

ADTECH4 Series

CNC Maintenance Manual

Basic Information

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

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This Manual was first released on August 27, 2013, with version No. A0101 and item number BZ001B092A.

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Adtech (Shenzhen) Technology Co., Ltd.

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: $0^{\circ}\text{C} \sim 60^{\circ}\text{C}$.
- ☞ 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 Inspecti on	Routine	Confirm environmental temperature, humidity, dust, or foreign objects. Confirm abnormal vibration and noise; Check whether vents are blocked by yarn etc.
Regular	One	Check whether solid components are loose

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1. Foreword

CNC4 series numerical control system is economic embedded system developed by Adtech (Shenzhen) Technology Co., Ltd. for lathes, milling machines and machining centers, where CNC4640 and 4940 are four axes motion controllers, CNC4960 is six axes motion controller and CNC4620 is two axes motion controller.

Instructions and reading convention of the Manual

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

Explanation of terms and reading conventions of this manual:

CNC4640 and CNC4620 are control systems with different axes but same hardware functions. M Series applications for milling machines and L Series applications for lathes are developed on this platform. The applications differ on functions and interfaces.

M series refers to a system for milling machine motion function. The interfaces and functions followed by a 'M' or "M Series" note are dedicated for the software system of milling machines.

L series refers to a system for lathe motion function. The interfaces and functions followed by an 'L' or "L Series" note are dedicated for the lathe software system.

"CNC system", "NC controller" and "CNC46XX" mentioned in this manual refer to CNC4640/4620;

"Note" indicates prompt for the operator in related operations or settings, or else it may cause operation failure or an action cannot be executed.

2. System Technical Features

2.1 Technical Parameters

Function	Name		Specification
Control axis	Control axes		4 axes (CNC4640 series) 4 axes (CNC4940 series) 6 axes (CNC4960 series) 2 axes (CNC4620 series)
	Simultaneous control axes		4 axes linear interpolation (CNC4640 series) 2 axes linear interpolation (CNC4620 series) 2 axes arc interpolation
Input instructions	Minimum setting unit		0.001mm
	Minimum moving unit		0.001mm
	Maximum instruction value		±9999.999mm
Feeding	Fast feeding speed		X axis, Y axis, Z axis, A axis: 9999mm/min (maximum)
	Feeding speed range	Feeding per minute	1~9999mm/min
		Feeding per revolution	1~500 rpm
	Automatic acceleration/deceleration		Yes
	Feeding speed rate		10~150%
Manual	Continuously manual feeding,		Yes
	Returning to reference point manually		All control axes return to reference point simultaneously (allow setting order of priority)
	Single step/hand wheel function		Yes
Interpolation	Positioning, linear interpolation, arc		G00, G01, G02/G03

Function	Name	Specification
	interpolation	
Operating mode	MDI, auto, manual, single step, edit	Yes
Testing function	Test run, single program section, hand wheel	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: 60MB 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	
	Position screen, program edit	Yes
	Tool compensation setting, alarm display	
	Hand wheel test, diagnosis screen	
M, S, T function	Parameter setting, graphic simulation	
	Auxiliary function	M code
	Spindle function	S0-S15 (shift control) S15-S99999 (analog)
	Tool function	T code
Compensation	Mold offset compensation function	Length of 30 sets of tools, radius compensation

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

2.2 System Functions

2.2.1. Self-diagnosis

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, principal axis, limits and I/O ports in real-time during operating.

2.2.2. Compensation

Automatic reverse clearance compensation

Automatic tool length compensation

Automatic tool radius compensation

Automatic tool radius offset and automatic tool tip transition

2.2.3. 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.

Point punching, arc nibbling, linear nibbling, grid punching, etc.

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

2.2.4. Full Chinese Menu Operation & Full Screen Edit

4640/4620 CNC system uses cascading menu structure and full Chinese operation to ensure simple operation and visibility.

2.2.5. Abundant Error-correction Functions

Point out the nature and correct the errors in operation.

2.2.6. 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.

2.3 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

3. Operating Panel

3.1 ADTCNC46 Series System LCD/ Button Panel

Button panel

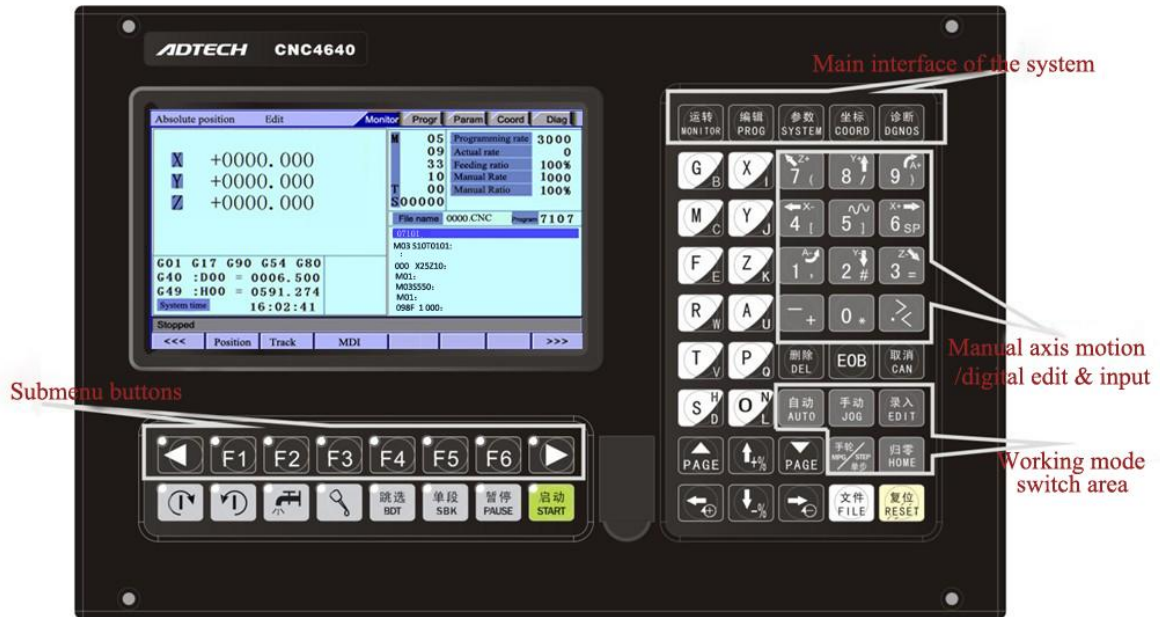


Fig. 3.1 CNC4640 Operation Panel Diagram

Note:

Press the Menu buttons to operate corresponding sub-menus.

Manual axis movement buttons and edit and input buttons are reused, and have different definitions in different modes.

Work mode switching area is used to switch working modes of the system, and the security and system operating experience are enhanced through different modes. Hand wheel and single-step mode are switched through the Repeat button.

LCD display unit

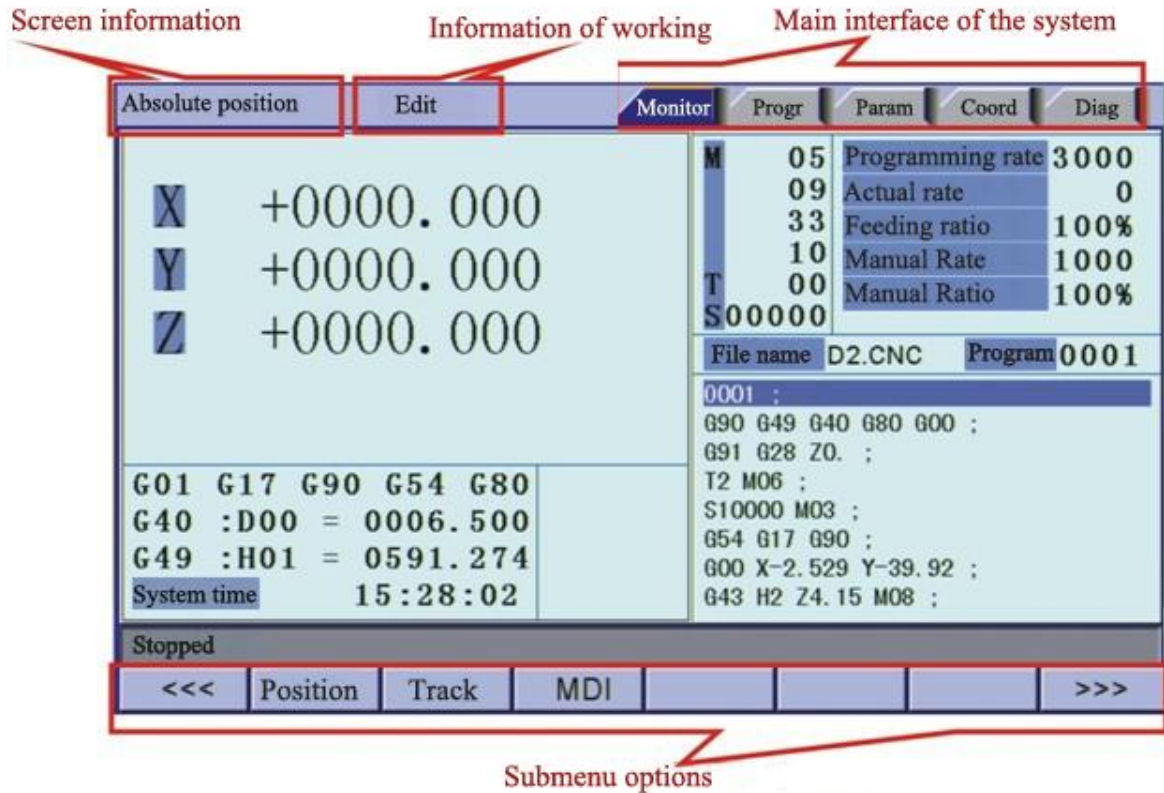


Fig. 3.2 CNC4640 LCD Screen Diagram

Note:

Screen information displays the information about the current window

Working mode information displays the currently selected working mode

Main screen information displays the current content of the main screen.

Sub-screen menu options are used to switch the corresponding sub-screens with the left arrow, F1 ~ F6 and right arrow. The right cycle arrow is used to turn pages, the left cycle arrow is used to close the submenu and return to previous menu.

3.2 ADTCNC49 Series System LCD/ Button Panel



3.3 System Menus

CNC46XX system uses cascading menu structure. You can press the following keys to operate the menus.



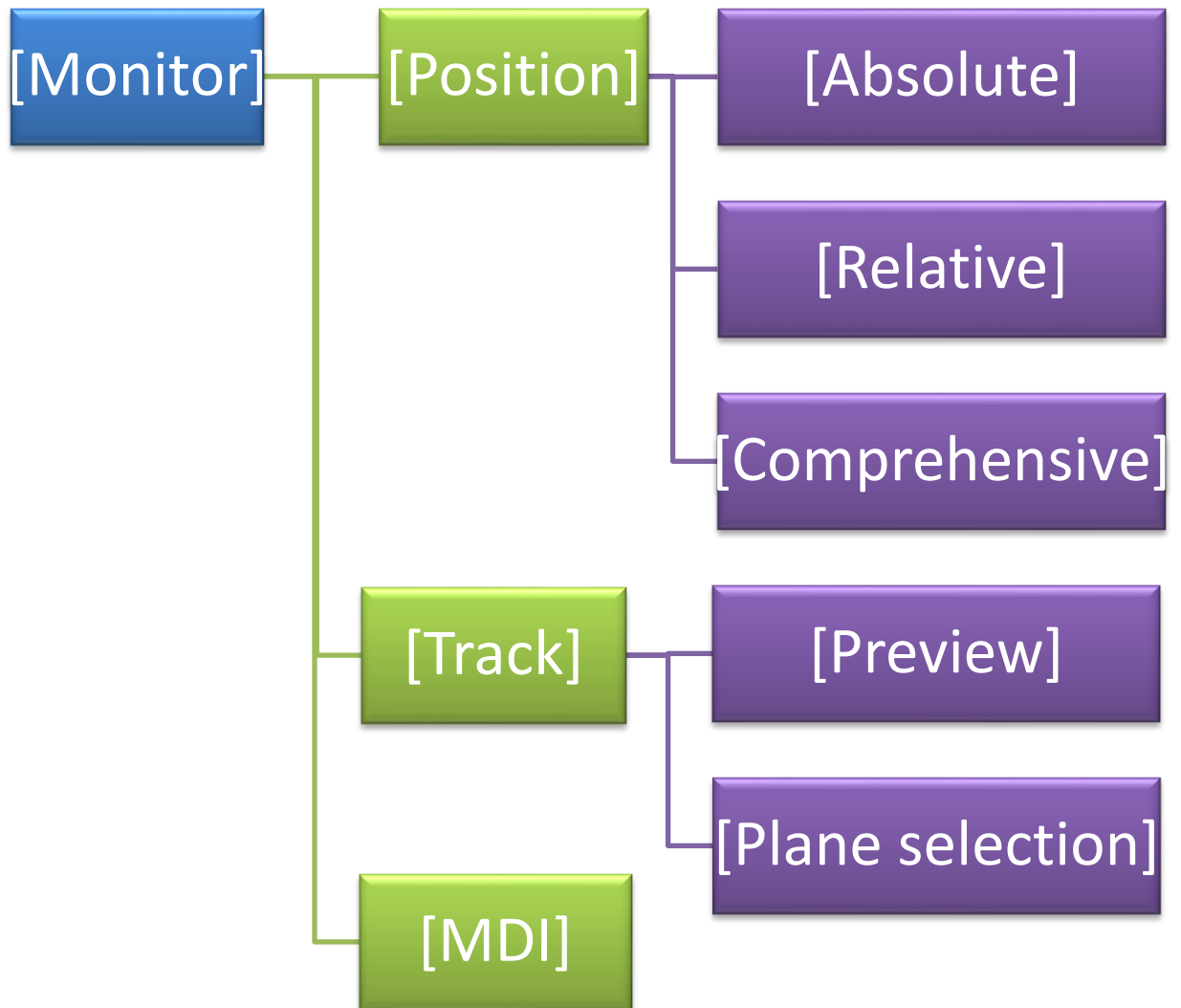
Press a key to show the corresponding content in the bottom of the LCD.

Key in the left: Return to previous menu

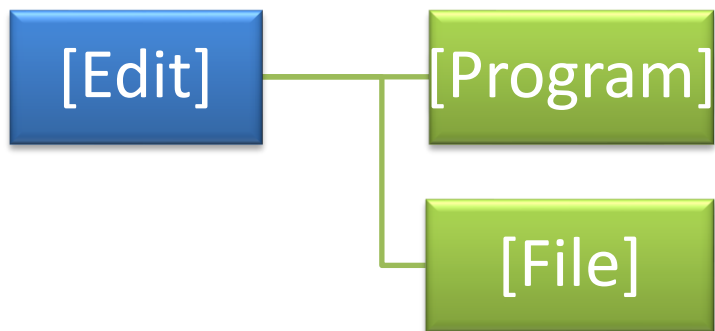
Key in the right: Turn pages to show other menus of same level

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

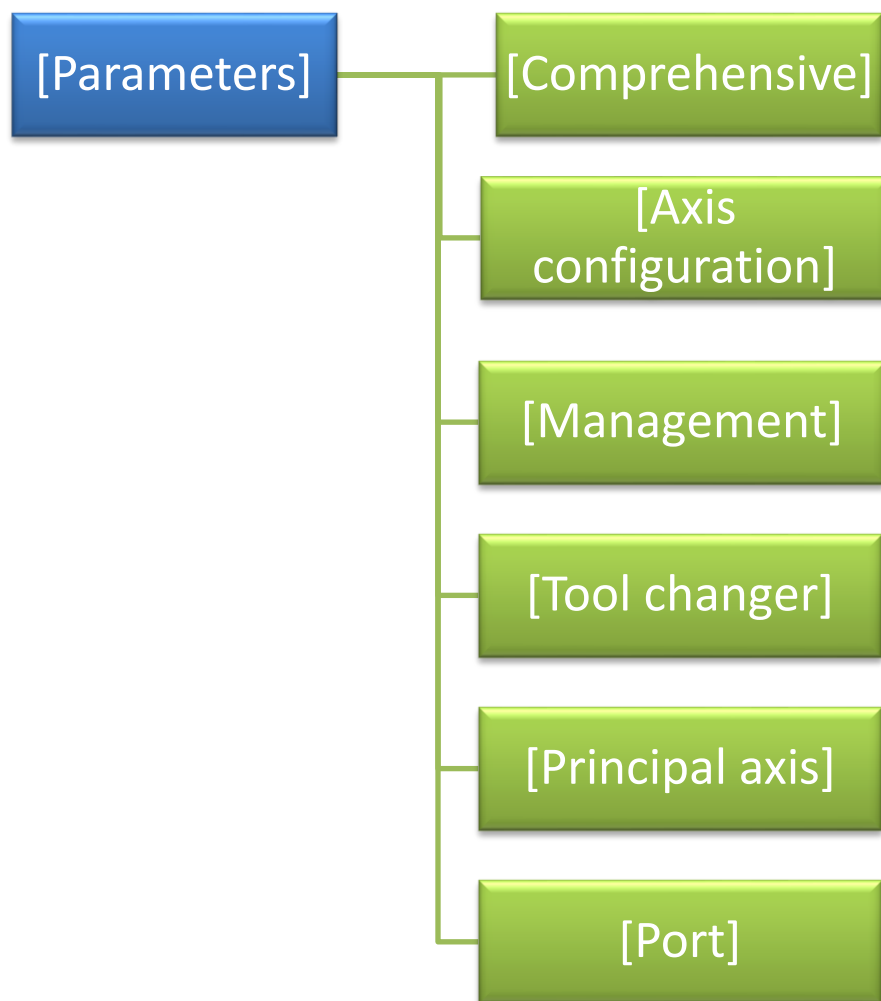
3.3.1. Auto-monitor submenu



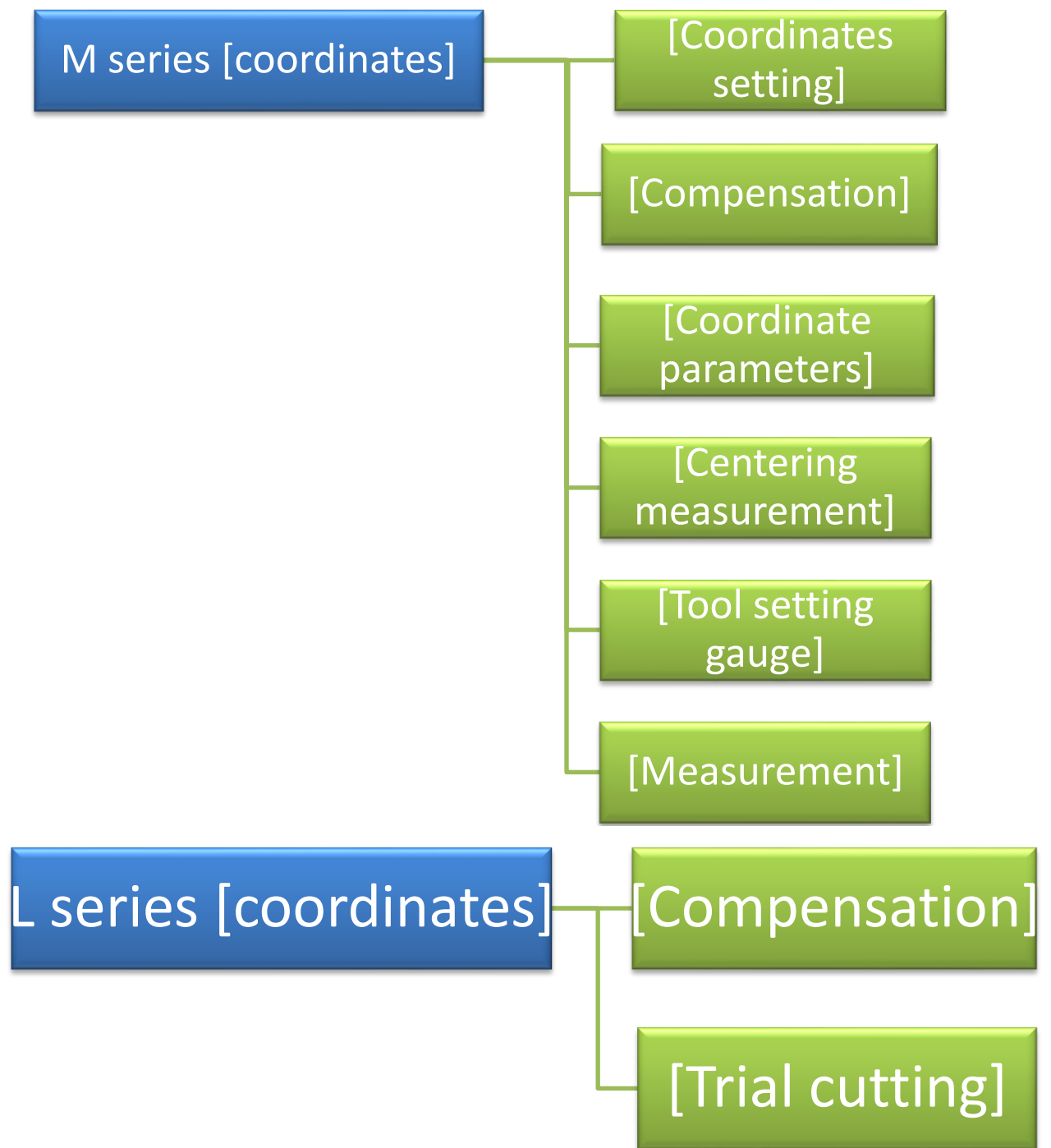
3.3.2. Program editing submenu



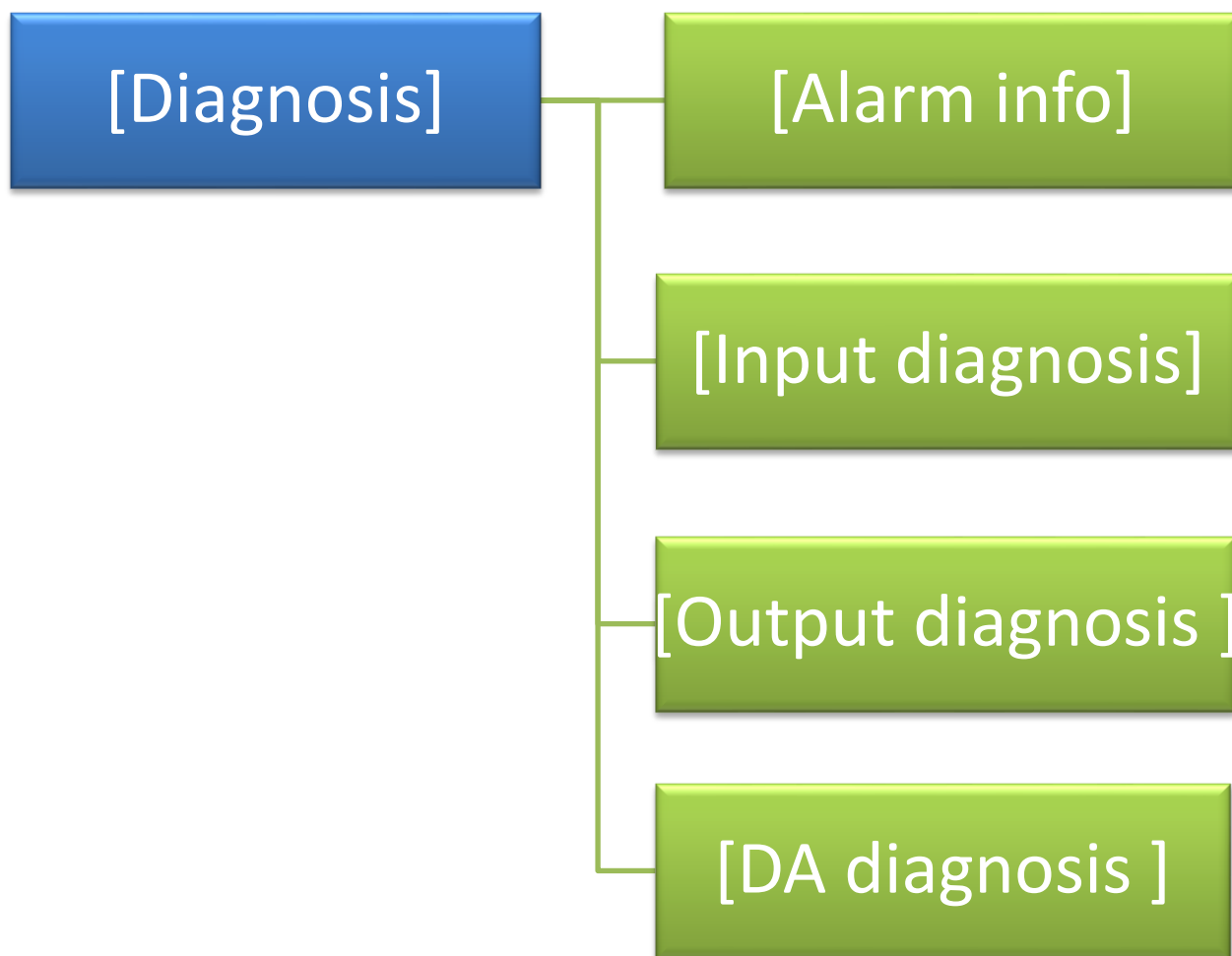
3.3.3. Parameters submenu



3.3.4. Working coordinate submenu



3.3.5. Diagnosis submenu



3.4 Operating Keys

The keys of CNC4 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 between subsections; Left/Right: move cursor to left/right
Page key	Up/Down: Turn pages
Menu keys	Select the menus
Principal axis forward	Press it and the principal axis rotates forward, press it again and the principal axis stops
Principal axis reverse	Press it and the principal axis rotates reversely, press it again and the principal axis stops
Coolant	Coolant ON/OFF
Lubricant	Lubricant ON/OFF
[BDT]	BDT function ON/OFF
[SBK]	SBK function ON/OFF
[PAUSE]	Pause automatic operation
[START]	Start automatic operation

4. Manual Operation

4.1 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 follow:

(1) 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 numbers section to return the corresponding axis to reference point.

