In this user manual, we will try to describe various matters related to the operation of the system. Due to space limitations and specific use of the product, it is not possible to describe in detail all the operations that do not have to be done and/or cannot be done in the system. Therefore, matters not specifically specified in this user manual are considered "impossible" or "impermissible" to be done.

preface

Dear Customer:

For the products you choose, the company is deeply honored and grateful!

This user manual details the programming, operation and installation of the machining center's CNC system. In order to ensure the safe, normal and effective operation of the product, please be sure to carefully read this user manual before installing and using the product.

Security warnings

 Improper operation will cause accidents and must be qualified to operate the system.

Special note: The system power supply installed on the chassis (inside) is a special power supply provided only for the CNC system manufactured by the company. Users are prohibited from using this power supply for other purposes. Otherwise, there will be great danger!

Security warnings

■ Transportation and storage

1. The product packaging box stacking shall not exceed six layers;
2. Do not climb, stand or place heavy objects on the product box;
3. Do not use the cable connected to the product to drag or handle the product;
4. It is strictly forbidden to collide and scratch the panel and display;
5. Product packaging should be protected from moisture, exposure to sunlight and rain.

■ Check out of the box

1. After opening the package, please confirm whether it is the product you have purchased;
2. Check whether the product is damaged in transit;
3. Check whether the parts are complete and whether there is damage against the list;
4. If there is a product model inconsistency, missing accessories or shipping damage, please contact the company in time.

■ Wiring

1. The personnel participating in the wiring and inspection must be professionals with corresponding capabilities;
2. The product must be reliably grounded, the grounding resistance should be less than 0.1Ω, and the neutral wire (zero wire) cannot be used instead of the ground wire;
3. The wiring must be correct and firm, so as not to lead to product failure or unexpected consequences;
4. The surge absorption diode connected to the product must be connected in the specified direction, otherwise the product will be damaged;
5. The power supply to the product must be cut off before plugging or opening the product chassis.

■ Overhaul

1. The power supply must be cut off before overhauling or replacing components;
2. When a short circuit or overload occurs, the fault should be checked, and the troubleshooting can be restarted;
3. Do not frequently power off the product, if you must re-power after the power outage, the interval time is at least 1min.

statement

The manual describes as many different things as possible, but because of the possibilities involved, it is not possible to explain all the actions that can or cannot be done, so what is not specifically stated in this manual can be considered unusable.

warn

Before the installation connection, programming and operation of this product, it is necessary to read the product manual and the instruction manual of the machine tool manufacturing plant in detail, and strictly follow the requirements of the manual and the instructions for related operations, otherwise it may lead to damage to the product, the machine tool, the scrap of the workpiece and even personal injury.

The product functions and technical indicators described in this manual (such as accuracy, speed, etc.) are only for this product, the CNC machine tool of this product is installed, the actual functional configuration and technical performance are determined by the design

of the machine tool manufacturer, and the functional configuration and technical indicators of the CNC machine tool are subject to the instructions of the machine tool manufacturer; Although the system is equipped with a standard machine tool operation panel, the function of each button of the standard machine tool panel is defined by the PLC program (ladder diagram). Please note that the function of the keys in the machine panel of this manual is described for the standard PLC program!

*** The contents of this manual are subject to change without notice.**

The safety responsibility of the manufacturer

- The manufacturer shall be responsible for the hazards that have been eliminated and/ or controlled in the design and structure of the CNC system provided and the accessories supplied with the accompanying supply.

——The manufacturer shall be responsible for the safety of the CNC system provided and the accessories supplied with the supply.

- The manufacturer shall be responsible for the use information and suggestions provided to the user.

User's responsibility for safety

——The user should learn and train the safe operation of the numerical control system, and be familiar with and master the content of the safe operation.

——The user shall be responsible for the safety and dangers caused by adding, changing or modifying the original CNC system and accessories.

- The user shall be responsible for the hazards caused by the failure to operate, adjust, maintain, install and store the product in accordance with the provisions of the manual.

*** This manual is for the end-user collection. Sincerely thank you for your friendly support to our company when our products!**

Part III
Installation connection instructions

directory

Chapter 1 Installation Layout

1.1 Machining center series connection

1.1.1 Interface distribution of back cover of machining center series

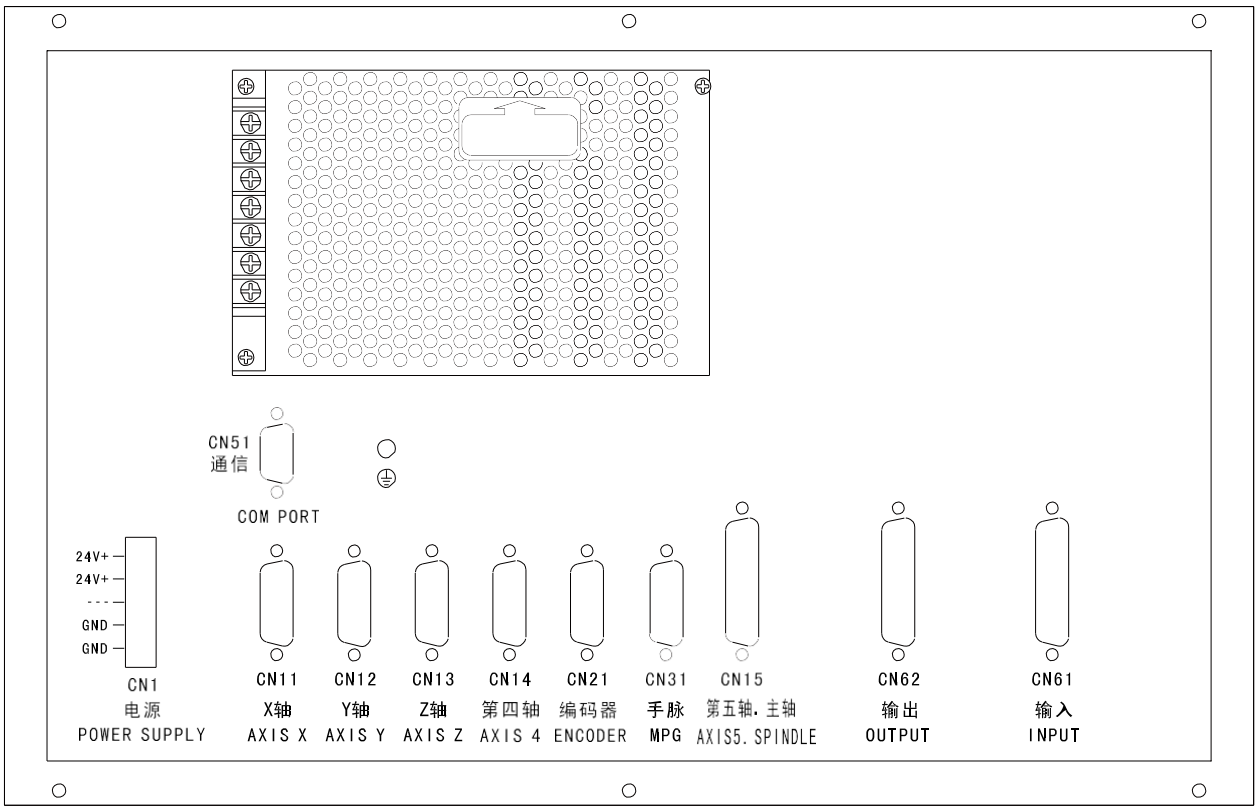


Figure 1-1 Interface distribution of back cover of machining center series

1.1.2 Interface description

◎Power box: +24V, GND power supply

◎Filter (optional): The input terminal is AC 220V power input, PE terminal is grounded, and the output terminal is connected to the L, N terminal of the power box

◎ CN1: Power connector

◎ CN11: X axis, 15 core D hole socket, connected X axis drive unit

◎ CN12: Y-axis, 15-core D-hole socket, connected to Y-axis drive unit

◎ CN13: Z axis, 15-core D-hole socket, connected to Z axis drive unit

◎ CN14: 4th axis, 15-core D-hole socket, connected to 4th axis drive unit

◎ CN15: spindle, 25-core D-hole socket, connected to the spindle drive unit

◎ CN21: Encoder, 15-core D-pin socket, connected spindle encoder
◎ CN31: handwheel, 26-core D-pin socket, connected handwheel
◎ CN51: Communication, 9-core D-hole socket, connected to PC RS232 interface
◎ CN61: input, 44-core D-pin socket, connection machine input
◎ CN62: output, 44-core D-hole socket, connected machine output

1.2 Machining center series installation

1.2.1 Installation conditions of the electrical cabinet

◎The electric cabinet must be able to effectively prevent the entry of dust, coolant and organic solution;
◎When designing the electric cabinet, the distance between the CNC back cover and the chassis is not less than 20cm, and it is necessary to consider that when the temperature in the cabinet rises, it must be ensured that the temperature difference between the cabinet and the outside of the cabinet does not exceed 10 °C;
◎In order to ensure effective heat dissipation, it is best to install a fan in the electric cabinet;
◎The display panel must be installed in a place where the coolant cannot be sprayed;
◎When designing the electric cabinet, it must be considered to minimize external electrical interference and prevent interference from transmitting to the CNC .

1.2.2 Methods of preventing interference

In the design, the CNC has taken anti-interference measures such as shielding space electromagnetic radiation, absorbing inrush current, and filtering out power supply clutter, which can prevent the influence of external interference sources on the CNC itself to a certain extent. In order to ensure the stable operation of the CNC, it is necessary to take the following measures when installing the connection in the CNC:

1、 The CNC should be kept away from equipment that generates interference (such as frequency converters, AC contactors, electrostatic generators, high-voltage generators, and segmentation devices for power lines).
2、 To power the CNC via an isolation transformer, the machine where the CNC is installed must be grounded, and the CNC and the drive unit must be connected to separate ground wires from the grounding point.
3、 Interference suppression: the RC loop is connected in parallel at both ends of the AC coil (as shown in Figure 1-3), and the RC loop should be installed as close as possible to the inductive load; reverse parallel freewheeling diodes at both ends of the DC coil (Figure 1-4); Connect the surge absorber at the winding end of the AC motor (Fig. 1-5).

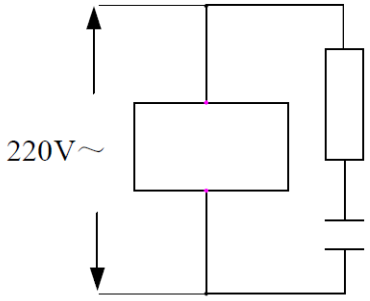


Figure 1-3

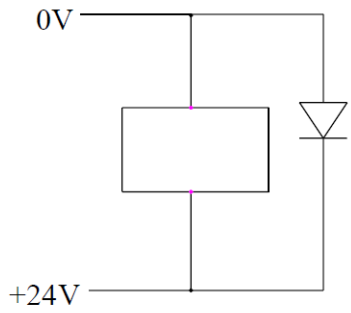


Figure 1-4

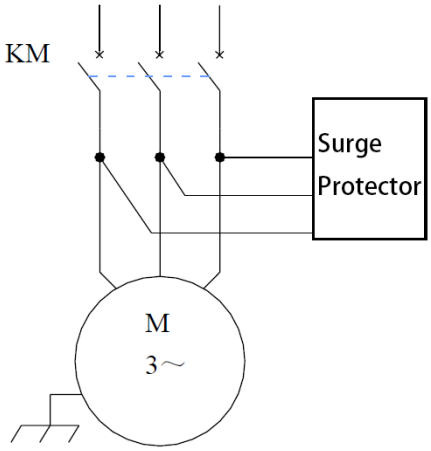


Figure 1-5

4、 The lead cable of the CNC adopts a stranded shielded cable or a shielded cable, and the shield layer of the cable is single-ended ground on the CNC side, and the signal line should be as short as possible.

5、 In order to reduce mutual interference between CNC signal cables and with strong electric cables, the following principles should be followed when wiring:

Constit	Cable type	Cabling requirements
A	AC power cord	Bundle the cables of Group A separately from Group B and Group C, and keep the distance between
	AC coil	
	AC contactors	
B	DC coil (DC24V).	Bundle Group B cables separately from Group A cables or shield Group B cables; The farther away from the
	DC relay (DC24V).	
	The cable between the CNC	
	The cable between the CNC	
C	The cable between the CNC and the	Strap Group C and Group A cables separately, or screen Group C cables for Group C cables The distance between the cable and the B group cable is at least 10
	Position feedback cable	
	Position encoder cable	
	Handwheel cable	
	Other shielding cables	

Chapter 2 Interface Signal Definition and Connection

2.1 Connection to the drive unit

2.1.1 Driver interface definition

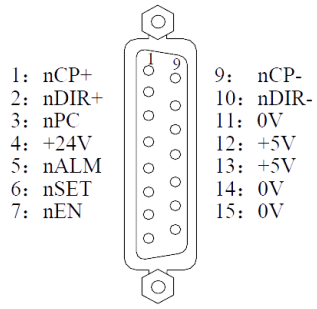


Figure 2-1 CN11,CN12,CN13,CN14 (15-core D-hole socket) interface

Signals	illustrate
nCP+、nCP-	Command pulse
nDIR+、nDIR-	Directs the direction
nPC	Zero signal
nALM	Drive alarm signal
nEN	Axis enable signal
nSET	Pulse disable signal

2.1.2 Instruction pulse signal and instruction direction signal

nCP+, nCP- for instruction pulse signal, nDIR+, nDIR- for instruction direction signals, both sets of signals are differential (AM26LS31) outputs, and the AM26LS32 is recommended externally Receive, the internal circuit is shown in Figure 2-2 below

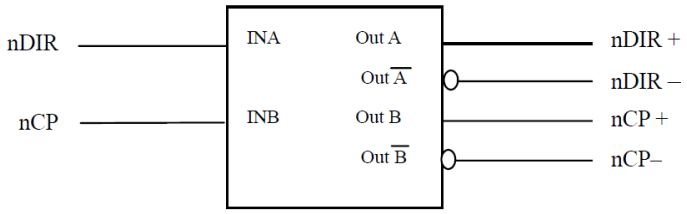


Figure 2-2 Internal circuit of instruction pulse signal and instruction direction signal

2.1.3 Drive unit alarm signal nALM

Bit0, Bit1, Bit2, Bit3, and Bit4 of the CNC parameter No . 009 The bit sets whether the alarm level of the driver unit is low or high. The internal circuit is shown in Figure 2-3:

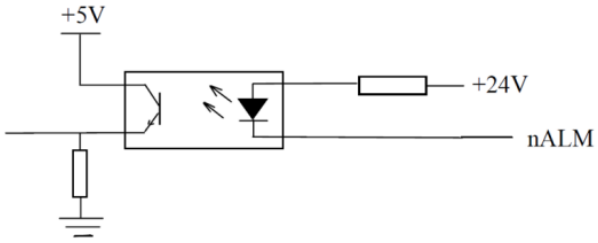


Figure 2-3 Drive unit alarm signal internal circuit

This type of input circuit requires the driver unit to provide the signal in the manner described in Figure 2-4 below:

Method 1: Method 2:

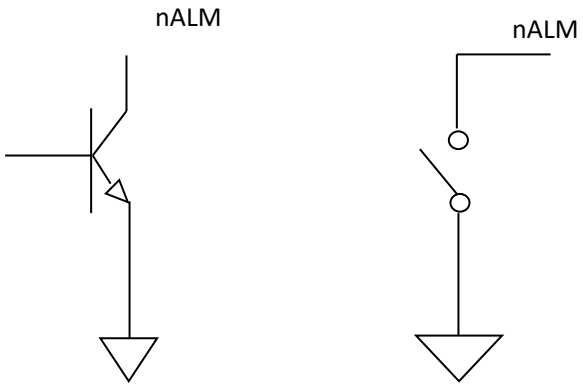


Fig. 2-4 Method for providing signals to the driver unit

2.1.4 Axis enable signal nEN

When the CNC is working normally, the nEN signal output is valid (the nEN signal is turned on with 0V), and when the drive unit alarms, the CNC turns off the nEN signal output (nEN The signal is disconnected from 0V). The internal interface circuit is shown in Figure 2-5 below

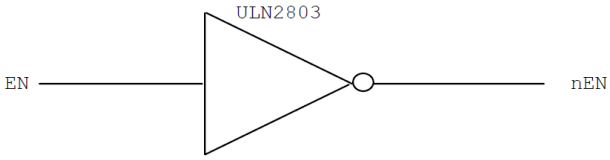


Figure 2-5 Internal interface circuit of axis enable signal

2.1.5 Pulse disable signal nSET

The nSET signal is used to control servo input suppression and improve immunity between

the CNC and the drive unit, which is high impedance when the CNC has pulsed signal output and low when no pulsed signal output. The internal interface circuit is shown in Figure 2-6 below

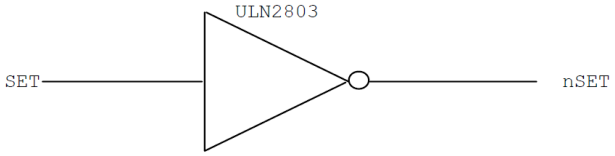


Figure 2-6 Pulse disable signal circuit

2.1.6 Zero signal nPC

When the machine tool returns to zero, use the one-turn signal of the motor encoder or the proximity switch signal as the zero point signal. The internal connection circuit is shown in Figure 2-7 below

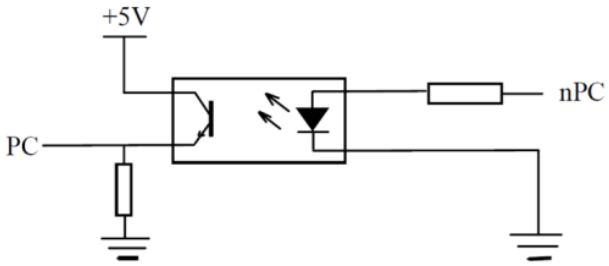


Figure 2-7 Zero point signal circuit

Note: The nPC signal is at +24V.

a) The waveform of the PC signal that the user should provide is shown in Figure 2-8 below:

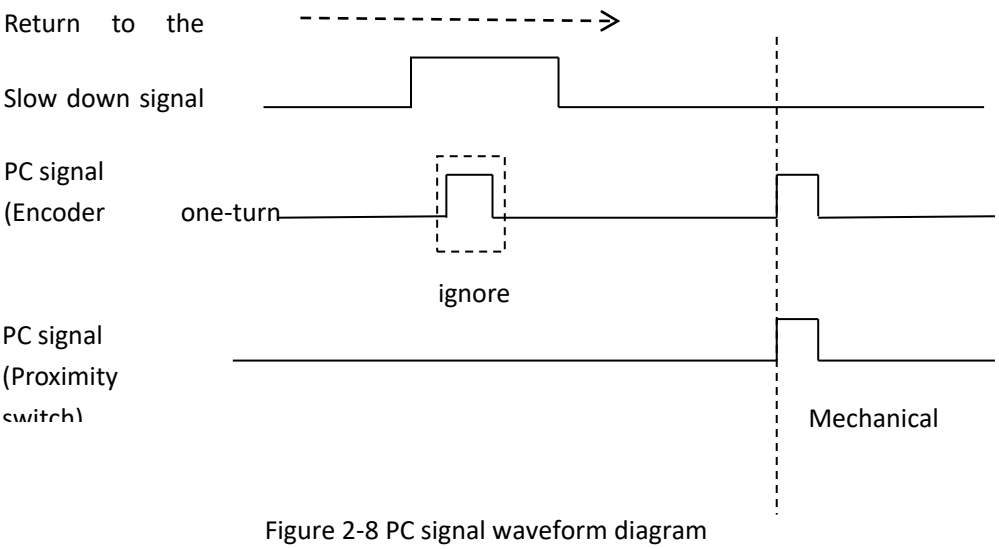


Figure 2-8 PC signal waveform diagram

Note: When the machine tool returns to zero, the CNC determines the position of the reference point by detecting the jump of the **PC** signal **after the deceleration switch is disengaged, and the rising or falling edge is valid.**

b) The connection method when using an NPN-type Hall element as both a deceleration signal

and a zero signal is shown in Figure 2-9 below

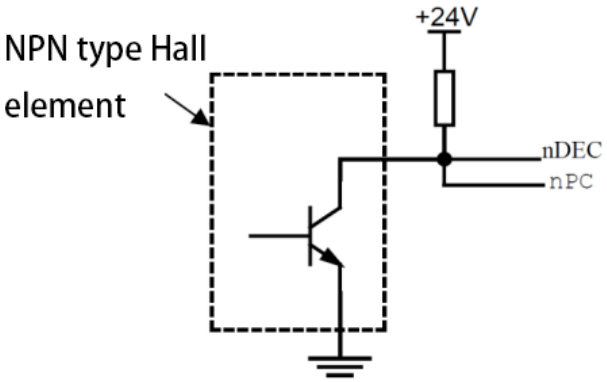


Figure 2-9 Connection with an NPN type Hall element

c) The connection method when using a PNP-type Hall element as both a deceleration signal and a zero signal is shown in Figure 2-10 below

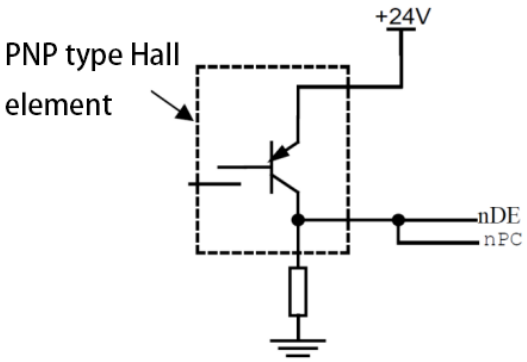


Figure 2-10 Connection with an PNP type Hall element

2.1.7 Connection to the drive unit

The connection of the milling machine system to the drive unit is shown in Fig. 2-11 below

Connection of the milling machine system to the DA98(A) drive unit

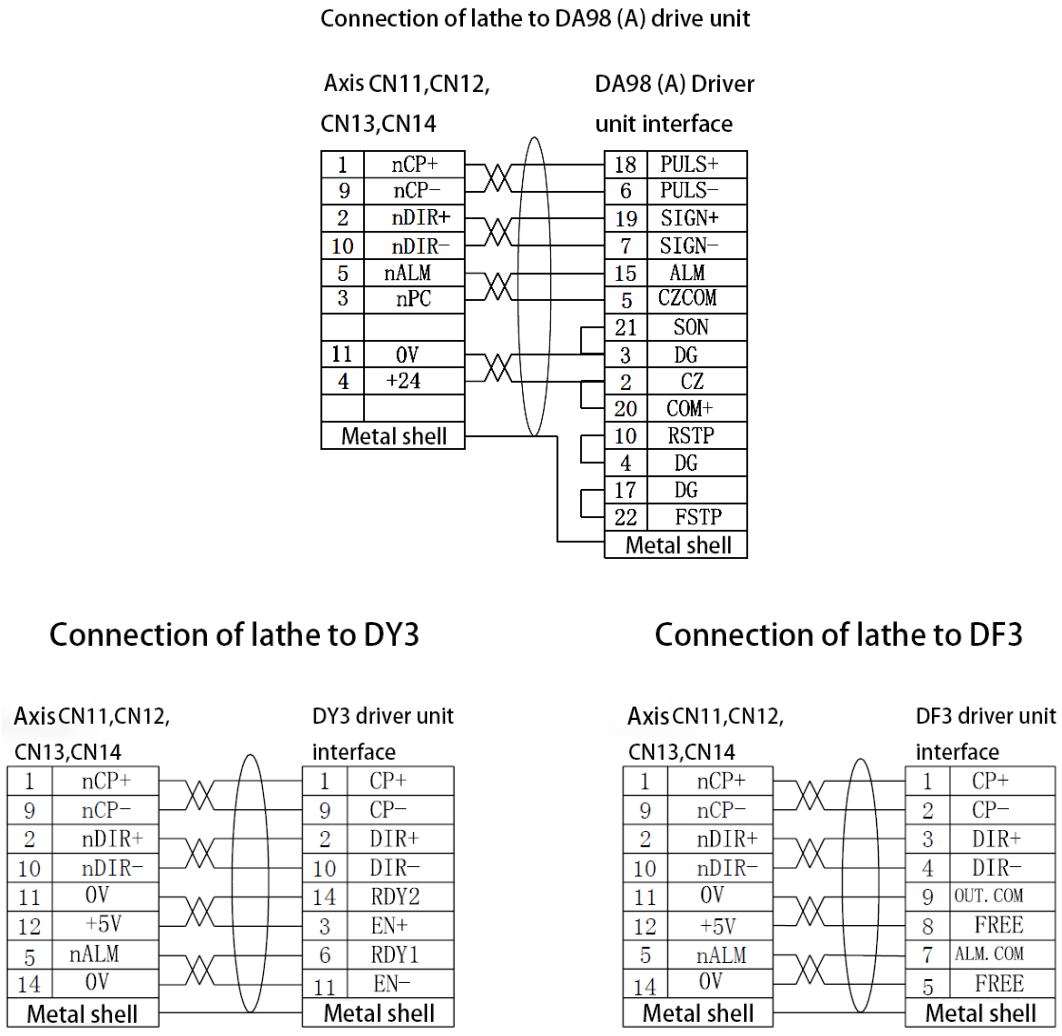


Fig. 2-11 Connection of the milling machine system to the drive unit

2.2 Connection to spindle encoder

2.2.1 Spindle encoder interface definition

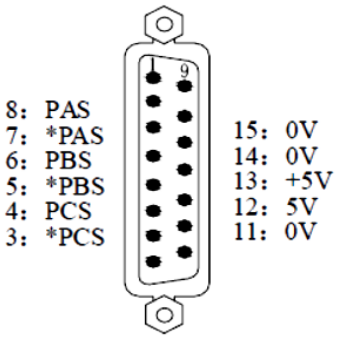


Figure 2-12 CN21 Encoder interface (15-core D-pin socket)

name	illustrate
*PAS	Encoder signal A-
PAS	Encoder signal A+
*PBS	Encoder signal B-
PBS	Encoder signal B+
*PCS	Encoder signal C-
PCS	Encoder signal C+

2.2.2 Signal description

*PCS/PCS, *PBS/PBS, *PAS/PAS are differential input signals for the C-phase, B-phase, and A-phases of the encoder, respectively, using 26LS32 Reception; *PAS/PAS, *PBS/PBS are orthogonal square waves with a difference of 90, and the maximum signal frequency < 1MHz; The number of lines used for the encoder is set by the parameters (range 100 ~ 5000).

The internal connection circuit is shown in Figure 2-13 :(Figure n=A, B, C).

