

---

---

# **ADTECH 9 Series CNC Maintenance Manual**

---

---

---

## Basic Information

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

This Manual is mainly written by Tang Xiaobing.

This Manual was first released on June 27, 2016 with version No. A0101 and item number is applicable for all the CNC9 series.

This Manual was revised on November 23, 2017 by Xu Yuwen with version No. A0102 and item number is applicable for all the CNC9 series.

This Manual was revised on February 1, 2018 by Xu Yuwen with version No. A0103 and item number is applicable for all the CNC9 series.

This Manual was revised on July 21, 2018 by Tang Xiaobing and Yao Lei with version No. A0104 and item number is applicable for all the CNC9 series.

## Copyright

Adtech (Shenzhen) Technology Co., Ltd. (Adtech hereafter) is in possession of the copyright of this manual.

Without the permission of Adtech, the imitation, copy, transcription and translation by any organization or individual are prohibited. This manual doesn't contain any assurance, stance or implication in any form. Adtech and the employees are not responsible for any direct or indirect data disclosure, profits loss or cause termination caused by this manual or any information about mentioned products in this manual. In addition, the products and data in this manual are subject to changes without prior notice.

All rights reserved.

**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  $4\Omega$  grounding resistance. Do not use neutral line (N) to substitute earth wire.
- ☞ Ensure grounding to be correct and solid, in order to avoid product failures or unexpected consequences;
- ☞ Connect the surge absorption diodes to the product in the required direction, otherwise, the product will be damaged;
- ☞ Ensure the power switch is OFF before inserting or removing plug, or disassembling chassis.

### ※Overhauling

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

### ※Miscellaneous

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

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

#### ※Maintenance

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

|                    |          |                                                                                                                                                                             |
|--------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Routine Inspection | Routine  | <ul style="list-style-type: none"> <li>● Confirm environmental temperature, humidity, dust, or foreign objects.</li> <li>● Confirm abnormal vibration and noise;</li> </ul> |
| Regular Check      | One year | <ul style="list-style-type: none"> <li>● Check whether solid components are loose</li> <li>● Confirm whether terminal block is damaged</li> </ul>                           |



---

## Foreword

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

## Instructions and reading convention of the Manual

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

Terminology note and reading convention in this Manual:

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

M series are system for milling machine motion. The ‘M’ or “M series” mark indicates specific interface or function for milling machine software system.

L series are system for lathe motion. The ‘L’ or “L series” mark indicates specific interface or function for lathe software system.

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

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

---

## Contents

|                                                              |               |
|--------------------------------------------------------------|---------------|
| <b>1. System technical characteristics .....</b>             | <b>- 7 -</b>  |
| 1.1 System technical parameters .....                        | - 7 -         |
| 1.2 System operating condition .....                         | - 9 -         |
| 1.3 System function .....                                    | - 9 -         |
| 1.3.1 Self-diagnosis function .....                          | - 9 -         |
| 1.3.2 Compensation .....                                     | - 9 -         |
| 1.3.3 Abundant instruction system .....                      | - 9 -         |
| 1.3.4 Full Chinese menu operation & full screen edit .....   | - 10 -        |
| 1.3.5 Abundant error-correction functions .....              | - 10 -        |
| 1.3.6 Program exchange between CNC system and PC .....       | - 10 -        |
| <b>2. Operating panel .....</b>                              | <b>- 11 -</b> |
| 2.1 ADTCNC96 series system LCD/keypad .....                  | - 11 -        |
| 2.2 ADTCNC99 and 98 series system LCD/keypad .....           | - 13 -        |
| 2.3 System menus .....                                       | - 15 -        |
| 2.3.1 Autorun .....                                          | - 15 -        |
| 2.3.2 Program edit .....                                     | - 16 -        |
| 2.3.3 Parameter .....                                        | - 16 -        |
| 2.3.4 Work coordinates .....                                 | - 17 -        |
| 2.3.5 Diagnosis .....                                        | - 18 -        |
| 2.4 Operating keys .....                                     | - 19 -        |
| <b>3. Manual operation .....</b>                             | <b>- 21 -</b> |
| 3.1 Returning to reference point manually .....              | - 21 -        |
| 3.2 Each axis returns to reference point separately .....    | - 21 -        |
| 3.3 Each axis return to reference point simultaneously ..... | - 21 -        |
| 3.4 Reset machine tool position .....                        | - 21 -        |
| 3.5 Reset relative position manually .....                   | - 22 -        |
| 3.6 Continuous feeding manually .....                        | - 22 -        |
| 3.7 Single-step feeding .....                                | - 23 -        |
| 3.7.1 Single-step increment selection .....                  | - 23 -        |
| 3.8 Handwheel feeding .....                                  | - 24 -        |
| 3.9 Manual auxiliary function operation .....                | - 25 -        |
| 3.10 Tool setting .....                                      | - 26 -        |

|           |                                                                      |               |
|-----------|----------------------------------------------------------------------|---------------|
| 3.10.1.   | Centered (M series) .....                                            | - 26 -        |
| 3.10.2.   | Tool regulator (M series) .....                                      | - 28 -        |
| 3.10.3.   | Auto tool setting mode .....                                         | - 34 -        |
| 3.10.4.   | Four-point centering: .....                                          | - 34 -        |
| 3.10.5.   | Calculate the center of the circle using two points and radius ..... | - 34 -        |
| 3.10.6.   | Calculate circle center using 3 points .....                         | - 35 -        |
| 3.11      | Manual operation .....                                               | - 35 -        |
| 3.12      | Data recording .....                                                 | - 35 -        |
| 3.13      | Update the coordinate system .....                                   | - 35 -        |
| 3.14      | Coordinate Parameter .....                                           | - 35 -        |
| 3.14.1.   | EXT offset coordinates .....                                         | - 35 -        |
| 3.14.2.   | Tool Regulator Parameter .....                                       | - 37 -        |
| 3.14.3.   | Tool setting by test cutting (L series) .....                        | - 38 -        |
| 3.15      | Data settings .....                                                  | - 38 -        |
| 3.15.1.   | Tool compensation data settings .....                                | - 38 -        |
| 3.15.2.   | System parameters setting .....                                      | - 39 -        |
| 3.16      | System shortcuts .....                                               | - 39 -        |
| <b>4.</b> | <b>Automatic Operation .....</b>                                     | <b>- 41 -</b> |
| 4.1       | Memory operation .....                                               | - 41 -        |
| 4.2       | MDI operation .....                                                  | - 41 -        |
| 4.3       | USB disk DNC .....                                                   | - 41 -        |
| 4.4       | Speed rate adjustment .....                                          | - 42 -        |
| 4.5       | SBK function .....                                                   | - 42 -        |
| 4.6       | BDT function .....                                                   | - 43 -        |
| 4.7       | Stopping automatic operating .....                                   | - 43 -        |
| <b>5.</b> | <b>Safe operation .....</b>                                          | <b>- 44 -</b> |
| 5.1       | Emergency stop .....                                                 | - 44 -        |
| 5.2       | Hard limit over travel .....                                         | - 44 -        |
| 5.3       | Soft limit over travel .....                                         | - 44 -        |
| <b>6.</b> | <b>Alarm and self-diagnosis function .....</b>                       | <b>- 45 -</b> |
| 6.1       | NC program execution alarm error .....                               | - 45 -        |
| 6.2       | System environment alarm content codes .....                         | - 47 -        |
| 6.3       | Alarm processing .....                                               | - 52 -        |

|           |                                                      |               |
|-----------|------------------------------------------------------|---------------|
| 6.4       | Self-diagnosis function.....                         | - 52 -        |
| <b>7.</b> | <b>Program saving &amp; editing.....</b>             | <b>- 53 -</b> |
| 7.1       | Saving the program in the memory .....               | - 53 -        |
| 7.1.1     | Keypad input (new program).....                      | - 53 -        |
| 7.1.2     | Computer network access/serial port input.....       | - 53 -        |
| 7.1.3     | Copying processing files from USB disk .....         | - 57 -        |
| 7.2       | Reading programs into work area.....                 | - 57 -        |
| 7.2.1     | Reading programs from controller into work area..... | - 57 -        |
| 7.2.2     | Reading programs from USB disk into work area.....   | - 57 -        |
| 7.3       | Editing & modifying programs .....                   | - 58 -        |
| 7.3.1     | Single-line copy, paste and delete.....              | - 58 -        |
| 7.3.2     | Multi-line copy, paste and delete.....               | - 58 -        |
| 7.3.3     | Macro function fast programming.....                 | - 58 -        |
| 7.4       | Deleting files .....                                 | - 59 -        |
| 7.4.1     | Deleting files in memory .....                       | - 59 -        |
| <b>8.</b> | <b>Main interfaces of the system.....</b>            | <b>- 60 -</b> |
| 8.1       | Position Interface.....                              | - 60 -        |
| 8.1.1     | Absolute Position .....                              | - 61 -        |
| 8.1.2     | Relative Position .....                              | - 62 -        |
| 8.1.3     | Comprehensive coordinates.....                       | - 63 -        |
| 8.1.4     | Deviation position .....                             | - 63 -        |
| 8.2       | Edit .....                                           | - 64 -        |
| 8.2.1     | Program edit.....                                    | - 65 -        |
| 8.2.2     | New program.....                                     | - 65 -        |
| 8.2.3     | Save as.....                                         | - 65 -        |
| 8.3       | MDI interface .....                                  | - 65 -        |
| 8.4       | File management .....                                | - 67 -        |
| 8.4.1     | Copy .....                                           | - 67 -        |
| 8.4.2     | Paste .....                                          | - 68 -        |
| 8.4.3     | Cut.....                                             | - 68 -        |
| 8.4.4     | Connect computer .....                               | - 68 -        |
| 8.5       | Graphic Simulation.....                              | - 68 -        |
| 8.6       | Parameter Interface.....                             | - 69 -        |

|            |                                                                   |               |
|------------|-------------------------------------------------------------------|---------------|
| 8.6.1      | Comprehensive Parameter.....                                      | - 71 -        |
| 8.6.2      | Axis parameters.....                                              | - 72 -        |
| 8.6.3      | Management Parameter.....                                         | - 73 -        |
| 8.6.4      | Tool magazine parameters.....                                     | - 74 -        |
| 8.6.5      | Spindle parameters.....                                           | - 74 -        |
| 8.6.6      | IO configuration parameters.....                                  | - 75 -        |
| 8.7        | Compensation interface.....                                       | - 75 -        |
| 8.8        | Milling system workpiece coordinate system setting interface..... | - 76 -        |
| 8.8.1      | Workpiece coordinate system.....                                  | - 76 -        |
| 8.8.2      | Settings of tool setting parameter.....                           | - 78 -        |
| 8.8.3      | Allowance.....                                                    | - 79 -        |
| 8.8.4      | Offset.....                                                       | - 80 -        |
| 8.8.5      | Screw itch error compensation.....                                | - 80 -        |
| 8.9        | Controller diagnosis interface (diagnosis).....                   | - 82 -        |
| 8.9.1      | Alarm check.....                                                  | - 82 -        |
| 8.9.2      | IO diagnosis interface.....                                       | - 82 -        |
| 8.9.3      | Function test.....                                                | - 82 -        |
| 8.9.4      | System Info.....                                                  | - 83 -        |
| 8.10       | Macro variable view interface (macro variable).....               | - 83 -        |
| 8.11       | Current mode instruction info.....                                | - 84 -        |
| <b>9.</b>  | <b>System maintenance.....</b>                                    | <b>- 85 -</b> |
| 9.1        | Restart.....                                                      | - 85 -        |
| 9.2        | System upgrade.....                                               | - 85 -        |
| 9.3        | Reset.....                                                        | - 85 -        |
| 9.4        | Parameter backup and restore.....                                 | - 85 -        |
| 9.5        | Enter BIOS.....                                                   | - 86 -        |
| <b>10.</b> | <b>System parameters.....</b>                                     | <b>- 87 -</b> |
| 10.1       | Parameter index list.....                                         | - 88 -        |
| 10.2       | Comprehensive parameter (P1.).....                                | - 111 -       |
| 10.3       | Axis parameter configuration (P2.).....                           | - 131 -       |
| 10.4       | Management parameter (P3.).....                                   | - 158 -       |
| 10.5       | Tool magazine parameter (P4.).....                                | - 168 -       |
| 10.6       | Spindle parameters (P5.).....                                     | - 168 -       |

|            |                                                                                                                       |                |
|------------|-----------------------------------------------------------------------------------------------------------------------|----------------|
| 10.7       | Port configuration (P6.).....                                                                                         | - 178 -        |
| <b>11.</b> | <b>Hardware interface definition and connection instructions.....</b>                                                 | <b>- 182 -</b> |
| 11.1       | Installation Layout.....                                                                                              | - 182 -        |
| 11.1.1.    | 9640 series external interface diagram .....                                                                          | - 182 -        |
| 11.1.2.    | 9810 and 9650 series external interface diagram.....                                                                  | - 183 -        |
| 11.1.3.    | 99 series external interface diagram .....                                                                            | - 184 -        |
| 11.1.4.    | 96 Series Mounting dimensions.....                                                                                    | - 185 -        |
| 11.1.5.    | 99 Series Mounting dimensions.....                                                                                    | - 185 -        |
| 11.1.6.    | Installation precautions.....                                                                                         | - 186 -        |
| 11.2       | Interface Definition .....                                                                                            | - 188 -        |
| 12.2.1.    | Motor driver control interface .....                                                                                  | - 188 -        |
| 12.2.2.    | Digital input interface.....                                                                                          | - 192 -        |
| 12.2.3.    | Digital output interface.....                                                                                         | - 198 -        |
| 12.2.4.    | Handheld box interface .....                                                                                          | - 202 -        |
| 12.2.5.    | Analog output interface (9640 series XS8).....                                                                        | - 205 -        |
| 12.2.6.    | Spindle encoder interface (9640 series XS12).....                                                                     | - 206 -        |
| 12.2.7.    | RS232 interface (96 series XS9, 99 series XS11), RS-485 interface (9810 9650) and RJ45 network interface (9 series) - | 209 -          |
| 12.2.8.    | USB memory connection interface (96 series XS10).....                                                                 | - 210 -        |
| 12.2.9.    | PC USB communication interface (96 series XS11, 99 series X13).....                                                   | - 210 -        |
| 11.3       | Electrical connection diagram .....                                                                                   | - 210 -        |
| 11.3.1.    | Symbol schematic diagram.....                                                                                         | - 210 -        |
| 11.3.2.    | Power connection diagram .....                                                                                        | - 211 -        |
| 11.3.3.    | Servo driver connection diagram.....                                                                                  | - 212 -        |
| 11.3.4.    | Step connection diagram .....                                                                                         | - 213 -        |
| 11.3.5.    | IO electrical connection diagram.....                                                                                 | - 214 -        |
| 11.3.6.    | ADT9163 splitter wiring diagram.....                                                                                  | - 217 -        |
| 11.3.7.    | ET102A splitter wiring diagram .....                                                                                  | - 220 -        |
| 11.3.8.    | ET202A splitter wiring diagram .....                                                                                  | - 223 -        |
| 11.3.9.    | ADT-I24HNA input board.....                                                                                           | - 224 -        |
| 11.3.10.   | ADT-O24HNA output board .....                                                                                         | - 225 -        |
| <b>12.</b> | <b>CNC9 Series Hardware Interface Instructions .....</b>                                                              | <b>- 227 -</b> |
| 12.1.      | External Interface Diagram .....                                                                                      | - 227 -        |

---

|            |                                                                        |                |
|------------|------------------------------------------------------------------------|----------------|
| 12.2.      | Motor driver control interface .....                                   | - 227 -        |
| 12.3.      | ADT9163 splitter wiring diagram .....                                  | - 230 -        |
| 12.4.      | ET102A splitter wiring diagram .....                                   | - 232 -        |
| 12.5.      | ET202A splitter wiring diagram .....                                   | - 236 -        |
| <b>13.</b> | <b>Transmission of Computer NC Program Network to the system .....</b> | <b>- 239 -</b> |
| 13.1.      | System IP Settings .....                                               | - 239 -        |
| <b>14.</b> | <b>Appendix-Common Servo Wiring Diagrams.....</b>                      | <b>- 243 -</b> |
| 14.1.      | Pulse control port wiring definition .....                             | - 243 -        |
| 14.1.1.    | Wiring diagram of ADTECH QS, QX and Shanyang servo driver.....         | - 243 -        |
| 14.1.2.    | Yaskawa, Matsushita, Fuji, TECO.....                                   | - 243 -        |

# 1. System technical characteristics

## 1.1 System technical parameters

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



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

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

## 1.2 System operating condition

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

## 1.3 System function

### 1.3.1. Self-diagnosis function

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

### 1.3.2. Compensation

Automatic reverse clearance compensation

Automatic tool length compensation

Automatic tool radius compensation

Automatic tool radius biasing and automatic tool tip transition

### 1.3.3. Abundant instruction system

Scaling instruction

Mirror processing instruction

Tool biasing instructions

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

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

Linear, arc and spiral interpolation instructions

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

#### **1.3.4. Full Chinese menu operation & full screen edit**

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

#### **1.3.5. Abundant error-correction functions**

Point out the nature and correct the errors in operation.

#### **1.3.6. Program exchange between CNC system and PC**

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

## 2. Operating panel

### 2.1 ADTCNC96 series system LCD/keypad

#### Keypad

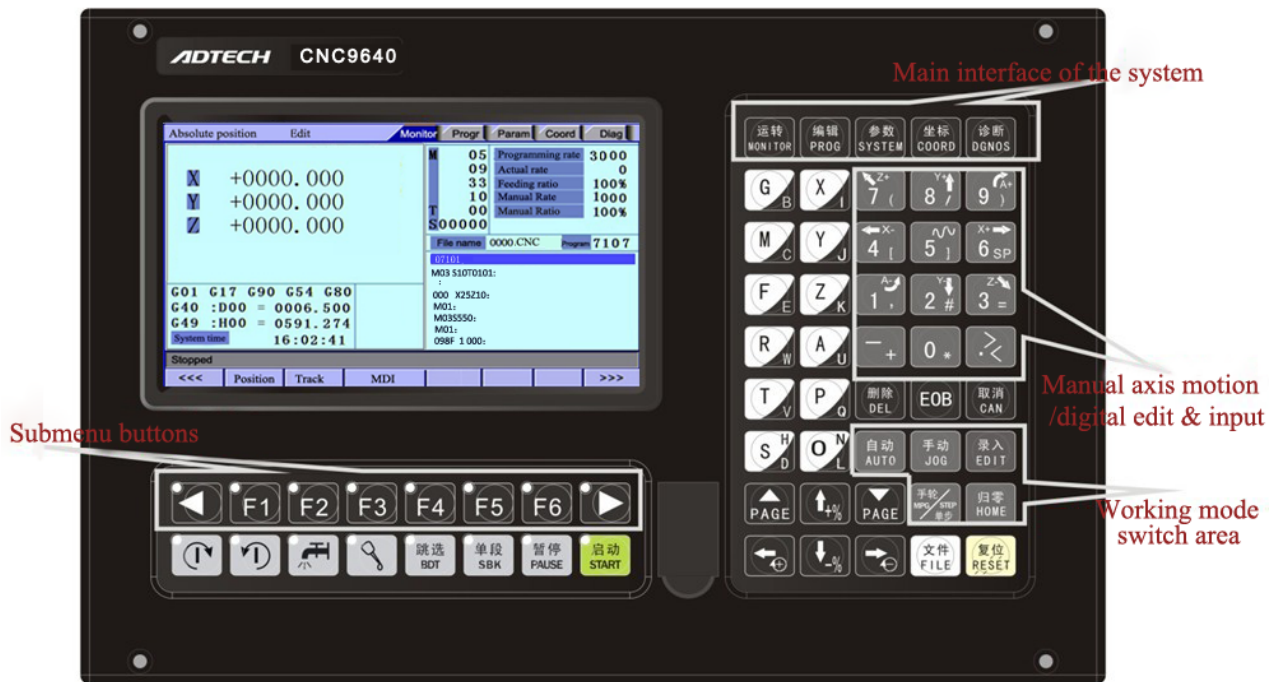


Fig. 2.1 CNC9640 Operating Panel Diagram

Note:

Press the submenu buttons to perform the operations of submenus.

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

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

## LCD unit

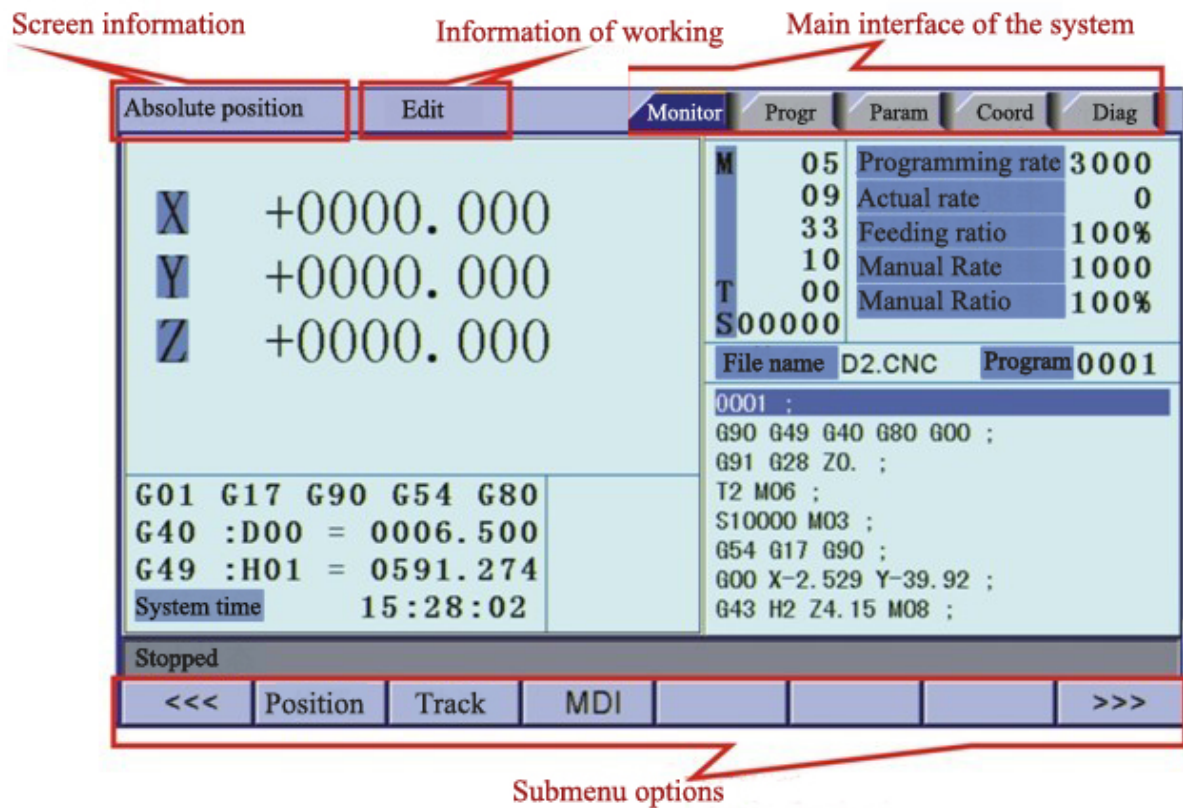


Fig. 2.2 CNC9640 LCD Screen Diagram

### Note:

Screen info shows the information of current window

Working mode info shows currently selected working mode

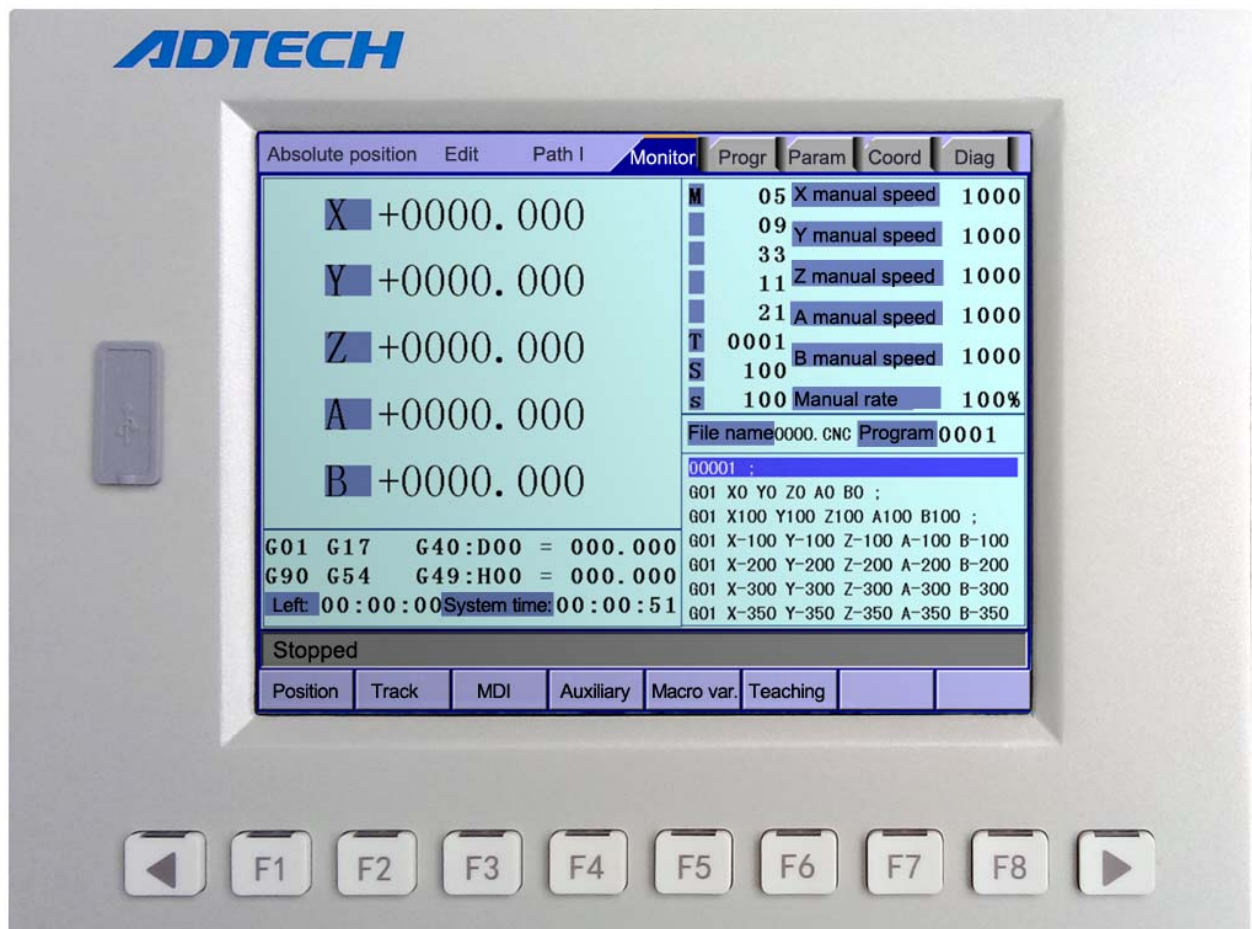
System main screen shows current main screen.

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

## 2.2 ADTCNC99 and 98 series system LCD/keypad









## 2.3 System menus

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



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

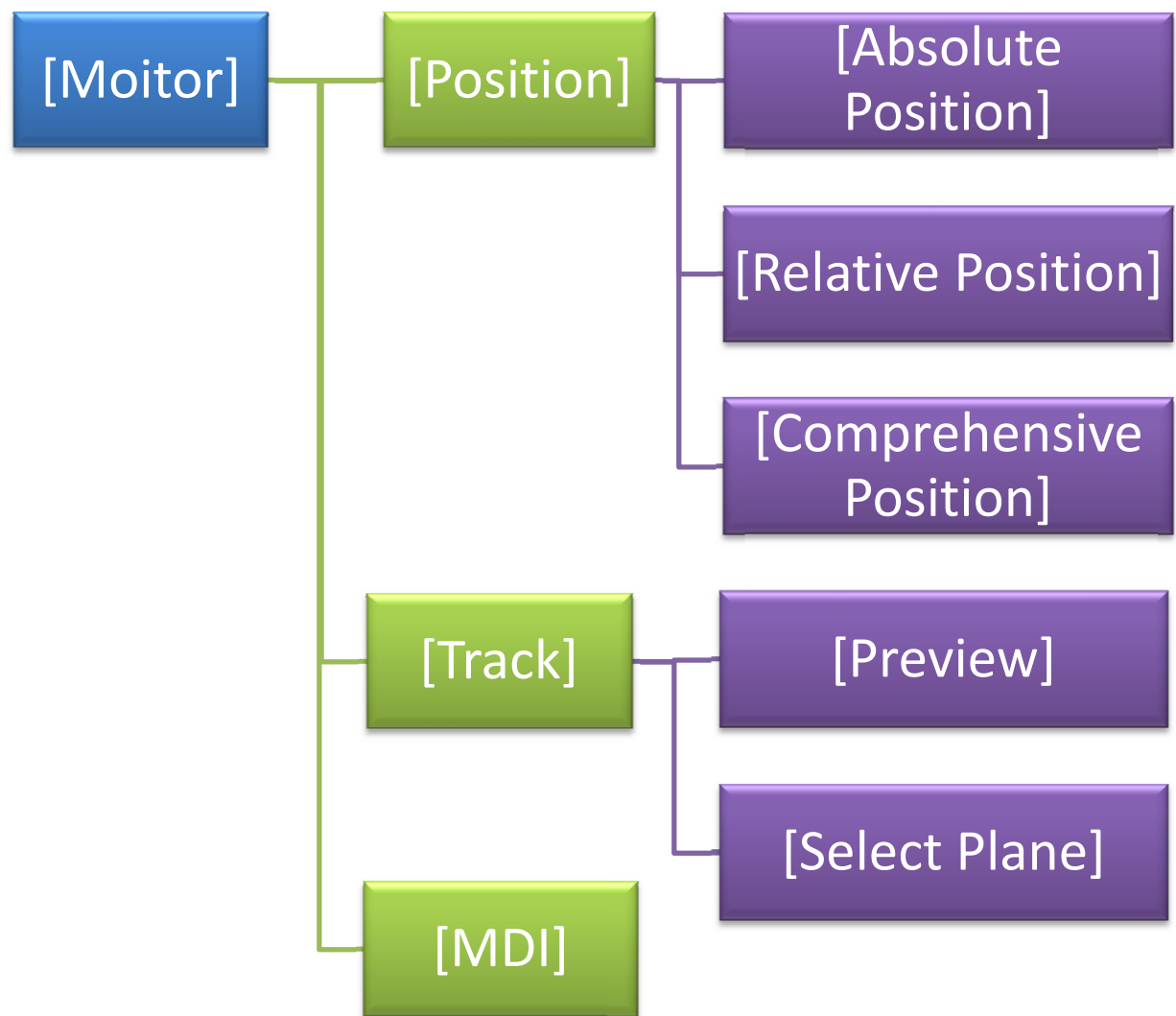
Key in the left: Return to previous menu

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

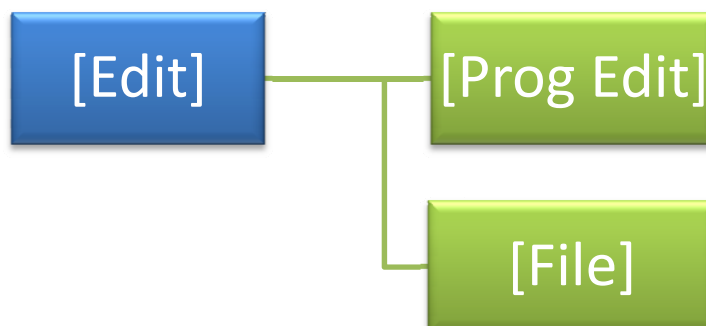
The main menus of the system include [Monitor], [Prog Edit], [Parameter], [Coordinate] and [Diagnosis]. Each main menu contains several submenus, which are shown below:

### 2.3.1. Autorun

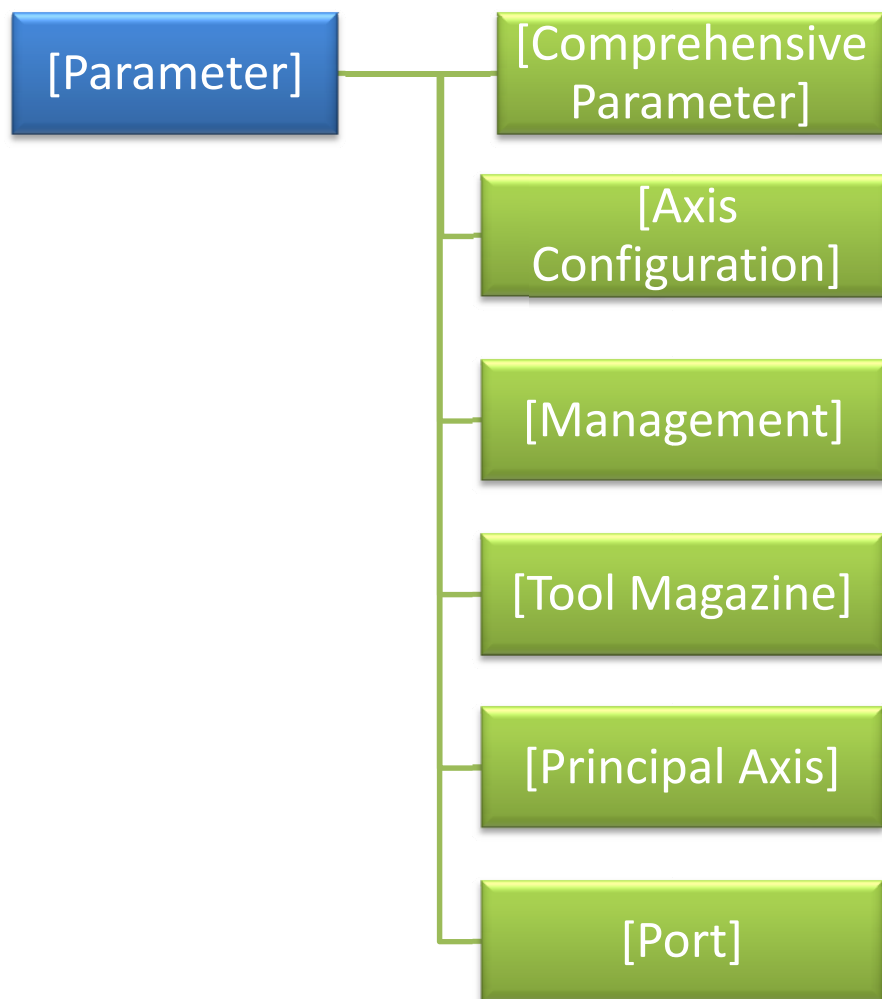




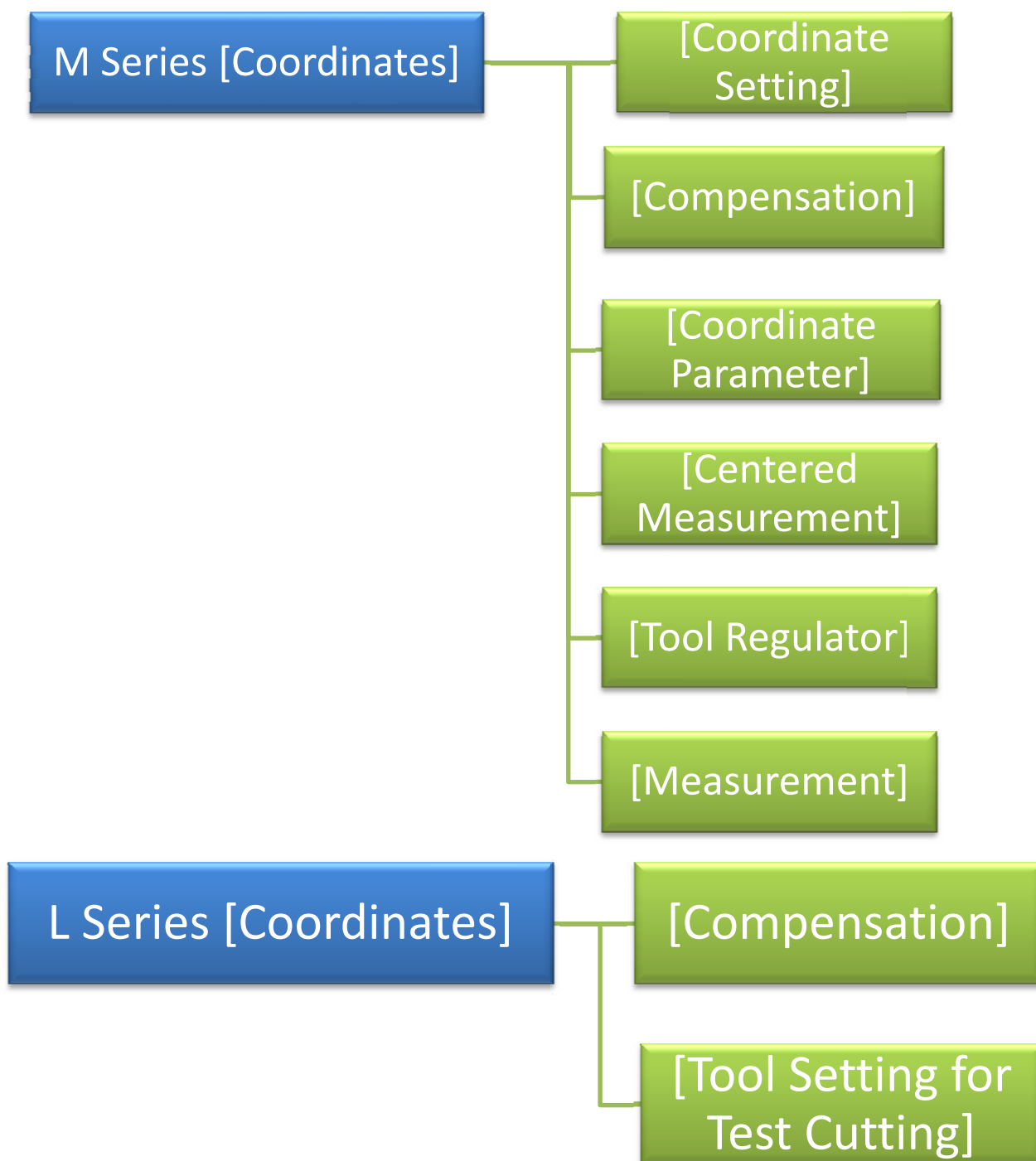
### 2.3.2. Program edit



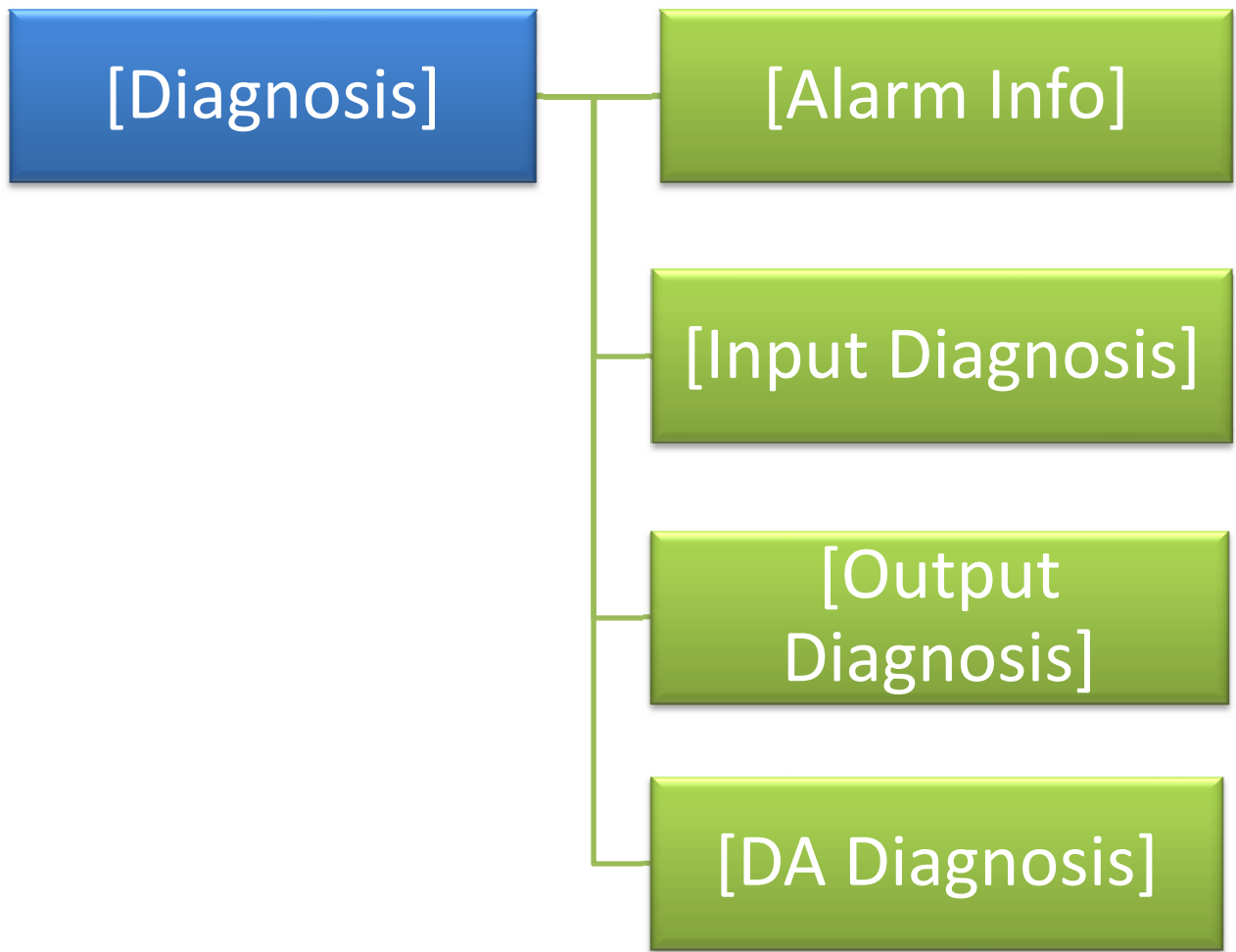
### 2.3.3. Parameter



#### 2.3.4. Work coordinates



### 2.3.5. Diagnosis



## 2.4 Operating keys

The keys of CNC9 series system are defined below:

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

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

## 3. Manual operation

### 3.1 Returning to reference point manually

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

The home operation includes program and mechanical mode:

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

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

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

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

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

### 3.2 Each axis returns to reference point separately

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

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

### 3.3 Each axis returns to reference point simultaneously

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

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

### 3.4 Reset machine tool position

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

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

### 3.5 Reset relative position manually

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

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

**Note**

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

**Caution:**

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

### 3.6 Continuous feeding manually

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

The operation is as follows:

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



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

 **Note:**

Only single axis motion is available in manual mode.

