ADTECH 9 Series
CNC Maintenance Manual

Basic Information

This Manual is written by Adtech (Shenzhen) Technology Co., Ltd.

This Manual is mainly written by Tang Xiaobing.

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Precautions and Explanations

※Transport and storage:

- Do not stack product package more than six layers;
- Do not climb, stand on or place heavy stuff on the product package;
- Do not pull the cable still connecting with machine to move product.
- Forbid impact and scratch on the panel and display;
- Prevent the product package from humidity, sun exposure, and rain.

※Open-box inspection:

- Open the package to confirm the product to be purchased by you.
- Check damages situation after transportation;
- Confirm the integrity of parts comparing with the parts list or damages situation;
- Contact our company promptly for discrepant models, shortage accessories, or transport damages.

※Wiring

- Ensure the persons involved into wiring and inspecting are specialized staff;
- Guarantee the product is grounded with less than 4Ω grounding resistance. Do not use neutral line (N) to substitute earth wire.
- Ensure grounding to be correct and solid, in order to avoid product failures or unexpected consequences;
- Connect the surge absorption diodes to the product in the required direction, otherwise, the product will be damaged;
- Ensure the power switch is OFF before inserting or removing plug, or disassembling chassis.

※Overhauling

- Ensure the power is OFF before overhauling or components replacement;
- Make sure to check failures after short circuit or overloading, and then restart the machine after troubleshooting
- Do not allow to frequently connect and disconnect the power, and at least one minute interval between power-on and power-off.

※Miscellaneous

- Do not open housing without permission;
- Keep power OFF if not in use for a long time;
- Pay close attention to keep dust and ferrous powder away from control;
- Fix freewheel diode on relay coil in parallel if non-solid state relay is used as output relay.
- Check whether power supply meets the requirement to ensure not burning the control.

- Install cooling fan if processing field is in high temperature, due to close relationship between service life of the control and environmental temperature.
- Keep proper operative temperature range for the control: 0℃ ～60℃.
- Avoid using the product in the overheating, humid, dusty, or corrosive environments;
- Add rubber rails as cushion on the place with strong vibration.

※Maintenance

Please implement routine inspection and regular check upon the following items, under the general usage conditions (i.e. environmental condition: daily average 30℃, load rate: 80%, and operating rate: 12 hours/ day)

Routine Inspection	Routine	● Confirm environmental temperature, humidity, dust, or foreign objects. ● Confirm abnormal vibration and noise;
Regular Check	One year	● Check whether solid components are loose ● Confirm whether terminal block is damaged

Foreword

CNC9 series CNC system is an economic embedded CNC system developed by Adtech (Shenzhen) Technology Co., Ltd. for lathe and milling machines and machining centers, where CNC9640 is four axes motion controller, CNC9960 is six axes motion controller, CNC9650 and CNC9810 are five axes motion controllers, and CNC9810E is bus motion controller. (Note: ETherCAT bus control can be configured at most 12 axes of thread.)

Instructions and reading convention of the Manual

Before using this CNC system, please read this Manual carefully to operate properly.

Terminology note and reading convention in this Manual:

CNC9640 is control systems with different axes and same hardware functions. The programs developed on this platform contain M series software for milling machines and L series software for lathes. Different software has different functions and masks.

M series are system for milling machine motion. The 'M' or "M series" mark indicates specific interface or function for milling machine software system.

L series are system for lathe motion. The 'L' or "L series" mark indicates specific interface or function for lathe software system.

"CNC system", "NC controller" and "CNC9XXX" mentioned in this Manual all refer to CNC9640/CNC9960/CNC9810/CNC9816;

The articles marked with "Caution" prompt users to pay special attention for operation or setting, or else this operation may fail or certain action can't be performed.

Contents

1. System technical characteristics

1.1 System technical parameters

Function	Name		Specification
Control axis	Control axes		4 axes (CNC9640 series) 5 axes (CNC9650 series) 5 axes (CNC9810 series) 6 axes (CNC9960 series) Bus axes (CNC9810E) up to 12 axes
	Simultaneous control axes		4 axes linear interpolation (CNC9640 series) 6 axes linear interpolation (CNC9960 series) 5 axes linear interpolation (CNC9810 series) 5 axes linear interpolation (CNC9650 series) 2 axes arc interpolation
Input instruction	Minimum setting unit		0.001 mm
	Minimum moving unit		0.001 mm
	Maximum instruction value		±9999.999 mm
Feeding	Fast feeding speed		X axis, Y axis, Z axis, A axis: 9999 mm/min (maximum)
	Feeding speed range	Per minute	1~9999 mm/min
		Per rotation	1~500 rpm
	Automatic acceleration/deceleration		Yes
	Feeding speed rate		10~150%
Manual	Continuous manual feeding,		Yes
	Returning to reference point manually		All control axes return to reference point simultaneously (allow setting order of priority)
	Single-step/handwheel function		Yes
Interpolation	Positioning, linear interpolation, arc interpolation		G00,G01,G02/G03

Function	Name	Specification
Operating mode	MDI, auto, manual, single-step, edit	Yes
Testing function	Test run, single program segment, Handwheel	Yes
Coordinate system and pause	Pause (sec/ms)	G04 X/P_
	Coordinate system setting	G92 (M series) G50 (L series)
	Automatic coordinate system setting	Yes
Safe functions	Soft & hard limit check	Yes
	Emergency stop	Yes
Program storage	Program storage capacity, storage quantity	Capacity: 2G 100 work areas No limit on processing file quantity
Program edit	Program edit	Insert, modify, delete, cancel
	Program No., sequence No., address, character retrieval	Yes
	Decimal point programming	Yes
Display	800×480 pixels 7” LCD 800×600 pixels 8”, 10.4” LCD	CNC9640, 9650 CNC9810, 9960
	Position screen, program edit Tool compensation setting, alarm display Handwheel test, diagnosis screen Parameter setting, graphic simulation	Yes
M, S, T function	Auxiliary function	M code
	Spindle function	S0-S15 (gear control) S15-S99999 (analog)
	Tool function	T code
Compensation function	Tool compensation memory	30 tools length, radius compensation

Function	Name	Specification
	Reverse clearance compensation	Yes
Other functions	Measurement centered Automatic tool regulator	Yes
	Specify arc radius R/center position	Yes
	Electronic gear ratio	Yes

1.2 System operating condition

Operating voltage	24V DC (with filter)
Operating temperature	0℃-45℃
Optimum operating temperature	5℃-40℃
Operating humidity	10%-90% (no condensing)
Optimum operating humidity	20%-85%
Storage temperature	0℃-50℃
Storage humidity	10%-90%
Operating environment	No excessive dust, acid, alkali, corrosive and explosive gases, no strong electromagnetic interference

1.3 System function

1.3.1. Self-diagnosis function

Diagnose CPU, memory, LCD, I/O interface, parameter state, coordinates and processing program comprehensively every time the system is started or reset; diagnose power supply, spindle, limit and I/O ports in real-time during operating.

1.3.2. Compensation

Automatic reverse clearance compensation

Automatic tool length compensation

Automatic tool radius compensation

Automatic tool radius biasing and automatic tool tip transition

1.3.3. Abundant instruction system

Scaling instruction

Mirror processing instruction

Tool biasing instructions

Program cycle, program skip, program shift, program transfer, different end processing modes, macro definition and program management instructions

Fixed-point instructions: starting point, setting point, etc.

Linear, arc and spiral interpolation instructions

Six workpiece coordinate systems, nine extension coordinate systems and one reference point

1.3.4. Full Chinese menu operation & full screen edit

9640/9620 CNC system uses cascading menu structure and full Chinese operation to ensure simple, intuitive and convenient operation.

1.3.5. Abundant error-correction functions

Point out the nature and correct the errors in operation.

1.3.6. Program exchange between CNC system and PC

Perform CAD/CAM/CAPP auxiliary programming with abundant software in PC, and then transmit CNC program to the system through communication interface (USB disk, RS232 interface), or transmit the programs from the system to PC.

2. Operating panel

2.1 ADTCNC96 series system LCD/keypad

Keypad

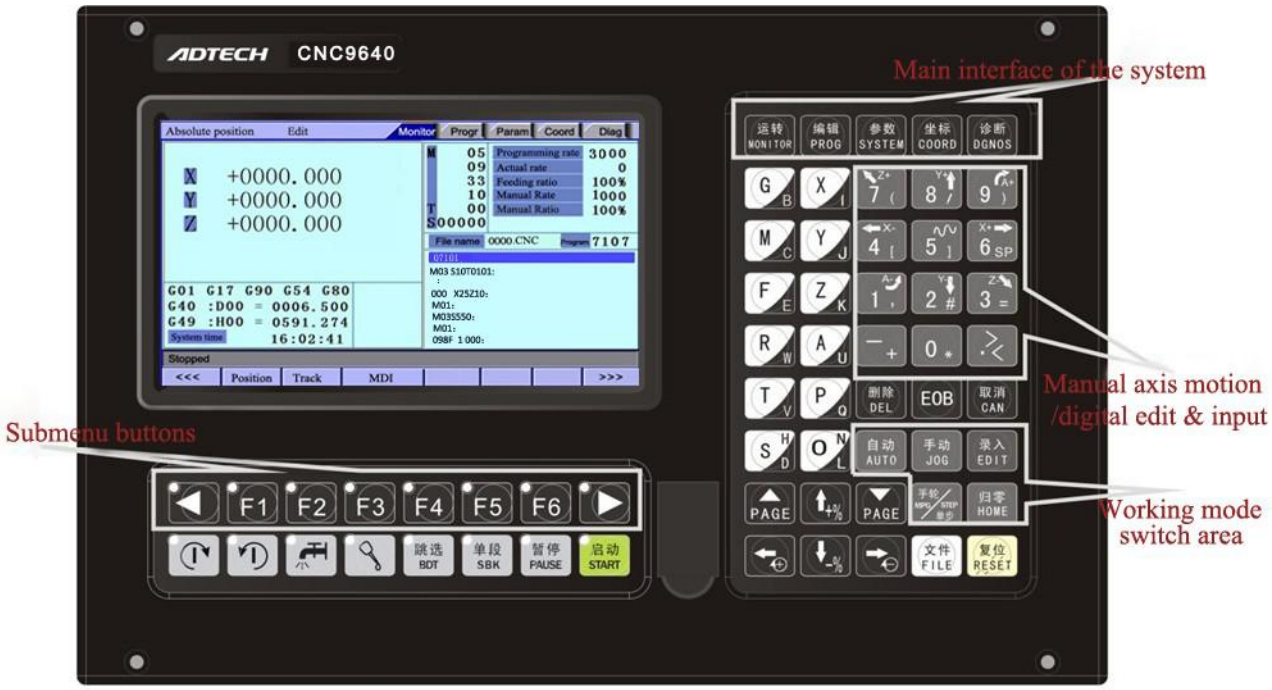


Fig. 2.1 CNC9640 Operating Panel Diagram

Note:

Press the submenu buttons to perform the operations of submenus.

Manual axis moving and edit & input are composite. It has different definitions in different modes.

System working mode switch area is used to switch working modes, which can improve the security and system performance. Handwheel and single-step mode are switched with Repeat button.

LCD unit

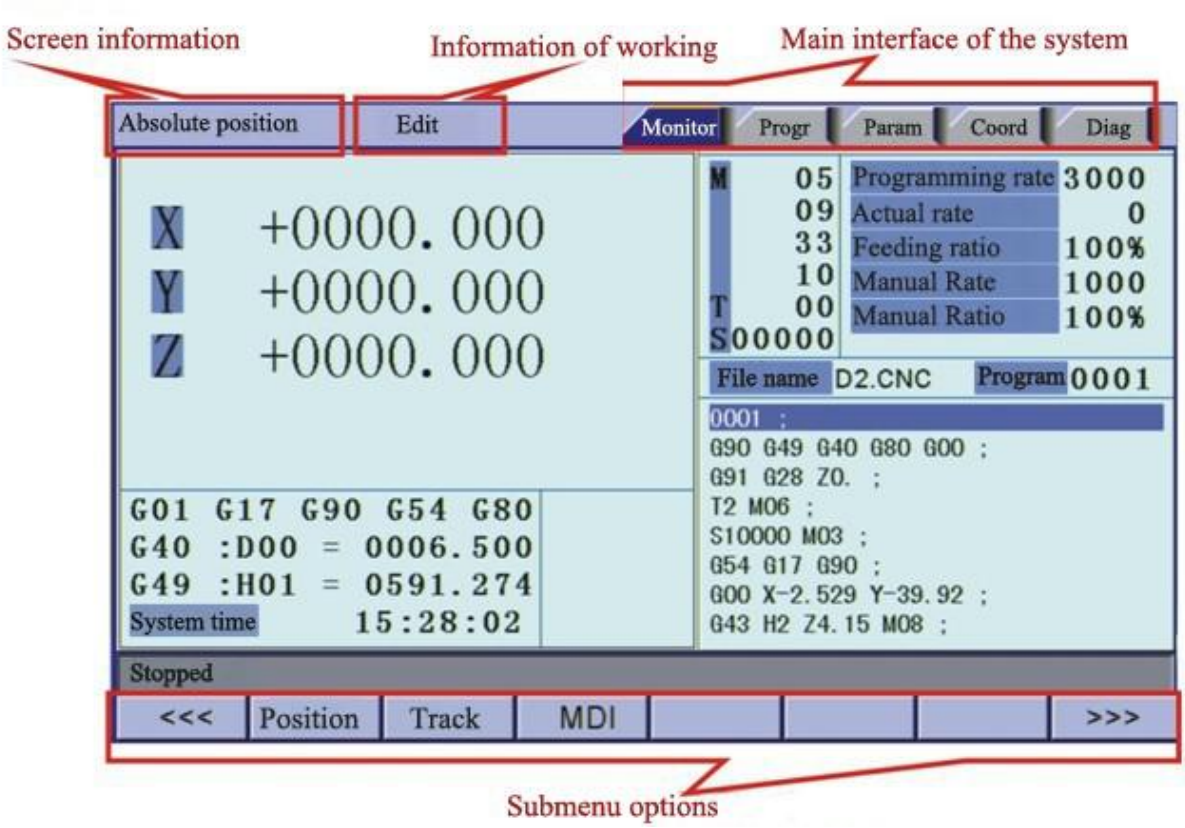


Fig. 2.2 CNC9640 LCD Screen Diagram

Note:

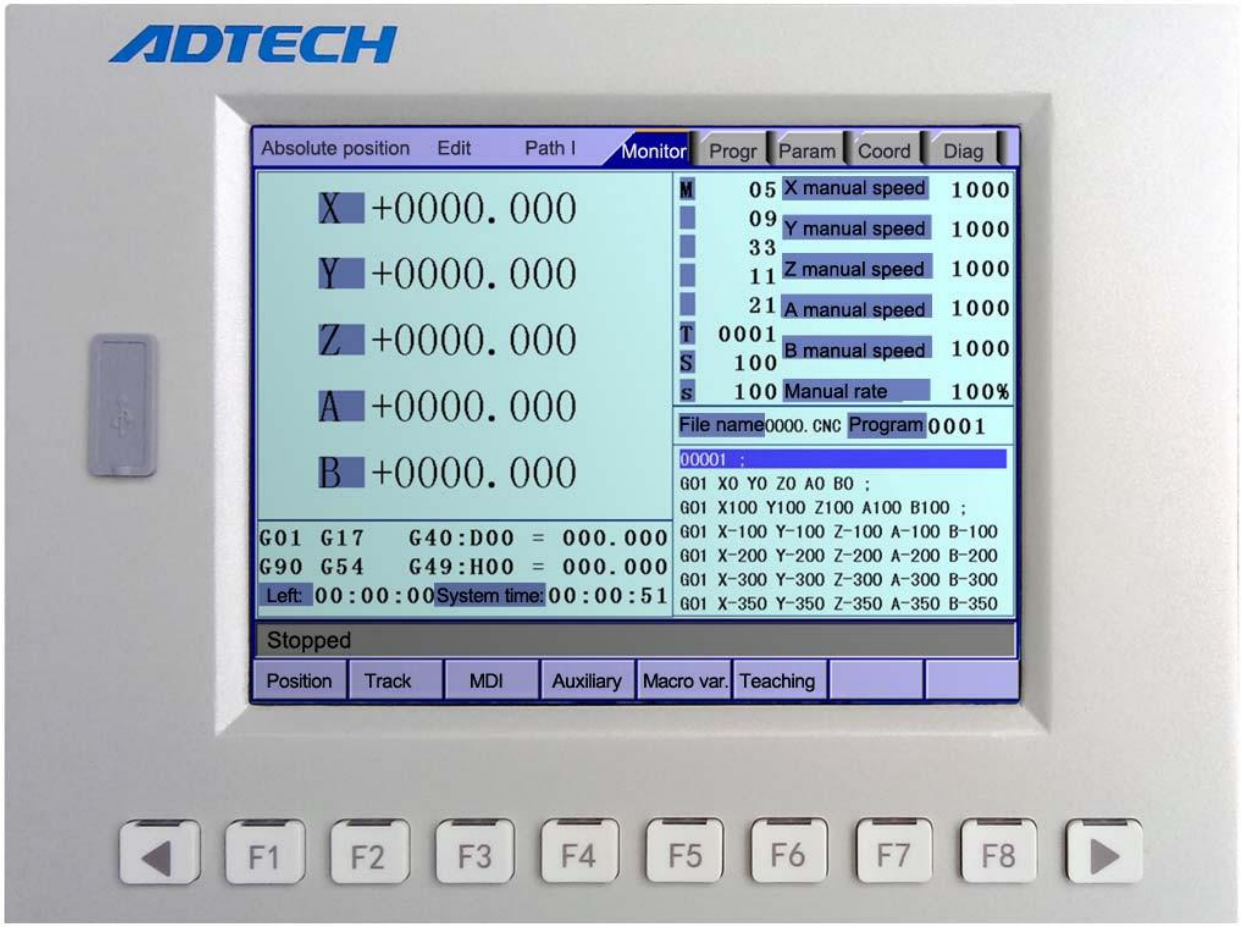
Screen info shows the information of current window

Working mode info shows currently selected working mode

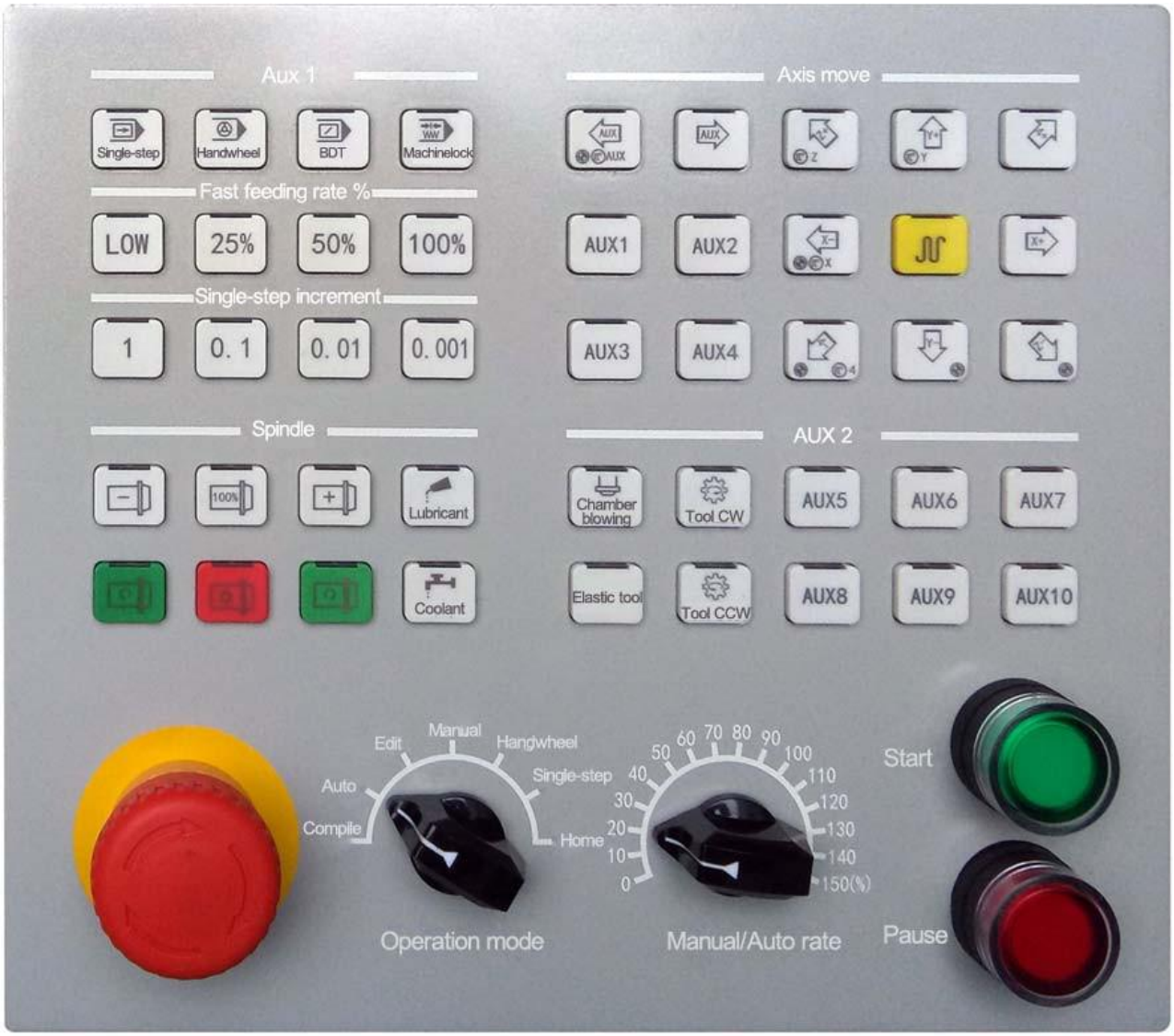
System main screen shows current main screen.

The submenu options are used to switch submenus with left triangle, F1~F6 and right triangle. The right arrow is used to turn pages, and the left arrow is used to close the submenus in next level and previous menu.

2.2 ADTCNC99 and 98 series system LCD/keypad


ADTECH
Absolute position
Edit
Path I
Monitor
Progr
Param
Coord
Diag
X +0000. 000
Y +0000. 000
Z +0000. 000
A +0000. 000
B +0000. 000
M 05 X manual speed 1000
09 Y manual speed 1000
33
11 Z manual speed 1000
21 A manual speed 1000
T 0001 B manual speed 1000
S 100
s 100 Manual rate 100%
File name0000. CNC Program 0001
00001 ;
G01 X0 Y0 Z0 A0 B0 ;
G01 X100 Y100 Z100 A100 B100 ;
G01 X-100 Y-100 Z-100 A-100 B-100
G01 X-200 Y-200 Z-200 A-200 B-200
G01 X-300 Y-300 Z-300 A-300 B-300
G01 X-350 Y-350 Z-350 A-350 B-350
G01 G17 G40:D00 = 000.000
G90 G54 G49:H00 = 000.000
Left: 00:00:00 System time: 00:00:51
Stopped
Position
Track
MDI
Auxiliary
Macro var.
Teaching
F1
F2
F3
F4
F5
F6
F7
F8


FCNC910V
Run
Stop
Alarm
Power
MONITOR
EDIT
PARAM
COORD
DIAG
FILE
Shift
PAGE UP
SELECT
RESET
PAGE DOWN
DEL
EOB
CAN



2.3 System menus

CNC96XX system uses cascading menu structure. You can press the following keys to operate the menus.

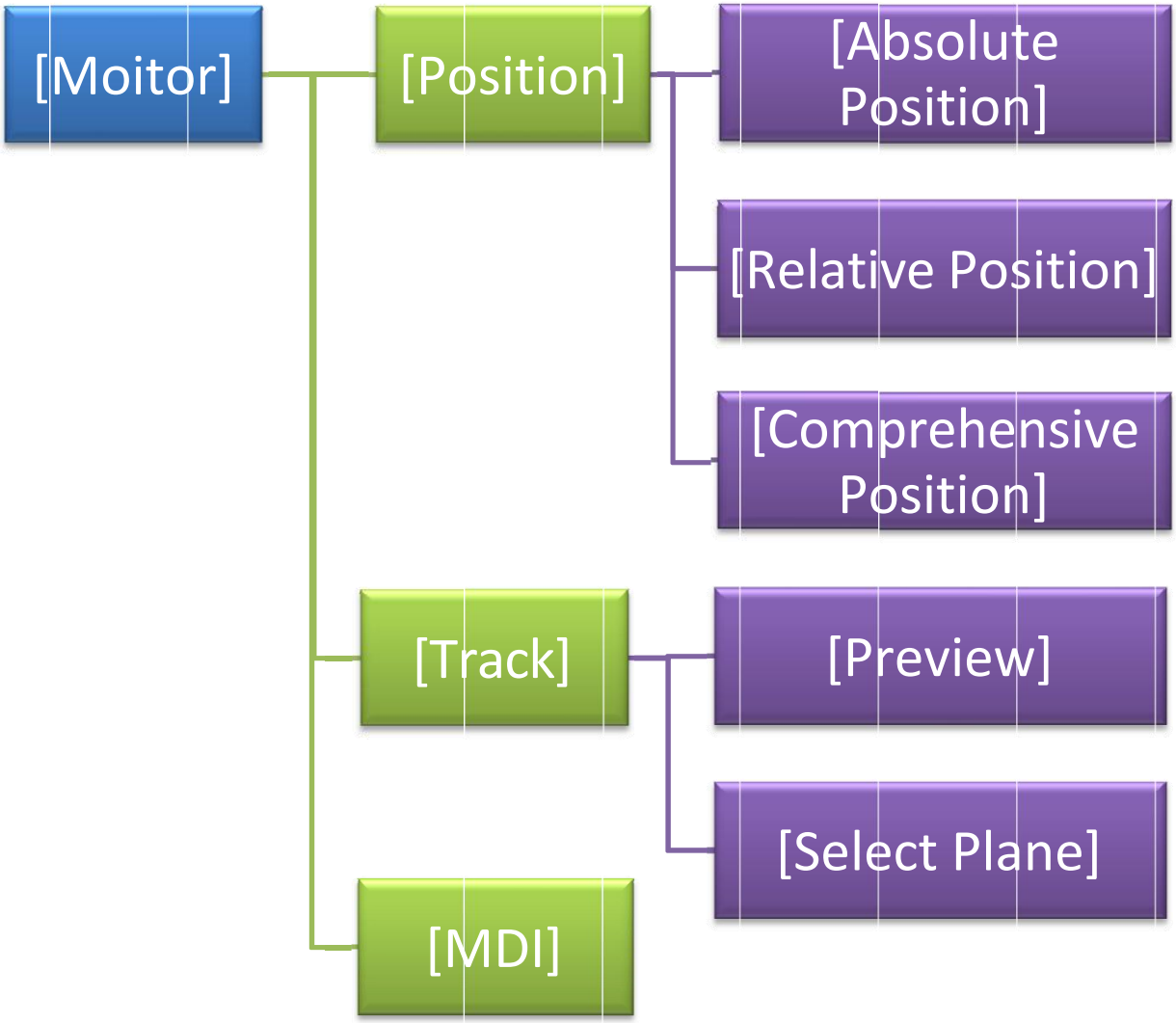
Press a key to show the corresponding content in the bottom of the LCD.

Key in the left: Return to previous menu

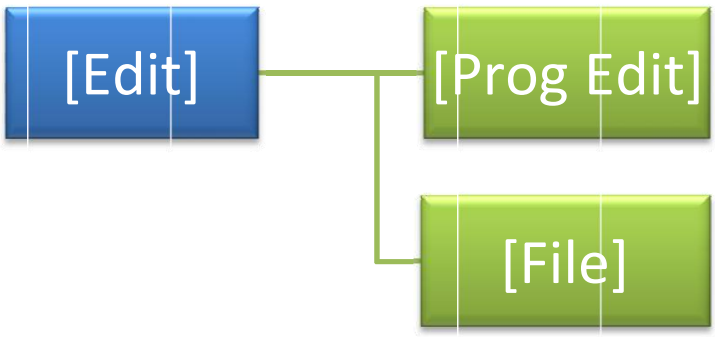
Key in the right: Turn pages to show other menus of same level

The main menus of the system include [Monitor], [Prog Edit], [Parameter], [Coordinate] and [Diagnosis]. Each main menu contains several submenus, which are shown below:

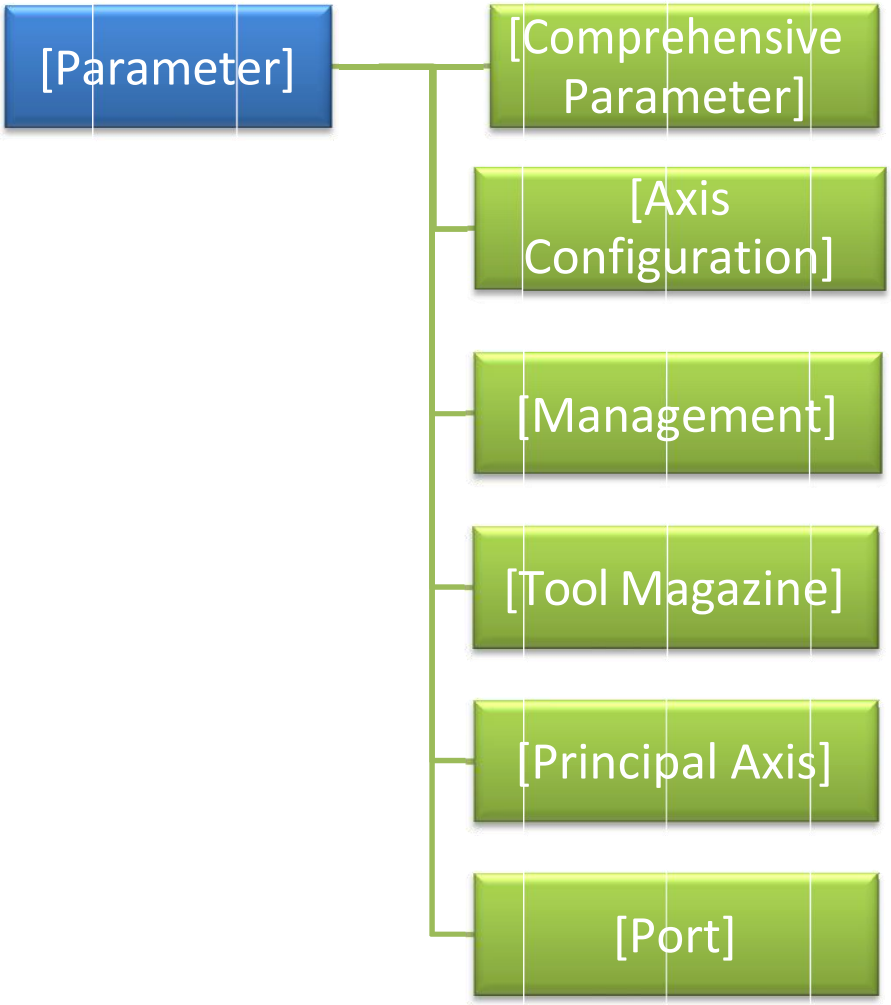
2.3.1. Autorun



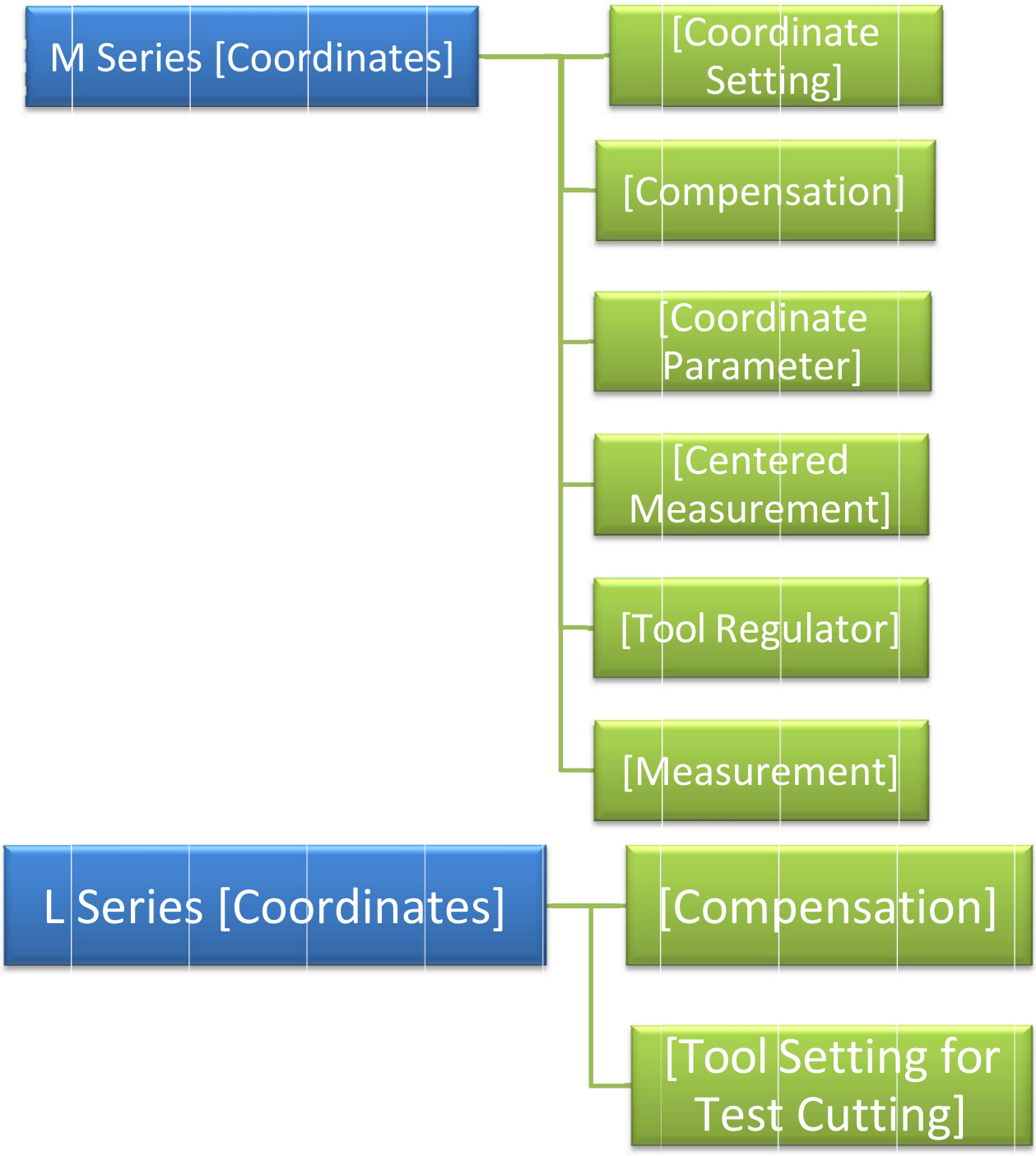
2.3.2. Program edit



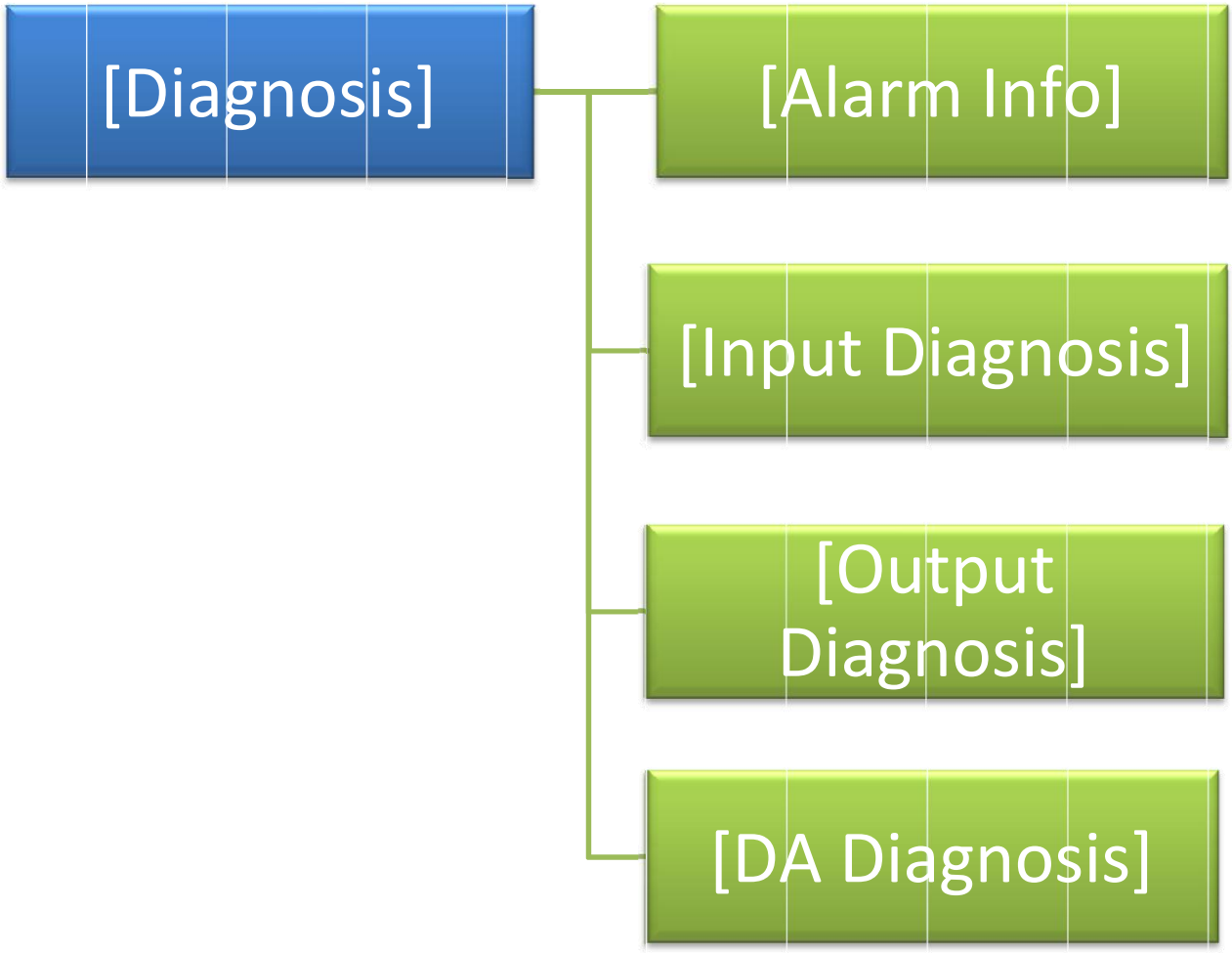
2.3.3. Parameter



2.3.4. Work coordinates



2.3.5. Diagnosis



2.4 Operating keys

The keys of CNC9 series system are defined below:

Key	Purpose
[RESET]	Cancel alarm, reset CNC
Address/number keys	Enter letters, numbers, etc.
[EOB], [CAN]	Confirm or cancel operation
[EOB], [CAN], [DEL]	Program edit (insert, delete, modify)
Mode switch key	Select operating mode
Cursor moving key	Four keys are available: Up/Down: adjust ration, move cursor among subsections; Left/Right: move cursor to left/right
Page key	Up/Down: page up or down
Menu keys	Select the menus

Key	Purpose
Spindle clockwise	Press to rotate the spindle clockwise, and press it again to stop rotating
Spindle counterclockwise	Press to rotate the spindle counterclockwise, and press it again to stop rotating
Coolant	Coolant on/off
Lubricant	Lubricant on/off
[BDT]	Block delete on/off
[SBK]	Single block function on/off
[PAUSE]	Automatic running pauses
[START]	Automatic running starts

3. Manual operation

3.1 Returning to reference point manually

CNC machine tool has specific mechanical position, which is called as reference point and for tool exchange and coordinates setting. Generally, when the power supply is connected, the tool should be moved to the reference point. This operation is also called as home operation, which will make the CNC system confirm the origin of machine tool.

The home operation includes program and mechanical mode:

For program home, the action completes when the coordinates of machine tool are 0, and won't check whether origin switch is in position;

For mechanical home, the external home sensor switch is used to locate the origin of the machine tool; two checking modes are available:

With the external sensor switch, the home operation completes when the sensing is successfully repeatedly.

The external sensor switch is used as deceleration switch, the servo home is enabled as home signal after sensing and then the sensing stops. You can set the "Home mode" in [Parameter][Comprehensive Parameter], in which 0 (default) indicates program and 1 indicates mechanical. You can also press [SBK] key in home mode to switch among "Mechanical – Program – Mechanical…" quickly. This method doesn't conflict with parameter setting. You can select accordingly. To use servo home as the home signal, you need to set "Axis phase Z home enable" to "1" in [Parameter] [Axis Configuration] in mechanical home mode, and the setting will take effect in next home checking.

Several methods are available for tool returning to reference point and the steps are as follows:

3.2 Each axis returns to reference point separately

Press the mode switch key [Home] to select home operation;

Press the composite key [X-], [Y-], [Z-], [A-] in the numeric section to return the corresponding axis to reference point.

3.3 Each axis returns to reference point simultaneously

Press the mode switch key [Home] to select home operation;

Press the [Start] key to allow Z axis to return to reference point, and then other axes return to reference point simultaneously. The automatic home sequence can be configured in the parameters.

3.4 Reset machine tool position

Press the mode switch key [Home] to select home operation;

In [Absolute Position] and [Coordinate System] screen, press [X], [Y], [Z], [A] respectively to show the value of corresponding axis position, and then press the [Cancel] key to reset the machine tool position of current axis, i.e. current point is used as machine tool origin. After this operation, the system considers it as a home action. Therefore, when the program is running, there will be no alarm of not returning to home. If you press by mistake, it will switch the screen and cancel selection automatically.

3.5 Reset relative position manually

Press the mode switch key [Manual] to select manual operation;

In [Relative Position] and [Coordinate System] screen, press [X], [Y], [Z], [A] respectively to show the value of corresponding axis, and then press the [Cancel] key to reset the relative position of current axis.

Note

The tool also can return to reference point according to program instruction, i.e. returning to reference point automatically.

Caution:

Generally, the system will perform home operation after connecting the power supply. If the power fails while the machine tool is moving, the system shall also return to reference point when the power supply is resumed. Return to Z axis first to prevent tool and workpiece from colliding, and damaging tool, workpiece and clamp.

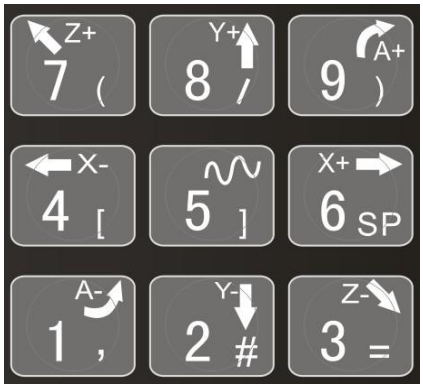
3.6 Continuous feeding manually

Press the keys on the operation panel or handwheel to move the tool along every axis.

The operation is as follows:

(1) Press the mode switch key [Manual] to select manual operation;

(2) Press composite keys [X+], [X-]; [Y+], [Y-]; [Z+], [Z-]; [A+], [A-] in numeric section to move the tool along selected axis. The keypad is as follows:



In manual mode, 5# key can be used to switch the manual speed and rapid traverse speed. The rapid traverse speed of each axis depends on comprehensive parameter 009-012 (rapid traverse speed setting). After switching to rapid traverse speed, the manual speed of the position interface will be highlighted, while the actual speed of the position interface is sampled from the moving speed of current axis. This value can truly reflect the moving speed of current axis (unit: mm/min);

Note:

Only single axis motion is available in manual mode.

3.7 Single-step feeding

Single-step mode is similar to manual mode, the operations are the same, but only a specified pulse increment is moved every time the key is pressed.

The specific operation is as follows:

3.7.1 Single-step increment selection

After selecting the single-step mode, the single-step movement amount is selected by the five single-step increments of 0.001, 0.01, 0.1, 1.0, L by pressing the up, down, left/right direction keys. L is set to a manual user-defined increment. By moving the cursor to L and pressing EOB, you can then set the desired single-step increment value.

(1) Press the mode switch key [Handwheel/Single-step] (this key is composite, and you can press it repeatedly to switch the modes) to select the single-step operation;

(2) Press composite keys [X+], [X-]; [Y+], [Y-]; [Z+], [Z-]; [A+], [A-] in numeric section to move the tool for a fixed distance along the selected axis. This distance is controlled by four rates (1.000, 0.100, 0.010, 0.001) (unit: mm). To select pulse increment, press Up (+) and Down (-) key in the [Position] interface.

3.8 Handwheel feeding

In handwheel mode, rotate the handwheel to make the machine perform single-step or continuous motion. Determine the feed by testing the handwheel signal of the handheld box. In handwheel mode, the feeding axis and feeding unit are determined by the axis selection signal of the handheld box.

The handwheel feeding step is as follows:

(1) Press the mode switch key [Handwheel/Single-step] to select handwheel operation;

(2) Rotate the dip switch on the handwheel to select handhweel axis (X, Y,Z, A);

(3) Rotate the increment dip switch on the handwheel to select the moving amount (0.1, 0.01, 0.001);

(4) Rotate the handwheel to move the machine tool. The tool moves certain distance every time you rotate the handwheel for a scale. (For example, if you select X axis in step (2) and select 0.01 in step (3), the tool moves 0.01mm every scale). Rotate the handle continuously to move the machine tool on this axis continuously.

Note:

The handwheel feeding mode controls only one coordinate axis every time; the faster the handwheel rotates, the faster the machine tool moves.

3.9 Manual auxiliary function operation

Coolant on/off

 In handwheel/single-step/manual mode, press this key to switch on/off the coolant.

Key indicator: No matter in what mode, the key indicator is on if only the coolant is on, or else he indicator is off.

Lubricant on/off

 In handwheel/single-step/manual mode, press this key to switch on/off the lubricant.

Key indicator: No matter in what mode, the key indicator is on if only the lubricant is on, or else the indicator is off.

Spindle positive rotation/stop

 In handwheel/single-step/manual mode, press this key to rotate the spindle positively and press it again to stop the axis.

Key indicator: No matter in what mode, the key indicator is on if only the spindle is positive rotating, or else the indicator is off.

Spindle reverse rotation/stop

 In handwheel/single-step/manual mode, press this key to rotate the spindle reversely and press it again to stop the axis.

Key indicator: No matter in what mode, the key indicator is on if only the spindle is reverse rotating, or else the indicator is off.

General instructions for manual operation keys

Cooling, lubricant, spindle positive/reverse rotation are available in handwheel, single-step and manual mode;

When the spindle is rotating, press the reverse rotation key, the spindle will stop first, and rotate in reverse direction after pressing it again.

When auxiliary output is on, if the system is switched to other modes, the output is unchanged; you need to press "Reset" key to switch it off, execute the corresponding M code in automatic mode or execute the corresponding M code in MDI interface to turn off the output;

When the spindle is positive/reverse rotating and execute M04/M03 directly, the system first stops positive/reverse rotating and then execute M04/M03 instruction;

Positive/reverse rotating of principal is stopped while emergency stop, and other outputs can be set according to system parameters.

3.10 Tool setting

Tool setting is the main operation and important skill during CNC processing. Under certain conditions, tool setting precision can determine the processing precision of parts, and the tool setting efficiency also affects the CNC processing efficiency directly. CNC96XX has M series tool setting mode and L series tool setting mode, while M series has two tool setting methods, i.e. centered and tool regulator, and L series uses test cutting.

3.10.1. Centered (M series)

The centered function is that the system calculates the center position of the workpiece automatically while tool setting to realize segment centered, rectangle centered and circle center location.

Note

In the tool setting operation below, if the auxiliary parameters of the coordinate system doesn't need setting, the first three steps can be omitted. Please refer to chapter 9.5 for auxiliary parameters of the coordinate system.

(1) Single axis centered

Select the edit mode;

Press [Coordinates], [Coordinates Parameter] to enter the auxiliary parameters setting interface of the coordinate system;

Move the cursor to desired position, enter new parameters and press [EOB];

Select handwheel or manual mode;

Press [Coordinates] to enter coordinate system setting interface;

Press the left/right arrow to move the cursor to select coordinate system;

Press [Centered Measurement] to enter centered interface;

Move the tool to make its side blade touch side A surface of the workpiece, and press [EOB] to record boundary point 1;

Move the tool to make its side blade touch side B surface of the workpiece, and press [EOB] to record boundary point 2;

Press [EOB] to calculate the coordinates of center point;

If there is no question, press [EOB] again to return the result to specified coordinate system.

⑵ Square centered

Select the edit mode;

Press [Coordinates], [Coordinates Parameter] to enter the auxiliary parameters setting interface of the coordinate system;

Move the cursor to desired position, enter new parameters and press [EOB];

Select handwheel or manual mode;

Press [Coordinates] to enter coordinate system setting interface;

Press the left/right arrow to move the cursor to select coordinate system;

Press [Centered Measurement] to enter centered interface;

Move the tool to make its side blade touch side A surface of the workpiece, and press [EOB] to record boundary point 1;

Move the tool to make its side blade touch side B surface of the workpiece, and press [EOB] to record boundary point 2;

Record boundary point 3.4 in the same method;

Press [EOB] after recording all boundary points to calculate the coordinates of center point;

If there is no question, press [EOB] again to return the result to specified coordinate system.

⑶ Plane circle (XY plane) centered

Circle centered has two modes, which are three points and two points with specified radius; If the user only types two coordinates in the option of workpiece boundary point and specifies one value for R, the system will determine the circle center with two points and radius automatically; if the user types coordinates of three points in the option of workpiece boundary point, the system will determine the circle center with three points and shield R.

The centered steps of three points arc are as follows:

Select the edit mode;

Press [Coordinates], [Coordinates Parameter] to enter the auxiliary parameters setting interface of the coordinate system;

Move the cursor to desired position, enter new parameters and press [EOB];

Select handwheel or manual mode;

Press [Coordinates] to enter coordinate system setting interface;

Press the left/right arrow to move the cursor to select coordinate system;

Press [Centered Measurement] to enter centered interface;

Move the tool to make its side blade touch the surface of round workpiece, and press [EOB] to record boundary point 1;

Move the tool to make its side blade touch another point in the surface of the workpiece, and press [EOB] to record boundary point 2;

Move the tool to make its side blade touch another point in the surface of the workpiece, and press [EOB] to record boundary point 3;

Press [EOB] after recording all boundary points to calculate the coordinates of circle center and display in the result section;

If there is no question, press [EOB] again to return the result to specified coordinate system.

Arc centered validation

In the main menu, press [Monitor], [MDI] to enter the MDI interface, select edit mode, enter program block G55G0X0Y0 (if coordinate system G55 is selected while tool setting), press [Start], [EOB], and the tool moves to workpiece center automatically, indicating that three points arc centered properly.

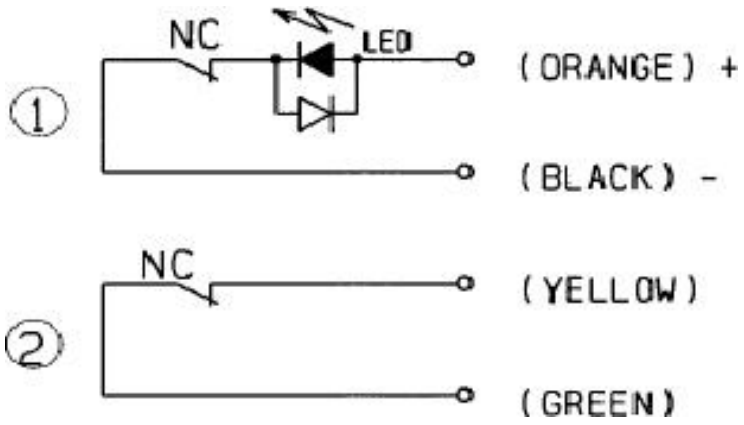
The validation steps for other tool setting methods are same.

3.10.2. Tool regulator setting gauge (M series)

The tool regulator of CNC96xx system can realize Z-axis tool setting and A-axis tool setting, and can perform the detection by using the same tool regulator. It can switch Z-axis tool setting or A-axis tool setting. The tool regulator function is not enabled by default, so you need to modify the parameters before use. This document description is based on the system version 7.0 or above.

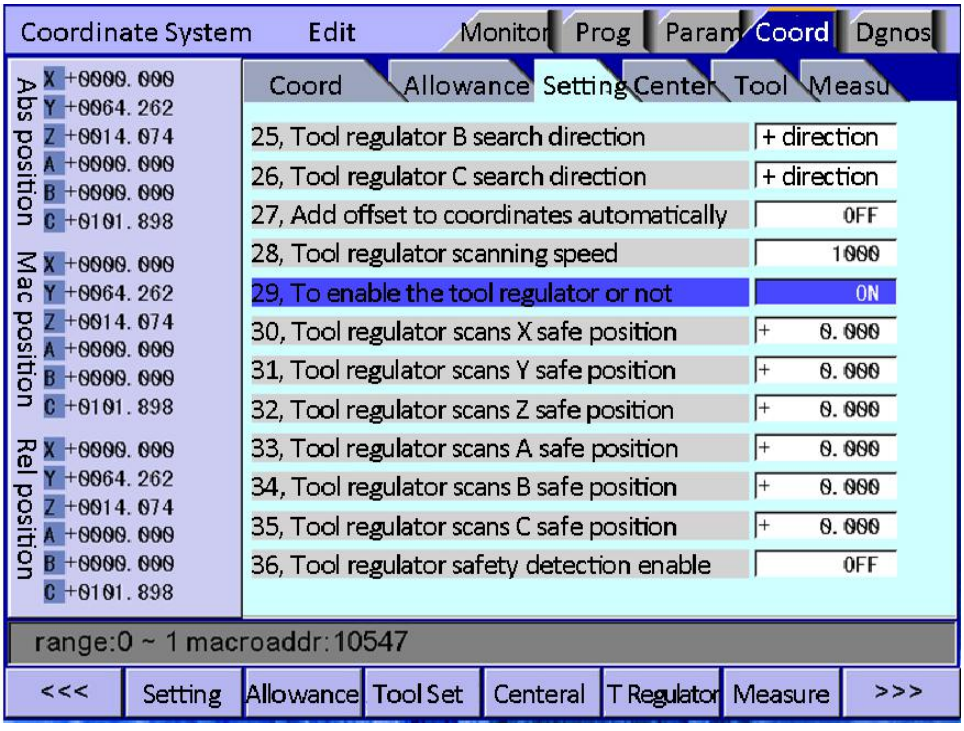
Related parameters and instructions for using the system tool regulator:

1. Install the tool regulator (the figure below shows the wiring diagram of tool regulator of a brand).

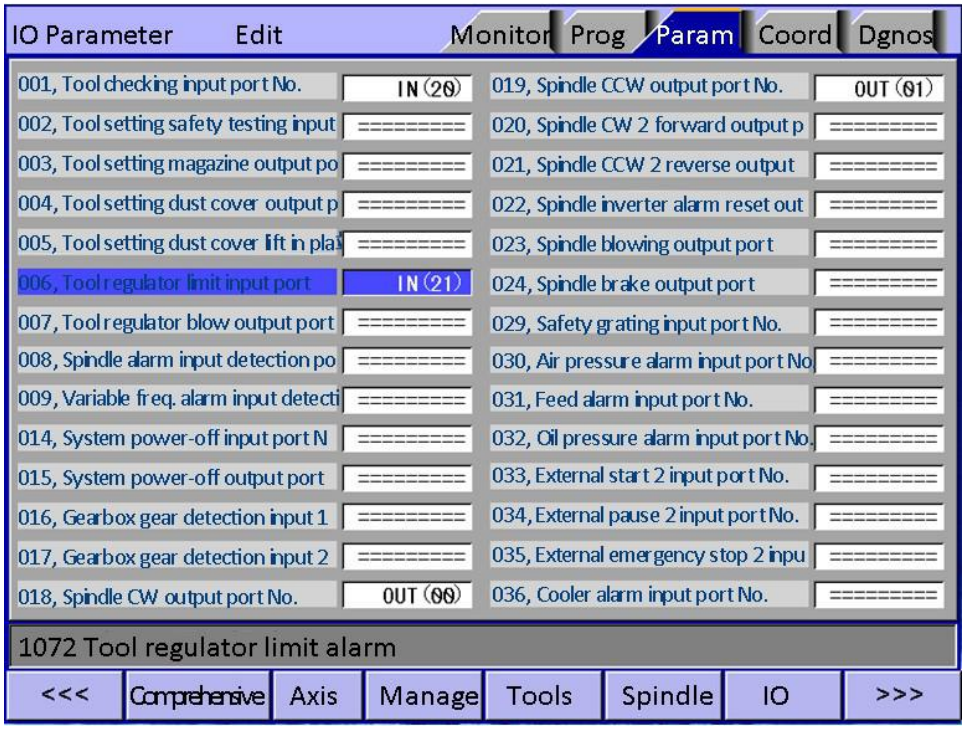


Since the input point on the ADT input board supplies +24V, the black and yellow lines in the above figure must be connected to 0V in parallel. The orange and green lines are respectively connected to the corresponding input points on the input board. If the orange and black lines are reversed at time of connection, there will be no input for tool setting detection.