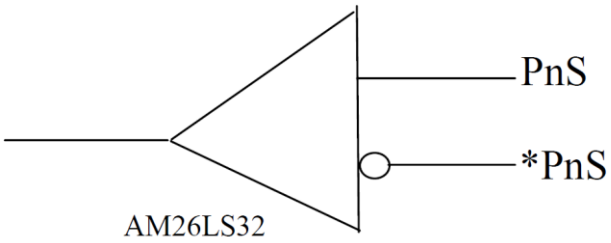


Figure 2-13 encoder signal circuit

2.2.3 Spindle encoder interface connection

The connection between the milling machine system and the spindle encoder is shown in Fig. 2-14 below, and the connection is twisted pair. (Take Changchun Yiguang ZLF-12-102.4BM-C05D encoder as an example):

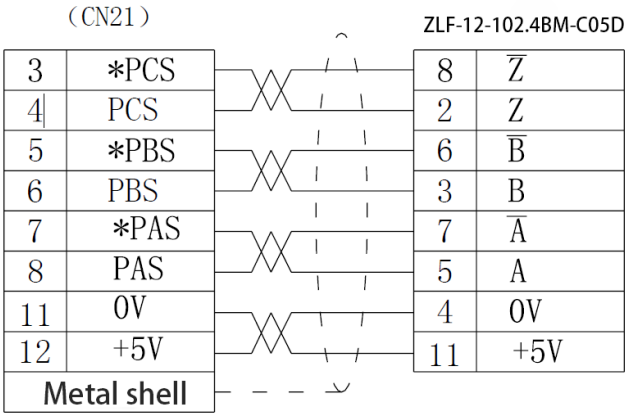
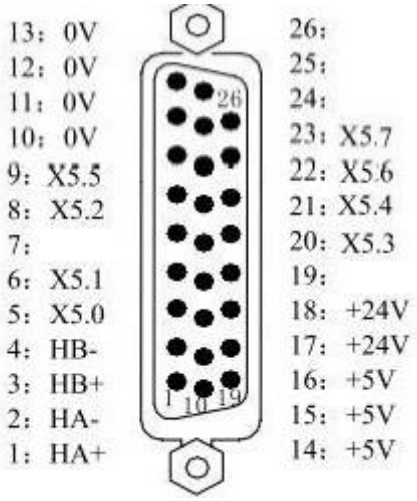


Figure 2-14 The connection to the encoder

Fig. 2-14 Connection of the milling machine system to the encoder

2.3 Connection to the handwheel

2.3.1 Handwheel interface definition



address	Signals	illustrate
1、2	HA＋、HA－	Handwheel A Believe
3、4	HB＋、HB－	Handwheel B Believe
5	X5.0	X handwheel axle selection
6	X5.1	Y handwheel shaft selection
8	X5.2	Z handwheel axle selection
20	X5.3	4-axis handwheel shaft selection
21	X5.4	5-axis handwheel shaft selection
9	X5.5	Increment X1
22	X5.6	Increment X10
23	X5.7	Increment X100
17、18	+24V	DC power supply 24V
14、15、16	+5V	DC power supply 5V
10-13	0V	DC power supply 0V

2.3.2 Signal description

HA and HB are the A-phase and B-phase input signals of the handwheel respectively. The internal connection circuit is shown in Figure 2-16 below

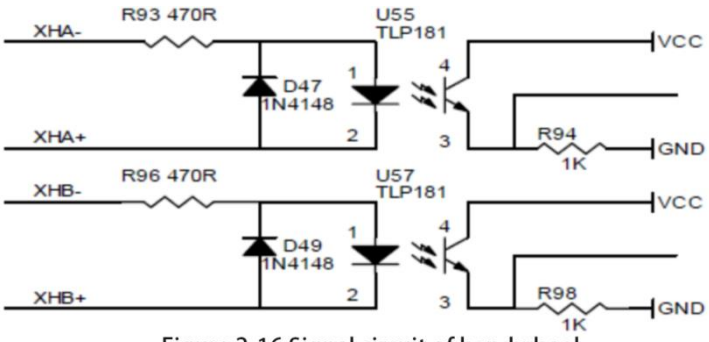


Figure 2-16 Signal circuit of handwheel

The connection of the milling machine system to the handwheel is shown in Fig. 2-17 below

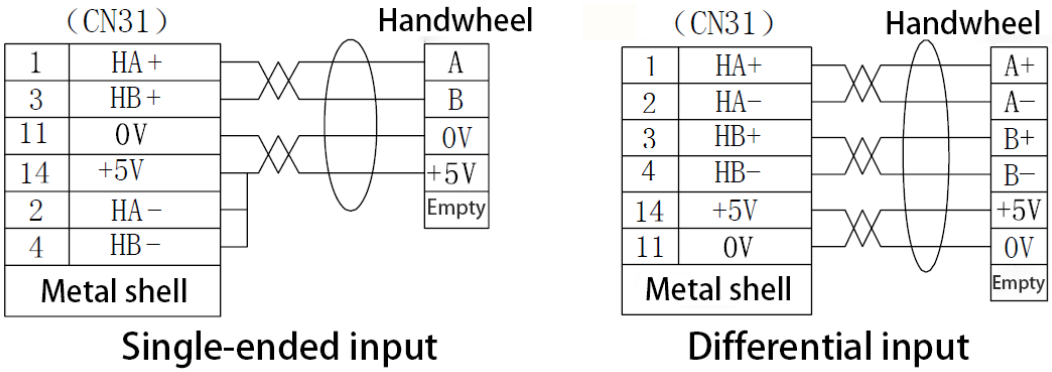


Fig. 2-17 Connection of the **milling machine system to the handwheel**

2.4 Spindle interface

2.4.1 Spindle interface definition

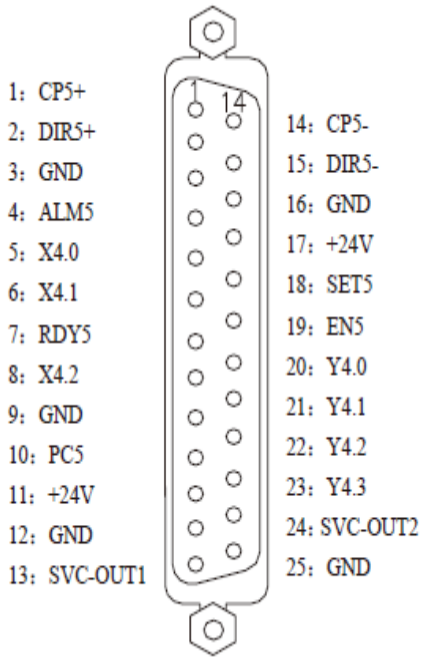


Fig. 2-18 CN15 spindle interface (25 core DB holes).

Foot	address	definition
3、9、6	0V	Power supply 0V
11、17	+24V	Power supply +24V
1	CP5+	Spindle pulse positive signal
2	DIR5+	Positive signal in spindle
4	ALM5（X4.3）	Spindle drive alarm
5	X4.0	Position mode switching
6	X4.1	Speed arrival/2nd spindle
7	RDY5	The spindle is ready for the
8	X4.2	Spindle orientation in place
9	GND	Power supply 0V terminal
10	PC5	Spindle zero signal
11	+24V	Power supply +24V terminal
12	GND	Spindle analog voltage 0V
13	SVC-OUT1	Spindle analog voltage
14	CP5 -	Spindle pulse negative
15	DIRD5 -	Negative signal in spindle
19	EN5	Enable signal
20	Y4.0	Spindle position control
21	Y4.1	Pulse spindle
22	Y4.2	Spindle directional output
23	Y4.3	The spindle is reversed
24	SVC-OUT2	Spindle analog voltage
25	GND	Spindle analog voltage 0V

Note 1: PC5 is valid for **0V on, unlike other feed axes (**+24V for **PCs with CN11 to CN14 axis connections On-active).**

Note 2: The signal internal circuit of PC5 is shown in the figure below

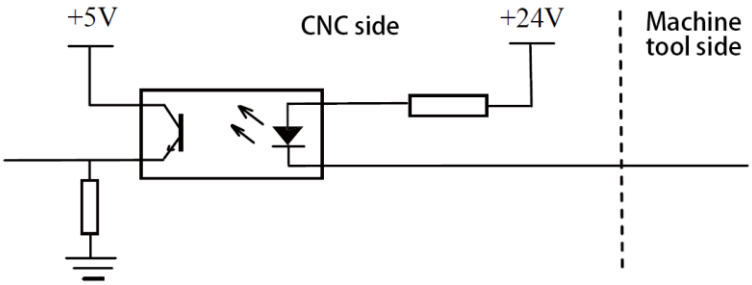


Fig. 2-19 PC5 signal circuit

2.4.2 Ordinary frequency converter connection

The SVC side of the analog spindle interface can output 0 to 10V voltage, and the signal internal circuit is shown in Figure 2-20 below

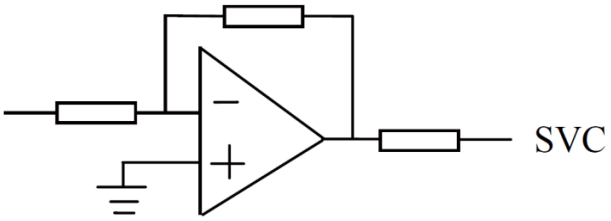


Figure 2-20 SVC signal circuit

The connection of the milling machine system to the frequency converter is shown in Fig. 2-21 below

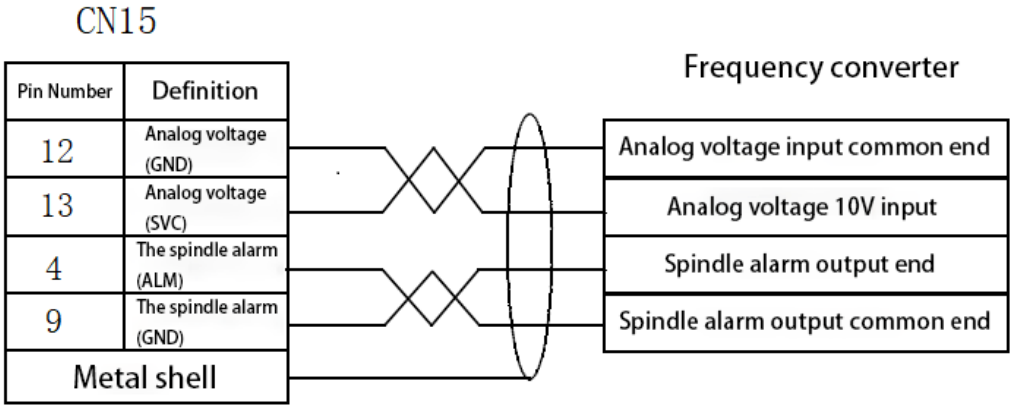


Fig. 2-21 Connection of the **milling machine system to the frequency converter**

2.5 Connection of the system to the serial port of the PC

2.5.1 Communication interface definition

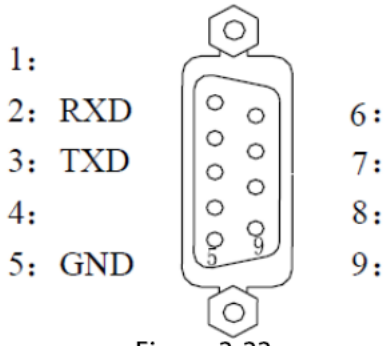


Figure 2-22
Communication, 9-core D-hole socket

Signals	illustrate
RXD	Receive data
TXD	Send data
GND	Signal ground

2.5.2 Communication interface connection

The milling machine system communicates with the PC via the CN51 interface (optional communication software required).

The connection of the system to the PC is shown in Figure 2-23A below

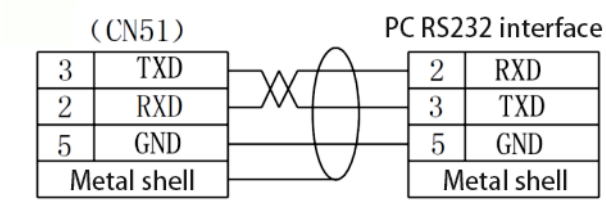


Figure 2-23A The connection of the system to **the PC**

The system can communicate with another system through the CN51 interface. The connection is shown in Figure 2-23B below:

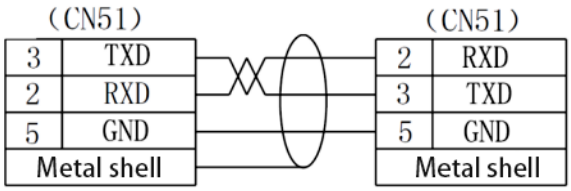


Figure 2-23B The connection of the system **to** the **system communication**

2.6 Power connector connection

When the system ships from the factory, the power pod is connected to the CN1 interface of the system, and the user only needs to connect an external 220Vac power supply.

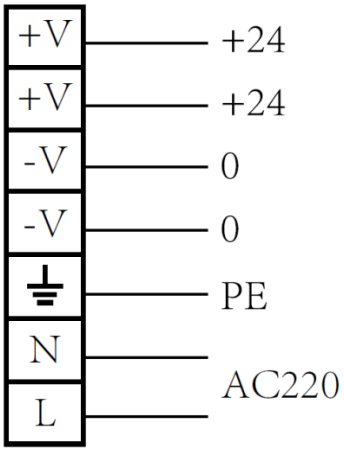


Figure 2-24 System Power Interface CN1

2.7 I/O interface definition

Note!

Milling machine CNC does not mark fixed address I/O functional meaning is defined by the PLC program (ladder), when the milling machine CNC assembles the machine tool, the I/O function is determined by the design of the machine manufacturer, For details, please refer to the instructions of the machine tool manufacturer.

Please note that the I/O functions that are not marked with fixed addresses in this section are described for the Machining center series standard PLC program!

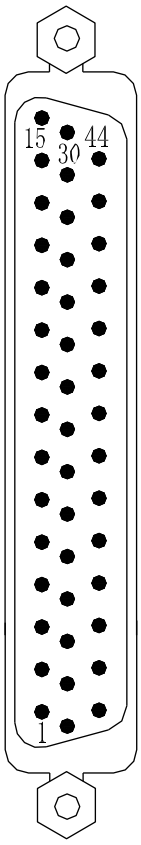


Figure 2-25 Input Interface (CN61).

Foot number	address	illustrate
17～20	dangling	
21～24	0V	Power port
25～28	+24V	Power port
1	X0.0	Protective door detection signal / external processing blow button
2	X0.1	External pause signal (normally closed contact)
3	X0.2	External loose/pinch control
4	X0.3	X-axis zero deceleration signal
5	X0.4	G31 jump signal/tool tester signal
6	X0.5	Emergency stop input signal (normally closed contact)
7	X0.6	Lubrication detection signal
8	X0.7	Barometric pressure detection signal
9	X1.0	The tool releases the signal in place
10	X1.1	Tool clamping in place signal
11	X1.2	The magazine returns to zero in place signal
12	X1.3	Z-axis zero deceleration signal
13	X1.4	External loop start (normally open contact)
14	X1.5	Spindle 1 stop in place/table clamping signal
15	X1.6	Spindle 2 stop in place/table release signal
16	X1.7	Tool setter overrange signal
29	X2.0	Magazine forward/inverted knife in place signal
30	X2.1	Tool magazine back/return tool in place signal
31	X2.2	Tool magazine counting signal
32	X2.3	Y-axis return zero deceleration signal
33	X2.4	4-axis return zero deceleration signal
34	X2.5	5-axis zero-return deceleration signal / disc brake signal
35	X2.6	The current cutterhead has a knife detection/disc snap knife in place signal
36	X2.7	The current spindle has a knife detection/disc origin in place signal
37	X3.0	X Hard Limit Alarm/M89K0 Detection Signal/Macro Input #1008/External Spindle Multiplier A
38	X3.1	Y hard limit alarm/M89K1 heartbeat/macro input #1009/external spindle magnification F
39	X3.2	Z hard limit alarm/M89K2 heartbeat/macro input #1010/external spindle magnification B
40	X3.3	4 Hard limit alarm/M89K3 detection signal/Macro input #1011/External spindle magnification E
41	X3.4	External feed magnification A/5 hard limit alarm/M89K4 heartbeat/macro input #1012
42	X3.5	External feed magnification F/M89K5 heartbeat/macro input #1013
43	X3.6	External feed magnification B/M89K6 heartbeat/macro input #1014
44	X3.7	External feed magnification E/M89K7 heartbeat/macro input #1015

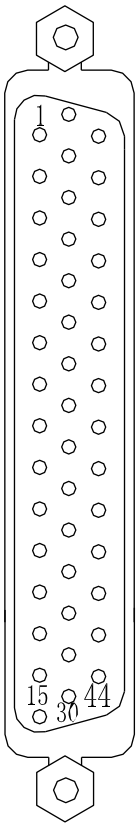


Figure 2-26 Output Interface (CN62).

Foot number	address	illustrate
19	dangling	
26～28 17～18	0V	Power port
20～25	+24V	Power port
1	Y0.0	Cooling output M08/M09
2	Y0.1	Lubrication output M32/M33
3	Y0.2	Tool clamping/loosening M16/M17
4	Y0.3	The spindle is turning to M03
5	Y0.4	The spindle is reversed M04
6	Y0.5	Spindle stop M05/M89 I0 output/macro output #1100
7	Y0.6	Processing blow M07/M09
8	Y0.7	Spindle brake/M89 I1 output/macro output #1101
9	Y1.0	M41/S1 spindle gear 1/M89 I2 output/macro output #1102
10	Y1.1	M42/S2 spindle gear 2/M89 I3 output/macro output #1103
11	Y1.2	M43/S3 spindle gears 3/M89 I4 output/macro output #1104
12	Y1.3	M44/S4 spindle gears 4/M89 I5 output/macro output #1105
13	Y1.4	K1 blows the M70/M71 against the knife
14	Y1.5	K2 custom output M72/M73
15	Y1.6	K4 table clamping output M10
16	Y1.7	The K4 table releases the output M11
29	Y2.0	Protective door output M34/M35
30	Y2.1	Hold gate output / M89 I6 output / macro output #1106
31	Y2.2	Tri-color light - yellow light
32	Y2.3	Tri-color light - green light
33	Y2.4	Tri-color light - red light
34	Y2.5	2nd spindle stop output M65/ M89 I7 output/macro output #1107
35	Y2.6	The 2nd spindle inverts M64
36	Y2.7	The 2nd spindle is forward to M63
37	Y3.0	K3 custom output M74/M75
38	Y3.1	The tool magazine is turning
39	Y3.2	The magazine is reversed
40	Y3.3	Tool magazine forward/inverted knife
41	Y3.4	Tool magazine back/retract
42	Y3.5	Tool magazine back indicator / disc robot arm output
43	Y3.6	Chip evacuation output M36/M37
44	Y3.7	The working lamp outputs M38/M39

Note 1: Some input and output interfaces can define a variety of functions, which are indicated by "/" in the table above;

Note 2: When the output function is active, the output signal is internally turned on with **0V. When the output function is invalid, the output signal is a high impedance cut-off;**

Note 3: This input is valid when the **input signal** is on **+24V.** The input is invalid when the input signal cuts off with **+24V;**

Note 4: +24V, COM and the **system supporting the power box of the same name terminal equivalent;**

2.7.1 Input signal

The input signal refers to the signal from the machine to the CNC, and the input signal is valid when the +24V is turned on; The input is invalid when the input signal is disconnected from +24V. The contacts on the machine side of the input signal should meet the following conditions:

Contact capacity: DC30V, 16mA or more

Leakage current between contacts at open circuit: 1mA or less

Voltage drop between contacts during path: 2V or less (current 8.5mA, including voltage drop of the cable).

There are two ways to enter the external input of the input signal: one uses a contact switch input, and the signal in this way comes from the buttons on the machine side, the limit switch, and the contacts of the relay, etc. The connection is shown in Figure 2-27

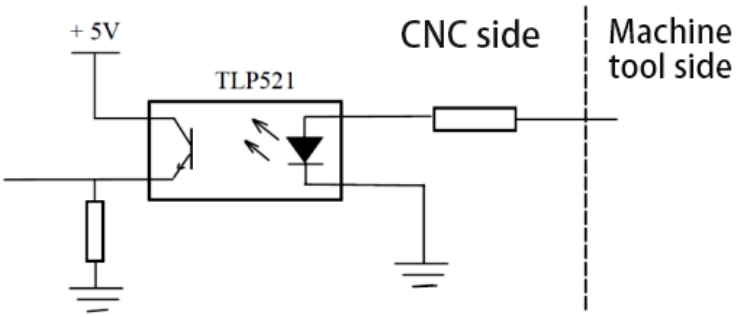


Figure 2-27

The other uses a contactless switch (transistor) input, which is shown in Fig. 2-28A and Fig. 2-28B.

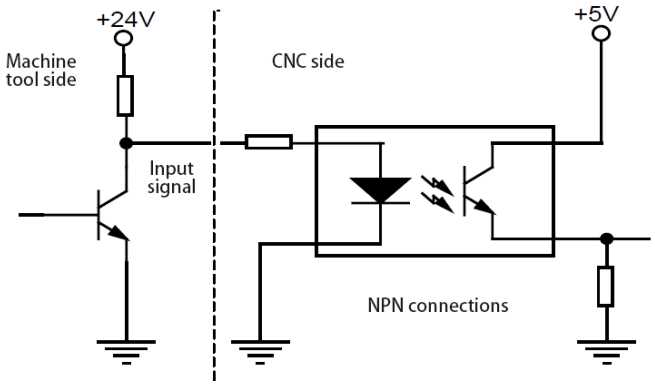


Figure 2-28A NPN connection

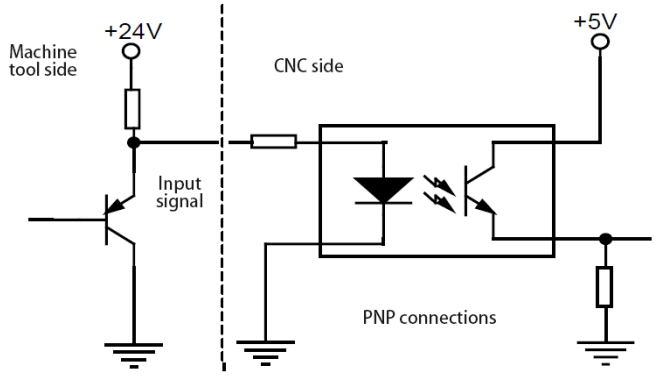


Figure 2-28B PNP connection

The functions defined in the milling machine system standard PLC include XDEC, YDEC, ZDEC, KYP, ST, SP, PRKY, etc. signals.

2.7.2 Output signal

The output signal is used to drive the relays and indicators on the machine side of the machine, and the output function is effective when the output signal is connected with 0V; When disconnected from 0V, the output function is invalid. There are a total of 36 digital outputs in the I/O interface, all with the same structure, as shown in Figure 2-29

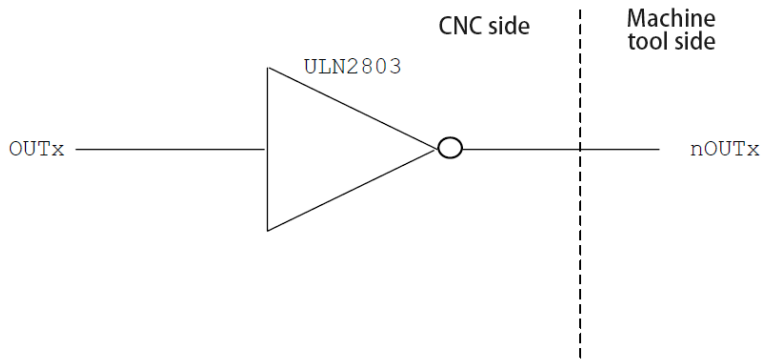


Figure 2-29 Circuit structure of the digital output module

The logic signal OUTx output by the motherboard is sent through the connector to the input of the inverter (ULN2803), and nOUTx has two output states: 0V output or high impedance.

Typical applications are as follows:

Drives the LEDs

Using the ULN2803 output to drive a light-emitting diode requires a resistor in series to limit the current flowing through the light-emitting diode (typically about 10mA). This is shown in Figure 2-30 below

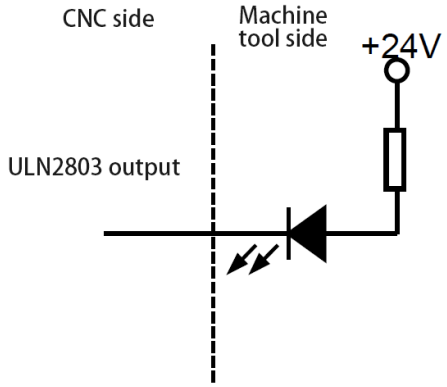


Figure 2-30

Drive filament-type indicator

Using the ULN2803 output to drive the filament type indicator, an external preheating resistor is required to reduce the current shock at turn-on, and the preheating resistor resistance is the size to make the indicator light not light as a principle, as shown in Fig. 2-31 below.

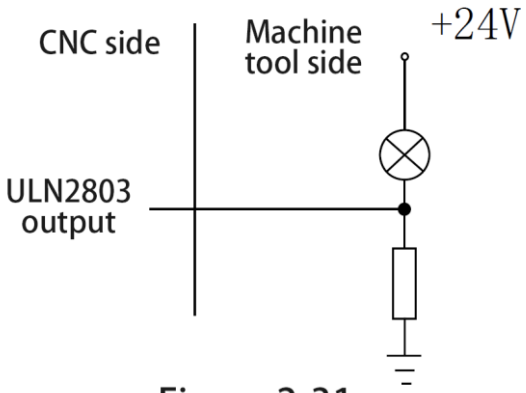


Figure 2-31

Drive inductive loads (e.g. relays)

The ULN2803 output is used to drive inductive loads, where a freewheeling diode needs to be connected near the coil to protect the output circuitry and reduce interference. This is shown in Figure 2-32 above.

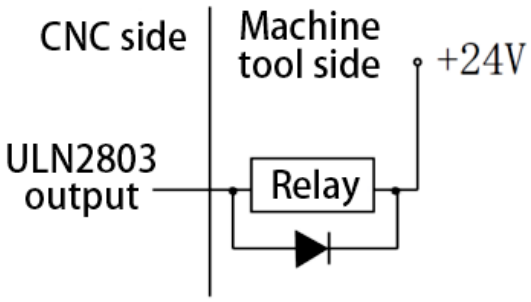


Figure 2-32

The meaning of the output signal in the I/O interface is defined by the PLC program, and the output signals defined by the standard PLC program include S1 ~ S4 (M41 ~ M44) and M3 ~ M5, M8, M32 and other signals.

2.8 I/O Functionality and Connectivity

Note!

The meaning of the I/O function of the milling machine CNC is defined by the PLC program (ladder diagram), when the milling machine CNC assembles the machine tool, the I/O function is determined by the design of the machine manufacturer, please refer to the instructions of the machine manufacturer.

The I/O functions in this section are described for the 1000M Series standard PLC program. Please note!

2.8.1 Stroke limits and emergency stops

Related signals

KYP: Emergency stop signal, emergency stop alarm when disconnected from +24V

LMIX: X-axis stroke limit detection input

LMIY: Y-axis stroke limit detection input

LMIZ: Z-axis stroke limit detection input

Diagnostic data

0	0	0
Interface pins		

ESP							
CN61.6							

Signal diagnostics

Signals	KYP	LMIX	LMIY	LMIZ
Diagnostic	X0.5	X3.0	X3.1	X3.2

address				
Interface pins	CN61.6	CN61.37	CN61.38	CN61.39

Control parameters

Status parameters

0	2	1							MESP		

KYP=0: Check the KYP emergency stop signal

=1: Do not check the KYP emergency stop signal.

PLC status parameters

K	1	0	LMIT	LMIS							

LMIT=1: The stroke limit detection function of each axis is effective.

=0: The stroke limit detection function of each axis is invalid.

LMI=1: Overtravel alarm when the stroke limit detection signal is disconnected from +24V.

=0: Overtravel alarm when stroke limit detection signal is on with + 24V .

The signal connects the stroke limit to the emergency stop signal (KYP) circuit as shown in Figure 2-33 below

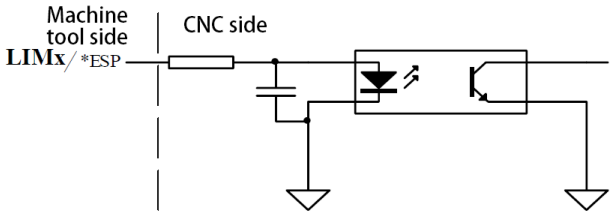


Figure 2-33

External connection of the machine

① The stroke limit is connected in series with the emergency stop as shown in Figure 2-34A below

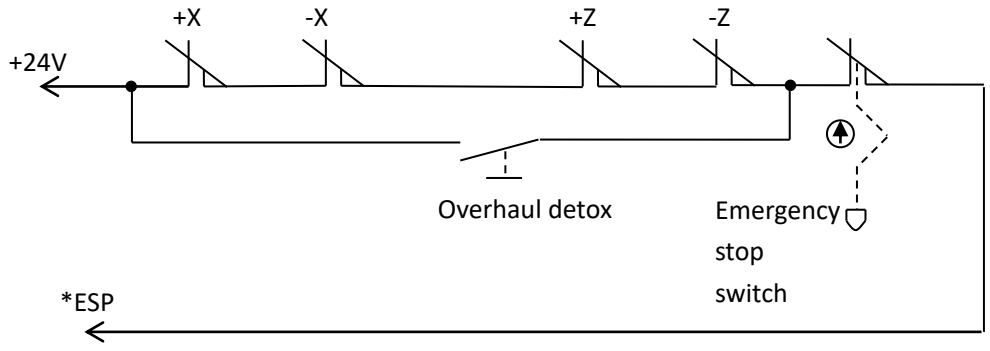


Fig. 2-34A emergency stop, stroke switch series connection

(2) The stroke limit is independently connected with the emergency stop, and the connection mode is shown in Figure 2-34B below

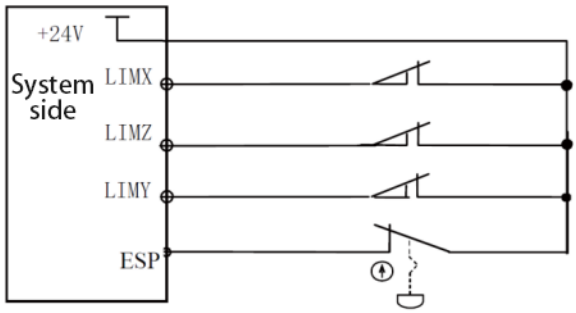


Figure 2-34B Emergency stop and travel switch are independently connected

Control logic

(1) The stroke limit is connected in series with the emergency stop

When there is an overrun or press the E-STOP button, the CNC will appear "E-STOP" alarm, if it is overdriven, press the over-release button does not let go, press the reset key to cancel the alarm after moving in the opposite direction to cancel the overrun. In the event of an emergency stop alarm, the CNC stops the pulse output. In addition to the functions of CNC processing described above, other functions can also be defined by the PLC program during emergency stop alarms. The function defined by the standard PLC program is: in case of emergency stop alarm, the M03 or M04, M08 signal output is turned off, and the M05 signal is output at the same time.

(2) The stroke limit is independently connected to the emergency stop

1. Each axis has only one overhaul contact, and the positive and negative overhaul alarm is judged by the direction of movement of the axis.

2. When the overtravel alarm occurs, it can be moved in the opposite direction, and the alarm can be cleared according to the reset after moving out of the limit position.

Note: Before enabling the overhaul limit function, it is necessary to ensure that the machine drag plate is between positive and negative strokes, otherwise the alarm will not match the actual situation.

2.8.2 Machine zero return

Related signals

DECX: X-axis deceleration signal;

DECY: Y-axis deceleration signal;

DECZ: Z-axis deceleration signal;

DEC4: 4th axis deceleration signal;

DEC5: 5th axis deceleration signal;

Diagnostic data

0	0	0
Interface pins		

			DEC5	DEC4	DECZ	DECY	DECX
			CN61.34	CN61.33	CN61.12	CN61.32	CN61.4

Control parameters

K	**2**	**2**

DEC4T	**DECY**	**DECZ**	**DECX**	**DEC5T**			

DEC5T = 0:5th axis deceleration signal low level

=1:5th Axis deceleration signal high

DEC4T = 0:4th axis deceleration signal low level

=1:4th Axis deceleration signal high level

DECY=0: Y-axis deceleration signal low

=1: Y-axis deceleration signal high

DECZ=0: Z-axis deceleration signal low

=1: Z-axis deceleration signal high

DECX=0: X-axis deceleration signal low

=1: X-axis deceleration signal high

0	**0**	**6**

				ZPLS			**ZMOD**

ZMOD=1: before selecting the gear in zero mode;

=0: After selecting the gear in zero mode.