(2) The axes return to reference point simultaneously

- Press the mode switch key [Home] to select home operation;
- Press the [Start] key to return Z axis to reference point, and other axes return to reference point simultaneously. The automatic home sequence can be configured in the parameters.

(3) 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, the alarm of not home won't occur. If you press by mistake, it will switch the screen and cancel selection automatically.

(4) 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 also will return to reference point when the power supply is connected again. First return the z-axis to avoid collision of the tool and workpiece, which will result in damage to the tool, workpiece and fixture.

4.2 Continuous Feeding Manually

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

The operation 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 numbers area to move the tool along selected axis. The keypad follows:



In manual mode, 5# key can be used to switch the manual speed and rapid traverse speed. The rapid traverse speed of every 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.

4.3 Single Step Feeding

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

The specific operation follows:

- (1) Press the mode switch key [Hand wheel/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 numbers area 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.

4.4 Hand wheel feeding

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

The hand wheel feeding step follows:

- (1) Press the mode switch key [Hand wheel/Single step] to select hand wheel operation;
- (2) Rotate the dip switch on the hand wheel to select handheld axis (X, Y, Z, A);
- (3) Rotate the increment dip switch on the hand wheel to select the moving amount (0.1, 0.01, 0.001);
- (4) Rotate the hand wheel to move the machine tool. The tool moves certain distance every time you rotate the hand wheel 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 hand wheel feeding mode controls only one coordinate axis every time; the faster the hand wheel rotates, the faster the machine tool moves.

4.5 Manual auxiliary function operation

Coolant on/off



In hand wheel/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 the indicator is off.

Lubricant on/off



In hand wheel/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.

Principal axis positive rotation/stop



In hand wheel/single step/manual mode, press this key to rotate the principal axis positively and press it again to stop the axis.

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

Principal axis reverse rotation/stop



In hand wheel/single step/manual mode, press this key to rotate the principal axis reversely and press it again to stop the axis.

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

General instructions for manual operation keys

Cooling, lubricant, principal axis positive/reverse rotation are available in hand wheel, single step and manual mode;

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

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

When the principal axis 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.

4.6 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. CNC46XX 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.

4.6.1. 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 hand wheel 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.

(2) 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 hand wheel 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.

(3) 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 step of three points arc 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 hand wheel 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.

4.6.2. Tool regulator (M series)

Tool regulator principle:

The tool regulator uses external sensor switch to set the reference point for axis Z, which is similar to home. After changing tool during processing or changing tool manually, transfer this function to automatically check the Z value of current workpiece's home.

Tool regulator usage

Before using the tool regulator, you need to set the parameters. In [Coordinate] menu, press [Coordinate Parameter] to show tool setting parameters. After that, press [Tool Regulator] in the setting interface to execute the tool regulator program according to specified parameters.

The action sequence of tool regulator follows

- Return Z axis to mechanical home first, and then locate principal axis to X, Y coordinates of the tool regulator;
- Tool regulator blows to start;
- Z axis moves down, and retracts when touches tool regulator sensor switch, moves down at lower speed when the sensor switch leaves, records the machine tool coordinates of current Z axis when touches the switch and assigns to the Z coordinates of current selected coordinate system;
- Tool regulator blows to turn off;
- Z axis returns to home position.

4.6.3. 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 hand wheel, single step or manual mode;
- Press the principal axis on, and then press [X+] [X-] [Z+] [Z-] to move the axis and test cutting the workpiece;
- After test cutting, turn off the principal axis 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;

 Caution

-  **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.**
-  **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.**
-  **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.**

4.7 Data settings

4.7.1. Tool compensation data setting

Tool compensation data setting

- 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.

 Caution

-  **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

4.7.2. System parameter 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.

4.8 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.

5. Automatic Operation

The machine tool moving according to prepared program is called as automatic operation. The automatic operation modes of CNC46XX and 49XX system follow:

Memory operation, MDI operation, USB disk DNC operation

5.1 Memory Operation

The machine tool can operate according to the program in CNC46XX memory, which is called as memory operation.

The program is pre-stored 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 step of memory operation follows:

- (1) Save the program in the memory (see 8.1 for details);
- (2) Select [Edit], [File] in the menu or press [File] on the panel to enter file operation interface;
- (3) Press the direction keys to move the cursor, press [EOB] to select a program and load the file into the work area;
- (4) Press mode selection key [Auto] to switch to automatic mode;
- (5) Press the [Start] key to run the program, and the indicator is on.

5.2 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 step follows:

- (1) Press mode selection key [Edit];
- (2) Select [Monitor], [MDI] in the menu to enter MDI interface;
- (3) Enter program block instruction manually;
- (4) Press [Start], [EOB] to start executing the program block.

5.3 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 step of USB disk DNC operation follows:

- (1) Insert the USB disk;
- (2) Select [Monitor], [File] in the menu to enter file operation interface;
- (3) Select USB disk and press [EOB] to enter;
- (4) Move cursor to select a file in the disk;
- (5) Press [EOB] to load the file into work area (system buffer);
- (6) Press mode selection key [Auto];
- (7) Press the [Start] key to run the program, and the indicator is on.

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.

5.4 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%).

Principal axis rotation

In automatic or manual mode, press the Left/Right key to adjust the principal axis rotation by 100r/min. The maximum rotation is set by the principal axis 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.

5.5 Run idle

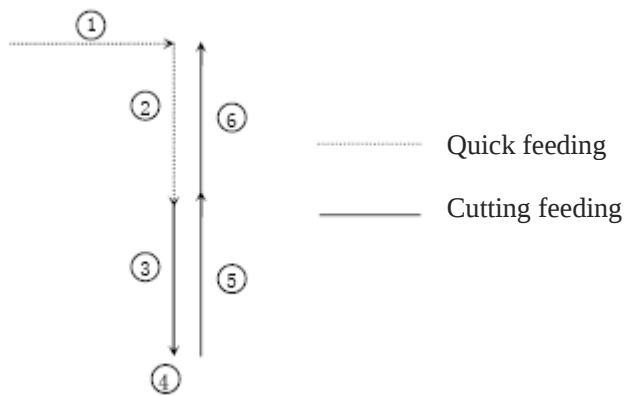
(Reserved)

5.6 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.

⚠ 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.



5.7 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.

5.8 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 ends

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.

6. Safe Operation

6.1 Emergency Stop

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

 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.

6.2 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.

6.3 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.

 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.

7. 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

7.1 NC Program Execution Alarm

0000	Please reset
0001	Program ends
0004	Changing tool fails
0005	Tool is invalid
0006	G block repeat error
0007	G block program No. error
0008	G7x8x complex instruction code can't run normally
0009	Abnormal program termination error
0010	Specify M01 code program pause
0011	M98 format error
0012	Motion transfer fails
0013	This block doesn't need compensation
0014	G block invalid format
0015	M99 instruction transfer abnormal; M99 transfer is prohibited in current position
0016	Abnormal motion alarm
0017	Illegal character
0018	Note symbol format error or no symmetric note symbol
0019	Illegal G code
0020	G code radius compensation number or value error
0021	Undefined G code radius compensation error
0022	Arc programming error
0023	Specify illegal plane, exceed G17, G18, G19
0024	M98 transfer error, may exceed the maximum value
0025	Principal axis specifying hardware axis No. error
0026	M code execution error

0027	: Specifying principal axis fails
0028	: Motion repeats request
0029	: Specified arc doesn't exist
0030	: X instruction missing error
0031	: Y instruction missing error
0032	: Z instruction missing error
0033	: A instruction missing error
0034	: B instruction missing error
0035	: C instruction missing error
0036	: D instruction missing error
0037	: R instruction missing error
0038	: F instruction missing error
0039	: T instruction missing error
0040	: S instruction missing error
0041	: P instruction missing error
0042	: M instruction missing error
0043	: G instruction missing error
0044	: I instruction missing error
0045	: J instruction missing error
0046	: K instruction missing error
0047	: Q instruction missing error
0048	: Screw distance repeat designation error
0049	: System alarm occurs and exits abnormally
0050	: Exit through human intervention
0051	: G code parameter source isn't specified
0052	: G code program No. table storage address isn't specified

7.2 System Environment Alarms

1024	:	The controller isn't reset
1. The system doesn't perform home action after started		
1025	:	A axis negative soft limit
1026	:	A 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	:	A axis negative hard limit
1034	:	A 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 has 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 sense disappears. If yes, please check the circuit. If the problem still exists, the internal optocoupler is 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	:	Servo X drive alarm
1043	:	Servo Y drive alarm
1044	:	Servo Z drive alarm
1045	:	Servo A drive alarm
Servo alarm; if the servo doesn't alarm, parameter P2.001~004 setting and actual servo alarm level may be reverse. Please modify the parameters. The corresponding function ports are IN34~37, which can be checked in input diagnosis.		
1046	:	Axis No. definition internal repeat error
Interface axis No. set by parameter P2.45~P2.49 is specified repeatedly		
1047	:	Principal axis isn't reset
1048	:	Mold isn't clamped
1049	:	System safety signal not in position error
1051	:	System air pressure insufficient
1052	:	System material clamping signal invalid alarm

7.3 Alarm processing

If 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 the conditions that false alarm causes system suspended, but can't 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.

7.4 Self-diagnosis

CNC system sometimes stops even there is no alarm. The reason may be that the system is running processes, and the self-diagnostic function is available for checking.

The self-diagnostic steps of the system are as follows:

- (1) In the main menu, press [Diagnosis] to enter the diagnosis screen;
- (2) Select [Input] to enter the input diagnosis screen, or select [Output] to enter the output diagnosis screen;
- (3) Output diagnosis: Press the direction keys select the output port, and press [EOB] to switch the output level corresponding to the output port;
- (4) Input diagnosis: When certain input signal is valid, the corresponding screen flashes.

8. Program Saving & Editing

8.1 Saving the Program in the Memory

8.1.1. Keypad Input (New Program)

Create new program in the memory with the keypad, and the step 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.

8.1.2. PC Serial Port Input

The step of transmitting files to controller through PC follows:

Set system baud rate and ID No.;

Connect to PC and run Adtech serial communication software;

Set the baud rate same as controller, and scan ID device;

Select the [Upload file to NC] button in the communication software;

Select CNC file in the popup dialog box and press [Open] button.

8.1.3. Copying Processing Files from USB Disk

The step of copying CNC processing file to system memory through USB disk 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.

8.2 Reading Programs into Work Area

8.2.1. Reading Programs from Controller into Work Area

The step of loading files from system memory into work area 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.

8.2.2. Reading Programs from USB Disk into Work Area

The step of loading files from USB disk into work area 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.

8.3 Editing & Modifying Programs

- The program in CNC memory can be edited with 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 8.2). The edit mode is similar to notepad in Windows. Move the cursor directly to locate, press keys to enter, press [EOB] to change line, and press [Delete] to delete the character where the cursor locates.

Caution

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

CNC46XX 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.

8.4 Deleting Files

8.4.1. Deleting Files in Memory

Follow the step 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.

Caution

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

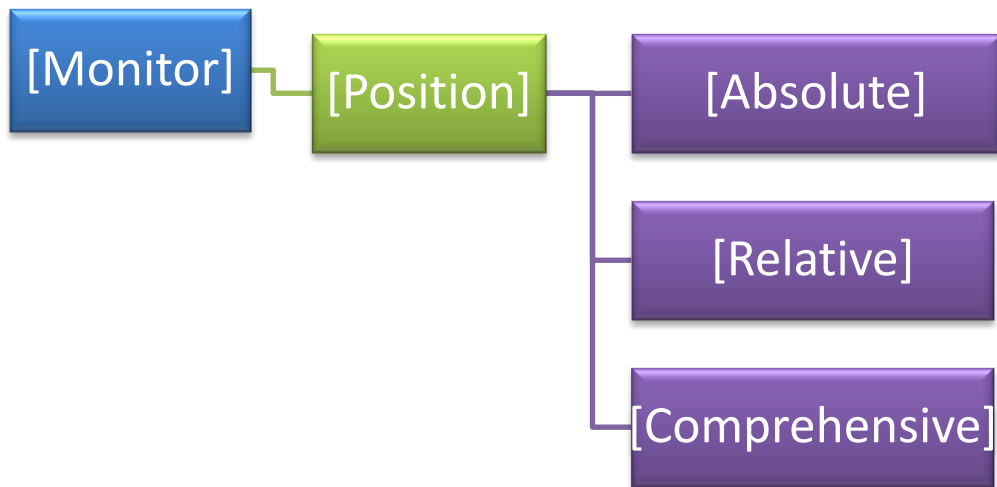
The programs loaded into the work area can't be deleted, or else the system will report error.

9. Main Interfaces of the System

9.1 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.

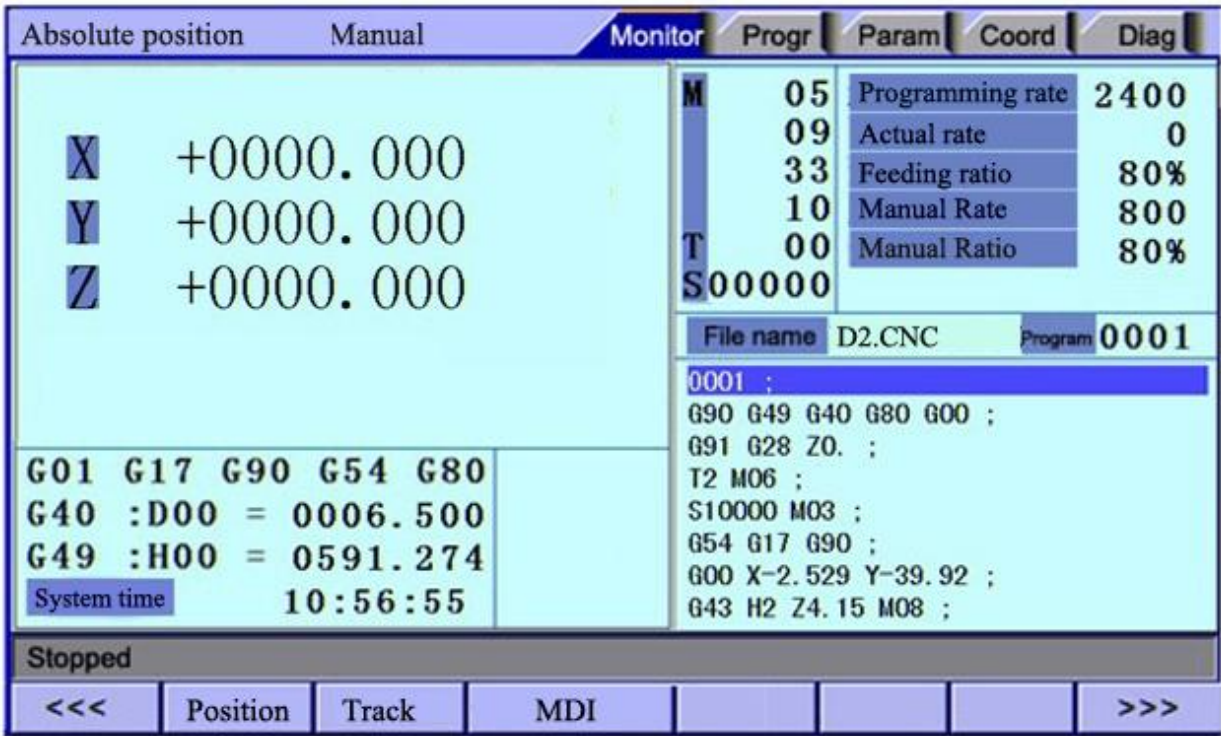
To enter position interface:



Absolute position

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

The absolute position interface follows:



Absolute Position Interface

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 the more and more powerful of automatic centered function, it is used less.

The operation 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 follows:

Relative position		Manual	Monitor	Progr	Param	Coord	Diag
X	+0000.000		M 05	Programming rate	2400		
Y	+0000.000		09	Actual rate	0		
Z	+0000.000		33	Feeding ratio	80%		
			10	Manual Rate	800		
			T 00	Manual Ratio	80%		
			S00000				
G01 G17 G90 G54 G80			File name		D2.CNC	Program 0001	
G40 :D00 = 0006.500			0001 :				
G49 :H00 = 0591.274			G90 G49 G40 G80 G00 ;				
System time 11:00:10			G91 G28 Z0. ;				
			T2 M06 ;				
			S10000 M03 ;				
			G54 G17 G90 ;				
			G00 X-2.529 Y-39.92 ;				
			G43 H2 Z4.15 M08 ;				
Stopped							
Close	Absolute	Relative	Comprehensive				>>>

Relative position interface

Comprehensive coordinates

The interface displayed by absolute coordinates and machine tool coordinates

Comprehensive position interface is shown below:

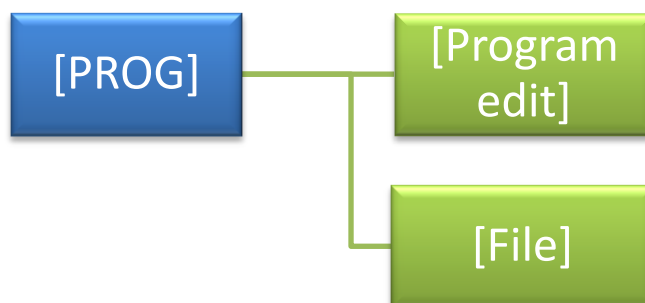
Comprehensive position		Manual	Monitor	Progr	Param	Coord	Diag
Absolute position X +0000.000 Y +0000.000 Z +0000.000 Mechanical position X +0000.000 Y +0000.000 Z +0000.000		Relative position X +0000.000 Y +0000.000 Z +0000.000 Feedback position X Y Z		M 05 09 33 10 T 00 S00000	Programming rate 2400 Actual rate 0 Feeding ratio 80% Manual Rate 800 Manual Ratio 80%	File name D2.CNC Program 0001 0001 ; G90 G49 G40 G80 G00 ; G91 G28 Z0. ; T2 M06 ; S10000 M03 ; G54 G17 G90 ; G00 X-2.529 Y-39.92 ; G43 H2 Z4.15 M08 ;	
G01 G17 G90 G54 G80 G40 :D00 = 0006.500 G49 :H00 = 0591.274 System time 11:04:04							
Stopped							
Close	Absolute	Relative	Comprehensive				>>>

Comprehensive position interface

9.2 Programming Interface

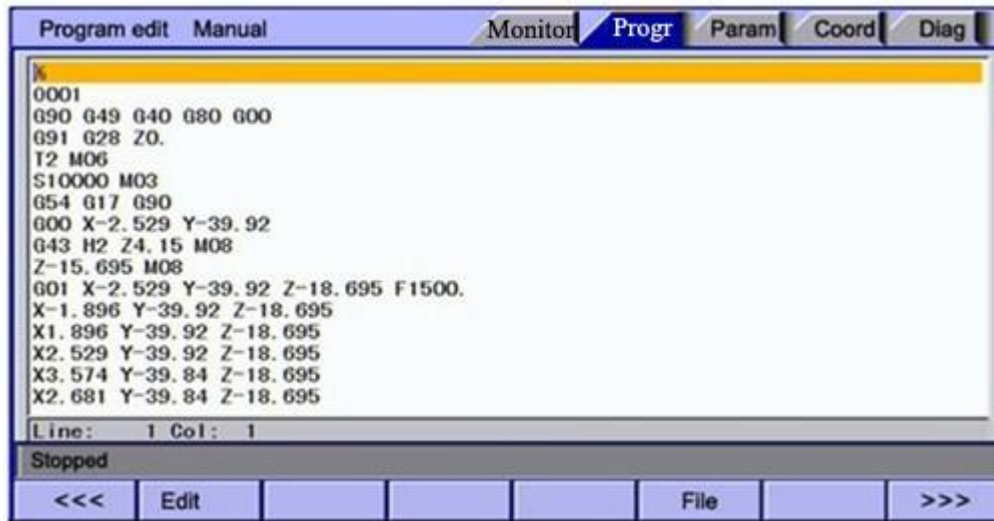
The edit interface shows the program info in current workpiece. In the main interface, press [Edit] to enter the program interface.

To enter program edit interface:



Program edit

The program edit interface shows the NC program currently processed; in edit mode, you can edit the NC program (see 8.3 for details).



Program Edit Interface

System info interface

The system info is a summary of the program blocks in current processing area, and calculates the resource usage in current work area. The upper right of the program directory interface shows the version info of current controller software. If our engineering personnel ask to confirm the software version of the controller on site, please provide this version info.

To enter system info interface:



System info interface is shown below:

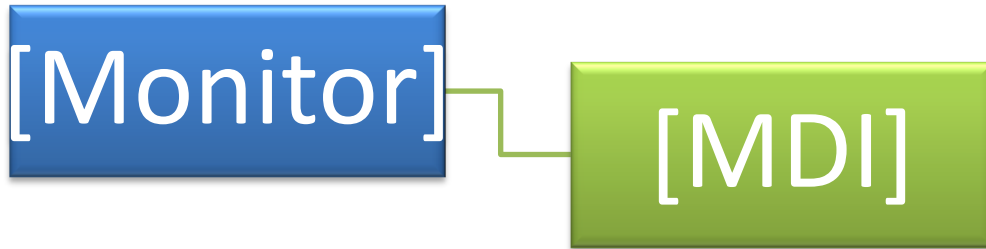


System Info Interface

9.3 MDI interface

MDI mode is mainly used for the writing and execution of single G code.

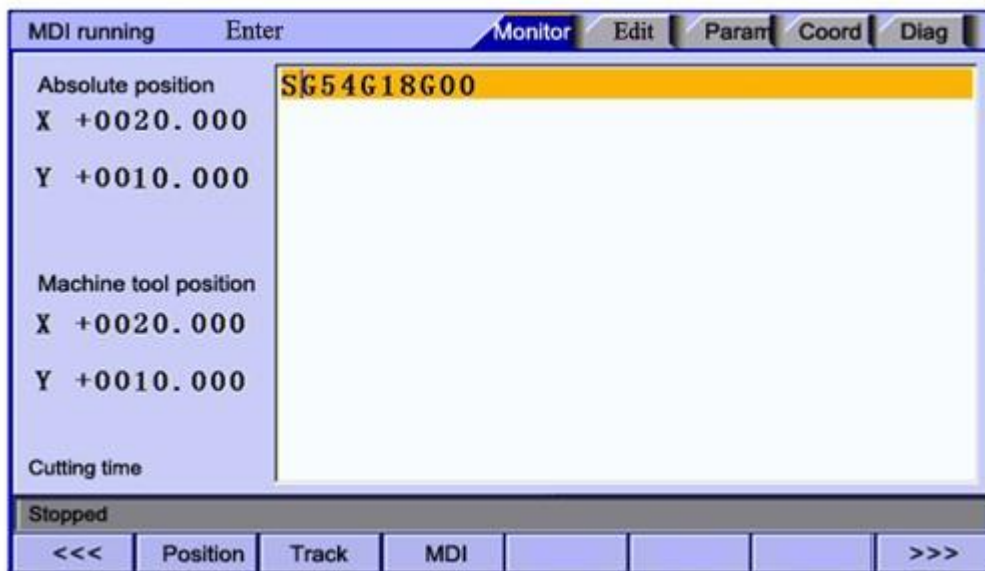
To enter MDI interface:



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:

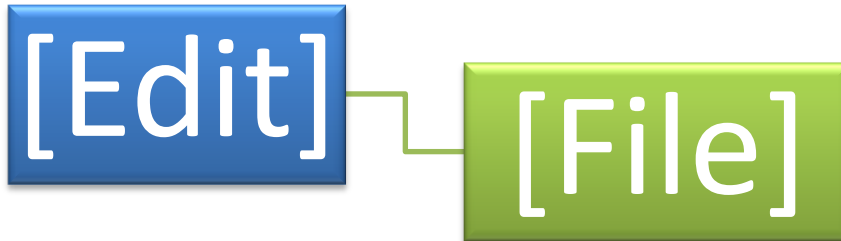


MDI Interface

9.4 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:

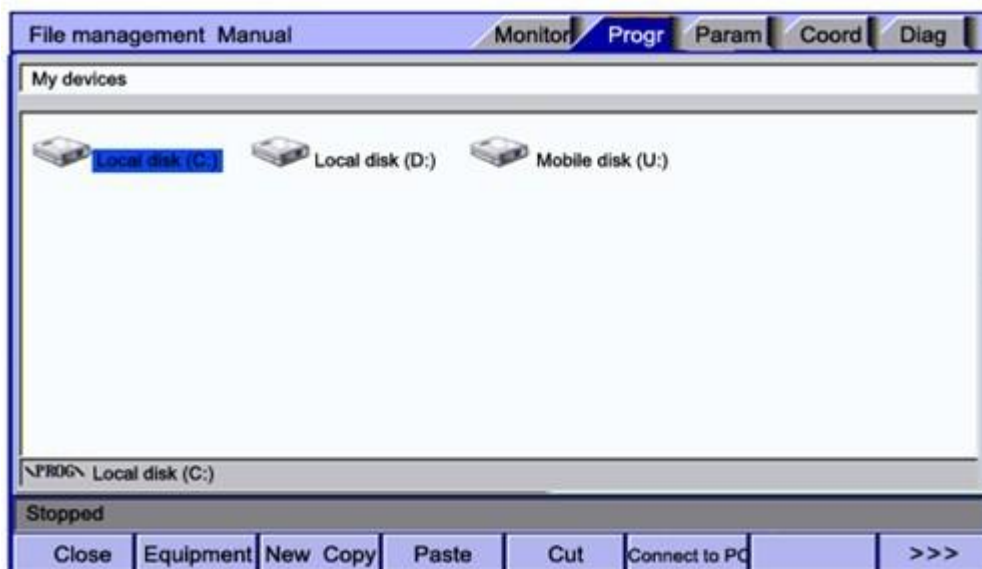
Connect the UBS disk, and copy the files between USB disk and electronic disk;

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

9.5 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 pre-scan the processing file.

