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, any operation not specifically specified in this user manual is considered "impossible" or "not allowed".

preface

Dear Customer:

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

This user manual details the programming, operation, and installation and connection of lathe CNC. 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 personnel with appropriate qualifications must be required to operate the system.

Special note: The system power supply installed on the chassis (inside) is a dedicated power supply provided only for the numerical

control system manufactured by the company. Users are prohibited from using this power supply for other purposes. Otherwise, there will be great danger!

Precautions

■ Transportation and storage

1. The stacking of product packaging boxes should 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 move the product;

4. Collision and scratching of the panel and display screen are strictly prohibited;

5. The product packaging box should avoid moisture, exposure to the sun and rain.

■ Unpacking inspection

1. After opening the package, please confirm whether it is the product you purchased;

2. Check whether the product is damaged during transportation;

3. Check whether the components are complete and whether there is damage to the list;

4. If there is a product model discrepancy, missing accessories or transportation damage, please contact the company in time.

■Wiring

1. The personnel participating in the wiring and inspection must be professionals with corresponding abilities;

2. The product must be reliably grounded, the grounding resistance should be less than 0.1Ω, and the neutral wire (zero line) 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 unintended consequences;

4. The surge absorption diode connected to the product must be connected in the prescribed direction, otherwise the product will be damaged;

5. Before plugging in or unplugging the plug or opening the product chassis, you must cut off the power to the product.

■Overhaul

1. The power supply must be cut off before overhauling or replacing components;

2. When short circuit or overload, the fault should be checked, and the restart can be restarted after troubleshooting;

3. Do not frequently power off the product, if you must re-energize after the power failure, the interval is at least 1min.

statement

The manual describes as many different elements as possible, but because of the possibilities involved to describe all the operations that can or cannot be performed, the contents of this manual that are not specifically described may be considered unusable.

warn

Before installing, connecting, programming and operating this product, it is necessary to read the product manual and the instruction manual of the machine tool manufacturer in detail, and strictly follow the requirements of the manual and the manual for related operations, otherwise it may lead to damage to the product, the machine tool, the scrapping of the workpiece and even personal injury.

note

The product functions and technical indicators (such as accuracy, speed, etc.) described in this manual 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 instruction manual of the machine tool manufacturer;

Although the system is equipped with a standard machine tool operation panel, the functions of the buttons of the standard machine tool panel are defined by the PLC program (ladder diagram). Please note that the functions of the keys in the machine panel of this manual are described for standard PLC procedures!

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

The third system installation connection instructions

Describes how to install, connect, and set up the system.

Safety Responsibility

Manufacturer's responsibility for safety

- The manufacturer shall be responsible for the design and structural elimination and/ or control 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 accompanying supply.

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

User's Security Responsibility

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

-- The user shall be responsible for the safety and danger caused by adding, changing or modifying the original NUMERICAL control 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 collection of end users. Sincerely thank you for your friendly support when using our products!**

directory

Chapter 1 Installation Layout

1.1 Lathe system connection

1.1.1 Horizontal and vertical system back cover terminal layout

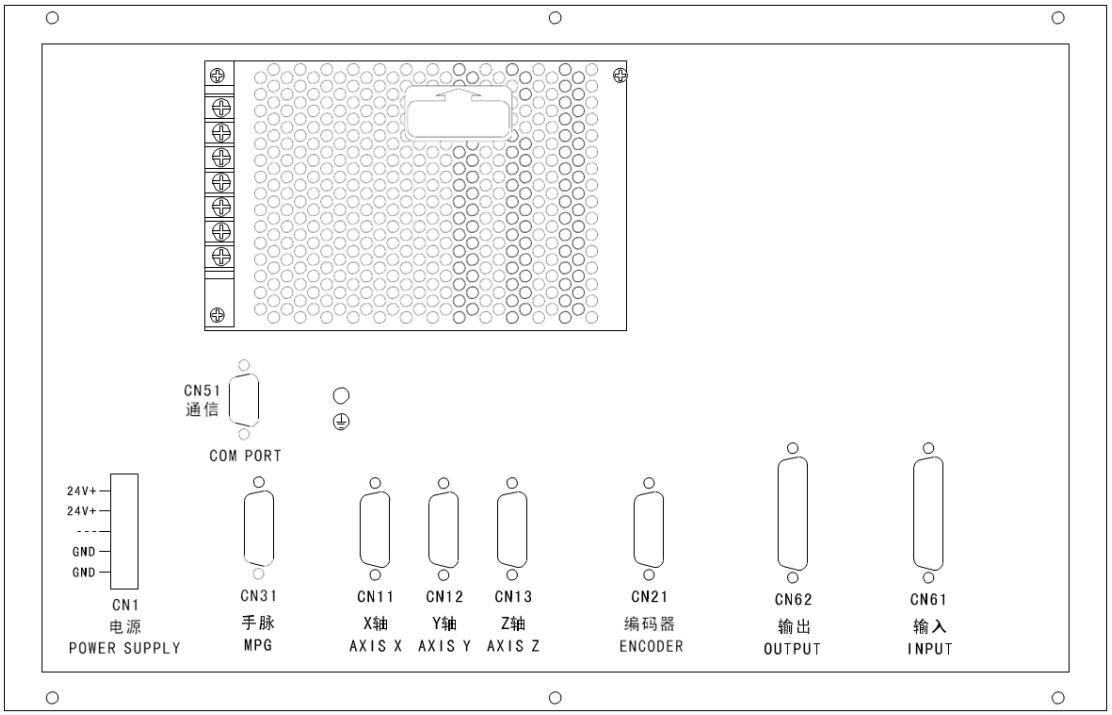


Figure 1-1 Horizontal system back cover interface layout

1.1.2 Interface Description

◎Power supply box: +24V, GND power supply
◎Filter (optional): The input is an AC 220V power input, the PE terminal is grounded, and the output is terminated to the L and N terminals of the power supply box
◎ CN1: Power connector
◎ CN11: X-axis, 15-core D-hole socket, connected to X-axis drive unit
◎ CN12: Y axis, 15-core D-hole socket, connected to the Y-axis drive unit
◎ CN13: Z axis, 15-core D-hole socket, connected to the Z-axis drive unit
◎ CN14: 4th shaft, 15-core D-hole socket, connected to 4th shaft drive unit
◎ CN21: Encoder, 15-core D-pin socket, connect spindle encoder
◎ CN31: Handwheel, 26-core D-pin socket, connected to handwheel
◎ CN51: Communication, 9-core D-hole socket, connected to PC RS232 interface
◎ CN61: input, 25-core D-hole socket, connected to the machine input
◎ CN62: output, 25-core D-pin socket, connected to the machine output

1.2 Lathe system installation

1.2.1 Installation conditions of the electrical cabinet

◎The electrical cabinet must be able to effectively prevent the entry of dust, coolant and organic solution;
◎When designing the electrical 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 inside 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 electrical cabinet;
◎The display panel must be installed where the coolant cannot be sprayed;
◎When designing the electrical cabinet, it must be considered to minimize external electrical interference and prevent interference from being transmitted to THE CNC .

1.2.2 Methods of Preventing Interference

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

1. THE CNC should be kept away from the equipment that produces interference (such as frequency converters, AC contactors, electrostatic generators, high-voltage generators and segmented devices of power lines, etc.).
2. To supply power to the CNC through the isolation transformer, the machine tool installing the CNC must be grounded, and the CNC and the drive unit must be connected to a separate grounding wire from the grounding point.
3, suppress interference: in the AC coil at both ends of the parallel connection RC circuit (figure 1-3), 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); At the winding end of the AC motor and connect the surge absorber (Figure 1-5).

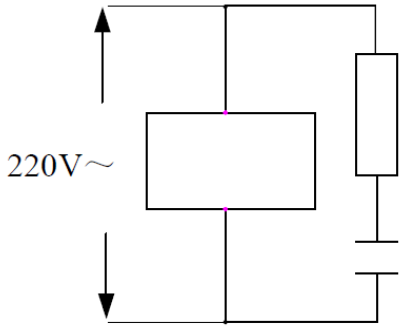


Figure 1-3

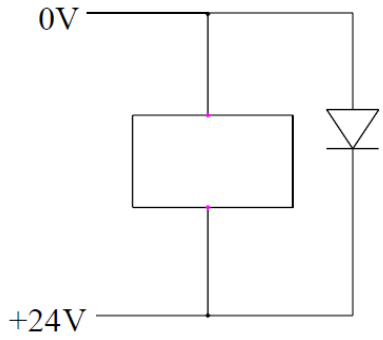


Figure 1-4

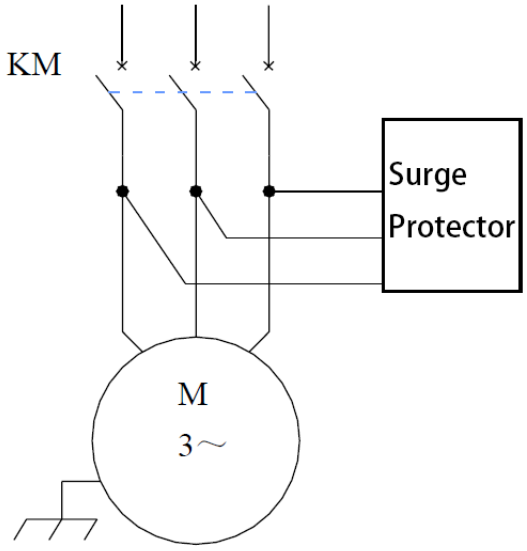


Figure 1-5

4, CNC lead out cable using stranded shielded cable or shielded cable, the shielding layer of the cable in the CNC side to take a single end ground, the signal line should be as short as possible.
5. In order to reduce the mutual interference between the CNC signal cable and the strong electric cable, the following principles should be followed when wiring:
Group cable type wiring requirements

Cons	The type of cable	Cabling requirements
A	AC power cord	Bundle the cables of Group A separately from Groups B and C, leaving a distance of at least 10cm
	AC coil	
	AC contactors	
B	DC Coil (DC24V)	Bundle or shield a Group B cable separately from a Group A cable; The farther away the
	DC Relay (DC24V)	
	Cable between CNC and	
	Cable between CNC and	
C	Cable between CNC and servo	Bundle Group C separately from Group A cables, or screen group C cables The distance to the B cable is as small as 10cm, and the cable is
	Position feedback cable	
	Position encoder cable	
	Handwheel cable	
	Other shielded cables	

Chapter 2 Interface Signal Definition and Connection

2.1 Connection to the drive unit

2.1.1 Driver Interface Definition

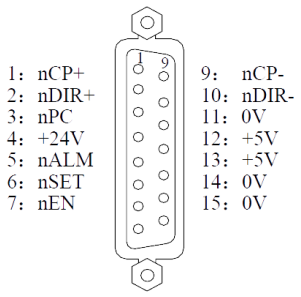


Figure 2-1 CN11,CN12,CN13,CN14 (15-core D-hole socket) interface

Signal	illustrate
nCP+、nCP-	Command pulse
nDIR+、nDIR-	Command direction
nPC	Zero signal
nALM	Drive alarm signal
nEN	Shaft enable signal
nSET	Pulse suppression

2.1.2 Command pulse signal and command direction signal

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

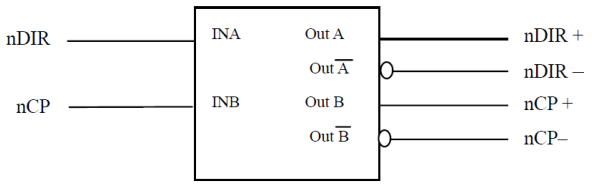


Figure 2-2 Internal circuit of instruction pulse signal and instruction direction signal

2.1.3 Drive unit alarm signal nALM

Bit0, Bit1, Bit2, Bit3, and Bit4 by CNC parameters No.009 Bit sets whether the drive unit alarm level is low or high. The internal circuit is shown in Figure 2-3

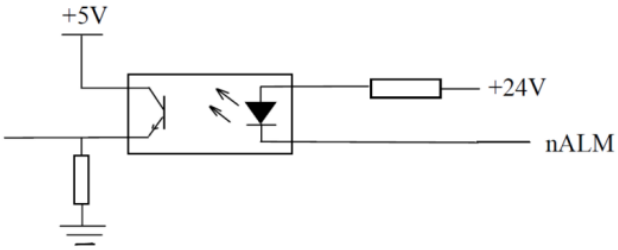


Figure 2-3 Drive unit alarm signal internal circuit

This type of input circuit requires the drive unit to provide the signal in figures 2-4 below:

Method 1: Method 2:

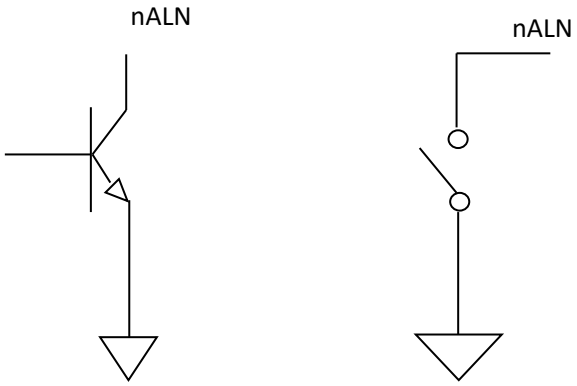


Figure 2-4 Method for providing signals from the driver unit

2.1.4 Axis enable signal nEN

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

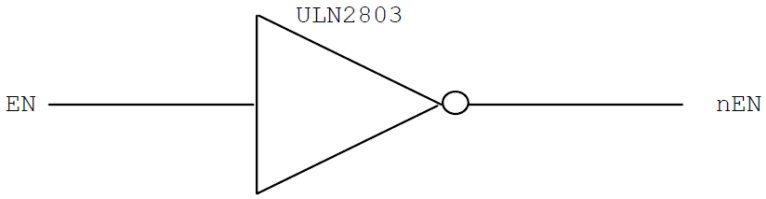


Figure 2-5 Internal interface circuit of the axis enable signal

2.1.5 Pulse suppression signal nSET

The nSET signal is used to control the servo input suppression and improve the immunity between the CNC and the drive unit, which is high impedance when the CNC has a pulsed signal output and a low level when the pulseless signal output is not. The internal interface circuit is shown in Figure 2-6 below

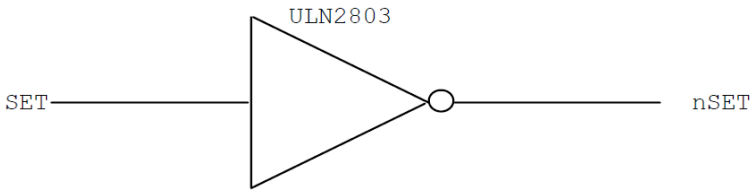


Figure 2-6 Pulse suppression circuit

2.1.6 Zero signal nPC

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

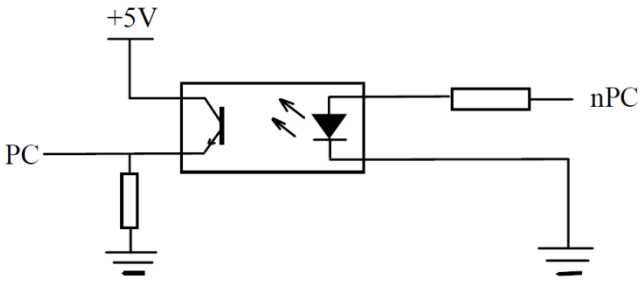


Figure 2-7 Zero signal circuit

Note: The nPC signal is at a +24V level.

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

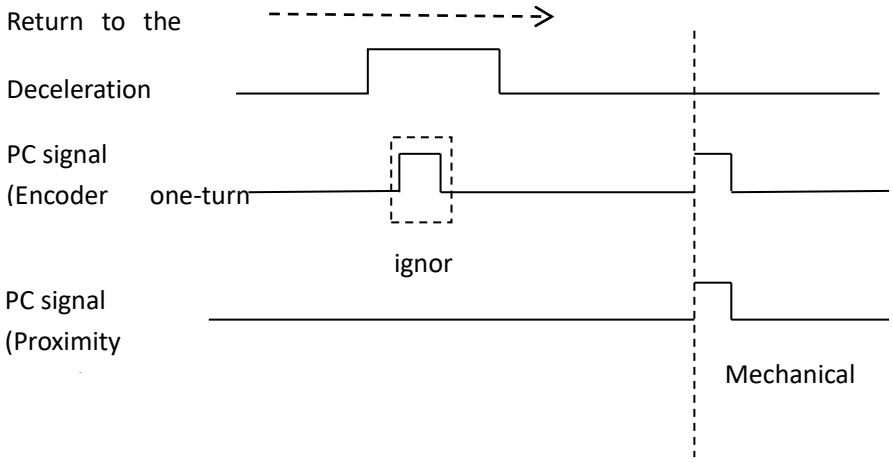


Figure 2-8 PC Signal Waveform Diagram

Note: When the machine returns to zero, the CNC determines the position of the reference point by detecting the transition 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 to do both deceleration signal and zero signal is shown in Figure 2-9 below:

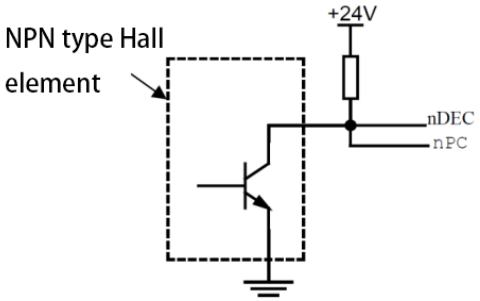


Figure 2-9 Connection with an NPN type Hall element

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

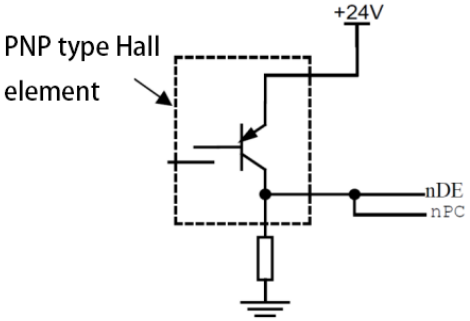


Figure 2-10 Connection **of a** Hall **element of the PNP** type

2.1.7 Connection to the drive unit

The connection of the lathe system to the drive unit is shown in Figure 2-11 below:

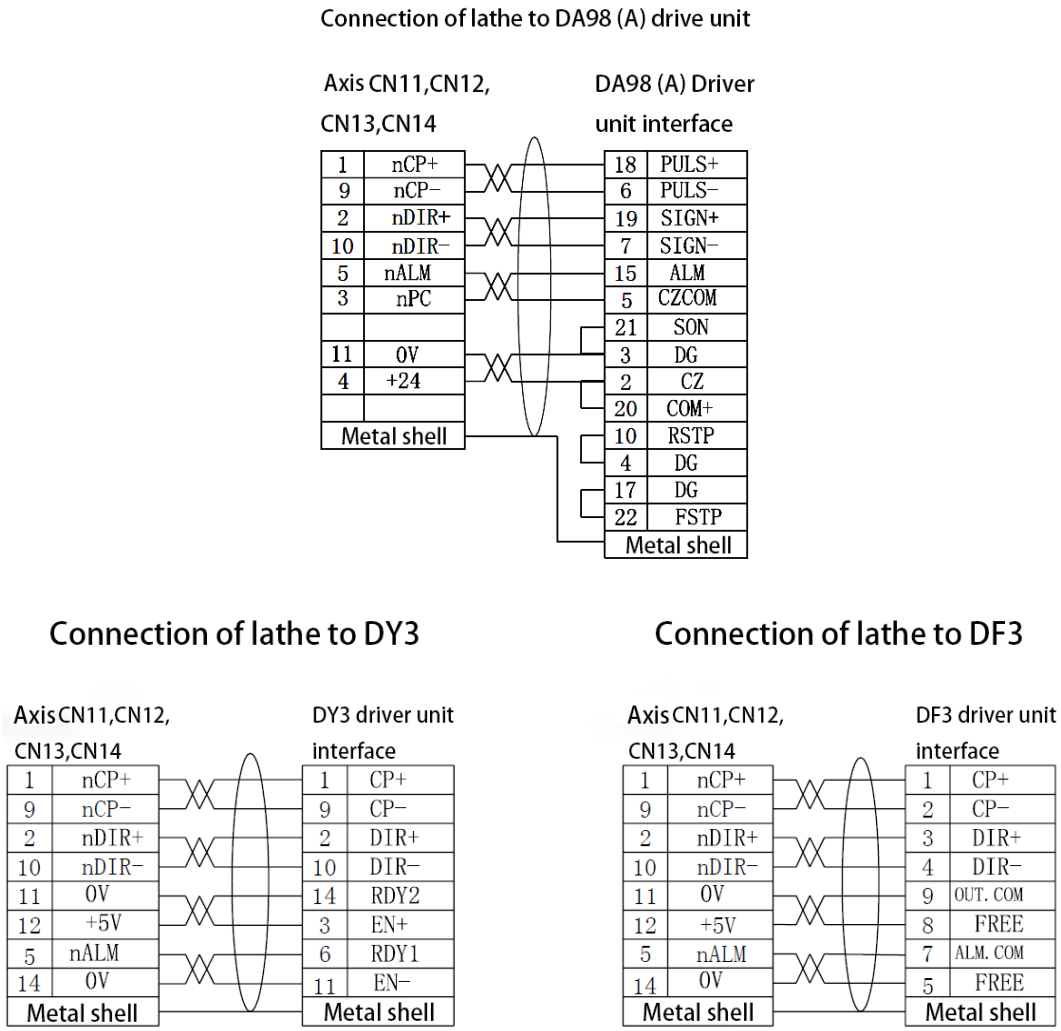


Fig. 2-11 Connection of **a lathe system to a drive unit**

2.2 Connection to spindle encoders

2.2.1 Spindle encoder interface definition

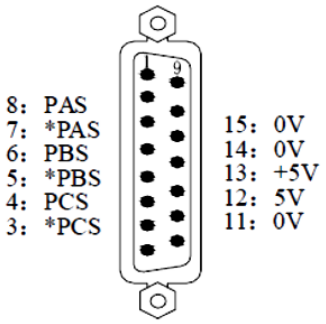


Figure 2-12 CN21 Encoder interface (15-core D-pin socket)

Foot number	name	illustrate
1、11、14、15	GND	Power supply 0V
2	nALM_M	Spindle alarm signal
3	#PCS	Encoder C phase negative pulse
4	PCS	Encoder C phase forward pulse
5	#PBS	Encoder B phase negative pulse
6	PBS	Encoder B phase forward pulse
7	#PAS	Encoder A phase negative pulse
8	PAS	Encoder A phase forward pulse
9	SVC_OUT	Spindle analog voltage output
12	TH5IO5V	Power supply 5V
13	TH5IO5V	Power supply 5V

2.2.2 Signal Description

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

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

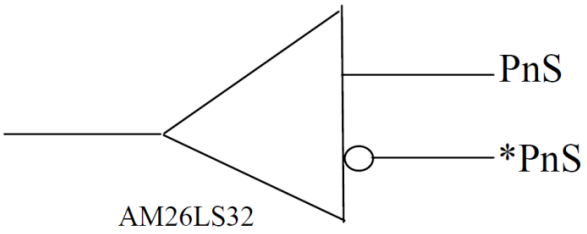


Figure 2-13 Encoder signal circuit

2.2.3 Spindle encoder interface connection

The connection of the lathe system to the spindle encoder is shown in Figure 2-14 below, using twisted pair wire. (Take Changchun Yiguang ZLF-12-102.4BM-C05D encoder as an example):

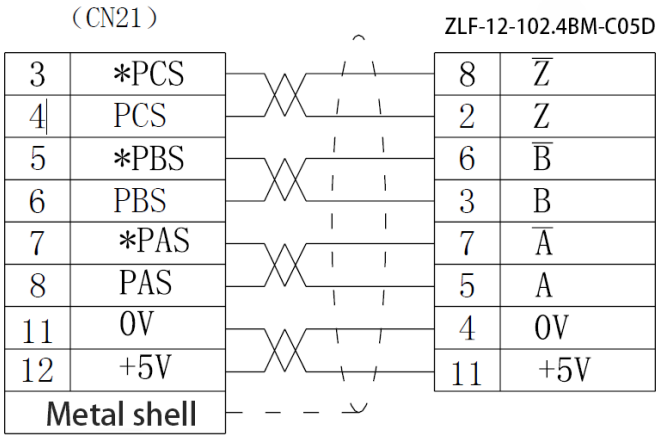
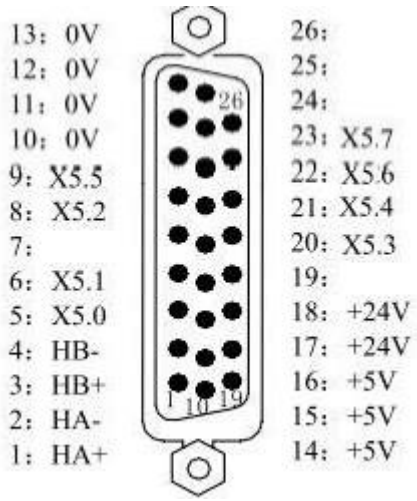


Figure 2-14 The connection to the encoder

2.3 Connection to the handwheel

2.3.1 Handwheel Interface Definition



Signal	illustrate
HA+、HA-	Handwheel A believe number
HB+、HB-	Handwheel B believes in the number
X5.0	X hand axle selection /T05
X5.1	Three-position switch 2
X5.2	Z hand axle selection /T06
X5.3	Three-position switch 1
X5.4	Y-axis hand wheel axle selection
X5.5	Increment × 1/T07
X5.6	Increments × 10/T08
X5.7	Increment × 100
+24V	DC power supply
VCC、GND	

2.3.2 Signal Description

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

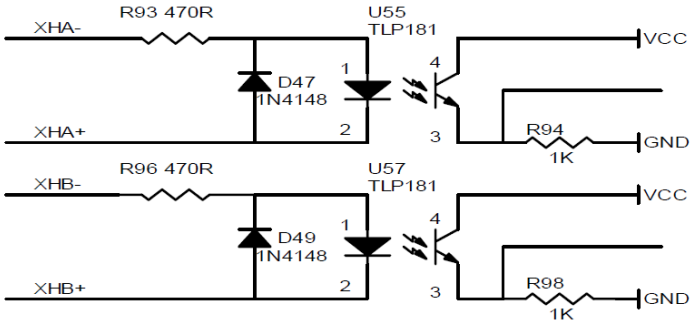


Figure 2-16 Handwheel signal circuit

The connection of the lathe system to the handwheel is shown in Figure 2-17 below:

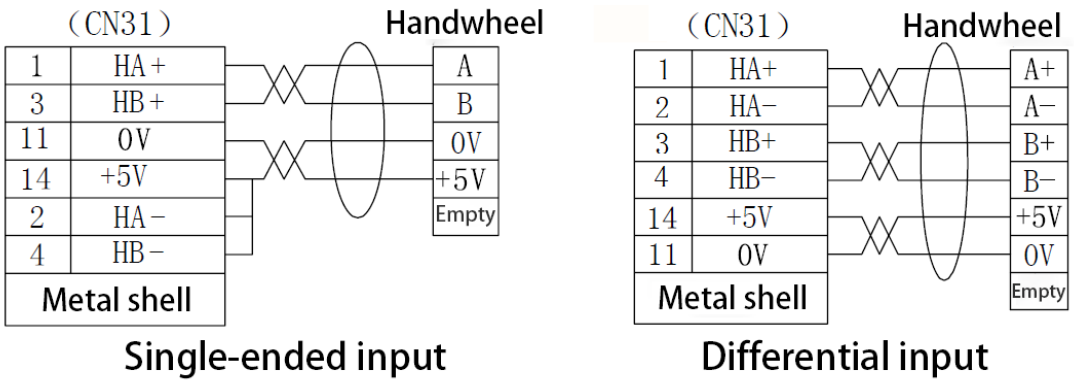


Fig. 2-17 Connection of **the lathe to the handwheel**

2.4 Spindle interface

2.4.1 Ordinary frequency converter connection

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

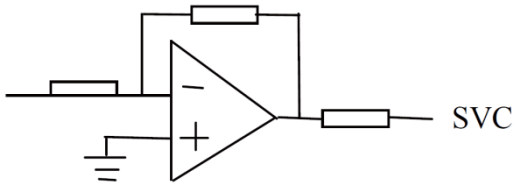


Figure 2-20 SVC signal circuit

The connection between the lathe system and the frequency converter is shown in Figure 2-21 below:

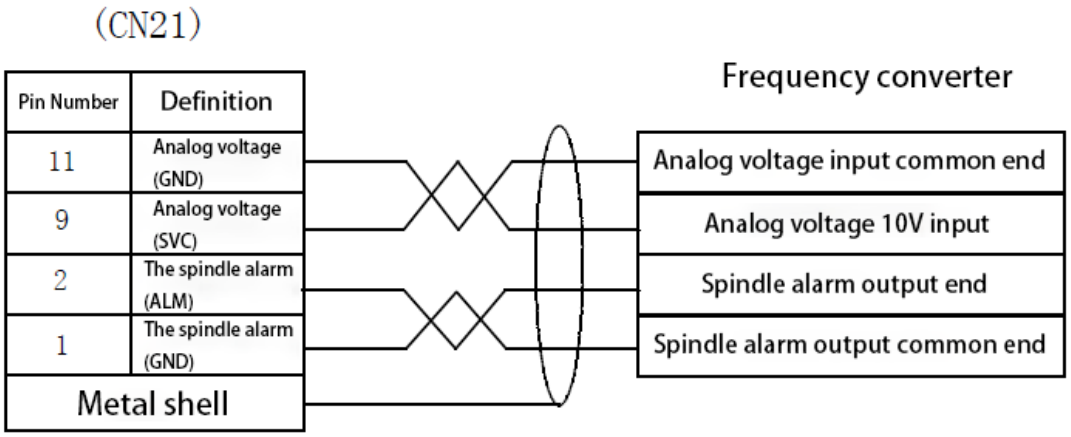


Fig. 2-21 Connection of **a lathe to a frequency converter**

2.5 The connection between the lathe and the serial port of the PC

2.5.1 Communication Interface Definitions

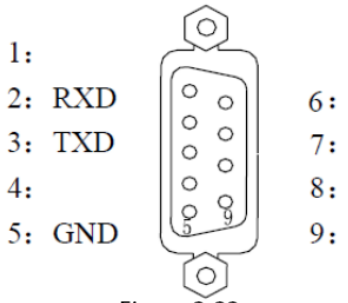


Figure 2-22
Communication, 9-core D-hole socket

Signal	illustrate
RXD	Receive data
TXD	Send data
GND	Signal ground

2.5.2 Communication interface connection

The lathe system can communicate with the PC via the CN51 interface (optional communication software). The connection of the lathe to the PC is shown in Figure 2-23A below:

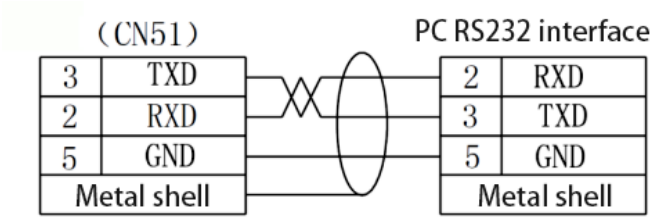


Fig . 2-23A Lathe system connection to a PC

The lathe system can communicate with another lathe system via the CN51 interface . The connections are shown in Figure 2-23B below:

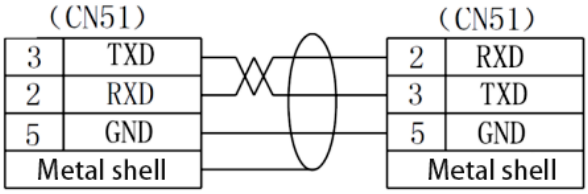


Fig . 2-23B Lathe system Connection to the lathe system communication

2.6 Power connector connection

2.6 Power connector connection

Lathe system At the factory, the power box and the CN1 interface of the system have been connected, and the user only needs to connect the external 220V AC power supply.

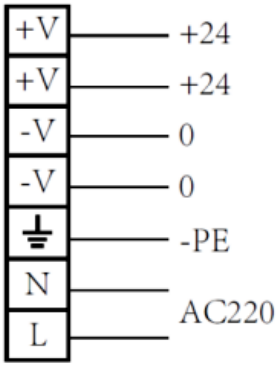


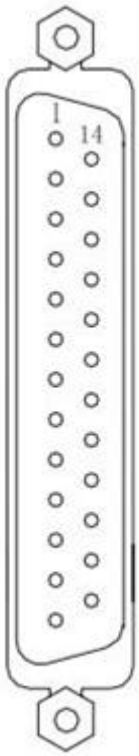
Figure 2-24
System power port CN1

2.7 I/O Interface Definitions

Note!

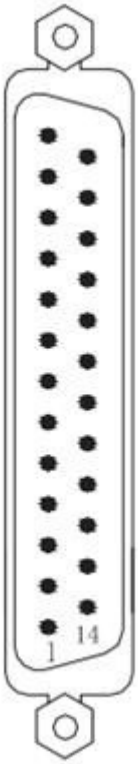
Lathe CNC is not labeled with a fixed address I/O Functional significance Defined by the PLC program (ladder diagram), when the lathe CNC assembles the machine, I/O The function is determined by the design of the machine tool manufacturer, please refer to the manual of the machine tool manufacturer.

The I/O functions not marked with fixed addresses in this section are described for lathe systems standard PLC procedures. Without special instructions, the content described applies to multiple models of systems, please note that!



Foot number	address	function	illustrate
3、10、19	0V	Power connector	Power supply 0V
4、7、11、16、20、23	+24V	Power connector	Power supply +24V
1	X0.0	WQPJ	Internal/external chuck release/clamping in place signal/Y-axis back-to-zero deceleration signal
14	X0.1	SP	External pause signal
2	X0.2	DIQP	Chuck controls input
15	X0.3	DECX	X-axis zero reduction signal/G31 jump signal
17	X0.4	DITW	Tail axis controls input
5	X0.5	ESP	Emergency stop signal
18	X0.6	TCP	Tool holder lock signal / spindle positioning completion signal / protective door signal / lubrication detection signal
6	X0.7	T01	Tool position signal T01
8	X1.0	T02	The tool position signal T02/M89K0 detects the signal/macro input #1000
21	X1.1	T03	The tool position signal T03/M89K1 detects the signal/macro input #1001
9	X1.2	T04	The tool position signal T04 / M89K2 detects the signal / macro input #1002
22	X1.3	DECZ	Z-axis zero-back deceleration signal / M89K3 heartbeat / macro input #1003
24	X1.4	ST	External loop start/M89K4 heartbeat/macro input #1004
12	X1.5	LMIX	X-axis overrange/1-gear-in-place signal M89K5 heartbeat/macro input #1005
25	X1.6	LMIZ	Z-axis overrange/2-gear-in-place signal M89K6 heartbeat/macro input #1006
13	X1.7	NQPJ	Internal/external chuck clamping/loosening in place signal/Y-axis overrun/M89K7 heartbeat/macro input #1007

Figure 2-25 Input Interface (CN61).



Foot number	address	function	illustrate
3、7、10、16、19、23	0V	Power connector	Power supply 0V
4、11、20	+24V	Power connector	Power supply +24V
1	Y0.0	COOL	Cooling output (M08/M09)
14	Y0.1	M32	Lubrication output (M32/M33)
2	Y0.2	SPJD	Spindle brake/spindle directional output/M89 I0
15	Y0.3	M03	Spindle forward M03
17	Y0.4	M04	Spindle reversal M04
5	Y0.5	M05	Spindle stop M05/ spindle position output/M89 I1
18	Y0.6	DOTWJ	Tail seat into M10
6	Y0.7	DOTWS	Tail seat retraction M11
8	Y1.0	SI/M41	Mechanical gear 1 output / yellow light / M89 I2
21	Y1.1	S2/M42	Mechanical gear 2 output / green light / M89 I3
9	Y1.2	S3/M43	Mechanical gear 3 output / red light / M89 I4
22	Y1.3	S4/M44	Mechanical gear 4 output / (guard door) M34/M35/ M89 I5
24	Y1.4	DOQPJ	Chuck clamped M12
12	Y1.5	DOQPS	The chuck releases the M13
25	Y1.6	TL+	The knife holder is forward / M89 I6
13	Y1.7	TL-	Knife holder reversal / M89 I7

Figure 2-26 Output connection (CN62).

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

Note 2: When the output function is active, the output signal internally turns **on to 0V. When the output function is invalid, the output signal is high impedance cutoff;**

Note 3: The input signal is valid when it is on with **+24V. The input signal** is invalid when it is cut off from **+24V;**

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

2.7.1 Input Signals

The input signal refers to the signal from the machine tool to the CNC, and the input signal is valid when it is switched on with +24V; When the input signal is disconnected from +24V, the input is invalid. The contact of the input signal on the machine side 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 at path: 2V or less (current 8.5mA, including voltage drop from cable).

There are two ways to input the external input of a signal:

A type of switch input with contacts in this way the signal comes from the keys on the machine side, the limit switch, and the contacts of the relay, etc., as shown in Fig. 2-27

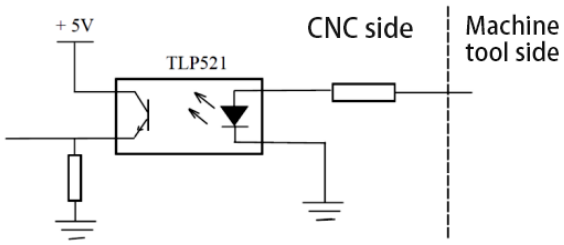


Figure 2-27

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

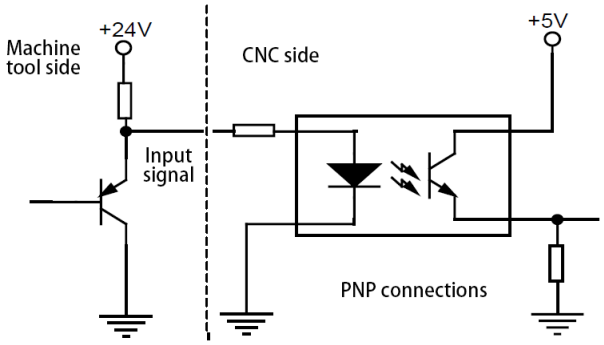


Figure 2-28A NPN type connection

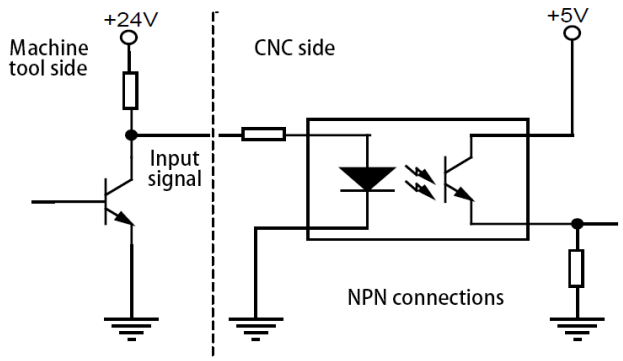


Figure 2-28B PNP type connection

The system standard PLC defines the function input interfaces XDEC, ZDEC, ESP, ST, SP, etc SAGT、PRES、BDT/DITW、DIQP、OV1 ～ OV8、 T01 ~ T08, TCP and other signals.