2. Enable tool regulator: Coordinates -> Coordinates parameter -> 29. Whether to enable the tool regulator --------- By setting it to ON, you can enable the tool regulator and perform the tool setting operation. When it is set to OFF, the tool regulator cannot be enabled. .



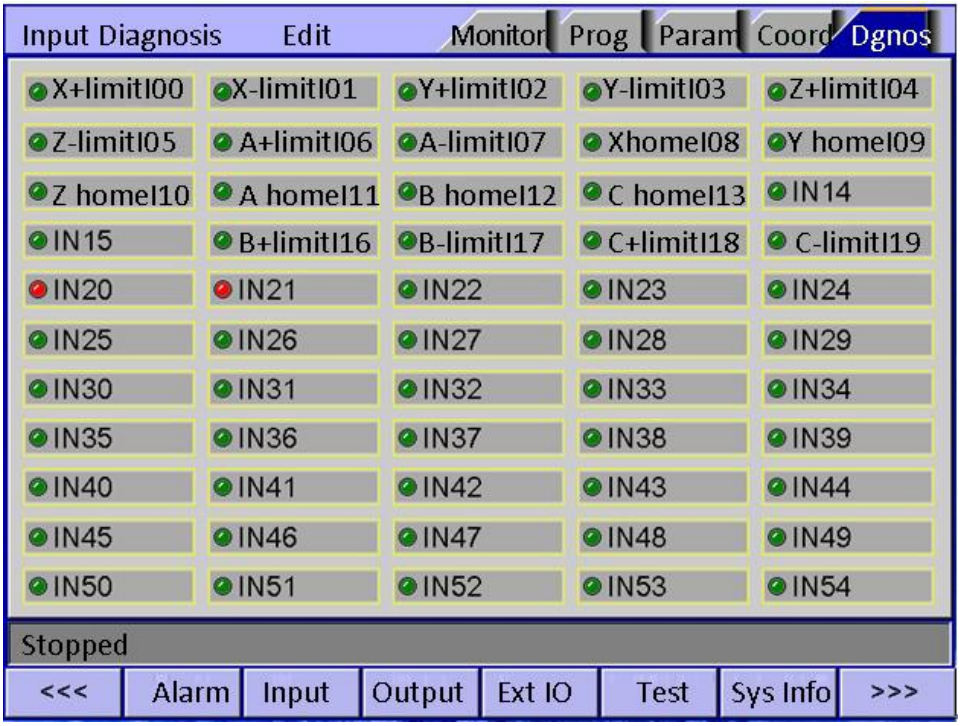
3. Configurations of tool regulator detection input port and limit input port: Parameter -> Port -> 001. Tool regulator detection input port number--------- set the tool regulator detection signal input port, through which the system can detect whether the tool regulator is in place when it scans tool regulator, for example, if the signal line of the tool regulator is connected to the input number IN20, input 20 and the parameter will become IN (20). The limit input port is also configured to IN (21) in the same way.



4. Invert the input detection active level

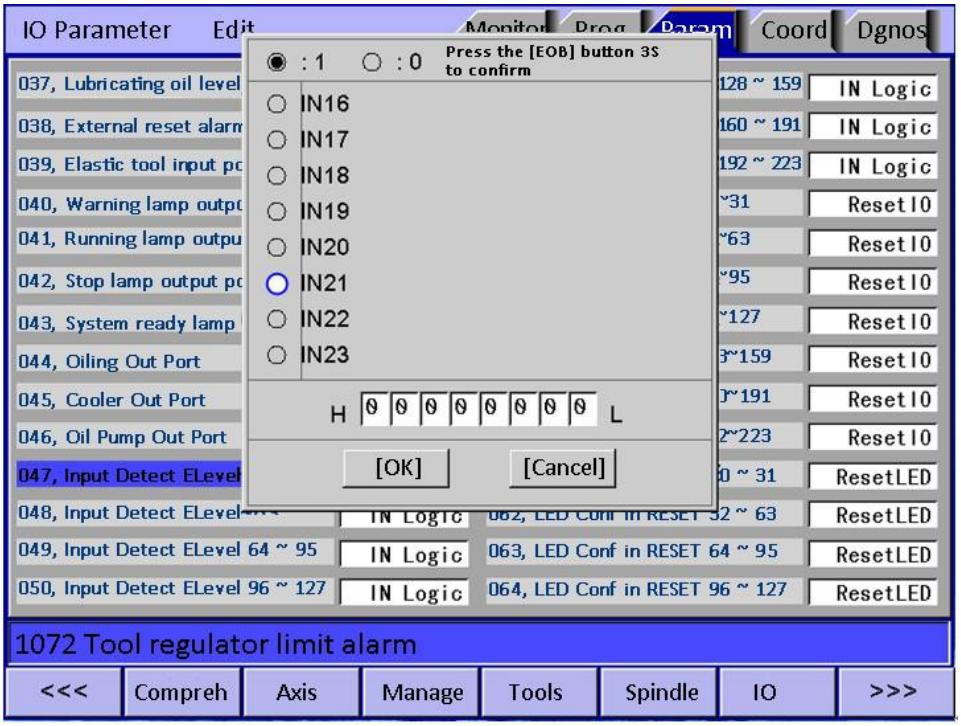
According to the wiring diagram of the tool regulator in the above example, the limit and the test switches of such tool regulator are of NC type. After connecting the tool regulator properly, enter the controller input diagnosis interface.

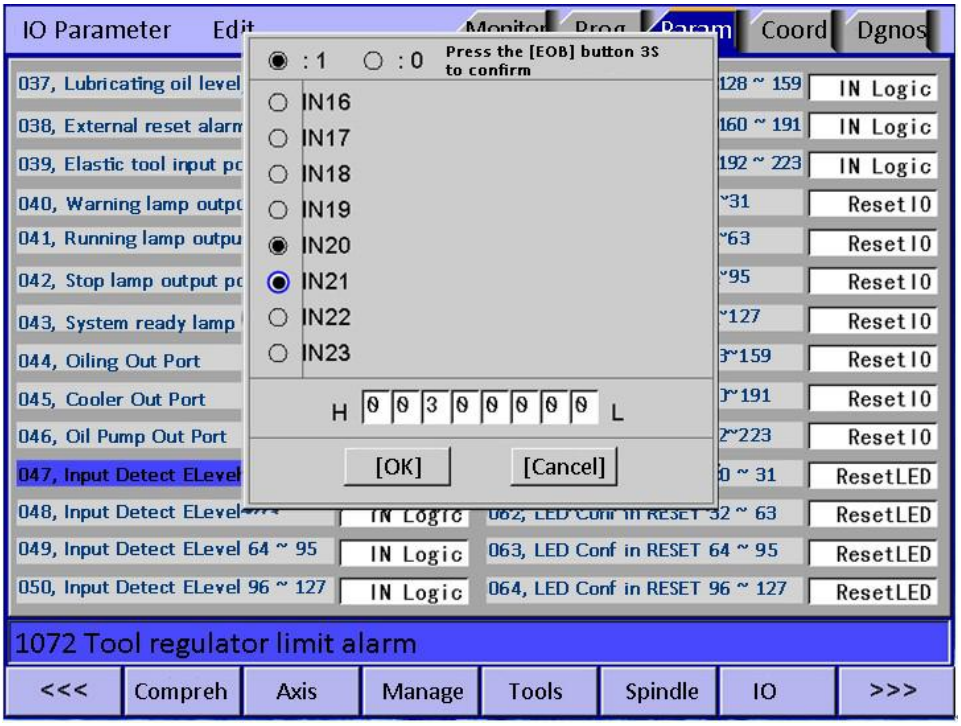
It can be seen that the front indicator lights of IN20 and IN21 light up, and the limit alarm prompt of tool regulator appears.



The above phenomenon occurs because the detection and input switches are of NC type. If they are of NO type, the front indicator lamps of IN20 and IN21 will not light up, and there will be no limit alarm for the tool regulator, until the input signal is detected and it is beyond the tool regulator limit.

In the case both the detection and limit switches are of NC type, we need to invert the active levels of the input detecting points IN20 and IN21. Parameter->Port-> 047. Input detection active level 00-31--------Change the input detection active level of IN20 and IN21 in the input mode. After changing the input detection level as shown below, press and hold the “EOB” button until the pop-up dialog box disappears. Then, press the Reset button, the tool regulator alarm will disappears, and the indicator lamps in front of IN20 and IN21 will be off.





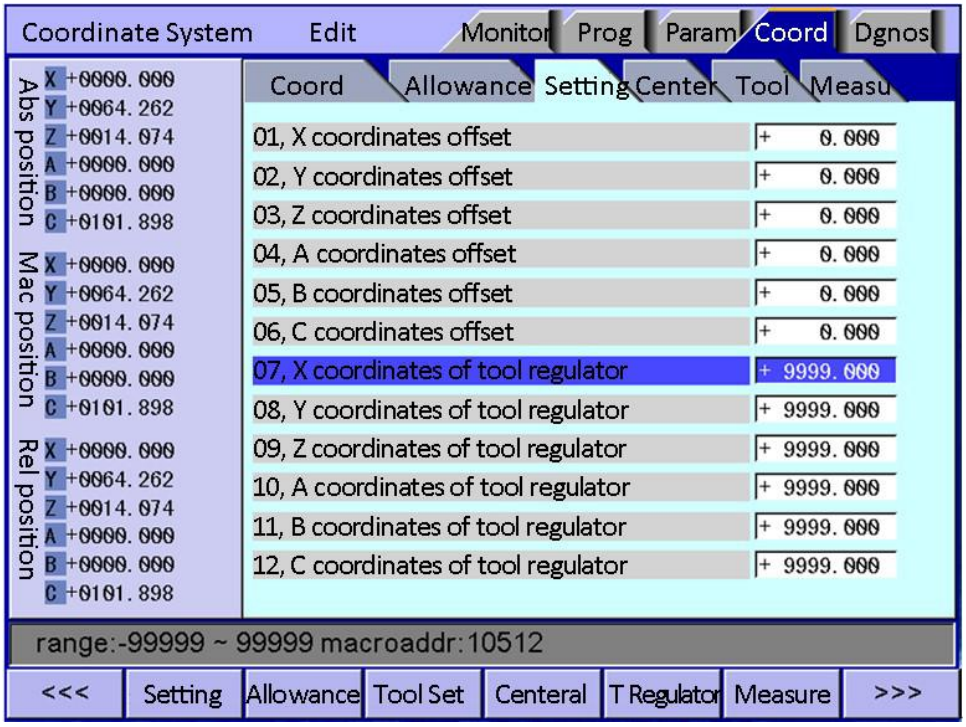
5. Tool setting coordinates setting

Coordinates ->Tool setting parameter ->07. X coordinates of tool regulator

08. Y coordinates of tool regulator

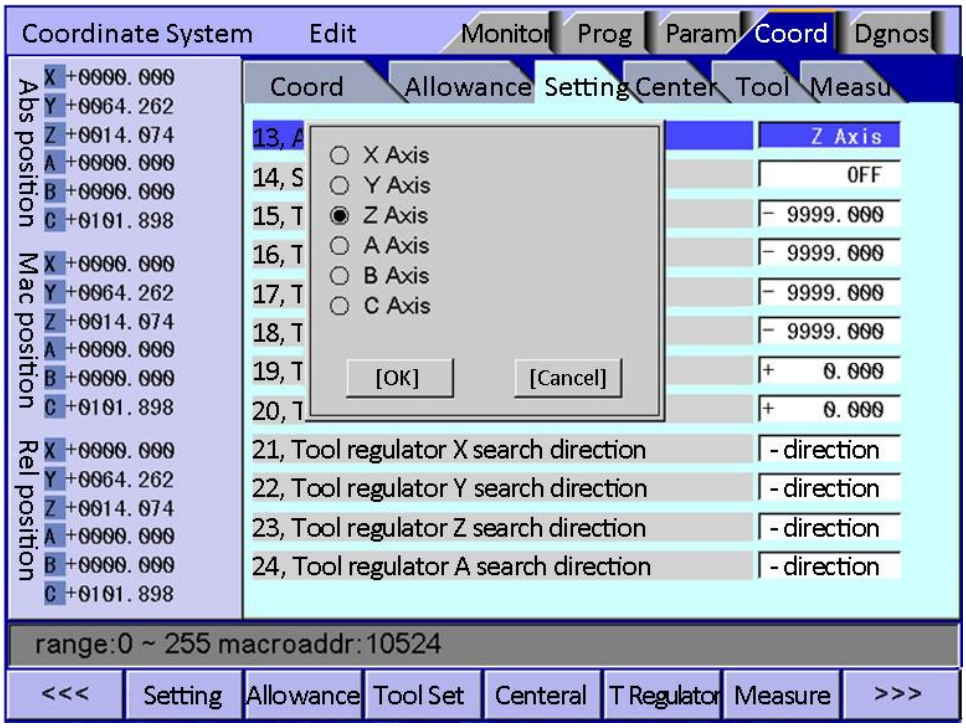
09. Z coordinates of tool regulator

10. Tool regulator coordinate A----------set the mounting position of the tool regulator, pay attention to the machine coordinate value. Take Z-axis tool setting as an example, for instance, X is 200, Y is 300 and Z is 0; when the system scans the tool regulator, the Z-axis of the tool setting axis quickly moves to the machine coordinate 0, then the X and Y axes move to the machine coordinates of 200 and 300 in a fast manner, after that, the Z-axis starts to scan the tool regulator signal. This parameter is suitable for the condition where the tool regulator is fixed at a certain position of the machine. For the setting method of movable tool block, the tool regulator performs tool setting at any point. You can set this parameter to 9999. When the system performs tool setting, it will scan the tool regulator signal at current point.



Axis selection symbol of tool regulator

Coordinates->Tool setting parameters->13. Tool regulator axis selection flag---------- Set the axis to start the tool regulator, for example, Z-axis is defaulted to enable the Z-axis tool setting, and A-axis is defaulted to enable A-axis tool setting. You can press the left/right direction keys to switch after selecting the parameter by cursor.



3.10.3. Auto tool setting mode setting

Coordinates->Tool setting parameters->38. Tool setting method

Mode 0: 0 is the tool setting method using the reference No. 1 tool as the reference tool, and the result is stored in the length compensation table.

Mode 1: way of tool setting with non-reference tool, corresponded to the workpiece coordinate system Z-axis. G54 coordinates

Mode 2: non-standard customization, and the offset scale is X Y Z A B C

Mode 3: G43

3.10.4. Four-point centering:

1: Set the coordinate value of workpiece boundary point 1 to point 4 in manual or input mode

2: Move the cursor to [Center Calculation Result], and automatically calculate the four-point to the current column by pressing [EOB].

3.10.5. Calculate the center of the circle using two points and radius

1st point: [Workpiece Boundary Point 1]

2nd point: [Workpiece Boundary Point 2]

Radius: [Circular Workpiece Radius]

Move the cursor to [Center Calculation Result], and automatically calculate the center coordinates to the current column by pressing [EOB].

3.10.6. Calculate circle center using 3 points

Point 1: [Workpiece Boundary Point 1]

Point 2: [Workpiece Boundary Point 2]

Point 3: [Workpiece Boundary Point 3]

Move the cursor to [Circular Workpiece Radius] and press [Delete],and then [EOB], the center coordinates to the [Center Calculation Result] column can be automatically calculated.

3.11 Manual operation

Magnification adjustment: Press the Page Up/Page Down key in [Manual] mode to adjust the manual magnification

Single-step pitch adjustment: In the [Single-step] mode, press the Page Up/Page Down key to adjust the step pitch;

3.12 Data entry

In [Manual] mode, press [EOB] to enter the current absolute coordinates into the current column.

In [Manual] mode, press [X] [Y] [Z] to enter the corresponding axis coordinates into the current column.

In [Enter] mode, press [X] + [Number Key] and then press [EOB] to manually modify the data of the corresponding axis;

3.13 Update the coordinate system

Move the cursor to [Center Calculation Result]. Press [EOB] twice to calculate the centering result set, and update the current coordinate.

3.14 Coordinate Parameter

3.14.1. EXT offset coordinates

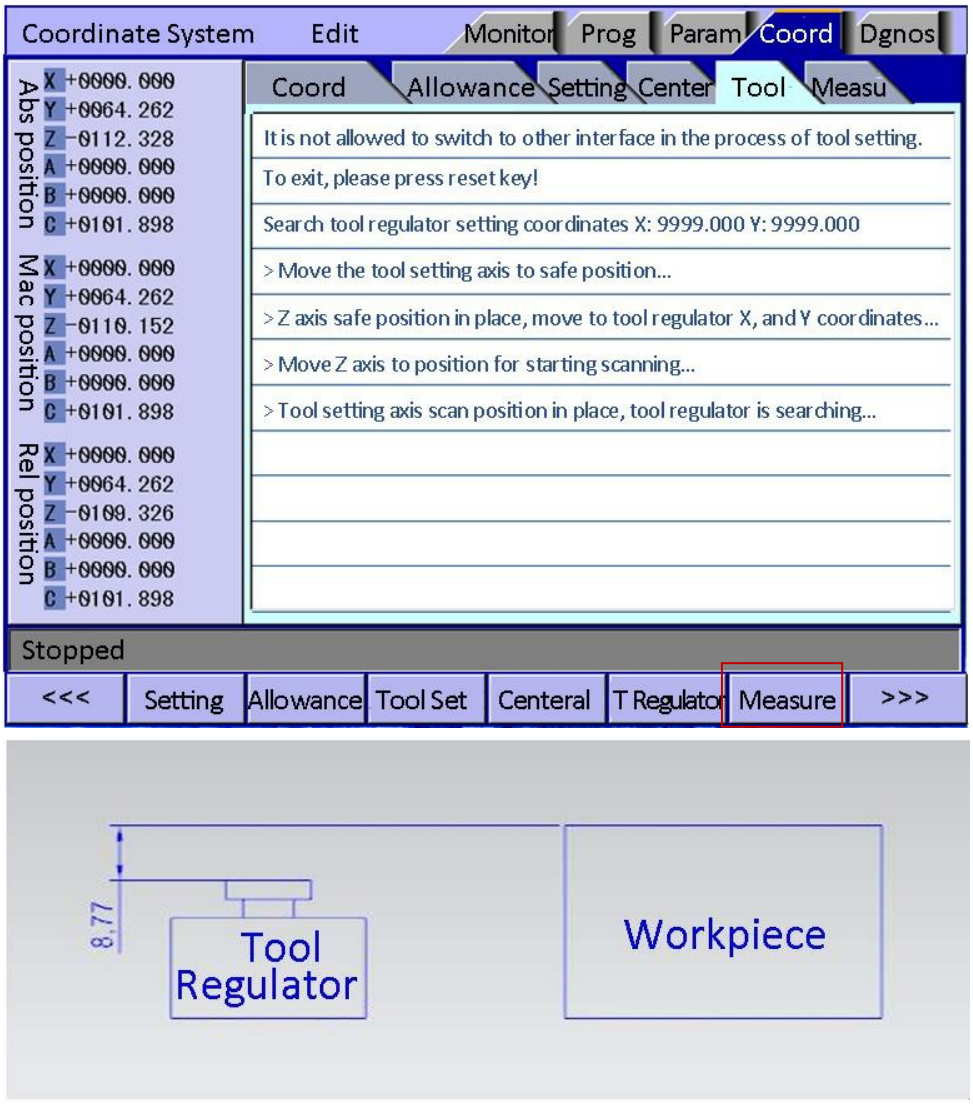
1. X coordinates offset

2. Y coordinates offset

3. Z coordinates offset

4. A coordinates offset---------- set the offset of workpiece coordinate system and the tool setting point, for example, the tool setting point is machine coordinate -100, the coordinate offset is 10, then the system’s

workpiece coordinate zero point is -100+10 = -90, which is the workpiece zero point. The system sets the workpiece zero position by adding mechanical coordinate of tool regulator scanning point with the offset. For the tool regulator installed in a fixed manner, this parameter is generally tested using the measurement function. To do this, you shall first select a tool, after setting the workpiece coordinate system, you shall activate the measurement function, and the system will scan the tool regulator signal, and after scanning is completed, it will subtract the machine coordinate of the workpiece zero from the machine coordinate of the tool setting point. In the set offset, this parameter can also be input manually. For the setting of tool block, input thickness of the tool block to the parameter. Generally, the offset is positive when the workpiece origin is above the tool setting point, and negative when workpiece point is above the tool setting point (such as the tool block).



In the above figure, the distance from the top surface of the workpiece (i.e., the origin of the coordinate system Z-axis) to the top surface of the tool regulator is the offset value of the Z coordinate system.

3.14.2. Tool Regulator Parameter

Coordinates -> Tool setting parameters

15~20. The limit of tool regulator machine X, Z, A, B, C. Search for the maximum position of the axis when searching for the tool regulator, and this value is the machine coordinate value. The search stops when the search axis motion value is equal to or greater than the set value, and an alarm is given.

21. Searching direction of the tool regulator----------Set the tool limit coordinate and the search direction of the tool regulator. 1 is the negative direction searching, and 0 is the positive direction searching.

28. Scanning speed of the tool regulator----------Set the search speed when the system searches for the tool regulator signal. The speed is defaulted as 1,000mm/min. For example, when the Z-axis starts searching for tool regulator signal in negative direction, the tool regulator searches at the speed of 1,000 mm/min until the system detects the tool regulator signal, and the system then switches to a low scanning speed to reposition the signal of tool regulator.

38. Way of tool setting----------set the processing mode after the system tool regulator scanning setting is finished: 1 is the tool setting mode when non-reference tool is used. After the scanning is finished, the system will set the calculated workpiece origin position to the coordinate system, for example, the zero coordinate of the workpiece after scanning is -90, the system will then set the coordinate value of -90 to the Z-axis in the coordinate system (when the Z-axis is set), and the set coordinate system is the one currently selected in the coordinate setting, the length compensation is realized by calling the coordinate system command in the program. 0 is the tool setting method by taking No.1 tool as the reference tool. After the scanning is finished, the compensation value is set to the length compensation in the allowance, for example, when the No.2 tools is aligned, the system sets the tool value to the No.2 length compensation value of the allowance, and then calls G43 H2 in the program to realize the length compensation. Taking No.1 tool as the reference tool means that, when measuring the coordinate offset, the measurement is performed with No.1 tool, and the No.1 amount of compensation in the allowance is generally zero.

When the tool setting mode is set to 3, the system will input the data of each tool measured by the tool regulator in the tool compensation interface. Please note that the Z value is set to 0 in the coordinate system.

Coordinates->Allowance

Steps to use tool regulator and troubleshooting

1. According to the system requirements, after modifying the parameters, observe system diagnostic screen to check whether the input signal is normal, and whether the effective level is correct. In the diagnostic screen, for example, if the red lamp of IN5 lights up, it indicates that low level is detected as 0, and green lamp

indicates that high level is detected as 1, then confirm whether the corresponding parameter level is correct. If the setting is wrong, the scanning speed and direction will work abnormally.

2. After the scanning is finished, confirm whether the compensation value is correct by moving the machine to the workpiece zero point.

3.14.3. Tool setting by test cutting (L series)

The machine tool uses test cutting for tool setting, which moves the tool to cut the processing file, measures the value after cutting and enters into the system to complete the tool setting for center point.

For tool setting by test cutting, enter the test cutting interface first.

Press [Coordinate], [Tool Setting] to enter tool setting interface;

Move cursor to desired tool number, and select diameter or length for the type of current test cutting;

Select handwheel, single-step or manual mode;

Press the spindle on, and then press [X+] [X-] [Z+] [Z-] to move the axis and test cutting the workpiece;

After test cutting, turn off the spindle but do not move the axis;

Select edit mode, measure corresponding data and display data, press the number keys to enter directly, press [EOB] to calculate and save automatically, or press [Cancel] to exit;

Š Caution

1. For tool setting by test cutting, automatically calculate the entered measurement value plus current machine tool coordinates and then enter. Therefore, the current position of machine tool must be true.
2. When measuring the diameter of workpiece, test cutting a layer of the workpiece surface. After cutting, the axis can only retract in opposite direction. Do not move X axis, or else the measured diameter will be invalid.
3. Measure the length of the workpiece, touch the workpiece end with the tool, make it can be cut; enter length value 0, indicating that current point is the workpiece home of Z axis.

3.15 Data settings

3.15.1. Tool compensation data settings

The tool compensation parameters can be set as follow:

Select the edit mode;

In the main menu, press [Coordinate], and then press submenu [Compensation] to enter tool compensation parameter setting interface;

Move cursor to select the parameter, enter the value and then press [EOB] to modify the parameter where the cursor locates.

Š Caution

1. Numeric Input dialog box has two input methods: direct assignment and incremental assignment. Direct assignment refers to assigning the entered number directly to the specified parameter, and incremental assignment refers to assigning the sum of entered number and current value of the specified parameter to the parameter;
2. Incremental input and direct input box have symbols on the left: '=' represents direct input, '+' represents incremental input; the default mode is always direct assignment; to change to incremental assignment, press the "UP/DOWN arrow" key

3.15.2. System parameters setting

The system parameters can be modified as follow:

Select the edit mode;

In the main menu, press [Parameter] to enter parameter setting interface;

Then, press the submenu key to select the parameter type (comprehensive, management …);

Move cursor to select the parameter, enter the value and then press [EOB] to modify the parameter where the cursor locates.

3.16 System shortcuts

Numeric Input dialog box has two input methods: direct assignment and incremental assignment. Direct assignment refers to assigning the entered number directly to the specified parameter, and incremental assignment refers to assigning the sum of entered number and current value of the specified parameter to the parameter; Incremental input and direct input box have symbols on the left: '=' represents direct input, '+' represents incremental input; the default mode is always direct assignment; to change to incremental assignment, press the "UP/DOWN arrow" key.

In the [Monitor] screen, under [Position] menu, press the 'O' key to bring up the G-code O program number box to quickly switch to O block. Press the "EOB" to confirm, and press "Cancel" to return.

In the [Monitor] screen, under [Position] menu, press '←', '→' in "Manual mode" to trim spindle speed quickly; if you press and hold it, the speed value will be accumulated quickly. Note that this feature is available when the spindle is turned on and the current spindle speed is not zero; if the current speed is 0, please first set it to non-zero value in MDI mode, and then perform the shortcut operation.

1. Automatic Operation

The machine tool moving according to prepared program is called as automatic operation. The automatic operation modes of CNC96XX, CNC98XX and CNC99XX system follow:

Memory operation, MDI operation, USB disk DNC operation.

4.1 Memory operation

The machine tool can operate according to the program in CNC96XX memory, which is called as memory operation.

The program is prestored in the memory. Select and load a program with the operation panel and press the “Start” key to start the automatic operation. Then, press “Pause” key to pause, press “Start” key again to resume the operation, and press “Reset” during operation to stop the program immediately.

The steps of memory operation are as follows:

⑴ Save the program in the memory (see 8.1 for details);

⑵ Select [Edit], [File] in the menu or press [File] on the panel to enter file operation interface;

⑶ Press the direction keys to move the cursor, press [EOB] to select a program and load the file into the work area;

⑷ Press mode selection key [Auto] to switch to automatic mode;

⑸ Press the [Start] key to run the program, and the indicator is on.

4.2 MDI operation

In [Monitor] interface, switch to [MDI], enter the program with keypad and make the machine tool operate according to the program. The program block isn’t saved in system memory, and can’t be preserved upon power failure. This is called as MDI operation and the steps are as follows:

⑴ Press mode selection key [Edit];

⑵ Select [Monitor], [MDI] in the menu to enter MDI interface;

⑶ Enter program block instruction manually;

⑷ Press [Start], [EOB] to start executing the program block.

4.3 USB disk DNC

The program read from external USB disk can operate the machine tool without saving in CNC memory. This operation is called as USB disk DNC operation.

The steps of USB disk DNC operation are as follows:

⑴ Insert the USB disk;

⑵ Select [Monitor], [File] in the menu to enter file operation interface;

⑶ Select USB disk and press [EOB] to enter;

⑷ Move cursor to select a file in the disk;

⑸Press [EOB] to load the file into work area (system buffer);

⑹ Press mode selection key [Auto];

⑺ Press the [Start] key to run the program, and the indicator is on.

Š Caution

The system won't record the USD disk path. If power failure occurs during DNC processing, the program info will be lost when the power supply is connected again.

4.4 Speed rate adjustment

Feeding rate

In automatic mode, press Up/Down key in [Position] interface to adjust the feeding rate; Press the key once to increase or decrease by 10% (10%-150%).

Manual rate

In manual mode, press Up/Down key in [Position] interface to adjust the manual rate; Press the key to increase or decrease by 10% (10%-150%). If you press the FF key and Up/Down key, you can adjust the fast forward rate by 10% (10%-150%).

Spindle rotation

In automatic or manual mode, when the spindle rotates normally, press the Left/Right key to adjust the spindle rotation by 100r/min. The maximum rotation is set by the spindle parameters in the system and the minimum rotation is 16r/min. If you press and hold the key for three seconds, the value will be increased or decreased quickly.

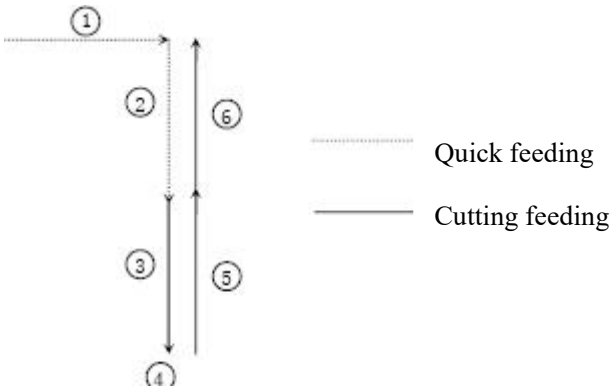
4.5 SBK function

In automatic mode, press [SBK] to start the SBK function. Current program block stops after executing; press [Start] again and next block stops after executing. The SBK mode allows checking the program block by block.

Š Caution:

① In G28-G30, single block also can be stopped at the center point;

② The stop points of single block in fixed circle are ①, ②, ⑥ in the figure below; when the single blocks of ①, ② stops, the feeding pauses and the pause indicator is on.



4.6 BDT function

In automatic mode, press [BDT] to start the BDT function, which will make the block instructions in the line after '/' in the program invalid.

4.7 Stopping automatic operating

Two methods are available to stop automatic operating, i.e. enter stop command where the program will stop (M00, M01) and press the key on the operation panel to stop the machine tool.

Program stops

After executing the block with M00 or M01, the automatic operating stops, which is same to single block stop, and all mode information is saved. Start with CNC and the automatic operation can be started again.

After processing a part, the automatic operation stops.

Program End

After executing the block with M30, the automatic operating stops, changes into reset state, and returns to program start.

Feeding pause

During automatic operation, press the [Pause] key on the operation panel, the automatic operation pauses and the indicator is on; press [Start] again to continue operating the machine tool and the pause indicator is on.

Reset

During automatic operation, press the [Reset] key on the operation panel and the system stops immediately. Here, [Reset] has the same function as emergency stop button.

2. Safe operation

5.1 Emergency stop

Press the emergency stop button on the machine tool, which will stop immediately, and all outputs such as spindle rotation and coolant are turned off. Rotate the button clockwise to cancel emergency stop, but all outputs must be restarted.

Š Caution:

The power supply isn't always cut off upon emergency stop. Please refer to the electrical configuration description of the machine tool manufacturer for details;

Before releasing emergency stop, please eliminate the problems of the machine tool.

5.2 Hard limit over travel

The system alarms if the tool touches travel switch during operation. The axis in corresponding direction can't move, and only moves in reverse direction. Before the alarm is released, the system can't enter automatic operation normally. After investigating the alarm reason, press [Reset] to clear the alarm information.

5.3 Soft limit over travel

If the tool enters the restriction area regulated by the parameter (travel limit), the system alarms over travel, and the tool decelerates and stops. At this moment, you can move the tool to safe direction in manual mode, and then press [Reset] to release the alarm.

Š Caution:

During automatic operation, when the tool touches an axial travel switch, the tool decelerates and stops all axial motions, and only displays one over travel alarm.

During manual operation, when the tool touches an axial travel switch, the tool only decelerates and stops motion on current axis, and still moves along other axes.

When the tool is in safe position, press [Reset] to clear the alarm. Please refer to the manual of the machine tool for details.

Both limit alarm and soft limit alarm have a deceleration stop, and therefore the sensing range of the limit should have sufficient space, or else the limit protection will be disabled due to over travel.

3. Alarm and self-diagnosis function

The system has several levels, and the alarm numbers also have different type, as follow:

0~1023: G code program running alarm info

1024~2048: System environment alarm info

6.1 NC program execution alarm error

0000	:	Reset
0001	:	Program End
0004	:	No Motion Function Appointed
0005	:	No G code to get the line code function
0006	:	Changing tool fails
0007	:	Tool Invalid
0008	:	G Program Repeat Error
0009	:	G Program Number Error
0010	:	G7X8X Instruction Run Error
0011	:	Appointed Port Number Error
0012	:	Program Abend
0013	:	Appointed M01 Instruction Stop
0014	:	Appointed Program Number Nonentity
0015	:	M98 Format Error
0016	:	Motion Run Error
0017	:	Current Program No Repair
0018	:	G Program Format Error
0019	:	M99 Instruction Abort
0020	:	Motion Abort
0021	:	Illegal char
0022	:	Noneffective Exegesis Character
0023	:	Illegal G Code
0024	:	G Code Compensation Number Error
0025	:	Noneffective G Code Radial Offset
0026	:	Arc Appointed Error
0027	:	Appointed Noneffective Plane,

0028	:	M Code Action Error
0029	:	Spindle Appointed Err
0030	:	Motion Repeat Request
0031	:	Appointed Arc Nonentity
0032	:	Missing X Code Error
0033	:	Missing Y Code Error
0034	:	Missing Z Code Error
0035	:	Missing A Code Error
0036	:	Missing B Code Error
0037	:	Missing C Code Error
0038	:	Missing D Code Error
0039	:	Missing R Code Error
0040	:	Missing F Code Error
0041	:	Missing T Code Error
0042	:	Missing S Code Error
0043	:	Missing P Code Error
0044	:	Missing M Code Error
0045	:	Missing G Code Error
0046	:	Missing I Code Error
0047	:	Missing J Code Error
0048	:	Missing K Code Error
0049	:	Missing Q Code Error
0050	:	Screw Value Repeat Error
0051	:	System Abort
0052	:	System [Reset] exits
0053		No G code parameter source
0054		No store address for G code program number form
0055		Macro function call error
0056		Abnormal macro expression writing
0057		Macro variable address error
0058		Illegal variable value
0059		Jump statement execution error
0060		Macro loop statement pairing error

0061		Macro loop statement nesting error
0062		Excessive call of subprogram nesting, exceeding the maximum number of layers
0063		No macro variable defined to get the address function
0064		User-defined information
0065		User-defined alarm
0066		Const reference error
0067		Previous track i_gcode attribute value error
0068		Next track i_gcode attribute value error
0069		Starting compensation point arc enters
0070		Ending compensation point arc exits
0071		Starting point and ending point of the previous track of the radius compensation overlaps
0072		Starting point and ending point of the next track of the radius compensation overlaps
0073		Compensation value of radius compensation greater than the R value ofG0203
0074		Code group not supported in radius compensation
0075		Excessive NURBS nodes
0076		NURBS parameter error
0077		Overflow error due to excessive segments of compound program memory program
0078		Compound program expression error
0079		No U command error
0080		No W command error
0081		Multiple G code expression error
0082		Multiple M code error
0083		Macro function parameter mismatch error
0084		Undefined macro function error
0085		Macro definition information output, no alarm but pause
0086		Arc-connected corner transition function currently not supported
0087		Straight line or arc connected corner transition error

6.2 System environment alarm content codes

1024	:	The controller isn’t reset

1. The system doesn't perform home action after started.

1025	:	4 axis negative soft limit
1026	:	4 axis positive soft limit
1027	:	Z axis negative soft limit
1028	:	Z axis positive soft limit
1029	:	Y axis negative soft limit
1030	:	Y axis positive soft limit
1031	:	X axis negative soft limit
1032	:	X axis positive soft limit
1033	:	4 axis negative hard limit
1034	:	4 axis positive hard limit
1035	:	Z axis negative hard limit
1036	:	Z axis positive hard limit
1037	:	Y axis negative hard limit
1038	:	Y axis positive hard limit
1039	:	X axis negative hard limit
1040	:	X axis positive hard limit

The system has corresponding limit alarm. Please check corresponding limit sensor point or parameters.

If hard limit occurs, and the appearance of the sensor point doesn't have any problem, enter the diagnosis mode in manual mode and check the state of the input port in diagnosis mode. If the state is valid, please eliminate in sequence. Pull out the input IO cable and check whether the induction disappears. If yes, please check the circuit. If the problem still exists, the internal optocoupler may be broken. Please contact the supplier.

1041	:	Emergency stop

Emergency stop button of the handheld box interface is valid.

External emergency stop 2 input is valid; check whether IO assignment has conflict or interference.

Search for corresponding function ports in IO configuration, and then check in input diagnosis.

1042	:	X Servo driver alarm
1043	:	Y Servo driver alarm
1044	:	Z Servo driver alarm
1045	:	A Servo driver alarm

Servo alarm; if the servo doesn't alarm, parameter P2.001~004 setting may be contrary to actual servo alarm level. Please modify the parameters.

The corresponding function ports are IN34~37, which can be checked in input diagnosis.

1046	:	Axis number definition interface repeat error

Interface axis number set by parameter P2.45~P2.49 is specified repeatedly

1047	:	Spindle not reset
1048	:	Mold not clamped
1049	:	Safety signal can't be detected
1051	:	Air pressure insufficient
1052	:	System material clamping signal invalid alarm
1053		System filling machine oil pressure alarm
1054		Spindle alarm
1055		Inverter alarm
1056		Tool placement failure
1057		Tool grabbing failure
1058		Magazine door detection error
1059		Detent detection error
1060		Tool releasing detection error
1061		Excessive double driver shaft zero deviation
1062		Reserve
1063		Reserve
1064		Reserve
1065		Reserve
1066		Reserve
1067		Reserve
1068		Reserve
1069		Reserve
1070		Reserve
1071		Reserve

1072	Tool regulator limit alarm
1073	Abnormal additional panel work
1074	Preprocessing exception, and program execution terminated
1075	Coolers Alarm
1076	B - direction soft limit
1077	B + direction soft limit
1078	C - direction soft limit
1079	C + direction soft limit
1080	B - direction hard limit
1081	B + direction hard limit
1082	C - direction hard limit
1083	C + direction hard limit
1084	B Servo driver alarm
1085	C Servo driver alarm
1086	Cumulative number of workpieces exceeds the maximum set limit
1087	Spindle overcurrent alarm
1088	X1 - direction soft limit
1089	X1 + direction soft limit
1090	Y1 - direction soft limit
1091	Y1 + direction soft limit
1092	X1 - direction hard limit
1093	X1+ direction hard limit
1094	Y1 - direction hard limit
1095	Y1+ direction hard limit
1096	X1 Servo driver alarm
1097	Y1 Servo driver alarm
1098	Z1 - direction soft limit
1099	A1 - direction soft limit
1100	B1 - direction soft limit
1101	C1 - direction soft limit
1102	Z1 + direction soft limit
1103	A1 + direction soft limit
1104	B1 + direction soft limit

1105	C1 + direction soft limit
1106	Z1 - direction hard limit
1107	A1 - direction hard limit
1108	B1 - direction hard limit
1109	C1 - direction hard limit
1110	Z1+ direction hard limit
1111	A1+ direction hard limit
1112	B1+ direction hard limit
1113	C1+ direction hard limit
1114	Z1 Servo driver alarm
1115	A1 Servo driver alarm
1116	B1 Servo driver alarm
1117	C1 Servo driver alarm
1118	Channel 2 not zeroed
1119	Motion library abnormal alarm code (system restart required):
1120	Bus servo disconnected axis number (system restart required):
1121	Bottom motion target position data exception 110
1122	EtherCAT bus communication failure 118
1123	Axis alarm 119
1124	System alarm 17
1125	System alarm 18
1126	System alarm 19
1127	System alarm 20
1128	System alarm 21
1129	System alarm 22
1130	System alarm 23
1131	System alarm 24
1132	System alarm 25
1133	System alarm 26
1134	System alarm 27
1135	System alarm 28
1136	System alarm 29
1137	System alarm 30

1138	System alarm 31

6.3 Alarm processing

- If exception alarm occurs, please refer to the alarm code to confirm the failure reason.
- When alarm occurs, if the system isn't reset, the alarm will constantly prompt no matter whether the alarm still exists, so as to avoid system halt due to false alarm, in which case it is unable to find the reason.
- If the error is caused by data setting, modify the data, and then press [Reset] to clear the alarm info.
- When alarm occurs, please remove the alarm reason. Please note that several alarms may occur at the same time. Please refer to the alarm info in the Diagnosis menu for details. When the alarms are eliminated, please press [Reset] to clear the alarm ring.

6.4 Self-diagnosis function

The CNC system may stop even when there is no alarm info, this may be because the system is executing certain processes. Please check with the self-diagnosis function.

The steps of self-diagnosis are as follows:

(1) In the main menu, press [Diagnosis] to enter the diagnosis interface;

(2) Select [Input] to enter the input diagnosis interface, or select [Output] to enter the output diagnosis interface;

(3) Output diagnosis: In edit mode, press the direction keys to select the output port, and press [EOB] to switch the output level of corresponding output port;

(4) Input diagnosis: When a certain input signal is valid, the corresponding area on the screen will flash.

4. Program saving & editing

7.1 Saving the program in the memory

7.1.1 Keypad input (new program)

Create new program in the memory with the keypad, and the steps are as follows:

In the main menu, press [Edit] to enter program edit interface;

Press [File] to enter file operation interface;

Select [New] to create a new file;

Enter the file name and press [EOB] to confirm and create a new program in current directory in the memory, and load into the system by default;

Select [Close] to exit [Edit] interface;

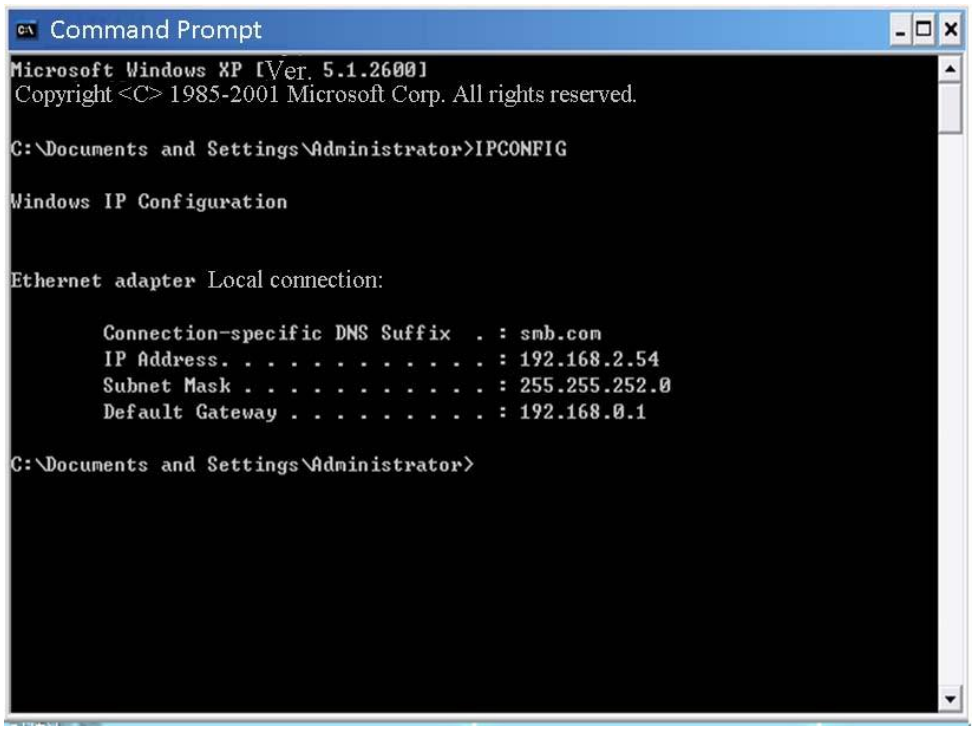
In edit mode, enter the program content;

After editing all programs, press [Reset] to save the edited programs into the system memory.

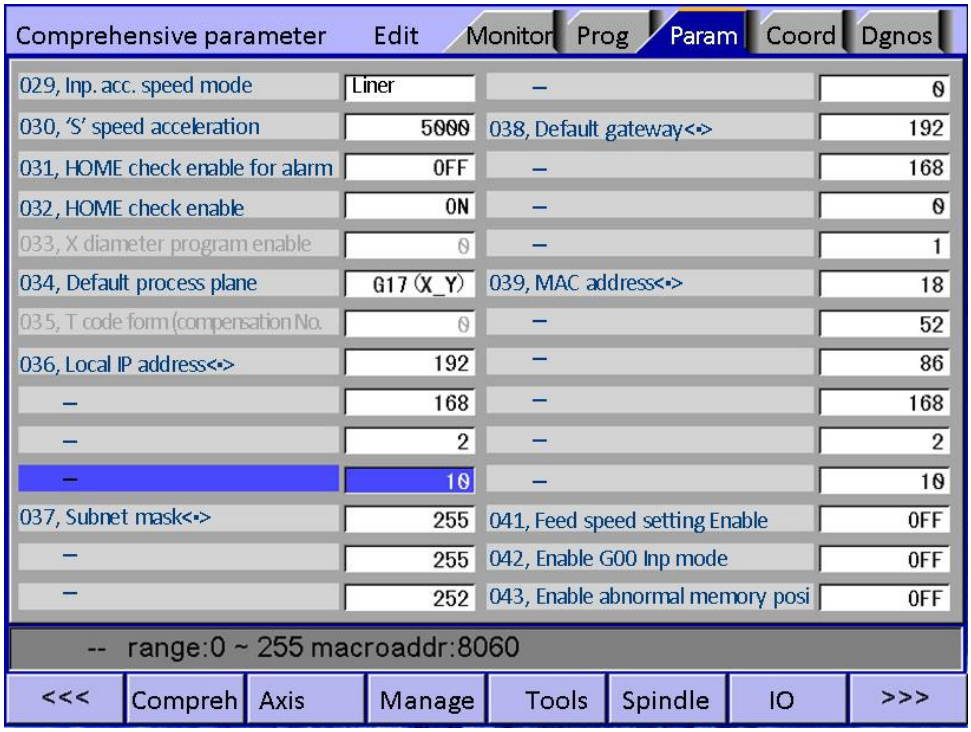
7.1.2 Computer network access/serial port input

Connect the controller to the router with a network cable.

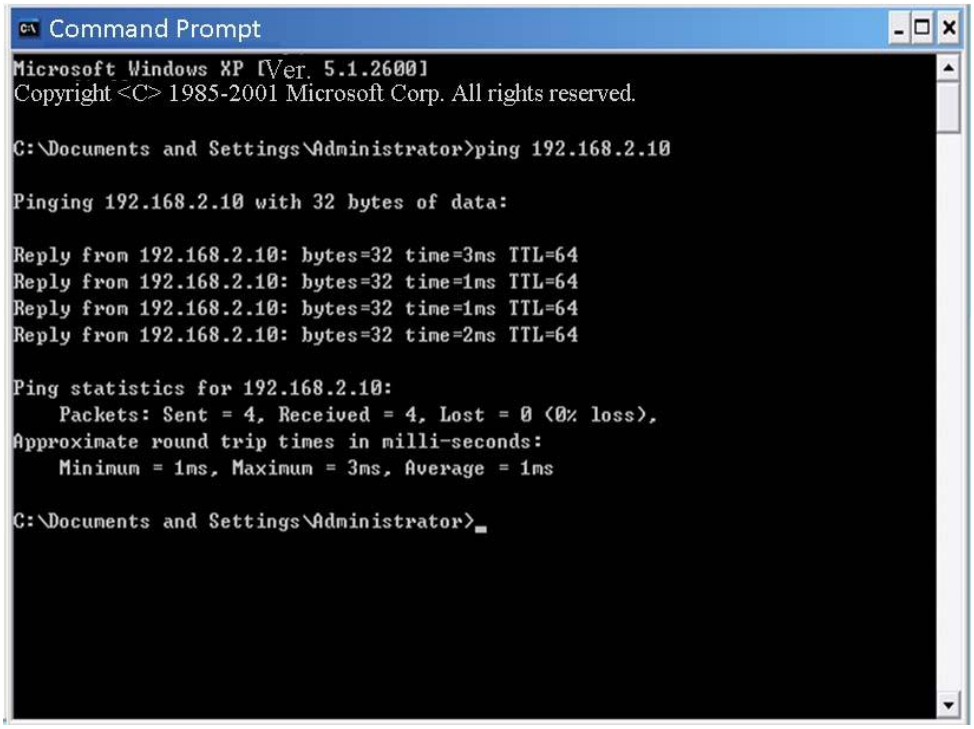
Through built-in command window, it is available to view the local computer ip address configuration using the IPCONFIG command, as shown below:



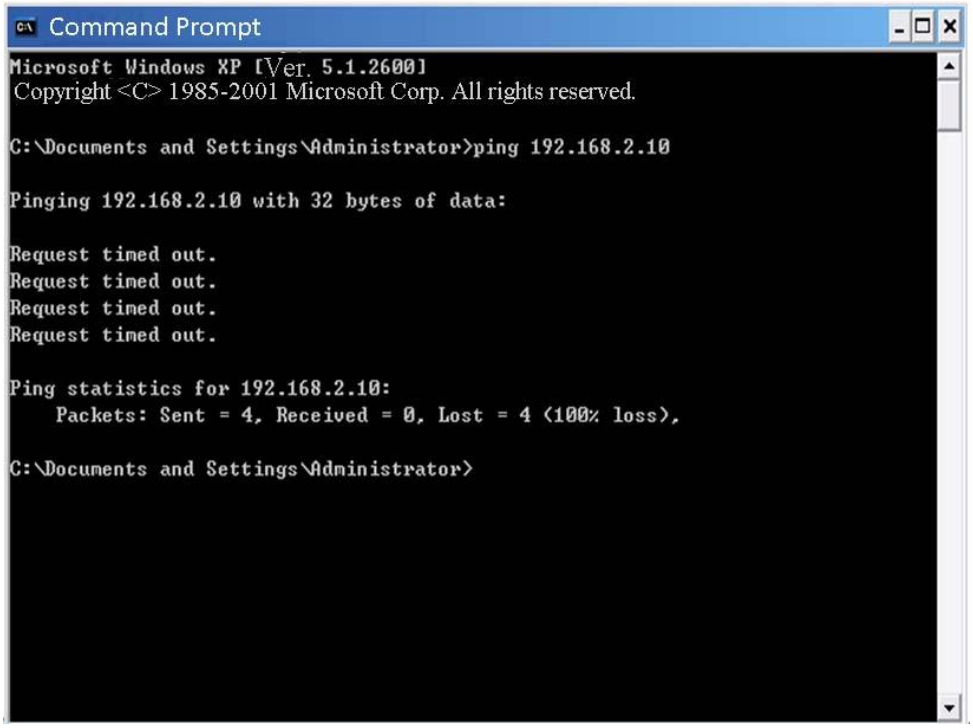
Assign the controller the IP address 192.168.2.10 in the same network segment that is not used based on the IP address of the host computer, for example, the IP address is 192.168.2.54.



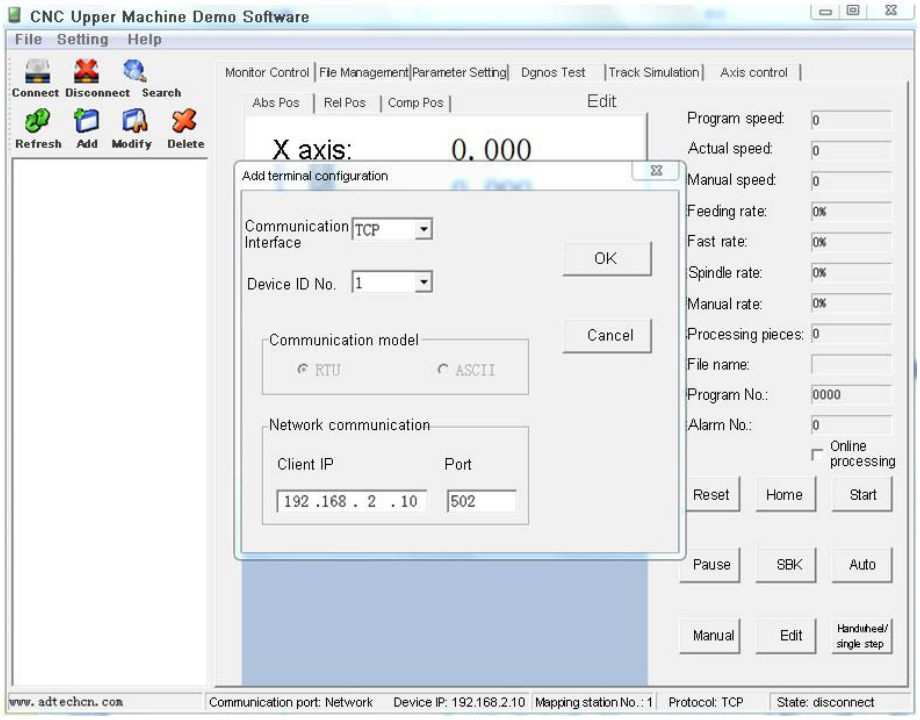
Check whether the network is connected through the ping command in the command window on the computer, as shown in the following figure:



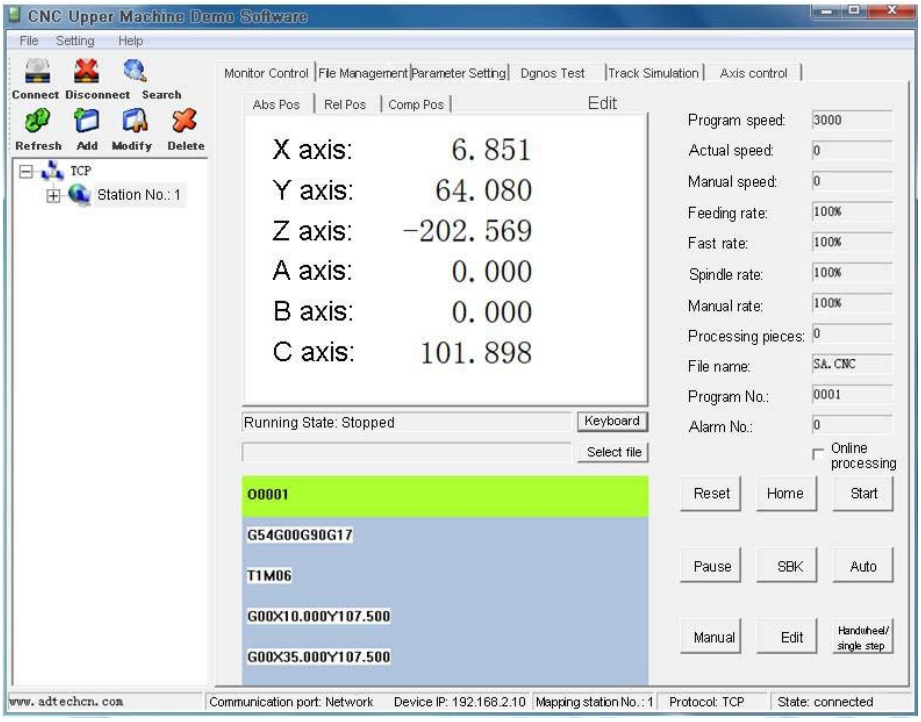
If the screen shown below appears, the network is not connected. Check whether the IP address is correctly assigned, whether there is any problem with the connection, and whether the system is powered on.