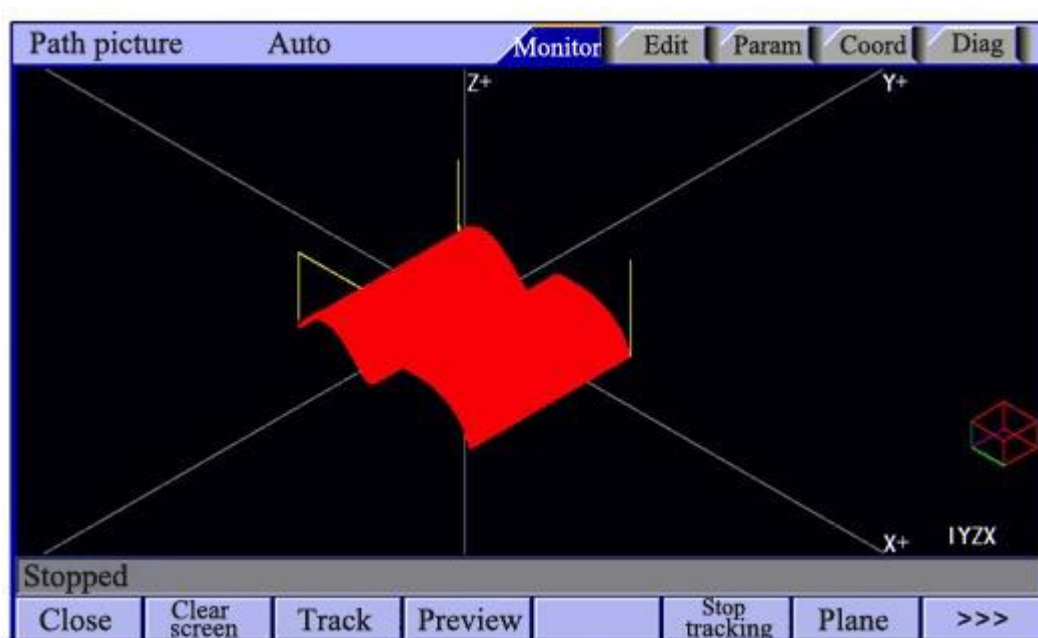
The shortcuts of adjusting position:

PageUp : Zoom in

PageDown : Zoom out

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

Graphic simulation interface is shown below:

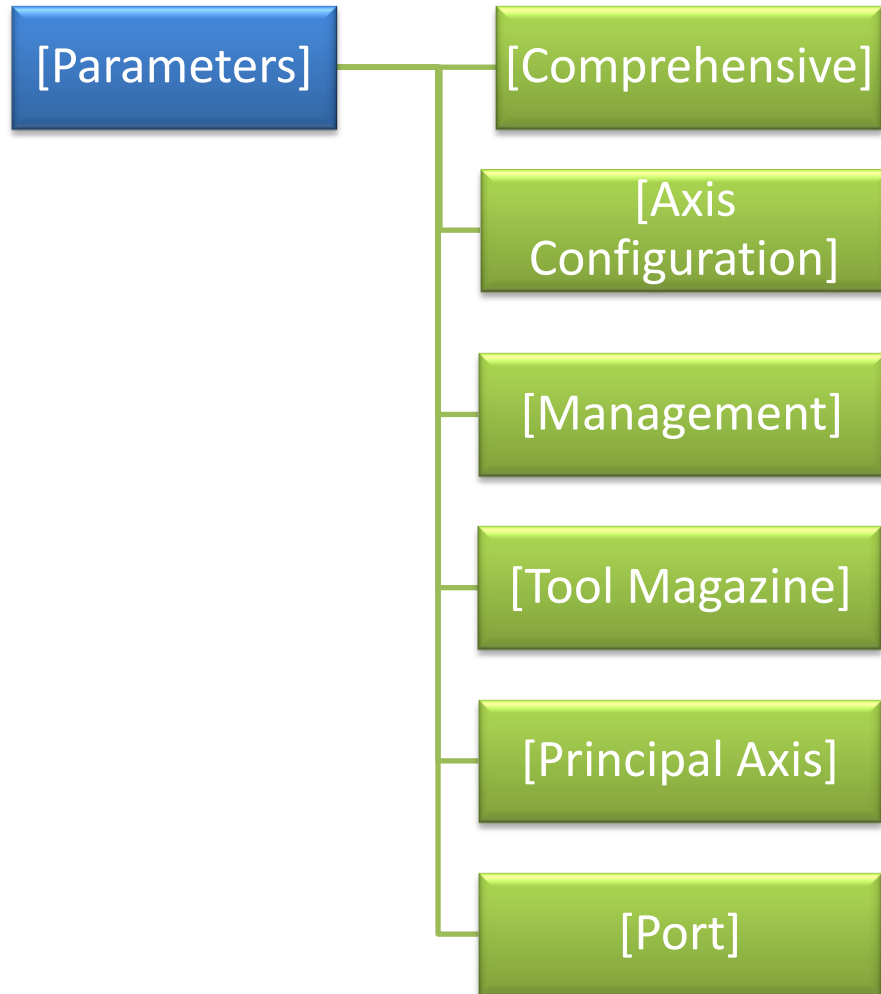


Graphic Simulation Interface

9.6 Parameter Interface

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

Parameter has the following menus:



Comprehensive parameters

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:

general		JOG	Run	Edit	Param	Coord	Test
001 X Gear Numerator	1	013,XStartupSpeed(mm/min)	100				
002 X Gear Denominator	1	014,YStartupSpeed(mm/min)	100				
003 Y Gear Numerator	1	015,ZStartupSpeed(mm/min)	100				
004 Y Gear Denominator	1	016,4StartupSpeed(mm/min)	100				
005 Z Gear Numerator	1	017,X Acceleration(Kpps)	1000				
006,Z Gear Denominator	1	018,Y Acceleration(Kpps)	1000				
007,4 Gear Numerator	1	019,Z Acceleration(Kpps)	1000				
008,4 Gear Denominator	1	020,4 Acceleration(Kpps)	1000				
009,X FastSpeed(mm/min)	3000	021,X Soft PosLimit+(mm)	+ 9999.999				
010,Y FastSpeed(mm/min)	3000	022,X Soft PosLimit-(mm)	- 9999.999				
011,Z FastSpeed(mm/min)	3000	023,Y Soft PosLimit+(mm)	+ 9999.999				
012,4 FastSpeed(mm/min)	3000	024,Y Soft PosLimit-(mm)	- 9999.999				
Stop							
<<<		genl	axis	manage	tools	spindle	port >>>

Comprehensive Parameter Interface

Axis parameters

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

Axis parameter interface is shown below:

axis		JOG	Run	Edit	Param	Coord	Test
001,X_ServoAlarmIn ELevel	0	013,Z_ECZ Home Enable	0				
002,Y_ServoAlarmIn ELevel	0	014,Z_ECZ Home ELevel	0				
003,Z_ServoAlarmIn ELevel	0	015,4_ECZ Home Enable	0				
004,A_ServoAlarmIn ELevel	0	016,4_ECZ Home ELevel	0				
005,X_ServoResetOut ELevel	1	017,X Limit+ Enable<•>	0				
006,Y_ServoResetOut ELevel	1	018,X Limit- Enable<•>	0				
007,Z_ServoResetOut ELevel	1	019,X Limit ELevel<•>	0				
008,A_ServoResetOut ELevel	1	020,Y Limit+ Enable<•>	0				
009,X_ECZ Home Enable	0	021,Y Limit- Enable<•>	0				
010,X_ECZ Home ELevel	0	022,Y Limit ELevel<•>	0				
011,Y_ECZ Home Enable	0	023,Z Limit+ Enable<•>	0				
012,Y_ECZ Home ELevel	0	024,Z Limit- Enable<•>	0				
Stop							
<<<		genl	axis	manage	tools	spindle	port >>>

Axis Parameter Interface

Management parameters

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

Management parameter interface is shown below:

Mamage		JOG	Monitor	Edit	Param	Coord	Diag
001. Enter password select management mode	Superuser	013. Import CSV system configuration	=====				
002. Change super user password	*****	014. Startup display module	Rel				
003. Change user password	*****	015. System language pack	English				
004. Initialize	=====	016. Macro keyword valid enable	ON				
005. Initialize IO configuration	=====	017. Startup picture display	=====				
006. Reset all parameters <=>	=====	018. System display axis setting	XYZ				
007. Back up parameters to sysconf.bak	=====						
008. Restore parameters from sysconf.bak	=====						
009. Generate cryptogram	=====						
010. Menu click mode	=====						
011. Clear add up work number	=====						
012. Clear current work number	=====						
0.							
Stopped							
<<<	General	Axis	Manage	Tools	Spindle	Port	>>>

Management Parameter Interface

Tool magazine parameters

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

Principal axis parameters

Principal axis parameters are the set of electrical characteristics of servo and common principal axes. The specific application also depends on the principal axis 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.

Principal axis parameter interface is shown below:

Axis parameter	Edit	Monitor	Progr	Param	Coord	Diag
001. Spindle alarm effective level	1	013. Spindle encoder bits (p)		2500		
002. Spindle reset effective level	1	014. Spindle zero offset (p)		0		
003. Spindle ECZ home enable	1	015. Spindle pulse logic level		0		
004. Spindle ECZ effective level	0	016. Spindle rolling display usage		0		
005. Spindle limit+ enable	0	017. Spindle maximum acceleration (kbps)		2000		
006. Spindle limit- enable	0	018. Spindle external home direction		0		
007. Spindle limit effective level	0	019. Spindle servo home direction		0		
008. Spindle pulse mode	1	020. Spindle maximum speed (rpm)		24000		
009. Spindle pulse logic mode	1	021. Spindle home speed (rpm)		1000		
010. Spindle home direction effective level	0	022. Spindle gear numerator		1		
011. Spindle external home check enable	1	023. Spindle gear denominator		1		
012. Spindle round setting	0	024. Spindle encoder logic direction		0		
0.						
Stopped						
<<< General Axis Manage Tools Spindle Port >>>						

Principal Axis Parameters Interface

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 para	JOG	Run	Edit	Param	Coord	Test
001,Wheel0.1	24	013,Z Alarm	36			
002,Wheel0.01	26	014,4 Alarm	37			
003,Wheel0.001	28	015, IN0-----wire No:(1-24)	1			
004,X Wheel	25	016, IN1-----wire No:(1-24)	2			
005,Y Wheel	27	017, IN2-----wire No:(1-24)	3			
006,Z Wheel	29	018, IN3-----wire No:(1-24)	4			
007,A Wheel	31	019, IN4-----wire No:(1-24)	5			
008,SCRAM	33	020, IN5-----wire No:(1-24)	6			
009,STOP	32	021, IN6-----wire No:(1-24)	7			
010,STARTUP	30	022, IN7-----wire No:(1-24)	8			
011,X Alarm	34	023, IN8-----wire No:(1-24)	9			
012,Y Alarm	35	024, IN9-----wire No:(1-24)	10			
Stop						
<<<	genl	axis	manage	tools	spindle	port >>>

IO Configuration Parameters Interface

9.7 Compensation interface

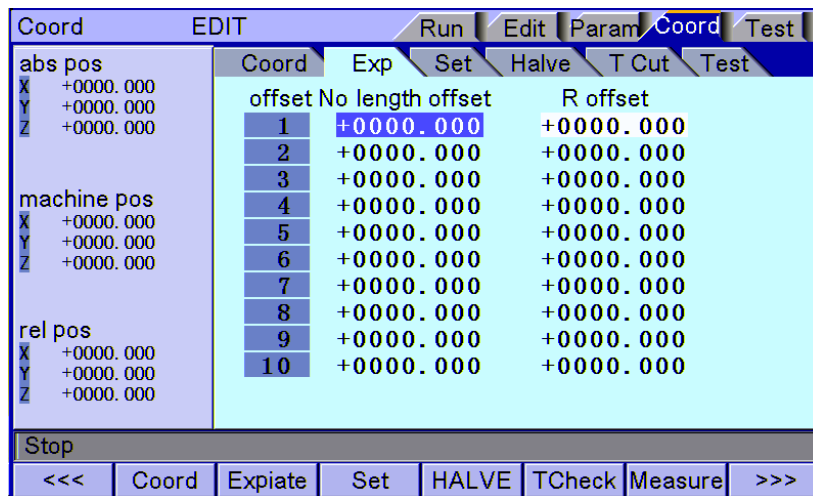
Tool compensation interface shows tool compensation info of the system, including tool length compensation, tool radius compensation and other input variables. The compensation method is different from M series and L series, which will be described below.

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 transfer the compensation number in NC program to realize the compensation. Tool compensation numbers have 36 variables.

Tool compensation interface is shown below:



Tool Compensation Parameter Setting Interface

9.8 M series 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.



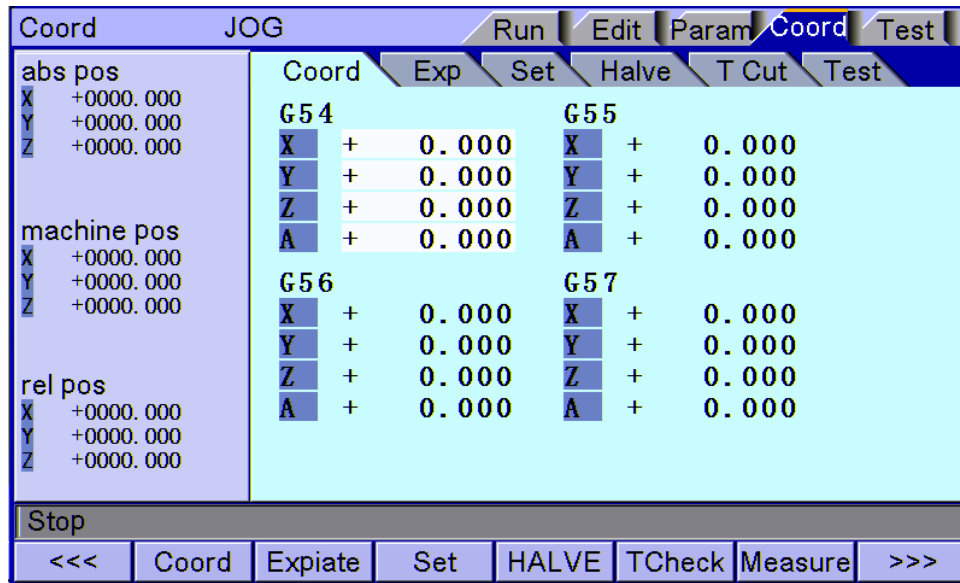
Workpiece coordinate system

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

To enter workpiece coordinate system interface:



The workpiece coordinate system interface is shown below:



Workpiece Coordinate System Setting Interface

Coordinate system auxiliary parameter setting interface

The auxiliary parameters for workpiece coordinate system, including origin offset and tool setting parameters of automatic tool regulator.

To enter coordinate system auxiliary parameter setting interface:



The detailed auxiliary parameters are described in the table below:

1	X coordinates offset
2	Y coordinates offset
3	Z coordinates offset
4	A coordinates offset
5	X coordinates of tool regulator
6	Y coordinates of tool regulator
7	Z coordinates of tool regulator
8	Axis selection symbol of tool regulator
9	Effective voltage level of tool regulator
10	Set tool automatically after changing
11	Tool regulator machine tool X limit
12	Tool regulator machine tool Y limit
13	Tool regulator machine tool Z limit

14	Tool regulator X search direction
15	Tool regulator Y search direction
16	Tool regulator Z search direction
17	Tool regulator limit effective signal
18	Add offset to coordinates automatically

(1) Origin offset

- The origin offset is added to current machine tool coordinates when setting the coordinate system; this parameter setting is available 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.

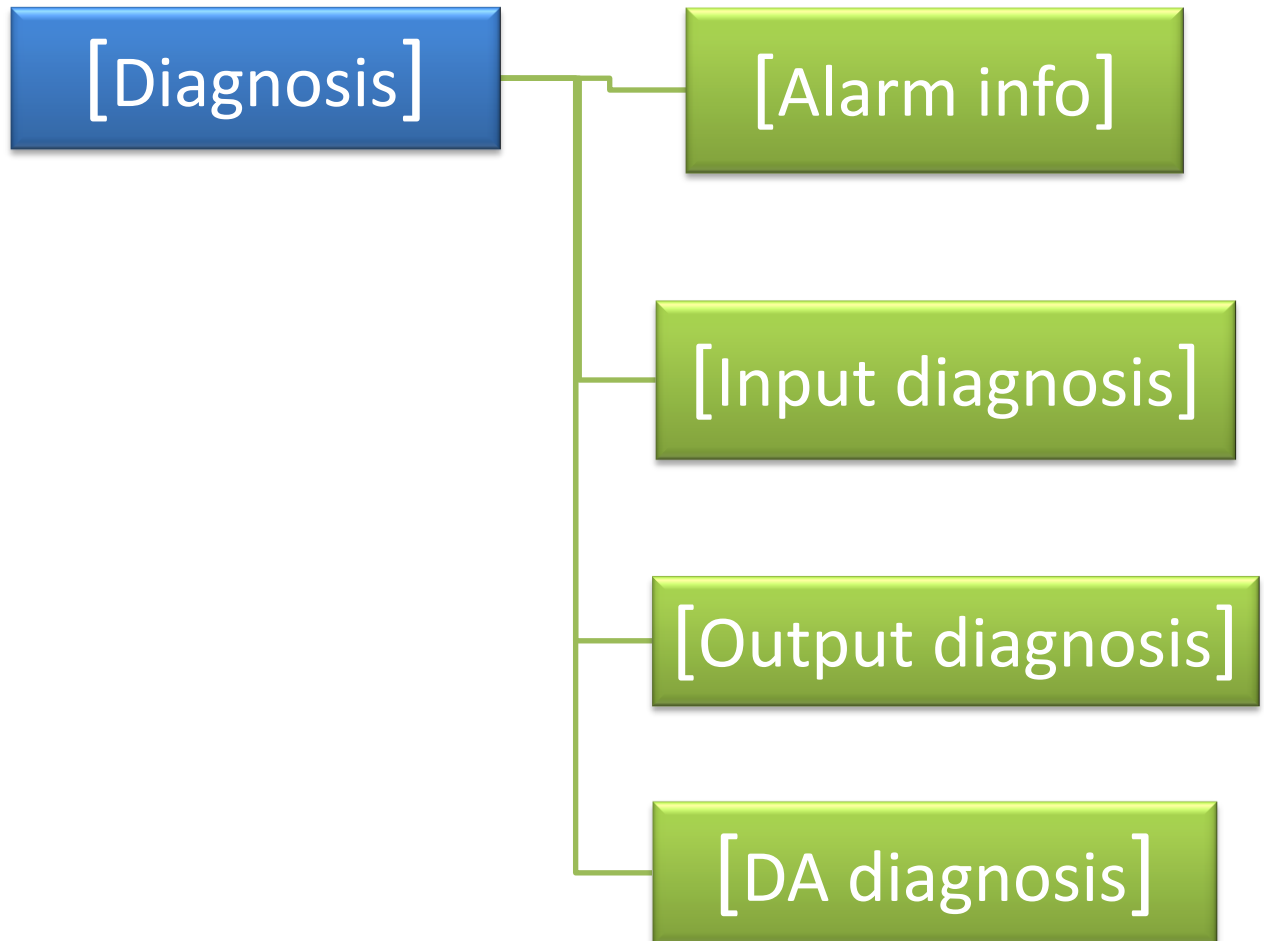
- Z negative limit is used to prevent crash caused by not in place of Z axis error checking.

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.

9.9 Controller Diagnosis Interface (Diagnosis)

The diagnosis interface is used to display the hardware interfaces and system info, including alarm, input, output, DA diagnosis; press [Diagnosis] to enter the diagnosis interface.

The diagnosis interface follows:



Alarm interface

Display the alarm of the system after power on, including 15 alarm records.

IO diagnosis interface

IO diagnosis allows entering at any moment. 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.

DA diagnosis interface

Correct the output voltage of two lines DA voltage module for testing; press the direction keys to output corresponding voltage directly, input the actually measured voltage to corresponding gear position; when transferring control instructions of principal axis, the system will correct according to correction value.

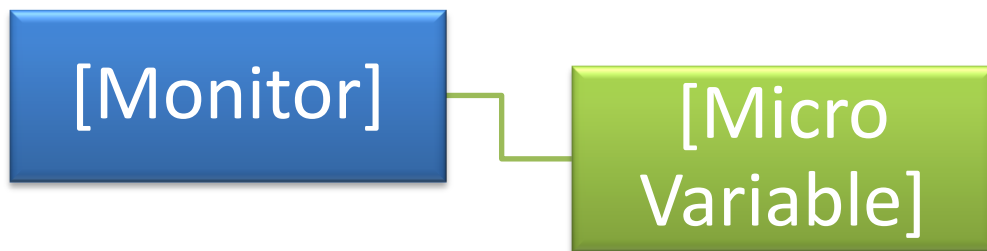
System info

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 to perform operations.

9.10 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

Process 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 transferred with variable number.

9.11 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
Principal axis rotation:	S
Tool No.:	T

10. System Maintenance

10.1 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 asks whether restart or not;
- (4) Press [OK] to restart the system.

10.2 System Upgrade

The step of copying upgrade program with USB disk follows:

- (1) In the main menu, press [Edit] to enter the program interface;
- (2) Press [File] to enter the file management interface;
- (3) Press [File] to enter the file management interface;
- (4) Move cursor to the upgrade file ADTROM.BIN, select [Copy], enter ADT directory in disk D and paste;
- (5) Select the second upgrade file NC_RES.NC; skip this step if the file doesn't exist. Also select Copy, enter disk D, and paste in directory ADT.
- (6) After upgrading, enter BIOS, select USB in [Boot-up mode], and restart the system to take effect.
- (7) Enter System Info in Diagnosis menu to view the system version and compilation date, and check whether the upgrade is successful.

10.3 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.

10.4 Parameter Backup & Restore

- (1) Select the edit mode;
- (2) In the main menu, press [Parameters] key to enter the parameter interface;

- (3) Press the [Management] key to enter management parameters interface;
- (4) Move the cursor to 007 or 008 and select appropriate menu;
- (5) Press the [EOB] key, the system confirms and performs backup and 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.

10.5 Entering BISO Interface

- (1) If the system can't be started due to irreversible error, you can enter the BIOS to upgrade and maintain the program;
- (2) Enter the BIOS after the controller powers on and before the program is started, press the [Cancel] button to enter a blue background successfully; if the BIOS has password, it will pop up a prompt, and type the valid password to enter the BIOS
- (3) Enter the BIOS to perform the maintenance: Format C, D disk, copy USB disk files and upgrade;

11. 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 principal axis, hand wheel, 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 drive;
- 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 of management parameters, the system enters 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 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 system corresponding to binary system 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 parameter will be $1+2+32=35$.