ZPLS=1: Zero return mode is selected, there is a turn signal;

=0: Zero return mode is selected, no turn signal.

0	**1**	**2**

							ISOT

ISOT=1: After powering on, before returning to the zero point of the machine, manual and fast movement is effective;

=0: After powering on, before returning to the zero point of the machine, manual fast movement is invalid.

0	**2**	**6**

			MZR5	**MZR4**	**MZRY**	**MZRZ**	**MZRX**

MZRx=1: Select the axis to return to zero in the negative direction to return to zero;

=0: Select the axis to return to zero in the positive direction back to zero.

Data parameters

0	**8**	**0**	ZRNFL

ZRNFL: The low speed rate back to the mechanical zero point.

0	**7**	**0**	ZRNFHX

ZRNFHX: The X-axis returns to the mechanical zero point at a high speed.

0	**7**	**1**	ZRNFHY

ZRNFHY: The high-speed speed of the Y axis back to the zero point of the machine.

0	**7**	**2**	ZRNFHZ

ZRNFHZ: The high-speed speed of the Z-axis back to the mechanical zero point.

0	**7**	**3**	ZRNFH4

ZRNFH4: 4th speed of the shaft back to the mechanical zero point.

0	**7**	**4**	ZRNFH5

ZRNFH5: 5th axis back to the mechanical zero point of the high-speed speed.

Signal connection

The internal connection circuit of the deceleration signal is shown in Figure 2-38 below

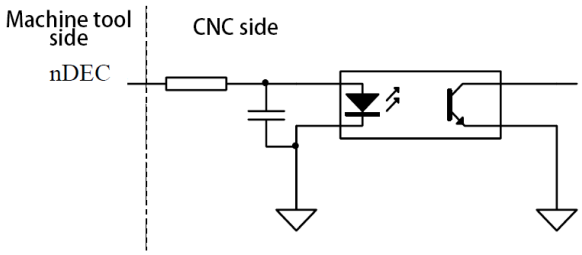


Figure 2-38

The machine tool returns to zero when using the servo motor to make a zero signal with a turn signal

① The schematic diagram is shown below

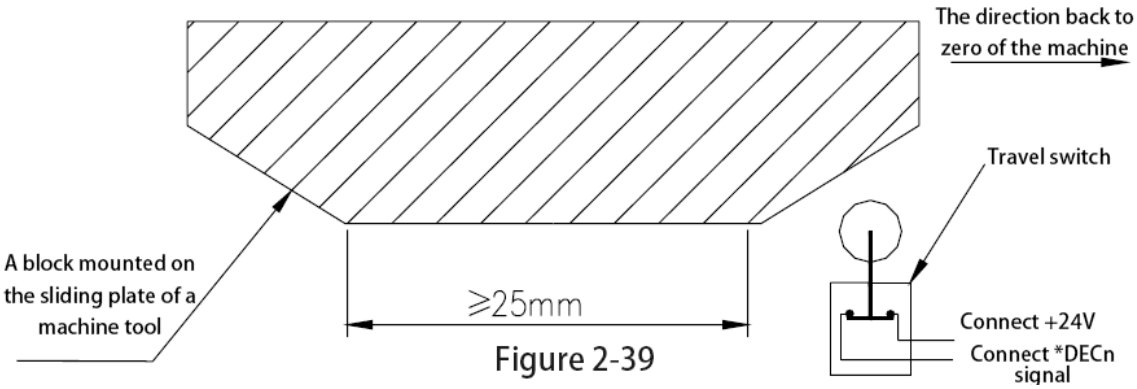


Figure 2-39

(2) The connection circuit of the deceleration signal

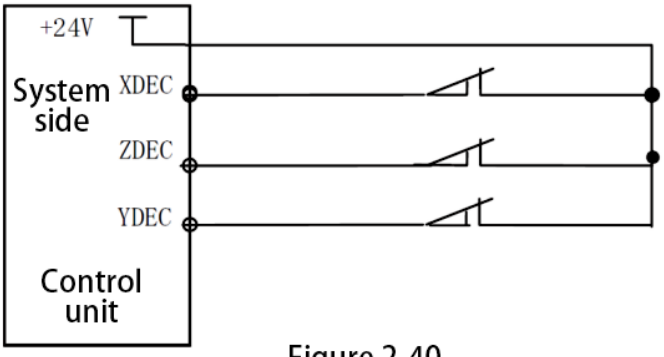


Figure 2-40

+

(3) Return to the zero point action sequence of the machine (only take the X axis as an example).

At BIT4=0 for K022, the deceleration signal is active low.

The timing diagram of the return machine to zero action is as follows:

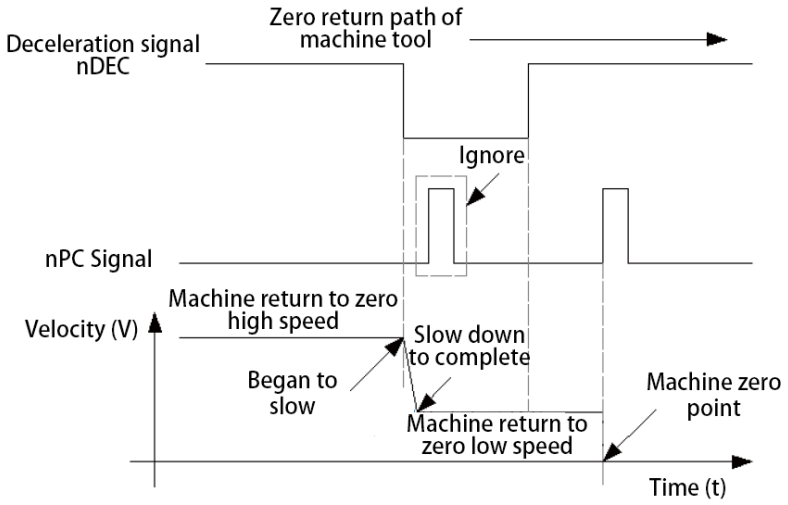


Figure 2-41-1

The process of returning the zero point of the machine

The process of returning the zero point of the machine

1) Select the machine tool zero operation mode, press the manual positive or negative direction (back to the machine zero direction set by the status parameter No 026 number) feed key, then the corresponding axis to the high speed of the reference point (parameter No 70 ~ No 74) to the machine tool zero point direction. Run to the pressure on the deceleration switch, when the deceleration signal contact is disconnected, the machine decelerates and continues to run at a fixed low speed (parameter No 80).
2) When the deceleration switch is released, the deceleration signal contact is closed again, and the CNC begins to detect the one-turn signal (PC) of the encoder, if the signal level jumps, the movement stops, and the zero-back indicator of the corresponding axis on the operator panel is lit, and the machine tool is finished with zero-back operation.

When the status parameter No 006's BIT1 (ZMOD) is set to 1, K022's BIT4=0. Select Return Machine Zero to be active in the pre-block mode, the deceleration signal is low. At this time, the action sequence of the zero point back to the machine tool is shown in the following figure:
The timing diagram of the zero-point action of the machine tool is returned to the machine in the pre-block mode as follows:

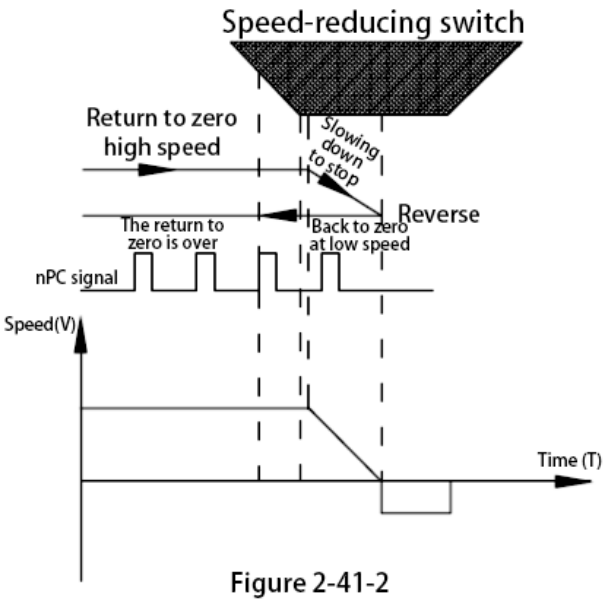


Figure 2-41-2

The process of returning to the zero point of the machine **tool before the stop (there is no A/B mode before the** stop is returned to zero).

a) Select the machine tool zero operation mode, press the manual positive or negative direction (back to the machine zero direction set by the status parameter No 026 number) feed key, then the corresponding axis to the high speed of the reference point (parameter No 70 ~ No 74) to the machine tool zero point direction. Run to press on the deceleration switch, when the deceleration signal contact is disconnected, the running speed is reduced to zero (the length of the deceleration baffle must be enough shaft deceleration to zero), and then run in the opposite direction at the zero point low speed of the machine tool;

b) In reverse operation, until the deceleration switch is removed, the deceleration signal contact is closed again, the system begins to detect the encoder's one-turn signal (PC), if the signal level jumps, the movement stops, and the zero return indicator of the corresponding axis on the operator panel is lit, and the machine tool returns to zero operation.

Post-block mode (BIT 0 (ZMOD) set to 0 for status parameter No 006**).**

The process of returning the machine zero point in mode A (BIT4 of the status parameter No 006 is set to 0**).**

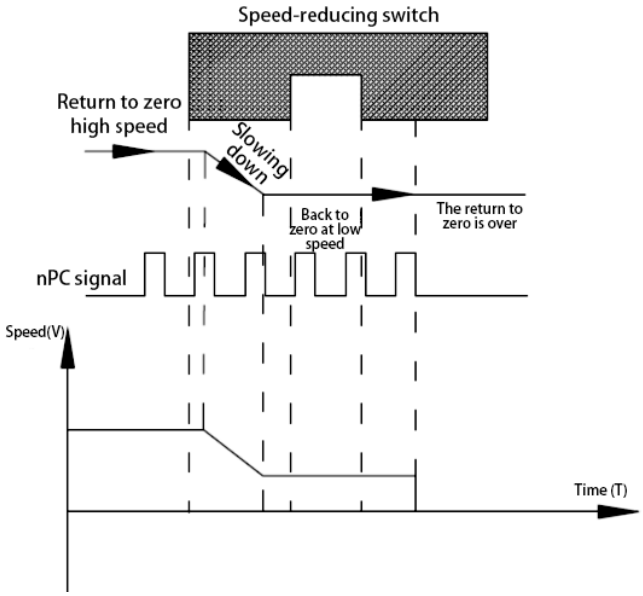


Fig. 2-41-A

a) Select the operation mode of the machine tool back to zero, press the manual positive or negative direction (back to the machine zero direction set by the status parameter No 026) feed button, then the corresponding axis to return to the reference point of the high-speed speed (parameter No 70-74) to the zero point of the machine. Run to the pressure on the deceleration switch, when the deceleration signal contact is disconnected, the operating speed deceleration (the length of the deceleration baffle must be enough shaft deceleration), and then run in the same direction at the low speed of the zero point of the machine tool, leave the deceleration switch, and the deceleration signal contact is closed again.

b) 2 to return to the machine tool zero point low speed to run in the same direction, until the deceleration switch is pressed again, the deceleration signal contact is disconnected, the system only begins to detect the encoder's one-turn signal (PC), such as the signal level jump, the movement stops, while the corresponding axis on the operator panel of the zero end indicator is on, the machine tool back to zero operation ends.

Post-block mode (BIT5 (ZMOD) set to 0 for status parameter No 006**).**
The process of returning the zero point of the machine to the B **mode (**BIT4 of the status parameter No 006 is set to 1**).**

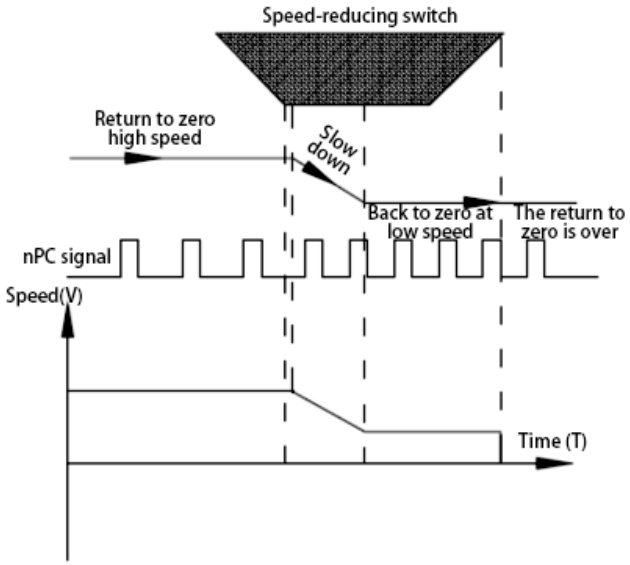


Fig. 2-41-B

a) Select the operation mode of the machine tool back to zero, press the manual positive or negative direction (the zero point direction of the machine tool is set by the status parameter No 026) feed key, then the corresponding axis moves in the direction of the zero point of the machine tool at the high speed (parameter No 70-74) of the reference point. Run to the pressure on the deceleration switch, when the deceleration signal contact is disconnected, the operating speed is decelerated (the length of the deceleration bezel must be sufficient for the shaft deceleration), and then run in the same direction at the low speed back to the zero point of the machine.

b) Run in the same direction at the low speed of the zero point of the machine tool, until you leave the deceleration switch, when the deceleration signal contact is closed again, the system begins to detect the one-turn signal (PC) of the encoder, if the signal level jumps, the movement stops, and the end-of-zero indicator of the corresponding axis on the operation panel is lit, and the machine tool zero-back operation ends.

2.8.4 Spindle control

The relevant signal (defined by the standard PLC program).

Signal type	symbol	Signal	address	Description of the	remark
Input signal	SAR	CN15.6	X4.1	Spindle speed reaches signal	
	SALM	CN15.4	X4.3	Spindle abnormality alarm input	This signal is valid for the 0V input
Output signal	M03	CN62.4	Y0.3	The spindle rotates counterclockwise (forward).	
	M04	CN62.5	Y0.4	The spindle rotates clockwise (inverts).	
	M05	CN62.6	Y0.5	The spindle stops	
	SPZD	CN62.8	Y0.7	Spindle brake	
The directive format	M03			The spindle rotates counterclockwise (forward).	
	M04			The spindle rotates clockwise (inverts).	
	M05			The spindle stops	

Control parameters

Status parameters

K	1	0	RSJG

RSJG=1: When the key is pressed, the CNC does not turn off the M03, M04, M08, M32 output signals;

=0: When the key is pressed, the CNC turns off the M03, M04, M08, M32 output signals.

0	2	0	SAR

Bit6 1: Check the spindle SAR signal before cutting;

0: Do not check the spindle SAR signal before cutting.

Data parameters

D	1	2	6	

Spindle zero-speed output range (r/min).

Signal connection

M03, M04, M05, SCLP, SPZD, SVF signal output circuits are shown in Figure 2-45A below

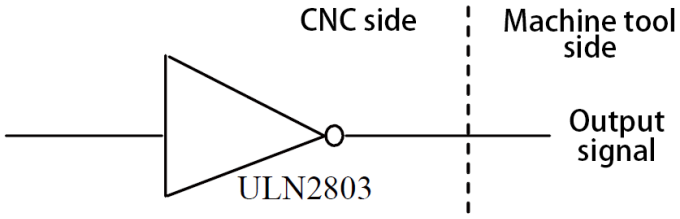


Figure 2-45A

The SALM signal input circuit is shown in Figure 2-45B below

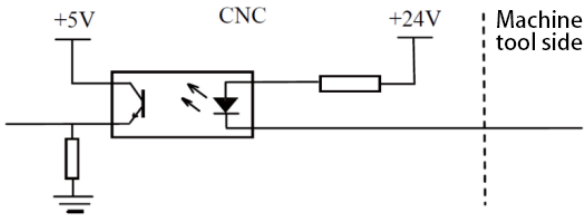


Figure 2-45B

Action timing (defined by standard **PLC** programs).

The spindle action timing is shown in Figure 2-46 below

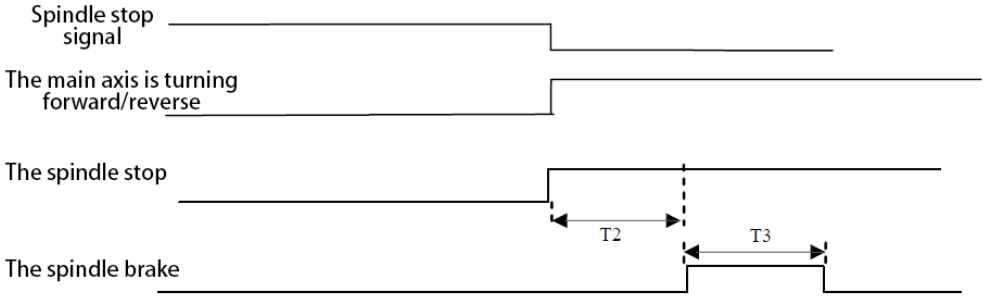


Figure 2-46
Sequence Diagram of forward and reverse of the principal axis

Note: T2 is the delay time from the spindle **stop signal to the spindle braking signal; T3 Holds time for main shaft brakes.**

Functional description (standard PLC program definition).

(1) The M05 output is valid after the CNC is powered on. When the M05 output is active, execute the M03 or M04, M03 or M04 output valid and hold, while turning off the M05 output; When the M03 or M04 output is active, execute M05 and turn off the output of M03 or M04, M05 The output is valid and maintained;

(2) When the M03 (M04) output is valid, the execution of M04 (M03) will generate an alarm.

Note 1: In the case of an emergency CNC stop, turn off the M03 **or** M04, M08 signal output, and output the **M05 signal at the same time ;**

Note 2: When the **CNC is reset,** whether M03, **M04 is canceled** by the Bit1 bit setting **of the K parameter NO.010 Output:**

When Bit1 = 0, CNC resets to turn off the output of M03 **and M04 ;**

When Bit1 = 1, the output state of **CNC reset M03 and M04 remains unchanged.**

2.8.5 Spindle speed switching control

The relevant signal (defined by the standard **PLC** program).

S01 ~ S04: spindle speed switching control signal, standard PLC program defined S01 ~ S04 signal interface is a multiplexing interface, S01 ~ S04 Shared interface with M41 ~ M44.

Signal diagnostics

Signals	S4	S3	S2	S1
Diagnostic address	Y1.3	Y1.2	Y1.1	Y1.0
Interface pins	CN62.12	CN62.11	CN62.10	CN62.09

Control parameters

Status parameters

0	**0**	**1**				Simulates the spindle				

Bit4=1: spindle speed analog voltage control;

=0: Spindle speed switch control.

Control logic (defined by standard **PLC** programs).

The S1 ~ S4 output is invalid when the CNC is powered up. Execute any of the code in S01, S02, S03, S04, and the corresponding S signal output is valid and maintained, while the other S is canceled The output of the signal. When executing the S5-S8 code, the output of S1 ~ S4 is canceled, and only one output of S1 ~ S4 is valid at the same time.

2.8.6 Automatic spindle shift control

The relevant signal (defined by the standard **PLC** program).

M41 ~ M44: Spindle automatic shift output signal, when the spindle analog control (0 ~ 10V analog voltage output) can support 4 gears spindle automatic shift control.

M41I, M42I: Spindle automatic shift 1st and 2nd gear shift in place signals, which can support 2 gear shift in place detection functions.

Signal diagnostics

Signals	M42I	M41I	M44	M43	M42	M41
Diagnostic	X1.6	X1.5	Y1.3	Y1.2	Y1.1	Y1.0
Interface	CN61.15	CN61.14	CN62.12	CN62.11	CN62.10	CN62.09

Signal connection

The M41 ~ M44 circuit is shown in Figure 2-47 below

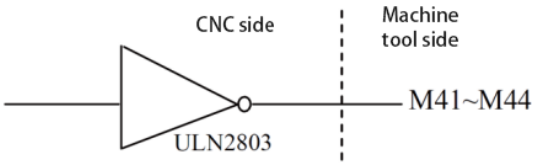


Figure 2-47

Control parameters

Status parameters

0	0	1				Simulates the spindle				

Bit4=1: spindle speed analog control, when using the spindle automatic shift function, it must be set to 1;

=0: Spindle speed switch control.

K	1	5					SHT	AGIM	AGIN	AGER

AGER=1: The spindle automatic shift function is effective;

=0: Spindle autoshift function is invalid.

AGIN=1: When the spindle automatically shifts to 1 or 2 gears, check the shift signals M41I and M42I;

=0: When the spindle automatically shifts to 1st and 2nd gears, the shift signals M41I, M42I are not checked.

AGIM=1: Effective when shift in place signals M41I, M42I and +24V are disconnected;

=0: Shift in place signals M41I, M42I and +24V are active.

SHT=1: Spindle gear power-down memory;

=0: The spindle gear is not remembered when the power is lost.

Data parameters

2	1	0	GRMAX1
2	1	1	GRMAX2
2	1	2	GRMAX3
2	1	3	GRMAX4

GRMAX1, GRMAX2, GRMAX3, GRMAX4: The spindle analog voltage output is 10V corresponding to 1st and 2nd , 3, 4 times spindle speed. When the spindle automatic shift is effective, the maximum spindle speed corresponds to the execution code M41, M42, M43, M44 respectively.

2	1	4	SFTREV

Voltage output during spindle shift (0 to 10000 in mV).

Functional description (standard PLC program definition).

The spindle speed must be selected as analog voltage control mode (the Bit4 bit of the status parameter NO.001 is set to 1) and the Bit0 bit of the K parameter NO.15 is set At 1 time, the spindle automatic shift function is effective; When the spindle automatic shift function is invalid, the CNC will alarm when the M41 ~ M44 is executed. M41, M42, M43, M44 are valid for only one at the same time.

The spindle automatic shift function is used to control the automatic switching of the spindle mechanical gear, and when the CNC executes the S □□□□ code, the corresponding parameters (M41 ~ M44) corresponding to the corresponding data parameters according to the current M4n control gear NO.210 ~ NO.213) Calculate the analog voltage output to the spindle servo or inverter, and control the actual speed of the spindle is consistent with the speed of the S code.

When the CNC is powered up, the CNC is controlled by the Bit3 bit of the K parameter NO.15 to restore the spindle gear before the power failure. When the Bit4 bit of the status parameter NO.001 is 0, the spindle gear is not remembered after power off, and the default 1st spindle gear, M41~ M44 has no output; When the Bit4 bit of the status parameter NO.001 is 1, the power is powered on after power off, and the spindle gear is remembered. If the specified gear matches the current gear, no gear shift occurs.

If the specified gear is inconsistent with the current gear, the shift process is performed and the shift process defined by the standard PLC is as follows:

(1) Execute any code in M41, M42, M43, M44, and set the value (unit: mv) according to the data parameter NO.214 Output analog voltage to spindle servo or frequency converter;

(2) After delaying the data DT000 (shift time 1), turn off the original gear output signal and output a new shift signal at the same time;

(3) When the gear shift is 1 or 2 gears, and the Bit1 bit (AGIN) of K parameter No 15 is 1, then turn (4), Otherwise turn (5);

(4) Check the 1 or 2 gears in place input signals M41I, M42I, if the gear shift in place (5); If the shift is not in place, the CNC has been waiting for the shift in place signal;

(5) Delay data DT001 (shift time 2), according to the current gear according to the data parameters NO.210 ~ NO.213 (corresponding to 1 ~ 4 gear) value output spindle analog voltage, shift ends.

Note: When the CNC is reset or in an emergency, the output state **defined by** the standard **PLC** as **M41 ~ M44 remains unchanged.**

2.8.7 External loop start and feed hold

The relevant signal (defined by the standard **PLC** program).

ST: External automatic cycle start signal, the same function as the automatic cycle start key in the machine panel.

SP: External feed hold signal, the same function as the feed hold key in the machine panel.

Signal diagnostics

Signals	SP	ST
Diagnostic	X0.1	X1.4
Interface pins	CN61.2	CN61.13

Signal connection

The internal circuit of the SP/ST signal is shown in Figure 2-48 below

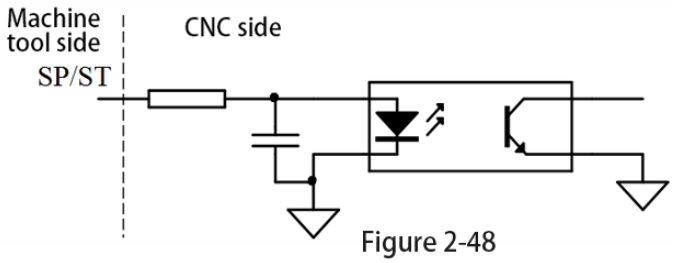


Figure 2-48

Control parameters

Status parameters

0	**2**	**1**						**MSP**	**MST**

MST=1: The external loop start (ST) signal is invalid;

=0: The external loop start (ST) signal is valid.

MSP=1: The external pause (SP) signal is invalid;

=0: The external pause (SP) signal is valid. An external pause switch must be connected at this point, otherwise the CNC displays "Pause".

External connection circuitry

For the external connection of SP and ST signals, see Fig. 2-49 below.

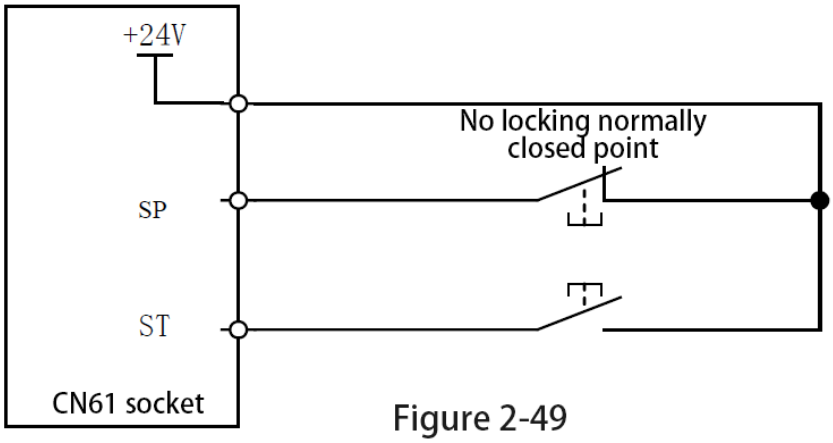


Figure 2-49

2.8.8 Cooling pump control

Relevant instruction signals (defined by standard **PLC** programs).

Signal type	symbol	Signal interface	address	Description of the feature	remark
Output signal	M08	CN62.1	Y0.0	Cooling pump control	
The directive format	M08			Coolant on	
	M09			Coolant off	

Signal connection

The internal circuit is shown in Figure 2-50 below

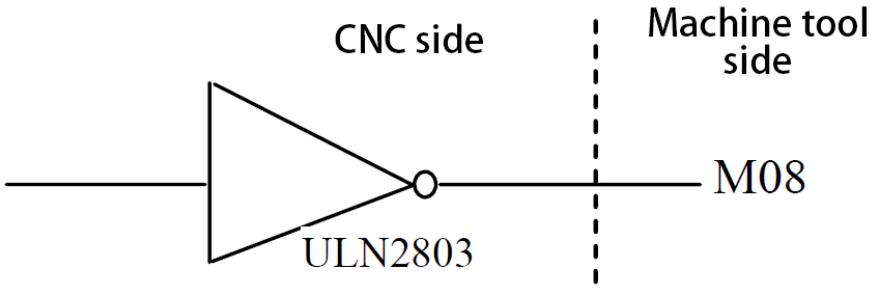


Figure 2-50

Functional description (standard PLC program definition).

When the CNC is powered up, M09 is valid, that is, the M08 output is invalid. Execute M08, M08 output effective, cooling pump open; Execute M09, cancel M08 output, cool pump off.

Note 1: In the event of an emergency CNC stop, the output **of M08** is canceled;

Note 2: When the CNC **is reset,** whether **M08 is canceled** by **the bit1** setting **of the CNC's** K **parameter NO.10 Output:**

Bit1 = 0: When **the CNC** is **reset, the** output of **M08** is canceled;

Bit1 = 1: When **the CNC is reset, the** output state of **M08 remains unchanged.**

Note 3: M09 **has no corresponding output signal, and execution** of M09 **cancels** the output **of M08 .**

Note 4: The keys of the operator panel can control the cooling pump switch, as detailed in the second article of this manual, "Operating Instructions". 

2.8.9 Lubrication control

Relevant instruction signals (defined by standard **PLC** programs).

Signal type	symbol	Signal interface	address	Description of the feature	remark
Output signal	M32	CN62.2	Y0.1	Lubrication control output	
The directive format	M32			Lubrication open	
	M33			Lubrication off	

Signal connection

The internal circuit is shown in Figure 2-51 below

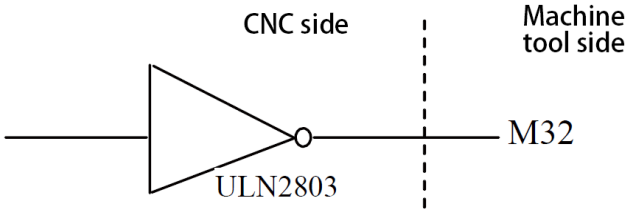


Figure 2-50

Control parameters

PLC status parameters

K	1	0							RSJG	

RSJG=1: When pressing the key, the CNC does not turn off the M03, M04, M08, M32 output signals.