### 3.7 Single-step feeding

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

The specific operation is as follows:

#### 3.7.1 Single-step increment selection

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

- (1) Press the mode switch key [Handwheel/Single-step] (this key is composite, and you can press it repeatedly to switch the modes) to select the single-step operation;
- (2) Press composite keys [X+], [X-]; [Y+], [Y-]; [Z+], [Z-]; [A+], [A-] in numeric section to move the tool for a fixed distance along the selected axis. This distance is controlled by four rates (1.000, 0.100, 0.010, 0.001) (unit: mm). To select pulse increment, press Up (+) and Down (-) key in the [Position] interface.



### 3.8 Handwheel feeding

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

The handwheel feeding step is as follows:

- (1) Press the mode switch key [Handwheel/Single-step] to select handwheel operation;
- (2) Rotate the dip switch on the handwheel to select handhweel axis (X, Y, Z, A);
- (3) Rotate the increment dip switch on the handwheel to select the moving amount (0.1, 0.01, 0.001);
- (4) Rotate the handwheel to move the machine tool. The tool moves certain distance every time you rotate the handwheel for a scale. (For example, if you select X axis in step (2) and select 0.01 in step (3), the tool moves 0.01mm every scale). Rotate the handle continuously to move the machine tool on this axis continuously.



**Note:**

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

### 3.9 Manual auxiliary function operation

#### Coolant on/off



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

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

#### Lubricant on/off



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

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

#### Spindle positive rotation/stop



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

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

#### Spindle reverse rotation/stop



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

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

#### General instructions for manual operation keys

Cooling, lubricant, spindle positive/reverse rotation are available in handwheel, single-step and manual mode; When the spindle is rotating, press the reverse rotation key, the spindle will stop first, and rotate in reverse direction after pressing it again.

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

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

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

### 3.10 Tool setting

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

#### 3.10.1. Centered (M series)

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

##### Note

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

##### (1) Single axis centered

Select the edit mode;

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

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

Select handwheel or manual mode;

Press [Coordinates] to enter coordinate system setting interface;

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

Press [Centered Measurement] to enter centered interface;

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

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

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

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

## **(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 handwheel or manual mode;

Press [Coordinates] to enter coordinate system setting interface;

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

Press [Centered Measurement] to enter centered interface;

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

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

Record boundary point 3.4 in the same method;

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

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

## **(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 steps of three points arc are as follows:

Select the edit mode;

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

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

Select handwheel or manual mode;

Press [Coordinates] to enter coordinate system setting interface;

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

Press [Centered Measurement] to enter centered interface;

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

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

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

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

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

### **Arc centered validation**

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

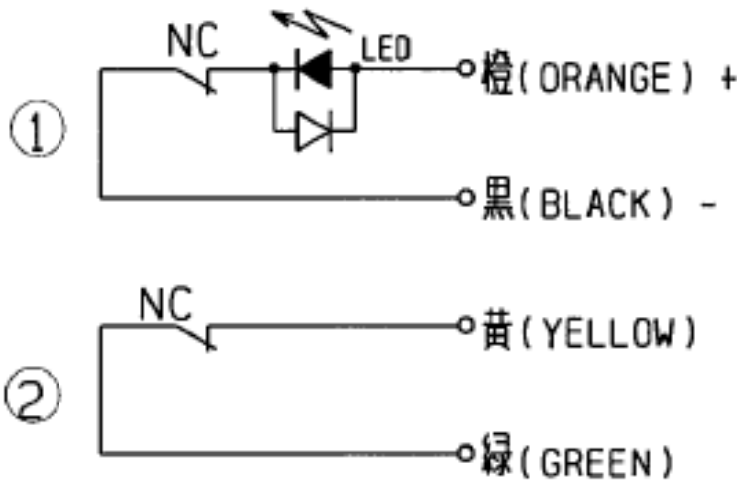
The validation steps for other tool setting methods are same.

### **3.10.2. Tool regulator setting gauge (M series)**

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

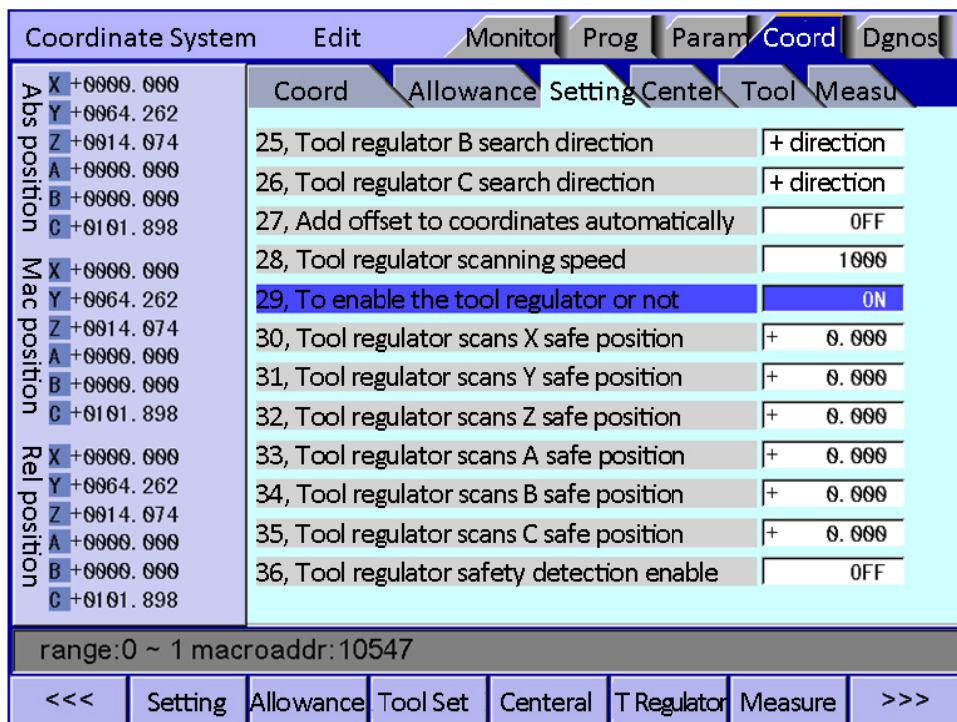
Related parameters and instructions for using the system tool regulator:

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



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

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



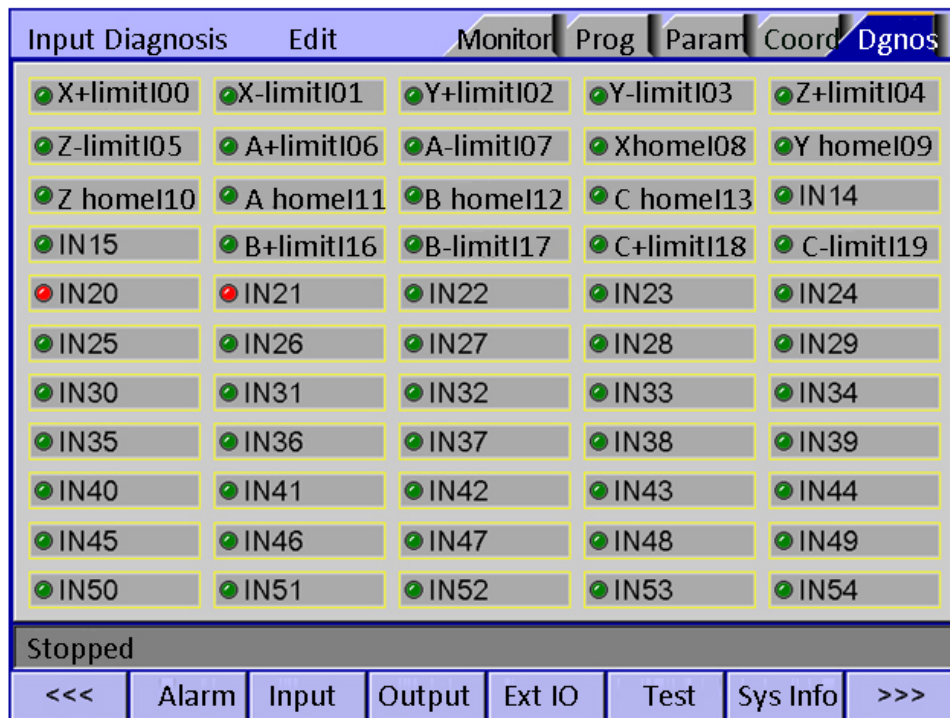
3. Configurations of tool regulator detection input port and limit input port: Parameter -> Port -> 001. Tool regulator detection input port number ----- set the tool regulator detection signal input port, through which the system can detect whether the tool regulator is in place when it scans tool regulator,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

| IO Parameter                             | Edit          | Monitor                                | Prog     | Param | Coord   | Dgnos  |
|------------------------------------------|---------------|----------------------------------------|----------|-------|---------|--------|
| 001, Tool checking input port No.        | IN (20)       | 019, Spindle CCW output port No.       | OUT (01) |       |         |        |
| 002, Tool setting safety testing input   | =====         | 020, Spindle CW 2 forward output p     | =====    |       |         |        |
| 003, Tool setting magazine output po     | =====         | 021, Spindle CCW 2 reverse output      | =====    |       |         |        |
| 004, Tool setting dust cover output p    | =====         | 022, Spindle inverter alarm reset out  | =====    |       |         |        |
| 005, Tool setting dust cover lift in pla | =====         | 023, Spindle blowing output port       | =====    |       |         |        |
| 006, Tool regulator limit input port     | IN (21)       | 024, Spindle brake output port         | =====    |       |         |        |
| 007, Tool regulator blow output port     | =====         | 029, Safety grating input port No.     | =====    |       |         |        |
| 008, Spindle alarm input detection po    | =====         | 030, Air pressure alarm input port No. | =====    |       |         |        |
| 009, Variable freq. alarm input detecti  | =====         | 031, Feed alarm input port No.         | =====    |       |         |        |
| 014, System power-off input port N       | =====         | 032, Oil pressure alarm input port No. | =====    |       |         |        |
| 015, System power-off output port        | =====         | 033, External start 2 input port No.   | =====    |       |         |        |
| 016, Gearbox gear detection input 1      | =====         | 034, External pause 2 input port No.   | =====    |       |         |        |
| 017, Gearbox gear detection input 2      | =====         | 035, External emergency stop 2 input   | =====    |       |         |        |
| 018, Spindle CW output port No.          | OUT (00)      | 036, Cooler alarm input port No.       | =====    |       |         |        |
| 1072 Tool regulator limit alarm          |               |                                        |          |       |         |        |
| <<<                                      | Comprehensive | Axis                                   | Manage   | Tools | Spindle | IO >>> |

#### 4. Invert the input detection active level

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

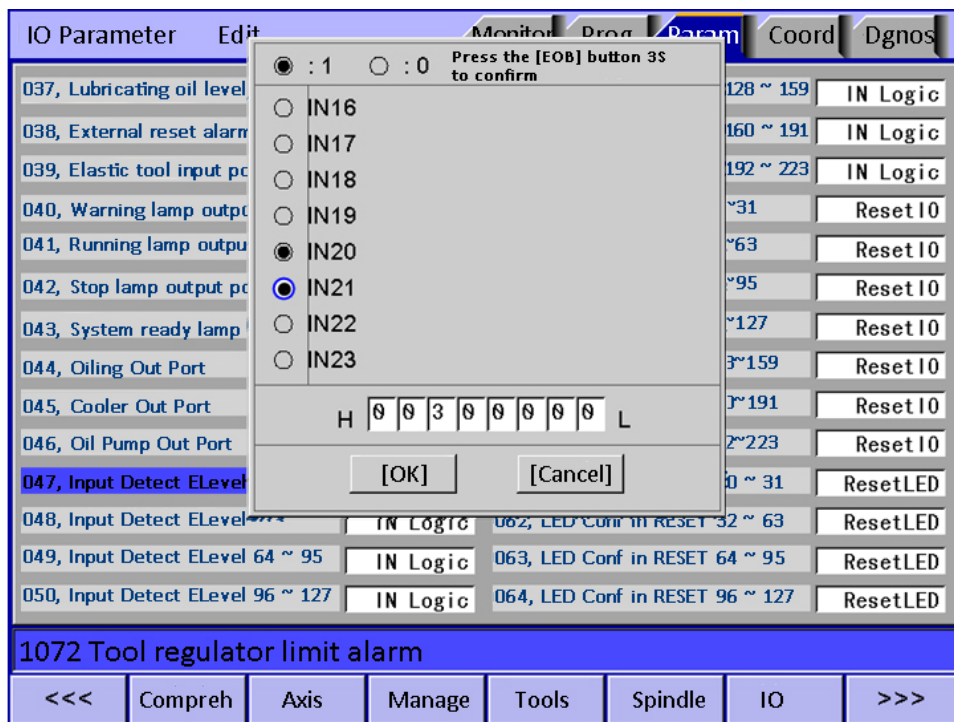
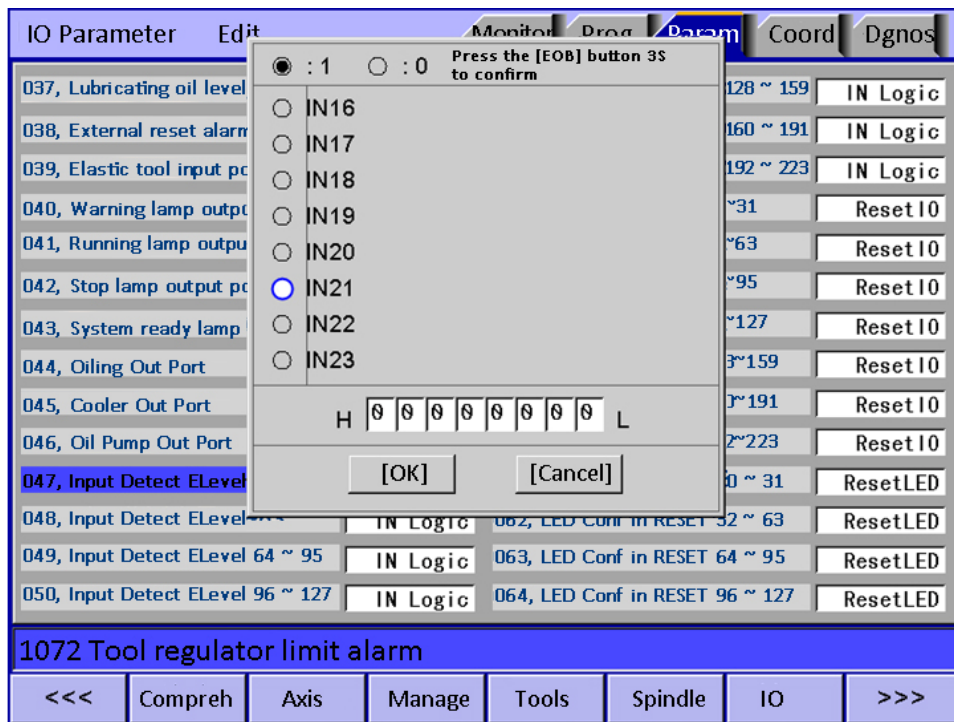
It can be seen that the front indicator lights of IN20 and IN21 light up, and the limit alarm prompt of tool regulator appears.



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

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





##### 5. Tool setting coordinates setting

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

08. Y coordinates of tool regulator

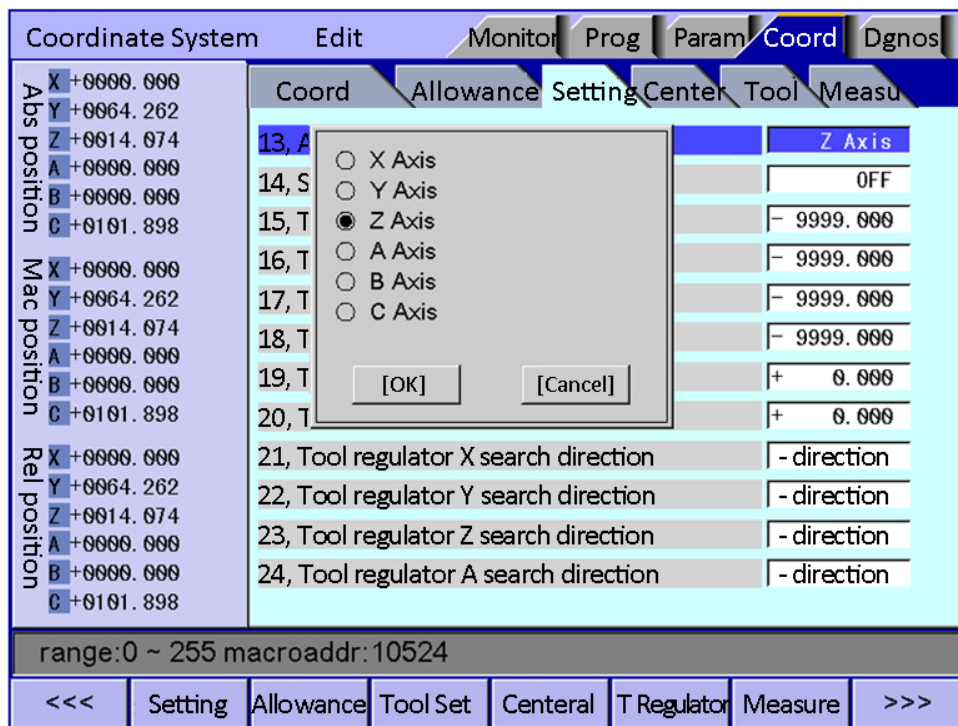
09. Z coordinates of tool regulator

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

| Coordinate System                    |                          | Edit      | Monitor   | Prog     | Param   | Coord       | Dgnos       |
|--------------------------------------|--------------------------|-----------|-----------|----------|---------|-------------|-------------|
|                                      |                          | Coord     | Allowance | Setting  | Center  | Tool        | Measu       |
| Abs position                         | X                        | +0000.000 |           |          |         |             |             |
|                                      | Y                        | +0064.262 |           |          |         |             |             |
|                                      | Z                        | +0014.074 |           |          |         |             |             |
|                                      | A                        | +0000.000 |           |          |         |             |             |
|                                      | B                        | +0000.000 |           |          |         |             |             |
| Mac position                         | C                        | +0101.898 |           |          |         |             |             |
|                                      | X                        | +0000.000 |           |          |         |             |             |
|                                      | Y                        | +0064.262 |           |          |         |             |             |
|                                      | Z                        | +0014.074 |           |          |         |             |             |
|                                      | A                        | +0000.000 |           |          |         |             |             |
| Rel position                         | B                        | +0000.000 |           |          |         |             |             |
|                                      | C                        | +0101.898 |           |          |         |             |             |
|                                      | 01, X coordinates offset |           | +         | 0.000    |         |             |             |
|                                      | 02, Y coordinates offset |           | +         | 0.000    |         |             |             |
|                                      | 03, Z coordinates offset |           | +         | 0.000    |         |             |             |
| 04, A coordinates offset             |                          | +         | 0.000     |          |         |             |             |
| 05, B coordinates offset             |                          | +         | 0.000     |          |         |             |             |
| 06, C coordinates offset             |                          | +         | 0.000     |          |         |             |             |
| 07, X coordinates of tool regulator  |                          | +         | 9999.000  |          |         |             |             |
| 08, Y coordinates of tool regulator  |                          | +         | 9999.000  |          |         |             |             |
| 09, Z coordinates of tool regulator  |                          | +         | 9999.000  |          |         |             |             |
| 10, A coordinates of tool regulator  |                          | +         | 9999.000  |          |         |             |             |
| 11, B coordinates of tool regulator  |                          | +         | 9999.000  |          |         |             |             |
| 12, C coordinates of tool regulator  |                          | +         | 9999.000  |          |         |             |             |
| range:-99999 ~ 99999 macroaddr:10512 |                          |           |           |          |         |             |             |
| <<<                                  |                          | Setting   | Allowance | Tool Set | Central | T Regulator | Measure >>> |

Axis selection symbol of tool regulator

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



### 3.10.3. Auto tool setting mode setting

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

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

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

G54 coordinates

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

Mode 3: G43

### 3.10.4. Four-point centering:

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

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

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

1<sup>st</sup> point: [Workpiece Boundary Point 1]

2<sup>nd</sup> point: [Workpiece Boundary Point 2]

Radius: [Circular Workpiece Radius]

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

### 3.10.6. Calculate circle center using 3 points

Point 1: [Workpiece Boundary Point 1]

Point 2: [Workpiece Boundary Point 2]

Point 3: [Workpiece Boundary Point 3]

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

## 3.11 Manual operation

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

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

## 3.12 Data entry

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

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

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

## 3.13 Update the coordinate system

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

## 3.14 Coordinate Parameter

### 3.14.1. EXT offset coordinates

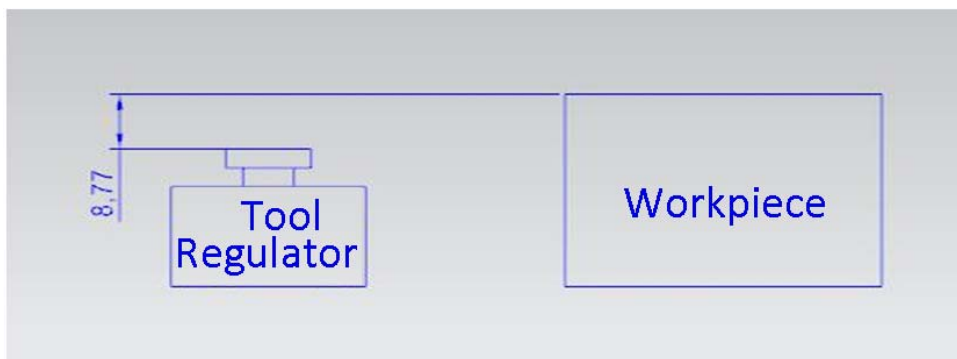
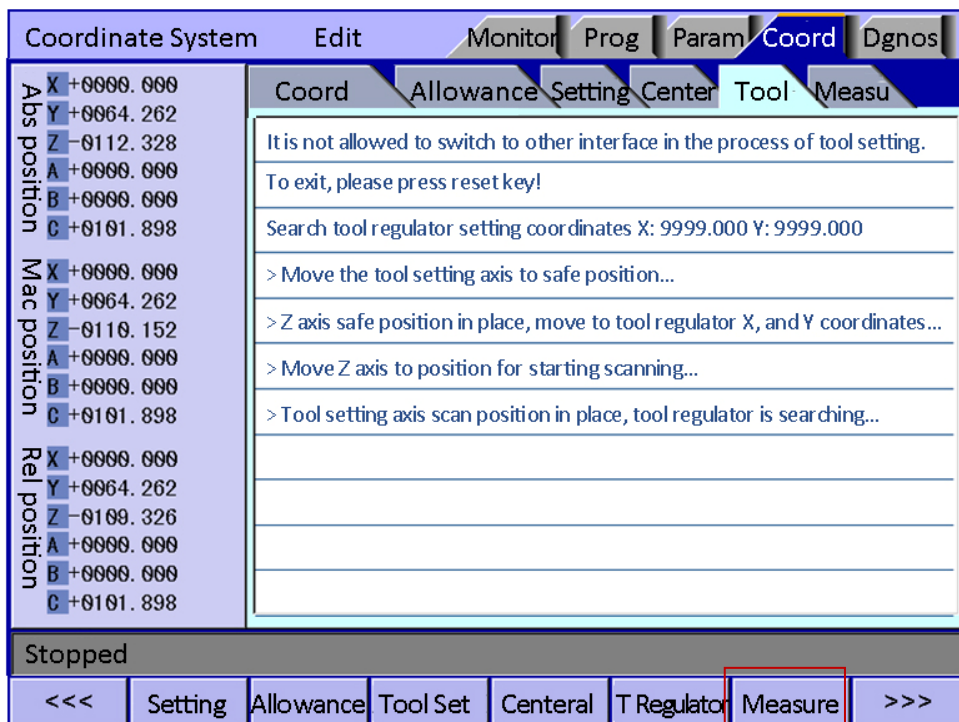
1. X coordinates offset

2. Y coordinates offset

3. Z coordinates offset

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

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



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

### 3.14.2. Tool Regulator Parameter

Coordinates -> Tool setting parameters

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

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

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

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

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

Coordinates->Allowance

Steps to use tool regulator and troubleshooting

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



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

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

### 3.14.3. Tool setting by test cutting (L series)

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

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

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

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

Select handwheel, single-step or manual mode;

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

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

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



#### **Caution**

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

## 3.15 Data settings

### 3.15.1. Tool compensation data settings

The tool compensation parameters can be set as follow:

Select the edit mode;

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

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

 **Caution**

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

### 3.15.2. System parameters setting

The system parameters can be modified as follow:

Select the edit mode;

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

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

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

## 3.16 System shortcuts

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

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

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





## 4. Automatic Operation

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

Memory operation, MDI operation, USB disk DNC operation.

### 4.1 Memory operation

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

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

The steps of memory operation are as follows:

- (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.

### 4.2 MDI operation

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

- (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.

### 4.3 USB disk DNC

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

The steps of USB disk DNC operation are as follows:

- (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.

## 4.4 Speed rate adjustment

### Feeding rate

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

### Manual rate

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

### Spindle rotation

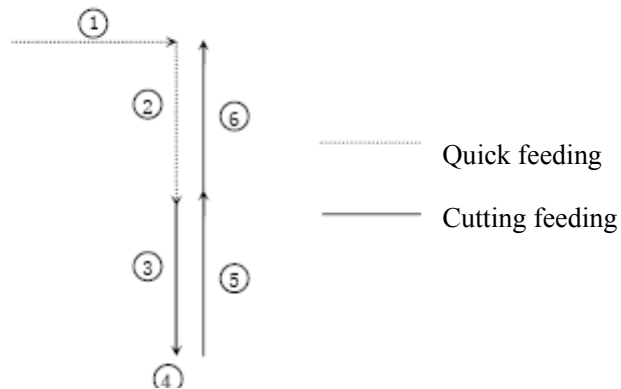
In automatic or manual mode, when the spindle rotates normally, press the Left/Right key to adjust the spindle rotation by 100r/min. The maximum rotation is set by the spindle parameters in the system and the minimum rotation is 16r/min. If you press and hold the key for three seconds, the value will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

## 4.5 SBK function

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

 **Caution:**

- ① In G28-G30, single block also can be stopped at the center point;
- ② The stop points of single block in fixed circle are ①, ②, ⑥ in the figure below; when the single blocks of ①, ② stops, the feeding pauses and the pause indicator is on.



## 4.6 BDT function

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

## 4.7 Stopping automatic operating

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

### Program stops

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

After processing a part, the automatic operation stops.

### Program End

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

### Feeding pause

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

### Reset

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

## 5. Safe operation

### 5.1 Emergency stop

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

**Caution:**

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

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

### 5.2 Hard limit over travel

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

### 5.3 Soft limit over travel

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

**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.

## 6. Alarm and self-diagnosis function

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

0~1023: G code program running alarm info

1024~2048: System environment alarm info

### 6.1 NC program execution alarm error

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

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

|      |                                                                                           |
|------|-------------------------------------------------------------------------------------------|
| 0061 | Macro loop statement nesting error                                                        |
| 0062 | Excessive call of subprogram nesting, exceeding the maximum number of layers              |
| 0063 | No macro variable defined to get the address function                                     |
| 0064 | User-defined information                                                                  |
| 0065 | User-defined alarm                                                                        |
| 0066 | Const reference error                                                                     |
| 0067 | Previous track i_gcode attribute value error                                              |
| 0068 | Next track i_gcode attribute value error                                                  |
| 0069 | Starting compensation point arc enters                                                    |
| 0070 | Ending compensation point arc exits                                                       |
| 0071 | Starting point and ending point of the previous track of the radius compensation overlaps |
| 0072 | Starting point and ending point of the next track of the radius compensation overlaps     |
| 0073 | Compensation value of radius compensation greater than the R value of G02/G03             |
| 0074 | Code group not supported in radius compensation                                           |
| 0075 | Excessive NURBS nodes                                                                     |
| 0076 | NURBS parameter error                                                                     |
| 0077 | Overflow error due to excessive segments of compound program memory program               |
| 0078 | Compound program expression error                                                         |
| 0079 | No U command error                                                                        |
| 0080 | No W command error                                                                        |
| 0081 | Multiple G code expression error                                                          |
| 0082 | Multiple M code error                                                                     |
| 0083 | Macro function parameter mismatch error                                                   |
| 0084 | Undefined macro function error                                                            |
| 0085 | Macro definition information output, no alarm but pause                                   |
| 0086 | Arc-connected corner transition function currently not supported                          |
| 0087 | Straight line or arc connected corner transition error                                    |

## 6.2 System environment alarm content codes

|      |   |                            |
|------|---|----------------------------|
| 1024 | : | The controller isn't reset |
|------|---|----------------------------|



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

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

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

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

|      |   |                |
|------|---|----------------|
| 1041 | : | Emergency stop |
|------|---|----------------|

Emergency stop button of the handheld box interface is valid.

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

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

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

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

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

|      |   |                                                                            |
|------|---|----------------------------------------------------------------------------|
| 1046 | : | Axis number definition interface repeat error                              |
|      |   | Interface axis number set by parameter P2.45~P2.49 is specified repeatedly |
| 1047 | : | Spindle not reset                                                          |
| 1048 | : | Mold not clamped                                                           |
| 1049 | : | Safety signal can't be detected                                            |
| 1051 | : | Air pressure insufficient                                                  |
| 1052 | : | System material clamping signal invalid alarm                              |
| 1053 | : | System filling machine oil pressure alarm                                  |
| 1054 | : | Spindle alarm                                                              |
| 1055 | : | Inverter alarm                                                             |
| 1056 | : | Tool placement failure                                                     |
| 1057 | : | Tool grabbing failure                                                      |
| 1058 | : | Magazine door detection error                                              |
| 1059 | : | Detent detection error                                                     |
| 1060 | : | Tool releasing detection error                                             |
| 1061 | : | Excessive double driver shaft zero deviation                               |
| 1062 | : | Reserve                                                                    |
| 1063 | : | Reserve                                                                    |
| 1064 | : | Reserve                                                                    |
| 1065 | : | Reserve                                                                    |
| 1066 | : | Reserve                                                                    |
| 1067 | : | Reserve                                                                    |
| 1068 | : | Reserve                                                                    |
| 1069 | : | Reserve                                                                    |
| 1070 | : | Reserve                                                                    |
| 1071 | : | Reserve                                                                    |

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

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

1138

System alarm 31

### 6.3 Alarm processing

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

### 6.4 Self-diagnosis function

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

The steps of self-diagnosis are as follows:

- (1) In the main menu, press [Diagnosis] to enter the diagnosis interface;
- (2) Select [Input] to enter the input diagnosis interface, or select [Output] to enter the output diagnosis interface;
- (3) Output diagnosis: In edit mode, press the direction keys to select the output port, and press [EOB] to switch the output level of corresponding output port;
- (4) Input diagnosis: When a certain input signal is valid, the corresponding area on the screen will flash.

## 7. Program saving & editing

### 7.1 Saving the program in the memory

#### 7.1.1 Keypad input (new program)

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

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

Press [File] to enter file operation interface;

Select [New] to create a new file;

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

Select [Close] to exit [Edit] interface;

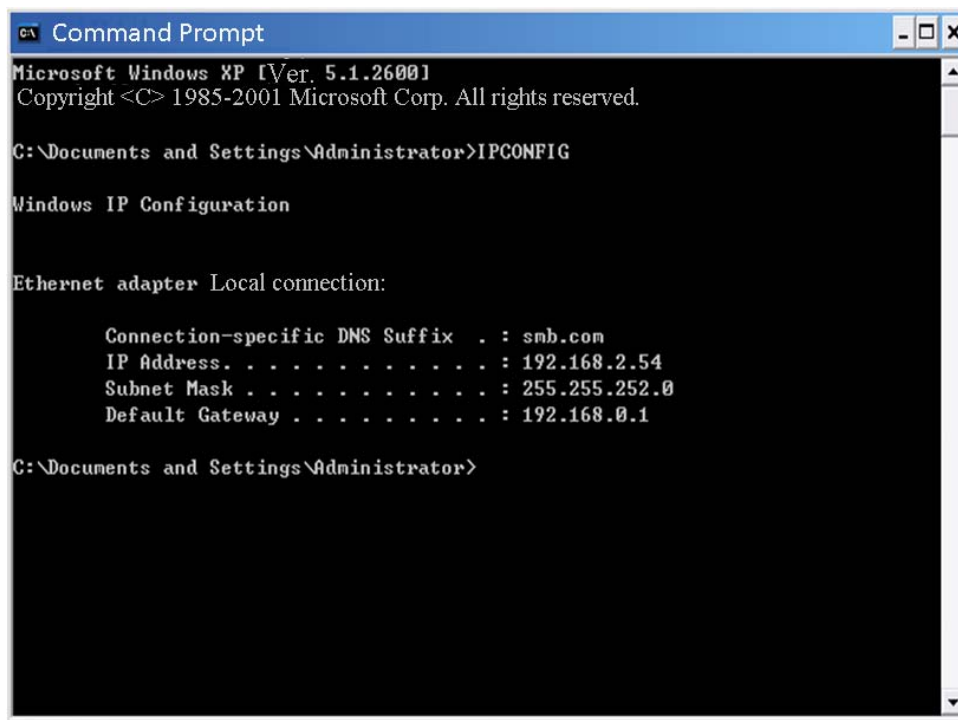
In edit mode, enter the program content;

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

#### 7.1.2 Computer network access/serial port input

Connect the controller to the router with a network cable.