11.1 Parameter Index List

Parameter type	S/N	Description	Effective mode	Default value	Page
General parameter (P1.)	001	Feeding speed	Instant		
General parameter (P1.)	002	Initial feeding speed	Instant		
General parameter (P1.)	003	Feeding acceleration	Instant		
General parameter (P1.)	004	Home mode	Instant		
General parameter (P1.)	005	IO filter level (1~8)	Instant		
General parameter (P1.)	006	Select communication mode	Restart		
General parameter (P1.)	007	Maximum feeding speed	Instant		
General parameter (P1.)	008	Maximum hand wheel speed	Instant		
General parameter (P1.)	009	Hand wheel response factor	Instant		
General parameter (P1.)	010	M code waiting time (ms)	Instant		
General parameter (P1.)	011	Line number increment	Instant		
General parameter (P1.)	012	System baud rate	Restart		
General parameter (P1.)	013	Controller ID	Restart		
General parameter (P1.)	014	Arc interpolation feed rate	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
General parameter (P1.)	015	G73(M) circulating tool retraction amount (mm)	Instant		
General parameter (P1.)	016	G83(M) circulating tool retraction amount (mm)	Instant		
General parameter (P1.)	017	Arc interpolation processing mode	Instant		
General parameter (P1.)	018	Speed optimization constraint mode	Instant		
General parameter (P1.)	019	Code pretreatment processing mode	Instant		
General parameter (P1.)	020	CNC file scan flag	Instant		
General parameter (P1.)	021	Variable frequency analog control mode	Instant		
General parameter (P1.)	022	Lubricant pressure schedule open (min)	Instant		
General parameter (P1.)	023	Lubricant pressure holding time (sec)	Instant		
General parameter (P1.)	024	Lubricant control frequency (Hz)	Instant		
General parameter (P1.)	025	Automatic home mode configuration (bit)	Instant		
General parameter (P1.)	026	Arc Acc.for Radii	Instant		
General parameter (P1.)	027	Arc Acc.for Speed	Instant		
General parameter (P1.)	028	Pretreatment buffer sections	Instant		
General parameter (P1.)	029	Interpolation acceleration speed mode	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
General parameter (P1.)	030	'S'Speed Acceleration	Instant		
General parameter (P1.)	031	HOME Check for alarm	Instant		
General parameter (P1.)	032	System home test enable	Instant		
General parameter (P1.)	033	X diameter prog enable	Instant		
General parameter (P1.)	034	Default process plane	Instant		
General parameter (P1.)	035	T code form	Instant		
General parameter (P1.)	036	IP address	Restart		
General parameter (P1.)	037	Subnet mask	Restart		
General parameter (P1.)	038	Default gateway	Restart		
General parameter (P1.)	039	MAC address	Restart		
General parameter (P1.)	040	Pretreatment segments	Instant		
General parameter (P1.)	041	Feed speed setting enable	Instant		
General parameter (P1.)	042	Enable G00 Inp mode	Instant		
General parameter (P1.)	043	Enable abnormal memory position jump	Instant		
General parameter (P1.)	044	Pause Z to safe altitude	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
General parameter (P1.)	045	Pause A to safe altitude	Instant		
General parameter (P1.)	046	Program home reference point enable	Instant		
General parameter (P1.)	047	Mechanical home reference point enable	Instant		
General parameter (P1.)	048	Clear coordinates in home mode	Instant		
General parameter (P1.)	049	Z-axis safe height	Instant		
General parameter (P1.)	050	A-axis safe height	Instant		
General parameter (P1.)	051	Z-axis feed rate limit (mm/min)	Instant		
General parameter (P1.)	052	A-axis feed rate limit (mm/min)	Instant		
General parameter (P1.)	053	Thread cutting acceleration pitch P(mm)	Instant		
General parameter (P1.)	054	Thread cutting acceleration pitch D(mm)	Instant		
General parameter (P1.)	055	Thread cutting backslide amount V (mm)	Instant		
General parameter (P1.)	056	Enable jump to M98 * times * lines	Instant		
General parameter (P1.)	057	System home ON	Instant		
General parameter (P1.)	058	Spindle brake delay (ms)	Instant		
General parameter (P1.)	089	Rotation axis speed optimization features	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
General parameter (P1.)	060	4-axis maximum speed	Instant		
General parameter (P1.)	061	Hand wheel encoder direction	Instant		
General parameter (P1.)	062	Hand wheel control mode (0- old)	Instant		
General parameter (P1.)	063	Hand wheel maximum ratio	Instant		
General parameter (P1.)	064	Hand wheel acceleration Kps	Instant		
Axis parameter (P2.)	001	X axis instruction frequency multiplication ratio	Restart		
Axis parameter (P2.)		X axis instruction frequency division coefficient	Restart		
Axis parameter (P2.)		Y axis instruction frequency multiplication ratio	Restart		
Axis parameter (P2.)		Y axis instruction frequency division coefficient	Restart		
Axis parameter (P2.)		Z axis instruction frequency multiplication ratio	Restart		
Axis parameter (P2.)		Z axis instruction frequency division coefficient	Restart		
Axis parameter (P2.)		4 axes instruction frequency multiplication ratio	Restart		
Axis parameter (P2.)		4 axes instruction frequency division coefficient	Restart		
Axis parameter (P2.)		B axis instruction frequency multiplication ratio	Restart		
Axis parameter		B axis instruction frequency	Restart		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		division coefficient			
Axis parameter		C axis instruction frequency	Restart		
(P2.)		multiplication ratio			
Axis parameter		C axis instruction frequency	Restart		
(P2.)		division coefficient			
Axis parameter	002	X axis rapid traverse rate (mm/min)	Instant		
(P2.)					
Axis parameter		Y axis rapid traverse rate (mm/min)	Instant		
(P2.)					
Axis parameter		Z axis rapid traverse rate (mm/min)	Instant		
(P2.)					
Axis parameter		4 axes rapid traverse rate (mm/min)	Instant		
(P2.)					
Axis parameter		B axis rapid traverse rate (mm/min)	Instant		
(P2.)					
Axis parameter		C axis rapid traverse rate (mm/min)	Instant		
(P2.)					
Axis parameter	003	X axis start rate (mm/min)	Instant		
(P2.)					
Axis parameter		Y axis start rate (mm/min)	Instant		
(P2.)					
Axis parameter		Z axis start rate (mm/min)	Instant		
(P2.)					
Axis parameter		4 axes start rate (mm/min)	Instant		
(P2.)					
Axis parameter		B axis start rate (mm/min)	Instant		
(P2.)					
Axis parameter		C axis start rate (mm/min)	Instant		
(P2.)					
Axis parameter	004	X axis acceleration (Kpps)	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		Y axis acceleration (Kpps)	Instant		
Axis parameter (P2.)		Z axis acceleration (Kpps)	Instant		
Axis parameter (P2.)		4 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 axis positive soft limit (mm)	Instant		
Axis parameter (P2.)		X axis negative soft limit (mm)	Instant		
Axis parameter (P2.)		Y axis positive soft limit (mm)	Instant		
Axis parameter (P2.)		Y axis negative soft limit (mm)	Instant		
Axis parameter (P2.)		Z axis positive soft limit (mm)	Instant		
Axis parameter (P2.)		Z axis negative soft limit (mm)	Instant		
Axis parameter (P2.)		4 axes positive soft limit (mm)	Instant		
Axis parameter (P2.)		4 axes negative soft limit (mm)	Instant		
Axis parameter (P2.)		B axis positive soft limit (mm)	Instant		
Axis parameter		B axis negative soft limit (mm)	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		C axis positive soft limit (mm)	Instant		
Axis parameter (P2.)		C axis negative soft limit (mm)	Instant		
Axis parameter (P2.)	006	X axis reverse clearance compensation (pulse)	Instant		
Axis parameter (P2.)		Y axis reverse clearance compensation (pulse)	Instant		
Axis parameter (P2.)		Z axis reverse clearance compensation (pulse)	Instant		
Axis parameter (P2.)		4 axes reverse clearance compensation (pulse)	Instant		
Axis parameter (P2.)		B axis reverse clearance compensation (pulse)	Instant		
Axis parameter (P2.)		C axis reverse clearance compensation (pulse)	Instant		
Axis parameter (P2.)	007	X axis home offset (mm)	Instant		
Axis parameter (P2.)		Y axis home offset (mm)	Instant		
Axis parameter (P2.)		Z axis home offset (mm)	Instant		
Axis parameter (P2.)		4 axes home offset (mm)	Instant		
Axis parameter (P2.)		B axis home offset (mm)	Instant		
Axis parameter (P2.)		C axis home offset (mm)	Instant		
Axis parameter	008	X axis home direction	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		Y axis home direction	Instant		
Axis parameter (P2.)		Z axis home direction	Instant		
Axis parameter (P2.)		4 axes home direction	Instant		
Axis parameter (P2.)		B axis home direction	Instant		
Axis parameter (P2.)		C axis home direction	Instant		
Axis parameter (P2.)	009	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.)		4 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.)	010	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		4 axes manual speed (mm/min)	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		B axis manual speed (mm/min)	Instant		
Axis parameter (P2.)		C axis manual speed (mm/min)	Instant		
Axis parameter (P2.)	011	X axis constraint acceleration (mm/s ²)	Instant		
Axis parameter (P2.)		Y axis constraint acceleration (mm/s ²)	Instant		
Axis parameter (P2.)		Z axis constraint acceleration (mm/s ²)	Instant		
Axis parameter (P2.)		4 axes constraint acceleration (mm/s ²)	Instant		
Axis parameter (P2.)		B axis constraint acceleration (mm/s ²)	Instant		
Axis parameter (P2.)		C axis constraint acceleration (mm/s ²)	Instant		
Axis parameter (P2.)	012	X axis maximum constraint acceleration (mm/s)	Instant		
Axis parameter (P2.)		Y axis maximum constraint acceleration (mm/s)	Instant		
Axis parameter (P2.)		Z axis maximum constraint acceleration (mm/s)	Instant		
Axis parameter (P2.)		4 axes maximum constraint acceleration (mm/s)	Instant		
Axis parameter (P2.)		B axis maximum constraint acceleration (mm/s)	Instant		
Axis parameter (P2.)		C axis maximum constraint acceleration (mm/s)	Instant		
Axis parameter	013	Effective voltage level for servo	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		X axis alarm			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		Y axis alarm			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		Z axis alarm			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		4 axes alarm			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		B axis alarm			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		C axis alarm			
Axis parameter	014	Effective voltage level for servo	Instant		
(P2.)		X axis reset			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		Y axis reset			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		Z axis reset			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		4 axes reset			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		B axis reset			
Axis parameter		Effective voltage level for servo	Instant		
(P2.)		C axis reset			
Axis parameter	015	Servo X axis Z phase home enable	Instant		
(P2.)					
Axis parameter		Servo Y axis Z phase home enable	Instant		
(P2.)					
Axis parameter		Servo Z axis Z phase home enable	Instant		
(P2.)					
Axis parameter		Servo 4 axes Z phase home	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		enable			
Axis parameter		Servo B axis Z phase home	Instant		
(P2.)		enable			
Axis parameter		Servo C axis Z phase home	Instant		
(P2.)		enable			
Axis parameter	016	Effective voltage level for servo X axis Z phase	Instant		
(P2.)		Effective voltage level for servo Y axis Z phase	Instant		
Axis parameter		Effective voltage level for servo Z axis Z phase			
		Effective voltage level for servo 4 axes Z phase			
		Effective voltage level for servo B axis Z phase			
		Effective voltage level for servo C axis Z phase			
Axis parameter	017	Effective voltage level for X hard limit	Instant		
(P2.)		Effective voltage level for Y hard limit	Instant		
Axis parameter		Effective voltage level for Z hard limit	Instant		
(P2.)		Effective voltage level for 4 hard limit	Instant		
Axis parameter		Effective voltage level for B hard limit	Instant		
(P2.)		Effective voltage level for C hard limit	Instant		
Axis parameter	018	X pulse command format	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		Y pulse command format	Instant		
Axis parameter (P2.)		Z pulse command format	Instant		
Axis parameter (P2.)		4 pulse command format	Instant		
Axis parameter (P2.)		B pulse command format	Instant		
Axis parameter (P2.)		C pulse command format	Instant		
Axis parameter (P2.)	019	X pulse logic direction	Instant		
Axis parameter (P2.)		Y pulse logic direction	Instant		
Axis parameter (P2.)		Z pulse logic direction	Instant		
Axis parameter (P2.)		4 pulse logic direction	Instant		
Axis parameter (P2.)		B pulse logic direction	Instant		
Axis parameter (P2.)		C pulse logic direction	Instant		
Axis parameter (P2.)	020	Effective voltage level for X external home	Instant		
Axis parameter (P2.)		Effective voltage level for Y external home	Instant		
Axis parameter (P2.)		Effective voltage level for Z external home	Instant		
Axis parameter		Effective voltage level for 4	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		external home			
Axis parameter		Effective voltage level for B	Instant		
(P2.)		external home			
Axis parameter		Effective voltage level for C	Instant		
(P2.)		external home			
Axis parameter	021	X axis ROUND settings	Instant		
(P2.)					
Axis parameter		Y axis ROUND settings	Instant		
(P2.)					
Axis parameter		Z axis ROUND settings	Instant		
(P2.)					
Axis parameter		4 axes ROUND settings	Instant		
(P2.)					
Axis parameter		B axis ROUND settings	Instant		
(P2.)					
Axis parameter		C axis ROUND settings	Instant		
(P2.)					
Axis parameter	022	X axis specified interface axis No.	Instant		
(P2.)					
Axis parameter		Y axis specified interface axis No.	Instant		
(P2.)					
Axis parameter		Z axis specified interface axis No.	Instant		
(P2.)					
Axis parameter		4 axes specified interface axis No.	Instant		
(P2.)					
Axis parameter		B axis specified interface axis No.	Instant		
(P2.)					
Axis parameter		C axis specified interface axis No.	Instant		
(P2.)					
Axis parameter	023	X axis encoder wire number (p)	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		Y axis encoder wire number (p)	Instant		
Axis parameter (P2.)		Z axis encoder wire number (p)	Instant		
Axis parameter (P2.)		4 axes encoder wire number (p)	Instant		
Axis parameter (P2.)		B axis encoder wire number (p)	Instant		
Axis parameter (P2.)		C axis encoder wire number (p)	Instant		
Axis parameter (P2.)	024	X axis 360 reset	Instant		
Axis parameter (P2.)		Y axis 360 reset	Instant		
Axis parameter (P2.)		Z axis 360 reset	Instant		
Axis parameter (P2.)		4 axes 360 reset	Instant		
Axis parameter (P2.)		B axis 360 reset	Instant		
Axis parameter (P2.)		C axis 360 reset	Instant		
Axis parameter (P2.)	025	X axis pulse logic voltage level	Instant		
Axis parameter (P2.)		Y axis pulse logic voltage level	Instant		
Axis parameter (P2.)		Z axis pulse logic voltage level	Instant		
Axis parameter		4 axes pulse logic voltage level	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		B axis pulse logic voltage level	Instant		
Axis parameter (P2.)		C axis pulse logic voltage level	Instant		
Axis parameter (P2.)	026	X axis characteristics (rotation: 0, linear: 1)	Instant		
Axis parameter (P2.)		Y axis characteristics (rotation: 0, linear: 1)	Instant		
Axis parameter (P2.)		Z axis characteristics (rotation: 0, linear: 1)	Instant		
Axis parameter (P2.)		4 axes characteristics (rotation: 0, linear: 1)	Instant		
Axis parameter (P2.)		B axis characteristics (rotation: 0, linear: 1)	Instant		
Axis parameter (P2.)		C axis characteristics (rotation: 0, linear: 1)	Instant		
Axis parameter (P2.)	027	X axis rotation display mode	Instant		
Axis parameter (P2.)		Y axis rotation display mode	Instant		
Axis parameter (P2.)		Z axis rotation display mode	Instant		
Axis parameter (P2.)		4 axes rotation display mode	Instant		
Axis parameter (P2.)		B axis rotation display mode	Instant		
Axis parameter (P2.)		C axis rotation display mode	Instant		
Axis parameter	028	X axis rotation path	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		optimization			
Axis parameter		Y axis rotation path	Instant		
(P2.)		optimization			
Axis parameter		Z axis rotation path	Instant		
(P2.)		optimization			
Axis parameter		4 axes rotation path	Instant		
(P2.)		optimization			
Axis parameter		B axis rotation path	Instant		
(P2.)		optimization			
Axis parameter		C axis rotation path	Instant		
(P2.)		optimization			
Axis parameter	029	X axis maximum acceleration	Instant		
(P2.)		(Kpps)			
Axis parameter		Y axis maximum acceleration	Instant		
(P2.)		(Kpps)			
Axis parameter		Z axis maximum acceleration	Instant		
(P2.)		(Kpps)			
Axis parameter		4 axes maximum acceleration	Instant		
(P2.)		(Kpps)			
Axis parameter		B axis maximum acceleration	Instant		
(P2.)		(Kpps)			
Axis parameter		C axis maximum acceleration	Instant		
(P2.)		(Kpps)			
Axis parameter	030	X servo home direction	Instant		
(P2.)					
Axis parameter		Y servo home direction	Instant		
(P2.)					
Axis parameter		Z servo home direction	Instant		
(P2.)					
Axis parameter		4 servo home direction	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		B servo home direction	Instant		
Axis parameter (P2.)		C servo home direction	Instant		
Axis parameter (P2.)	031	X axis external home enable	Instant		
Axis parameter (P2.)		Y axis external home enable	Instant		
Axis parameter (P2.)		Z axis external home enable	Instant		
Axis parameter (P2.)		4 axes external home enable	Instant		
Axis parameter (P2.)		B axis external home enable	Instant		
Axis parameter (P2.)		C axis external home enable	Instant		
Axis parameter (P2.)	032	X axis encoder pulse logic direction	Instant		
Axis parameter (P2.)		Y axis encoder pulse logic direction	Instant		
Axis parameter (P2.)		Z axis encoder pulse logic direction	Instant		
Axis parameter (P2.)		4 axes encoder pulse logic direction	Instant		
Axis parameter (P2.)		B axis encoder pulse logic direction	Instant		
Axis parameter (P2.)		C axis encoder pulse logic direction	Instant		
Axis parameter	033	X axis home deceleration speed	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)					
Axis parameter (P2.)		Y axis home deceleration speed	Instant		
Axis parameter (P2.)		Z axis home deceleration speed	Instant		
Axis parameter (P2.)		4 axes home deceleration speed	Instant		
Axis parameter (P2.)		B axis home deceleration speed	Instant		
Axis parameter (P2.)		C axis home deceleration speed	Instant		
Axis parameter (P2.)	034	X axis home scanning speed	Instant		
Axis parameter (P2.)		Y axis home scanning speed	Instant		
Axis parameter (P2.)		Z axis home scanning speed	Instant		
Axis parameter (P2.)		4 axes home scanning speed	Instant		
Axis parameter (P2.)		B axis home scanning speed	Instant		
Axis parameter (P2.)		C axis home scanning speed	Instant		
Axis parameter (P2.)	035	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		4 axes screw interpolation	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		enable			
Axis parameter (P2.)		B axis screw interpolation enable	Instant		
Axis parameter (P2.)		C axis screw interpolation enable	Instant		
Axis parameter (P2.)	036	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.)		4 axes 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.)	037	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.)		4 axes screw interpolation starting position (mm)	Instant		
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.)	038	X axis screw interpolation end	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P2.)		position (mm)			
Axis parameter		Y axis screw interpolation end	Instant		
(P2.)		position (mm)			
Axis parameter		Z axis screw interpolation end	Instant		
(P2.)		position (mm)			
Axis parameter		4 axes screw interpolation end	Instant		
(P2.)		position (mm)			
Axis parameter		B axis screw interpolation end	Instant		
(P2.)		position (mm)			
Axis parameter		C axis screw interpolation end	Instant		
(P2.)		position (mm)			
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		

Parameter type	S/N	Description	Effective mode	Default value	Page
Management parameter (P3.)	010	Menu clicking mode	Instant		
Management parameter (P3.)	011	Clear accumulated processing pieces	Instant		
Management parameter (P3.)	012	Clear current processing pieces	Instant		
Management parameter (P3.)	013	Maximum cumulative processing number	Instant		
Management parameter (P3.)	014	Import CSV system configuration <●>	Restart		
Management parameter (P3.)	015	Default boot screen <●>	Restart		
Management parameter (P3.)	016	System language packs <●>	Restart		
Management parameter (P3.)	017	Macro keyword effective enable	Instant		
Management parameter (P3.)	018	Boot screen mode	Instant		
Management parameter (P3.)	019	System display axis setting (bit)	Instant		
Management parameter (P3.)	020	System debugging info enable	Instant		
Management parameter (P3.)	021	Axis control composite key enable	Instant		
Management parameter (P3.)	022	Additional panel enable	Instant		
Management parameter (P3.)	023	M code macro program selection <●>	Restart		
Management parameter (P3.)	024	T code macro program selection <●>	Restart		

Parameter type	S/N	Description	Effective mode	Default value	Page
Management parameter (P3.)	025	PLC program selection <●>	Restart		
Management parameter (P3.)	026	Screen saver ON	Instant		
Management parameter (P3.)	027	Modbus master / slave setting <●>	Restart		
Tool magazine parameter (P4.)		Factory custom	Instant		
Principal axis parameter (P5.)	001	Principal axis specified interface No. <●>	Restart		
Principal axis parameter (P5.)	002	Principal axis alarm effective voltage level	Instant		
Principal axis parameter (P5.)	003	Principal axis reset effective voltage level	Instant		
Principal axis parameter (P5.)	004	Principal axis encoder Z phase home enable	Instant		
Principal axis parameter (P5.)	005	Principal axis encoder Z phase effective voltage level	Instant		
Principal axis parameter (P5.)	006	Principal axis positive limit (port enable)	Instant		
Principal axis parameter (P5.)	007	Principal axis negative limit (port enable)	Instant		
Principal axis parameter (P5.)	008	Principal axis limit effective voltage level	Instant		
Principal axis parameter (P5.)	009	Principal axis pulse format	Instant		
Principal axis parameter (P5.)	010	Principal axis pulse logic direction	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Principal axis parameter (P5.)	011	Principal axis external home effective voltage level	Instant		
Principal axis parameter (P5.)	012	Principal axis external home check enable	Instant		
Principal axis parameter (P5.)	013	Principal axis ROUND settings	Instant		
Principal axis parameter (P5.)	014	Principal axis encoder wires (p)	Instant		
Principal axis parameter (P5.)	015	Principal axis home offset pulses (p)	Instant		
Principal axis parameter (P5.)	016	Principal axis pulse logic level	Instant		
Principal axis parameter (P5.)	017	Principal axis rotation display	Instant		
Principal axis parameter (P5.)	018	Principal axis maximum acceleration (Kpps)	Instant		
Principal axis parameter (P5.)	019	Principal axis external home direction	Instant		
Principal axis parameter (P5.)	020	Principal axis servo home direction	Instant		
Principal axis parameter (P5.)	021	Principal axis maximum speed (rpm)	Instant		
Principal axis parameter (P5.)	022	Principal axis home speed (rpm)	Instant		
Principal axis parameter (P5.)	023	Principal axis gear numerator	Instant		
Principal axis parameter (P5.)	024	Principal axis gear denominator	Instant		
Principal axis parameter (P5.)	025	Principal axis encoder logic direction	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
Principal axis parameter (P5.)	026	Principal axis open delay time (ms)	Instant		
Principal axis parameter (P5.)	027	Servo principal axis ready level			
Principal axis parameter (P5.)	028	Servo principal axis stop place level			
Principal axis parameter (P5.)	029	Servo principal axis zero speed in place level			
Principal axis parameter (P5.)	030	Servo principal axis speed arrival level			
Principal axis parameter (P5.)	031	System principal axis speed			
Principal axis parameter (P5.)	032	Whether close principal axis to execute M30			
Principal axis parameter (P5.)	033	Principal axis minimum speed (rpm)			
Principal axis parameter (P5.)	034	Second channel principal axis maximum speed (rpm)			
Principal axis parameter (P5.)	035	Second channel principal axis speed			
Principal axis parameter (P5.)	036	Principal axis command S value invalid enable			
Principal axis parameter (P5.)	037	Mechanical principal axis first gear speed (rpm)			
Principal axis parameter (P5.)	038	Mechanical principal axis second gear speed (rpm)			
Principal axis parameter (P5.)	039	Mechanical principal axis third gear speed (rpm)			
Principal axis parameter (P5.)	040	Mechanical principal axis fourth gear speed (rpm)			

Parameter type	S/N	Description	Effective mode	Default value	Page
Port parameter (P6.)	001	TChecking signal Port	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 presetter limit input port	Instant		
Port parameter (P6.)	007	Tool presetter blow output port number	Instant		
Port parameter (P6.)	008	Principal axis alarm input detection port number	Instant		
Port parameter (P6.)	009	Variable frequency alarm input detection port number	Instant		
Port parameter (P6.)	010	Servo principal axis ready input number	Instant		
Port parameter (P6.)	011	Servo principal axis stop in place input number	Instant		
Port parameter (P6.)	012	Servo principal axis zero speed in place input number	Instant		
Port parameter (P6.)	013	Servo principal axis speed arrival input number	Instant		
Port parameter (P6.)	014	Variable frequency 0 gear output port number	Instant		
Port parameter	015	Variable frequency 1 gear output	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P6.)		port number			
Port parameter (P6.)	016	Variable frequency 2 gear output port number	Instant		
Port parameter (P6.)	017	Variable frequency 3 gear output port number	Instant		
Port parameter (P6.)	018	Principal axis forward output port number	Instant		
Port parameter (P6.)	019	Principal axis reverse output port number	Instant		
Port parameter (P6.)	020	Principal axis 2 forward output port number	Instant		
Port parameter (P6.)	021	Principal axis 2 reverse output port number	Instant		
Port parameter (P6.)	022	Principal axis inverter alarm reset output	Instant		
Port parameter (P6.)	023	Principal axis blowing output port	Instant		
Port parameter (P6.)	024	Principal axis brake output port	Instant		
Port parameter (P6.)	025	Servo principal axis enable output port number	Instant		
Port parameter (P6.)	026	Servo principal axis stop output port number	Instant		
Port parameter (P6.)	027	Servo principal axis pulse control output port number	Instant		
Port parameter (P6.)	028	Servo principal axis rigid tapping output port number	Instant		
Port parameter (P6.)	029	Safety grating input port number	Instant		
Port parameter	030	Air pressure alarm input port	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P6.)		number			
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		
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	Tightness 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	Lubrication output port	Instant		
Port parameter (P6.)	044	Cooling output port number	Instant		
Port parameter	045	Pump output port number	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P6.)					
Port parameter (P6.)	046	X axis negative limit input port number	Instant		
		X axis positive limit input port	Instant		
		Y axis negative limit input port number	Instant		
		Y axis positive limit input port	Instant		
		Z axis negative limit input port number	Instant		
		Z axis positive limit input port	Instant		
		4 axes negative limit input port number	Instant		
		4 axes positive limit input port	Instant		
		B axis negative limit input port number	Instant		
		B axis positive limit input port	Instant		
		C axis negative limit input port number	Instant		
		C axis positive limit input port	Instant		
Port parameter (P6.)	047	X external home input port number	Instant		
		Y external home input port number	Instant		
		Z external home input port number	Instant		
		4 external home input port number	Instant		
		B external home input port number	Instant		
		C external home input port	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
		number			
Port parameter (P6.)	048	X servo enable output port number	Instant		
		Y servo enable output port number	Instant		
		Z servo enable output port number	Instant		
		4 servo enable output port number	Instant		
		B servo enable output port number	Instant		
		C servo enable output port number	Instant		
Port parameter (P6.)	049	Input detection effective voltage level 00 ~ 31	Instant		
Port parameter (P6.)	050	Input detection effective voltage level 32 ~ 63	Instant		
Port parameter (P6.)	051	Input detection effective voltage level 64 ~ 95	Instant		
Port parameter (P6.)	052	Reset close LED configuration 00 ~ 31	Instant		
Port parameter (P6.)	053	Reset close LED configuration 32 ~ 63	Instant		
Port parameter (P6.)	054	Reset close LED configuration 64 ~ 95	Instant		
Port parameter (P6.)	055	Reset close LED configuration 00 ~ 31	Instant		
Port parameter (P6.)	056	Reset close LED configuration 32 ~ 63	Instant		
Port parameter	057	Reset close LED configuration	Instant		

Parameter type	S/N	Description	Effective mode	Default value	Page
(P6.)		64 ~ 95			

11.2 General 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

Default : 3000, 200, 1000, 3000

Effective time : Instant

Note : The feeding instructions 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 transferring processing files.

004	Home mode
-----	-----------

Range : 0~1

Unit : None

Authority : Operation admin

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 level (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, e.g. rain and thunder, please enter a filter value. Higher value indicates longer test time and high reliability; 0 indicates no filter;
006	Select communication mode (restart)
Range	: No User Network Uart All User
Unit	: None
Authority	: Operation admin
Default	: Uart
Effective time	: Restart
Note	:
008	Maximum hand wheel speed (mm/min)
Range	: 500 ~ 10000
Unit	: None
Authority	: Operation admin
Default	: 5000
Effective time	: Instant
Note	: Used to limit the maximum speed of moving the axis with hand wheel (note: valid when P1.062 is set to 0).
009	Hand wheel response factor
Range	: 100 ~ 3000
Unit	: None
Authority	: Operation admin
Default	: 1000

Effective time : Instant

Note : Used to limit the maximum speed of moving the axis with hand wheel
(note: valid when P1.062 is set to 0).