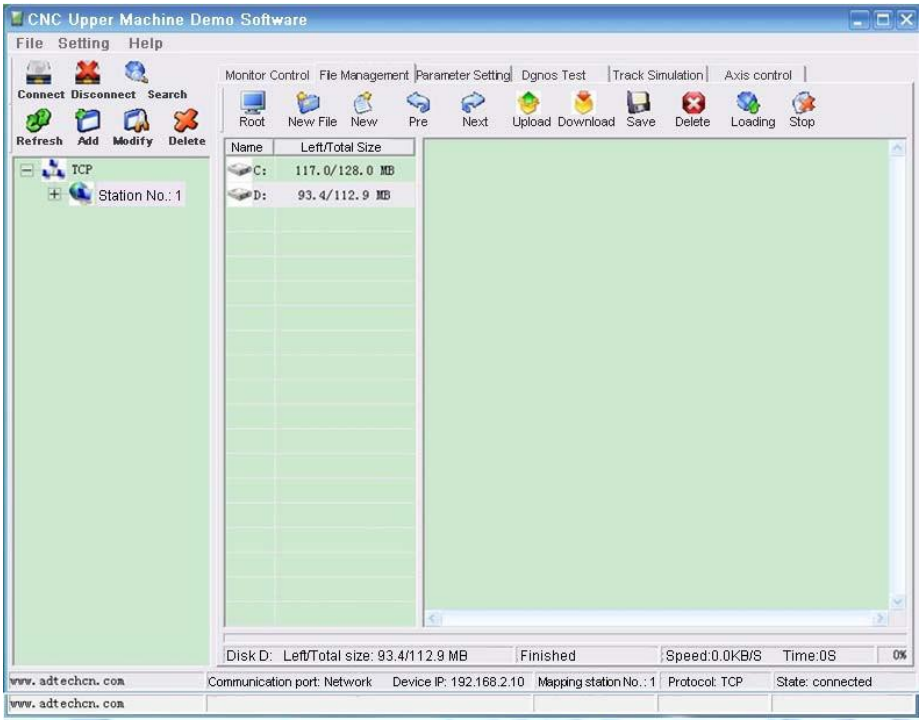
When the network is normal, you can open the communication software, add the terminal configuration, and set the IP address, as shown below:



After setting the correct IP address, select the station number 1 under the TCP extension menu bar, and click the "Connect" button to access the contents of the controller, as shown below:



Select to upload and download files in the file management bar.

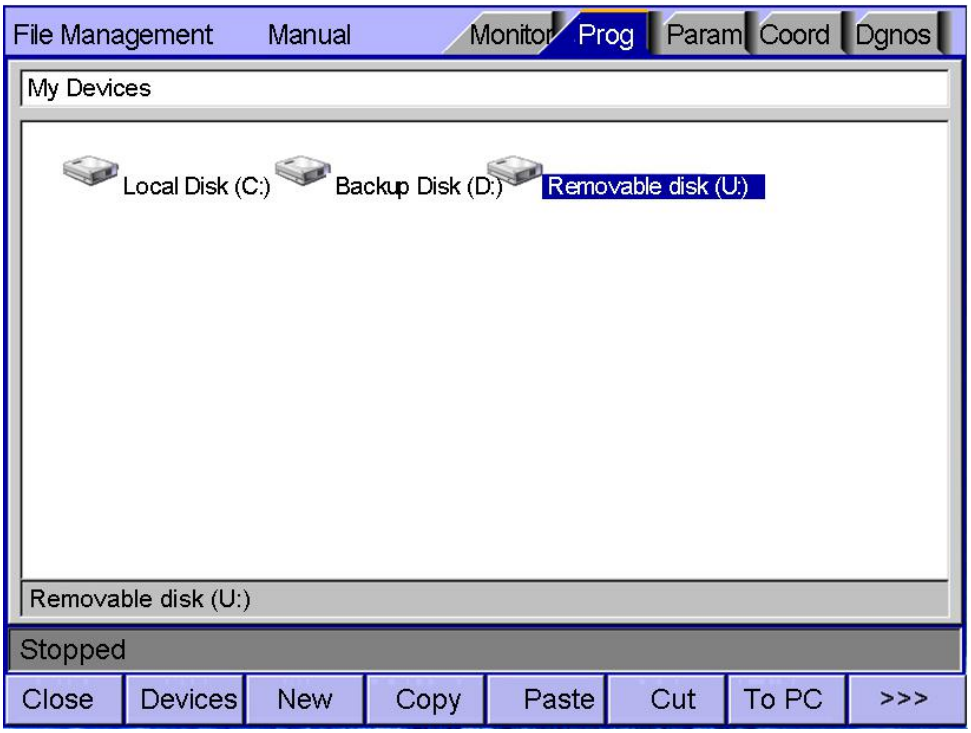


7.1.3 Copying processing files from USB disk

The steps of copying CNC processing file to system memory through USB disk are as follows:

In the main menu, press [Edit] to enter program edit interface;

Select [File] to enter file operation interface;



Select USB disk and press [EOB] to enter;

Move the cursor to select a CNC file and then select [Copy];

Return to the root directory, locate the PROG directory in disk D, enter the directory, and select [Paste] to complete copying.

7.2 Reading programs into work area

7.2.1 Reading programs from controller into work area

The steps of loading files from system memory into work area are as follows:

Press [File] to enter file operation interface;

Select desired program, which is in PROG directory in disk D by default, press [EOB] to enter subdirectory, or press [Cancel] to exit;

Move cursor to select desired program, press [EOB] to confirm and load the program.

7.2.2 Reading programs from USB disk into work area

The steps of loading files from USB disk to work area are as follows:

Insert the USB disk;

Press [File] to enter file operation interface;

Select USB disk, move cursor to select a file in the disk, and press [EOB] to load the file.

7.3 Editing & modifying programs

The program in CNC memory can be edited using NC keypad. In the main menu, press [Edit] to enter program edit interface and edit the program in current work area (for loading program into work area, refer to 7.2). The edit mode is similar to notepad in Windows. Move the cursor directly to locate, press keys to enter, press [EOB] to change line, press [Delete] to delete the character where the cursor locates, and press [Cancel] to delete the previous character.

The shortcuts in program editing interface mainly include copy, paste, delete, macro function fast programming and so on. The specific operations are as follows:

Copy, paste and delete:

7.3.1 Single-line copy, paste and delete

Move the cursor to the line you want to copy, and then press “Line Copy [F1]” to copy the single line; then, move the cursor to the position you want to paste, and then press “Line Paste [F2]” to paste the single line.

Move the cursor to the line you want to delete, and then press “Line Delete [F3]” to delete the single line.

7.3.2 Multi-line copy, paste and delete

Move the cursor to the starting line to be copied, and then press “Segment Copy [F4]”, the prompt box “Please move the cursor to the end of the segment to be copied and press [Enter] for confirmation” pops up, press “OK [EOB]” and close the prompt box. According to the prompt, move the cursor to the end of the segment of the program you want to copy, and press the “Enter” button to complete the segment copying; then move the cursor to the position to be pasted, and then press “Segment Paste [F5]” to complete the segment paste.

Move the cursor to the starting line to be deleted, and then press “Segment Delete [F6]”, the prompt box “Please move the cursor to the end of the segment to be deleted and press [Enter] for confirmation” pops up, press “OK [EOB]” and close the prompt box. According to the prompt, move the cursor to the end of the segment of the program you want to delete, and press the “Enter” button; then press “Segment Paste [F6]” to complete the segment deletion.

7.3.3 Macro function fast programming

When programming a macro program, just enter the keyword in the corresponding macro function (the number of keyword letters is greater than or equal to 2),and press the "Enter" button, a list of macro functions containing the keyword will pop up, move the up and down keys and Page Up/Down keys to select the corresponding macro function; then, press the "OK [EOB]" key to implement the quick programming of the corresponding

macro function. To cancel this fast programming operation, please press the “Cancel [CAN]” key to cancel this operation when a macro function list pops up to ask for selection.

Note: The current way of macro function fast programming does not show the detailed description of the related macro function and the use case program. If you want to display them, please set the macro "MACROLISTTYPE" in the program. The macro variable MACROLISTTYPE can be defined as follows: #define MACROLISTTYPE 0 //0 not display macro number comment interface 1 display macro number comment interface

Š **Caution**

After all operations, press Reset to save the files, and the edit functions base on edit mode;

CNC96XX uses new file mapping technology, and allows loading processing files that exceed its memory. Therefore, to ensure the system efficiency, you can only search and process, but can’t edit the processing files that exceed 2MB.

7.4 Deleting files

7.4.1 Deleting files in memory

Follow the steps below to delete the programs in system memory:

Press [File] to enter file operation interface;

Follow the prompt on the screen, select the file and press [Delete] to confirm and delete the file.

Š **Caution**

If the file has been loaded to work area, you need to restart the system to delete the program, or else the system will report error.

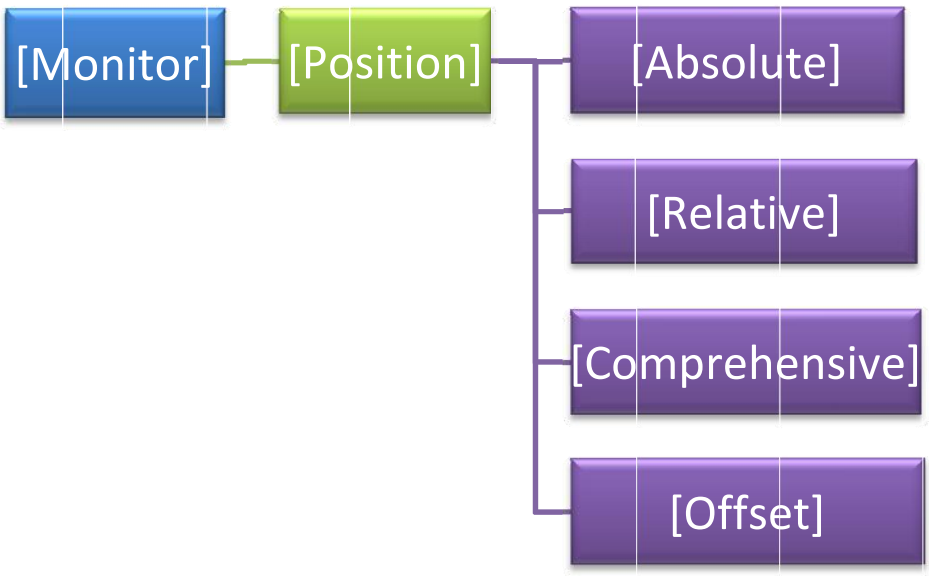
The programs loaded into the work area can’t be deleted, or else the system will report error.

5. Main interfaces of the system

8.1 Position Interface

The position interface shows current machine tool coordinates, including absolute position, relative position and comprehensive position. In the main interface, press [Monitor] to enter the position interface.

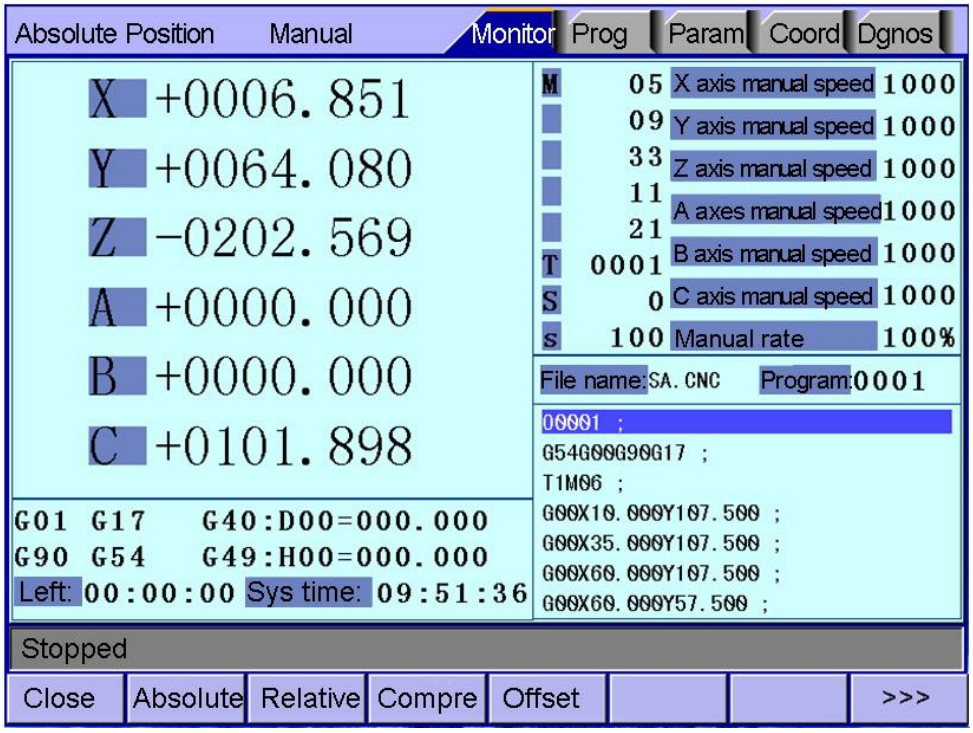
The way to enter position interface is as follows:



8.1.1 Absolute Position

The position of current machine tool coordinates relative to the origin of workpiece coordinate system

The absolute position interface is as follows:



Absolute position interface

8.1.2 Relative Position

In manual mode, reset current coordinates to check the relative motion distance of any displacement, and thus it is called as relative position.

This interface is usually used for early tool setting. Considering that some operators have been used to manual calculation, this function is preserved. With more and more powerful automatic centered function, it is less used. The operation is as follows:

Enter [Position] interface;

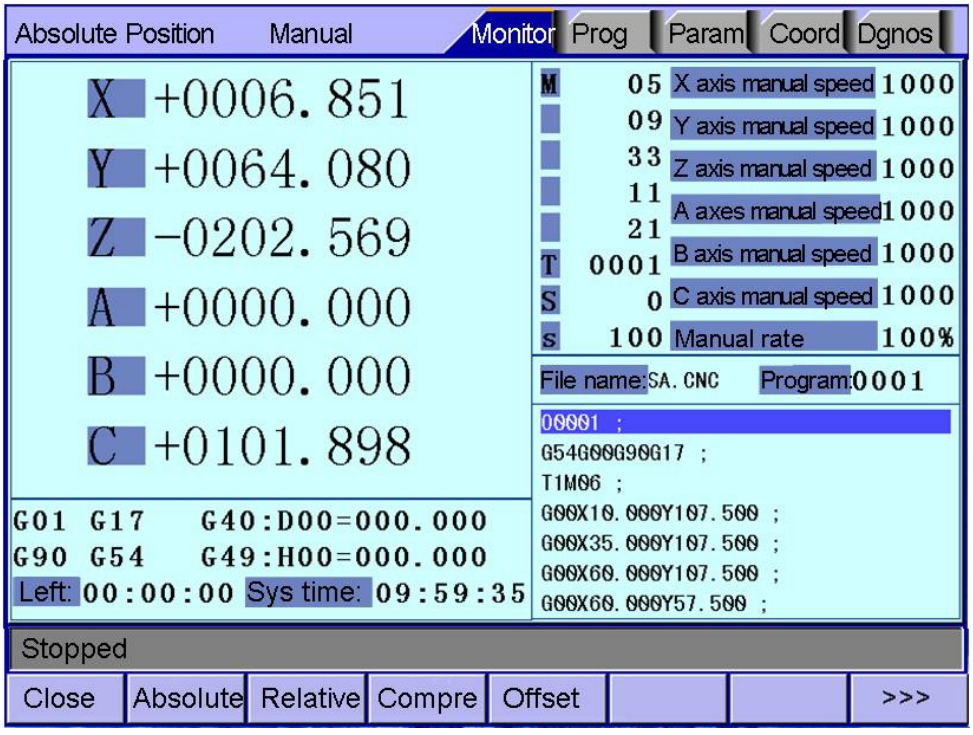
Switch to [Relative] interface;

Then, enter manual mode;

Press a coordinate axis No., e.g., 'X', and the X coordinate flashes;

Press "Cancel" to reset X coordinate to 0;

The relative position interface is as follows:

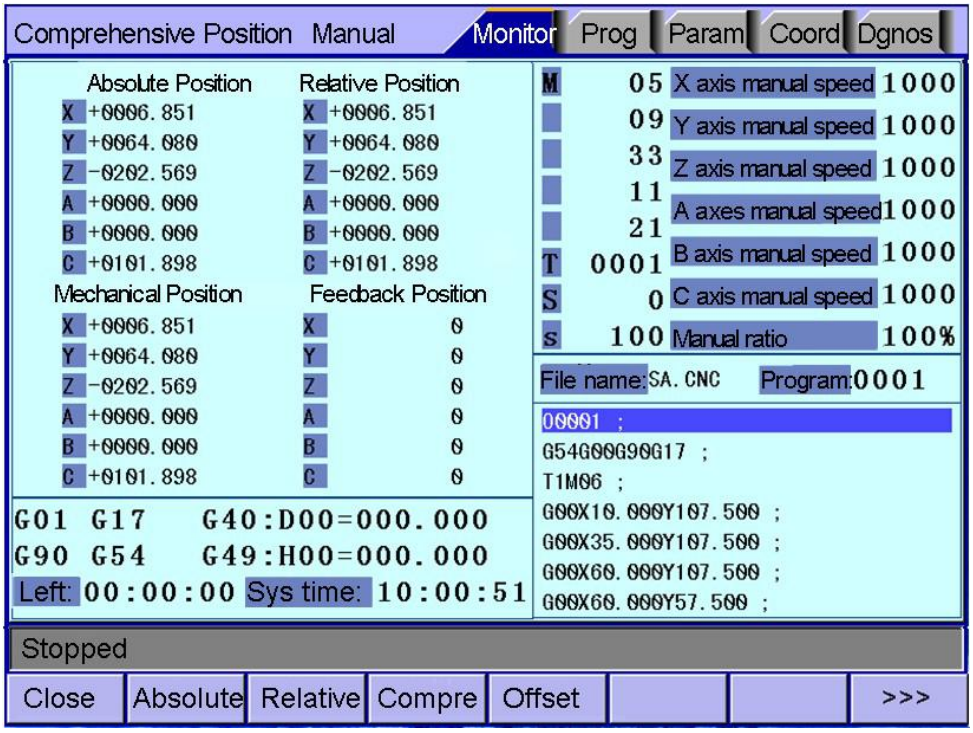


Relative Position Interface

8.1.3 Comprehensive coordinates

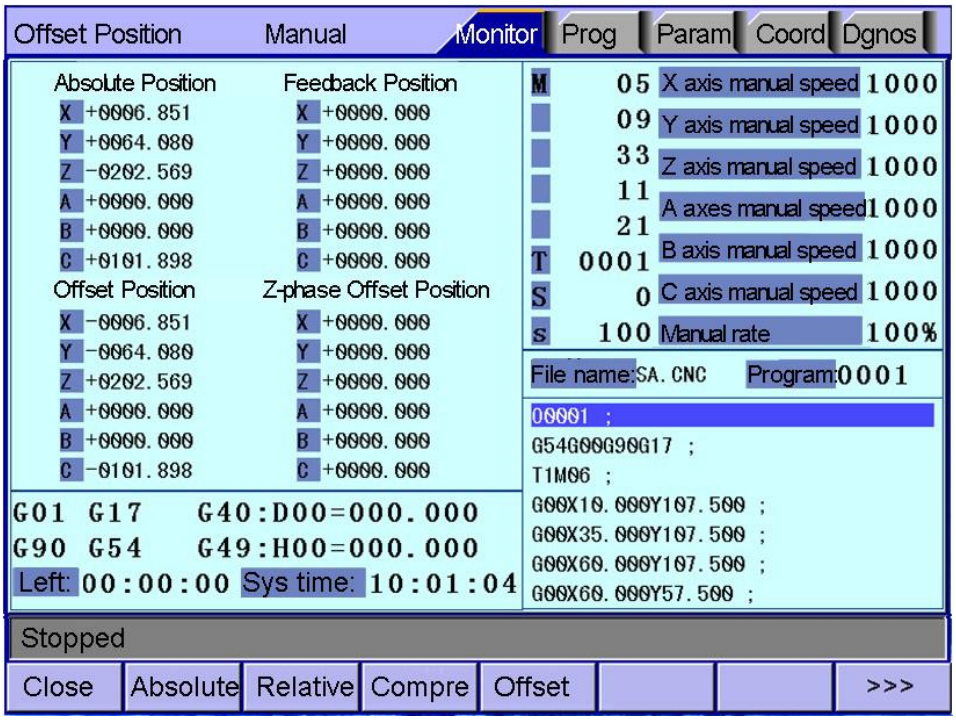
The interface displayed by absolute coordinates and machine tool coordinates.

Comprehensive position interface is shown below:



Comprehensive Position Interface

8.1.4 Deviation position

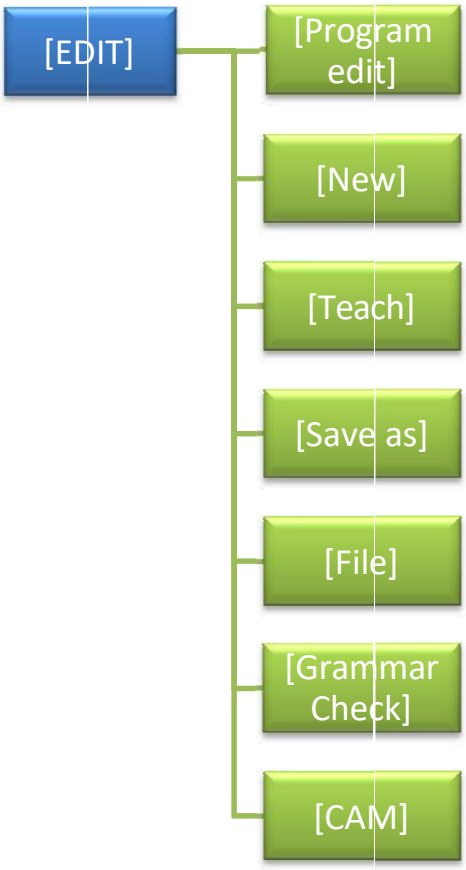


Z-phase offset position: this value indicates the amount of movement from speed reducing switch to Z-phase signal axis when using the Z-phase signal of servo motor as the zero point. This value takes about half of the motor's single-turn movement. For example, if the screw is directly connected, the lead of the screw is 10MM, and after it returns to zero, check whether the value is near 5, while 4, 5, and 6 are also ok. If it is 0.00X. There may be an error of one turn after being zeroed. Be sure to adjust to about half of the motor's single-turn movement. To do this, loosen the coupling to rotate the motor, lock it and return to zero, and then view the value. Repeat this method until the requirements are satisfied.

8.2 Edit

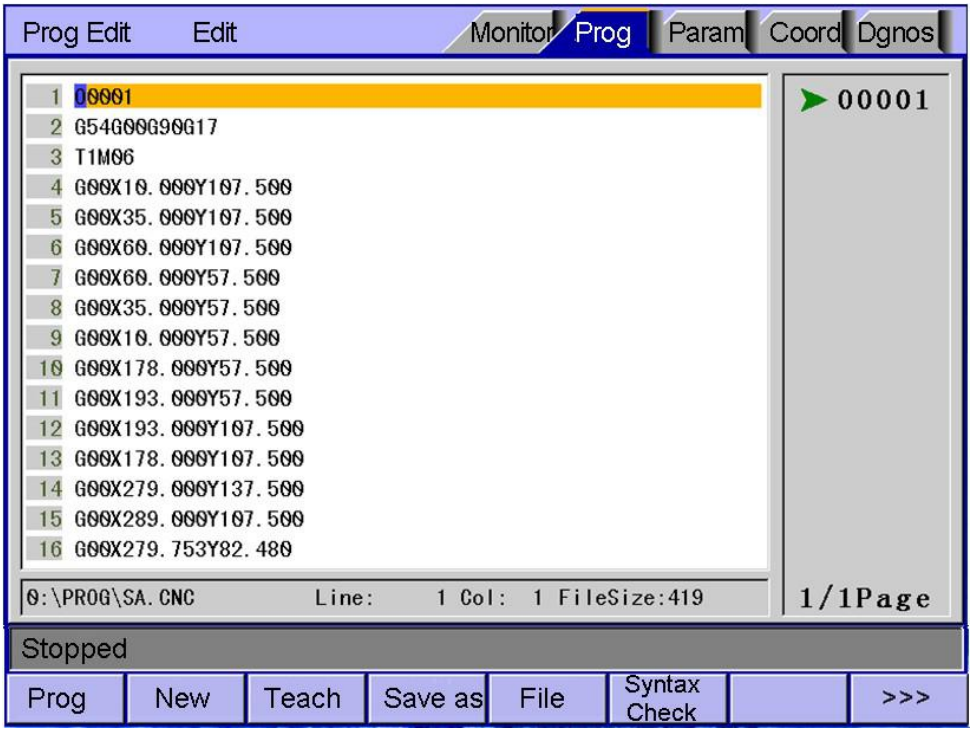
The edit interface shows the program info in current work area. In the main interface, press [Edit] to enter the program interface.

To enter program edit interface:



8.2.1 Program edit

The program edit interface shows the contents of NC program currently processed; in edit mode, you can edit the NC program (see 7.3 for details).



Program Edit Interface

8.2.2 New program

Manual programming: First, create a new program file by pressing the corresponding F1 key, and a dialog box will pop up requiring entering the file name, enter the file name and press the EOB key to create the file, when there will be a prompt asking to load the file, then press Edit to edit the program.

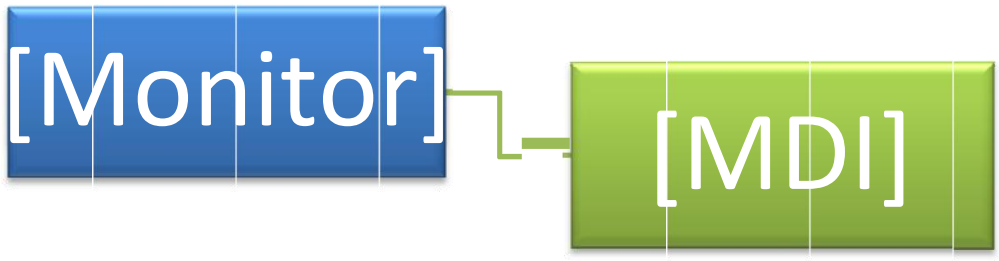
8.2.3 Save as

By saving the file as a copy and modifying on this copy,, thus realizing the quick similar product program editing.

8.3 MDI interface

MDI mode is mainly used for the execution of single G code in certain occasions.

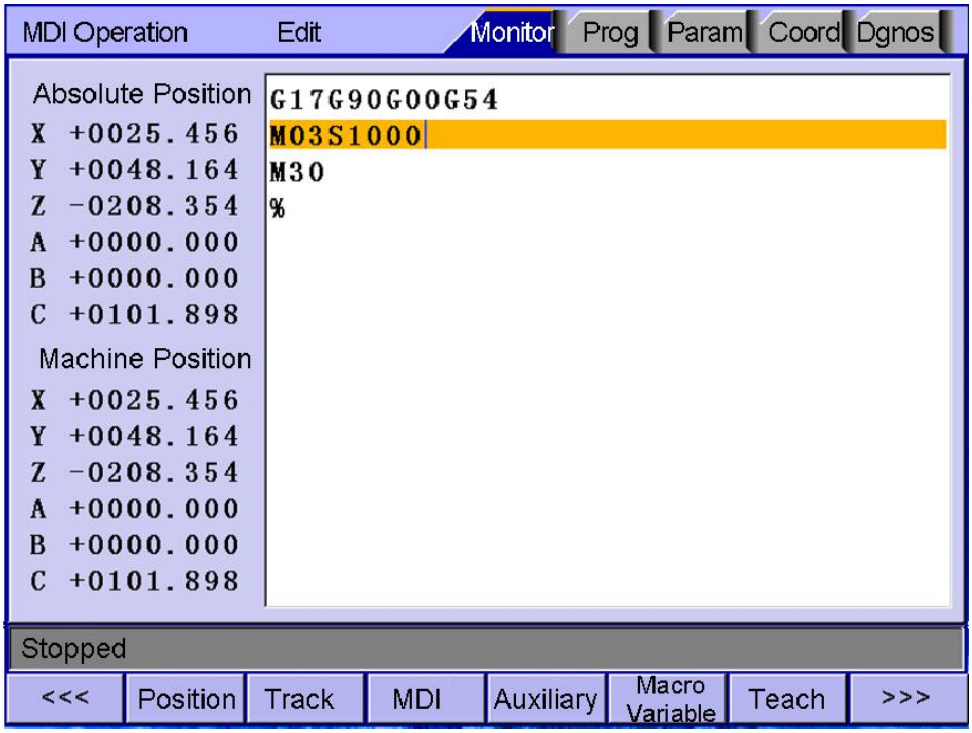
To enter MDI interface:



In MDI interface, enter complete NC code instruction in edit mode, press the [Start] key in the edit mode and confirm to execute directly.

To restore the default settings quickly, press and hold the [Reset] key for three seconds and choose to reset or not.

MDI interaction interface is shown below:

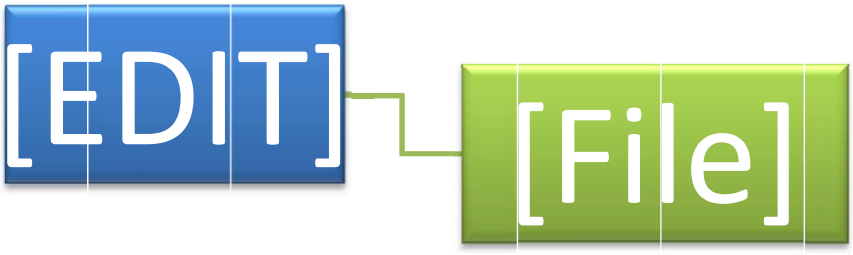


MDI Interface

8.4 File management

In the file management interface, you can manage the system files.

To enter file management interface:



File management mainly has the following functions:

- Connect the UBS disk, and copy the files between USB disk and electronic disk;
- Upgrade system software: Copy the upgrade file to system memory in either method above to upgrade the software;
- Restart the controller. In [File Management] interface, press the Reset key to restart the controller. This method is different from restarting due to power failure. In certain occasions, you can restart the controller quickly in this method to make certain function take effect.
- Connect to PC with the USB cable, and exchange the data between USB disk and PC.

File operation interface is shown below:

File Operation Interface

8.4.1 Copy

It is equivalent to the file copy on the computer. You copy the selected file to the clipboard, and then paste it to the target location. This allows file interaction.

8.4.2 Paste

It is equivalent to the file paste on the computer. You copy the selected file to the clipboard, and then paste it to current position. This allows file interaction.

8.4.3 Cut

This function is equivalent to the file cut on the computer. You select the files copied to the pasteboard and cut them to the current position. It realizes the transfer of files.

8.4.4 Connect computer

USB cable, with two ends flat, is used to connect the computer via USB disk interface.

8.5 Graphic Simulation

[Track] function is to simulate NC processing program.

To enter graphic simulation interface:

Enter track interface to enable real-time track display automatically. During automatic running of the system, the motion track is displayed in real-time. In standby mode, you can also press Preview to prescan the processing file.

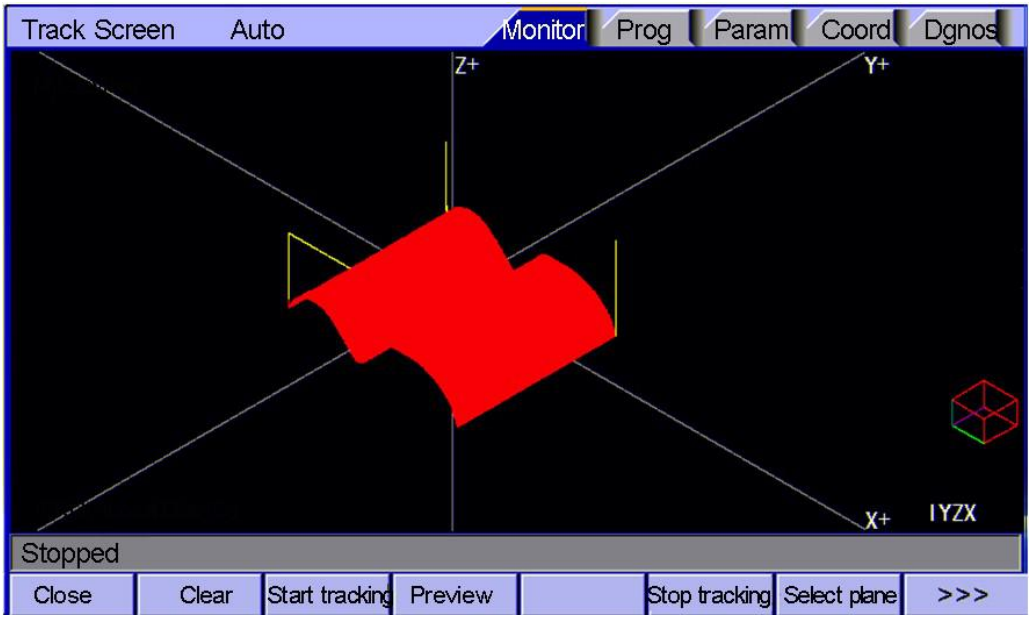
The shortcuts of adjusting position are as shown below:

PageUp: Zoom in

PageDown: Zoom out

→←↑↓: Shift position; the shift unit is the set pixel unit

Graphic simulation interface is shown below:

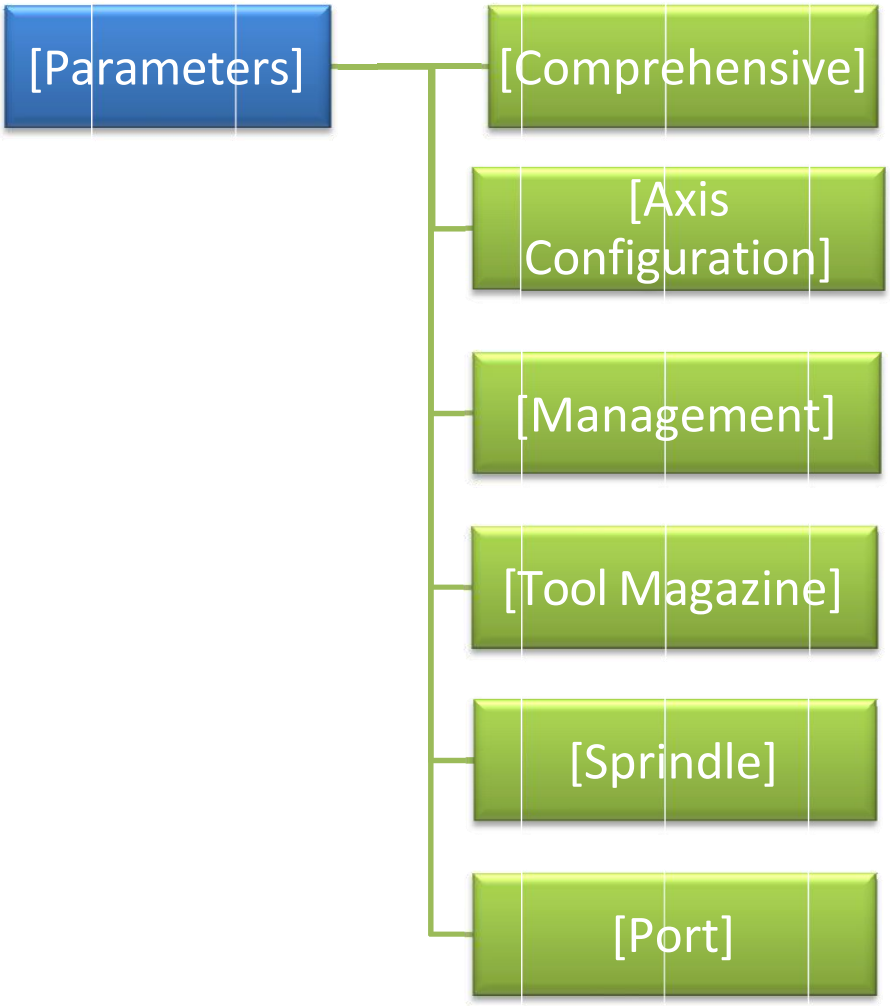


Graphic Simulation Interface

8.6 Parameter Interface

The parameter interface shows system parameter info, including comprehensive, axis parameter, management, tool magazine, spindle, port, etc. In the main interface, press [parameter] to enter the interface.

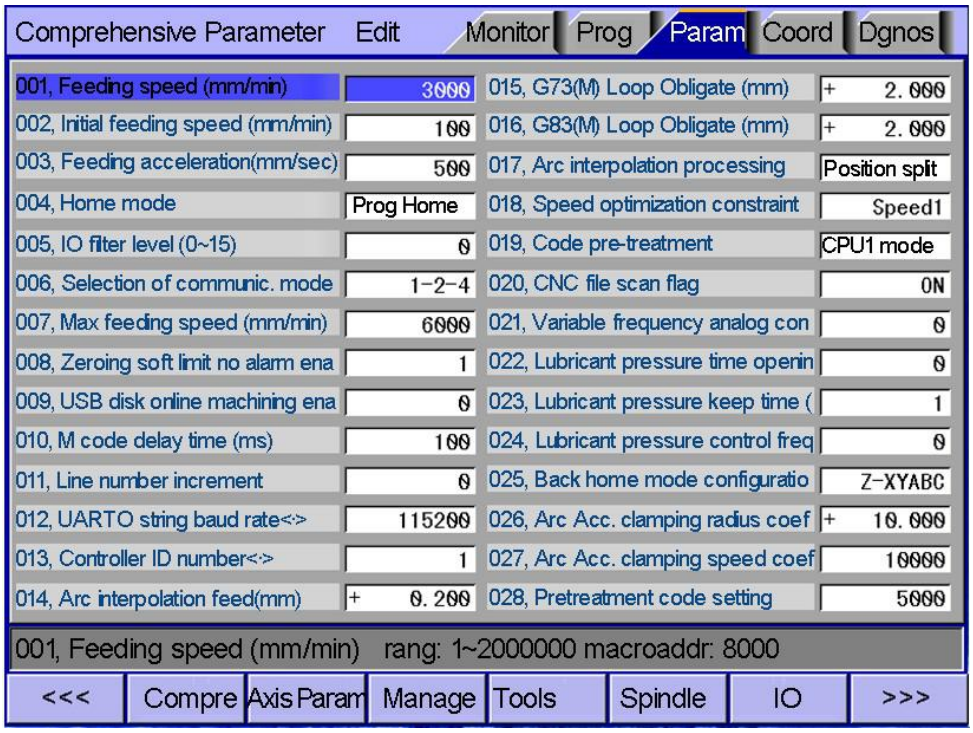
Parameter has the following menus:


[Parameters]
[Comprehensive]
[Axis Configuration]
[Management]
[Tool Magazine]
[Sprindle]
[Port]

8.6.1 Comprehensive Parameter

Comprehensive parameters are a set of functions that aren't classified in details, e.g. home mode, manual speed, etc.

Comprehensive parameter interface is shown below:

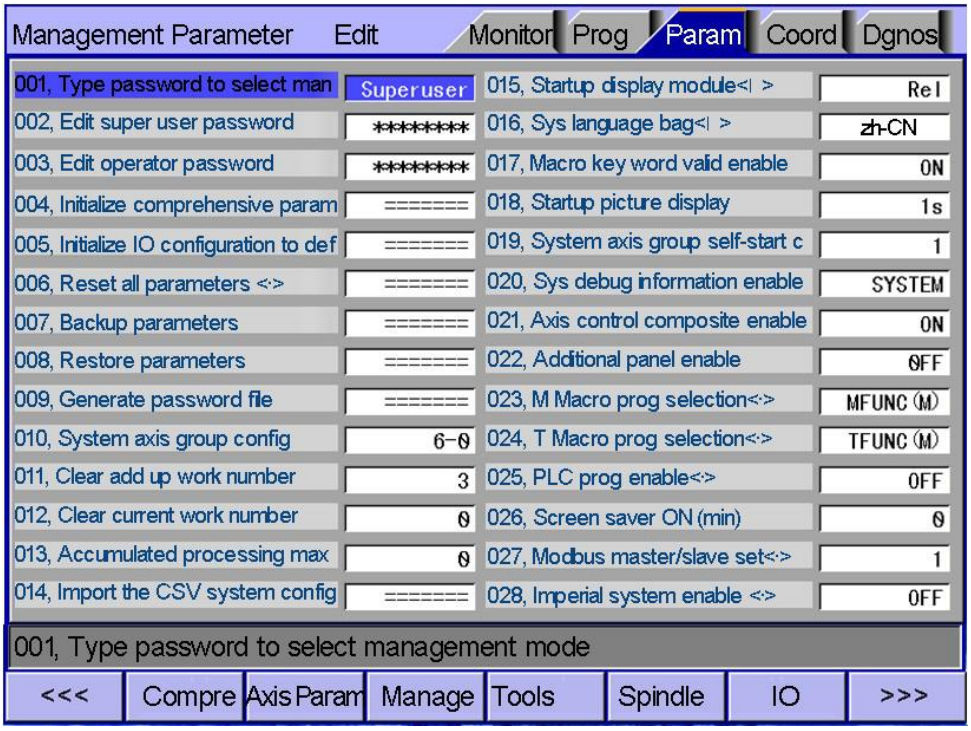


Comprehensive Parameter Interface

8.6.2 Axis parameters

Axis parameters are a set of parameters of interface characteristics of control position axis. Please refer to the parameter description for details.

Axis parameter interface is shown below:

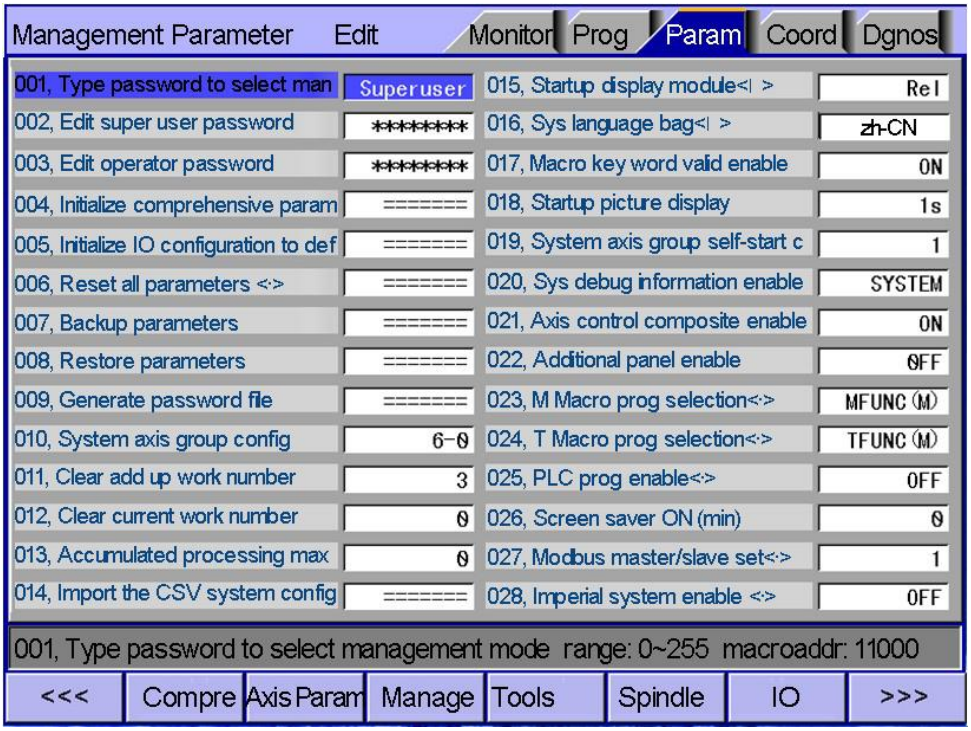


Axis Parameter Interface

8.6.3 Management Parameter

This is a function set that confirms identity and initializes the system.

Management parameter interface is shown below:



Management Parameter Interface

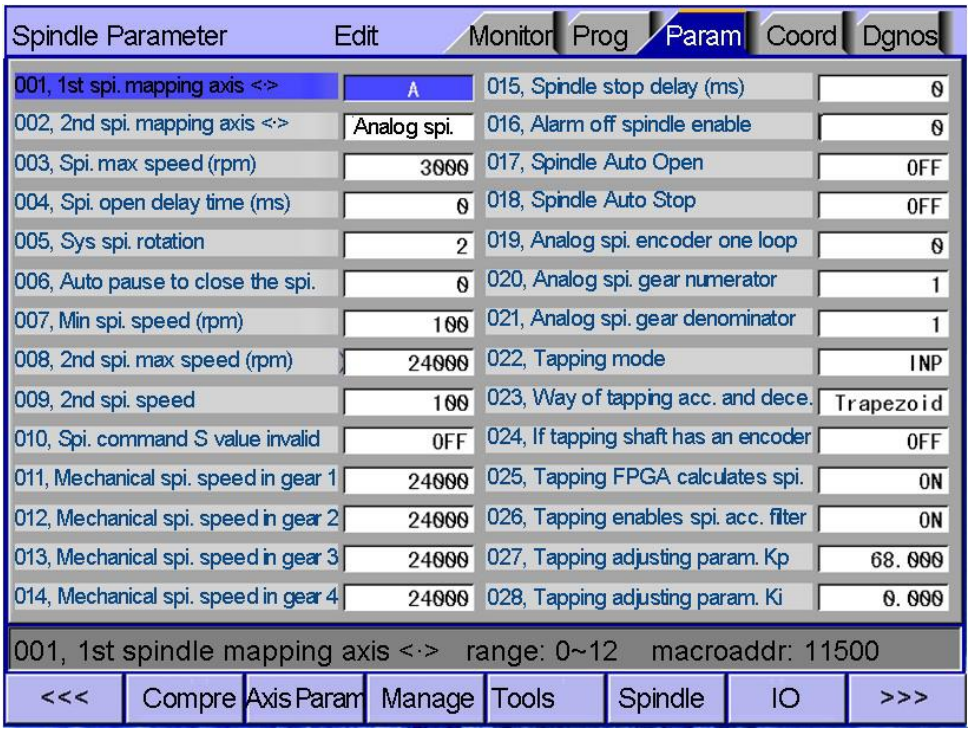
8.6.4 Tool magazine parameters

Tool magazine parameters collect the common required parameters of the tool magazine. The specific meaning of the parameters should be determined by the tool magazine of the machine tool manufacturer, and therefore should refer to the instructions provided by the machine tool manufacturer.

8.6.5 Spindle parameters

Spindle parameters are the set of electrical characteristics of servo and common spindles. The specific application also depends on the spindle selection of the machine tool manufacturer. The servo parameters and axis parameters have the same meaning, and therefore please refer to the description of axis parameters.

Spindle parameter interface is shown below:

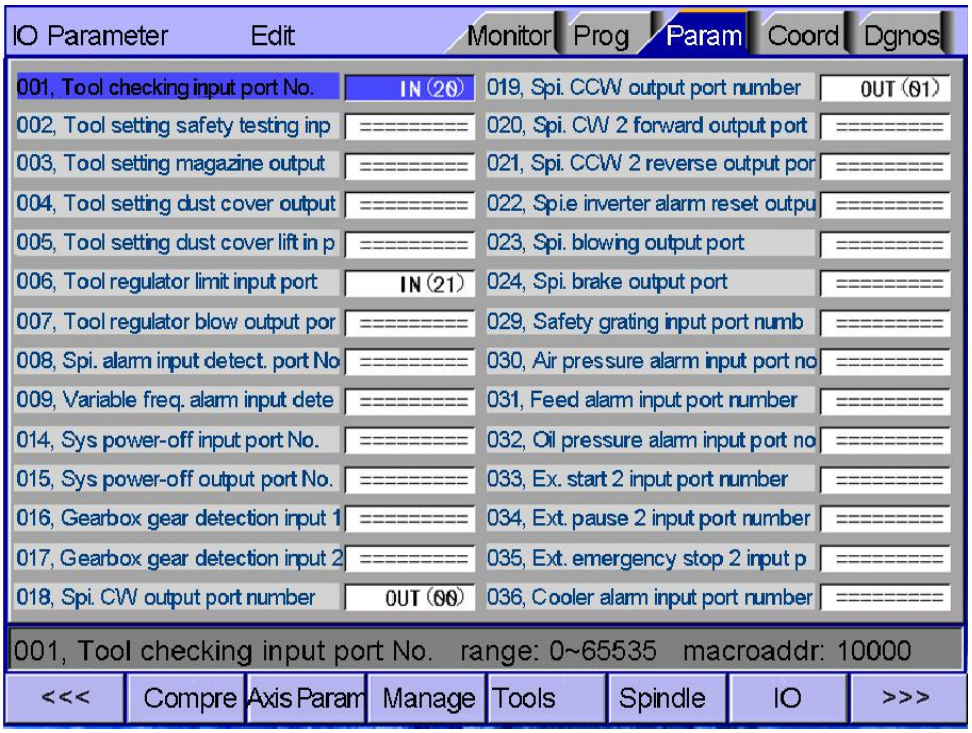


Spindle Parameter Interface

8.6.6 IO configuration parameters

IO configuration parameters are the assignment of hardware interfaces. This parameter set is the IO pin sequence specified by the system's IO function numbers, which will improve the system flexibility. Please refer to System Parameters for the specific meaning of the parameters.

IO configuration parameter interface is shown below:



IO Configuration Parameters Interface

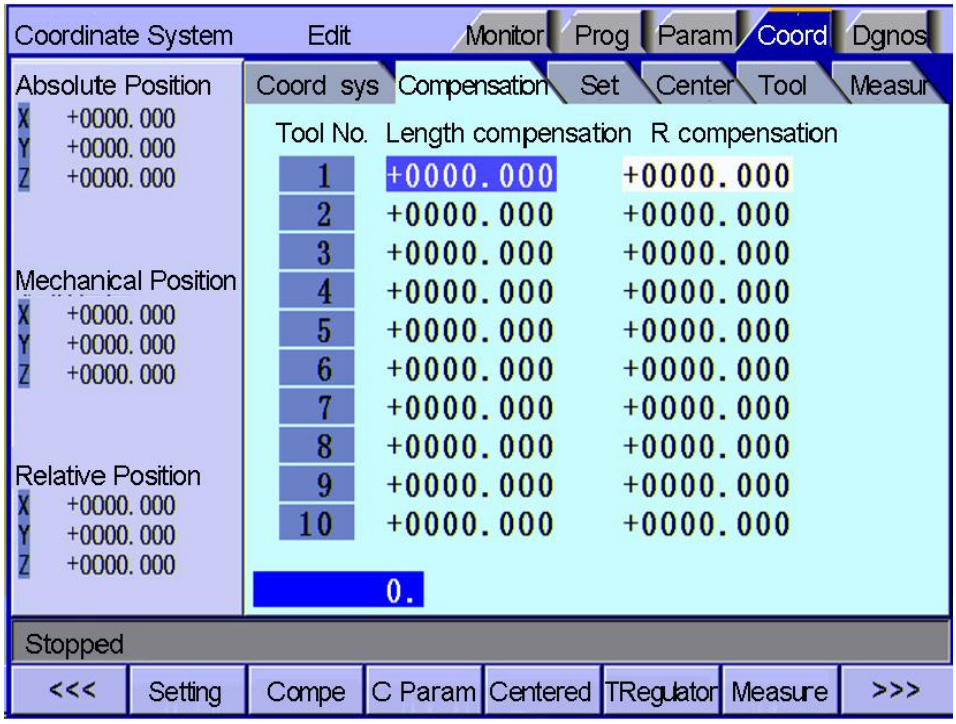
8.7 Compensation interface

Tool compensation interface shows tool compensation info of the system, including tool length compensation, tool radius compensation and other input variables. The compensation method is different from M series and L series, which will be described below.

To enter tool compensation interface:

M series tool compensation interface has two compensation variables, i.e. tool length compensation and tool radius compensation; corresponding to G43, G44 and G41, G42; enter compensation value to corresponding compensation number, and call the compensation number in NC program to realize the compensation. Tool compensation numbers have 36 sets of variables.

Tool compensation interface is shown below:



Tool Compensation Parameter Setting Interface

8.8 Milling system workpiece coordinate system setting interface

The coordinates interface shows coordinate system info, including setting, coordinate system, centered, and tool regulator. In the main interface, press [Coordinate] to enter coordinate system.

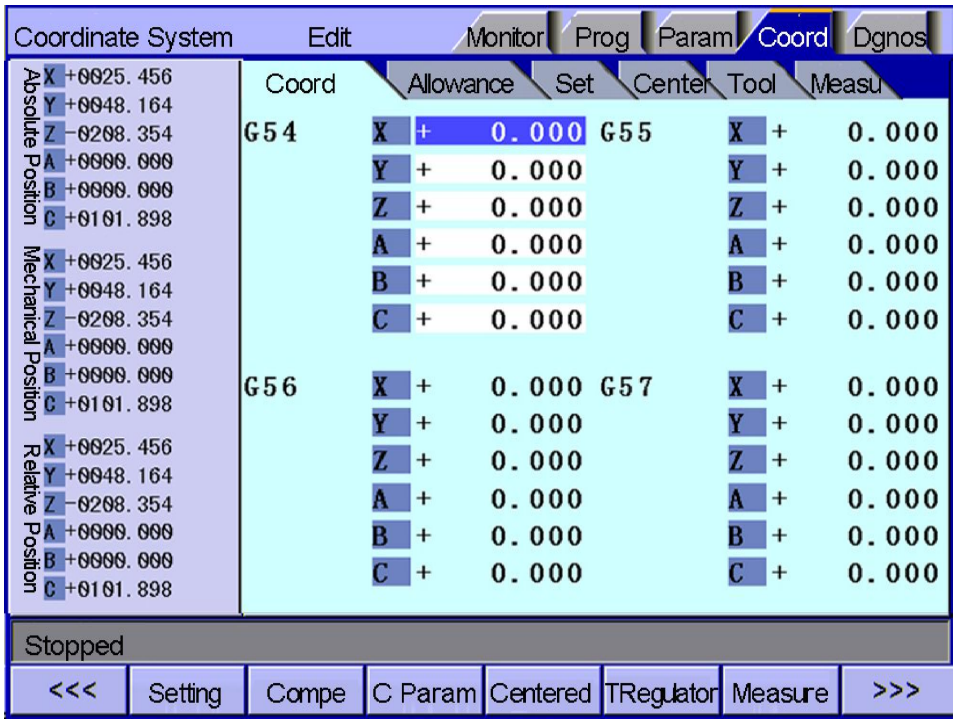
8.8.1 Workpiece coordinate system

Display workpiece coordinate system, i.e. the offset of workpiece zero position and machine tool zero position, Totally six basic workpiece coordinate systems (G54~G59) and nine extension coordinate systems (G591~G599) are available.

To enter workpiece coordinate system interface:

[coordinates] → [Coordinate settings]

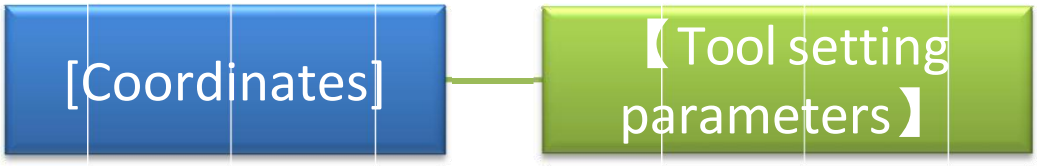
The workpiece coordinate system interface is shown below:



Workpiece Coordinate System Setting Interface

8.8.2 Settings of tool setting parameter

The tool setting parameter of the automatic tool regulator, and the way to enter the tool setting parameter is as follows:



The tool parameters are shown below:

1	X coordinates offset
2	Y coordinates offset
3	Z coordinates offset
4	A coordinates offset
5	B coordinates offset
6	C coordinates offset
7	X coordinates of tool regulator
8	Y coordinates of tool regulator
9	Z coordinates of tool regulator
10	A coordinates of tool regulator
11	B coordinates of tool regulator
12	C coordinates of tool regulator
13	Axis selection symbol of tool regulator
14	Set tool automatically after changing
15	Tool regulator machine tool X limit
16	Tool regulator machine tool Y limit
17	Tool regulator machine tool Z limit
18	Tool regulator machine tool A limit
19	Tool regulator machine tool B limit
20	Tool regulator machine tool C limit
21	Tool regulator X search direction
22	Tool regulator Y search direction
23	Tool regulator Z search direction
24	Tool regulator A search direction
25	Tool regulator B search direction
26	Tool regulator C search direction
27	Add offset to coordinates automatically
28	Tool regulator scanning speed
29	To enable the tool regulator or not
30	Tool regulator scans X safe position

31	Tool regulator scans Y safe position
32	Tool regulator scans Z safe position
33	Tool regulator scans A safe position
34	Tool regulator scans B safe position
35	Tool regulator scans C safe position
36	Tool regulator safety detection enable
37	Dust cover falling delay time
38	Way of tool setting

(1) Coordinate offset

The origin offset is added to current machine tool coordinates as the value of coordinates when setting the coordinate system; this parameter setting is valid in next tool setting;

The application of this parameter is for the processing of certain parts that require several working procedures. The first processing procedure may damage the tool setting position of the workpiece, and the next procedure can't locate the proper tool setting position. Therefore, a reference tool setting point is required, and the offset from reference point to actual tool setting position can be set to this parameter. No matter tool setting in which procedure, you only need to set to this reference point and it is same like setting to home position of the workpiece.