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



```
C:\Documents and Settings\Administrator>IPCONFIG

Windows IP Configuration

Ethernet adapter Local connection:

    Connection-specific DNS Suffix  . : smb.com
    IP Address. . . . . : 192.168.2.54
    Subnet Mask . . . . . : 255.255.252.0
    Default Gateway . . . . . : 192.168.0.1

C:\Documents and Settings\Administrator>
```

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

| Comprehensive parameter                                                                                                                                             |           | Edit                             | Monitor | Prog | Param | Coord | Dgnos |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------|---------|------|-------|-------|-------|
| 029, Inp. acc. speed mode                                                                                                                                           | Liner     | —                                |         |      |       |       | 0     |
| 030, 'S' speed acceleration                                                                                                                                         | 5000      | 038, Default gateway<>           |         |      |       |       | 192   |
| 031, HOME check enable for alarm                                                                                                                                    | OFF       | —                                |         |      |       |       | 168   |
| 032, HOME check enable                                                                                                                                              | ON        | —                                |         |      |       |       | 0     |
| 033, X diameter program enable                                                                                                                                      | 0         | —                                |         |      |       |       | 1     |
| 034, Default process plane                                                                                                                                          | G17 (X_Y) | 039, MAC address<>               |         |      |       |       | 18    |
| 035, T code form (compensation No.                                                                                                                                  | 0         | —                                |         |      |       |       | 52    |
| 036, Local IP address<>                                                                                                                                             | 192       | —                                |         |      |       |       | 86    |
| —                                                                                                                                                                   | 168       | —                                |         |      |       |       | 168   |
| —                                                                                                                                                                   | 2         | —                                |         |      |       |       | 2     |
| —                                                                                                                                                                   | 10        | —                                |         |      |       |       | 10    |
| 037, Subnet mask<>                                                                                                                                                  | 255       | 041, Feed speed setting Enable   |         |      |       |       | OFF   |
| —                                                                                                                                                                   | 255       | 042, Enable G00 Inp mode         |         |      |       |       | OFF   |
| —                                                                                                                                                                   | 252       | 043, Enable abnormal memory posi |         |      |       |       | OFF   |
| -- range:0 ~ 255 macroaddr:8060                                                                                                                                     |           |                                  |         |      |       |       |       |
| <div> <div>&lt;&lt;&lt;</div> <div>Compreh</div> <div>Axis</div> <div>Manage</div> <div>Tools</div> <div>Spindle</div> <div>IO</div> <div>&gt;&gt;&gt;</div> </div> |           |                                  |         |      |       |       |       |

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

```

C:\ Command Prompt
Microsoft Windows XP [Ver. 5.1.2600]
Copyright (C) 1985-2001 Microsoft Corp. All rights reserved.

C:\Documents and Settings\Administrator>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

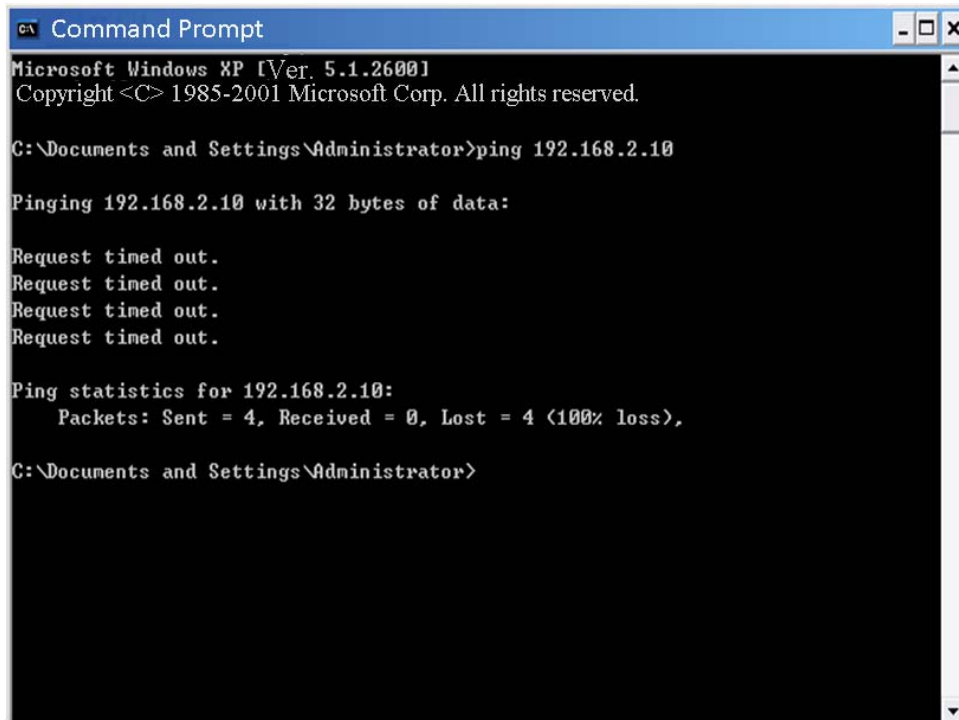
Reply from 192.168.2.10: bytes=32 time=3ms TTL=64
Reply from 192.168.2.10: bytes=32 time=1ms TTL=64
Reply from 192.168.2.10: bytes=32 time=1ms TTL=64
Reply from 192.168.2.10: bytes=32 time=2ms TTL=64

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

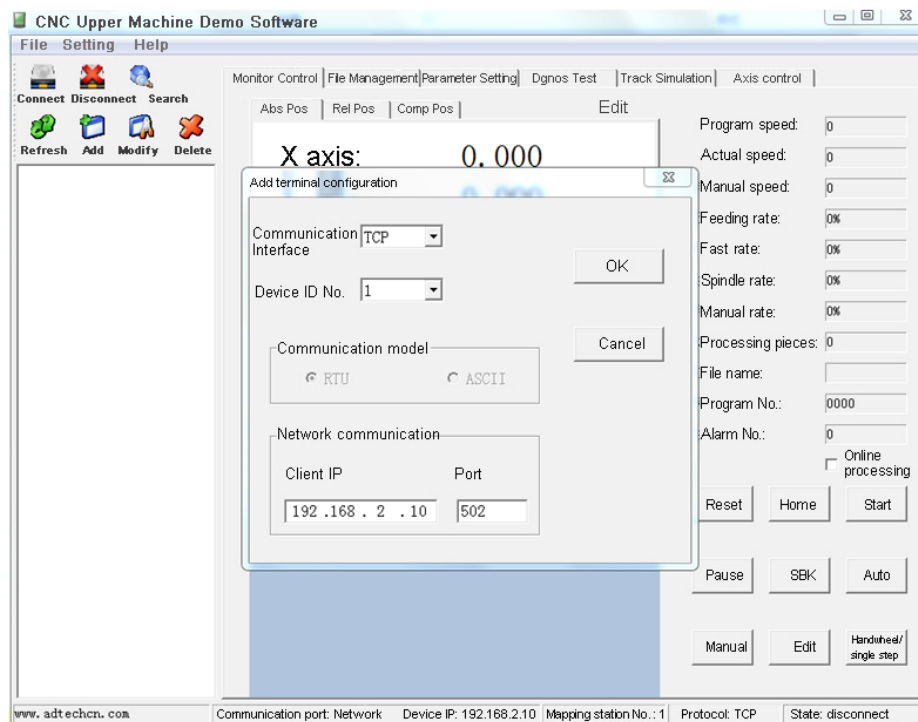
C:\Documents and Settings\Administrator>

```

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

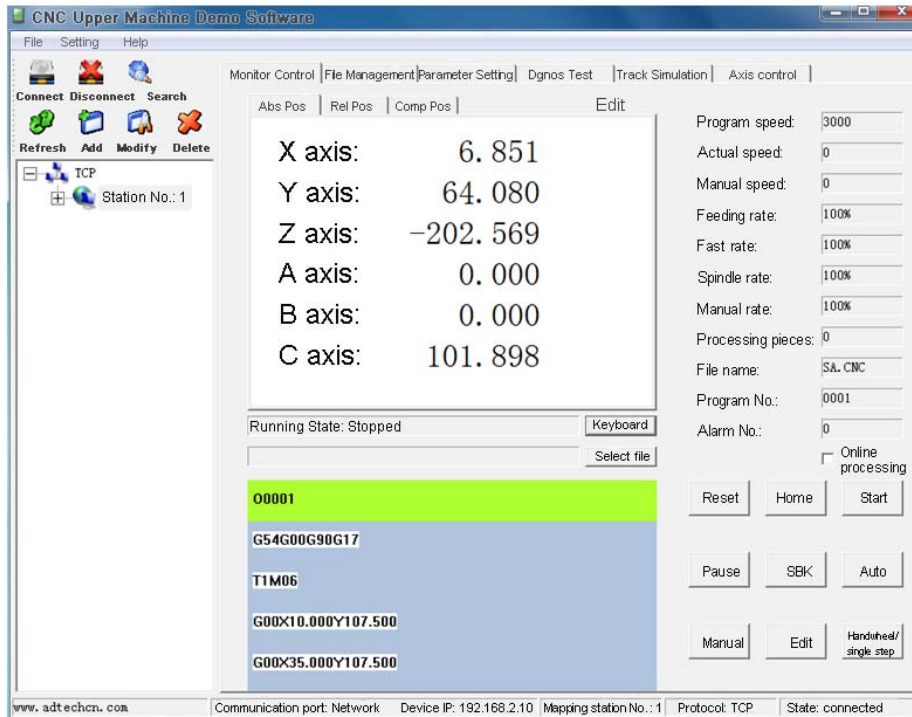


When the network is normal, you can open the communication software, add the terminal configuration, and set the IP address, as shown below:

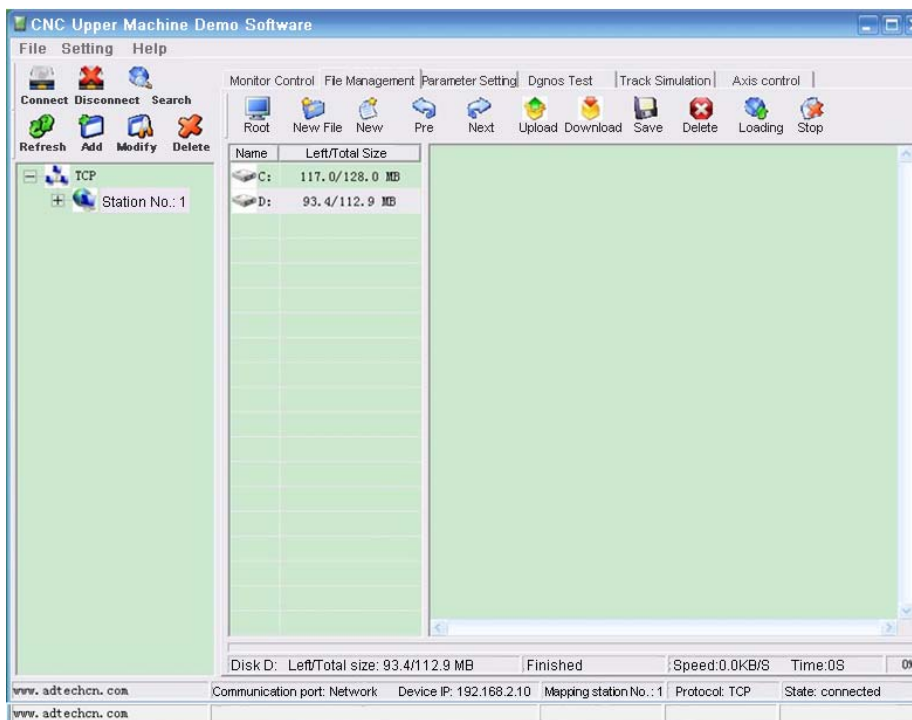




After setting the correct IP address, select the station number 1 under the TCP extension menu bar, and click the “Connect” button to access the contents of the controller, as shown below:



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

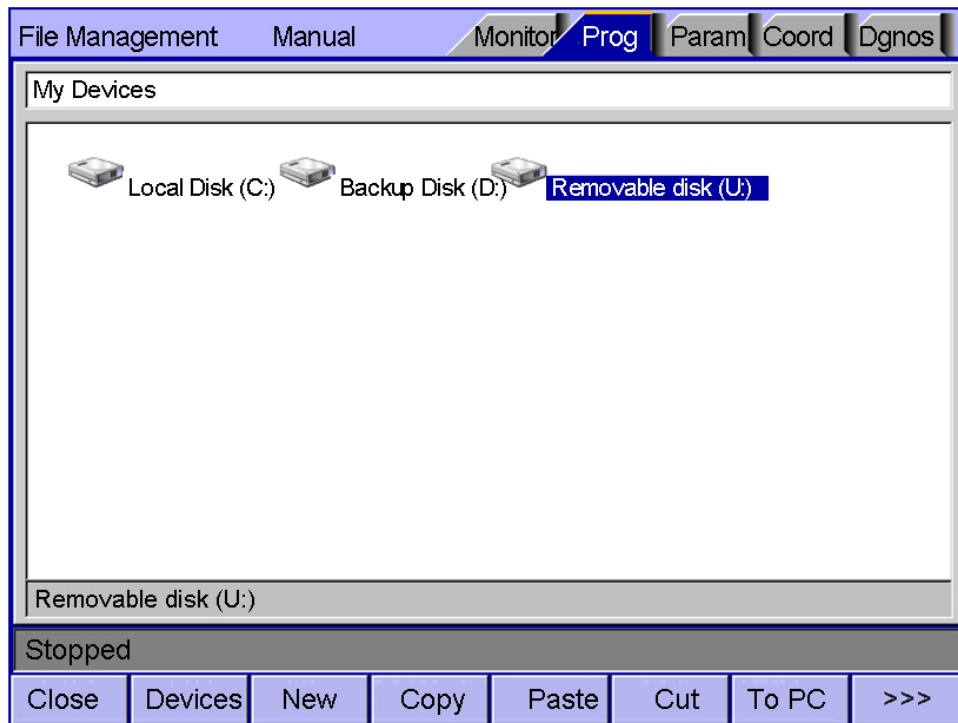


### 7.1.3 Copying processing files from USB disk

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

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

Select [File] to enter file operation interface;



Select USB disk and press [EOB] to enter;

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

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

## 7.2 Reading programs into work area

### 7.2.1 Reading programs from controller into work area

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

Press [File] to enter file operation interface;

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

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

### 7.2.2 Reading programs from USB disk into work area

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

Insert the USB disk;

Press [File] to enter file operation interface;

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

### 7.3 Editing & modifying programs

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

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

Copy, paste and delete:

#### 7.3.1 Single-line copy, paste and delete

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

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

#### 7.3.2 Multi-line copy, paste and delete

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

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

#### 7.3.3 Macro function fast programming

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

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

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

 **Caution**

After all operations, press Reset to save the files, and the edit functions base on edit mode;  
CNC96XX uses new file mapping technology, and allows loading processing files that exceed its memory. Therefore, to ensure the system efficiency, you can only search and process, but can't edit the processing files that exceed 2MB.

## 7.4 Deleting files

### 7.4.1 Deleting files in memory

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

Press [File] to enter file operation interface;

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

 **Caution**

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

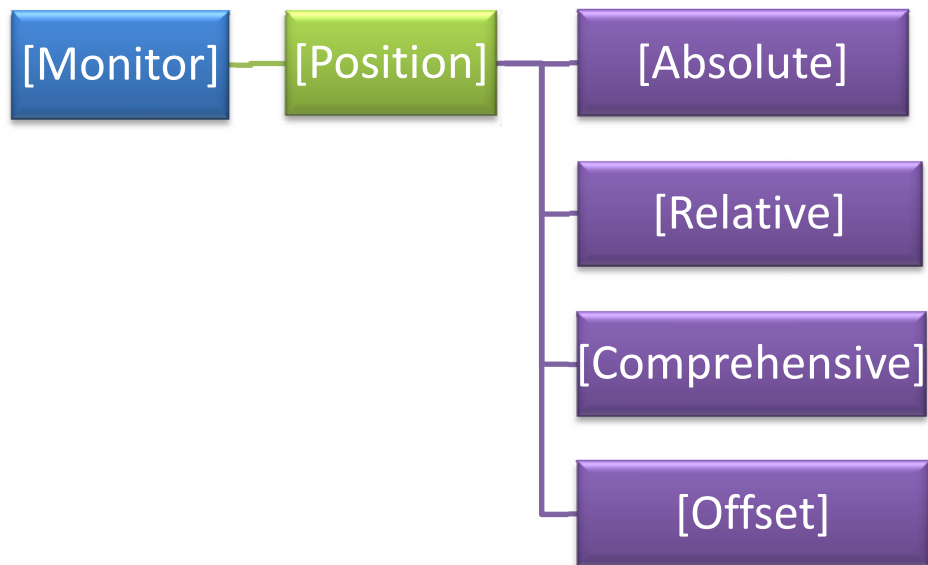
The programs loaded into the work area can't be deleted, or else the system will report error.

## 8. Main interfaces of the system

### 8.1 Position Interface

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

The way to enter position interface is as follows:



### 8.1.1 Absolute Position

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

The absolute position interface is as follows:

| Absolute Position                 |           | Manual                        | Monitor | Prog                | Param | Coord | Dgnos |
|-----------------------------------|-----------|-------------------------------|---------|---------------------|-------|-------|-------|
| X                                 | +0006.851 | M                             | 05      | X axis manual speed | 1000  |       |       |
| Y                                 | +0064.080 |                               | 09      | Y axis manual speed | 1000  |       |       |
| Z                                 | -0202.569 |                               | 33      | Z axis manual speed | 1000  |       |       |
| A                                 | +0000.000 |                               | 11      | A axes manual speed | 1000  |       |       |
| B                                 | +0000.000 | T                             | 0001    | B axis manual speed | 1000  |       |       |
| C                                 | +0101.898 | S                             | 0       | C axis manual speed | 1000  |       |       |
|                                   |           | s                             | 100     | Manual rate         | 100%  |       |       |
| G01 G17 G40:D00=000.000           |           | File name:SA.CNC Program:0001 |         |                     |       |       |       |
| G90 G54 G49:H00=000.000           |           | 00001 ;                       |         |                     |       |       |       |
| Left: 00:00:00 Sys time: 09:51:36 |           | G54G00G90G17 ;                |         |                     |       |       |       |
|                                   |           | T1M06 ;                       |         |                     |       |       |       |
|                                   |           | G00X10.000Y107.500 ;          |         |                     |       |       |       |
|                                   |           | G00X35.000Y107.500 ;          |         |                     |       |       |       |
|                                   |           | G00X60.000Y107.500 ;          |         |                     |       |       |       |
|                                   |           | G00X60.000Y57.500 ;           |         |                     |       |       |       |
| Stopped                           |           |                               |         |                     |       |       |       |
| Close                             | Absolute  | Relative                      | Compre  | Offset              |       |       | >>>   |

Absolute position interface

### 8.1.2 Relative Position

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

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

The operation is as follows:

Enter [Position] interface;

Switch to [Relative] interface;

Then, enter manual mode;

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

Press "Cancel" to reset X coordinate to 0;

The relative position interface is as follows:

| Absolute Position                 | Manual   | Monitor                         | Prog   | Param  | Coord | Dgnos |
|-----------------------------------|----------|---------------------------------|--------|--------|-------|-------|
| X +0006.851                       |          | M 05 X axis manual speed 1000   |        |        |       |       |
| Y +0064.080                       |          | 09 Y axis manual speed 1000     |        |        |       |       |
| Z -0202.569                       |          | 33 Z axis manual speed 1000     |        |        |       |       |
| A +0000.000                       |          | 11 A axes manual speed 1000     |        |        |       |       |
| B +0000.000                       |          | 21 B axis manual speed 1000     |        |        |       |       |
| C +0101.898                       |          | T 0001 C axis manual speed 1000 |        |        |       |       |
|                                   |          | S 0 Manual rate 100%            |        |        |       |       |
|                                   |          | s 100 Manual rate 100%          |        |        |       |       |
|                                   |          | File name: SA.CNC Program: 0001 |        |        |       |       |
|                                   |          | 00001 ;                         |        |        |       |       |
|                                   |          | G54G00G90G17 ;                  |        |        |       |       |
|                                   |          | T1M06 ;                         |        |        |       |       |
|                                   |          | G00X10.000Y107.500 ;            |        |        |       |       |
|                                   |          | G00X35.000Y107.500 ;            |        |        |       |       |
|                                   |          | G00X60.000Y107.500 ;            |        |        |       |       |
|                                   |          | G00X60.000Y57.500 ;             |        |        |       |       |
| G01 G17 G40:D00=000.000           |          |                                 |        |        |       |       |
| G90 G54 G49:H00=000.000           |          |                                 |        |        |       |       |
| Left: 00:00:00 Sys time: 09:59:35 |          |                                 |        |        |       |       |
| Stopped                           |          |                                 |        |        |       |       |
| Close                             | Absolute | Relative                        | Compre | Offset |       | >>>   |

Relative Position Interface



### 8.1.3 Comprehensive coordinates

The interface displayed by absolute coordinates and machine tool coordinates.

Comprehensive position interface is shown below:

| Comprehensive Position                                                                                                                                                                                                                     |          | Manual                                                                                                                                                                                   | Monitor | Prog                                                                                                                                                                                                                                                                                                                                                                                                                        | Param | Coord | Dgnos |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|
| <b>Absolute Position</b><br>X +0006.851<br>Y +0064.080<br>Z -0202.569<br>A +0000.000<br>B +0000.000<br>C +0101.898<br><b>Mechanical Position</b><br>X +0006.851<br>Y +0064.080<br>Z -0202.569<br>A +0000.000<br>B +0000.000<br>C +0101.898 |          | <b>Relative Position</b><br>X +0006.851<br>Y +0064.080<br>Z -0202.569<br>A +0000.000<br>B +0000.000<br>C +0101.898<br><b>Feedback Position</b><br>X 0<br>Y 0<br>Z 0<br>A 0<br>B 0<br>C 0 |         | M 05 X axis manual speed 1000<br>09 Y axis manual speed 1000<br>33 Z axis manual speed 1000<br>11 A axes manual speed 1000<br>21 B axis manual speed 1000<br>T 0001 C axis manual speed 1000<br>S 0 Manual ratio 100%<br>s 100 Manual ratio 100%<br>File name: SA. CNC Program: 0001<br>00001 ;<br>G54G00G90G17 ;<br>T1M06 ;<br>G00X10.000Y107.500 ;<br>G00X35.000Y107.500 ;<br>G00X60.000Y107.500 ;<br>G00X60.000Y57.500 ; |       |       |       |
| G01 G17 G40:D00=000.000<br>G90 G54 G49:H00=000.000<br>Left: 00:00:00 Sys time: 10:00:51                                                                                                                                                    |          |                                                                                                                                                                                          |         |                                                                                                                                                                                                                                                                                                                                                                                                                             |       |       |       |
| Stopped                                                                                                                                                                                                                                    |          |                                                                                                                                                                                          |         |                                                                                                                                                                                                                                                                                                                                                                                                                             |       |       |       |
| Close                                                                                                                                                                                                                                      | Absolute | Relative                                                                                                                                                                                 | Compre  | Offset                                                                                                                                                                                                                                                                                                                                                                                                                      |       |       | >>>   |

Comprehensive Position Interface

### 8.1.4 Deviation position

| Offset Position                                                                                                                                                                                                                        |          | Manual                                                                                                                                                                                                                                         | Monitor | Prog                                                                                                                                                                                                                                                                                                                                                                                                                      | Param | Coord | Dgnos |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|
| <b>Absolute Position</b><br>X +0006.851<br>Y +0064.080<br>Z -0202.569<br>A +0000.000<br>B +0000.000<br>C +0101.898<br><b>Offset Position</b><br>X -0006.851<br>Y -0064.080<br>Z +0202.569<br>A +0000.000<br>B +0000.000<br>C -0101.898 |          | <b>Feedback Position</b><br>X +0000.000<br>Y +0000.000<br>Z +0000.000<br>A +0000.000<br>B +0000.000<br>C +0000.000<br><b>Z-phase Offset Position</b><br>X +0000.000<br>Y +0000.000<br>Z +0000.000<br>A +0000.000<br>B +0000.000<br>C +0000.000 |         | M 05 X axis manual speed 1000<br>09 Y axis manual speed 1000<br>33 Z axis manual speed 1000<br>11 A axes manual speed 1000<br>21 B axis manual speed 1000<br>T 0001 C axis manual speed 1000<br>S 0 Manual rate 100%<br>s 100 Manual rate 100%<br>File name: SA. CNC Program: 0001<br>00001 ;<br>G54G00G90G17 ;<br>T1M06 ;<br>G00X10.000Y107.500 ;<br>G00X35.000Y107.500 ;<br>G00X60.000Y107.500 ;<br>G00X60.000Y57.500 ; |       |       |       |
| G01 G17 G40:D00=000.000<br>G90 G54 G49:H00=000.000<br>Left: 00:00:00 Sys time: 10:01:04                                                                                                                                                |          |                                                                                                                                                                                                                                                |         |                                                                                                                                                                                                                                                                                                                                                                                                                           |       |       |       |
| Stopped                                                                                                                                                                                                                                |          |                                                                                                                                                                                                                                                |         |                                                                                                                                                                                                                                                                                                                                                                                                                           |       |       |       |
| Close                                                                                                                                                                                                                                  | Absolute | Relative                                                                                                                                                                                                                                       | Compre  | Offset                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       | >>>   |



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

## 8.2 Edit

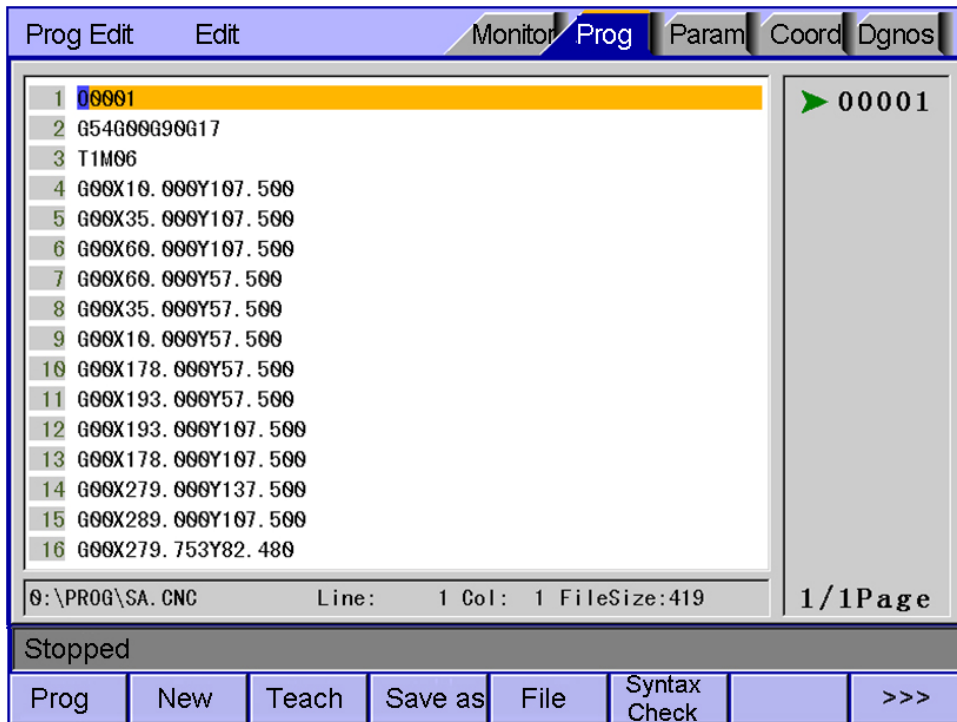
The edit interface shows the program info in current work area. In the main interface, press [Edit] to enter the program interface.

To enter program edit interface:



### 8.2.1 Program edit

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



Program Edit Interface

教导 Teaching 语法检查 Syntax check

### 8.2.2 New program

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

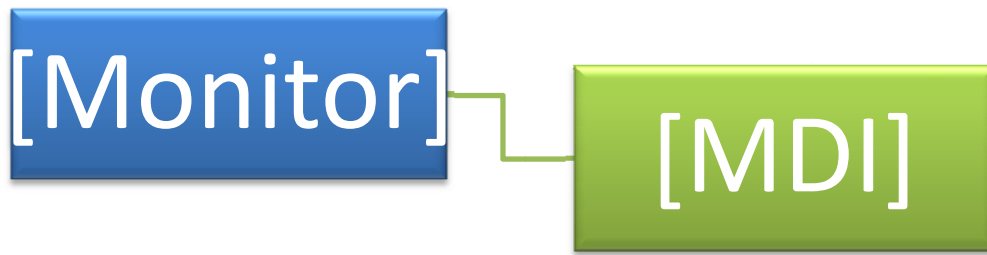
### 8.2.3 Save as

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

## 8.3 MDI interface

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

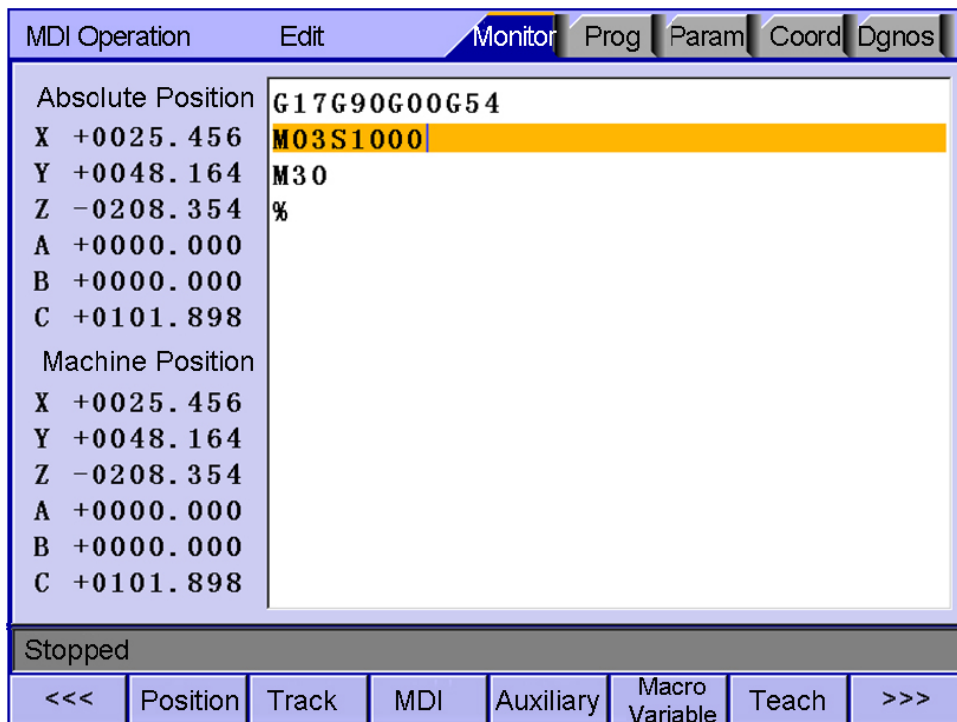
To enter MDI interface:



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

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

MDI interaction interface is shown below:

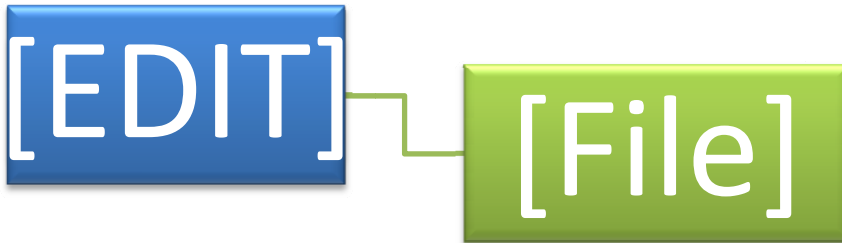


MDI Interface

## 8.4 File management

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

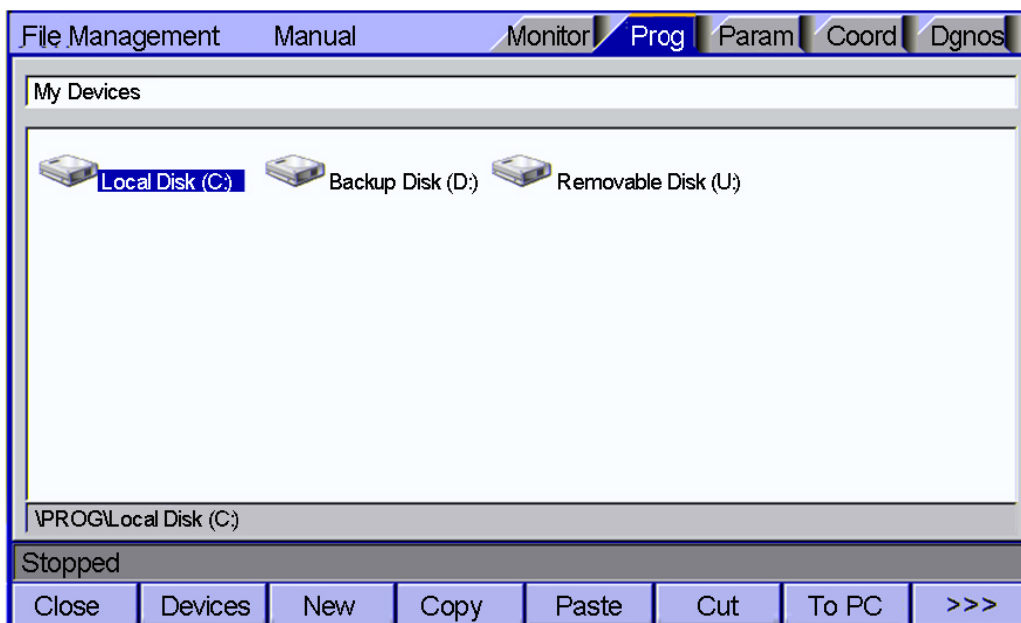
To enter file management interface:



File management mainly has the following functions:

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

File operation interface is shown below:



File Operation Interface

### 8.4.1 Copy

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

This allows file interaction.

### 8.4.2 Paste

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

This allows file interaction.

### 8.4.3 Cut

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

### 8.4.4 Connect computer

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

## 8.5 Graphic Simulation

[Track] function is to simulate NC processing program.

To enter graphic simulation interface:



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

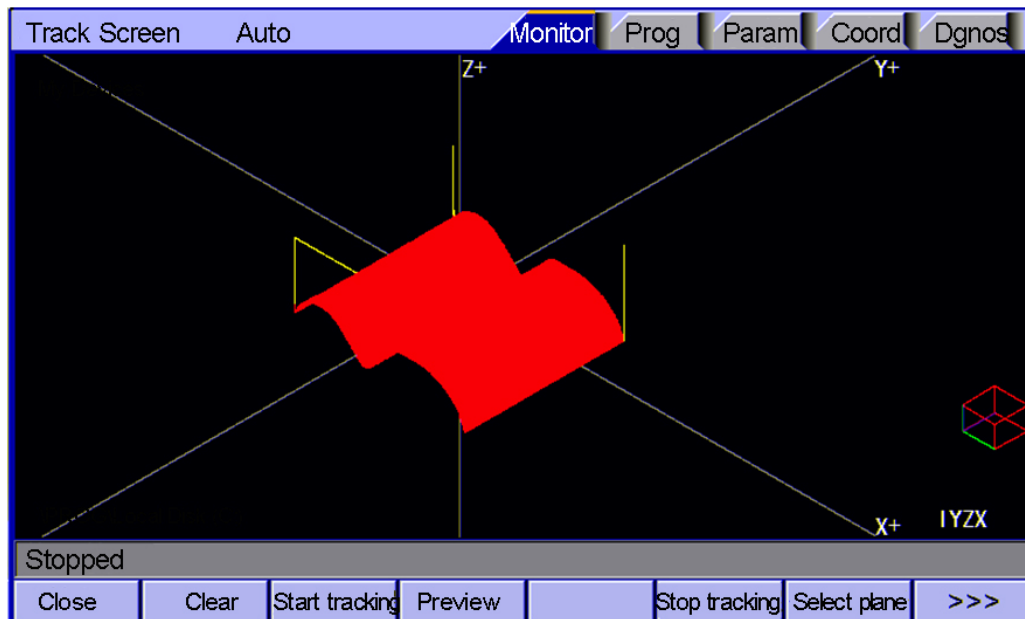
The shortcuts of adjusting position are as shown below:

PageUp: Zoom in

PageDown: Zoom out

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

Graphic simulation interface is shown below:

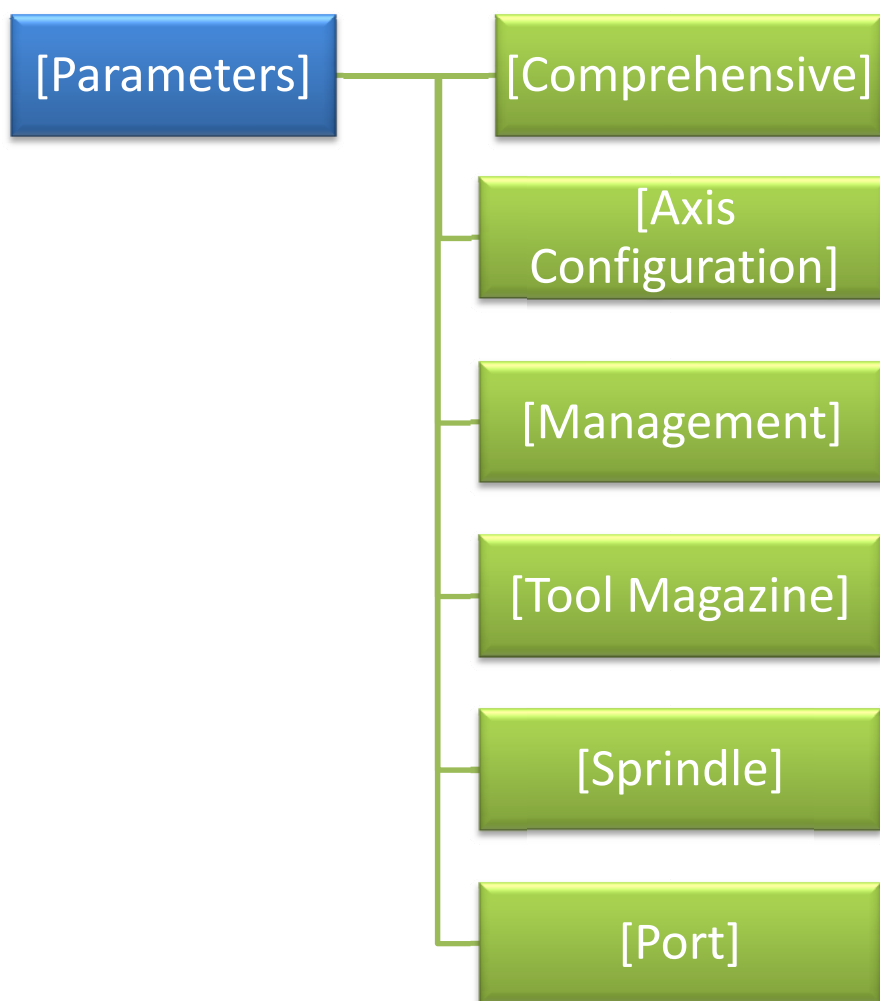


Graphic Simulation Interface

## 8.6 Parameter Interface

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

Parameter has the following menus:



## 8.6.1 Comprehensive Parameter

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

Comprehensive parameter interface is shown below:

| Comprehensive Parameter                                     |           | Edit                                 | Monitor | Prog           | Param   | Coord | Dgnos |
|-------------------------------------------------------------|-----------|--------------------------------------|---------|----------------|---------|-------|-------|
| 001, Feeding speed (mm/min)                                 | 3000      | 015, G73(M) Loop Obligate (mm)       | +       | 2.000          |         |       |       |
| 002, Initial feeding speed (mm/min)                         | 100       | 016, G83(M) Loop Obligate (mm)       | +       | 2.000          |         |       |       |
| 003, Feeding acceleration(mm/sec)                           | 500       | 017, Arc interpolation processing    |         | Position split |         |       |       |
| 004, Home mode                                              | Prog Home | 018, Speed optimization constraint   |         | Speed1         |         |       |       |
| 005, IO filter level (0~15)                                 | 0         | 019, Code pre-treatment              |         | CPU1 mode      |         |       |       |
| 006, Selection of communic. mode                            | 1-2-4     | 020, CNC file scan flag              |         | ON             |         |       |       |
| 007, Max feeding speed (mm/min)                             | 6000      | 021, Variable frequency analog con   |         | 0              |         |       |       |
| 008, Zeroing soft limit no alarm ena                        | 1         | 022, Lubricant pressure time openin  |         | 0              |         |       |       |
| 009, USB disk online machining ena                          | 0         | 023, Lubricant pressure keep time (  |         | 1              |         |       |       |
| 010, M code delay time (ms)                                 | 100       | 024, Lubricant pressure control freq |         | 0              |         |       |       |
| 011, Line number increment                                  | 0         | 025, Back home mode configuratio     |         | Z-XYABC        |         |       |       |
| 012, UART0 string baud rate<>                               | 115200    | 026, Arc Acc. clamping radius coef   | +       | 10.000         |         |       |       |
| 013, Controller ID number<>                                 | 1         | 027, Arc Acc. clamping speed coef    |         | 10000          |         |       |       |
| 014, Arc interpolation feed(mm)                             | + 0.200   | 028, Pretreatment code setting       |         | 5000           |         |       |       |
| 001, Feeding speed (mm/min) rang: 1~2000000 macroaddr: 8000 |           |                                      |         |                |         |       |       |
| <<<                                                         | Compre    | AxisParam                            | Manage  | Tools          | Spindle | IO    | >>>   |

Comprehensive Parameter Interface



## 8.6.2 Axis parameters

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

Axis parameter interface is shown below:

| Management Parameter                         |            | Edit                                | Monitor   | Prog  | Param   | Coord | Dgnos |
|----------------------------------------------|------------|-------------------------------------|-----------|-------|---------|-------|-------|
| 001, Type password to select man             | Super user | 015, Startup display module<  >     | Rel       |       |         |       |       |
| 002, Edit super user password                | *****      | 016, Sys language bag<  >           | zh-CN     |       |         |       |       |
| 003, Edit operator password                  | *****      | 017, Macro key word valid enable    | ON        |       |         |       |       |
| 004, Initialize comprehensive param          | =====      | 018, Startup picture display        | 1s        |       |         |       |       |
| 005, Initialize IO configuration to def      | =====      | 019, System axis group self-start c | 1         |       |         |       |       |
| 006, Reset all parameters <>                 | =====      | 020, Sys debug information enable   | SYSTEM    |       |         |       |       |
| 007, Backup parameters                       | =====      | 021, Axis control composite enable  | ON        |       |         |       |       |
| 008, Restore parameters                      | =====      | 022, Additional panel enable        | OFF       |       |         |       |       |
| 009, Generate password file                  | =====      | 023, M Macro prog selection<>       | MFUNC (M) |       |         |       |       |
| 010, System axis group config                | 6-0        | 024, T Macro prog selection<>       | TFUNC (M) |       |         |       |       |
| 011, Clear add up work number                | 3          | 025, PLC prog enable<>              | OFF       |       |         |       |       |
| 012, Clear current work number               | 0          | 026, Screen saver ON (min)          | 0         |       |         |       |       |
| 013, Accumulated processing max              | 0          | 027, Modbus master/slave set<>      | 1         |       |         |       |       |
| 014, Import the CSV system config            | =====      | 028, Imperial system enable <>      | OFF       |       |         |       |       |
| 001, Type password to select management mode |            |                                     |           |       |         |       |       |
| <<<                                          | Compre     | AxisParam                           | Manage    | Tools | Spindle | IO    | >>>   |

Axis Parameter Interface

### 8.6.3 Management Parameter

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

Management parameter interface is shown below:

| Management Parameter                                                       |            | Edit                                | Monitor   | Prog  | Param   | Coord | Dgnos |
|----------------------------------------------------------------------------|------------|-------------------------------------|-----------|-------|---------|-------|-------|
| 001, Type password to select man                                           | Super user | 015, Startup display module<  >     | Re I      |       |         |       |       |
| 002, Edit super user password                                              | *****      | 016, Sys language bag<  >           | zh-CN     |       |         |       |       |
| 003, Edit operator password                                                | *****      | 017, Macro key word valid enable    | ON        |       |         |       |       |
| 004, Initialize comprehensive param                                        | =====      | 018, Startup picture display        | 1s        |       |         |       |       |
| 005, Initialize IO configuration to def                                    | =====      | 019, System axis group self-start c | 1         |       |         |       |       |
| 006, Reset all parameters <>                                               | =====      | 020, Sys debug information enable   | SYSTEM    |       |         |       |       |
| 007, Backup parameters                                                     | =====      | 021, Axis control composite enable  | ON        |       |         |       |       |
| 008, Restore parameters                                                    | =====      | 022, Additional panel enable        | OFF       |       |         |       |       |
| 009, Generate password file                                                | =====      | 023, M Macro prog selection<>       | MFUNC (M) |       |         |       |       |
| 010, System axis group config                                              | 6-0        | 024, T Macro prog selection<>       | TFUNC (M) |       |         |       |       |
| 011, Clear add up work number                                              | 3          | 025, PLC prog enable<>              | OFF       |       |         |       |       |
| 012, Clear current work number                                             | 0          | 026, Screen saver ON (min)          | 0         |       |         |       |       |
| 013, Accumulated processing max                                            | 0          | 027, Modbus master/slave set<>      | 1         |       |         |       |       |
| 014, Import the CSV system config                                          | =====      | 028, Imperial system enable <>      | OFF       |       |         |       |       |
| 001, Type password to select management mode range: 0~255 macroaddr: 11000 |            |                                     |           |       |         |       |       |
| <<<                                                                        | Compre     | Axis Param                          | Manage    | Tools | Spindle | IO    | >>>   |