2.7.2 Output signal

The output signal is used to drive the relay and indicator light on the side of the machine tool, and the output signal is effective when it is switched on with 0V; When disconnected from 0V, the output function is invalid. There are a total of 16 digital outputs in the I/O interface , all of which have the same structure, as shown in Figure 2-29

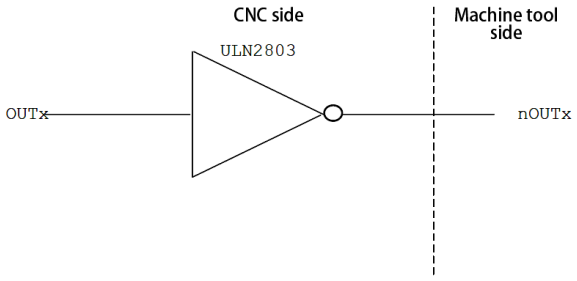


Figure 2-29 Digital output module circuit structure diagram

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

Drive a LIGHT-emitting diode

Using the UCN2803 output to drive a LED requires a resistor in series to limit the current flowing through the LED (typically about 10mA). As shown in Figure 2-30 below:

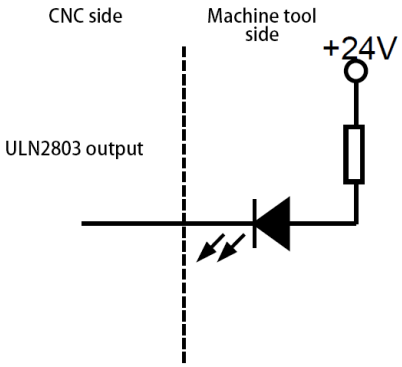


Figure 2-30

Moving filament type indicator

Using the URN2803 output to drive the filament type indicator, an external preheating resistor is required to reduce the current surge at on, and the preheating resistor is large so that the led is not lit, as shown in Figure 2-31 below.

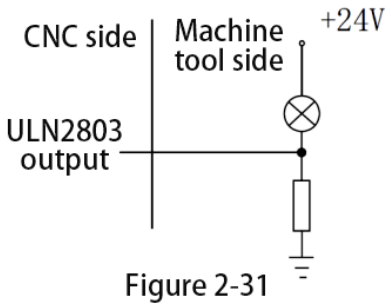


Figure 2-31

Drive inductive loads (e.g. relays)

Using the UCN2803 output to drive inductive loads, a freewheeling diode needs to be connected near the coil to protect the output circuitry and reduce interference. This is shown in Figures 2-32 above.

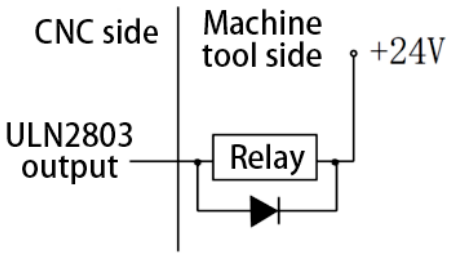


Figure 2-32

The meaning of the output signal in the I/O interface is defined by the PLC program, and the output signal defined by the standard PLC program includes S1 ~ S4 (M41 ~ M44) and M3 ～ M5、M8、M10、M11、M32、TL-、 TL+, UO0 ~ UO5, DOQPJ, DOQPS, SPZD and other signals.

2.8 I/O capabilities and connectivity

Note!

The I/O functional significance of lathe CNC is defined by the PLC program (ladder diagram), when the lathe CNC assembles the machine tool, the I/O function is determined by the machine tool factory design, please refer to the manual of the machine tool manufacturer.

The I/O functions in this section are described for standard PLC procedures for lathe systems. Without special instructions, the content described is also applicable to multiple models of systems, please note that!

2.8.1 Stroke limits and emergency stops

Relevant signals

ESP: 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. 5							

Signal diagnostics

Signal	ESP	LMIX	LMIY	LMIZ
Diagnostic address	X0.5	X1.5	X1.7	X1.6
Interface pins	CN61. 5	CN61. 12	CN61. 13	CN61. 25

Control parameters

Status parameters

1	7	6

					MESP		

ESP=0: Check the ESP emergency stop signal

=1: Esp emergency stop signal is not checked.

PLC status parameters

K	1	0

LMIT	LMI	LISW					

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: Overrange alarm when the stroke limit detection signal is disconnected from +24V.

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

LISW : Overdraft release signal for each axis (0: Invalid 1: Valid).

K	2	4

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : X-axis hard limit overreach (0: valid 1: invalid);

BIT1 : Z-axis hard limit overreach (0: valid 1: invalid);

BIT2 : Y-axis hard limit overreach (0: valid 1: invalid);

BIT3: 4-axis hard limit overreach (0: valid 1: invalid).

BIT4 : 5-axis hard limit overreach (0: valid 1: invalid).

Signal connection

The stroke limit and emergency stop signal (ESP) circuit is shown in Figures 2-33 below:

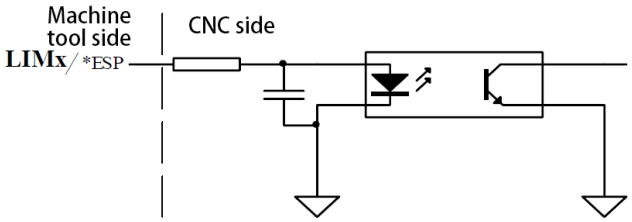


Figure 2-33

External connection of the machine

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

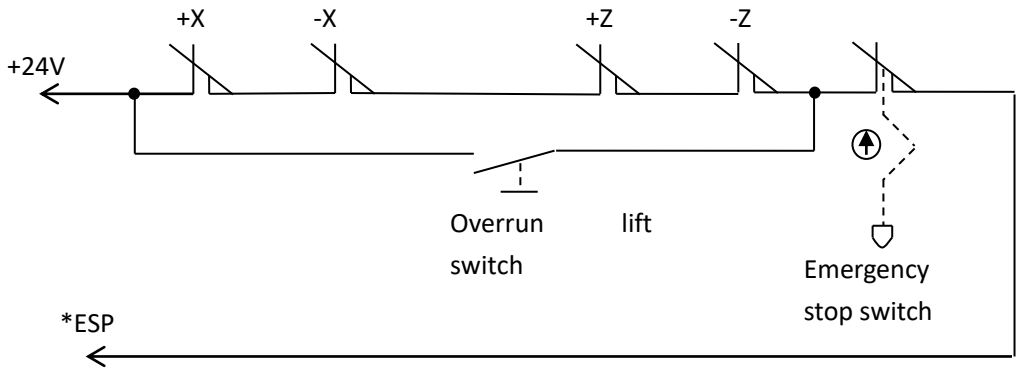


Fig. 2-34A Emergency stop and stroke switch connected in series

② The stroke limit is connected independently to the emergency stop, as shown in Figure 2-34B below:

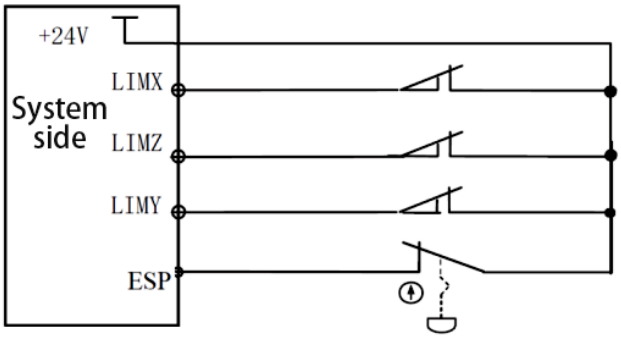


Fig. 2-34B Emergency stop and stroke switch are connected independently

Control logic

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

When overrun or press the emergency stop button, the CNC will appear "emergency stop" alarm, if it is overrun, then press the overrun to release the button does not release, press the reset key to cancel the alarm after moving in the opposite direction to cancel the overreach. When an emergency stop alarm occurs, the CNC stops the pulse output. In addition to the functions handled by the CNC above, other functions can also be defined by the PLC program in the event of an emergency stop alarm. The standard PLC program defines the function of turning off the output of the M03 or M04 and M08 signals and outputting the M05 signal at the same time during an emergency stop alarm.

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

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

2. When the over-range alarm occurs, it can be moved in the opposite direction, and the alarm can be cleared by reset after moving out of the limit position.

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

2.8.2 Tool change control

Associated Signals (Standard PLC Program Definition)

Signal type	symbol	Signal	addres	Signal function
Input signal	T01	CN61. 06	X0.7	Tool position
	T02	CN61. 08	X1.0	Tool position
	T03	CN61. 21	X1.1	Tool position
	T04	CN61. 05	X1.2	Tool position
	T05	CN31.05	X5.0	Tool position
	T06	CN31.08	X5.2	Tool position
	T07	CN31.09	X5.5	Tool position

	T08	CN31.22	X5.6	Tool position
	TCP	CN61. 18	X0.6	Knife holder lock
Output signal	TL+	CN62. 25	Y1.6	The tool holder
	TL-	CN62. 13	Y1.7	Tool holder reversal signal

Control parameters

K	1	1	****	****	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : Tool change selection 0 (00: mode B 01: AK31 turret 10: Liuxin hydraulic 11: servo turret).

BIT1 : Tool change option 1 (00: Mode B 01: AK31 turret 10: Liuxin Hydraulic 11: Servo turret).

BIT2 : The tool position signal is active with +24V (0: on 1: disconnected) (the tool holder can be adjusted non-stop).

BIT3 : Normal tool holder lock signal (0: no detection 1: detection).

BIT4 : The tool holder lock signal is valid with +24V (0: Disconnect 1: Turn on).

BIT5 : Tool position signal at the end of a normal tool holder change (0: not detected 1: detected).

Data parameters

0	7	8	Maximum time to move the maximum tool position when changing tools (default: 15000).
0	8	2	Tool holder forward reversal lock delay time (default: 0).
0	8	3	The tool holder lock*TCP signal alarm time (default: 500) was not received
0	8	4	Select [Row knife changed to 1] (default value: 4) of the total number of knives
0	8	5	Tool holder reversal locking time (default: 1000).

Signal connection

1, T01 ~ T08, TCP signal using optical fiber input, the internal circuit diagram is shown in Figure 2-35 below:

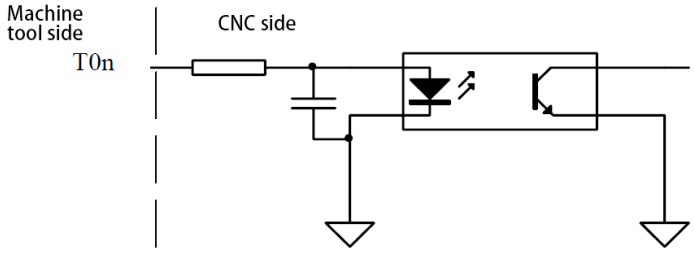


Figure 2-35

2, TL+, TL- is the tool holder forward and reverse output signal, the internal circuit is shown in Figure 2-36 below:

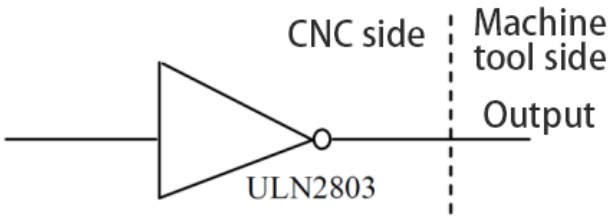


Figure 2-36

3. The external connection circuit of the tool position signal machine tool is shown in Figure 2-37, and when the tool position signal is low and effective, an external pull-up resistor is required.

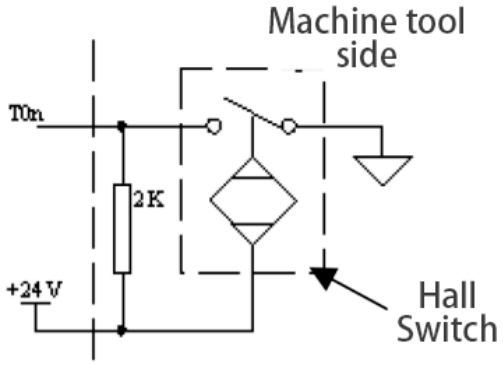


Figure 2-37

Functional description (Standard PLC Program Definition).

