

**BEIJING**

**RUIZHITIANHONG S&T Co.,Ltd**

**Engraving machine motion control system**

**Color Screen**

**A58:Four-axis mechanical carving**

**User's manual**

Thank you for choosing the products!

This manual helps you be familiar with the company's products, and get information about systems' components、 configuration, etc.

This manual detailed knowledge of the system characteristics、 operational processes、 installation and commissioning, and safety precautions. Please read this manual carefully before using the system and machine, which will help you make use it better.

### **Cautions:**

1. Use of this product is strictly prohibited in the strong interference、 strong magnetic field environment. Operating ambient temperature 0-70 °C, working environment humidity 0-90% (non-condensing).
2. Insert U disk in the correct direction. Do not pull out 50-pin cable when system run.
3. Perform processing U disk file process, Do not pull out the U disk to prevent the interruption of data transmission.
4. Strictly prohibited metal, dust, and other conductive substances enter the controller.
5. The machine shell should connect the ground wire to ensure the safety of the work and to prevent interference.
6. Prohibited unauthorized disassembly, no internal user repairable parts.
7. For long periods of time, please pay attention to the power outage, and retain.
8. Pay attention to water, dust, fire when using it.
9. Do not use the corrosive chemical solvents to clean the equipment.
10. Spindle motor bearing life and its speed is inversely proportional.
11. Graver is very sharp. Do not touch when it is running, in order to avoid injury; Do not use handkerchiefs, scarves contact it to prevent embroiled damage.

### **Important Notice:**

The Company shall not be responsible for any loss caused by improper using or breaking the correct operating procedures.



Beijing RichAuto S&T Co., Ltd.

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## ✧ Foreword

### ● **System Introduction:**

**RichAuto** is CNC motion control system independently developed by Beijing RichAuto and it can be widely applied to machinery, advertisement, woodworking, mold engraving machine, laser, flame, plasma cutting machine, and so on in the machine control field.

**RichAuto** make DSP as the core control system, High-speed processing operation is the microcontroller, PLC systems can't match; Use embedded structure, High degree of integration, Strong stability, easy to installation and operation; U disk support, Removable storage card reader, With USB Interface, High speed transfer, Plug and play the full realization of all work offline.

### ● **Characteristics:**

1. System deploy standard X, Y, Z, A axis motion control method, enables to switch the processing of surface and processing of rotation, implementation four axis interlocking Control.
2. Multi I / O Point Control, there is 16 input and output signals in every basic I / O signal node, expansion I / O nodes can be expanded to 32 input and output signals.
3. Support the standard G code, PLT format instructions; support domestic and international mainstream CAM software, such as: Type3, Art cam, UG, Pro / E, Master CAM, Cimatron, Wentai etc.
4. Provide with power-down protection. Instantaneous power processing system to automatically save the current processing of information (file name, current line number processing, processing speed, spindle threshold), when power again machine moves back, the system automatically prompts the user to restore the processing before power down, the processing operations become more humanity.
5. Support breakpoint memory, file selection, processing. Save 8 different

- breakpoint processing information.
6. Multi-coordinate memory function. Provide 8 working coordinates system, the user can switch among the 8 coordinates, each coordinate system can save a process origin information.
  7. Support online adjust spindle operating frequency. The spindle frequency from 0 to maximum frequency is divided into 8 thresholds; 1 - 8 threshold can be processed directly adjust up and down without suspend processing.
  8. Support adjust speed ratio online. Users can adjust the speed ratio, to adjust the processing speed and empty running speed, speed ratio values from 0.1-1, Ascending or descending per 0.1 numerical.
  9. Simply manual operate mode. In manual mode, the system provides three kinds of sports concluding continuous, step (crawl), distance, manual operation became more simple and convenient.
  10. Identifies M code, F code and other development commands, can open a special code based on user needs.
  11. Built-in 512 M memory.
  12. Unique handheld form factor with one hand to hold. Own liquid crystal display and 16 button button board , operate intuitive and flexible, no longer dependent on the computer, the full realization of full offline operation
  13. Comes with USB communications port, file transfer efficiency can be directly read U disk, card reader file, Plug and Play.
  14. Self-test function, the system comes with I / O port signal detection capabilities, ease of remote maintenance.
  15. Processing with high-speed and smooth, support high subdivide, make sure processing with high accuracy and high speed.
  16. Unique in Chinese-English to show double-interface, can be realized in switching Chinese and English show online.
  17. Multi-language display. Support for Simplified Chinese, Traditional Chinese,

English, Russian, French and other languages, can be customized according to user needs.

18. System can support automatic dynamic upgrades, convenient to remote operation, remote maintenance.



## ➤ 1. RichAuto system composition

### ● 1.1 System composition

RichAuto-A58 contains the following parts: A hand-held motion controller(handle) , a line adapter board(interface board), a 19-pin HDMI data transmission cable.

#### RichAuto accessories schematic diagram



Hand- held motion controller



Interface board



## 19-pin HDMI data transmission cable

### ● 1.2 Description of Each Component

#### 1.2.1 Handle

As shown below, including 6 parts:



#### Handle

- 1) Color screen: 5-inch color screen, to display the machine motion, system settings and other information.

- 2) Button board: Contains 20 buttons to input system parameter information and operate the machine.
- 3) U Disk Interface: The port of U disk (FAT16/32) and the memory card.
- 4) 19-pin HDMI Data Cable port: The port of 19-pin data cable, it connect the handle with the interface board to realize controlling the machine.

### 1.2.2 Interface board

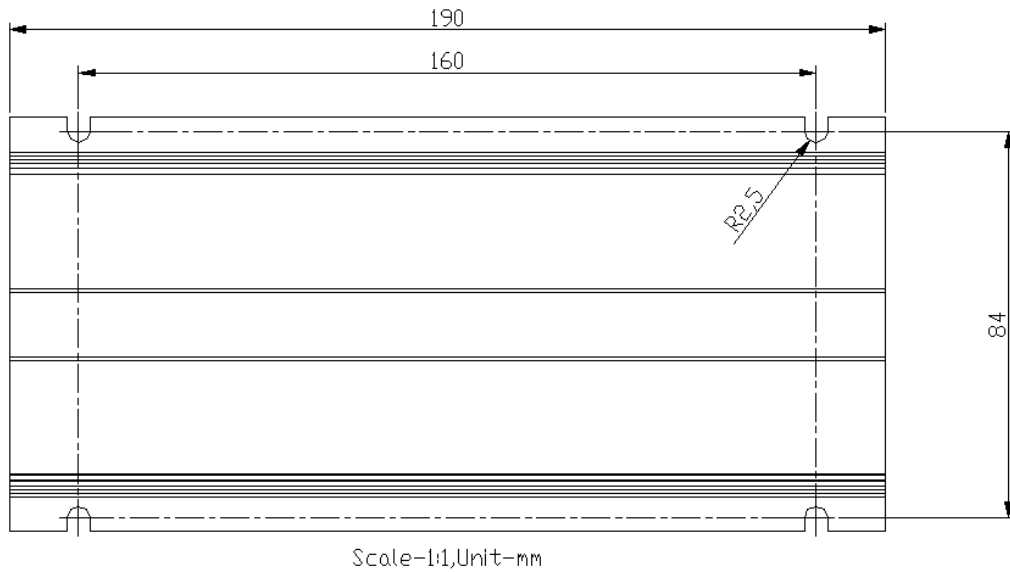
As shown below, including 5 parts:

- 1) 50-pin data cable port: connect handle with interface board.
- 2) Output control terminal: including spindle On/Off signal, work&alarm led signal etc..
- 3) Input control terminal: including machine origin detection switch, toolsetting, driver alarm, hard limit switch, and E-stop signal.
- 4) Power supply terminal: DC24V,3A
- 5) Motor driver control terminal

### 1.2.3 19-pin HDMI data transmission cable



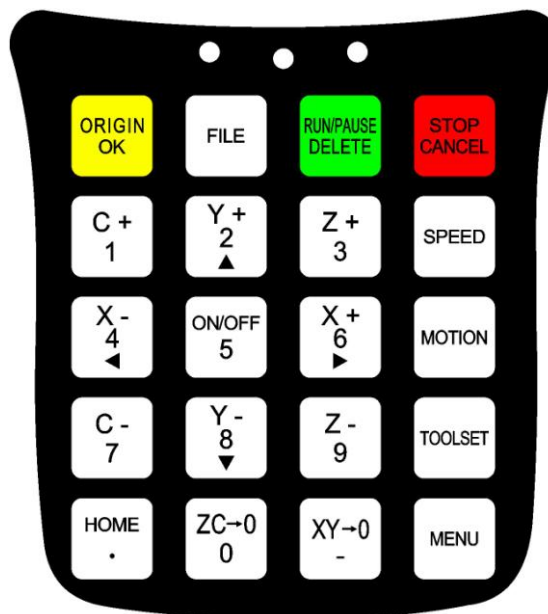
## 1.3 Interface Board Shell Size



## ➤ 2. Handle buttons introduction

### ● 2.1 Buttons introduction

RichAuto motion control system defines 16 buttons according to functional requirements. Each button has one or more functions under different work status:



Buttons picture

### ● 2.2 Usage mode









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**RichAuto** motion control system provide two modes of buttons' operations, including one-touch button & Combination button.



**One-touch button:** Press one button on handle.

**Combination button:** Press two buttons at the same time to achieve the operation; the operation step: press one main function button and meanwhile press a second accessibility button, and then release the two buttons at the same time to realize the combination button operation.

#### List of Combination buttons:

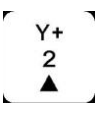
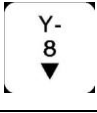
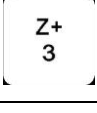
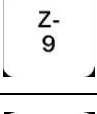
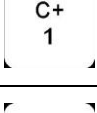
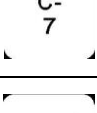
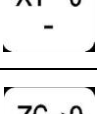
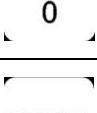

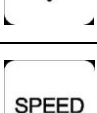
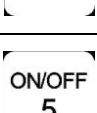


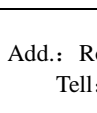
	Combination key	Function
1	 + "0-9" NO.button	Switch the coordinate system (0 for the mechanical coordinate system , 1 - 9 for the work coordinate system)
2	 + "1-8" NO.button	Start the breakpoints processing (support number 1 - 8)
3	 + 	Start advanced processing
4	 + 	System upgrade
6	 + 	Quit buttons check



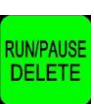

### ● 2.3 Detail information for buttons function

Button	Function
	Positive movement of X axis、 menu right shift、 figure 6 inputting
	Negative movement of X axis、 menu left shift、 figure 4 inputting

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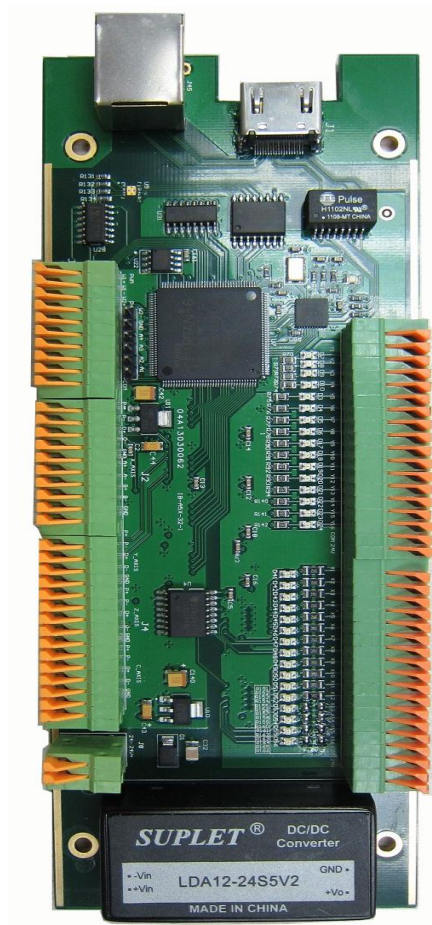
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	Positive movement of Y axis、 speed-up processing speed、 figure 2 inputting、 menu up shift
	Positive movement of Y axis、 solw down processing speed、 figure 8 inputting、 menu down shift
	Positive movement of Z axis、 figure 3 inputting、 increase spindle speed during processing
	Negative movement of Z axis、 figure 9 inputting、 reduce spindle speed during processing
	Positive movement of X axis、 figure 1 inputting
	Negative movement of X axis、 figure 7 inputting
	Set X axis and Y axis work origin、 negative sign inputting
	Set Z axis and C axis work origin、 figure 0 inputting
	Start Z-axis automatic tool setting
	Machine back home、 decimal point inputting
	High or low speed selection under manual mode
	Spindle start/stop、 figure 5 inputting
	Enter menu setting、 change information of “Machine status area” during processing
	Back to work origin,confirm motions /inputting/operating

	Manual mode-continue/step/distance to select
	Load processing filefrom Udisk or Internal
	Run or pause processing、 delete inputting data、 different property selecting in menu
	Quit process stop/selections, inputting and operating cancel、 start “The display function list”

### ➤ 3. Wiring Instructions

#### ● 3.1 RichAuto interface board description



### ● 3.2 Interface board I / O Description

Port	Pin Definition		Pin functions and parameters	Notes
<b>DC24V:</b> Power Supply	<b>24V+</b>		Supply working voltage for handle	Range: DC12-40V
	<b>24V-</b>			
<b>X_AXIS</b> : X OUTPUT SIGNAL Terminal	<b>P</b>	<b>P+</b>	PULSE+ Output	
		<b>P-</b>	PULSE- Output	
	<b>U</b>	<b>D+</b>	DIR+ Output	
		<b>D-</b>	DIR - Output	
	<b>S</b>	<b>GND</b>		
		<b>E</b>	<b>A+</b>	
	<b>N</b>	<b>A-</b>		
		<b>C</b>	<b>B+</b>	
	<b>O</b>	<b>B-</b>		
		<b>D</b>	<b>GND</b>	
	<b>Y_AXIS</b> : Y OUTPUT SIGNAL Terminal	<b>P+</b>	PULSE+ Output	
		<b>P-</b>	PULSE- Output	
<b>D+</b>		DIR+ Output		
<b>D-</b>		DIR - Output		
<b>GND</b>				
<b>Z_AXIS</b> : Y OUTPUT SIGNAL Terminal	<b>P+</b>	PULSE+ Output		
	<b>P-</b>	PULSE- Output		
	<b>D+</b>	DIR+ Output		
	<b>D-</b>	DIR - Output		
	<b>GND</b>			



<b>C_AXIS</b> : Y OUTPUT SIGNAL Terminal	<b>P+</b>	PULSE+ Output		
	<b>P-</b>	PULSE- Output		
	<b>D+</b>	DIR+ Output		
	<b>D-</b>	DIR - Output		
	<b>GND</b>			
<b>ANALOG:</b> Analog Quantity	<b>A4</b>			
	<b>A3</b>			
	<b>A2</b>			
	<b>A1</b>			
	<b>COM</b>			
<b>PWM</b> : PWM OUTPUT SIGNAL Terminal	<b>W1+</b>			
	<b>W1-</b>			
	<b>W2+</b>			
	<b>W2-</b>			
	<b>GND</b>			
<b>OUTPUT</b> <b>SIGNAL:</b> Analog Quantity Terminal	<b>Y01</b>	FWD	Logic low	
	<b>Y02</b>	Multi-speed 1	Logic low	
	<b>Y03</b>	Multi-speed 2	Logic low	
	<b>Y04</b>	Multi-speed 3	Logic low	
	<b>Y05</b>	Definable Signal	Logic low	
	<b>Y06</b>	Definable Signal	Logic low	
	<b>Y07</b>	Definable Signal	Logic low	
	<b>Y08</b>	Definable Signal	Logic low	
	<b>Y09</b>	Definable Signal	Logic low	
	<b>Y10</b>	Definable Signal	Logic low	
	<b>Y11</b>	Definable Signal	Logic low	
	<b>Y12</b>	Definable Signal	Logic low	
	<b>Y13</b>	Definable Signal	Logic low	