Management Parameter Interface

## 8.6.4 Tool magazine parameters

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

## 8.6.5 Spindle parameters

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

Spindle parameter interface is shown below:

| Spindle Parameter                                              |             | Edit                                  | Monitor | Prog      | Param   | Coord | Dgnos |
|----------------------------------------------------------------|-------------|---------------------------------------|---------|-----------|---------|-------|-------|
| 001, 1st spi. mapping axis <->                                 | A           | 015, Spindle stop delay (ms)          |         | 0         |         |       |       |
| 002, 2nd spi. mapping axis <->                                 | Analog spi. | 016, Alarm off spindle enable         |         | 0         |         |       |       |
| 003, Spi. max speed (rpm)                                      | 3000        | 017, Spindle Auto Open                |         | OFF       |         |       |       |
| 004, Spi. open delay time (ms)                                 | 0           | 018, Spindle Auto Stop                |         | OFF       |         |       |       |
| 005, Sys spi. rotation                                         | 2           | 019, Analog spi. encoder one loop     |         | 0         |         |       |       |
| 006, Auto pause to close the spi.                              | 0           | 020, Analog spi. gear numerator       |         | 1         |         |       |       |
| 007, Min spi. speed (rpm)                                      | 100         | 021, Analog spi. gear denominator     |         | 1         |         |       |       |
| 008, 2nd spi. max speed (rpm)                                  | 24000       | 022, Tapping mode                     |         | INP       |         |       |       |
| 009, 2nd spi. speed                                            | 100         | 023, Way of tapping acc. and dece.    |         | Trapezoid |         |       |       |
| 010, Spi. command S value invalid                              | OFF         | 024, If tapping shaft has an encoder  |         | OFF       |         |       |       |
| 011, Mechanical spi. speed in gear 1                           | 24000       | 025, Tapping FPGA calculates spi.     |         | ON        |         |       |       |
| 012, Mechanical spi. speed in gear 2                           | 24000       | 026, Tapping enables spi. acc. filter |         | ON        |         |       |       |
| 013, Mechanical spi. speed in gear 3                           | 24000       | 027, Tapping adjusting param. Kp      |         | 68.000    |         |       |       |
| 014, Mechanical spi. speed in gear 4                           | 24000       | 028, Tapping adjusting param. Ki      |         | 0.000     |         |       |       |
| 001, 1st spindle mapping axis <-> range: 0~12 macroaddr: 11500 |             |                                       |         |           |         |       |       |
| <<<                                                            | Compre      | Axis Param                            | Manage  | Tools     | Spindle | IO    | >>>   |

Spindle Parameter Interface

## 8.6.6 IO configuration parameters

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

IO configuration parameter interface is shown below:

| IO Parameter                                                      | Edit     | Monitor                               | Prog     | Param | Coord   | Dgnos  |
|-------------------------------------------------------------------|----------|---------------------------------------|----------|-------|---------|--------|
| 001, Tool checking input port No.                                 | IN (20)  | 019, Spi. CCW output port number      | OUT (01) |       |         |        |
| 002, Tool setting safety testing inp                              | =====    | 020, Spi. CW 2 forward output port    | =====    |       |         |        |
| 003, Tool setting magazine output                                 | =====    | 021, Spi. CCW 2 reverse output por    | =====    |       |         |        |
| 004, Tool setting dust cover output                               | =====    | 022, Spi.e inverter alarm reset outpu | =====    |       |         |        |
| 005, Tool setting dust cover lift in p                            | =====    | 023, Spi. blowing output port         | =====    |       |         |        |
| 006, Tool regulator limit input port                              | IN (21)  | 024, Spi. brake output port           | =====    |       |         |        |
| 007, Tool regulator blow output por                               | =====    | 029, Safety grating input port numb   | =====    |       |         |        |
| 008, Spi. alarm input detect. port No                             | =====    | 030, Air pressure alarm input port no | =====    |       |         |        |
| 009, Variable freq. alarm input dete                              | =====    | 031, Feed alarm input port number     | =====    |       |         |        |
| 014, Sys power-off input port No.                                 | =====    | 032, Oil pressure alarm input port no | =====    |       |         |        |
| 015, Sys power-off output port No.                                | =====    | 033, Ex. start 2 input port number    | =====    |       |         |        |
| 016, Gearbox gear detection input 1                               | =====    | 034, Ext. pause 2 input port number   | =====    |       |         |        |
| 017, Gearbox gear detection input 2                               | =====    | 035, Ext. emergency stop 2 input p    | =====    |       |         |        |
| 018, Spi. CW output port number                                   | OUT (00) | 036, Cooler alarm input port number   | =====    |       |         |        |
| 001, Tool checking input port No. range: 0~65535 macroaddr: 10000 |          |                                       |          |       |         |        |
| <<<                                                               | Compre   | Axis Param                            | Manage   | Tools | Spindle | IO >>> |

IO Configuration Parameters Interface

## 8.7 Compensation interface

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

To enter tool compensation interface:



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

Tool compensation interface is shown below:

| Tool No. | Length compensation | R compensation |
|----------|---------------------|----------------|
| 1        | +0000.000           | +0000.000      |
| 2        | +0000.000           | +0000.000      |
| 3        | +0000.000           | +0000.000      |
| 4        | +0000.000           | +0000.000      |
| 5        | +0000.000           | +0000.000      |
| 6        | +0000.000           | +0000.000      |
| 7        | +0000.000           | +0000.000      |
| 8        | +0000.000           | +0000.000      |
| 9        | +0000.000           | +0000.000      |
| 10       | +0000.000           | +0000.000      |

Tool Compensation Parameter Setting Interface

## 8.8 Milling system workpiece coordinate system setting interface

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



### 8.8.1 Workpiece coordinate system

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

To enter workpiece coordinate system interface:

[coordinates]

[Coordinate settings]

The workpiece coordinate system interface is shown below:

| Coordinate System                                                                                                                                                                |             | Edit      | Monitor   | Prog | Param     | Coord     | Dgnos |           |           |           |           |           |           |           |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|-----------|------|-----------|-----------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Absolute Position                                                                                                                                                                | X +0025.456 | G54       | X + 0.000 | G55  | X + 0.000 | X + 0.000 |       |           |           |           |           |           |           |           |           |
|                                                                                                                                                                                  | Y +0048.164 |           |           |      |           |           |       | Y + 0.000 | Y + 0.000 | Y + 0.000 |           |           |           |           |           |
|                                                                                                                                                                                  | Z -0208.354 |           |           |      |           |           |       |           |           |           | Z + 0.000 | Z + 0.000 | Z + 0.000 |           |           |
|                                                                                                                                                                                  | A +0000.000 |           |           |      |           |           |       |           |           |           |           |           |           | A + 0.000 | A + 0.000 |
|                                                                                                                                                                                  | B +0000.000 |           |           |      |           |           |       |           |           |           |           |           |           |           |           |
| C +0101.898                                                                                                                                                                      | C + 0.000   | C + 0.000 | C + 0.000 |      |           |           |       |           |           |           |           |           |           |           |           |
| Mechanical Position                                                                                                                                                              | X +0025.456 | G56       | X + 0.000 | G57  | X + 0.000 | X + 0.000 |       |           |           |           |           |           |           |           |           |
|                                                                                                                                                                                  | Y +0048.164 |           |           |      |           |           |       | Y + 0.000 | Y + 0.000 | Y + 0.000 |           |           |           |           |           |
|                                                                                                                                                                                  | Z -0208.354 |           |           |      |           |           |       |           |           |           | Z + 0.000 | Z + 0.000 | Z + 0.000 |           |           |
|                                                                                                                                                                                  | A +0000.000 |           |           |      |           |           |       |           |           |           |           |           |           | A + 0.000 | A + 0.000 |
|                                                                                                                                                                                  | B +0000.000 |           |           |      |           |           |       |           |           |           |           |           |           |           |           |
| C +0101.898                                                                                                                                                                      | C + 0.000   | C + 0.000 | C + 0.000 |      |           |           |       |           |           |           |           |           |           |           |           |
| Relative Position                                                                                                                                                                | X +0025.456 | G57       | X + 0.000 | G58  | X + 0.000 | X + 0.000 |       |           |           |           |           |           |           |           |           |
|                                                                                                                                                                                  | Y +0048.164 |           |           |      |           |           |       | Y + 0.000 | Y + 0.000 | Y + 0.000 |           |           |           |           |           |
|                                                                                                                                                                                  | Z -0208.354 |           |           |      |           |           |       |           |           |           | Z + 0.000 | Z + 0.000 | Z + 0.000 |           |           |
|                                                                                                                                                                                  | A +0000.000 |           |           |      |           |           |       |           |           |           |           |           |           | A + 0.000 | A + 0.000 |
|                                                                                                                                                                                  | B +0000.000 |           |           |      |           |           |       |           |           |           |           |           |           |           |           |
| C +0101.898                                                                                                                                                                      | C + 0.000   | C + 0.000 | C + 0.000 |      |           |           |       |           |           |           |           |           |           |           |           |
| Stopped                                                                                                                                                                          |             |           |           |      |           |           |       |           |           |           |           |           |           |           |           |
| <div> <div>&lt;&lt;&lt;</div> <div>Setting</div> <div>Compe</div> <div>C Param</div> <div>Centered</div> <div>TRegulator</div> <div>Measure</div> <div>&gt;&gt;&gt;</div> </div> |             |           |           |      |           |           |       |           |           |           |           |           |           |           |           |

Workpiece Coordinate System Setting Interface



### 8.8.2 Settings of tool setting parameter

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



The tool parameters are shown below:

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

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

#### (1) Coordinate offset

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

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

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

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

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

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

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

### 8.8.3 Allowance

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



| Coordinate System   |           | Edit                | Monitor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Prog           | Param               | Coord          | Dgnos          |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|---------------------|-----------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------|----------------|----------------|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|---|-----------|-----------|----|-----------|-----------|--|--|--|--|
| Absolute Position   | X         | +0025.456           | <div>Coord sys</div> <div>Allowance</div> <div>Set</div> <div>Center</div> <div>Tool</div> <div>Measu</div> <table border="1"> <thead> <tr> <th>Tool No.</th> <th>Length compensation</th> <th>R compensation</th> </tr> </thead> <tbody> <tr><td>1</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>2</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>3</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>4</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>5</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>6</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>7</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>8</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>9</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>10</td><td>+0000.000</td><td>+0000.000</td></tr> </tbody> </table> | Tool No.       | Length compensation | R compensation | 1              | +0000.000 | +0000.000 | 2 | +0000.000 | +0000.000 | 3 | +0000.000 | +0000.000 | 4 | +0000.000 | +0000.000 | 5 | +0000.000 | +0000.000 | 6 | +0000.000 | +0000.000 | 7 | +0000.000 | +0000.000 | 8 | +0000.000 | +0000.000 | 9 | +0000.000 | +0000.000 | 10 | +0000.000 | +0000.000 |  |  |  |  |
|                     | Tool No.  | Length compensation |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | R compensation |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | 1         | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | +0000.000      |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | 2         | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | +0000.000      |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 3                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 4                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 5                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 6                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 7                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 8                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 9                   | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| 10                  | +0000.000 | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| Y                   | +0048.164 |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| Z                   | -0208.354 |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| A                   | +0000.000 |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| Mechanical Position | B         | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | C         | +0101.898           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | X         | +0025.456           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | Y         | +0048.164           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| Relative Position   | Z         | -0208.354           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | A         | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | B         | +0000.000           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
|                     | C         | +0101.898           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| Stopped             |           |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                     |                |                |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |
| Close               |           | Allowance           | Offset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | X screw in     | Y screw in          | Z screw in     | A screw in >>> |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |   |           |           |    |           |           |  |  |  |  |

#### 8.8.4 Offset

| Coordinate System   |           | Edit      | Monitor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Prog       | Param      | Coord      | Dgnos          |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|---------------------|-----------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|----------------|-----------|----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|----|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|--|
| Absolute Position   | X         | +0025.456 | <div>Coord sys</div> <div>Allowance</div> <div>Set</div> <div>Center</div> <div>Tool</div> <div>Measu</div> <table border="1"> <thead> <tr> <th>No.</th> <th>X Offset</th> <th>Y Offset</th> <th>Z Offset</th> <th>A Offset</th> <th>B Offset</th> <th>C Offset</th> </tr> </thead> <tbody> <tr><td>1</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>2</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>3</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>4</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>5</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>6</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>7</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>8</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>9</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> <tr><td>10</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td><td>+0000.000</td></tr> </tbody> </table> | No.        | X Offset   | Y Offset   | Z Offset       | A Offset  | B Offset | C Offset | 1 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 2 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 3 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 4 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 5 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 6 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 7 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 8 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 9 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | 10 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 | +0000.000 |  |  |  |  |
|                     | No.       | X Offset  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Y Offset   | Z Offset   | A Offset   | B Offset       | C Offset  |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | 1         | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      | +0000.000 |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | 2         | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      | +0000.000 |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 3                   | +0000.000 | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 4                   | +0000.000 | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 5                   | +0000.000 | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 6                   | +0000.000 | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 7                   | +0000.000 | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 8                   | +0000.000 | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | +0000.000  | +0000.000  | +0000.000  | +0000.000      |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 9                   | +0000.000 | +0000.000 | +0000.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | +0000.000  | +0000.000  | +0000.000  |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| 10                  | +0000.000 | +0000.000 | +0000.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | +0000.000  | +0000.000  | +0000.000  |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| Y                   | +0048.164 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| Z                   | -0208.354 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| A                   | +0000.000 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| Mechanical Position | B         | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | C         | +0101.898 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | X         | +0025.456 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | Y         | +0048.164 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| Relative Position   | Z         | -0208.354 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | A         | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | B         | +0000.000 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
|                     | C         | +0101.898 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| Stopped             |           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |                |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |
| Close               |           | Allowance | Offset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | X screw in | Y screw in | Z screw in | A screw in >>> |           |          |          |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |    |           |           |           |           |           |           |  |  |  |  |

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

#### 8.8.5 Screw itch error compensation

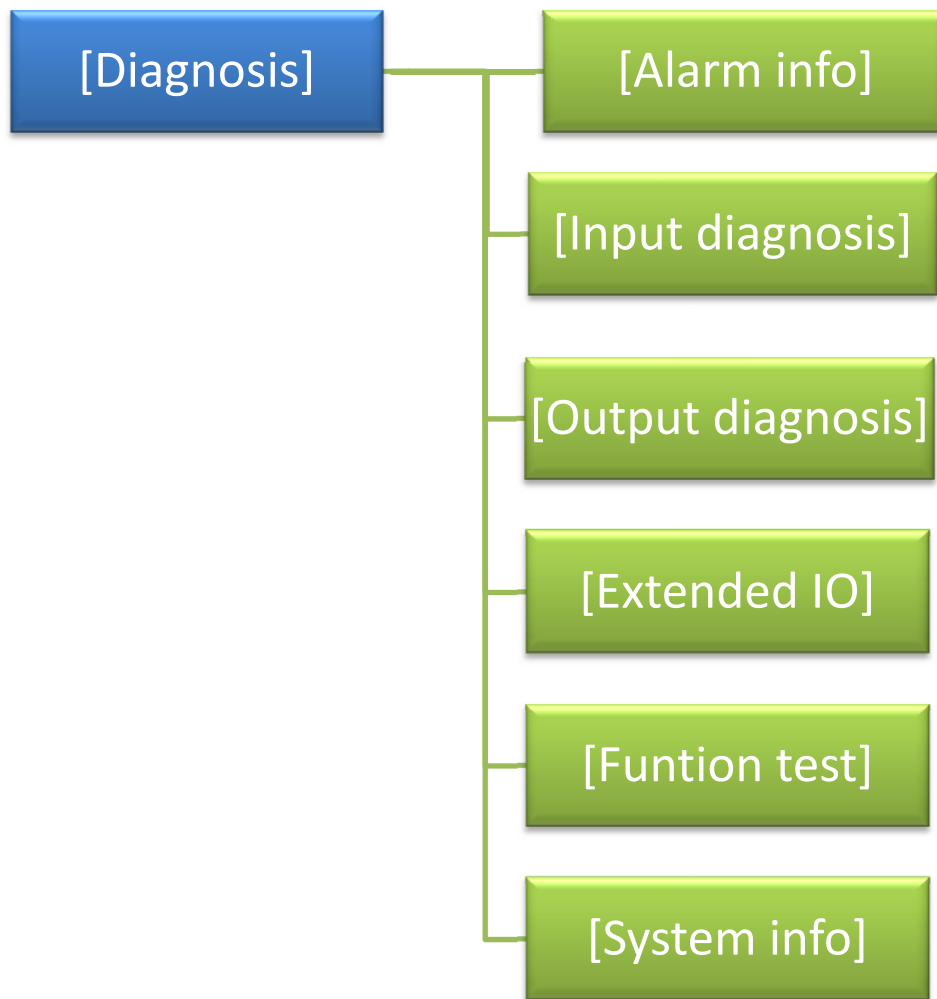
| Coordinate System   |             | Edit      | Monitor                  | Prog                      | Param      | Coord      | Dgnos          |
|---------------------|-------------|-----------|--------------------------|---------------------------|------------|------------|----------------|
| Absolute Position   | X +0025.456 | Coord sys | Allowance                | Set                       | Center     | Tool       | Measu          |
|                     | Y +0048.164 | SN        | X CW screw interpolation | X CCW screw interpolation |            |            |                |
|                     | Z -0208.354 | 0         | +                        | 0.000                     | +          | 0.000      |                |
|                     | A +0000.000 | 1         | +                        | 0.000                     | +          | 0.000      |                |
| Mechanical Position | B +0000.000 | 2         | +                        | 0.000                     | +          | 0.000      |                |
|                     | C +0101.898 | 3         | +                        | 0.000                     | +          | 0.000      |                |
|                     | X +0025.456 | 4         | +                        | 0.000                     | +          | 0.000      |                |
|                     | Y +0048.164 | 5         | +                        | 0.000                     | +          | 0.000      |                |
| Relative Position   | Z -0208.354 | 6         | +                        | 0.000                     | +          | 0.000      |                |
|                     | A +0000.000 | 7         | +                        | 0.000                     | +          | 0.000      |                |
|                     | B +0000.000 | 8         | +                        | 0.000                     | +          | 0.000      |                |
|                     | C +0101.898 | 9         | +                        | 0.000                     | +          | 0.000      |                |
| Stopped             |             |           |                          |                           |            |            |                |
| Close               |             | Allowance | Offset                   | X screw in                | Y screw in | Z screw in | A screw in >>> |

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

## 8.9 Controller diagnosis interface (diagnosis)

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

The diagnosis interface is as follows:



### 8.9.1 Alarm check

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

### 8.9.2 IO diagnosis interface

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

### 8.9.3 Function test

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

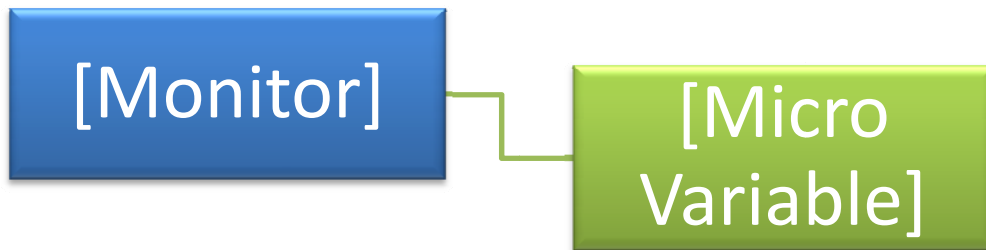
### 8.9.4 System Info

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

### 8.10 Macro variable view interface (macro variable)

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

To enter macro variable view interface:



The macro variable menu has eight levels, as below:

Local variable

#100~#199

#500~#599

#600~#699

#700~#799

#800~#899

#900~#999

User variable

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

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

## 8.11 Current mode instruction info

Display the G code mode info of current system;

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

|                                        |                           |
|----------------------------------------|---------------------------|
| Motion instruction:                    | G00, G01                  |
| Select plane:                          | G17, G18, G19             |
| Coordinate logic:                      | G90, G91                  |
| Workpiece coordinate system:           | G54, ...G59, G591... G599 |
| Radius compensation:                   | G40, G41, G42             |
| Length compensation:                   | G43, G44, G49             |
| Compound instruction retracting plane: | G98, G99                  |
| Spindle rotation:                      | S                         |
| Tool No.:                              | T                         |

## 9. System maintenance

### 9.1 Restart

- (1) In the main menu, press [Edit] to enter the program interface;
- (2) Press [File] to enter the file interface;
- (3) Press [Reset] and the system will ask whether to restart or not;
- (4) Press [OK] to restart the system.

### 9.2 System upgrade

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

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

### 9.3 Reset

- (1) Select the edit mode;
- (2) In the main menu, press [Parameter] to enter the parameter interface;
- (3) Press [Management] key to enter management parameter interface;
- (4) Move cursor to "006 Reset all parameters";
- (5) Press [EOB], the system confirms, restores the default parameters and restarts automatically.

### 9.4 Parameter backup and restore

- (1) Select the edit mode;
- (2) In the main menu, press [Parameter] to enter the parameter interface;
- (3) Press [Management] key to enter management parameter interface;

- (4) Move cursor to 007 or 008, and select corresponding operation menu;
- (5) Press [EOB], the system confirms, and performs backup or restore operation;
- (6) The backup operation will generate the SYSCONF.BAK file in the root directory of disk D. Please save this file for backup in the future.
- (7) For restore operation, also save the SYSCONF.BAK file in the root directory of disk D. The system will recognize this file automatically in the process of restoring.

## 9.5 Enter BIOS

- (1) If the system has irreversible error and can't be started, please enter BIOS to upgrade and maintain the program;
- (2) To enter BIOS, press the [Cancel] key after the controller is electrified and before the application is started; after entering, a blue background interface pops up. If the BIOS requires password, a prompt pops up. Please type the password to enter the BIOS.
- (3) Enter BIOS to perform operations such as format disk C, D, and copy files from USB disk to upgrade;

## 10. System parameters

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

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

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

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

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

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

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

Bit0: Set to 1 to correspond to decimal 1;

Bit1: Set to 1 to correspond to decimal 2;

Bit2: Set to 1 to correspond to decimal 4;

Bit3: Set to 1 to correspond to decimal 8;

Bit4: Set to 1 to correspond to decimal 16;

Bit5: Set to 1 to correspond to decimal 32;

Bit6: Set to 1 to correspond to decimal 64;

Bit7: Set to 1 to correspond to decimal 128;

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

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



## 10.1 Parameter index list

| Parameter type                | S/N | Description                                    | Effective mode | Default value | Page |
|-------------------------------|-----|------------------------------------------------|----------------|---------------|------|
| Comprehensive parameter (P1.) | 001 | Feeding speed                                  | Instant        |               |      |
| Comprehensive parameter (P1.) | 002 | Initial feeding speed                          | Instant        |               |      |
| Comprehensive parameter (P1.) | 003 | Feeding acceleration                           | Instant        |               |      |
| Comprehensive parameter (P1.) | 004 | Home mode                                      | Instant        |               |      |
| Comprehensive parameter (P1.) | 005 | IO filter level (1~15)                         | Instant        |               |      |
| Comprehensive parameter (P1.) | 006 | Selection of communication mode                | Restart        |               |      |
| Comprehensive parameter (P1.) | 007 | Max feeding speed (mm/min)                     | Instant        |               |      |
| Comprehensive parameter (P1.) | 008 | Zeroing soft limit no alarm enable             | Instant        |               |      |
| Comprehensive parameter (P1.) | 009 | USB disk online online processing enable       | Instant        |               |      |
| Comprehensive parameter (P1.) | 010 | M code delay time (ms)                         | Instant        |               |      |
| Comprehensive parameter (P1.) | 011 | Line number increment                          | Instant        |               |      |
| Comprehensive parameter (P1.) | 012 | UART0 string baud rate                         | Restart        |               |      |
| Comprehensive parameter (P1.) | 013 | Controller ID number                           | Restart        |               |      |
| Comprehensive parameter (P1.) | 014 | Arc interpolation feed(mm)                     | Instant        |               |      |
| Comprehensive parameter (P1.) | 015 | G73(M) circulating tool retraction amount (mm) | Instant        |               |      |
| Comprehensive parameter (P1.) | 016 | G83(M) circulating tool retraction amount (mm) | Instant        |               |      |
| Comprehensive parameter (P1.) | 017 | Arc interpolation processing mode              | Instant        |               |      |
| Comprehensive parameter (P1.) | 018 | Speed optimization constraint mode             | Instant        |               |      |
| Comprehensive parameter (P1.) | 019 | Code pre-treatment                             | Instant        |               |      |
| Comprehensive parameter (P1.) | 020 | CNC file scan flag                             | Instant        |               |      |
| Comprehensive parameter (P1.) | 021 | Variable frequency analog control mode         | Instant        |               |      |
| Comprehensive parameter (P1.) | 022 | Lubricant pressure time opening (min)          | Instant        |               |      |
| Comprehensive parameter (P1.) | 023 | Lubricant pressure keep time (sec)             | Instant        |               |      |
| Comprehensive parameter (P1.) | 024 | Lubricant pressure control freq(Hz)            | Instant        |               |      |
| Comprehensive parameter (P1.) | 025 | Back home mode configuration                   | Instant        |               |      |

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

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

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

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

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



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

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



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

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

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

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

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

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



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

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



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

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

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

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

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

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

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



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

## 10.2 Comprehensive parameter (P1.)

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

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



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

004

#### Zero Return Mode

|                |   |                                         |
|----------------|---|-----------------------------------------|
| Range          | : | 0~1                                     |
| Unit           | : | None                                    |
| Authority      | : | Operation admin or higher               |
| Default        | : | 0 (Program home)                        |
| Effective time | : | Instant                                 |
| Note           | : | 0 - Program home<br>1 - Mechanical home |

Program home is that the coordinates go to home, i.e. in place.

Mechanical home requires external detection switch to locate the home position; while home operation, move to specified home direction at home speed, and move back slowly after signal is detected. At this moment, move forward slowly when the signal is disconnected, and the home operation completes when the signal is valid again. When the servo Z phase enable switch in IO configuration parameters is enabled, mechanical home will enable Z phase positioning as home position automatically after signal reaches.

005

#### IO Filter Wave (restart)

|       |   |      |
|-------|---|------|
| Range | : | 0~8  |
| Unit  | : | None |

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

006

## Selection of communication mode (restart)

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

008

## Zeroing soft limit no alarm enables

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

009

## USB disk online processing enable

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

Effective time : Instant

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

010

#### M Code Delay time (ms)

Range : 1~9999

Unit : ms

Authority : Operation admin or higher

Default : 100

Effective time : Instant

Note : Set the waiting time (unit: ms) after executing M code

011

#### Line number increment

Range : 0~64

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : While editing G code manually, add a line number Nxxxxx automatically in a new line;  
0 indicates that this function is disabled;

012

#### UART serial port baud rate

Range : 9600~115200

Unit : None

Authority : Operation admin or higher

Default : 115200

Effective time : Restart

Note : The communication rate setting when DNC or other PC software and this controller are in RS232 communication mode

013

#### Controller ID

Range : 1~255

Unit : None

Authority : Operation admin or higher

Default : 1

Effective time : Restart

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

|     |                                                                                                                                                                                              |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 014 | Circle Inp Unit(mm)                                                                                                                                                                          |
|     | Range : 0~1                                                                                                                                                                                  |
|     | Unit : mm                                                                                                                                                                                    |
|     | Authority : Operation admin or higher                                                                                                                                                        |
|     | Default : 0.2                                                                                                                                                                                |
|     | Effective time : Instant                                                                                                                                                                     |
|     | Note : Set the arc interpolation equivalent                                                                                                                                                  |
|     | If this value is too small, the arc has higher approximation accuracy, but the computation will be too high, making the pause during processing obvious and affecting the processing effect. |
| 015 | G73(M) Loop Obligate(mm)                                                                                                                                                                     |
| 016 | G83(M) Loop Obligate(mm)                                                                                                                                                                     |
|     | Range : 0.1~100                                                                                                                                                                              |
|     | Unit : mm                                                                                                                                                                                    |
|     | Authority : Operation admin or higher                                                                                                                                                        |
|     | Default : 2.000                                                                                                                                                                              |
|     | Effective time : Instant                                                                                                                                                                     |
|     | Note : Set the tool retracting amount after Q is fed in G73 and G83 instructions; this parameter (default: 2mm) is set according to actual chip removal effect.                              |
| 017 | Arc interpolation processing mode                                                                                                                                                            |
|     | Range : Time split, position split                                                                                                                                                           |
|     | Unit : None                                                                                                                                                                                  |
|     | Authority : Operation admin or higher                                                                                                                                                        |
|     | Default : Position split                                                                                                                                                                     |
|     | Effective time : Instant                                                                                                                                                                     |
|     | Note : Position split is done based on arc length                                                                                                                                            |
|     | Time split is done by time.                                                                                                                                                                  |
| 018 | Speed optimization constraint mode                                                                                                                                                           |
|     | Range : Angle Speed Speed1                                                                                                                                                                   |

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

019

#### G Code pre-treatment processing mode

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

020

#### 'O' Pro Scan

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

021

#### Variable frequency analog control mode

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

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

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

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

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

|     |                                                                             |
|-----|-----------------------------------------------------------------------------|
| 025 | Back Home Mode Configuration (BIT)                                          |
|     | Range :                                                                     |
|     | Unit :                                                                      |
|     | Authority : Operation admin or higher                                       |
|     | Default : Z – XYABC                                                         |
|     | Effective time : Instant                                                    |
|     | Note : Set the zero sequence of each axis; up to three sections can be set. |

|     |                                                                                                               |
|-----|---------------------------------------------------------------------------------------------------------------|
| 026 | Arc speed for Radii                                                                                           |
| 027 | Arc speed for Speed                                                                                           |
|     | Range :                                                                                                       |
|     | Unit : Coefficient                                                                                            |
|     | Authority : Operation admin or higher                                                                         |
|     | Default : 50, 100                                                                                             |
|     | Effective time : Instant                                                                                      |
|     | Note : Used to restrict the arc processing speed automatically. This parameter is valid in pretreatment mode. |
|     | The bigger the radius coefficient is, the lower the arc speed is.                                             |
|     | The bigger the acceleration coefficient is, the higher the arc speed is.                                      |

|     |                                                                              |
|-----|------------------------------------------------------------------------------|
| 028 | Pretreatment Code Setting                                                    |
|     | Range : 100~5000                                                             |
|     | Unit : Instruction line                                                      |
|     | Authority : Operation admin or higher                                        |
|     | Default : 500                                                                |
|     | Effective time : Instant                                                     |
|     | Note : Set the pre-reading instruction lines; if the pretreatment processing |

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

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

Range :  
Unit :  
Authority : Operation admin or higher  
Default :  
Effective time : Instant  
Note : Used to set the performance of S curve acceleration/deceleration

|     |                             |
|-----|-----------------------------|
| 031 | HOME check enable for alarm |
| 032 | HOME Check Enable           |

Range : 0~1  
Unit :  
Authority : Operation admin or higher  
Default : 0, 1  
Effective time : Instant  
Note : Used to set whether prompt user to reset under certain conditions, ensuring that the user has performed the operation;  
If the value is set to 0, it won't check, and will run directly.

|     |                                   |
|-----|-----------------------------------|
| 033 | X diameter prog enable (L series) |
|-----|-----------------------------------|

Range : 0~1  
Unit :  
Authority : Operation admin or higher  
Default : 1 (L series) /0 (M series)  
Effective time : Instant  
Note : On lathe controller (L series), it is used to set whether the display and programming of X axis are in radius or diameter;



|                |                                                                                                                                                                                                             |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 034            | Default process plane                                                                                                                                                                                       |
| Range          | : G17, 18, 19                                                                                                                                                                                               |
| Unit           | :                                                                                                                                                                                                           |
| Authority      | : Operation admin or higher                                                                                                                                                                                 |
| Default        | : G18 (L series)/G17 (M series)                                                                                                                                                                             |
| Effective time | : Instant                                                                                                                                                                                                   |
| Note           | : Set the default processing plane to XY or XZ; modify the default plane, so that it isn't need to specify the modal plane value while programming, and write plane related instructions directly in stead; |

|                |                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 035            | T code form (compensation number digits)(L series)                                                                                                                                                                                                                                                                                                                           |
| Range          | : 0~2                                                                                                                                                                                                                                                                                                                                                                        |
| Unit           | :                                                                                                                                                                                                                                                                                                                                                                            |
| Authority      | : Operation admin or higher                                                                                                                                                                                                                                                                                                                                                  |
| Default        | : 2 (L series)                                                                                                                                                                                                                                                                                                                                                               |
| Effective time | : Instant                                                                                                                                                                                                                                                                                                                                                                    |
| Note           | : Used to set the T value in tool change instruction on lathe controller (L series); the latter digits indicate the compensation number. In some conventional programming, people usually use two digits to specify the compensation number used by corresponding tool number;<br><br>For example: T0801 M06 indicates changing the #8 tool and compensating with #1 length. |

|           |                                                 |
|-----------|-------------------------------------------------|
| 036       | Local IP address                                |
| 037       | Subnet mask                                     |
| 038       | Default gateway                                 |
| Range     | :                                               |
| Unit      | :                                               |
| Authority | : Operation admin or higher                     |
| Default   | : 192.168.0.123<br>255.255.255.0<br>192.168.0.1 |

Effective time : Restart

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

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

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

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

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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

|     |                     |
|-----|---------------------|
| 042 | G00 Inp mode Enable |
|-----|---------------------|

Range : 0~1

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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

The acceleration is the interpolation acceleration.

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 043 | Abnormal memory position jump enable                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|     | Range : 0~2 (corresponding OFF position memory, and status memory)<br>Unit : None<br>Authority : Operation admin or higher<br>Default : 0(OFF)<br>Effective time : Instant<br>Note : OFF: turn off this function<br>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<br>Unit :<br>Authority : Operation admin or higher<br>Default : 0<br>Effective time : Instant<br>Note : OFF: turn off this function<br>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<br>Unit :<br>Authority : Operation admin or higher<br>Default : 0<br>Effective time : Instant<br>Note : OFF: turn off this function                                                                                                                                                                                                                                                                                                                           |

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

|                |                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 048            | Clear coordinates in home mode                                                                                                                                                                                                                                                                                                                                                      |
| Range          | : MAC Coord G54 Coord                                                                                                                                                                                                                                                                                                                                                               |
| Unit           | : None                                                                                                                                                                                                                                                                                                                                                                              |
| Authority      | : Operation admin                                                                                                                                                                                                                                                                                                                                                                   |
| Default        | : MAC Coord                                                                                                                                                                                                                                                                                                                                                                         |
| Effective time | : Instant                                                                                                                                                                                                                                                                                                                                                                           |
| Note           | : For setting in home mode, press axis X, Y, Z, A, B, C in Run -> Absolute position and the red LED flashes, press the [Cancel] button to clear the coordinate system, press MAC Coord to clear machine coordinates, and press G54 Coord to clear G54 workpiece coordinates. This function is generally used for machine debugging. Do not use it if the machine has been debugged. |

|                |                                                                                                                                                                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 049            | Z-axis safe height                                                                                                                                                                                                                                                                          |
| 050            | A-axis safe height                                                                                                                                                                                                                                                                          |
| Range          | : -9999.999~9999.999                                                                                                                                                                                                                                                                        |
| Unit           | : mm                                                                                                                                                                                                                                                                                        |
| Authority      | : Operation admin or higher                                                                                                                                                                                                                                                                 |
| Default        | : 0                                                                                                                                                                                                                                                                                         |
| Effective time | : Instant                                                                                                                                                                                                                                                                                   |
| Note           | : When P1.044 or P1.045 is enabled and set to workpiece coordinates or machine coordinates, it is used to set the safety height automatically lifted (workpiece coordinates or machine coordinates) when A-axis or Z-axis pauses in the processing or executes home operation in home mode. |

|       |                        |
|-------|------------------------|
| 051   | Z axis feed rate limit |
| 052   | A axis feed rate limit |
| Range | : 0~20000              |

|                |   |                                                                                                    |
|----------------|---|----------------------------------------------------------------------------------------------------|
| Unit           | : | mm/min                                                                                             |
| Authority      | : | Operation admin or higher                                                                          |
| Default        | : | 0                                                                                                  |
| Effective time | : | Instant                                                                                            |
| Note           | : | When Z-axis or A-axis is used as the cutting feed axis, it sets the maximum G01 cutting feed rate. |

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

|                |   |                                                                                                                                                                                                                                            |
|----------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range          | : | 0~100                                                                                                                                                                                                                                      |
| Unit           | : | mm                                                                                                                                                                                                                                         |
| Authority      | : | Operation admin or higher                                                                                                                                                                                                                  |
| Default        | : | 0                                                                                                                                                                                                                                          |
| Effective time | : | Instant                                                                                                                                                                                                                                    |
| Note           | : | To set the pitch length of acceleration segment of lathe CNC4620 system thread cutting command G32 & G92, pitch length of the deceleration segment and run-out amount. For details of G32 G92 instruction, see CNC4620 programming manual. |

|     |          |
|-----|----------|
| 056 | Reserved |
|-----|----------|

|                |   |                 |
|----------------|---|-----------------|
| Range          | : | OFF ON          |
| Unit           | : | None            |
| Authority      | : | Operation admin |
| Default        | : | OFF             |
| Effective time | : | Instant         |
| Note           | : |                 |

|     |                |
|-----|----------------|
| 057 | System home ON |
|-----|----------------|

|           |   |                    |
|-----------|---|--------------------|
| Range     | : | No, Ask, Auto      |
| Unit      | : | None               |
| Authority | : | Operation admin    |
| Default   | : | Non-return-to-zero |

Effective time : Instant

Note : Ask: when the system is restarted, it asks whether to execute home operation; press the [EOB] button to execute.

Auto: when the system is restarted, it executes home operation automatically.

058

Spindle brake delay (ms)

Range : 0~60000

Unit : Second

Authority : Operation admin

Default : 1000

Effective time : Instant

Note : Used to set the delay between actions of the spindle brake switch

059

This parameter is invalid currently

Range :

Unit :

Authority : Operation admin

Default :

Effective time : Instant

Note : This parameter is invalid currently.

060

4 axis max rotate speed

Range : 1~500

Unit :

Authority : Operation admin

Default : 50

Effective time : Instant

Note : When P1.018 is set to (Angle X Y Z space angle optimization), set the maximum rotation speed when the fourth axis A is the rotation axis.

061

Handwheel encoder dir

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

062

#### Handwheel control mode

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

063

#### Handwheel max rate

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

064

#### Handwheel acceleration

|           |   |                 |
|-----------|---|-----------------|
| Range     | : | 1~20            |
| Unit      | : |                 |
| Authority | : | Operation admin |
| Default   | : | 10              |

Effective time : Instant

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

|                |                                                                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 065            | Enables for returning to reference point after machining                                                                                                            |
| Range          | : OFF Absolute coordinates, Machine coordinates                                                                                                                     |
| Unit           | :                                                                                                                                                                   |
| Authority      | : Operation admin                                                                                                                                                   |
| Default        | : OFF                                                                                                                                                               |
| Effective time | : Instant                                                                                                                                                           |
| Note           | : To set the system to return to the G54 workpiece coordinate system zero point or machine coordinate system zero point after machining program operation completes |

|                |                                                |
|----------------|------------------------------------------------|
| 066            | Feeding rate variation                         |
| Range          | : 1~100                                        |
| Unit           | :                                              |
| Authority      | : Operation admin                              |
| Default        | : OFF                                          |
| Effective time | : Instant                                      |
| Note           | : To set the adjusting unit amount of feedrate |

|                |                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------|
| 067            | Auto chamfering and arc chamfering enable                                                          |
| Range          | : OFF Auto chamfering , Auto arc chamfering, Arc chamfering error                                  |
| Unit           | :                                                                                                  |
| Authority      | : Operation admin                                                                                  |
| Default        | : OFF                                                                                              |
| Effective time | : Instant                                                                                          |
| Note           | : To set the straight lines or arc chamfering transition at the intersection of two straight lines |

|                |                                            |
|----------------|--------------------------------------------|
| 068            | Chamfering or arc chamfering accuracy (mm) |
| Range          | : 0~100                                    |
| Unit           | :                                          |
| Authority      | : Operation admin                          |
| Default        | : 1.000                                    |
| Effective time | : Instant                                  |



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

|                |                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 069            | Tool setting way of coordinate system                                                                                                     |
| Range          | : 0~1                                                                                                                                     |
| Unit           | :                                                                                                                                         |
| Authority      | : Operation admin                                                                                                                         |
| Default        | : 0                                                                                                                                       |
| Effective time | : Instant                                                                                                                                 |
| Note           | : To set the absolute input or relative input by manually entering the G5x workpiece coordinate system.                                   |
| 070            | Maximum deviation of double drive zero return-to-zero (mm)                                                                                |
| Range          | : 0.1~10000                                                                                                                               |
| Unit           | :                                                                                                                                         |
| Authority      | : Operation admin                                                                                                                         |
| Default        | : 1.000                                                                                                                                   |
| Effective time | : Instant                                                                                                                                 |
| Note           | : To set the machine of double-drive gantry structure (the maximum deviation of the two servo return-to-zero synchronization error alarm) |
| 071            | G code loading boundary scan enable                                                                                                       |
| Range          | : OFF ON                                                                                                                                  |
| Unit           | :                                                                                                                                         |
| Authority      | : Operation admin                                                                                                                         |
| Default        | : OFF                                                                                                                                     |
| Effective time | : Instant                                                                                                                                 |
| Note           | : To set whether the machining path stroke exceeds the software limit setting value during the G code loading process.                    |
| 072            | Split cycle                                                                                                                               |
| Range          | :                                                                                                                                         |
| Unit           | :                                                                                                                                         |
| Authority      | : Operation admin                                                                                                                         |
| Default        | : 1 ms                                                                                                                                    |
| Effective time | : Instant                                                                                                                                 |

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

Unit :  
 Authority : Operation admin  
 Default : 0  
 Effective time : Instant  
 Note : To set the IP address to access the remote Modbus slave when the system is used as a Modbus master

079

## Modbus master timeout (ms)

Range : 0~1000  
 Unit :  
 Authority : Operation admin  
 Default : 0  
 Effective time : Instant  
 Note : To set the communication timeout to access the remote Modbus slave when the system is used as a Modbus master

080

## Modbus master retransmission times

Range : 0~100  
 Unit :  
 Authority : Operation admin  
 Default : 10  
 Effective time : Instant  
 Note : To set the communication retransmission times to access the remote Modbus slave when the system is used as a Modbus master

081

## UART3 serial port baud rate

Range : 9600~115200  
 Unit :  
 Authority : Operation admin  
 Default : 115200  
 Effective time : Instant  
 Note : To set the communication baud rate of UART3 serial port (RS485)

082

## Local IP address 2

Range :  
 Unit :

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

083

MAC address 2

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

084

LV interrupt enable (0 off 1 on)

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

### 10.3 Axis parameter configuration (P2.)

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

|  |                    |
|--|--------------------|
|  | B Gear Denominator |
|  | C Gear Numerator   |
|  | C Gear Denominator |

Range : 1~65535

Unit : None

Authority : Operation admin or higher

Default : 1

Effective : 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 Fast Speed(mm/min) |
|     | Y Fast Speed(mm/min) |
|     | Z Fast Speed(mm/min) |
|     | A Fast Speed(mm/min) |

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

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

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

Authority : Operation admin or higher

Default : 3000, 200, 1500

Effective time : Instant

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

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

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

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

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

Range : -9999~9999

Unit : mm

Authority : Operation admin or higher

Default : Maximum positive/negative value

Effective time : Instant

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

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

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

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

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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

Range : 0~8888

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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



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

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

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

Range : 0~8888

Unit :

Authority : Operation admin or higher

Default : 0  
 Effective time : Instant  
 Note : To set the reset servo control output port number

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

Range : 1~20000  
 Unit : Pulse  
 Authority : Operation admin or higher  
 Default : 0  
 Effective time : Instant  
 Note : Compensate the clearance between control axis  
 Compensate with the pulse in minimum unit. The specific number should be converted according to gear ratio.

