LIST

Foreword

System Introduction：

RZNC-0501 is CNC motion control system independently developed by Beijing ruizhi tianhong 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.

RZNC-0501 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 axis motion control method ,Support the rotation axis （C axis）control，Enables to switch the processing of surface and processing of rotation；up extended to X, Y, Z, C four-axis motion control, Implementation four axis interlocking Control.

2. Multi I / O Point Control，there is four 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 6 different breakpoint processing information.

6. Multi-coordinate memory function. Provide nine working coordinate system, the user can switch among the 9 coordinate, 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 7 thresholds; 1 - 7 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 128 M memory, can expand the memory size according to user needs. The system will be divided into 30 storage space, the size of each storage area is automatic allocation.

12. Unique handheld form factor with one hand to hold. Own liquid crystal display and 16 key keyboard , operate intuitive and flexible, no longer dependent on the computer, the full realization of full offline operation

13. C omes 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.

Notice：

1. Forbid in strong interference and strong magnetic field environment.
2. Do not plug signal transmission cable which connect hand-held controller to the machine.
3. When processing U disk files, do not pull out the U disk, to prevent interruption of data transmission.
4. Strictly forbidden metal, dust and other conductive materials into the hand-held controller.
5. Ground wire should be connected machine housing to ensure safety and to prevent bring in interference .
6. Unauthorized removal prohibited, no user repairable parts inside.
7. If do not use for a long time, please power-down, and properly maintained.
8. Note water, dust and fire when using.

1. RZNC-0501 system composition

1.1 System composition

RZNC-0501 control system is made up of host computer and lower computer. It contains the following parts：A hand-held motion controller ,a line adapter board, a fifty pin data transmission cable, an USB communication cable, CD（including PC　and lower computer supporting programs）.
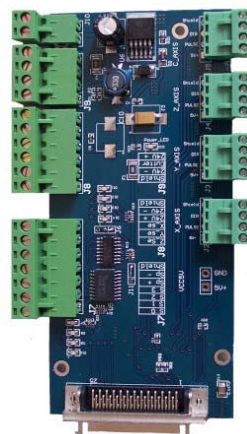
RZNC-0501 accessories schematic diagram

Hand- held motion controller　　　　　**CD**　　　　　　**adapter board**

50 pin data transmission cable　　　**USB communication cable**

Figure 1-1

1.2 Host Computer

PC is the supporting software installation system used to achieve the communications between computer and the handle. It contains PC Setup（**0501(English).exe**），USB driver（**usbcam.inf、usbcam.sys**）.

Host computer matching program diagram

usbcam.Inf
安装信息
2 KB

usbcam.sys
系统文件
19 KB

0501(English).exe
Setup Launcher
Ruizhitianhong

Figure 1-2

1.3 Lower Computer

Lower computer refers to control structure which can transfer the movement data into electrical pulse signals to control the movement of machine. It contains Hand-held motion controller, a adapter board,50 pin data transmission cable, USB communication cable, lower computer supporting program（including **system program、label、menu**）。

Lower computer matching program

O501_1.0_Menu C.txt   rhbLabel501_C_v17.label
O501_1.0_Menu E.txt   rhbLabel501_E_v17.label

Chinese,English menu   Chinese English label

RZNC-D5416-1.2(rhb59)_init.NEWBIN2
RZNC-D5416-1.2(rhb2289)_normal.NEWBIN2
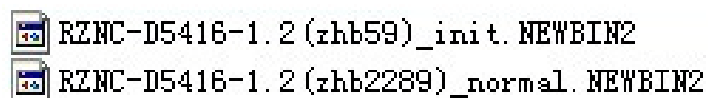
System upgrade
Figure 1-3

2. PC Software Installation and Usage

2.1 PC Software Installation

1．**PC installation environment requirements**：

Main board: **PIII 450** or above, Memory:**128M** or above, OS：**Win XP，Vista，Win7(x86)**.

2．**Installation steps**：

(1)：Put the CD into CD-ROM，Open the host computer software folder in the CD；double click **0501(English)**.**exe**（Figure **2-1-1**）；

(2)：Into the installation interface，click "NEXT"（Figure **2-1-2**）；

0501(English).exe
Setup Launcher
Ruizhitianhong
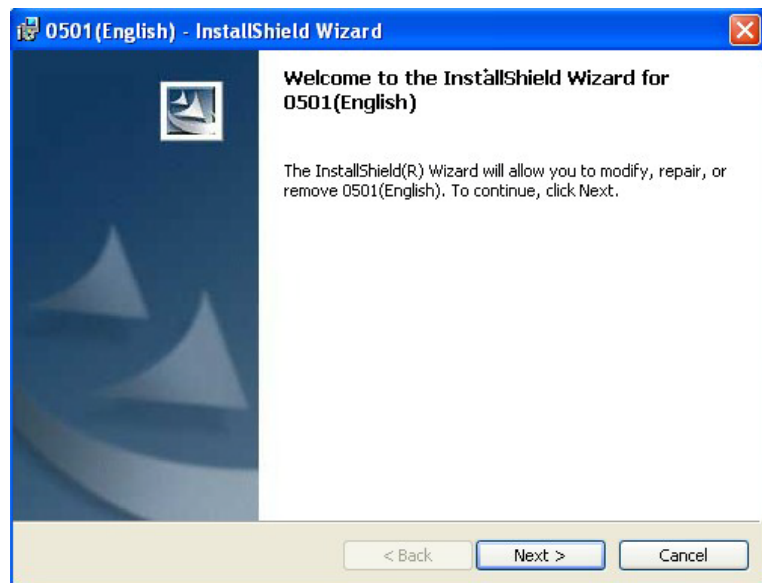
Figure 2-1-1   Figure 2-1-2

(3)：Into the installation directory selection，click "Change" to change the installation directory（Figure **2-1-3**）；

(4)：After change the installation directory, click "Next" into the installation interface, click "install".（Figure **2-1-4**）；

(5)：After installing，the icon can be automatically add to the Start Menu (Figure **2-1-5)**. At the same time when you see the icon on your

computer desk, the software installation is completed.

(6)：Whenever need to uninstall the software, you can do it as the following steps: click "**start** → **all programs** → **ruizhitianhong** → **0501(English)** → **Uninstall 0501(English)**".
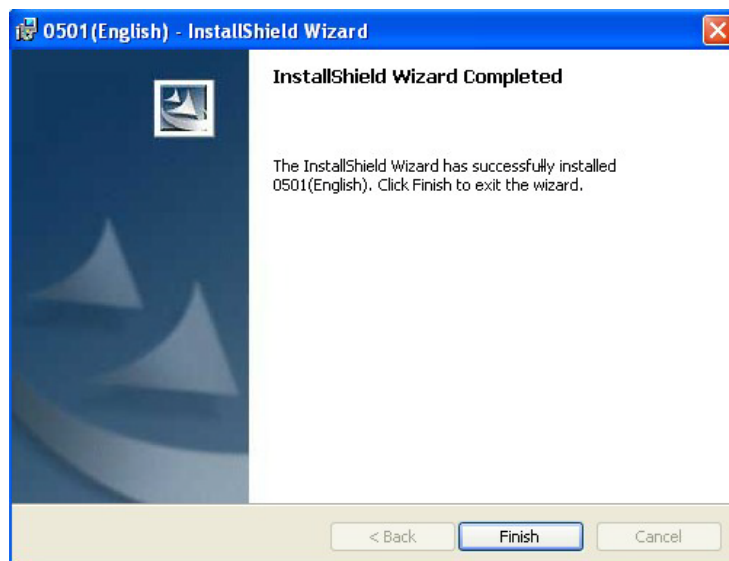

Figure 2-1-3

Figure 2-1-4

Figure 2-1-5

2.2 PC Driver Installation

After the software installation, you need to install the USB driver to connect the communication of the software and the handle. The USB driver files（usbcam.inf、usbcam.sys）are usually placed in the folder usbcam2.2.

(1)：When the handle firstly connect with the computer by the USB cable , the computer will prompt "Found New Hardware"（Figure **2-1-6**），and then the Guide to Found New Hardware appears.
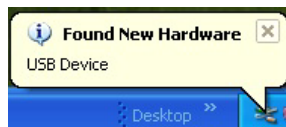
<div style="display:flex;">
Figure 2-2-6   Figure 2-2-7
</div>

(2)：Choose "No，not this time" tab，click "NEXT" into the interface.（2-2-7）;

(3)：Choose "From a list or specific location"，click "NEXT" button，Figure（2-2-8）;

(4)：Click "browse" to find the folder which contains the USB driver files，click "NEXT"，to start the installation.（Figure2-2-9）;

(5)：When driver installation prompts "has not passed Microsoft logo testing"，select "still continue" .(Figure2-2-10）;

(6)：When the installation is completed, it shows as follows (Figure2-2-11) and the icon will appear on the right corner of the computer.

Figure 2-2-8
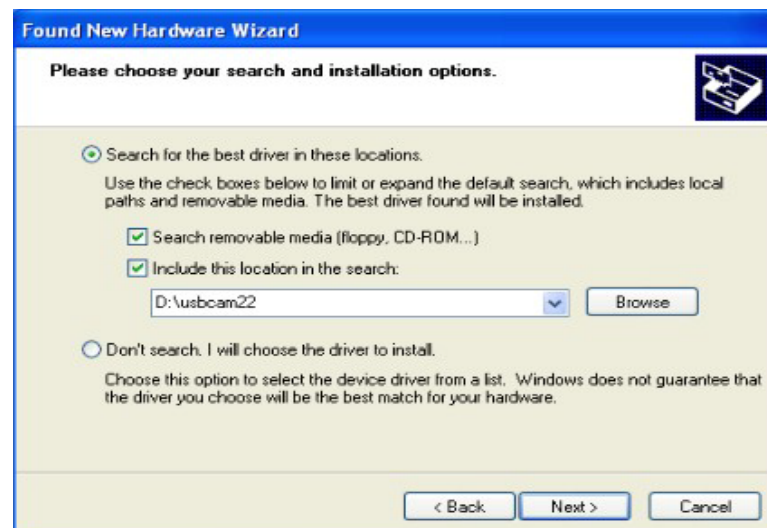
Figure 2-2-9

Figure2-2-10

Figure 2-2-11

Notes：

(1)：When we open the Device Manager Tab, if "Universal Serial Bus Controllers" option shown as in Figure (**2-2-12**), indicating that the computer system does not install USB driver, or the USB driver is not installed successful；

(2)：When you double-click to open the PC software, if the computer system prompts "**not connect handle or version not match**", indicating that the computer system does not install the USB driver, or the user did not connect the handle with the computer by the USB cable, so the communication is unsuccessful.
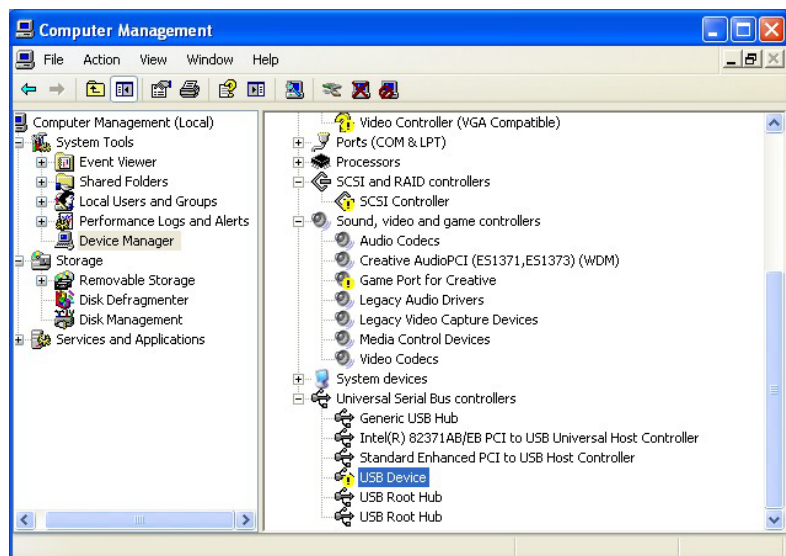
Figure 2-2-12

2.3 PC Software Usage

Software interface：

Double-click **0501(English) 快捷方式 3.08 KB** on the desk to open PC software；Software interface shows as Figure 2-3-1，including menu bar, code display field and simulation display field.