	<b>Y14</b>	Definable Signal	Logic low
	<b>Y15</b>	Definable Signal	Logic low
	<b>Y16</b>	Definable Signal	Logic low
	<b>COM</b>	Output GND	
	<b>24V</b>		
<b>INPUT SIGNAL: INPUT SIGNAL Terminal</b>	<b>X01</b>	XH:X HOME	Logic low
	<b>X02</b>	YH:Y HOME	Logic low
	<b>X03</b>	ZH:Z HOME	Logic low
	<b>X04</b>	CH:C HOME	Logic low
	<b>X05</b>	TS:Toolset	Logic low
	<b>X06</b>	Definable Signal	Logic low
	<b>X07</b>	Definable Signal	Logic low
	<b>X08</b>	Definable Signal	Logic low
	<b>X09</b>	Definable Signal	Logic low
	<b>X10</b>	Definable Signal	Logic low
	<b>X11</b>	Definable Signal	Logic low
	<b>X12</b>	Definable Signal	Logic low
	<b>X13</b>	Definable Signal	PNP (Normally Closed)
	<b>X14</b>	Definable Signal	PNP (NC)
	<b>X15</b>	Definable Signal	PNP (NC)
	<b>X16</b>	Definable Signal	PNP (NC)
		<b>COM</b>	Input GND
	<b>24V</b>	Sensor power input (Eg: return home sensor)	

### ● 3.3 Hardware Wiring

Installation Requirements: Power (24V, 3A), it is better to add a filter to prevent the electric field interference. If origin detecting switch are different power supply type, the special testing switching power is needed. (24V origin detecting switch is the best choice)

RichAuto-A58 realizes its control through the connection between the interface board and CNC machine. Interface board terminal can be divided into input terminal and output terminal:

#### Input terminal:

INPUT SIGNAL (Input signal terminal)

DC24V (Power supply terminal)

#### Output terminal:

X\_AXIS (X pulse output terminal&encoder output terminal)

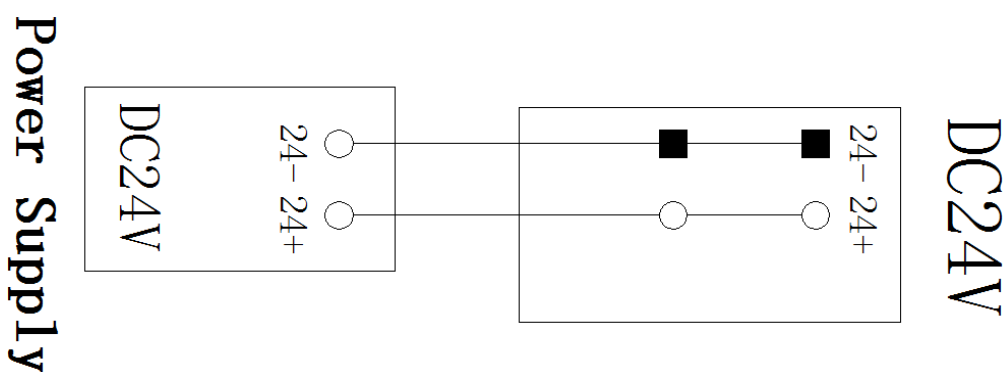
Y\_AXIS (Y pulse output terminal) Z\_AXIS (Z pulse output terminal)

C\_AXIS(C pulse output terminal) OUTPUT SIGNAL(Output signal terminal)

ANALOG(Analog quantity output terminal) PWM(PWM output terminal)

#### INPUT SIGNAL Terminal

##### DC24V Power supply wiring

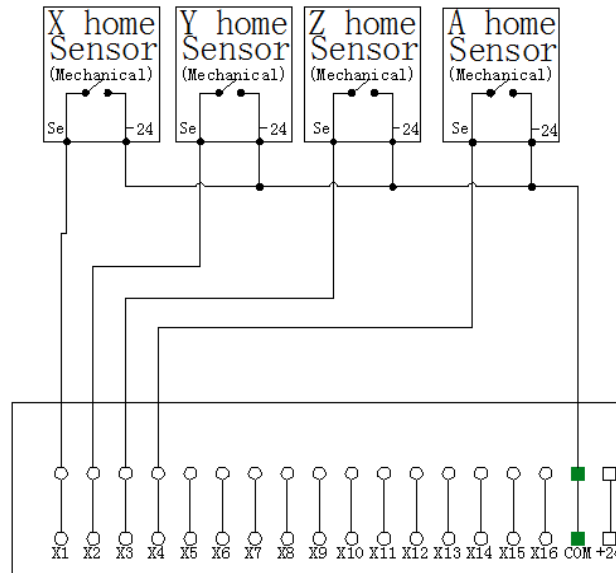


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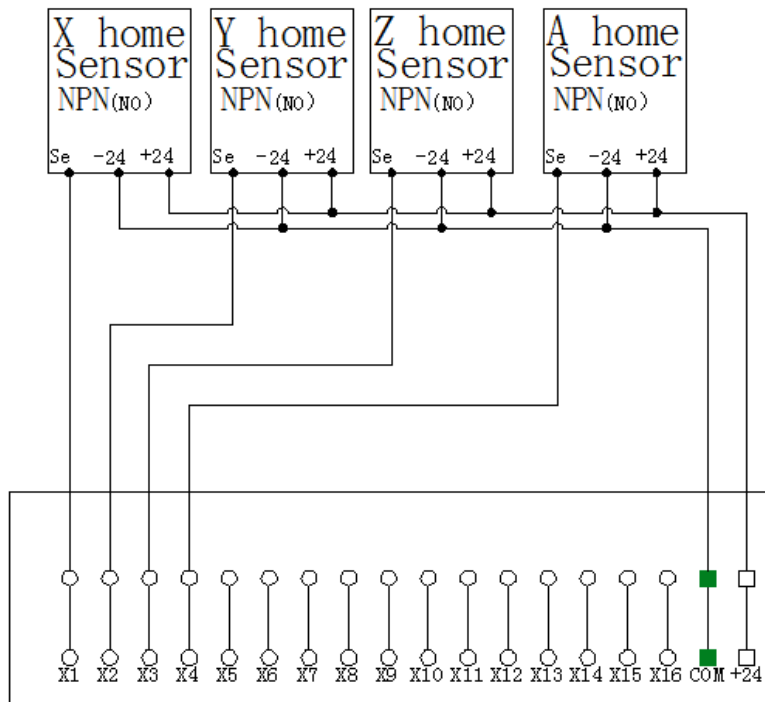
## INPUT SIGNAL Wiring

### 1. Home signal ports: a) Mechanical home switch wiring



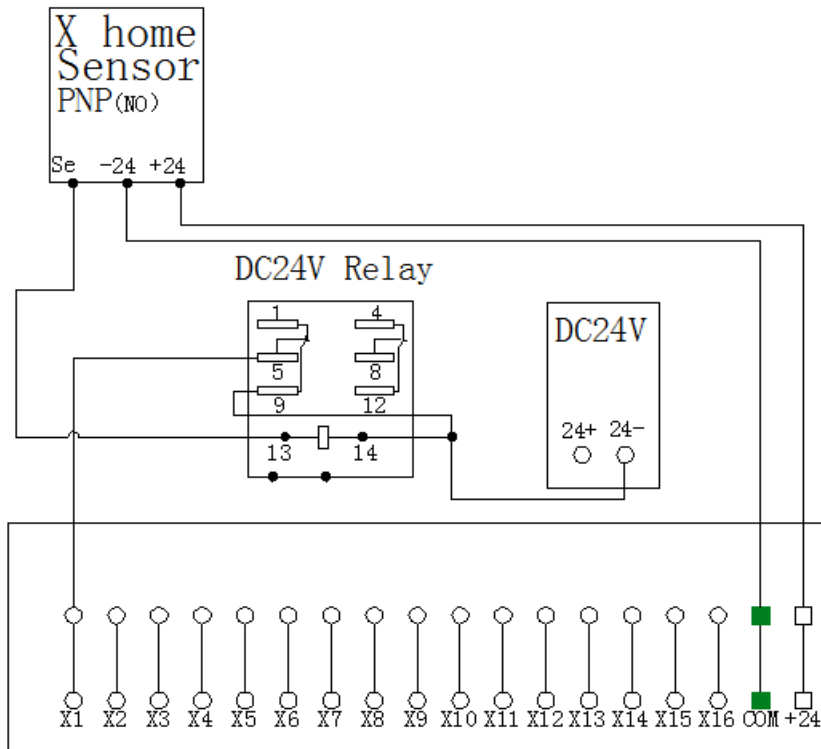
## INPUT SIGNAL

### b) NPN(NO) home switch wiring



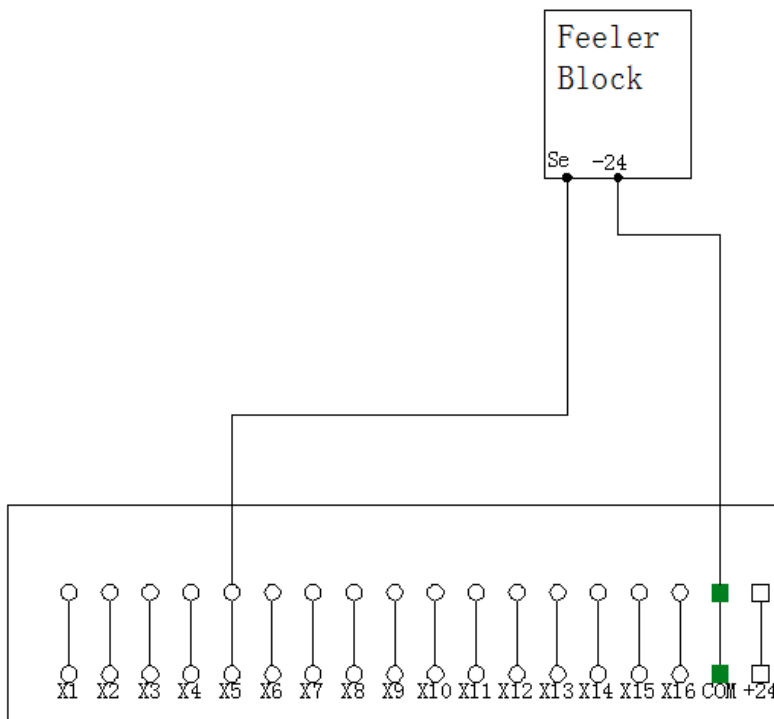
## INPUT SIGNAL

### c) PNP(NO) home switch wiring (Y、Z、A same as X)



## INPUT SIGNAL

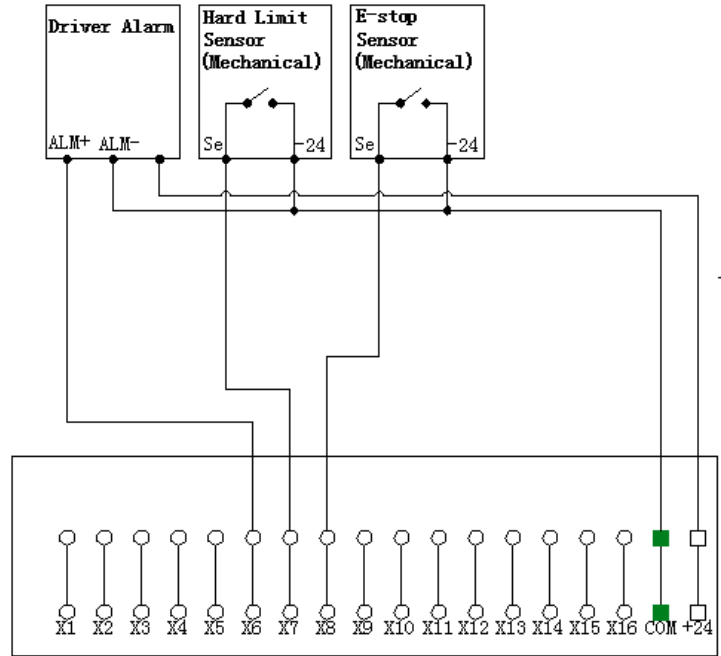
### 2. Toolset terminal: Simple feeler block wiring



## INPUT SIGNAL

### 3. Definable terminal wiring:

eg: X5-Driver Alarm signal & X6-Hard Limit signal& X7-E-stop switch signal

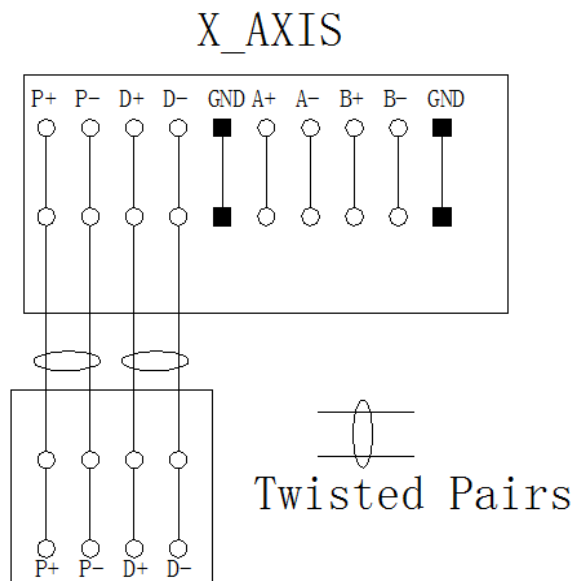


## INPUT SIGNAL

### Output Terminal

**X\_AXIS:** X pulse signal wiring (Y、Z、 A same as X)

**Step drive:**



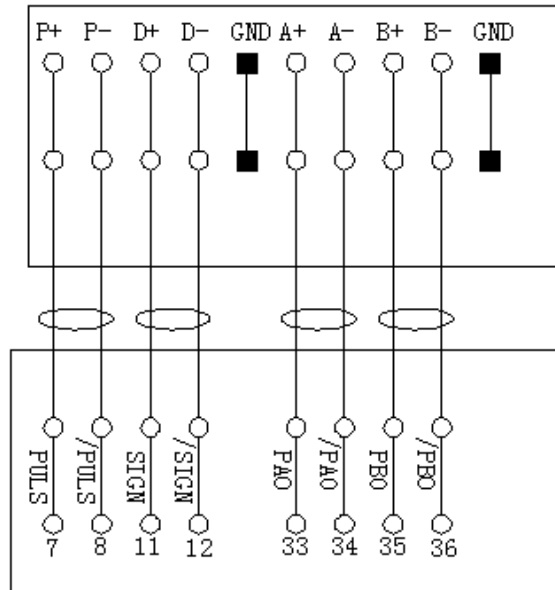
## Stepper Motor Driver

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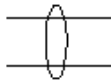
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**Servo drive:**

**X\_AXIS**



**Yaskawa  $\Sigma$ -V Encoder CN1**

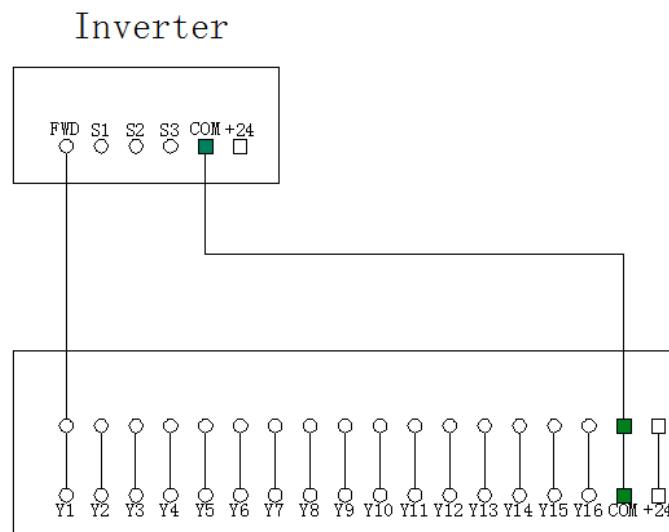


**Twisted Pairs**

**OUTPUT SIGNAL: Spindle output**

**2-state** : spindle start-ON / spindle start-OFF

**ON、OFF:**




**OUTPUT SIGNAL**


### Spindle State:

Setting: Enter “**Spindle State**”, screen shows:






**SpdlCnt=Spindle Count**

Press “”, input the number 1, change Spindle Count to 1, and then press

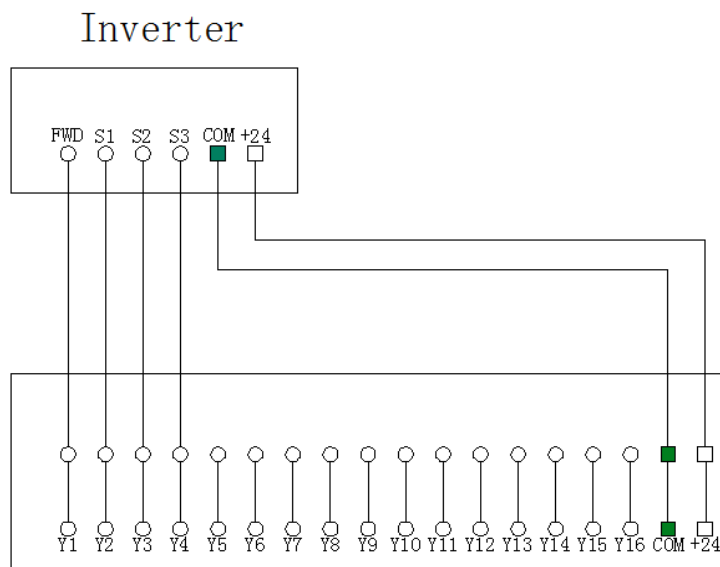
“”, screen shows:



Press “”、“” to move cursor up and down, press “”, you can change the indicator light color, like above picture.