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

Range : -9999~9999  
 Unit : Pulse(mm)  
 Authority : Operation admin or higher  
 Default : 0  
 Effective time : Instant  
 Note : Set the compensation home offset (unit: pulse) after axis home

operation.

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

Note: This parameter is invalid during program home operation.

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

Range : 0~1

Unit : None

Authority : Operation admin or higher

Default : 1, 1, 0, 0

Effective time : Instant

Note : Set the mechanical home direction of every processing axis

Positive

Negative

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

Range : 0~9999

Unit : mm/min

Authority : Operation admin or higher

Default : 1000

Effective time : Instant

Note : Set the home speed of every axis separately

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

Range : 0~9999

Unit : mm/min

Authority : Operation admin or higher

Default : 1000

Effective time : Instant

Note : Set the manual speed of every axis separately

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

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

Range : 1~90000

Unit :

Authority : Super Admin

Default : 90000

Effective time : Instant

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

pretreatment processing.

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

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

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

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

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0, 1

Effective time : Instant

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

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

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | C_ECZ Home Enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Range          | : 0~1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Unit           | : LOGIC VOLTAGE LEVEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Authority      | : Super Admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Default        | : 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Effective time | : Instant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Note           | : When this parameter is enabled, encoder Z phase positioning of corresponding axis will be enabled automatically in mechanical home mode, i.e. the “servo home” positioning; in this mode, the accuracy of repeated home positioning depends on servo positioning accuracy, and therefore it is recommended to enable this function for servo motor. Step motor doesn’t have encoder and can’t enable this option, or else the signals can’t be scanned during mechanical home operation and will move constantly. |

|                |                                                                                                                                                             |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 022            | X_ECZ Home ELevel                                                                                                                                           |
|                | Y_ECZ Home ELevel                                                                                                                                           |
|                | Z_ECZ Home ELevel                                                                                                                                           |
|                | A_ECZ Home ELevel                                                                                                                                           |
|                | B_ECZ Home ELevel                                                                                                                                           |
|                | C_ECZ Home ELevel                                                                                                                                           |
| Range          | : 0~1                                                                                                                                                       |
| Unit           | : LOGIC VOLTAGE LEVEL                                                                                                                                       |
| Authority      | : Super Admin                                                                                                                                               |
| Default        | : 0                                                                                                                                                         |
| Effective time | : Instant                                                                                                                                                   |
| Note           | : Adapt to the interface parameters of selected servo driver; please refer to interface voltage level description of servo for specific parameter settings. |

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

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

|                |   |                                                                                                                           |
|----------------|---|---------------------------------------------------------------------------------------------------------------------------|
| Range          | : | 0~1                                                                                                                       |
| Unit           | : | None                                                                                                                      |
| Authority      | : | Super Admin                                                                                                               |
| Default        | : | 0                                                                                                                         |
| Effective time | : | After restarted                                                                                                           |
| Note           | : | Specific parameter settings depend on the interface level instructions of selected button or photoelectric sensor switch. |

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

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

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

|                |   |                                                                                                                                                                                                                      |
|----------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range          | : | 0~1                                                                                                                                                                                                                  |
| Unit           | : | None                                                                                                                                                                                                                 |
| Authority      | : | Super Admin                                                                                                                                                                                                          |
| Default        | : | 1                                                                                                                                                                                                                    |
| Effective time | : | Restart                                                                                                                                                                                                              |
| Note           | : | <p>Pulse command format setting is to configure the mode of output pulse.</p> <p>The compatible command format of the motor driver should be known in advance.</p> <p>0 Pulse + pulse</p> <p>1 Pulse + direction</p> |

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

|                |   |                                                                                                                                                                        |
|----------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range          | : | 0~1                                                                                                                                                                    |
| Unit           | : | None                                                                                                                                                                   |
| Authority      | : | Super Admin                                                                                                                                                            |
| Default        | : | 1                                                                                                                                                                      |
| Effective time | : | Restart                                                                                                                                                                |
| Note           | : | <p>Set pulse direction; if the controller direction is reverse to actual driver direction, please modify this parameter to adjust the rotation direction of motor.</p> |

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

|       |   |     |
|-------|---|-----|
| Range | : | 0~1 |
|-------|---|-----|



|                |   |                                                                                                                          |
|----------------|---|--------------------------------------------------------------------------------------------------------------------------|
| Unit           | : | LOGIC VOLTAGE LEVEL                                                                                                      |
| Authority      | : | Super Admin                                                                                                              |
| Default        | : | 0                                                                                                                        |
| Effective time | : | Instant                                                                                                                  |
| Note           | : | Set the effective voltage level of external home sensor switch during home operation.<br><br>Low level<br><br>High level |

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

|                |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range          | : | 0~9999999                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Unit           | : | Pulse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Authority      | : | Super Admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Default        | : | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Effective time | : | Restart                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Note           | : | Round function is available on hardware version 1.0 or later only;<br><br>This function is used to prevent the logic counting of axis exceeding the maximum counting range (2147483648) and causing overflow error;<br><br>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.<br><br>This parameter requires restart to take effect; the corresponding axis must be rotary and set to 360° display (P2.062~069); |

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

Range : 0~4

Unit : Pulse port sequence No.

Authority : Super Admin

Default :

Effective time : Restart

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

0: no such axis

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

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

Range : 0~9999

Unit : Wire number

Authority : Super Admin

Default : 2500

Effective time : Instant

Note : Set the encoder wires connected to every pulse port (AB phase pulse).  
Since four times frequency division is performed for internal transfer, the

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

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

Range : 0~1

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

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

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

Range : 0~1

Unit : LOGIC VOLTAGE LEVEL

Authority : Super Admin

Default : 0

Effective time : Restart

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

parameter matches.

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

Range : 0~1  
Unit : None  
Authority : Super Admin  
Default : 1  
Effective time : Instant  
Note : Set axis features.

0: Rotary axis

1: Linear axis

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

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

Range : 0~1  
Unit : None  
Authority : Super Admin  
Default : 0  
Effective time : Instant  
Note : Set the coordinate display mode of the axis. This parameter is valid when P2.062~P2.065 is set to 0 This parameter is valid when P2.062~P2.065 is set to 0

0: 0~360° display

1: -9999.999~9999.999° display

The setting of this parameter and P2.026 axis will affect the setting of

P2.021 Please refer to the parameter description of P2.021 for details.

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

Range : 0~1

Unit : None

Authority : Super Admin

Default : 1

Effective time : Instant

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

0: Do not optimize the path

1: Enable the shortest path

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

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

Range : 100~8000

Unit : Kpps (Kilo Pulse Per Second)

Authority : Super Admin

Default : 2000

Effective time : Instant

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

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

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

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

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

Range : 0~1

Unit : None

Authority : Super Admin

Default : 0

Effective time : Instant

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

0: Positive

1: Negative

|     |                   |
|-----|-------------------|
| 037 | X Ext Home Enable |
|     | X Ext Home Enable |
|     | Z Ext Home Enable |

|  |                                                                                                                                                                                                                                                                                               |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | A Ext Home Enable                                                                                                                                                                                                                                                                             |
|  | B Ext Home Enable                                                                                                                                                                                                                                                                             |
|  | C Ext Home Enable                                                                                                                                                                                                                                                                             |
|  | Range : 0~1                                                                                                                                                                                                                                                                                   |
|  | Unit : None                                                                                                                                                                                                                                                                                   |
|  | Authority : Super Admin                                                                                                                                                                                                                                                                       |
|  | Default : 1                                                                                                                                                                                                                                                                                   |
|  | Effective time : Instant                                                                                                                                                                                                                                                                      |
|  | Note : When mechanical home mode is selected, this parameter determines whether external deceleration switch should be searched. If this parameter is set to 0, and P2.015 (servo Z phase enable) is also set to 0, the home mode sets current point as the home directly in mechanical mode. |
|  | 0: No                                                                                                                                                                                                                                                                                         |
|  | 1: Yes                                                                                                                                                                                                                                                                                        |

|     |                                                                                                                                                                         |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 038 | X Encoder Logic Dir                                                                                                                                                     |
|     | Y Encoder Logic Dir                                                                                                                                                     |
|     | Z Encoder Logic Dir                                                                                                                                                     |
|     | A Encoder Logic Dir                                                                                                                                                     |
|     | B Encoder Logic Dir                                                                                                                                                     |
|     | C Encoder Logic Dir                                                                                                                                                     |
|     | Range : 0~1                                                                                                                                                             |
|     | Unit : None                                                                                                                                                             |
|     | Authority : Super Admin                                                                                                                                                 |
|     | Default : 0                                                                                                                                                             |
|     | Effective time : Instant                                                                                                                                                |
|     | Note : When the logic direction obtained by handheld box encoder is reverse to the actual motion direction of the axis, set this parameter to perform in-phase setting. |
|     | 0: positive direction                                                                                                                                                   |
|     | 1: negative direction                                                                                                                                                   |

|     |                                                           |
|-----|-----------------------------------------------------------|
| 039 | X-axis return-to-zero 2 <sup>nd</sup> segment leave speed |
|-----|-----------------------------------------------------------|

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

Range : 1~20000

Unit : mm/min

Authority : Super Admin

Default : 100, 60

Effective time : Instant

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

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

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

Range : OFF ON

Unit : None

Authority : Super Admin

Default : OFF

Effective time : Instant

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



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

Range : 1~1000

Unit : mm

Authority : Super Admin

Default : 10

Effective time : Instant

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

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

Range : -9999.999 ~ 9999.999

Unit : mm

Authority : Super Admin

Default : 0

Effective time : Instant

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

|     |                                        |
|-----|----------------------------------------|
| 044 | X axis pitch compensation end position |
|-----|----------------------------------------|

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

Range : -9999.999 ~ 9999.999

Unit : mm

Authority : Super Admin

Default : 0

Effective time : Instant

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

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

Range : 0 ~ 255

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

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

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

Range : -9999.999 ~ 9999.999

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

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

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

Range : -9999.999 ~ 9999.999

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

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

|     |                     |
|-----|---------------------|
| 048 | X Servo Driver Type |
|     | Y Servo Driver Type |

|                |                                                                                             |
|----------------|---------------------------------------------------------------------------------------------|
|                | Z Servo Driver Type                                                                         |
|                | A Servo Driver Type                                                                         |
|                | B Servo Driver Type                                                                         |
|                | C Servo Driver Type                                                                         |
| Range          | : Standard pulse type QX, QS8 .... ETherCAT bus type servo driver                           |
| Unit           | :                                                                                           |
| Authority      | : Super Admin                                                                               |
| Default        | : Standard Pluse Mode                                                                       |
| Effective time | : Instant                                                                                   |
| Note           | : It is used to set the standard pulse type and ETherCAT bus type of the servo driver types |

|                |                                        |
|----------------|----------------------------------------|
| 049            | X encoder type                         |
|                | Y encoder type                         |
|                | Z encoder type                         |
|                | A encoder type                         |
|                | B encoder type                         |
|                | C encoder type                         |
| Range          | : Relative, absolute                   |
| Unit           | :                                      |
| Authority      | : Super Admin                          |
| Default        | : Standard Pluse Mode                  |
| Effective time | : Instant                              |
| Note           | : To set the servo driver encoder type |

|       |                                      |
|-------|--------------------------------------|
| 050   | X Server Orientation Output Port No. |
|       | Y Server Orientation Output Port No. |
|       | Z Server Orientation Output Port No. |
|       | A Server Orientation Output Port No. |
|       | B Server Orientation Output Port No. |
|       | C Server Orientation Output Port No. |
| Range | : 0~8888                             |
| Unit  | :                                    |

|                |   |                                                                                                                                                  |
|----------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Authority      | : | Super Admin                                                                                                                                      |
| Default        | : | Standard Pluse Mode                                                                                                                              |
| Effective time | : | Instant                                                                                                                                          |
| Note           | : | To set the servo spindle quasi-stop control output port number (Note: This parameter is used when the servo spindle is configured for this axis) |

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

|                |   |                                                                                                                                                                                     |
|----------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range          | : | 0~8888                                                                                                                                                                              |
| Unit           | : |                                                                                                                                                                                     |
| Authority      | : | Super Admin                                                                                                                                                                         |
| Default        | : | Standard Pluse Mode                                                                                                                                                                 |
| Effective time | : | Instant                                                                                                                                                                             |
| Note           | : | To set the control output port number when servo spindle simulates and switch with the pulse mode (Note: This parameter is used when the servo spindle is configured for this axis) |

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

|                |   |                                                                          |
|----------------|---|--------------------------------------------------------------------------|
| Range          | : | 0~8888                                                                   |
| Unit           | : |                                                                          |
| Authority      | : | Super Admin                                                              |
| Default        | : | Standard Pluse Mode                                                      |
| Effective time | : | Instant                                                                  |
| Note           | : | To set the control output port number when the servo spindle is switched |

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

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

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

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

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

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

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

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

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

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

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

Range : 0~8888

Unit :

Authority : Super Admin

Default : Standard Pluse Mode

Effective time : Instant

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

## 10.4 Management parameter (P3.)

|     |                           |
|-----|---------------------------|
| 001 | Select administrator mode |
|-----|---------------------------|

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 002 | Edit super user password                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 003 | Edit operation user password                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|     | Range : None<br>Unit : None<br>Authority : None<br>Default : None<br>Effective time : Instant<br>Note : In this menu, type the password and press ‘Insert’. If the password is valid, the system will enter this user mode;<br>After entering, this menu will turn into “Exit XXX admin mode”, indicating entering successfully;<br>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;<br>The super user can modify all passwords, while the operation user only can modify the own password.<br>Password 0 indicates that the password isn’t checked in this mode; it isn’t required to enter the admin mode to modify the parameters. |

|     |                                                                                                                                                               |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 004 | Initialize <●>                                                                                                                                                |
| 005 | Initialize IO configuration <●>                                                                                                                               |
| 006 | All para reset<●>                                                                                                                                             |
|     | Range : None<br>Unit : None<br>Authority : Super user<br>Default : None<br>Effective time : Instant<br>Note : Initial parameter table only in super user mode |

|     |              |
|-----|--------------|
| 007 | Para backup  |
| 008 | Para recover |



|                |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range          | : | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Unit           | : | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Authority      | : | Super user                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Default        | : | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Effective time | : | Instant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Note           | : | <p>The parameters are backed up and restored only in super user mode.</p> <p>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.</p> <p>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.</p> <p>After restoring, the system will restart automatically.</p> |

|     |                                                                                                                                                                                                                                                                                                                                |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 009 | Generate cryptogram                                                                                                                                                                                                                                                                                                            |
|     | <p>Range : None</p> <p>Unit : None</p> <p>Authority : None</p> <p>Default : None</p> <p>Effective time : Instant</p> <p>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.</p> |
| 010 | System axis group configuration                                                                                                                                                                                                                                                                                                |
|     | <p>Range : 1~65535</p> <p>Unit : None</p> <p>Authority : None</p> <p>Default : 0 (click)</p> <p>Effective time : Instant</p> <p>Note : To set the axis configuration of the Channel 1 and 2 of the multi-channel</p>                                                                                                           |
| 011 | Clear accumulated processing pieces                                                                                                                                                                                                                                                                                            |
| 012 | Clear current processing pieces                                                                                                                                                                                                                                                                                                |

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

013

#### Maximum cumulative processing number

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

014

#### Import CSV system configuration

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

015

#### Startup display module

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

comprehensive position.

|     |                                                                                                                                                                                                                                                                                                                                 |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 016 | Sys language bag                                                                                                                                                                                                                                                                                                                |
|     | Range : 0~1<br>Unit : None<br>Authority : Operation admin<br>Default : 0 (Chinese)<br>Effective time : Instant<br>Note : Sys language select<br>Chinese<br>English                                                                                                                                                              |
| 017 | Macro key word valid enable                                                                                                                                                                                                                                                                                                     |
|     | Range : 0~1<br>Unit : None<br>Authority : Operation admin<br>Default : 0 (Chinese)<br>Effective time : Instant<br>Note : Macro keyword effective parameter is used to set whether the macro expression symbol on the membrane is valid (1: valid, 0: invalid).                                                                  |
| 018 | Startup picture display                                                                                                                                                                                                                                                                                                         |
|     | Range : 0~6<br>Unit : None<br>Authority : Operation admin<br>Default : 1S<br>Effective time : Instant<br>Note : Used to configure the display mode of the logo; if it is set to 0, the user needs to press any key to enter the system; for any other value, the system delays for corresponding time and enters automatically. |
| 019 | System axis group starts configuration automatically                                                                                                                                                                                                                                                                            |

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

020

## Sys debug information enable

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

021

## Axis control composite enable

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

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

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 022 | <div>Additional panel enable</div> <div> Range : OFF FCNC4M FDK4A FCNC900V FCNC6D<br/> Unit : None<br/> Authority : Super user<br/> Default : OFF/0<br/> Effective time : Instant<br/> Note : Used to configure whether NC uses additional panel, which must be ADT matching additional panel, or compatible with the interface of same protocol.<br/><br/> If additional panel is used, the system testing info enable must be deactivated (P3.20). </div> |
| 023 | <div>M code macro program selection</div> <div> Range : MFUNC User-Def<br/> Unit : None<br/> Authority : Super user<br/> Default : MFUNC<br/> Effective time : Restart<br/> 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. </div>                                                                                                                      |
| 024 | <div>T macro program selection</div> <div> Range : TFUNC User-Def<br/> Unit : None<br/> Authority : Super user<br/> Default : TFUNC<br/> Effective time : Instant </div>                                                                                                                                                                                                                                                                                    |

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

#### 025 PLC program selection (this parameter is invalid)

Range :  
Unit :  
Authority :  
Default :  
Effective time :  
Note : This parameter is invalid.

#### 026 Screen Saver ON (min)

Range : 0~1  
Unit : None  
Authority : Super user  
Default : 0  
Effective time : Instant  
Note : Set whether to turn on screen saver; 0: off; 1: on

#### 027 Modbus master/slave settings

Range : UART0\_POLL UART1\_POLL UART3\_POLL TCP\_POLL UDP\_POLL  
Unit : None  
Authority : Super user  
Default : SLAVE  
Effective time : Instant  
Note : Set the system as Modbus communication slave or host; SLAVE: as slave; POLL: as host

#### 028 Imperial unit enable

Range : OFF ON  
Unit : None  
Authority : Super user

Default : OFF  
 Effective time : Instant  
 Note : To set the system to display in imperial units

029

Additional panel UART1 baud rate

Range : 9600~115200  
 Unit : None  
 Authority : Super user  
 Default : 115200  
 Effective time : Instant  
 Note : To set the communication baud rate of system additional panel serial port UART1

030

Additional panel emergency stop for negation

Range : OFF ~ ON  
 Unit : None  
 Authority : Super user  
 Default : OFF  
 Effective time : Restart  
 Note : To set the system additional panel emergency stop button logic level for negation

031

this parameter is invalid currently (Standby)

Range : OFF ~ ON  
 Unit : None  
 Authority : Super user  
 Default : OFF  
 Effective time : Restart  
 Note :

032

Extended IO type

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

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

033

## Number of expanded input boards (blocks)

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

034

## Number of extended output board

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

035

## Bus axis or IO node configuration

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



## 10.5 Tool magazine parameter (P4.)

|                |                                                                                                                                                |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 001            | Customized by manufacturer                                                                                                                     |
| Range          | :                                                                                                                                              |
| Unit           | :                                                                                                                                              |
| Authority      | : Operation admin or higher                                                                                                                    |
| Default        | :                                                                                                                                              |
| Effective time | : Instant                                                                                                                                      |
| Note           | : This parameter is determined by tool magazine design of each machine tool manufacturer. Please refer to the machine too manuals for details. |

## 10.6 Spindle parameters (P5.)

|                |                                                                            |
|----------------|----------------------------------------------------------------------------|
| 001            | 1 <sup>st</sup> spindle mapping axis                                       |
| Range          | : Analog Spindle X Y .... C                                                |
| Unit           | :                                                                          |
| Authority      | : Operation admin or higher                                                |
| Default        | : Analog Spindle                                                           |
| Effective time | :                                                                          |
| Note           | : To set the first spindle to specify the analog spindle or servo spindle  |
| 002            | 2 <sup>nd</sup> spindle mapping axis                                       |
| Range          | : Analog Spindle X Y .... C                                                |
| Unit           | :                                                                          |
| Authority      | : Super Admin                                                              |
| Default        | : Analog Spindle                                                           |
| Effective time | : Restart                                                                  |
| Note           | : To set the second spindle to specify the analog spindle or servo spindle |
| 003            | Spi. Max Speed(rpm)                                                        |
| Range          | : 1~30000                                                                  |
| Unit           | : None                                                                     |
| Authority      | : Operation admin or higher                                                |
| Default        | : 24000                                                                    |

Effective time : Instant

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

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

|                |                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------|
| 004            | Spindle Open Delay                                                                                |
| Range          | : 0~10000                                                                                         |
| Unit           | : ms                                                                                              |
| Authority      | : Operation admin or higher                                                                       |
| Default        | : 0                                                                                               |
| Effective time | : Instant                                                                                         |
| Note           | : Set the delay before next action or operation after forward or reverse rotation of the spindle. |
| 005            | System spindle rotation                                                                           |
| Range          | : 1~24000                                                                                         |
| Unit           | : rpm                                                                                             |
| Authority      | : Operation admin or higher                                                                       |
| Default        | : 6000                                                                                            |
| Effective time | : Instant                                                                                         |
| Note           | : Set the current speed of the spindle.                                                           |
| 006            | Whether close spindle to execute Auto stop                                                        |
| Range          | : 0~1                                                                                             |
| Unit           | :                                                                                                 |
| Authority      | : Operation admin or higher                                                                       |
| Default        | : 0                                                                                               |
| Effective time | : Instant                                                                                         |

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

|                |                                                    |
|----------------|----------------------------------------------------|
| 007            | Spindle Min Speed(rpm)                             |
| Range          | : 100~100000                                       |
| Unit           | : rpm                                              |
| Authority      | : Operation admin or higher                        |
| Default        | : 100                                              |
| Effective time | : Instant                                          |
| Note           | : Spindle min speed setting                        |
| 008            | Second channel spindle max speed                   |
| Range          | : 1~100000                                         |
| Unit           | : rpm                                              |
| Authority      | : Operation admin or higher                        |
| Default        | : 24000                                            |
| Effective time | : Instant                                          |
| Note           | : Set the maximum speed of second channel spindle. |
| 009            | Second channel spindle speed                       |
| Range          | : 1~24000                                          |
| Unit           | : rpm                                              |
| Authority      | : Operation admin or higher                        |
| Default        | : 6000                                             |
| Effective time | : Instant                                          |
| Note           | : Set the speed of second channel spindle.         |
| 010            | Spindle command S value invalid enable             |
| Range          | : OFF ON                                           |
| Unit           | :                                                  |
| Authority      | : Operation admin or higher                        |
| Default        | : OFF                                              |

Effective time : Instant

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

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

Range : 1~1000000

Unit : rpm

Authority : Operation admin or higher

Default : 24000

Effective time : Instant

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

|     |                         |
|-----|-------------------------|
| 015 | Spindle stop delay (ms) |
|-----|-------------------------|

Range : 0~60000

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

Note : To set the delay time after the spindle stops

|     |                          |
|-----|--------------------------|
| 016 | Alarm off spindle enable |
|-----|--------------------------|

Range : 0~1

Unit : None

Authority : Operation admin or higher

Default : 0

Effective time : Instant

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

## system alarm

|                |                                                                                                                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 017            | Spindle Auto Open                                                                                                                                                                                                                         |
| Range          | : OFF ON                                                                                                                                                                                                                                  |
| Unit           | : None                                                                                                                                                                                                                                    |
| Authority      | : Operation admin or higher                                                                                                                                                                                                               |
| Default        | : OFF                                                                                                                                                                                                                                     |
| Effective time | : Instant                                                                                                                                                                                                                                 |
| Note           | : To set to automatically start the spindle when system executes the machining program                                                                                                                                                    |
| 018            | Spindle Auto Stop                                                                                                                                                                                                                         |
| Range          | : OFF ON                                                                                                                                                                                                                                  |
| Unit           | : None                                                                                                                                                                                                                                    |
| Authority      | : Operation admin or higher                                                                                                                                                                                                               |
| Default        | : OFF                                                                                                                                                                                                                                     |
| Effective time | : Instant                                                                                                                                                                                                                                 |
| Note           | : To set to stop the spindle automatically when the system machining program ends.                                                                                                                                                        |
| 019            | Analog spindle encoder a loop pulse number                                                                                                                                                                                                |
| Range          | : 0~10000000                                                                                                                                                                                                                              |
| Unit           | : None                                                                                                                                                                                                                                    |
| Authority      | : Operation admin or higher                                                                                                                                                                                                               |
| Default        | : 2500                                                                                                                                                                                                                                    |
| Effective time | : Instant                                                                                                                                                                                                                                 |
| Note           | : The received wire number of the encoder when the spindle rotates one circle;<br><br>Same as common axis encoder, it can only receive AB phase pulse, and thus the wire number of the encoder must be pulses of one circle divided by 4. |

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

|     |                                 |
|-----|---------------------------------|
| 020 | Analog Spindle Gear Numerator   |
| 021 | Analog Spindle Gear Denominator |

Range : 1~65535

Unit : None

Authority : Operation admin or higher

Default : 1

Effective time : Instant

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

|     |              |
|-----|--------------|
| 022 | Tapping mode |
|-----|--------------|

Range : INP ClosedLoop

Unit : None

Authority : Operation admin or higher

Default : CloseLoop

Effective time : Instant

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

|     |                                        |
|-----|----------------------------------------|
| 023 | Tapping acceleration/deceleration mode |
|-----|----------------------------------------|

Range : S-shaped Trapezoid Index Sin

Unit : None

Authority : Operation admin or higher

Default : Trapezoid

Effective time : Instant

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

acceleration and deceleration

|     |                                                                                                                                                                                                                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 024 | <p>If tapping shaft has an encoder</p> <p>Range : OFF ON</p> <p>Unit : None</p> <p>Authority : Operation admin or higher</p> <p>Default : OFF</p> <p>Effective time : Instant</p> <p>Note : To set the tapping axis, that is, whether the tapping follower axis is connected to the encoder</p> |
| 025 | <p>Tapping FPGA calculate spindle speed</p> <p>Range : OFF ON</p> <p>Unit : None</p> <p>Authority : Operation admin or higher</p> <p>Default : ON</p> <p>Effective time : Instant</p> <p>Note : To set to use FPGA to calculate spindle precision speed during tapping</p>                      |
| 026 | <p>Tapping start spindle acceleration filter</p> <p>Range : OFF ON</p> <p>Unit : None</p> <p>Authority : Operation admin or higher</p> <p>Default : ON</p> <p>Effective time : Instant</p> <p>Note : To set tapping spindle acceleration smoothing function</p>                                 |
| 027 | <p>Tapping adjusting parameter Kp</p> <p>Range :</p> <p>Unit : None</p> <p>Authority : Operation admin or higher</p> <p>Default : 68.00</p> <p>Effective time : Instant</p>                                                                                                                     |

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

028

Tapping adjusting parameter Ki

Range :

Unit : None

Authority : Operation admin or higher

Default : 0.0

Effective time : Instant

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

029

Tapping adjusting parameter Kd

Range :

Unit : None

Authority : Operation admin or higher

Default : 0.6

Effective time : Instant

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

030

Filter coefficient of tapping adjusting parameter Kd

Range :

Unit : None

Authority : Operation admin or higher

Default : 500.0

Effective time : Instant

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



|                |                                                                                    |
|----------------|------------------------------------------------------------------------------------|
| 031            | Amplitude limiting value of tapping adjusting parameter Ki                         |
| Range          | :                                                                                  |
| Unit           | : None                                                                             |
| Authority      | : Operation admin or higher                                                        |
| Default        | : 10.0                                                                             |
| Effective time | : Instant                                                                          |
| Note           | : Default value is generally used to set tapping closed loop adjustment parameters |

|                |                                                                                    |
|----------------|------------------------------------------------------------------------------------|
| 032            | Amplitude limiting value of tapping adjusting parameter Kd                         |
| Range          | :                                                                                  |
| Unit           | : None                                                                             |
| Authority      | : Operation admin or higher                                                        |
| Default        | : 100.0                                                                            |
| Effective time | : Instant                                                                          |
| Note           | : Default value is generally used to set tapping closed loop adjustment parameters |

|                |                                                                                    |
|----------------|------------------------------------------------------------------------------------|
| 033            | Tapping adjusting parameter K2                                                     |
| Range          | :                                                                                  |
| Unit           | : None                                                                             |
| Authority      | : Operation admin or higher                                                        |
| Default        | : 10.0                                                                             |
| Effective time | : Instant                                                                          |
| Note           | : Default value is generally used to set tapping closed loop adjustment parameters |

|                |                             |
|----------------|-----------------------------|
| 034            | Delay before tapping        |
| Range          | :                           |
| Unit           | : None                      |
| Authority      | : Operation admin or higher |
| Default        | : 100                       |
| Effective time | : Instant                   |

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

035

Tapping hole bottom delay

Range :

Unit : None

Authority : Operation admin or higher

Default : 100

Effective time : Instant

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

036

If tapping collects data?

Range :

Unit : None

Authority : Operation admin or higher

Default : 100

Effective time : Instant

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

037

Max allowable tapping error

Range :

Unit : None

Authority : Operation admin or higher

Default : 10000

Effective time : Instant

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

038

Tapping fixed cycle type

Range :

|                |   |                                                            |
|----------------|---|------------------------------------------------------------|
| Unit           | : | None                                                       |
| Authority      | : | Operation admin or higher                                  |
| Default        | : | 100                                                        |
| Effective time | : | Instant                                                    |
| Note           | : | Set tapping F to indicate rate or logic programming method |

## 10.7 Port configuration (P6.)

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

|                |   |                                                                             |
|----------------|---|-----------------------------------------------------------------------------|
| Range          | : | 0~23                                                                        |
| Unit           | : | Terminal No.                                                                |
| Authority      | : | Super Admin                                                                 |
| Default        | : | The port table in the manual                                                |
| Effective time | : | Instant                                                                     |
| Note           | : | Set the input or output port number assigned to configure system functions; |

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

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

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

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

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

not reset.

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

Range : 0x00000000~0xFFFFFFFF

Unit :

Authority : Super Admin

Default : 0

Effective time : Instant

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

Use binary system to configure in positions.

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

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

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

Range : 0x00000000~0xFFFFFFFF

Unit :

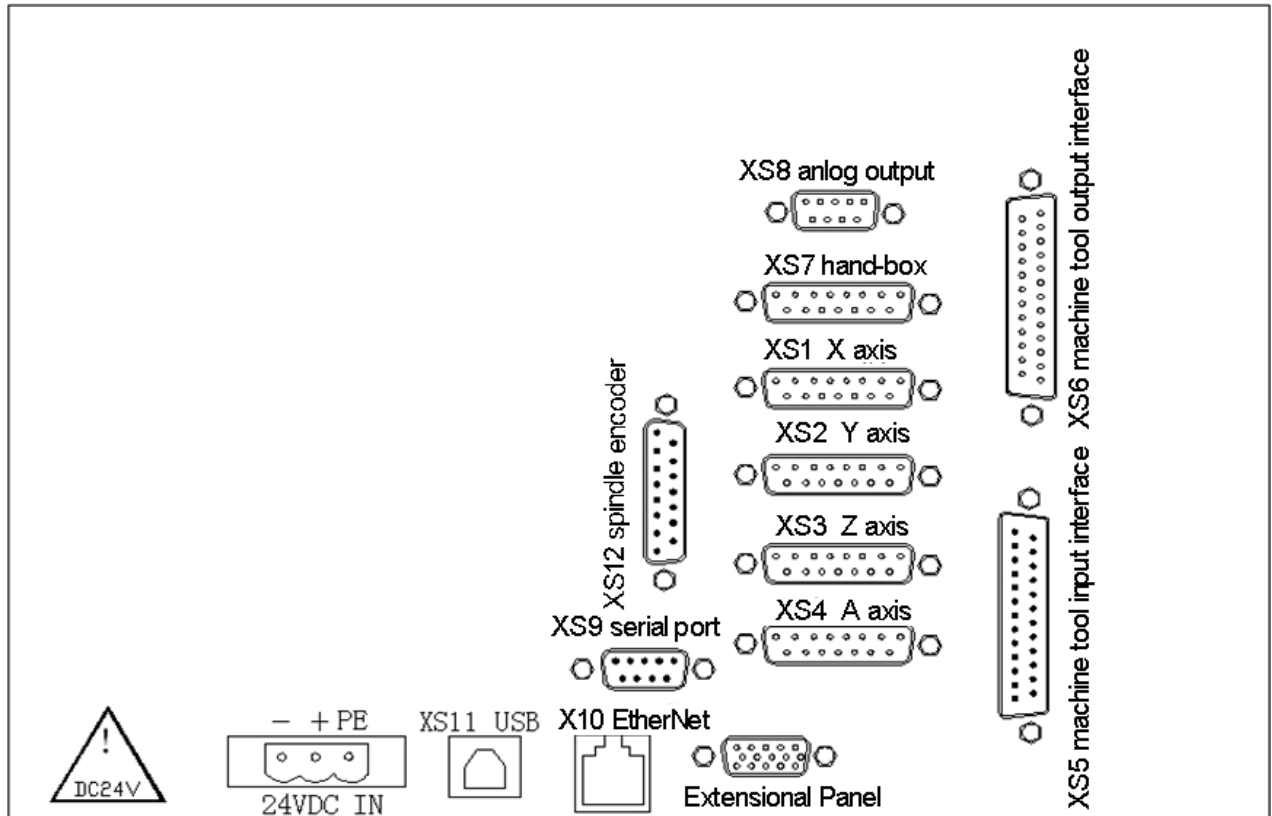
Authority : Super Admin

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

## 11. Hardware interface definition and connection instructions

### 11.1 Installation Layout

#### 11.1.1. 9640 series external interface diagram



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

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

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

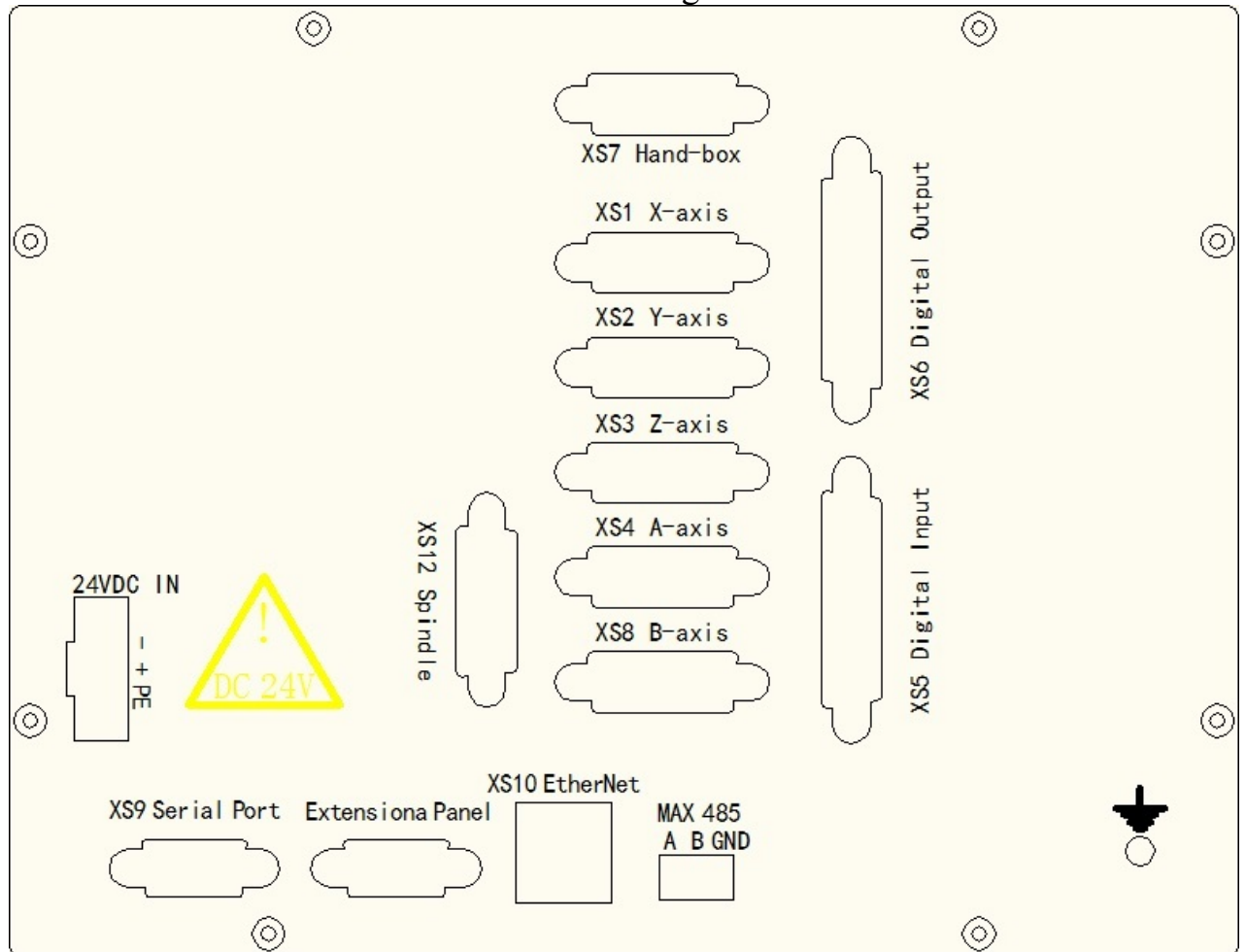
(4) USB and serial port exchange files between PC and CNC96 controller and realize other functions.