The control timing and control logic of the tool change are defined by the PLC program. The standard PLC program supports four tool holder control logics to select the tool change method by setting bit0 for the K011 parameter. The details are as follows:

1, CHT = 0: tool change mode B

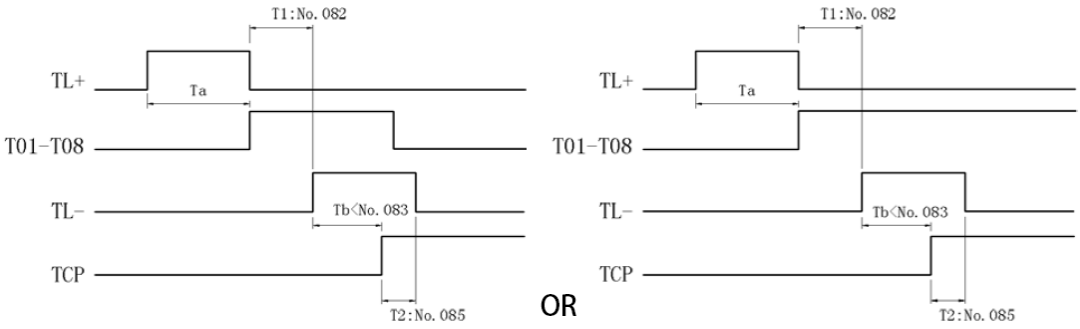
(1) After performing the tool change operation, the system outputs the tool holder forward rotation signal TL+ and starts to detect the tool position signal, after detecting the tool position signal, close the TL + output, delay the data parameter No 082 set the time after the output tool holder reversal signal TL-. Then check the locking signal TCP, when this signal is received, delay the time set by the data parameter No 085, turn off the tool holder reversal signal (TL-);

(2) If CHET (K011.5) is set to 1 (check the tool position signal at the end of the tool change), confirm whether the current tool position input signal is consistent with the current tool number after the end of the tool holder reversal time, if it is inconsistent, the system will generate an alarm;

(3) The tool change process is over.

(4) When the system outputs the tool holder reversal signal, in the time set by the data parameter No 083 , if the system does not receive a TCP signal, the system will generate an alarm and close the tool holder reversal signal;

(5) If the tool holder does not have a tool holder lock signal, the CTCP (K011.3) can be set to 0, and the tool holder lock signal is not detected.



Tool change method B timing diagram

2.8.3 Machine return to zero

Relevant 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;

PCX: X axis zero signal;

PCY: Y axis zero signal;

PCZ: Z axis zero signal;

PC4: 4th Axis Zero Signal;

PC5: 5th axis zero signal;

Diagnostic data

0	0	0
Interface pins		

					DECY	DECZ	DECX
					CN61.01	CN61.22	CN61.15

Control parameters

K	2	2

BIT7	BIT6	BIT5	BIT4	BIT3	****	****	****

BIT3: 5-axis deceleration signal is valid with +24V (0: disconnect 1: turn on).

BIT4 : X-axis deceleration signal is valid with +24V (0: disconnect 1: on).

BIT5 : Z-axis deceleration signal is valid with +24V (0: disconnect 1: switched on).

BIT6: Y-axis deceleration signal is valid with +24V (0: disconnect 1: switched on).

BIT7: 4-axis deceleration signal is valid with +24V (0: disconnect 1: turn on).

0	0	6

****	****	BIT5	****	****	****	****	****

BIT5 : Zeroback mode selects the stop (0:back 1:front).

0	0	7

****	****	****	****	BIT3	BIT2	BIT1	BIT0

BIT0 : 1st axis back to zero (0: none 1: yes) one-turn signal (X axis).

BIT1 : 2nd axis back to zero (0: none 1: yes) one-turn signal (Z axis).

BIT2 : 3rd axis back to zero (0: none 1: yes) one-turn signal (Y axis).

BIT3 : 4th axis back to zero (0: none 1: yes) one-turn signal (4 axes).

0	1	2	****	****	****	****	****	****	****	BIT0

BIT0 : After power-on, before returning to the machine zero, manual fast movement (0: invalid 1: effective).

1	8	1	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : Select the (x) axis to zero back to zero in the (0: positive 1: negative) direction

BIT1 : Select the (Z) axis to return to zero in the (0: positive direction 1: negative direction).

BIT2 : Select the (Y) axis to zero back to zero in the (0: positive 1: negative) direction

BIT3 : Select the (4) axis to zero back to zero in the (0: positive 1: negative) direction

BIT4 : Select the (5) axis zero return direction as (0: positive 1: negative direction) back to zero

Data parameters

0	3	3	X, Z back to zero mechanical zero low speed speed (default: 40).
1	1	3	The high-speed speed of the X and Z axes back to the mechanical zero point (default: 4000).
1	7	4	The Y-axis returns to the low speed of the mechanical zero (default: 40).
1	7	5	4-axis low-speed speed back to mechanical zero (default: 40).
1	7	6	5-axis low speed back to mechanical zero (default: 40).
1	7	7	The high-speed speed of the Y axis back to the mechanical zero point (default: 4000).
1	7	8	4TH high speed of the axial return to the mechanical zero (default: 4000).
1	7	9	5TH high speed of the axis back to mechanical zero (default: 4000).

Signal connection

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

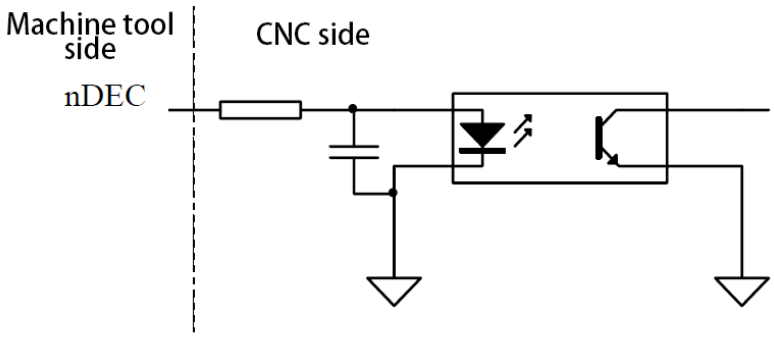


Figure 2-38

The machine returns to zero when using the servo motor one-turn signal to do the zero signal

(1) The schematic diagram is as follows

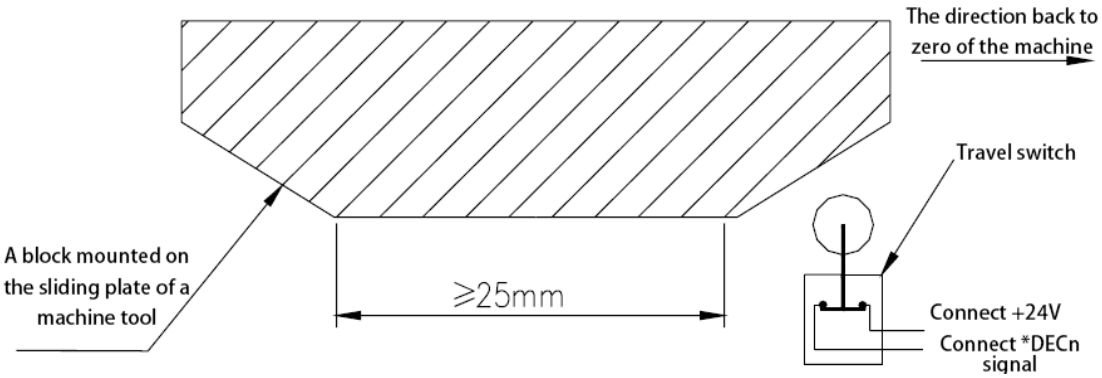


Figure 2-39

(2) The connection circuit of the deceleration signal

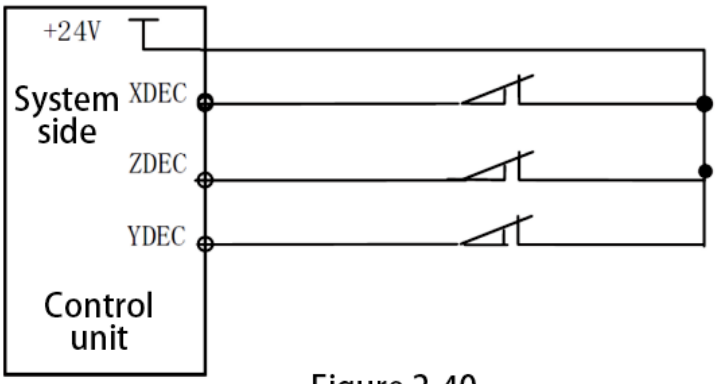


Figure 2-40

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

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

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

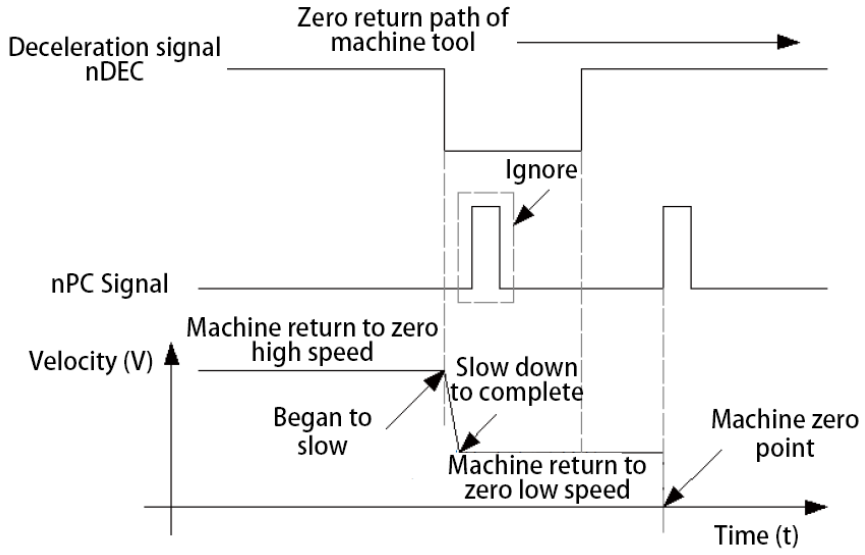


Figure 2-41-1

The process of returning the machine zero

1): Select the machine tool zero operation mode, press the manual positive or negative direction (the zero direction of the machine tool is set by the status parameter No 18 1), the corresponding axis moves to the machine zero direction at a high speed back to the reference point (parameter No 113). The machine slows down when the contact of the deceleration signal is disconnected and continues to operate at a fixed low speed (parameter No 33).

2): When the deceleration switch is released, the deceleration signal contact is closed again, the CNC begins to detect the encoder's turn signal (PC), if the signal level jumps, the movement stops, and the zero-end indicator of the corresponding shaft on the operation panel is lit, and the machine tool return-to-zero operation ends.

When the status parameter No 006 of BIT5 (ZMOD) is set to 1, BIT4=0 of K022. The option to return to machine zero is valid for the pre-block mode, and the deceleration signal is low. At this point, the operation timing of the return to the machine zero point is shown in the following figure:

The sequence diagram of the zero-point action of the machine machine in the front mode of the gear block is as follows:

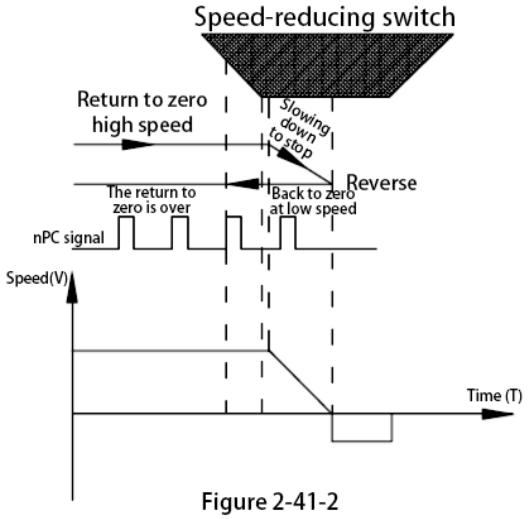


Figure 2-41-2

Pre-block mode The process of returning to the zero point of the machine tool (zero before the stop is not divided by A/B mode**).**

1): Select the machine zero operation mode, press the manual positive or negative direction (the zero direction of the return machine tool is set by the status parameter No 181) Feed key, then the corresponding axis moves to the machine zero at a high speed back to the reference point (parameter No 113). Run to the pressure on the deceleration switch, when the deceleration signal contact is disconnected, the operating speed is reduced to zero (the length of the deceleration baffle must be long enough for the shaft to decelerate to zero), and then run in the opposite direction at the low speed of returning to the machine at zero.

2): In the reverse operation, until the deceleration switch is left and the deceleration signal contact is reclosed, the system begins to detect the encoder's one-turn signal (PC), if the signal level jumps, the motion stops, and the zero-end indicator of the corresponding shaft on the operation panel is on, and the machine return-to-zero operation ends.

Post-block mode (BIT5 (ZMOD) for status parameter No 006 is set to 0**).**

The process of returning the zero point of the machine tool in **A mode (**bit1 for status parameter No 208 is set to 1).

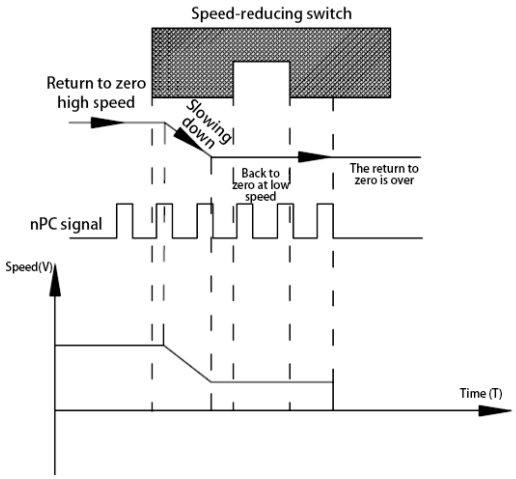


Figure 2-41-A

1): Select the machine machine zero operation mode, press the manual positive or negative direction (the zero direction of the return machine tool is set by the status parameter No 181) Feed key, then the corresponding axis will return to the high speed of the reference point (parameter No 113) moves toward the machine zero. 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 to reduce the shaft deceleration), and then run in the same direction at the low speed of returning to the zero point of the machine tool, leaving the deceleration switch, and the deceleration signal contact is reclosed.
2): Run in the same direction at the low speed of the zero point of the return machine tool, until the deceleration switch is pressed again, and the deceleration signal contact is disconnected, the system begins to detect the encoder's one-turn signal (PC), such as the signal level jump, the movement stops, and the zero end indicator of the corresponding shaft on the operation panel is lit, and the machine tool returns to zero.