1.Menu bar：including five selections: file, operation, update and help. You can do varies operations from PC software to handle by these five menus。

2.Code display field：Show the code information of the processing files which are already in open status.

3. Simulation display field ：Simulation shows the graphics route of the processing documents which are already in open.
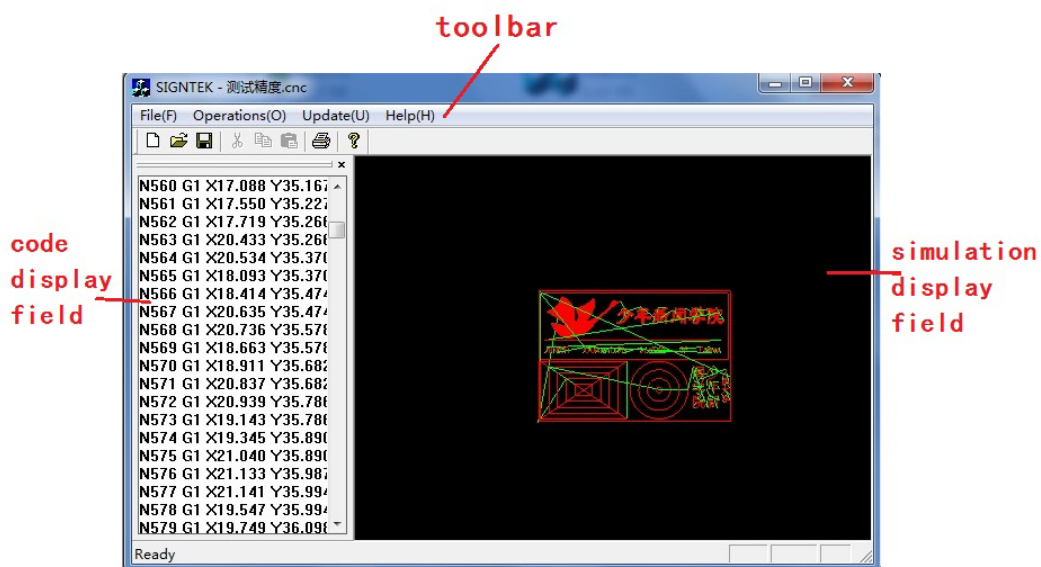
Figure 2-3-1

Usage：

PC software contains four menus: file, operation, update and help；Use the PC menu operation, you can achieve the transportation operation, lower machine parameters

maintenance operations, lower computer upgrade operations between the host computer and the handheld motion controller.

1. File transfer operation：

（**1**）**Open file**：Open the processing files, view file information.

Steps : click "File" → "Open", Into the Open File dialog box，Switch to the directory where the processed files locate，Set the file type to "All Files (*.*)"，select the processing file，click "Open"，(figure 2-3-2) and then the operation is completed.
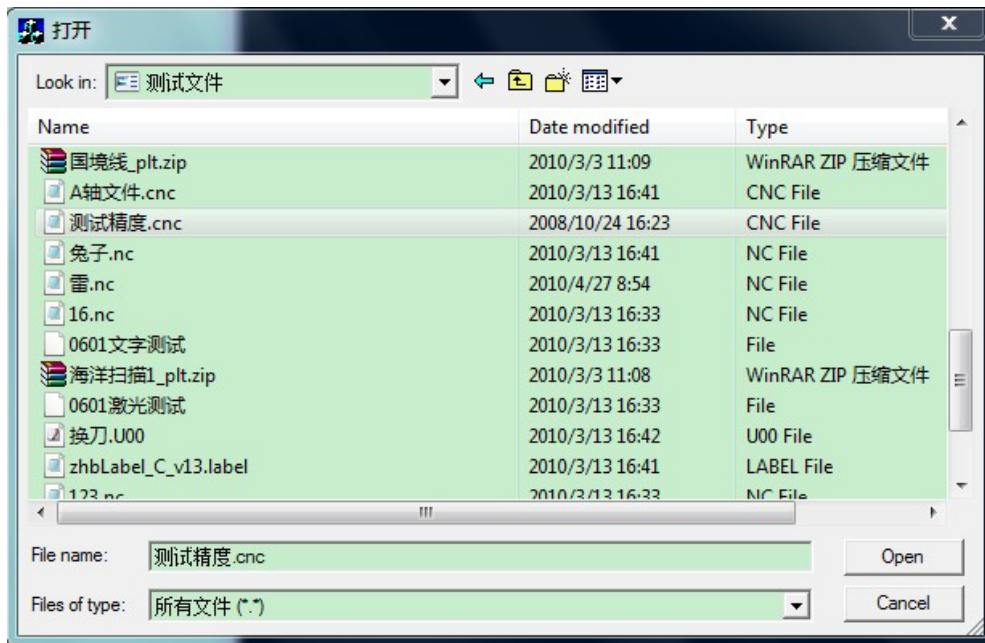
Figure 2-3-2

（**2**）**Download**：Download the processing files to the internal document storage area of the handheld motion controller.

Steps: click "operation"→"Download file"，Into the Open File dialog box，you can refer to the steps of the operation of "open file"；after open the file to select the file storage location dialog box，select the file storage location，click "OK"（Figure2-3-3）to download the files. After the download is complete, the system prompts "File download complete"。
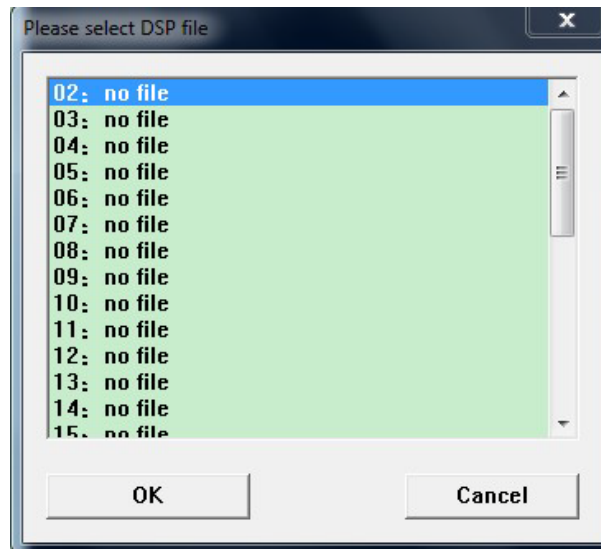
Figure 2-3-3

（3）**Upload file：**Upload the files in the internal storage area onto the computer.

　　　Steps：click "operation"→"upload file" into the select File dialog box，Click the file

　　　storage list to choose file which you want to be uploaded，click "OK"（Figure

　　　2-3-4），Into the file save dialogue box；Switch to the file save location，input
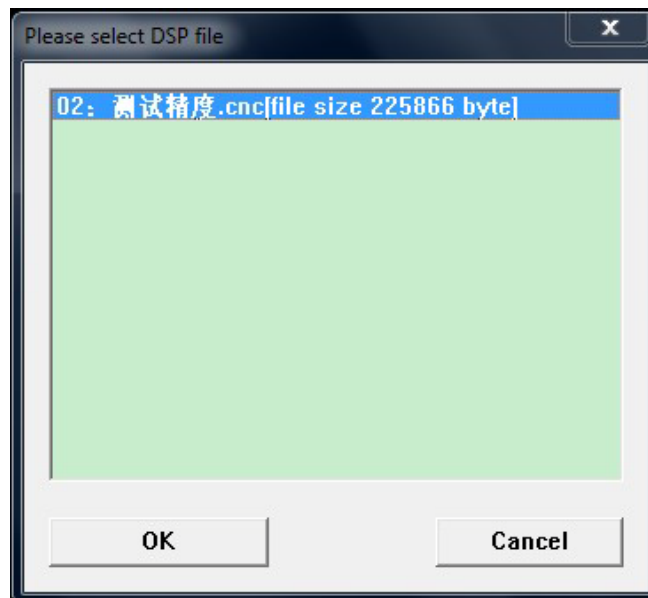
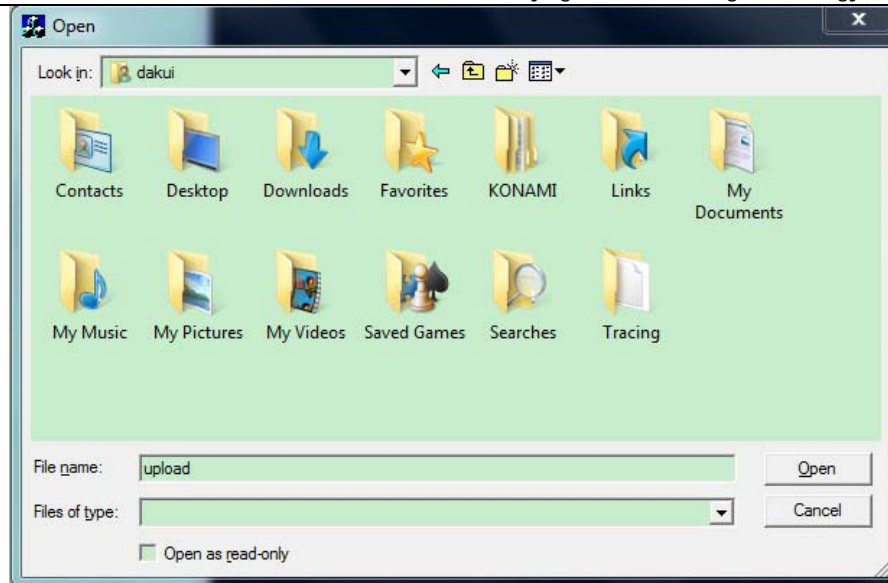　　　the file name，click "open"（Figure2-3-5）to upload.

Figure 2-3-4

Figure 2-3-5

2. Maintenance of the lower machine parameters：

(1) **Backup Configure Data:** Backup the configure data of the handle controller to computer.

Step：Click "operation"→"Backup configures data", into the parameter save dialogue box.（Figure2-3-6），select save catalog，input file name，click "save"，a backup file with DAT extension will be created，System displays "Configure Data Backup successful".
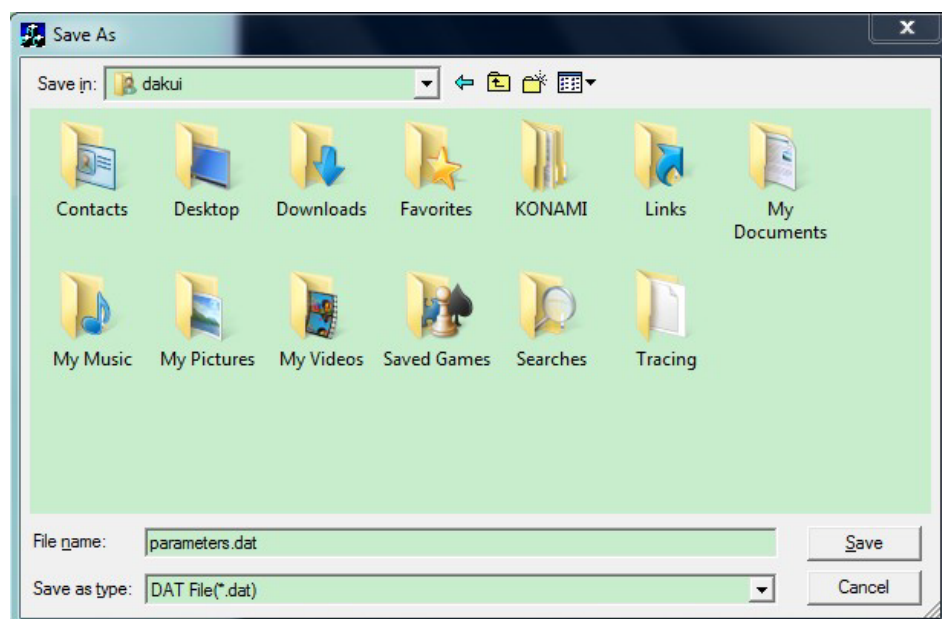
Figure 2-3-6

(2) Restore configure data： Restore the backup file to the handle controller.