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

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

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

### 11.1.2. 9810 and 9650 series external interface diagram



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

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

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

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

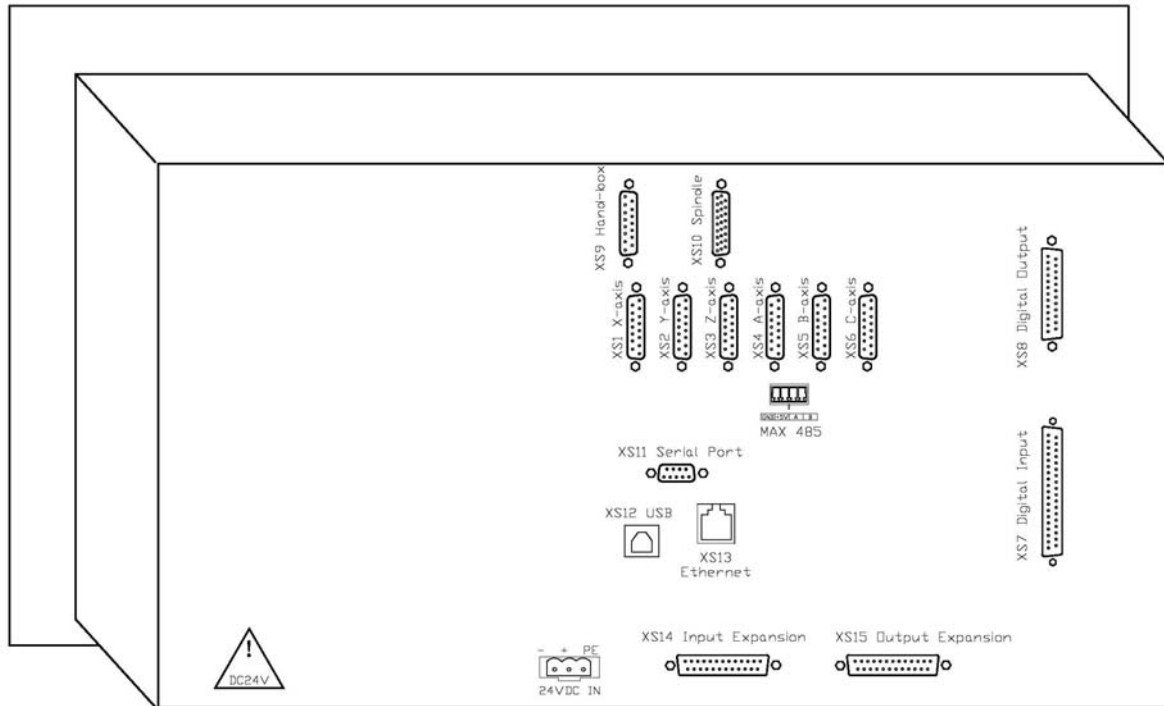
(5) CNC98 controller uses 24V DC power supply, and the internal power consumption is about 5W.

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

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



### 11.1.3. 99 series external interface diagram



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

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

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

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

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

(6) XS9 hand wheel interface:

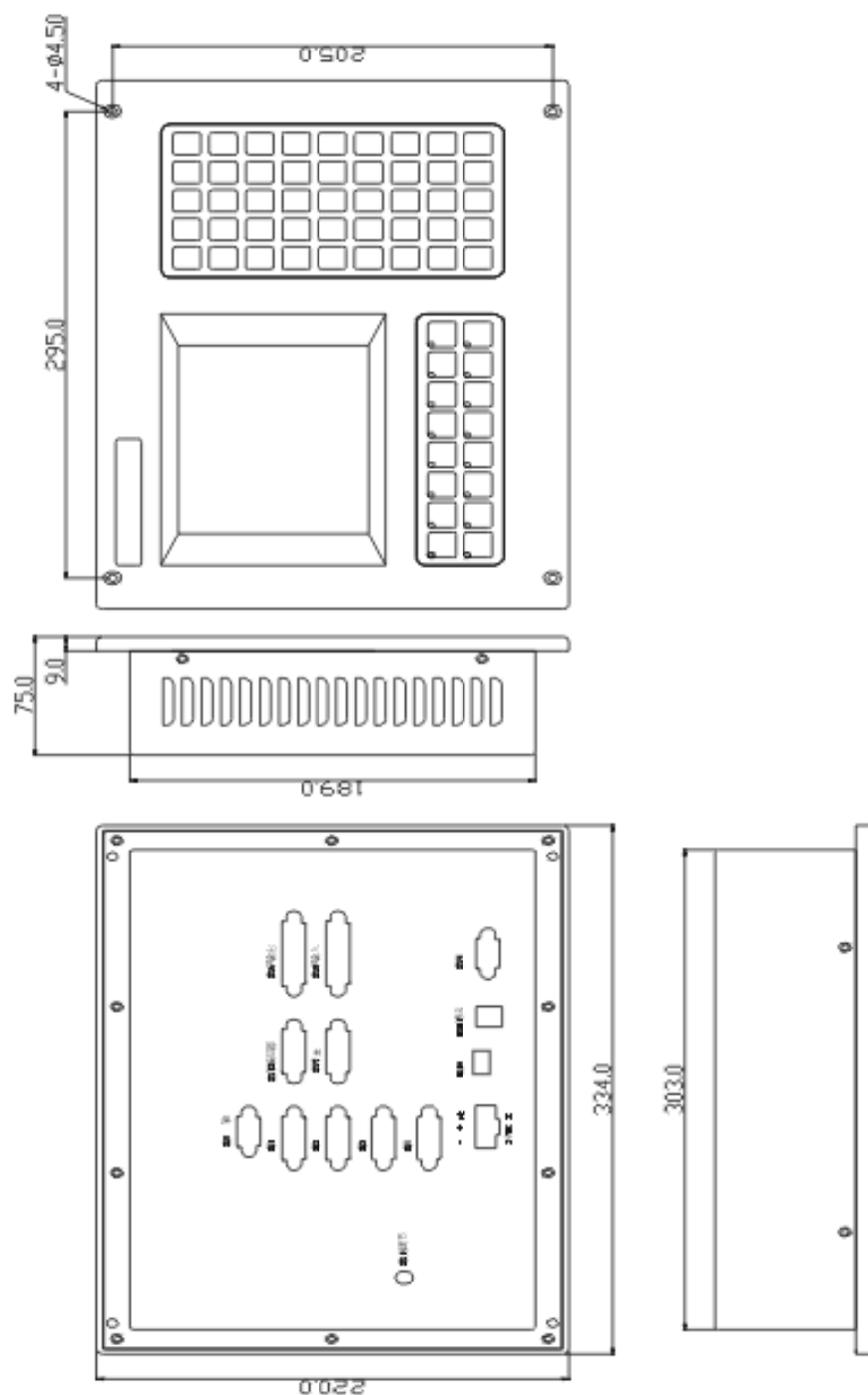
15-core D-pin socket connects to hand wheel

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

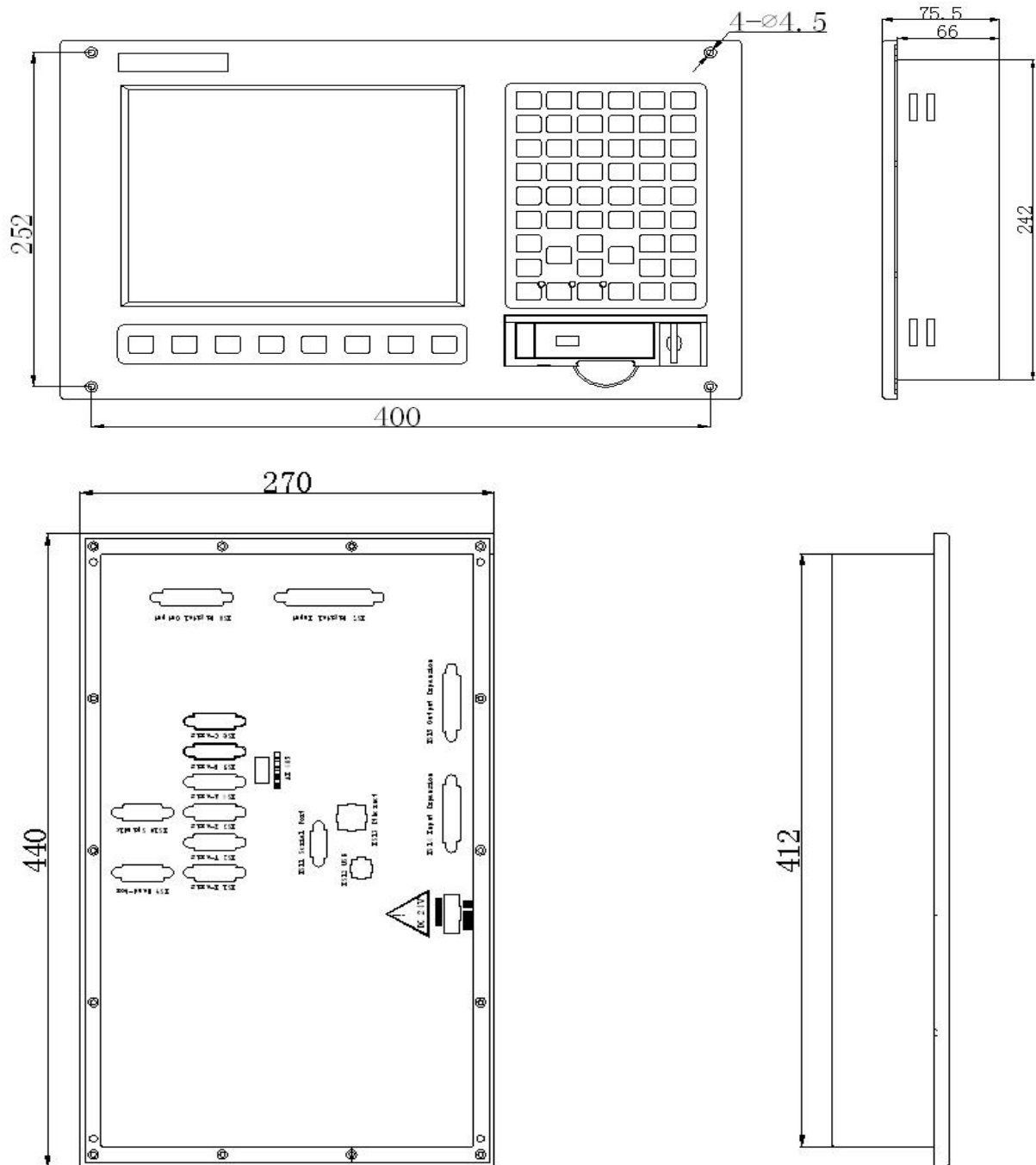
(8) XS14 machine tool extended input interface: 25-pin D-type socket is switching quantity extended input signal

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

### 11.1.4. 96 Series Mounting dimensions



### 11.1.5. 99 Series Mounting dimensions



### 11.1.6. Installation precautions

#### Installation condition for electric cabinet

- (1) The cabinet must be able to effectively prevent dust, coolant and organic solution from entering;
- (2) When design electric cabinet, the distance between rear cover and case should be at least 20CM; considering the temperature rises in the cabinet, the difference of temperature inside and outside of the cabinet shouldn't exceed 10°C;
- (3) The cabinet should be installed with fan to ensure interior ventilation;

- (4) The display panel should be installed at the position where can't be sprayed by the coolant;
- (5) When designing electric cabinet, the external electrical interference should be reduced to as lowest as possible to prevent interfering with the system;

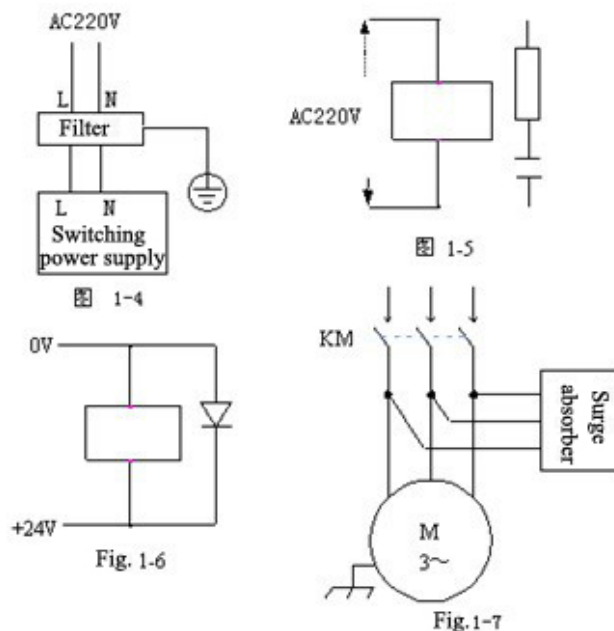
### To prevent interference

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

- (1) CNC must be kept away from equipment generating interference (e.g. inverter, AC contactor, electrostatic generator, high voltage generator, and sub-unit of power lines), and the switching power supply should be connected to a filter to improve the anti-interference of CNC (as in Fig. 1-4);
- (2) To supply power to the system through isolation transformer, the machine tool must be grounded, CNC and driver must be connected to separate earth wire.

### To suppress interference

Connect RC circuit ( $0.01\mu\text{F}$ ,  $100\sim 200\Omega$ , 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).



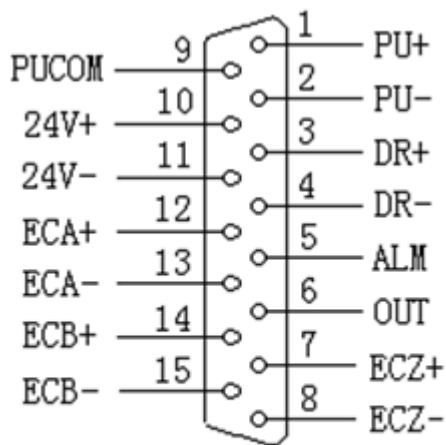
To reduce the interference between CNC signal cables and strong current cables, the wiring shall follow the principles below:

| 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 machine tool           | Bundle the cables of group C separately from group A, or shield group C; keep at least 10cm clearance between group C and group B and use twisted pair |
|       | Position feedback cable                         |                                                                                                                                                        |
|       | Position encoder cable                          |                                                                                                                                                        |
|       | Handwheel cable                                 |                                                                                                                                                        |
|       | Other cables for shielding                      |                                                                                                                                                        |

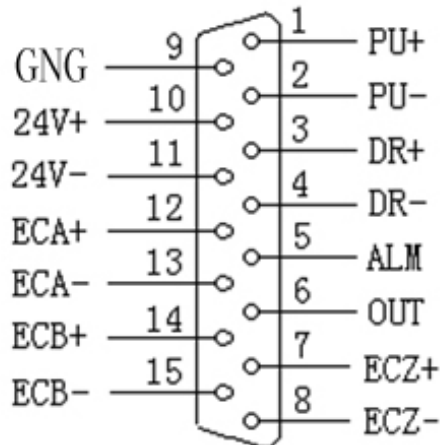
## 11.2 Interface Definition

### 12.2.1. Motor driver control interface

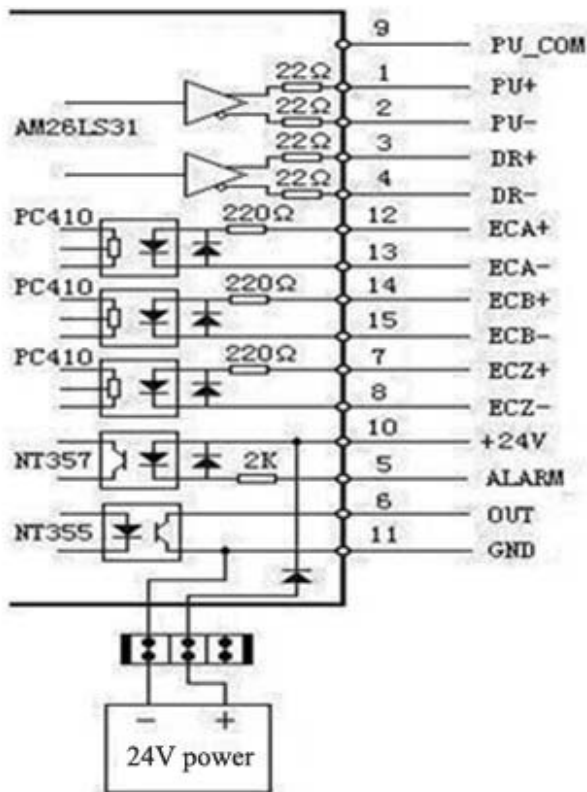
Four driver interfaces are available (XS1.. XS4, XS8 (note: CNC9650) of 96 series or XS1...XS4, XS5, XS6 of 99 series), and they have the same definition, as shown below:



96 series pulse interface



99 series pulse interface

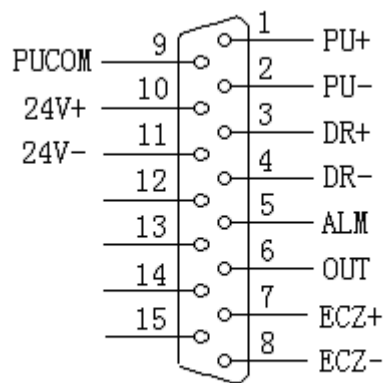


Simple Internal Circuit Diagram for Pulse Output

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

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

### Standard pulse wiring diagram

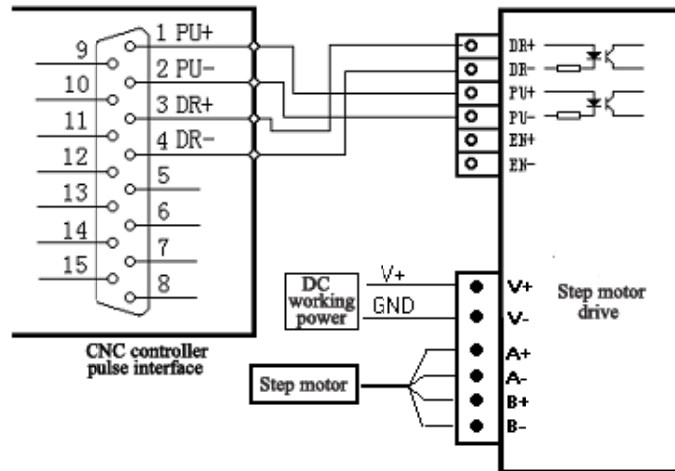


XS1 ... XS4 Pulse Interfaces Standard Wiring

This wiring is suitable for 96 and 99 series controller

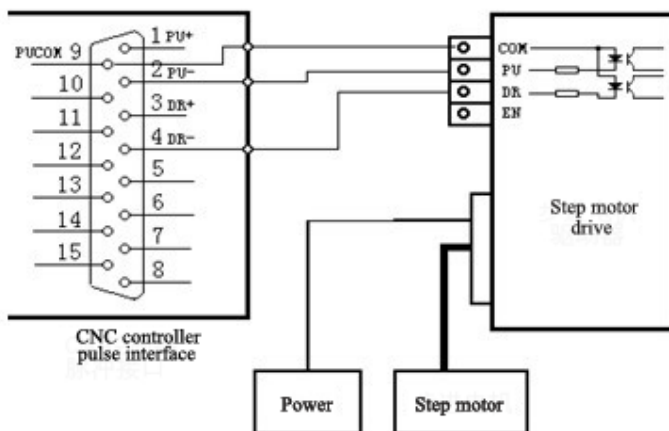
### Step motor driver cable to differential input

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



Wiring diagram of step motor driver with single-ended input

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



Wiring Diagram of Step Motor Driver with Common Anode Input

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

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

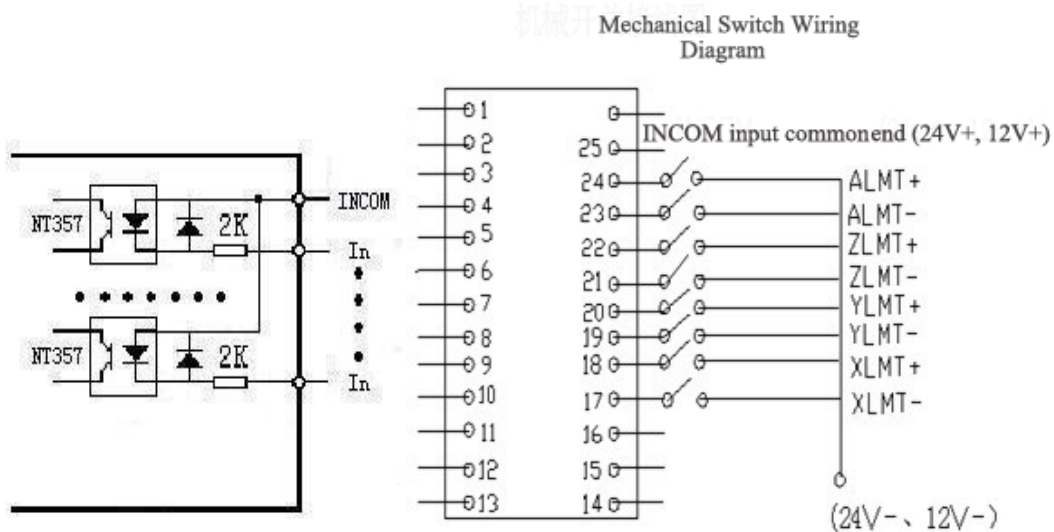
#### Caution

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



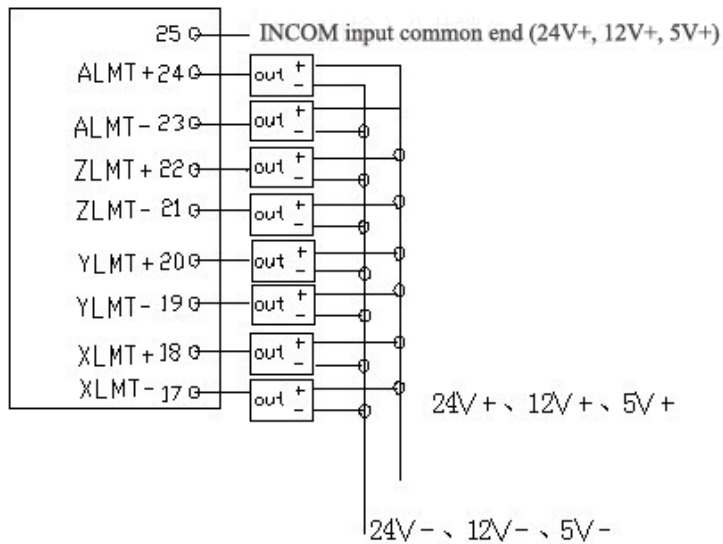
### 12.2.2. Digital input interface

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



Simple Internal Output Diagram for Digital Input

Photoelectric Switch Wiring Diagram



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

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

| Wire No. | Port Definition | Function |
|----------|-----------------|----------|
|----------|-----------------|----------|

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

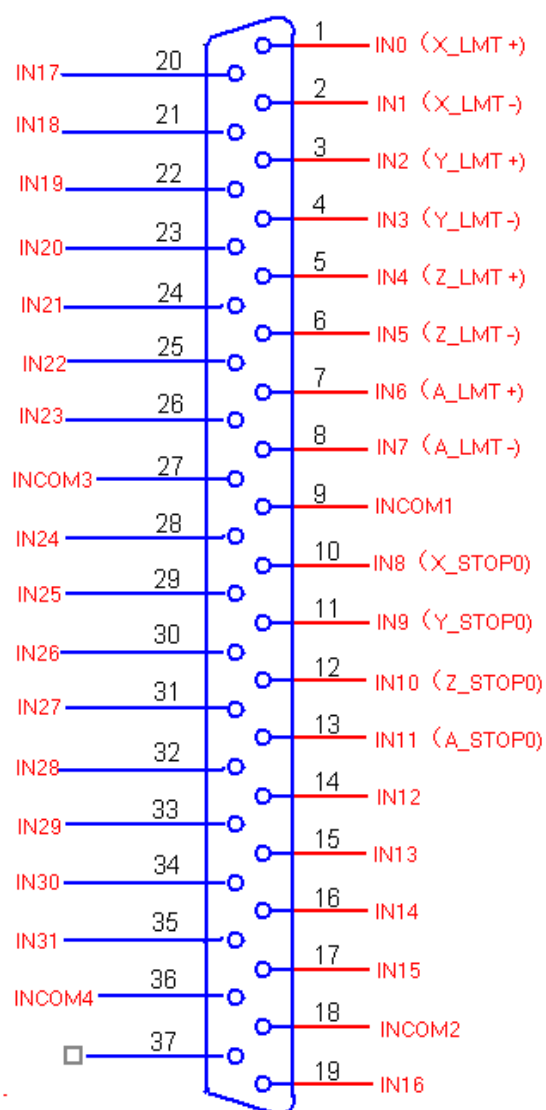
Default input port configuration of 98M series XS5 (CNC9810 milling machine)

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

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

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

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



Machine input interface

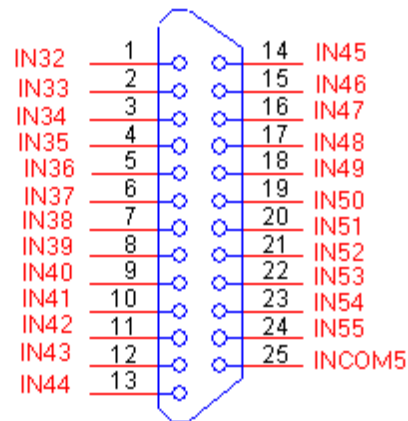
| 37-pin<br>plug wire | 9960(40)<br>Definition | Function              | 9163 Definition |
|---------------------|------------------------|-----------------------|-----------------|
| 1                   | IN0 (X_LMT+)           | X axis positive limit | IN00            |
| 2                   | IN1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

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

37

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

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

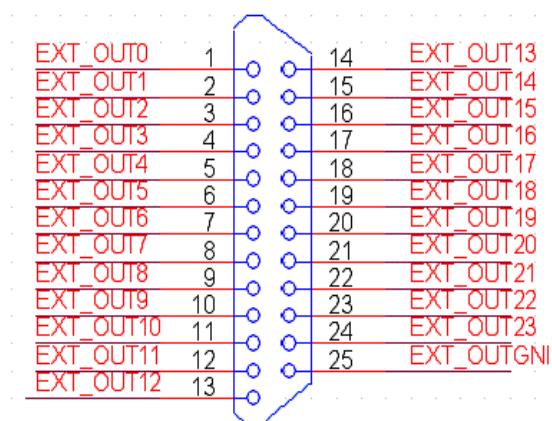


| Wire No. | Port Definition | Function      |
|----------|-----------------|---------------|
| 1        | IN32            | Standby input |
| 2        | IN33            | Standby input |
| 3        | IN34            | Standby input |
| 4        | IN35            | Standby input |
| 5        | IN36 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

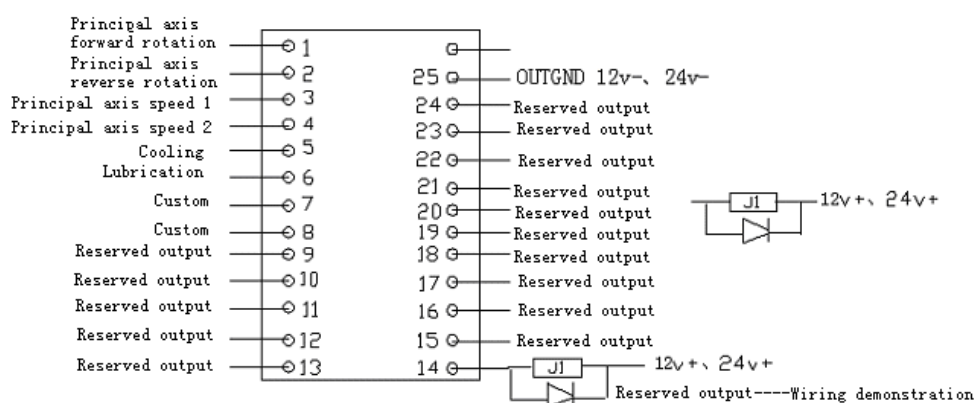
|    |        |                               |
|----|--------|-------------------------------|
| 18 | IN49   | Standby input                 |
| 19 | IN50   | Standby input                 |
| 20 | IN51   | Standby input                 |
| 21 | IN52   | Standby input                 |
| 22 | IN53 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

### 12.2.3. Digital output interface

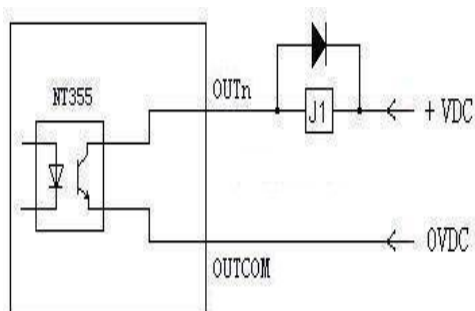
The wiring of digital output interface is as follows:



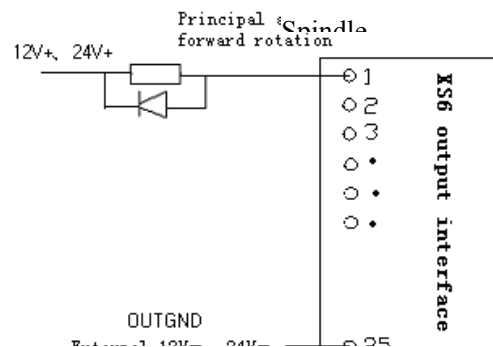
XS6 Output Interface Wiring Diagram



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



Simple Internal Circuit of Digital Output (left)



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



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

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

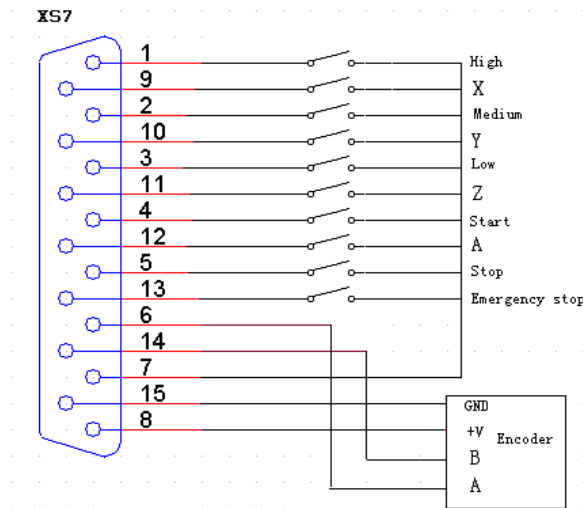
|    |       |                                                         |
|----|-------|---------------------------------------------------------|
| 22 | OUT21 | (M46, M47) (operation panel F3 M46, M47)                |
| 23 | OUT22 | (M48, M49) (operation panel F4 M48, M49)                |
| 24 | OUT23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

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

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

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

#### 12.2.4. Handheld box interface



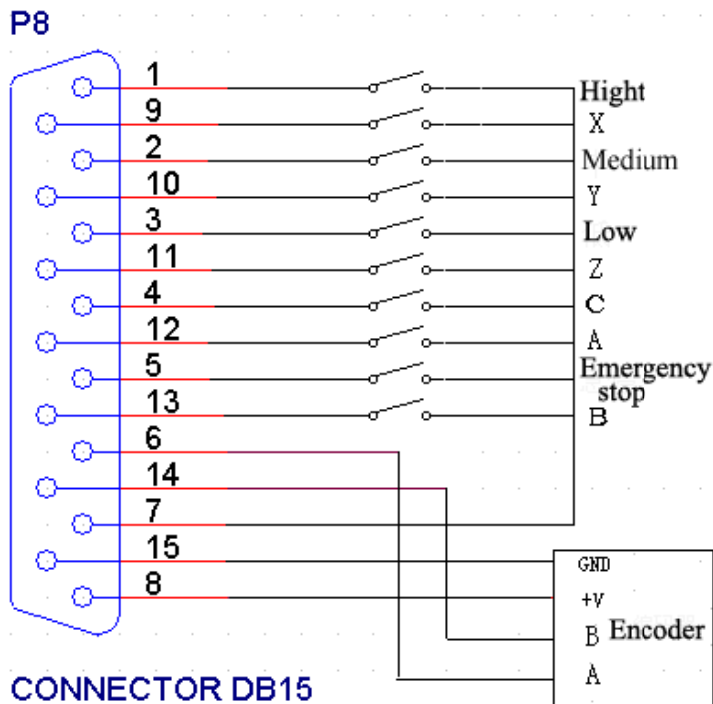
The definition of 9 series (CNC9640 XS7) is as follows:

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

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

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

CNC9960 and CNC9810 definitions are as follows:

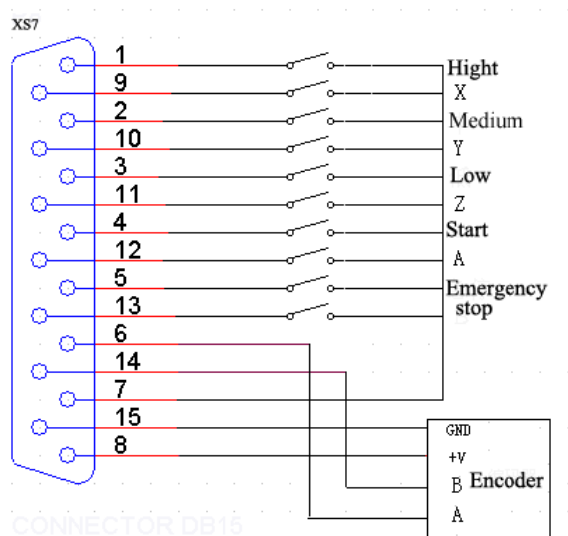


| Wire No. | Definition | Function                          |
|----------|------------|-----------------------------------|
| 1        | IN56       | 0.1 gear switch - High            |
| 2        | IN58       | 0.01 gear switch - Medium         |
| 3        | IN60       | 0.001 gear switch - Low   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

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

9 series (XS9)

CNC9940 definition is as follows:

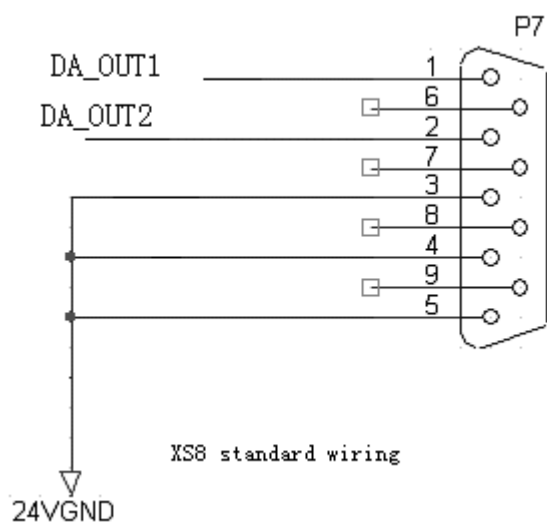


| Wire No. | Definition | Function                          |
|----------|------------|-----------------------------------|
| 1        | IN56       | 0.1 gear switch - High            |
| 2        | IN58       | 0.01 gear switch - Medium         |
| 3        | IN60       | 0.001 gear switch - Low   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

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

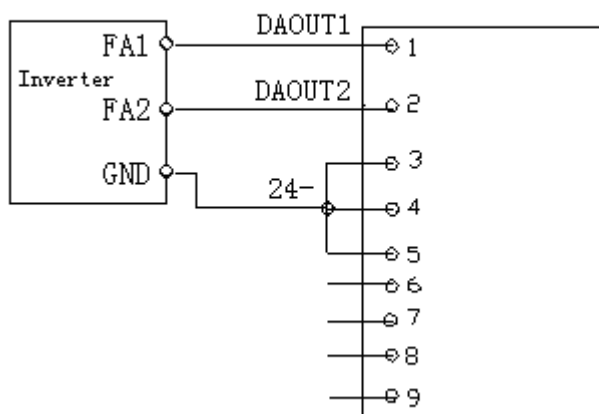
### 12.2.5. Analog output interface (9640 series XS8)

Analog output interface wiring diagram:



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

**Wiring diagram of analog principal axis IS8 and inverter**

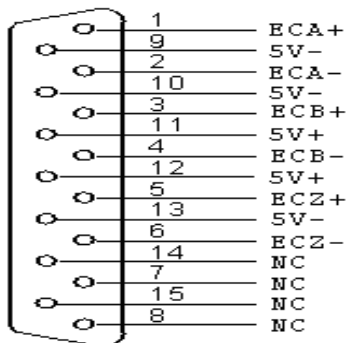


| Wire No. | Definition | Function                       |
|----------|------------|--------------------------------|
| 1        | DAOUT1     | Analog voltage output (0~10) V |

|   |        |                                |
|---|--------|--------------------------------|
| 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. Spindle encoder interface (9640 series XS12)

Spindle encoder interface diagram (9640 series XS12):

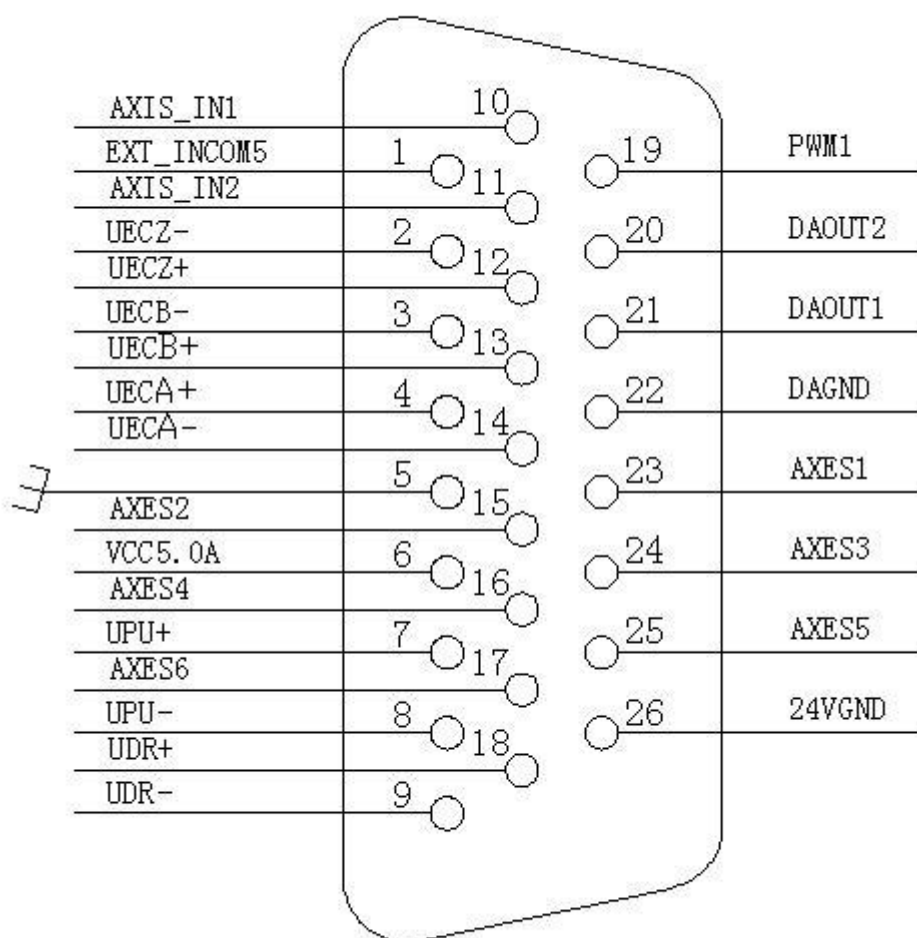


The spindle encoder (9 series CNC9640 controller) definition is as follow:

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

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

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



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

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



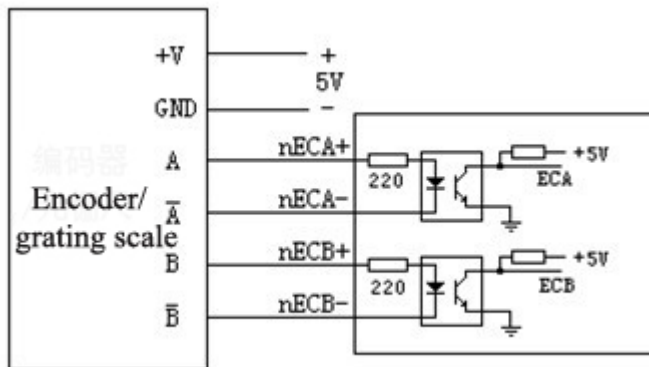
|    |            |                                                                           |
|----|------------|---------------------------------------------------------------------------|
| 3  | UECB-      | Spindle encoder B-                                                        |
| 4  | UECA+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

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

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

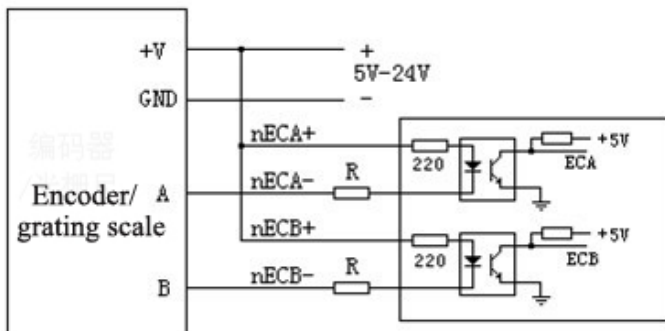
As shown in the figure below, AB phase decoder input signal uses differential input connection; if common anode connection is used, the positive ends of phase A and phase B must be connected; for common cathode connection, the negative ends of phase A and phase B must be connected.

**Differential connection is as follows:**



5V power supply is externally provided.