=0: When the key is pressed, the CNC turns off the M03, M04, M08, M32 output signals.

K	1	6							M32A		

M32A = 1: Output lubrication at startup when automatic lubrication is active

=0: Automatic lubrication does not output when the machine is active

PLC data

D	T	0	5	3	

Automatic lubrication interval (0 ~ 65535s).

D	T	0	1	3	

Automatic lubrication output time (0 ~ 65535ms).

Functional description

There are two types of lubrication functions defined by the standard PLC program for milling machine systems, manual lubrication and automatic lubrication, set by parameters: DT13=0:

manual lubrication

>0: Automatic lubrication, lubrication time DT13 and lubrication interval DT53 can be set

1、 The manual lubrication function is lubrication flip output, press the machine operator panel key, lubricate the output, and repeatedly press the lubrication output canceled. 

When M32 is executed, the lubrication output is performed, and then M33, the lubrication output is canceled.

When DT13>1, for the lubrication timing output, press the machine tool operation panel key, lubrication output, after DT13 

set time, lubrication output canceled; Execution of M32, lubrication output, after the time set by DT13, lubrication output is canceled. If the time set by DT13 is not reached, at which point the M33 or another key is pressed, the lubrication output is canceled. 

2、 Automatic lubrication:

When K16.2 is set to 1, the system powers up and starts lubricating the DT13 set time, then stops the output, after the time set by DT53, repeats the output lubrication, and then cycles in turn. When auto-lubricated, the M32, M33 code, and the machine operator panel keys are also valid, and the lubrication time is still the time set for DT13 

.

Note 1: In **the event of an emergency CNC stop, turn off the lubrication output;**

Note 2: When the **CNC** is **reset,** the Bit1 bit **of** the **K parameter NO.010 is set to whether to cancel the lubrication output:**

When Bit1 = 0, the CNC resets to turn off the lubrication output;

When Bit1 = 1, the output state of **the CNC reset lubrication remains unchanged.**

2.8.10 Guard door detection

The relevant signal (defined by the standard PLC program).

SAGT: The guard gate detects the input signal.

Signal diagnostics

Signals	SAGT
Diagnostic address	X0.0
Interface pins	CN61.1

Control parameters

Status parameters

K	1	4						SPB4	PB4		

PB4=0: The detection function of the protective door is invalid;

=1: The protective gate detection function is effective.

SPB4 = 0: Protective door closed at SAGT low (disconnected from +24V);

=1: The protective door closes at SAGT high (on with +24V).

Functional description (standard PLC program definition).

(1) When PB4 = 1 and SPB4 = 0 , the SAGT signal is disconnected from the CNC with +24V Confirm that the protective door is closed;
(2) When PB4 = 1 and SPB4 = 1, the SAGT signal is connected to the CNC with +24V Confirm that the protective door is closed;

The macro	#1015	#1014	#1013	#1012	#1011	#1010	#1009	#1008
Diagnostic	X1.7	X1.6	X1.5	X1.4	X1.3	X1.2	X1.1	X1.0

(3) The protective door detection function is effective in the automatic mode, but when the protective door is opened, "the protective door has been opened" will be given in all ways. warning prompts, does not affect the execution of other functions;
(4) In the automatic mode, when the automatic cycle starts, if the CNC detects that the protective door is open, an alarm is generated;
(5) During the automatic operation, if the CNC detects that the protective door is open, the shaft feed is suspended, the spindle is closed, and the cooling output is closed;

2.8.11 CNC macro variables

Related signals

The macro	#1105	#1104	#1103	#1102	#1101	#1100
Diagnostic						

The macro	#1015	#1014	#1013	#1012	#1011	#1010	#1009	#1008
Diagnostic								

Functional description (standard PLC program definition).

Assign a value to the macro variable # 1100 ~ # 1105 to change the UO0 ~ UO5 output signal state; When assigned to "1", output 0V; When assigned a value of "0", its output signal is turned off.

Detect the value of the macro variable # 1000 ~ # 1015 to know the input status of the input interface.

2.8.12 Tri-color lamp

Relevant signal and function definitions (standard PLC program definitions).
Y2.2 (CN62.31): Yellow light, indicating normal (non-operational, non-alarm state).
Y2.3(CN62.32): Green light, indicating the operating status
Y2.4(CN62.33): Red light, indicating alarm status

2.8.13 External handwheels

Related signals

CN31	PLC	Address	The function of the	remark
5	X5.0	EHDX	X handwheel	Applicable to PSG-100-05E/L, ZSSY2080 handwheel
6	X5.1	EHDY	Y handwheel	
8	X5.2	EHDZ	Z handwheel	
20	X5.3	EHD4	4 hand wheels	
21	X5.4	EHD5	5 handwheels	
9	X5.5	EMP0	Increment × 1	
22	X5.6	EMP1	Increment × 10	
23	X5.7	EMP2	Increments× 100	
11、12、13	GND			
14、15	+5V			
17、18	+24V			

Relevant parameters

Status parameters

0	0	1						SOHW			

Bit3=0: single-step working mode;

=1: The way the handwheel works.

PLC status parameters

K	1	6	SINC							

SINC=0: Handwheel, single-step × 1000 increments effective.

=1: Handwheel, single-step × 1000 increments are invalid.

Functional description

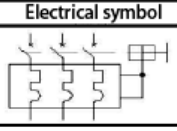
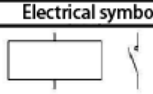
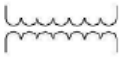
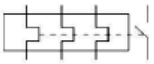
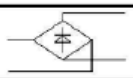
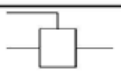
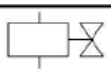
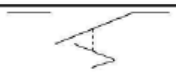
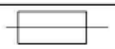
(1) When SINC is set to 1, the handwheel/single-step mode × 1000 increment file selection is invalid, if the × 1000 gear has been selected before modifying the parameters, it will automatically change to ×100mm gear.

(2) When using an external handwheel, the shaft selection of the external handwheel is not self-locking, that is, when the shaft selection input of the handwheel is invalid, it will become a non-shaft selection state.

(3) When the external handwheel axle selection and gear selection inputs are valid, the panel handwheel axle selection and gear selection buttons are invalid, and when the external handwheel axle selection and gear selection inputs are invalid, the panel handwheel axle selection and gear selection buttons are valid and self-locking.

2.9 Common symbol comparison of electrical diagrams

In the design, the DC24V power supply of the system and the DC24V power supply used by the solenoid valve with a large working current must be independent, and the electrical device symbol is described as follows:

Name	Symbol	Electrical symbol	Name	Symbol	Electrical symbol
Air circuit breaker	QF		Contactor coils, contacts and auxiliary contacts	KM	
Transformer	TC		Thermal relays and contacts	FR	
Bridge rectifier	VC		Capacitance	C	
Motor	M		Resistance	R	
Diode	VD		Hall element		
Solenoid valve	YV		Moving stroke switch	SQ	
Relay coil and	KA		Connection terminal		
			Foot switch	SA	
			Fusible cutout	FU	

Chapter 3 Parameter Description

This chapter mainly explains the status parameters and data parameters of the CNC, and different functional requirements can be achieved through different parameter settings.

3.1 Parameter descriptions (sorted sequentially).

3.1.1 Status parameters

The status parameter is represented as follows:

Parameter numbers BIT7 BIT6 BIT5 BIT4 BIT3 BIT2 **BIT1** **BIT0**

0	**0**	**1**	********	********	********	**SPTY**	**SOHW**	********	********	**.INI**

Bit0 0: metric input;

1: Imperial input.

Bit3 0: single step mode;

1: Handwheel mode.

Bit4 0: spindle speed switch control;

1: Spindle speed analog voltage control.

Default value: 0 0 0 1 1 0 0 0

0	**0**	**3**	********	********	**SCRW**	**TLC**	********	********	**CIM**	**OIM**

Bit0 0: The tool complement value is not automatically converted when the metric imperial system is converted;

1: The tool complement value is automatically converted when the metric imperial system is converted.

Bit1 0: The workpiece coordinate system value is not automatically converted when the metric imperial system is converted;

1: The workpiece coordinate system value is automatically converted when the metric imperial system is converted.

Bit4 0: Select the type of tool length compensation mode A;

1: Select the type of tool length compensation mode B.

Bit5 0: Pitch error compensation function is invalid;

1: The pitch error compensation function is effective.

Default value: 0 0 1 1 0 0 1 1

0	**0**	**4**	**SCW**	********	********	********	********	********	********	********

Bit7 0: Metric output;

1: Imperial output.

Default value: 0 0 0 0 0 0 0 0

0	0	5

****	****	****	M30	M02	****	****	****

Bit3 0: M02 does not return the beginning after execution;

1: M02 returns the beginning after execution.

Bit4 0: The cursor does not return the beginning after M30 execution;

1: The cursor returns to the beginning after M30 execution.

Default value: 0 0 0 1 1 0 0 0

0	0	6

****	****	****	MAOB	ZPLS	****	****	ZMOD

Bit0 0: After selecting the gear in zero mode;

1: Zero mode before selecting the gear.

Bit3 0: Zero return mode selection: no turn signal;

1: Return to zero mode selection: There is a turn signal.

Bit4 0: When there is no turn signal, the return zero mode selects the A mode;

1: When there is no single turn signal, select the B mode for the return to zero.

Default value: 0 0 0 0 1 0 0 0

0	0	8

****	****	****	DIR5	DIR4	DIRZ	DIRY	DIRX

Bit0 0: The direction signal is high when the X axis is moving negatively;

1: The direction signal is high when the X axis is moving in a positive direction.

Bit1 0: The direction signal is high when the Y axis is moving negatively;

1: The direction signal is high when the Y axis is moving in a positive direction.

Bit2 0: The direction signal is high when the Z axis is moving negatively;

1: The direction signal is high when the Z axis is moving in a positive direction.

Bit3 0:4th The direction signal is high when the axis is moving negatively;

1:4th The direction signal is high when the axis is moving in a positive direction.

Bit4 0:5th The direction signal is high when the axis moves negatively;

1:5th The direction signal is high when the axis is moving in a positive direction.

Default value: 0 0 0 1 1 1 0 1

0	0	9

SALM	****	****	5ALM	4ALM	ZALM	YALM	XALM

Bit0 0: X-axis alarm signal is high level alarm;

1: The X-axis alarm signal is a low level alarm.

Bit1 0: The Y axis alarm signal is a high level alarm;

1: The Y-axis alarm signal is a low level alarm.

Bit2 0: The Z axis alarm signal is a high level alarm;

1: The Z-axis alarm signal is a low level alarm.

Bit3 0:4th axis alarm signal is a high level alarm;

The 1:4th axis alarm signal is a low level alarm.

Bit4 0:5th axis alarm signal is high level alarm;

The 1:5th axis alarm signal is a low level alarm.

Bit7 0: The spindle alarm signal is a high level alarm;

1: The spindle alarm signal is a low level alarm.

Default value: 0 0 0 0 0 0 0 0

0	1	1

RVCS	****	****	****	****	****	****	****

Bit7 0: The reverse gap compensation method is fixed frequency;

1: The reverse clearance compensation method is acceleration and deceleration.

Default value: 0 0 0 0 0 0 0 0

0	1	2

****	****	****	****	****	****	****	ISOT

Bit0 0: After powering on, before returning to the mechanical zero point, manual fast movement is invalid;

1: After powering on, before returning to the mechanical zero point, manual fast movement is effective.

Default value: 0 0 0 0 0 0 0 0

0	1	3

HPF	RHPG	****	****	****	****	****	HNGD

Bit0 0: The coordinates increase when the handwheel of each axis is rotated counterclockwise;

1: The coordinates increase when the handwheel of each axis rotates clockwise.

Bit6 0: does not use the electronic handwheel drive function;

1: Use the electronic handwheel drive function.

Bit7 0: The rotation displacement of the hand wheel wheel is all running;

1: The rotation displacement of the hand wheel wheel is not fully run.

Default value: 1 0 0 0 0 0 0 1

0	1	4

****	****	****	****	****	****	RFO	LRP

Bit0 0: Positioning (G00) interpolated trajectory is non-straight;

1: Positioning (G00) interpolation trajectory is straight.

Bit1 0: When fast feeding, does not stop when the fast feed magnification is Fo;

1: When fast feeding, stop when the fast feed magnification is Fo.

Default value: 0 0 0 0 0 0 0 0

0	1	5

JAX	****	****	****	DLF	ZRN	AZR	SJZ

Bit0 0: Mechanical zero point does not remember;

1: Mechanical zero point memory.

Bit1 0: G28 instruction using a stop when the reference point is not established;

1: The reference point does not have the G28 command alarm when it is established.

Bit2 0: The reference point is not established, and the command other than G28 is specified not to alarm;

1: The reference point is not established, specify the command alarm other than G28.

Bit3 0: Manually return to the reference point to get fast speed after the reference point is remembered;

1: Manually return to the reference point to get the manual speed after the reference point is remembered.

Bit7 0: manual return to zero point can select multiple axes at the same time;

1: Manual return to zero point can not select multiple axes at the same time.

Default value: 0 0 0 0 0 1 0 0

0	1	6	WLOE	HLOE	CLLE	CBLS	CBOL	FLLS	FBLS	FBOL

Bit0 0: acceleration and deceleration before fast running mode;

1: Acceleration and deceleration after fast running mode.

Bit1 0: acceleration and deceleration before fast running is straight;

1: Acceleration and deceleration before fast operation is S type.

Bit2 0: Acceleration and deceleration after fast operation is linear type;

1: The acceleration and deceleration after fast running is exponential.

Bit3 0: the cutting feed mode is pre-reading mode for pre-acceleration and deceleration;

1: The cutting feed mode is post-acceleration and deceleration in non-pre-reading mode.

Bit4 0: The acceleration and deceleration before cutting feed is linear in non-pre-reading mode;

1: The acceleration and deceleration before cutting feed is S type under non-pre-reading mode.

Bit5 0: The acceleration and deceleration after cutting feed in non-pre-reading mode is linear type;

1: The acceleration and deceleration after cutting feed in non-pre-reading mode is exponential.

Bit6 0: Manual (JOG) operation selects linear acceleration and deceleration;

1: Manual (JOG) operation selects exponential acceleration and deceleration.

Bit7 0: handwheel running selects linear acceleration and deceleration;

1: Select exponential acceleration and deceleration for handwheel operation.

Default value: 1 0 0 0 1 1 0 1

0	1	7	****	****	****	PIIS	PPCK	ASL	PLAC	STL

Bit0 0: Select the processing method as non-pre-read;

1: Select the processing method as pre-read.

Bit1 0: The acceleration and deceleration mode after the pre-reading mode is interpolated is straight;

1: The acceleration and deceleration mode after interpolation in the pre-reading mode is exponential.

Bit2 0: Pre-read automatic corner deceleration function: angle control;

1: Pre-reading mode automatic corner deceleration function: speed difference control.

Bit3 0: Pre-read mode does not perform spot detection;

1: Pre-reading method for spot detection.

Bit4 0: Overlapping interpolation of the acceleration and deceleration program segments before the read-ahead mode is invalid;

1: The overlapping interpolation of the acceleration and deceleration program sections before the pre-read mode is effective.

Default value: 1 1 0 0 0 0 0 1

0	1	8	****	****	****	****	CANT	****	CLV	CCV

Bit0 0: macro program common variable #100 ~ #199, not clear after reset;

1: Macro program common variable #100 ~ #199, empty after reset.

Bit1 0: macro program local variable #1 ~ #50, not empty after reset;

1: Macro program local variable #1 ~ #50, clear after reset.

Bit3 0: The processing time of a single piece is not automatically cleared;

1: The processing time of a single piece is automatically cleared.

Default value: 0 0 0 0 0 0 0 0

0	1	9	G39	ODI	CCA	CCN	SUP	CNI	****	****

Bit2 0: no radius compensation interference checking;

1: Radius compensation interference check is performed.

Bit3 0: The starting and retracting forms of the tool in the tool radius compensation are Type A;

1: The starting and retracting forms of the tool radius compensation are B type.

Bit4 0: G28, G30 command moves to the middle point, does not cancel the radius compensation;

1: G28, G30 command moves to the middle point, cancel the radius compensation.

Bit5 0: G28, G30 move to the middle point, cancel the standard action of knife time;

1: G28, G30 move to the middle point, cancel the knife timer vertical.

Bit6 0: The tool radius compensation amount is set by the radius value;

1: The amount of tool radius compensation is set by the diameter value.

Bit7 0: Radius compensation, corner arc function is invalid;

1: In the radius compensation, the corner arc function is effective.

Default value: 1 1 0 1 0 1 0 0

0	2	0	SPFD	SAR	****	VAL5	VAL4	VALY	VALZ	VALX

Bit0 0: X axis move key in reverse direction;

1: The X axis moves the key in the opposite direction.

Bit1 0: Z axis movement key direction reversed;

1: The direction of the Z axis moving key is not reversed.

Bit2 0: The Y axis moves the key in reverse direction;

1: The direction of the Y axis moving key is not reversed.

Bit3 0:4th axis moving key direction reversed;

1:4th Axis movement key direction is not reversed.

Bit4 0:5th axis movement key direction reversed;

1:5th Axis move key direction is not reversed.

Bit6 0: Do not check the spindle SAR signal before cutting;

1: Check the spindle SAR signal before cutting.

Bit7 0: When cutting feed, allow the spindle to stop rotating;

1: When cutting feed, the spindle is not allowed to stop rotating.

Default value: 0 0 0 0 0 0 0 0

0	2	1	****	****	****	****	****	MESP	MSP	MST

Bit0 0: The external loop start signal is valid;

1: The external loop start signal is invalid.

Bit1 0: The external pause signal is valid;

1: The external pause signal is invalid.

Bit2 0: Check the emergency stop signal;

1: Do not check the emergency stop signal.

Default value: 0 0 0 0 0 0 1 1

0	2	2	AD2	****	****	****	****	BFA	LZR	UOT2

Bit0 0: inside the no-go area of the second travel limit;

1: Outside the no-go area of the second itinerary limit.

Bit1 0: The soft limit before returning to the mechanical zero point is invalid;

1: The soft limit is valid before returning to the mechanical zero point.

Bit2 0: when the overdrive command is issued, the alarm is raised before the overrun;

1: When the overdrive command is issued, the alarm is issued after the overpass.

Bit7 0: In the same paragraph, the command does not alarm when more than two identical addresses;

1: In the same paragraph, the alarm is activated when two or more are at the same address.

Default value: 1 0 0 0 0 0 0 1

0	2	5	NAT	RRW	****	****	****	WARP	PETP	SPOS

Bit0 0: Position & Range monitor displays relative coordinates;

1: Location & Range monitor shows the remaining movement.

Bit1 0: pressing the edit key does not switch to the program interface;

1: Press the Edit key to switch to the program interface.

Bit2 0: Do not switch to the alarm interface when an alarm occurs;

1: Switch to the alarm interface when an alarm occurs.

Bit6 0: Resetting the cursor to return the beginning of the program is valid in editing mode;

1: Resetting the cursor returns the beginning of the program in any way.

Bit7 0: function ATAN, ASIN range -90.0 ~ 90.0;

1: function ATAN, ASIN range 90.0 ~ 270.0.

Default value: 0 0 0 0 0 0 1 0

0	2	6	****	****	****	ZMI5	ZMI4	ZMIY	ZMIZ	ZMIX

Bit0 0: The X axis returns to the positive direction of the reference point;

1: The X axis returns to the negative direction of the reference point.

Bit1 0: The Z axis returns to the positive direction of the reference point;

1: The Z axis returns to the negative direction of the reference point.

Bit2 0: The Y axis returns to the positive direction of the reference point;

1: The Y axis returns to the negative direction of the reference point.

Bit3 0:4th axis returns to the positive direction of the reference point;

The 1:4th axis returns to the reference point in the negative direction.

Bit4 0:5th axis returns to the positive direction of the reference point;

The 1:5th axis returns to the reference point in the negative direction.

Default value: 0 0 0 0 0 0 0 0

0	2	9

****	****	NE9	NE8	****	****	****	****

Bit4 0: does not prohibit the editing of subroutines with program numbers 8000 ~ 8999;

1: Disable editing of subroutines with program numbers 8000 ~ 8999.

Bit5 0: does not prohibit the editing of subroutines with program numbers 9000 ~ 9999;

1: Disable editing of subroutines with program numbers 9000 ~ 9999.

Default value: 0 0 1 1 0 0 0 0

0	3	0

****	****	****	****	****	****	PRPD	PLA

Bit0 0: PLC axis control function is invalid;

1: PLC axis control function is effective.

Bit1 0: PLC axis fast moving speed to take the parameter setting value;

1: PLC shaft fast moving speed to take the input value.

Default value: 0 0 0 0 0 0 0 0

0	3	3

****	****	RG90	****	****	AXSZ	AXSY	AXSX

Bit0 0: The X axis is set to the linear axis;

1: The X axis is set to the axis of rotation.

Bit1 0: The Y axis is set to the linear axis;

1: The Y axis is set to the axis of rotation.

Bit2 0: The Z axis is set to the linear axis;

1: The Z axis is set to the axis of rotation.

Bit5 0: Indexing instruction: G90/G91 specified;

1: Indexing instruction: Absolute instruction.

Default value: 0 0 0 0 0 0 0 0

0	3	4

SATP	****	RCS4	****	****	****	ROS4	ROT4

Bit0 0: Set the 4th axis type as a linear axis;

1: Set the 4th axis type to the axis of rotation.

Bit1 0: The type when setting the 4th axis as the axis of rotation is the axis of rotation A type;

1: The type when setting the 4th axis as the axis of rotation is the axis of rotation B.

The Cs axis function of the Bit5 0:4th axis is effective;

The Cs axis function for the 1:4th axis is invalid.

Bit7 0: three-axis linkage system;

1: Four-axis linkage system.

Default value: 0 0 0 0 0 0 0 0

0	3	5

****	****	****	****	****	RRL4	RAB4	ROA4

When the Bit0 0:4th axis is the axis of rotation, the absolute coordinate cycle function is invalid;

When the 1:4th axis is the axis of rotation, the absolute coordinate cycle function is effective.

Bit1 0:4th When the axis is the axis of rotation, rotate in the direction of the symbol;

1:4th When the axis is the axis of rotation, rotate nearby.

When the Bit2 0:4th axis is the axis of rotation, the relative coordinate cycle function is

invalid;

When the 1:4th axis is the axis of rotation, the relative coordinate cycle function is effective.

Default value: 0 0 0 0 0 0 0 0

0	3	6	****	****	RCS5	****	****	****	ROS5	ROT5

Bit0 0: Set the 5th axis as a straight axis;

1: Set the 5th axis as the axis of rotation.

Bit1 0: The type when setting the 5th axis as the axis of rotation is the axis of rotation type A;

1: The type when setting the 5th axis as the axis of rotation is the axis of rotation B.

The Cs axis function of the Bit5 0:5th axis is effective;

The Cs axis function for the 1:5th axis is invalid.

Default value: 0 0 0 0 0 0 0 0

0	3	7	****	****	****	****	****	RRL5	RAB5	ROA5

When the Bit0 0:5th axis is the axis of rotation, the absolute coordinate cycle function is invalid.

When the 1:5th axis is the axis of rotation, the absolute coordinate cycle function is effective.

Bit1 0:5th When the axis is the axis of rotation, rotate nearby;

1:5th When the axis is the axis of rotation, rotate in the direction of the symbol.

When the Bit2 0:5th axis is the axis of rotation, the relative coordinate cycle function is invalid;

When the 1:5th axis is the axis of rotation, the relative coordinate cycle function is effective.

Default value: 0 0 0 0 0 0 0 0

0	4	2	****	****	****	****	RIN	****	****	SSC

Bit0 0: Do not use constant surface cutting speed control;

1: Use constant surface cutting speed control.

Bit3 0: G68 coordinate rotation angle of rotation: absolute command;

1: G68 coordinate rotation angle: G90/G91 command.

Default value: 0 0 0 0 1 0 0 0

0	4	3	XSC	****	****	SCLZ	SCLY	SCLX	****	SCL

Bit0 0: does not use the zoom function;

1: Use the zoom function.

Bit2 0: X axis zoom is invalid;

1: X-axis scaling works.

Bit3 0: Y axis scaling is invalid;

1: Y-axis scaling is valid.

Bit4 0: Z axis scaling is invalid;

1: Z-axis scaling is valid.

Bit7 0: Each axis zoom magnification is specified by: P instruction for each axis;

1: Each axis zoom magnification is specified by: Each axis uses IJK instructions.

Default value: 1 0 0 1 1 1 0 1

0	4	4

QZA	****	RD2	RD1	MUNI	****	****	****

Bit3 0: G76, G87 displacement amount: Q instruction;

1: G76, G87 displacement: I, J, K instructions.

Bit4 0: Set G76, G87 retract direction is positive;

1: Set G76, G87 retract direction is negative.

Bit5 0: Set the G76, G87 retract axis to the X axis;

1: Set G76, G87 retract axis to Y axis.

Bit7 0: deep hole drilling (G73, G83), no command to cut the amount does not alarm;

1: Deep hole drilling (G73, G83), no command to cut the amount alarm.

Default value: 1 0 0 0 0 0 0 0

0	4	5

****	****	****	****	****	****	****	DWL

Bit0 0: When resetting or emergency stopping, do not clear F,H,D codes;

1: In the event of reset or emergency stop, clear the F, H, D codes.

Default value: 0 0 0 0 0 0 0 0

0	4	6

C07	C06	C05	C04	C03	C02	C01	****

Bit1 0: Do not clear the 01 group G code during reset or emergency stop;

1: Clear Group 01 G code during reset or emergency stop.

Bit2 0: does not clear the 02 group G code during reset or emergency stop;

1: Clear Group 02 G code during reset or emergency stop.

Bit3 0: does not clear 03 sets of G codes during reset or emergency stop;

1: Clear Group 03 G code during reset or emergency stop.

Bit4 0: 04 Group G code is not cleared during reset or emergency stop;

1: Clear Group 04 G codes during reset or emergency stop.

Bit5 0: does not clear the 05 group G code during reset or emergency stop;

1: Clear Group 05 G code during reset or emergency stop.

Bit6 0: does not clear the 06 group G code during reset or emergency stop;

1: Clear Group 06 G codes during reset or emergency stop.

Bit7 0: Do not clear the 07 group G code during reset or emergency stop;

1: Clear Group 07 G code during reset or emergency stop.

Default value: 1 0 0 0 0 0 0 0

0	4	7

C15	C14	C13	C12	C11	C10	C09	C08

Bit0 0: 08 Group G codes are not cleared during reset or emergency stop;

1: Clear Group 08 G code during reset or emergency stop.

Bit1 0: 09 Group G codes are not cleared during reset or emergency stop;

1: Clear the 09 Group G code during reset or emergency stop.

Bit2 0: 10 sets of G codes are not cleared during reset or emergency stop;

1: Clear 10 sets of G codes during reset or emergency stop.

Bit3 0: 11 sets of G codes are not cleared during reset or emergency stop;

1: Clears 11 sets of G codes during reset or emergency stop.

Bit4 0: 12 sets of G codes are not cleared during reset or emergency stop;

1: Clear 12 sets of G codes during reset or emergency stop.

Bit5 0: 13 sets of G codes are not cleared during reset or emergency stop;

1: Clears 13 sets of G codes during reset or emergency stop.

Bit6 0: 14 sets of G codes are not cleared during reset or emergency stop;

1: Clear 14 sets of G codes during reset or emergency stop.

Bit7 0: 15 sets of G codes are not cleared during reset or emergency stop;

1: Clear 15 sets of G codes during reset or emergency stop.

Default value: 0 0 0 0 0 0 1

0	4	8

****	****	G13	G91	G19	G18	G17	G01

Bit0 0: G00 mode when power is turned on or cleared;

1: G01 mode when the power is plugged in or cleared.

Bit1 0: Non-G17 is selected for the plane when the power is turned on or cleared;

1: The plane selection is G17 when the power is turned on or cleared.

Bit2 0: Non-G18 plane selection when power on or clear state;

1: The plane selection is G18 when the power is turned on or cleared.

Bit3 0: Non-G19 plane selection when power is turned on or cleared;

1: The plane selection is G19 when the power is turned on or cleared.

Bit4 0: set the G90 mode when the power is turned on or cleared;

1: Set the G91 mode when the power is turned on or cleared.

Bit5 0: Set G12 when the power is turned on or when the clear state is cleared;

1: Set G13 when the power is turned on or when the clear state is on.

Default value: 0 0 1 0 0 0 1 0

0	4	9

****	****	****	****	WZ0	MCV	GOF	WOF

Bit0 0: Enter the amount of tool wear offset via MDI;

1: It is forbidden to enter the tool wear offset amount through MDI.

Bit1 0: Input tool geometry offset amount via MDI;

1: Disable the input of tool geometry offset through MDI.

Bit2 0: Enter macro program variables via MDI;

1: Macro program variables are prohibited from being entered through MDI.

Bit3 0: Enter the workpiece origin offset amount via MDI;

1: Prohibition of entering the workpiece origin offset amount through MDI.

Default value: 0 0 0 0 0 0 0 0

0	5	0

DAL	****	****	****	MCL	MKP	MSL	SEQ

Bit0 0: sequence numbers are not inserted automatically;

1: Sequence numbers are inserted automatically.