Step：click "operation"→"restore the configure data"，enter into the find Files dialog box（figure 2-3-7），Switch to the saving list，Select the backuped file，click "open"，start to restore the configure data to the handle controller. It will display "Configure data restores is successful".
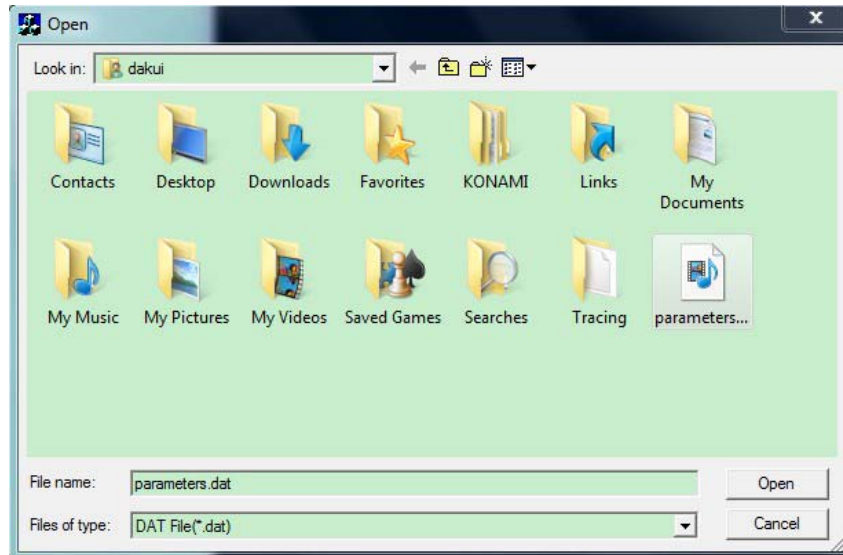
Figure 2-3-7

3. Lower computer upgrade operations：

You can set function to the handle controller and update operation of various supporting procedures by the "upgrade" menu. You can refer to the supporting procedure in Figure**1-3**；click **"upgrade"**，the operations shown in Figure（**2-3-8**）
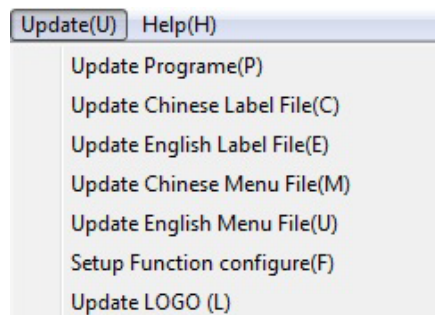
Figure 2-3-8

（1）Update：Update the emergency recovery procedures and general program files of the handheld motion controller.

Steps：click "update"，choose "update program"，Into Find File dialog box to choose the program files，click "open"（Figure 2-3-9）；It displays the information of the program files，click "Yes" to update（Figure 2-3-10）； it displays "update

is successful" when it finished.
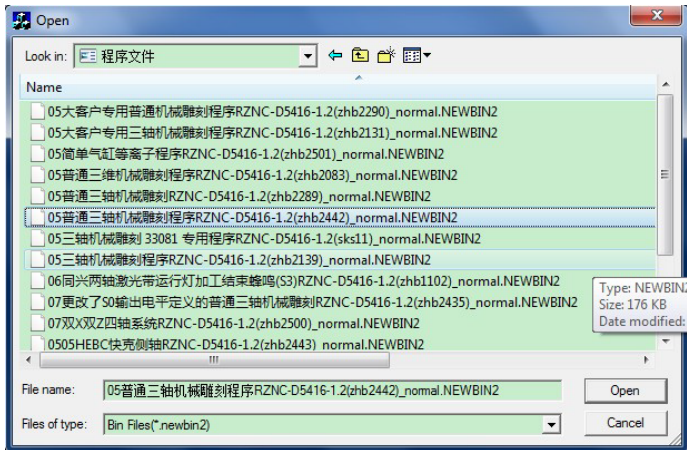

Figure2-3-9   Figure2-3-10
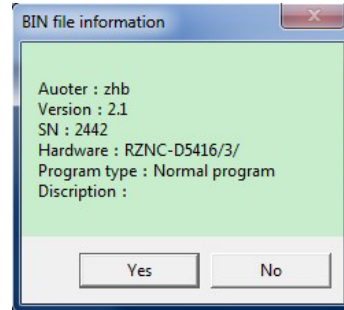
（2）Update Chinese Label File： Renew the information of the label of the handle motion

controller in Chinese interface.

Steps：click "update"，choose "update Chinese Label File "，choose Label file，click

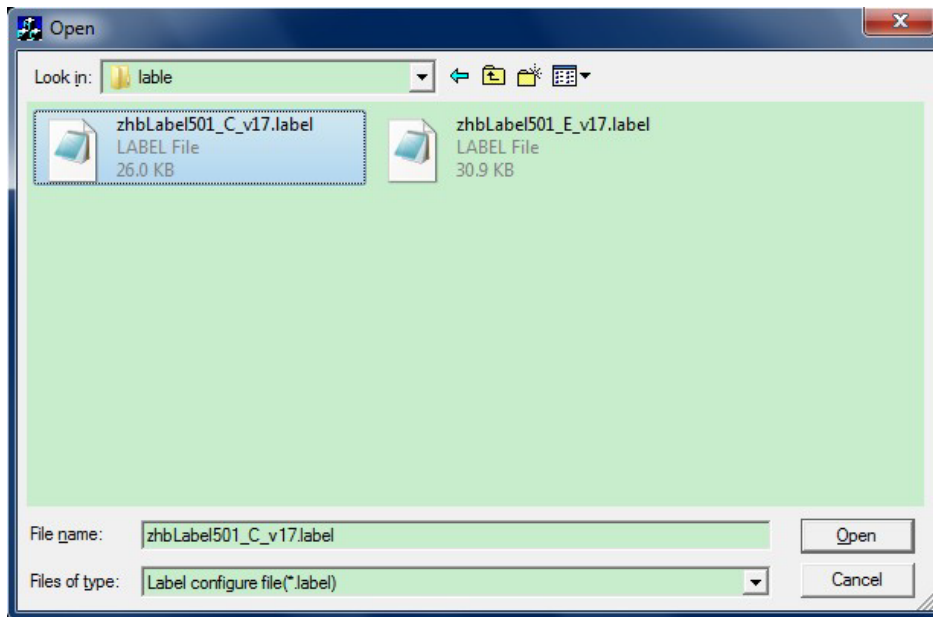"open"（Figure2-3-11）to update，after that, it displays "Label is successfully

downloaded".

Figure 2-3-11

（3）Update English Label：Renew the information of the label of the handle motion

controller in English interface. Steps are the same as Chinese label.

（4）Update Chinese menu： Renew the information of the menu of the handle motion

controller in Chinese interface. Steps：click "update"，choose "update Chinese menu file"，choose menu file and click "open"（Figure2-3-12）to update；After finish, system displays "update menu successfully".

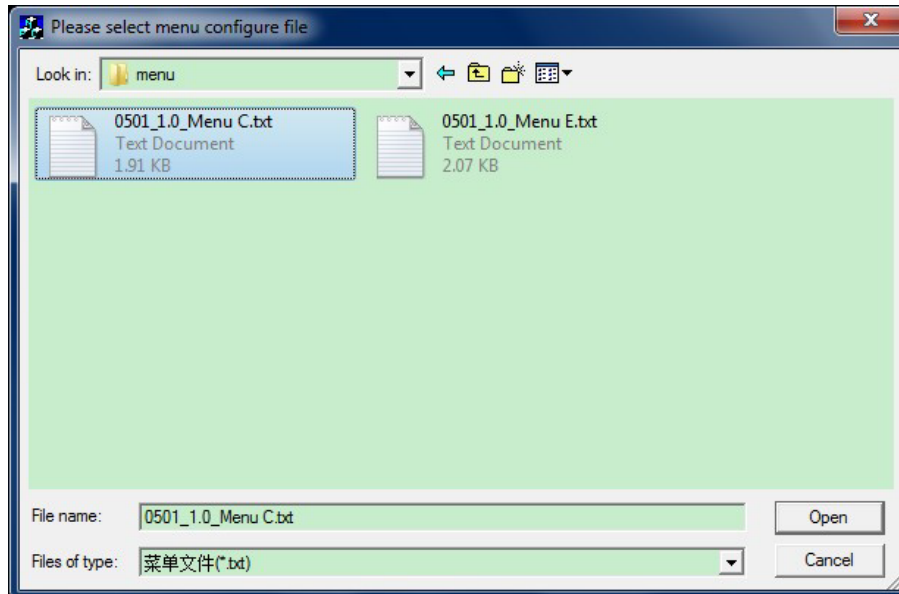Figure 2-3-12

（5）Update English menu： Renew the information of the menu of the handle motion controller in English interface.

（6）Update LOGO：set opening image with the identifiable resolution of 128 * 64   *.JPG, *.BMP format for the handle motion controller.

Steps：click "update" to choose "Update LOGO"，into download LOGO dialog，input the time of LOGO displayed；choose the save list of the file for LOGO， click "open" （Figure 2-3-13），open LOGO file，click "OK"，start to load LOGO （Figure 2-3-14），after finish, it displays "LOGO is successfully loaded ".
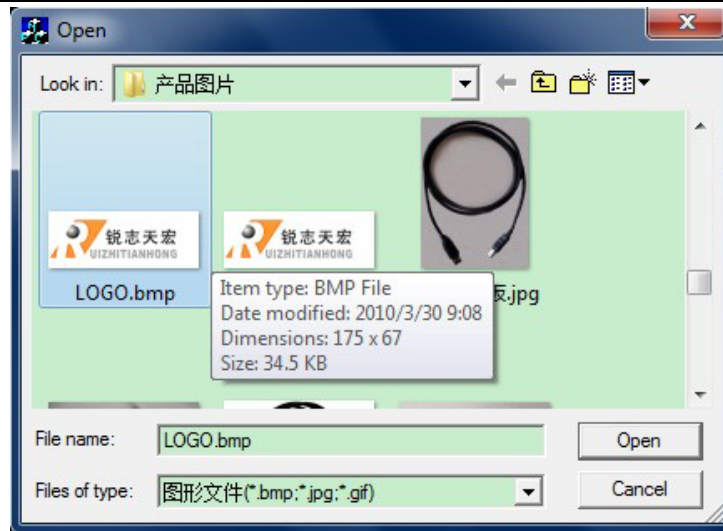
Figure 3-3-13

Figure 2-3-14

（**7**）**Function configure setting:** set whether the handle motion controller to keep a system function；The following features can be set: power protection, the system language, ways of back to home, XYZ axis back to zero function, the system movement after the automatic processing, whether to keep the depth of Z-axis, and the type of the system manual movement.