Post-block mode (BIT5 (ZMOD) for status parameter No 006 is set to 0**).**
B mode (status parameter No 208 with BIT1 set to 0**) Returns the machine zero point**

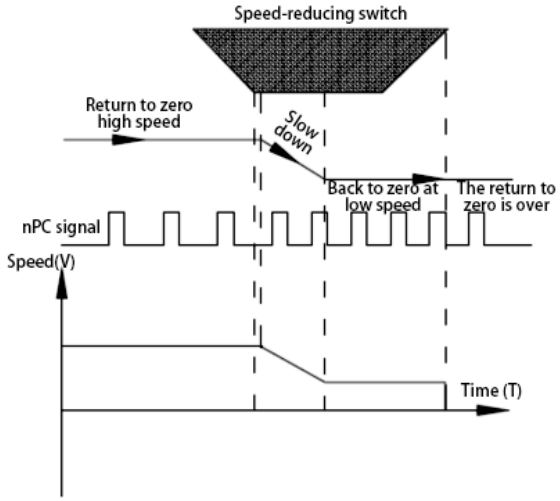


Figure 2-41-B

1): Select the machine tool zero operation mode, press the manual positive or negative direction (the zero direction of the return machine tool is set by the status parameter No 18 1) Feed key, then the corresponding axis moves to the machine zero direction at a high speed back to the reference point (parameter No 113). Run to the pressure deceleration switch, when the deceleration signal contact is disconnected, the operating speed deceleration (the length of the deceleration baffle must be sufficient for shaft deceleration), and then run in the same direction at the low speed of the zero point back to the machine.
2): Run in the same direction at the low speed of the zero point of the return machine tool, until you leave the deceleration switch, the deceleration signal contact is reclosed, the system begins to detect the encoder's one-turn signal (PC), if the signal level jumps, the movement stops, and the zero end indicator of the corresponding shaft on the operation panel is lit, and the machine return to zero operation ends.

2.8.4 Spindle control

Associated Signals (Standard PLC Program Definition)

Signal	symb	Signal	address	Function description	remark
Input signal					This signal 0V input is valid
	SALM	CN21.02	ALM	Spindle abnormal alarm input	
Output signal	M03	CN62. 15	Y0.3	Spindle rotation counterclockwise (forward rotation)	
	M04	CN62. 17	Y0.4	Spindle rotation clockwise (inverted)	
	M05	CN62. 05	Y0.5	Spindle stops	
	SPZD	CN62. 02	Y0. 2	Spindle braking	
Directive format	M03			Spindle rotation	
	M04			Spindle rotation clockwise (inverted)	
	M05			Spindle stops	
	M20			Spindle clamping	Valid when simulati
	M21			Spindle loosened	

Control parameters

Status parameters

0	0	9	BIT7	****	****	****	****	****	****	****	****

BIT7 : Spindle alarm signal (0: high 1: low) level alarm (on and off with 0V).

1	7	5	****	BIT6	****	****	****	****	****	****

BIT6 : Spindle SAR signal before cutting (0: do not check 1: detect).

K	1	0	****	****	****	****	****	****	BIT1	****

BIT1 : Spindle lubrication cooling output (0: off 1: hold) when reset;

Data parameters

0	7	2	Spindle speed reaches signal delay detection time (ms).
0	8	0	M code execution duration (ms) (default: 1).
0	8	7	Spindle brake delay output time (ms) (default: 0).

0	8	9	Spindle brake output time (ms) (default: 50).
D	9	9	Spindle zero-speed output range

Signal connection

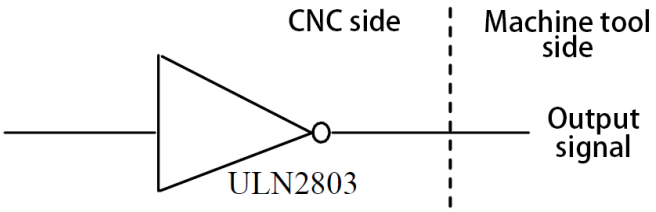


Figure 2-45A

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

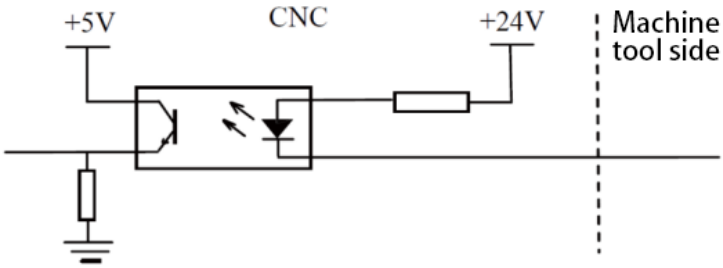


Figure 2-45B

Motion timing (standard PLC program definition).

The spindle action timing is shown in Figures 2-46 below:

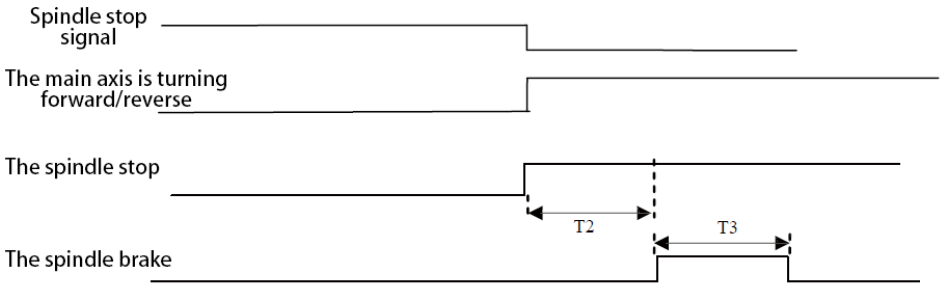


Figure 2-46
Sequence Diagram of forward and reverse of the principal axis

Note: T2 is the delay time from the time the spindle stop signal is issued to the spindle brake signal; T3 Spindle brake hold time.

Functional description (standard PLC program definition)

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

The spindle brake SPZD signal output delay is set by the data parameter NO.087 (the delay

time between the spindle stop signal output and the spindle brake SPZD signal output), and the braking signal retention time is set by the data parameter NO.089 (spindle brake output time).
(2) When the M03 (M04) output is active, executing M04 (M03) will generate an alarm.
(3) When No 175.6 is 1, the speed arrival signal SAR will be checked before cutting whether it is valid, if it is valid, it will run normally, and if it is not, it will display "Detect speed arrival... ”。
(4) When the spindle speed command and the cutting feed instruction are executed in the same section, in order to avoid the CNC from starting the cutting according to the last spindle speed arrival signal SAR, the SAR signal can be detected for delay detection, and the delay time is set by the No 072 parameter.
(5) D99 is the zero speed output range of the spindle, when the actual speed of the spindle is not greater than the D99 setting value, the spindle will be considered to have been reduced to zero speed, and the operation of the loose chuck and the hydraulic control can be closed.

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

Note 2: When the CNC resets, whether **M03 and M04 are canceled** by **the** Bit1 bit of **the K parameter NO.010 Output:**

When Bit1 = 0, the CNC reset turns off the output of **M03 and M04;**

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

2.8.5 Spindle speed switching control

Associated Signals (Standard PLC Program Definition)

S01 ~ S04: Spindle speed switch control signal, the standard PLC program defined S01 ~ S04 signal interface is a multiplex interface, S01 ~ S04 Shared interface with M41 ~ M44.

Control parameters

Status parameters

0	0	1	****	****	****	SPTY	****	****	****	****

BIT4 : Spindle speed (0: Switching control 1: analog voltage control).

Data parameters

0	8	1	S code execution time (default: 1).

Control logic (standard PLC program definition).

When the CNC is powered on, the S1 ~ S4 output is invalid. Execute any of the codes in S01, S02, S03, S04, and the corresponding S signal output is valid and maintained, while canceling the other S The output of the signal. When executing S5~8 codes, cancel the output of S1 ~ S4, S1 ~ S4 Only one output is valid at a time.

2.8.6 Spindle automatic shift control

Associated Signals (Standard PLC Program Definition)

M41 ~ M44: spindle automatic shift output signal, when selecting spindle analog control (0 ~

10V analog voltage output) can support 4 gear spindle automatic shift control.

M41I, M42I: Spindle automatic shift 1st and 2nd gear shift in place signal, can support 2 gear shift position detection function.

Signal diagnostics

Signal	S4	S3	S2	S1
Diagnostic address	Y1.3	Y1.2	Y1.1	Y1.0
Interface pins	CN62. 22	CN62. 09	CN62. 21	CN62.08

Signal connection

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

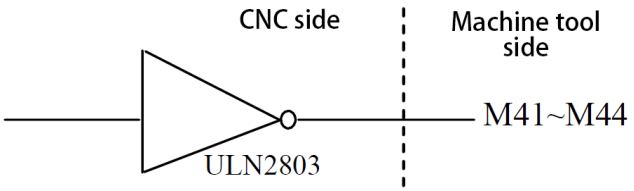


Figure 2-47

Control parameters

Status parameters

0	0	1	****	****	****	SPTY	****	****	****	****

BIT4 : Spindle speed (0: Switching control 1: analog voltage control).

Data parameters

0	6	5	Spindle shift time 1 (default: 1000) Spindle shift turns off the timing of the original gear time
0	6	6	Spindle shift time 2 (default: 1000) The delay of the new spindle gear output to the end
0	6	7	The voltage (mV) output when the spindle is turned

Functional description (standard PLC program definition)

The spindle speed must be selected in analog voltage control mode (bit4 bits for status parameter NO.001 are set to 1), and bit0 bits for K parameters NO.15 must be set 1, the spindle automatic shift function is effective; When the spindle auto shift function is invalid, the CNC will be alarmed when the M41 ~ M44 is executed. Only one M41, M42, M43, M44 is valid at

the same time.

Spindle automatic shift function is used to control the automatic switching of spindle mechanical gear, CNC execution of S □□□□ code, according to the current M4n control of the gear corresponding parameters (M41 ~ M44 corresponding to the data parameters NO.037 ~ NO.040) calculates the analog voltage output to the spindle servo or frequency converter, and controls the actual speed of the spindle to be consistent with the speed of the S code.

When the CNC is powered on, the BIT3 bit of the K parameter NO.15 controls whether the spindle gear before the power outage is restored. When the Bit4 bit of the status parameter NO.001 is 0, after power-off, the spindle gear is not remembered, and the default 1st spindle gear, M41 ~ None of the M44s have an output; When the Bit4 bit of the status parameter NO.001 is 1, it is powered on after power-off and the spindle gear is remembered. If the specified gear is consistent with the current gear, no shift is performed.

If the specified gear does not match the current gear, the shift is carried out, 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 of the data parameter NO.067 (unit: mv Output analog voltage to spindle servo or frequency converter;

(2) After delaying the data parameter No 065 (shift time 1), turn off the original gear output signal and output a new shift signal;

(3) When shifting gears to 1 or 2 stops, and the Bit1 bit (AGIN) of K parameter No 15 is 1 , then turn (4), otherwise turn (5);

(4) Check the 1st or 2nd gear input signals M41I, M42I, if the gear shift is in place (5); If the shift is not in place, the CNC waits for the shift signal to be in place;

(5) Delay data parameter No 066 (shift time 2), according to the current gear according to the data parameter NO.037 ~ NO.040 (corresponding to 1 ~ 4 Gear) set the output spindle analog voltage, the end of the shift.

Note: During CNC reset and emergency stop, the output state **defined as M41 ~ M44 remains unchanged.**

2.8.7 External Loop Start and Feed Hold

Associated Signals (Standard PLC Program Definition)

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

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

Signal diagnostics

Signal	SP	ST
Diagnostic address	X0.1	X1.4
Interface pins	CN61. 14	CN61. 24

Signal connection

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

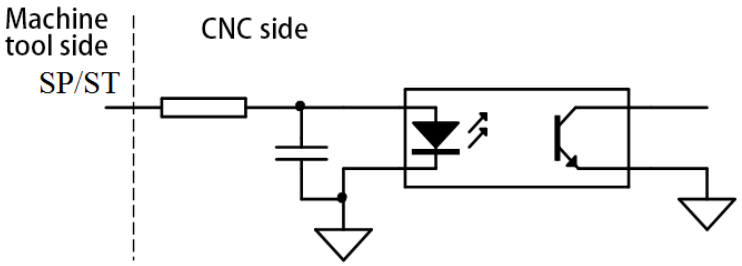


Figure 2-48

Control parameters

Status parameters

1	7	6	****	****	****	****	****	BIT2	BIT1	BIT0

BIT0 : The external loop starts (0: valid 1: invalid).