Bit1 0: When the program state interface is executed, the first line of the starting behavior;

1: When the program state interface is executed, the starting behavior is the line where the cursor is located.

Bit2 0: The program status interface does not delete the programmed program after executing the program;

1: The program status interface deletes the programmed program after executing the program.

Bit3 0: The reset key in the program status interface does not delete the programmed program;

1: The reset key under the program status interface deletes the programmed program.

Bit7 0: absolute position display does not take into account tool length compensation;

1: Absolute position display considering tool length compensation.

Default value: 0 0 0 0 0 0 0 0

0	5	1	ITL	****	****	****	****	****	****	SCBM

Bit0 0: Stroke is not detected before moving;

1: Stroke detection before moving.

Bit7 0: All axis interlock signals are invalid;

1: All axis interlock signals are valid.

Default value: 0 0 0 0 0 0 0 0

0	5	2	MDLY	SBM	****	SIM	****	MDL	****	****

Bit2 0: Unidirectional positioning G code is not set to modal code;

1: The one-way positioning G code is set to a modal code.

Bit4 0: The indexing instruction and other control axis instructions do not alarm in the same section;

1: Partition command and other control axis commands with the same section alarm.

Bit6 0: Macro directive statements can not use a single segment;

1: Single segments can be used in macro directive statements.

Bit7 0: Delay in macro instruction statements;

1: There is no delay in macro instruction statements.

Default value: 0 0 0 0 0 0 0 0

0	5	3	ZCL	RLC	****	****	****	****	****	****

Bit6 0: The relative coordinate system is not canceled after reset;

1: The relative coordinate system is canceled after reset.

Bit7 0: the relative coordinates returned by the reference point are not canceled;

1: Cancel the relative coordinates returned by the reference point.

Default value: 0 0 0 0 0 0 0 0

0	5	4	****	****	****	****	****	****	HPC	NPC

Bit0 0: When there is no position encoder installed, the feed feed is invalid;

1: When there is no position encoder installed, the feed is valid.

Bit1 0: The system does not have a position encoder installed;

1: The system has an installation position encoder.

Default value: 0 0 0 0 0 0 1 0

0	5	5

****	****	****	****	****	CALT	ALS	CPCT

Bit0 0: The cutting feed is not controlled in place for accuracy;

1: Cutting feed control in place accuracy.

Bit1 0: The automatic corner magnification function is invalid;

1: The automatic corner multiplier function is effective.

Bit2 0: exponential acceleration and deceleration cutting feed acceleration is not clamped;

1: Exponential acceleration and deceleration cutting feed acceleration clamping.

Default value: 0 0 0 0 0 0 1

0	5	6

****	****	****	****	****	TDR	FDR	RDR

Bit0 0: Blank operation of cutting feed is invalid;

1: The cutting feed empty operation is effective.

Bit1 0: Fast Locate Null Run is invalid;

1: Fast positioning null operation is effective.

Bit2 0: During tapping, empty run is invalid;

1: During tapping, the empty run is effective.

Default value: 0 0 0 0 0 0 0 0

0	5	7

DWL	****	SOC	RSC	****	****	****	****

Bit4 0:G0 calculates the G96 spindle speed according to the end coordinates when positioning;

1:G0 Calculation of G96 spindle speed according to current coordinates when positioning.

Bit5 0: G96 spindle speed clamping spindle magnification before;

1: G96 spindle speed after clamping spindle magnification.

Bit7 0: G04 is not paused per turn in feed mode;

1: In per-turn feed mode, G04 is paused per revolution.

Default value: 0 0 0 0 0 0 0 0

0	5	8

OVU	DOV	TDR	****	ORI	****	PCP	SSOG

Bit0 0: The spindle control mode is follow when tapping;

1: The spindle control mode is servo when tapping.

Bit1 0: Tapping is unchanged for high-speed deep hole tapping cycle;

1: Tapping becomes a high-speed deep hole tapping cycle.

Bit3 0: When the flexible tapping starts, the spindle does not make a quasi-stop;

1: When the flexible tapping starts, the spindle is quasi-stopped.

Bit5 0: rigid tapping into the knife, retract does not use the same time constant;

1: Rigid tapping into the knife, retract using the same time constant.

Bit6 0: When rigid tapping retracts, the magnification is invalid;

1: When rigid tapping retracts, the magnification is effective.

Bit7 0: Rigid tapping retract rate is 1%;

1: Rigid tapping retract rate is 10%.

Default value: 0 0 0 0 0 0 0 0

0	5	9

LEDT	LOPT	PHPG	HISP	****	SOVD	FOVD	ROVD

Bit0 0: Fast running magnification adjustment using operator panel buttons;

1: Fast running magnification adjustment using band switch.

Bit1 0: Cutting feed magnification adjustment using operator panel buttons;

1: The cutting feed magnification is adjusted using a band switch.

Bit2 0: spindle speed magnification adjustment using operator panel buttons;

1: Spindle speed magnification adjustment using band switch.

Bit4 0: does not use the handwheel / single step interrupt function;

1: Use the handwheel/ single step interrupt function.

Bit5 0: Do not use external handwheel;

1: Use external handwheels.

Bit6 0: No external operator panel lock is used;

1: Use external operator panel lock.

Bit7 0: No external edit lock is used;

1: Use external edit lock.

Default value: 0 0 0 0 0 0 0 0

2	1	5

****	****	****	AALM	LALM	EALM	SALM	FALM

Bit0 0: Do not ignore feed shaft drive alarm;

1: Ignore the feed shaft drive alarm.

Bit1 0: Do not ignore spindle drive alarm;

1: Ignore spindle drive alarms.

Bit2 0: Do not ignore the emergency stop alarm;

1: Ignore the emergency stop alarm.

Bit3 0: Do not ignore the hard limit alarm;

1: Ignore the hard limit alarm.

Bit4 0: Do not ignore external user alarms;

1: Ignore external user alerts.

Default value: 0 0 0 0 0 0 0 0

3.1.2 Data parameters

0	0	0	X-axis pulse output backup coefficient (CMR).
0	0	1	Y-axis pulse output backup coefficient (CMR).
0	0	2	Z-axis pulse output backup coefficient (CMR).
0	0	3	4TH axis pulse output backup coefficient (CMR).
0	0	4	5TH axis pulse output backup coefficient (CMR).

[Data range] 1 ～ 65536

[Default] 1

0	0	5	X-axis instruction division factor (CMD).
0	0	6	Y-axis instruction division factor (CMD).
0	0	7	Z-axis instruction division factor (CMD).

0	**0**	**8**
0	**0**	**9**

4TH axis instruction division factor (CMD).
5TH axis instruction division coefficient (CMD).

[Data range] 1 ～ 65536

Electronic gear ratio calculation formula:

$$\frac{CMR}{CMD} = \frac{P}{\mathrm{L} \times 1000}$$

P: The number of pulses corresponding to the feedback of the motor rotation

L: The motor is rotated to correspond to the movement of the machine tool (mm).

[Default] 1

0	1	0
0	1	2
0	1	4
0	1	6
0	1	8

X-axis negative maximum stroke (first stroke limit).
Y-axis negative maximum stroke (first stroke limit).
Z axis negative maximum stroke (first stroke limit).
4TH axis negative maximum stroke (first stroke limit).
5TH axis negative maximum stroke (first stroke limit).

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ~ 9999.9999

[Default value] -9999.9999

0	1	1
0	1	3
0	1	5
0	1	7
0	1	9

X-axis negative maximum stroke (first stroke limit).
Y-axis negative maximum stroke (first stroke limit).
Z axis negative maximum stroke (first stroke limit).
4TH axis negative maximum stroke (first stroke limit).
5TH axis negative maximum stroke (first stroke limit).

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ~ 9999.9999

[Default] 9999.9999

0	2	0
0	2	2
0	2	4
0	2	6
0	2	8

X-axis negative maximum stroke (second stroke limit).
Y-axis negative maximum stroke (second stroke limit).
Z axis negative maximum stroke (second stroke limit).
4TH axis negative maximum stroke (second stroke limit).
5TH axis negative maximum stroke (second stroke limit).

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ~ 9999.9999

[Default value] -9999.9999

0	2	1	**X-axis forward maximum stroke (second stroke limit**).
0	2	3	**Y-axis forward maximum stroke (second stroke limit**).
0	2	5	**Z axis forward maximum stroke (second stroke limit**).
0	2	7	**4TH axis forward maximum stroke (second stroke limit**).
0	2	9	**5TH axis forward maximum stroke (second stroke limit**).

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ~ 9999.9999

[Default] 9999.9999

0	3	0	**Reverse clearance compensation determines the accuracy of the reverse (X0.0001).**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0.0001 ~ 1

[Default value] 0.01

0	3	1	**The amount of X-axis reverse clearance compensation**
0	3	2	**Y-axis reverse clearance compensation amount**
0	3	3	**The amount of Z axis reverse clearance compensation**
0	3	4	**4TH axis reverse clearance compensation**
0	3	5	**5TH shaft reverse clearance compensation**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data Range] 0 ~ 0.5000

[Default value] 0

0	3	6	**The compensation step of the X-axis clearance compensated at a fixed frequency**
0	3	7	**The compensation step of the Y-axis clearance is compensated at a fixed frequency**
0	3	8	**The compensating step of the Z-axis clearance is compensated at a fixed frequency**
0	3	9	**The compensation step of 4TH shaft gap is compensated at a fixed frequency**
0	4	0	**The compensation step of 5TH shaft gap compensated in a fixed frequency manner**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ~ 99.9999

[Default value] 0.003

0	4	1	**The time constant of the reverse clearance compensated by way of a lift or decrease speed**

[Data Units] ms

[Data range] 0 ~ 400

[Default value] 20

0	5	0	**The coordinate value X** of the **1st reference point on a mechanical coordinate** system
0	5	1	**The coordinate value of the 1st reference point on a mechanical coordinate** system**, Y**
0	5	2	**The coordinate value Z** of the **1st reference point on a mechanical coordinate** system
0	5	3	**The coordinate value of the 1st reference point on the mechanical coordinate system is 4TH**
0	5	4	**The coordinate value of the 1st reference point on the mechanical coordinate system is 5TH**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ～ 9999.9999

[Default value] 0

0	5	5	**The coordinate value X** of the **second reference point on the mechanical coordinate** system
0	5	6	**The coordinate value of the second reference point on the mechanical coordinate** system, **Y**
0	5	7	**The coordinate value Z** of the **2nd reference point on the mechanical coordinate** system
0	5	8	**The coordinate value of the second reference point on the mechanical coordinate system is 4TH**
0	5	9	**The coordinate value of the second reference point on the mechanical coordinate system is 5TH**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ～ 9999.9999

[Default value] 0

0	6	1	**The coordinate value X** of the **3rd reference point on a mechanical coordinate** system
0	6	2	**The coordinate value Y** of the **3rd reference point on a mechanical coordinate** system
0	6	3	**The coordinate value Z** of the **3rd reference point on the mechanical coordinate** system
0	6	4	**The coordinate value of the 3rd reference point on the mechanical coordinate system is 4TH**
0	6	5	**The coordinate value of the 3rd reference point on the mechanical coordinate system is 5TH**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ～ 9999.9999

[Default value] 0

0	6	5	**The coordinate value X** of the **4th reference point on a mechanical coordinate** system
0	6	6	**The coordinate value of the 4th reference point on the mechanical coordinate system is Y**
0	6	7	**The coordinate value Z** of the **4th reference point on the mechanical coordinate** system
0	6	8	**The coordinate value of the 4th reference point on the**

0	6	9

mechanical coordinate system is 4TH
The coordinate value of the 4th reference point on the mechanical coordinate system is 5TH

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch
Rotating shaft	deg

[Data range] -9999.9999 ～ 9999.9999

[Default value] 0

0	7	0
0	7	1
0	7	2
0	7	3
0	7	4

The X-axis returns the high-speed speed of the mechanical zero point
The Y axis returns the high-speed speed of the mechanical zero point
The Z-axis returns the high-speed speed of the mechanical zero point
The 4TH axis returns the high-speed speed of the mechanical zero point
The 5TH axis returns the high-speed speed of the mechanical zero point

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 10 ～ 9999

[Default value] 4000

0	7	5
0	7	6
0	7	7
0	7	8
0	7	9

The grid offset or reference point offset of the X axis
The grid offset or reference point offset of the Y axis
The grid offset or reference point offset of the Z-axis
The grid offset or reference point offset of the 4TH axis
The grid offset or reference point offset of the 5TH axis

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch
Rotary shaft	deg

[Data range] 0 ～ 50

[Default value] 0

0	8	0

Returns the low speed (FL) speed of the mechanical zero point **(universal across all axes**).

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 1 ～ 60

[Default value] 40

0	8	2

Empty running speed

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 9999

[Default value] 5000

0	8	3

The cutting feed speed when the power is turned on

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 9999

[Default value] 300

0	8	5

Fo speed of the fast running rate of each **axis (universal for all axes**).

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 1000

[Default value] 30

0	8	6

Fast-positioning, non-read-ahead mode feeds the highest control speed (universal for all axes)

[Data Units].

Set the units	Data units
Metric machines	mm/min

Imperial machines	inch/min

[Data range] 300 ～ 30000

[Default value] 8000

0	8	7

Minimum control speed for fast positioning and non-pre-reading (universal for all axes)

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 300

[Default value] 0

0	8	8

Maximum control speed in pre-read mode (universal on all axes)

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 300 ～ 9999

[Default value] 6000

0	8	9

Lowest control speed in pre-read mode (universal for all axes)

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 300

[Default value] 0

0	9	0	**X-axis G0 fast positioning speed**
0	9	1	**Y-axis G0 fast positioning speed**
0	9	2	**Z-axis G0 fast positioning speed**
0	9	3	**4TH axis G0 fast positioning speed**
0	9	4	**5TH axis G0 fast positioning speed**

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 30000

[Default value] 5000

1	0	0

Exponential acceleration and deceleration acceleration clamping constant

[Data Units] ms

[Data range] 0 ~ 1000

[Default value] 50

1	0	2

The highest clamping speed of the handwheel incomplete operation

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 3000

[Default value] 2000

1	0	3

The handwheel does not run completely in a way that accelerates the clamping constant

[Data range] 0 ～ 1000

[Default value] 50

[Data Units] ms

1	0	4

The time constant of the straight-line acceleration and deceleration of the handwheel

[Data range] 1 ~ 4000

[Default value] 120

[Data Units] ms

1	0	5

The time constant of the acceleration and deceleration of the handwheel index

[Data range] 1 ~ 4000

[Default value] 80

1	0	8

Single step to the maximum clamping speed

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 3000

[Default value] 1000

1	1	0

The feed speed of each axis manual (J0G) continuous feed

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 9999

[Default value] 2000

1	1	1	**The exponential acceleration and deceleration time constant for manual feed for each axis**

[Data Units] ms

[Data range] 0 ~ 400

[Default value] 100

1	1	2	**The exponential acceleration and deceleration time constant for manual feed for each axis**

[Data Units] ms

[Data range] 0 ~ 400

[Default value] 120

1	1	3	**X-axis manual fast positioning speed**
1	1	4	**Y-axis manual fast positioning speed**
1	1	5	**Fast positioning speed for manual Z-axis**
1	1	6	**4TH axis manual fast positioning speed**
1	1	7	**5TH axis manual fast positioning speed**

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 30000

[Default value] 5000

1	2	0	**Linear time constant for acceleration and deceleration before fast X-axis**
1	2	1	**Linear time constant for acceleration and deceleration before the fast Y-axis**
1	2	2	**Linear time constant for acceleration and deceleration before the fast Z-axis**
1	2	3	**Fast 4TH axis pre-acceleration and deceleration linear type time constant**
1	2	4	**Linear time constant for acceleration and deceleration before** the fast **5TH** axis

[Data Units] ms

[Data range] 3 ~ 400

[Default value] 100

1	2	5	**Fast X-axis pre-acceleration and deceleration S-type time constant**
1	2	6	**Fast Y-axis pre-acceleration and deceleration S-type time constant**
1	2	7	**Fast Z-axis pre-acceleration and deceleration S-type time constant**
1	2	8	**Fast 4TH axis pre-acceleration and deceleration S-type time constant**
1	2	9	**Fast 5TH axis pre-acceleration and deceleration S-type time constant**

[Data Units] ms
[Data range] 3 ～ 400
[Default value] 100

1	3	0	**Fast X-axis acceleration and deceleration linear type time constant**
1	3	1	**Fast Y-axis acceleration and deceleration linear type time constant**
1	3	2	**Fast Z-axis acceleration and deceleration linear type time constant**
1	3	3	**Fast 4TH axis acceleration and deceleration linear type time constant**
1	3	4	**Fast 5TH axis acceleration and deceleration linear type time constant**

[Data Units] ms
[Data range] 3 ～ 400
[Default value] 80

1	3	5	**Acceleration and deceleration of the fast X-axis S-type time constant**
1	3	6	**Fast Y-axis post-acceleration and deceleration S-type time constant**
1	3	7	**Acceleration and deceleration of the** Z axis after **fast S-type time constant**
1	3	8	**Fast 4TH axis after acceleration and deceleration of the S-type time constant**
1	3	9	**Fast 5TH axis after acceleration and deceleration of the S-type time constant**

[Data Units] ms
[Data range] 3 ～ 400
[Default value] 60

1	4	0	**Non-read-ahead mode, maximum number of merging program segments**

[Data range] 0 ～ 10
[Default value] 0

1	4	1

Non-read-ahead mode, merging program segments to control accuracy

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0.001 ～ 0.5
[Default value] 0.01

1	4	2

Non-pre-reading mode, cutting feed in place accuracy

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0.01 ～ 0.5
[Default value] 0.03

1	4	4

Non-pre-read, linear time constant for acceleration and deceleration before cutting feed

[Data Units] ms
[Data range] 3 ～ 400
[Default value] 100

1	4	5

Non-pre-read, S-type time constant for acceleration and **deceleration** before cutting feed

[Data Units] ms
[Data range] 3 ～ 400
[Default value] 100

1	4	6

Non-pre-read, straight-line time constant for acceleration and deceleration after cutting feed

[Data Units] ms
[Data range] 3 ～ 400
[Default value] 80

1	4	7

Non-pre-read, exponential time constant of acceleration and

deceleration after cutting feed

[Data Units] ms

[Data range] 3 ～ 400

[Default value] 60

1	4	8

Non-read-before, exponential acceleration and deceleration minimum speed (FL).

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 9999

[Default value] 10

1	5	0

Read ahead mode, the maximum number of merging program segments

[Data range] 0 ～ 15

[Default value] 0

1	5	1

Pre-read mode, merge program segments to control accuracy

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0.001 ～ 0.5

[Default value] 0.01

1	5	2

Pre-reading mode, cutting feed in place accuracy

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0.01 ～ 0.5

[Default value] 0.01

1	5	4

Pre-reading method, acceleration (mm/s/s) of the linear type before cutting feed

[Data Units].

Set the units	Data units
Metric machines	mm/s/s
Imperial machines	inch/s/s

[Data range] 0 ～ 2000

[Default value] 250

1	5	5

Pre-read, acceleration and deceleration type S-type time constant before cutting feed

[Data Units] ms

[Data range] 3 ～ 400

[Default value] 100

1	5	6

Pre-reading method, the linear acceleration and deceleration time constant after cutting feed

[Data Units] ms

[Data range] 3 ～ 400

[Default value] 80

1	5	7

Pre-reading method, the acceleration and deceleration time constant of the exponential type after cutting feed

[Data Units] ms

[Data range] 3 ～ 400

[Default value] 60

1	5	8

Pre-read, exponential acceleration and deceleration minimum speed (PL).

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 400

[Default value] 10

1	6	0

Pre-reading mode, the critical angle (degrees) of the two program segments for automatic corner deceleration

[Data Units]. Angle

[Data range] 1 ～ 45

[Default value] 5

1	6	1

Pre-reading mode, automatic corner deceleration minimum feed speed

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 10 ～ 1000

[Default value] 120

1	6	2

Pre-reading mode, speed difference mode deceleration function each axis allowable deviation

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 60 ～ 1000

[Default value] 80

1	6	3

Pre-reading mode, cutting machining accuracy level

[Data range] 0 ～ 8

[Default] 2

1	6	5

Pre-read, which constitutes the spline length condition

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0.5 ～ 5

[Default value] 3

1	6	6

Pre-read, which constitutes the spline angle condition

[Data Units]. Angle

[Data range] 0 ～ 30

[Default value] 5

1	7	0

Arc interpolation with external acceleration limit

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 100 ～ 5000

[Default value] 1000

1	7	1

The lower limit of the low velocity of the arc interpolation external acceleration insert

[Data Units].

Set the units	Data units
Metric machines	mm/min
Imperial machines	inch/min

[Data range] 0 ～ 2000

[Default value] 200

1	7	2	**Circular arc interpolation controls precision**

[Data range] 0 ～ 0.5

[Default value] 0.03

1	7	3	**The arc radius error limit value**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0.0001 ～ 1

[Default value] 0.01

1	8	0	**The pitch error compensation number for the X-axis reference point**
1	8	1	**The pitch error compensation number for the Y-axis reference point**
1	8	2	**The pitch error compensation number for the Z-axis reference point**
1	8	3	**The pitch error compensation number for the 4TH axis reference point**
1	8	4	**The pitch error compensation number for the 5TH axis reference point**

[Data range] 0 ～ 255

[Default value] 0

1	8	5	**The number of X axis pitch error compensation points**
1	8	6	**The number of Y-axis pitch error compensation points**
1	8	7	**The number of Z-axis pitch error compensation points**
1	8	8	**4TH shaft pitch error compensation points**
1	8	9	**5TH shaft pitch error compensation points**

[Data range] 0 ～ 256

[Default] 256

1	9	0	**X-axis pitch error compensates for pitch**
1	9	1	**Y-axis pitch error compensates for pitch**
1	9	2	**Z-axis pitch error compensates for pitch**
1	9	3	**4TH shaft pitch error compensates for pitch**
1	9	4	**5TH shaft pitch error compensates for pitch**

[Data Units].

Set the units	Data units

Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 9999.9999

[Default value] 5

1	9	5	**X-axis pitch error compensates for magnification**
1	9	6	**Y-axis pitch error compensates for magnification**
1	9	7	**Z-axis pitch error compensates for magnification**
1	9	8	**4TH shaft pitch error compensates for magnification**
1	9	9	**5TH shaft pitch error compensates for magnification**

[Data range] 0 ～ 99.9999

[Default value] 0.001

2	0	0	**Maximum spindle speed**

[Data Units] r/min

[Data range] 0 ～ 99999

[Default value] 6000

2	0	1	**The number of spindle encoder lines**

[Data Units]. Line/turn

[Data range] 100 ～ 5000

[Default] 1024

2	0	2	**The maximum setting value corresponding to the frequency converter**

[Data range] 4000 ～ 65536

[Default] 65535

2	0	3	**Spindle magnification lower limit**

[Data range] 0 ～ 1

[Default value] 0

2	0	5	**Spindle speed simulates the gain adjustment data of the output**

[Data range] 0.98 ～ 1.02

[Default] 1

2	0	6	**The spindle speed simulates the offset value of the output bias voltage**

[Data range] -0.2 ～ 02

[Default value] 0

2	0	8	**The spindle speed when the spindle is oriented or jogged**

[Data Units] r/min

[Data range] 0 ～ 9999

[Default value] 50

2	0	9	**Maximum spindle speed during tapping cycle**

[Data Units] r/min
[Data range] 0 ～ 5000
[Default value] 2000

2	1	0	**Corresponds to the maximum spindle speed of Gear 1**
2	1	1	**Corresponds to the maximum spindle speed of** Gear **2**
2	1	2	**Corresponds to the maximum spindle speed of** Gear **3**

[Data Units] r/min
[Data range] 0 ～ 99999
[Default value] 6000

2	1	4	**The voltage output (mV)** when the spindle is shifted

[Data Units] mV
[Data range] 0 ～ 10000
[Default value] 100

2	2	0	**The number of teeth of the spindle side gear (1st gear**).
2	2	1	**The number of teeth of the spindle side gear (2nd gear**).
2	2	2	**The number of teeth of the spindle side gear (3rd gear**).

[Data range] 1 ～ 999
[Default] 1

2	2	3	**The number of gear teeth on the side of the position encoder (1st gear**).
2	2	4	**The number of gear teeth on the side of the position encoder (2nd gear**).
2	2	5	**The number of position encoder side gear teeth (3rd gear**).

[Data range] 1 ～ 999
[Default] 1

2	3	0	**Tapping spindle command multiplier factor (CMR) (1st gear**).
2	3	1	**Tapping spindle command multiplier factor (CMR) (2nd gear**).
2	3	2	**Tapping spindle command multiplier factor (CMR) (3rd gear**).

[Data range] 1 ～ 999
[Default] 512

2	3	3	**Tapping spindle command division factor (CMD) (1st gear**).
2	3	4	**Tapping spindle command division factor (CMD) (2nd gear**).
2	3	5	**Tapping spindle command division factor (CMD) (3rd gear**).

[Data range] 1 ～ 999
[Default] 215

2	4	0	**The amount of clearance of the rigid tapping spindle (1st gear**).

2	4	1	**The amount of clearance of the rigid tapping spindle (2nd gear**).
2	4	2	**The amount of clearance of the rigid tapping spindle (3rd gear**).

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 99.9999

[Default value] 0

2	4	4	**The maximum speed of the rigid tapping spindle (1st gear**).
2	4	5	**Maximum speed of the rigid tapping spindle (2nd gear**).
2	4	6	**Maximum speed of the rigid tapping spindle (3rd gear**).

[Data Units] r/min

[Data range] 0 ～ 9999

[Default value] 6000

2	5	0	**The linear acceleration and deceleration time constant of the spindle and tapping shaft (1st gear**).
2	5	1	**Linear acceleration and deceleration time constant for spindle and tapping shaft (2nd gear**).
2	5	2	**Linear acceleration and deceleration time constant for spindle and tapping shaft (3rd gear**).

[Data Units] ms

[Data range] 0 ～ 9999

[Default value] 200

2	5	3	**The linear acceleration and deceleration time constant of the spindle and tapping shaft at the time of retract (1st gear**).
2	5	4	**The linear acceleration and deceleration time constant of the spindle and tapping shaft when retracting the knife (2nd gear**).
2	5	5	**The linear acceleration and deceleration time constant of the spindle and tapping shaft when retracting the knife (3rd gear**).

[Data Units] ms

[Data range] 0 ～ 9999

[Default value] 200

2	6	0	**The X-axis offset** of the external workpiece origin
2	6	1	**The Z-axis offset** of the external workpiece origin
2	6	2	**The Y-axis offset** of the external workpiece origin
2	6	3	**External workpiece origin 4TH axis offset**

2	6	4	**External workpiece origin 5TH axis offset**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -999.999 ～ 999.999

[Default value] 0

2	6	5	**The workpiece origin offset of** the G54 **axis workpiece coordinate system 1**
2	6	6	**The workpiece origin offset of** the G54 **axis workpiece coordinate system 1**
2	6	7	**The workpiece origin offset of** the G54 **axis workpiece coordinate system 1**
2	6	8	**The workpiece origin offset of** the G54 **axis workpiece coordinate system 1**
2	6	9	**The workpiece origin offset of** the G54 **axis workpiece coordinate system 1**
2	7	0	**The workpiece origin offset for** the G55 **axis workpiece coordinate system 2**
2	7	1	**The workpiece origin offset for** the G55 **axis workpiece coordinate system 2**
2	7	2	**The workpiece origin offset for** the G55 **axis workpiece coordinate system 2**
2	7	3	**The workpiece origin offset for** the G55 **axis workpiece coordinate system 2**
2	7	4	**The workpiece origin offset for** the G55 **axis workpiece coordinate system 2**
2	7	5	**The workpiece origin offset for** the G56 **axis workpiece coordinate system 3**
2	7	6	**The workpiece origin offset for** the G56 **axis workpiece coordinate system 3**
2	7	7	**The workpiece origin offset for** the G56 **axis workpiece coordinate system 3**
2	7	8	**The workpiece origin offset for** the G56 **axis workpiece coordinate system 3**
2	7	9	**The workpiece origin offset for** the G56 **axis workpiece coordinate system 3**
2	8	0	**The workpiece origin offset of the** G57 **axis workpiece coordinate system 4**
2	8	1	**The workpiece origin offset of the** G57 **axis workpiece coordinate system 4**
2	8	2	**The workpiece origin offset of the** G57 **axis workpiece**

			coordinate system 4
2	8	3	**The workpiece origin offset of the** G57 **axis workpiece coordinate system 4**
2	8	4	**The workpiece origin offset of the** G57 **axis workpiece coordinate system 4**
2	8	5	**The workpiece origin offset of** the **G58 axis workpiece coordinate system** 5
2	8	6	**The workpiece origin offset of** the **G58 axis workpiece coordinate system** 5
2	8	7	**The workpiece origin offset of** the **G58 axis workpiece coordinate system** 5
2	8	8	**The workpiece origin offset of** the **G58 axis workpiece coordinate system** 5
2	8	9	**The workpiece origin offset of** the **G58 axis workpiece coordinate system** 5
2	9	0	**The workpiece origin offset of** the G59 **axis workpiece coordinate system 6**
2	9	1	**The workpiece origin offset of** the G59 **axis workpiece coordinate system 6**
2	9	2	**The workpiece origin offset of** the G59 **axis workpiece coordinate system 6**
2	9	3	**The workpiece origin offset of** the G59 **axis workpiece coordinate system 6**
2	9	4	**The workpiece origin offset of** the G59 **axis workpiece coordinate system 6**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -9999.9999 ～ 9999.9999

[Default value] 0

3	0	0	**DNC mode selection (0**: **USB flash drive 1**: **Xon/Xoff 2: XModem).**

[Data range] 0 ～ 2

[Default value] 0

3	0	1	**Communication channel baud rate (DNC).**

[Data Unit] bit/s

[Data range] 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200

[Default value] 38400

3	0	2	**Communication channel baud rate (transfer file)**

[Data Unit] bit/s

[Data range] 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200
[Default value] 115200

3	0	3

CNC controls the number of axes

[Data range] 3 ～ 4
[Default value] 3

3	0	4

The ladder number currently in use

[Data range] 0 ～ 99
[Default] 1

3	0	5

System language selection (0:CH 1:EN 2:RUS 3:ESP).