Step: click **"update"** to select **"**Setup the function configure**"**. In the dialog box，Click the left button to select a system function when you need. Click "OK" to save and it displays "Configuration is downloaded successfully". The setting will take into effect once you restart the handle (Figure 2-3-15).
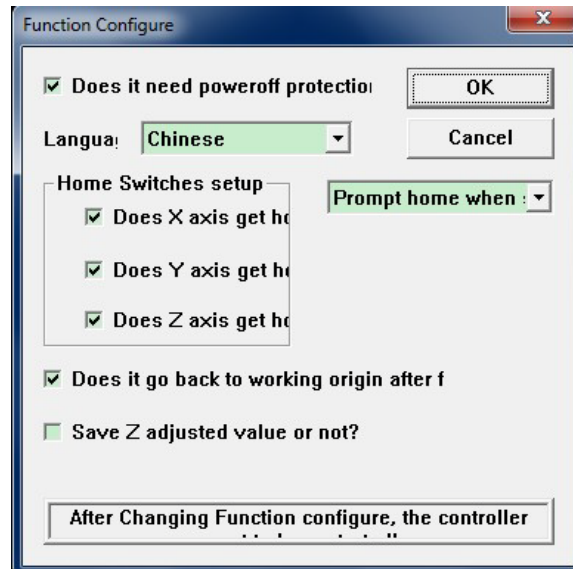
Figure 2-3-15

3. Introduction and Operation of Lower Computer

3.1 Lower Computer Structure

RZNC-0501 lower computer contains handle motion controller (or "Handle"),line adapter, 50 pin data transmission cable(or "Data Line"),USB communication cable, supporting procedure.

Description of Each Component：

1. Handle: the core of the lower computer, it contains six function modules.

Handle

(1).LCD：Resolution of 128 * 64 LCD display，To display the machine motion, and the information, such as the system settings and other information.

(2).KEYBOARD：It contains 16 keys to input the system parameter information and operate the machine.

(3). U Disk Interface: external memory access ports to U disk and the memory card. The file format can be identified by the external memory is FAT32.

(4).50-pin Data Cable Jack: through 50 pin data transmission cable and line adapter can achieve the connection between system and the machine. The system sent the movement to machine motion actuator.

(5).USB Communication Indicator Light：the direction for communication between the PC and the lower computer. Indicator lights turn on which means connection is successfully, while it means fail to connect.

(6).USB Communication Port: USB data line access port. It is used to connect the host computer with the lower computer to achieve data communication.

2. Interface Board: The operation between the low computer and machine is completed by the link of the interface boards. It contains 6 parts.
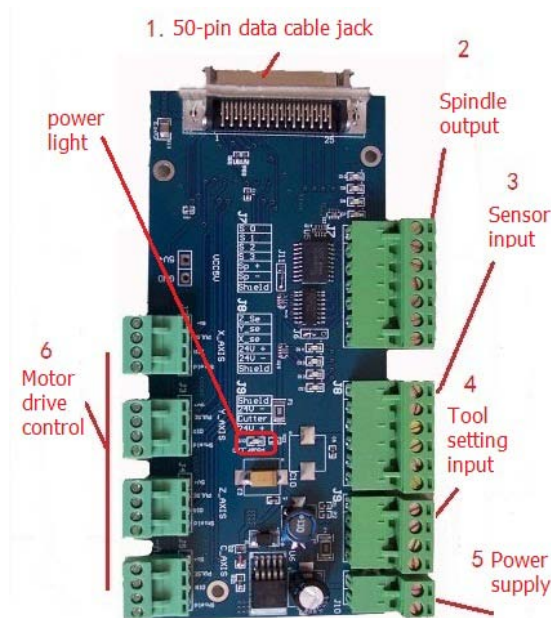
Interface board

(1). 50-pin data cable jack: The connection between the system and the machine can be completed through 50 pin data transmission cable and line adapter and then the system can sent the movement signal to machine motion actuator.

(2).Spindle output：It can control start and stop of the spindle and gear change. Different connection ways refer to different control. You can check the details in the menu notes, "spindle set the option" Help.

(3).Sensor input terminal: The input terminal for the machine origin detection switch signal.

(4).Tool setting input terminal: The input terminal for automatic tool setting signal.

(5).Power supply terminal: the input terminal for system switching Power Supply.（DC24V 3A）

(6).Motor drive control terminal: the output terminal for drive control line.
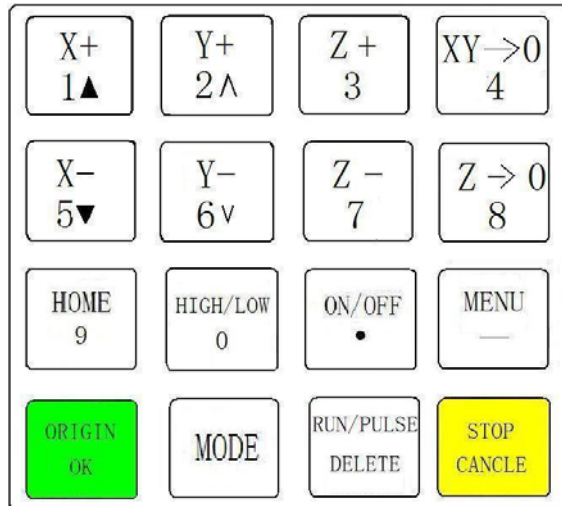
3. 50 pin data transmission cable

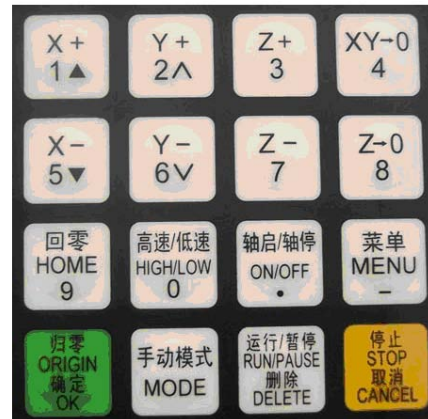**4．** USB communication cable

3.2 Instruction to Handle controller keyboard

Introduction：

RZNC-0501 system handle controller defines 16 operation keys according to the system functional requirements. Each key has one or more functions under different work status；

16-key layout   Chinese Button really making plans

Usage:

RZNC-0501 control system divided the key's operation into one-touch button operation, and the combined-key operation.

One Touch: Press one button on handheld motion controller.

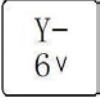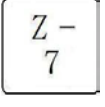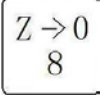Combined-key operation: Press two buttons at the same time to achieve the operation; The operation step: press one main function key and meanwhile press a second accessibility key, and then release the two keys at the same time to realize the combined-key operation.
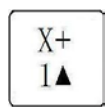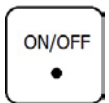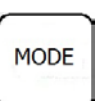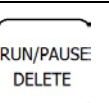
PS: Commonly used combined-key list:

	Combined-key	Function
1	"Menu" + "0—9" Number keys	to switch the coordinate system (0 for the mechanical coordinate system , 1 - 9 for the work coordinate system)
2	"Menu" + "Axis start / stop"	Start Z-axis automatic tool setting

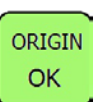| 3	"Run" + "1—6" Number keys	to start the break processing (support number 1 - 6)
4	"Run" + "High / Low Speed"	to start the advanced processing modes
5	"axis on/off" + "Z+/Z-"	To switch gear shaft
6	"OK" + "CANCLE"	Help information

Detail information for key functions：

key	Function
X+ 1▲	Positive movement of X axis, Menu upward , figure 1 inputting
Y+ 2∧	Positive movement of Y axis, accelerate process speed, figure 2 inputting, different property selecting in Menu
Z+ 3	Positive movement of Z axis, figure 3 inputting, rise spindle speed in process
XY→0 4	Working origin of X axis and Y axis setting, figure 4 inputting
X- 5▼	Negative movement of X axis; Menu downward, figure 5 inputting
Y- 6∨	Negative movement of Y axis; slowdown process speed; figure 6 inputting different property selecting in Menu
Z- 7	Negative movement of Z axis, figure 7 inputting, spindle speed adjusting in process
Z→0 8	Z axis origin setting ; figure 8 inputting
HOME 9	Axes home to machine tool origin, figure 9 inputting

HIGH/LOW 0	Manual moving mode, high speed or low speed selection, figure 0 inputting
ON/OFF ●	Spindle startup/stop, decimal point inputting
MENU —	Menu setting entering, negative symbol inputting, multi process state checking
ORIGIN OK	All axes go working origin: confirm of motions /inputting/operating
MODE	Manual move, continue, step and distance modes selection
RUN/PAUSE DELETE	Cut process running/pause/inputted words delete
STOP CANAEL	High/low speed parameter adjust, Cut process stop/selections, inputting and operating cancel

4. Wiring Instructions

4.1 0501 Stepping wiring instructions
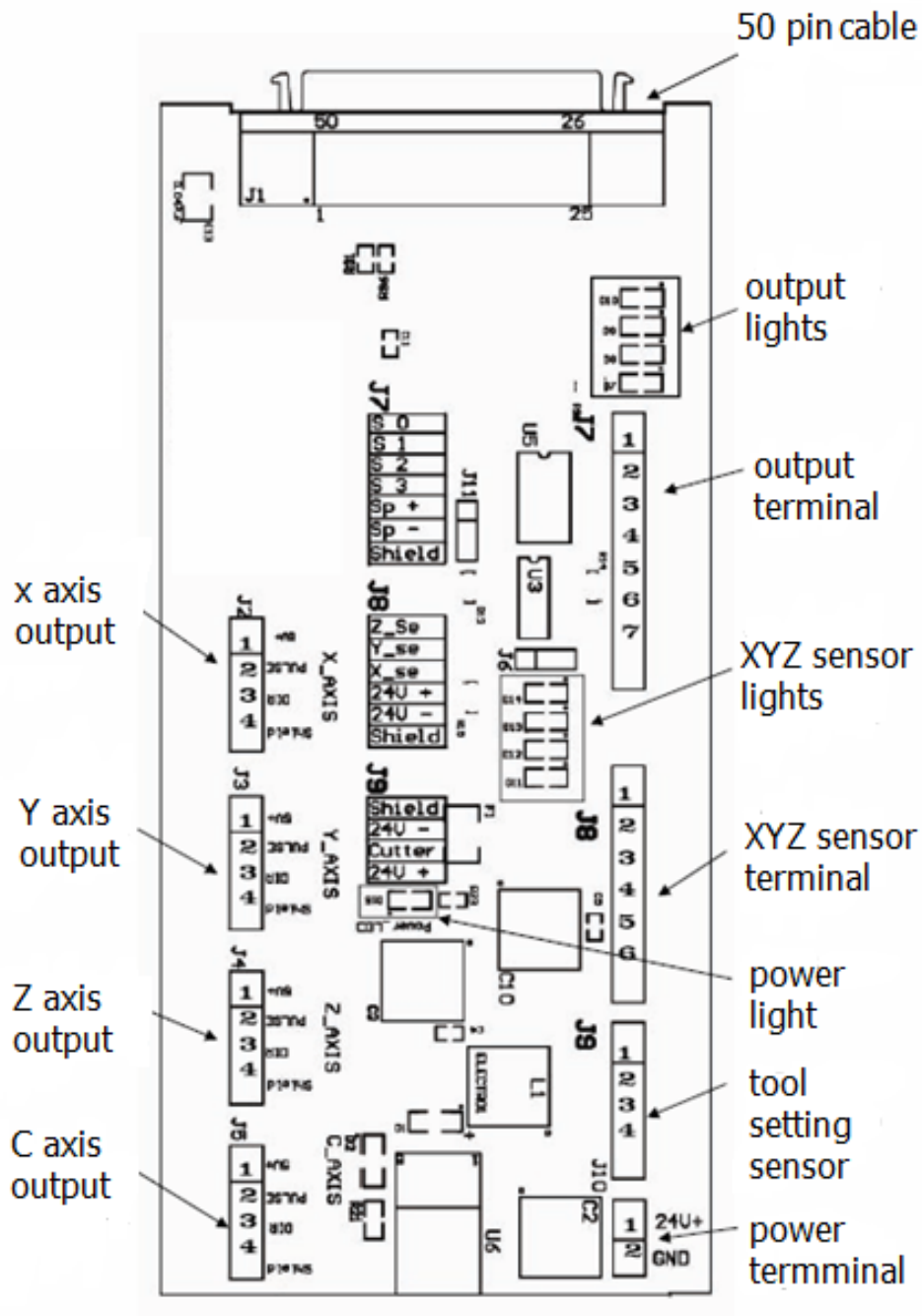
4.2 Patch Board I / O Description