(2) Tool regulator coordinates, effective signal, automatic tool setting, machine tool Z negative limit of tool regulator:

The X, Y coordinates are the mechanical coordinates of the tool regulator on machine tool; the tool regulator can position automatically only when the coordinate is set properly.

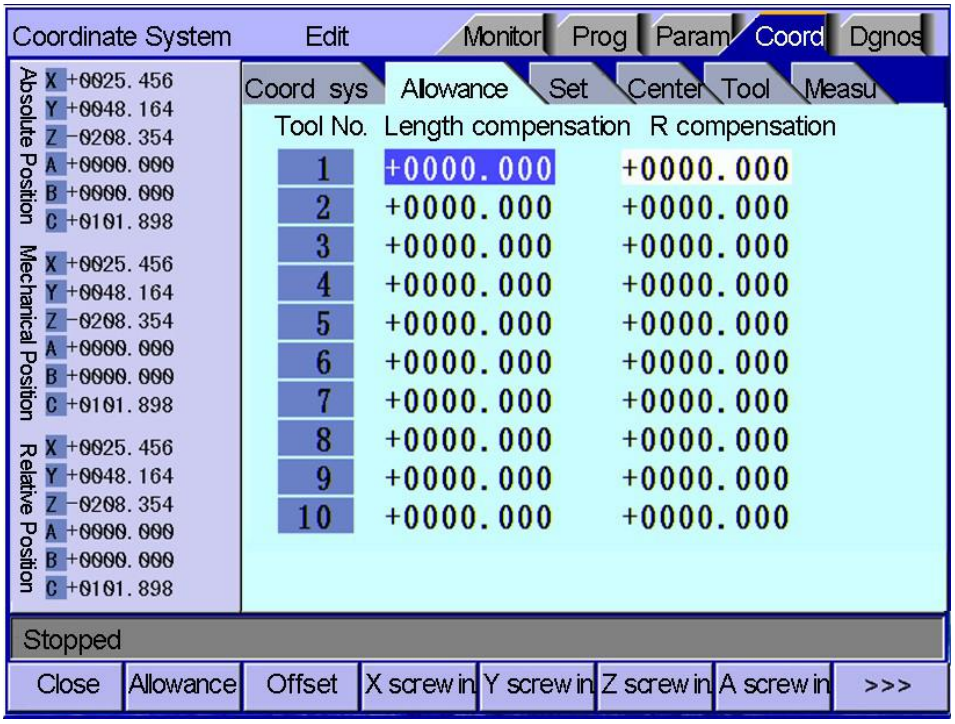
Effective voltage level of tool regulator is to set the signal interface level of the tool regulator, which should be set according to the actual interface of the tool regulator.

Automatic tool setting after changing is that the tool regulator function executes automatically after tool changing instruction is returned successfully to improve the processing efficiency.

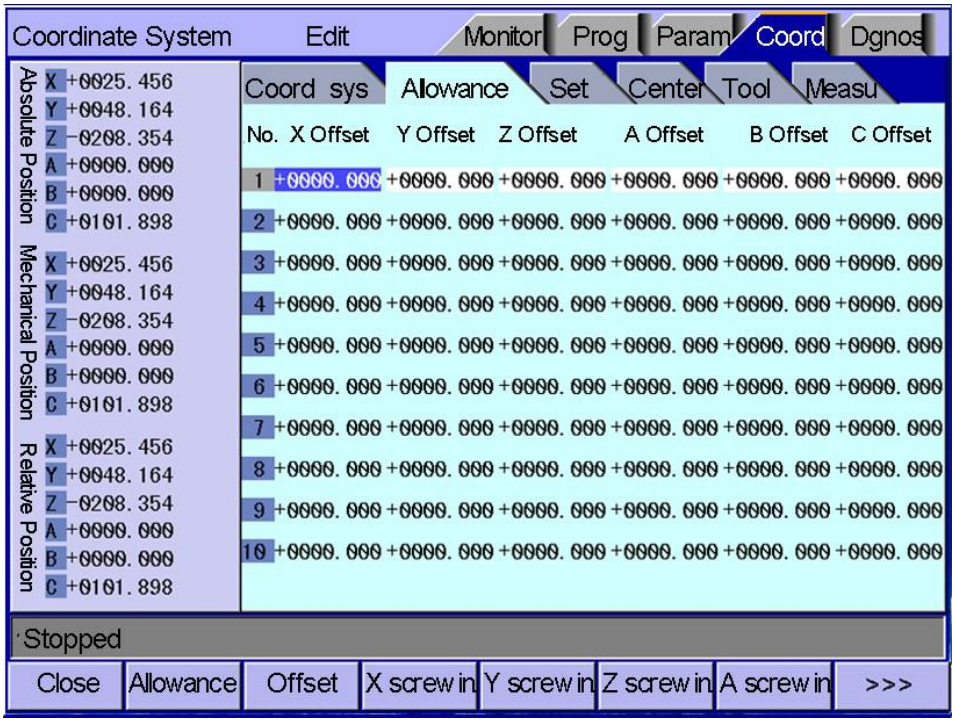
Z negative limit is used to prevent crash caused by not in place of Z axis error checking. Once negative limit alarm occurs, the tool regulator stops working immediately. If the system is in processing state, the system will send abnormal alarm; during separate setting of the tool regulator, the alarm won't occur.

8.8.3 Allowance

The allowance sheet lists the length and radius compensations of 36 sets of tools. When the system reads the compensation number of the tool change command, it performs the corresponding compensation. The length acts on the Z axis, and the radius acts on the XY platform track. The parameter interface is shown below.

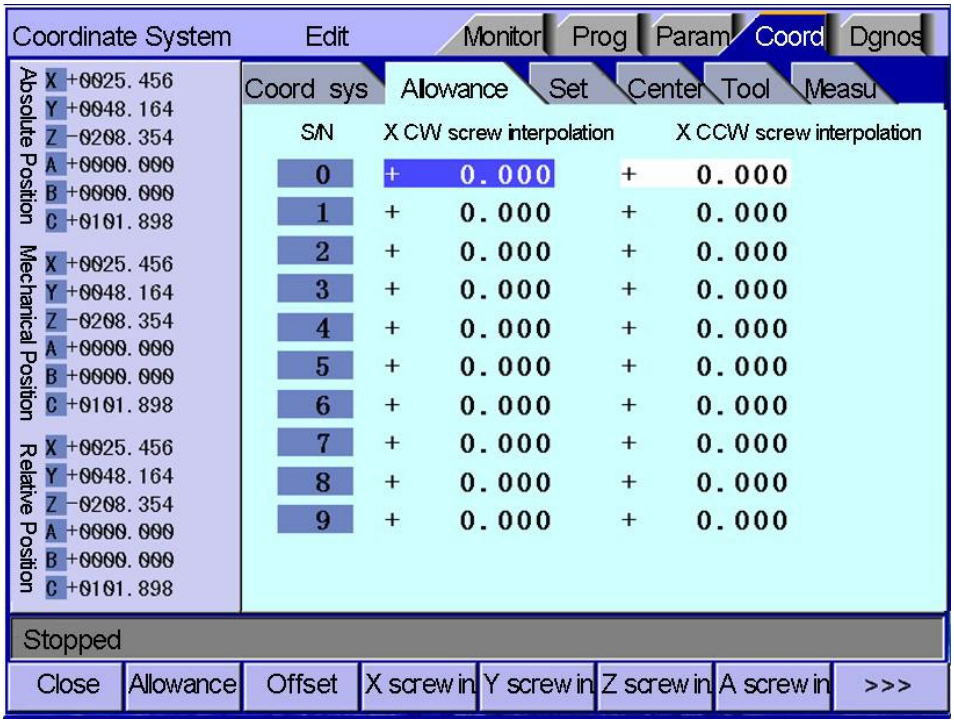


8.8.4 Offset



It can be used for the irregularly fixed magazines. Each tool placement position of each axis can be set individually.

8.8.5 Screw itch error compensation

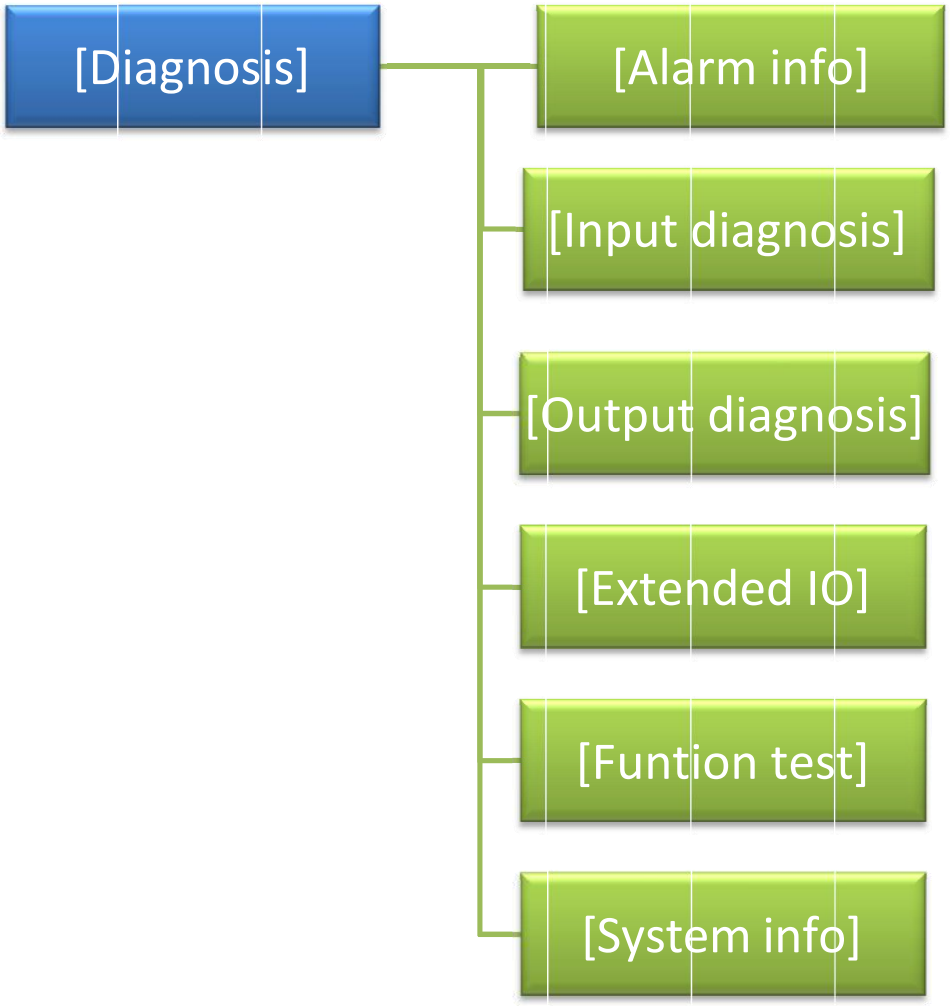


Input the compensation number by referring to the screw bidirectional error compensation table of each axis.

8.9 Controller diagnosis interface (diagnosis)

The diagnostic interface is used to display some hardware interfaces of system and system information. There're alarm information, input, output, extended IO, function test and system information. Press [Diagnosis] and enter the diagnosis interface.

The diagnosis interface is as follows:



8.9.1 Alarm check

Press [F1] in diagnosis interface to check the alarm, including 15 alarm records.

8.9.2 IO diagnosis interface

IO diagnosis is accessible at any time. You can check current IO state of the system. In manual mode, press the direction keys to select corresponding IO, and press EOB to control the output manually.

8.9.3 Function test

Function test including spindle DA, spindle fiction and handwheel. Correct the output voltage of two lines of DA voltage module for parameter optimization of related functions; press the direction keys to output corresponding voltage directly, input the actually measured voltage to corresponding gear position; when transferring control instructions of spindle, the system will correct according to correction value.

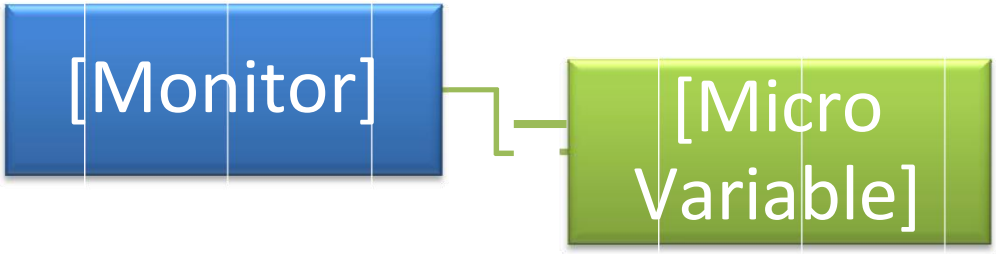
8.9.4 System Info

The system info shows basic information of current system, and is used to mark current software version, hardware version, upgrade info, etc. In this interface, you can follow the prompt below to perform operations.

8.10 Macro variable view interface (macro variable)

This is the variable register view menu of macro function. In this menu, you can turn pages to view the macro variables, or enter values to variable register directly in edit mode.

To enter macro variable view interface:



The macro variable menu has eight levels, as below:

Local variable

#100~#199

#500~#599

#600~#699

#700~#799

#800~#899

#900~#999

User variable

In the variable interfaces of different levels, you can check the corresponding variable number. Local variable has five levels totally, and shows the variables of current working layer by default. To view a specific layer, please enter local variable submenu, and then select according to layers.

Process variables are to customize the names of 20 variables (#100~#999) according to CSV configuration table, so that the variable names have visual meanings. In programs, the user customized variables are called with variable number. (For the writing and use of macro programs, see the macro function section in ADT4 series programming manual)

8.11 Current mode instruction info

Display the G code mode info of current system;

In [Monitor] interface, you can check the running code info of current system:

Motion instruction: G00, G01

Select plane: G17, G18, G19

Coordinate logic: G90, G91

Workpiece coordinate system: G54, …G59, G591… G599

Radius compensation: G40, G41, G42

Length compensation: G43, G44, G49

Compound instruction retracting plane: G98, G99

Spindle rotation: S

Tool No.: T

6. System maintenance

9.1 Restart

(1) In the main menu, press [Edit] to enter the program interface;

(2) Press [File] to enter the file interface;

(3) Press [Reset] and the system will ask whether to restart or not;

(4) Press [OK] to restart the system.

9.2 System upgrade

The steps of copying upgrade program with USB disk are as follows:

(1) In the main menu, press [Edit] to enter the program interface;

(2) Press [File] to enter the file management interface;

(3) Insert the USB disk, select the USB disk symbol in the root directory to open the USB disk; after reading successfully, the system will enter the USB directory automatically;

(4) Move cursor to the upgrade file ADTROM.BIN, select [Copy], enter ADT directory in disk C and paste it;

(5) Select the second upgrade file NC_RES.NC; skip this step if the file doesn't exist. Also select Copy, enter disk C, and paste it in directory ADT.

(6) After upgrading, enter BIOS, select [Boot-up mode] to startup, and restart the system to validate the program in disk D.

(7) Enter System Info in Diagnosis menu to view the system version and compilation date, and check whether the upgrade is successful.

9.3 Reset

(1) Select the edit mode;

(2) In the main menu, press [Parameter] to enter the parameter interface;

(3) Press [Management] key to enter management parameter interface;

(4) Move cursor to "006 Reset all parameters";

(5) Press [EOB], the system confirms, restores the default parameters and restarts automatically.

9.4 Parameter backup and restore

(1) Select the edit mode;

(2) In the main menu, press [Parameter] to enter the parameter interface;

(3) Press [Management] key to enter management parameter interface;

⑷ Move cursor to 007 or 008, and select corresponding operation menu;

⑸ Press [EOB], the system confirms, and performs backup or restore operation;

(6) The backup operation will generate the SYSCONF.BAK file in the root directory of disk D. Please save this file for backup in the future.

(7) For restore operation, also save the SYSCONF.BAK file in the root directory of disk D. The system will recognize this file automatically in the process of restoring.

9.5 Enter BIOS

(1) If the system has irreversible error and can't be started, please enter BIOS to upgrade and maintain the program;

(2) To enter BIOS, press the [Cancel] key after the controller is electrified and before the application is started; after entering, a blue background interface pops up. If the BIOS requires password, a prompt pops up. Please type the password to enter the BIOS.

(3) Enter BIOS to perform operations such as format disk C, D, and copy files from USB disk to upgrade;

7. System parameters

According to occasions and functions, the parameters contain comprehensive parameters, IO configuration parameters, management parameters and coordinate setting parameters.

Comprehensive parameters are complete, and contain basic operation and usage settings of the controller, including spindles, handwheel, home, tool magazine, etc.;

IO configuration parameters are mainly used for machine installation and test, adapting to the interface characteristics of machine tool and motor driver;

Coordinate setting parameters are tool setting configuration in [Coordinate] interface;

(1) It is required to confirm user identity to modify the parameter table. The controller has two levels of user authority, which are super user and operator; super user can modify all parameters and user passwords; while operator only can operate the parameters that require modification, and modify the operator password; in P3.1 in management parameters, the system will enter the corresponding mode automatically according to the entered password.

(2) According to the application, the parameters will take effect immediately or after restarted; the parameters that require restart are marked with <●>.

(3) Certain parameters are set in binary system (parameter descriptor has bit symbol); the conversion between binary system and decimal system is as follows:

Bit0: Set to 1 to correspond to decimal 1;

Bit1: Set to 1 to correspond to decimal 2;

Bit2: Set to 1 to correspond to decimal 4;

Bit3: Set to 1 to correspond to decimal 8;

Bit4: Set to 1 to correspond to decimal 16;

Bit5: Set to 1 to correspond to decimal 32;

Bit6: Set to 1 to correspond to decimal 64;

Bit7: Set to 1 to correspond to decimal 128;

For more bits, multiply the decimal digit corresponding to binary digit of previous position by 2. If only the corresponding bit is 1, accumulate the numbers of corresponding decimal system according to the comparison table to get the setting value.

For example: set Bit0, Bit1 and Bit5 to 1, and the setting value of parameter will be 1+2+32=35.

10.1 Parameter index list

Parameter type	S/N	Description	Effective mode	Default value	Page
Comprehensive parameter (P1.)	001	Feeding speed	Instant		
Comprehensive parameter (P1.)	002	Initial feeding speed	Instant		
Comprehensive parameter (P1.)	003	Feeding acceleration	Instant		
Comprehensive parameter (P1.)	004	Home mode	Instant		
Comprehensive parameter (P1.)	005	IO filter level (1~15)	Instant		
Comprehensive parameter (P1.)	006	Selection of communication mode	Restart		
Comprehensive parameter (P1.)	007	Max feeding speed (mm/min)	Instant		
Comprehensive parameter (P1.)	008	Zeroing soft limit no alarm enable	Instant		
Comprehensive parameter (P1.)	009	USB disk online online processing enable	Instant		
Comprehensive parameter (P1.)	010	M code delay time (ms)	Instant		
Comprehensive parameter (P1.)	011	Line number increment	Instant		
Comprehensive parameter (P1.)	012	UARTO string baud rate	Restart		
Comprehensive parameter (P1.)	013	Controller ID number	Restart		
Comprehensive parameter (P1.)	014	Arc interpolation feed(mm)	Instant		
Comprehensive parameter (P1.)	015	G73(M) circulating tool retraction amount (mm)	Instant		
Comprehensive parameter (P1.)	016	G83(M) circulating tool retraction amount (mm)	Instant		
Comprehensive parameter (P1.)	017	Arc interpolation processing mode	Instant		
Comprehensive parameter (P1.)	018	Speed optimization constraint mode	Instant		
Comprehensive parameter (P1.)	019	Code pre-treatment	Instant		
Comprehensive parameter (P1.)	020	CNC file scan flag	Instant		
Comprehensive parameter (P1.)	021	Variable frequency analog control mode	Instant		
Comprehensive parameter (P1.)	022	Lubricant pressure time opening (min)	Instant		
Comprehensive parameter (P1.)	023	Lubricant pressure keep time (sec)	Instant		
Comprehensive parameter (P1.)	024	Lubricant pressure control freq(Hz)	Instant		
Comprehensive parameter (P1.)	025	Back home mode configuration	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		(bit)			
Comprehensive parameter (P1.)	026	Arc Acc. clamping radius coefficient	Instant		
Comprehensive parameter (P1.)	027	Arc Acc. clamping speed coefficient	Instant		
Comprehensive parameter (P1.)	028	Pretreatment code setting	Instant		
Comprehensive parameter (P1.)	029	Inp. acc. speed mode	Instant		
Comprehensive parameter (P1.)	030	'S' speed acceleration	Instant		
Comprehensive parameter (P1.)	031	HOME check enable for alarm	Instant		
Comprehensive parameter (P1.)	032	HOME check enable	Instant		
Comprehensive parameter (P1.)	033	X diameter program enable	Instant		
Comprehensive parameter (P1.)	034	Default process plane	Instant		
Comprehensive parameter (P1.)	035	T code form (compensation number digit)	Instant		
Comprehensive parameter (P1.)	036	Local IP address	Restart		
Comprehensive parameter (P1.)	037	Subnet mask	Restart		
Comprehensive parameter (P1.)	038	Default gateway	Restart		
Comprehensive parameter (P1.)	039	MAC address	Restart		
Comprehensive parameter (P1.)	040	No this parameter	Instant		
Comprehensive parameter (P1.)	041	Feed speed setting Enable	Instant		
Comprehensive parameter (P1.)	042	Enable G00 Inp mode	Instant		
Comprehensive parameter (P1.)	043	Enable abnormal memory position jump	Instant		
Comprehensive parameter (P1.)	044	Pause Z to safe altitude	Instant		
Comprehensive parameter (P1.)	045	Pause A to safe altitude	Instant		
Comprehensive parameter (P1.)	046	Program home reference point enable	Instant		
Comprehensive parameter (P1.)	047	Mechanical home reference point enable	Instant		
Comprehensive parameter (P1.)	048	Clear coordinates in home mode	Instant		
Comprehensive parameter (P1.)	049	Z axis safe height	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Comprehensive parameter (P1.)	050	A axis safe height	Instant		
Comprehensive parameter (P1.)	051	Z axis feed rate limit (mm/min)	Instant		
Comprehensive parameter (P1.)	052	A axis feed rate limit (mm/min)	Instant		
Comprehensive parameter (P1.)	053	Thread cutting acceleration pitch P (mm)	Instant		
Comprehensive parameter (P1.)	054	Thread cutting acceleration pitch D (mm)	Instant		
Comprehensive parameter (P1.)	055	Thread cutting backslide amount V (mm)	Instant		
Comprehensive parameter (P1.)	056	Enable jump to M98 * times * lines	Instant		
Comprehensive parameter (P1.)	057	System home ON	Instant		
Comprehensive parameter (P1.)	058	Spindle brake delay (ms)	Instant		
Comprehensive parameter (P1.)	059	Excessive programming coordinates calculation conversion	Instant		
Comprehensive parameter (P1.)	060	4 axis max rotate speed	Instant		
Comprehensive parameter (P1.)	061	Handwheel encoder dir	Instant		
Comprehensive parameter (P1.)	062	Handwheel control mode (0- old)	Instant		
Comprehensive parameter (P1.)	063	Handwheel max rate	Instant		
Comprehensive parameter (P1.)	064	Handwheel acceleration (Kps)	Instant		
Comprehensive parameter (P1.)	065	Machining end back reference point enable	Instant		
Comprehensive parameter (P1.)	066	Feeding rate variation	Instant		
Comprehensive parameter (P1.)	067	Auto chamfering or arc chamfering enable	Instant		
Comprehensive parameter (P1.)	068	Chamfering or arc chamfering accuracy (mm)	Instant		
Comprehensive parameter (P1.)	069	Tool setting way of coordinate system	Instant		
Comprehensive parameter (P1.)	070	Maximum deviation of double driver zero return-to-zero (mm)	Instant		
Comprehensive parameter (P1.)	071	G code loading boundary scan enable	Instant		
Comprehensive parameter (P1.)	072	Split cycle	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Comprehensive parameter (P1.)	073	Z-axis safe height return speed	Instant		
Comprehensive parameter (P1.)	074	A-axis safe height return speed	Instant		
Comprehensive parameter (P1.)	075	Z-axis Feed Speed Limit (mm/min) (mm/min)	Instant		
Comprehensive parameter (P1.)	076	A-axis Feed Speed Limit (mm/min)	Instant		
Comprehensive parameter (P1.)	077	Abnormal jump mode configuration bit	Instant		
Comprehensive parameter (P1.)	078	Remote slave IP address	Instant		
Comprehensive parameter (P1.)	079	Modbus master timeout (ms)	Instant		
Comprehensive parameter (P1.)	080	Modbus master retransmission times	Restart		
Comprehensive parameter (P1.)	081	UART3 serial port baud rate	Restart		
Comprehensive parameter (P1.)	082	Local IP address 2	Restart		
Comprehensive parameter (P1.)	083	MAC address 2	Restart		
Comprehensive parameter (P1.)	084	Low voltage interrupt enable (0 off 1 on)	Restart		
Axis parameter (P2.)	001	X Gear Numerator	Restart		
Axis parameter (P2.)		X Gear Denominator	Restart		
Axis parameter (P2.)		Y Gear Numerator	Restart		
Axis parameter (P2.)		Y Gear Denominator	Restart		
Axis parameter (P2.)		Z Gear Numerator	Restart		
Axis parameter (P2.)		Z Gear Denominator	Restart		
Axis parameter (P2.)		A Gear Numerator	Restart		
Axis parameter (P2.)		A Gear Denominator	Restart		
Axis parameter (P2.)		B Gear Numerator	Restart		
Axis parameter (P2.)		B Gear Denominator	Restart		
Axis parameter (P2.)		C Gear Numerator	Restart		
Axis parameter (P2.)		C Gear Denominator	Restart		
Axis parameter (P2.)	002	X Fast Speed(mm/min)	Instant		
Axis parameter (P2.)		Y Fast Speed(mm/min)	Instant		
Axis parameter (P2.)		Z Fast Speed(mm/min)	Instant		
Axis parameter (P2.)		A Fast Speed(mm/min)	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		B Fast Speed(mm/min)	Instant		
Axis parameter (P2.)		C Fast Speed(mm/min)	Instant		
Axis parameter (P2.)	003	X axis start rate (mm/min)	Instant		
Axis parameter (P2.)		Y axis start rate (mm/min)	Instant		
Axis parameter (P2.)		Z axis start rate (mm/min)	Instant		
Axis parameter (P2.)		A axes start rate (mm/min)	Instant		
Axis parameter (P2.)		B axis start rate (mm/min)	Instant		
Axis parameter (P2.)		C axis start rate (mm/min)	Instant		
Axis parameter (P2.)	004	X axis acceleration (Kpps)	Instant		
Axis parameter (P2.)		Y axis acceleration (Kpps)	Instant		
Axis parameter (P2.)		Z axis acceleration (Kpps)	Instant		
Axis parameter (P2.)		A axes acceleration (Kpps)	Instant		
Axis parameter (P2.)		B axis acceleration (Kpps)	Instant		
Axis parameter (P2.)		C axis acceleration (Kpps)	Instant		
Axis parameter (P2.)	005	X Soft PosLimit+(mm)	Instant		
Axis parameter (P2.)		X Soft NegLimit-(mm)	Instant		
Axis parameter (P2.)		Y Soft PosLimit+(mm)	Instant		
Axis parameter (P2.)		Y Soft NegLimit-(mm)	Instant		
Axis parameter (P2.)		Z Soft PosLimit+(mm)	Instant		
Axis parameter (P2.)		Z Soft NegLimit-(mm)	Instant		
Axis parameter (P2.)		A Soft PosLimit+(mm)	Instant		
Axis parameter (P2.)		A Soft NegLimit-(mm)	Instant		
Axis parameter (P2.)		B Soft PosLimit+(mm)	Instant		
Axis parameter (P2.)		B Soft NegLimit-(mm)	Instant		
Axis parameter (P2.)		C Soft PosLimit+(mm)	Instant		
Axis parameter (P2.)		C Soft NegLimit-(mm)	Instant		
Axis parameter (P2.)	006	X- Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		Y- Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		Z- Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		A- Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		B- Machine Limit Input Port No.	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		C- Machine Limit Input Port No.	Instant		
Axis parameter (P2.)	007	X+ Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		Y+ Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		Z+ Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		A+ Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		B+ Machine Limit Input Port No.	Instant		
Axis parameter (P2.)		C+ Machine Limit Input Port No.	Instant		
Axis parameter (P2.)	008	X Ext Home Input Port No.	Instant		
Axis parameter (P2.)		Y Ext Home Input Port No.	Instant		
Axis parameter (P2.)		Z Ext Home Input Port No.	Instant		
Axis parameter (P2.)		A Ext Home Input Port No.	Instant		
Axis parameter (P2.)		B Ext Home Input Port No.	Instant		
Axis parameter (P2.)		C Ext Home Input Port Number	Instant		
Axis parameter (P2.)	009	X Server Enable Output Port No.	Instant		
Axis parameter (P2.)		Y Server Enable Output Port No.	Instant		
Axis parameter (P2.)		Z Server Enable Output Port No.	Instant		
Axis parameter (P2.)		AServer Enable Output Port No.	Instant		
Axis parameter (P2.)		B Server Enable Output Port No.	Instant		
Axis parameter (P2.)		C Server Enable Output Port No.	Instant		
Axis parameter (P2.)	010	X Server Alarm Input Port No.	Instant		
Axis parameter (P2.)		Y Server Alarm Input Port No.	Instant		
Axis parameter (P2.)		Z Server Alarm Input Port No.	Instant		
Axis parameter (P2.)		A Server Alarm Input Port No.	Instant		
Axis parameter (P2.)		B Server Alarm Input Port No.	Instant		
Axis parameter (P2.)		B Server Alarm Input Port No.	Instant		
Axis parameter (P2.)	011	X Server Reset Output Port	Instant		
Axis parameter (P2.)		Y Server Reset Output Port	Instant		
Axis parameter (P2.)		Z Server Reset Output Port	Instant		
Axis parameter (P2.)		A Server Reset Output Port	Instant		
Axis parameter (P2.)		B Server Reset Output Port	Instant		
Axis parameter (P2.)		C Server Reset Output Port	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)	012	X Backlash Expiate(pulse)	Instant		
Axis parameter (P2.)		Y Backlash Expiate(pulse)	Instant		
Axis parameter (P2.)		Z Backlash Expiate(pulse)	Instant		
Axis parameter (P2.)		A Backlash Expiate(pulse)	Instant		
Axis parameter (P2.)		B Backlash Expiate(pulse)	Instant		
Axis parameter (P2.)		C Backlash Expiate(pulse)	Instant		
Axis parameter (P2.)	013	X Home Offset(mm)	Instant		
Axis parameter (P2.)		Y Home Offset(mm)	Instant		
Axis parameter (P2.)		Z Home Offset(mm)	Instant		
Axis parameter (P2.)		A Home Offset (mm)	Instant		
Axis parameter (P2.)		B Home Offset(mm)	Instant		
Axis parameter (P2.)		C Home Offset(mm)	Instant		
Axis parameter (P2.)	014	X Home Dir	Instant		
Axis parameter (P2.)		Y Home Dir	Instant		
Axis parameter (P2.)		Z Home Dir	Instant		
Axis parameter (P2.)		A Home Dir	Instant		
Axis parameter (P2.)		B Home Dir	Instant		
Axis parameter (P2.)		C Home Dir	Instant		
Axis parameter (P2.)	015	X axis home speed (mm/min)	Instant		
Axis parameter (P2.)		Y axis home speed (mm/min)	Instant		
Axis parameter (P2.)		Z axis home speed (mm/min)	Instant		
Axis parameter (P2.)		A axes home speed (mm/min)	Instant		
Axis parameter (P2.)		B axis home speed (mm/min)	Instant		
Axis parameter (P2.)		C axis home speed (mm/min)	Instant		
Axis parameter (P2.)	016	X axis manual speed (mm/min)	Instant		
Axis parameter (P2.)		Y axis manual speed (mm/min)	Instant		
Axis parameter (P2.)		Z axis manual speed (mm/min)	Instant		
Axis parameter (P2.)		A axes manual speed (mm/min)	Instant		
Axis parameter (P2.)		B axis manual speed (mm/min)	Instant		
Axis parameter (P2.)		C axis manual speed (mm/min)	Instant		
Axis parameter (P2.)	017	X-axis corner speed smoothing	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		level			
Axis parameter (P2.)		Y-axis corner speed smoothing level	Instant		
Axis parameter (P2.)		Z-axis corner speed smoothing level	Instant		
Axis parameter (P2.)		A-axis corner speed smoothing level	Instant		
Axis parameter (P2.)		B-axis corner speed smoothing level	Instant		
Axis parameter (P2.)		C-axis corner speed smoothing level	Instant		
Axis parameter (P2.)	018	X max restrain rate(mm/s)	Instant		
Axis parameter (P2.)		Y max restrain rate(mm/s)	Instant		
Axis parameter (P2.)		Z max restrain rate(mm/s)	Instant		
Axis parameter (P2.)		A max restrain rate(mm/s)	Instant		
Axis parameter (P2.)		B max restrain rate(mm/s)	Instant		
Axis parameter (P2.)		C max restrain rate(mm/s)	Instant		
Axis parameter (P2.)	019	X_Servo Alarm ELevel	Instant		
Axis parameter (P2.)		Y_Servo Alarm ELevel	Instant		
Axis parameter (P2.)		Z_Servo Alarm ELevel	Instant		
Axis parameter (P2.)		A_Servo Alarm ELevel	Instant		
Axis parameter (P2.)		B_Servo Alarm ELevel	Instant		
Axis parameter (P2.)		C_Servo Alarm ELevel	Instant		
Axis parameter (P2.)	020	X_Servo Reset Out ELevel	Instant		
Axis parameter (P2.)		Y_Servo Reset Out ELevel	Instant		
Axis parameter (P2.)		Z_Servo Reset Out ELevel	Instant		
Axis parameter (P2.)		A_Servo Reset Out ELevel	Instant		
Axis parameter (P2.)		B_Servo Reset Out ELevel	Instant		
Axis parameter (P2.)		C_Servo Reset Out ELevel	Instant		
Axis parameter (P2.)	021	X_ECZ Home Enable	Instant		
Axis parameter (P2.)		Y_ECZ Home Enable	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		Z_ECZ Home Enable	Instant		
Axis parameter (P2.)		A_ECZ Home Enable	Instant		
Axis parameter (P2.)		B_ECZ Home Enable	Instant		
Axis parameter (P2.)		C_ECZ Home Enable	Instant		
Axis parameter (P2.)	022	X_ECZ Home ELevel	Instant		
Axis parameter (P2.)		Y_ECZ Home ELevel	Instant		
Axis parameter (P2.)		Z_ECZ Home ELevel	Instant		
Axis parameter (P2.)		A_ECZ Home ELevel	Instant		
Axis parameter (P2.)		B_ECZ Home ELevel	Instant		
Axis parameter (P2.)		C_ECZ Home ELevel	Instant		
Axis parameter (P2.)	023	X Limit ELevel<●>	Instant		
Axis parameter (P2.)		Y Limit ELevel<●>	Instant		
Axis parameter (P2.)		Z Limit ELevel<●>	Instant		
Axis parameter (P2.)		4 Limit ELevel<●>	Instant		
Axis parameter (P2.)		B Limit ELevel<●>	Instant		
Axis parameter (P2.)		C Limit ELevel<●>	Instant		
Axis parameter (P2.)	024	X Pulse Mode<●>	Restart		
Axis parameter (P2.)		Y Pulse Mode<●>	Restart		
Axis parameter (P2.)		Z Pulse Mode<●>	Restart		
Axis parameter (P2.)		A Pulse Mode<●>	Restart		
Axis parameter (P2.)		B Pulse Mode<●>	Restart		
Axis parameter (P2.)		C Pulse Command Format	Restart		
Axis parameter (P2.)	025	X Pulse Logic Dir Mode	Restart		
Axis parameter (P2.)		Y Pulse Logic Dir Mode	Restart		
Axis parameter (P2.)		Z Pulse Logic Dir Mode	Restart		
Axis parameter (P2.)		A Pulse Logic Dir Mode	Restart		
Axis parameter (P2.)		B Pulse Logic Dir Mode	Restart		
Axis parameter (P2.)		C Pulse Logic Dir Mode	Restart		
Axis parameter (P2.)	026	X Ext Home ELevel	Instant		
Axis parameter (P2.)		Y Ext Home ELevel	Instant		
Axis parameter (P2.)		Z Ext Home ELevel	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		A Ext Home ELevel	Instant		
Axis parameter (P2.)		B Ext Home ELevel	Instant		
Axis parameter (P2.)		C Ext Home ELevel	Instant		
Axis parameter (P2.)	027	X Round Setting	Restart		
Axis parameter (P2.)		Y Round Setting	Restart		
Axis parameter (P2.)		Z Round Setting	Restart		
Axis parameter (P2.)		A Round Setting	Restart		
Axis parameter (P2.)		B Round Setting	Restart		
Axis parameter (P2.)		C Round Setting	Restart		
Axis parameter (P2.)	028	X physial Assign Num	Restart		
Axis parameter (P2.)		Y Physial Assign Num	Restart		
Axis parameter (P2.)		Z Physial Assign Num	Restart		
Axis parameter (P2.)		A Physial Assign Num	Restart		
Axis parameter (P2.)		B physial Assign Num	Restart		
Axis parameter (P2.)		C Physial Assign Num	Restart		
Axis parameter (P2.)	029	X encoder line number (p)	Instant		
Axis parameter (P2.)		Y encoder line number (p)	Instant		
Axis parameter (P2.)		Z encoder line number (p)	Instant		
Axis parameter (P2.)		A encoder line number (p)	Instant		
Axis parameter (P2.)		B Encoder line number (p)	Instant		
Axis parameter (P2.)		C Encoder line number (p)	Instant		
Axis parameter (P2.)	030	X Reset to 306	Instant		
Axis parameter (P2.)		Y Reset to 306	Instant		
Axis parameter (P2.)		Z Reset to 306	Instant		
Axis parameter (P2.)		A Reset to 306	Instant		
Axis parameter (P2.)		B Reset to 306	Instant		
Axis parameter (P2.)		C Reset to 306	Instant		
Axis parameter (P2.)	031	X Pulse Logic Level	Restart		
Axis parameter (P2.)		Y Pulse Logic Level	Restart		
Axis parameter (P2.)		Z Pulse Logic Level	Restart		
Axis parameter (P2.)		A Pulse Logic Level	Restart		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		B Pulse Logic Level	Restart		
Axis parameter (P2.)		C Pulse Logic Level	Restart		
Axis parameter (P2.)	032	X feature (Rotate 0, Line 1)	Restart		
Axis parameter (P2.)		Y feature (Rotate 0, Line 1)	Restart		
Axis parameter (P2.)		Z feature (Rotate 0, Line 1)	Restart		
Axis parameter (P2.)		A feature (Rotate 0 Line 1)	Restart		
Axis parameter (P2.)		B feature (Rotate 0, Line 1)	Restart		
Axis parameter (P2.)		C feature (Rotate 0, Line 1)	Restart		
Axis parameter (P2.)	033	X Rolling Display Usage	Instant		
Axis parameter (P2.)		Y Rolling Display Usage	Instant		
Axis parameter (P2.)		Z Rolling Display Usage	Instant		
Axis parameter (P2.)		A Rolling Display Usage	Instant		
Axis parameter (P2.)		B Rolling Display Usage	Instant		
Axis parameter (P2.)		C Rolling Display Usage	Instant		
Axis parameter (P2.)	034	X G00 Rolling Path Optimize	Instant		
Axis parameter (P2.)		Y G00 Rolling Path Optimize	Instant		
Axis parameter (P2.)		Z G00 Rolling Path Optimize	Instant		
Axis parameter (P2.)		A G00 Rolling Path Optimize	Instant		
Axis parameter (P2.)		B G00 Rolling Path Optimize	Instant		
Axis parameter (P2.)		C G00 Rolling Path Optimize	Instant		
Axis parameter (P2.)	035	X Max Acc. (Kpps)	Instant		
Axis parameter (P2.)		Y Max Acc. (Kpps)	Instant		
Axis parameter (P2.)		Z Max Acc. (Kpps)	Instant		
Axis parameter (P2.)		A Max Acc. (Kpps)	Instant		
Axis parameter (P2.)		B Max Acc. (Kpps)	Instant		
Axis parameter (P2.)		C Max Acc. (Kpps)	Instant		
Axis parameter (P2.)	036	X Servo Home Dir	Instant		
Axis parameter (P2.)		Y Servo Home Dir	Instant		
Axis parameter (P2.)		Z Servo Home Dir	Instant		
Axis parameter (P2.)		A Servo Home Dir	Instant		
Axis parameter (P2.)		B Servo Home Dir	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		C Servo Home Dir	Instant		
Axis parameter (P2.)	037	X Ext Home Enable	Instant		
Axis parameter (P2.)		X Ext Home Enable	Instant		
Axis parameter (P2.)		Z Ext Home Enable	Instant		
Axis parameter (P2.)		A Ext Home Enable	Instant		
Axis parameter (P2.)		B Ext Home Enable	Instant		
Axis parameter (P2.)		C Ext Home Enable	Instant		
Axis parameter (P2.)	038	X Encoder Logic Dir	Instant		
Axis parameter (P2.)		Y Encoder Logic Dir	Instant		
Axis parameter (P2.)		Z Encoder Logic Dir	Instant		
Axis parameter (P2.)		A Encoder Logic Dir	Instant		
Axis parameter (P2.)		B Encoder Logic Dir	Instant		
Axis parameter (P2.)		C Encoder Logic Dir	Instant		
Axis parameter (P2.)	039	X-axis return-to-zero 2nd segment leave speed	Instant		
Axis parameter (P2.)		Y-axis return-to-zero 2nd segment leave speed	Instant		
Axis parameter (P2.)		Z-axis return-to-zero 2nd segment leave speed	Instant		
Axis parameter (P2.)		A-axis return-to-zero 2nd segment leave speed	Instant		
Axis parameter (P2.)		B-axis return-to-zero 2nd segment leave speed	Instant		
Axis parameter (P2.)		C-axis return-to-zero 2nd segment leave speed	Instant		
Axis parameter (P2.)	040	X-axis return-to-zero 3rd segment detection speed	Instant		
Axis parameter (P2.)		Y-axis return-to-zero 3rd segment detection speed	Instant		
Axis parameter (P2.)		Z-axis return-to-zero 3rd segment detection speed	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		A-axis return-to-zero 3rd segment detection speed	Instant		
Axis parameter (P2.)		B-axis return-to-zero 3rd segment detection speed	Instant		
Axis parameter (P2.)		C-axis return-to-zero 3rd segment detection speed	Instant		
Axis parameter (P2.)	041	X axis screw interpolation enable	Instant		
Axis parameter (P2.)		Y axis screw interpolation enable	Instant		
Axis parameter (P2.)		Z axis screw interpolation enable	Instant		
Axis parameter (P2.)		A axis screw interpolation enable	Instant		
Axis parameter (P2.)		B axis screw interpolation enable	Instant		
Axis parameter (P2.)		C axis screw interpolation enable	Instant		
Axis parameter (P2.)	042	X axis screw interpolation pitch (mm)	Instant		
Axis parameter (P2.)		Y axis screw interpolation pitch (mm)	Instant		
Axis parameter (P2.)		Z axis screw interpolation pitch (mm)	Instant		
Axis parameter (P2.)		A axis screw interpolation pitch (mm)	Instant		
Axis parameter (P2.)		B axis screw interpolation pitch (mm)	Instant		
Axis parameter (P2.)		C axis screw interpolation pitch (mm)	Instant		
Axis parameter (P2.)	043	X axis screw interpolation starting position (mm)	Instant		
Axis parameter (P2.)		Y axis screw interpolation starting position (mm)	Instant		
Axis parameter (P2.)		Z axis screw interpolation starting position (mm)	Instant		
Axis parameter (P2.)		A axes screw interpolation starting	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		position (mm)			
Axis parameter (P2.)		B axis screw interpolation starting position (mm)	Instant		
Axis parameter (P2.)		C axis screw interpolation starting position (mm)	Instant		
Axis parameter (P2.)	044	X axis screw interpolation end position (mm)	Instant		
Axis parameter (P2.)		Y axis screw interpolation end position (mm)	Instant		
Axis parameter (P2.)		Z axis screw interpolation end position (mm)	Instant		
Axis parameter (P2.)		A axis screw interpolation end position (mm)	Instant		
Axis parameter (P2.)		B axis screw interpolation end position (mm)	Instant		
Axis parameter (P2.)		C axis screw interpolation end position (mm)	Instant		
Axis parameter (P2.)	045	X servo device address	Instant		
Axis parameter (P2.)		Y servo device address	Instant		
Axis parameter (P2.)		Z servo device address	Instant		
Axis parameter (P2.)		A servo device address	Instant		
Axis parameter (P2.)		B servo device address	Instant		
Axis parameter (P2.)		C servo device address	Instant		
Axis parameter (P2.)	046	X-axis single-turn offset (mm/turn)	Instant		
Axis parameter (P2.)		Y-axis single-turn offset (mm/turn)	Instant		
Axis parameter (P2.)		Z-axis single-turn offset (mm/turn)	Instant		
Axis parameter (P2.)		A-axis single-turn offset (mm/turn)	Instant		
Axis parameter (P2.)		B-axis single-turn offset (mm/turn)	Instant		
Axis parameter (P2.)		C-axis single-turn offset (mm/turn)	Instant		
Axis parameter (P2.)	047	X absolute encoder origin calibration	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		Y absolute encoder origin calibration	Instant		
Axis parameter (P2.)		Z absolute encoder origin calibration	Instant		
Axis parameter (P2.)		A absolute encoder origin calibration	Instant		
Axis parameter (P2.)		B absolute encoder origin calibration	Instant		
Axis parameter (P2.)		C absolute encoder origin calibration	Instant		
Axis parameter (P2.)	048	X Servo Driver Type	Restart		
Axis parameter (P2.)		Y Servo Driver Type	Restart		
Axis parameter (P2.)		Z Servo Driver Type	Restart		
Axis parameter (P2.)		A Servo Driver Type	Restart		
Axis parameter (P2.)		B Servo Driver Type	Restart		
Axis parameter (P2.)		C Servo Driver Type	Restart		
Axis parameter (P2.)	049	X encoder type	Restart		
Axis parameter (P2.)		Y encoder type	Restart		
Axis parameter (P2.)		Z encoder type	Restart		
Axis parameter (P2.)		A encoder type	Restart		
Axis parameter (P2.)		B encoder type	Restart		
Axis parameter (P2.)		C encoder type	Restart		
Axis parameter (P2.)	050	X Server Orientation Output Port No.	Instant		
Axis parameter (P2.)		Y Server Orientation Output Port No.	Instant		
Axis parameter (P2.)		Z Server Orientation Output Port No.	Instant		
Axis parameter (P2.)		A Server Orientation Output Port No.	Instant		
Axis parameter (P2.)		B Server Orientation Output Port	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		No.			
Axis parameter (P2.)		C Server Orientation Output Port No.	Instant		
Axis parameter (P2.)	051	X servo pulse control output port number	Instant		
Axis parameter (P2.)		Y servo pulse control output port number	Instant		
Axis parameter (P2.)		Z servo pulse control output port number	Instant		
Axis parameter (P2.)		A servo pulse control output port number	Instant		
Axis parameter (P2.)		B servo pulse control output port number	Instant		
Axis parameter (P2.)		C servo pulse control output port number	Instant		
Axis parameter (P2.)	052	X servo rigid tapping mode output port number	Instant		
Axis parameter (P2.)		Y servo rigid tapping mode output port number	Instant		
Axis parameter (P2.)		Z servo rigid tapping mode output port number	Instant		
Axis parameter (P2.)		A servo rigid tapping mode output port number	Instant		
Axis parameter (P2.)		B servo rigid tapping mode output port number	Instant		
Axis parameter (P2.)		C servo rigid tapping mode output port number	Instant		
Axis parameter (P2.)	053	X servo spindle ready input port number	Instant		
Axis parameter (P2.)		Y servo spindle ready input port number	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Axis parameter (P2.)		Z servo spindle ready input port number	Instant		
Axis parameter (P2.)		A servo spindle ready input port number	Instant		
Axis parameter (P2.)		B servo spindle ready input port number	Instant		
Axis parameter (P2.)		C servo spindle ready input port number	Instant		
Axis parameter (P2.)	054	X servo spindle quasi-stop in-position input port number	Instant		
Axis parameter (P2.)		Y servo spindle quasi-stop in-position input port number	Instant		
Axis parameter (P2.)		Z servo spindle quasi-stop in-position input port number	Instant		
Axis parameter (P2.)		A servo spindle quasi-stop in-position input port number	Instant		
Axis parameter (P2.)		B servo spindle quasi-stop in-position input port number	Instant		
Axis parameter (P2.)		C servo spindle quasi-stop in-position input port number	Instant		
Axis parameter (P2.)	055	X servo spindle zero-speed in-position input port number	Instant		
Axis parameter (P2.)		Y servo spindle zero-speed in-position input port number	Instant		
Axis parameter (P2.)		Z servo spindle zero-speed in-position input port number	Instant		
Axis parameter (P2.)		A servo spindle zero-speed in-position input port number	Instant		
Axis parameter (P2.)		B servo spindle zero-speed in-position input port number	Instant		
Axis parameter (P2.)		C servo spindle zero-speed	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		in-position input port number			
Axis parameter (P2.)	056	X servo spindle speed at input port number	Instant		
Axis parameter (P2.)		Y servo spindle speed at input port number	Instant		
Axis parameter (P2.)		Z servo spindle speed at input port number	Instant		
Axis parameter (P2.)		A servo spindle speed at input port number	Instant		
Axis parameter (P2.)		B servo spindle speed at input port number	Instant		
Axis parameter (P2.)		C servo spindle speed at input port number	Instant		
Management parameter (P3.)	001	Type password to select management mode	Instant		
Management parameter (P3.)	002	Edit super user password	Instant		
Management parameter (P3.)	003	Edit operation user password	Instant		
Management parameter (P3.)	004	Initialize comprehensive parameters to default <●>	Restart		
Management parameter (P3.)	005	Initialize IO configuration to default <●>	Restart		
Management parameter (P3.)	006	Reset all parameters <●>	Restart		
Management parameter (P3.)	007	Back up parameters	Instant		
Management parameter (P3.)	008	Restore parameters	Restart		
Management parameter (P3.)	009	Generate password file	Instant		
Management parameter (P3.)	010	Menu click way	Instant		
Management parameter (P3.)	011	Clear add up work number	Instant		
Management parameter (P3.)	012	Clear current work number	Instant		
Management parameter (P3.)	013	Accumulated processing max	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		pieces			
Management parameter (P3.)	014	Import the CSV system configuration List<●>	Restart		
Management parameter (P3.)	015	Startup display module<●>	Restart		
Management parameter (P3.)	016	Sys language bag<●>	Restart		
Management parameter (P3.)	017	Macro key word valid enable	Instant		
Management parameter (P3.)	018	Startup picture display	Instant		
Management parameter (P3.)	019	System axis group self-start configuration	Instant		
Management parameter (P3.)	020	Sys debug information enable	Instant		
Management parameter (P3.)	021	Axis control composite enable	Instant		
Management parameter (P3.)	022	Additional panel enable	Instant		
Management parameter (P3.)	023	M Macro Program Selection<●>	Restart		
Management parameter (P3.)	024	T Macro Program Selection<●>	Restart		
Management parameter (P3.)	025	PLC program enable<●>	Restart		
Management parameter (P3.)	026	Screen Saver ON	Instant		
Management parameter (P3.)	027	Modbus master / slave setting <●>	Restart		
Management parameter (P3.)	028	Imperial system enable <●>	Restart		
Management parameter (P3.)	029	Additional panel baud rate <●>	Restart		
Management parameter (P3.)	030	Additional panel emergency stop for negation<●>	Restart		
Management parameter (P3.)	031	RS485 parity mode<●>	Restart		
Management parameter (P3.)	032	Extended IO type <●>	Restart		
Management parameter (P3.)	033	Number of expended input <●>	Restart		
Management parameter (P3.)	034	Number of expended output <●>	Restart		
Management parameter (P3.)	035	Bus axis or IO node configuration <●>	Restart		
Tool magazine parameter (P4.)		Customized by manufacturer	Instant		
Spindle parameters (P5.)	001	1st spindle mapping axis	Restart		

Parameter type	S/N	Description	Effective mode	Default value	Page
Spindle parameters (P5.)	002	2nd spindle mapping axis	Restart		
Spindle parameters (P5.)	003	Spindle max speed(rpm)	Instant		
Spindle parameters (P5.)	004	Spindle open delay time(ms)	Instant		
Spindle parameters (P5.)	005	System spindle rotation	Instant		
Spindle parameters (P5.)	006	Auto pause to close the spindle or not	Instant		
Spindle parameters (P5.)	007	Min spindle speed	Instant		
Spindle parameters (P5.)	008	2nd spindle max speed (rpm)	Instant		
Spindle parameters (P5.)	009	2nd spindle speed	Instant		
Spindle parameters (P5.)	010	Spindle command S value invalid enable	Instant		
Spindle parameters (P5.)	011	Mechanical spindle speed in gear 1 (rpm)	Instant		
Spindle parameters (P5.)	012	Mechanical spindle speed in gear 2 (rpm)	Instant		
Spindle parameters (P5.)	013	Mechanical spindle speed in gear 3 (rpm)	Instant		
Spindle parameters (P5.)	014	Mechanical spindle speed in gear 4 (rpm)	Instant		
Spindle parameters (P5.)	015	Spindle stop delay (ms)	Instant		
Spindle parameters (P5.)	016	Alarm off spindle enable	Instant		
Spindle parameters (P5.)	017	Spindle Auto Open	Instant		
Spindle parameters (P5.)	018	Spindle Auto Stop	Instant		
Spindle parameters (P5.)	019	Analog Spindle Encoder One Loop Pulse	Instant		
Spindle parameters (P5.)	020	Analog Spindle Gear Numerator	Instant		
Spindle parameters (P5.)	021	Analog Spindle Gear Denominator	Instant		
Spindle parameters (P5.)	022	Tapping mode	Instant		
Spindle parameters (P5.)	023	Way of tapping acceleration and deceleration	Instant		
Spindle parameters (P5.)	024	If tapping shaft has an encoder	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Spindle parameters (P5.)	025	Tapping FPGA calculates spindle speed	Instant		
Spindle parameters (P5.)	026	Tapping enables spindle acceleration filtering	Instant		
Spindle parameters (P5.)	027	Tapping adjusting parameter Kp	Instant		
Spindle parameters (P5.)	028	Tapping adjusting parameter Ki	Instant		
Spindle parameters (P5.)	029	Tapping adjusting parameter Kd	Instant		
Spindle parameters (P5.)	030	Filter coefficient of tapping adjusting parameter Kd	Instant		
Spindle parameters (P5.)	031	Amplitude limiting value of tapping adjusting parameter Ki	Instant		
Spindle parameters (P5.)	032	Amplitude limiting value of tapping adjusting parameter Kd	Instant		
Spindle parameters (P5.)	033	Tapping adjusting parameter K2	Instant		
Spindle parameters (P5.)	034	Delay before tapping	Instant		
Spindle parameters (P5.)	035	Tapping hole bottom delay	Instant		
Spindle parameters (P5.)	036	If tapping collects data	Instant		
Spindle parameters (P5.)	037	Maximum allowable tapping error	Instant		
Spindle parameters (P5.)	038	Tapping fixed cycle type	Instant		
			Instant		
Port parameter (P6.)	001	Tool checking input port No.	Instant		
Port parameter (P6.)	002	Tool setting safety testing input port number	Instant		
Port parameter (P6.)	003	Tool setting magazine output port number	Instant		
Port parameter (P6.)	004	Tool setting dust cover output port number	Instant		
Port parameter (P6.)	005	Tool setting dust cover lift in place input port	Instant		
Port parameter (P6.)	006	Tool regulator limit input port	Instant		
Port parameter (P6.)	007	Tool regulator blow output port	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		number			
Port parameter (P6.)	008	Spindle alarm input detection port number	Instant		
Port parameter (P6.)	009	Variable frequency alarm input detection port number	Instant		
Port parameter (P6.)	014	System power-off input port number	Instant		
Port parameter (P6.)	015	System power-off output port number	Instant		
Port parameter (P6.)	016	Gearbox gear detection input 1	Instant		
Port parameter (P6.)	017	Gearbox gear detection input 2	Instant		
Port parameter (P6.)	018	Spindle CW output port number	Instant		
Port parameter (P6.)	019	Spindle CCW output port number	Instant		
Port parameter (P6.)	020	Spindle CW 2 forward output port number	Instant		
Port parameter (P6.)	021	Spindle CCW 2 reverse output port number	Instant		
Port parameter (P6.)	022	Spindle inverter alarm reset output	Instant		
Port parameter (P6.)	023	Spindle blowing output port	Instant		
Port parameter (P6.)	024	Spindle brake output port	Instant		
Port parameter (P6.)	029	Safety grating input port number	Instant		
Port parameter (P6.)	030	Air pressure alarm input port number	Instant		
Port parameter (P6.)	031	Feed alarm input port number	Instant		
Port parameter (P6.)	032	Oil pressure alarm input port number	Instant		
Port parameter (P6.)	033	External start 2 input port number	Instant		
Port parameter (P6.)	034	External pause 2 input port number	Instant		
Port parameter (P6.)	035	External emergency stop 2 input port number	Instant		
Port parameter (P6.)	036	Cooler alarm input port number	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Port parameter (P6.)	037	Lubricating oil level alarm input port number	Instant		
Port parameter (P6.)	038	External reset alarm input port number	Instant		
Port parameter (P6.)	039	Elastic tool input port number	Instant		
Port parameter (P6.)	040	Warning lamp output port	Instant		
Port parameter (P6.)	041	Running lamp output port	Instant		
Port parameter (P6.)	042	Stop lamp output port	Instant		
Port parameter (P6.)	043	System ready lamp output port	Instant		
Port parameter (P6.)	044	Oiling Out Port	Instant		
Port parameter (P6.)	045	Cooler Out Port	Instant		
Port parameter (P6.)	046	Oil Pump Out Port	Instant		
Port parameter (P6.)	047	Input Detect ELevel 00 ~ 31	Instant		
Port parameter (P6.)	048	Input Detect ELevel 32 ~ 63	Instant		
Port parameter (P6.)	049	Input Detect ELevel 64 ~ 95	Instant		
Port parameter (P6.)	050	Input Detect ELevel 96 ~ 127	Instant		
Port parameter (P6.)	051	Input Detect ELevel 128 ~ 159	Instant		
Port parameter (P6.)	052	Input Detect ELevel 160 ~ 191	Instant		
Port parameter (P6.)	053	Input Detect ELevel 192 ~ 223	Instant		
Port parameter (P6.)	054	IO Conf in RESET 00~31	Instant		
Port parameter (P6.)	055	IO Conf in RESET 32~63	Instant		
Port parameter (P6.)	056	IO Conf in RESET 64~95	Instant		
Port parameter (P6.)	057	IO Conf in RESET 96~127	Instant		
Port parameter (P6.)	058	IO Conf in RESET 128~159	Instant		
Port parameter (P6.)	059	IO Conf in RESET 160~191	Instant		
Port parameter (P6.)	060	IO Conf in RESET 192~223	Instant		
Port parameter (P6.)	061	LED Conf in RESET 00 ~ 31	Instant		
Port parameter (P6.)	062	LED Conf in RESET 32 ~ 63	Instant		
Port parameter (P6.)	063	LED Conf in RESET 64 ~ 95	Instant		
Port parameter (P6.)	064	LED Conf in RESET 96 ~ 127	Instant		
Port parameter (P6.)	065	LED Conf in RESET 128 ~ 159	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Port parameter (P6.)	066	LED Conf in RESET 160 ~ 191	Instant		
Port parameter (P6.)	067	LED Conf in RESET 192 ~ 223	Instant		
Port parameter (P6.)	068	Power-on Output Open 00 ~ 31	Instant		
Port parameter (P6.)	069	Power-on Output Open 32 ~ 63	Instant		
Port parameter (P6.)	070	Power-on Output Open 64 ~ 95	Instant		
Port parameter (P6.)	071	Power-on Output Open 96 ~ 127	Instant		
Port parameter (P6.)	072	Power-on Output Open 128 ~ 159	Instant		
Port parameter (P6.)	073	Power-on Output Open 160 ~ 191	Instant		
Port parameter (P6.)	074	Power-on Output Open 192 ~ 223	Instant		
Port parameter (P6.)	075	Wheel 0.1	Instant		
Port parameter (P6.)	076	Wheel 0.01	Instant		
Port parameter (P6.)	077	Wheel 0.001	Instant		
Port parameter (P6.)	078	X Wheel	Instant		
Port parameter (P6.)	079	Y Wheel	Instant		
Port parameter (P6.)	080	Z Wheel	Instant		
Port parameter (P6.)	081	A Wheel	Instant		
Port parameter (P6.)	082	B Wheel	Instant		
Port parameter (P6.)	083	C Wheel	Instant		
Port parameter (P6.)	084	7 Wheel	Instant		
Port parameter (P6.)	085	8 Wheel	Instant		
Port parameter (P6.)	086	STARTUP	Instant		
Port parameter (P6.)	087	STOP	Instant		
Port parameter (P6.)	088	SCRAM	Instant		

10.2 Comprehensive parameter (P1.)

001	Feeding speed (mm/min)
002	Initial feeding speed (mm/min)
003	Feeding acceleration (mm/sec)
007	Maximum feeding speed (mm/min)

Range : 1~9999, 1~9999, 1~8000, 1~9999

Unit	:	mm/min, mm/min, mm/sec, mm/min
Authority	:	Operation admin or higher
Default	:	3000, 200, 1000, 3000
Effective time	:	Instant
Note	:	The feeding instructions such as G01, G02 and G03 move at the speed of F instruction. If the F instruction isn't specified in the program, the above instructions move at the speed set by this parameter. If the F instruction is specified, this parameter will be invalid. The maximum feeding speed restricts the F instruction during processing, i.e. no matter what F is set to, the actual speed can't exceed this parameter value. Setting this parameter will prevent the damage caused by accidental speed programming error when calling processing files.