010

M code waiting time (ms)

Range : 1~9999

Unit : ms

Authority : Operation admin

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

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

System baud rate

Range : 9600~115200

Unit : None

Authority : Operation admin

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

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	Arc interpolation feed rate
Range	: 0~1
Unit	: mm
Authority	: Operation admin
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) circulating tool retraction amount
016	G83(M) circulating tool retraction amount
Range	: 0.1~100
Unit	: mm
Authority	: Operation admin
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
Default	: Position split
Effective time	: Instant
Note	: Set the split mode of arc interpolation to position split or time split.
018	Speed optimization constraint mode
Range	: Angle Speed Speed1
Unit	: None
Authority	: Operation admin

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

Code pretreatment processing mode

Range : 0~1

Unit : None

Authority : Operation admin

Default : 0 (rear-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

CNC file scan flag

Range : 0~1

Unit : None

Authority : Operation admin

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. 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
Default	:	0
Effective time	:	Instant
Note	:	Control mode corresponding to principal axis S code (frequency conversion mode) 0 : Analog output 1: Section speed regulation (4-digit code determined by output port configured by principal axis 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: $V = S / \text{MaxRPM}$ S is the rotation set by the user, and MaxRPM is the maximum rotation of principal axis 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 schedule open setting (min)
023	Lubricant pressure holding time setting (sec)
024	Lubricant control output frequency (Hz)

Range	:	
Unit	:	
Authority	:	Operation admin
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 oil pump outputs (P4.056 Lubricant output port No.) when the timing reaches specified value after the system starts and times. Output signal stops keeping for the seconds specified by P1.053 (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	Auto-zero mode configuration (BIT)
-----	------------------------------------

Range :
Unit :
Authority : Operation admin
Default : Z – XYABC
Effective time : Instant
Note : Set the zero sequence of each axis; up to three sections can be set.

026	Arc Acc.for Radii
027	Arc Acc.for Speed

Range :
Unit : Coefficient
Authority : Operation admin
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 Set
-----	-----------------------

Range : 100~5000
Unit : Instruction line
Authority : Operation admin
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
	Default :
	Effective time : Instant
	Note : Used to set the performance of S curve acceleration/deceleration
031	Home test enable after alarm
032	System home test enable
	Range : 0~1
	Unit :
	Authority : Operation admin
	Default : 0, 1
	Effective time : Instant
	Note : Used to set whether prompt user to home in corresponding occasions, ensuring that the user has performed the home operation; If it is set to 0, the system will run directly without performing home operation.
033	X axis diameter programming enable (L series)
	Range : 0~1
	Unit :
	Authority : Operation admin
	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
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 instead;

035	T code form (compensation number digits)(L series)
Range	: 0~2
Unit	:
Authority	: Operation admin
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	IP address		
037	Subnet mask		
038	Default gateway		
Range :			
Unit :			
Authority : Operation admin			
Default : 192.168.0.123			
255.255.255.0			
192.168.0.1			
Effective time : Restart			
Note : It is used to configure the Ethernet network parameters, which should			
match the actual network settings, or else it can't be normally accessed.			

After configuration, test the ping command on the PC in the same network segment (same subnet mask) in the Intranet. If the return times out, the connection has error; please check the physical connection.

The network environment requires independent NC network, which shouldn't be connected to office networks and the Internet, because the network broadcast and regular query of Windows will block NC network communication, thus affecting the communication performance.

040	Pretreatment segments
Range	: 10~200
Unit	:
Authority	: Operation admin
Default	: 20
Effective time	: Instant
Note	: Pretreatment forward segments are used to set the segments of pretreatment preview.
	Pretreatment forward segments are used to set the segments of pretreatment preview.
	Pretreatment forward segments are used to set the segments of pretreatment preview.
	If this value is smaller, the balance value is set according to the actual price effect because the forward data are insufficient and the speed can't be improved during small segment interpolating.
	This parameter is invalid when P1.018 is set to Speed1.

041	Feed speed setting En
Range	: 0~1
Unit	:
Authority	: Operation admin
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	Enable of G00 Inp mode
Range	: 0~1
Unit	:
Authority	: Operation admin
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	Enable abnormal memory position jump
Range	: 0~1
Unit	:
Authority	: Operation admin
Default	: 0
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
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 reference point enable
047	Mechanical home reference point enable

Range : 0~1

Unit :

Authority : Operation admin

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
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
052	A-axis feed rate limit

Range	:	0~20000
Unit	:	mm/min
Authority	:	Operation admin
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
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	Enable jump to M98 * times * lines
-----	------------------------------------

Range	:	OFF ON
Unit	:	None
Authority	:	Operation admin
Default	:	OFF
Effective time	:	Instant
Note	:	Enable and set this parameter to ON to jump to line N of X cycle of M98 instruction and start processing.

057

System home ON

Range	:	No, ask, auto
Unit	:	None
Authority	:	Operation admin
Default	:	No
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	:	sec
Authority	:	Operation admin
Default	:	1000
Effective time	:	Instant
Note	:	Used to set the delay between actions of the principal axis brake switch

059

Rotation axis speed optimization feature (this parameter is invalid currently)

Range	:	
Unit	:	
Authority	:	Operation admin
Default	:	
Effective time	:	Instant

Note : This parameter is invalid currently

060	4-axis maximum 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	Hand wheel encoder direction
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	Hand wheel control mode
Range	: 0 ~ 1
Unit	:
Authority	: Operation admin
Default	: 0
Effective time	: Instant
Note	: Used to set hand wheel to control the motion of each axis; 0: old, 1: new
063	Hand wheel maximum rate
Range	: 500 ~ 10000

Unit :
Authority : Operation admin
Default : 4000
Effective time : Instant
Note : Used to set the maximum rate of hand wheel (valid when P1.062 is set to 1).

064	Hand wheel acceleration
Range	: 1 ~ 20
Unit	:
Authority	: Operation admin
Default	: 10
Effective time	: Instant
Note	: Used to set the maximum acceleration of hand wheel (valid when P1.062 is set to 1).

11.3 Axis parameter configuration (P2.)

001	X axis instruction frequency multiplication ratio
	X axis instruction frequency division coefficient
	Y axis instruction frequency multiplication ratio
	Y axis instruction frequency division coefficient
	Z axis instruction frequency multiplication ratio
	Z axis instruction frequency division coefficient
	4 axes instruction frequency multiplication ratio
	4 axes instruction frequency division coefficient
	B axis instruction frequency multiplication ratio
	B axis instruction frequency division coefficient
	C axis instruction frequency multiplication ratio
	C axis instruction frequency division coefficient
Range	: 1~65535
Unit	: None
Authority	: Operation admin

Default : 1

Effective : Restart

time

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.

$$CMR/CMD = P/(L \times 1000)$$

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

$$CMR/CMD = 5000/(5 \times 1000) = 1/1$$

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

$$CMR/CMD = 5000/(10 \times 1000) = 1/2$$

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

002	X axis rapid traverse rate (mm/min)
	Y axis rapid traverse rate (mm/min)
	Z axis rapid traverse rate (mm/min)
	4 axes rapid traverse rate (mm/min)
	B axis rapid traverse rate (mm/min)
	C axis rapid traverse rate (mm/min)
003	X axis start rate (mm/min)
	Y axis start rate (mm/min)
	Z axis start rate (mm/min)
	4 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)
	4 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

Default : 3000, 200, 1500

Effective time : Instant

Note : This parameter is the trapezoid acceleration/deceleration setting 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 axis positive soft limit (mm)
	X axis negative soft limit (mm)
	Y axis positive soft limit (mm)
	Y axis negative soft limit (mm)
	Z axis positive soft limit (mm)
	Z axis negative soft limit (mm)
	4 axes positive soft limit (mm)
	4 axes negative soft limit (mm)
	B axis positive soft limit (mm)

	B axis negative soft limit (mm)
	C axis positive soft limit (mm)
	C axis negative soft limit (mm)

Range : -9999~9999

Unit : mm

Authority : Operation admin

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 axis reverse clearance compensation (pulse)
	Y axis reverse clearance compensation (pulse)
	Z axis reverse clearance compensation (pulse)
	4 axes reverse clearance compensation (pulse)
	B axis reverse clearance compensation (pulse)
	C axis reverse clearance compensation (pulse)

Range : 1~20000

Unit : Pulse

Authority : Operation admin

Default : 0

Effective time : Instant

Note : Compensate the clearance of control axis

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

007	X axis home pulse offset
-----	--------------------------

	Y axis home pulse offset
	Z axis home pulse offset
	4 axes home pulse offset
	B axis home pulse offset
	C axis home pulse offset

Range : -9999~9999

Unit : Pulse (mm)

Authority : Operation admin

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.

008	X axis home direction
	Y axis home direction
	Z axis home direction
	4 axes home direction
	B axis home direction
	C axis home direction

Range : 0~1

Unit : None

Authority : Operation admin

Default : 1,1,0,0

Effective time : Instant

Note : Set the mechanical home direction of every processing axis

Positive direction

Negative direction

009	X axis home speed
	Y axis home speed
	Z axis home speed

	4 axes home speed
	B axis home speed
	C axis home speed

Range : 0~9999
 Unit : mm/min
 Authority : Operation admin
 Default : 1000
 Effective time : Instant
 Note : Set the home speed of every axis separately

010	X axis manual speed
	Y axis manual speed
	Z axis manual speed
	4 axes manual speed
	B axis manual speed
	C axis manual speed

Range : 0~9999
 Unit : mm/min
 Authority : Operation admin
 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.

011	X axis constraint acceleration (mm/sec^2)
	Y axis constraint acceleration (mm/sec^2)
	Z axis constraint acceleration (mm/sec^2)
	4 axes constraint acceleration (mm/sec^2)
	B axis constraint acceleration (mm/sec^2)
	C axis constraint acceleration (mm/sec^2)
012	X axis maximum constraint speed (mm/sec)

	Y axis maximum constraint speed (mm/sec)
	Z axis maximum constraint speed (mm/sec)
	4 axes maximum constraint speed (mm/sec)
	B axis maximum constraint speed (mm/sec)
	C axis maximum constraint speed (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 general parameter P1.018 (speed optimization constraint mode) is set to Speed or Speed1.

013	Effective voltage level for servo X axis alarm
	Effective voltage level for servo Y axis alarm
	Effective voltage level for servo Z axis alarm
	Effective voltage level for servo 4 axes alarm
	Effective voltage level for servo B axis alarm
	Effective voltage level for servo C axis alarm
014	Effective voltage level for servo X axis reset
	Effective voltage level for servo Y axis reset
	Effective voltage level for servo Z axis reset
	Effective voltage level for servo 4 axes reset
	Effective voltage level for servo B axis reset

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 drive; please refer to interface voltage level description of servo for specific parameter settings.

0015	Servo X axis Z phase home enable
	Servo Y axis Z phase home enable
	Servo Z axis Z phase home enable
	Servo 4 axes Z phase home enable
	Servo B axis Z phase home enable
	Servo C axis Z phase 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.

0016	Effective voltage level for servo X axis Z phase
	Effective voltage level for servo Y axis Z phase
	Effective voltage level for servo Z axis Z phase
	Effective voltage level for servo A axis Z phase
	Effective voltage level for servo B axis Z phase
	Effective voltage level for servo C axis Z phase

Range	:	0~1
Unit	:	LOGIC VOLTAGE LEVEL
Authority	:	Super admin
Default	:	0
Effective time	:	Instant
Note	:	Adapt to the interface parameters of selected servo drive; please refer to interface voltage level description of servo for specific parameter settings.

017	X hardware positive limit effective voltage level
	Y hardware positive limit effective voltage level
	Z hardware positive limit effective voltage level
	A hardware positive limit effective voltage level
	B hardware positive limit effective voltage level
	C hardware positive limit effective voltage level

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 overshoot will occur.

018	X pulse command format (restart)
	Y pulse command format (restart)
	Z pulse command format (restart)
	4 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 drive should be known in advance.

0 Pulse + pulse

1 Pulse + direction

019	X pulse logic direction (restart)
	Y pulse logic direction (restart)
	Z pulse logic direction (restart)
	4 pulse logic direction (restart)
	B pulse logic direction (restart)
	C pulse logic direction (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 drive direction, please modify this parameter to adjust the rotation direction of motor.

020	Effective voltage level for X external home
	Effective voltage level for Y external home
	Effective voltage level for Z external home
	Effective voltage level for 4 external home
	Effective voltage level for B external home
	Effective voltage level for C external home

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

021	X axis ROUND settings (restart)
	Y axis ROUND settings (restart)
	Z axis ROUND settings (restart)
	4 axes ROUND settings (restart)
	B axis ROUND settings (restart)
	C axis ROUND settings (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);

022	X axis specified interface axis No. (restart)
	Y axis specified interface axis No. (restart)
	Z axis specified interface axis No. (restart)
	4 axes specified interface axis No. (restart)
	B axis specified interface axis No. (restart)
	C axis specified interface axis No. (restart)

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

023	X axis encoder wire number
-----	----------------------------

	Y axis encoder wire number
	Z axis encoder wire number
	4 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.

025	X axis pulse logic voltage level (restart)
	Y axis pulse logic voltage level (restart)
	Z axis pulse logic voltage level (restart)
	4 axes pulse logic voltage level (restart)
	B axis pulse logic voltage level (restart)
	C axis pulse logic voltage 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 drive, 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.

026	X axis characteristics (rotation: 0, linear: 1)
	Y axis characteristics (rotation: 0, linear: 1)
	Z axis characteristics (rotation: 0, linear: 1)
	4 axes characteristics (rotation: 0, linear: 1)
	B axis characteristics (rotation: 0, linear: 1)
	C axis characteristics (rotation: 0, linear: 1)

Range : 0~1

Unit : None

Authority : Super admin

Default : 1

Effective time : Instant

Note : Set axis characteristics.

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.

027	X axis rotation display mode
	Y axis rotation display mode
	Z axis rotation display mode
	4 axes rotation display mode
	B axis rotation display mode
	C axis rotation 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

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.

028	X axis rotation path optimization
	Y axis rotation path optimization
	Z axis rotation path optimization
	A axis rotation path optimization
	B axis rotation path optimization
	C axis rotation path optimization

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.

029	X axis maximum acceleration
	Y axis maximum acceleration
	Z axis maximum acceleration
	4 axes maximum acceleration
	B axis maximum acceleration
	C axis maximum 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.

030	X servo home direction
	Y servo home direction
	Z servo home direction
	4 servo home direction
	B servo home direction
	C servo home direction

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

031	X axis external home enable
	Y axis external home enable
	Z axis external home enable
	4 axes external home enable
	B axis external home enable
	C axis external 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

032	X axis encoder pulse logic direction
	Y axis encoder pulse logic direction
	Z axis encoder pulse logic direction
	4 axes encoder pulse logic direction
	B axis encoder pulse logic direction
	C axis encoder pulse logic direction

Range	:	0~1
Unit	:	None
Authority	:	Super admin
Default	:	0
Effective time	:	Instant
Note	:	If the logic direction obtained by the encoder is reverse to the actual motion direction of the axis, please set this parameter. 0: Positive 1: Negative

033	X axis home deceleration speed
	Y axis home deceleration speed
	Z axis home deceleration speed
	4 axes home deceleration speed
	B axis home deceleration speed

	C axis home deceleration speed
034	X axis home scanning speed
	Y axis home scanning speed
	Z axis home scanning speed
	4 axes home scanning speed
	B axis home scanning speed
	C axis home scanning speed

Range : 1~20000

Unit : mm/min

Authority : Super admin

Default : 100, 60

Effective time : Instant

Note : Used to set different speed parameters for mechanical home; the specific effect is as follows:

Home speed - (when external switch home is detected) Deceleration speed - Scanning speed.

035	X axis pitch compensation function enable
	Y axis pitch compensation function enable
	Z axis pitch compensation function enable
	4 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.

036	X axis pitch compensation spacing
	Y axis pitch compensation spacing

	Z axis pitch compensation spacing
	4 axes pitch compensation spacing
	B axis pitch compensation spacing
	C axis pitch compensation spacing

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.

037	X axis pitch compensation start position
	Y axis pitch compensation start position
	Z axis pitch compensation start position
	4 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.

038	X axis pitch compensation end position
	Y axis pitch compensation end position
	Z axis pitch compensation end position

	4 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.

11.4 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 comprehensive parameters to default <●>
005	Initialize IO configuration to default <●>
006	Reset all parameters <●>

Range : None

Unit : None

Authority : Super user

Default : None

Effective time : Instant

Note : Initial parameter table only in super user mode.

007	Back up parameters
008	Restore parameters

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 password file
-----	------------------------

	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	Menu clicking mode Range : 0~1 Unit : None Authority : None Default : 0 (click) Effective time : Instant Note : The function is to be developed
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	Default boot screen 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	System language packs Range : 0~1 Unit : None Authority : Operation admin Default : 0 (Chinese) Effective time : Instant Note : Select system language Chinese English
017	Macro keyword effective 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 set on the face is valid; 1: valid, 0: invalid.

018

Boot screen mode

Range	:	0~6
Unit	:	None
Authority	:	Operation admin
Default	:	1S
Effective time	:	Instant
Note	:	Used to configure logo display mode; if it is set to 0, press any key to enter the system; for non-zero value, it enters into the system automatically after corresponding time delay.

019

Sys display axis setting (bit)

Range	:	
Unit	:	None
Authority	:	Super user
Default	:	XYZ
Effective time	:	Instant
Note	:	Used to configure the display axis of current system, and different display combinations are available.

This configuration only determines the content of the interface. If the axis function of the hardware exists, it still can output axis control during programming, but the axis status won't be displayed. The status such as axis limit and alarm will be ignored.

020

System debugging info 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 debugging information during running. This parameter is dedicated for programmers, and users are not recommended to enable this parameter. If debugging information is enabled, the system performance will deteriorate, so that it is disabled in the normal process. If networking is enabled, this feature must be turned off, or else the networking will crash.

021

Axis control composite key enable

Range	:	0~1
Unit	:	None
Authority	:	Super user
Default	:	ON/1
Effective time	:	Instant
Note	:	Used to configure whether enable the key for axis motion on the controller panel. This parameter is used to shield the composite function of the axis motion control button on the NC panel when use additional panel; if additional panel isn't used, it must be enabled or else axis movement cannot be controlled through the buttons.

022

Additional panel enable

Range	:	OFF FCNC4M FDK4A FCNC6D
Unit	:	None
Authority	:	Super user
Default	:	OFF/0
Effective time	:	Instant
Note	:	Used to configure whether NC uses additional panel, which must match ADT series, or compatible with the same protocol interface. To use additional panel, the system debugging information must be

disabled (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 code 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
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 : SLAVE 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

11.5 Tool magazine parameters (P4.)

001

Customized by manufacturer

Range :

Unit :

Authority : Operation admin

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.

11.6 Principal axis parameter (P5.)

002

Spi.Alarm ELevel

003

Spi.Reset ELevel

004

Spi.ECZ Home Enable

005

Spi.ECZ Elevel

006

Spi. Limit+ Enable

007

Spi. Limit- Enable

008

Spi.Limit Elevel

009	Spi.Pulse Mode
010	Spi.Pulse Logic Mode
011	Spi.HomeDect ELevel
012	Spi.ExtHome Check En
013	Spi.Round Setting (restart)
015	Spi.ZeroOffset(p)
016	Spi.PulseLogic Level
017	Spi.Rolling Display Usage
018	Spi.Max Acc(Kpps)
019	Spi.Ext HomeDir
020	Spi.Servo HomeDir
022	Spi.Home Speed(rpm)
025	Spindle encoder logic direction

Range :

Unit :

Authority : Operation admin

Default :

Effective time :

Note : Servo principal axis parameters are same as common positioning axis parameters. If only the principal axis is controlled with servo port, you can set the number according to axis parameters.

001	Spindle physical Assign Num (restart)
-----	---------------------------------------

Range : 0~7

Unit : Pulse port sequence No.

Authority : Super admin

Default :

Effective time : Restart

Note : It is set to 0 by default, indicating that the principal axis is in variable frequency control mode, i.e. analog or gear position control mode. To use servo principal axis, a coding port is required (servo principal axis must be in position control mode); you can modify this parameter to specify

the function.

0: variable frequency principal axis adjusted by analog

1~4: for CNC4640(20), corresponding to 1#-4# axis

7: for CNC4960(40), corresponding to independent spindle interface

Note: If a pulse port is specified as the function port of principal axis, the pulse port should be removed from previously corresponding function axis number, or else the system will assign to principal axis after restarted and the original function axis will be invalid.

014	Spindle encoder bits
Range	: 0~5000
Unit	: None
Authority	: Operation admin
Default	: 2500
Effective time	: Instant
Note	: The received wire number of the encoder when the principal axis 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.

021	Spi.Max Speed
Range	: 1~30000
Unit	: None
Authority	: Operation admin
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.

023	Spi.Gear Numerator (CMR)
024	Spi.Gear Denominator (CMD)

Range : 1~65535

Unit : None

Authority : Operation admin

Default : 1

Effective time : Instant

Note : If the principal axis 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.

026	Principal axis on delay
-----	-------------------------

Range : 0~10000

Unit : ms

Authority : Operation admin

Default : 0

Effective time : Instant

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

027	Servo principal axis ready level
028	Servo principal axis stop place level
029	Servo principal axis zero speed in place level
030	Servo principal axis speed arrival level

Range : 0~1

Unit : None

Authority : Operation admin

Default : 0

Effective time : Instant

Note : Set the effective voltage level of input signal of servo principal axis.
Refer to the specific servo principal axis instructions for details.

031

System principal axis speed

Range : 1~24000

Unit : rpm

Authority : Operation admin

Default : 6000

Effective time : Instant

Note : Set the current speed of the principal axis.

032

Whether close principal axis to execute M30

Range : 0 ~ 1

Unit :

Authority : Operation admin

Default : 0

Effective time : Instant

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

033

Principal axis minimum speed

Range : 100 ~ 100000

Unit : rpm

Authority : Operation admin

Default : 100

Effective time : Instant

Note : Set the minimum speed of the principal axis

034

Second channel principal axis maximum speed

Range : 1 ~ 100000

Unit : rpm

Authority : Operation admin
 Default : 24000
 Effective time : Instant
 Note : Set the maximum speed of second channel principal axis

035	Second channel principal axis speed
Range	: 1 ~ 24000
Unit	: rpm
Authority	: Operation admin
Default	: 6000
Effective time	: Instant
Note	: Set the speed of second channel principal axis

036	Principal axis command S value invalid enable
Range	: OFF ON
Unit	:
Authority	: Operation admin
Default	: OFF
Effective time	: Instant
Note	: When set to ON, the value specified by S in M03Sxxxx instruction is invalid, and the principal axis speed uses the value specified by P5.031.

037	Mechanical principal axis first gear speed (L series)
038	Mechanical principal axis second gear speed (L series)
039	Mechanical principal axis third gear speed (L series)
040	Mechanical principal axis fourth gear speed (L series)
Range	: 1~1000000
Unit	: rpm
Authority	: Operation admin
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.

11.7 Port configuration (P6.)

001	Tool setting gauge detection port number
...	...
048	X Y Z A B C enable output port number

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.

049	Input detection effective voltage level 00 ~ 31
050	Input detection effective voltage level 32 ~ 63
051	Input detection effective voltage level 64 ~ 95

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.

052	IO Conf in RESET 00~31
-----	------------------------

053	IO Conf in RESET 32~63
054	IO Conf in RESET 64~95

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.

055	LED Conf in RESET 00~31
056	LED Conf in RESET 32~63
057	LED Conf in RESET 64~95

Range : 0x00000000~0xFFFFFFFF

Unit :

Authority : Super admin

Default : 0

Effective time : Instant

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

LED

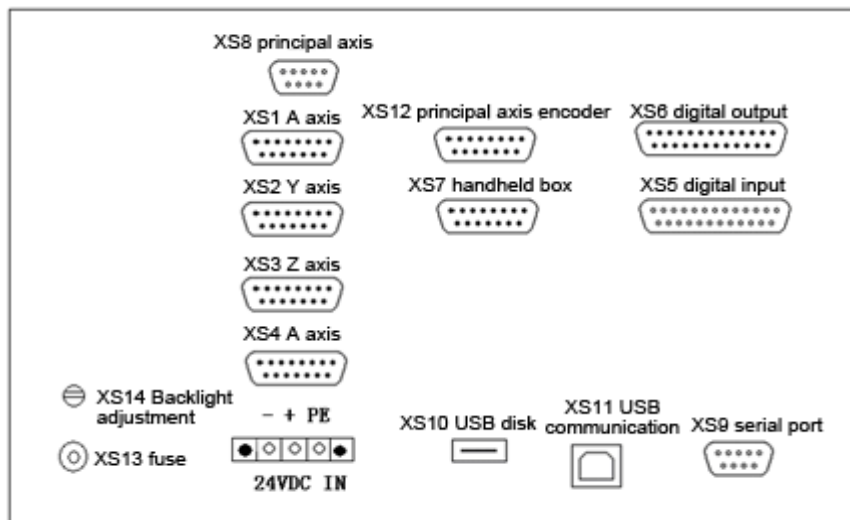
For example: P6.56:10, is 00000000 00000000 00000000 00001010 in binary system;

which indicates that among LED32 ~ LED63, LED33 is reset when the system resets or alarms, LED35 turns off, while other LEDs are not reset.

12. Hardware Interface Definition and Connection Instructions

12.1 Installation Layout

12.1.1. 46 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 drive or digital AC servo drive

(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 NCT-XX controller and realize other functions.