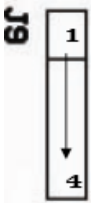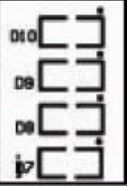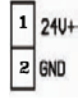| Port label	Port definition	Pin Definition	Pin functions and parameters	Notes
J2 1 4	X-axis pulse output port	Were positive signal output port	X-axis drive common anode power supply terminal 5V output	Do not impose voltage on this pin
		Pulse signal output port	X-axis drive pulse signal output port, the output voltage ≧ 3V drive current≦ 8mA	
		direction signal output port	X-axis direction of the drive signal output port output voltage ≧ 3V drive current≦ 8mA	
		Shield connection port	X-axis drive signal output voltage line terminal shield	Do not use this port for the grounding port
J3 1 4	Y-axis pulse output port	Were positive signal output port	Y-axis drive common anode power supply terminal 5V output	Do not impose voltage on this pin
		Pulse signal output port	Y-axis drive pulse signal output port, the output voltage ≧ 3V drive current≦ 8mA	
		direction signal output port	Y-axis direction of the drive signal output port output voltage ≧ 3V drive current≦ 8mA	
		Shield connection port	Y-axis drive signal output voltage line terminal shield	Do not use this port for the grounding port
J4 1 4	Z-axis pulse output port	Were positive signal output port	Z-axis drive common anode power supply terminal 5V output	Do not impose voltage on this pin
		Pulse signal output port	Z-axis drive pulse signal output port, the output voltage ≧ 3V drive current≦ 8mA	
		direction signal output port	Z-axis direction of the drive signal output port output voltage ≧ 3V drive current≦ 8mA	
		Shield connection port	Z-axis drive signal output voltage line terminal shield	Do not use this port for the grounding port

J5 1 4	C-axis pulse output port	Were positive signal output port	C-axis drive common anode power supply terminal 5V output	Do not impose voltage on this pin
		Pulse signal output port	C-axis drive pulse signal output port, the output voltage ≧ 3V drive current≦ 8mA	
		direction signal output port	C-axis direction of the drive signal output port output voltage ≧ 3V drive current≦ 8mA	
		Shield connection port	C-axis drive signal output voltage line terminal shield	Do not use this port for the grounding port

PS：All the pin terminals are for the parties sort the mouth as the first one, the bit serial extended direction of the arrow.

Port Label	Port definition	Pin definition	Pin function and parameter	Notes
J8 1 6	X、Y、Z Sensor Signal For Back To Zero terminal	X origin sensor Signal Input	X origin sensor signal input terminal	Isolated power supply for the sensor effectively shorted anode
		Y origin sensor Signal Input	Y origin sensor signal input terminal	Isolated power supply for the sensor effectively shorted anode
		Z origin sensor Signal Input	Z origin sensor signal input terminal	Isolated power supply for the sensor effectively shorted anode
		Sensor power input	X、Y、Z sensor isolate circuit power supply positive input terminal	Sensor isolate circuit supply voltage range DC10V~DC24V, Interlinked with the main power supply circuit can be a separate power supply by disconnecting the F3 (default is off）
		Sensor power input	X、Y、Z sensor isolate circuit power supply negative input terminal	
		Shield input	Sensor signal cable shield input terminal	Do not use this port as a negative use of the sensor isolation circuit power

J9 (1-4)	Tool-setting Sensor Signal Terminal	Sensor shield input	Sensor signal cable shield input	Do not use this port as a negative use of power sensor isolation circuit
		Sensor power input	Sensor isolate circuit power negative input	Tool-setting sensor power and XYZ sensor isolate circuit power connected, this terminal have the same voltage when XYZ sensor isolate circuit power is supplied. This terminal cancan be used as the sensor power output port
		Tool-setting sensor signal input	Tool-setting sensor signal input terminal	
		Sensor power input	Sensor isolate circuit power positive input terminal	
J7 (1-7)	Spindle Speed Control terminal	Speed signal S0	Connect to inverter to control speed	Inline circuit of terminal structure is OC Gate。 Max sink voltage: ≦DC 25 V Max sink current： ≦400mA。
		Speed signal S1	Connect to inverter to control speed	
		Speed signal S2	Connect to inverter to control speed	
		Speed signal S3	Connect to inverter to control speed	
		Positive power output	Output isolate circuit power positive input terminal	Don't need power when in control inverter speed mode
		Negative power output	Output isolate circuit power negative input terminal	Gnd connect to this terminal in control inverter speed mode.
		Shield into output	Output circuit shield input terminal	

Port label	Port definition	Pin definition	Pin function and parameter	Notes
Power_LED D15	D15	Power LED	Interface board 5V indicator，indicate the interface and internal power supply status moderators	Lights after power

	D14	Status indicator	Tool-setting Status indicator	Indicator take effect when each sensor input terminal short to negative power terminal。
	D13	Status indicator	Z origin status indicator	
	D12	Status indicator	Y origin status indicator	
	D11	Status indicator	X origin status indicator	
	D10	Status indicator	Out S3 status indicator	
	D9	Status indicator	Out S2 status indicator	
	D8	Status indicator	Out S1 status indicator	
	D7	Status indicator	Out S0 status indicator	
	System Main power	System main power supply side	System main power supply terminal ，interface board give DC 5V for system。When F3 shorted can provide voltage to XYZ。	Power area：DC10V~DC24V/ 3A

4.3 Hardware Connection

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

RZNC0501 control system 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 includes：

J8（origin detecting sensor terminals）

J9（tool-setting detecting terminals）

J10（main power terminals）.

Output terminal includes：

J2（X axis pulse signal output terminal）

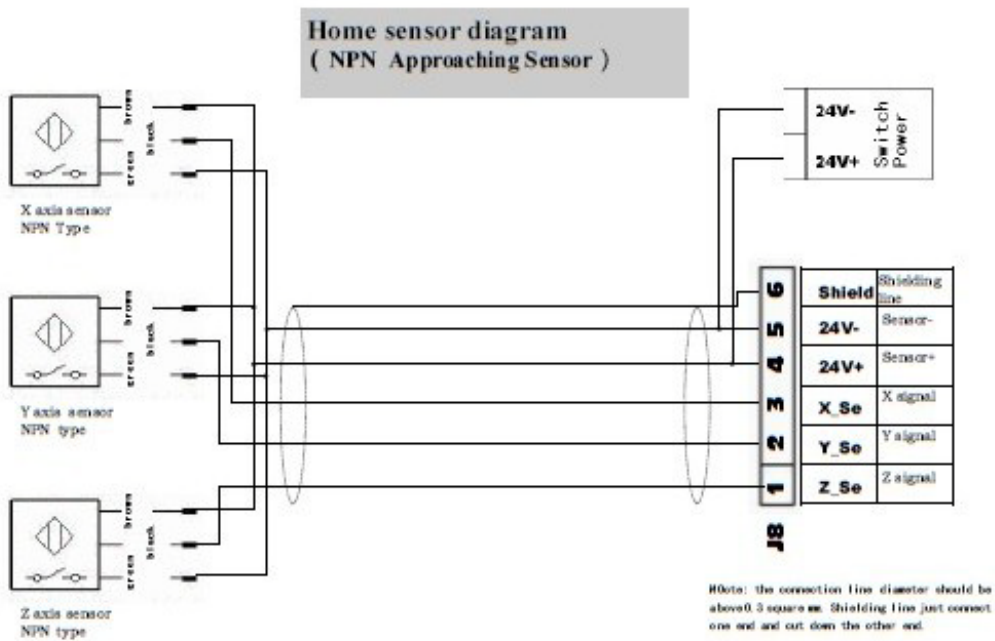J3（Y axis pulse signal output terminal）

J4（Z axis pulse signal output terminal）
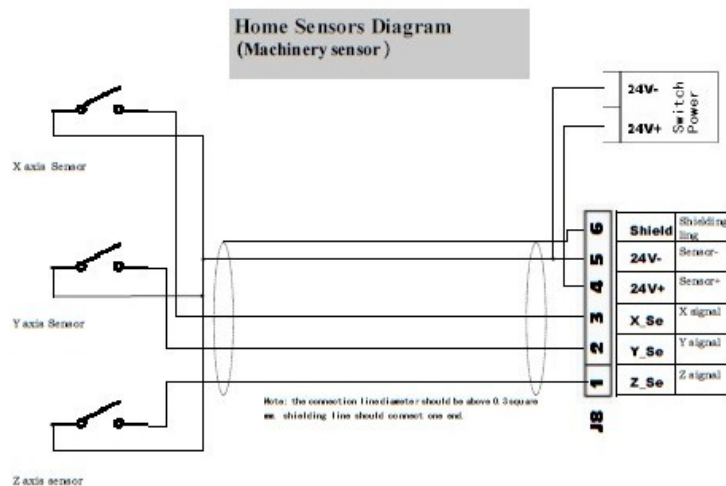
J5（C axis pulse signal output terminal）

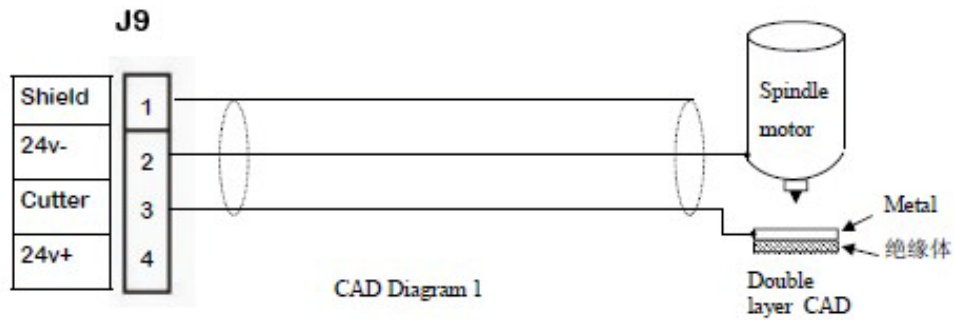J7（output terminal）

Input terminal
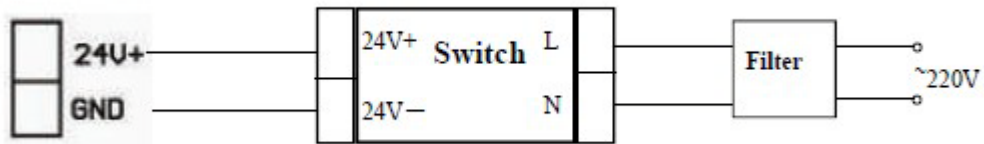
J8 origin detection switch wiring diagram（proximity）

Home sensor diagram
（NPN Approaching Sensor）

Mechanical

Home Sensors Diagram
(Machinery sensor)

J9 tool-setting detecting wiring
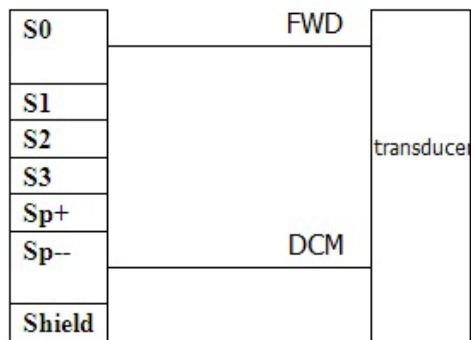

CAD Diagram 1

J10 main power wiring

Output terminal

J2　X pulse signal wiring　（Y、Z the same as X）
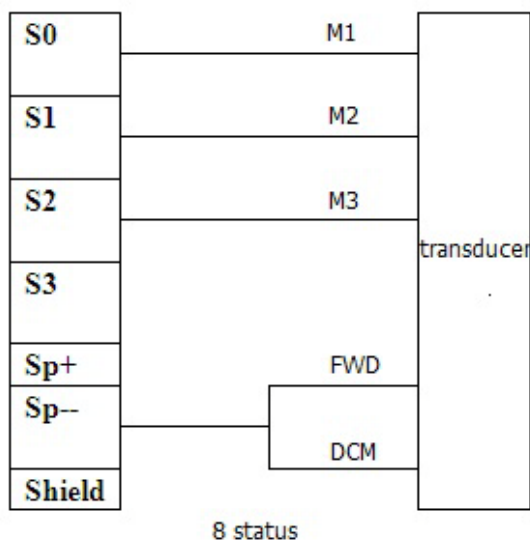
J7　Spindle inverter

2 status：spindle start/stop

2 status

The corresponding spindle setting is:

	0	1	2	3
off	↓	↓	↓	↓
1	↑	↓	↓	↓

8 status：spindle start---S1—speed 1，S2—speed 2，Sn—speed n，when spindle stop，the screen displays Fn—the speed before spindle stop.