[Data range] 0 ～ 3
[Default value] 0

3	1	3

The program name of the 4th axis (**3**:**A**, **4**:**B, 5:C).**

[Data range] 3 ～ 5
[Default value] 3

3	1	6

The increment value of the number of numbers when the sequence number is automatically inserted

[Data range] 0 ～ 1000
[Default value] 10

3	1	7

The starting number of the tool offset amount is prohibited from being entered by **MDI**

[Data range] 0 ～ 9999
[Default value] 0

3	1	8

The number of tool offset amounts that are prohibited from being entered by **MDI**

[Data range] 0 ～ 9999
[Default value] 0

3	2	1

The output time of the reset signal

[Data Units] ms
[Data range] 50 ～ 400
[Default value] 200

3	2	2

The number of allowed bits for the M code

[Data range] 1 ～ 2
[Default] 2

3	2	3

The number of allowed bits for the S code

[Data range] 1 ～ 6
[Default value] 5

3	2	4

The number of allowed bits for the T code

[Data range] 1 ～ 6

[Default] 4

3	2	7

The axis that acts as a counterweight when the surface speed is controlled

[Data Range].

The setting value	significance
0	X-axis
1	Y-axis
2	Z-axis
3	4th axis
4	5th axis

[Default value] 0

3	2	8

The lowest spindle speed at constant surface speed control (**G96**).

[Data Units] r/min

[Data range] 0 ～ 9999

[Default value] 100

3	3	0

The limit value of the vector is ignored when moving along the outside of the corner in tool radius compensation **C**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 9999.9999

[Default value] 0

3	3	1

The maximum amount of tool wear compensation

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 999.9999

[Default value] 400

3	3	2

The tool radius compensates for the maximum error value of C

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0.0001 ～ 0.01

[Default value] 0.001

3	3	3

The coefficient of the radius of the spiral knife in the groove cycle

[Data range] 0.01 ～ 3

[Default] 1.5

3	3	4

The amount of retract of the high-speed deep hole cycle **G73**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 999.9999

[Default] 2

3	3	5

Fixed cycle G83 for the amount of blank

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 999.9999

[Default] 2

3	3	6

The minimum pause time at the bottom of the hole

[Data Units] ms

[Data range] 0 ～ 1000

[Default value] 250

3	3	7

Maximum pause time at the bottom of the hole

[Data Units] ms

[Data range] 1000 ～ 9999

[Default] 9999

3	3	8

The magnification value when rigid tapping retracts

[Data range] 0.8 ～ 1.2

[Default] 1

3	3	9

The amount of rewind or void left during the deep hole tapping cycle

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] 0 ～ 100

[Default value] 0

3	4	2	**The angle of rotation used when there is no rotation angle command in** G68 coordinate rotation

[Data Units]. Angle

[Data range] 0 ～ 9999.9999

[Default value] 0

3	4	4	**The zoom magnification used when there is no zoom magnification instruction**

[Data range] 0.0001 ～ 9999.9999

[Default] 1

3	4	5	**The magnification of the X axis**

[Data range] 0.0001 ～ 9999.9999

[Default] 1

3	4	6	**The magnification of the Y axis**

[Data range] 0.0001 ～ 9999.9999

[Default] 1

3	4	7	**The magnification of the Z-axis**

[Data range] 0.0001 ～ 9999.9999

[Default] 1

3	5	0	**The pause time when unidirectional positioning**

[Data Units] s

[Data range] 0 ～ 10

[Default value] 0

3	5	1	**The X-axis offset** of the external workpiece origin
3	5	2	**The Z-axis offset** of the external workpiece origin
3	5	3	**The Y-axis offset** of the external workpiece origin
3	5	4	**External workpiece origin 4TH axis offset**
3	5	5	**External workpiece origin 5TH axis offset**

[Data Units].

Set the units	Data units
Metric machines	mm
Imperial machines	inch

[Data range] -99.9999 ～ 99.9999

[Default value] 0

3	6	0	**Total number of parts machined**

[Data range] 0 ～ 9999

[Default value] 0

3	6	1	The total number of parts that need to be machined

[Data range] 0 ～ 9999

[Default value] 0

Chapter 4 Machine Tool Commissioning Methods and Steps

This chapter describes the commissioning method and its steps when the milling machine system is first energized, and after debugging according to the following operating steps, the corresponding machine operation can be performed.

4.1 Emergency Stops and Limits

The milling machine system has a software limit function, for safety reasons, it is recommended to take hardware limit measures at the same time, install stroke limit switches in the positive and negative directions of each axis, and connect as shown in Figure 4-1 below (taking two axes as an example):

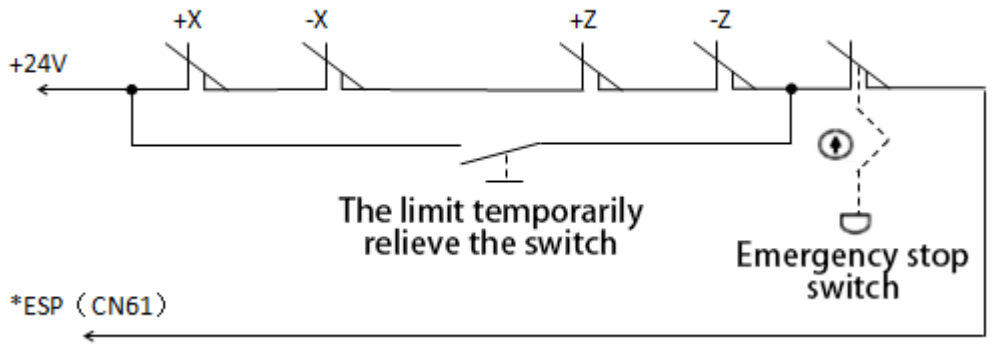


Figure 4-1

At this point, the BIT2 bit (MKYP) of the status parameter No 021 needs to be set to 0.

Diagnostic information DGN000.7 monitors the status of the emergency stop input signal.

Slow movement of each axis under manual or handwheel mode to verify the effectiveness of the override limit switch, the correctness of the alarm display, and the effectiveness of the override release button; When there is an overdrive or press the E-STOP button, the CNC will appear "E-STOP" alarm, if it is overdriven, press the overdrive release button, press the reset key to cancel the alarm after the opposite direction of movement can cancel the overrun.

4.2 Driver unit settings

Set the status parameters No 009 according to the alarm logic level of the driver unit for the BIT4, BIT3, BIT2, BIT1, BIT0 bits (5ALM, 4ALM, YALM, ZALM, XALM, 5th, respectively 4th, Y, Z, X axis), BIT4 with the status parameter No 009 of the company's driving unit, BIT3, BIT2, BIT1, BIT0 bits are set to 1.

If the direction of movement of the machine is inconsistent with the direction required by the instruction, the BIT4, BIT3, BIT2, BIT1 and BIT0 bits (DIR4, DIR5, DIRY, DIRZ, DIRX correspond to 5th, 4th, Y, Z, X axis).

The manual movement direction is available via the parameters No 020 bits of BIT4, BIT3, BIT2, BIT1 and BIT0 (5VAL , 4VAL, YVAL, ZVAL, XVAL correspond to 5th and 4th respectively , Y, Z, X axis move key) to change.

4.3 Gear ratio adjustment

When the moving distance of the machine tool is inconsistent with the displacement distance displayed by CNC coordinates, the data parameter No 000 ~ No 009 can be modified to adjust the electronic gear ratio to adapt to different mechanical transmission ratios.
Calculation formula:

$$\frac{\mathrm{CMR}}{\mathrm{CMD}} = \frac{\delta \times 360}{\alpha \times \mathrm{L}} \times \frac{\mathrm{Z_M}}{\mathrm{Z_D}}$$

$$\frac{CMR}{CMD} = \frac{\delta \times 360}{\alpha \times L} \times \frac{Z_M}{Z_D}$$

CMR: Instruction multiplication factor (data parameters No 000, No 001, No 002, No 003, No 004).
CMD: Instruction division coefficient (data parameters No 005, No 006, No 007, No 008, No 009).
α: Pulse equivalent, the angle at which the motor receives a pulse rotation
L: The lead of the lead screw
δ: The current input minimum unit for the CNC
ZM: The number of teeth of the lead screw end gear
ZD: The number of teeth of the gear at the end of the motor

Example: The number of teeth of the screw end gear is 50, the number of teeth of the motor end gear is 30, the pulse equivalent α = 0.075 degrees, and the lead screw lead is 4 mm;
Electronic gear ratio:

$$\frac{CMR}{CMD} = \frac{\delta \times 360}{\alpha \times L} \times \frac{Z_M}{Z_D} = \frac{0.001 \times 360}{0.075 \times 4} \times \frac{50}{30} = \frac{2}{1}$$

$$\frac{\mathrm{CMR}}{\mathrm{CMD}} = \frac{\delta \times 360}{\alpha \times \mathrm{L}} \times \frac{\mathrm{Z_M}}{\mathrm{Z_D}} = \frac{0.001 \times 360}{0.075 \times 4} \times \frac{50}{30} = \frac{2}{1}$$

4.4 Acceleration and deceleration characteristics adjustment

The relevant CNC parameters are adjusted according to factors such as the drive unit, the characteristics of the motor and the size of the machine load:
Data parameters No 090 ~No 094, No 113 ~No 117: X, Y, Z , 4th, 5th axis fast movement speed;
Data parameters No 120 ~No 139: X, Y, Z, 4th, 5th The acceleration and deceleration time constant when the axis is moving rapidly;
Data parameters No 111 ~ No 112: acceleration and deceleration time constant of manual feed for each axis;
Data parameter No 154: pre-reading mode, acceleration of the linear type (mm/s/s) of acceleration and deceleration before cutting feed;
Data parameters No 102 ~ No 105: handwheel speed and acceleration and deceleration time constant;
Data parameter No 108: single step to the maximum clamping speed;
Data parameter No 110: Feed speed at continuous feed for each axis of manual (JOG).
The larger the acceleration and deceleration time constant, the slower the acceleration and deceleration process, the smaller the impact of the machine tool movement, and the lower the efficiency during processing; The smaller the acceleration and deceleration time constant, the faster the acceleration and deceleration process, the greater the impact of the machine tool movement, and the higher the efficiency during processing.
The principle of adjustment of acceleration and deceleration characteristics is to appropriately reduce the acceleration and deceleration time constant under the premise that the drive unit does not alarm, the motor does not lose step and the machine tool movement does not have obvious impact, so as to improve processing efficiency. The acceleration and deceleration time constant is set too small, which can easily cause the drive unit alarm, motor loss of step or machine vibration.

4.5 Machine zero point adjustment

Related signals
DECX: X-axis deceleration signal;
DECY: Y-axis deceleration signal;
DECZ: Z-axis deceleration signal;
DEC4: 4th axis deceleration signal;
DEC5: 5th axis deceleration signal;

Diagnostic data

0	0	0
Interface pins		

			DEC5	DEC4	DECZ	DECY	DECX
			CN61.34	CN61.33	CN61.12	CN61.32	CN61.4

Control parameters

K	2	2	DEC4T	DECY	DECZ	DECX	DEC5T			

DEC5T = 0:5th axis deceleration signal low level;

=1:5th Axis deceleration signal high.

DEC4T=0:4th axis deceleration signal low level;

=1:4th Axis deceleration signal high level.

DECY=0: Y-axis deceleration signal low level;

=1: Y-axis deceleration signal high.

DECZ=0: Z-axis deceleration signal low level;

=1: Z-axis deceleration signal high.

DECX=0: X-axis deceleration signal low;

=1: X-axis deceleration signal high.

0	0	6					ZPLS			ZMOD

ZMOD=1: before selecting the gear in zero mode;

=0: After selecting the gear in zero mode.

ZPLS=1: Zero return mode is selected, there is a turn signal;

=0: Zero return mode is selected, no turn signal.

0	1	2								ISOT

ISOT=1: After powering on, before returning to the zero point of the machine, manual and fast movement is effective;

=0: After powering on, before returning to the zero point of the machine, manual fast movement is invalid.

0	2	6				ZMI5	ZMI4	ZMIZ	ZMIY	ZMIX

ZMIX=1: Select the axis to return to zero in the negative direction to return to zero;

=0: Select the axis to return to zero in the positive direction back to zero.

Data parameters

0	8	0	ZRNFL

ZRNFL: The low speed rate back to the mechanical zero point.

0	7	0	ZRNFHX

ZRNFHX: X-axis, Z-axis returns to the mechanical zero point of the high-speed speed.

0	7	1	ZRNFHY

ZRNFHY: The high-speed speed of the Y axis back to the zero point of the machine.

0	7	2	ZRNFHZ

ZRNFHZ: The high-speed speed of the Z-axis back to the mechanical zero point.

0	7	3	ZRNFH4

ZRNFH4: 4th speed of the shaft back to the mechanical zero point.

0	7	4	ZRNFH5

ZRNFH5: 5th axis back to the mechanical zero point of the high-speed speed.

Adjust the relevant parameters according to the effective level of the connected signal, the zero-return method used, and the direction of zero-return:

The K parameter No 22 for BIT4, BIT5, BIT6, BIT7: X, Y , Z, the effective level of the deceleration signal when the 4th axis returns to the zero point of the machine tool.

Status parameter No 006 BIT0 (ZMOD): Zero mode selection (0: Block after 1: Block Front) selection.

The status parameter No 006 of BIT3: Zero Back to Zero mode is selected :(0: None 1: Yes) a turn signal.

Data parameter No 080: Each axis returns to the low speed of the zero deceleration process of the machine.

Data parameters No 070 ~ No 074: The high-speed speed at which each axis returns to the zero point of the machine.

Status parameters No 26 for BIT0, BIT1, BIT2 (ZMIX, ZMIY, ZMIZ, ZMI4, ZMI5): Each axis is selected to return to zero, to zero in the positive direction, or to zero in the negative direction.

After confirming that the overhaul limit switch is valid, the machine zero operation can be performed. Usually the machine tool zero point is installed at the maximum stroke, the effective stroke of the zero collider is more than 25 mm, to ensure sufficient deceleration distance, to ensure that the speed can be reduced, in order to ensure accurate return to zero. The faster the speed of the machine tool to zero back, the longer the zero collider, otherwise it will be due to CNC acceleration and deceleration, machine tool inertia, etc. The speed of the drag plate rushing through the zero collider cannot be reduced, and there is not enough deceleration distance, which affects the accuracy of the zero return. There are usually two ways to connect the machine tool back to zero:

1, usually supporting the AC servo motor connection: the use of a stroke switch and servo motor a turn signal schematic diagram

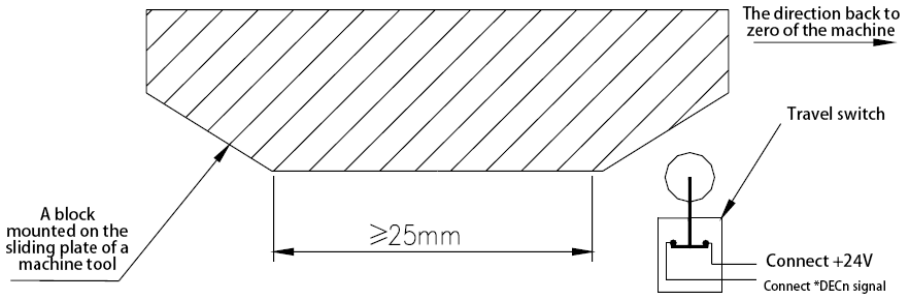


Figure 4-2

Using this connection method, when the deceleration switch is released when returning to the zero point of the machine tool, the one-turn signal of the encoder should be avoided at the critical point position after the release of the stroke switch, so as to ensure that the motor turns half a circle to reach the one-turn signal of the encoder to improve the accuracy of the zero.

The parameter settings (recommended values) are as follows:

Status parameter No 006 for BIT0 (ZMOD) = 0

BIT3 (ZPLS) = 1 for status parameter No 006

Data parameter No 080=200

BIT0 (ZMIX), BIT1 (ZMIY), BIT2 (ZMIZ), BIT3 (ZMI4), BIT4 (ZMI5) = 0 for the status parameter No 026

2, usually supporting the stepper motor connection: the use of a proximity switch as a deceleration, zero signal schematic diagram;

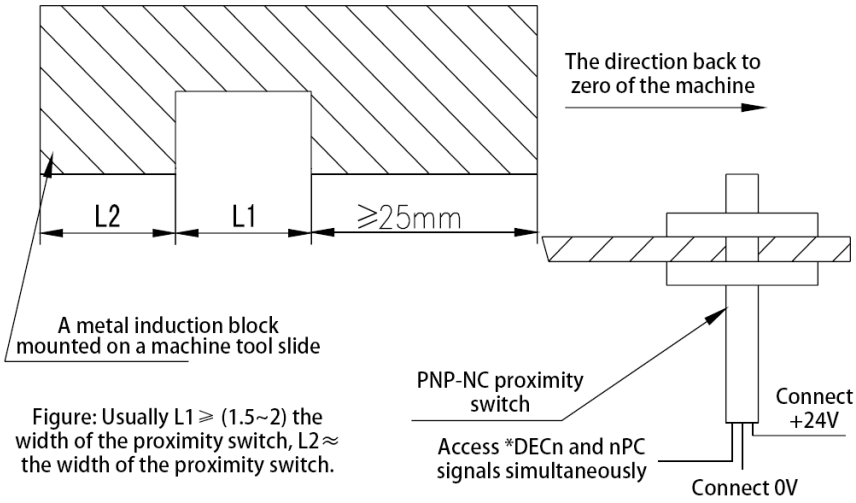


Figure 4-3

Supporting stepper motor, the parameter settings (recommended values) are as follows:

Status parameter No 006 for BIT0 (ZMOD) = 0

Status parameter No 006 for BIT3 (ZPLS)=0

BIT0 (ZMIX), BIT1 (ZMIY), BIT2 (ZMIZ), BIT3 (ZMI4), BIT4 (ZMI5) = 0 for the status parameter No 026

Data parameter No 080=200;

4.6 Spindle function adjustment

4.6.1 Spindle encoders

To perform flexible tapping of the machine, an encoder must be installed, and the number of lines of the encoder can be 100 ~ 5000 lines, which is set in the data parameter NO.201. The transmission ratio of the encoder to the spindle (spindle teeth / encoder teeth) is 1/255 ~ 255, the number of spindle end teeth is set in the CNC data parameter NO.220, and the number of encoder end teeth is in The CNC data parameter is set in NO.223. Synchronous belt transmission (no sliding transmission) must be used.

4.6.2 Spindle speed switching control

When the machine tool uses multi-speed motor control, the control motor speed code is S01 ~ S04, and the relevant parameters are as follows:

Bit4=0 for status parameter No 001: Select spindle speed switch control;

4.6.3 Spindle speed analog voltage control

Spindle speed analog voltage control can be realized through CNC parameter setting, and the interface outputs an analog voltage of 0V ~ 10V to control the frequency converter to achieve stepless speed change; Relevant parameters to be adjusted:
Bit4=1 of the status parameter No 001: Select spindle speed analog voltage control;
Data parameter No 206: Voltage compensation (mv) at analog voltage output 10V;
Data parameters No 210 ~ No 212: the maximum speed of the spindle of each gear;
The basic parameters to be adjusted by the frequency converter:
Forward and reverse mode selection: determined by terminal VF ;
Frequency setting mode selection: Determined by terminal FR .

When the speed specified by programming is inconsistent with the speed detected by the encoder, the data parameter No 210 ~ No 212 can be adjusted to make the specified speed consistent with the actual speed.

Speed adjustment method: first change the spindle to the corresponding gear, determine the system should be gear data parameter of 9999, adjust the spindle magnification rate of 100%, MDI interface input spindle operation instructions and run: M03/M04 S9999, observe the spindle speed displayed in the lower right corner of the screen, Enter the displayed speed value into the system data parameters corresponding to the corresponding gear.

The voltage value should be 10V when entering S9999, the voltage value should be 0V when entering S0, and if the voltage value is biased, the adjustable status parameter No 206 corrects the voltage bias compensation value (usually it has been correctly adjusted before shipping, and generally does not need to be adjusted). When the current gear is the highest speed, when the analog voltage of the CNC output is not 10V, adjust the data parameter No 206 so that the analog voltage of the CNC output is 10V .

When the machine tool is not equipped with an encoder, the spindle speed can be detected by the speed sensor, and the MDI code is entered into S9999, and the speed displayed by the speed sensor is set to the data parameter No 210 ~ No 212 of the corresponding gear.

4.7 Reverse clearance compensation

The inverting gap compensation amount is input to the actual measured clearance amount. The units are mm (metric machines) or inch (inch machines). You can use a percentile meter, a dial meter or a laser detector to measure, reverse gap compensation to be accurately compensated to improve the accuracy of processing, so it is not recommended to use a handwheel or a single step to measure the reverse clearance of the lead screw, it is recommended to measure the reverse gap as follows:

Editing program (Z-axis as an example):
O0001 ；
N10 G01 Z10 F800 G91 ；

N20 Z15 ；
N30 Z1 ；
N40 Z-1 ；
N50 M30 。

The reverse gap error compensation value should be set to zero before measurement;

Run the program in a single section, locate it twice, find the measurement reference A, record the current data, run the same direction for 1mm, and then run 1mm to B point in reverse to read the current data.

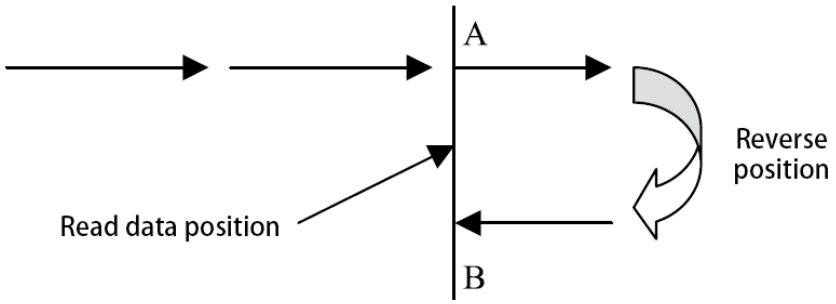


Fig. 4-4 Schematic diagram of the reverse clearance measurement method

Reverse gap error compensation value = | Data recorded at point A – The data recorded at point B | ； Enter the calculated data into the CNC data parameters No 031 ~No 035 .

Data A:A read the data of the percentile;

Data B: Data read from the percentage table at B;

Note 1: Bit7 of CNC parameter No **011 can set the reverse gap compensation method, data parameters** No **036 ~ No 040 The compensation step of the reverse gap gap can be set to compensate for at a fixed frequency;**

Note 2: The **reverse clearance is re-inspected after every 3 months of use.**

4.8 Single step/ handwheel adjustment

The operator panel 

keys can be selected as a single-step operation mode or as a handwheel operation mode, selected by the Bit3 setting of the status parameter No 001.

Bit3=1: The handwheel operation mode is valid, and the single-step operation mode is invalid;

=0: The single-step operation mode is valid, the handwheel operation mode is invalid.

4.9 Other Adjustments

0	2	1								MSP	MST

MST=0: The external loop start (ST) signal is valid;

=1: The external loop start (ST) signal is invalid.

MSP=0: The external pause (SP) signal is valid. At this time, an external pause switch must be connected, otherwise the CNC displays "Pause";

=1: The external pause (SP) signal is invalid.

Chapter V: Diagnostic Information

This chapter describes diagnostic information for CNC systems for milling machine systems.

5.1 CNC diagnostics

This section of diagnostics is used to detect CNC interface signals and internal operating status and cannot be modified.

5.1.1 I/O Fixed Address Diagnostic Information

0	0	0
Foot number		
PCL fixed address		

ESP	***	***	DEC5	DEC4	DECZ	DECY	DECX
CN61.6			CN61.34	CN61.33	CN61.12	CN61.32	CN61.4
X0.5							

DECX、DECY、DECZ、DEC4、DEC5：X、Y、Z , 4th, 5th axis machine tool back zero deceleration signal

KYP: Emergency stop signal

0	0	0
Foot number		
PCL fixed address		

***	***	***	***	***	***	***	**SKIP**
							CN61.42
							X3.5

5.1.2 CNC axis motion status and data diagnostic information

0	**0**	**4**		*******	*******	*******	**EN5**	**EN4**	**ENZ**	**ENY**	**ENX**

EN5 ~ ENX: Axis enable signal

0	**0**	**5**		*******	*******	*******	**SET5**	**SET4**	**SETZ**	**SETY**	**SETX**

SET5 ~ SETX: Axis pulse disable signal

0	**0**	**6**		*******	*******	*******	**DRO5**	**DRO4**	**DROZ**	**DROY**	**DROX**

DRO5 ~ DROX: X, Y, Z, 4th, 5th axis motion direction output

0	**0**	**9**		*******	*******	*******	**5ALM**	**4ALM**	**ZALM**	**YALM**	**XALM**

5ALM ~ XALM: X, Y, Z, 4th, 5th axis alarm signal

0	**9**	**0**	**X-axis output pulses**
0	**9**	**1**	**The number of pulses output in the Y axis**
0	**9**	**2**	**The Z-axis output number of pulses**
0	**9**	**3**	**4th output pulse number**
0	**9**	**4**	**5th output pulse number**
1	**4**	**0**	**The handwheel count value**
1	**4**	**4**	**Spindle encoder count value**

5.1.3 Key diagnostics

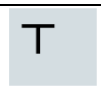
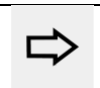
Diagnostic information DGN.010 ~ DGN.016 is diagnostic information for editing keyboard keys. When the corresponding key is pressed in the panel, the corresponding bit is displayed as "1", and when the key is released, it is displayed as "0", otherwise the keyboard circuit is faulty.

0	1	0	9	8	7	P/Q	G	N	O	RST
Correspondence key										

0	1	1	6	5	4	U	Z	Y	X	PGU
Correspondence key										

0	1	2	3	2	1	R	K	J	I	PGD
Correspondence key										

0	1	3	-	0	.	T	S	M	RIGHT	CRU

Correspondence key								
								

0	1	4	ALT	INS	EOB	F/E	D/L	H	LEFT	CRD
Correspondence key										

0	1	5	PLC	DGN	PAR	SET	ALM	OFT	PRG	POS
Correspondence key										

0	1	6	IN	OUT	CHG	CAN	DEL	***	***	***
Correspondence key										

5.1.4 Others

1	**4**	**5**	**PLC execution time (ms).**
1	**4**	**6**	**Total system uptime (h).**

5.2 PLC status

This section of the diagnostics is used to inspect machine → PLC(X), PLC→ machine (Y), CNC→ PLC (F), PLC → CNC (G).) and alarm information address A, status of internal relays (R, K).