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

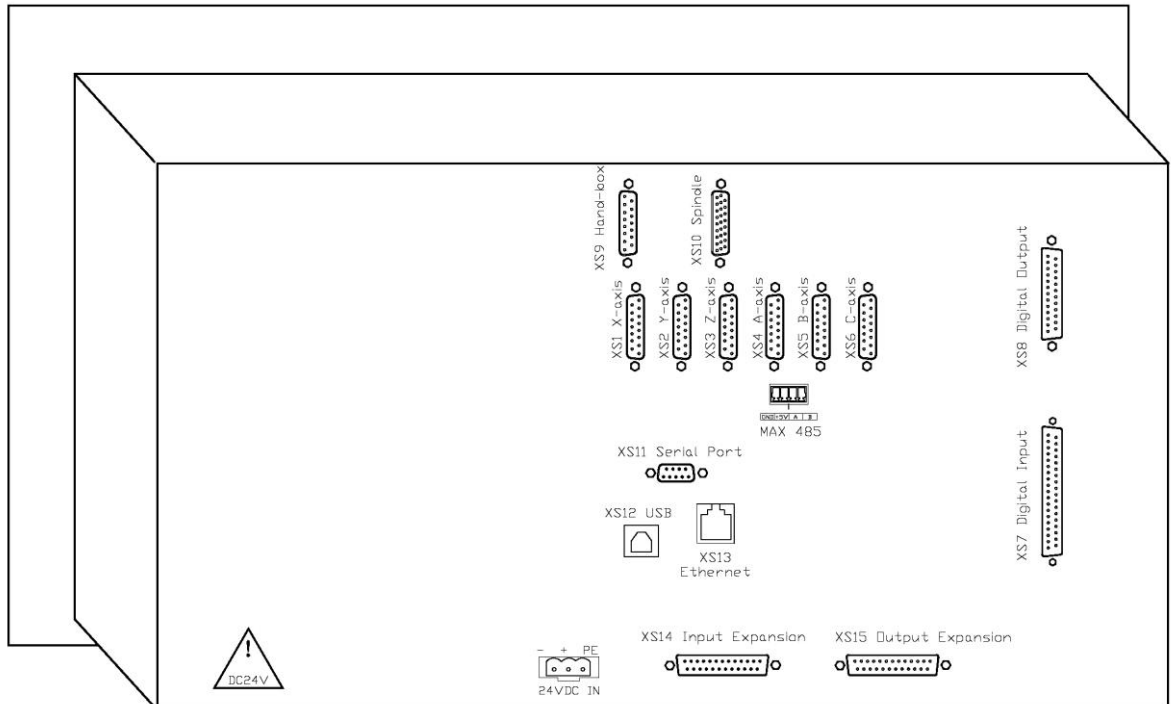
(6) XS7 accessory panel:

15-core D-pin socket connects to hand wheel

(7) XS8 principal axis:

9-core D-pin socket connects to principal axis inverter

12.1.2. 49 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 drive or digital AC servo drive

(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 CNC49 controller and realize other functions.

(5) CNC49 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 principal axis:

26-core D-pin socket connects to principal axis inverter

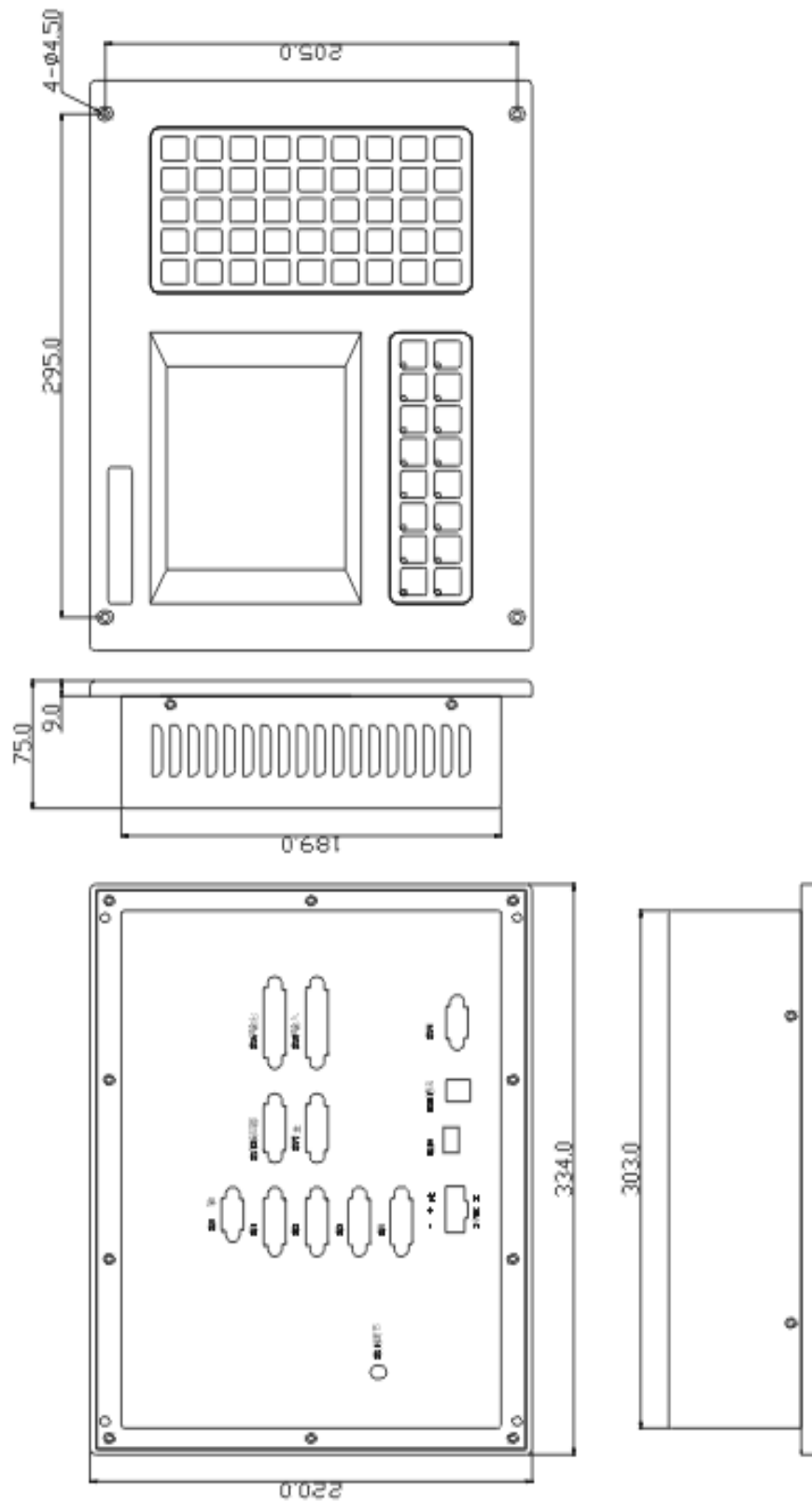
(8) XS14 machine tool extended input interface:

25-pin D-type socket is switching quantity extended input signal

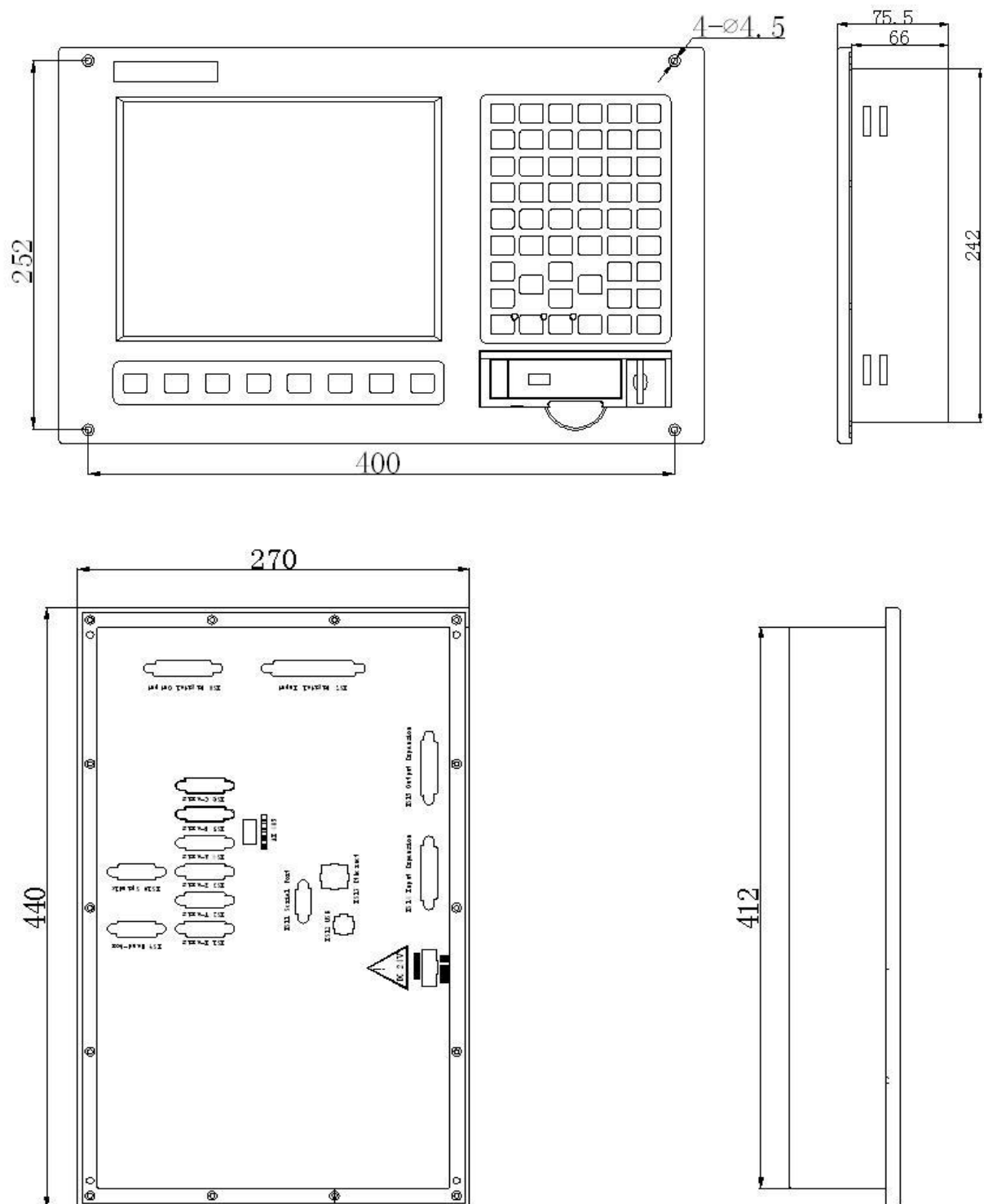
(9) XS15 machine tool extended output interface:

25-pin D-type socket is switching quantity extended output signal

12.1.3. 46 Series Mounting dimensions



12.1.4. 49 Series Mounting dimensions



12.1.5. Installation precautions

Installation condition for electric cabinet

- (1) The cabinet must be able to effectively prevent dust, coolant and organic solution 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 temperature difference between interior and exterior of the cabinet shouldn't exceed 10°C;
- (3) The cabinet should be installed with fan to ensure interior ventilation;
- (4) The display panel should be installed at the position can't be sprayed by the coolant;
- (5) When design electric cabinet, the external electrical interference should be reduced to lowest to prevent interfering with the system;

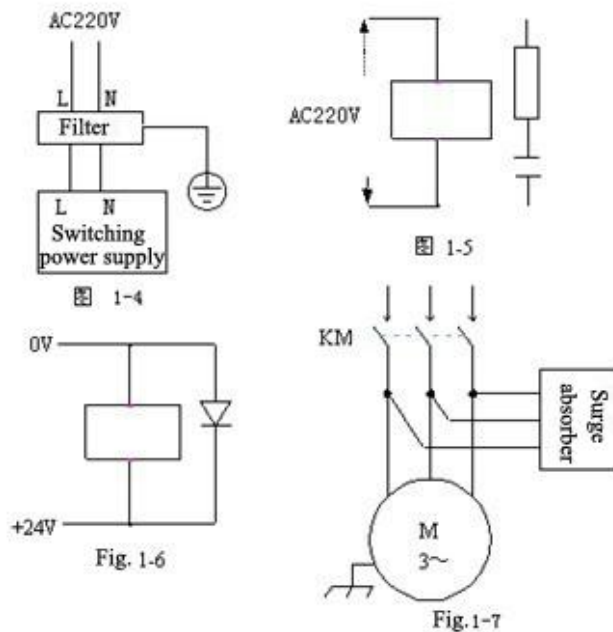
To prevent interference

The system is designed with anti-interference measures such as shielding space electromagnetic radiation, absorbing impact current and filtering power clutter, which can prevent interference with the system in certain degree. To ensure system stability, please take the following measures to install and connect the system:

- (1) CNC must be kept away from the equipment with 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);
- (2) To supply power to the system through isolation transformer, the machine tool must be grounded, CNC and drive 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).



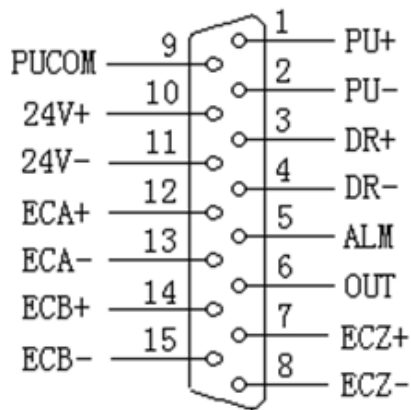
To reduce the interference between CNC signal cables and strong current cables, the wiring shall follow the principles below:

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 servo drive	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	
	Hand wheel cable	
	Other cables for shielding	

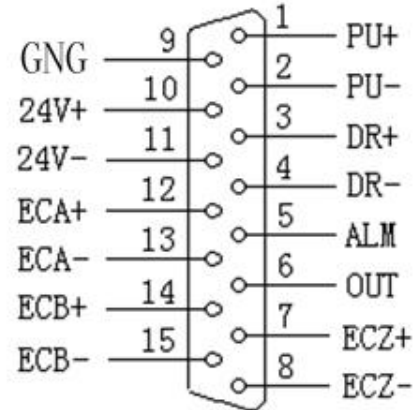
12.2 Interface Definition

12.2.1. Motor Drive Control Interface

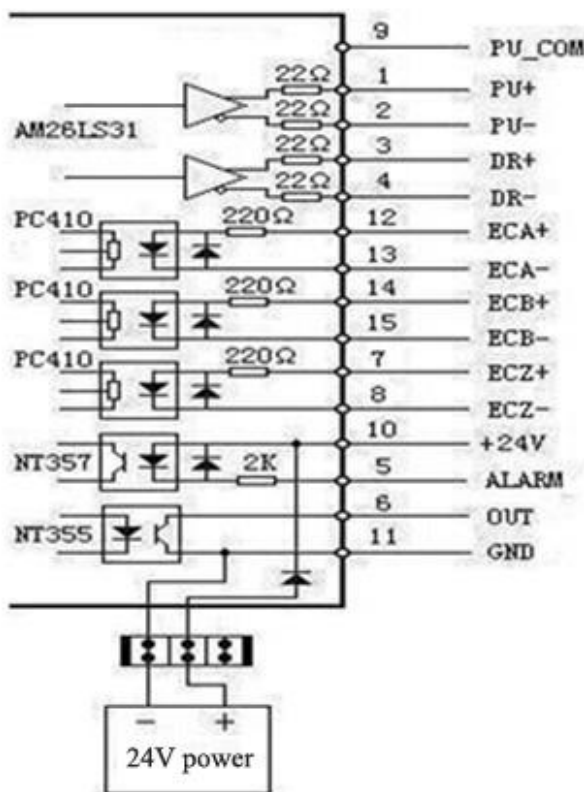
Four drive interfaces are available (46 series XS1...XS4 or 49 series XS1...XS4, XS5, XS6), and they have the same definition, as shown below:



46 series pulse connection



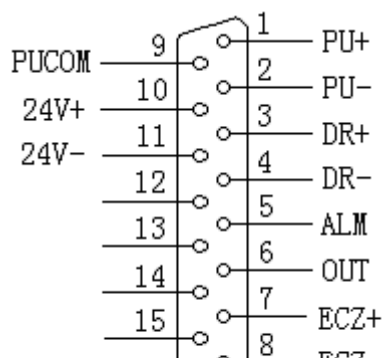
49 series pulse connection



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 X axis: IN34, Y axis: IN35, Z axis: IN36, A axis: IN37
6	OUT	Axis alarm reset output signal X axis: OUT24, Y axis: OUT25, Z axis: OUT26 A, axis: OUT27
7	ECZ+	Encoder phase Z input +
8	ECZ-	Encoder phase Z input -
9	GND	49 series reference ground, 46 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

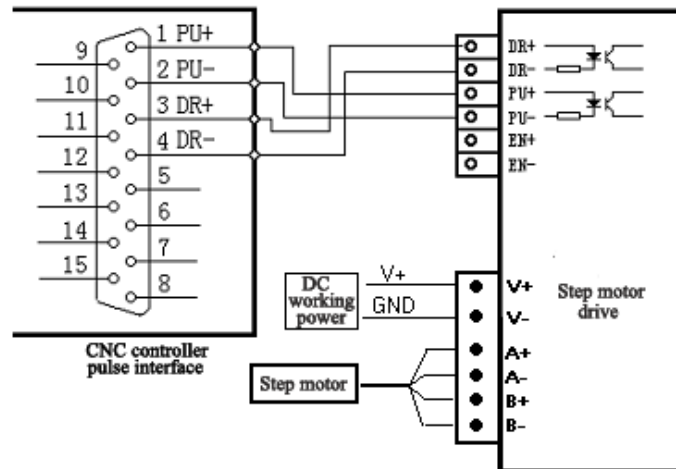


XS1 ... XS4 Pulse Interfaces Standard Wiring

This wiring is suitable for 46 series and 49 series controller;

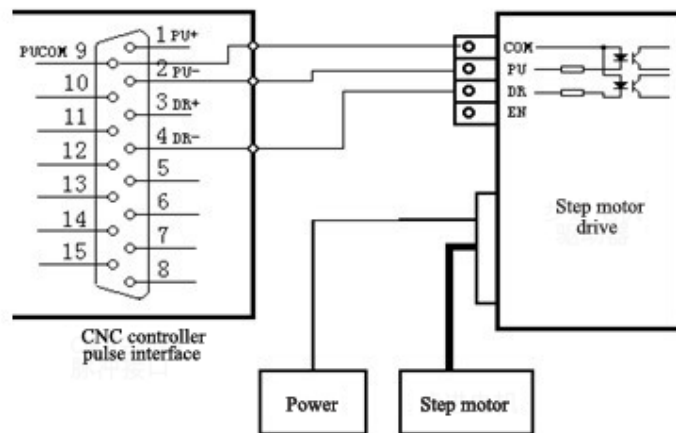
Step motor drive cable to differential input

Adtech CNC drive is 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 drive and step motor



Step motor drive wiring diagram for single-ended input

Certain companies connect together the optocoupler input cathodes of step drives, i.e. common cathode connection, which 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 for Step Motor Drive with Common Anode Input

Servo motor drive wiring diagram (note: only applicable for 46 series controller)

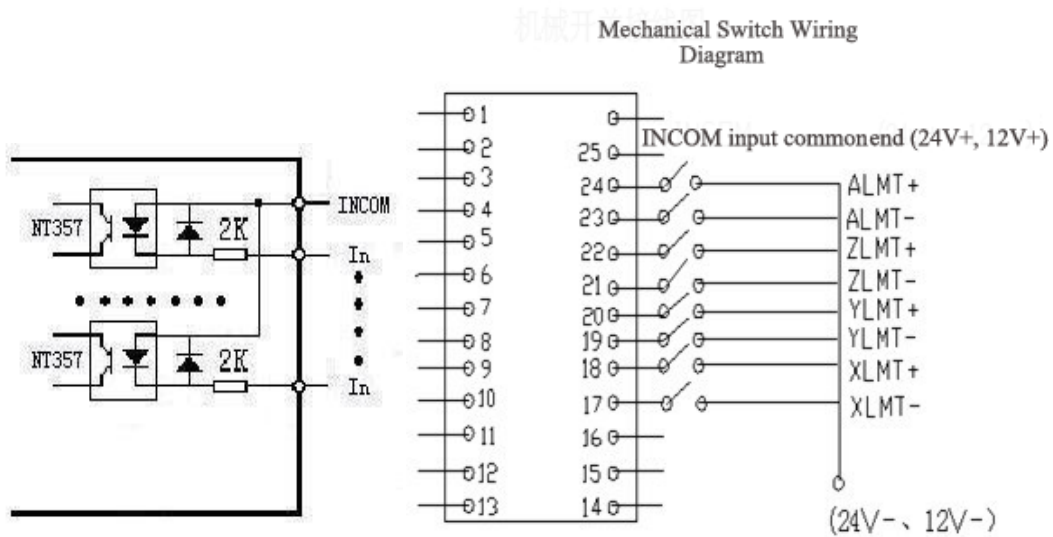
Since differential connection is used in most cases, please refer to differential mode for the pulse connection. Most servo drives require 12-24V power supply, and the 24V power provided by pin 10, 11 is available. The specific connection depends on servo drive. Please contact us if you have any question.

⚠ Caution

Either two of PU+, PU-, DR+ and DR- shouldn't be connected, or else the pulse interface may be damaged.

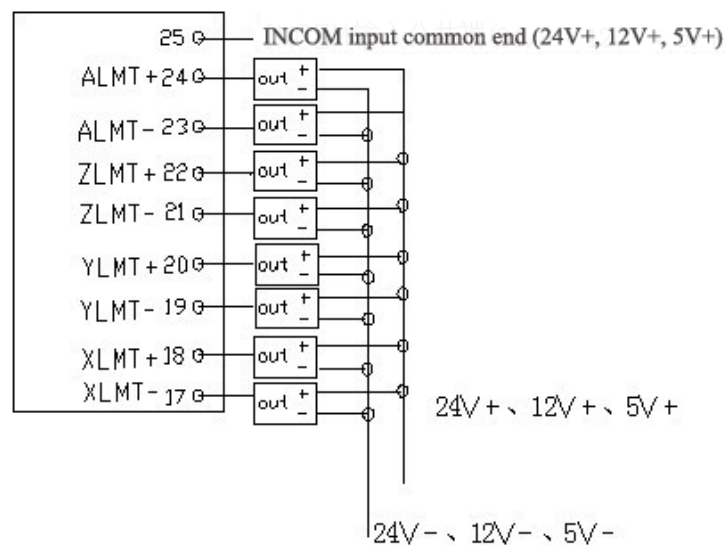
12.2.2. Digital input interface

The digital input interface contains the hard limit signal of every axis, and the definition 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 46M series (milling machine)

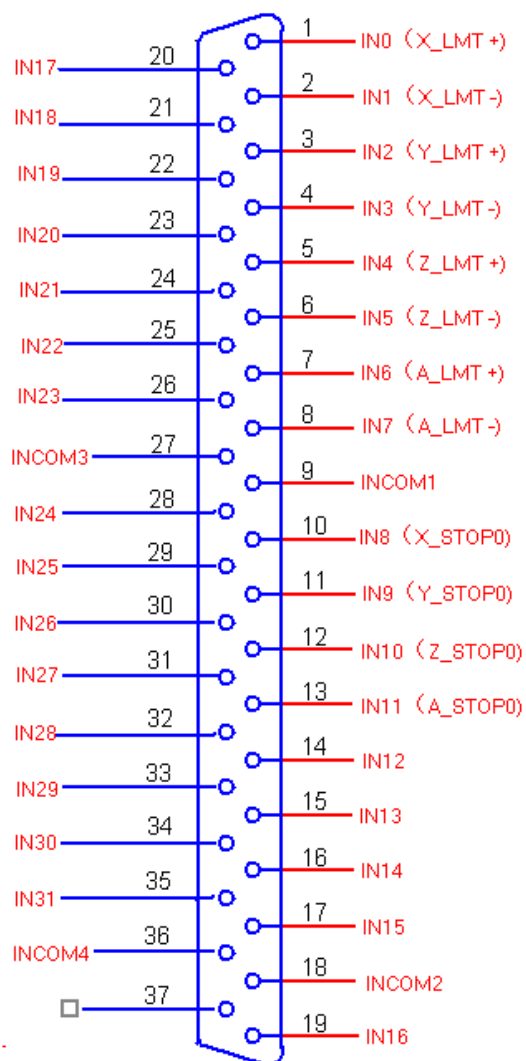
Wire No.	Port Definition	Function
1	IN0	X axis zero point
2	IN1	Y axis zero point
3	IN2	Z axis zero point
4	IN3	A axis zero point
5	IN4	Backup input
6	IN5	Backup input
7	IN6	Backup input
8	IN7	Backup input
9	IN8	Backup input
10	IN9	Backup input
11	IN10	Backup input
12	IN11	Backup input
13	IN12	Backup input
14	IN13	Backup input
15	IN14	Backup input
16	IN15	Backup input
17	IN16(XLMT-)	X axis negative limit (backup IN32)
18	IN17(XLMT+)	X axis positive limit (backup IN33)
19	IN18(YLMT-)	Y axis negative limit (backup IN34)
20	IN19(YLMT+)	Y axis positive limit (backup IN35)
21	IN20(ZLMT-)	Z axis negative limit (backup IN36)
22	IN21(ZLMT+)	Z axis positive limit (backup IN37)
23	IN22(ALMT-)	A axis negative limit (backup IN38)
24	IN23(ALMT+)	A axis positive limit (backup IN39)
25	INCOM	Input common end INCOM (24V+, 12V+) connects to internal or external power supply

Default input port configuration of 46L series XS5 (lathe)

WireNo.	Port Definition	Function
1	IN0	X axis zero point
2	IN1	Backup input
3	IN2	Z axis zero point
4	IN3	Backup input
5	IN4	Tool #1 in place test
6	IN5	Tool #2 in place test
7	IN6	Tool #3 in place test
8	IN7	Tool #4 in place test
9	IN8	Tool #5 in place test
10	IN9	Tool #6 in place test
11	IN10	Tool #7 in place test
12	IN11	Tool #8 in place test
13	IN12	Chuck pedal input
14	IN13	Backup input
15	IN14	Backup input
16	IN15	Backup input
17	IN16(XLMT-)	X axis negative limit (backup IN32)
18	IN17(XLMT+)	X axis positive limit (backup IN33)
19	IN18	
20	IN19	
21	IN20(ZLMT-)	Z axis negative limit (backup IN36)
22	IN21(ZLMT+)	Z axis positive limit (backup IN37)
23	IN22	
24	IN23	
25	INCOM	Input common end INCOM (24V+, 12V+) connects to internal or external power supply