8 status

The corresponding spindle setting is:

eight mode

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

4.4 Commissioning of The Machine and Control System

1） After turn on the power, you can manually run each axis movement and decide the direction. If the direction of movement and definition direction are opposite, you can set to change the motor phase sequence.

2） According to the original location of the machine coordinates, you can enter into menu-machine setting-home setting- home direction to reset it.

3） Into menu-system setting-self input detection to check whether the home switch is working.

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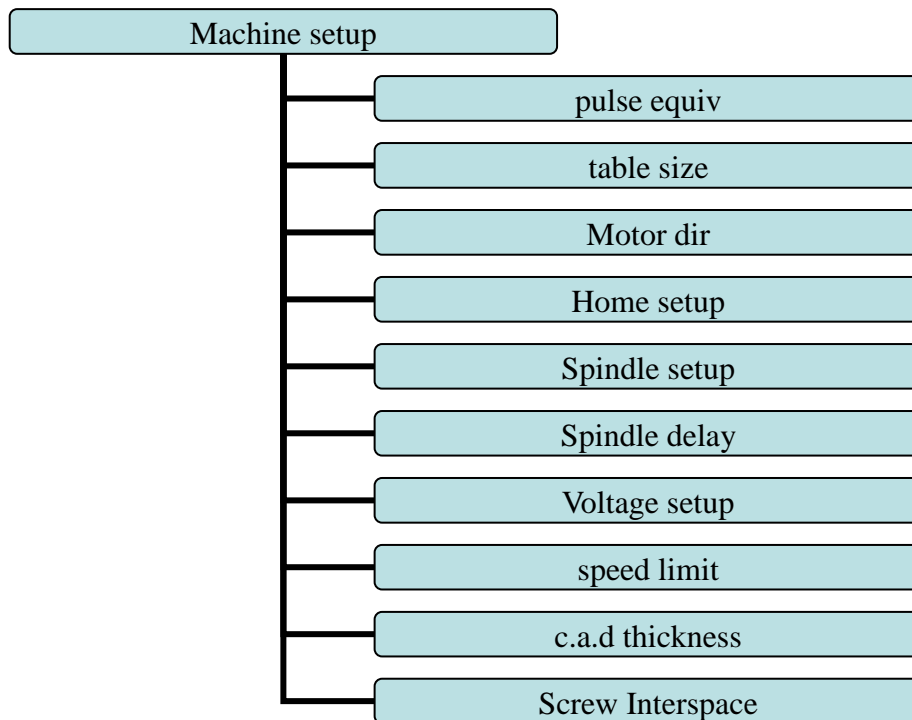
5. Menu direction

5.1 Menu category

According to menu function,RZNC-0501 system menu can be divided into: **machine setup、auto pro setup、system setup、advanced pro setup、version view**，every main menu has corresponding submenus.

5.2 Menu detail

1．Machine setup：

Machine parameter setup is to set machine hardware. This parameter is set by machine producer according to device type. If machine hardware parameter is not change this parameter should not change. If machine user need to change，please dell to machine producer.

Machine setup chart

```
┌─────────────────────────────┐
│        Machine setup        │
└──────┬──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤      pulse equiv      │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤       table size      │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤       Motor dir       │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤       Home setup      │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤     Spindle setup     │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤     Spindle delay     │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤     Voltage setup     │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤       speed limit     │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       ├─────┤      c.a.d thickness  │
       │     └──────────────────────┘
       │     ┌──────────────────────┐
       └─────┤    Screw Interspace   │
             └──────────────────────┘
```

(1).pulse equiv：

Control system need to send pulse number when machine move 1 mm，Unit：pulse/mm；Formula = (pulse/r) / (distance/r)   r (motor)

Distance/r formula：

Screw drive machine = screw pitch * mechanical transmission ratio

Rack drive machine = rack module * gear teeth number*∏* mechanical transmission ratio

setting：

choose "pulse equiv"， Cursor in the X-axis pulse equivalent，click "X+"、"X-" move cursor to be modified option，click "DELETE"，press the number keys to enter values，press "OK" to save，cursor auto move to next line，in turn modify the Y, Z axis equivalent value，press "OK"，save all value，back to "pulse equiv"。

(2)．Table Size

RZNC-0501 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：

Into "table size"，click "**X+**" or "**X-**" to move cursor to be modified, press "**DELETE**"，input modified number，click "**OK**" to save，cursor auto move to next line，in turn change **Y、Z** axis values，click "**OK**" to save all values，back to "table size"。

(3)．Motor dir：

Motor direction is to change machine movement direction，system default setting is "negative "，if some axis move opposite direction，change motor direction can solve this problem。

setting：

into "motor dir"，click "**X+**" or "**X-**" to move cursor to be modified，press "**Y+**" 、"**Y-**" to change motor direction，press "**OK**" to save all change，back to "motor dir" 。

(4)．Home setup：

Home speed ：set every axis move speed when machine home，system default speed is   X.Y: **3000** MM/秒，**Z** :**1800** MM/秒。

Home direction：set every axis move direction when machine home，this setting depends on the position where home switch in the machine. Such as the return to zero switch installed in the machine positive direction so   that home direction should be set "positive" . and vice versa。

set：

Into "home dir"，press "**X+**" or "**X-**" to move cursor to be modified，press "**Y+**"、 "**Y-**" to change home direction，click "**OK**" to save change，back to "home dir"。

(5). **Spindle setup：**

When system using multi-step speed to control spindle, user should change this parameter.   This parameters must corresponding to spindle output signal terminal wiring sequence. Detail setting please see "spindle setup"。

(6). **Spindle delay：**

Set spindle starting time, unit : ms；This is also set how long system start spindle after read processing file.

(7). **Voltage setup：**

This used to set input and output signal terminal status，when set ↓ means normal open，the same ↑ normal closed。

Input voltage setup：

Set input voltage signal terminal status. Input voltage top 4(0,1,2,3) corresponding to X zero point, Y zero point, Z zero point, tool setting input signal terminal.

Output voltage setup:

Set output voltage signal terminal status. Output voltage top 4(0,1,2,3) corresponding to multi-step speed 1, multi-step 2, multi-step 3，multi-step 4 output voltage status.

Setting mode：

Into "input voltage setup" and "output voltage setup"，press "X+" and "X-" to

control cursor to be modified . press "Y+"、"Y-" to change terminal status，press

"OK" to save all changing。

(8)．**Speed limit：**

Set machine top speed, this set can only take effect when machine processing,

when speed limit value is "******" means move without limit。

(9)．**Tool setting thickness：**

This thickness should input by actual， when above actual Z axis will cut over,

when low to actual Z axis can't touch workpiece. This parameter can only take

effect when user use auto tool change function.

(10)．**Screw interspace**

There is inter space after screw be used for a long time. In order to ensure the

accuracy of processing we should compensate. The value should be set by

actual，max is **1 mm** 。

2．Auto pro setup：

This set processing parameters and process files read property.

Auto pro setup menu structure

Auto pro setup

Linear accl   Curv accl   Process time   G code read set
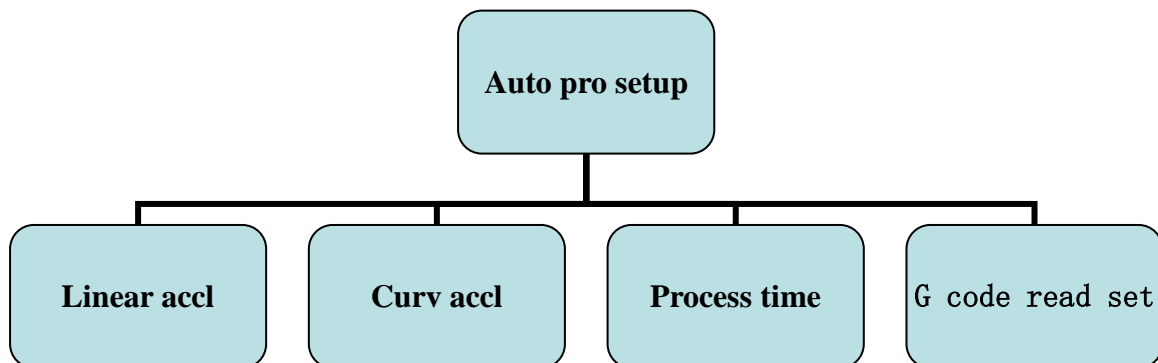
(1) Linear acceleration ：

This parameter can improve the ability to handling line motion, unit: **mm/s^2**

(2) Curve acceleration：

This parameter can improve the ability to handling curve motion，unit: mm**/s^2**

PS： Acceleration is related to velocity，if process speed is in 10m/min，

acceleration can be in 300—600 mm/s^2；if speed is above 10m/min，we can

increase the acceleration value。But in normal，should not above 1200mm/s^2.

(3) Process time：

This can tell us how long the file can process. Unit: s.