**8-state** : spindle start---S1—speed 1 , S2—speed 2...Sn—speed n ; spindle stop--- screen shows Fn—the speed number.

### 3-line、8-state:



## OUTPUT SIGNAL





### Spindle State:

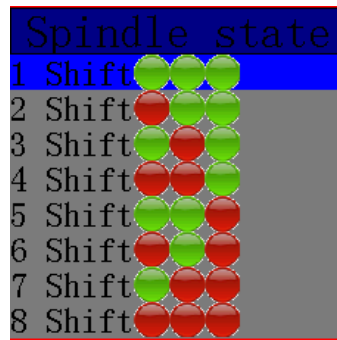
Setting: Enter “**Spindle State**”, screen shows:






**SpdlCnt=Spindle Count**

Press “”, input the number 3, change Spindle Count to 3, and then press

“”, screen shows:

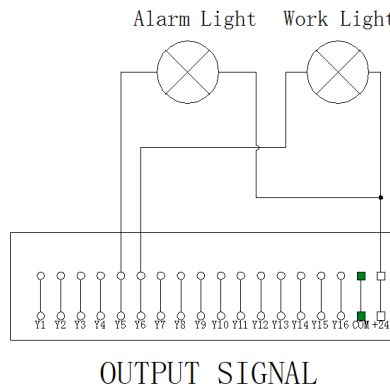


Press “”、“” to move cursor up and down, press “”, you can change the indicator light color, like above picture.

**NOTE:** FWD and DCM has Connected in Parallel in some inverters, please do not need to connect Y1 (S0) in such situations, you only need to connect DCM with GND of interface board, without having to reset the spindle gear.

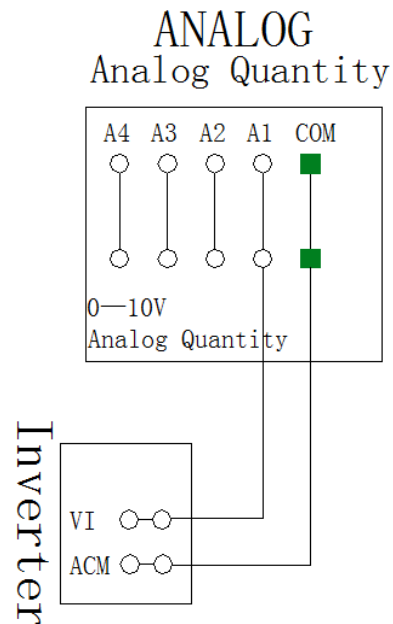
### Definable ports wiring:

eg: Y5-Alarm Light signal & Y6-Work Light signal



## ANALOG:

Analog quantity output wiring:



Setting procedure: enter **“MENU”** – **“Menu function user interface”** – **“MACHINE SETUP”** – **“Spindle Setup”** – **“Spindle MAX Spd”** (Spd=speed)

You can connect the machine with the control system when the above setting is over.

### ● 3.4 Commissioning of the Machine and Control System

1. After turn on the power, users can manually move each axis and confirm the direction. If the movement direction and definition direction are opposite, users can change the motor phase sequence.
2. According to the original location of the machine coordinates, users can enter **menu-menu function user interface-machine setup-home setup- home direction** to reset it.
3. Enter **menu-menu function user interface-machine setup-voltage setup**, to check whether the home switch is working (Manual trigger , signal lamp lights up({green to red})).

The machine is in good connection if all the above setting is ok.

## ➤ 4. User interface

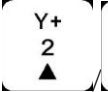


RichAuto-A58 contains five user interfaces: **Manual control user interface**、**Manual function user interface**、**Remote control user interface**、**Input output control user interface**、**View toolpath user interface**.


### ● 4.1 Manual control user interface

After the system is powered on, the system prompts the user to back home after the boot process, system enter the interface “Home Type At Start”:

```




HomeTypeAtStart
All axis home
Z home only
none axis home
  
```

Press “ ” to move cursor to choose your type, and then press “” to confirm.

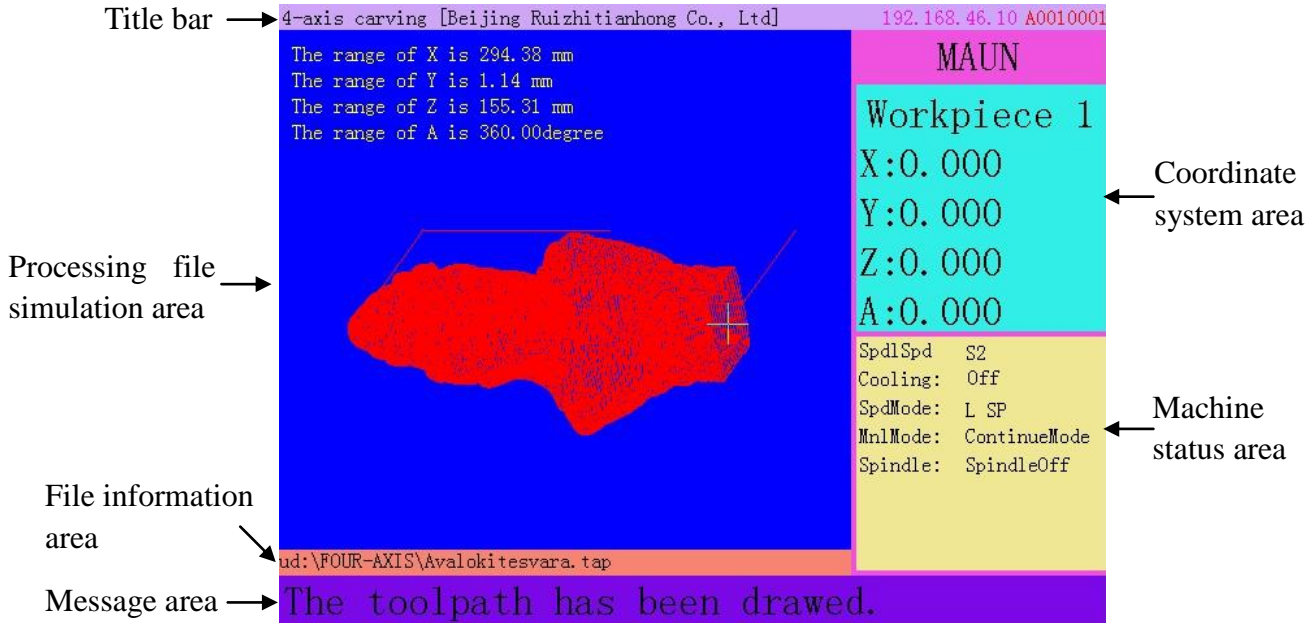
Press “”, screen shows:

```

Switch user interface
Manual control user interface
Menu function user interface
Remote control user interface
Input output control user inter
View toolpath user interface
  
```


Press “ ” to move cursor to choose your interface, and then press “” to confirm.

## Manual control user interface:



1. **Title bar:** Display system software type (4-axis carving) and company information.
2. **Processing file simulation area:** Display processing file emulational image、tool path、file size,etc.
3. **File information area:** Display filename (including filename extension)、record location.
4. **Message area:** Display file loading process information.
5. **Coordinate system area:** Display the current coordinate system, including machine coordinate system and work coordinate system, there are eight work coordinates system.
6. **Machine status area:** Display spindle state、speed mode、motion mode、cooling unit state,etc.



Under the manual control interface, press “”, screen shows “**The display function list**”, it is convenient for the customer different ways to view processing file emulational image.Function list as shown below:

```
The display function list
Display the whole tool path
Zoom in the tool path
Zoom out the tool path
Left to view the tool path
Rigth to view the tool path
Up to view the tool path
Down to view the tool path
Display the limit of the machin
```

## ● 4.2 Menu function user interface

```
4-axis carving [Beijing Ruizhitianhong Co., Ltd] 172.31.14.114 A0010001
MACHINE SETUP Pulse Equiv
AUTO PRO SETUP Table Size
SYSTEM SETUP Spindle Setup
OPERATE FILE Home Setup
VERSION VIEW Accel
Start Spd
Voltage Setup
C.A.D. Thickness
Max Spd Limit
DistTime Limit
Input Confi

The toolpath is loaded.
```

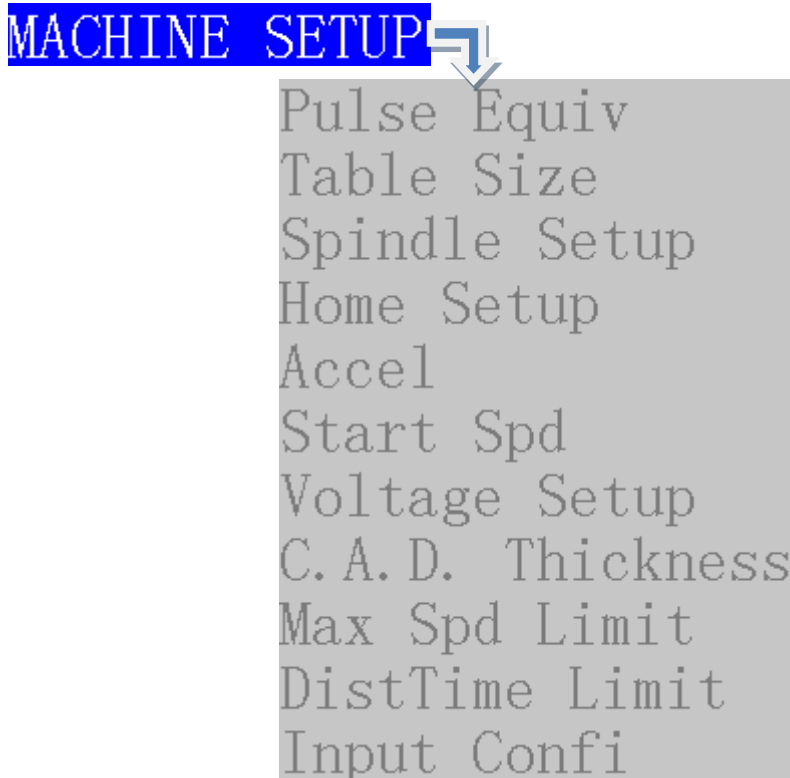
Menu details: Including 5 main menus: **MACHINE SETUP**、**AUTO PRO SETUP**、**SYSTEM SETUP**、**OPERATE FILE**、**VERSION VIEW**， and there are other in every main menu.

### 4.2.1 Machine Setup

Users can set the parameters about machine hardware under "Machine Setup". It is set by machine producer according to device type. If machine hardware parameter

is not changed, this parameter should also not change. If machine users need to change, please consult machine producer.

### Machine setup chart



#### 1. Pulse Equiv(Pulse Equivalent)

The number of pulses of the system needs to send when machine moves every 1mm. Unit: pulse/mm.

##### 1) stepper driver

###### Ordinary axis:

Formula = pulses per revolution / distance per revolution

Pulses per revolution formula:  $(360 / \text{stepper angle}) * \text{Driver subdivision}$

Some stepper drivers mark pulse number directly.


Distance/r formula:

Screw drive machine = screw pitch \* mechanical transmission ratio

Rack drive machine = rack module \* gear teeth number \*  $\pi$  \* mechanical transmission ratio

So stepper motor system formula:

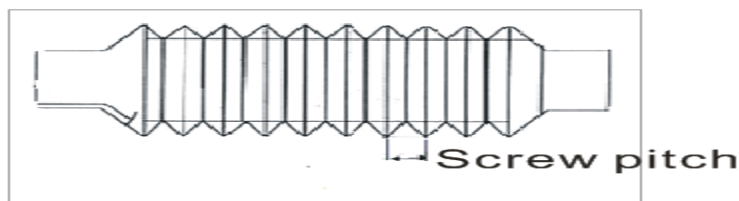
✓ **Screw drive:**



$$\text{pulse} = \frac{360^\circ}{\text{Stepper angle}} * \text{Driver subdivision} \\ \text{Screw pitch} * \text{transmission ratio}$$

Formula Description: step angle is the angle of the motor parameters, motor rotation step walk.


Driver subdivision is the parameter set by the driver.



Screw pitch(above picture): The distance that the nut moves when the ball screw makes one rotation.

Transmission ratio: The speed ratio or angular velocity ratio of the capstan and the driven wheel.

✓ **Rack drive:**



$$\text{pulse} = \frac{360^\circ}{\text{stepper angle}} * \text{Driver subdivision} \\ \text{rack module} * \text{gear teeth number} * \pi * \text{transmission ratio}$$

Formula Description: step angle is the angle of the motor parameters, motor rotation step walk.

Driver subdivision is the parameter set by the driver.

Rack module and gear teeth number are gear parameters. rack module \* gear teeth number\* $\pi$  equals the perimeter of the reference circle.

Transmission ratio: The speed ratio or angular velocity ratio of the capstan and the driven wheel.

### Rotation axis:

Formula = pulses per revolution / angles per revolution (360° )





$$\text{pulse} = \frac{\frac{360^\circ}{\text{stepper angle}} * \text{driver subdivision}}{360^\circ * \text{transmission ratio}}$$



Formula Description: step angle is the angle of the motor parameters, motor rotation step walk.


Driver subdivision is the parameter set by the driver.

Transmission ratio: The speed ratio or angular velocity ratio of the capstan and the driven wheel.

**Setting:** Enter “**Pulse Equiv**”, cursor is in the X-axis pulse equivalent

position, press “”, “” to move cursor to where users want to

modify. Press “”, input the new number, and press “” to save. After

modifying X、Y、Z、A pulse equiv, press “” to confirm.