5.2.1 F signal

F000	**OP**	**SA**	**STL**	**SPL**				

OP: Autorun signals
SA: Servo ready signal
STL: Cycle start light signal
SPL: Feed pause light signal

F001	**MA**		**TAP**	**ENB**	**DEN**		**RST**	**AL**

MA: CNC ready signal

TAP: Tapping signal
ENB: Spindle enable signal
DEN: Assign an end signal
RST: Reset signal
AL: Alarm signal

F002	MDRN	CUT	MSTOP	SRNMV	THRD		RPDO	

MDRN: Null runtime heartbeat
CUT: Cutting feed signal
MSTOP: Select Stop Heartbeat
SRNMV: Program start signal
THRD: Thread cutting signal
RPDO: Fast feed signal

F003		MEDT	MMEM	MRMT	MMDI	MJ	MH	MINC

MEDT: Memory editing selects the heartbeat
MMEM: Automatically runs the selection heartbeat
MRMT: The DNC runs a select heartbeat
MMDI: Manual data entry selects the heartbeat
MJ:JOG feed selector heartbeat
MH: Handwheel feed selection heartbeat
MINC: Incremental feed selection heartbeat

F004		MPST	MREF	MAFL	MSBK	MABSM	MMLK	MBDT

MPST: Returns to the program starting point to detect the signal
MREF: Manually return the reference point heartbeat
MAFL: The auxiliary function locks the heartbeat
MSBK: A single-segment heartbeat
MABSM: Manual absolute value heartbeat
MMLK: All axis machines lock the detection signal
MBDT: Skips the heartbeat for any program segment

F007						TF	SF		MF

TF: The tool function selects the communication number
SF: Spindle speed selector communication number
MF: Accessibility selects the communication number

F008								SCHK	

SCHK: Syntax check is performed for signaling

F009	DM00	DM01	DM02	DM30				RCT

DM00: M00 decoded signal
DM01: M01 decoded signal
DM02: M02 decoded signal

DM30: M30 decoded signal

RCT: Tool change in progress

F010	MB07	MB06	MB05	MB04	MB03	MB02	MB01	MB00

MB07: Accessibility code MB07

MB06: Accessibility code MB06

MB05: Accessibility code MB05

MB04: Accessibility code MB04

MB03: Accessibility code MB03

MB02: Accessibility code MB02

MB01: Accessibility code MB01

MB00: Accessibility code MB00

F014							PDBG	DRUN

PDBG: The PLC enters debug mode

DRUN: Switch mode to disable the signal

F015				EN5T	EN4T	ENZ		

EN5T: 5th axis selection

EN4T: 4th axis selection

ENZ: Z-axis selection

F016					ZP4	ZP3	ZP2	ZP1

ZP1: The X axis returns the zero end signal

ZP2: The Y axis returns the zero end signal

ZP3: The Z-axis returns the zero end signal

ZP4: The 4TH axis returns a zero end signal

F018	AR07	AR06	AR05	AR04	AR03	AR02	AR01	AR00

AR07: Spindle actual speed AR07

AR06: Spindle actual speed AR06

AR05: Spindle actual speed AR05

AR04: Spindle actual speed AR04

AR03: Spindle actual speed AR03

AR02: Spindle actual speed AR02

AR01: Spindle actual speed AR01

AR00: Spindle actual speed AR00

F019	AR15	AR14	AR13	AR12	AR11	AR10	AR09	AR08

AR15: Spindle actual speed AR15

AR14: Spindle actual speed AR14

AR13: Spindle actual speed AR13

AR12: Spindle actual speed AR12

AR11: Spindle actual speed AR11

AR10: Spindle actual speed AR10

AR09: Spindle actual speed AR09

AR08: Spindle actual speed AR08

F020							BCLP	BUCLP

BCLP: 4TH axis indexing table clamping signal

BUCLP: 4TH axis indexing table releases the signal

F021		MST	MSP		MKYP			

MST: Shields the external loop start signal

MSP: Blocks the external pause signal

MKYP: Shields an external emergency stop signal

F022	SB07	SB06	SB05	SB04	SB03	SB02	SB01	SB00

SB07: Spindle speed code signal SB07

SB06: Spindle speed code signal SB06

SB05: Spindle speed code signal SB05

SB04: Spindle speed code signal SB04

SB03: Spindle speed code signal SB03

SB02: Spindle speed code signal SB02

SB01: Spindle speed code signal SB01

SB00: Spindle speed code signal SB00

F026	TB07	TB06	TB05	TB04	TB03	TB02	TB01	TB00

TB07: Tool function code signal TB07

TB06: Tool function code signal TB06

TB05: Tool function code signal TB05

TB04: Tool function code signal TB04

TB03: Tool function code signal TB03

TB02: Tool function code signal TB02

TB01: Tool function code signal TB01

TB00: Tool function code signal TB00

F030	R08O	R07O	R06O	R05O	R04O	R03O	R02O	R01O

R08O: S12-bit code signal R08O

R07O: S12-bit code signal R07O

R06O: S12-bit code signal R06O

R05O: S12-bit code signal R05O

R04O: S12-bit code signal R04O

R03O: S12-bit code signal R03O

R02O: S12-bit code signal R02O

R01O: S12-bit code signal R01O

F031					R12O	R11O	R10O	R09O

R12O: S12-bit code signal R12O
R11O: S12-bit code signal R11O
R10O: S12-bit code signal R10O
R09O: S12-bit code signal R09O

F032	X1000	X100	X10	X1			RGSPM	RGSPP

X1000: Step X1000 softkey
X100: Step X100 softkey
X10: Step X10 softkey
X1: Step X1 softkey
RGSPM: Spindle reversal in rigid tapping
RGSPP: Spindle forward rotation in rigid tapping

F033	MTAP	DTAP						RTAP

MTAP: G63 tapping mode signal
DTAP: Signal in rigid tapping execution
RTAP: Rigid tapping signal

F034	SSTOP	SCW	Z-	Z+	Y-	Y+	X-	X+

SSTOP: Spindle stop softkey
SCW: Spindle forward softkey
Z-:Z- softkey
Z+: Z+ softkey
Y-:X- softkey
Y+:X+ softkey
X-:X- softkey
X+: X+ softkeys

F035	SCCW	MSTOP	AFLO	BDTO	SBKO	MLKO	DRNO	QFAST

SCCW: Spindle turns counterclockwise to softkey
MSTOP: Select the Stop softkey
AFLO: Accessibility locks the softkey
BDTO: Program skip section softkey
SBKO: Single program segment softkey
MLKO: Machine lock softkey
DRNO: Empty Run softkey
QFAST: Quickly move softkeys

F036	S-	S+	FAST-	FAST+			FEED-	FEED+

S-: Spindle magnification minus softkey
S+: Spindle magnification softkey
FAST-: Fast magnification minus softkey
FAST+: Fast multiplier softkey
FEED-: Feed multiplier minus softkey

FEED+: Feed multiplier softkey

F037					ZP5	ZP4	ZP3	ZP2	ZP1

ZP5: Returns the reference point to end signal ZP5

ZP4: Returns the reference point to end signal ZP4

ZP3: Returns the reference point to end signal ZP3

ZP2: Returns the reference point to end signal ZP2

ZP1: Returns the reference point to end signal ZP1

F038					MV5	MV4	MV3	MV2	MV1

MV5: Axis movement signal MV5

MV4: Axis movement signal MV4

MV3: Axis movement signal MV3

MV2: Axis movement signal MV2

MV1: Axis movement signal MV1

F039					MVD5	MVD4	MVD3	MVD2	MVD1

MVD5: Axis direction of motion signal MVD5

MVD4: Axis direction of motion signal MVD4

MVD3: Axis direction signal MVD3

MVD2: Axis direction signal MVD2

MVD1: Axis direction signal MVD1

F040					ZRF5	ZRF4	ZRF3	ZRF2	ZRF1

ZRF5: The reference point establishes the signal ZRF5

ZRF4: The reference point establishes the signal ZRF4

ZRF3: The reference point establishes the signal ZRF3

ZRF2: The reference point establishes the signal ZRF2

ZRF1: The reference point establishes the signal ZRF1

F041					ZP15	ZP14	ZP13	ZP12	ZP11

ZP15:5TH axis returns the first reference point to the end signal

ZP14:4TH axis returns the first reference point to the end signal

ZP13: The Z-axis returns the first reference point to the end signal

ZP12: The Y axis returns to the first reference point to end the signal

ZP11: The X-axis returns the first reference point to the end signal

F042					PRO5	PRO4	PRO3	PRO2	PRO1

PRO5: Returns the program zero end signal PRO5

PRO4: Returns the program zero end signal PRO4

PRO3: Returns the program zero end signal PRO3

PRO2: Returns the program zero end signal PRO2

PRO1: Returns the program zero end signal PRO1

F043								MSPHD

MSPHD: Spindle jog detection signal

F044				SIMSPL			FSCSL	

SIMSPL: The analog spindle is valid

FSCSL: Cs profile control toggle end signal

F047	Total number of tool positions

F048		MST	MSP		MESP			

MST: Shields the external loop start signal

MSP: Blocks the external pause signal

MKYP: Shields an external emergency stop signal

F051				VAL5	VAL4	VALY	VALZ	VALX

VAL5: 5 direction selection

VAL4: 4 direction selection

VALY: Y direction selection

VALZ: Z direction selection

VALX: X direction selection

F054	UO07	UO06	UO05	UO04	UO03	UO02	UO01	UO00

U O 07: The macro output signal UO07

U O 06: Macro output signal UO06

U O 05: Macro output signal UO05

U O 04: The macro output signal UO04

U O 03: Macro output signal UO03

U O 02: Macro output signal UO02

U O 01: Macro output signal UO01

U O00: The macro output signal UO00

F055	UO15	UO14	UO13	UO12	UO11	UO10	UO09	UO08

U O 15: The macro output signal UO15

U O 14: The macro output signal UO14

U O 13: The macro output signal UO13

U O 12: The macro output signal UO12

U O11: The macro output signal UO11

U O 10: The macro output signal UO10

U O 09: Macro output signal UO09

U O 08: Macro output signal UO08

F057				ZP25	ZP24	ZP23	ZP22	ZP21

ZP25:5TH axis returns the end signal to the second reference point

ZP24:4TH axis returns the end signal to the second reference point

ZP23: The Z-axis returns the end signal to the second reference point

ZP22: The Y axis returns the end signal to the second reference point

ZP21: The X-axis returns the end signal to the second reference point

F058				ZP35	ZP34	ZP33	ZP32	ZP31

ZP35:5TH axis returns the third reference point to the end signal

ZP34:4TH axis returns the end signal to the third reference point

ZP33: The Z-axis returns the third reference point to the end signal

ZP32: The Y axis returns the third reference point to the end signal

ZP31: The X-axis returns the third reference point to the end signal

F059				ZP45	ZP44	ZP43	ZP42	ZP41

ZP45:5TH axis returns the end signal to the fourth reference point

ZP44:4TH axis returns the fourth reference point end signal

ZP43: The Z-axis returns the end signal to the fourth reference point

ZP42: The Y axis returns the fourth reference point to the end signal

ZP41: The X-axis returns the fourth reference point to the end signal

F061								ESEND

KYEND: The number of parts required arrives at the signal

5.2.2 G signal

G004					FIN			

FIN: Auxiliary end signal

G005	LEDT	AFL		LAXIS				

LEDT: Edit the lock signal

AFL: Auxiliary function locks the signal

LAXIS: All axes interlock signals

G006		SKIPP		OVC		ABSM	MSTOP	SRN

SKIPP: Jump signal

OVC: Feed multiplier cancellation signal

ABSM: Manual absolute value signal

MSTOP: Select Stop signal

SRN: The program starts again with the signal

G007						ST		

ST: Cyclic start signal

G008				SP	ESP				

SP: Feed hold signal

ESP: Emergency stop signal

G009							M12	M32	COOL

M12:0/1: Spindle tool release/ clamping signal

M32: Lubrication signal

COOL: Cooling signal

G010	JV07	JV06	JV05	JV04	JV0	JV02	JV01	JV00

JV07: Manual move magnification signal JV07

JV06: Manual move magnification signal JV06

JV05: Manual move rate multiplier signal JV05

JV04: Manual move magnification signal JV04

JV03: Manual move magnification signal JV03

JV02: Manual move rate signal JV02

JV01: Manual move magnification signal JV01

JV00: Manually move the magnification signal JV00

G011	JV15	JV14	JV13	JV12	JV11	JV10	JV09	JV08

JV08: Manual move magnification signal JV08

JV09: Manual move magnification signal JV09

JV10: Manually move the magnification signal JV10

JV11: Manually move the magnification signal JV11

JV12: Manually move the magnification signal JV12

JV13: Manual move magnification signal JV13

JV14: Manually move the magnification signal JV14

JV15: Manual move magnification signal JV15

G012	FV07	FV06	FV05	FV04	FV03	FV02	FV01	FV00

FV07: Feed velocity magnification signal FV07

FV06: Feed rate magnification signal FV06

FV05: Feed rate rate signal FV05

FV04: Feed rate magnification signal FV04

FV03: Feed velocity magnification signal FV03

FV02: Feed velocity multiplier signal FV02

FV01: Feed rate magnification signal FV01

FV00: Feed rate rate signal FV00

G014	RV08	RV07	RV06	RV05	RV04	RV03	RV02	RV01

RV08: Fast feed rate signal RV08

RV07: Fast feed rate signal RV07

RV06: Fast feed rate signal RV06

RV05: Fast feed rate signal RV05
RV04: Fast feed rate signal RV04
RV03: Fast feed rate signal RV03
RV02: Fast feed rate signal RV02
RV01: Fast feed rate signal RV01

G016								

SAR: Spindle speed arrival signal

G017					DECA	DECY	DECZ	DECX

DECA: 4TH axis zero deceleration signal detection
DECY: Z-axis zero deceleration signal detection
DECZ: Y-axis zero deceleration signal detection
DECX: X-axis zero deceleration signal detection

G018					H4TH	HY	HZ	HX

H4TH: 4TH axis handwheel feed selection signal
HY: Z-axis handwheel feed selection signal
HZ: Y-axis handwheel feed selection signal
HX: X-axis handwheel feed selection signal

G019	RT		.MP2	MP1				

RT: Manual fast feed of the select signal
MP2: Handwheel magnification signal MP2
MP1: Handwheel magnification signal MP1

G021	SOV7	SOV6	SOV5	SOV4	SOV3	SOV2	SOV1	SOV0

SOV7: Spindle speed magnification signal SOV7
SOV6: Spindle speed magnification signal SOV6
SOV5: Spindle speed magnification signal SOV5
SOV4: Spindle speed magnification signal SOV4
SOV3: Spindle speed magnification signal SOV3
SOV2: Spindle speed magnification signal SOV2
SOV1: Spindle speed magnification signal SOV1
SOV0: Spindle speed magnification signal SOV0

G022	R08I	R07I	R06I	R05I	R04I	R03I	R02I	R01I

R08I: Spindle motor speed code signal R08I
R07I: Spindle motor speed code signal R07I
R06I: Spindle motor speed code signal R06I
R05I: Spindle motor speed code signal R05I
R04I: Spindle motor speed code signal R04I
R03I: Spindle motor speed code signal R03I
R02I: Spindle motor speed code signal R02I

R01I: Spindle motor speed code signal R01I

G023	SIND	SGN			R12I	R11I	R10I	R09I

SIND: Spindle motor speed code selection signal

SGN: Spindle motor code polarity selection signal

R12I: Spindle motor speed code signal R12I

R11I: Spindle motor speed code signal R11I

R10I: Spindle motor speed code signal R10I

R09I: Spindle motor speed code signal R09I

G024	MRDYA							

MRDYA: Machine ready signal

G025			SRVB	SFRB				

SRVB: Spindle reversal signal

SFRB: Spindle forward rotation signal

G026	CON							

CON: The switching signal for CS profile control

G027					+J4	+J3	+J2	+J1

+J4: Feed axis and direction selection signal +J4

+J3: Feed axis and direction selection signal +J3

+J2: Feed axis and direction selection signal +J2

+J1: Feed axis and direction selection signal +J1

G028					-J4	-J3	-J2	-J1

-J4: Feed axis and direction selection signal -J4

-J3: Feed axis and direction selection signal -J3

-J2: Feed axis and direction selection signal -J2

-J1: Feed axis and direction selection signal -J1

G030					+L4	+L3	+L2	+L1

+L4: Axis overhaul signal +L4

+L3: Axis overhaul signal +L3

+L2: Axis overhaul signal +L2

+L1: Axis overhaul signal +L1

G031					-L4	-L3	-L2	-L1

-L4: Shaft overhaul signal -L4

-L3: Shaft overhaul signal -L3

-L2: Shaft overhaul signal -L2

-L1: Axis overhaul signal -L1

G036	BEUCL	BECLP						SPD

BEUCL: The indexing table releases the completion signal

BECLP: Indexing table clamping completion signal

SPD: Spindle jog function signal

G037	NT07	NT06	NT05	NT04	NT03	NT02	NT01	NT00

NT07: The current tool number NT07

NT06: The current tool number is NT06

NT05: The current tool number NT05

NT04: The current tool number NT04

NT03: The current tool number NT03

NT02: The current tool number NT02

NT01: The current tool number NT01

NT00: The current tool number, NT00

G043	ZRN		DNC1			MD4	MD2	MD1

ZRN: Select 4 for the current mode of operation

DNC1: The DNC runs the select signal

MD4: Select 3 for the current mode of operation

MD2: Select 2 for the current mode of operation

MD1: Select 1 for the current mode of operation

G044	HDT						MLK	BDT

HDT: Manual sequential tool change signal

MLK: Machine Locked Signal (PLC → CNC).

BDT: Program Selective Jump Signal (PLC → CNC).

G046	DRN				KEY1		SBK	

DRN: Empty running signal

KEY1: Memory protection signal

SBK: Single program segment signal (PLC → CNC).

G048							GR2	GR1

GR2: Gear selection signal

GR1: Gear selection signal

G053	CD2	SMZ						

CDZ: Chamfer signal

SMZ: Error check signal

G054	UI07	UI06	UI05	UI04	UI03	UI02	UI01	UI00

UI07: Macro input signal UI07

UI06: Macro input signal UI06

UI05: Macro input signal UI05

UI04: Macro input signal UI04
UI03: Macro input signal UI03
UI02: Macro input signal UI02
UI01: Macro input signal UI01
UI00: Macro input signal UI00

Chapter 6 Storage type pitch error compensation function

6.1 Function Description

The pitch of each axis of the machine tool screw more or less has a precision error, which will inevitably affect the processing accuracy of the parts, the system has a storage type pitch error compensation function can accurately compensate the pitch error of the lead screw.

6.2 Specifications

1、 The amount of compensation set is related to the origin of compensation, compensation interval and other factors;
2、 The pitch error compensation value is obtained by the root machine coordinate (mechanical coordinate) value and the origin of the pitch error compensation;
3、 Number of points compensated: up to 256 axes;
4、 Compensable axes: X, Y, Z, 4th, 5th a total of five axes;
5、 Compensation range: 0 ~ ±99× minimum instruction increment;
6、 Compensation interval: 1 ~ 9999.9999 ;
7、 Compensation point N(N = 0, 1, 2, 3, ...). 255) the amount of compensation, determined by the mechanical error of the interval N, N-1;
8、 The setting method is the same as the input method of CNC parameters, which is detailed in the "Operation Instructions".

6.3 Parameter setting

6.3.1 Screw Repair Function

Status parameters

0	0	3

		SCRW					

Bit5=1: Pitch error compensation function is effective;

Bit5=0: The pitch error compensation function is invalid.

6.3.2 Pitch error compensation origin

The compensation position number corresponding to the zero point of the machine tool in the pitch error compensation table is called the pitch error compensation origin (reference point); The pitch error compensation origin is set by the data parameters No 180 ~ No 184 . According to the actual requirements, each axis can be set at any position in 0 ~ 255.

Data parameters

1	8	0	The position number of the X-axis pitch error compensates for the origin
1	8	1	The position number of the Y-axis pitch error compensates for the origin
1	8	2	Z-axis pitch error compensates for the position number of the origin
1	8	3	4th axis pitch error compensates for the position number of the origin
1	8	4	5th axis pitch error compensates for the position number of the origin

6.3.3 Compensation interval

Pitch error compensation interval: No 190 ~ No 194;

Input unit: metric machine: mm, inch machine;

Set range: 1 ~ 9999.9999 .

Status parameters

1	9	0	X-axis pitch error compensation interval distance
1	9	1	Y-axis pitch error compensates for the interval distance
1	9	2	Z-axis pitch error compensates for the interval distance
1	9	3	4th axle pitch error compensates for interval distance
1	9	4	5th axle pitch error compensates for the interval distance

6.3.4 Amount of compensation

The amount of compensation for the error of each shaft pitch is set according to the parameter number of the following table, and the compensation amount is fixed to the radius value input, regardless of whether the diameter is programmed or the radius is programmed, and the input value unit is mm (metric machine tool) or inch (inch machine tool).

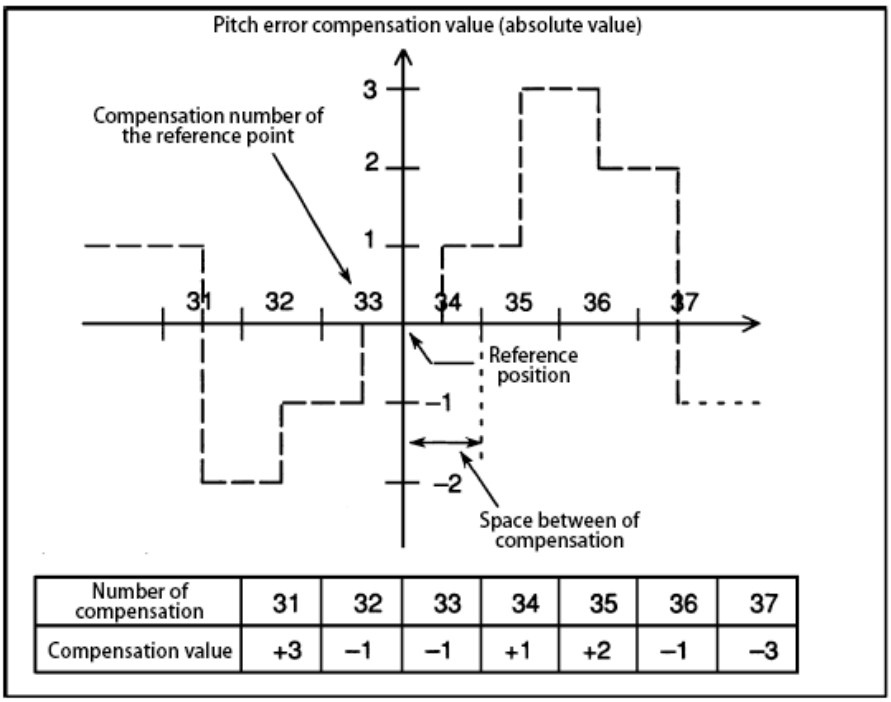
Compensatio	X	Y	Z
000	...	...	...
001	5	-2	3
002	-3	4	-1
...	...	...	...
255	...	...	...

6.4 Precautions for setting compensation amounts

(1) The operation authority must be a secondary password to set and modify the screw parameters.
(2) After setting the parameters of pitch error compensation, the correct compensation can be made after returning to the zero point of the machine tool.

6.5 Example of compensation parameter setting

(1) The data parameter No 180 (pitch error compensation origin) = 33, the data parameter No 185 (compensation interval) = 10.000mm The pitch error compensation point number of the reference point in the following example is 33.



Number of compensation	31	32	33	34	35	36	37
Compensation value	+3	−1	−1	+1	+2	−1	−3

Appendix

Appendix I Alarm List

1. CNC alarm

Alarm number	content	remark
0000	Modified the parameter that the power must be cut off once	
0001	Failed to open file	
0002	Input data is out of range	
0003	The copied or renamed program number exists	
0004	Address not found	
0005	There is no data behind the address	
0006	Illegal use of minus signs	
0007	Illegal use of decimal points	
0008	The program file is too large to be fully	

	loaded	
0009	Enter an illegal address	
0010	Incorrect G code	
0011	No feed speed command	
0012	There is not enough disk space	
0013	The maximum number of program files has been reached	
0014	G95 cannot be instructed, spindle is not supported	
0015	Too many axes are commanded	
0016	The current pitch error compensation point is out of range	
0017	No permission to modify	
0018	Modifications are not allowed	
0019	The zoom function is not enabled	
0020	Radius tolerances are exceeded	
0021	Illegal plane axes are commanded	
0022	R and IJK in the arc are all 0	
0023	IJK and R are specified in arc interpolation at the same time	
0024	The helix interpolation rotation angle is 0	
0025	G12 cannot be in the same section as other G instructions	
0026	The file format is not supported by the system	
0027	The length of the knife repair instruction cannot be the same as G92	
0028	Illegal plane selection	
0029	The illegal bias value	
0030	Illegal compensation number	
0031	The G10 has been ordered for an illegal P	
0032	Illegal compensation value in G10	
0033	There is no intersection in the knife patch C or chamfer	
0034	Arc commands cannot be created or canceled	
0035	The M99 directive was not cancelled before the C knife patch	
0036	G31 cannot be instructed	
0037	The plane cannot be changed in knife patch C	
0038	Interference in arc program segments	
0039	The tip of the knife is mispositioned in	

	Tool Patch C	
0040	Change the workpiece coordinate system during tool patch C execution	
0041	There is interference	
0042	In Knife Patch C there are more than ten non-moving instructions	
0043	Insufficient permissions	
0044	Instructions G27 to G30 are not allowed in a fixed cycle	
0045	Address Q is not found or Q value is 0 (G73/G83).	
0046	Illegal reference point return instruction	
0047	The mechanical return to zero is performed before the order can be executed	
0048	The Z plane should be lower than the R plane	
0049	The Z plane should be lower than the R plane	
0050	You should move the position when changing the fixed loop mode	
0051	Wrong movement after chamfering or too large a chamfer value	
0052	Milling slot fixing cycles cannot use the mirroring function	
0053	Too many address instructions	
0054	DNC transmission error	
0055	The wrong move value in the chamfer or inverted R	
0056	M99 cannot be in the same paragraph as macro instructions	
0057	Write file failed and must be powered off and restarted	
0058	No end points found	
0059	The program number was not found	
0060	No sequence numbers found	
0061	The X axis is not at the reference point	
0062	The axis is not at the reference point	
0063	The Y axis is not at the reference point	
0064	The 4TH axis is not at the reference point	
0065	The TH5 axis is not at the reference point	
0066	The fixed loop must be unfixed before	

	performing G10	
0067	G10 does not support formatting	
0068	The parameter switch is not turned on	
0069	Processing operation needs to close the U disk operation interface	
0070	Insufficient memory capacity	
0071	No data end found	
0072	Too many programs	
0073	The program number is already in use	
0074	The illegal program number	
0075	protection	
0076	Address P is not defined	
0077	Subprogram nesting error	
0078	The program number was not found	
0079	The system usage time expires	
0080	The data entered is unreasonable	
0082	The H code is instructed in the G37	
0083	G37 illegal axis directive	
0084	The keys are timed out or short-circuited	
0085	Communication error	
0087	The X-axis reference point returns to incomplete	
0088	The Y-axis reference point returns to incomplete	
0089	The Z-axis reference point returns to incomplete	
0090	The 4TH axis reference point returns to incomplete	
0091	TH5 axis reference point return is not complete	
0092	The axis that is not at the reference point	
0094	P type (coordinates) is not allowed	
0095	P type is not allowed (EXT OFS CHG).	
0096	P type is not allowed (WRK OFS CHG).	
0097	P type does not allow (automatic).	
0098	G28 is found in the sequential return	
0099	Execution of MDI after retrieval is not allowed	
0100	Parameter writes are valid	
0101	Power off memory data is confused, make sure the location is correct	
0110	Location data exceeds the allowed range, please return to zero	

0111	Compute data overflow	
0112	is divided by zero	
0113	Incorrect instructions	
0114	The macro program is malformed	
0115	Illegal variables	
0116	Write-protected variables	
0118	Brace nesting error	
0119	M00~M02,M06,M98,M99,M30 cannot be in the same section as other M instructions	
0122	Fourfold macromodal-call	
0123	Macros cannot be used in the DNC	
0124	The program ended illegally	
0125	The macro program is malformed	
0126	The number of illegal loops	
0127	NC and macros are in the same program segment	
0128	The sequence number of the illegal macro	
0129	The address of the illegal argument	
0130	Illegal axis operations	
0131	Too much external alarm information	
0132	No alarm number found	
0133	Axis directives that are not supported by the system	
0134	Rigid tapping cannot be used when the number of control axes in the system is greater than 3	
0135	Illegal angle directives	
0136	Illegal axis directives	
0139	The PLC control axis cannot be changed	
0142	Illegal proportional rate	
0143	Zoom motion data overflow	
0144	Illegal plane selection	
0148	Illegal data settings	
0149	G10L3 format error	
0150	Illegal tool group number	
0151	No tool group number found	
0152	Tool data cannot be stored	
0153	The C knife repair was not cancelled before the tool change	
0154	Unused tools in the life group	
0155	Illegal T code in M06	

0156	No P/L instructions found	
0157	Too many sets of tools	
0158	Illegal tool life data	
0159	Tool data setting is not complete	
0160	In polar coordinate mode, arcs can only be programmed using R	
0161	The directive cannot be executed in polar mode	
0163	The command cannot be executed in rotation mode	
0164	The directive cannot be executed in zoom mode	
0165	Specify the directive in a separate program segment	
0166	No axis is specified when returning to the reference point	
0167	The midpoint coordinates are too large	
0168	The minimum pause time at the bottom of the hole should be less than the maximum pause time at the bottom of the hole	
0170	Tool radius compensation is not removed when entering or exiting a subprogram	
0172	In the program segment where the subprogram is called, P is not an integer or P is less than 0	
0173	The number of subprogram calls should be less than 9999	
0175	Fixed loops can only be performed in the G17 plane	
0176	The spindle speed is not specified before the start of the rigid tapping	
0177	The spindle orientation feature is not supported	
0178	The spindle speed is not specified before the fixed cycle begins	
0181	Illegal M code	
0182	Illegal S code	
0183	Illegal T code	
0184	The selected tool is out of range	
0185	L is too small or L is undefined	
0186	L is too big	
0187	The tool radius is too large	

0188	U is too big	
0189	The U value is less than the tool radius	
0190	V is too small or Q is undefined	
0191	W is too small or Q is undefined	
0192	Q is too small or Q is undefined	
0193	I is not defined or J is 0	
0194	J is undefined or J is 0	
0195	D is undefined or D is 0	
0198	Illegal axis selection	
0199	The macro is not defined	
0200	Illegal S-way instructions	
0201	No feed velocity was found in rigid tapping	
0202	Location LSI overflow	
0203	The procedure is not correct in rigid tapping	
0204	Illegal axis operations	
0205	Rigid mode DI signal off	
0206	The plane cannot be changed (rigid tapping).	
0207	The tapping data is incorrect	
0208	This instruction cannot be executed in G10 mode	
0212	Illegal plane selection	
0224	Returns the reference point	
0231	Illegal format in G10 L50 or L51	
0232	There are too many spiral interpolation axes for instructions	
0233	The device is busy	
0235	The record ends	
0236	The program restarts parameter error	
0237	No decimal point	
0238	Address duplicate error	
0239	Parameter 0	
0240	G41/G42 are not allowed in MDI mode	
0241	The handwheel pulse is abnormal	
0251	Emergency stop alarm	
0260	Axis names are repeated, please modify the parameters NO.225~227	
0451	X-axis drive alarm	
0452	Y-axis drive alarm	
0453	Z-axis drive alarm	
0454	4TH axis drive alarm	

0455	TH5-axis drive alarm	
0456	Spindle drive alarm	
0500	Soft limit overflight: -X	
0501	Soft limit overpass: +X	
0502	Soft limit overflight: -Y	
0503	Soft limit overrun: +Y	
0504	Soft limit overflight: -Z	
0505	Soft limit overpass: +Z	
0506	Soft limit overrange: -4TH	
0507	Soft limit overrange: +4TH	
0508	Soft limit overflight: -Th5	
0509	Soft limit overrun: +Th5	
0510	Hard limit overpass: -X	
0511	Hard limit overpass: +X	
0512	Hard limit overpass: -Y	
0513	Hard limit overrun: +Y	
0514	Hard limit overpass: -Z	
0515	Hard limit overrange: +Z	
0516	Hard limit overflight: -4TH	
0517	Hard limit overrange: +4TH	
0518	Hard limit overrun: -Th5	
0519	Hard limit overpass: +Th5	
0740	Rigid tapping alarm: Exceptional	
0741	Rigid tapping alarm: Exceptional	
0742	Rigid tapping alarm: LSI	
0751	First spindle alarm (AL-XX) detected	
0754	Spindle abnormal torque alarm	
1001	The address of the relay or coil is not set	
1002	The function instruction for entering the code does not exist	
1003	The function directive COM/COME is not used correctly	
1004	The user ladder exceeds the maximum number of allowed rows or steps	
1005	Function Directive END1 or END2 is not used correctly	
1006	There is an illegal output in the network	
1007	A hardware failure or system interrupt error prevents the PLC from communicating	
1008	The function instructions are not connected correctly	
1009	The network horizontal line is not	

	connected	
1010	A power outage while editing a ladder diagram causes the network to be edited to be lost	
1011	The address data was not entered correctly	
1012	The input symbol is undefined or the input address is out of range	
1013	Illegal characters or data out of range were specified	
1014	CTR addresses are duplicated	
1015	Function instructions JMP/LBL are not handled correctly or exceed capacity	
1016	The network structure is incomplete	
1017	A network structure that is not currently supported appears	
1019	TMR addresses are duplicated	
1020	Parameters are missing from the function directive	
1021	The PLC executes a timeout and the system automatically stops the PLC	
1022	The function instruction name is missing	
1023	The address or constant of a function instruction parameter is out of range	
1024	There are unnecessary relays or coils	
1025	The function instructions are not output correctly	
1026	The number of network connection rows is out of the supported range	
1027	The same output address is used elsewhere	
1028	The ladder file format is incorrect	
1029	The ladder file in use is missing	
1030	There are incorrect vertical lines in the network	
1031	The user data area is full, and the data table capacity is indicated	
1032	The first stage of the ladder is too large to be executed in time	
1033	The SFT instruction exceeds the maximum number of allowed uses	
1034	The function directive DIFU/DIFD is not used correctly	

1035	The conversion of the currently open ladder file was not successful	
1036	PLC abnormal stop alarm	
1037	The open ladder chart is inconsistent with the data parameter settings ladder diagram	
1039	The instruction or network is not within executable range	
1040	The function instruction CALL/SP/SPE is not used correctly	
1041	Horizontal conduction wires are connected in parallel with the node network	
1042	The PLC system parameter file is not loaded	

2. **PLC alarm**

A001.5 The tool magazine debug mode function is turned on and the program cannot be started, and K30.7 turns off debug mode

Alarm reason: After using the tool magazine function, open the tool magazine debugging function, and the system starts to run the program alarm;

Processing: press [reset key] to cancel the alarm, check whether the tool magazine is normal, if the tool magazine debugging function K30.7=0 is closed normally; If it is not normal, turn off the tool magazine debugging function after troubleshooting.

