triggered at the same time, the multi-alarm information will be displayed on the displayer. User can go to “Alarm info” to check the alarm information in detail.

Section 6 Installing

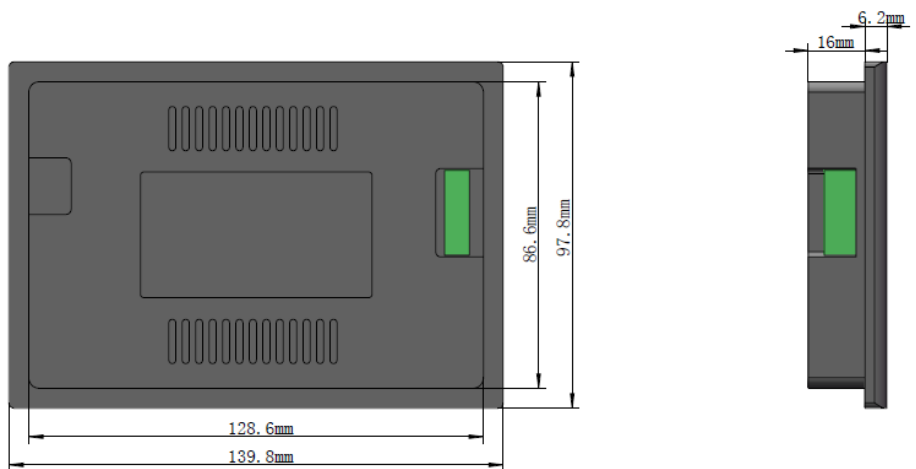
CONTENTS:

- Size Of The Distance
Controller
- Size Of The Touch
Screen
- Size Of The Amplifier

6.1 Size Of The Distance Controller

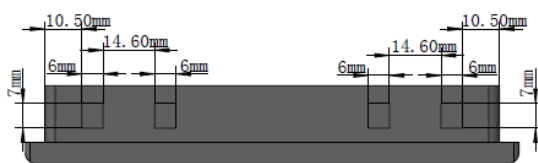


1.4 Size Of The Touch Screen



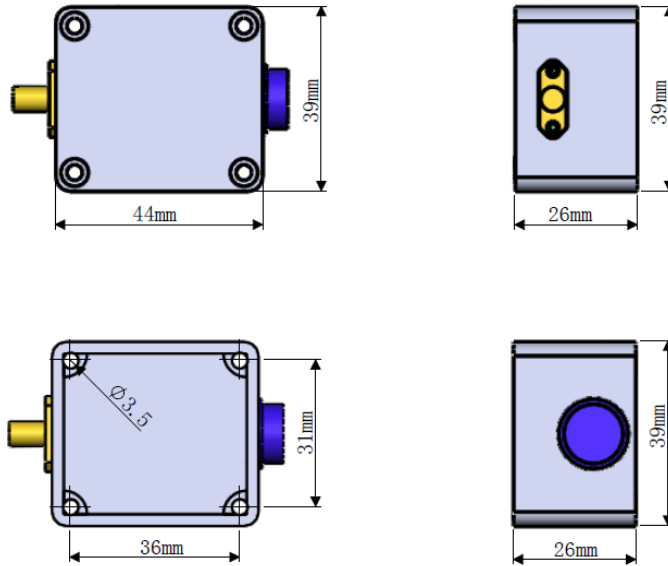
Back View

Left View



Bottom View

1.5 Size Of The Amplifier



Appendix: Trouble Shoots

FAULT	MAIN REASON	SOLVED
Manual moving up and down function failed	Wiring of DIR+, DIR-, PULSE+, PULSE-is not correct	Reference to the manual to ensure a right connection
	Parameters of Servo drive is not correct	Reference to the servo drive operating manual
	There is no serve on to the drive	Enable the servo drive internal or by external signal
	Connection between the distance controller and the displayer is not correct	Check the wiring
	Emergency trigger	Release the emergency input
“connect failure” on the displayer	Wrong connection between the displayer and the distance controller	Check the wiring
	The displayer do not match with the distance controller	Check the version of the distance controller
	Controller hardware port is damaged.	—
	Displayer hardware port is damaged	—
“touch screen not match” on the displayer	The firmware is not match with the displayer	Check the version of the distance controller
During calibration, the laser head moving down and no stop when touch the metal sheet.	Dross on the nozzle has caused the capacity changed a lot	Clear the nozzle
	Metal sheet do not have a good conduction with machine	Have a good conduction between the metal sheet and the machine
	Metal sheet have a plastic film	Clear the plastic film
During calibration , calibration failed is displayed.	During the calibration, “stop” is pressed	—
	When calibration, the laser head is too far away from the metal sheet	When calibration, move the laser head close to the metal sheet.

	During the calibration, up limit or down limit triggered	Before calibration, check the position of the laser head. Move the laser head away from the limit
	There is no motion and cause a time out	Check the parameters of the servo drive and can run a jog motion
“write para” can not write the parameters into the distance controller	The laser head is in the running status	Stop motion and set laser head to be standby status
	wrong connection between the displayer and the distance controller	Check the wire and the interface
There is big error between the actual height and the referenced height	no calibration for a long time	Calibration again
	Has changed some parts of the sensor but do not do the calibration	Calibration again
	Some laser beam is located on the capacity sensor or the lens is dirty and make the sensor's temperature increasing	Check the lens is clean and the position of the laser beam
	Auxiliary gas has caused the capacity changing	Check the cleanliness and the humidity of the auxiliary gas
Laser head shaking during tracing	Shield of the amplifier do not have good conduction with the machine	Check the EARTH wire is connected well
	Filter factor parameter is not normal	Decrease the filter factor parameter and decrease the responsibility of the distance controller
	Before start a normal cutting. Calibration is not done or the calibration result is not so good	Calibration again
	Servo stiffness is too big	Decrease the stiffness
	Servo electrical interference	Check the shield of servo drive is connect to the EARTH

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