## 2) servo driver

The pulse equivalent factory default X,Y,Z,A are 400, and set the electronic gear ratio in the servo drive according to the pulse equivalent.



The numerator of the electronic gear ratio represents encoder pulse number, users can search it in servo driver manual.

The denominator of the electronic gear ratio:

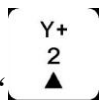
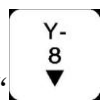



**Ordinary axis:**

- ✓ screw drive: Handle pulse equivalent(400)\* screw pitch \* mechanical transmission ratio
- ✓ rack drive: Handle pulse equivalent(400)\*rack module \* gear teeth number\* $\pi$ \* mechanical transmission ratio

**Rotation axis:** Handle pulse equivalent(400)\* $360^\circ$  \* mechanical transmission ratio

## 2. Table Size:

RichAuto system make the table size as the soft limit values, in order to prevent machine move over travel, machine size must be less than or equal to the value of the actual motion displacement machine

**Setting:** Enter “**Table Size**”, press “”, “” to move cursor to where users want to modify. Press “”, input the new number, press “” to save. After modifying X、Y、Z、A pulse equiv, press “” to confirm.

## 3. Spindle Setup:

**Spindle delay:** Unit: ms;including start delay and stop delay. corresponding system parameters. System default “3-line 8-state”, if users need “1-line 2-state(On/Off)”, users can change the number of lines is 1; See detailed settings at spindle output wiring.

**Spindle Max Spd:** User should set this menu if choosing 10V analog quantity to control the spindle speed,the number is the maximum speed of the spindle.Unit:r/minute.User do not need modify this menu if choosing





“muti-step”mode.

#### 4. Home Setup:

**Home speed:** Every axis movement speed when back home,system default speed X, Y: 3000 MM/Minute, Z, A: 1800 MM/Minute.

**Setting:** Enter “**Home speed**”, screen shows:

Unit MMPerSec	
XSpeedOfHome	3000.000
YSpeedOfHome	3000.000
ZSpeedOfHome	1800.000
ASpeedOfHome	1800.000

Press “”, “” to move cursor to where users want to modify, press “”, input the new number, press “” to save. After modifying X、Y、Z、


A home speed, press “” to confirm.

**Home order:** Every axis movement order when back home.

Including:

Home order
Z, XY, A
Z, A, XY
A, Z, XY
Z, X and Y
A home only
Z only
X home only

**Setting:** Enter “**Home speed**”, press “”, “” to move cursor

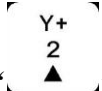
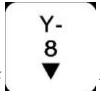
to choose home order, press “” to confirm.



**Home direction:** Every axis movement direction when back home, this direction depends on the position where home switch is on the machine. If home switch is installed in the positive direction, so home direction should be “**positive**”, and vice versa.

**Setting:** Enter “**Home direction**”, screen shows:

```

Input home dir
X Dir      Neg
Y Dir      Neg
Z Dir      Pos
A Dir      Neg
  
```

Press “”, “” to move cursor to where users want to modify,

press “” to change home direction, and then press “” to confirm.

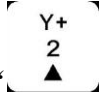

## 5. Accel (Acceleration): Unit: mm/s<sup>2</sup>

The maximum acceleration value during acceleration and deceleration movement, improve (including straight and curved motion) processing capabilities. If acceleration is too large, it may cause the motor losing steps, jitter and even whistle, if too small, it will lead to accelerated slowly and reduce the operating speed of the entire graph.

Unit MMPerSec2	
Accel type	LinearType
X Accel	800.000
Y Accel	800.000
Z Accel	800.000
A Accel	800.000
X JAccel	10000.000
Y JAccel	10000.000
Z JAccel	10000.000
A JAccel	10000.000
X StartSpeed	1.667

Suggest curve acceleration 1-1.5 times linear acceleration.


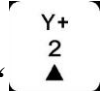
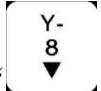
Jerk refers to the growth rate of acceleration, and moderate adverse impact caused by a sudden deceleration.

**Setting:** Enter “**Accel**”, press “”, “” to move cursor to where


users want to modify, press “”, screen shows:

```

Accel type
LinearType
SCurveType
  
```

Choose your type, press “” to confirm, and then press “”, “”

to move cursor to each axis “**Accel**” and “**JAccel**”, press “” and input the new



number, press “” to save. Same operations to modify other options.

## 6. Start Speed: Unit: mm/minute

The speed of axis started directly from standstill. Not starting from zero speed, but starting directly from a certain speed,so it can shorten the overall processing time,but do not set this speed too high. Set too high, it will cause the motor losing steps, jitter and even whistle; Set too small, it will reduce the operating speed of the entire graph. If the inertia of motion axes (axis heavier), users can set a smaller start speed, if the inertia of motion axes smaller (lighter shaft), users can set it bigger.

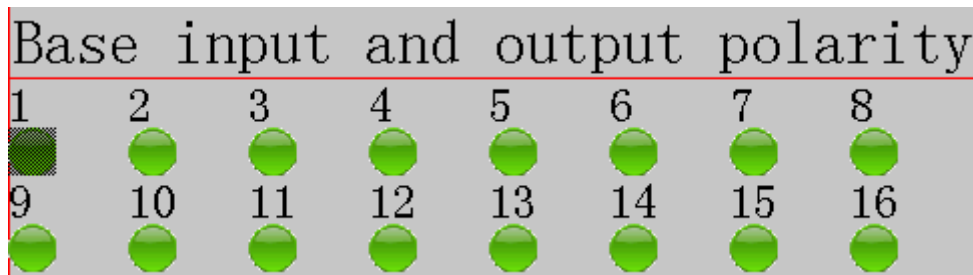
**Setting:** Enter “**Start Speed**”, screen shows:

Unit MMPerSec	
X StartSpeed	100.000
Y StartSpeed	100.000
Z StartSpeed	100.000
A StartSpeed	100.000

Press “” and input the new number, press “” to save.






## 7. Voltage Setup:

Set input and output signal terminal status, lights green indicate normally open state, lights red indicate normally closed state. Including the two rows of light:



The upper lights indicate the input level: Set input voltage signal terminal status. The top four: 0、1、2、3、4 positions correspond X axis back home、Y axis back home、Z axis back home、A axis back home、 tool setting signal.

The under lights indicate the input level: Set output voltage signal terminal status. The top four: 0、1、2、3 positions correspond spindle On/Off、multi-speed 1、multi-speed 2、multi-speed 3 siganl.



Setting: Press “”, “” to move cursor right and left, press “”, “” to move cursor up and down, press “” to change light red or green.

### 8. C.A.D. Thickness: Unit: mm

This thickness should input by actual, if it is bigger than the actual thickness, Z axis may cut too much; if smaller, Z axis can't touch workpiece. This parameter can only take effect when user use auto toolsetting function.

Setting: Enter “**C.A.D.Thickness**”, screen shows:

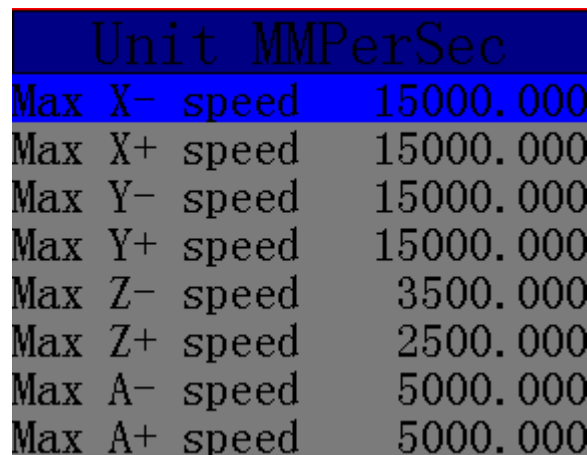


Press “” and input the new number, press “” to save.



### 9. Max Spd Limit (Max Speed Limit): Unit: mm/minute




Set machine top speed, it only take effect during processing.

Setting: Enter “**Max Spd Limit**”, screen shows:



Unit		MMPerSec
Max X-	speed	15000.000
Max X+	speed	15000.000
Max Y-	speed	15000.000
Max Y+	speed	15000.000
Max Z-	speed	3500.000
Max Z+	speed	2500.000
Max A-	speed	5000.000
Max A+	speed	5000.000

Press “”, “” to move cursor to where users want to modify. Press



“” and input the new number, press “” to save. After modifying all options, press “” to confirm.

### 10. DistTime Limit: Unit: second

Users select distance mode, and if the machine does not move in a certain period of time (system default is 30 seconds), the system will go back to continuous mode to prevent Z-axis collision risk because of the customer forgot to switch back to continuous mode and set a large distance value.

**Setting:** Enter “**DistTime Limit**”, screen shows:

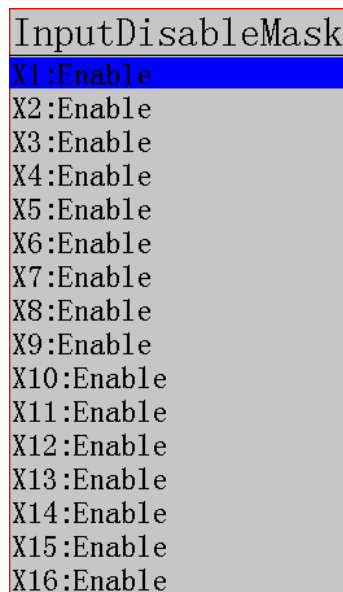






Press “” and input the new number, press “” to save.

### 11. InputConfi (Input Port Configuration):

To open or prohibit input signal, if the interface board does not connect X6-X16 signals, users can prohibit X6-X16 signals.

**Setting:** Enter “**InputConfi**”, screen shows:

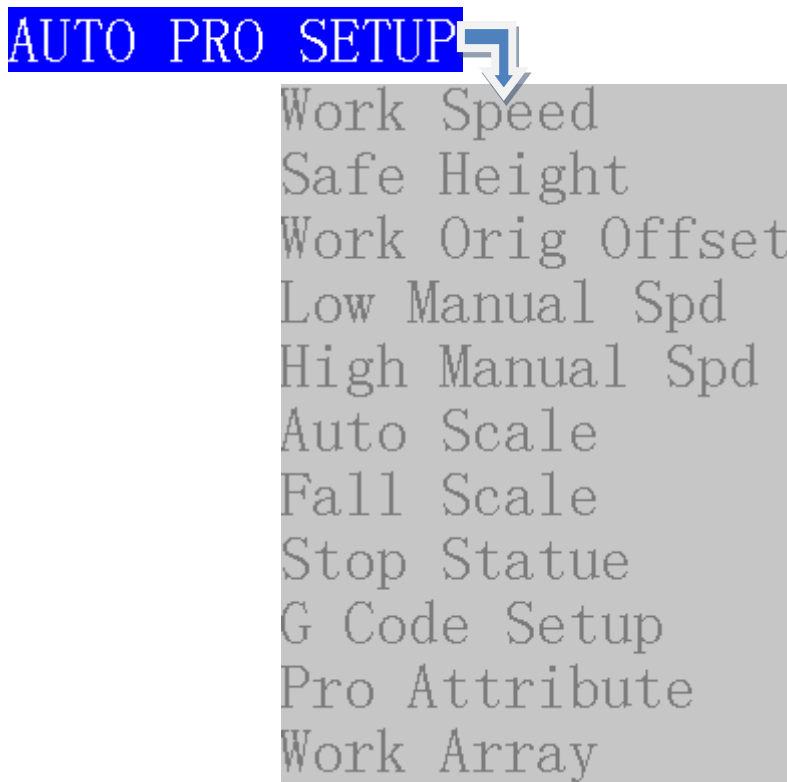


Press “”, “” to move cursor to where users want to modify, press  to change the ports enable or disable, and then press “” to confirm.

## 4.2.2 Auto Pro Setup

Users can set processing parameters,G code attributes etc.under this menu.

### Auto Pro Setup chart








#### 1. Work Speed: Unit: mm/minute

ncluding work speed and fast speed.

**Setting:** Enter “**Work Speed**”, screen shows:

Unit MPerSec	
WorkSpeed:	18000.000
FastSpeed:	3000.000



Press “” and input the new number, press “” to save, and then press “” to choose “**Fast Speed**”, press “” and input the new number, press “” to save.

## 2. Safe Height: Unit: mm



The height of Z axid rise during processing. system default is 250.000 mm.

**Setting:** Enter “**Safe Height**”, screen shows:



```

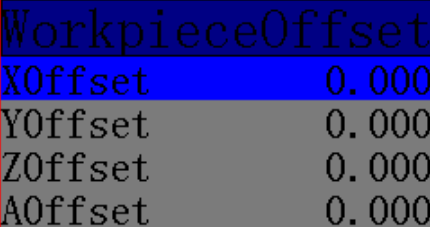
Unit mm
Safe height 250.000
    
```

Press “” and input the new number, press “” to save.

## 3. Work Orig Offset(Orig=Origin): Unit: mm



It is mainly used for the work origin position which is the center of the processing material. If the processing material is cylindrical and work origin is the center, we can still set origin on the surface and then modify work origin offset number for cylindrical radius, so that the actual work origin is the center. X、Y、A are the same.



**Setting:** Enter “**Work Orig Offset**”, screen shows:



```

WorkpieceOffset
Xoffset 0.000
Yoffset 0.000
Zoffset 0.000
Aoffset 0.000
    
```

Press “”、“” to move cursor to where users want to modify, press



“” and input the new number, press “” to save.



#### 4. Low Manual Spd(speed): Unit: mm/minute

Under “**Low Manual Spd**” mode, the speed of manually to move each axis.

**Setting:** Enter “**Low Manual Spd**”, screen shows:

Unit MMPerSec	
XSpeedOfSlow	1200.000
YSpeedOfSlow	1200.000
ZSpeedOfSlow	1200.000
ASpeedOfSlow	1200.000

Press “”、“” to move cursor to where users want to modify, press

“” and input the new number, press “” to save.

#### 5. High Manual Spd(speed): Unit: mm/minute

Under “**High Manual Spd**” mode, the speed of manually to move each axis.



**Setting:** Same operations as “**Low Manual Spd**” .

#### 6. Auto Scale:

Actual processing speed=work speed\*auto scale, it does not affect fast speed.

**Setting:** Enter “**Auto Scale**”, screen shows:

SpeedRatio	
SpeedScale	1.000

Press “” and input the new number, press “” to save.

#### 7. Fall Scale:

Fall scale, system default is 0.200.fall speed=fast speed\*fall scale, the

maximum fall speed is Z axis negative limit speed\*fall scale.

Fall height, system default is 5.000mm, fall down scale takes effect when the spindle falls to the fall height.

**Setting:** Enter “**Fall Scale**”, screen shows:



FallDownScale	
FallDownScale	0.200
FallDownHiight	5.000



Same operations as “**Low Manual Spd**” .


## 8. Stop Statue:

Setup stop position after auto processing., User can set special position and specified position.




Work stop state	
Act after work	Pickup Z
XCoordnt	0.000
YCoordnt	0.000
ZCoordnt	0.000
ACoordnt	0.000

**Set stop position:** Press “”, “” move cursor to where users want

to modify, press “” and input the new number, press “” to save.

Press “”, user can enter stop statue list:





```
Act after work
Pickup Z
BackToWorkOrg
BackHome
BackPosition
NoneMove
```

Press “”, “” move cursor to the statue users want, press “” to confirm.

## 9. G Code Setup:

Set special G code attribute, according to the actual need to make changes.

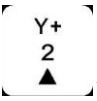
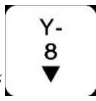
```
AttrOfGCode
G read F code Ignore F
G abs center False
G read T code Ignore ATC
G spindle Always on
Filter JD: None
G read S code Ignore S
Read G54 Ignore G54
Read G49 Ignore G49
Read G40 Ignore G40
CodeHead Skip
Input T0 -1
```



**Setting:** Press “”, “” to move cursor to where users want to modify, press “” to select the attribute users want, press “” to save.