**Common anode connection is as follows:**



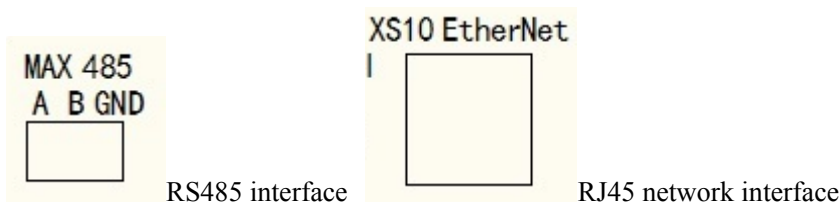
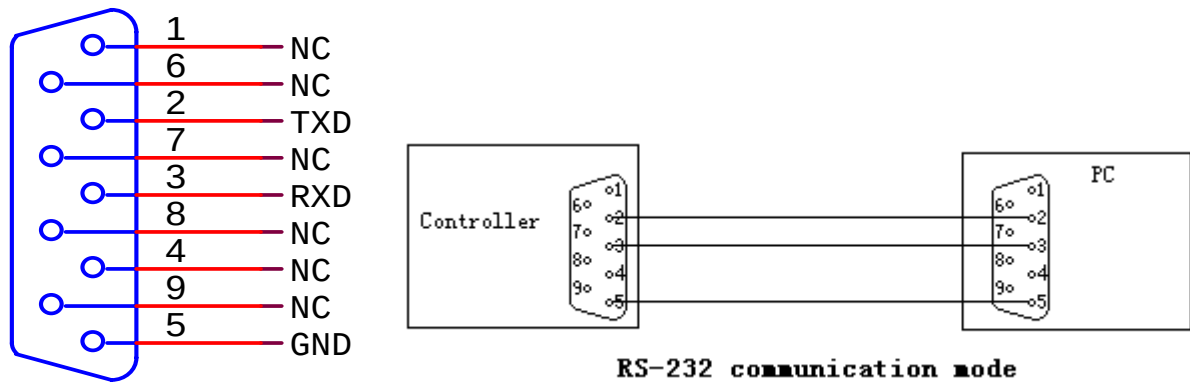
The power voltage is determined by encoder. If 5V power supply is used, resistor R will be unnecessary. For 12V power supply, please use 1K-2K resistor, and for 24V power supply, please use 2K-5K resistor.

Suggestion:

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

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

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



### 12.2.8. USB memory connection interface (96 series XS10)

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

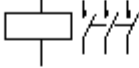
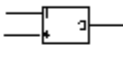
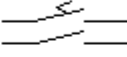
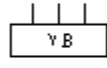
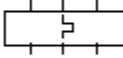
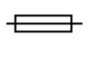
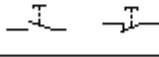
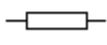
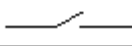
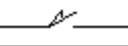
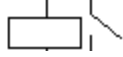
### 12.2.9. PC USB communication interface (96 series XS11, 99 series X13)

Standard USB communication interface;

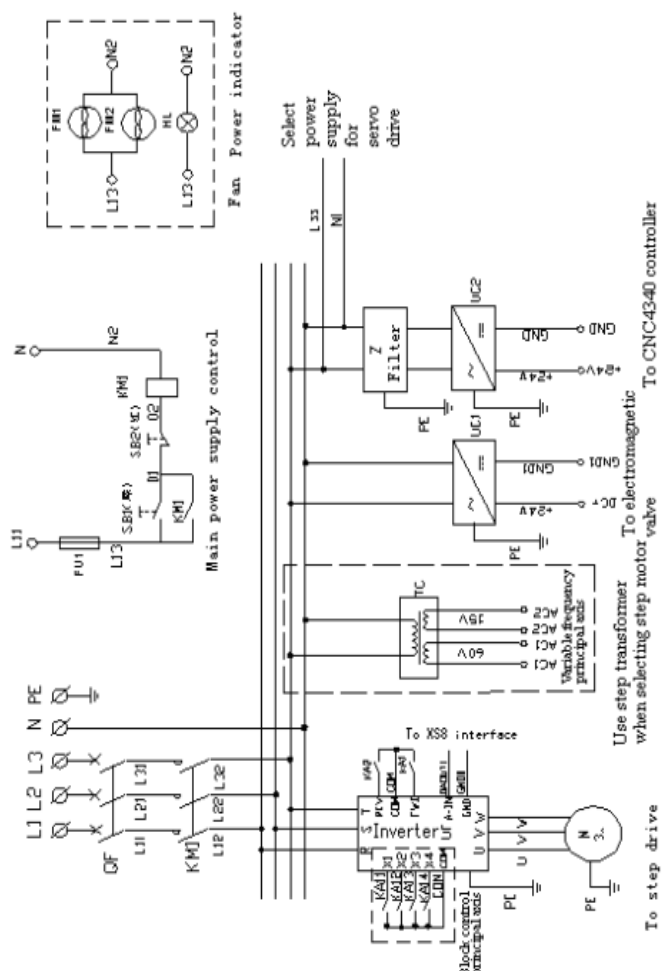


## 11.3 Electrical connection diagram

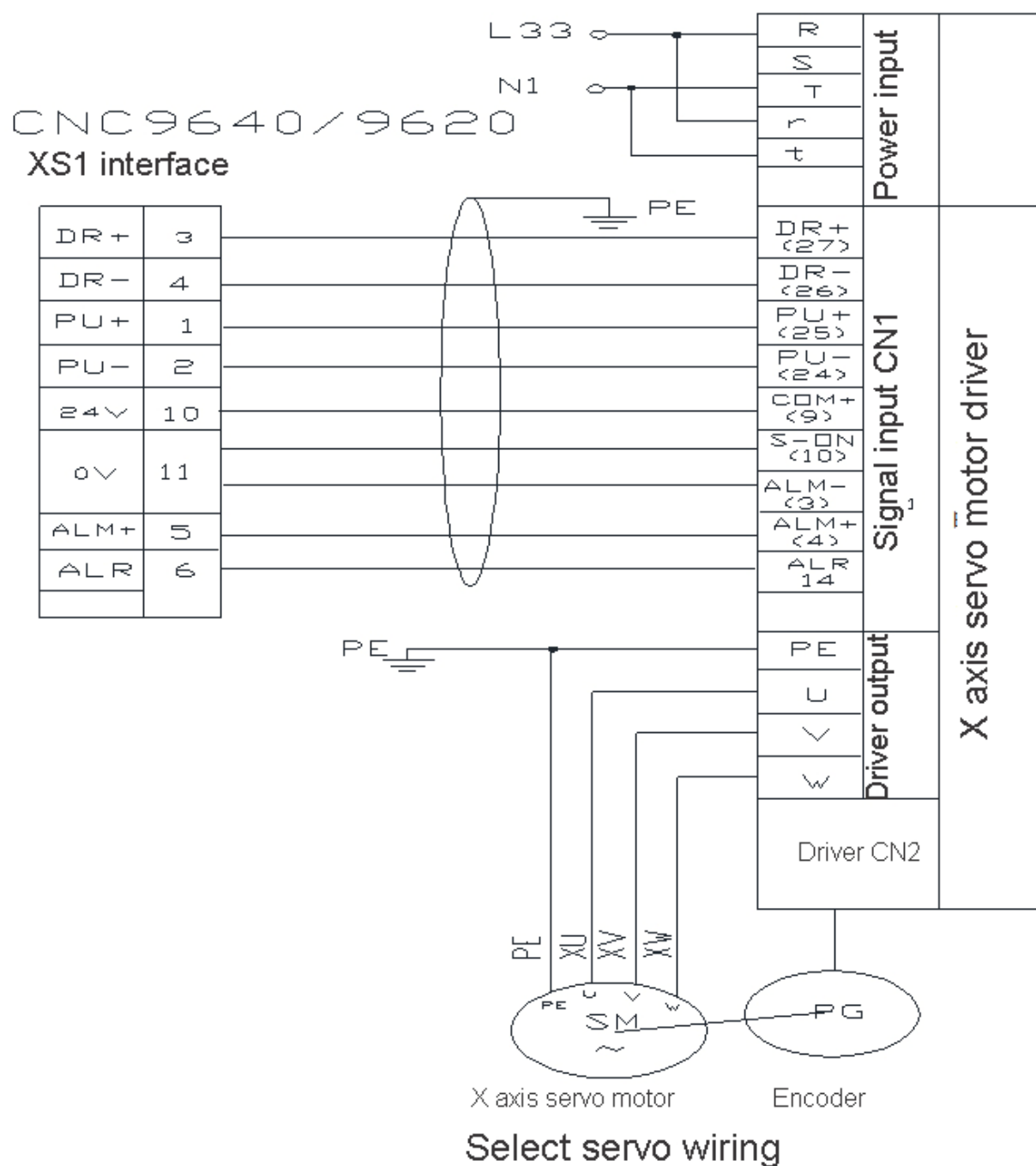
### 11.3.1. Symbol schematic diagram

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

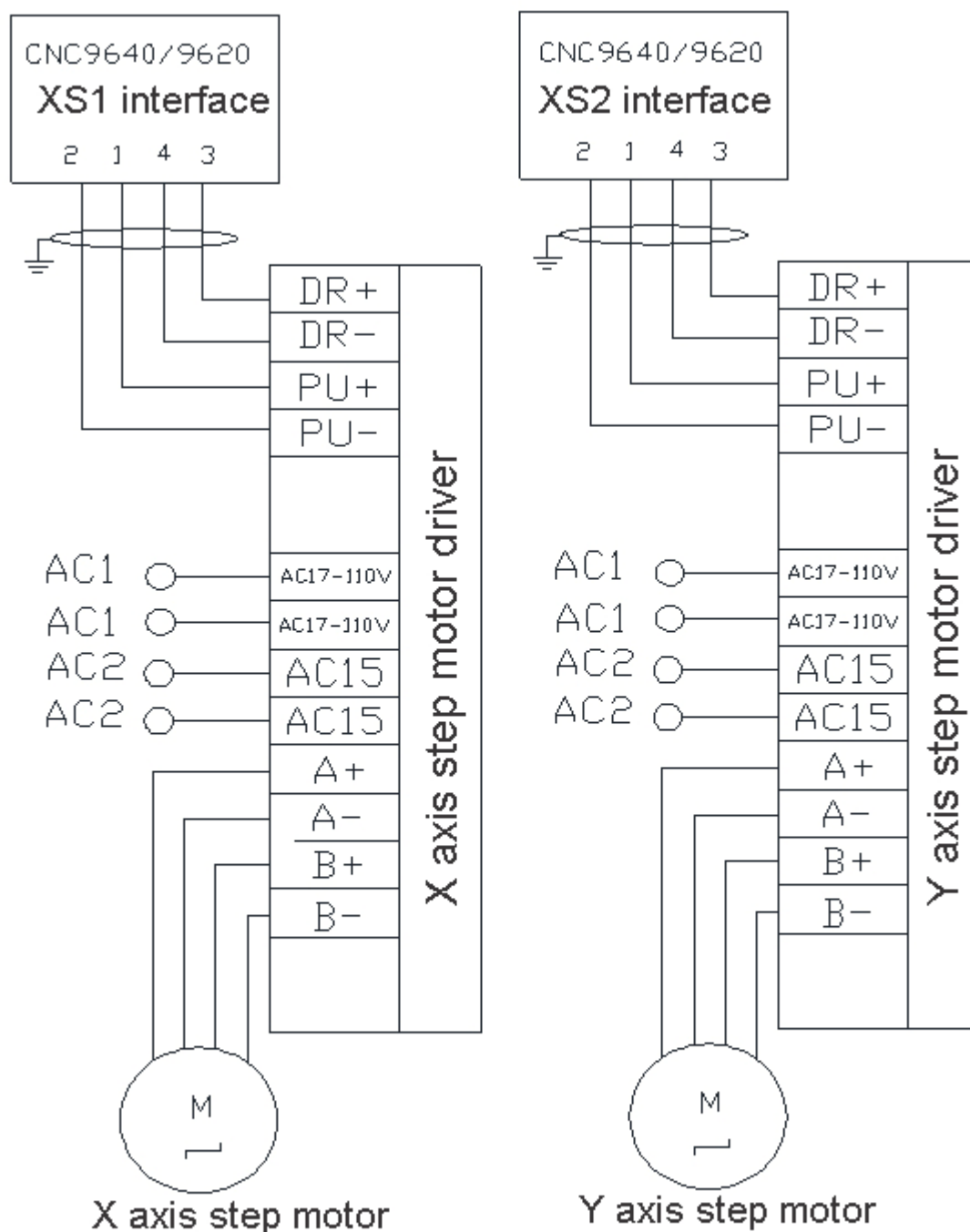
### 11.3.2. Power connection diagram



11.3.3. Servo driver connection diagram

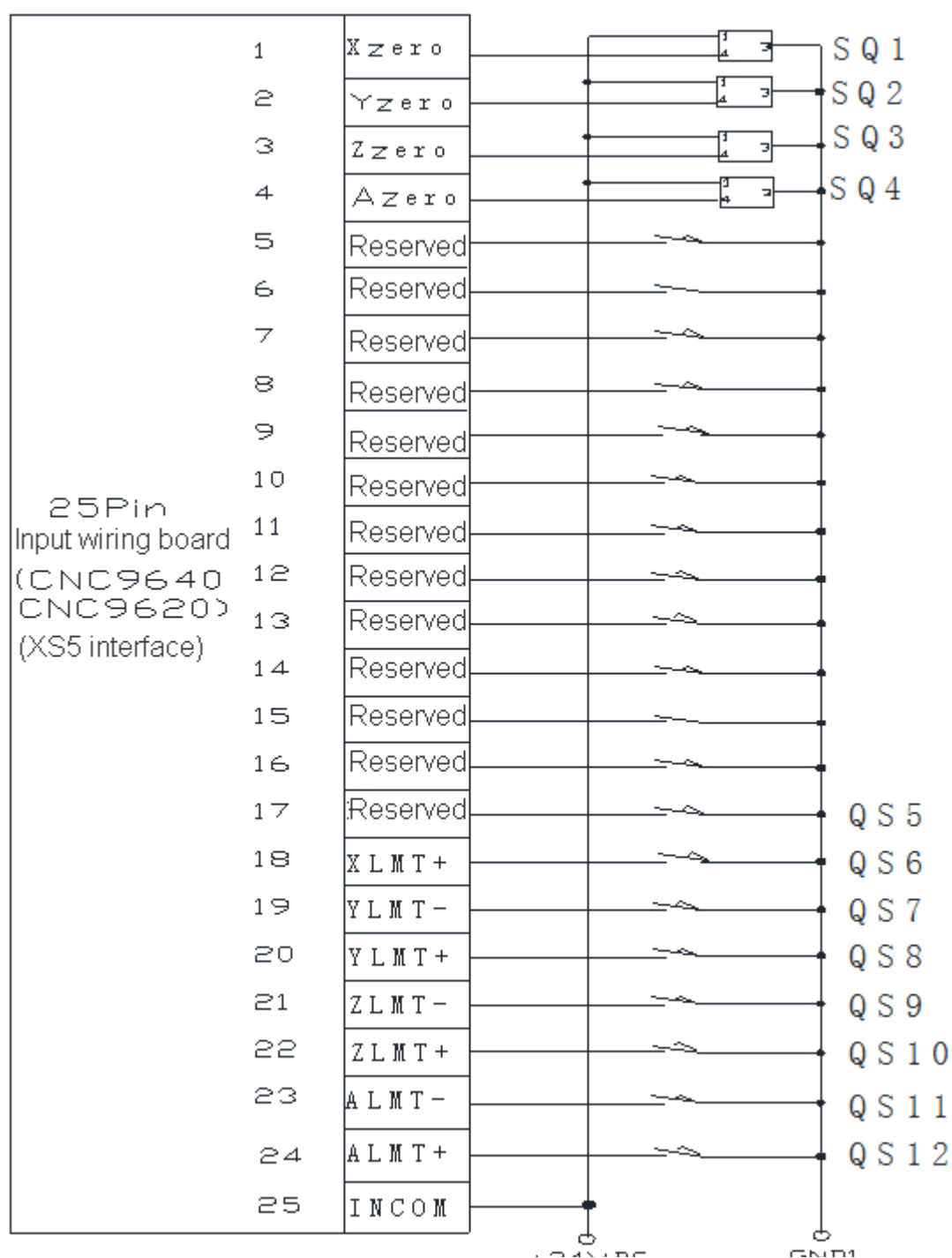


#### 11.3.4. Step connection diagram

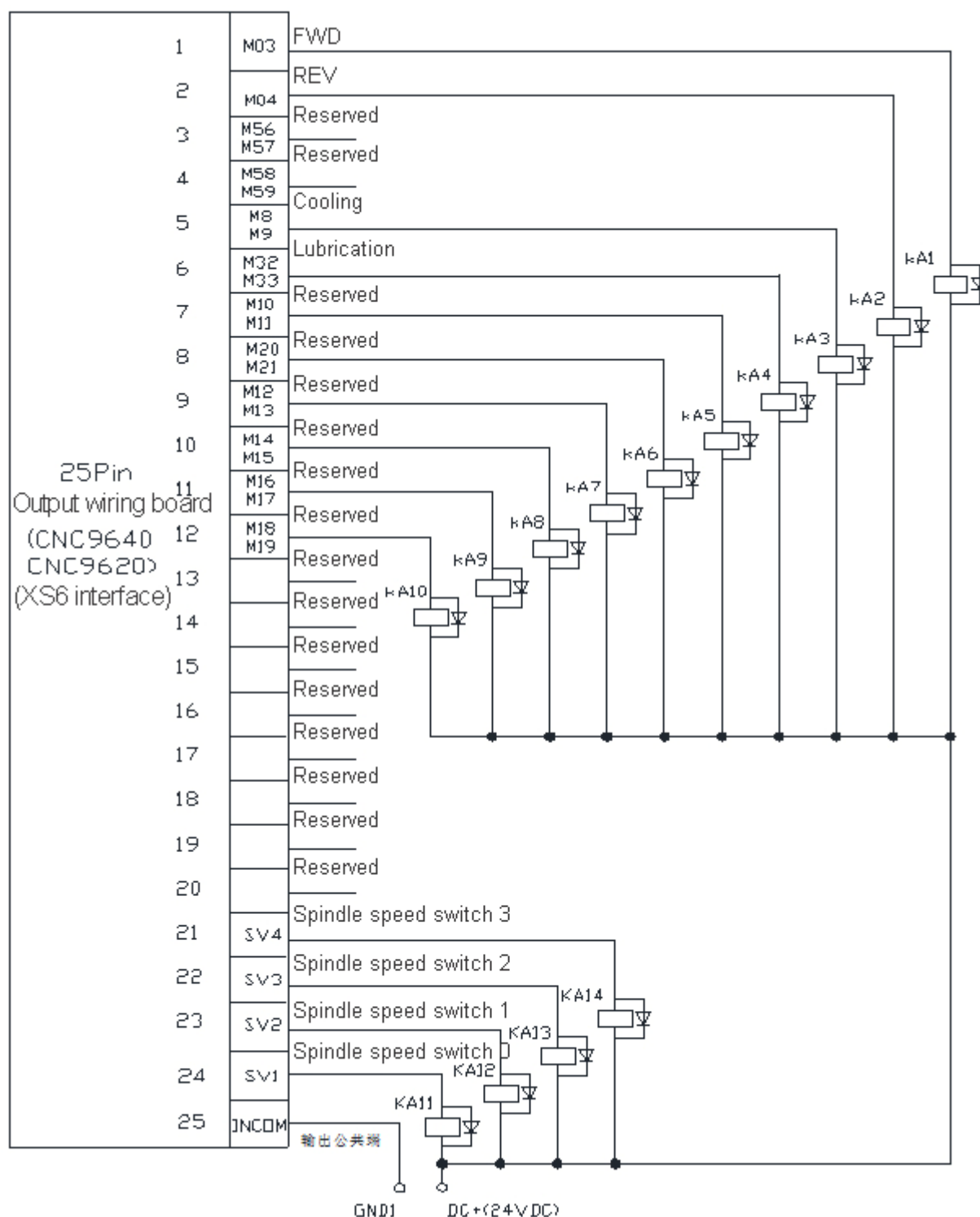


## Q2BYG1106M Step System

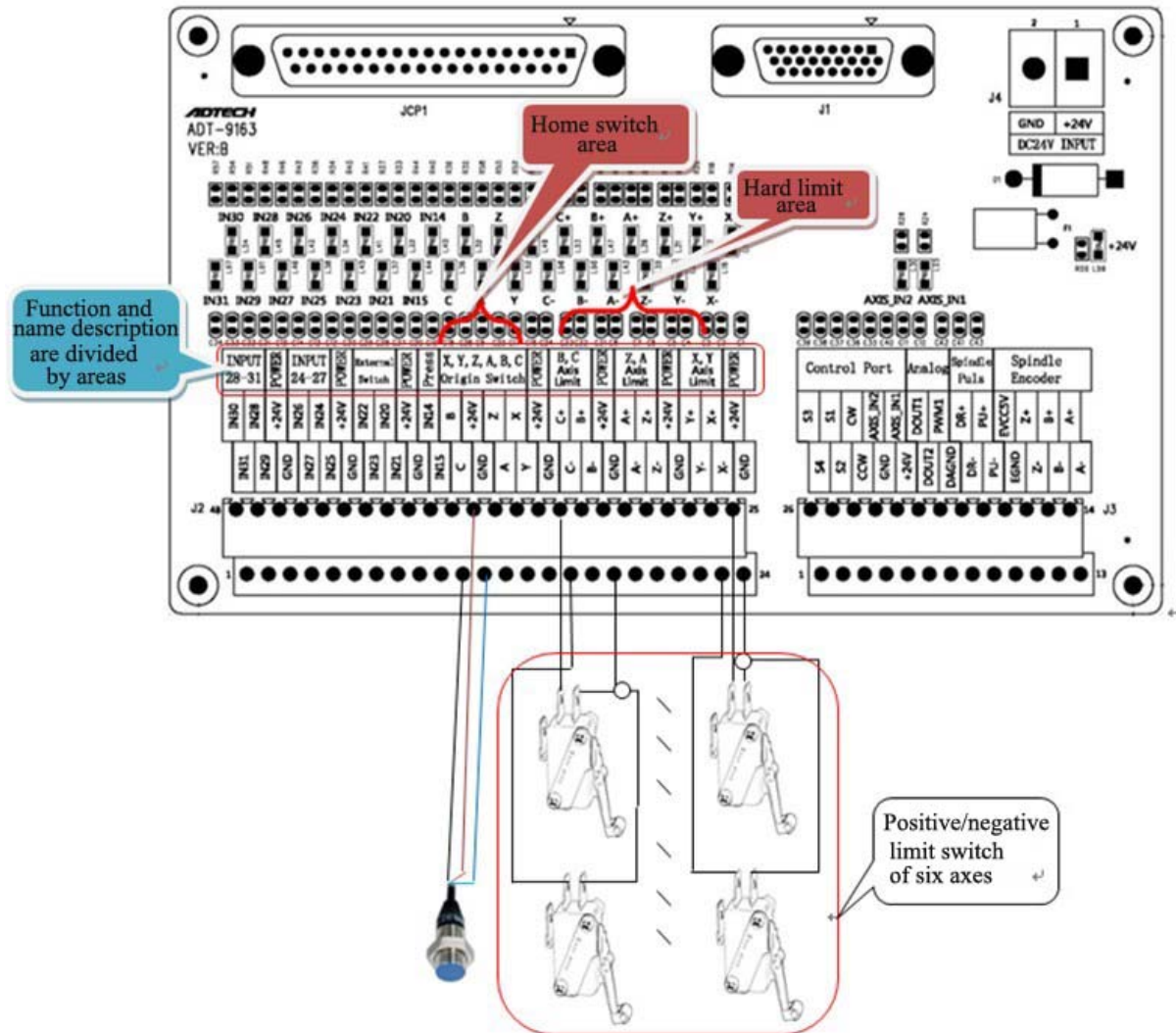
### 11.3.5. IO electrical connection diagram







### 11.3.6. ADT9163 splitter wiring diagram



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

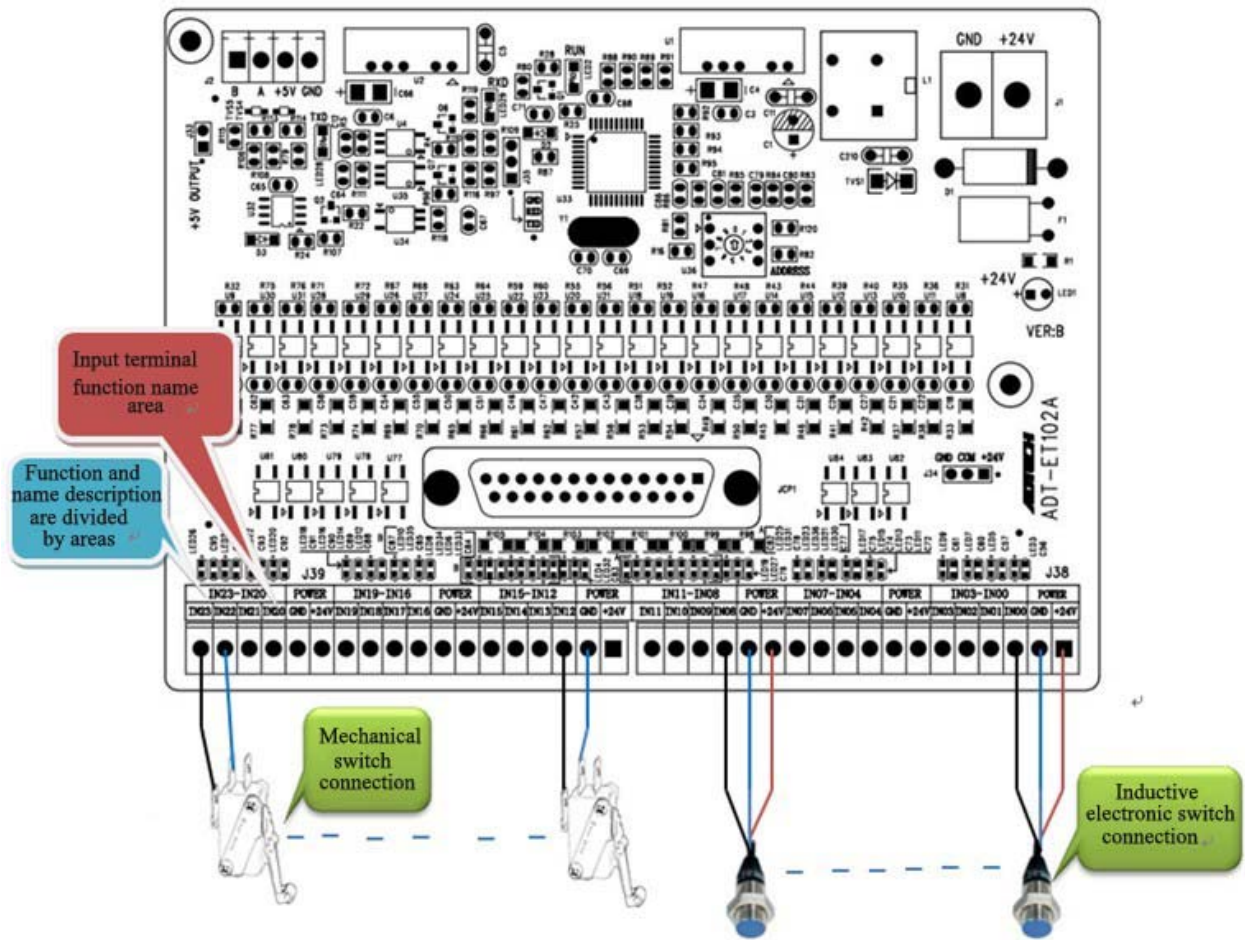
| Terminal No. | Area                        | Port Name | Function                             |
|--------------|-----------------------------|-----------|--------------------------------------|
| J2           | POWER                       | +24V      | 24V power supply output terminal     |
| J2  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

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

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

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

### 11.3.7. ET102A splitter wiring diagram



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

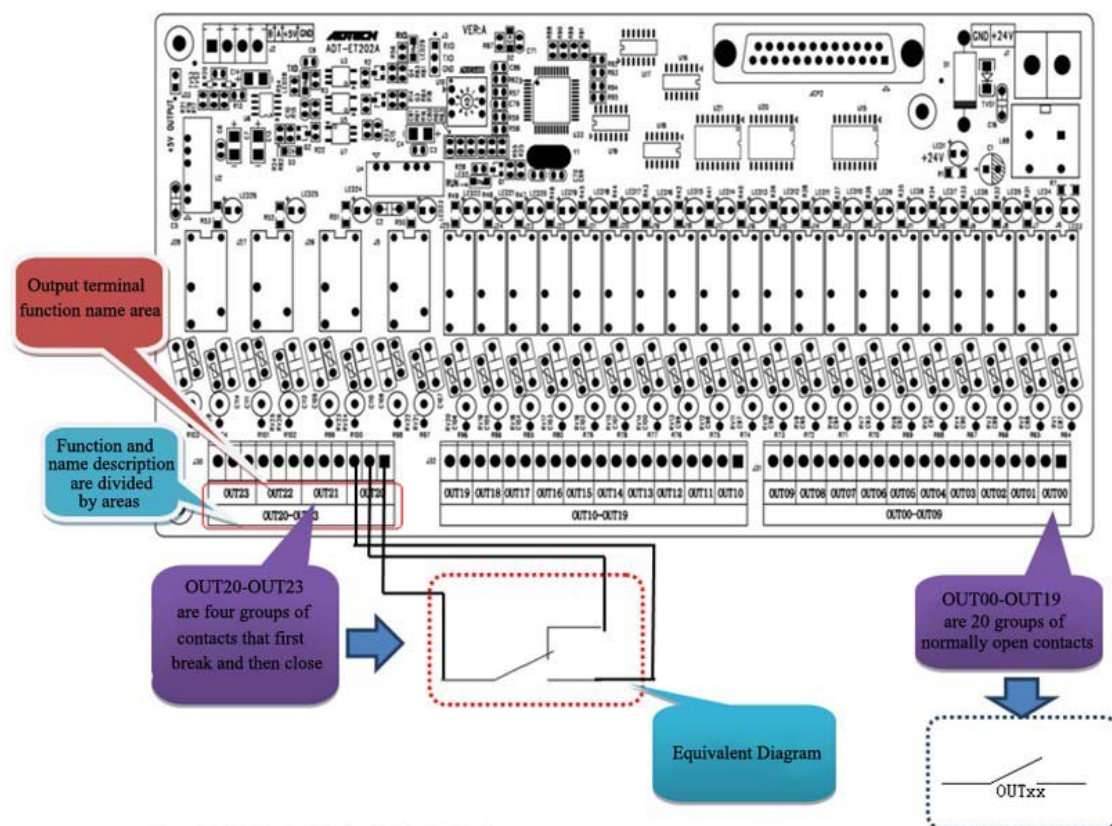
#### ET102A splitter function definition

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

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



### 11.3.8. ET202A splitter wiring diagram



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

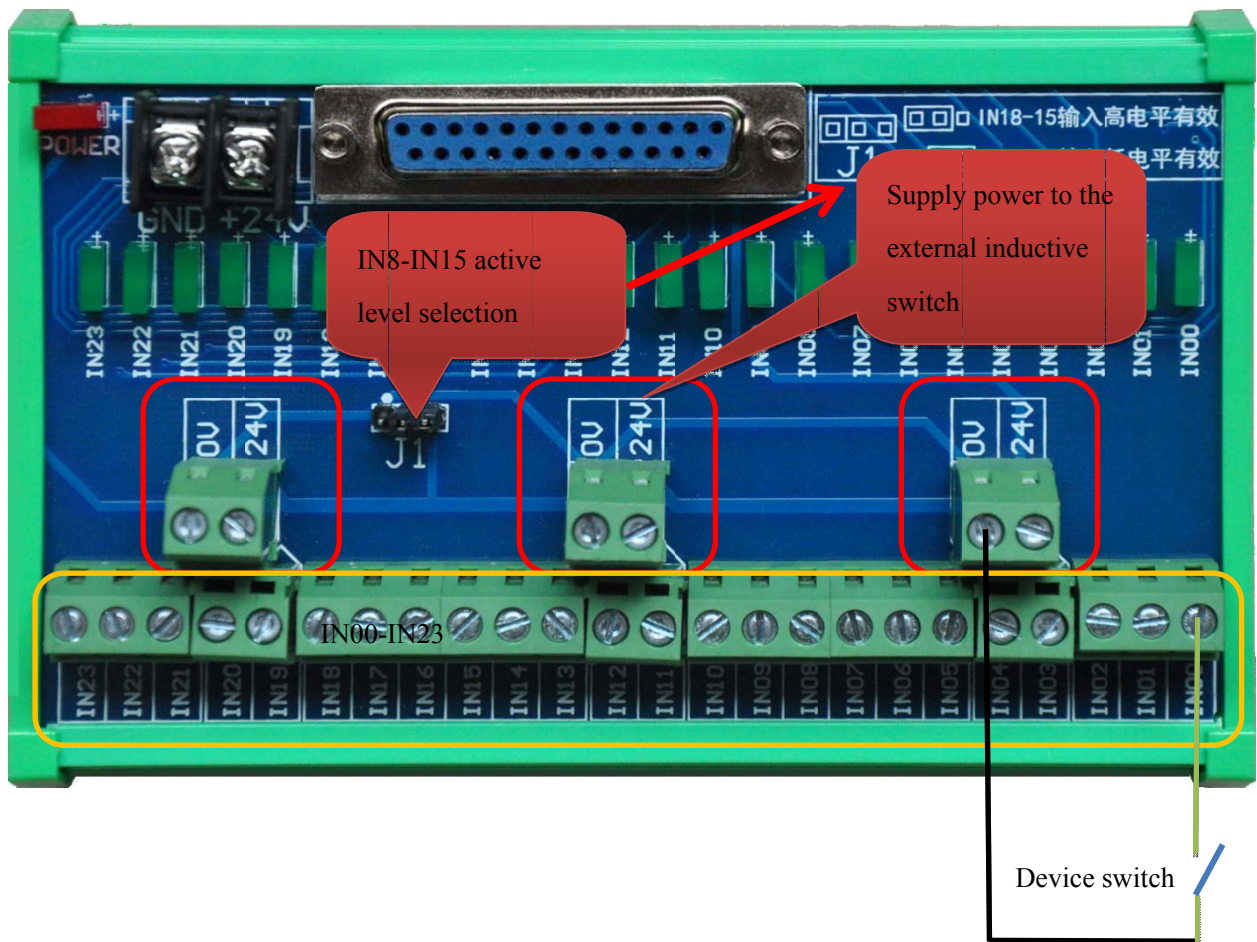
### ET202A splitter function definition

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



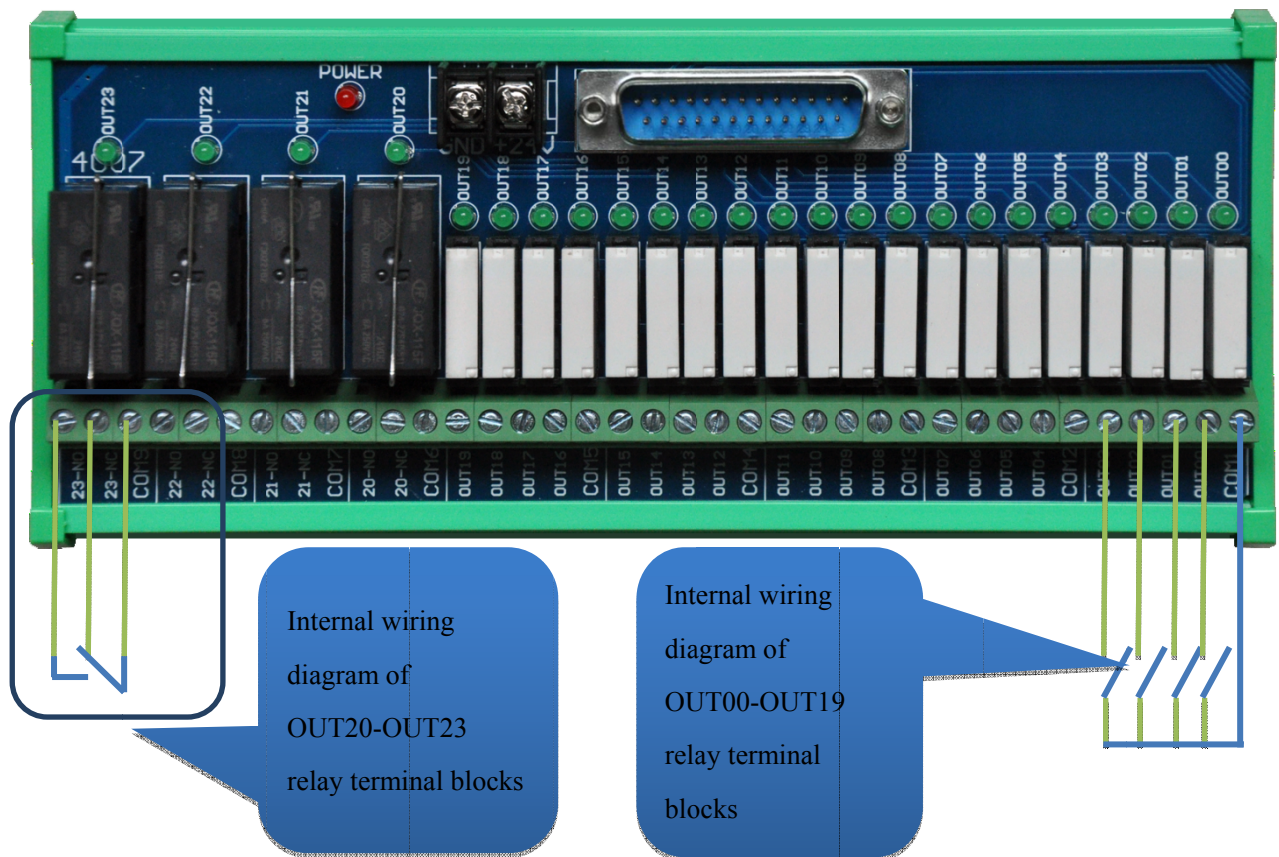
|     |             |       |       |
|-----|-------------|-------|-------|
| J31 |             | OUT09 | OUT09 |
| J32 | OUT10-OUT19 | OUT10 | OUT10 |
| J32 |             | OUT11 | OUT11 |
| J32 |             | OUT12 | OUT12 |
| J32 |             | OUT13 | OUT13 |
| J32 |             | OUT14 | OUT14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

### 11.3.9. ADT-I24HNA input board



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

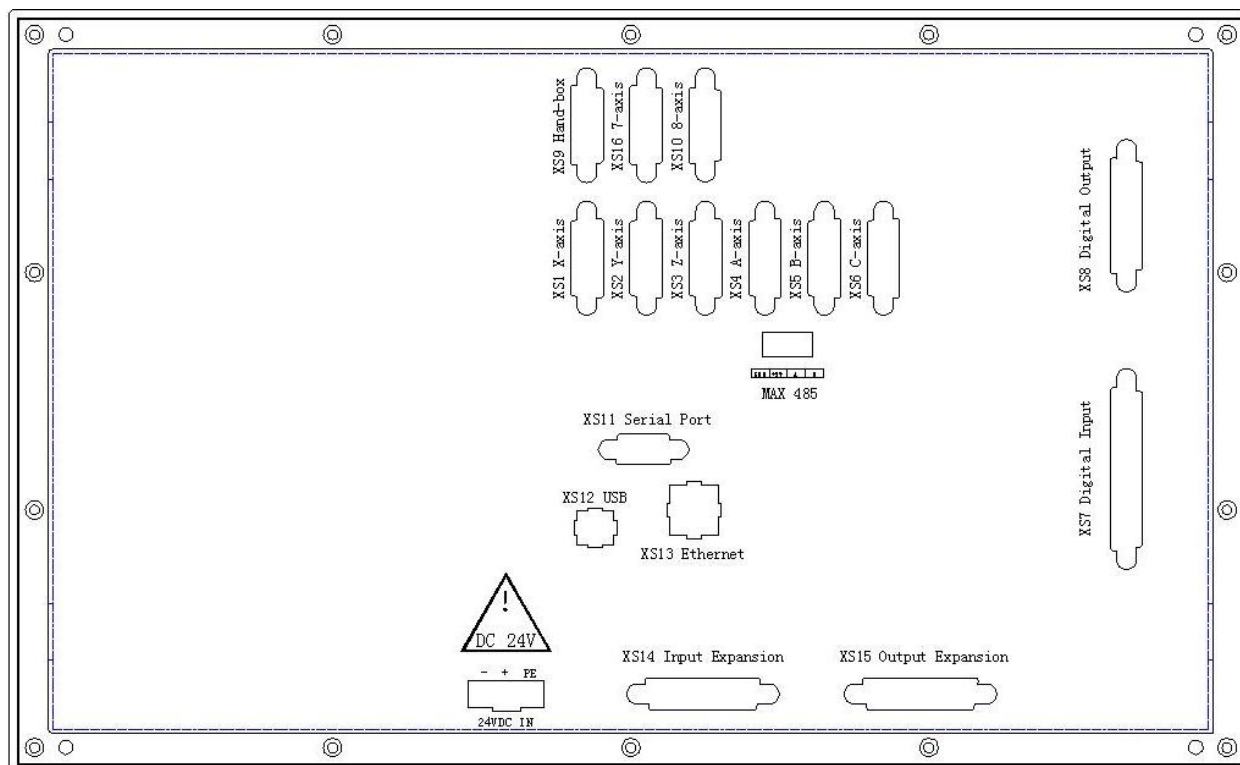
### 11.3.10. ADT-O24HNA output board



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

## 12. CNC9 Series Hardware Interface Instructions

### 12.1. External Interface Diagram



XS1 (X axis), XS2 (Y axis), XS3 (Z axis), XS4 (A axis), XS5 (B axis), XS6(C axis), XS16(7 axis), XS10(8 axis):

15-core D-pin socket connects to step motor driver or digital AC servo driver.