004	Zero Return Mode		
	Range	:	0~1
	Unit	:	None
	Authority	:	Operation admin or higher
	Default	:	0 (Program home)
	Effective time	:	Instant
	Note	:	0 - Program home 1 - Mechanical home Program home is that the coordinates go to home, i.e. in place. Mechanical home requires external detection switch to locate the home position; while home operation, move to specified home direction at home speed, and move back slowly after signal is detected. At this moment, move forward slowly when the signal is disconnected, and the home operation completes when the signal is valid again. When the servo Z phase enable switch in IO configuration parameters is enabled, mechanical home will enable Z phase positioning as home position automatically after signal reaches.

005	IO Filter Wave (restart)		
	Range	:	0~8
	Unit	:	None

Authority	:	Super Admin
Default	:	0
Effective time	:	After restarted
Note	:	Set the filter constant; If the environment has too much interference, such as rain or thunder, please set a filter value. Higher value indicates longer test time and high reliability; 0 indicates no filter;

006	Selection of communicɛtion mode (restart)

Range	:	No User Network Uart All User
Unit	:	None
Authority	:	Operation admin or higher
Default	:	Uart
Effective time	:	Restart
Note	:	NetTCP Uart0 Uart1 NetUDP Uart3

008	Zeroing soft limit no alɛrm enables

Range	:	0~1
Unit	:	None
Authority	:	Operation admin or higher
Default	:	0
Effective time	:	Instant
Note	:	No soft limit detection required when zeroing

009	USB disk online processing enable

Range	:	0~1
Unit	:	None
Authority	:	Operation admin or higher
Default	:	0

Effective time	:	Instant
Note	:	To set to read USB disk processing file directly, and with USB disk processing online processing function

010	M Code Delay time (ms)

Range	:	1~9999
Unit	:	ms
Authority	:	Operation admin or higher
Default	:	100
Effective time	:	Instant
Note	:	Set the waiting time (unit: ms) after executing M code

011	Line number increment

Range	:	0~64
Unit	:	None
Authority	:	Operation admin or higher
Default	:	0
Effective time	:	Instant
Note	:	While editing G code manually, add a line number Nxxxxx automatically in a new line; 0 indicates that this function is disabled;

012	UART serial port baud rate

Range	:	9600~115200
Unit	:	None
Authority	:	Operation admin or higher
Default	:	115200
Effective time	:	Restart
Note	:	The communication rate setting when DNC or other PC software and this controller are in RS232 communication mode

013	Controller ID

Range	:	1~255
Unit	:	None
Authority	:	Operation admin or higher
Default	:	1

Effective time : Restart

Note : The ID number setting of the controller when DNC or other PC software and this controller are in MODBUS communication mode

014	Circle Inp Unit(mm)

Range : 0~1

Unit : mm

Authority : Operation admin or higher

Default : 0.2

Effective time : Instant

Note : Set the arc interpolation equivalent

If this value is too small, the arc has higher approximation accuracy, but the computation will be too high, making the pause during processing obvious and affecting the processing effect.

015	G73(M) Loop Obligate(mm)
016	G83(M) Loop Obligate(mm)

Range : 0.1~100

Unit : mm

Authority : Operation admin or higher

Default : 2.000

Effective time : Instant

Note : Set the tool retracting amount after Q is fed in G73 and G83 instructions; this parameter (default: 2mm) is set according to actual chip removal effect.

017	Arc interpolation processing mode

Range : Time split, position split

Unit : None

Authority : Operation admin or higher

Default : Position split

Effective time : Instant

Note : Position split is done based on arc length

Time split is done by time.

018	Speed optimization constraint mode

Range : Angle Speed Speed1

Unit	:	None
Authority	:	Operation admin or higher
Default	:	Speed2
Effective time	:	Instant
Note	:	In pretreatment mode, set to Angle to use corner speed balancing algorithm, or set to Speed to use axis acceleration constraints balancing algorithm, or set to Speed1 to use efficient and quick acceleration constraints balancing algorithm.

019	G Code pre-treatment processing mode

Range	:	0~1
Unit	:	None
Authority	:	Operation admin or higher
Default	:	0 (real-time processing)
Effective time	:	Instant
Note	:	Real-time processing is suitable for machine test. In pretreatment mode, the system enters processing state buffs for two seconds and pre-reads. The pretreatment mode only can check the direction and size of feeding segment to adjust the speed automatically and process at optimized speed.

020	'O' Pro Scan

Range	:	0~1
Unit	:	None
Authority	:	Operation admin or higher
Default	:	1
Effective time	:	Instant
Note	:	File scanning symbol will quicken the file transfer speed when processing large files. When transferring NC files, the system needs to scan over to position every program block. X In this way, if the file only has one block and the file size is very big, it will cause unnecessary waiting time. If this option is closed, the system will exit after scanning the address of first block.

021	Variable frequency analog control mode

Range	:	0~1
Unit	:	None
Authority	:	Operation admin or higher
Default	:	0
Effective time	:	Instant
Note	:	Control mode corresponding to spindle S code (frequency conversion mode) 0 : Analog output 1: Section speed regulation (4-digit code determined by output port configured by spindle parameters P6.014 ~ P4.017), as below: P6.014----- S0 P4.015----- S1 P4.016----- S2 P4.017----- S3 In analog output mode, the analog voltage is: V＝S/MaxRPM S is the rotation set by the user, and MaxRPM is the maximum rotation of spindle set by the parameter (P4.017); In switching quantity mode, constitute block 0-15 according to four-digit code to output; S code value is restricted to 0-15;

022	Lubricant Pressure Open(min)
023	Lubricant Pressure Keep(sec)
024	Lubricant Pressure Out Freq(Hz)

Range	:	
Unit	:	
Authority	:	Operation admin or higher
Default	:	0
Effective time	:	Instant
Note	:	Set the schedule start and holding time of the automatic oil pump of the system Schedule open setting is that the settings of P6.045 oil pump output ports when the timing reaches specified value after the system starts and times.

Output signal stops keeping for the seconds specified by P1.023 (reverse phase).

Output signal follows the hertz specified by P1.024 in working state, and used for oil supply devices. If it is set to 0, the system will keep low output level.

025	Back Home Mode Configuration (BIT)

Range :

Unit :

Authority : Operation admin or higher

Default : Z – XYABC

Effective time : Instant

Note : Set the zero sequence of each axis; up to three sections can be set.

026	Arc speed for Radii
027	Arc speed for Speed

Range :

Unit : Coefficient

Authority : Operation admin or higher

Default : 50, 100

Effective time : Instant

Note : Used to restrict the arc processing speed automatically. This parameter is valid in pretreatment mode.

The bigger the radius coefficient is, the lower the arc speed is.

The bigger the acceleration coefficient is, the higher the arc speed is.

028	Pretreatment Code Setting

Range : 100~5000

Unit : Instruction line

Authority : Operation admin or higher

Default : 500

Effective time : Instant

Note : Set the pre-reading instruction lines; if the pretreatment processing

pauses and pre-reads, please increase this value to pre-read more instructions.

029	Inp AccSpeed Mode (1: linear acceleration/deceleration 0:S curve acceleration/deceleration)
030	'S' Speed Acceleration

Range :

Unit :

Authority : Operation admin or higher

Default :

Effective time : Instant

Note : Used to set the performance of S curve acceleration/deceleration

031	HOME check enable for alarm
032	HOME Check Enable

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0, 1

Effective time : Instant

Note : Used to set whether prompt user to reset under certain conditions, ensuring that the user has performed the operation;

If the value is set to 0, it won't check, and will run directly.

033	X diameter prog enable (L series)

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 1 (L series) /0 (M series)

Effective time : Instant

Note : On lathe controller (L series), it is used to set whether the display and programming of X axis are in radius or diameter;

034	Default process plane

Range : G17, 18, 19

Unit :

Authority : Operation admin or higher

Default : G18 (L series)/G17 (M series)

Effective time : Instant

Note : Set the default processing plane to XY or XZ; modify the default plane, so that it isn't need to specify the modal plane value while programming, and write plane related instructions directly in stead;

035	T code form (compensation number digits)(L series)

Range : 0~2

Unit :

Authority : Operation admin or higher

Default : 2 (L series)

Effective time : Instant

Note : Used to set the T value in tool change instruction on lathe controller (L series); the latter digits indicate the compensation number. In some conventional programming, people usually use two digits to specify the compensation number used by corresponding tool number;

For example: T0801 M06 indicates changing the #8 tool and compensating with #1 length.

036	Local IP address
037	Subnet mask
038	Default gateway

Range :

Unit :

Authority : Operation admin or higher

Default : 192.168.0.123

255.255.255.0

192.168.0.1

Effective time : Restart

Note : Used to configure Ethernet parameters, which shall comply with the actual network settings, or else it can't be accessed normally.

After configured successfully, the user can perform the ping command test on the PC of same network segment (same subnet mask) in the intranet. The connection has error if the return overtimes. Please check the physical connection.

The network environment requires independent NC network. Do not connect to office network or Internet, because the broadcast in the network and regular query of windows will block the network communication of NC.

040	This parameter is invalid (Standby)
041	Feed speed setting En

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : This parameter is used to modify the interpolation speed in programming, making F programming invalid.

Used for the cases that processing codes requires ignoring F-value.

042	G00 Inp mode Enable

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : Used to set whether G00 instruction is moved with G01 mode

If G01 mode is used, the interpolation speed shall follow the setting of minimum speed;

The acceleration is the interpolation acceleration.

043	Abnormal memory position jump enable

Range : 0~2 (corresponding OFF position memory, and status memory)

Unit : None

Authority : Operation admin or higher

Default : 0(OFF)

Effective time : Instant

Note : OFF: turn off this function

ON: turn on this function; when turned on, the processing ends because the processing code has abnormal condition during processing; the processing can be continued from the break point.

044	Pause Z to safe altitude
045	Pause A to safe altitude

Range : OFF workpiece coordinates, machine tool coordinates

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : OFF: turn off this function

ON: turn on this function; when turned on, press the [Pause] key during code processing or execute home operation in home mode, Z axis or A axis lifts to the safe altitude set by P1.049 or P1.050 automatically (workpiece coordinates or machine tool coordinates).

046	Program home referenc e point enable
047	Mechanical home reference point enable

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : OFF: turn off this function

ON: turn on this function; when turned on, execute program or mechanical home in home mode, return to the value set by coordinate parameters -€ coordinate settings -€ reference point 1.

048	Clear coordinates in home mode

Range : MAC Coord G54 Coord

Unit : None

Authority : Operation admin

Default : MAC Coord

Effective time : Instant

Note : For setting in home mode, press axis X, Y, Z, A, B, C in Run -€ Absolute position and the red LED flashes, press the [Cancel] button to clear the coordinate system, press MAC Coord to clear machine coordinates, and press G54 Coord to clear G54 workpiece coordinates. This function is generally used for machine debugging. Do not use it if the machine has been debugged.

049	Z-axis safe height
050	A-axis safe height

Range : -9999.999~9999.999

Unit : mm

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : When P1.044 or P1.045 is enabled and set to workpiece coordinates or machine coordinates, it is used to set the safety height automatically lifted (workpiece coordinates or machine coordinates) when A-axis or Z-axis pauses in the processing or executes home operation in home mode.

051	Z axis feed rate limit
	A axis feed rate limit
052	

Range : 0~20000

Unit : mm/min

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : When Z-axis or A-axis is used as the cutting feed axis, it sets the maximum G01 cutting feed rate.

053	Thread cutting acceleration pitch P (L series)
054	Thread cutting acceleration pitch D (L series)
055	Thread cutting backslide amount V (L series)

Range : 0~100

Unit : mm

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the pitch length of acceleration segment of lathe CNC4620 system thread cutting command G32 & G92, pitch length of the deceleration segment and run-out amount. For details of G32 G92 instruction, see CNC4620 programming manual.

056	Reserved

Range : OFF ON

Unit : None

Authority : Operation admin

Default : OFF

Effective time : Instant

Note :

057	System home ON

Range : No, Ask, Auto

Unit : None

Authority : Operation admin

Default : Non-return-to-zero

Effective time	:	Instant
Note	:	Ask: when the system is restarted, it asks whether to execute home operation; press the [EOB] button to execute. Auto: when the system is restarted, it executes home operation automatically.

058	Spindle brake delay (ms)	
Range	:	0~60000
Unit	:	Second
Authority	:	Operation admin
Default	:	1000
Effective time	:	Instant
Note	:	Used to set the delay between actions of the spindle brake switch

059	This parameter is invalid currently	
Range	:	
Unit	:	
Authority	:	Operation admin
Default	:	
Effective time	:	Instant
Note	:	This parameter is invalid currently.

060	4 axis max rotate speed	
Range	:	1~500
Unit	:	
Authority	:	Operation admin
Default	:	50
Effective time	:	Instant
Note	:	When P1.018 is set to (Angle X Y Z space angle optimization), set the maximum rotation speed when the fourth axis A is the rotation axis.

061	Handwheel encoder dir

Range	:	0~1
Unit	:	None
Authority	:	Operation admin
Default	:	0
Effective time	:	Instant
Note	:	When the logic direction obtained by handheld box encoder is reverse to the actual motion direction of the axis, set this parameter to perform in-phase setting. 0: positive direction 1: negative direction

062	Handwheel control mode	
Range	:	0~1
Unit	:	
Authority	:	Operation admin
Default	:	0
Effective time	:	Instant
Note	:	Used to set handwheel to control the motion of each axis; 0: old, 1: new

063	Handwheel max rate	
Range	:	500~10000
Unit	:	
Authority	:	Operation admin
Default	:	4000
Effective time	:	Instant
Note	:	Used to set the maximum rate of handwheel (valid when P1.062 is set to 1).

064	Handwheel acceleration	
Range	:	1~20
Unit	:	
Authority	:	Operation admin
Default	:	10

Effective time	:	Instant
Note	:	Used to set the maximum acceleration of handwheel (valid when P1.062 is set to 1).

065	Enables for returning to reference point after machining

Range	:	OFF Absolute coordinates, Machine coordinates
Unit	:	
Authority	:	Operation admin
Default	:	OFF
Effective time	:	Instant
Note	:	To set the system to return to the G54 workpiece coordinate system zero point or machine coordinate system zero point after machining program operation completes

066	Feeding rate variation

Range	:	1~100
Unit	:	
Authority	:	Operation admin
Default	:	OFF
Effective time	:	Instant
Note	:	To set the adjusting unit amount of feedrate

067	Auto chamfering and arc chamfering enable

Range	:	OFF Auto chamfering , Auto arc chamfering, Arc chamfering error
Unit	:	
Authority	:	Operation admin
Default	:	OFF
Effective time	:	Instant
Note	:	To set the straight lines or arc chamfering transition at the intersection of two straight lines

068	Chamfering or arc chamfering accuracy (mm)

Range	:	0~100
Unit	:	
Authority	:	Operation admin
Default	:	1.000
Effective time	:	Instant

Note : To set the straight line edge value or arc radius value at the intersection of two straight lines

069	Tool setting way of coordinate system

Range : 0~1

Unit :

Authority : Operation admin

Default : 0

Effective time : Instant

Note : To set the absolute input or relative input by manually entering the G5x workpiece coordinate system.

070	Maximum deviation of double drive zero return-to-zero (mm)

Range : 0.1~10000

Unit :

Authority : Operation admin

Default : 1.000

Effective time : Instant

Note : To set the machine of double-drive gantry structure (the maximum deviation of the two servo return-to-zero synchronization error alarm)

071	G code loading boundary scan enable

Range : OFF ON

Unit :

Authority : Operation admin

Default : OFF

Effective time : Instant

Note : To set whether the machining path stroke exceeds the software limit setting value during the G code loading process.

072	Split cycle

Range :

Unit :

Authority : Operation admin

Default : 1 ms

Effective time : Instant

	Note	: For settings
073	Z-axis safe height return speed	
	Range	: 0~20000
	Unit	:
	Authority	: Operation admin
	Default	: 100
	Effective time	: Instant
	Note	: To set the moving speed for positioning the Z-axis to a safe height when pause or jump the specified line
074	A-axis safe height return speed	
	Range	: 0~20000
	Unit	:
	Authority	: Operation admin
	Default	: 100
	Effective time	: Instant
	Note	: To set the moving speed for positioning the A-axis to a safe height when pause or jump the specified line
075	Z Axis Feed Speed Limit (mm/min)	
	Range	: 0~20000
	Unit	:
	Authority	: Operation admin
	Default	: 0
	Effective time	: Instant
	Note	: To set the total G01 feedrate for the Z-axis machining process
076	A Axis Feed Speed Limit (mm/min)	
	Range	: 0~20000
	Unit	:
	Authority	: Operation admin
	Default	: 0
	Effective time	: Instant
	Note	: To set the total G01 feedrate for the A-axis machining process
078	Remote slave IP address	
	Range	:

Unit :

Authority : Operation admin

Default : 0

Effective time : Instant

Note : To set the IP address to access the remote Modbus slave when the system is used as a Modbus master

079	Modbus master timeout (ms)

Range : 0~1000

Unit :

Authority : Operation admin

Default : 0

Effective time : Instant

Note : To set the communication timeout to access the remote Modbus slave when the system is used as a Modbus master

080	Modbus master retransmission times

Range : 0~100

Unit :

Authority : Operation admin

Default : 10

Effective time : Instant

Note : To set the communication retransmission times to access the remote Modbus slave when the system is used as a Modbus master

081	UART3 serial port baud rate

Range : 9600~115200

Unit :

Authority : Operation admin

Default : 115200

Effective time : Instant

Note : To set the communication baud rate of UART3 serial port (RS485)

082	Local IP address 2

Range :

Unit :

Authority	:	Operation admin
Default	:	0
Effective time	:	Instant
Note	:	To set the IP address of system Channel2 RJ45 network port

083	MAC address 2

Range	:	
Unit	:	
Authority	:	Operation admin
Default	:	0
Effective time	:	Instant
Note	:	To set the physical MAC address of the Channel 2 RJ45 network port of the system.

084	LV interrupt enable (0 off 1 on)

Range	:	
Unit	:	
Authority	:	Operation admin
Default	:	1
Effective time	:	Restart
Note	:	

10.3 Axis parameter configuration (P2.)

001	X Gear Numerator
	X Gear Denominator
	Y Gear Numerator
	Y Gear Denominator
	Z Gear Numerator
	Z Gear Denominator
	A Gear Numerator
	A Gear Denominator
	B Gear Numerator

	B Gear Denominator
	C Gear Numerator
	C Gear Denominator

Range : 1~65535

Unit : None

Authority : Operation admin or higher

Default : 1

Effective time : Restart

Note : When screws of different pitches and motors of different step angles or servo motors of different pulses are matched, or connected through gears, it allows keeping the program and actual motion distance consistent through electronic gear ratio setting of the system.

CMR/CMD =P/(L×1000)

CMR: gear ratio numerator

CMD: gear ratio denominator

P: Pulses corresponding to one rotation of the motor

L: Machine tool movement corresponding to one rotation of the motor (mm)

CMD/CMR is the pulse equivalent actually, i.e. the motion distance corresponding to every pulse (unit: 0.001mm).

Ex 1: the motor rotates one cycle every 5000 pulses, and the machine tool moves 5mm when the motor rotates one cycle, then

CMR/CMD=5000/(5*1000)=1/1

Then, CMR=1, CMD=1, the pulse equivalent is 0.001mm

Ex 2: the motor rotates one cycle every 5000 pulses, and the machine tool moves 10mm when the motor rotates one cycle, then

CMR/CMD=5000/(10*1000)=1/2

Then, CMR=1, CMD=2, the pulse equivalent is 0.002mm

002	X Fast Speed(mm/min)
	Y Fast Speed(mm/min)
	Z Fast Speed(mm/min)
	A Fast Speed(mm/min)

	B Fast Speed(mm/min)
	C Fast Speed(mm/min)
003	X axis start rate (mm/min)
	Y axis start rate (mm/min)
	Z axis start rate (mm/min)
	A axes start rate (mm/min)
	B axis start rate (mm/min)
	C axis start rate (mm/min)
004	X axis acceleration (Kpps)
	Y axis acceleration (Kpps)
	Z axis acceleration (Kpps)
	A axes acceleration (Kpps)
	B axis acceleration (Kpps)
	C axis acceleration (Kpps)

Range : 1~9999, 1~9999, 1~8000

Unit : mm/min,mm/min,mm/sec

Authority : Operation admin or higher

Default : 3000, 200, 1500

Effective time : Instant

Note : This parameter is the trapezoid acceleration/deceleration setting and used for GOO instruction

About start speed, 1-2 rotation motor speed is recommended for step motor; as above, the machine tool moves 5mm when the motor rotates one cycle, and the speed is 5-10mm/sec (300-600mm/min). For servo motor, the start and stop shouldn't have vibration. If this speed is too high, it will cause vibration during motion, and the step motor will be out of step.

Parameters affected by the acceleration and start speed include manual speed, home speed and other non-interpolation motions;

005	X Soft PosLimit+(mm)
	X Soft NegLimit-(mm)
	Y Soft PosLimit+(mm)
	Y Soft NegLimit-(mm)

	Z Soft PosLimit+(mm)
	Z Soft NegLimit-(mm)
	A Soft PosLimit+(mm)
	A Soft NegLimit-(mm)
	B Soft PosLimit+(mm)
	B Soft NegLimit-(mm)
	C Soft PosLimit+(mm)
	C Soft NegLimit-(mm)

Range : -9999~9999

Unit : mm

Authority : Operation admin or higher

Default : Maximum positive/negative value

Effective time : Instant

Note : Generally, the machine tool has hard limit signal. In this case, software limit isn't required. Please set the positive limit to +9999.999, and negative limit to -9999.999.

If hard limit switch isn't installed, please use soft limit, which uses machine tool coordinate system as the base point. Positive limit and negative limit are subject to actual distance (unit: mm).

Since soft limit decelerates and stops at the limit point, it may exceed the set distance, which depends on acceleration time and speed. Please keep certain margin when setting this parameter.

006	X- Machine Limit Input Port No.
	Y- Machine Limit Input Port No.
	Z- Machine Limit Input Port No.
	A- Machine Limit Input Port No.
	B- Machine Limit Input Port No.
	C- Machine Limit Input Port No.

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the negative hard limit input port number of each axis

007	X+ Machine Limit Input Port No.
	Y+ Machine Limit Input Port No.
	Z+ Machine Limit Input Port No.
	A+ Machine Limit Input Port No.
	B+ Machine Limit Input Port No.
	C+ Machine Limit Input Port No.

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the positive hard limit input port number of each axis

008	X Ext Home Input Port No.
	Y Ext Home Input Port No.
	Z Ext Home Input Port No.
	A Ext Home Input Port No.
	B Ext Home Input Port Number
	C Ext Home Input Port Number

Range : 0~8888

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the external zero input port number of each axis

009	X Server Enable Output Port No.
	Y Server Enable Output Port No.
	Z Server Enable Output Port No.

	A Server Enable Output Port No.
	B Server Enable Output Port No.
	C Server Enable Output Port No.

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the servo enable output port number of each axis

010	X Server Alarm Input Port No.
	Y Server Alarm Input Port No.
	Z Server Alarm Input Port No.
	A Server Alarm Input Port No.
	B Server Alarm Input Port No.
	C Server Alarm Input Port No.

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the input signal port number of receiving detection servo alarm

011	X Server Reset Output Port No.
	Y Server Reset Output Port No.
	Z Server Reset Output Port No.
	A Server Reset Output Port No.
	B Server Reset Output Port No.
	C Server Reset Output Port No.

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the reset servo control output port number

012	X Backlash Expiate(pulse)
	Y Backlash Expiate(pulse)
	Z Backlash Expiate(pulse)
	A Backlash Expiate(pulse)
	B Backlash Expiate(pulse)
	C Backlash Expiate(pulse)

Range : 1~20000

Unit : Pulse

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : Compensate the clearance between control axis

Compensate with the pulse in minimum unit. The specific number should be converted according to gear ratio.

013	X HOME Offset
	Y HOME Offset
	Z HOME Offset
	A HOME Offset
	B HOME Offset
	C HOME Offset

Range : -9999~9999

Unit : Pulse(mm)

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : Set the compensation home offset (unit: pulse) after axis home

operation.

First, complete the mechanical home operation, offset corresponding pulse, and then set this point as mechanical home.

Note: This parameter is invalid during program home operation.

014	X axis Home Dir
	Y axis Home Dir
	Z axis Home Dir
	A axis Home Dir
	B axis Home Dir
	C axis Home Dir

Range : 0~1

Unit : None

Authority : Operation admin or higher

Default : 1, 1, 0, 0

Effective time : Instant

Note : Set the mechanical home direction of every processing axis

Positive

Negative

015	X axis home speed
	Y axis home speed
	Z axis home speed
	A axes home speed
	B axis home speed
	C axis home speed

Range : 0~9999

Unit : mm/min

Authority : Operation admin or higher

Default : 1000

Effective time : Instant

Note : Set the home speed of every axis separately

016	X axis manual speed
	Y axis manual speed
	Z axis manual speed
	A axes manual speed
	B axis manual speed
	C axis manual speed

Range : 0~9999

Unit : mm/min

Authority : Operation admin or higher

Default : 1000

Effective time : Instant

Note : Set the manual speed of every axis separately

The starting speed and acceleration are determined by parameters 003 & 004.

017	X-axis corner speed smoothing level
	Y-axis corner speed smoothing level
	Z-axis corner speed smoothing level
	A-axis corner speed smoothing level
	B-axis corner speed smoothing level
	C-axis corner speed smoothing level
018	X axis max restrain rate (mm/sec)
	Y axis max restrain rate (mm/sec)
	Z axis max restrain rate (mm/sec)
	A axis max restrain rate (mm/sec)
	B axis max restrain rate (mm/sec)
	C axis max restrain rate (mm/sec)

Range : 1~90000

Unit :

Authority : Super Admin

Default : 90000

Effective time : Instant

Note : Used to configure the restriction acceleration of every axis during

pretreatment processing.

No matter which parameter, the lower the setting is, the slower the processing speed is; vice versa.

The setting value should be as high as possible if each axis permits.

This parameter is valid when the Comprehensive parameter P1.018 (speed optimization constraint mode) is set to Speed or Speed1.

019	X_Servo AlarmIn ELevel
	Y_Servo AlarmIn ELevel
	Z_Servo AlarmIn ELevel
	A_Servo Alarm ELevel
	B_Servo Alarm ELevel
	C_Servo Alarm ELevel
020	X_Servo Reset Out ELeve
	Y_Servo Reset Out ELeve
	Z_Servo Reset Out ELeve
	A_Servo Reset Out ELevel
	B_Servo Reset Out ELevel

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0, 1

Effective time : Instant

Note : Adapt to the interface parameters of selected servo driver; please refer to interface voltage level description of servo for specific parameter settings.

021	X_ECZ Home Enable
	Y_ECZ Home Enable
	Z_ECZ Home Enable
	A_ECZ Home Enable
	B_ECZ Home Enable

	C_ECZ Home Enable

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0

Effective time : Instant

Note : When this parameter is enabled, encoder Z phase positioning of corresponding axis will be enabled automatically in mechanical home mode, i.e. the “servo home” positioning; in this mode, the accuracy of repeated home positioning depends on servo positioning accuracy, and therefore it is recommended to enable this function for servo motor. Step motor doesn’t have encoder and can’t enable this option, or else the signals can’t be scanned during mechanical home operation and will move constantly.

022	X_ECZ Home ELevel
	Y_ECZ Home ELevel
	Z_ECZ Home ELevel
	A_ECZ Home ELevel
	B_ECZ Home ELevel
	C_ECZ Home ELevel

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0

Effective time : Instant

Note : Adapt to the interface parameters of selected servo driver; please refer to interface voltage level description of servo for specific parameter settings.

023	X Machine Limit ELevel<●>
	Y Machine Limit ELevel<●>

	Z Machine Limit ELevel<●>
	A Machine Limit ELevel<●>
	B Machine Limit ELevel<●>
	C Machine Limit ELevel<●>

Range : 0~1

Unit : None

Authority : Super Admin

Default : 0

Effective time : After restarted

Note : Specific parameter settings depend on the interface level instructions of selected button or photoelectric sensor switch.

Scanning mode is integrated by the system and can't be shielded. The scanning mode inputs signal by accessing specified function number, and uses software anti-interference detection technology to check whether limit alarm occurs or has no interference. This requires certain time to check, and thus the real time isn't as well as interrupted limit. However, in most cases (at 10mm/min processing speed), it can meet the requirement on processing safety check.

The hardware response function of hard limit is prior to scanning response function, i.e. if the hardware response is enabled, it will quicken the response speed directly. It should be noted that the hardware response function only can stop pulse in instant mode. Therefore, the instant stop mode may cause mechanical vibration if the speed is too high. While software scanning mode uses maximum acceleration mode and decelerates according to the maximum acceleration set to every axis by the user (parameter P2.029), and therefore overshot will occur.

024	X Pulse Command Format (restart)
	Y Pulse Command Format(restart)
	Z Pulse Command Format(restart)
	A Pulse Command Format(restart)
	B Pulse Command Format(restart)
	C Pulse Command Format (restart)

Range : 0~1

Unit : None

Authority : Super Admin

Default : 1

Effective time : Restart

Note : Pulse command format setting is to configure the mode of output pulse. The compatible command format of the motor driver should be known in advance.

0 Pulse + pulse

1 Pulse + direction

025	X Pulse Logic Dir Mode (restart)
	Y Pulse Logic Dir Mode (restart)
	Z Pulse Logic Dir Mode (restart)
	4 Pulse Logic Dir Mode (restart)
	B Pulse Logic Dir Mode (restart)
	C Pulse Logic Dir Mode (restart)

Range : 0~1

Unit : None

Authority : Super Admin

Default : 1

Effective time : Restart

Note : Set pulse direction; if the controller direction is reverse to actual driver direction, please modify this parameter to adjust the rotation direction of motor.

026	X Ext Home ELevel
	Y Ext Home ELevel
	Z Ext Home ELevel
	A Ext Home ELevel
	B Ext Home ELevel
	C Ext Home ELevel

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0

Effective time : Instant

Note : Set the effective voltage level of external home sensor switch during home operation.

Low level

High level

027	X Round Setting (Restart)
	Y Round Setting (Restart)
	Z Round Setting (Restart)
	A Round Setting (Restart)
	B Round Setting (Restart)
	C Round Setting (Restart)

Range : 0~9999999

Unit : Pulse

Authority : Super Admin

Default : 0

Effective time : Restart

Note : Round function is available on hardware version 1.0 or later only;

This function is used to prevent the logic counting of axis exceeding the maximum counting range (2147483648) and causing overflow error;

Generally, overflow occurs only when the axis is set to rotary. The system will calculate the corresponding pulse limit according to the gear ratio of current axis and assign to the ROUND parameter of corresponding axis, if current axis is set to rotary and uses 360° display mode after the system getting P2.062~P2.069 parameters. The user can check the change of this parameter when the rotary axis display function is enabled. The user can modify the changed parameters, and the finally displayed number will be effective.

This parameter requires restart to take effect; the corresponding axis must be rotary and set to 360° display (P2.062~069);

028	X physial Assign Num<●>
	Y physial Assign Num<●>
	Z physial Assign Num<●>
	A physial Assign Num<●>
	B physial Assign Num<●>
	C physial Assign Num<●>

Range : 0~4

Unit : Pulse port sequence No.

Authority : Super Admin

Default :

Effective time : Restart

Note : In default mode, the actual number of every axis corresponds to the silk screen number on the shell. If certain function axis is abnormal, you can replace the axis through this function. For example, set P2.045 to 4, P2.048 to 1, then, any operation to X axis will be the operation to A axis encoder port on the shell.

0: no such axis

1~6: corresponding to 1#-6# axis

029	X axis encoder wire number
	Y axis encoder wire number
	Z axis encoder wire number
	A axes encoder wire number
	B axis encoder wire number
	C axis encoder wire number

Range : 0~9999

Unit : Wire number

Authority : Super Admin

Default : 2500

Effective time : Instant

Note : Set the encoder wires connected to every pulse port (AB phase pulse).

Since four times frequency division is performed for internal transfer, the

value of this parameter should be the pulses collected by the encoder for one cycle divided by 4.

030	X Reset to 360
	Y Reset to 360
	Z Reset to 360
	A Reset to 360
	B Reset to 360
	C Reset to 360

Range : 0~1

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

Note : To set the 360 degree reset when each axis is set to the rotation

031	X Pulse Logic Level (restart)
	Y Pulse Logic Level (restart)
	Z Pulse Logic Level (restart)
	A Pulse Logic Level (restart)
	B Pulse Logic Level (restart)
	C Pulse Logic Level (restart)

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0

Effective time : Restart

Note : Set the normal voltage level when the pulse is working. If the setting is different from the normal voltage level required by motor driver, a direction will have accumulative error during every positive and negative motion (independent of pulses). Therefore, if the positioning axis of the machine has accumulative error in a direction, please check whether this

parameter matches.

032	X feature (Rotary 0 Linear 1)
	Y feature (Rotary 0 Linear 1)
	Z feature (Rotary 0 Linear 1)
	A feature (Rotary 0 Linear 1)
	B feature (Rotary 0, Linear 1)
	C feature (Rotary 0, Linear 1)

Range : 0~1

Unit : None

Authority : Super Admin

Default : 1

Effective time : Instant

Note : Set axis features.

0: Rotary axis

1: Linear axis

The setting of this parameter and P2.027 axis will affect the setting of P2.021 Please refer to the parameter description of P2.021 for details.

033	X Rolling Display Mode
	Y Rolling Display Mode
	Z Rolling Display Mode
	A Rolling Display Mode
	B Rolling Display Mode
	C Rolling Display Mode

Range : 0~1

Unit : None

Authority : Super Admin

Default : 0

Effective time : Instant

Note : Set the coordinate display mode of the axis. This parameter is valid when P2.062~P2.065 is set to 0 This parameter is valid when P2.062~P2.065 is set to 0

0: 0~360° display

1: -9999.999~9999.999° display

The setting of this parameter and P2.026 axis will affect the setting of P2.021 Please refer to the parameter description of P2.021 for details.

034	X G00 Rolling Path Optimize
	Y G00 Rolling Path Optimize
	Z G00 Rolling Path Optimize
	A G00 Rolling Path Optimize
	B G00 Rolling Path Optimize
	C G00 Rolling Path Optimize

Range : 0~1

Unit : None

Authority : Super Admin

Default : 1

Effective time : Instant

Note : This parameter is valid when P2.026 and P2.027 are set to 0; set whether looking for shortest path automatically; if it is rotary axis and is positioning but doesn't process, enable this function to shorten the motion time.

0: Do not optimize the path

1: Enable the shortest path

Note: If processing is required during the motion, the shortest path may be not your desired processing track.

035	X Max Acceleration
	Y Max Acceleration
	Z Max Acceleration
	A Max Acc(Kpps)
	B Max Acceleration
	C Max Acceleration

Range : 100~8000

Unit : Kpps (Kilo Pulse Per Second)

Authority : Super Admin

Default : 2000

Effective time : Instant

Note : Set the maximum acceleration of every axis. This setting will affect the track speed optimization of pretreatment to every axis. If a high value is set, the axis response time will be shortened and characteristics of the motor will be improved according to the machine tool.

This parameter also affects the home function and limit stop function.

Hard limit function: Use hard limit in software scanning mode, in which the hard limit decelerates and stops according to the maximum acceleration of this axis. Therefore, if this value is too high, the machine tool will stop in emergency, and if this value is too low, it will cause too much overshoot.

Home function: the home acceleration of every axis uses this value.

036	X Servo Home Dir
	Y Servo Home Dir
	Z Servo Home Dir
	A Servo Home Dir
	B Servo Home Dir
	C Servo Home Dir

Range : 0~1

Unit : None

Authority : Super Admin

Default : 0

Effective time : Instant

Note : This parameter determines the Z phase search direction when servo Z phase enable parameter is enabled in P2.015.

0: Positive

1: Negative

037	X Ext Home Enable
	X Ext Home Enable
	Z Ext Home Enable

	A Ext Home Enable
	B Ext Home Enable
	C Ext Home Enable

Range : 0~1

Unit : None

Authority : Super Admin

Default : 1

Effective time : Instant

Note : When mechanical home mode is selected, this parameter determines whether external deceleration switch should be searched. If this parameter is set to 0, and P2.015 (servo Z phase enable) is also set to 0, the home mode sets current point as the home directly in mechanical mode.

0: No

1: Yes

038	X Encoder Logic Dir
	Y Encoder Logic Dir
	Z Encoder Logic Dir
	A Encoder Logic Dir
	B Encoder Logic Dir
	C Encoder Logic Dir

Range : 0~1

Unit : None

Authority : Super Admin

Default : 0

Effective time : Instant

Note : When the logic direction obtained by handheld box encoder is reverse to the actual motion direction of the axis, set this parameter to perform in-phase setting.

0: positive direction

1: negative direction

039	X-axis return-to-zero 2nd segment leave speed

	Y-axis return-to-zero 2nd segment leave speed
	Z-axis return-to-zero 2nd segment leave speed
	A-axis return-to-zero 2nd segment leave speed
	B-axis return-to-zero 2nd segment leave speed
	C-axis return-to-zero 2nd segment leave speed
040	X-axis return-to-zero 3rd segment detection speed
	Y-axis return-to-zero 3rd segment detection speed
	Z-axis return-to-zero 3rd segment detection speed
	A-axis return-to-zero 3rd segment detection speed
	B-axis return-to-zero 3rd segment detection speed
	C-axis return-to-zero 3rd segment detection speed

Range : 1~20000

Unit : mm/min

Authority : Super Admin

Default : 100, 60

Effective time : Instant

Note : Used to set the speed parameters of mechanical resetting; the specific effective sequence is as follows:

Resetting speed ——> (when detecting external zero switch) deceleration ——> scanning speed

041	X axis pitch compensation function enable
	Y axis pitch compensation function enable
	Z axis pitch compensation function enable
	A axes pitch compensation function enable
	B axis pitch compensation function enable
	C axis pitch compensation function enable

Range : OFF ON

Unit : None

Authority : Super Admin

Default : OFF

Effective time : Instant

Note : Set to ON and the pitch compensation of axis X, Y,Z, 4, B, C is valid.

042	X axis pitch compensation spacing (mm)
	Y axis pitch compensation spacing (mm)
	Z axis pitch compensation spacing (mm)
	A axes pitch compensation spacing (mm)
	B axis pitch compensation spacing (mm)
	C axis pitch compensation spacing (mm)

Range : 1~1000

Unit : mm

Authority : Super Admin

Default : 10

Effective time : Instant

Note : Set the compensation spacing from point N to point N + 1 of each axis; if it is set to 10mm, the spacing from compensation point 0 to 1 is 10mm.

043	X axis pitch compensation start position
	Y axis pitch compensation start position
	Z axis pitch compensation start position
	A axes pitch compensation start position
	B axis pitch compensation start position
	C axis pitch compensation start position

Range : -9999.999 ~ 9999.999

Unit : mm

Authority : Super Admin

Default : 0

Effective time : Instant

Note : Set the starting position of compensation, which corresponds to the machine coordinate position. Since the number of pitch compensation is measured from mechanical zero position to a position on the machine, so that the parameter is set to the mechanical zero position. The parameter is generally set to 0.

044	X axis pitch compensation end position

	Y axis pitch compensation end position
	Z axis pitch compensation end position
	A axes pitch compensation end position
	B axis pitch compensation end position
	C axis pitch compensation end position

Range : -9999.999 ~ 9999.999

Unit : mm

Authority : Super Admin

Default : 0

Effective time : Instant

Note : Set the compensation of the end position, corresponding to the machine coordinate position. This value depends on the measured travel and has both positive and negative values. To measure pitch compensation from mechanical zero position to mechanical -110mm position, the value is set to -110mm; to measure from mechanical zero position to mechanical 110, the value is set to 110mm. After setting the starting position and end position, the mechanical coordinate position of the system trajectory only compensates the pitch error in this region.

045	X servo device address
	Y servo device address
	Z servo device address
	A servo device address
	B servo device address
	C servo device address

Range : 0 ~ 255

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

Note : It is used to set the address when it accesses servo slave as a Modbus master, i.e. the ID number.

046	X-axis single-turn offset (mm/turn)
	Y-axis single-turn offset (mm/turn)
	Z-axis single-turn offset (mm/turn)
	A-axis single-turn offset (mm/turn)
	B-axis single-turn offset (mm/turn)
	C-axis single-turn offset (mm/turn)

Range : -9999.999 ~ 9999.999

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

Note : It is used to set the screw moving distance after servo rotates a turn (usually be used by the absolute servo motor or ETherCAT bus servo in setting movement per revolution. Note: After setting this parameter for bus controller, it is not necessary to set P2 parameter 001 multiplication ratio and frequency division coefficient)

047	X-axis absolute encoder origin calibration
	Y-axis absolute encoder origin calibration
	Z-axis absolute encoder origin calibration
	A-axis absolute encoder origin calibration
	B-axis absolute encoder origin calibration
	C-axis absolute encoder origin calibration

Range : -9999.999 ~ 9999.999

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

Note : To set the absolute encoder servo origin position calibration for the ETherCAT bus

048	X Servo Driver Type
	Y Servo Driver Type

	Z Servo Driver Type
	A Servo Driver Type
	B Servo Driver Type
	C Servo Driver Type

Range : Standard pulse type QX, QS8.....ETherCAT bus type servo driver

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : It is used to set the standard pulse type and ETherCAT bus type of the servo driver types

049	X encoder type
	Y encoder type
	Z encoder type
	A encoder type
	B encoder type
	C encoder type

Range : Relative, absolute

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the servo driver encoder type

050	X Server Orientation Output Port No.
	Y Server Orientation Output Port No.
	Z Server Orientation Output Port No.
	A Server Orientation Output Port No.
	B Server Orientation Output Port No.
	C Server Orientation Output Port No.

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the servo spindle quasi-stop control output port number (Note: This parameter is used when the servo spindle is configured for this axis)

051	X servo pulse control output port number
	Y servo pulse control output port number
	Z servo pulse control output port number
	A servo pulse control output port number
	B servo pulse control output port number
	C servo pulse control output port number

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the control output port number when servo spindle simulates and switch with the pulse mode (Note: This parameter is used when the servo spindle is configured for this axis)

052	X servo rigid tapping mode output port
	Y servo rigid tapping mode output port
	Z servo rigid tapping mode output port
	A servo rigid tapping mode output port
	B servo rigid tapping mode output port
	C servo rigid tapping mode output port

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the control output port number when the servo spindle is switched

to the rigid tapping mode (Note: This parameter is used when the servo spindle is configured for this axis)

053	X servo spindle ready input port
	Y servo spindle ready input port
	Z servo spindle ready input port
	A servo spindle ready input port
	B servo spindle ready input port
	C servo spindle ready input port

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the input detection port prepared by the servo enable for servo spindle detection (Note: This parameter is used when the servo spindle is configured for this axis)

054	X servo spindle quasi-stop in-position input port
	Y servo spindle quasi-stop in-position input port
	Z servo spindle quasi-stop in-position input port
	A servo spindle quasi-stop in-position input port
	B servo spindle quasi-stop in-position input port
	C servo spindle quasi-stop in-position input port

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the servo quasi-stop in-position input detection port for the servo spindle detection (Note: This parameter is used when the servo spindle is configured for this axis)

055	X servo spindle zero speed in-position input port
	Y servo spindle zero speed in-position input port
	Z servo spindle zero speed in-position input port
	A servo spindle zero speed in-position input port
	B servo spindle zero speed in-position input port
	C servo spindle zero speed in-position input port

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the zero speed in-position input detection port after servo stop during servo spindle detection (Note: This parameter is used when the servo spindle is configured for this axis)

056	X servo spindle speed reaches the input port
	Y servo spindle speed reaches the input port
	Z servo spindle speed reaches the input port
	A servo spindle speed reaches the input port
	B servo spindle speed reaches the input port
	C servo spindle speed reaches the input port

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

Note : To set the input detection port when the servo speed reaches during servo spindle detection (Note: This parameter is used when the servo spindle is configured for this axis)

10.4 Management parameter (P3.)

001	Select administrator mode

002	Edit super user password
003	Edit operation user password

Range : None

Unit : None

Authority : None

Default : None

Effective time : Instant

Note : In this menu, type the password and press 'Insert'. If the password is valid, the system will enter this user mode;

After entering, this menu will turn into "Exit XXX admin mode", indicating entering successfully;

In the new menu, press the Insert key to exit the admin mode. To modify the parameter table at this moment, you need to enter the admin mode again;

The super user can modify all passwords, while the operation user only can modify the own password.

Password 0 indicates that the password isn't checked in this mode; it isn't required to enter the admin mode to modify the parameters.

004	Initialize <●>
005	Initialize IO configuration <●>
006	All para reset<●>

Range : None

Unit : None

Authority : Super user

Default : None

Effective time : Instant

Note : Initial parameter table only in super user mode

007	Para backup
008	Para recover

Range	:	None
Unit	:	None
Authority	:	Super user
Default	:	None
Effective time	:	Instant
Note	:	The parameters are backed up and restored only in super user mode. The parameters are backed up to the sysconf.bak file in the root directory of the controller. If this folder already has a file with same name, the latest backup will overwrite this file. The sysconf.bak file in the root directory is also used for restoring. During restoring, it will check whether the parameter versions are same according to the backed up parameter version; if not, the system won't restore the parameter table. After restoring, the system will restart automatically.

009	Generate cryptogram

Range	:	None
Unit	:	None
Authority	:	None
Default	:	None
Effective time	:	Instant
Note	:	1. If you have forgotten the password, you can generate a PassMeg.DAT file with this function, provide this file to controller manufacturer and ask the manufacturer to reset the password.

010	System axis group configuration

Range	:	1~65535
Unit	:	None
Authority	:	None
Default	:	0 (click)
Effective time	:	Instant
Note	:	To set the axis configuration of the Channel 1 and 2 of the multi-channel

011	Clear accumulated processing pieces
012	Clear current processing pieces

Range	:	None
Unit	:	None
Authority	:	None
Default	:	None
Effective time	:	Instant
Note	:	Clear the accumulated value of current processing pieces

013	Maximum cumulative processing number

Range	:	0~999999
Unit	:	None
Authority	:	None
Default	:	0
Effective time	:	Instant
Note	:	When this value is set, the system prompts alarm if the cumulative processing number in automatic mode is greater than or equals to this value. The proceeding can be continued when the P3.011 parameter is cleared.

014	Import CSV system configuration

Range	:	None
Unit	:	None
Authority	:	None
Default	:	None
Effective time	:	Restart
Note	:	Import the CSV system configuration of the manufacturer into the system

015	Startup display module

Range	:	Select
Unit	:	None
Authority	:	Operation admin
Default	:	ABS
Effective time	:	Instant
Note	:	Select default boot screen from absolute position, relative position and

comprehensive position.

016	Sys language bag

Range : 0~1

Unit : None

Authority : Operation admin

Default : 0 (Chinese)

Effective time : Instant

Note : Sys language select

Chinese

English

017	Macro key word valid enable

Range : 0~1

Unit : None

Authority : Operation admin

Default : 0 (Chinese)

Effective time : Instant

Note : Macro keyword effective parameter is used to set whether the macro expression symbol on the membrane is valid (1: valid, 0: invalid).

018	Startup picture displa y

Range : 0~6

Unit : None

Authority : Operation admin

Default : 1S

Effective time : Instant

Note : Used to configure the display mode of the logo; if it is set to 0, the user needs to press any key to enter the system; for any other value, the system delays for corresponding time and enters automatically.

019	System axis group starts configuration automatically

Range	:	Axis group 1 Axis group 2 GRUN4 GRUN5 GRUN6
Unit	:	None
Authority	:	Super user
Default	:	XYZ
Effective time	:	Instant
Note	:	To set the multi-channel G code configuration that is started in parallel when the system starts running the machining program

020	Sys debug information enable

Range	:	0~1
Unit	:	None
Authority	:	Super user
Default	:	OFF/0
Effective time	:	Instant
Note	:	Used to configure whether RS232 of current system outputs the testing info while program is running. This parameter is dedicated for programmers, and the users are not suggested using this parameter. If the testing info is enabled, the system performance will be lowered, and therefore it is disabled during normal processing. If networking is enabled, this function must be disabled, or else the networking will fail.

021	Axis control composite enable

Range	:	0~1
Unit	:	None
Authority	:	Super user
Default	:	ON/1
Effective time	:	Instant
Note	:	Used to configure whether the key for axis motion on the control panel is enabled. This parameter is used to shield the composite function of the key for axis motion on the NC panel and reduce the possibility of misoperation when

additional panel is used. However, if no additional panel is used, this parameter must be enabled, or else the axis motion can't be controlled through the key.

022	Additional panel enable

Range : OFF FCNC4M FDK4A FCNC900V FCNC6D

Unit : None

Authority : Super user

Default : OFF/0

Effective time : Instant

Note : Used to configure whether NC uses additional panel, which must be ADT matching additional panel, or compatible with the interface of same protocol.

If additional panel is used, the system testing info enable must be deactivated (P3.20).

023	M code macro program selection

Range : MFUNC User-Def

Unit : None

Authority : Super user

Default : MFUNC

Effective time : Restart

Note : Used to configure M code macro program of the system, MFUNC uses the default M code macro program, and User-Def uses user-defined M_FUNC.NC.

024	T macro program selection

Range : TFUNC User-Def

Unit : None

Authority : Super user

Default : TFUNC

Effective time : Instant

Note : Used to configure ATC function of the system, TFUNC uses the default M code macro program, and User-Def uses user-defined T_FUNC.NC.