## 10. Pro Attribute:

Set special Pro attribute, according to the actual need to make changes.

Work attribute	
AutoOn	None auto
Adjust Z	Adjust z
Adjust WP	None
IgnoreZ	Read Z
CircleLimit	55.556
StepWork	Contns
Spindle at ATC	Auto
FileParm	Ignore

**Setting:** Press “”, “” to move cursor to where users want to

modify, press “” to select the attribute users want, press “” to save.

## 11. Work Array:

Set array parameter, including columncount、Rowcount、Columnspace、Rowspace、Interval (unit: ms)



Columnspace: File spacing of X direction

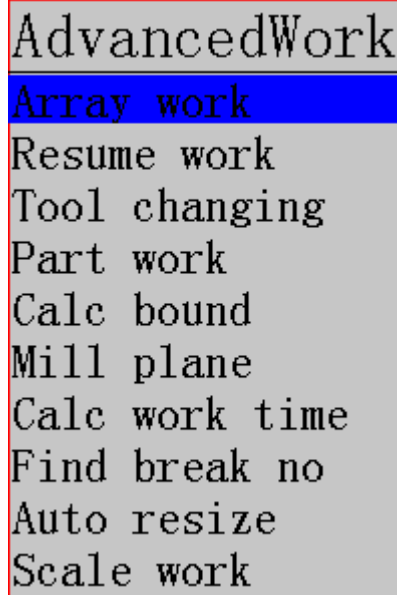
Rowspace: File spacing of Y direction


Total Processing times= columncount\* Rowcount

Interval: System default 0, it means no wait.

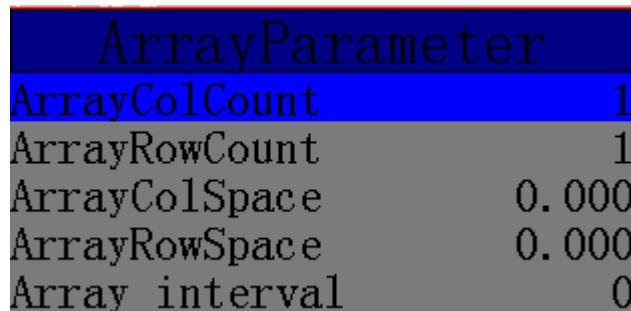
During processing, if users need to change processing materials after completion of each processing, you need set time interval a negative number. When the first time processing is completed, the screen prompt: waiting for the next array processing, press any key to start the next array processing at this time, if not press, system keep waiting.



Press “” + “”, screen shows:





Press “” to choose Array work.

**Setting:** Enter “**Work Array**”, screen shows:



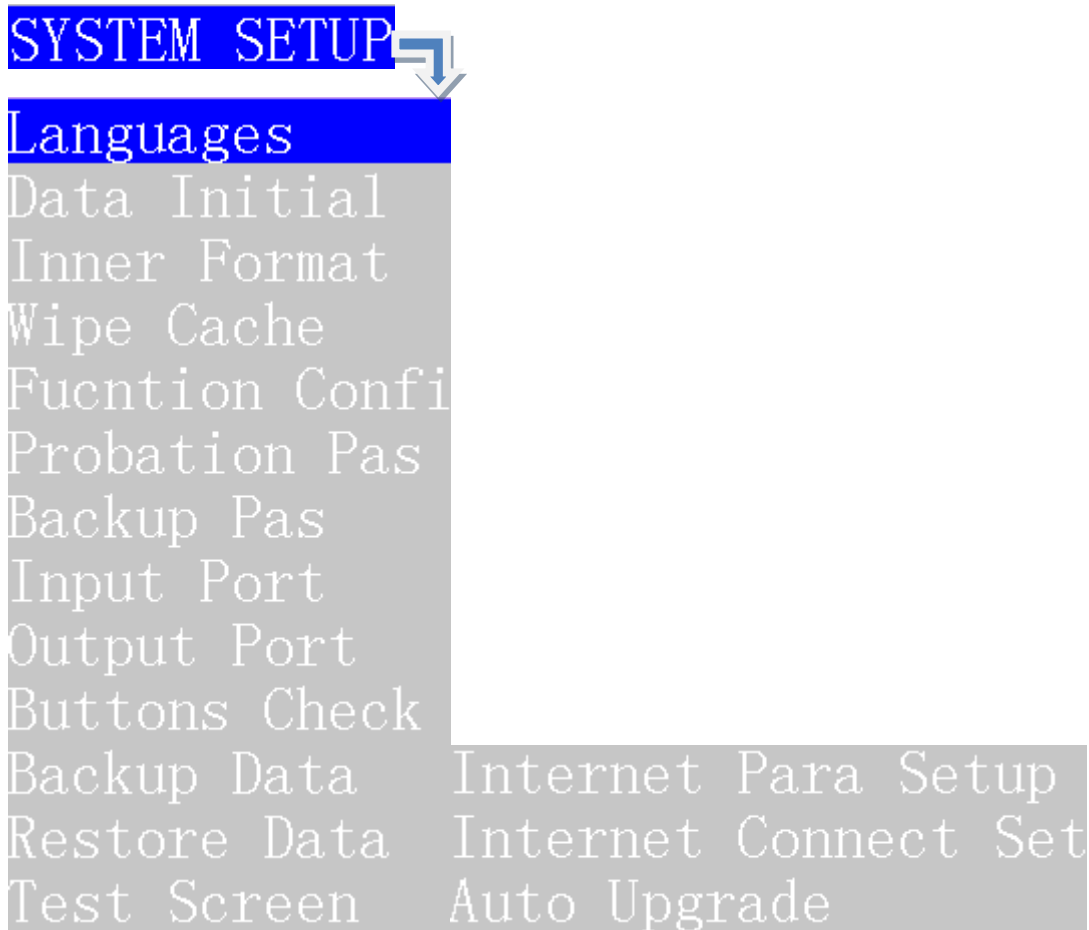
Press “”, “” to move cursor to where users want to modify. Press

“” and input the new number, press “” to save. After modifying all

options, press “” to confirm.

### 4.2.3 System Setup

#### System Setup Chart



#### 1. Languages:

Change system display language, users can choose Chinese and English.

#### 2. Data Initial:

After data initial system parameters will restore to factory setting.

#### 3. Inner Format:

Wipe the internal files, it will not damage the system parameters.

#### 4. Wipe Cache:



Users need to do this after functional upgrade, such as change four-axis program to three-axis program, users must do this operation. After this operation ,



users need to restart the system.

### 5. Function Confi (Function Configuration):

Set whether the system retain a function or not, change it according to the actual application in accordance with the practical application of changes. After the operation users need to restart the system.


Set function	
RotateMrk	A Axis
PausePkup	NoPick
ScaleFast	None
Manual	Step
Pretrt	Parse
QuryPara	Query
StrthHome	Query
CopyWork	False
RetOrgPZ	Pickup Z
Motion type	Smooth
DbgMode	Normal
Toolset act	Pickup
KeyCtrl	Local
Pause restore	all axis

**Setting:** Press “”、“” to move cursor to where users want to

modify, press “” to select the function users want, press “” to save.


### 6. Probation Pas (Probation Password):

Engraving machine manufacturers supply 20-digit initial passwords and limit time (processing time, Unit: hour), our company will send 20-digit new passwords that contain limit time.

**Setting:** Press “” to enter “**Probation Pas**”, screen shows:







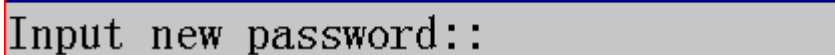
Please input new time password:  
02264815477061270461 → initial passwords


input new passwords directly, press “” to confirm.


## 7. Backup Pas (Backup Password):

Prevent users overwritten the original correct parameters in the parameter backup disorder or misuse case.

  Setting: Press “” to enter “**Work Array**”, screen shows:

Input new password, and then press “” to save.

If user want to cancel it, do not input any number, press “” to confirm.

## 8. Input Port(Input Port List):

Check X01-X16 input signal function.

## Input config

X1:Home of 1 axis  
X2:Home of 2 axis  
X3:Home of 3 axis  
X4:Home of 4 axis  
X5:Toolset,Rep of neg  
X6:Rep of pos  
X7:None used  
X8:AirPressGuard  
X9:None used  
X10:None used  
X11:None used  
X12:None used  
X13:None used  
X14:None used  
X15:None used  
X16:None used

**NOTE:** None used ports are definable.

## 9. Output Port(Output Port List):

Check Y01-Y16 output signal function.

## Output config

Y1:Spindle CW state,Spindle CCW state  
Y2:SpindleShift 1  
Y3:SpindleShift 2  
Y4:SpindleShift 3  
Y5:RunLamp, Switch of 1 spindle, Side spindle of 1  
Y6:AlarmLamp, Switch of 2 spindle, Side spindle of 2  
Y7:PowerLamp, Side spindle of 3  
Y8:Side spindle of 4  
Y9:Inverter alarm  
Y10:Driver alarm  
Y11:None used  
Y12:None used  
Y13:None used  
Y14:None used  
Y15:None used  
Y16:Buzzer

**NOTE:** None used ports are definable.



## 10. Buttons Check:

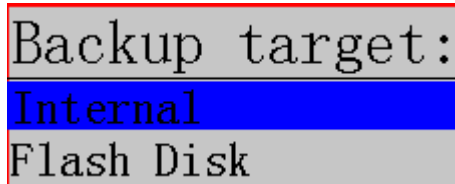
Users can check buttons are valid or not under this menu. Enter “Buttons Check”, press every button, if it is valid, the screen will highlight. Exit “Buttons

Check”, press “” + “”。




## 11. Backup Data:

Backup system parameters to U disk or inner, format system can't effect this. File format: **data.bak**.

 **Setting:** Press “” to enter “**Backup Data**”, screen shows:



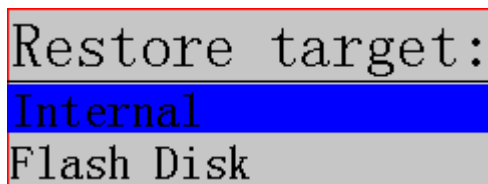
Backup target:  
Internal  
Flash Disk

Press “”、“” to move cursor to choose where to backup, press “” to confirm.



## 12. Restore Data:


Restore backup data from U disk or inner to system.

 **Setting:** Press “” to enter “**Restore Data**”, screen shows:



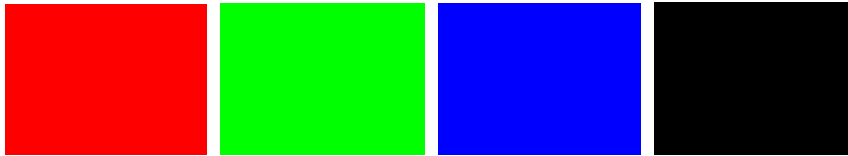
Restore target:  
Internal  
Flash Disk

Press “”、“” to move cursor to choose where to restore, press

 to confirm.

### 13. Test Screen:

Check whether the screen can work normally. Enter the interface, press each button, if it is monochrome, then it is OK; if not, user need to send our company the handle to repair.



### 14. Internet Para Setup:


```
NetworkConfig
LocalIPAddress:192.168.1.10
LocalIPMask: 255.255.255.0
GateWayAddress: 0.0.0.0
DNS Address: 0.0.0.0
```

### 15. Internet Connect Set(setup):

```
网络连接控制
允许:
允许:
允许:
允许:
拒绝:
拒绝:
拒绝:
拒绝:
```

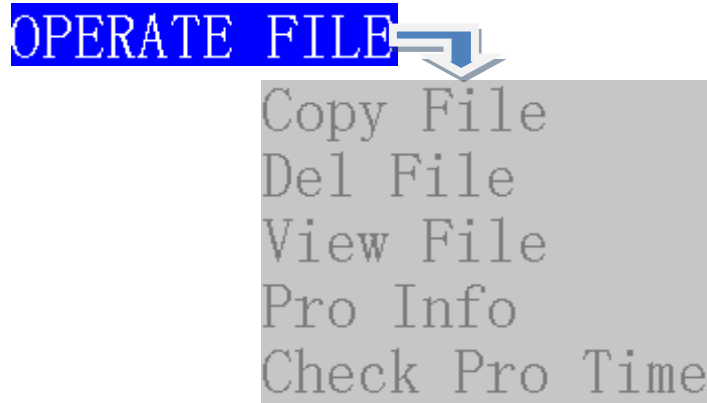
### 16. Auto Upgrade:

If the system has new function, our company will provide upgrade file (extension **\*\*\*\*\*.PKG** & shown as **rz-xxxx**), users can upgrade through the U disk, specific steps in Appendix 1. It will not damage the original parameters.

File format:  A51普通三轴雕刻[5寸彩屏][USB1](q9-194).pkg.

## 4.2.4 Operate File

### Operate File Chart



#### 1. Copy File:

Copy files from U disk to Inner.

#### 2. Del File (Delete File):

Delete files of inner.

#### 3. View File:

View the files and G codes of U disk or inner.

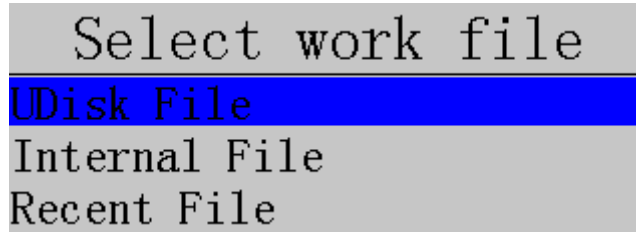
#### 4. Pro Info (Processing Information):



System power on, it will statistical the times of successful processing by file name, if system power off, the data will disappear.

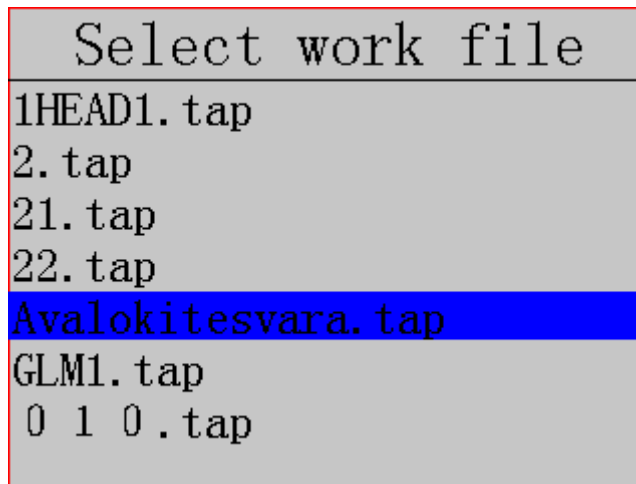
#### 5. Check Pro Time (Check Processing Time):



Calculate processing time by system work speed, after reading G code, the screen will display the processing time, different work speed corresponding to different processing time.

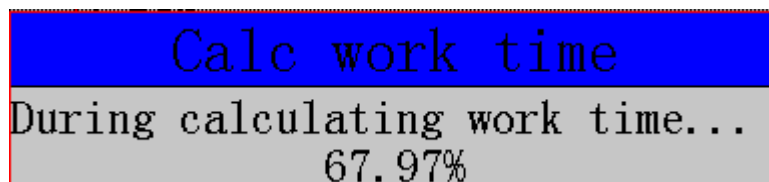
Operating mode: Press "" to enter "**Check Pro Time**", screen shows:



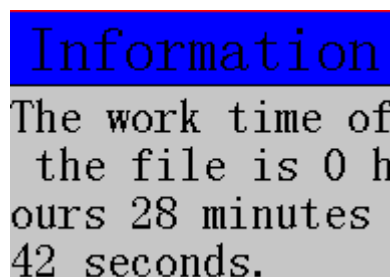
Press “”, “” to choose “UDisk” / “Internal/RecentFile”:



Press “” to enter, choose processing file, and then press “”, after calculation:



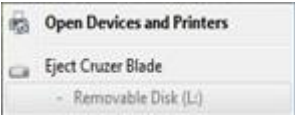
Screen will show processing time :




**NOTE:** Please pull out the U disk correctly after copying files from

computer, if not, the controller may not recognize the U disk.