BIT1 : External pause signal (0: valid 1: invalid).

External connection circuitry

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

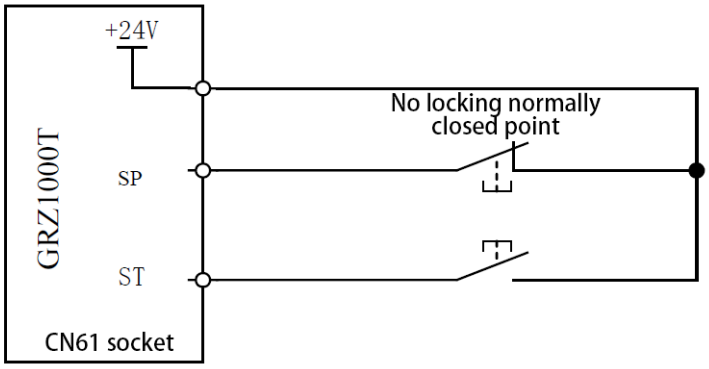


Figure 2-49

2.8.8 Cooling pump control

Relevant instruction signals (standard PLC program definitions).

Signal type	symbol	Signal interface	address	Function description	remark
Output signal	M08	CN62.1	Y0.0	The cooling pump	
Directive format	M08			Coolant on	
	M09			Coolant off	

Signal connection

The internal circuit is shown in Figures 2-50 below:

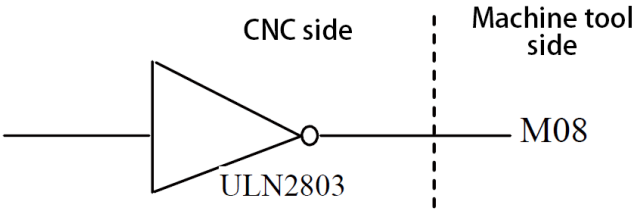


Figure 2-50

Functional description (standard PLC program definition)

After the CNC is powered on, the M09 is active, that is, the M08 output is invalid. Perform M08, M08 output is effective, cooling pump on; Execute M09, cancel the M08 output, cool the pump off.

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

Note 2: When the CNC resets, the Bit1 bit **setting of the K parameter NO.10 of the CNC cancels M08 Output:**

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

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

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

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

2.8.9 Lubrication control

Relevant instruction signals (standard PLC program definitions).

Signal type	symbol	Signal interface	address	Function description	remark
Output signal	M32	CN62.2	Y0.1	Lubrication control output	
Directive format	M32			Lubricate on	
	M33			Lubrication off	

Signal connection

The internal circuit is shown in Figures 2-51 below:

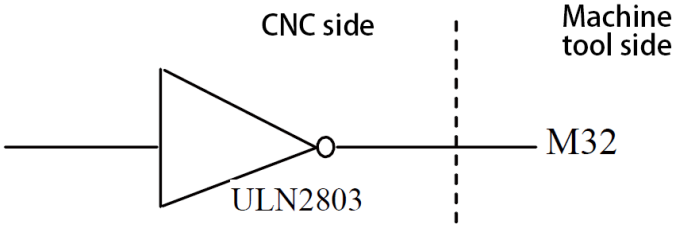


Figure 2-51

Control parameters

Data parameters

1	1	2	Lubrication on-time (lubrication is not limited by time when set to 0) Unit: milliseconds

PLC status parameters

K	1	0	****	****	****	****	****	****	BIT1	****

BIT1 : Spindle lubrication cooling output (0: off 1: hold) when reset;

K	1	6	****	****	****	****	****	BIT2	****	****

BIT2 : Automatic lubrication when the power-on (0: No 1: Yes) output lubrication;

PLC data

T	1	3	Automatic lubrication output time (0~65535ms) (set at parameter 112).

T	5	3	Automatic lubrication interval time (0~ 65535s) unit: seconds

Feature description

The system standard PLC program defines two lubrication functions, manual lubrication and automatic lubrication, which are set by parameters:

1) Automatic lubrication is effective when DT13 is not zero, at which point theoutput lubrication will be output after the time set by DT 53 (the time is set by DT 13); The lubrication output can also be turned on or off by hand and by command, and the opening time is set for DT1 3 (the timing will start again after this operation);
2) When the automatic lubrication is effective, if K16.2 is set to 1, the lubrication output will be output as soon as the system is powered on, and the output time is set by DT13, and if K16.2 is set to 0, the lubrication will be started after the power-on time set by DT53.
3) When DT13=0, manual lubrication is effective, if the parameter No.112=0, the output will not be automatically turned off, if not 0, the output time will automatically turn off after reaching the time set by N0.112;
4) When DT53=0, the lubrication output is turned off after entering DT13, and the output is no longer spaced; When the DT53 is not 0, the lubrication output is turned off after entering the DT13, and the output is in the output after the DT53 interval output time;

Note 1: When **the CNC is stopped urgently, turn off the lubrication output;**

Note 2: When the CNC resets, the Bit1 bit **of the K parameter NO.010 sets whether to unlubricated the output:**

When Bit1 = 0, the CNC reset turns off the lubrication output;

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

2.8.10 Chuck Control

Associated Signals (Standard PLC Program Definition)

DIQP: The chuck controls the input signal

DOQPJ: Inner chuck clamp output / External chuck release output signal

DOQPS: Inner chuck release output / outer chuck clamp output signal

NQPJ: Inner chuck clamp in place / Outer chuck release in place signal

WQPJ: Inner chuck release in place / Outer chuck clamp in place signal

Signal diagnostics

Signal	DIQP	WQPJ	NQPJ	DOQPJ	DOQPS
Diagnostic address	X0.2	X1.5	X1.6	Y1.4	Y1.5
Interface pins	CN61. 2	CN61. 12	CN61. 25	CN62. 24	CN62. 12

Control parameters

K	1	2	****	****	****	****	BIT3	BIT2	BIT1	BIT0

BIT0 : Chuck control function (0: Invalid 1: Valid).

BIT1 : Chuck clamping before spindle start-up (0: Check 1: Do not check).

BIT2 : Chuck (0: External card 1: Internal card) control mode

BIT3: (0: Do not check 1: Check) Chuck in place signal

T	1	8	Chuck output remains for a period of time

T18>0: Chuck clamping and loosening signals are pulse outputs, and the pulse width is set by T18

=0: Chuck clamping and release signals are level outputs

T	2	1	The spindle stops and the chuck operation enables the delay
T	4	3	Chuck in place signal detection timing (default 6000) unit: milliseconds
D	9	9	Spindle zero-speed output range (r/min) (default 5).

Signal connection

The DOQPJ/DOQPS circuit is shown in Figure 2-52 below:

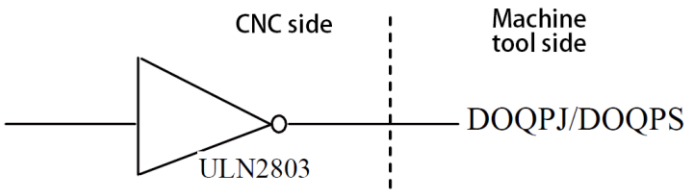


Figure 2-52

Motion timing

(1) When SLQP=1, SLSP=0, NYQP=0, CCHU=1, the CNC selects the internal card mode, and the chuck is in place signal detection function is valid:
DOQPS: Chuck release output; WQPJ: Release the signal in place;
DOQPJ: Chuck clamp output; NQPJ: Clamp the signal in place.

When powering on, DOQPJ and DOQPS both output high impedance, when the CNC first detects that the chuck control input signal DIQP is valid, DOQPJ and 0V are switched on, Chuck clamping.

After executing M12, DOQPS (CN62.14) outputs high impedance, DOQPJ (CN62.13) outputs 0V, chuck clamping, The CNC waits for the NQPJ signal to arrive;

After executing M13, DOQPJ (CN62.13) outputs high impedance, DOQPS (CN62.14) outputs 0V, and the chuck is released The CNC waits for the WQPJ signal to arrive.

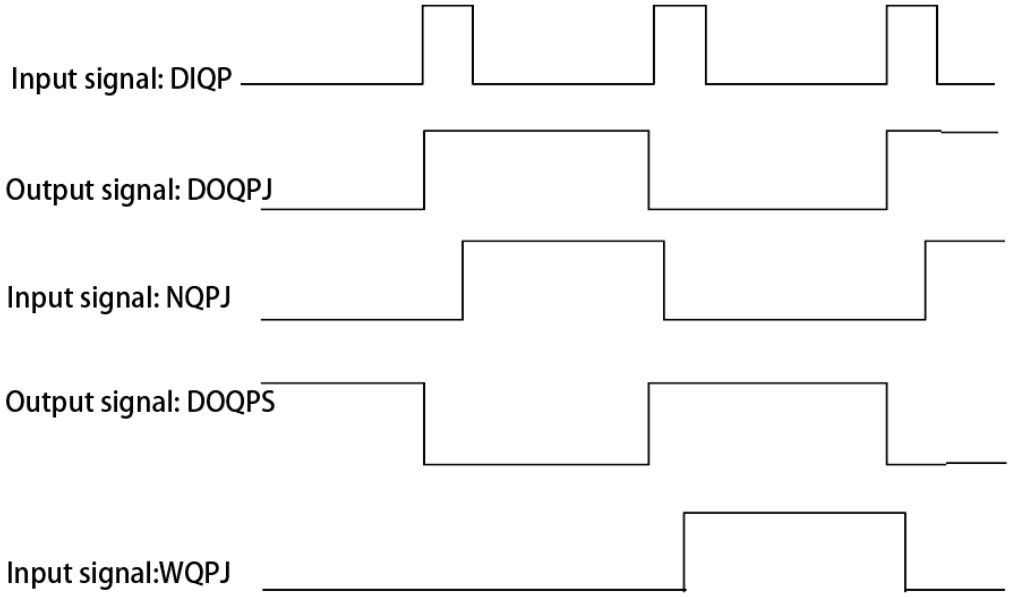


Figure 2-53 Chuck clamping and loosening signal is level output

(2) When SLQP=1, SLSP=0, NYQP=1, CCHU=1, cnc selects the wild card mode, and the chuck is in place signal detection function is valid:
DOQPS: Chuck clamp output. WQPJ: Clamp in place signal
DOQPJ: Chuck release output. NQPJ: Loosen the signal in place.

When powering on, DOQPJ and DOQPS both output high impedance, when the CNC first detects that the chuck control input signal DIQP is valid, DOQPS and 0V are switched on, Chuck clamping.

After executing M12, DOQPS (CN62.14) output 0V, DOQPJ (CN62.13) output high impedance, chuck clamping, THE CNC waits for the WQPJ signal to arrive;

After executing M13, DOQPJ (CN62.13) outputs 0V, DOQPS (CN62.14) outputs high impedance, and the chuck is released The CNC waits for the NQPJ signal to arrive.

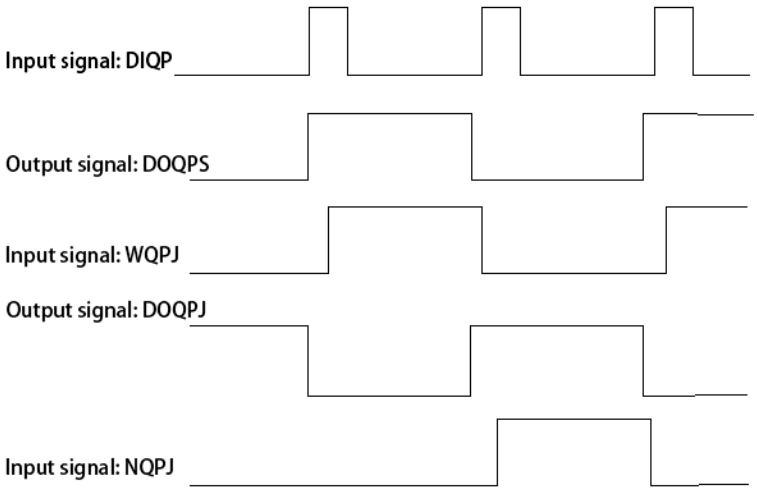


Fig. 2-54 The chuck clamping and release signals are level outputs

When the second chuck control input is valid, the DOQPS output is 0V, the chuck is released, and the chuck clamping/loosening signal is interlocked alternately output, that is, every time the chuck control input signal is valid, its output state is changed once.

(3) Interlocking relationship between chuck and spindle:

When SLQP=1, SLSP=0, M3 or M4 are active, the execution of M13 generates an alarm, and the output state is unchanged;

SLQP=1, SLSP=0, CCHU=1, when executing M12 code in MDI or automatic mode, the CNC does not detect that the chuck clamp is in place before it is valid The CNC does not execute the next code, and when the chuck control input signal DIQP is valid in manual mode, the panel spindle forward and reverse keys are invalid before the CNC does not detect that the chuck clamp is in place. The DIQP signal input is invalid when the spindle is rotating or during automatic cyclic machining;

DOQPS and DOQPJ remain unchanged during CNC reset and emergency stop.