025	PLC program selection (this parameter is invalid)

Range :

Unit :

Authority :

Default :

Effective time :

Note : This parameter is invalid.

026	Screen Saver ON (min)

Range : 0~1

Unit : None

Authority : Super user

Default : 0

Effective time : Instant

Note : Set whether to turn on screen saver; 0: off; 1: on

027	Modbus master/salve settings

Range : UART0_POLL UART1_POLL UART3_POLL TCP_POLL UDP_POLL

Unit : None

Authority : Super user

Default : SLAVE

Effective time : Instant

Note : Set the system as Modbus communication salve or host; SLAVE: as slave; POLL: as host

028	Imperial unit enable

Range : OFF ON

Unit : None

Authority : Super user

Default : OFF

Effective time : Instant

Note : To set the system to display in imperial units

029	Additional panel UART1 baud rate

Range : 9600~115200

Unit : None

Authority : Super user

Default : 115200

Effective time : Instant

Note : To set the communication baud rate of system additional panel serial port UART1

030	Additional panel emergency stop for negation

Range : OFF ~ ON

Unit : None

Authority : Super user

Default : OFF

Effective time : Restart

Note : To set the system additional panel emergency stop button logic level for negation

031	this parameter is invalid currently (Standby)

Range : OFF ~ ON

Unit : None

Authority : Super user

Default : OFF

Effective time : Restart

Note :

032	Extended IO type

Range : No IO expansion 485 extension - IO ET1616-IO

Unit	:	None
Authority	:	Super user
Default	:	No IO expansion
Effective time	:	Restart
Note	:	To set external expanded IO type (Modbus-485 bus IO or ETeCAT bus IO)

033	Number of expanded input boards (blocks)

Range	:	0~100
Unit	:	None
Authority	:	Super user
Default	:	0
Effective time	:	Restart
Note	:	To set the number of externally extended ETherCAT bus input board modules

034	Number of extended output board

Range	:	0~100
Unit	:	None
Authority	:	Super user
Default	:	0
Effective time	:	Restart
Note	:	To set the number of externally extended ETherCAT bus input board modules

035	Bus axis or IO node configuration

Range	:	ECAT_IO_01 ~ ECAT_IO_16
Unit	:	None
Authority	:	Super user
Default	:	0
Effective time	:	Restart
Note	:	

10.5 Tool magazine parameter (P4.)

001	Customized by manufacturer

Range :

Unit :

Authority : Operation admin or higher

Default :

Effective time : Instant

Note : This parameter is determined by tool magazine design of each machine tool manufacturer. Please refer to the machine too manuals for details.

10.6 Spindle parameters (P5.)

001	1st spindle mapping axis

Range : Analog Spindle X Y …. C

Unit :

Authority : Operation admin or higher

Default : Analog Spindle

Effective time :

Note : To set the first spindle to specify the analog spindle or servo spindle

002	2nd spindle mapping axis

Range : Analog Spindle X Y …. C

Unit :

Authority : Super Admin

Default : Analog Spindle

Effective time : Restart

Note : To set the second spindle to specify the analog spindle or servo spindle

003	Spi. Max Speed(rpm)

Range : 1~30000

Unit : None

Authority : Operation admin or higher

Default : 24000

Effective time : Instant

Note : This setting is used to calculate the analog output of the controller, and suppose that the analog of variable frequency control is in linear control mode;

This method is to set the rotation to this parameter according to the variable frequency rotation corresponding to analog 10V, and transfer the rotation directly later, while the controller will output corresponding analog voltage according to linear scale automatically.

004	Spindle Open Delay

Range : 0~10000

Unit : ms

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : Set the delay before next action or operation after forward or reverse rotation of the spindle.

005	System spindle rotation

Range : 1~24000

Unit : rpm

Authority : Operation admin or higher

Default : 6000

Effective time : Instant

Note : Set the current speed of the spindle.

006	Whether close spindle to execute Auto stop

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : Set to 0: execute M30 instruction and do not turn off spindle running; set to 1: execute M30 instruction and turn off spindle running.

007	Spindle Min Speed(rpm)

Range : 100~100000

Unit : rpm

Authority : Operation admin or higher

Default : 100

Effective time : Instant

Note : Spindle min speed setting

008	Second channel spindle max speed

Range : 1~100000

Unit : rpm

Authority : Operation admin or higher

Default : 24000

Effective time : Instant

Note : Set the maximum speed of second channel spindle.

009	Second channel spindle speed

Range : 1~24000

Unit : rpm

Authority : Operation admin or higher

Default : 6000

Effective time : Instant

Note : Set the speed of second channel spindle.

010	Spindle command S value invalid enable

Range : OFF ON

Unit :

Authority : Operation admin or higher

Default : OFF

Effective time : Instant

Note : When set to ON, the value specified by S in M03Sxxxx instruction is invalid, and the spindle speed uses the value specified by P5.031.

011	Mechanical spindle first gear speed (rpm)
012	Mechanical spindle second gear speed (rpm)
013	Mechanical spindle third gear speed (rpm)
014	Mechanical spindle fourth gear speed (rpm)

Range : 1~1000000

Unit : rpm

Authority : Operation admin or higher

Default : 24000

Effective time : Instant

Note : This parameter is used for L version system of lathe, to the maximum speed of the version, set the maximum speed of each mechanical position of the lathe spindle relative to M41 M42 M43 M44.

015	Spindle stop delay (ms)

Range : 0~60000

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the delay time after the spindle stops

016	Alarm off spindle enable

Range : 0~1

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set whether to automatically turn off the spindle after setting the

system alarm

017	Spindle Auto Open		
	Range	:	OFF ON
	Unit	:	None
	Authority	:	Operation admin or higher
	Default	:	OFF
	Effective time	:	Instant
	Note	:	To set to automatically start the spindle when system executes the machining program

018	Spindle Auto Stop		
	Range	:	OFF ON
	Unit	:	None
	Authority	:	Operation admin or higher
	Default	:	OFF
	Effective time	:	Instant
	Note	:	To set to stop the spindle automatically when the system machining program ends.

019	Analog spindle encoder a loop pulse number		
	Range	:	0~10000000
	Unit	:	None
	Authority	:	Operation admin or higher
	Default	:	2500
	Effective time	:	Instant
	Note	:	The received wire number of the encoder when the spindle rotates one circle; Same as common axis encoder, it can only receive AB phase pulse, and thus the wire number of the encoder must be pulses of one circle divided by 4.

This parameter will affect G74 and G84 tap instructions. Please set it properly.

020	Analog Spindle Gear Numerator
021	Analog Spindle Gear Denominator

Range : 1~65535

Unit : None

Authority : Operation admin or higher

Default : 1

Effective time : Instant

Note : If the spindle has gear position, please set the hardware gear ratio to this parameter, which hasn't been used in standard version, but may be used in certain special conditions.

022	Tapping mode

Range : INP ClosedLoop

Unit : None

Authority : Operation admin or higher

Default : CloseLoop

Effective time : Instant

Note : To set the system tapping mode to use interpolation or closed-loop tapping

023	Tapping acceleration/deceleration mode

Range : S-shaped Trapezoid Index Sin

Unit : None

Authority : Operation admin or higher

Default : Trapezoid

Effective time : Instant

Note : To set the system closed-loop tapping acceleration and deceleration modes: S, curve, trapezoida, index and trigonometric function

acceleration and deceleration

024	If tapping shaft has an encoder

Range : OFF ON

Unit : None

Authority : Operation admin or higher

Default : OFF

Effective time : Instant

Note : To set the tapping axis, that is, whether the tapping follower axis is connected to the encoder

025	Tapping FPGA calculate spindle speed

Range : OFF ON

Unit : None

Authority : Operation admin or higher

Default : ON

Effective time : Instant

Note : To set to use FPGA to calculate spindle precision speed during tapping

026	Tapping start spindle acceleration filter

Range : OFF ON

Unit : None

Authority : Operation admin or higher

Default : ON

Effective time : Instant

Note : To set tapping spindle acceleration smoothing function

027	Tapping adjusting parameter Kp

Range :

Unit : None

Authority : Operation admin or higher

Default : 68.00

Effective time : Instant

Note : To set tapping closed-loop adjusting parameters (proportional-derivative-integral adjusting parameters) to use default values

028	Tapping adjusting parameter Ki

Range :

Unit : None

Authority : Operation admin or higher

Default : 0.0

Effective time : Instant

Note : To set tapping closed-loop adjusting parameters (proportional-derivative-integral adjusting parameters) to use default values

029	Tapping adjusting parameter Kd

Range :

Unit : None

Authority : Operation admin or higher

Default : 0.6

Effective time : Instant

Note : To set tapping closed-loop adjusting parameters (proportional-derivative-integral adjusting parameters) to use default values

030	Filter coefficient of tapping adjusting parameter Kd

Range :

Unit : None

Authority : Operation admin or higher

Default : 500.0

Effective time : Instant

Note : Default value is generally used to set tapping closed loop adjustment parameters

031	Amplitude limiting value of tapping adjusting parameter Ki

Range :

Unit : None

Authority : Operation admin or higher

Default : 10.0

Effective time : Instant

Note : Default value is generally used to set tapping closed loop adjustment parameters

032	Amplitude limiting value of tapping adjusting parameter Kd

Range :

Unit : None

Authority : Operation admin or higher

Default : 100.0

Effective time : Instant

Note : Default value is generally used to set tapping closed loop adjustment parameters

033	Tapping adjusting parameter K2

Range :

Unit : None

Authority : Operation admin or higher

Default : 10.0

Effective time : Instant

Note : Default value is generally used to set tapping closed loop adjustment parameters

034	Delay before tapping

Range :

Unit : None

Authority : Operation admin or higher

Default : 100

Effective time : Instant

Note : Default value is generally used to set tapping closed loop adjustment parameters

035	Tapping hole bottom delay

Range :

Unit : None

Authority : Operation admin or higher

Default : 100

Effective time : Instant

Note : Default value is generally used to set tapping closed loop adjustment parameters

036	If tapping collects data?

Range :

Unit : None

Authority : Operation admin or higher

Default : 100

Effective time : Instant

Note : Set the data collected during the tapping process for the graphical analysis of the tapping effect

037	Max allowable tapping error

Range :

Unit : None

Authority : Operation admin or higher

Default : 10000

Effective time : Instant

Note : To set the maximum allowable error during tapping to prevent abnormal conditions such as screw tap breaking

038	Tapping fixed cycle type

Range :

Unit : None

Authority : Operation admin or higher

Default : 100

Effective time : Instant

Note : Set tapping F to indicate rate or logic programming method

10.7 Port configuration (P6.)

001	Tool Checking Signal Port No.
…	…
046	Oil Pump Out Port No.
075	Handwheel 0.1
…	…
088	SCRAM

Range : 0~23

Unit : Terminal No.

Authority : Super Admin

Default : The port table in the manual

Effective time : Instant

Note : Set the input or output port number assigned to configure system functions;

To shield this function, you can type 8888 and press Insert. This operation is in background, and displays "==========" if the operation is successful.

047	Input Detect ELevel 00 ~ 31
048	Input Detect ELevel 32 ~ 63
049	Input Detect ELevel 64 ~ 95
050	Input Detect ELevel 96 ~ 127
051	Input Detect ELevel 128 ~ 159
052	Input Detect ELevel 160 ~ 191
053	Input Detect ELevel 192 ~ 223

Range	:	0x00000000~0xFFFFFFFF
Unit	:	
Authority	:	Super Admin
Default	:	0
Effective time	:	Instant
Note	:	Used to configure IO detection effective voltage level, 0: Low 1: High. Use binary system to configure in positions. For example: P6.050:10, is 00000000 00000000 00000000 00001010 in binary system; which indicates that among input ports IN32 ~ IN63, IN33 IN35 IO detection effective voltage level is high, while other IO detection effective voltage levels are low.

054	IO Conf in RESET 00~31
055	IO Conf in RESET 32~63
056	IO Conf in RESET 64~95
057	IO Conf in RESET 96~127
058	IO Conf in RESET 128~159
059	IO Conf in RESET 160~191
060	IO Conf in RESET 192~223

Range	:	0x00000000~0xFFFFFFFF
Unit	:	
Authority	:	Super Admin
Default	:	0
Effective time	:	Instant
Note	:	Used to configure the IO that the system needs to reset when there is alarm. 0: No; 1: Yes Used to configure the IO signal that the system needs to reset when there is alarm. For example: P6.53:10, is 00000000 00000000 00000000 00001010 in binary system; which indicates that among OUT32 ~ OUT63, OUT33 is reset when the system resets or alarms, OUT35 turns off, while other output ports are

not reset.

061	LED Conf in RESET 00 ~ 31
062	LED Conf in RESET 32 ~ 63
063	LED Conf in RESET 64 ~ 95
064	LED Conf in RESET 96 ~ 127
065	LED Conf in RESET 128 ~ 159
066	LED Conf in RESET 160 ~ 191
067	LED Conf in RESET 192 ~ 223

Range : 0x00000000~0xFFFFFFFF

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

Note : Used to configure the IO that the system needs to reset when there is alarm. 0: No; 1: Yes

Use binary system to configure in positions.

For example: P6.56:10, is 00000000 00000000 00000000 00001010 in binary system;

which indicates that among OUT32 ~ OUT63, OUT33 is reset when the system resets or alarms, OUT35 turns off, while other output ports are not reset.

068	Power-on Output Open 00~31
069	Power-on Output Open 32~63
070	Power-on Output Open 64~95
071	Power-on Output Open 96~127
072	Power-on Output Open 128~159
073	Power-on Output Open 160~191
074	Power-on Output Open 192~223

Range : 0x00000000~0xFFFFFFFF

Unit :

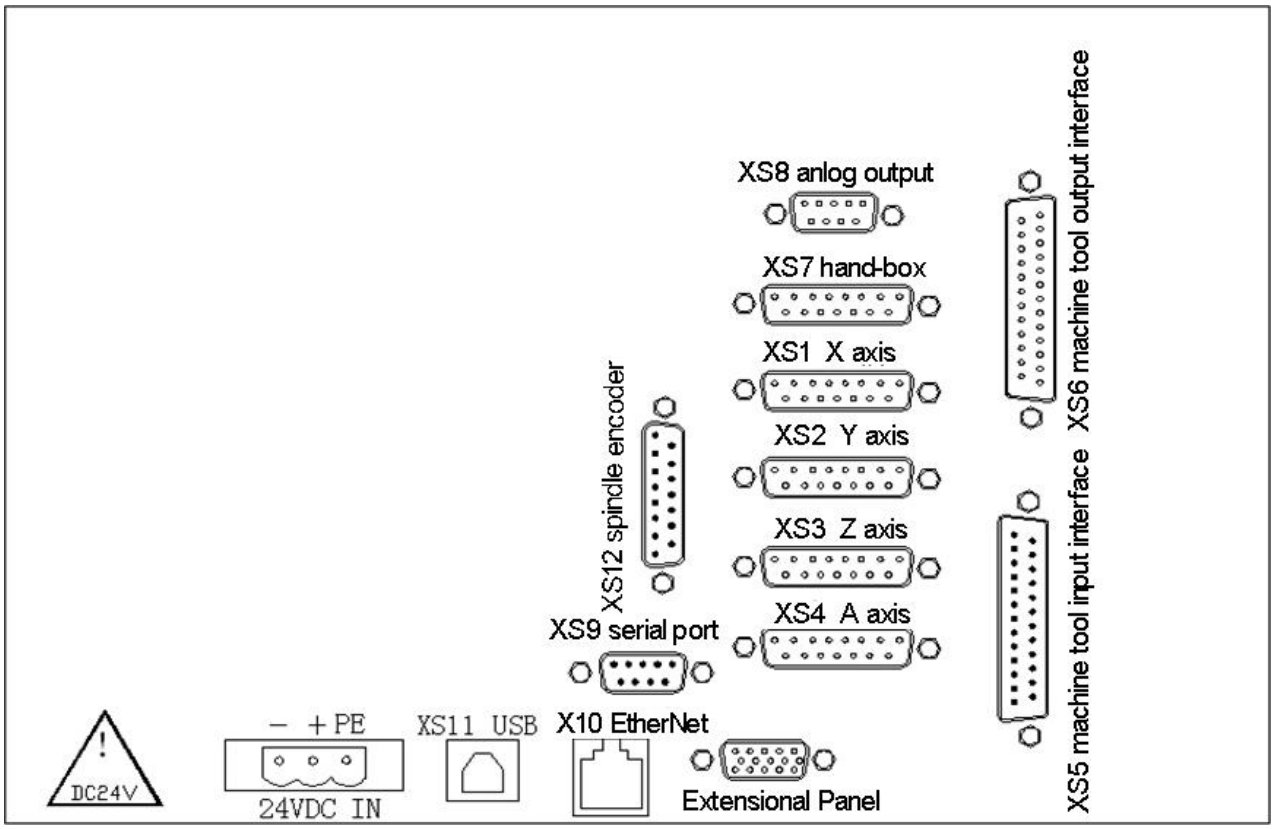
Authority : Super Admin

Default	:	0
Effective time	:	Instant
Note	:	To configure to automatically turn on the output point when the system is powered on (configuration method <reset and turn off LED>)

8. Hardware interface definition and connection instructions

11.1 Installation Layout

11.1.1. 9640 series external interface diagram



XS1(X axis), XS2(Y axis), XS3(Z axis), XS4(A axis): 15-core D-pin socket connects to step motor driver or digital AC servo driver

(2) XS5 digital input: 25-core D-pin socket inputs signals for every axis limit and other switching quantity

(3) XS6 digital output: 25-core D-pin socket outputs signals for switching quantity

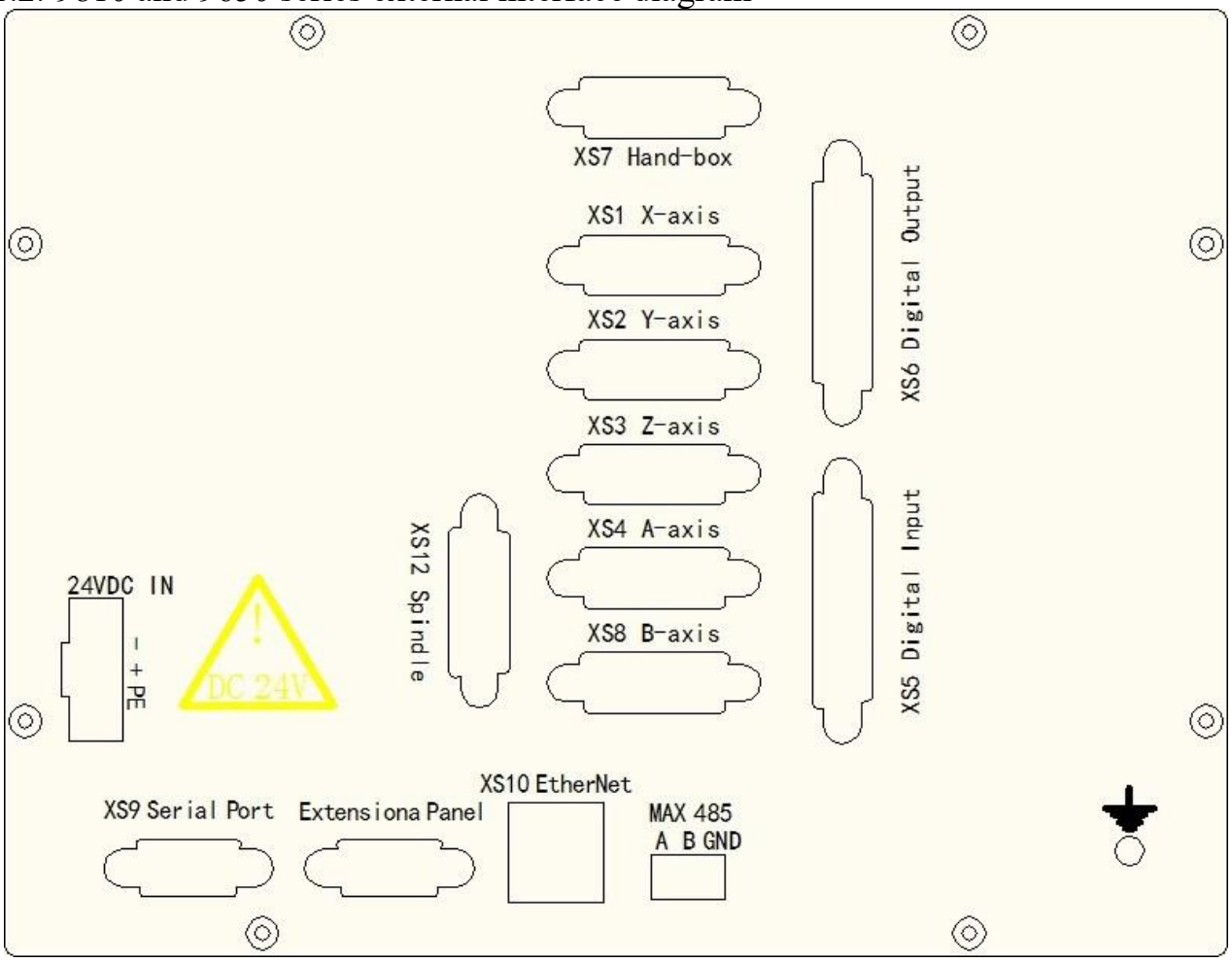
(4) USB and serial port exchange files between PC and CNC96 controller and realize other functions.

(5) CNC96 controller uses 24V DC power supply, and the internal power consumption is about 5W.

(6) Extensional panel: 15-core D-pin socket connects to hand wheel

(7) XS8 spindle: 9-core D-pin socket connects to spindle inverter

11.1.2. 9810 and 9650 series external interface diagram



XS1(X axis), XS2(Y axis), XS3(Z axis), XS4(A axis), (XS8 axis): 15-core D-pin socket connects to step motor driver or digital AC servo driver.

(2) XS5 digital input: 25-core D-pin socket inputs signals for every axis limit and other switching quantity.

(3) XS6 digital output: 25-core D-pin socket outputs signals for switching quantity.

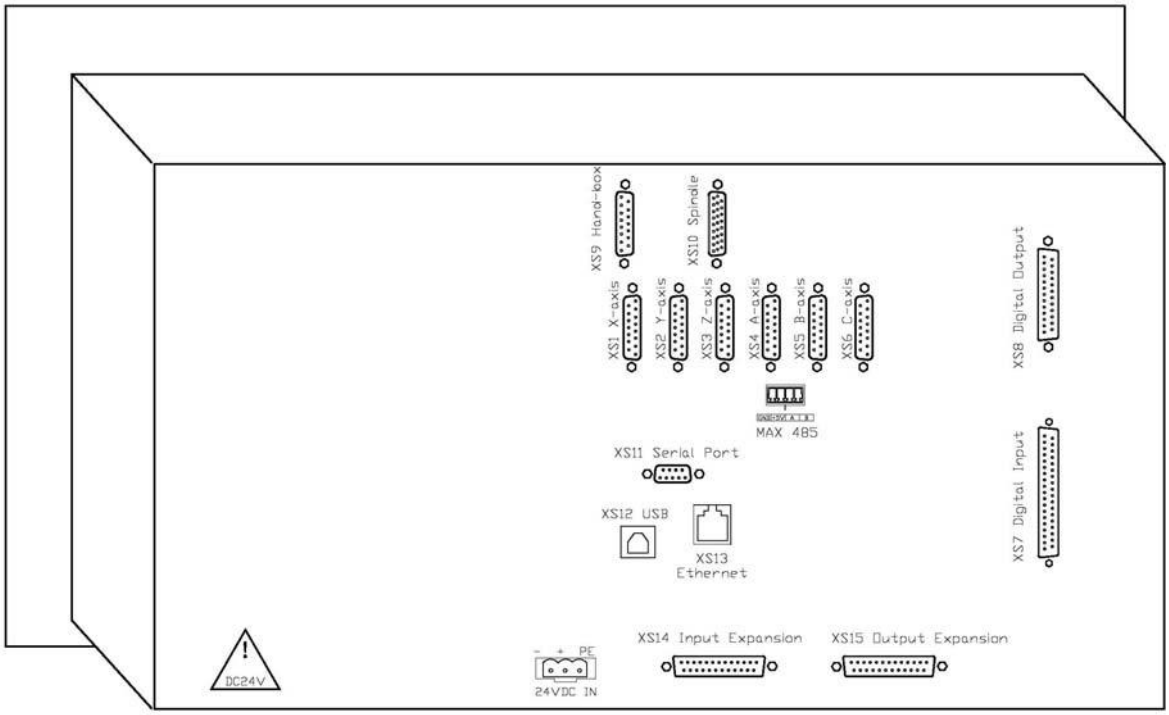
(4) XS9 serial port exchange files between PC and CNC96 controller and realize other functions.

(5) CNC98 controller uses 24V DC power supply, and the internal power consumption is about 5W.

(6) XS7 extensional panel: 15-core D-pin socket connects to hand wheel

(7) XS8 Spindle: 26-core D-pin socket connects to spindle inverter or servo host driver.

11.1.3. 99 series external interface diagram



XS1 (X axis), XS2 (Y axis), XS3 (Z axis), XS4 (A axis), XS5 (B axis), XS6(C axis): 15-core D-pin socket connects to step motor driver or digital AC servo driver.

(2) XS7 machine tool input interface: 37-core D-pin socket inputs signals for every axis limit and other switching quantity.

(3) XS8 machine tool output interface: 25-core D-pin socket outputs signals for switching quantity.

(4) USB and serial port exchange files between PC and CNC99 controller and realize other functions.

(5) CNC99 controller uses 24V DC power supply, and the internal power consumption is about 5W.

(6) XS9 hand wheel interface:

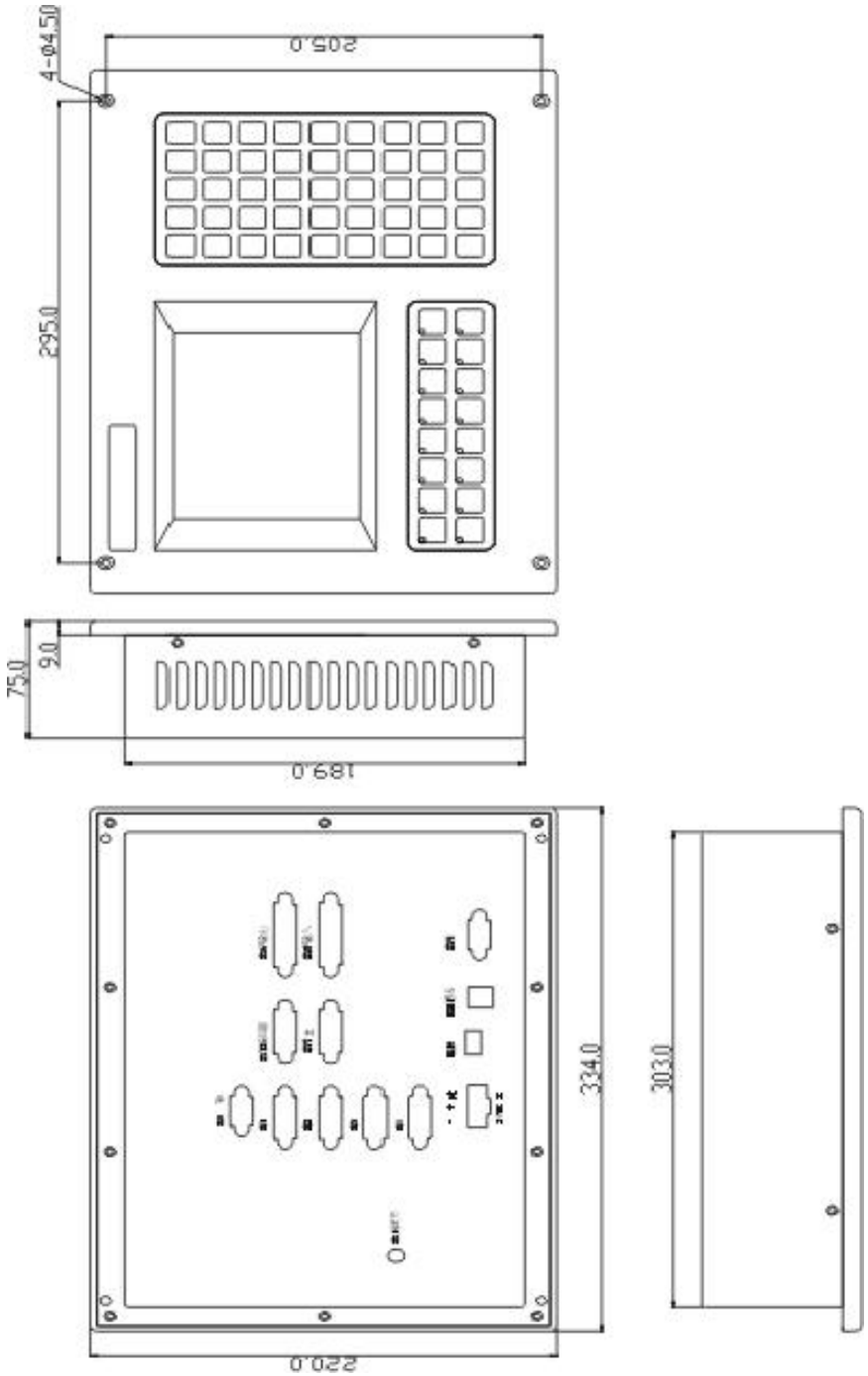
15-core D-pin socket connects to hand wheel

(7) XS10 spindle: 26-core D-pin socket connects to spindle inverter

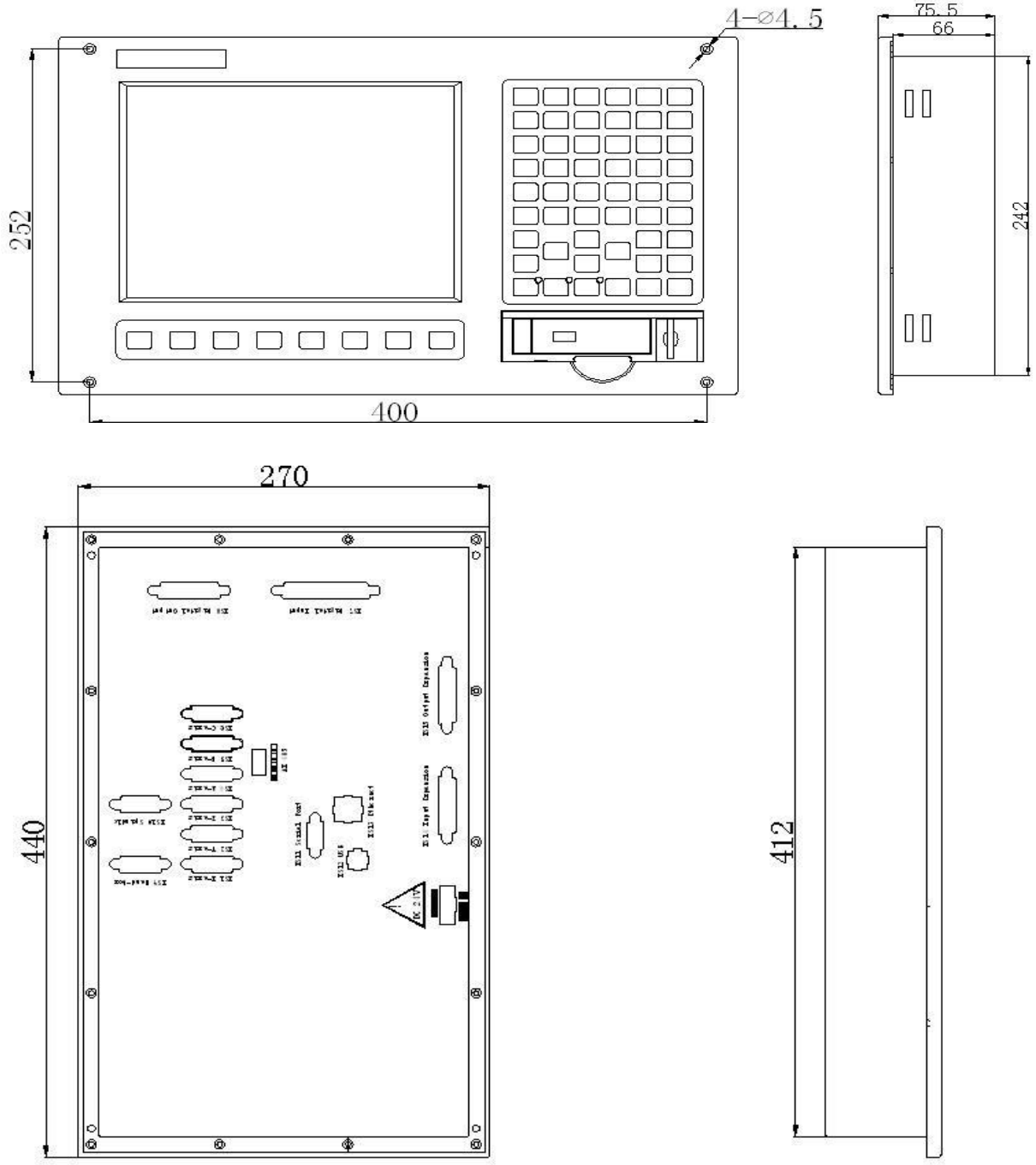
(8) XS14 machine tool extended input interface: 25-pin D-type socket is switching quantity extended input signal

(9) XS15 machine tool extended output interface: 25-pin D-type socket is switching quantity extended output signal

11.1.4. 96 Series Mounting dimensions



11.1.5. 99 Series Mounting dimensions



11.1.6. Installation precautions

Installation condition for electric cabinet

(1) The cabinet must be able to effectively prevent dust, coolant and organic solution from entering;

(2) When design electric cabinet, the distance between rear cover and case should be at least 20CM; considering the temperature rises in the cabinet, the difference of temperature inside and outside of the cabinet shouldn't exceed 10℃;

(3) The cabinet should be installed with fan to ensure interior ventilation;

⑷ The display panel should be installed at the position where can't be sprayed by the coolant;

⑸ When designing electric cabinet, the external electrical interference should be reduced to as lowest as possible to prevent interfering with the system;

To prevent interference

Anti-interference measures such as shielding space electromagnetic radiation, absorbing impact current and filtering power clutter have been taken in design of system, which can prevent interference with the system in a certain degree. To ensure system stability, please take the following measures to install and connect the system:

⑴ CNC must be kept away from equipment generating interference (e.g. inverter, AC contactor, electrostatic generator, high voltage generator, and sub-unit of power lines), and the switching power supply should be connected to a filter to improve the anti-interference of CNC (as in Fig. 1-4);

⑵ To supply power to the system through isolation transformer, the machine tool must be grounded, CNC and driver must be connected to separate earth wire.

To suppress interference

Connect RC circuit (0.01μF, 100~200Ω, as in Fig. 1-5) to both sides of AC coil in parallel. RC circuit should be installed close to inductive load; connect freewheeling diode reversely on both sides of DC coil in parallel (as in Fig.1-6); connect surge absorber to the winding of AC motor in parallel (as in Fig. 1-7).

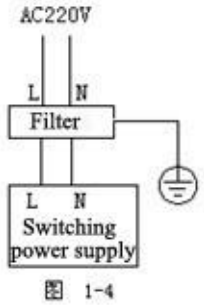


图 1-4

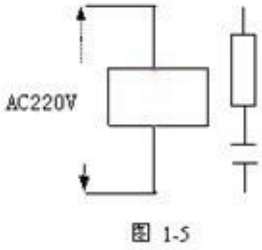


图 1-5

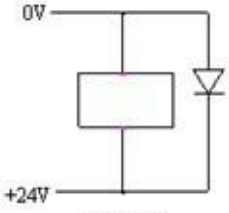


Fig. 1-6

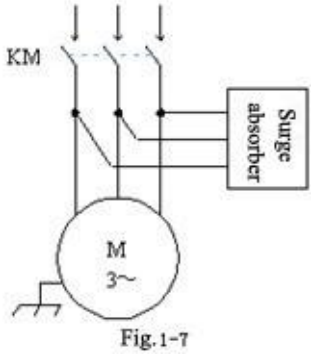


Fig.1-7

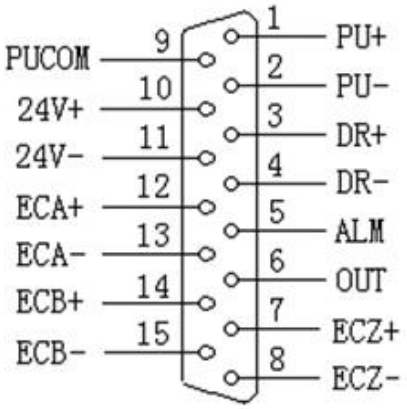
To reduce the interference between CNC signal cables and strong current cables, the wiring shall follow the principles below:

Group	Cable type	Wiring Requirement
A	AC power cord	Bundle the cables of group A separately from group B and C, keep at least 10cm clearance, or make electromagnetic shielding for group A
	AC coil	
	AC contactor	
B	AC coil (24VDC)	Bundle the cables of group B separately from group A or shield group B; group B and group C should be as far as possible
	DC relay (24VDC)	
	Cable between system and strong current cabinet	
	Cable between system and machine tool	
C	Cable between system and machine tool	Bundle the cables of group C separately from group A, or shield group C; keep at least 10cm clearance between group C and group B and use twisted pair
	Position feedback cable	
	Position encoder cable	
	Handwheel cable	
	Other cables for shielding	

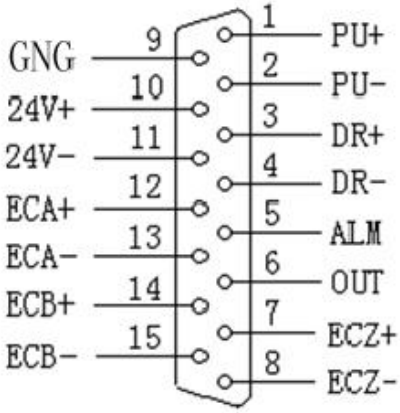
11.2 Interface Definition

12.2.1. Motor driver control interface

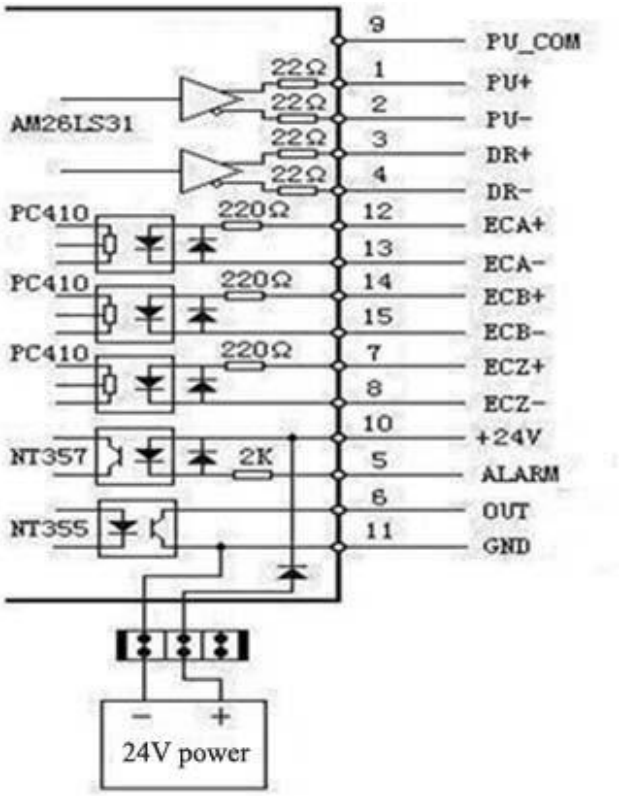
Four driver interfaces are available (XS1.. XS4, XS8 (note: CNC9650) of 96 series or XS1…XS4, XS5, XS6 of 99 series), and they have the same definition, as shown below:



96 series pulse interface



99 series pulse interface

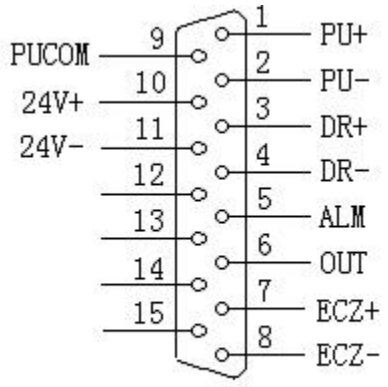


Simple Internal Circuit Diagram for Pulse Output

Wire No.	Definition	Function
1	PU+	Pulse signal +
2	PU-	Pulse signal -
3	DR+	Direction signal +
4	DR-	Direction signal -
5	ALM	Servo alarm signal input (CNC96 series X axis: IN66, Y axis: IN67, Z axis: IN68, A axis: IN69, B axis: IN70) (CNC99, CNC98 series X axis: I66, Y axis: I67, Z axis: I68, A axis: I69, B axis: I70, C axis: I71)
6	OUT	Axis alarm reset output signal (CNC96 series X axis: OUT48, Y axis: OUT49, Z axis: OUT50, A axis: OUT51, B axis: OUT52) (CNC99, CNC98 series X axis: OUT48, Y axis: OUT49, Z axis: OUT50, A axis: OUT51, B axis: OUT52, B axis: OUT53)
7	ECZ+	Encoder phase Z input + (CNC96 series X axis: IN40, Y axis: IN43, Z axis: IN46, A axis: IN49) (CNC99, CNC98 series X

		axis: IN72, Y axis: IN73, Z axis: IN74, A axis: IN75, B axis: IN76, C axis: IN77)
8	ECZ-	Encoder phase Z input - (CNC96 series X axis: IN72, Y axis: IN73, Z axis: IN74, A axis: IN75) (CNC99, CNC98 series X axis: IN72, Y axis: IN73, Z axis: IN74, A axis: IN75, B axis: IN76, C axis: IN77)
9	GND	99 series reference ground, 96 series single-ended to common terminal
10	24V+	Internally provided 24V power supply, directly connected to 24V power supply of the controller
11	24V-	
12	ECA+	Encoder phase A input +
13	ECA-	Encoder phase A input -
14	ECB+	Encoder phase B input +
15	ECB-	Encoder phase B input -

Standard pulse wiring diagram

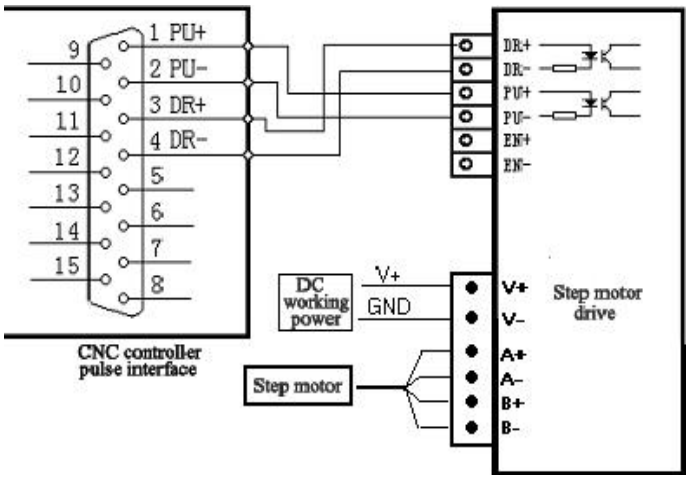


XS1 ··· XS4 Pulse Interfaces Standard Wiring

This wiring is suitable for 96 and 99 series controller

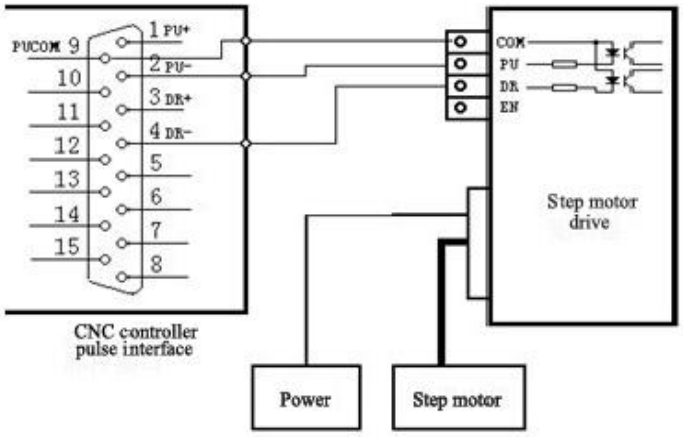
Step motor driver cable to differential input

Adtech CNC driver is used for reference, all of which use differential input mode. This mode has strong anti-interference and is recommended. Please refer to the figure below for the connection of CNC with step motor driver and step motor



Wiring diagram of step motor driver with single-ended input

Certain companies connect together the optocoupler input cathodes of step drivers, which is called common cathode connection and isn't suitable for CNC controller. Common anode connection connects together the anodes of optocoupler input. The wiring shall follow the figure below, and do not connect PU+ and DR+ together, or else the pulse interface may be damaged.



Wiring Diagram of Step Motor Driver with Common Anode Input

Servo motor driver wiring diagram (note: only for 96 series controller)

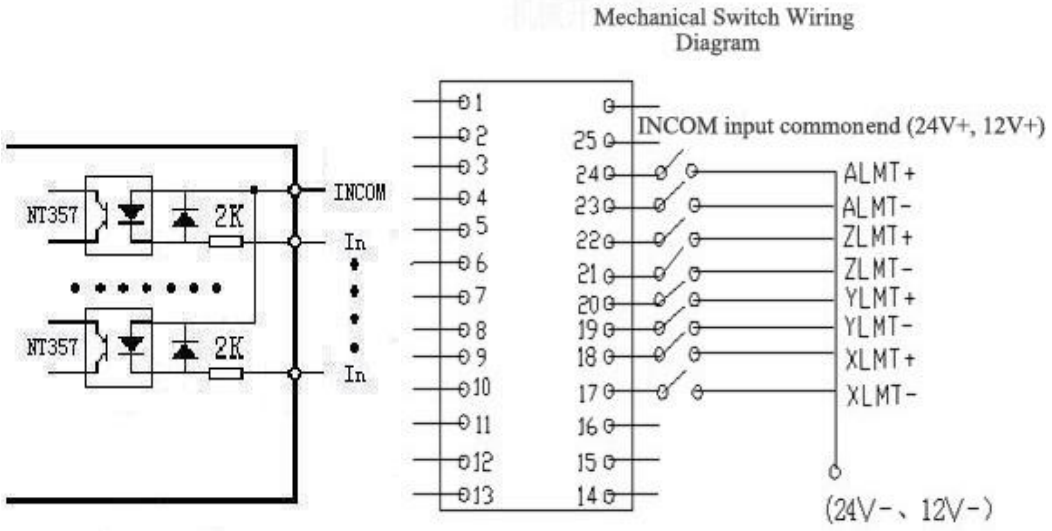
Since differential connection is used in most cases, please refer to differential mode for the pulse connection. Most servo drivers require 12-24V power supply, and the 24V power provided by pin 10, 11 may be used. The specific connection depends on servo driver. Please contact us if you have any question.

Š Caution

Neither two of PU+, PU-, DR+ and DR- could be connected, or else the pulse interface may be damaged.

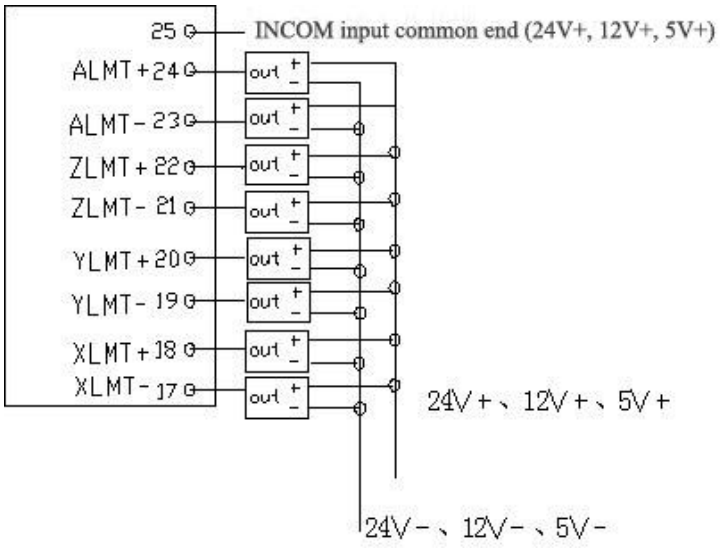
12.2.2. Digital input interface

The digital input interface contains the hardware limit signal of every axis, and the definition is as follows:



Simple Internal Output Diagram for Digital Input

Photoelectric Switch Wiring Diagram



+ is the anode of approach switch, - is the earth wire, and OUT is output signal. For common approach switch, please select 10-30V power supply and NPN output. Photoelectric switch is similar.