Default input port configuration of 49M series XS7 (milling machine)

The digital input interface contains every home of XYZABC axis, and the hard limit signal of XYZA axis, and the definition follows:



Machine input interface

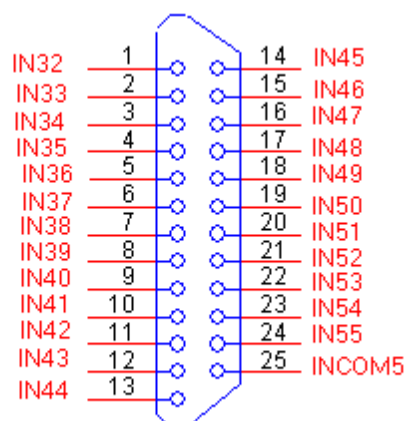
37-pin plug wire	4960 (40) definition	Function	9163 definition
------------------------	-------------------------	----------	--------------------

No.			
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 terminal (24v+, 12v+)	+24V
10	IN8 (X_STOP0)	X axis zero point	IN08
11	IN9 (Y_STOP0)	Y axis zero point	IN09
12	IN10 (Z_STOP0)	Z axis zero point	IN10
13	IN11 (A_STOP0)	A axis zero point	IN11
14	IN12 (B_STOP0)	B axis zero point	IN12
15	IN13 (C_STOP0)	C axis zero point	IN13
16	IN14	Backup input	IN14
17	IN15	Backup input	IN15
18	INCOM2	Input common terminal (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	Backup input	IN20
24	IN21	Backup input	IN21
25	IN22	Backup input	IN22
26	IN23	Backup input	IN23
27	INCOM3	Input common terminal (24v+, 12v+)	+24V
28	IN24	Backup input	IN24
29	IN25	Backup input	IN25
30	IN26	Backup input	IN26
31	IN27	Backup input	IN27
32	IN28	Backup input	IN28
33	IN29	Backup input	IN29
34	IN30	Backup input	IN30
35	IN31	Backup input	IN31
36	INCOM4	Input common terminal (24v+, 12v+)	+24V
37			

Default expanded input port configuration of 49M series XS14 (milling machine)

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

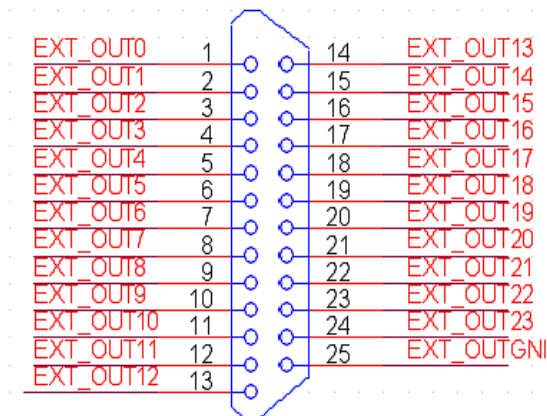


Wire No.	Definition	Function
1	IN32	Backup input
2	IN33	Backup input
3	IN34	Backup input
4	IN35	Backup input
5	IN36	Backup input
6	IN37	Backup input
7	IN38	Backup input
8	IN39	Backup input
9	IN40	Backup input
10	IN41	Backup input
11	IN42	Backup input
12	IN43	Backup input
13	IN44	Backup input
14	IN45	Backup input
15	IN46	Backup input
16	IN47	Backup input
17	IN48	Backup input
18	IN49	Backup input
19	IN50	Backup input

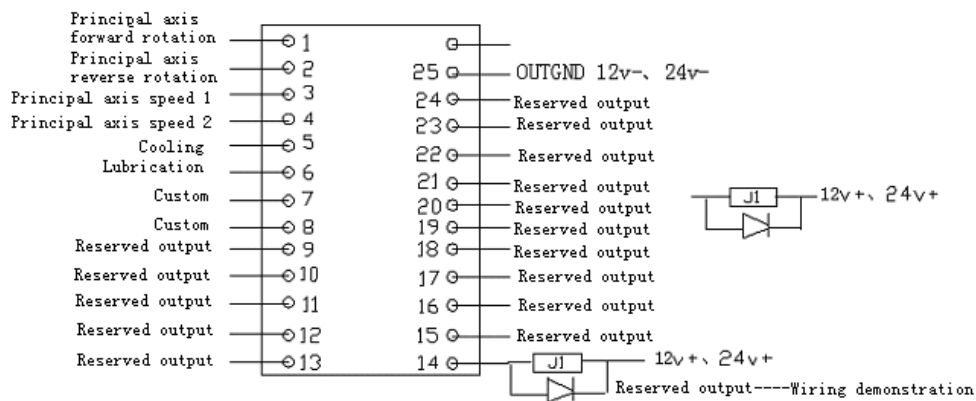
20	IN51	Backup input
21	IN52	Backup input
22	IN53	Backup input
23	IN54	Backup input
24	IN55	Backup input
25	INCOM5	Input common terminal (24v+, 12v+)

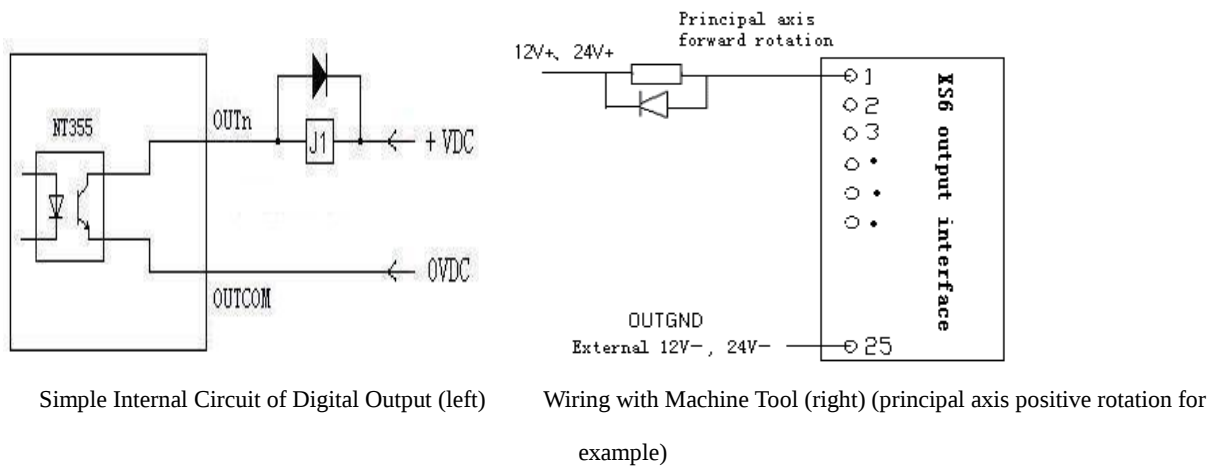
12.2.3. Digital output interface

The wiring of digital output interface follows:



XS6 Output Interface Wiring Diagram





Simple Internal Circuit of Digital Output (left)

Wiring with Machine Tool (right) (principal axis positive rotation for example)

Default output port configuration of M series milling machine CNC4640(XS6), CNC4960(XS8)

Wire No.	Port Definit ion	Function
1	OUT0	Principal axis positive rotation (M03)(operation panel M203)
2	OUT1	Principal axis reverse rotation (M04)(operation panel M204)
3	OUT2	(M10, M11) (FCNC4M panel chuckM10, 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 principal axis 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 output port configuration of M series milling machine CNC4960(XS15)

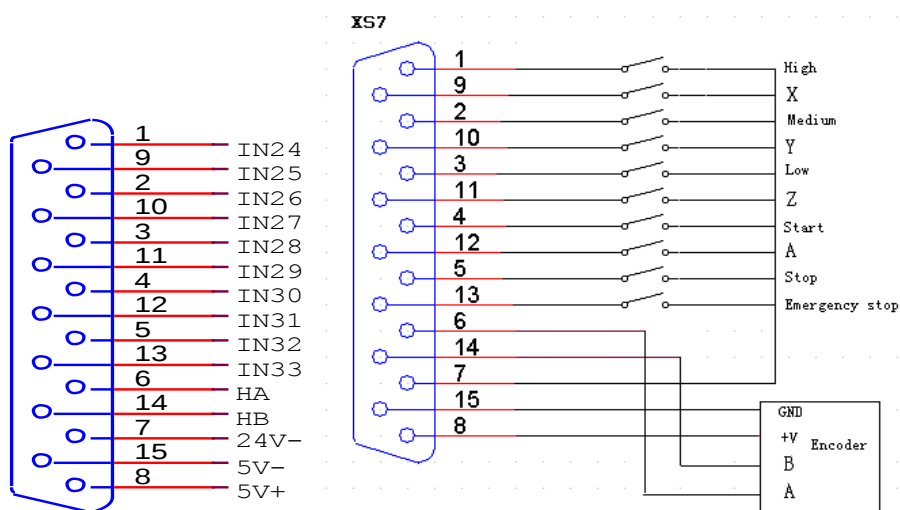
Wire No.	Port Definition	Function
1	OUT24	(FCNC6D panel F6 M52, M53)
2	OUT25	(FCNC6D panel F7 M54, M55)
3	OUT26	(FCNC6D panel F8 M56, M57)
4	OUT27	(FCNC6D panel F9 M58, M59)
5	OUT28	(FCNC6D panel F10 M60, M61)
6	OUT29	(FCNC6D panel F11 M62, M63)
7	OUT30	(FCNC6D panel F12 M64, M65)
8	OUT31	(FCNC6D panel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

25		OUTGND12V-, 24V- common power supply of external output
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Default output port configuration of L series (lathe)

Wire No.	Port Definition	Function
1	OUT0	Principal axis positive rotation (M03)
2	OUT1	Principal axis reverse rotation (M04)
3	OUT2	Tool regulator positive rotation output (M18, M19)
4	OUT3	Tool regulator reverse rotation & locking output (M20, M21)
5	OUT4	Cooling (M08, M09)
6	OUT5	Lubrication (M32, M33)
7	OUT6	backup output(M12, M13)
8	OUT7	backup output(M14, M15)
9	OUT8	Chuck locking (M10)
10	OUT9	Chuck loosening (M11)
11	OUT10	backup output(M22, M23)
12	OUT11	backup output(M24, M25)
13	OUT12	backup output(M26, M27)
14	OUT13	backup output(M128, M129)
15	OUT14	backup output(M130, M131)
16	OUT15	backup output(M34, M35)
17	OUT16	backup output(M36, M37)
18	OUT17	backup output(M38, M39)
19	OUT18	backup output(M52, M53)
20	OUT19	backup output(M54, M55)
21	OUT20	backup output(M56, M57)
22	OUT21	backup output(M46, M47)
23	OUT22	backup output(M48, M49)
24	OUT23	backup output(M50, M51)
25		OUTGND12V-, 24V- common power supply of external output

12.2.4. Handheld box interface



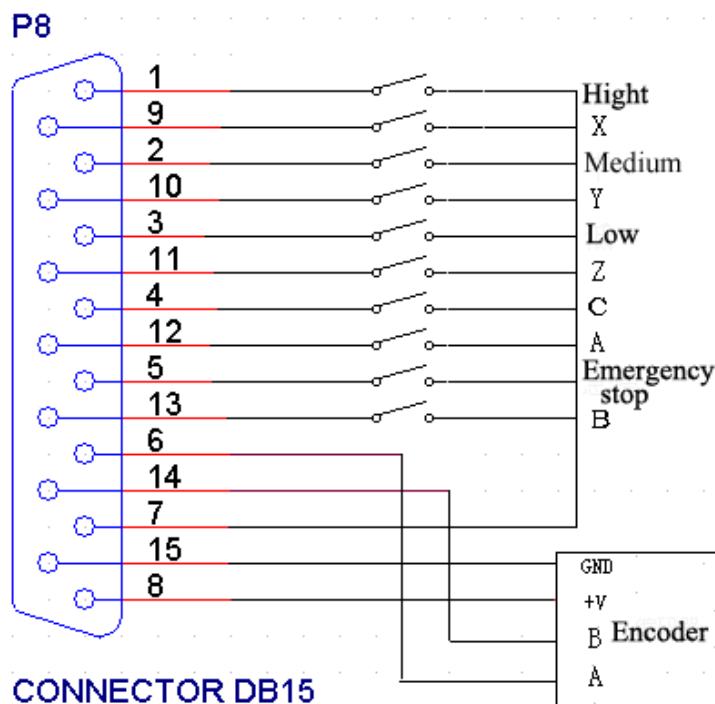
The definition of 46X series (XS7) follows:

Wire No.	Definition	Function
1	(IN24) gear switch	0.1 gear --- High speed
2	(IN26) gear switch	0.01 gear --- Medium speed
3	(IN28) gear switch	0.001 gear --- Low speed
4	(IN30) button	Cycle start
5	(IN32) button	Pause
7	24V-	Negative pole of internally provided 24V power supply
9	(IN25) axis selection	X axis
10	(IN27) axis selection	Y axis
11	(IN29) axis selection	Z axis
12	(IN31) axis selection	A axis
13	(IN33) 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
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49 series (XS9)

CNC4960 definition follows:

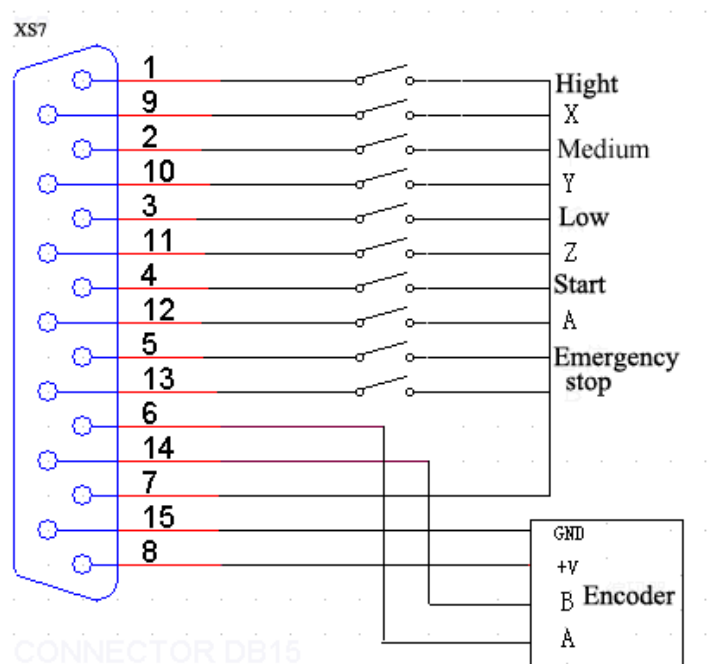


Wire No.	Definition	Function
1	IN63	0.1 gear switch - high
2	IN64	0.01 gear switch - medium
3	IN65	0.001 gear switch - low
4	IN60	Select C axis
5	IN61	Emergency stop
6	HA	Hand encoder phase A input signal
7	24V-	Internally provided -24V power supply
8	5V+	Internally provided +5V power supply
9	IN56	Select X axis
10	IN57	Select Y axis

11	IN58	Select Z axis
12	IN59	Select A axis
13	IN62	Select B axis
14	HB	Hand encoder phase B input signal
15	5V-	Internally provided -5V power supply

49 series (XS9)

CNC4940 definition follows:

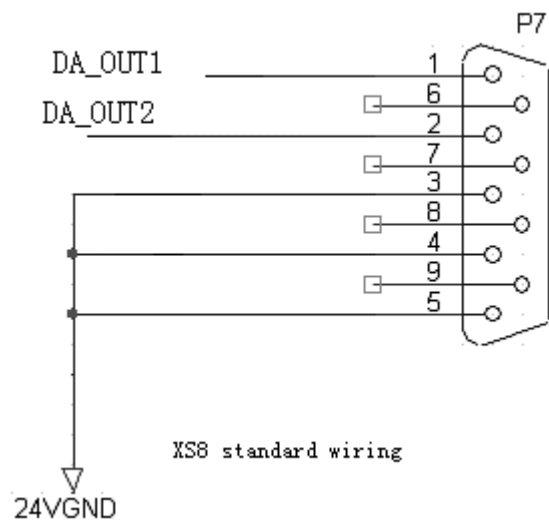


Wire No.	Definition	Function
1	IN63	0.1 gear switch - high
2	IN64	0.01 gear switch - medium
3	IN65	0.001 gear switch - low
4	IN60	Start
5	IN61	Stop
6	HA	Hand encoder phase A input signal
7	24V-	Internally provided -24V power supply

8	5V+	Internally provided +5V power supply
9	IN56	Select X axis
10	IN57	Select Y axis
11	IN58	Select Z axis
12	IN59	Select A axis
13	IN62	Emergency stop
14	HB	Hand encoder phase B input signal
15	5V-	Internally provided -5V power supply

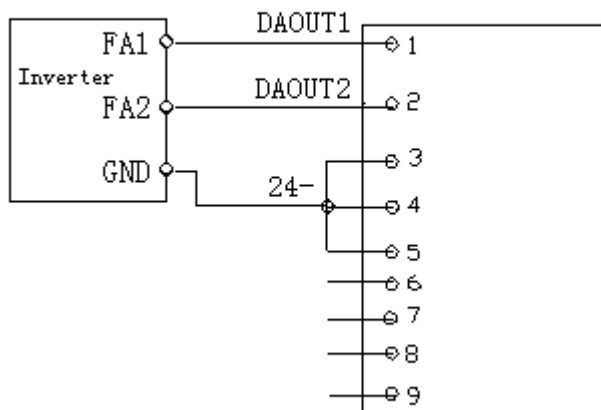
12.2.5. Analog output interface (46 series XS8)

Analog output interface wiring diagram:



The wiring is also suitable for XS8 interface of 46 series controller;

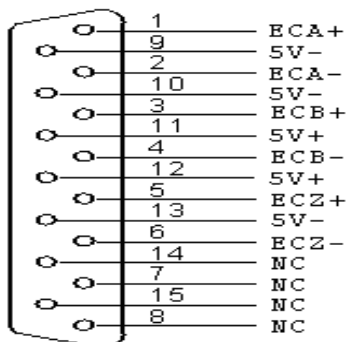
Wiring diagram of analog principal axis XS8 and inverter



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. Principal axis encoder interface (46 series XS12, 49 series XS10)

Principal axis encoder wiring diagram (46 series XS12):

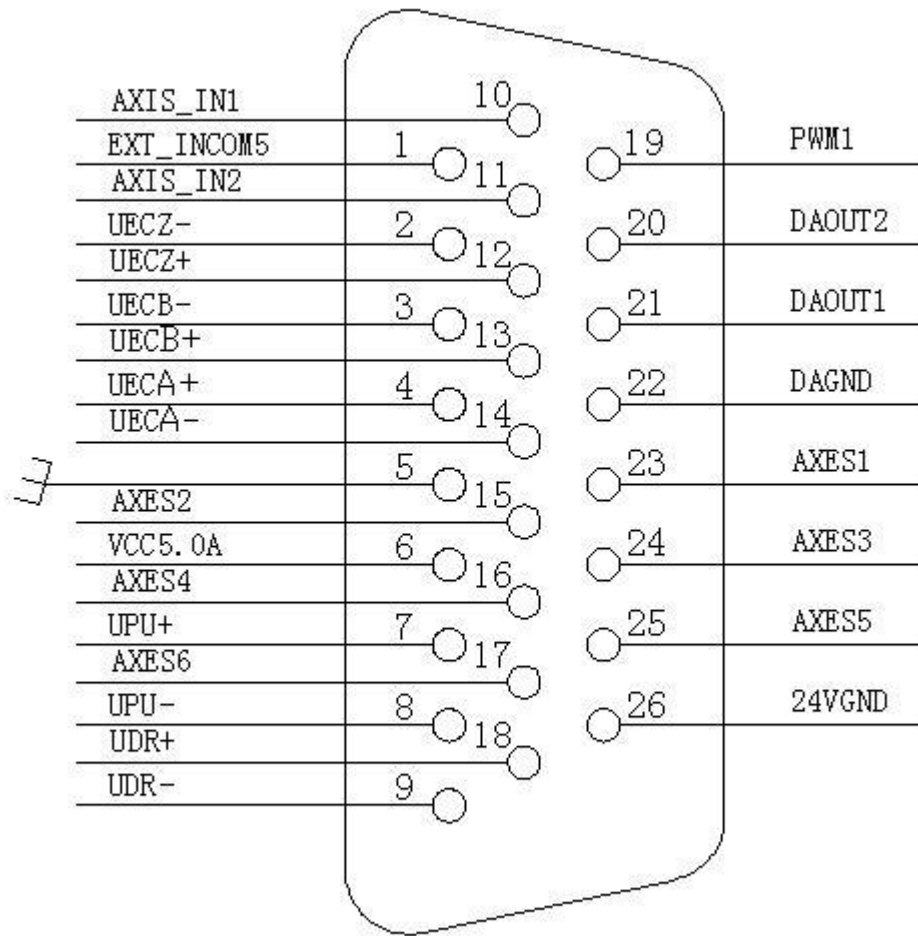


Principal axis encoder definition follows (46 series controller):

Wire No.	Definition	Function
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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 + (backup)
6	ECZ-	Encoder phase Z input - (backup)
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

Principal axis encoder wiring diagram (49 series XS10):



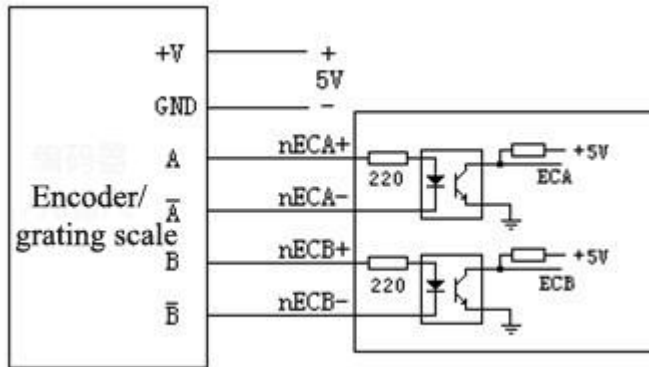
Principal axis encoder wiring diagram (49 series controller):

Wire No.	Definition	Function
1	EXT_INCOM5	Control signal common terminal power 24V+
2	UECZ-	Spindle encoder Z-
3	UECB-	Spindle encoder B-
4	UECA+	Spindle encoder A+
5	EXT_GNDA	Spindle encoder power GND
6	EXTVCC5.0A	Spindle encoder 5V+
7	CDR-	Spindle position control direction -
8	CDR+	Spindle position control direction +
9	CPU-	Spindle position control pulse -
10	AXIS_IN1	Spindle alarm input port 1

11	AXIS_IN2	Spindle alarm input port 2
12	UECZ+	Spindle encoder Z+
13	UEB+	Spindle encoder B+
14	UECA-	Spindle encoder A-
15	AXES2	Spindle output port 2(CCW)
16	AXES4	Spindle output port 4
17	AXES6	Spindle output port 6
18	CPU+	Spindle position control pulse +
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)
24	AXES3	Spindle output port 3
25	AXES5	Spindle output port 5
26	24VGND	Control signal common terminal power 24V GND

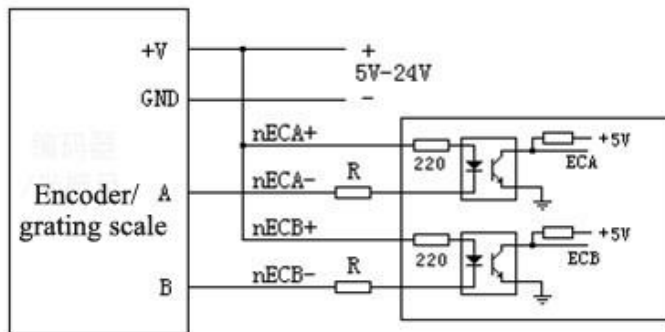
- AB phase decoder input allows differential connection and common anode connection, which will be determined by the encoder type.
- Encoder output modes include open collector, complementary, voltage and long drive, among which open collector, complementary and voltage output use common anode connection, and long drive 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 be connected.

Differential connection follows:



➤ 5V power supply is external.

Common anode connection follows:



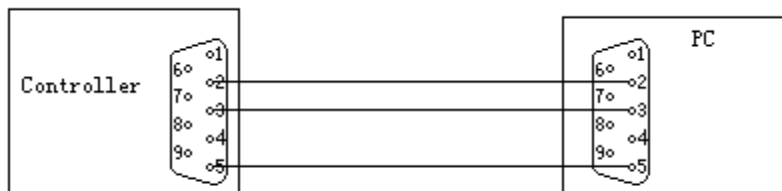
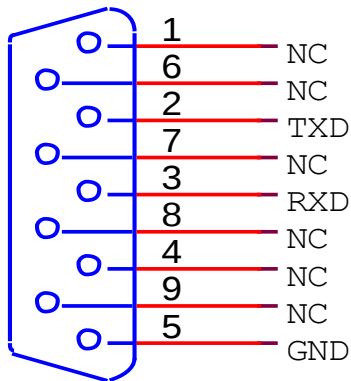
➤ The power voltage is determined by encoder. If 5V power supply is used, resistor R will be unnecessary. For 12V power supply, please use 1K-2K resistor, and for 24V power supply, please use 2K-5K resistor.