1. Win7(32 bit) system: after copying files, please press “”, and then the display

will show “”,choose the device to be shut down.when the display show

“”,the U disk pull out from computer successfully.

2. Win XP system: after copying files,please press“”,and then the display will show “”,choose the device to be shut down.when the display show “”,the U disk pull out from computer successfully.

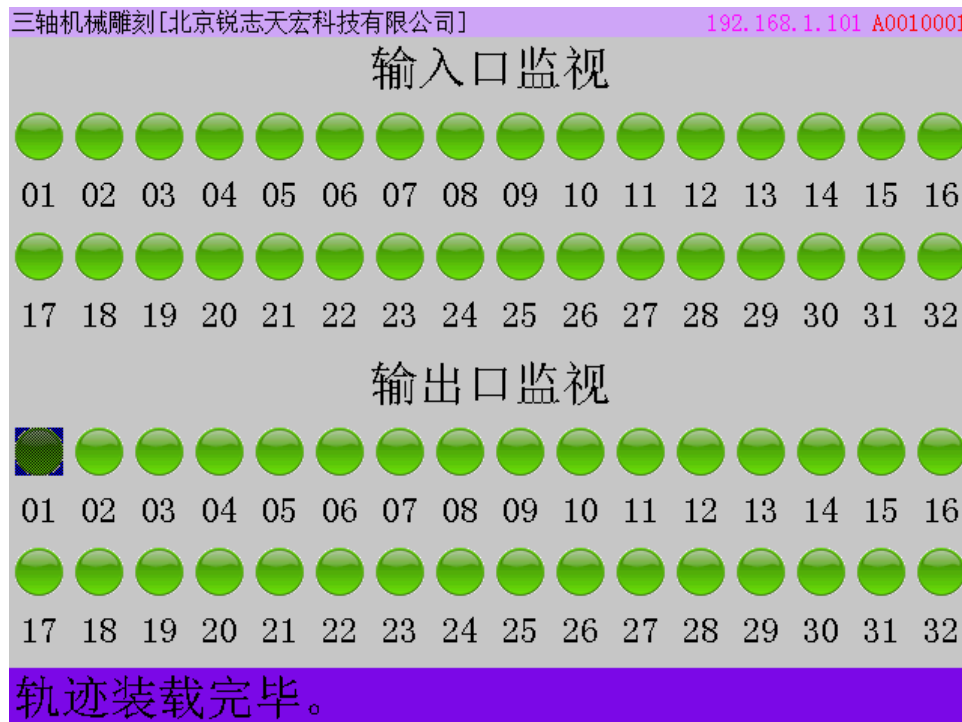
#### 4.2.5 Version View

Users can view information about the system hardware and software , including:

- ✧ Update Version: eg: P1.409/rz-xxxx/q10-82
- ✧ Product ID eg: A0020112
- ✧ Soft Version eg: A1.1936
- ✧ Emergency Version eg: A1.1920
- ✧ Soft type: 4-axis carving
- ✧ Hardware type: 4-axis carving Support 3-inch screen Flash Disk Mode

### ● 4.3 Remote control user interface

## ● 4.4 Input output control user interface



### 1. Input port monitor:

INPUT SIGNAL terminal has 01-32, total of 32 status indicator lamps, and the interface board INPUT SIGNAL terminal X01 - X16 one-to-one correspond to the indicator lamps. Indicator lamp01- INPUT SIGNAL X01(X back home signal), indicator lamp02- INPUT SIGNAL X02(Y back home signal), indicator lamp03- INPUT SIGNAL X03(Z back home signal), indicator lamp04- INPUT SIGNAL X04(A back home signal), indicator lamp05- INPUT SIGNAL X05(Toolset signal), and other lamps correspond to other definable signal.

If indicator lamp is green (not light), it signifies that no signal triggers, if signal triggers, indicator lamp will be red (light) .it signifies that signal triggers. If signal triggers, indicator lamp not light, you should check the corresponding signal sensor, circuit and interface board.

### 2. Output port monitor:






OUTPUT SIGNAL terminal has 01-32, total of 32 status indicator lamps, and the interface board OUTPUT SIGNAL terminal Y01 - Y16 one-to-one correspond to

Add.: Room 308 Third Street Block A Jiahua Building Haidian District, Beijing, China P.C.: 100085.

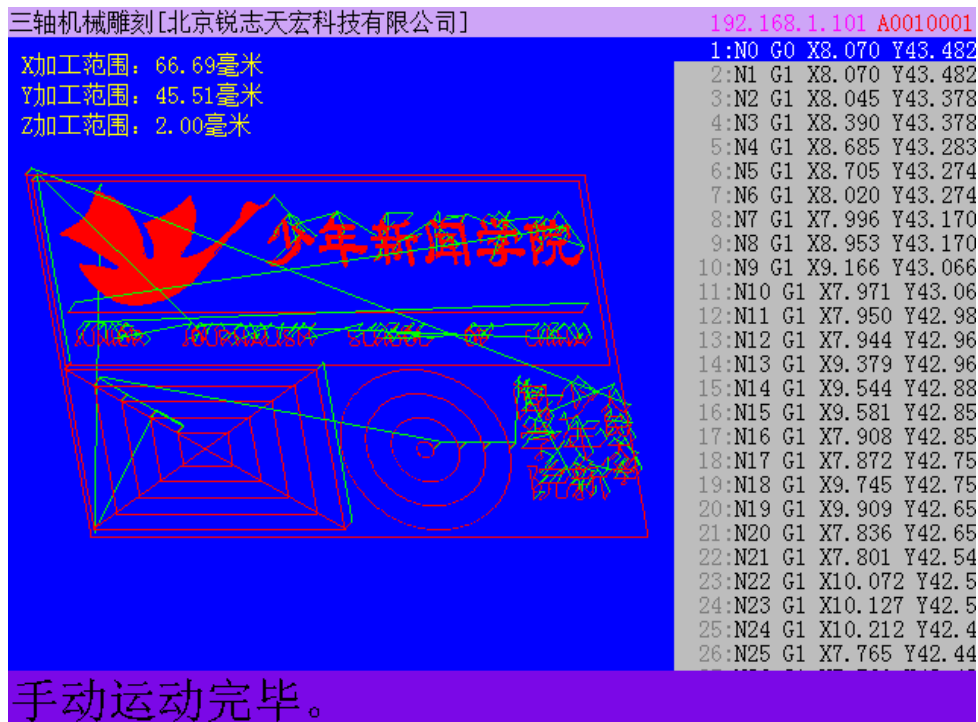
Tell: +86-10-62970368/82923063. Fax: +86-10-82920078 URL: www.richnc.com.cn



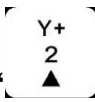
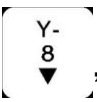
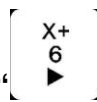
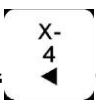
the indicator lamps.Indicator lamp01- OUTPUT SIGNAL Y01(Spindle CW state, Spindle CCW state), indicator lamp02- OUTPUT SIGNAL Y02(Spindle Shift 1), indicator lamp03- OUTPUT SIGNAL Y03(Spindle Shift 2), indicator lamp04- OUTPUT SIGNAL Y04(Spindle Shift 3),and other lamps correspond to other definable signal.

User can change indicator lamp state by pressing “”, to realize manually control output signal.Press “”、“” to move cursor left and right, and then press “” to change indicator lamp state. For instance: If cursor stop at indicator lamp 01, press “”, indicator lamp lights (get red), spindle on.

## ● 4.5 View toolpath user interface



1. In the “**View toolpath user interface**”, user can view the simulation picture of the processing file、 processing scope and G code of the file.

2. In G code display area, press “”、 “” to move cursor up and down, check G code line-by-line, press “”、 “” to realize that first line of G code directly jump to the end line or end line of G code directly jump to the first line.

## ➤ 5. Machine Operation

### ● 5.1 Return home

After starting up and system loading, screen shows: :


```
HomeTypeAtStart
All axis home
Z home only
none axis home
```

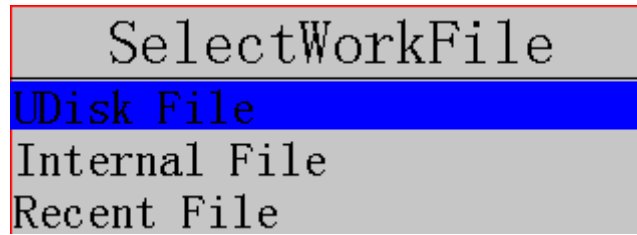
Select and confirm, machine will automatic return to mechanical origin, and also check system coordinates.


In some case, such as normal power off during processing, reboot and continue last operation, user should not HOME again, just choose “**none axis home**”. That is because system auto save coordinate value when system in normal exit.

### ● 5.2 Loading processing file

Before processing, generally we should import files. RichAuto system has 2 ways: **U disk import, inner file import.**

1. Import file directly from U disk, then press “” button, screen shows:

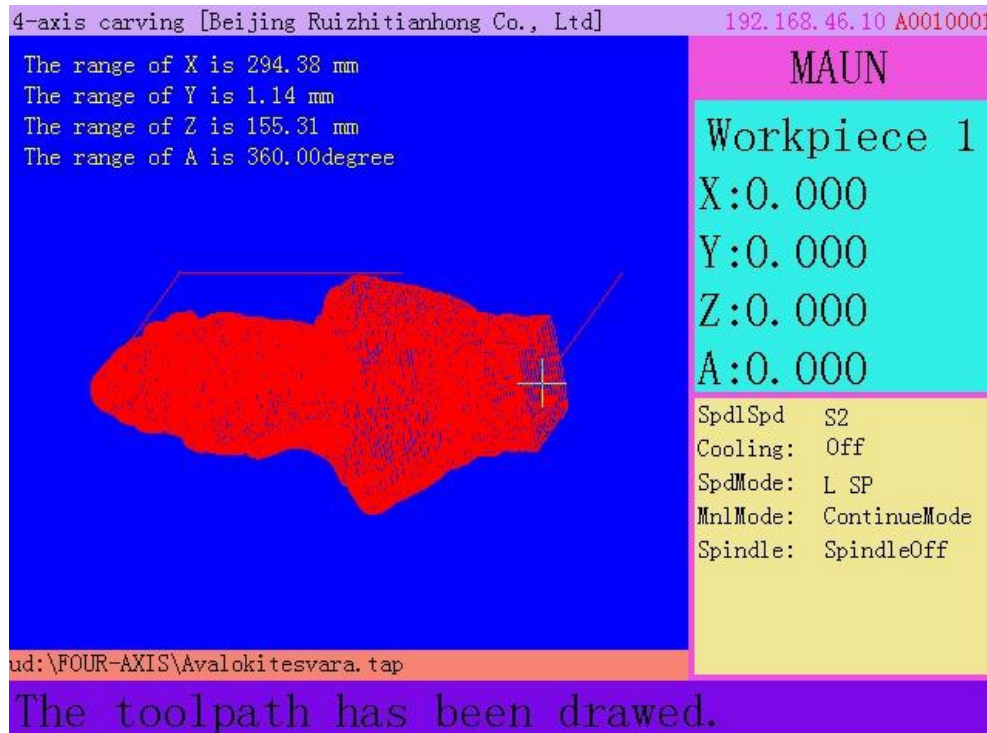


Choose required file, press “” .

2. Copy processing file to inner memory space from U disk. Same operations as above.

### ● 5.3 Manual processing Operation


Manual Processing Operation refers to controlling of the machine tool by pressing 3 axes direction keys. User can change the speed and set the grid under manual processing operation. System will enter Manual Operation state after returned home, and the screen displays as follow:



### 5.3.1 Manual operation speed switching and adjusting

#### 1) Speed mode switching



User can switchover between High speed and low speed by pressing “”.

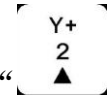

The speed mode you choose will decide processing speed.

#### 2) Speed adjusting

Firstly, go to “MENU”-“Manual function user interface”-“AUTO PRO SETUP” to find out “low manual speed” and “high manual speed”, the screen shows as follow:

Unit MMPerSec		Unit MMPerSec	
XSpeedOfSlow	1200.000	XSpeedOfFast	3000.000
YSpeedOfSlow	1200.000	YSpeedOfFast	3000.000
ZSpeedOfSlow	1200.000	ZSpeedOfFast	3000.000
ASpeedOfSlow	1200.000	ASpeedOfFast	3000.000



When cursor is in the low speed manual mode, press “”, “” to

move the cursor, then press “” the screen shows as follow:

**Input number**  
3000.00


Input the required value, then press “” to save it, or press “” to quit.

In order to ensure the accuracy of processing and debugging, the system introduces the concept of “grid” which also called “minimum feed”. It range is 0.05mm-1.0mm. When user change mode to “step”, push each axis button, machine will move by grid distance.

High speed manual mode setting is the same as low speed manual mode.









### 5.3.2 Manual motion mode

In order to meet different situation of manual movement, the system provide 3 kinds of motion modes: Continuous, step, distance. We can change mode by pressing

“”, and machine status area will display the current manual motion mode.

### 1) Continuous motion mode

In this mode, it has no value control. Machine move after user pressing motion

direction key (         )









Its motion speed is decided by current speed mode.


### 2) Step motion mode

This mode is always move in low speed, move 1 grid per 0.5 second. The grid distance is decided by current speed mode. This motion mode is suitable for tool adjusting or precise adjustment of the location of the mechanical coordinates.

### 3) Distance motion mode

In this mode, it runs according to the setting of distance. Machine will move by


the set distance when user press direction button (         ) .

**Setting:** Press “” to swtich to distance motion mode:

**Input number**  
 DistanceMode: 100.000

Input required distance value, press “” to confirm the changing.

**Note:** Grid unable to affect the distance motion mode. Machine will move by set distance(A axis:angle), can't move to grid point. If user wants to change distance(A

axis:angle), please press “” for three times to change to distance mode and re-enter the distance value.


## ● 5.4 Automatic processing operation


Auto processing refers to the system runs the file in U disk or inner storage space according to the instruction, it also called file processing. Before auto processing, user must set the machine tool parameters and all of the system parameters correctly.


Auto processing steps:

### 5.4.1 Determine the origin of the workpiece

The origin coordinates of X, Y and Z in the processing program is the workpiece origin. Before operating, we should pay attention to this position as well as the real position. Operation as follow:


Move X, Y and Z to the position which needs start to process the file on workpiece. Afterwards, press zero clearing “” can set X and Y axis origin.

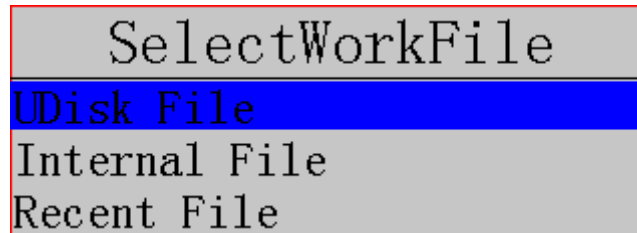
Press zero clearing “” to set Z axis origin. It should be noted, if user has

already used the automatic tool setting function, he will no need to press “”

for clearing. Only press “” will start tool setting function.