A001.6 The external loop open time is too long (with the normally open point) K20.0

Alarm reason: cyclic start button conduction time exceeds 4 seconds, system alarm;

Handling: Check whether the external loop start button of the system is connected to the normally open contact, and check whether the external switch is damaged.

A001.7 External Pause Open Time Is Too Long (Connect Normal Closed Point) K20.1

Alarm reason: external pause button conduction time exceeds 4 seconds, system alarm;

Handling: Check whether the external pause button of the system is connected to the normally closed contact, and check whether the external switch is damaged.

The A002.0 guard door is not closed and automatic operation is not allowed

Alarm reason: In the automatic mode, the protective door is not closed, the program is started, and the system generates an alarm;

Processing: Press [Reset] to cancel the alarm, if the protective door has been closed, detect whether the protective door sensor is damaged or whether the level selection is normal.

A002.1 Tool setter overstroke alarm

Alarm reason: When the overhaul signal of the tool instrument is selected, the override signal of the tool instrument has input, and the Z axis moves in the negative direction;

Processing: Press [Reset] to cancel the alarm and move the Z axis in the positive direction.

A002.2 Set the total number of parts to be machined to complete the alarm

Alarm reason: the number of processed parts reaches the number of parameters 361 The total number of processed parts is set, and the number of processed parts is set to the prompt effective K16.3=1 when the alarm is set;

Processing: Press [Reset] to cancel the alarm, manually clear the number of processed parts.

A002.3 When the spindle is rotated, the tool shall not be released

Alarm reason: loose knife in spindle rotation, the system generates an alarm;

Processing: Press [Reset] to cancel the alarm.

A002.4 When the spindle rotates, the tool clamping in place signal is invalid alarm

Alarm reason: The tool clamping signal is not detected in the spindle rotation;

Handling: Press [Reset] to cancel the alarm, check the installation position of the tool clamping signal switch and whether it is damaged.

A002.5 The spindle shall not be started when the tool clamping in place signal is invalid

Alarm reason: the spindle is started when the tool clamping signal is not detected;

Handling: Press [Reset] to cancel the alarm, check the installation position of the tool clamping signal switch and whether it is damaged.

A002.6 The spindle tool is loosened and the spindle must not be started

Alarm reason: the tool is in a loose state to start the spindle;

Processing: Press [Reset] to cancel the alarm, and the spindle can only be started when the tool is clamped.

A004.1 The spindle analog voltage control state is not currently available and cannot perform the spindle jog function

Alarm reason: when the spindle control is a switch control, open the spindle jog function, the system alarm;

Processing: Press [Reset] to cancel the alarm, and the spindle jog function cannot be used when the spindle switch is controlled.

A004.2 M03, M04 code specified error

Alarm reason: the spindle is rotated forward or reversed, and the alarm is activated when the spindle is rotated in the opposite direction;

Processing: Press [Reset] to cancel the alarm, the spindle must be in the stopped state to run in the opposite direction.

A004.3 M63, M64 code specified error

Alarm reason: In the 2nd spindle forward or reverse state, the alarm is performed when the spindle rotates in the opposite direction;

Processing: Press [Reset] to cancel the alarm, the spindle must be in the stopped state to run in the opposite direction.

A004.4 Spindle shift time is too long

Alarm reason: When the spindle automatic shift is effective, the shift code M41-M44 is executed, and the code alarm is not completed within the time set by T045;

Processing: Press [Reset] to cancel the alarm and check whether the shift in place signal is installed correctly and whether the switch is damaged.

A004. 7 The Z axis **is not at the zero point and the other axis cannot be ordered to zero operation, K22.0 can be selected**

Alarm reason: When the Z axis is selected and other axes need to be at the zero point position to perform the zero-return operation K22.0=1, the other axes are performed to return to zero;

Processing: Press [Reset] to cancel the alarm, first return the Z axis to zero, and then perform other axis operations.

A008.0 Spindle speed position mode conversion abnormal

Alarm reason: The code alarm was not completed within the T024 setting time after executing the M29 code;

Processing: Press [Reset] to cancel the alarm, check whether the T024/T025 setting time is correct (T025<T024), and check whether the signal setting is correct (K21.0) after the position mode switching is completed.

A008.1 Spindle position speed mode conversion abnormal

Alarm reason: The alarm was not completed within the T028 setting time after executing the M28 code;

Processing: Press [Reset] to cancel the alarm and check whether the T027/T028 setting time is correct (T027<T028).

A008. 2 Insufficient air pressure alarm, level selection K20.2 detection delay T02

Alarm reason: insufficient air pressure alarm signal detected within the T02 setting time;

Processing: check whether the air pressure detection device is normal, and whether the test signal level selection K20.2 setting is correct;

After waiting for the air pressure to be sufficient, press [Reset] to cancel the alarm.

A010.1 The spindle speed is too high and the tool cannot be released

Alarm reason: the spindle stop state is issued, but the spindle has not slowed down to zero, the speed of the big D data D126 set when the loose alarm;

Processing: Press [Reset] to cancel the alarm and check the D126 setting value (D126=20);

Or the spindle stops for a period of time and then loosens.

A010.4 Spindle tool clamping detection abnormality

Alarm reason: The clamping signal is not detected in the T020 set time after the tool is released;

Handling: Press [Reset] to cancel the alarm, check whether the T020 setting time is correct, check the installation position of the switch and whether the switch is damaged.

A010.5 Spindle tool release detects abnormalities

Alarm reason: The release signal is not detected in the T09 set time after the tool is released;

Processing: Press [Reset] to cancel the alarm, check whether the T09 setting time is correct, check the installation position of the switch and whether the switch is damaged.

A010.7 Spindle loose knife tightening knife detection abnormality

Alarm reason: At the same time, the loose knife / clip knife is in place signal;

Handling: Press [Reset] to cancel the alarm and check the installation position of the switch and whether the switch is damaged.

A011.0 Indexing Table Locking Loose is not in place

Alarm reason: When the output clamping/loosening signal is output, the release/clamping in place signal is not detected within the T043/T044 time.

Handling: Press [Reset] to cancel the alarm and check the installation position of the switch and whether the switch is damaged.

A011.1 Indexing table lock loosening detects abnormalities

Alarm cause: Spot spot of loosening in place and clamping in place at the same time.

Handling: Press [Reset] to cancel the alarm and check the installation position of the switch and whether the switch is damaged.

A011.2 The indexing table is not released and cannot be moved to the 4th axis

Alarm reason: In the case of automatic indexing work effective K1.7=1, the system does not detect the release of the 4th axis when the signal is released in place

Processing: Press [Reset] to cancel the alarm, and move the 4th axis in the indexing table release state.

A011.3 Indexing table is not locked and cannot be moved the XYZ axis

Alarm reason: In the case of automatic indexing effective K1.7=1, K1.4=0, the system does not detect any axis of XYZ when the release of the arrival signal is not detected

Processing: Press [Reset] to cancel the alarm, move the XYZ axis in the indexing table clamping state or change K1.4 to 1.

A012.5 Spindle orientation timing detection anomaly

Alarm reason: spindle orientation in place signal has an input in case of directional alarm;

Processing: Press [Reset] to cancel the alarm and reset the spindle orientation in place signal

input level (K21.1).

A012.6 Spindle tool release does not perform spindle positioning

Alarm reason: spindle directional output alarm in the case of tool release;

Processing: Press [Reset] to cancel the alarm, the tool is not oriented when the tool is released.

A012.7 (bucket type, disc type) The tool magazine is not at the origin and spindle positioning cannot be performed

(Turret) The Z-axis is in the tool change interval and spindle positioning cannot be performed

Alarm reason: bucket type tool magazine: the tool magazine is not in the back position, and the alarm is generated when the spindle is positioned;

Disc tool magazine: ATC tool arm is not in the origin position, and the alarm is generated when the spindle is positioned;

Turret type tool magazine: when the Z-axis is in the tool change section, the spindle generates an alarm when it performs positioning;

Processing: Press [Reset] to cancel the alarm, determine that the tool magazine is back to the original position, and then perform the spindle positioning operation.

A013.0 Command Knife Number T is 0

Alarm reason: turret type tool magazine: Execute the T0 code when changing the tool to generate an alarm

Processing: Press [Reset] to cancel the alarm, the turret magazine can not execute the T0 code

A013.1 Spindle orientation in place detection abnormality

Alarm reason: The spindle orientation signal is not detected after the system outputs the spindle orientation after the T023 and T018 setting time;

Processing: Press [Reset] to cancel the alarm, the spindle orientation in place signal X4.2 and +24V on/off effective, check whether the wiring is normal; Check whether the T023/T018 time setting is normal.

A013.2 The spindle tool number is inconsistent with the tool magazine and the tool magazine cannot be advanced

Alarm reason: After opening the tool magazine function, when the current tool number of the spindle is inconsistent with the knife number of the knife magazine cutterhead, the tool magazine is manually controlled in the manual / handwheel mode to advance alarm;

Processing: Press [Reset] to cancel the alarm, the tool magazine forward condition is that the current spindle tool number is equal to the tool magazine tool number, and the tool number position is required for manual rotation of the tool magazine transposition.

A013.3 The Z-axis is not at the **2/3rd reference point, and the magazine cannot be advanced**

Alarm reason: After opening the tool magazine function, when the Z axis is not in the 2nd or 3rd reference point, manually control the tool magazine forward alarm in the manual/handwheel mode;

Processing: Press [Reset] to cancel the alarm, the magazine forward condition is the Z axis and then the 2nd or 3rd reference point position, you can perform the G91G30 Z0 return to the first in the MDI mode 2 reference points.

A013.4 (Bucket Type) The magazine is not **rotating when it is not in the back position and the Z axis is not at** the **3rd** reference point

The (disc type) magazine tool holder is not in the return tool in place, and the tool magazine cannot be rotated

(Turret) The Z axis is not in the permissible rotation zone of the tool magazine, and the tool magazine is not rotatable

Alarm reason: bucket type tool magazine when the Z axis is not in the 3rd reference point or the tool magazine is not in the back position of the position, control the tool magazine rotation alarm;

Disc type tool magazine When the knife sleeve is not in the return tool position, control the tool magazine rotation alarm;

Turret type tool magazine when the Z axis is not in the allowable rotation range of the tool magazine, control the tool magazine rotation alarm;

Processing: Press [Reset] to cancel the alarm.

A013.5 Non-manual/handwheel mode does not allow manual control of the tool magazine

Alarm reason: After opening the tool magazine function, the tool magazine alarm is not manually controlled in the manual / handwheel mode;

Processing: Press [Reset] to cancel the alarm, and the manual control of the tool magazine conditions must be controlled in the manual/handwheel mode.

A013.6 (bucket type, disc type) The tool magazine is not zero **back to zero at the origin position**

The (turret) Z-axis is not in the magazine to allow rotation to be non-zero

Alarm reason: the bucket type knife magazine is not in the back position of the position, and the control tool magazine returns to zero alarm;

When the disc tool magazine knife holder is not in the return position, the control tool magazine back to zero alarm;

Turret type tool magazine: when the Z axis is not in the allowable rotation range of the tool magazine, the control magazine back to zero alarm;

Processing: Press [Reset] to cancel the alarm, manually control the tool magazine back to zero condition when the back to zero mode tool magazine back to the origin position.

A013.7 Tool change first execute the T command tool number

Alarm reason: after opening the tool magazine function, the T code is not specified before executing the tool change instruction M6 alarm;

Processing: Press [Reset] to cancel the alarm, and specify the T code before executing the tool change instruction M6.

A014.0 The Z-axis does not return to the mechanical zero point and cannot be changed

Alarm reason: After opening the tool magazine function, the tool change is performed when the Z axis does not return to zero;

Processing: Press [Reset] to cancel the alarm, and specify the T code before executing the tool change instruction M6.

A014.1 (Bucket Type) The cutterhead is not in the counting position and cannot be entered

The cutterhead (disc type) is not in the counting position and cannot be reversed

The cutterhead (turret) is not in the counting position and the Z axis is not movable

Alarm reason: when the bucket type knife magazine cutterhead is not in the counting position, the control tool magazine forward alarm;

When the disc type cutterhead is not in the counting position, the control knife sleeve inverted knife alarm;

When the turret cutterhead is not in the counting position, the Z-axis movement alarm is controlled;

Processing: Press [Reset] to cancel the alarm, manually control the cutterhead of the tool magazine must be in the counting position.

A014.2 (bucket type, disc type) The tool magazine is not in the origin position and the spindle is not rotatable

The (turret type) Z-axis is in the tool change section, and the spindle cannot be rotated

Alarm reason: when the bucket type tool magazine is not in the back position, the starting spindle generates an alarm;

When the disc type tool magazine ATC tool arm is not at the origin, the starting spindle generates an alarm;

Turret tool magazine: when the Z axis is in the tool change area, the spindle is activated to generate an alarm;

Processing: Press [Reset] to cancel the alarm, manually control the tool magazine back to the origin position.

A014.3 The spindle tool is loosened and the tool change cannot be performed

Alarm reason: After opening the tool magazine function, the tool is released to perform the tool change alarm;

Processing: Press [Reset] to cancel the alarm, and change the tool after clamping.

A014.4 The current cutterhead has a knife and cannot be entered

Alarm reason: after opening the tool magazine function, the knife magazine advances when the current cutterhead has a knife;

Processing: Press [Reset] to cancel the alarm, the tool magazine returns to zero or reset the spindle tool number D105.

A014.5 The current cutterhead has a knife number and spindle and cannot be entered

Alarm reason: After opening the tool magazine function, the current cutterhead and spindle are detected when the knife is controlled when the tool is alarmed;

Processing: Press [Reset] to cancel the alarm and remove the knife on the spindle.

A014.6 The current spindle tool number is zero, the spindle has a knife, and the tool cannot be changed

Alarm reason: after opening the tool magazine function, the spindle detection knife has a knife when the current spindle tool number is 0;

Processing: Press [Reset] to cancel the alarm and remove the knife on the spindle.

A014.7 The spindle has a knife, the Z axis is not in the loading position, and the knife cannot be entered

Alarm reason: After opening the tool magazine function, the current spindle is detected with a knife, and the Z axis is not at the 2nd reference point, the control tool magazine tool entry alarm;

Processing: Press [Reset] to cancel the alarm and move the Z axis to the 2nd reference point.

A015.0 The tool magazine number counting signal detects abnormalities, and the tool magazine needs to return to zero

Alarm reason: after opening the tool magazine function, the alarm when the tool magazine count switch is not detected after the T102 set time after the tool magazine rotation stops;

Processing: Press [Reset] to cancel the alarm and check whether the T102 setting time is correct (T102=2000); Check the magazine counter for damage; The magazine counter level is selected correctly (K30.5).

A015.1 The magazine origin is lost and the magazine needs to be returned to zero

Alarm reason: After opening the tool magazine function, there is a tool magazine back to zero switch in the case: the cutterhead count is 1 when the tool magazine back to zero switch is not detected or the cutlehead count is not 1 when the tool magazine back zero switch is detected;

Processing: Press [reset key] in the zero return mode to cancel the alarm, and the tool magazine returns to zero.

A015.2 Tool magazine zero detection anomaly

Alarm reason: After opening the tool magazine function, the tool magazine returns to zero for more than 5 minutes without returning to zero to complete the alarm;

Processing: Press [Reset Key] to cancel the alarm, and the tool magazine returns to zero.

A015.3 The zero position of the tool magazine was set successfully

Alarm reason: After opening the tool magazine function, the tool magazine zero return to

zero is successful or no zero switch in the case of holding down the [machine tool zero point key] 7 seconds after the alarm;

Processing: Press [Reset key] to cancel the alarm, the magazine count has been redesigned.

A015.4 Abnormal stop of tool change ensures that the tool magazine is normal

Alarm reason: after opening the tool magazine function, when there is an emergency stop, reset and alarm in the process of tool change, this alarm is issued;

Processing: Press [reset key] to cancel the alarm and check whether the tool magazine is normal

A015.5 No command tool number or duplicate command tool number in the tool table

Alarm reason: After opening the tool magazine function, the tool magazine search tool in the T command exceeds the magazine capacity or there are duplicate values in D0-D99 in the tool magazine data sheet;

Processing: press [reset key] to cancel the alarm, command the correct T command, or (when returning the knife) modify the current tool number D105 of the spindle; Check the magazine data sheets D0-D99 for errors.

A015.6 The tool magazine is in the forward state, and the spindle tool cannot be moved without releasing the Z-axis

Alarm reason: after opening the tool magazine function, when the tool magazine is in the forward state, when the tool is not released, the Z axis alarm is moved;

Processing: Press [Reset key] to cancel the alarm, the tool magazine must be released to move the Z axis when the tool magazine is in the forward state.

A015.7 (Bucket Type) The spindle is not positioned and the magazine cannot be advanced

The (turret type) spindle is not positioned, and the **Z-axis cannot enter the tool change area**

Alarm reason: (bucket type) after opening the tool magazine function, when the spindle has a positioning function, the unpositioned control tool magazine forward alarm;

(Turret) After opening the tool magazine function, when the spindle has a positioning function, the Z axis is not positioned to control the tool change area alarm;

Processing: Press [reset key] to cancel the alarm, so that the spindle positioning, and then control the tool magazine forward, the spindle does not have the positioning function to change K21.1 to 1.

A016.0 Tool magazine forward/inverted tool in place detects abnormalities

Alarm reason: After opening the tool magazine function, the forward / backward knife of the tool magazine is not detected after the T104 setting time;

Processing: Press [reset key] to cancel the alarm, check whether the T104 setting is correct (T104=3000), check whether the tool magazine is normal, and manually control the tool magazine rewind/retract.

A016.1 Tool magazine back/return tool in place detection abnormality

Alarm reason: After opening the tool magazine function, the tool magazine back / back tool is not detected after the T105 setting time is not detected back into place;

Processing: Press [reset key] to cancel the alarm, check whether the T105 setting is correct (T105=5000), check whether the tool magazine is normal, and manually control the tool magazine rewind/retract.

A016.2 Tool magazine forward and backward / **backward knife / return tool detection abnormality**

Alarm reason: After opening the tool magazine function, the tool magazine forward/reverse knife in place and the back / back knife in place signals are sensed at the same time;

Processing: Press [reset key] to cancel the alarm, check the installation position of the tool magazine forward and backward/reverse knife return knife in place switch, check the forward and backward/reverse knife return switch level selection (K30.3/K30.4).

A016.3 (disc type) The tool is not clamped and the arm cannot be returned to the point of origin

Alarm reason: when the tool is not clamped, control the ATC knife arm back to the original point;

Processing: Press [reset key] to cancel the alarm, the tool clamping can be performed to return the arm to the original point;

A016.4 The spindle tool cannot be reversed without clamping the tool magazine

Alarm reason: after opening the tool magazine function, the tool is not clamped to control the tool magazine back alarm;

Processing: Press [reset key] to cancel the alarm, and the tool can be clamped before the tool can be controlled to retreat.

A016.5 Abnormal magazine rotation forces the cessation of rotation

Alarm reason: After opening the tool magazine function, the tool magazine rotates after T110, T111, T103 time does not check the tool magazine counter signal change alarm;

Processing: press [reset key] to cancel the alarm, check whether there is rotation, if there is rotation, check whether T110, T111, T103 and the magazine counter signal is normal (T110=5000; T111=3000; T103=3000）; If there is no rotation, check for problems with the magazine circuit.

A016.6 (bucket type, disc type) The tool magazine is not in the origin position and cannot be started

The (turret type) Z axis is in the tool change interval and cannot be started

Alarm reason: the bucket type knife magazine is not in the back position, start the program alarm;

When the disc type tool magazine ATC tool arm is not at the origin, start the program alarm;

Turret tool magazine: when the Z axis is in the tool change area, the program

alarm is started;

Processing: Press [Reset Key] to cancel the alarm, manually control the tool magazine back to the original point.

A016.7 The tool magazine cannot be zeroed out without mechanical zeroing

Alarm reason: After opening the tool magazine function, the tool magazine has a zero return switch and does not execute the tool magazine zero alarm in the mechanical zero return mode;

Processing: Press [reset key] to cancel the alarm, and execute the tool magazine to zero in the mechanical zero return mode.

The A017.0 tool magazine is not at the origin and the Z axis is not movable

Alarm reason: when the bucket barrel is not in the back position, move the Z axis;

Move the Z axis when the disc magazine arm is not in the origin position;

Processing: Press [Reset Key] to cancel the alarm, manually control the tool magazine back to the origin position.

A017.1 (Disc type) The tool arm is not at the origin and cannot be reversed/returned

Alarm reason: when the knife arm is not in the origin position, control the tool magazine inverted knife / return knife;

Processing: Press [reset key] to cancel the alarm, and return the knife arm to the origin position of the knife when manual.

A017.2 (Disc type) The tool magazine inverted knife is not in place, and the knife arm cannot be moved

Alarm reason: when the knife sleeve is not in the inverted knife position, control the ATC knife arm action;

Processing: Press [reset key] to cancel the alarm, and the knife sleeve is in place when manual.

A017.3 (Disc type) The spindle is not positioned and the knife arm cannot be moved

Alarm reason: when the spindle is not positioned, control the ATC knife arm action;

Processing: Press [Reset Key] to cancel the alarm, and the knife arm action can be performed after the spindle positioning is completed.

A017.4 (Disc type) The Z-axis is not at the 2nd reference point, and the knife arm cannot be moved

Alarm reason: When the Z axis is not at the 2nd reference point, control the ATC knife arm action;

Processing: Press [Reset Key] to cancel the alarm, the Z axis must be at the 2nd reference point to perform the knife arm action.

A017.5 (disc type) The tool is not clamped and the knife arm cannot be snapped

Alarm reason: when the tool is not clamped, control the ATC knife arm clip knife;

Processing: Press [reset key] to cancel the alarm, the tool clamping can perform the knife arm clip;

A017.6 (Disc type) The tool is not loosened and **the arm cannot be pulled down and rotated**

Alarm reason: when the tool is not released, control the ATC arm pull-down rotation;

Processing: Press [reset key] to cancel the alarm, the tool is released to perform the knife arm action.

A017.7 (Disc) Tool arm running time is too long

Alarm reason: knife arm running time exceeds T115 set time alarm;

Processing: Press [reset key] to cancel the alarm, check whether the T115 data setting is reasonable, and check whether the knife arm brake signal is valid.

A018.0 (disc type) knife arm clipper is not in place

Alarm reason: When performing the knife action, the T112 setting time is not detected to signal the knife in place

Processing: Press [reset key] to cancel the alarm, check whether the T112 data setting is reasonable, and check whether the knife clip knife in place signal is valid.

A018.1 (Disc type) Arm pull-down rotation does not rise in place

Alarm reason: When performing the pull-down rotation action, the knife in place signal alarm is not detected after the T113 setting time

Processing: Press [reset key] to cancel the alarm, check whether the T113 data setting is reasonable, and check whether the knife in place signal is valid.

A018.2 (Disc type) The tool arm return point is not in place

Alarm reason: When performing the action back to the origin, the origin signal alarm is not detected after the T114 setting time

Processing: Press [reset key] to cancel the alarm, check whether the T114 data setting is reasonable, and check whether the origin in place signal is valid.

A018.3 (Disc) Tool arm operation abnormal

Alarm reason: when performing the knife arm action, the system issues an alarm when resetting, alarming, and emergency stopping;

Processing: Press the [reset key] to cancel the alarm.

A018. 4 M22 Tool Finding Abnormal

Alarm reason: When the M 22 tool hunting action is performed, the alarm is generated when the tool magazine stops rotating and passes through T117 time when the M22 code is not completed;

Processing: Press the [reset key] to cancel the alarm.

A020.0 Guard door opened warning

Alarm reason: After opening the protective door detection function, a warning is issued when the protective door signal is not detected;

Processing: Press [Reset Key] to cancel the alarm when closing the protective door, and the program cannot be started when the warning is triggered.

A020.1 Warning of insufficient lubricating oil

Alarm reason: Warning after delaying T03 set time in case of insufficient lubricating oil is detected;

Handling: Add lubricating oil, press [Reset key] to cancel the warning; Check that the lubricating oil detection level is selected correctly (K16.2).

A020.2 Warning of insufficient air pressure

Alarm reason: Warning is issued after delaying the T02 set time in the case of insufficient air pressure;

Treatment: check whether the intake element is normal, and cancel the warning after waiting for the air pressure to flush out; Check that the low air pressure detection level is selected correctly (K20.2) and warn that the program will not start when triggered.

A020.3 Zero warning for spindle tool number

Alarm reason: not warning when the current tool number of the spindle is 0 during the tool change process;

Processing: Check for a knife on the spindle, remove the tool to re-perform the tool change or modify the current tool size value D105 for the spindle.

A020.4 Tool magazine commissioning function opens warning

Alarm reason: tool magazine debugging function to open K30.7=1 trigger warning;

Processing: After confirming that the tool magazine is normal, turn off the debugging function to cancel the warning, and the warning cannot start when triggered.

A020.5 Warning in the tool magazine back to zero

Alarm reason: trigger warning when the tool magazine magazine returns to zero;

Processing: After the end of the tool magazine zero, the warning is can't be stopped, and the warning cannot start when triggered.

A020.6 (Bucket Type) magazine warning that it is not in the back position
(Disc) knife arm is not at the origin warning
(Turret) Z-axis warning in the tool change zone

Alarm reason: (bucket type) is not in the process of changing the tool, the tool magazine is not in the back position to trigger the warning;

(Disc type) is not in the process of tool change, and the knife arm is not at the origin position to trigger the warning;

(Turret) is not during the tool change, the Z axis triggers a warning in the tool change zone

Processing: Controls the tool magazine to fall back to the back position of the tool magazine to cancel the warning, warning that the program cannot be started when triggered.

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