Suggestion:

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

12.2.7. RS232 transmission interface (46 series XS9, 49 series XS11)

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



RS-232 communication mode

12.2.8. USB memory connection interface (46 series XS10)

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

12.2.9. PC USB communication interface (46 series XS11, 49 series X13)

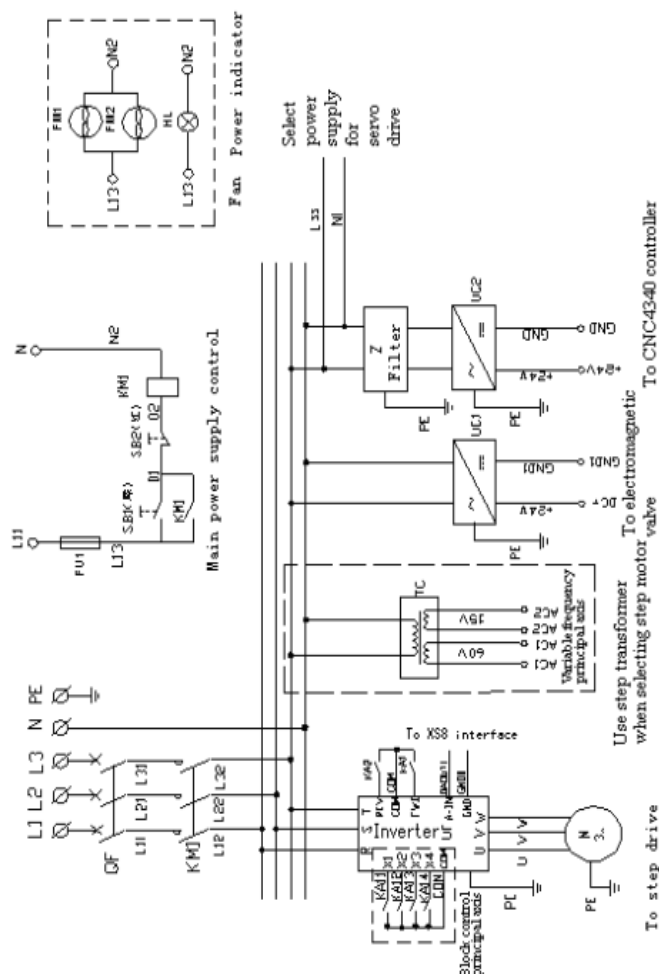
Standard USB communication interface;

12.3 Electrical connection diagram

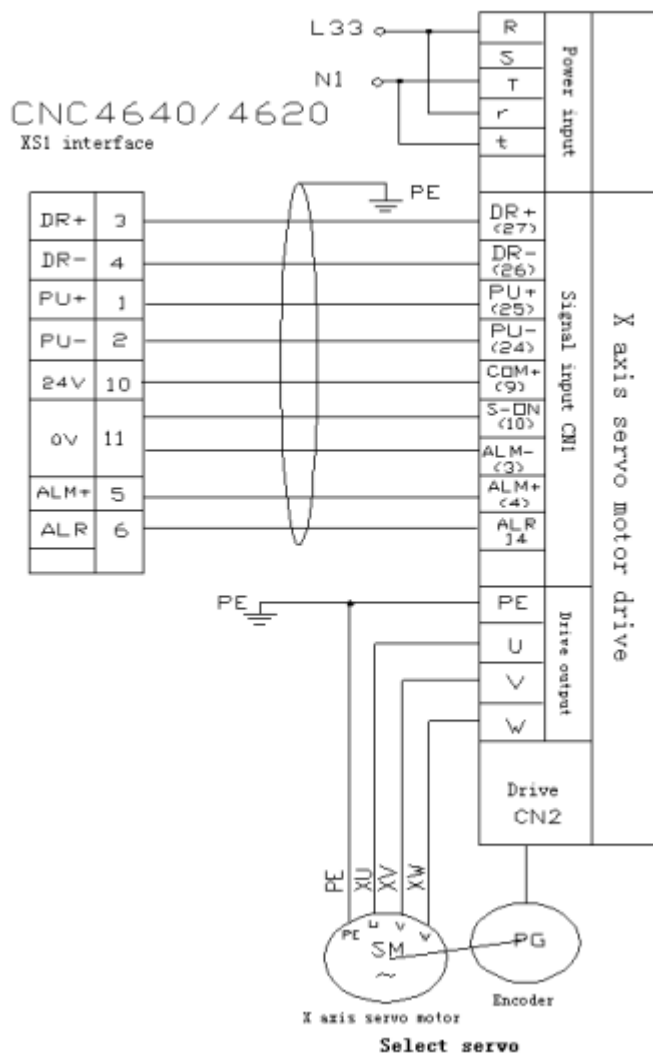
12.3.1. Symbol schematic diagram

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	

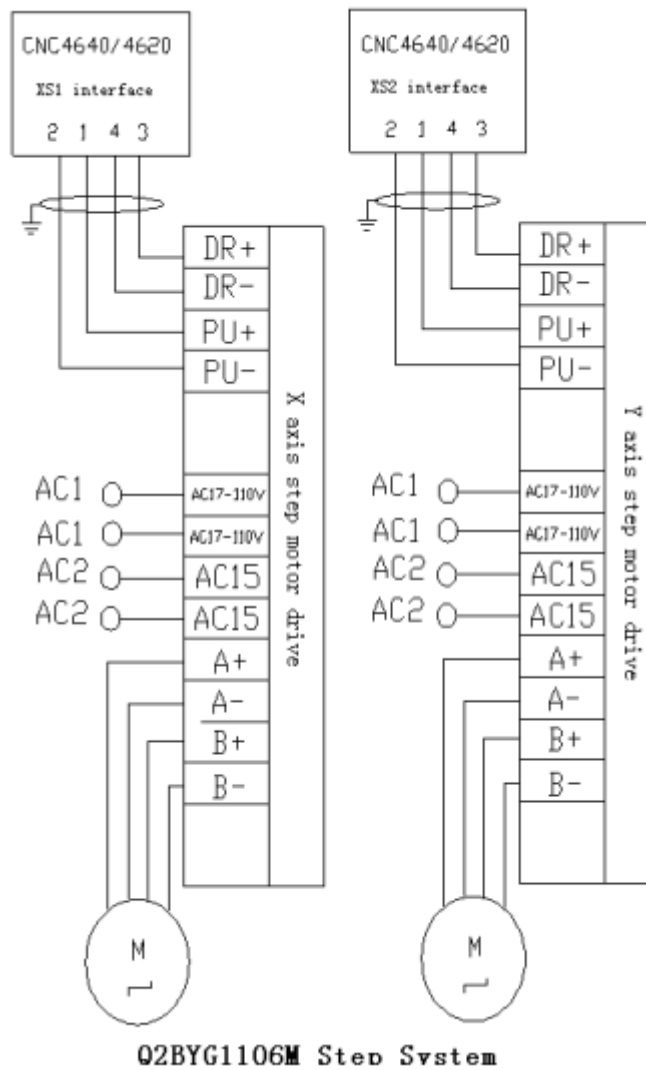
12.3.2. Power connection diagram



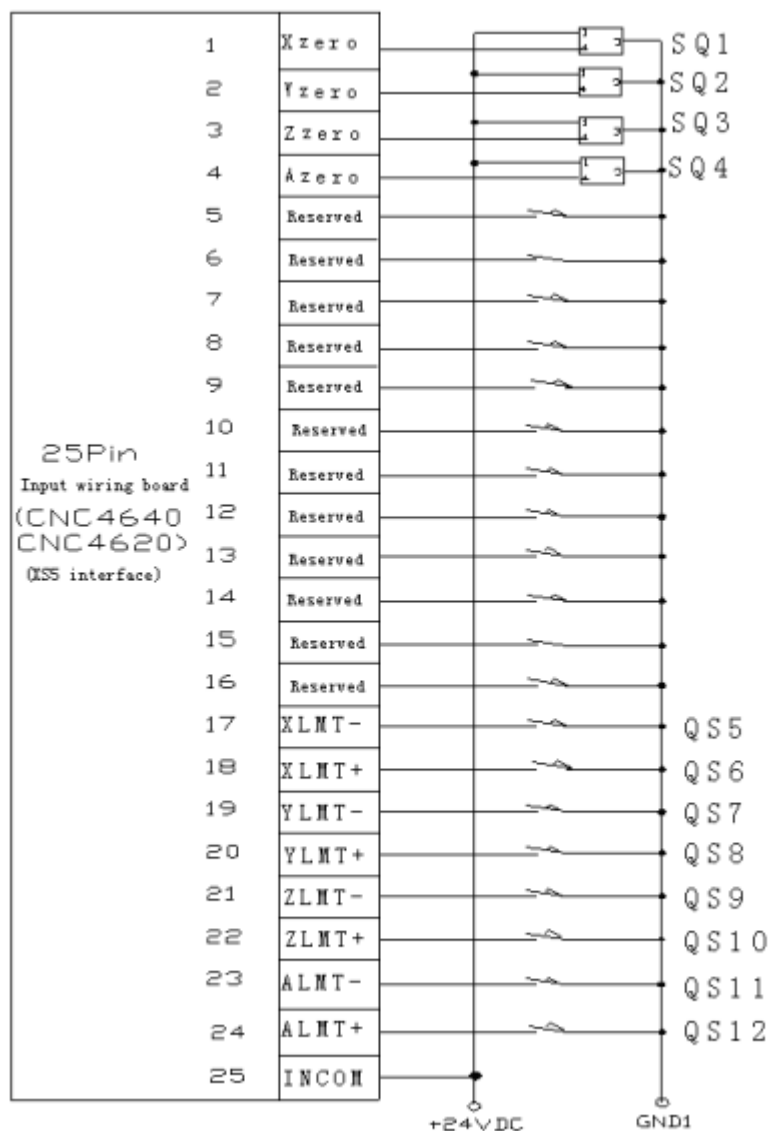
12.3.3. Servo drive connection diagram

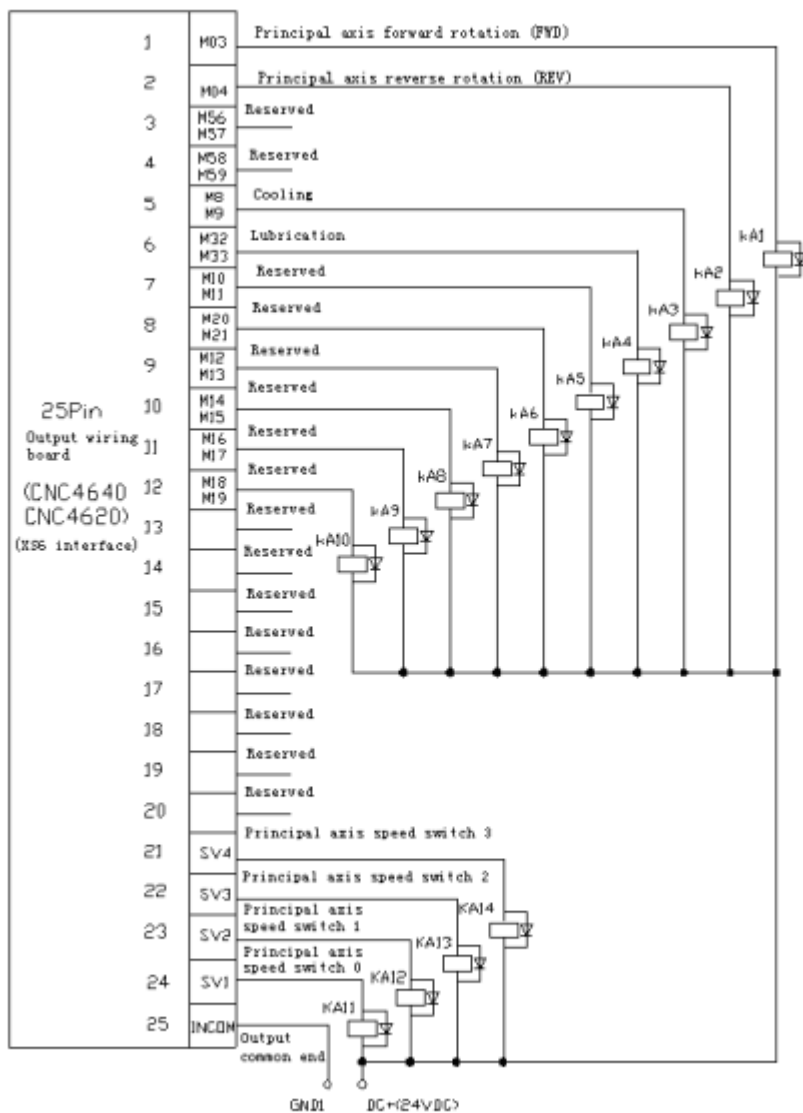


12.3.4. Step connection diagram

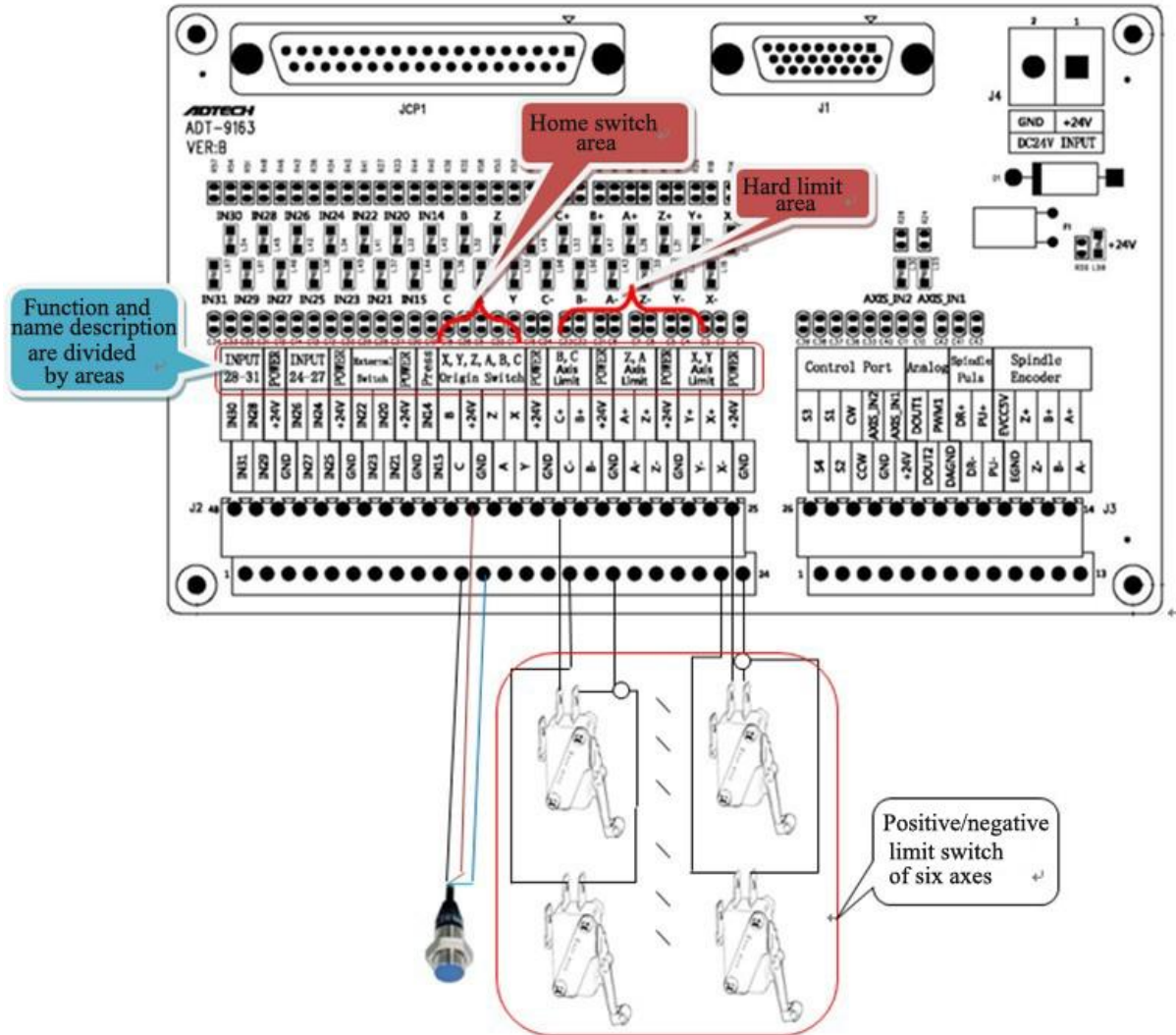


12.3.5. IO electrical connection diagram





12.3.6. 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 output terminal

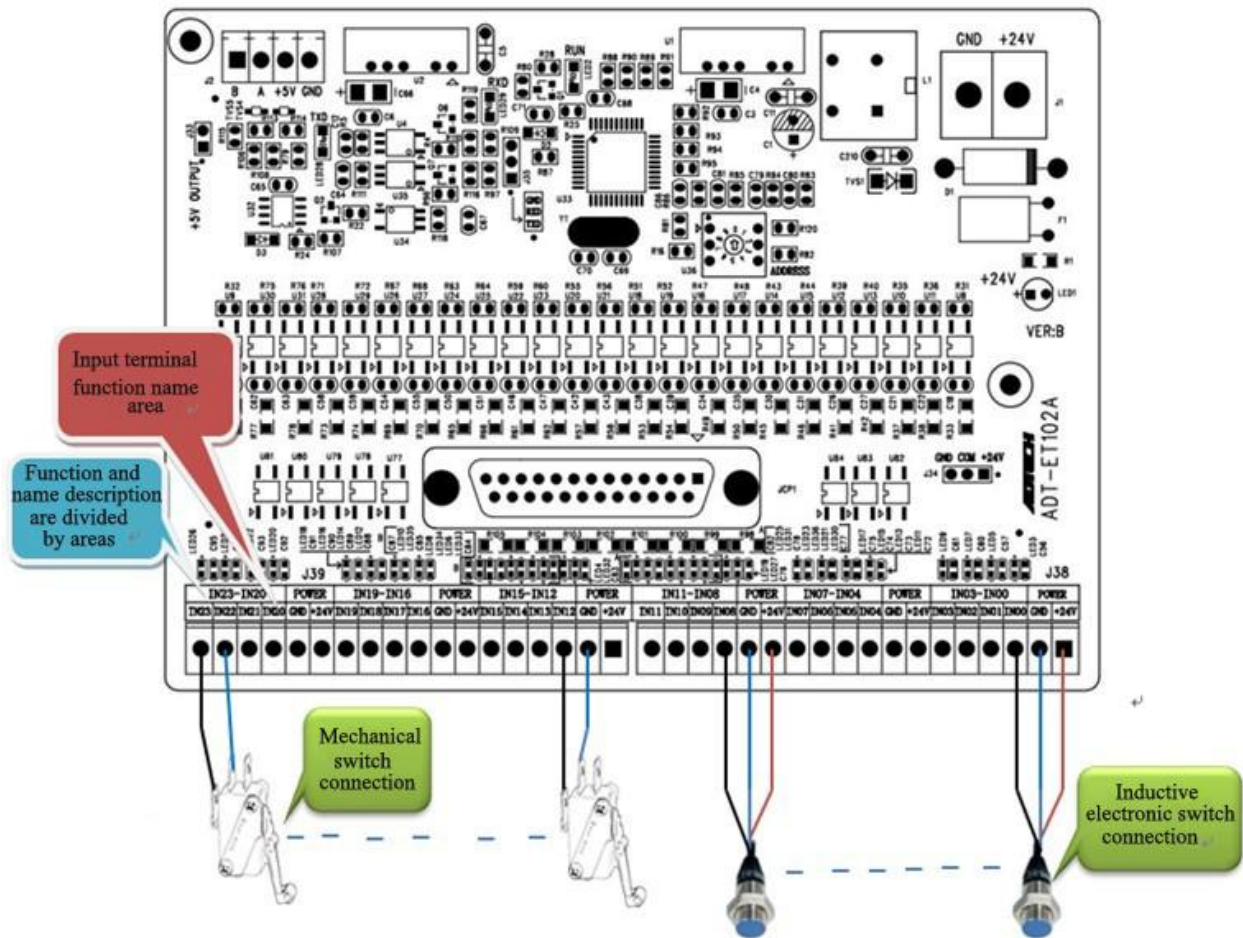
J2		GND	24V power output GND terminal
J2	X, Y Axis Limit	X+	X axis positive limit
J2		X-	X axis negative limit
J2		Y+	Y axis positive limit
J2		Y-	Y axis negative limit
J2			
J2	POWER	+24V	24V power output terminal
J2		GND	24V power output GND terminal
J2	Z, A Axis Limit	Z+	Z axis positive limit
J2		Z-	Z axis negative limit
J2		A+	A axis positive limit
J2		A-	A axis negative limit
J2			
J2	POWER	+24V	24V power output terminal
J2		GND	24V power 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			
J2	POWER	+24V	24V power output terminal
J2		GND	24V power output GND terminal
J2	X, Y, Z, Z Origin Switch	X	X axis origin
J2		Y	Y axis origin
J2		Z	Z axis origin
J2		A	A axis origin
J2			
J2	POWER	+24V	24V power output terminal
J2		GND	24V power output GND terminal
J2	B, C Origin Switch	B	B axis origin
J2		C	C axis origin
J2	Press	IN14	Air pressure detection
J2		IN15	Vacuum detection
Terminal	Area	Port Name	Function

No.			
J2	POWER	+24V	24V power output terminal
J2		GND	24V power output GND terminal
J2	External Switch	IN20	External control switch
J2		IN21	External control switch
J2		IN22	External control switch
J2		IN23	External control switch
J2	POWER	+24V	24V power output terminal
J2		GND	24V power output GND terminal
J2	INPUT 24-27	IN24	IN24
J2		IN25	IN25
J2		IN26	IN26
J2		IN27	IN27
J2	POWER	+24V	24V power output terminal
J2		GND	24V power output GND terminal
J2	INPUT 28-31	IN28	IN28
J2		IN29	IN29
J2		IN30	IN30
J2		IN31	IN31

Termi nal 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 Pulse	PU+	Servo spindle position control PU+
J3		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 terminal +24V
J3		IAXIS_IN2	Spindle alarm signal 2 input port
J3		GND	Control signal common terminal GND
J3		CW	Spindle forward signal
J3		CCW	Spindle reverse signal
J3		S1	Spindle speed 1
J3		S2	Spindle speed 2
J3		S3	Spindle speed 3
J3		S4	Spindle speed 4

12.3.7. 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.

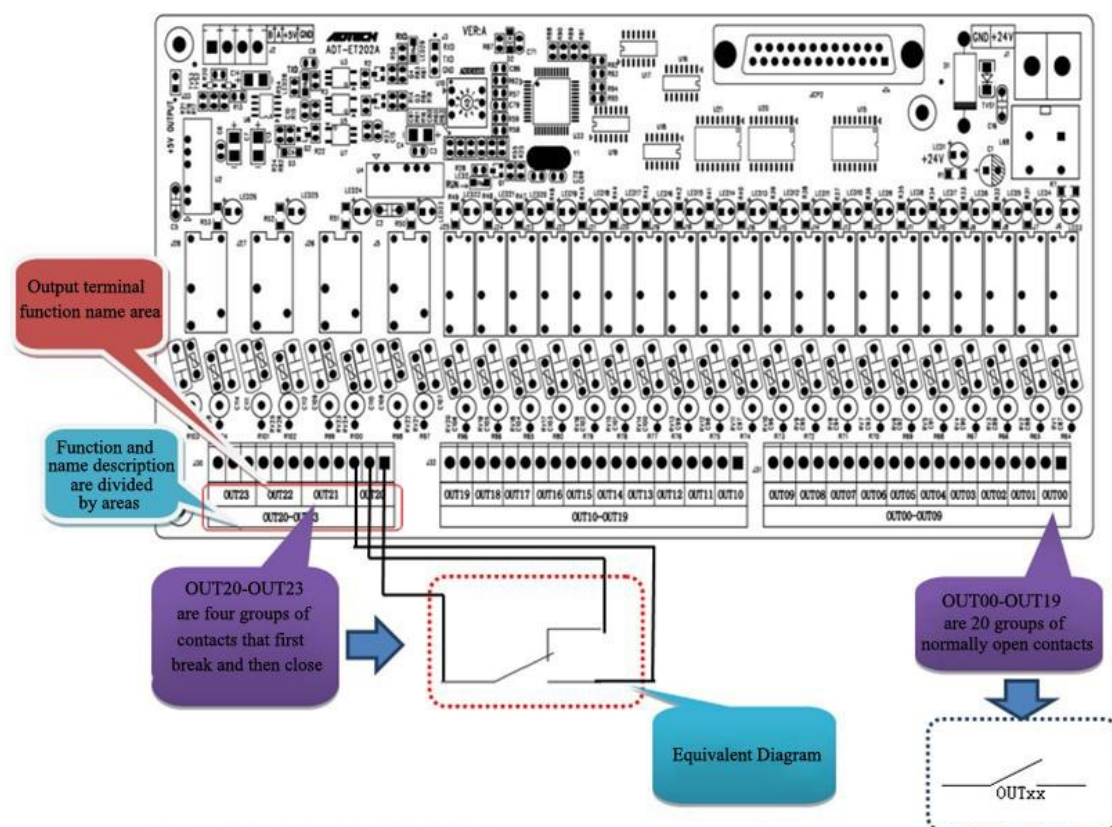
ET102A splitter function definition

Terminal No.	Area	Port Name	Function
J38	POWER	+24V	24V power output terminal
J38		GND	24V power output GND terminal
J38	IN03-IN00	IN00	IN00
J38		IN01	IN01
J38		IN02	IN02

J38		IN03	IN03
J38	POWER	+24V	24V power output terminal
J38		GND	24V power output GND terminal
J38	IN07-IN 04	IN04	IN04
J38		IN05	IN05
J38		IN06	IN06
J38		IN07	IN07
J38	POWER	+24V	24V power output terminal
J38		GND	24V power output GND terminal
J38	IN11-IN 08	IN08	IN08
J38		IN09	IN09
J38		IN10	IN10
J38		IN11	IN11
J39	POWER	+24V	24V power output terminal
J39		GND	24V power output GND terminal
J39	IN15-IN 12	IN12	IN12
J39		IN13	IN13
J39		IN14	IN14
J39		IN15	IN15
J39	POWER	+24V	24V power output terminal
J39		GND	24V power output GND terminal
J39	IN19-IN 16	IN16	IN16
J39		IN17	IN17
J39		IN18	IN18
J39		IN19	IN19
Terminal No.	Area	Port Name	Function
J39	POWER	+24V	24V power output terminal
J39		GND	24V power output GND terminal
J39	IN23-IN 20	IN20	IN20
J39		IN21	IN21
J39		IN22	IN22

J39		IN23	IN23
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12.3.8. 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