### 5.4.2 Load processing file

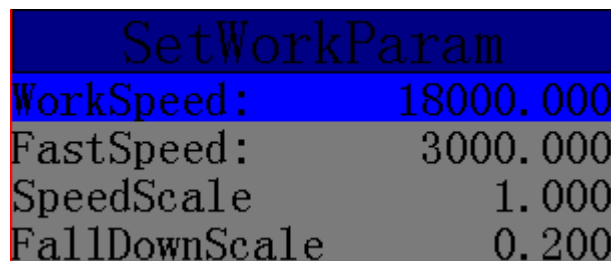
Insert Udisk(containing processing files), press “”, screen shows:





Choosing required file, and then press “” to confirm.


### 5.4.3 Set processing parameters


After the completion of loading processing file, press “”, it will popup processing parameters list:



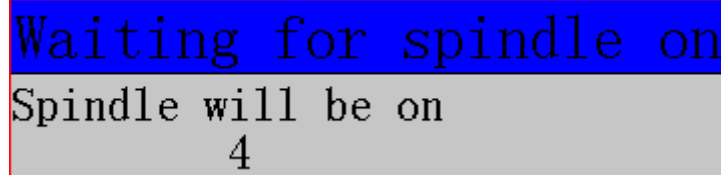
User can modify the parameters which include: Work speed, Fast speed, Speed ratio and Falling down speed ratio.


Setting: Press “”, “” to move the cursor to choose different

setting item, press “” to modify the value (next value setting is the same as

this one). After finished setting all values press “” to confirm. Waiting for

spindle on.







System will start processing after spindle on. During processing, user can check processing status at **machine status area**. The processing status including real-time processing speed, processing time, file line number, G code etc. Press  to switchover the content of **machine status area**.



## ● 5.5 During processing operation

### 5.5.1 Speed ratio & spindle speed Adjusting

#### 1) Adjust speed ratio


In process of processing, During processing, press 、“” can change speed ratio, each time press  /  , the ratio will increase/decrease 0.1. The processing speed ratio max 1.0, min 0.1, speed value will change while you change speed ratio, but time value can not be changed. **current speed= work speed \*speed ratio**.

#### 2) Adjust spindle grade

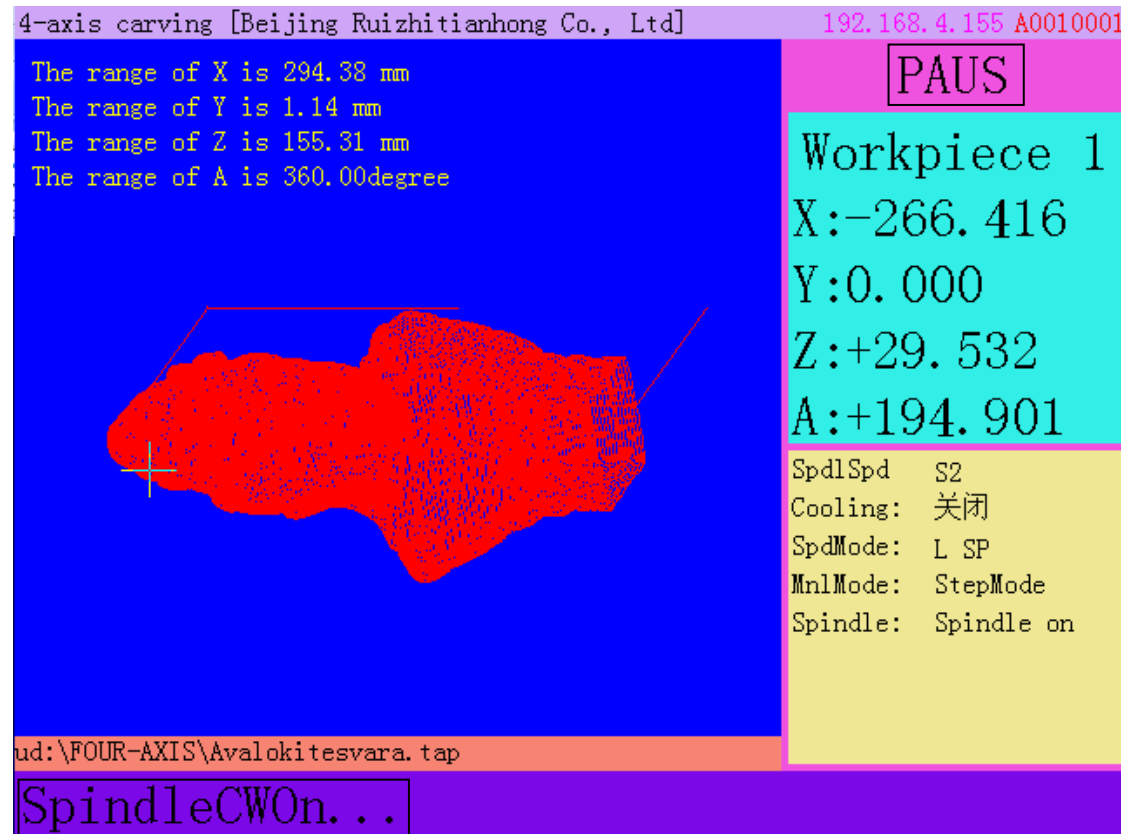
User can adjust spindle speed when there is set a multi-step speed. Press  ” turn up for 1 grade until S8, press  ” turn down for 1 grade until S1.

### 5.5.2 Pause processing & adjust position




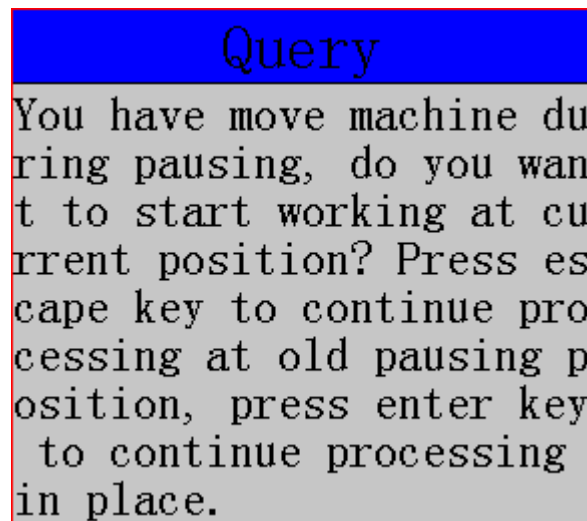
Press “” to pause processing, the right upwards of screen will change from “RUN” to “PAUS”, and machine stop processing except the rotating of spindle.




Shown below:



Now user can adjust position of each axis. System default motion mode is STEP, so that user can fine adjust each axis. That is to say, every click, machine axis moves 1 high/ low speed grid distance (A axis: angle) .


When the adjustment is finished, press “”, screen shows:

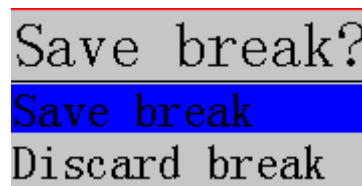



System ask user whether save the modified position. Press “” or “”, it will start at the modified position; Press “”, system will back to previous position and continue processing.

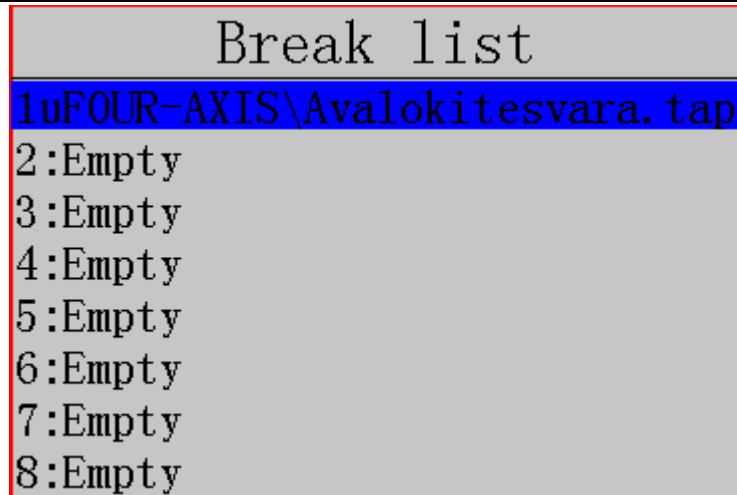
### 5.5.3 Breakpoint processing & power down protection

#### 1) Breakpoint processing

If user wants to stop during processing, please press “”, then screen shows as below:





If we want to save current processing position, press “”, then screen shows break lis:




Totally 8 breakpoints, press “”, “”, choose a breakpoint position


by moving cursor, and then press “” to save, system automatic return to zero.


If we want to continue processing from the breakpoint, we can choose the

combination key “” + “1-8”. First press “” not release it, at the same time press number key(1-8), then release together, the system will start processing from the breakpoint.

For example: You want to start processing from the breakpoint 1, then you

should use the combination key “” + “1”, system will restore processing from

breakpoint 1. If user doesn't want to save current breakpoint, pres “” next input

the line number which is required return back, and then press “” the system will start processing from the new line number.


## 2) Power off protection

When there is a sudden power failure during processing, system will save current coordinate and parameters, while power restart, process continue. Before that,

system must have a home motion. Shown as below:

<pre>HomeTypeAtStart All axis home Z home only none axis home</pre>	<p>Last power off during working, because of inertia the machine position may be error, do you want to restore coordinate? It's recommends not to restore. Press CANCEL to HOME, OK to restore.</p>
---	---



Press “” to continue unfinished processing, it will display stop line No.,



and the line number can be chosen. Press“” cancel the power off protection

## ● 5.6 Advanced Processing










Advanced processing is to meet the special requirements of operation. It contains: Array work, resume work, manual tool change, Part work, Calculate bound

etc. The combination key is “” + “”, shown below:

```
AdvancedWork
Array work
Resume work
Tool changing
Part work
Calc bound
Mill plane
Calc work time
Find break no
Auto resize
Scale work
```




### 1. Array work


Steps as below:

- 1) Press “”、“” to move cursor to the Array work, press “” to enter, and then press “”、“” to select different listed files;
- 2) Press “” to enter file list, then press “”、“” to move the cursor to choose target file;
- 3) Set processing parameters, also can modify the array parameters in this step, or you can go to “MENU”-“Menu function user interface”-“AUTO PRO SETUP”, choose “Work Array” and modify the array parameters. The rest steps are similar to the normal processing. In this way, system will start to work according to the user’s setting.
- 4) During array work, press “” could view real-time row number, column number and other processing information.

## 2. Resume work

Steps as below:


Press “”、“” to move cursor to resume work, press “” to enter the list:

Press “” system will resume working from the choosed breakpoint. If

you want to return back,should press “”, the screen prompt:

Input number  
The line no of the code::160



Input the line number which needs return to, and then press “”, the cursor will goto new line:


```
Start source no of break working
160:Z4.785 A-103.548
161:Z4.592 A-98.742
162:Z4.481 A-93.911
163:Z4.537 A-79.362
164:Z4.642 A-69.678
165:Z4.822 A-62.435
166:Z5.087 A-55.23
167:Z5.423 A-48.079
168:Z5.729 A-40.995
169:Z6.096 A-33.973
170:Z6.39 A-29.33
171:Z6.84 A-24.723
172:Z7.398 A-20.167
173:Z7.726 A-15.678
174:Z7.915 A-13.289
175:Z18.66 A-13.267
176:Z19.126 A-13.139
177:Z20.056 A-12.187
178:Z20.667 A-11.236
179:Z21.249 A-9.565
180:Z21.656 A-7.925
181:Z22.126 A-4.675
```



Press “” system will start from new line.


### 3. Manual tool changing

It means manually loading and unloading the cutting tool in a certain position

of machine tool, and the position also can be set. Press “” enter into setting:

```
Information
Please chang the
tool, press OK
key to back when
finished.
```




While new cutting tool has been changed, press “” system will go to workpiece origin.

### 4. Part work


Add.: Room 308 Third Street Block A Jiahua Building Haidian District, Beijing, China P.C.: 100085.

Tell: +86-10-62970368/82923063. Fax: +86-10-82920078 URL: www.richnc.com.cn

Park work means user can select a start line and stop line from G code, so that realize the part working. The steps are as follows:

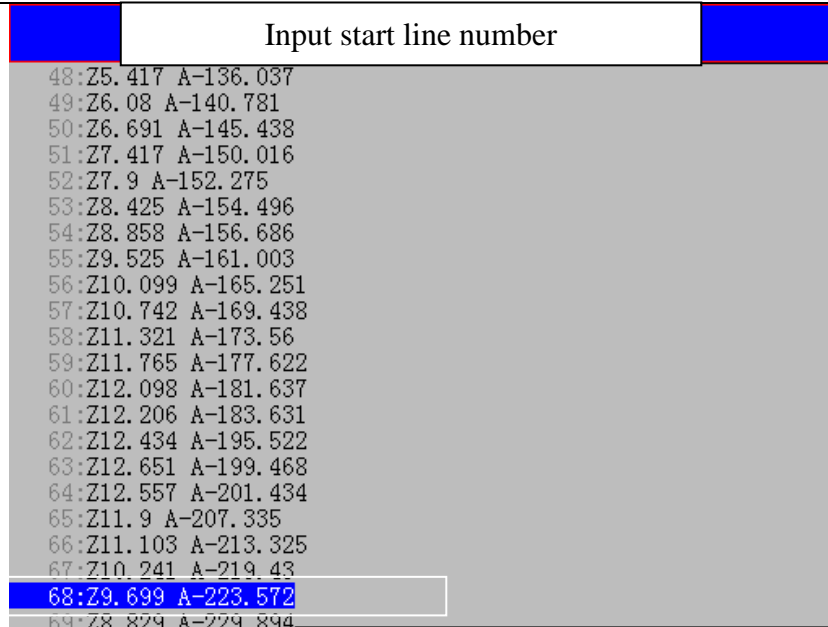
- 1) Press “” to enter the setting:


	Input start line number
<pre> 1:% 2:( Date - 21.09.12 - 11:20:35 ) 3:( DP Version 1510 Option File : lzw-4A ) 4::1 5:G05 P10000 6:G40 G17 G80 G49 7:G90 G28 Z0.0 8:( TOOL TYPE BALLNOSED ) 9:( TOOL ID 1 ) 10:( TOOL DIA. 6. LENGTH 30. ) 11:( ALLOWANCE = +0.0 ) 12:N1 T1 M6 13:( ===== ) 14:( TOOLPATH - 1 ) 15:( ToolPath Time - 01:18:57 ) 16:( ===== ) 17:G1 X-147.33 Y-1.144 Z157.648 A0.0 H01 F3000 18:X-294.659 Y0.0 19:Z152.648 20:Z21.998 F500 21:Z21.669 A-2.246 F1000 22:Z21.018 A-5.475                     </pre>	

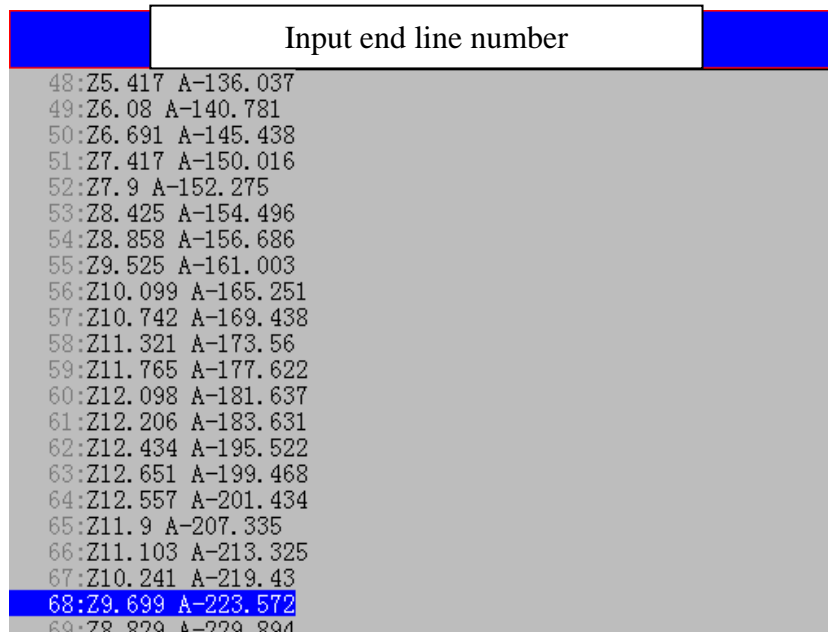
- 2) Press “” will prompt a message:



	Input number
<p>The line number of the code:68</p>	

- 3) Input new line number, press “” to confirm, **the cursor will goto new G code line:**

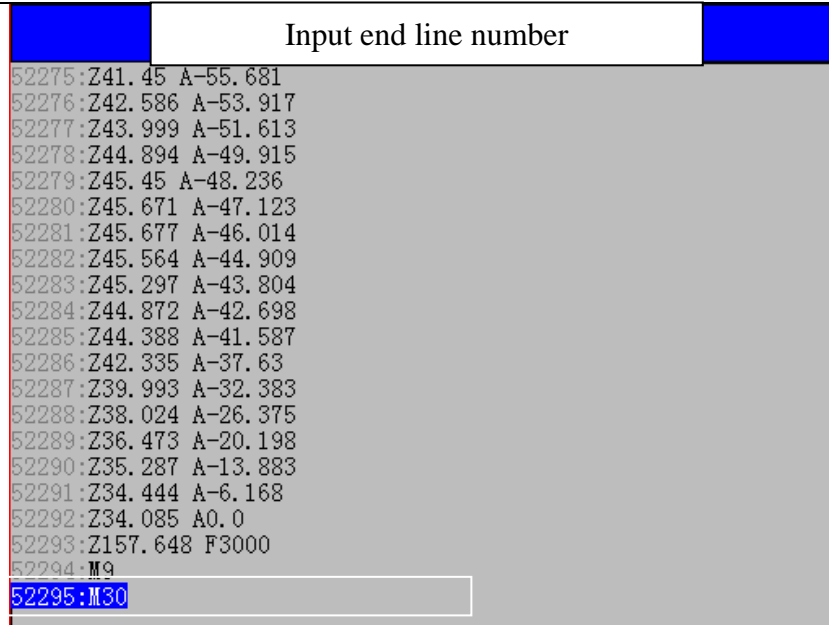


- 4) Once more press “” to set the end line number, it will prompt:



- 5) Press “” the cursor will go to the end line, or press “” to input the number of the end line:







Press “ORIGIN OK” to confirm, and start to processing.

6) Set processing parameters. The rest operation is as same as normal processing.

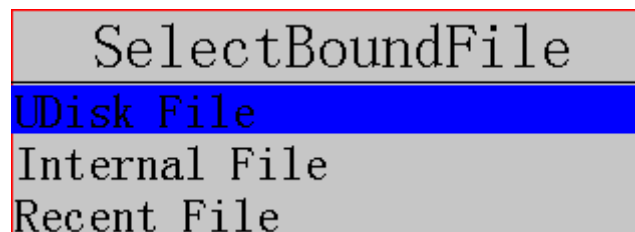
### 5. Calculate bound



Calculate bound means user can check the size of processing, So as to avoid unnecessary waste of materials and processing errors. The steps are as below:




1) Press “”, “” to move the cursor to “calculate bound”, press



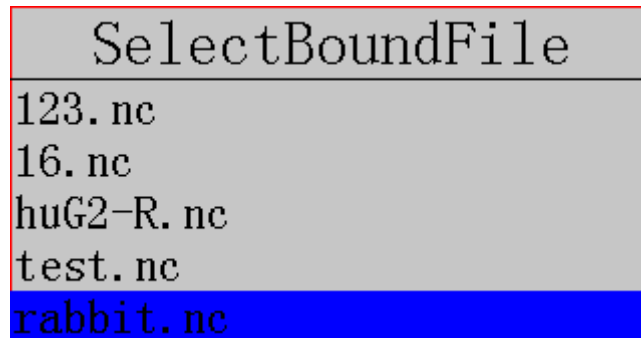
“ORIGIN OK” to enter:




Then press “”, “” to move cursor to choose different file list;

2) Press “” to enter the file list, and then press “”, “”

to choose target file:

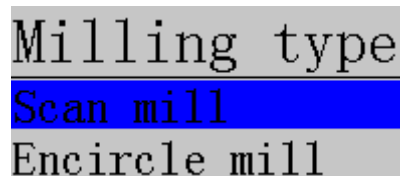


- 3) Press “”, system start to read the file, after that, the system will calculate the area:

Work bound	
WorkTime	0.000
X Size	18.726
Y Size	27.059
Z Size	42.232
X MinPos	0.000
X MaxPos	18.726
Y MinPos	0.000
Y MaxPos	27.059
Z MinPos	-2.232
Z MaxPos	40.000
A MaxPos	-360.00
A MinPos	0.000

## 6. Milling plane

Include two types: scan mill and encircle mill






Steps are as follows:

Add.: Room 308 Third Street Block A Jiahua Building Haidian District, Beijing, China P.C.: 100085.



Tell: +86-10-62970368/82923063. Fax: +86-10-82920078 URL: www.richnc.com.cn


## 1. Scan mill


1) Press “”, “” to move cursr to choose the mill type.

2) Press “” to enter the scan mill settings, it includes: Scan type, Scan Width, Scan Height, Tool Diameter, Scan Depth, Z Step T Ratio.



Scan mill set	
ScanType	Scan by X
Width	100.000
Height	100.000
Diameter	10.000
Depth	0.000
Z Step	0.100
TRatio	0.800


3) Press “”, “” to move cursor on the option which need modify,

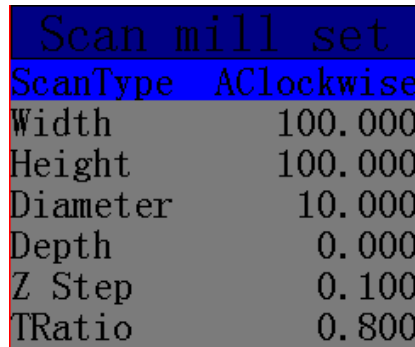
press “” to choose mill type (X Scan or Y Scan), also press this

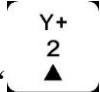

button to modify the parameters. Press “” to save them.


## 2. Encircle mill


1) Press “”, “” to move cursr to choose the mill type.

2) Press “” to enter the scan mill settings, it includes: Scan type, Scan Width, Scan Height, Tool Diameter, Scan Depth, Z Step T Ratio.



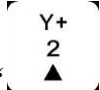

- 3) Press “”、“” to move cursor on the option which need modify,


press “” to choose mill type (X Scan or Y Scan), also press this

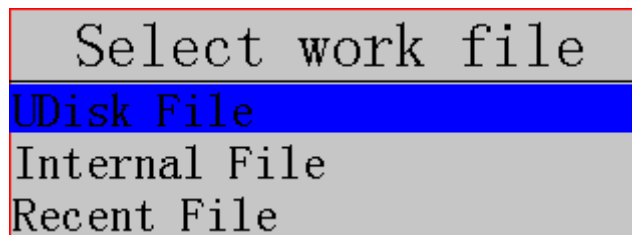
button to modify the parameters. Press “” to save them.


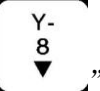
## 7. Calculate work time:

Calculate the processing time according to the system processing speed:

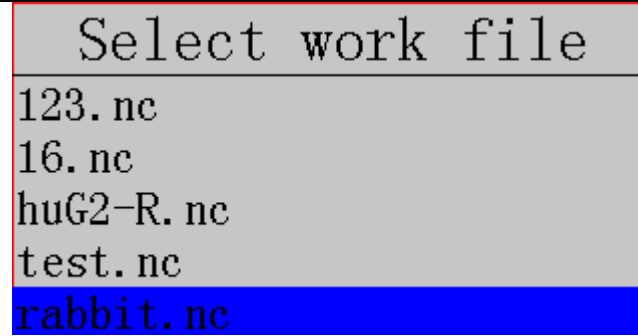
- 1) Press “”、“” to move the cursor to “calculate work time”, press

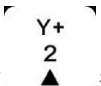
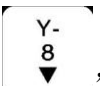
“” to enter:




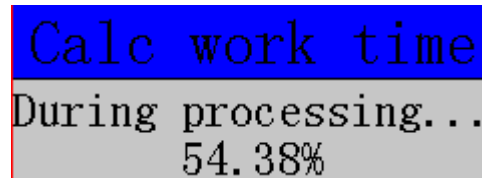
- 2) Press “”、“” to move the cursor to select the file store position,

then press “” to enter:

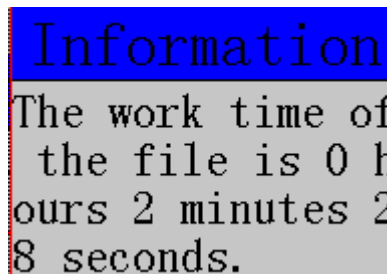


3) Press “”、“” to move cursor and choose the processing file,

press “” , system start to read the file, after that, the system will calculate the processing time: :






After calculating, the screen will display file processing time(different work speed will show different processing time):

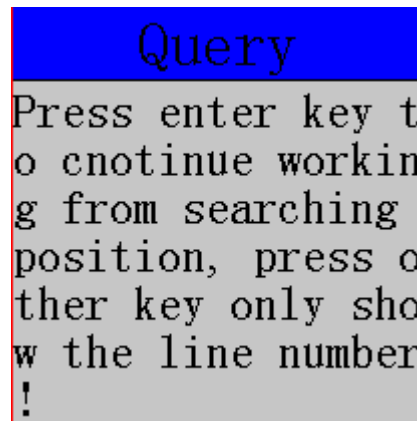



### 8. Find break no.:

During processing, if accidentally tool damaged and user hasn't saved the break point, stop working and replace tool. After that, user can manually move X, Y axis to the nearest point where the cutter was broken (recommend to move a little further),



press “” + “” to start advanced work, move cursor to “Find break no.”,

then press “” to enter, system will prompt:







Press “” to start working.

### 9. Auto resize:


1) Press “”、“” to move cursor to “**Auto resize**”, and then press

“” to enter.

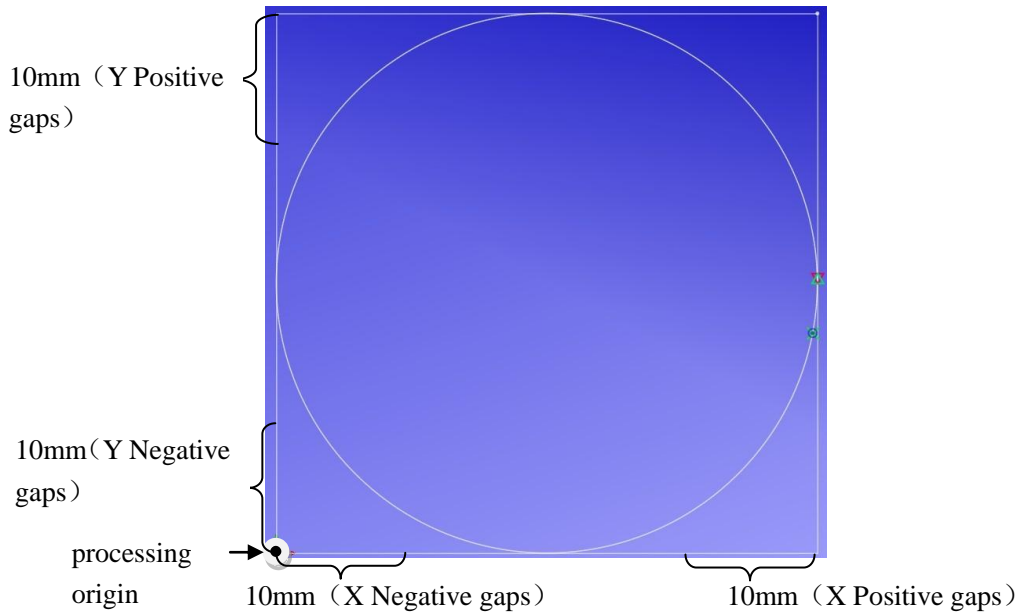
2) Press “”、“” to move to the option which needs to be modified,

then press “” to input new value, press “” to save the modification.

Input	Target	Size
X start	0.000	
Y start	0.000	
X size	10.000	
Y size	10.000	
X- Space	10.000	
X+ Space	10.000	
Y- Space	10.000	
Y+ Space	10.000	

3) After modified all the options, press “” to start processing.

200mm X 200mm Circle



**X、Y axis origin:** Offset value of the new workpiece origin which is relative to the original workpiece origin.

**X、Y axis size:** New processing file size.

**X negative gaps:** See the bottom mark, in X direction, processing origin is moved back for 10mm.

**X positive gaps:** See the bottom mark, in X direction, processing origin is moved ahead for 10mm.

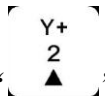
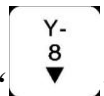
**Y negative gaps:** See the bottom mark, in X direction, processing origin is moved back for 10mm.

**Y positive gaps:** See the bottom mark, in X direction, processing origin is moved ahead for 10mm.

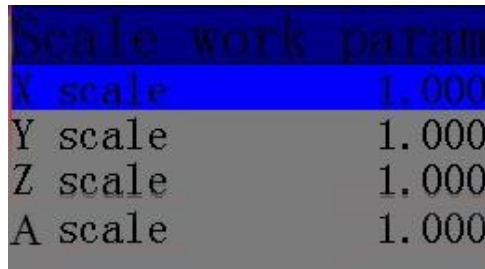
### 10.Zoom processing:

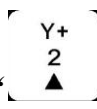
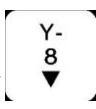

If user needs to view different sizes processing file, he can use ZOOM. Input the zoom ratio to process.


Operate steps:


- 1) Press “”、“” and move cursor to “calculate work time”, then

press “” to enter:



2) Press “”, “” and move cursor on axis ratio, press “”






to modify a new value, then press “” to confirm.

3) When finished the modifications press “” to start processing.




## ● PS1. System upgrade

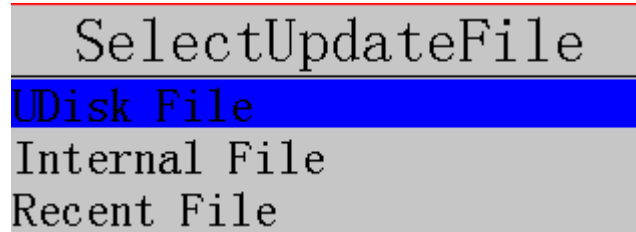
Copy upgrade file to U disk, and insert U disk into handle, file format: extension **\*\*\*\*\*.PKG** & shown as **rz-xxxx**. Operate as follow:



### U Disk Upgrad Method 1

1、 Press “” to enter “**Switch user interface**”, choose “**Menu function user interface**”, and then press “” to enter, press “”, “” to choose “**System Setup**”, press “” to enter.





- 2、 Press “”, “” to choose “**Auto Upgrade**”, press “” to enter,  
screen shows:



- 3、 Press “” to enter, choose “**Udisk file**”, enter Udisk to choose upgrade file,  
press “”, system will automatically upgrade.
- 4、 After upgrade completed, restart the handle.

### **U Disk Upgrad Method 2**

- 1、 Copy upgrade file to Udisk, and insert Udisk into handle.

- 2、 Press “” + “”, and then repeat Method 1 operation 3&4.