(4).G code read setup：

Set special code read configure in G code ，such as **M**、**T**、**F**、**I**、**J**、**K** ，the detail

please see "**G code read**"。

3．System setup：

System setup menu structure

```
┌─────────────────────────────┐
│        System setup         │
└──────────────┬──────────────┘
               │   ┌──────────────────────────────────┐
               ├───│            languages             │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│        Function configure        │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│           Inner format           │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│         Input self check         │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│        Output self check         │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│          Buttons check           │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│        System auto update        │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               ├───│           Backup data            │
               │   └──────────────────────────────────┘
               │   ┌──────────────────────────────────┐
               └───│           Restore data           │
                   └──────────────────────────────────┘
```
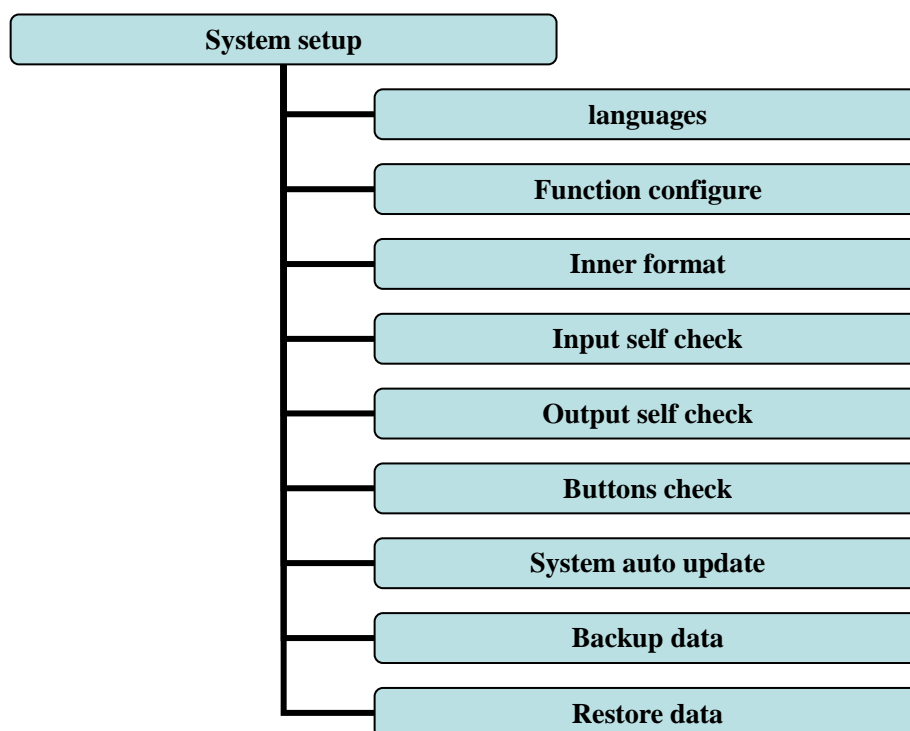
(1). Languages

Change system display language，choose Chinese and English。

(2). Function configure

Set system configure, detail setting please refer to PS2 "function configure"。

(3). Inner format：

Clean up inner files and system parameters，after format system parameters will

restore factory setting；this is in no force to function configure，function configure

parameters can't change after format。

(4). Input self check

Used to check input signal terminal status style。When input signal activity，if terminal status is normal open the corresponding terminal display ↓ ，if terminal status is normal closed the corresponding situation display ↑ 。This can be change in voltage setup.

(5). Output self check

Used to check output signal terminal status style。When output signal activity，if terminal status is normal open the corresponding terminal display ↓ ，if terminal status is normal closed the corresponding situation display ↑ 。This can be change in voltage setup.

(6). Buttons check

Test the validity of the keyboard keys. Into test interface，the screen displays highlights when key take effect, no highlights when key is broken. Press "ok"+ "cancel" to quit.

(7). Backup data

Back up menu parameters，format system can't effect this.

(8). Restore data

Restore backup data to system.

(9). System auto update

Update system online. Support the extension ********.ZUP** update file.

4. Advanced pro setup

Advanced pro setup menu structures

```
                    ┌──────────────┐
                    │   Advanced   │
                    │   pro setup  │
                    └──────┬───────┘
          ┌────────────┬───┴────────┬──────────────┐
  ┌───────────────┐ ┌──────────────┐ ┌────────────┐ ┌────────────────┐
  │ Multiple setup│ │File maintennce│ │ Stop setup │ │ Password setup │
  └───────────────┘ └──────────────┘ └────────────┘ └────────────────┘
```
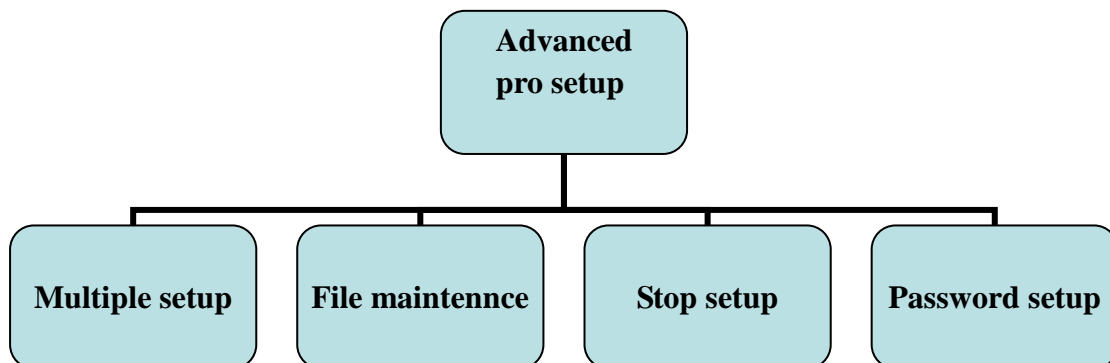
(1) Multiple setup

Set multiple process row, column, space and pause time.

(2) File maintennce

View, copy, delete file function.

(3) Stop setup

Set machine stop status and position after processing. You can even set special

or assigned situation.

(4) Password setup

```
                    ┌──────────────────────┐
                    │   Password setup     │
                    └──────────────────────┘
                    ┌──────────────────────┐
                    │   Super password     │
                    └──────────────────────┘
        ┌──────────────────────┐      ┌──────────────────────┐
        │   Class 1 password   │      │    Menu password     │
        └──────────────────────┘      └──────────────────────┘
                ┌──────────────────────┐
                │   Class 2 password   │
                └──────────────────────┘
```
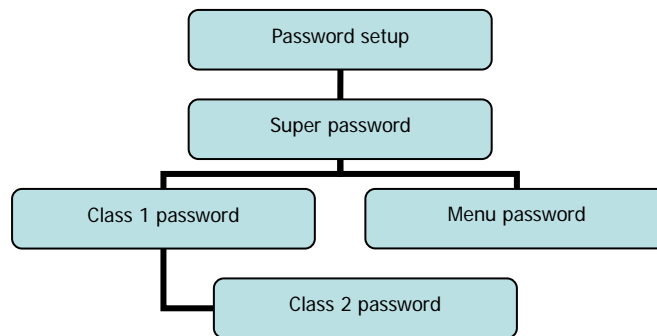
PS：First and second password been set time-based; When the super password is

unlock, all password are invalid

(5) Version view

Initinal version： display initinal version information.

Normal version: display normal version information.

Press [ORIGIN OK] to in , press [STOP CANAEL] to quit。

Normal version as an example, version is divided into 3 parts.

RZNC-D5416/3/L7	hardware version number
1.2（zhb2289）	software version number
28888	hardware NO.

6.   Machine operation

6.1 Return home

The handle will prompt "Goto Home?" after starting，press "OK"， machine will automatically return to the mechanical origin and regulate system coordinate.

In some cases, such as after the last normal shutdown, reboot and continue last operation, users don't need to reset machine. When it displays "Goto Home?", press skip home operation。That is because when system quit, it is auto save coordinate value.
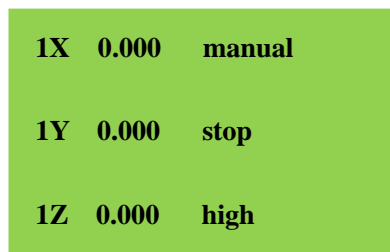
6.2 Import processing files

Before processing，generally we should import files. There is 2 ways : U disk，inner file process.

1. Directly import processing files to U disk, we can be run.
2. Downloading files into handle by PC software or U disk.

6.3 Manual processing operation

Manual processing is means we control machine through keyboard. The same we can change operation speed and grid setting. After return home, system into manual status, the screen displays:

1X	0.000	manual
1Y	0.000	stop
1Z	0.000	high

1. Manual operation speed adjust

There is two modes: high speed and low speed. We can change mode by

HIGH/LOW 0 。 The screen displays speed mode can decide processing speed.

Speed adjust: in manual mode, press "cannel" to set the current speed mode. If current speed is low speed, it displays as followed:

```
Low spd，mm/min

X axis：    1200.00

Y axis：    1200.00
Z axis：     600.00
Low  grid    0.100
```
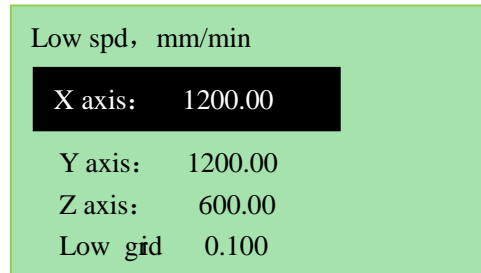
The cursor in X axis low speed mode，press X+ 1▲ and X− 5▼ move cursor to be modified，press RUN/PAUSE DELETE that we can change value, press ORIGIN OK to save，press

STOP CANAEL to quit，if number input is wrong, press RUN/PAUSE DELETE to delete the last number.

In order to ensure the accuracy of processing and debugging, the system introduces the concept of grid. Other systems also call it minimum feed. Its range is：0.05mm-1.0mm. when user change mode to step, machine will move by grid.

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

2．Manual processing mode

In order to meet manual movement in different situation, this system provides 3 motion modes: continuous, step, distance. We can change mode by "MODE". The bottom of the screen can display which mode system is on.

1) Continuous motion mode

This mode is no special data control, in this mode, press direction key（X+ 1▲、

Y+ 2∧、 Z+ 3、 X− 5▼、 Y− 6∨、 Z− 7） machine will follow, its speed is decided

by current speed mode.

Notice ：if user press key's time is too short（shorter than 0.5s），immediately lift buttons，machine will auto move to the nearest grid. It is always stop on grid when this motion mode is over. This motion mode is suitable for crude regulation machine coordinate situation.

2) Step motion mode

This mode is always run in low speed, move a grid per 0.5 second ，its grid distance is decided by current speed mode. This motion mode is suitable for tool adjust or precise adjust machine coordinate situation.

3) Distance motion mode

This mode is run by distance which user is set. When user press directory key

（ ），machine will move by set distance.

Notice: Grid can't effect to this motion. It will move by set distance, can't move to grid point.

If user want to change distance, please change to distance mode, re-enter distance value is ok.

6.4 Automatic machining operation

Auto processing is means system deal files in U disk and inner by command，this is also called file processing。Before auto processing, the parameters in system and machine must be correctly set.

Steps:

1) Determine the origin of the workpiece

The origin of the coordinate of XYZ in the processing program is the origin of workpiece. Before processing, we should connect the situation to the actual . The operation is as followed:

Move the machine to the situation where the file start processing. Press " " to

set the origin of X Y axis, press " [Z→0 8] " to set Z axis. If used tool setting function,

its no need to press" [Z→0 8] " to set origin，the key combination of tool setting is

" [MENU —] "+" [ON/OFF ●] "。
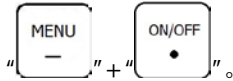
2) Choose processing files

After determining the origin of workpiece，press [RUN/PAUSE DELETE] ，the following dialog box

appears:

Choose file:

U disk file list

Inner file list
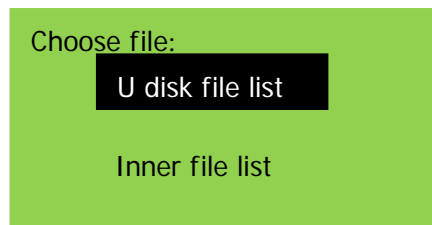
Press [X+ 1▲] and [X− 5▼] to move the cursor，press [ORIGIN OK] to choose the

situation，it will displays the first three files, press [X+ 1▲] and [X− 5▼] to move

cursor，press [Y+ 2∧] and [Y− 6∨] to jump 2 lines, press [STOP CANAEL] to quit.