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

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

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

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

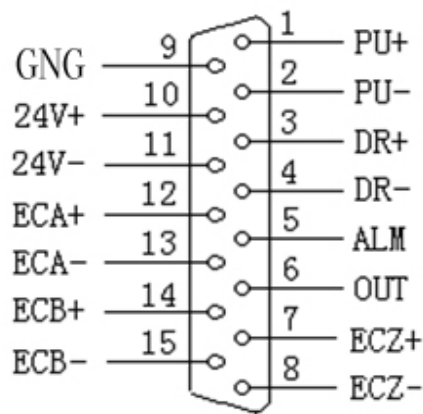
(6) XS9 hand wheel interface: 15-core D-pin socket connects to hand wheel

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

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

### 12.2. Motor driver control interface

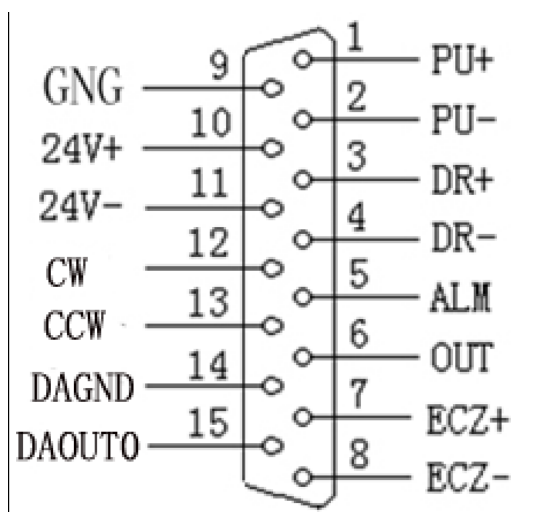
The definitions of XS1...XS4 XS5 XS6 (corresponding to X axis, Y axis, Z axis, A axis, B axis, C axis) are as follows:



49 series pluse interface

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

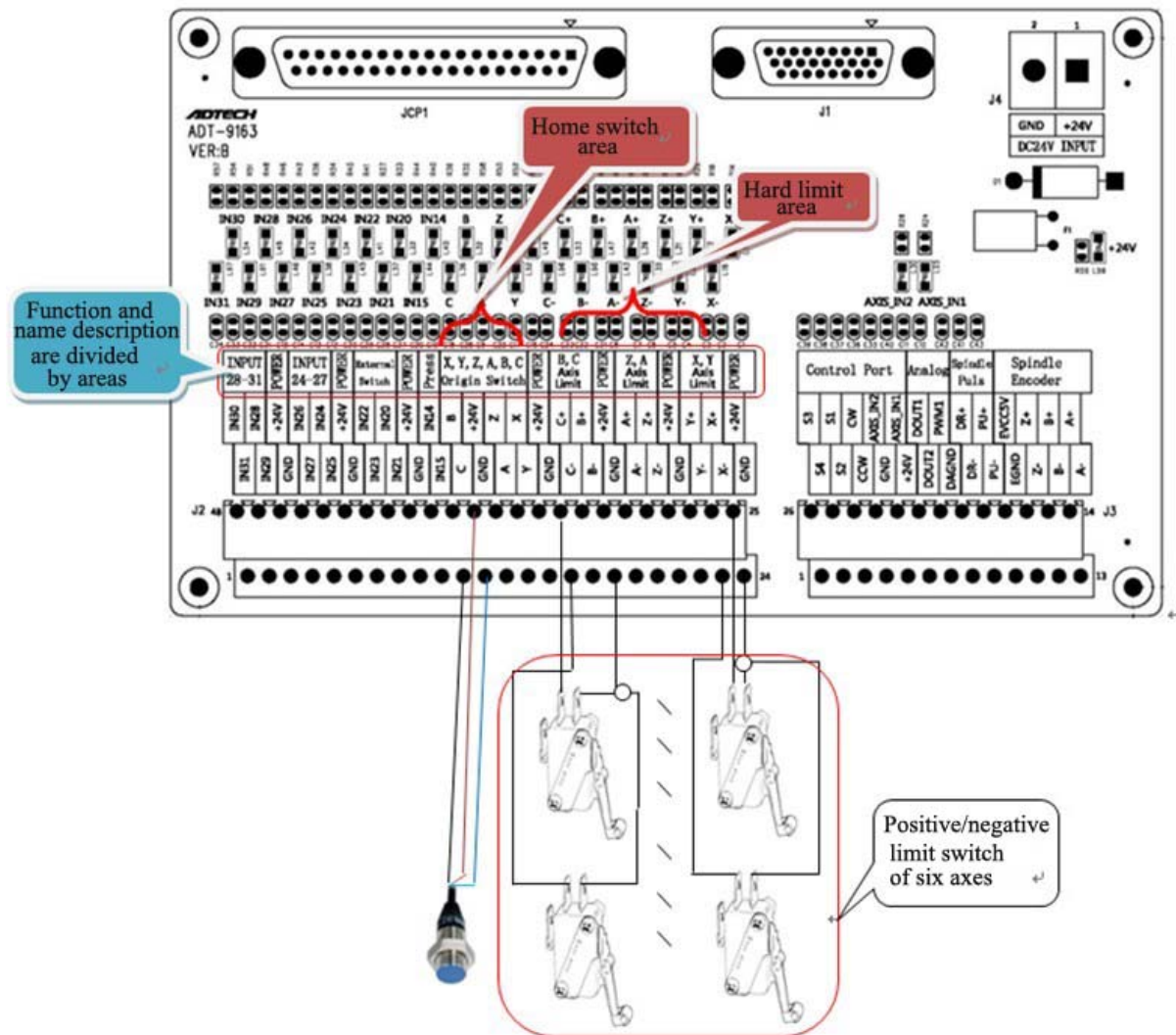
The definitions of XS16 and XS10((corresponding to the motor control definition of 7 axis, 8 axis) are as follows:



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



### 12.3. ADT9163 splitter wiring diagram



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

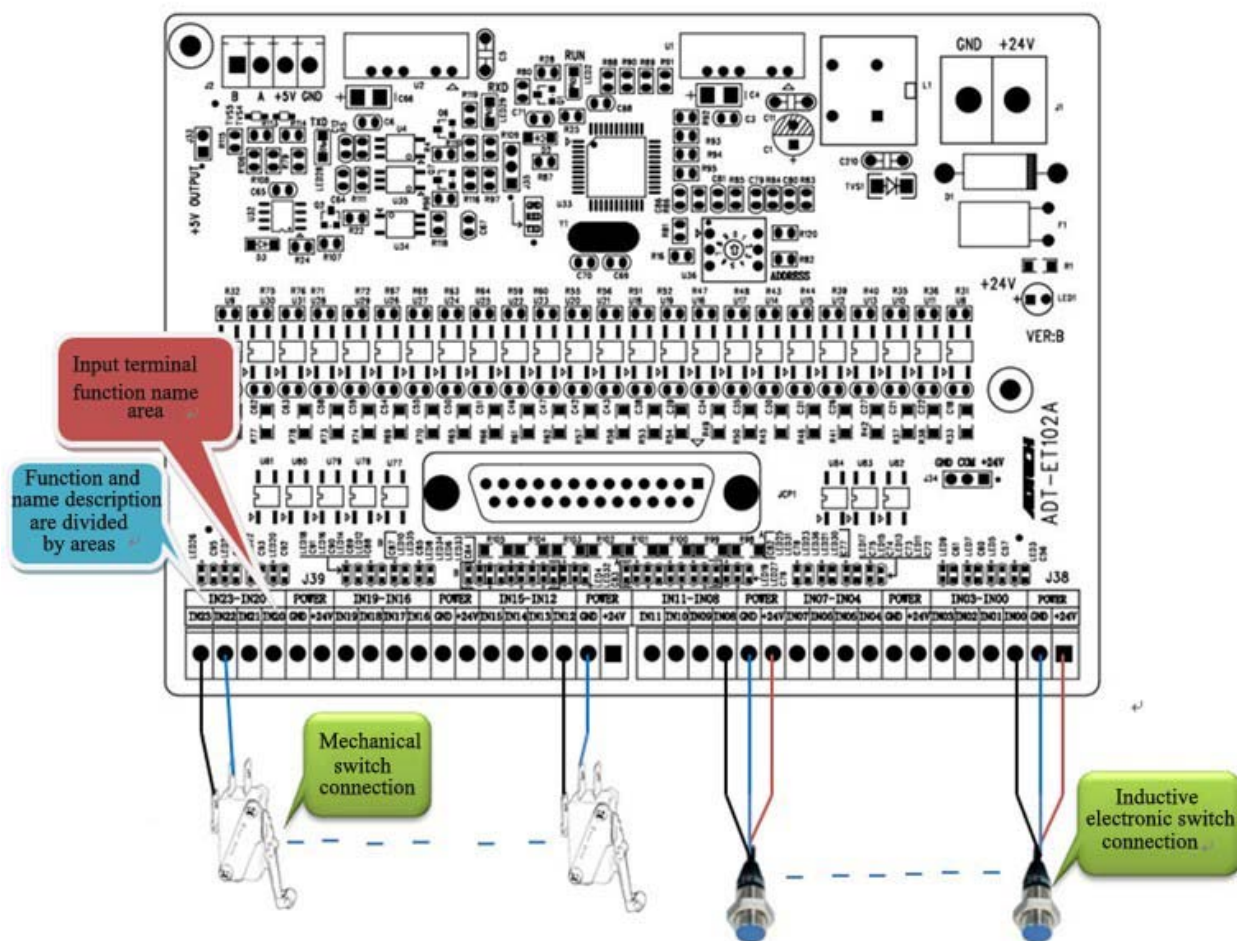
ADT-9163 splitter function definition (Basic input)

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



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

#### 12.4. ET102A splitter wiring diagram



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

ET102A splitter function definition (Extended input)

| Terminal No. | Area      | Port Name | Extended input of Standard system    |
|--------------|-----------|-----------|--------------------------------------|
| J38          | POWER     | +24V      | 24V power supply output terminal     |
| J38          |           | GND       | 24V power supply output GND terminal |
| J38          | IN03-IN00 | IN00      | IN32 #1032                           |
| J38          |           | IN01      | IN33 #1033                           |
| J38          |           | IN02      | IN34 #1034                           |

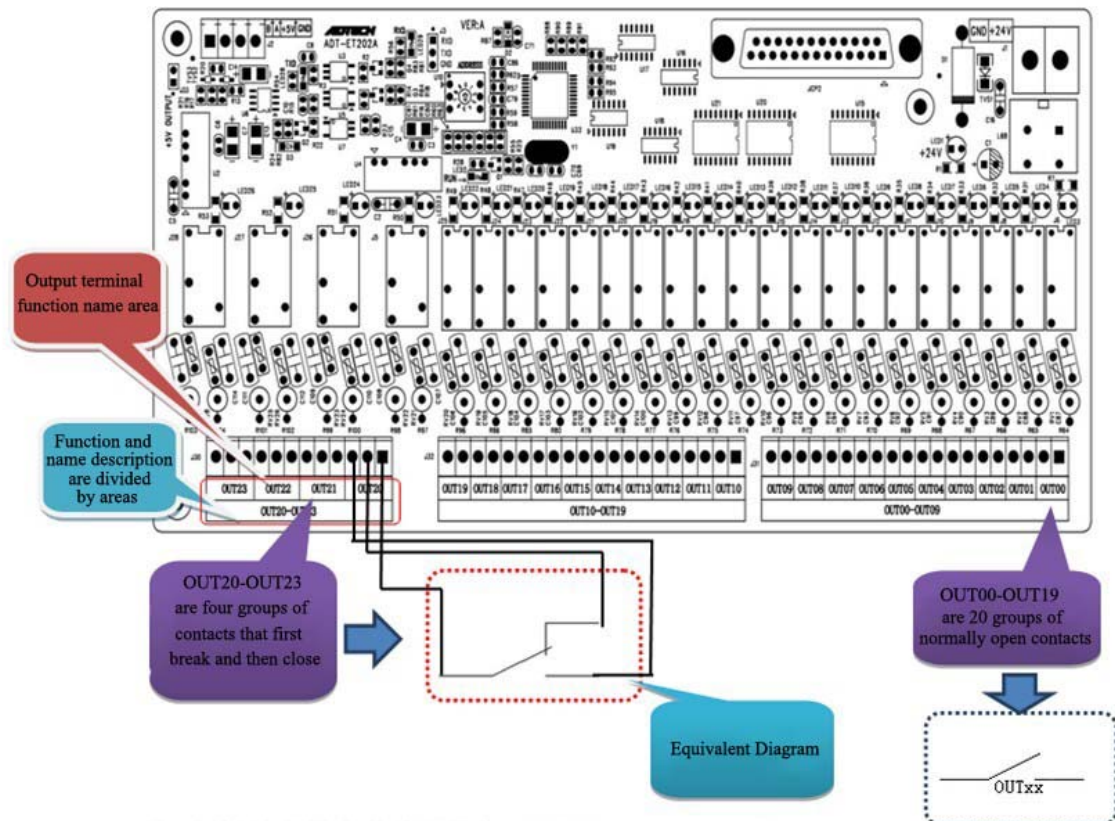
|              |           |           |                                      |
|--------------|-----------|-----------|--------------------------------------|
| J38          |           | IN03      | IN35 #1035                           |
| J38          | POWER     | +24V      | 24V power supply output terminal     |
| J38          |           | GND       | 24V power supply output GND terminal |
| J38          | IN07-IN04 | IN04      | IN36 #1036                           |
| J38          |           | IN05      | IN37 #1037                           |
| J38          |           | IN06      | IN38 #1038                           |
| J38          |           | IN07      | IN39 #1039                           |
| J38          | POWER     | +24V      | 24V power supply output terminal     |
| J38          |           | GND       | 24V power supply output GND terminal |
| J38          | IN11-IN08 | IN08      | IN40 #1040                           |
| J38          |           | IN09      | IN41 #1041                           |
| J38          |           | IN10      | IN42 #1042                           |
| J38          |           | IN11      | IN43 #1043                           |
| J39          | POWER     | +24V      | 24V power supply output terminal     |
| J39          |           | GND       | 24V power supply output GND terminal |
| J39          | IN15-IN12 | IN12      | IN44 #1044                           |
| J39          |           | IN13      | IN45 #1045                           |
| J39          |           | IN14      | IN46 #1046                           |
| J39          |           | IN15      | IN47 #1047                           |
| J39          | POWER     | +24V      | 24V power supply output terminal     |
| J39          |           | GND       | 24V power supply output GND terminal |
| Terminal No. | Area      | Port Name | Extended input of Standard system    |
| J39          | IN19-IN16 | IN16      | IN48 #1048                           |
| J39          |           | IN17      | IN49 #1049                           |
| J39          |           | IN18      | IN50 #1050                           |
| J39          |           | IN19      | IN51 #1051                           |
| J39          | POWER     | +24V      | 24V power supply output terminal     |
| J39          |           | GND       | 24V power supply output GND terminal |
| J39          | IN23-IN20 | IN20      | IN52 #1052                           |
| J39          |           | IN21      | IN53 #1053                           |
| J39          |           | IN22      | IN54 #1054                           |
| J39          |           | IN23      | IN55 #1055                           |

## ET102A splitter function definition (Extended input 2—external expansion)

| Terminal No. | Area      | Port Name | Extended input of Standard system    |
|--------------|-----------|-----------|--------------------------------------|
| J38          | POWER     | +24V      | 24V power supply output terminal     |
| J38          |           | GND       | 24V power supply output GND terminal |
| J38          | IN03-IN00 | IN00      | Standby IN100                        |
| J38          |           | IN01      | Standby IN101                        |
| J38          |           | IN02      | Standby IN102                        |
| J38          |           | IN03      | Standby IN103                        |
| J38          | POWER     | +24V      | 24V power supply output terminal     |
| J38          |           | GND       | 24V power supply output GND terminal |
| J38          | IN07-IN04 | IN04      | Standby IN104                        |
| J38          |           | IN05      | Standby IN105                        |
| J38          |           | IN06      | Standby IN106                        |
| J38          |           | IN07      | Standby IN107                        |
| J38          | POWER     | +24V      | 24V power supply output terminal     |
| J38          |           | GND       | 24V power supply output GND terminal |
| J38          | IN11-IN08 | IN08      | Standby IN108                        |
| J38          |           | IN09      | Standby IN109                        |
| J38          |           | IN10      | Standby IN110                        |
| J38          |           | IN11      | Standby IN111                        |
| J39          | POWER     | +24V      | 24V power supply output terminal     |
| J39          |           | GND       | 24V power supply output GND terminal |
| J39          | IN15-IN12 | IN12      | Standby IN112                        |
| J39          |           | IN13      | Standby IN113                        |
| J39          |           | IN14      | Standby IN114                        |
| J39          |           | IN15      | Standby IN115                        |
| J39          | POWER     | +24V      | 24V power supply output terminal     |
| J39          |           | GND       | 24V power supply output GND terminal |
| J39          | IN19-IN16 | IN16      | Standby IN116                        |
| J39          |           | IN17      | Standby IN117                        |

|     |           |      |                                      |
|-----|-----------|------|--------------------------------------|
| J39 |           | IN18 | Standby IN118                        |
| J39 |           | IN19 | Standby IN119                        |
| J39 | POWER     | +24V | 24V power supply output terminal     |
| J39 |           | GND  | 24V power supply output GND terminal |
| J39 | IN23-IN20 | IN20 | Standby IN120                        |
| J39 |           | IN21 | Standby IN121                        |
| J39 |           | IN22 | Standby IN122                        |
| J39 |           | IN23 | Standby IN123                        |

## 12.5. ET202A splitter wiring diagram



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

### ET202A splitter function definition (Basic output)

| Terminal No. | Area        | Port Name | Standard System function |
|--------------|-------------|-----------|--------------------------|
| J31          | OUT00-OUT09 | OUT00     | OUT00 #1400              |
| J31          |             | OUT01     | OUT01 #1401              |

|     |             |       |             |
|-----|-------------|-------|-------------|
| J31 |             | OUT02 | OUT02 #1402 |
| J31 |             | OUT03 | OUT03 #1403 |
| J31 |             | OUT04 | OUT04 #1404 |
| J31 |             | OUT05 | OUT05 #1405 |
| J31 |             | OUT06 | OUT06 #1406 |
| J31 |             | OUT07 | OUT07 #1407 |
| J31 |             | OUT08 | OUT08 #1408 |
| J31 |             | OUT09 | OUT09 #1409 |
| J32 | OUT10-OUT19 | OUT10 | OUT10 #1410 |
| J32 |             | OUT11 | OUT11 #1411 |
| J32 |             | OUT12 | OUT12 #1412 |
| J32 |             | OUT13 | OUT13 #1413 |
| J32 |             | OUT14 | OUT14 #1414 |
| J32 |             | OUT15 | OUT15 #1415 |
| J32 |             | OUT16 | OUT16 #1416 |
| J32 |             | OUT17 | OUT17 #1417 |
| J32 |             | OUT18 | OUT18 #1418 |
| J32 |             | OUT19 | OUT19 #1419 |
| J30 | OUT20-OUT23 | OUT20 | OUT20 #1420 |
| J30 |             | OUT21 | OUT21 #1421 |
| J30 |             | OUT22 | OUT22 #1422 |
| J30 |             | OUT23 | OUT23 #1423 |

ET202A splitter function definition (Extended output)

| Terminal No. | Area        | Name  | Standard System function |
|--------------|-------------|-------|--------------------------|
| J31          | OUT00-OUT09 | OUT00 | OUT24 #14024             |
| J31          |             | OUT01 | OUT25 #14025             |
| J31          |             | OUT02 | OUT26 #14026             |
| J31          |             | OUT03 | OUT27 #14027             |
| J31          |             | OUT04 | OUT28 #14028             |
| J31          |             | OUT05 | OUT29 #14029             |

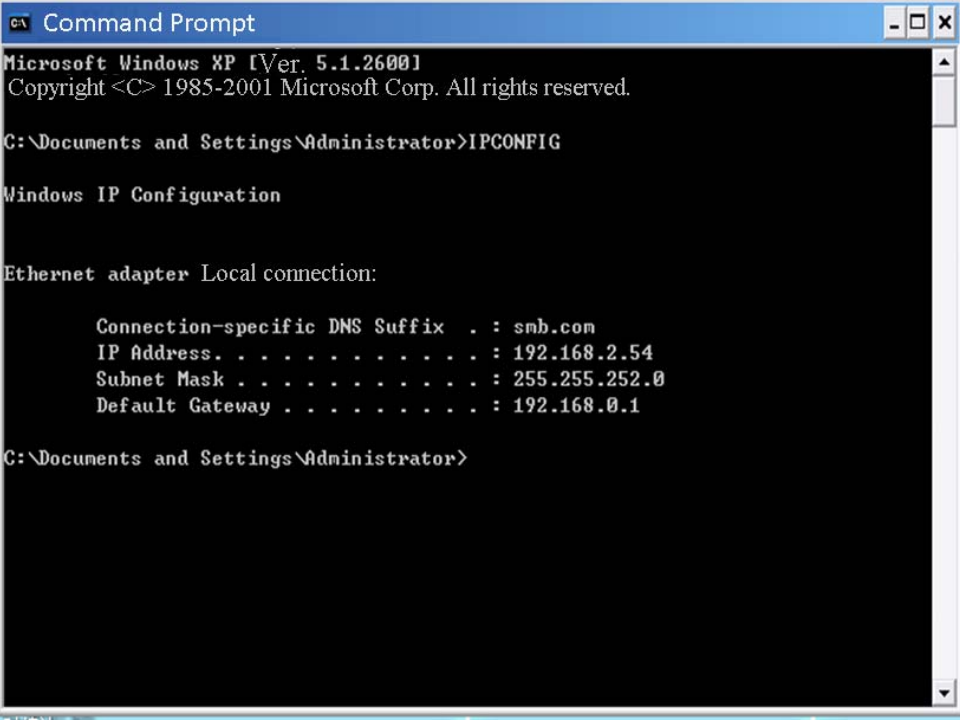
|     |            |       |              |
|-----|------------|-------|--------------|
| J31 |            | OUT06 | OUT30 #14030 |
| J31 |            | OUT07 | OUT31 #14031 |
| J31 |            | OUT08 | OUT32 #14032 |
| J31 |            | OUT09 | OUT33 #14033 |
| J32 |            | OUT10 | OUT34 #14034 |
| J32 |            | OUT11 | OUT35 #14035 |
| J32 |            | OUT12 | OUT36 #14036 |
| J32 |            | OUT13 | OUT37 #14037 |
| J32 | OUT10-OUT1 | OUT14 | OUT38 #14038 |
| J32 | 9          | OUT15 | OUT39 #14039 |
| J32 |            | OUT16 | OUT40 #14040 |
| J32 |            | OUT17 | OUT41 #14041 |
| J32 |            | OUT18 | OUT42 #14042 |
| J32 |            | OUT19 | OUT43 #14043 |
| J30 |            | OUT20 | OUT44 #14044 |
| J30 | OUT20-OUT2 | OUT21 | OUT45 #14045 |
| J30 | 3          | OUT22 | OUT46 #14046 |
| J30 |            | OUT23 | OUT47 #14047 |

## 13. Transmission of Computer NC Program Network to the System

### 13.1. System IP Settings

Connect the controller to the router with a network cable.

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



```
CA Command Prompt
Microsoft Windows XP [Ver. 5.1.2600]
Copyright (C) 1985-2001 Microsoft Corp. All rights reserved.

C:\Documents and Settings\Administrator>IPCONFIG

Windows IP Configuration

Ethernet adapter Local connection:

    Connection-specific DNS Suffix  . : smb.com
    IP Address. . . . . : 192.168.2.54
    Subnet Mask . . . . . : 255.255.252.0
    Default Gateway . . . . . : 192.168.0.1

C:\Documents and Settings\Administrator>
```

Assign the controller the IP address 192.168.2.2 in the same network segment that is not used based on the IP address of the host computer, for example, the IP address is 192.168.2.54.



| Comprehensive parameter                                                                                                                                             |           | Edit                             | Monitor | Prog | Param | Coord | Dgnos |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------|---------|------|-------|-------|-------|
| 029, Inp. acc. speed mode                                                                                                                                           | Liner     | —                                |         |      |       |       | 0     |
| 030, 'S' speed acceleration                                                                                                                                         | 5000      | 038, Default gateway<>           |         |      |       |       | 192   |
| 031, HOME check enable for alarm                                                                                                                                    | OFF       | —                                |         |      |       |       | 168   |
| 032, HOME check enable                                                                                                                                              | ON        | —                                |         |      |       |       | 0     |
| 033, X diameter program enable                                                                                                                                      | 0         | —                                |         |      |       |       | 1     |
| 034, Default process plane                                                                                                                                          | G17 (X_Y) | 039, MAC address<>               |         |      |       |       | 18    |
| 035, T code form (compensation No.                                                                                                                                  | 0         | —                                |         |      |       |       | 52    |
| 036, Local IP address<>                                                                                                                                             | 192       | —                                |         |      |       |       | 86    |
| —                                                                                                                                                                   | 168       | —                                |         |      |       |       | 168   |
| —                                                                                                                                                                   | 2         | —                                |         |      |       |       | 2     |
| —                                                                                                                                                                   | 10        | —                                |         |      |       |       | 10    |
| 037, Subnet mask<>                                                                                                                                                  | 255       | 041, Feed speed setting Enable   |         |      |       |       | OFF   |
| —                                                                                                                                                                   | 255       | 042, Enable G00 Inp mode         |         |      |       |       | OFF   |
| —                                                                                                                                                                   | 252       | 043, Enable abnormal memory posi |         |      |       |       | OFF   |
| -- range:0 ~ 255 macroaddr:8060                                                                                                                                     |           |                                  |         |      |       |       |       |
| <div> <div>&lt;&lt;&lt;</div> <div>Compreh</div> <div>Axis</div> <div>Manage</div> <div>Tools</div> <div>Spindle</div> <div>IO</div> <div>&gt;&gt;&gt;</div> </div> |           |                                  |         |      |       |       |       |

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

```

C:\ Command Prompt
Microsoft Windows XP [Ver. 5.1.2600]
Copyright (C) 1985-2001 Microsoft Corp. All rights reserved.

C:\Documents and Settings\Administrator>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

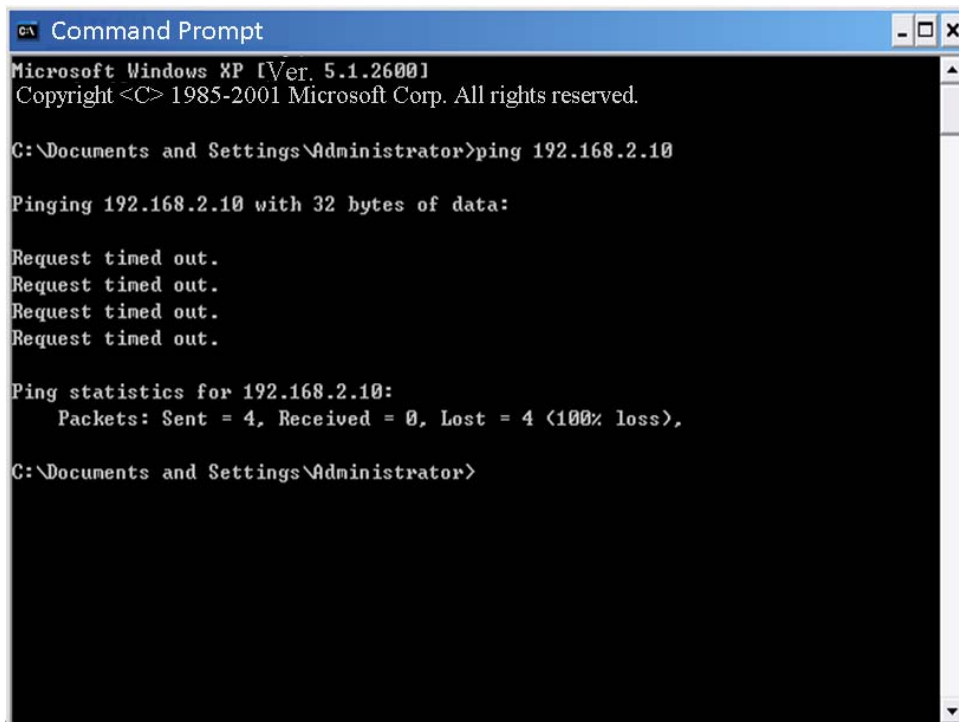
Reply from 192.168.2.10: bytes=32 time=3ms TTL=64
Reply from 192.168.2.10: bytes=32 time=1ms TTL=64
Reply from 192.168.2.10: bytes=32 time=1ms TTL=64
Reply from 192.168.2.10: bytes=32 time=2ms TTL=64

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

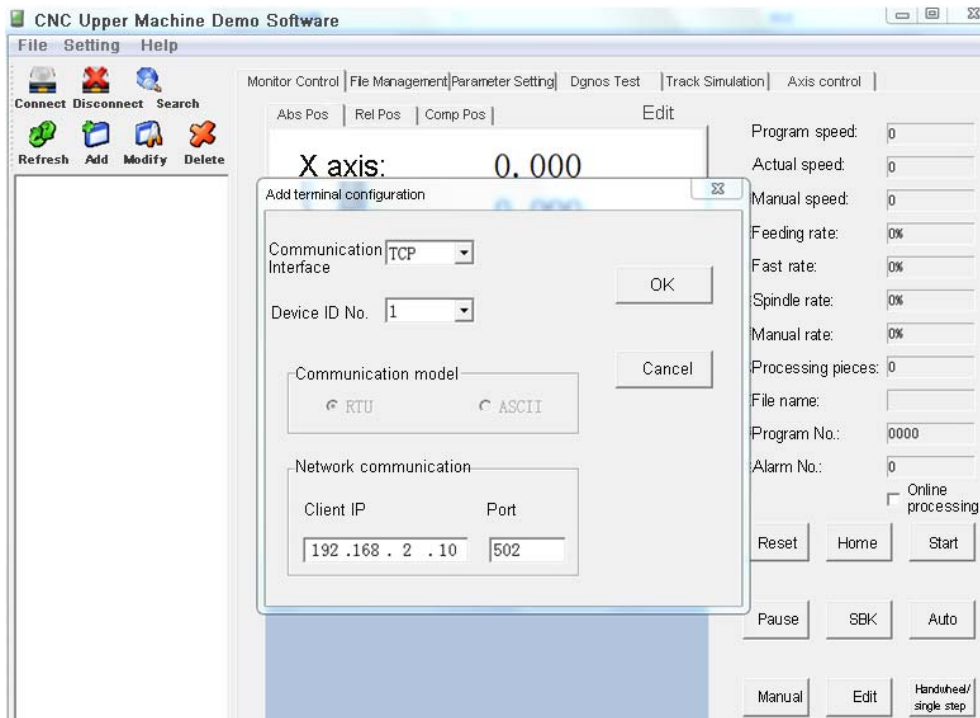
C:\Documents and Settings\Administrator>

```

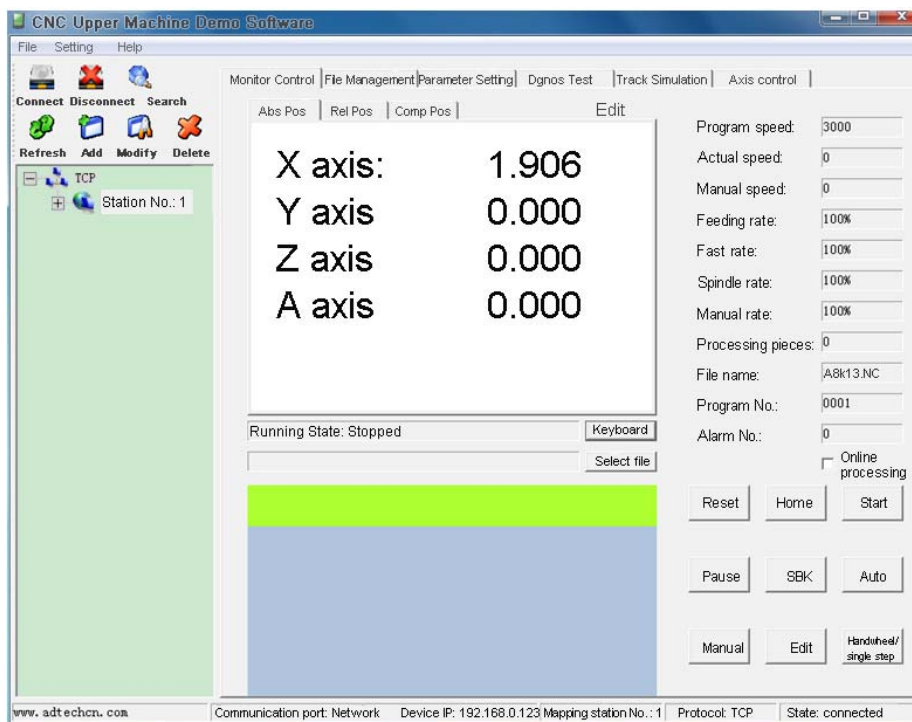
If the screen shown below appears, the network is not connected. Check whether the IP address is correctly assigned, whether there is any problem with the connection, and whether the system is powered on.



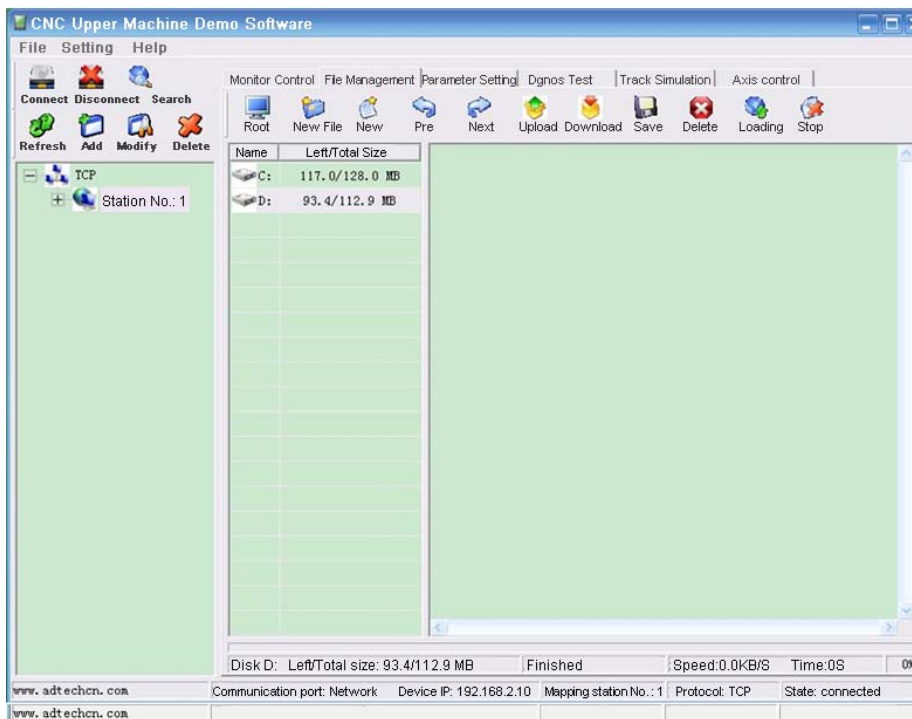
When the network is normal, you can open the communication software, add the terminal configuration, and set the IP address, as shown below:



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



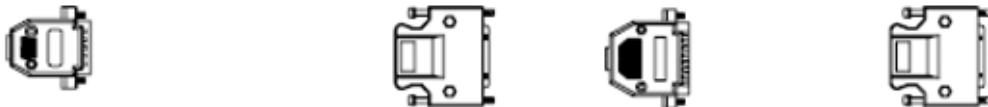
Select to upload and download files in the file management bar.



## 14. Appendix-Common Servo Wiring Diagrams

### 14.1. Pulse control port wiring definition

#### 14.1.1. Wiring diagram of ADTECH QS, QX and Shanyang servo driver

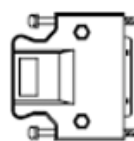


| Controller DB15 Plug | 16-Core shield | 16-Core shield Twisted | QS8/QS7/QS6 36P servo head | QS1AA030M2 DB25G | QS6AA050M3 DB25G | Shanyang R/Q series 50P servo head | QX series 50P servo head | QX-A2 series 50P servo head |
|----------------------|----------------|------------------------|----------------------------|------------------|------------------|------------------------------------|--------------------------|-----------------------------|
| Pin definition       | RED            | GRY RED                | CN1                        | CN1              | CN1              | CN1                                | CN1                      | CN1                         |
| 1 PU+                |                |                        | 25                         | 14               | 6                | 28                                 | 28                       | 45                          |
| 2 PU-                | GRN            | GRY BLK                | 24                         | 15               | 18               | 29                                 | 29                       | 44                          |
| 3 DR+                | YLM            | WHI RED                | 27                         | 17               | 7                | 26                                 | 26                       | 47                          |
| 4 DR-                | BLK            | WHI BLK                | 26                         | 18               | 19               | 27                                 | 27                       | 46                          |
| 5 ALM                | GRY            | OG RED                 | 4                          | 12               | 12               | 46                                 | 46                       | 37                          |
| 6 ALR                | OG             | OG BLK                 | 14                         | 4                | 22               | 34                                 | 34                       | 9                           |
| 7 ECZ+               | LT GN          | OG RED RED             | 30                         | 19               | 5                | 7                                  | 7                        | 23                          |
| 8 ECZ-               | PNK            | OG BLK BLK             | 31                         | 20               | 17               | 8                                  | 8                        | 24                          |
| 10 +24V              | BWN            | PNK                    | 9                          | 9                | 11               | 49/50                              | 49/50                    | 7                           |
| 11 0V                | BLU            | PNK BLK                | 3/10                       | 8/25             | 13/23            | 12/20/24/47/48                     | 12/20/24/37/47/48        | 41                          |
| 12 ECA+              | BLK WHI        | GRY RED RED            | 34                         | 23               | 3                | 3                                  | 3                        | 21                          |
| 13 ECA-              | BWN WHI        | GRY BLK BLK            | 35                         | 24               | 15               | 4                                  | 4                        | 22                          |
| 14 ECB+              | RED WHI        | WHI RED RED            | 32                         | 21               | 4                | 5                                  | 5                        | 48                          |
| 15 ECB-              | OG WHI         | SHI BLK BLK            | 33                         | 22               | 16               | 6                                  | 6                        | 49                          |

#### 14.1.2. Yaskawa, Matsushita, Fuji, TECO



| Controller DB15G |            |
|------------------|------------|
| Pin              | Definition |
| 1(WHI RED)       | PU+        |
| 2(GRY BLK)       | PU-        |
| 3(WHI BLK)       | DR+        |
| 4(OG RED)        | DR-        |
| 5(YLM RED)       | ALM        |
| 7(OG BLK)        | ECZ+       |
| 8(YLM BLK)       | ECZ-       |
| 10(PNK BLK)      | +24V       |
| 11 (GRY RED)     | 0V         |
| Shield (shell)   |            |

 10-core  
STP


| Servo driver 26 or 50PIN servo head |                         |                           |                        |                    |
|-------------------------------------|-------------------------|---------------------------|------------------------|--------------------|
| 50PIN                               | 50PIN                   | 26PIN                     | 26PIN                  | 50PIN              |
| Yaskawa<br>CN1                      | Matsushita<br>A4/A5 CN1 | Matsushita<br>J series X2 | Fuji RYC<br>series CN1 | TECO series<br>CN1 |
| 7                                   | 3                       | 20                        | 7                      | 14                 |
| 8                                   | 4                       | 21                        | 8                      | 15                 |
| 11                                  | 5                       | 22                        | 20                     | 16                 |
| 12                                  | 6                       | 23                        | 21                     | 17                 |
| 31                                  | 37                      | 8                         | 17                     | 19                 |
| 19                                  | 23                      | 17                        | 25                     | 39                 |
| 20                                  | 24                      | 18                        | 26                     | 40                 |
| 47                                  | 7                       | 1                         | 2/14                   | 45                 |
| 32/40<br>/42/43                     | 13/29<br>/36/41         | 2/11<br>/12               | 1                      | 4/46/5/47          |
| Shell                               | Shell                   | Shell                     | Shell                  | 50                 |