Default input port configuration of 96M series XS5 (CNC9640 milling machine)

Wire No.	Port Definition	Function

1	IN0	X axis home
2	IN1	Y axis home
3	IN2	Z axis home
4	IN3	Z axis home
5	IN4	Standby input
6	IN5	Standby input
7	IN6	Standby input
8	IN7	Standby input
9	IN8	Standby input
10	IN9	Standby input
11	IN10	Standby input
12	IN11	Standby input
13	IN12	Standby input
14	IN13	Standby input
15	IN14	Standby input
16	IN15	Standby input
17	IN16(XLMT-)	X axis negative limit
18	IN17(XLMT+)	X axis positive limit
19	IN18(YLMT-)	Y axis negative limit
20	IN19(YLMT+)	Y axis positive limit
21	IN20(ZLMT-)	Z axis negative limit
22	IN21(ZLMT+)	Z axis positive limit
23	IN22(ALMT-)	A axis negative limit
24	IN23(ALMT+)	A axis positive limit
25	INCOM	Input common end INCOM (24V+, 12V+) connects to internal or external power supply

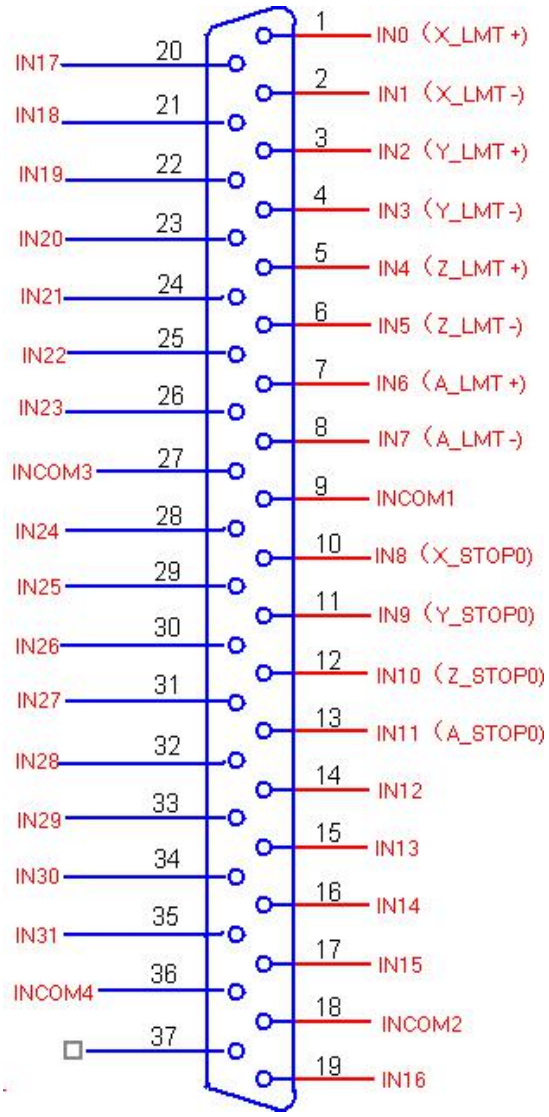
Default input port configuration of 98M series XS5 (CNC9810 milling machine)

Wire No.	Port Definition	Function
1	IN0	X axis home
2	IN1	Y axis home
3	IN2	Z axis home
4	IN3	Z axis home

5	IN4	B axis home
6	IN5	Standby input
7	IN6	Standby input
8	IN7	Standby input
9	IN8	Standby input
10	IN9	Standby input
11	IN10	Standby input
12	IN11	Standby input
13	IN12	Standby input
14	IN13	Standby input
15	IN14	B axis negative limit
16	IN15	B axis positive limit
17	IN16(XLMT-)	X axis negative limit
18	IN17(XLMT+)	X axis positive limit
19	IN18	Y axis negative limit
20	IN19	Y axis positive limit
21	IN20(ZLMT-)	Z axis negative limit
22	IN21(ZLMT+)	Z axis positive limit
23	IN22	A axis negative limit
24	IN23	A axis positive limit
25	INCOM	Input common end INCOM (24V+, 12V+) connects to internal or external power supply

Default input port configuration of 99M series XS7 (CNC9960 milling machine)

The digital input interface including the home of every axis (X, Y, Z, A, B, C), the hardware limit signal of every axis (X, Y, Z, A, B, C), and the definition is as follows:



Machine input interface

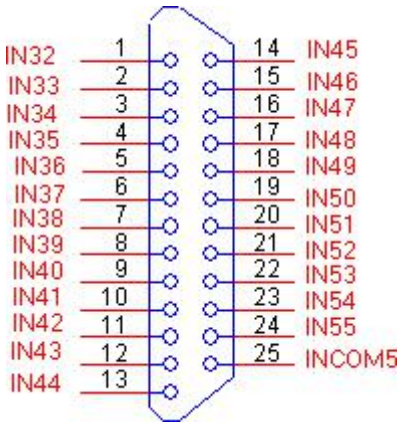
37-pin plug wire	9960(40) Definition	Function	9163 Definition
1	IN0（X_LMT+）	X axis positive limit	IN00
2	IN1（X_LMT-）	X axis negative limit	IN01
3	IN2（Y_LMT+）	Y axis positive limit	IN02
4	IN3（Y_LMT-）	Y axis negative limit	IN03
5	IN4（Z_LMT+）	Z axis positive limit	IN04
6	IN5（Z_LMT-）	Z axis negative limit	IN05
7	IN6（A_LMT+）	A axis positive limit	IN06

8	IN7 (A_LMT-)	A axis negative limit	IN07
9	INCOM1	Input common end (24v+, 12v+)	+24V
10	IN8（X_STOP0）	X axis zero point	IN08
11	IN9（Y_STOP0）	Y Axis Home	IN09
12	IN10 (Z_STOP0)	Z Axis Home	IN10
13	IN11(A_STOP0)	Z Axis Home	IN11
14	IN12(B_STOP0)	B Axis Home	IN12
15	IN13(C_STOP0)	C Axis Home	IN13
16	IN14	Standby input	IN14
17	IN15	Standby input	IN15
18	INCOM2	Input common end (24v+, 12v+)	+24V
19	IN16	B axis positive limit	IN16
20	IN17	B axis negative limit	IN17
21	IN18	C axis positive limit	IN18
22	IN19	C axis negative limit	IN19
23	IN20	Standby input	IN20
24	IN21	Standby input	IN21
25	IN22	Standby input	IN22
26	IN23	Standby input	IN23
27	INCOM3	Input common end(24v+, 12v+)	+24V
28	IN24	Standby input	IN24
29	IN25	Standby input	IN25
30	IN26	Standby input	IN26
31	IN27	Standby input	IN27
32	IN28	Standby input	IN28
33	IN29	Standby input	IN29
34	IN30	Standby input	IN30
35	IN31	Standby input	IN31
36	INCOM4	Input common end (24v+, 12v+)	+24V

37			

Default Extended input port configuration of 99M series XS14 (CNC9960 milling machine)

Extended digital input interfaces are mainly used for spare extension, which is defined in the following figure

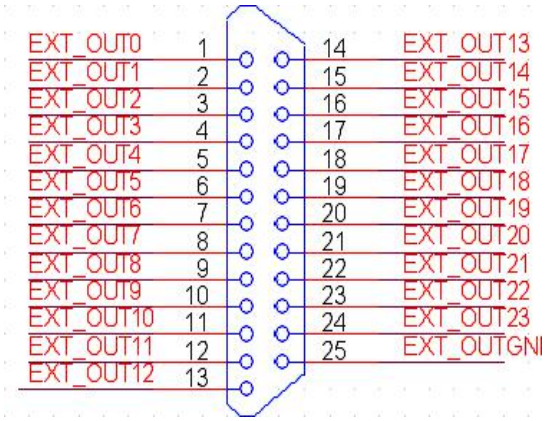


Wire No.	Port Definition	Function
1	IN32	Standby input
2	IN33	Standby input
3	IN34	Standby input
4	IN35	Standby input
5	IN36	Standby input
6	IN37	Standby input
7	IN38	Standby input
8	IN39	Standby input
9	IN40	Standby input
10	IN41	Standby input
11	IN42	Standby input
12	IN43	Standby input
13	IN44	Standby input
14	IN45	Standby input
15	IN46	Standby input
16	IN47	Standby input
17	IN48	Standby input

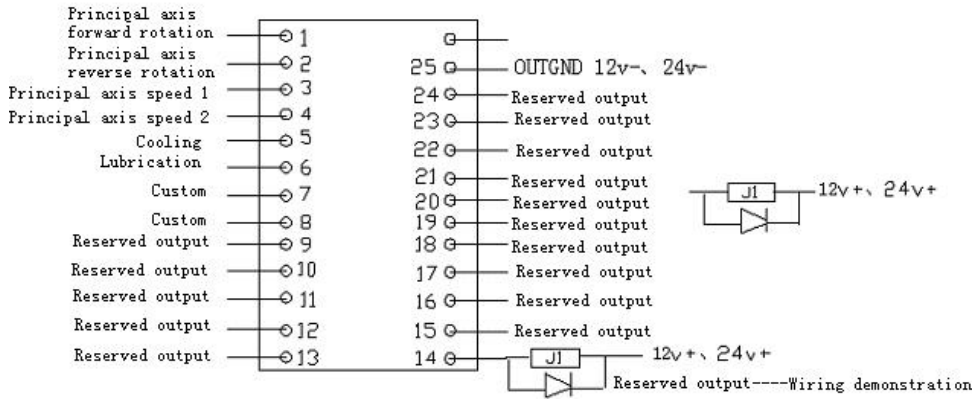
18	IN49	Standby input
19	IN50	Standby input
20	IN51	Standby input
21	IN52	Standby input
22	IN53	Standby input
23	IN54	Standby input
24	IN55	Standby input
25	INCOM5	Input common end (24v+, 12v+)

12.2.3. Digital output interface

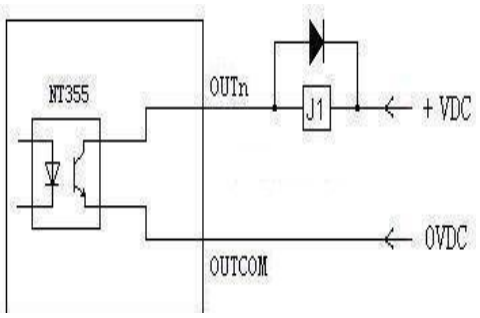
The wiring of digital output interface is as follows:



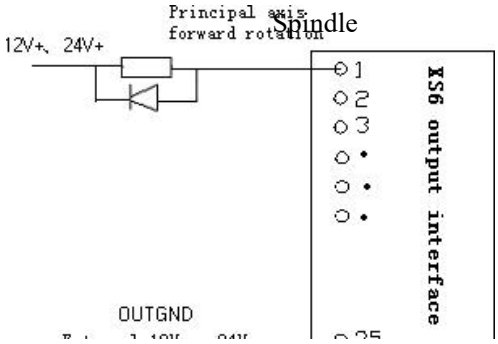
XS6 Output Interface Wiring Diagram



J1---Jn are the relays. Please connect the fly-wheel diode on each relay by following the method provided in figure below



Simple Internal Circuit of Digital Output (left)



Wiring of Machine Tool (right) (spindle positive rotation for example)

Default output port configuration of M series milling machine CNC9640 (XS6), CNC9960 (XS8) and NC9810

Wire No.	Port Definition	Function
1	OUT0	Spindle CW (M03)(operation panel M203)
2	OUT1	Spindle CCW (M04)(operation panel M204)
3	OUT2	(M10, M11) (FCNC9M panel chuck M10, M11)
4	OUT3	(M12, M13) (operation panel lighting M12, M13)
5	OUT4	Cooling (M08, M09)(operation panel cooling M208, M209)
6	OUT5	Lubrication (M32, M33)(operation panel lubrication M212, M213)
7	OUT6	(M14, M15) (operation panel elastic tool M14, M15)
8	OUT7	(M16, M17) (operation panel cutter or manual tool magazine M16, M17)
9	OUT8	(M18, M19) (operation panel tool magazine +M18, M19)
10	OUT9	(M20, M21) (operation panel tool magazine -M20, M21)
11	OUT10	(M22, M23) (operation panel chamber blowing M22, M23)
12	OUT11	(M24, M25) (operation panel chip removal M24, M25)
13	OUT12	(M26, M27) (FCNC6D panel chip removal 2 M26, M27)
14	OUT13	(M128, M129) (FCNC6D panel cooling 2 M128, M129)
15	OUT14	(M130, M131) (FCNC6D panel loose material M130, M131)
16	OUT15	(M34, M35) (FCNC6D panel discharge M34, M35)
17	OUT16	(M36, M37) (FCNC6D panel feeding M36, M37)
18	OUT17	(M38, M39) (FCNC6D panel spindle positioning M38, M39)
19	OUT18	(M40, M41) (operation panel F0 M40, M41)
20	OUT19	(M42, M43) (operation panel F1 M42, M43)
21	OUT20	(M44, M45) (operation panel F2 M44, M45)

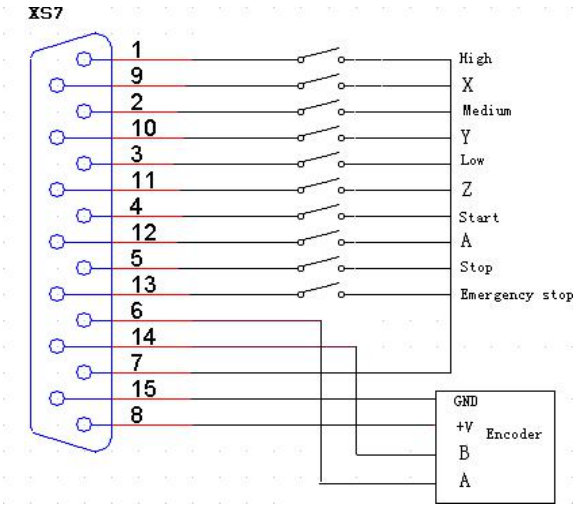
22	OUT21	(M46, M47) (operation panel F3 M46, M47)
23	OUT22	(M48, M49) (operation panel F4 M48, M49)
24	OUT23	(M50, M51) (FCNC6D panel F5 M50, M51)
25		OUTGND12V-, 24V- common power supply of external output

Default configuration of extended output port of M series milling machine CNC9960 (XS15)

Wire No.	Port Definition	Function
1	OUT24	(FCNC6D panel F6 M52, M53)
2	OUT25	(FCNC6D panel F7 M54, M55)
3	OUT26	(FCNC6D panel F8 M56, M57)
4	OUT27	(FCNC6D panel F9 M58, M59)
5	OUT28	(FCNC6D panel F10 M60, M61)
6	OUT29	(FCNC6D panel F11 M62, M63)
7	OUT30	(FCNC6D panel F12 M64, M65)
8	OUT31	(FCNC6D panel F13 M66, M67)
9	OUT32	(Standby output M68, M69)
10	OUT33	(Standby output M70, M71)
11	OUT34	(Standby output M72, M73)
12	OUT35	(Standby output M74, M75)
13	OUT36	(Standby output M76, M77)
14	OUT37	(Standby output M78, M79)
15	OUT38	(Standby output M80, M81)
16	OUT39	(Standby output M82, M83)
17	OUT40	(Standby output M84, M85)
18	OUT41	(Standby output M86, M87)
19	OUT42	(Standby output M90, M91)
20	OUT43	(Standby output M92, M93)
21	OUT44	(Standby output M94, M95)
22	OUT45	(Standby output M96, M97)
23	OUT46	(Standby output M198, M199)
24	OUT47	(Standby output M100, M101)

25		OUTGND12V-, 24V- common power supply of external output

12.2.4. Handheld box interface



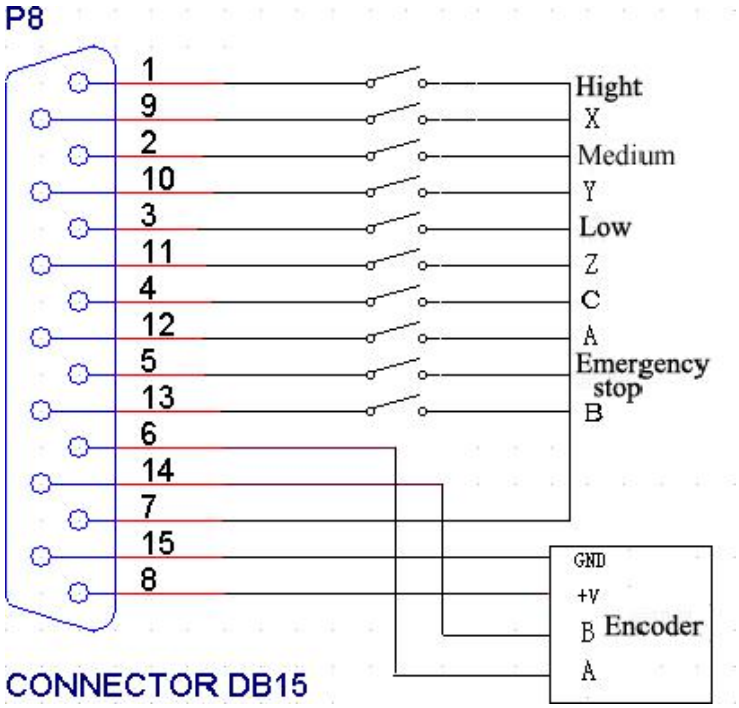
The definition of 9 series (CNC9640 XS7) is as follows:

Wire No.	Definition	Function
1	(IN56) gear switch	0.1 gear --- High speed
2	(IN58) gear switch	0.01 gear --- Medium speed
3	(IN60) gear switch	0.001 gear --- Low speed
4	(IN62) button	Cycle start
5	(IN64) button	Pause
7	24V-	Negative pole of internally provided 24V power supply
9	(IN57) axis selection	X axis
10	(IN59) axis selection	Y axis
11	(IN61) axis selection	Z axis
12	(IN63) axis selection	A axis
13	(IN65) button	Emergency stop
6	HA	Hand encoder phase A input signal
14	HB	Hand encoder phase B input signal
15	5V-	Negative pole of internally provided 5V

		power supply
8	+5V	Positive pole of internally provided 5V power supply
7	24V-	Negative pole of internally provided 24V power supply

9 series (CNC9960 XS9, CNC9810 XS7, CNC9650 XS7)

CNC9960 and CNC9810 definitions are as follows:

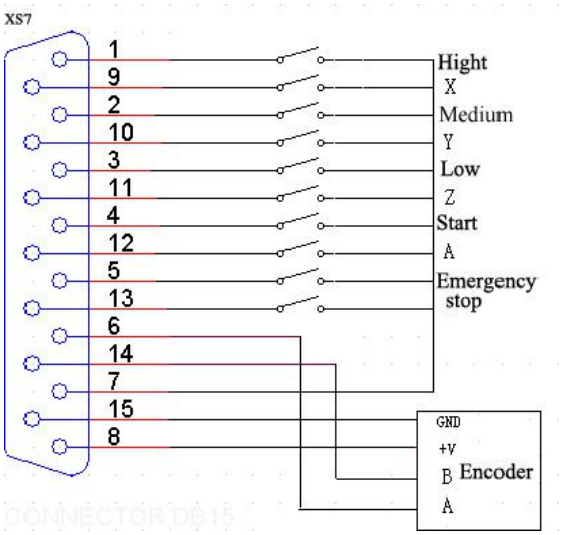


Wire No.	Definition	Function
1	IN56	0.1 gear switch - High
2	IN58	0.01 gear switch - Medium
3	IN60	0.001 gear switch - Low
4	IN62	Select C axis
5	IN64	Emergency stop
6	HA	Hand encoder phase A input signal
7	24V-	Internal -24V power supply
8	5V+	Internal +5V power supply
9	IN57	Select X axis

10	IN59	Select Y axis
11	IN61	Select Z axis
12	IN63	Select A axis
13	IN65	Select B axis
14	HB	Hand encoder phase B input signal
15	5V-	Internal -5V power supply

9 series (XS9)

CNC9940 definition is as follows:

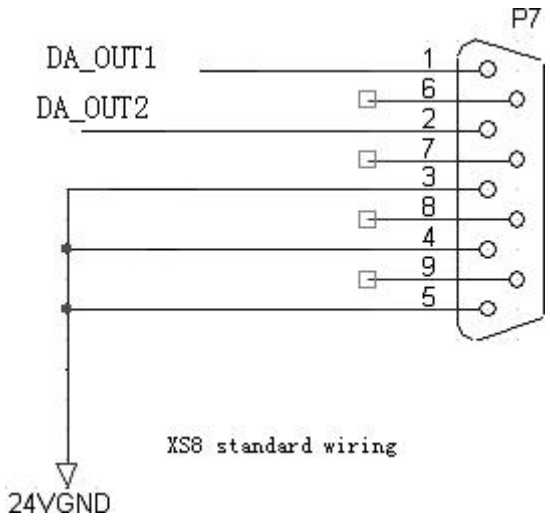


Wire No.	Definition	Function
1	IN56	0.1 gear switch - High
2	IN58	0.01 gear switch - Medium
3	IN60	0.001 gear switch - Low
4	IN62	Start
5	IN64	Stop
6	HA	Hand encoder phase A input signal
7	24V-	Internal -24V power supply
8	5V+	Internal +5V power supply
9	IN57	Select X axis
10	IN59	Select Y axis
11	IN61	Select Z axis

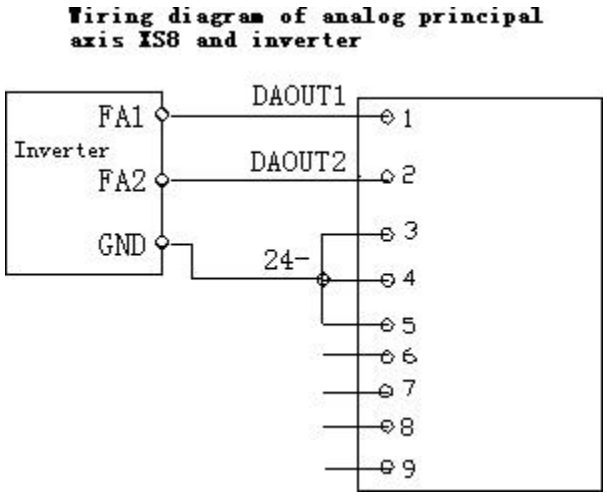
12	IN63	Select A axis
13	IN65	Emergency stop
14	HB	Hand encoder phase B input signal
15	5V-	Internal -5V power supply

12.2.5. Analog output interface (9640 series XS8)

Analog output interface wiring diagram:



The wiring is also suitable for XS8 interface of 96 series controller;

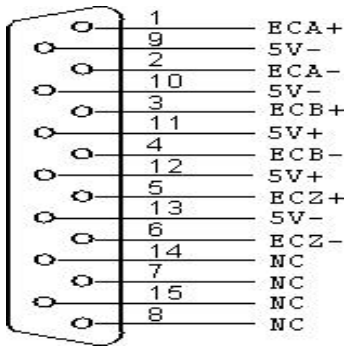


Wire No.	Definition	Function
1	DAOUT1	Analog voltage output (0~10) V

2	DAOUT2	Analog voltage output (0~10) V
3	GND	Internal 24V power grounding
4	GND	Internal 24V power grounding
5	GND	Internal 24V power grounding

12.2.6. Spindle encoder interface (9640 series XS12)

Spindle encoder interface diagram (9640 series XS12):

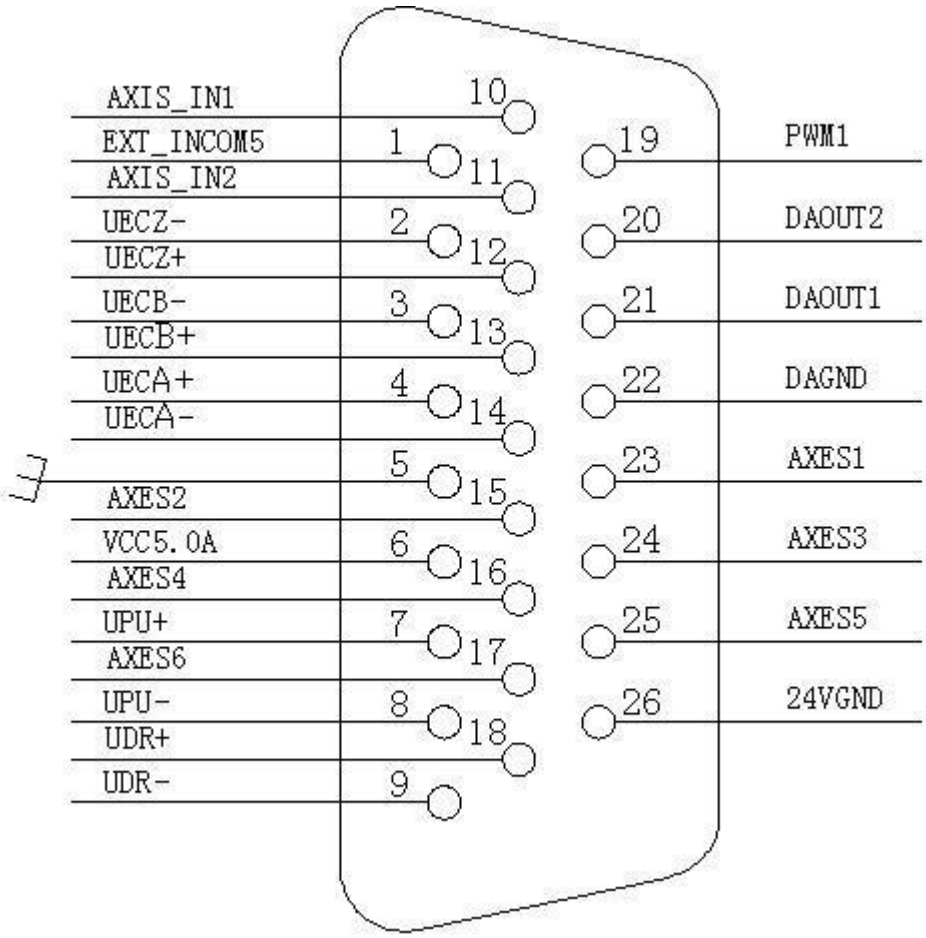


The spindle encoder (9 series CNC9640 controller) definition is as follow:

Wire No.	Definition	Function
1	ECA+	Encoder phase A input +
2	ECA-	Encoder phase A input -
3	ECB+	Encoder phase B input +
4	ECB-	Encoder phase B input -
5	ECZ+	Encoder phase Z input + (IN76)
6	ECZ-	Encoder phase Z input - (IN76)
7	NC	Null
8	NC	Null
9	5V-	Negative end of internal 5V power supply can't be connected to external power supply
10	5V-	Negative end of internal 5V power supply can't be connected to external power supply
11	5V+	Positive end of internal 5V power supply can't be connected to external power supply
12	5V+	Positive end of internal 5V power supply can't be connected to external power supply

13	5V-	Negative end of internal 5V power supply can't be connected to external power supply
14	NC	Null
15	NC	Null

Spindle encoder interface diagram (CNC9 series CNC9960 XS10, CNC9810 XS9, CNC9650 XS9):



The spindle encoder (CNC9 series, CNC9960, CNC9810, and CNC9810 controller) definition is as follow:

Wire No.	Definition	Function
1	EXT_INCOM5	Control signal common terminal power 24V+ (external power supply required)
2	UECZ-	Spindle encoder Z- (9810 9650: IN77, 9960: IN78)

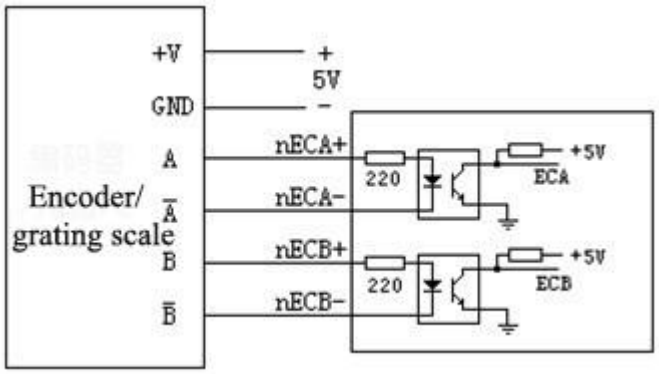
3	UECB-	Spindle encoder B-
4	UECA+	Spindle encoder A+
5	EXT_GNDA	Spindle encoder power GND
6	EXTVCC5.0V	Spindle encoder 5V+ (supply 5.0V voltage to external, 250MA)
7	CDR-	Spindle position control direction -(DR-) PU+
8	CDR+	Spindle position control direction +(DR+) PU-
9	CPU-	Spindle position control pulse -(PU-) DR-
10	AXIS_IN1	Spindle alarm input port 1 (IN93 needs EXT_INCOM5 to connect 24V voltage)
11	AXIS_IN2	Spindle alarm input port 2 (IN94 needs EXT_INCOM5 to connect 24V voltage)
12	UECZ+	Spindle encoder Z+ (9810 9650: IN77, 9960: IN78)
13	UEB+	Spindle encoder B+
14	UECA-	Spindle encoder A-
15	AXES2	Spindle output port 2(CCW)(OUT55)
16	AXES4	Spindle output port 4 (OUT57)
17	AXES6	Spindle output port 6 (OUT59)
18	CPU+	Spindle position control pulse +(PU+) DR-
19	PWM1	PWM output
20	DAOUT2	Second channel analog output 0~10V
21	DAOUT1	First channel analog output 0~10V
22	DAGND	Analog GND
23	AXES1	Spindle output port 1(CW)(OUT54)
24	AXES3	Spindle output port 3 (OUT56)
25	AXES5	Spindle output port 5 (OUT58)
26	24VGND	Control signal common terminal power 24V GND

AB phase decoder input allows differential connection and common anode connection, which is determined by the encoder type.

Encoder output modes include open collector, complementary, voltage and line driver, among which open collector, complementary and voltage outputs use common anode connection, and line driver output uses differential connection.

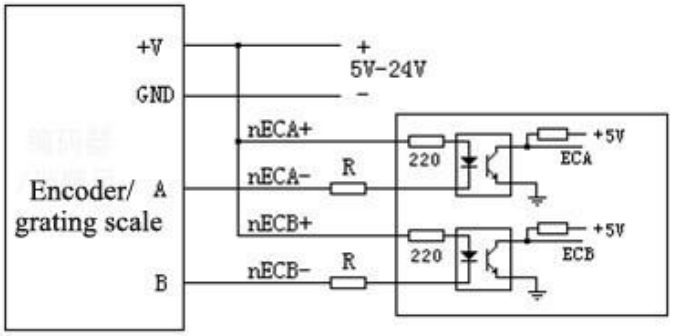
As shown in the figure below, AB phase decoder input signal uses differential input connection; if common anode connection is used, the positive ends of phase A and phase B must be connected; for common cathode connection, the negative ends of phase A and phase B must beconnected.

Differential connection is as follows:



5V power supply is externally provided.

Common anode connection is as follows:



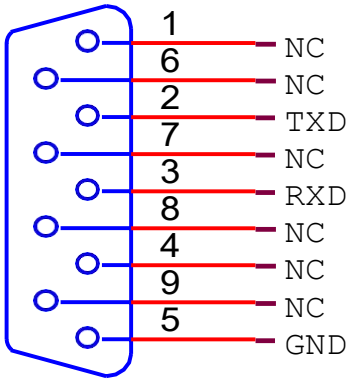
The power voltage is determined by encoder. If 5V power supply is used, resistor R will be unnecessary. For 12V power supply, please use 1K-2K resistor, and for 24V power supply, please use 2K-5K resistor.

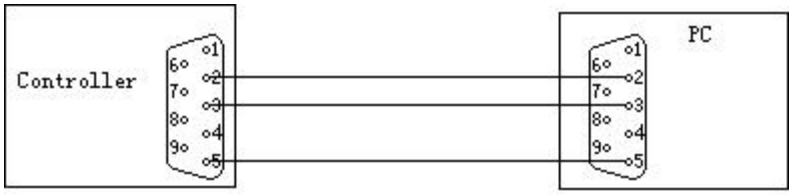
Suggestion:

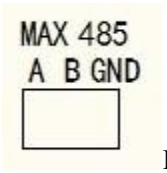
Please use differential output encoder to ensure better anti-interference when the line is long.

12.2.7. RS232 interface (96 series XS9, 99 series XS11), RS-485 interface (9810 9650) and RJ45 network interface (9 series)

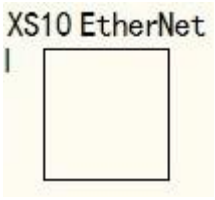
Serial communication interface--- 9-core signal socket (male)







RS485 interface



RJ45 network interface

12.2.8. USB memory connection interface (96 series XS10)

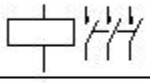
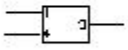
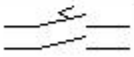
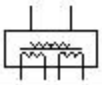
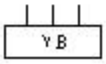
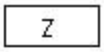
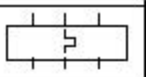
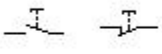
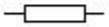
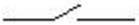
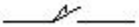
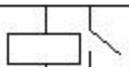
Standard USB memory (e.g. USB disk) interface;

12.2.9. PC USB communication interface (96 series XS11, 99 series X13)

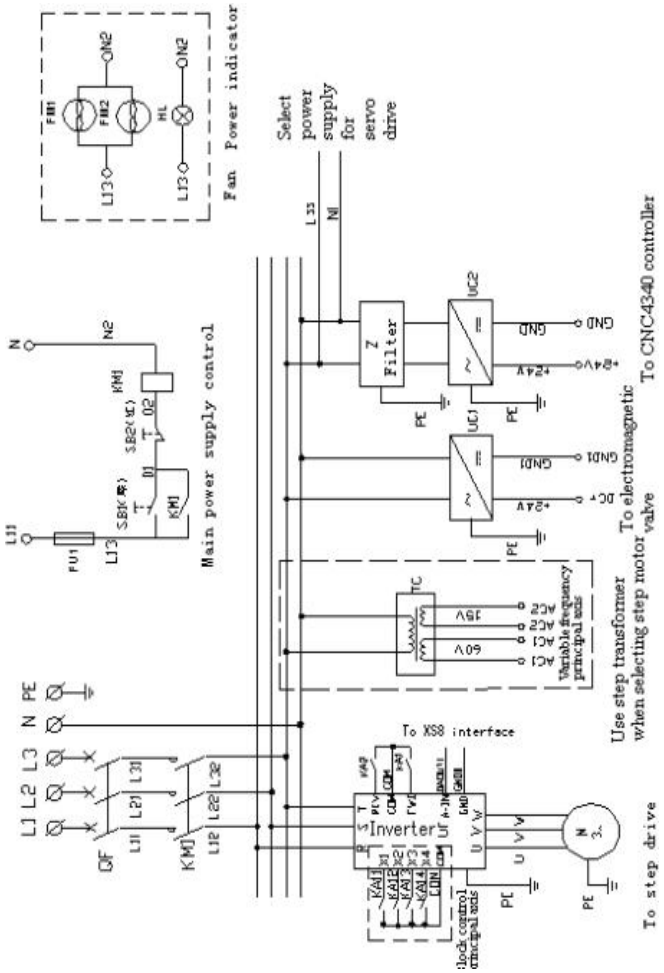
Standard USB communication interface;

11.3 Electrical connection diagram

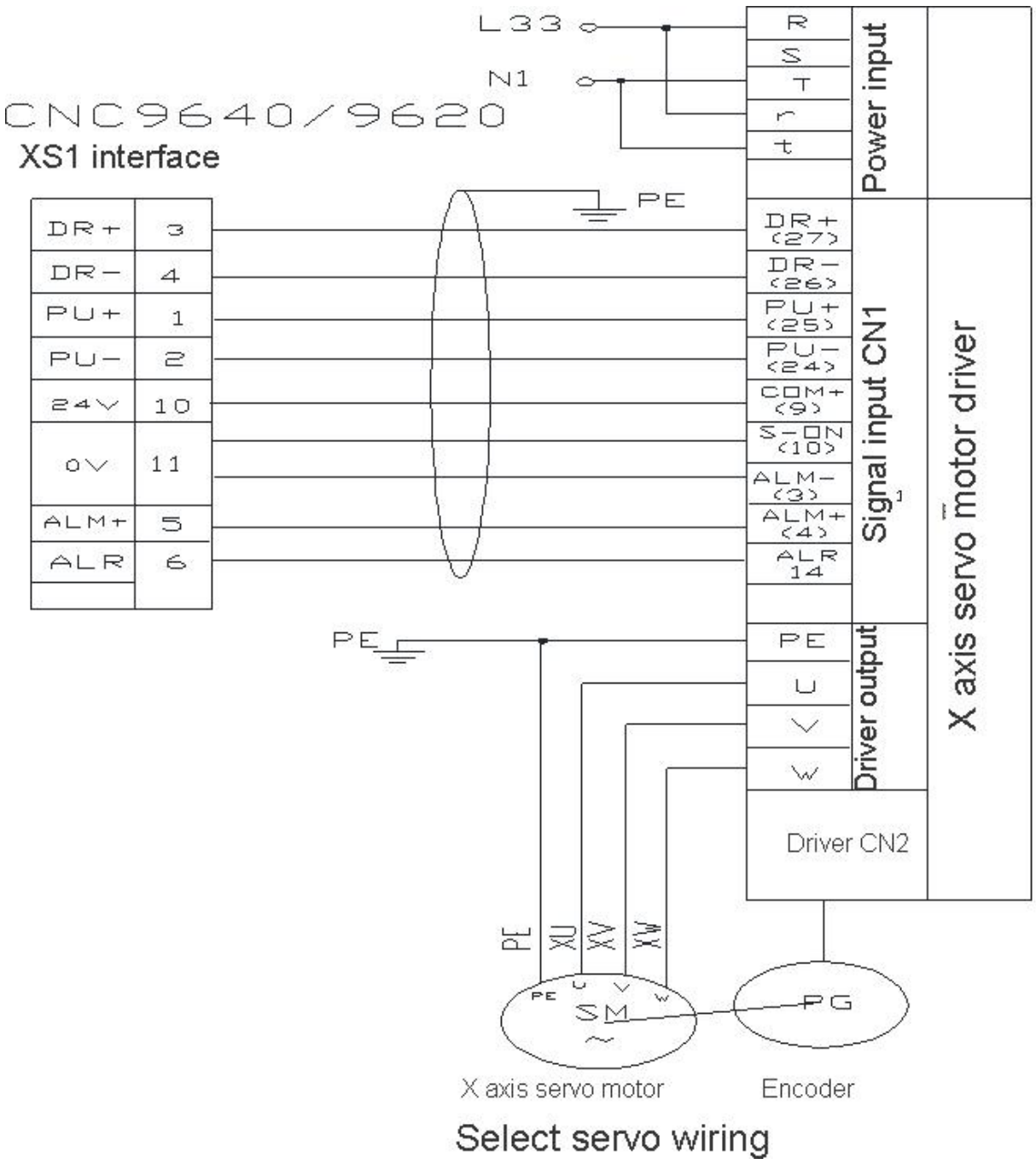
11.3.1. Symbol schematic diagram

Symbol	Name	Figure	Symbol	Name	Figure
QF	Breaker		SM	Servo motor	
KM	Contactor		M	Step motor	
UF	Inverter		SQ	Approach switch	
M	Motor		SA	Foot switch	
TC	Transformer		YB	Motor brake	
Z	Filter		FR	Thermal relay	
FU	Fuse		UC	Switching power supply	
SB	Button		YV	Electromagnetic valve	
FM	Fan		C	Capacitor	
HL	Indicator		R	Resistor	
QS	Touch switch		QS	Travel switch	
PG	Encoder		KA	Relay	

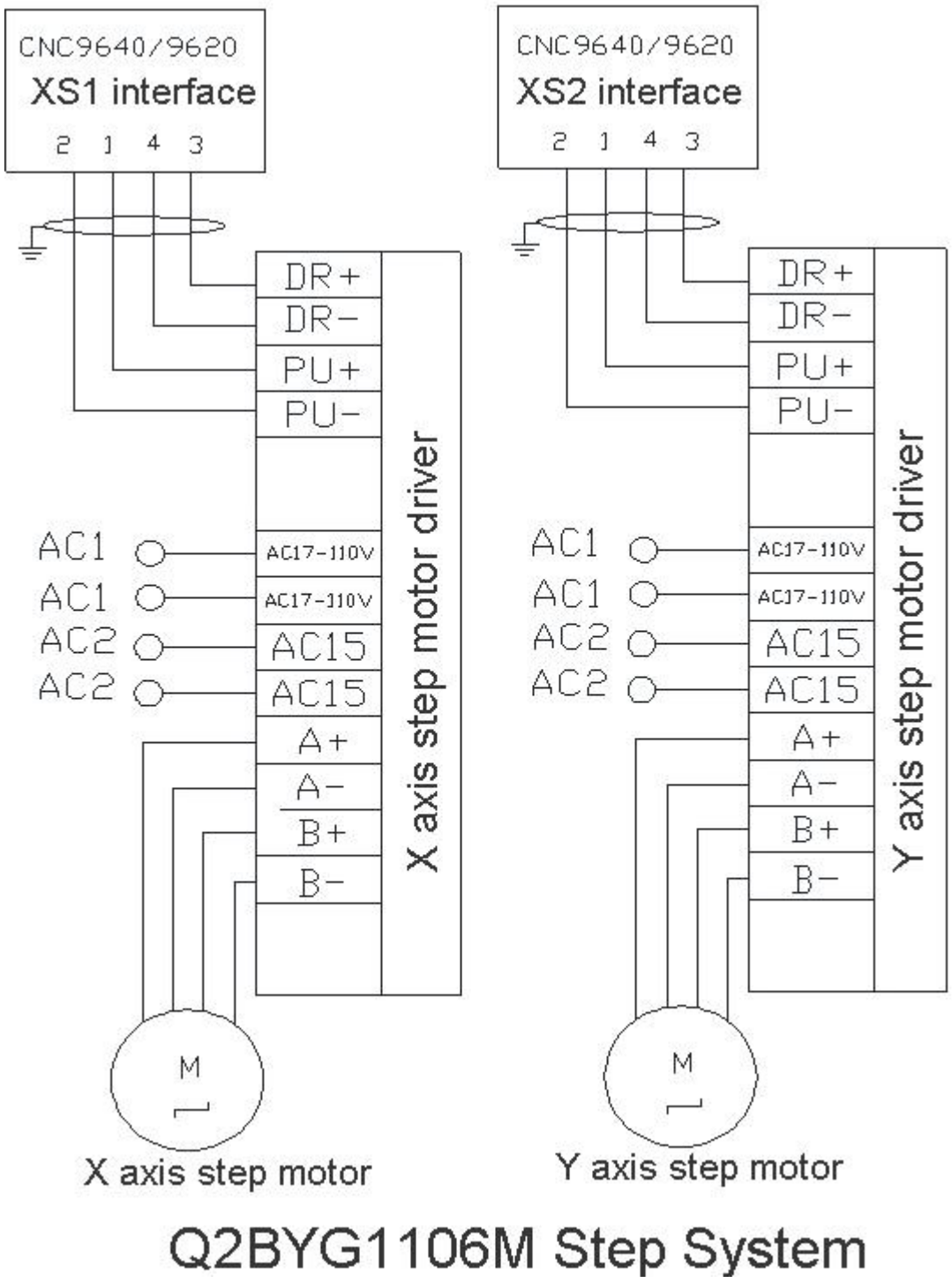
11.3.2. Power connection diagram



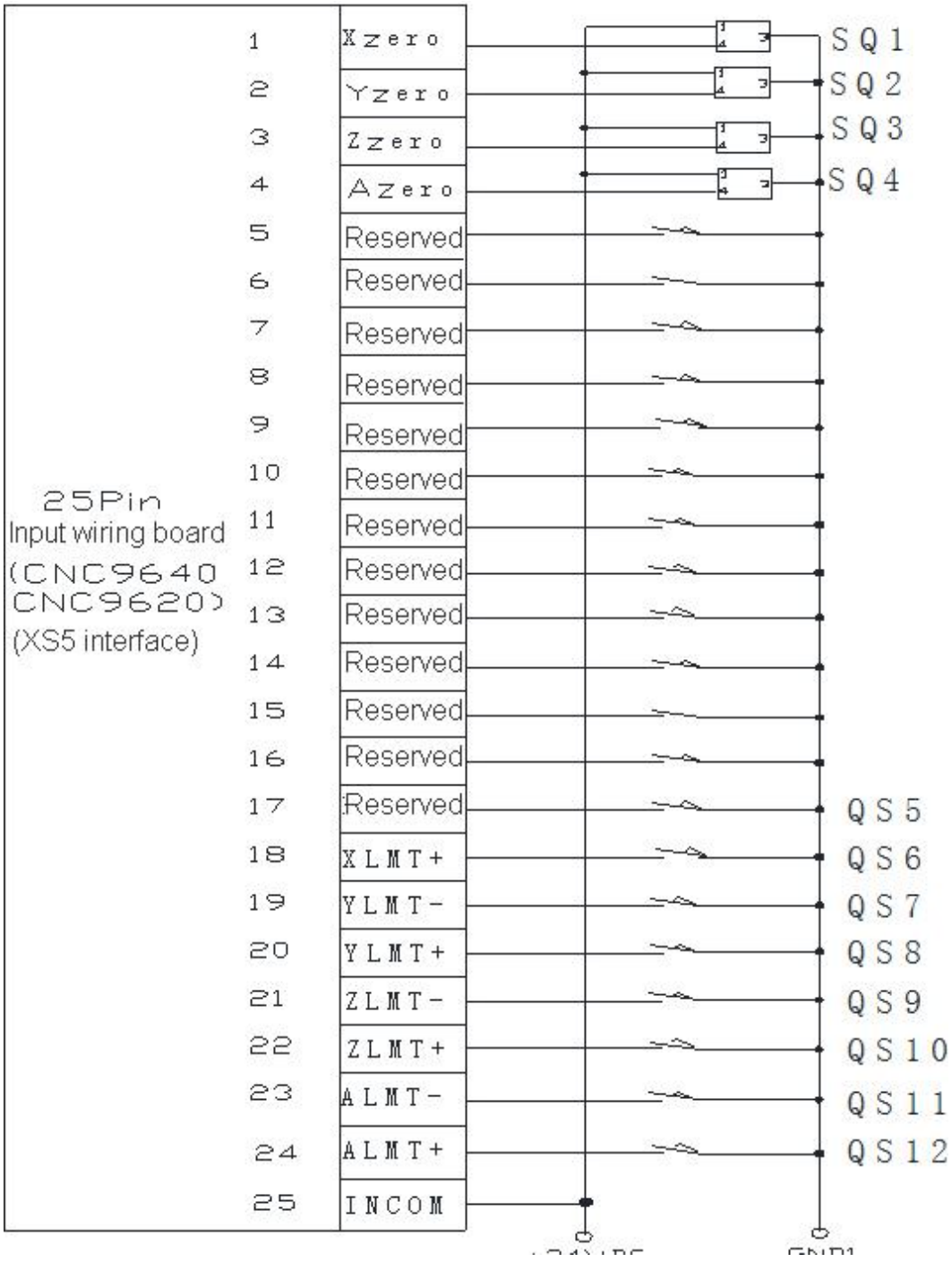
11.3.3. Servo driver connection diagram

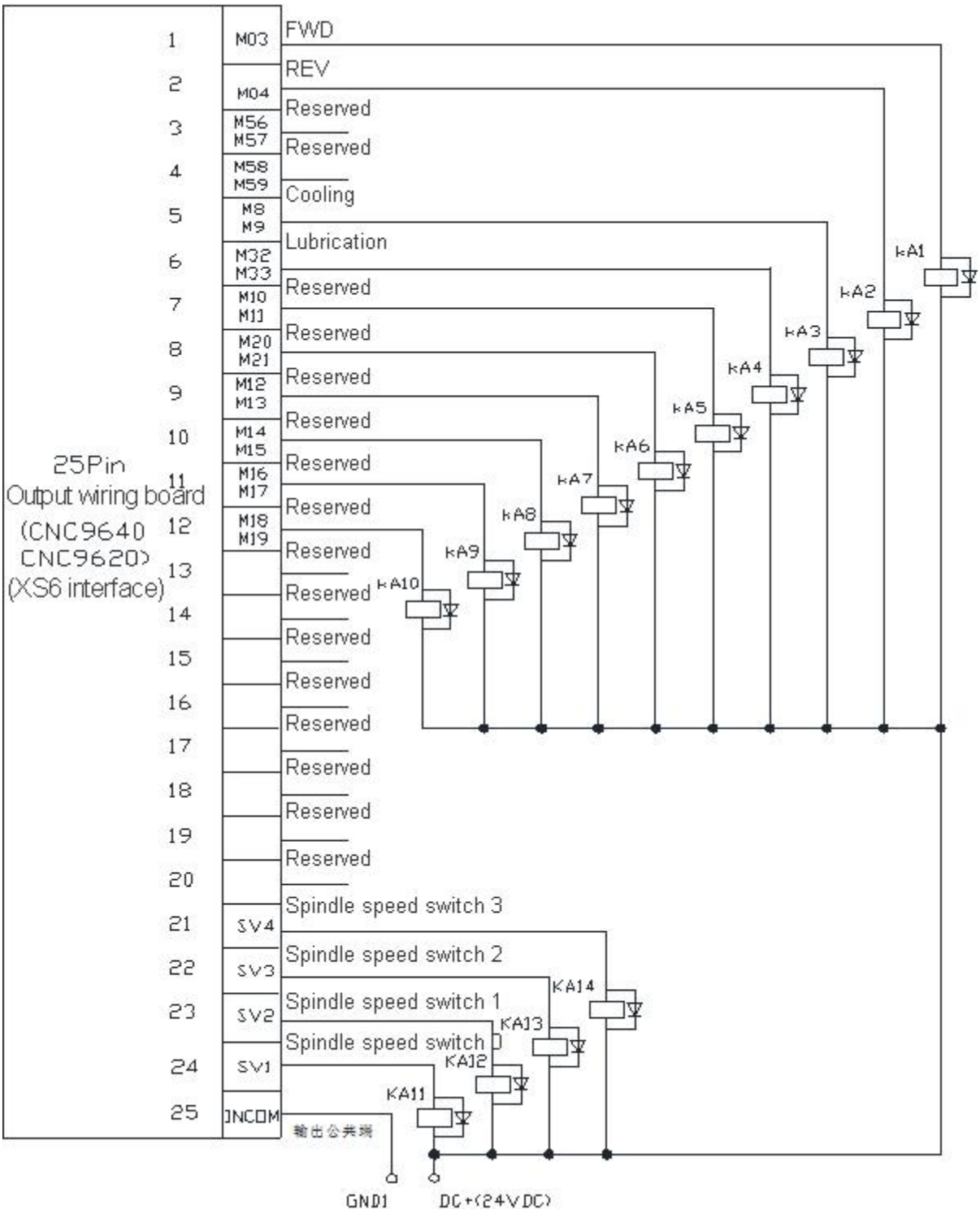


11.3.4. Step connection diagram

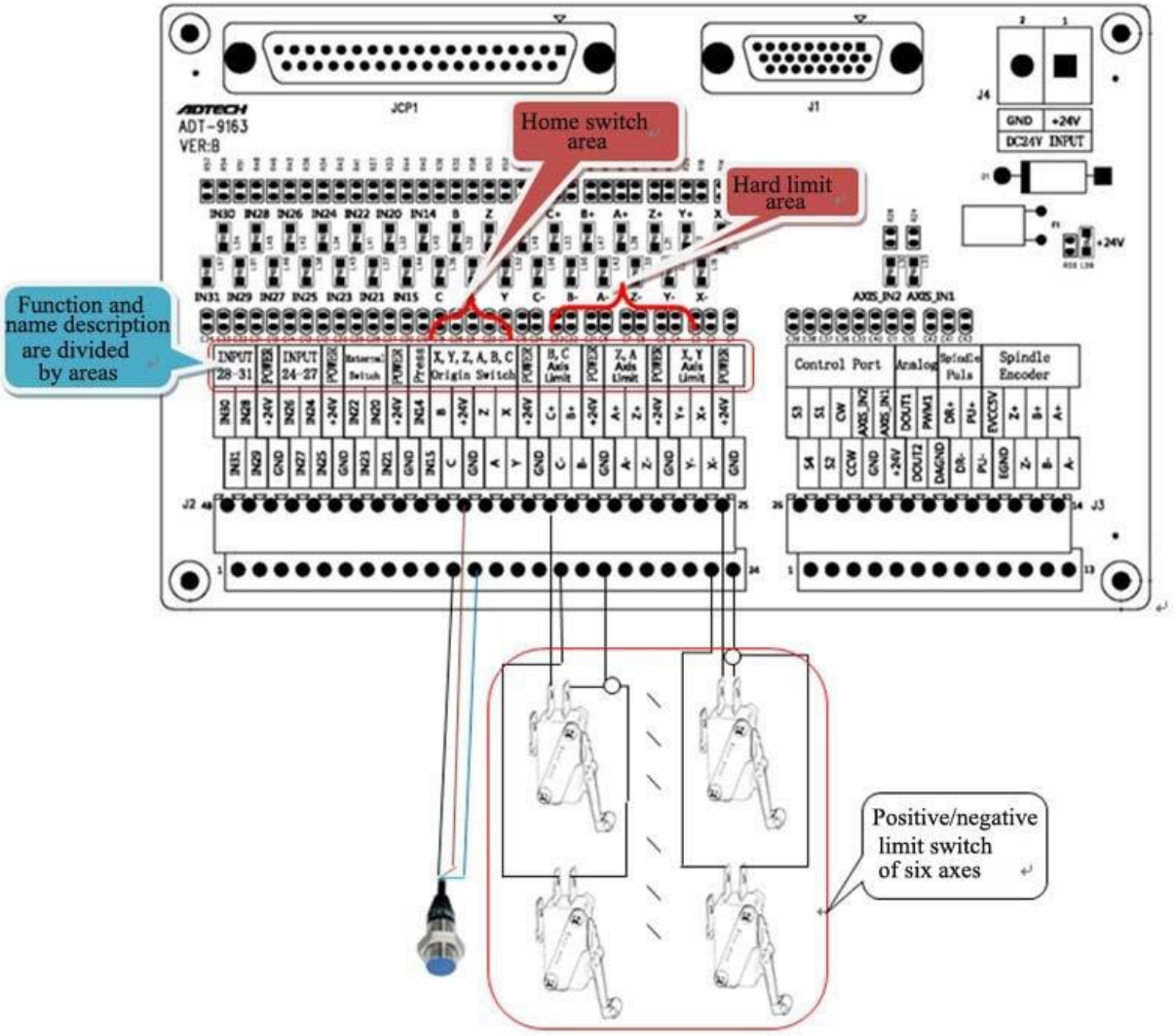


11.3.5. IO electrical connection diagram


25Pin
Input wiring board
(CNC9640
CNC9620)
(XS5 interface)
1 Xzero
2 Yzero
3 Zzero
4 Azero
5 Reserved
6 Reserved
7 Reserved
8 Reserved
9 Reserved
10 Reserved
11 Reserved
12 Reserved
13 Reserved
14 Reserved
15 Reserved
16 Reserved
17 Reserved
18 XLMT+
19 YLMT-
20 YLMT+
21 ZLMT-
22 ZLMT+
23 ALMT-
24 ALMT+
25 INCOM
SQ1
SQ2
SQ3
SQ4
QS5
QS6
QS7
QS8
QS9
QS10
QS11
QS12


25Pin
Output wiring board
(CNC9640
CNC9620)
(XS6 interface)
1 M03 FWD
2 M04 REV
3 M56 M57 Reserved
4 M58 M59 Reserved
5 M8 M9 Cooling
6 M32 M33 Lubrication
7 M10 M11 Reserved
8 M20 M21 Reserved
9 M12 M13 Reserved
10 M14 M15 Reserved
11 M16 M17 Reserved
12 M18 M19 Reserved
13 Reserved
14 Reserved
15 Reserved
16 Reserved
17 Reserved
18 Reserved
19 Reserved
20 Reserved
21 SV4 Spindle speed switch 3
22 SV3 Spindle speed switch 2
23 SV2 Spindle speed switch 1
24 SV1 Spindle speed switch
25 JNCOM 输出公共端
KA1
KA2
KA3
KA4
KA5
KA6
KA7
KA8
KA9
KA10
KA11
KA12
KA13
KA14
GND1
DC+(24VDC)

11.3.6. ADT9163 splitter wiring diagram



Note: The splitter terminal GND and +24V are used for power supply of external proximity sensor switch. Every four input points share a group, and the maximum operating current of each group of power supply terminals is 200MA. The common terminal of all input points is +24V, and the status of the input point inverts when all input terminals are connected to GND.

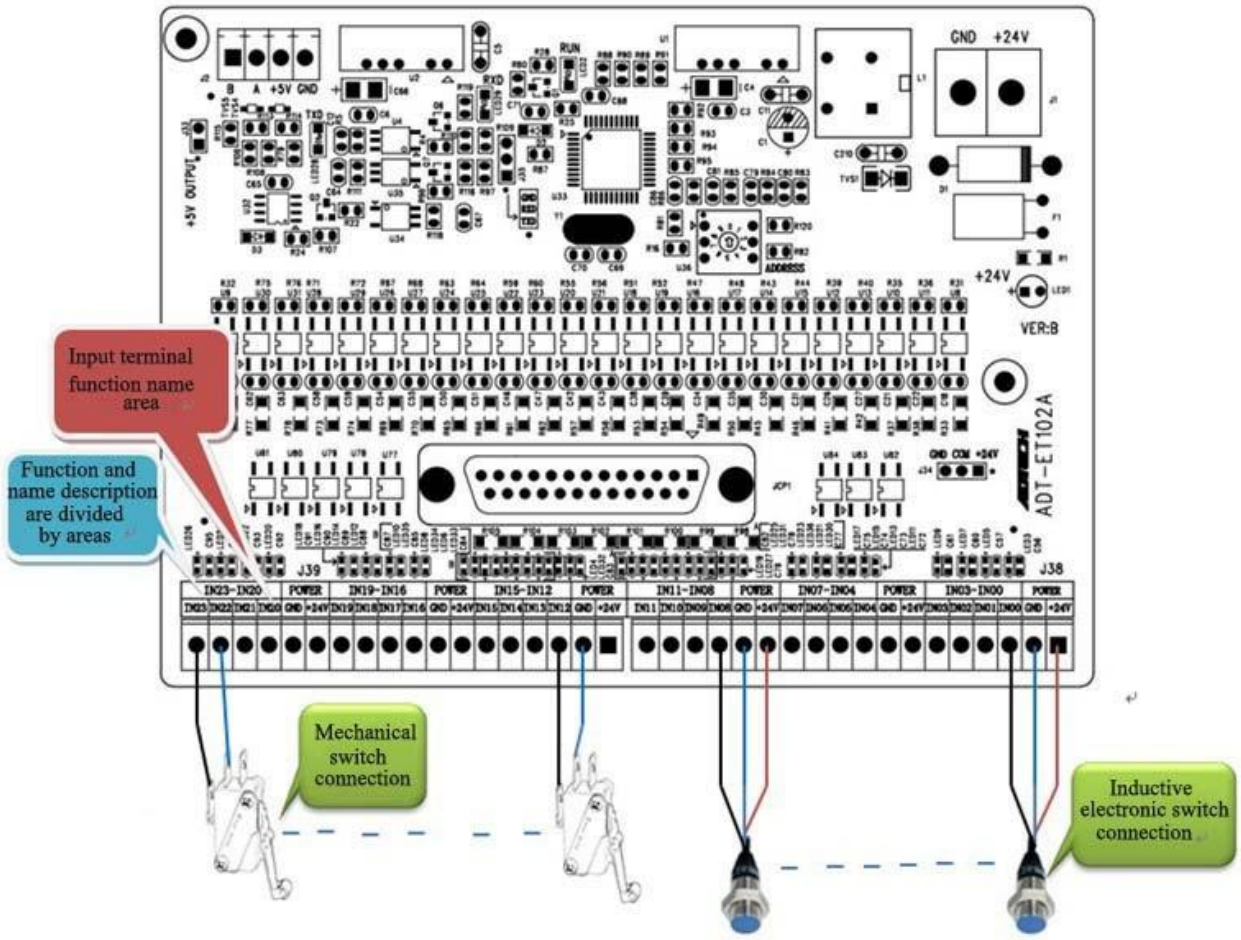
Terminal No.	Area	Port Name	Function
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	X, Y Axis Limit	X+	X axis positive limit
J2		X-	X axis negative limit
J2		Y+	Y axis positive limit
J2		Y-	Y axis negative limit
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	Z, A Axis Limit	Z+	Z axis positive limit
J2		Z-	Z axis negative limit
J2		A+	A axis positive limit
J2		A-	A axis negative limit
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	B, C Axis Limit	B+	B axis positive limit
J2		B-	B axis negative limit
J2		C+	C axis positive limit
J2		C-	C axis negative limit
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	X, Y, Z, Z Origin Switch	X	X Origin
J2		Y	Y Origin
J2		Z	Z Origin
J2		A	A Origin
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	B, C Origin Switch	B	B Origin
J2		C	C Origin
J2	Press	IN14	Pressure detection
J2		IN15	Vacuum detection
J2	POWER	+24V	24V power supply output terminal

J2		GND	24V power supply output GND terminal
J2	External Switch	IN20	EXT control switch
J2		IN21	EXT control switch
J2		IN22	EXT control switch
J2		IN23	EXT control switch
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	INPUT 24-27	IN24	IN24
J2		IN25	IN25
J2		IN26	IN26
J2		IN27	IN27
J2		+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	INPUT 28-31	IN28	IN28
J2		IN29	IN29
J2		IN30	IN30
J2		IN31	IN31

Terminal No.	Area	Port Name	Function
J3	Spindle Encoder	A+	Spindle encoder A+
J3		A-	Spindle encoder A-
J3		B+	Spindle encoder B+
J3		B-	Spindle encoder B-
J3		Z+	Spindle encoder Z+
J3		Z-	Spindle encoder Z-
J3		EVCC5V	Spindle encoder power 5V terminal
J3		EGND	Spindle encoder power 0V terminal
J3	Spindle	PU+	Servo spindle position control PU+

J3	Puls	PU-	Servo spindle position control PU-
J3		DR+	Servo spindle position control DR+
J3		DR-	Servo spindle position control DR-
J3		PWM1	PWM1
J3		DAGND	Analog grounding
J3		DOUT1	0-10V first analog output
J3		DOUT2	0-10V second analog output
J3	Control Port	IAXIS_IN1	Spindle alarm signal 1 input port
J3		+24V	Control signal common end +24V
J3		IAXIS_IN2	Spindle alarm signal 2 input port
J3		GND	Control signal common end GND
J3		CW	Spindle CW signal AXES1
J3		CCW	Spindle CCW signal AXES2
J3		S1	Spindle step 1 AXES3
J3		S2	Spindle step 2 AXES4
J3		S3	Spindle step 3 AXES5
J3		S4	Spindle step 4 AXES6

11.3.7. ET102A splitter wiring diagram



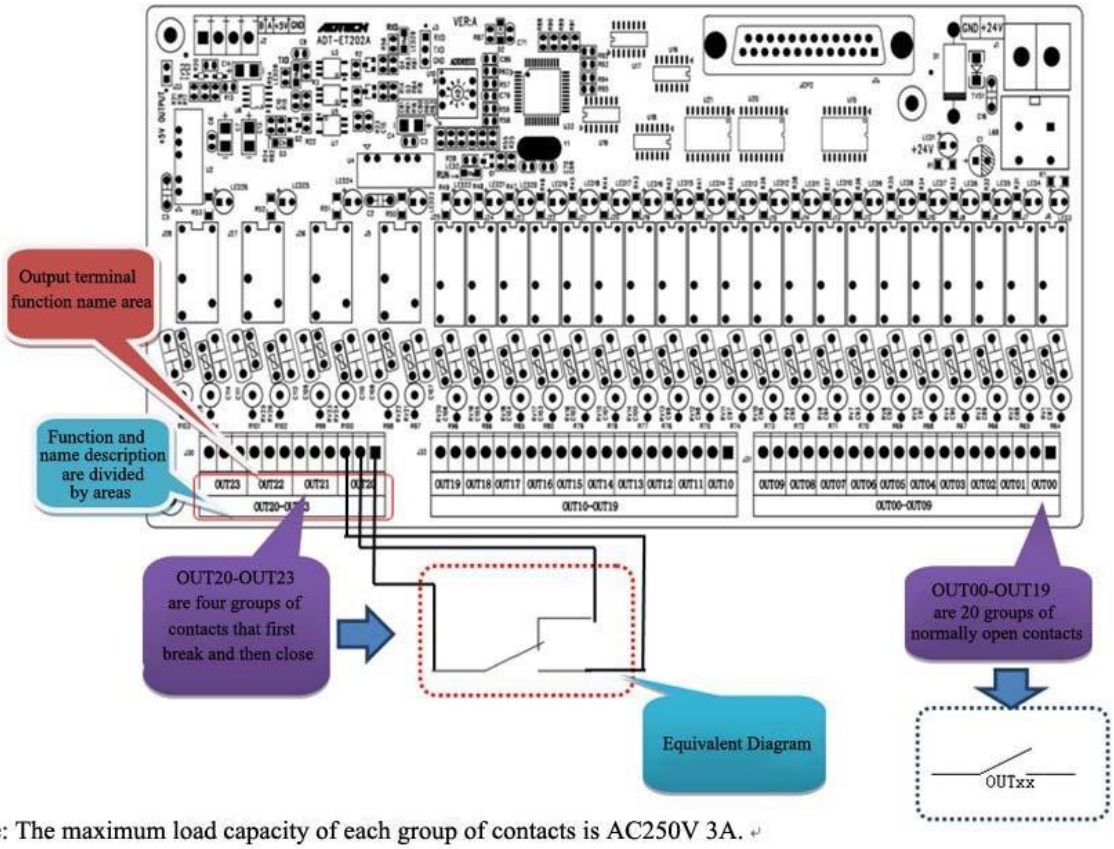
Note: The splitter terminal GND and +24V are used for power supply of external proximity sensor switch. Every four input points share a group, and the maximum operating current of each group of power supply terminals is 200MA. Except common terminal 24V or GND is selected for IN08-IN15 by J34, the common terminal of all other input points is +24V, and the status of the input point inverts when all input terminals are connected to GND.