3) Processing parameters setting

After choosing processing file press [ORIGIN OK] into setting processing parameters,

including processing speed, travel speed, Z down ratio, speed ratio, spindle grad,

pulse equivalent, and Z up distance.
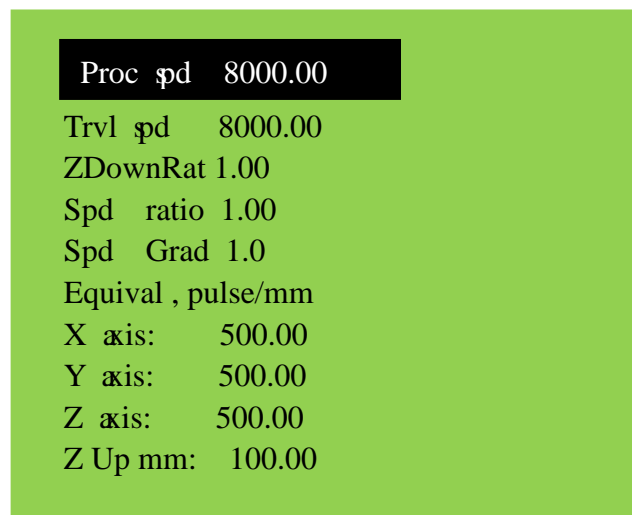
```
Proc  spd    8000.00
Trvl  spd    8000.00
ZDownRat 1.00
Spd    ratio  1.00
Spd    Grad  1.0
Equival , pulse/mm
X  axis:       500.00
Y  axis:       500.00
Z  axis:       500.00
Z Up mm:    100.00
```

Press $\boxed{\begin{array}{c}X+\\1\blacktriangle\end{array}}$ and $\boxed{\begin{array}{c}X-\\5\blacktriangledown\end{array}}$ to move cursor to be modified, press $\boxed{\begin{array}{c}RUN/PAUSE\\DELETE\end{array}}$ to set, input

value, press $\boxed{\begin{array}{c}ORIGIN\\OK\end{array}}$ to save, press $\boxed{\begin{array}{c}X+\\1\blacktriangle\end{array}}$ and $\boxed{\begin{array}{c}X-\\5\blacktriangledown\end{array}}$ to select the next. After

modifying, press $\boxed{\begin{array}{c}ORIGIN\\OK\end{array}}$ to save, system start checking files。It will start processing

after checking system. Pulse equivalent there can only display can't be modified. If

need to change, please back to "machine setup"。In processing，the screen will

display current line, current speed, speed ratio, operating time. We can switch

these option by pressing $\boxed{\begin{array}{c}MODE\end{array}}$ 。

6.5 Processing operations

1) Adjust speed ratio and spindle grade

Adjust speed ratio In processing ，press $\boxed{\begin{array}{c}Y+\\2\wedge\end{array}}$ and $\boxed{\begin{array}{c}Y-\\6^v\end{array}}$ can directly

change ratio，current speed =set speed*ratio，each click $\boxed{\begin{array}{c}Y-\\6^v\end{array}}$, ratio down drop

0.1。Speed ratio max 1.0，min 0.1，the display speed will corresponding change,

but time will not change.

Adjust spindle grade 在 this function can take effect when system set

multi-speed. In processing, press $\boxed{\begin{array}{c}Z+\\3\end{array}}$ and $\boxed{\begin{array}{c}Z-\\7\end{array}}$ to change spindle grade 。

Each click $\boxed{\begin{array}{c}Z+\\3\end{array}}$, up 1 grade, S7 is the top。Each click $\boxed{\begin{array}{c}Z-\\7\end{array}}$, drop 1 grade, till

to S1。

2) Processing pause and adjust situation

Press $\boxed{\begin{array}{c}\text{RUN/PAUSE}\\\text{DELETE}\end{array}}$ to pause，top right corner of the screen will change "run" to "pause"，

machine will stop running except spindle. Shown below：

1X	7.200	pauz
1Y	41.300	s-on
1Z	-0.200	step
Line No.		356

In this time we can adjust situation of 3 axis, the default motion mode is step, speed is low, users can change situation, that is means machine will move a low speed grid each click；if we need quickly a large range adjust, change the speed

mode to high by press $\boxed{\begin{array}{c}\text{HIGH/LOW}\\0\end{array}}$, the motion mode change to continuous.

After that，press $\boxed{\begin{array}{c}\text{RUN/PAUSE}\\\text{DELETE}\end{array}}$, shown below：

1X	7.200	Pauz
1Y	41.300	S-ON
1Z	-0.200	Step
Original？		

System will let users make sure whether to save the modified

Situation, press $\boxed{\begin{array}{c}\text{ORIGIN}\\\text{OK}\end{array}}$, system will back to situation before modifying；press $\boxed{\begin{array}{c}\text{STOP}\\\text{CANAEL}\end{array}}$,

system will start processing in modified situation。If we changed Z axis depth and

choose "save Z depth" in function configure, next time system will start processing in

modified situation.

3) Breakpoint processing and power-down protection

Breakpoint processing if user want to stop processing in middle ，press

[STOP CANAEL] ，shown below：

> 1X   0.000 Run
> 1Y   0.000 S-Off
> 1Z   0.000 Low
> Save stop pt？

System display "save break?"，if we want to save breakpoint, press [X+ 1▲] ，means

this is point 1（system can save 1、2、3、4、5、6），when input 1，LCD displays：

> 1X   0.000 Run
> 1Y   0.000 S-Off
> 1Z   0.000 Low
> Save stop pt？ **1**

press [ORIGIN OK] to save ，system auto home。If we want to continue processing from

breakpoint，we can choose key combination"[RUN/PAUSE DELETE] + [X+ 1▲]" ，first hold on press

[RUN/PAUSE DELETE] ，the same time press [X+ 1▲] ，release together，system will restore

processing from point 1，the same as 2,3,4,5,6。Before restore process, system must

have a home motion.

Power-down protection when there is a sudden power failure during processing,

system will save current coordinate and parameters, when power restart, process

continue. Before that, system must have a home motion, after home, shown as

below:

> Power off reboot？

Press **ORIGIN OK** to continue unfinished process, it will display the stop line, press **STOP CANAEL** to cancel process.

6.6 Advanced Processing

advanced processing is a function which is satisfied for some special request. It contains: segment process, multiple process, segment-multiple process，the key combination is **RUN/PAUSE DELETE** + **HIGH/LOW 0** ， shown below：

> Advanced process：
>   Segment process
>   Multiple process
>   Segment multiple

1) Segment process

When into advanced process, cursor auto in segment process。Segment process is means users can select start line and end line, so part of the processing file can be processed. The step is as below:

①press **ORIGIN OK** to set，press **X+ 1▲** and **X− 5▼** to move cursor to select different files；

②press **ORIGIN OK** to enter，press **X+ 1▲** and **X− 5▼** to select file.

③choose start line，screen displays line 1, press **RUN/PAUSE DELETE** ，prompted "switch to line"，input start line to cursor，press **ORIGIN OK** to confirm ，if line number is wrong，press **RUN/PAUSE DELETE** to delete input number.

④Press [ORIGIN OK] to the operation of the end line，the screen displays start line，press

[RUN/PAUSE DELETE]，prompted：″switch to line″. Input end line in cursor，press [ORIGIN OK] to confirm,

press [RUN/PAUSE DELETE] to modification；

⑤Set processing parameters。

2） Multiple process

First we should set multiple process parameters in "advanced setup ″，then we can

use this function。Step is as below：

1.press [X+ 1▲] and [X− 5▼] move cursor to multiple process，press [ORIGIN OK] to enter，

press [X+ 1▲] and [X− 5▼] to select different files；

2．Set process parameters, other operation is the same as general process, system

start multiple processing according to users′ set.

3） Segment-multiple process

This function is processing part of files in multiple process mode，this is combined

segment process and multiple process to satisfied users. Before use this function, we

should set the parameters of array, then set row and column. The detail operation

please refer to the preceding chapters.

PS 1. Handle operating system upgrades

In the process of using handle, there may be some minor problems, such as chaos display or no display. These problems update handle software can be restored.

Update handle operation

1、Properly installed PC software and USB drivers, ensure that handle can   connect to PC. (install method please refer to above install explanation）

2、Backup update files，update files is in product CD-ROM, users also can contact us to obtain the latest update files.

3、Connecting to the handle, open PC software, select "update" in the toolbar, so we can update program, label, menu etc.

4、In the drop-down menu, select the corresponding item，there will pop up select path dialog box, select update file backup location.

5、After the upgrade is complete, the success dialog box will pop up.

U disk update

This method is update by handle operation, don't need PC. Update files is *.ZUP.   Step is as below:

1、Save update files to U disk, insert into handle.

2、Press [MENU —], select "system setup" press [ORIGIN OK] to enter，press [X+ 1▲] and [X- 5▼] move cursor to "system update"。

3、Press [ORIGIN OK] to enter，select "**U disk files**", select update files suffix is .ZUP。System will auto update.

4、After update, please restart the handle.

PS：In normal condition, after update should format handle, parameters will back to factory setting, so before update, users must backup system parameters。

PS 2. Set Function Deployment

Function configure can set some special function in handle, if users set is wrong, system will run error, system can't working. So set function configure correctly is necessary. Now we explain each function meaning and configuration method.

1、 In manual interface, select "![MENU]" to enter, select "SYSTEM SETUP" press "![ORIGIN OK]" to enter.

2、 Select "Function Configure"，press "ok" to start configuration.

3、 Configuration contents and method is as below：

1) "Do you need save power Off?" press "![ORIGIN OK]" means need，press "![STOP CANAEL]" means don't need.（normal is need）

2) Language ：中文/English, this is choose by users.

3) Set home switch：

> X Axis: Enable
>
> Y Axis: Enable
>
> Z Axis: Enable

Enable is means machine have home switch and is necessary. Select "Disable" is means this function is no use. After editing, press "ok" move to next.（normal is enable）

4) Go home types：there are 3 to choose, "info go home", "auto go home" , "don't go home" ，we suggest users choose "info home" if there is no special.

5) Save Z adjusted value or not? ：this is means whether to save Z changed depth in processing. Press "![ORIGIN OK]" to save，press "![STOP CANAEL]" means not save.

6) Is there Emergent stop Sensor? ：means whether system connect emergent stop sensor signal, press "![ORIGIN OK]" means yes, "![STOP CANAEL]"means no.(normal 0501 system don't support this function)

7) Is there Hard limit sensors? : the same funcion as emergent stop sensor.(normal

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0501 system don't support this function)

8) It is in traditional manual mode? ：means whether system in traditional manual mode, press "" means yes，"" means no.（normal condition don't need）

9) T change setup ：It contains "tool cover" and "dust cover", this is special for tool change system. If it is necessary choose enable, or choose disable.(normal 0501 system is disable)

Now all configurations is all right, please restart system. All configurations will take effect.
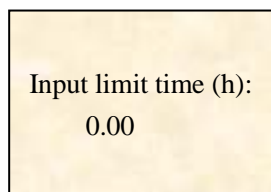
PS 3. Cipher set-up

System provides six password settings used to restrict the use of handle time. These cipher divided into five common passwords, a supper password and menu password. Five common passwords are no priority, but super password can unlock all passwords. Menu password can protect some important parameters. All passwords can be max up to 12 digit numbers.

The detail steps are as below: press [X− 5▼] to move cursor to "cipher setup", press [ORIGIN OK] to enter setup，the screen shown as below:
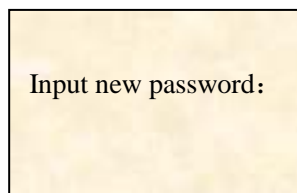
> Class 1 password
> Class 2 password
> Menu password
> Super password

press [ORIGIN OK] to enter class 1 password，shown below:

> Input limit time (h):
> 0.00

Input limit time, press [ORIGIN OK] to save 。Shown below:

> Input new password：

Input password press [ORIGIN OK] to word。Shown below：

> Press any key to restart system……

Press any key, system restart.

Set password 2,3,4,5 is the same as password 1.

If using time is over to limit time, when system power on, users must input password.

Menu password can be set in menu. User want to view and modify parameters, please input password.