ET102A splitter function definition

Terminal No.	Area	Port Name	Function
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN03-IN00	IN00	IN00

J38		IN01	IN01
J38		IN02	IN02
J38		IN03	IN03
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN07-IN04	IN04	IN04
J38		IN05	IN05
J38		IN06	IN06
J38		IN07	IN07
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN11-IN08	IN08	IN08
J38		IN09	IN09
J38		IN10	IN10
J38		IN11	IN11
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN15-IN12	IN12	IN12
J39		IN13	IN13
J39		IN14	IN14
J39		IN15	IN15
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN19-IN16	IN16	IN16
J39		IN17	IN17
J39		IN18	IN18
J39		IN19	IN19
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN23-IN20	IN20	IN20
J39		IN21	IN21
J39		IN22	IN22
J39		IN23	IN23

11.3.8. ET202A splitter wiring diagram



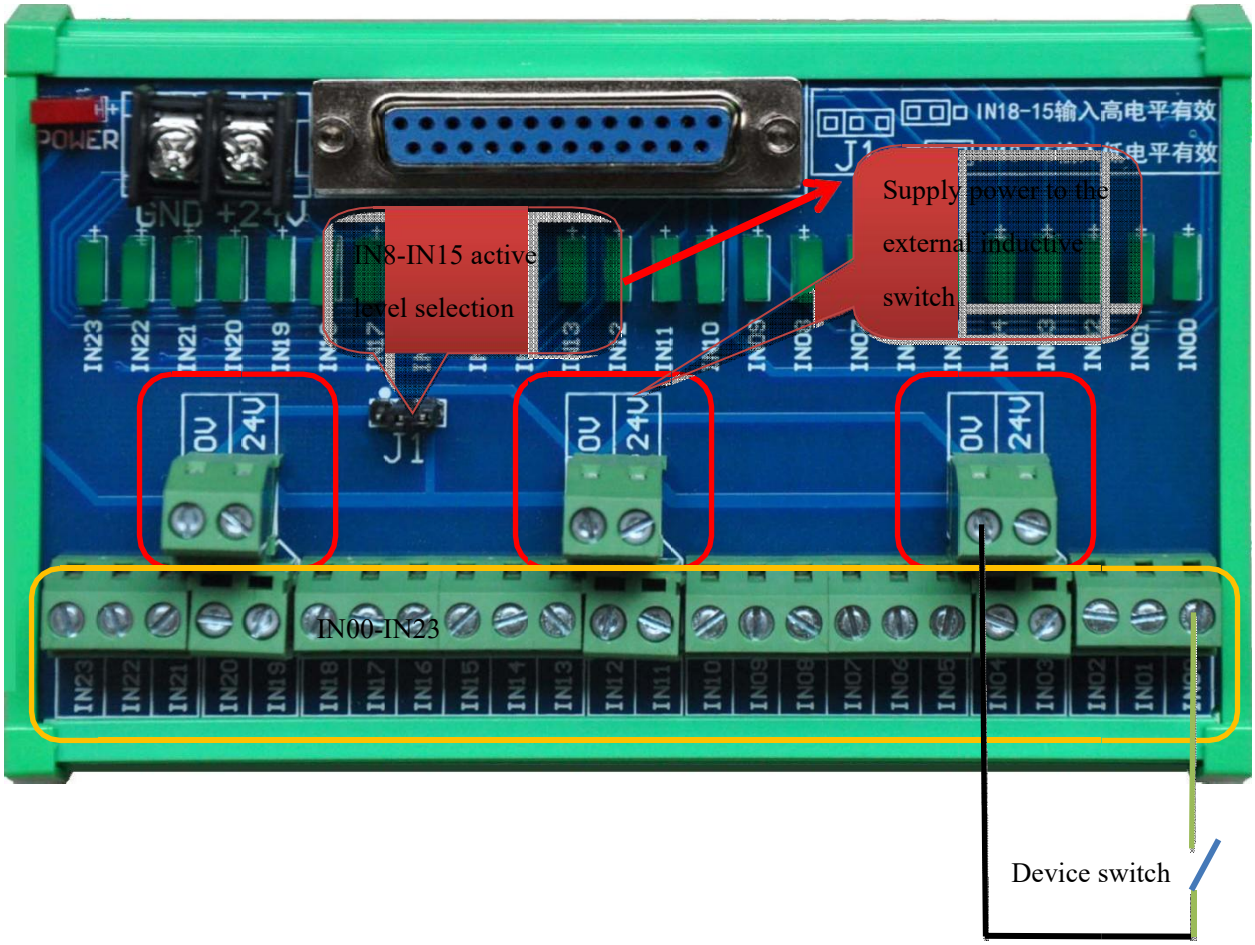
Note: The maximum load capacity of each group of contacts is AC250V 3A.

ET202A splitter function definition

Terminal No.	Area	Port Name	Function
J31	OUT00-OUT09	OUT00	OUT00
J31		OUT01	OUT01
J31		OUT02	OUT02
J31		OUT03	OUT03
J31		OUT04	OUT04
J31		OUT05	OUT05
J31		OUT06	OUT06
J31		OUT07	OUT07
J31		OUT08	OUT08

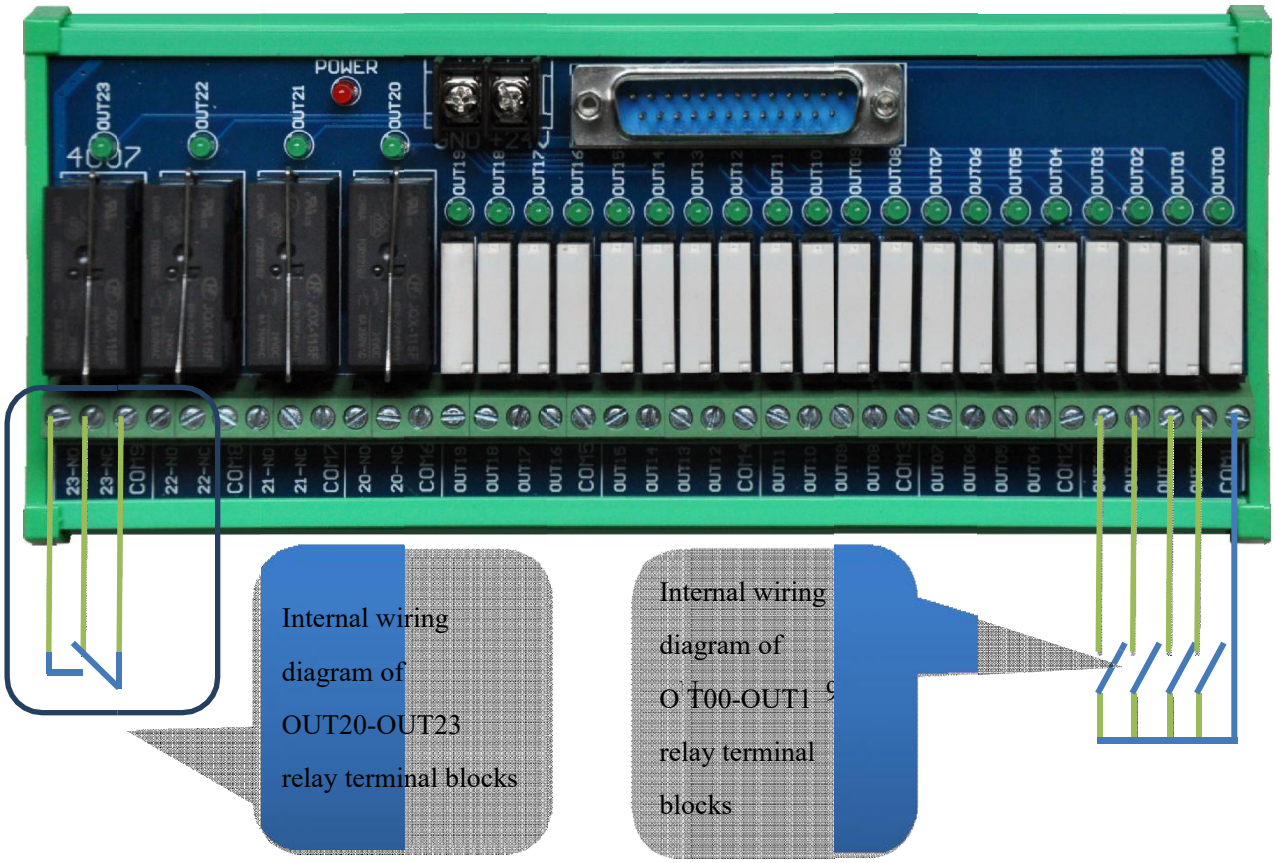
J31		OUT09	OUT09
J32	OUT10-OUT19	OUT10	OUT10
J32		OUT11	OUT11
J32		OUT12	OUT12
J32		OUT13	OUT13
J32		OUT14	OUT14
J32		OUT15	OUT15
J32		OUT16	OUT16
J32		OUT17	OUT17
J32		OUT18	OUT18
J32		OUT19	OUT19
J30	OUT20-OUT23	OUT20	OUT20
J30		OUT21	OUT21
J30		OUT22	OUT22
J30		OUT23	OUT23

11.3.9. ADT-I24HNA input board



When IN00-IN07 and IN15 to IN23 are fixed, the reversal occurs when OV is on, from IN08 to IN15. The J1 jumper selects to flip against OV or 24V.

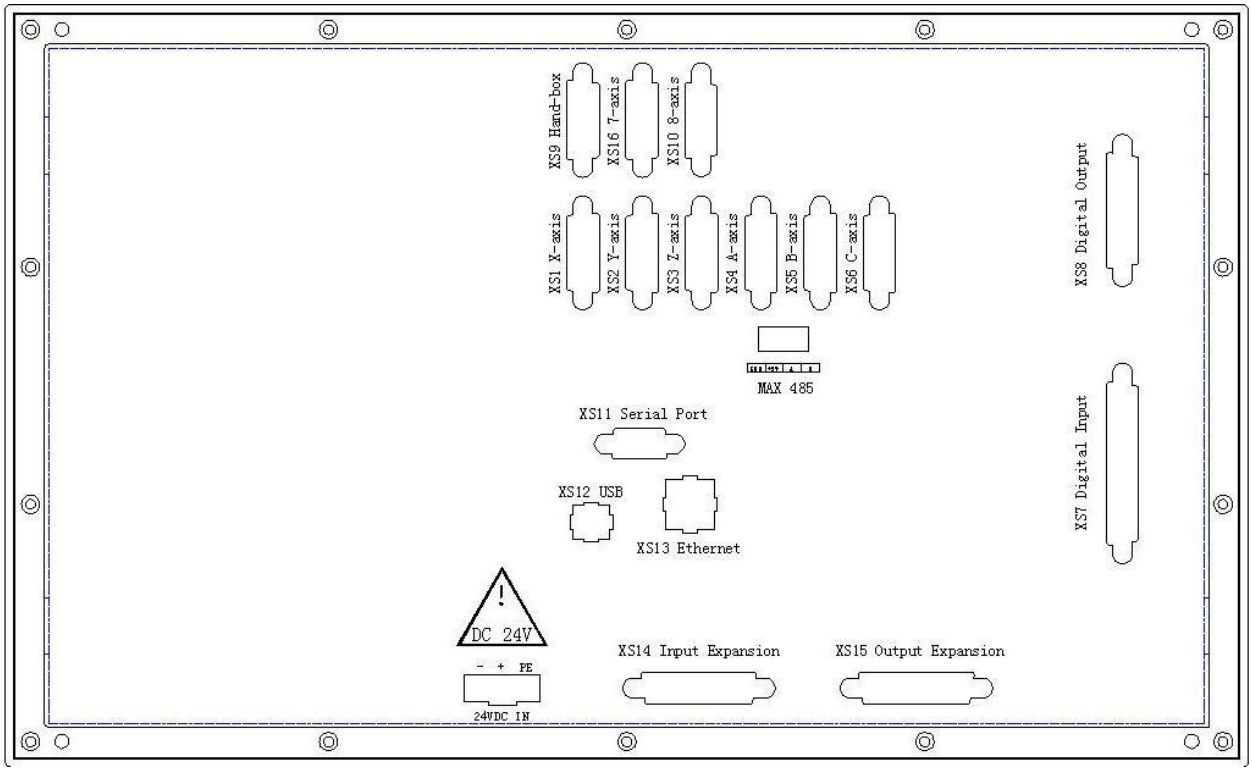
11.3.10. ADT-O24HNA output board



For OUT00-OUT19, every four output points share one COM terminal. The output points are not the normally opened contacts, which are disconnected usually and are closed when it is connected. The four output points of OUT20-OUT23 are equipped with independent COM ports, each of which leads one NO contact and one NC contact.

9. CNC9 Series Hardware Interface Instructions

12.1. External Interface Diagram



XS1 (X axis), XS2 (Y axis), XS3 (Z axis), XS4 (A axis), XS5 (B axis), XS6(C axis), XS16(7 axis), XS10(8 axis): 15-core D-pin socket connects to step motor driver or digital AC servo driver.

(2) XS7 machine tool input interface: 37-core D-pin socket inputs signals for every axis limit and other switching quantity.

(3) XS8 machine tool output interface: 25-core D-pin socket outputs signals for switching quantity.

(4) USB and serial port exchange files between PC and CNC99 controller and realize other functions.

(5) CNC99 controller uses 24V DC power supply, and the internal power consumption is about 5W.

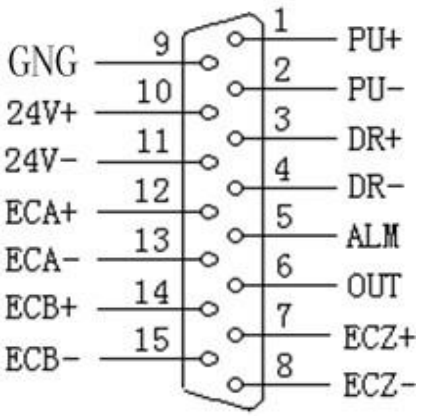
(6) XS9 hand wheel interface: 15-core D-pin socket connects to hand wheel

(7) XS14 machine tool extended input interface: 25-pin D-type socket is switching quantity extended input signal

(8) XS15 machine tool extended output interface: 25-pin D-type socket is switching quantity extended output signal

12.2. Motor driver control interface

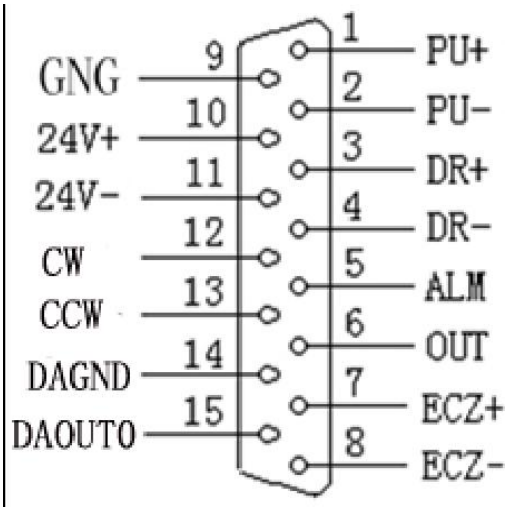
The definitions of XS1…XS4 XS5 XS6 (corresponding to X axis, Y axis, Z axis, A axis, B axis, C axis) are as follows:



49 series pluse interface

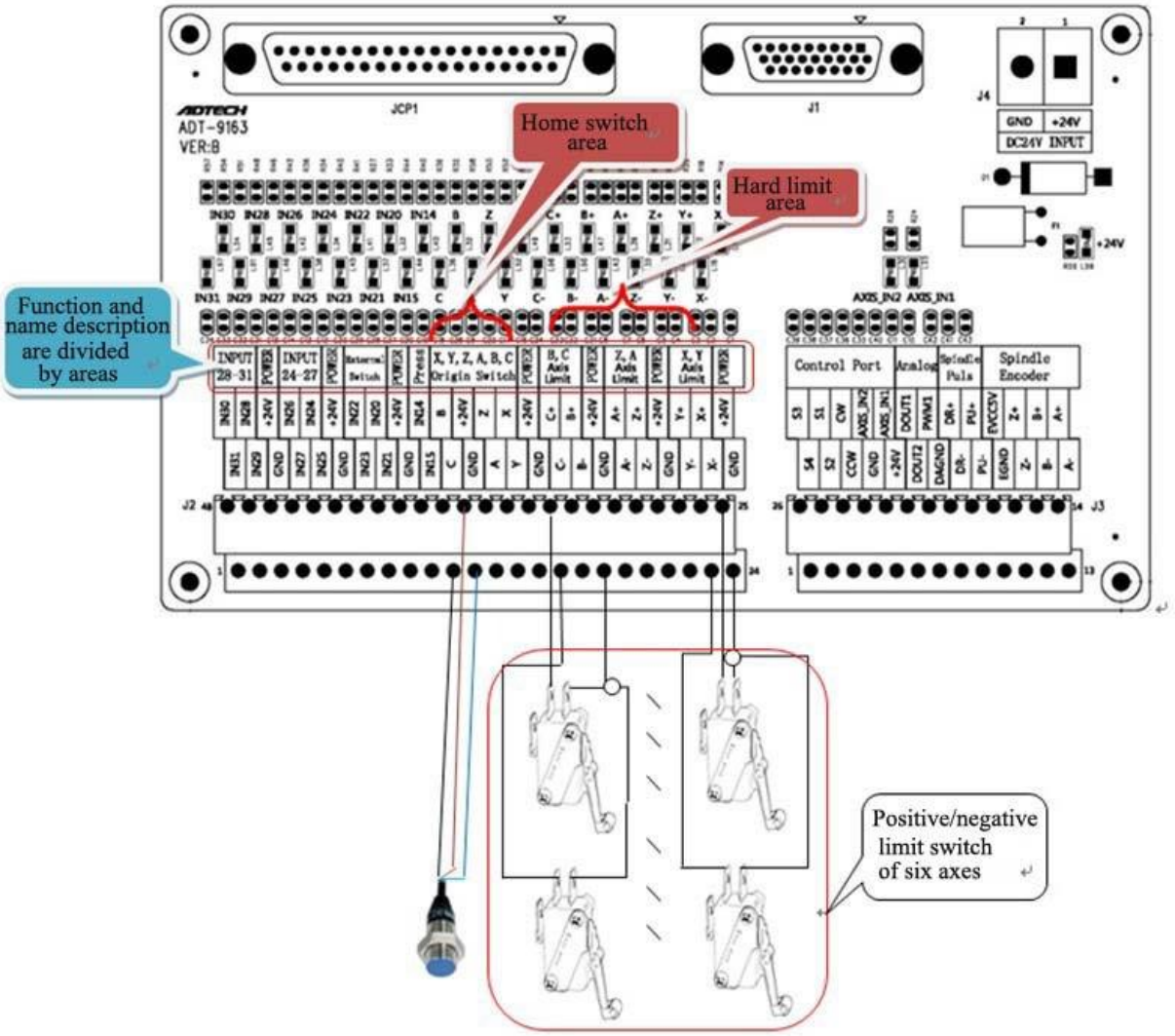
Wire No.	Definition	Function
1	PU+	Pulse signal +
2	PU-	Pulse signal -
3	DR+	Direction signal +
4	DR-	Direction signal -
5	ALM	Servo alarm signal input X axis: IN66, Y axis: IN67, Z axis: IN68, A axis: IN69 , B axis : IN70, C axis: IN71
6	OUT	Axis alarm reset output signal X axis: OUT48, Y axis: OUT49, Z axis: OUT50, A axis: OUT51 , B axis : OUT52, C axis: OUT53
7	ECZ+	Encoder phase Z input +
8	ECZ-	Encoder phase Z input -
9	GND	99 series reference ground, 96 series single-ended to common terminal
10	24V+	Internally provided 24V power supply, directly connected to 24V power supply of the controller
11	24V-	
12	ECA+	Encoder phase A input +
13	ECA-	Encoder phase A input -
14	ECB+	Encoder phase B input +
15	ECB-	Encoder phase B input -

The definitions of XS16 and XS10((corresponding to the motor control definition of 7 axis, 8 axis) are as follows:



Wire No.	Definition	Function
1	PU+	Pulse signal +
2	PU-	Pulse signal -
3	DR+	Direction signal +
4	DR-	Direction signal +
5	ALM	Servo alarm signal input (7 axis: IN93, 8 axis:IN94)
6	OUT	Axis alarm reset output signal (7 axis: OUT58, 8 axis: OUT56)
7	ECZ+	Encoder phase Z input +
8	ECZ-	Encoder phase Z input -
9	GND	99 series reference ground
10	24V+	Internally provided 24V power supply, directly connected to 24V power supply of the controller
11	24V-	
12	CW	Spindle forward output (can be used as general output)
13	CCW	Spindle reverse output (can be used as general output)
14	DAGND	Analog output GND
15	DAOUT0	Analog output (0-10V)

12.3. ADT9163 splitter wiring diagram



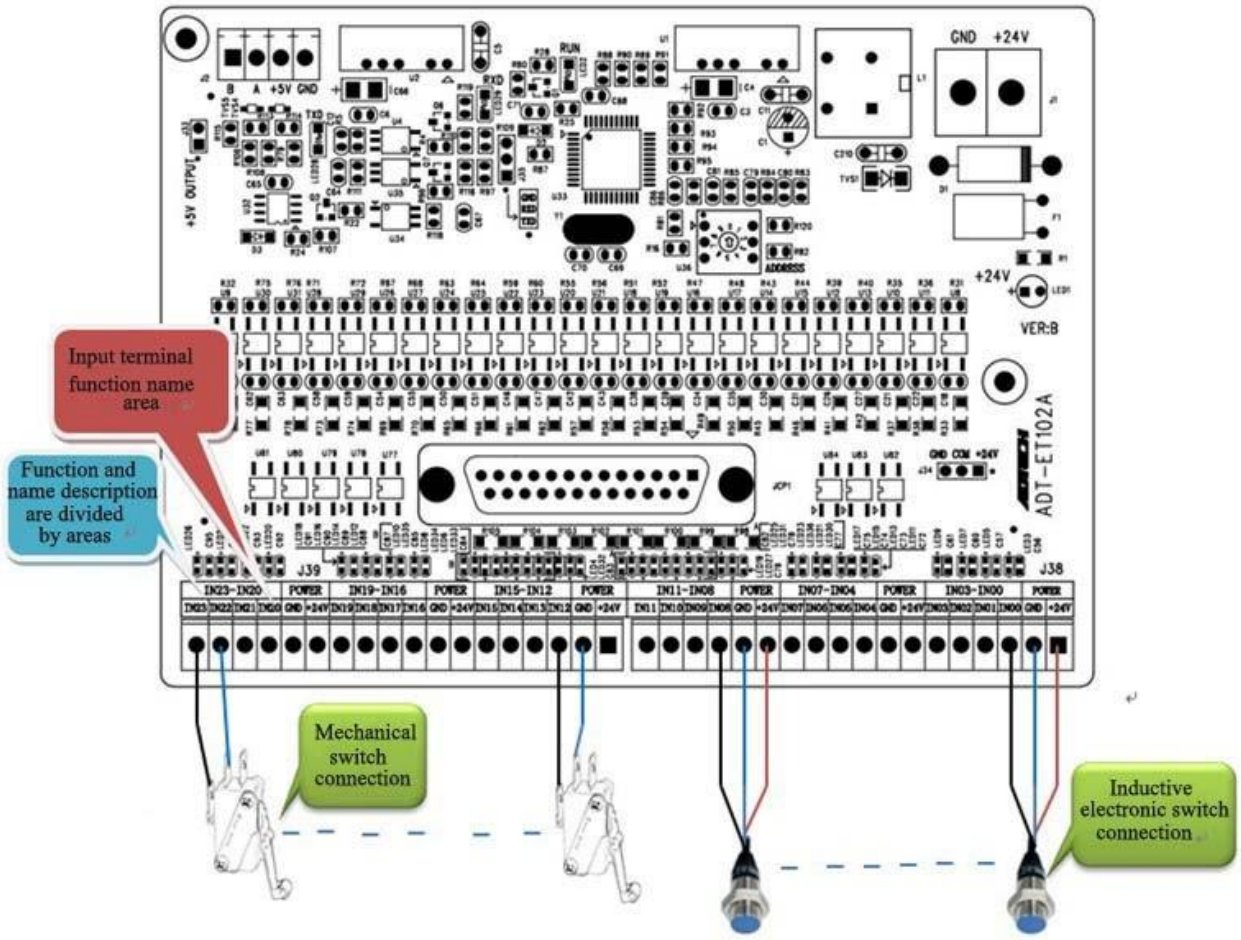
Note: The splitter terminal GND and +24V are used for power supply of external proximity sensor switch. Every four input points share a group, and the maximum operating current of each group of power supply terminals is 200MA. The common terminal of all input points is +24V, and the status of the input point inverts when all input terminals are connected to GND.

ADT-9163 splitter function definition (Basic input)

Terminal No.	Area	Port Name	Standard System function
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	X，Y Axis Limit	X+	X+ axis limit IN00, 1000
J2		X-	X- axis limit IN01, 1001
J2		Y+	Y+ axis limit IN02, #1002
J2		Y-	Y- axis limit IN03, 1003
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	Z, A Axis Limit	Z+	Z+ axis limit IN04, 1004
J2		Z-	Z- axis limit IN05, #1005
J2		A+	A+ axis limit IN06, 1006
J2		A-	A- axis limit IN07, 1007
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	B, C Axis Limit	B+	B+ Axis Limit IN16, 1016
J2		B-	B- axis limit IN17, 1017
J2		C+	C+ axis limit t IN18, 1018
J2		C-	C- axis limit IN19, 1019
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	X, Y, Z, Z Origin Switch	X	X Origin IN08, 1008
J2		Y	Y Origin IN09, 1008
J2		Z	Z Origin IN10, 1010
J2		A	A Origin IN11, 1011
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	B, C Origin Switch	B	B origin IN12, 1012
J2		C	C origin IN13, 1013
J2	Press	IN14	7 origin IN14 #1014
J2		IN15	8 origin IN15 #1015
J2	POWER	+24V	24V power supply output terminal

J2		GND	24V power supply output GND terminal
J2	External Switch	IN20	IN20 #1020
J2		IN21	IN21 #1021
J2		IN22	IN22 #1022
J2		IN23	IN23 #1023
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	INPUT 24-27	IN24	IN24
J2		IN25	IN25
J2		IN26	IN26
J2		IN27	IN27
J2	POWER	+24V	24V power supply output terminal
J2		GND	24V power supply output GND terminal
J2	INPUT 28-31	IN28	IN28
J2		IN29	IN29
J2		IN30	IN30
J2		IN31	IN31

12.4. ET102A splitter wiring diagram



Note: The splitter terminal GND and +24V are used for power supply of external proximity sensor switch. Every four input points share a group, and the maximum operating current of each group of power supply terminals is 200MA. Except common terminal 24V or GND is selected for IN08-IN15 by J34, the common terminal of all other input points is +24V, and the status of the input point inverts when all input terminals are connected to GND.

ET102A splitter function definition (Extended input)

Terminal No.	Area	Port Name	Extended input of Standard system
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN03-IN00	IN00	IN32 #1032
J38		IN01	IN33 #1033
J38		IN02	IN34 #1034

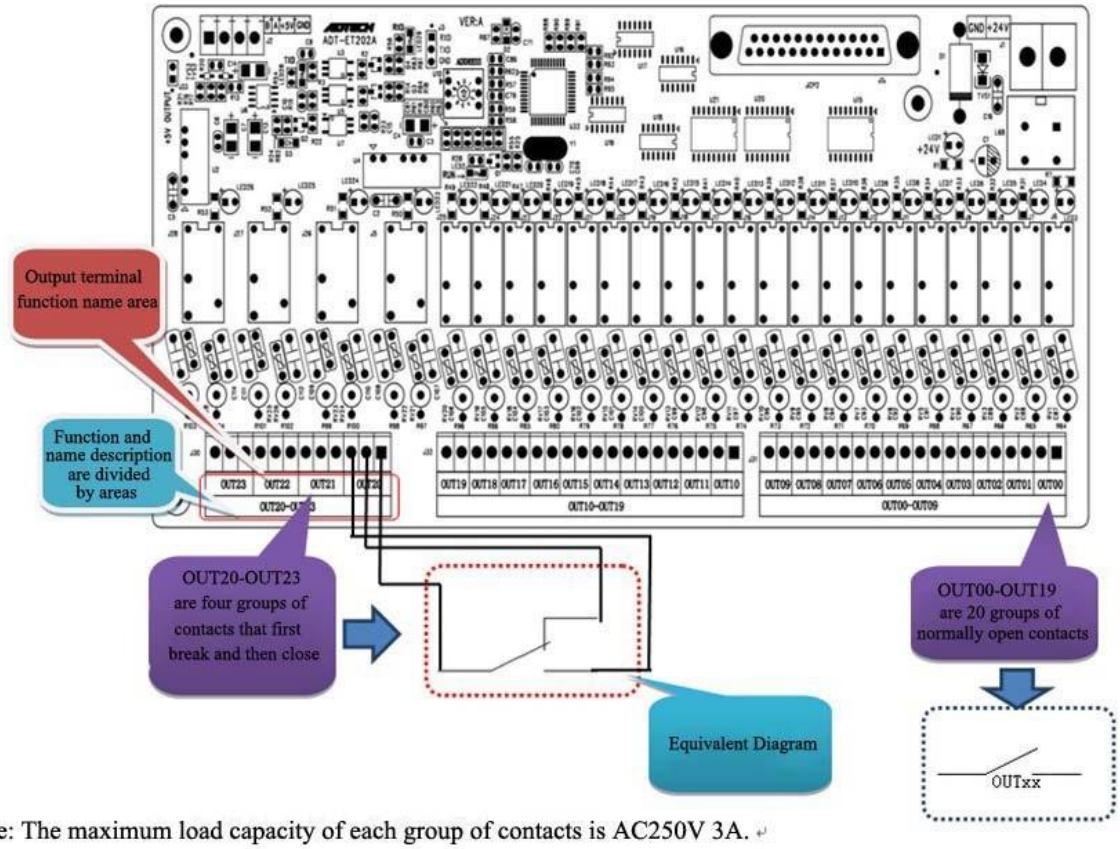
J38		IN03	IN35 #1035
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN07-IN04	IN04	IN36 #1036
J38		IN05	IN37 #1037
J38		IN06	IN38 #1038
J38		IN07	IN39 #1039
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN11-IN08	IN08	IN40 #1040
J38		IN09	IN41 #1041
J38		IN10	IN42 #1042
J38		IN11	IN43 #1043
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN15-IN12	IN12	IN44 #1044
J39		IN13	IN45 #1045
J39		IN14	IN46 #1046
J39		IN15	IN47 #1047
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
Terminal No.	Area	Port Name	Extended input of Standard system
J39	IN19-IN16	IN16	IN48 #1048
J39		IN17	IN49 #1049
J39		IN18	IN50 #1050
J39		IN19	IN51 #1051
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN23-IN20	IN20	IN52 #1052
J39		IN21	IN53 #1053
J39		IN22	IN54 #1054
J39		IN23	IN55 #1055

ET102A splitter function definition (Extended input 2—external expansion)

Terminal No.	Area	Port Name	Extended input of Standard system
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN03-IN00	IN00	Standby IN100
J38		IN01	Standby IN101
J38		IN02	Standby IN102
J38		IN03	Standby IN103
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN07-IN04	IN04	Standby IN104
J38		IN05	Standby IN105
J38		IN06	Standby IN106
J38		IN07	Standby IN107
J38	POWER	+24V	24V power supply output terminal
J38		GND	24V power supply output GND terminal
J38	IN11-IN08	IN08	Standby IN108
J38		IN09	Standby IN109
J38		IN10	Standby IN110
J38		IN11	Standby IN111
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN15-IN12	IN12	Standby IN112
J39		IN13	Standby IN113
J39		IN14	Standby IN114
J39		IN15	Standby IN115
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN19-IN16	IN16	Standby IN116
J39		IN17	Standby IN117

J39		IN18	Standby IN118
J39		IN19	Standby IN119
J39	POWER	+24V	24V power supply output terminal
J39		GND	24V power supply output GND terminal
J39	IN23-IN20	IN20	Standby IN120
J39		IN21	Standby IN121
J39		IN22	Standby IN122
J39		IN23	Standby IN123

12.5. ET202A splitter wiring diagram



Note: The maximum load capacity of each group of contacts is AC250V 3A.

ET202A splitter function definition (Basic output)

Terminal No.	Area	Port Name	Standard System function
J31	OUT00-OUT09	OUT00	OUT00 #1400
J31		OUT01	OUT01 #1401

J31		OUT02	OUT02 #1402
J31		OUT03	OUT03 #1403
J31		OUT04	OUT04 #1404
J31		OUT05	OUT05 #1405
J31		OUT06	OUT06 #1406
J31		OUT07	OUT07 #1407
J31		OUT08	OUT08 #1408
J31		OUT09	OUT09 #1409
J32	OUT10-OUT19	OUT10	OUT10 #1410
J32		OUT11	OUT11 #1411
J32		OUT12	OUT12 #1412
J32		OUT13	OUT13 #1413
J32		OUT14	OUT14 #1414
J32		OUT15	OUT15 #1415
J32		OUT16	OUT16 #1416
J32		OUT17	OUT17 #1417
J32		OUT18	OUT18 #1418
J32		OUT19	OUT19 #1419
J30	OUT20-OUT23	OUT20	OUT20 #1420
J30		OUT21	OUT21 #1421
J30		OUT22	OUT22 #1422
J30		OUT23	OUT23 #1423

ET202A splitter function definition (Extended output)

Terminal No.	Area	Name	Standard System function
J31	OUT00-OUT09	OUT00	OUT24 #14024
J31		OUT01	OUT25 #14025
J31		OUT02	OUT26 #14026
J31		OUT03	OUT27 #14027
J31		OUT04	OUT28 #14028
J31		OUT05	OUT29 #14029

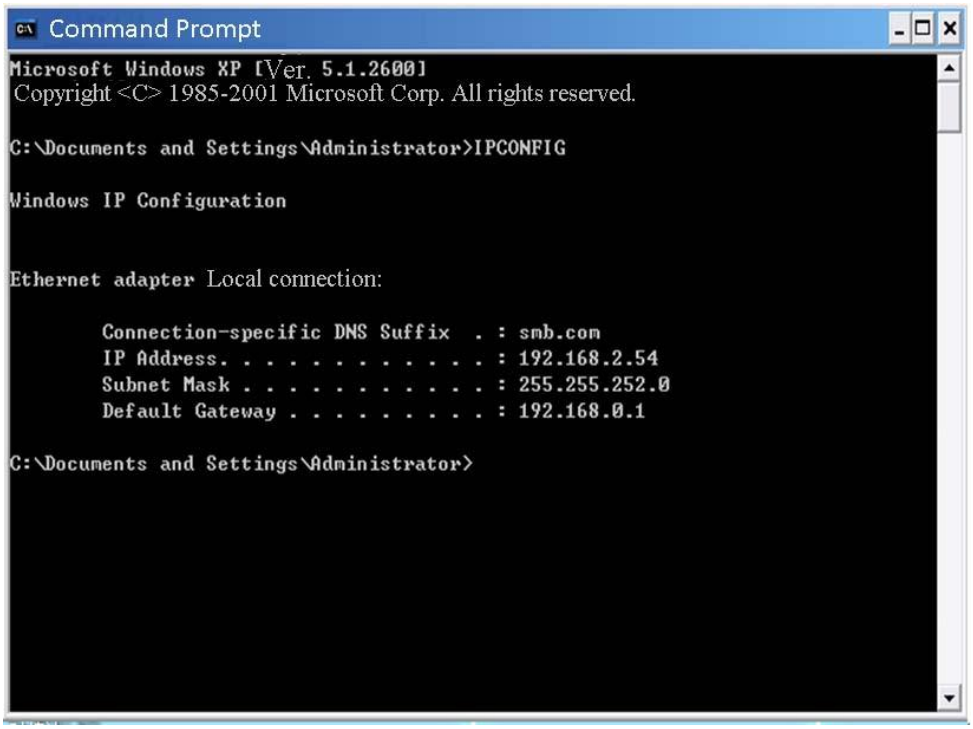
J31		OUT06	OUT30 #14030
J31		OUT07	OUT31 #14031
J31		OUT08	OUT32 #14032
J31		OUT09	OUT33 #14033
J32		OUT10	OUT34 #14034
J32		OUT11	OUT35 #14035
J32		OUT12	OUT36 #14036
J32		OUT13	OUT37 #14037
J32	OUT10-OUT19	OUT14	OUT38 #14038
J32		OUT15	OUT39 #14039
J32		OUT16	OUT40 #14040
J32		OUT17	OUT41 #14041
J32		OUT18	OUT42 #14042
J32		OUT19	OUT43 #14043
J30		OUT20	OUT44 #14044
J30	OUT20-OUT23	OUT21	OUT45 #14045
J30		OUT22	OUT46 #14046
J30		OUT23	OUT47 #14047

10. Transmission of Computer NC Program Network to the System

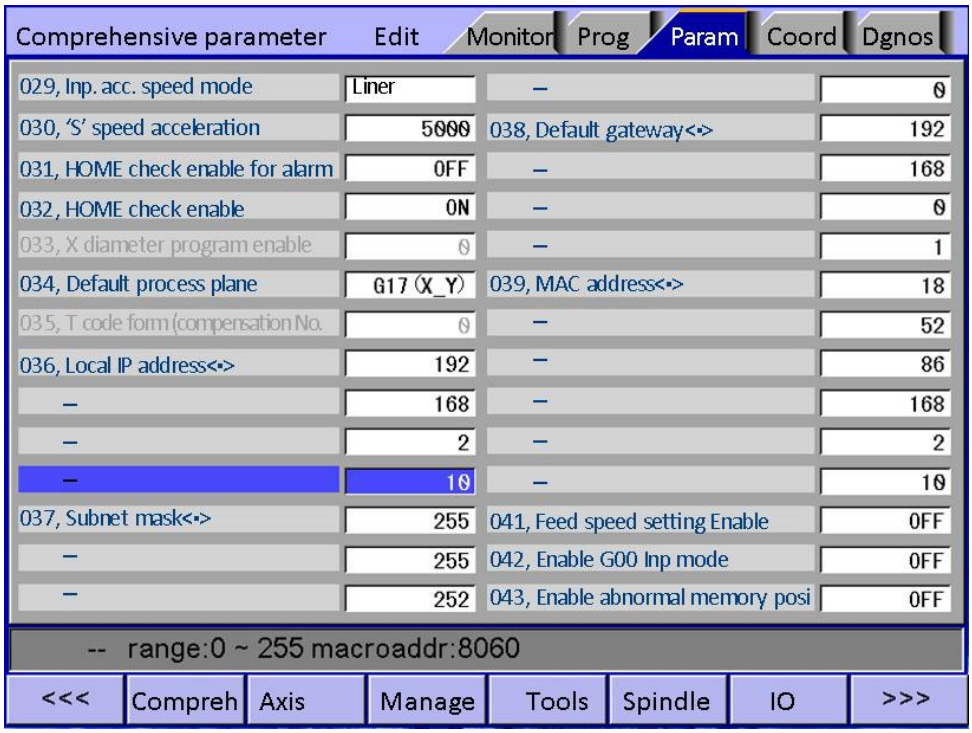
13.1. System IP Settings

Connect the controller to the router with a network cable.

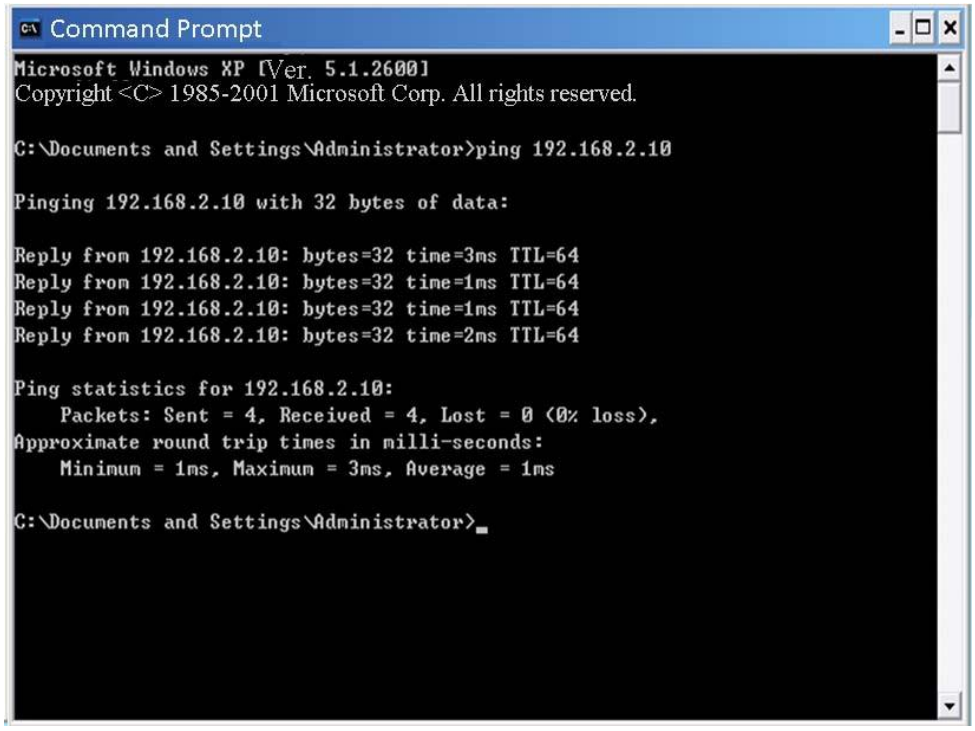
Through built-in command window, it is available to view the local computer ip address configuration using the IPCONFIG command, as shown below:



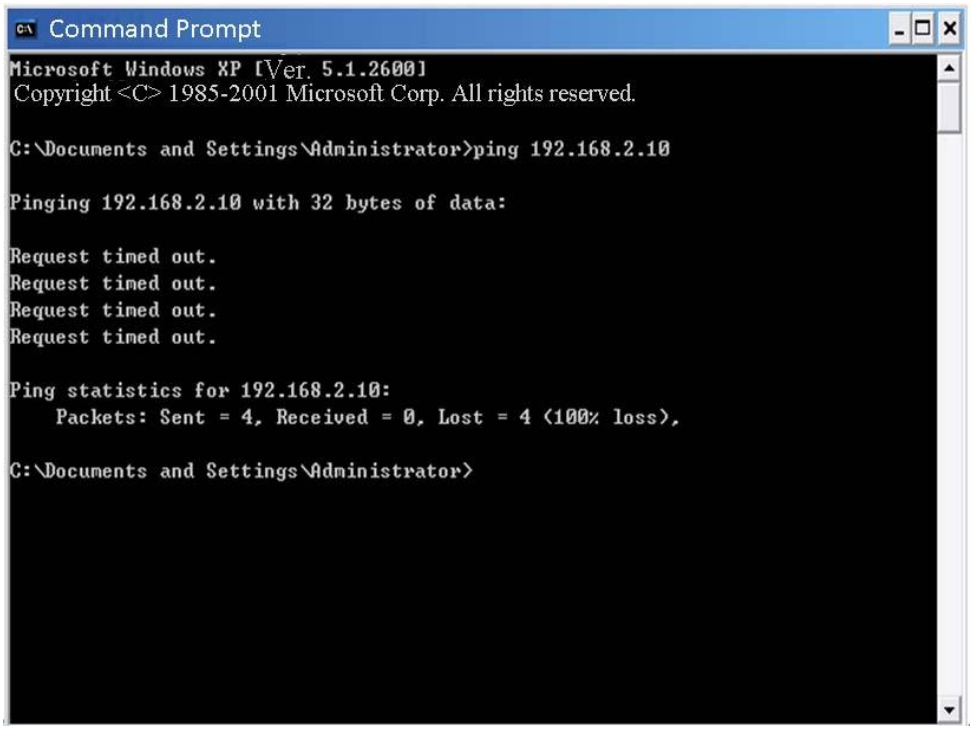
Assign the controller the IP address 192.168.2.2 in the same network segment that is not used based on the IP address of the host computer, for example, the IP address is 192.168.2.54.



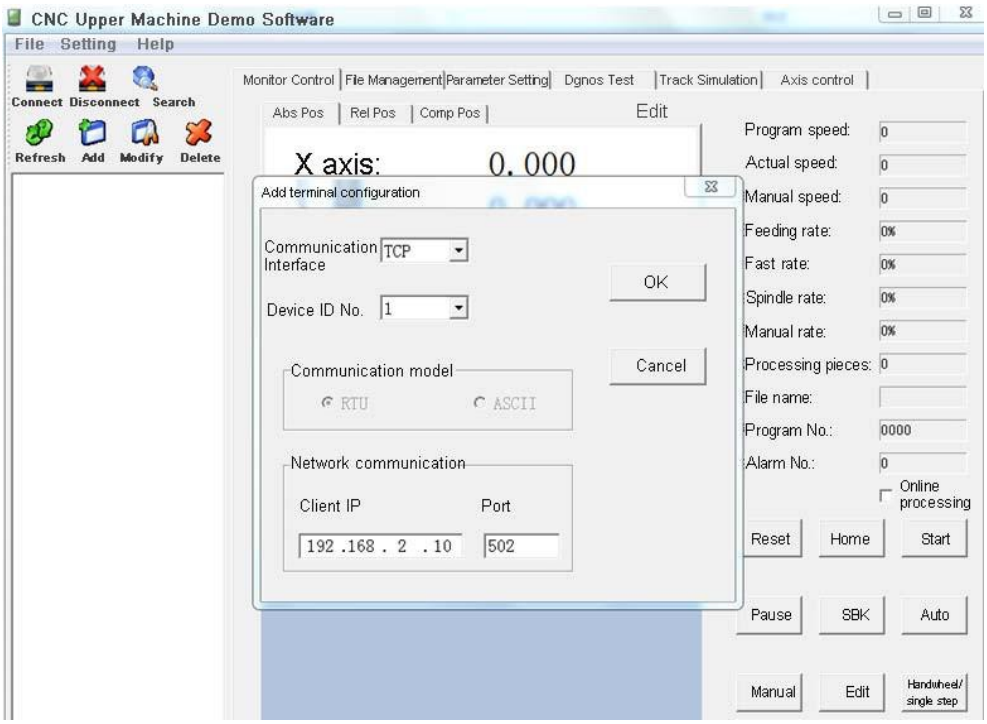
Check whether the network is connected through the ping command in the command window on the computer, as shown in the following figure:



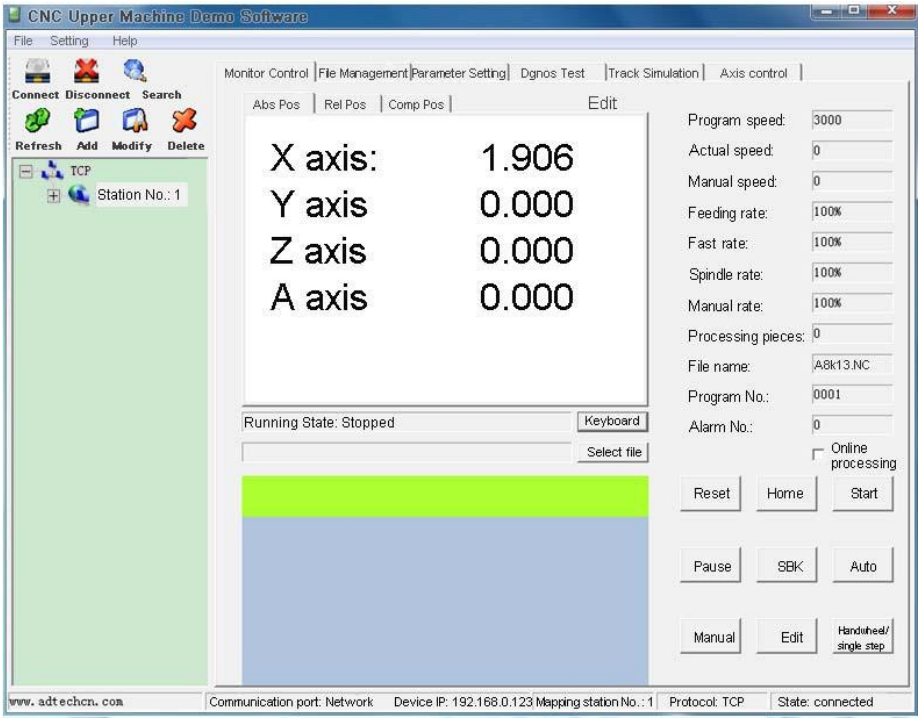
If the screen shown below appears, the network is not connected. Check whether the IP address is correctly assigned, whether there is any problem with the connection, and whether the system is powered on.



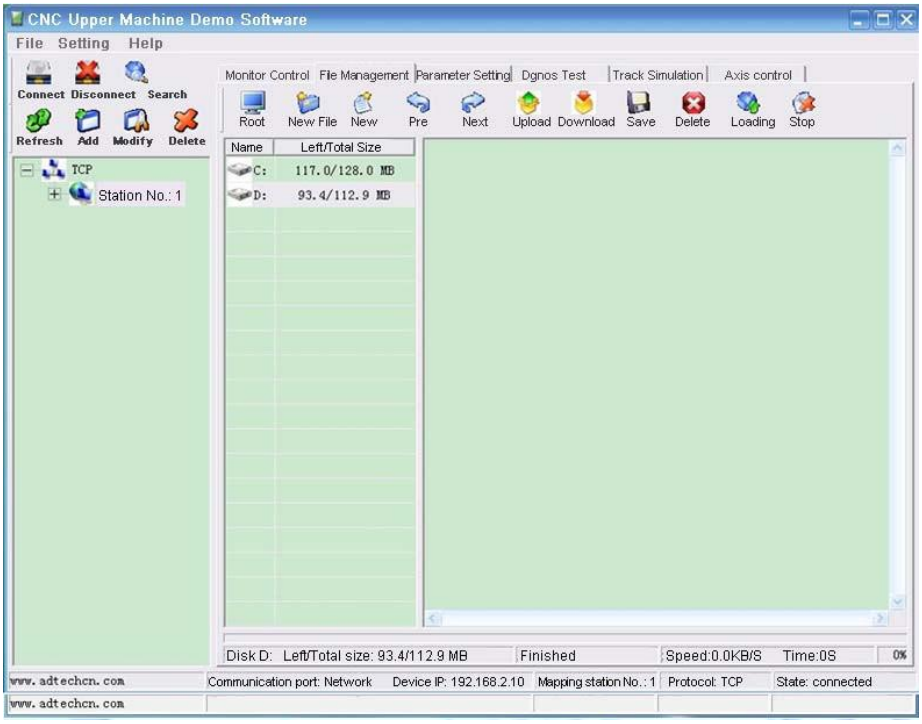
When the network is normal, you can open the communication software, add the terminal configuration, and set the IP address, as shown below:



After setting the correct IP address, select the station number 1 under the TCP extension menu bar, and click the "Connect" button to access the contents of the controller, as shown below:



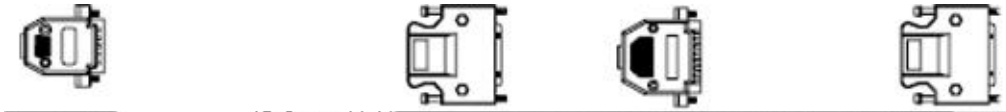
Select to upload and download files in the file management bar.



11. Appendix-Common Servo Wiring Diagrams

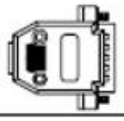
14.1. Pulse control port wiring definition

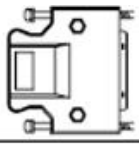
14.1.1. Wiring diagram of ADTECH QS, QX and Shanyang servo driver



Controller DB15 Plug Pin definition	16-Core shield	16-Core shield Twisted	QS8/QS7/QS6 36P servo head	QS1AA030M2 DB25G	QS6AA050M3 DB25G	Shanyang R/Q series 50P servo head	QX series 50P servo head	QX-A2 series 50P servo head
			CN1	CN1	CN1	CN1	CN1	CN1
1 PU+	RED	GRY RED	25	14	6	28	28	45
2 PU-	GRN	GRY BLK	24	15	18	29	29	44
3 DR+	YLM	WHI RED	27	17	7	26	26	47
4 DR-	BLK	WHI BLK	26	18	19	27	27	46
5 ALM	GRY	OG RED	4	12	12	46	46	37
6 ALR	OG	OG BLK	14	4	22	34	34	9
7 ECZ+	LT GN	OG RED RED	30	19	5	7	7	23
8 ECZ-	PNK	OG BLK BLK	31	20	17	8	8	24
10 +24V	BWN	PNK	9	9	11	49/50	49/50	7
11 0V	BLU	PNK BLK	3/10	8/25	13/23	12/20/24/ 47/48	12/20/24/ 37/47/48	41
12 ECA+	BLK WHI	GRY RED RED	34	23	3	3	3	21
13 ECA-	BWN WHI	GRY BLK BLK	35	24	15	4	4	22
14 ECB+	RED WHI	WHI RED RED	32	21	4	5	5	48
15 ECB-	OG WHI	SHI BLK BLK	33	22	16	6	6	49

14.1.2. Yaskawa, Matsushita, Fuji, TECO





Controller DB15G		10-core STP	Servo driver 26 or 50PIN servo head				
			50PIN	50PIN	26PIN	26PIN	50PIN
Pin	Definition		Yaskawa CN1	Matsushita A4/A5 CN1	Matsushita J series X2	Fuji RYC series CN1	TECO series CN1
1(WHI RED)	PU+		7	3	20	7	14
2(GRY BLK)	PU-		8	4	21	8	15
3(WHI BLK)	DR+		11	5	22	20	16
4(OG RED)	DR-		12	6	23	21	17
5(YLM RED)	ALM		31	37	8	17	19
7(OG BLK)	ECZ+		19	23	17	25	39
8(YLM BLK)	ECZ-		20	24	18	26	40
10(PNK BLK)	+24V		47	7	1	2/14	45
11(GRY RED)	0V		32/40 /42/43	13/29 /36/41	2/11 /12	1	4/46/5/47
Shield (shell)			Shell	Shell	Shell	Shell	50