2.8.11 Tailstock Control

Associated Signals (Standard PLC Program Definition)

DOTWJ: Tailstock inlet and output signal
DOTWS: Tailstock back output signal
DITW: Tailstock control input signal

Signal diagnostics

Signal	DITW	DOTWJ	DOTWS
Diagnostic	X0.4	Y0.6	Y0.7
Interface pins	CN61. 17	CN61. 18	CN61. 06

Control parameters

Status parameters

K	1	3	****	****	****	****	****	****	BIT1	BIT0

BIT0 : Tail axis control function (0: invalid 1: valid).

BIT1 : Spindle rotation and tailstock advance and retreat (0: interlocked 1: not interlocked).

Signal connection

The tailstock control signal circuit is shown in Figures 2-55 below:

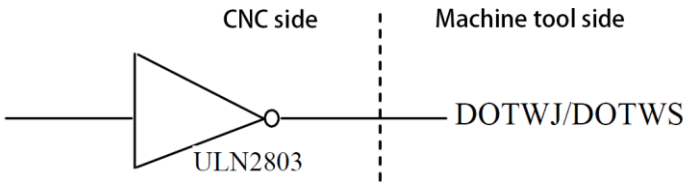


Figure 2-55

Motion timing (standard PLC program definition).

The tailstock control timing is shown in Figures 2-56 below:

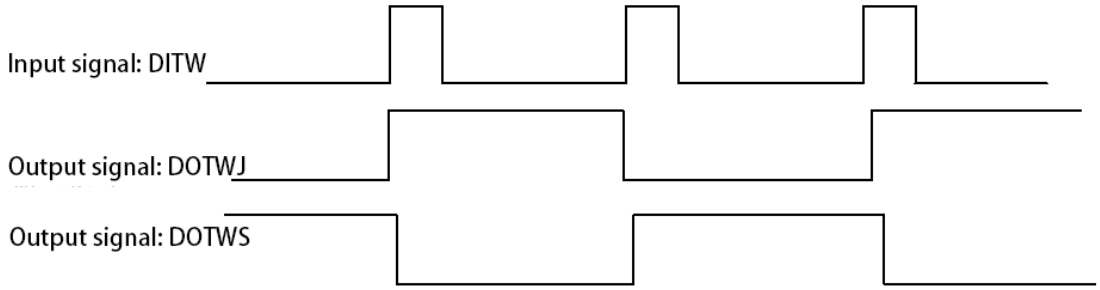


Figure 2-56 Tailstock Control Timing

When booting, the tailstock into dotwJ and tail seat back DOTWS are invalid; The first time the tailstock control input DITW is valid, the tailstock input is active; When the second tailstock control input is valid, the tailstock retreat is active, and the tailstock entry/ tailstock back signal interlock alternate output, that is, every time the tailstock control input signal is valid, the output state is changed once. After executing code M10, DOTWJ (CN62.34) outputs 0V, tailstock advance; After executing code M11, DOTWS (CN62 06) Output 0V, tailstock retreat.

When the spindle is rotated, the tailstock control input signal is invalid, and its output state remains unchanged; DOTWS and DOTWJ remain unchanged during CNC reset and emergency stop.

2.8.12 Inspection of protective doors

Related Signals (Standard PLC Program Definition)

SAGT: Guard door detection input signal.

Signal diagnostics

Signal	SAGT
Diagnostic	X0. 6
Interface pins	CN61. 18

Control parameters

Status parameters

K	1	4	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0

BIT2 : Guard door function (0: Invalid 1: Valid).

BIT3 : Guard gate heartbeat is valid with +24V (0: on 1: off).

BIT4 : Guard door when open (0: close 1: not closed) spindle

Functional description (standard PLC program definition)

① When BIT2 = 1 and BIT3 = 0, the SAGT signal disconnects the CNC from +24V Confirmed as a protective door closed;

② When BIT2 = 1 and BIT3 = 1, the SAGT signal is switched on to THENC with +24V Confirmed as a protective door closed;

(3) The protective door detection function is effective in the automatic mode, but when the protective door is opened, a warning prompt of "the protective door has been opened" will be given in all modes, which will not affect the execution of other functions;

③ In the automatic mode, when the automatic cycle is started, if the CNC detects that the protective door is open, an alarm is generated;

④ 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;

2.8.13 CNC macro variables

Relevant signals

Macro variable number	#1107	#1106	#1105	#1104	#1103	#1102	#1101	#1100
Diagnostic address	Y1.7	Y1. 6	Y1. 3	Y1. 2	Y1. 1	Y1.0	Y0. 5	Y0.2

Macro variable number	#1007	#1006	#1005	#1004	#1003	#1002	#1001	#1000
Diagnostic address	X1.7	X1.6	X1.5	X1.4	X1.3	X1.2	X1.1	X1.0

Functional description (standard PLC program definition)

Assigning a value to macro variables #1100 ~# 1107 to change the output signal state of UO0 ~ UO7; When assigned to "1", the output is 0V; When assigned to "0", its output signal is

turned off.

Detecting the value of macro variables #1000 ~# 1007 knows the input state of input interface X 1.0 ~ X1.7.

2.8.14 Tricolor lamps

Definition of relevant signals and functions (standard PLC program definition)

Y1.0(CN62. 08):Yellow light, indicating normal (non-operational, non-alarm state).

Y1.1(CN62. 21):Green light, indicating the operating status

Y1.2(CN62. 09):Red light, indicating the alarm status

2.8.15 External HandWheel

Relevant signals

CN31 (HandWheel).	PLC address	Address symbol	The function of address definition	remark
5	X5.0	EHDX	X HandWheel	Suitable for PSG-100-05E/L, ZSSY2080 handwheel
6	X5.1	EHDY	Three-position switch 2	
8	X5.2	EHDZ	Z hand wheel	
20	X5.3	EHD4	Three-position switch 1	
21	X5.4	EHD5	Y hand wheel	
9	X5. 5	EMP0	Increment ×1	
22	X5. 6	EMP1	Increment ×10	
23	X5. 7	EMP2	Increment ×100	
11、12、13	GND			
14、15	+5V			
17、18	+24V			

Related parameters

Status parameters

0	0	1	BIT7	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT3 : (0: Step 1: Hand wheel) mode

PLC status parameters

K	1	6	BIT7	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT7=0: Handwheel, single-step × 1000 increments are valid.

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

Feature description

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

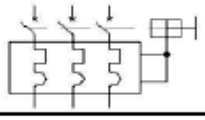
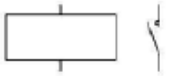
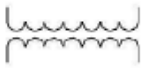
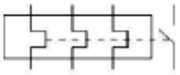
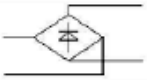
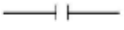
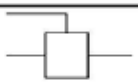
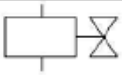
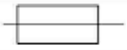
(2) When using an external handwheel, the shaft selection of the external handwheel is not self-locking, that is, when the shaft selection input of the handwheel is invalid, it will become a shaftless selection state.

(3) When the input of external hand axle selection and gear selection is valid, the panel hand wheel selection and gear selection buttons are invalid, and when the external hand wheel selection and gear selection inputs are invalid, the panel hand wheel 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 used in the DC24V power supply of the lathe system and the solenoid valve with a large working current must be independent of each other, and the electrical device characters must be independent

The instructions are 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 Description of Parameters

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

3.1 Parameter description (in order).

3.1.1 Status Parameters

0	0	0		BIT7	BIT6	BIT6	BIT4	BIT3	BIT2	BIT1	BIT0

The parameter number

0	0	1		****	****	****	SPTY	SOHW	RDC	****	INI

Bit0 0: Metric input;

1: Imperial input.

Bit2 0: Diameter programming;

1: Radius programming.

Bit3 0: One-step mode;

1: Handwheel mode.

Bit4 0: spindle speed switching control;

1: Spindle speed analog voltage control.

Default value: 0 0 0 1 1 0 0 0

0	0	2		****	****	****	LIFJ	MTL	LIFC	ROFT	TLIF

Bit0 0: The tool life management function is invalid;

1: The tool life management function is effective.

Bit1 0: The tip radius compensation function is invalid;

1: The tip radius compensation function is effective.

Bit2 0: Under the counting mode of the number of times, the tool life management count mode 1;

1: Under the counting of the number of times, the tool life management is counted in the 2nd.

Bit3 0: The count of tool life management is invalid when running in the input mode;

1: Tool life management is valid when the count is running in the input mode.

Bit4 0: Tool life management jump group number is invalid;

1: Tool life management jump group number is valid.

Bit6 0: Pulse width: automatic width;

1: Pulse width: 2.5 μs.

Default value: 0 1 0 0 0 0 1 0

0	0	3	****	****	SCRW	OFTM	****	****	CIMO	SLTW

Bit0 0: The tool complement value is not automatically converted during the metric conversion;

1: The knife complement value is automatically converted during the metric conversion.

Bit1 0: The coordinate system value of the workpiece is not automatically converted during the metric conversion;

1: The workpiece coordinate system value is automatically converted during the metric conversion.

Bit2 0: Manually clearing machine coordinates is invalid;

1: Manually clearing the machine coordinates is effective.

Bit4 0: Tool offset is performed in a mobile manner;

1: Perform tool offset with coordinate offset.

Bit5 0: The pitch error compensation function is invalid;

1: The pitch error compensation function is effective.

Bit6 0: Invalid for cutting empty runs;

1: The cutting empty operation is effective.

Default value: 0 0 1 1 0 1 1 1

0	0	4	****	RDRN	DECI	ORC	****	****	****	SCW

Bit0 0: The minimum command unit is metric;

1: The minimum command unit is imperial.

Bit4 0: Tool compensation value is expressed as diameter value;

1: The tool compensation value is expressed as a radius value.

Bit5 0: When returning to the zero point of the machine tool, the deceleration signal is low;

1: When returning to the machine zero, the deceleration signal is high.

Bit6 0: When running empty, G00 runs at a manual feed;

1: When running empty, G00 runs at a fast speed.

Bit7 0: Relative teach output full shaft;

1: Relative teach output to move the axis.

Default value: 0 1 0 0 0 0 0 0

0	0	5	****	****	SMAL	M30	M02	****	****	****

Bit0 0: The tool complement is not supported during machining;

1: Support modification of tool complement during machining.

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

1:M02 executes after the cursor returns to the beginning.

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

1:M30 executes after the cursor returns to the beginning.

Bit5 0: Spindle automatic shift when executing S code;

1 : Spindle manual shift when executing S code.

Bit6 0: Program editing supports block deletion;

1: Program editing does not support block deletion;

Default values: 0 0 1 1 0 0 0 1

0	0	6	****	****	ZMOD	ZM5	ZM4	ZMY	ZMZ	ZMX

Bit0 0: Support manual intervention function;

1: Manual intervention function is not supported; 。

Bit1 0: The spindle speed can be entered in the process monitoring interface;

1: The spindle speed cannot be entered in the cheng supervisor interface.

Bit2 0: The input Q value is valid;

1: The input slash is valid.

Bit3 0: Select the 1st spindle when the 4th axis is the analog spindle;

1: Select the 2nd spindle when the 4th axis is the analog spindle

Bit4 0: The 4th axis is not set as the analog spindle;

1: The 4th axis is set to the analog spindle.

Bit5 0: After selecting the file block in the back-to-zero mode;

1: Back to zero mode before selecting the file block.

Bit6 0: The cursor follows when shaking the hand wheel;

1: The cursor does not follow when shaking the hand wheel.

Bit7 0: The boot position interface displays absolutely;

1: The power-on position interface is displayed relatively.

Default value: 0 0 0 0 0 0 0 0

0	0	7	**DISP**	****	**SMZ**	****	****	****	****	**ZPLS**

Bit0 0: X-axis back-to-zero mode selection: no one-turn signal;

1: X-axis zero-back mode selection: There is a turn signal.

Bit1 0: Z axis back to zero mode selection: no one-turn signal;

1: Z axis zero mode selection: There is a turn signal.

Bit2 0:Y axis back to zero mode selection: no one-turn signal;

1:Y axis back to zero mode selection: There is a turn signal.

Bit3 0:4 axis back to zero mode selection: no one-turn signal;

1:4 axis zero-back mode selection: There is a turn signal.

Bit4 0:5 axis back to zero mode selection: no one-turn signal;

1:5 axis zero return mode selection: There is a turn signal.

Bit5 0: Smooth transition between program segment and degree segment;

1: Accurate execution between the program segment and the degree segment is in place.

Bit6 0: The user parameter interface is not displayed;

1: User parameters interface display.

Bit7 0: Enter the relative coordinate display page after booting;

1: After booting, enter the absolute coordinate display page.

Default value: 1 1 1 0 1 1 1 1

0	0	8	****	****	****	DIR5	DIR4	DIRY	DIRZ	DIRX

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

The direction signal is high when the 1:X axis is moving forward.

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

1: The direction signal is high when the Z axis is moving forward.

Bit2 0:Y axis negative movement direction signal is high;

The direction signal is high when the 1:Y axis is moving forward.

Bit3 0:4th Direction signal is high when the axis is moved in the negative direction;

The direction signal is high when the 1:4th axis is moving forward.

Bit4 0:5th Direction signal is high when the axis is negatively moving;

The direction signal is high when the 1:5th axis is moving forward.

Bit5 0: The direction signal is high when the tapping shaft is moving negatively;

1: The direction signal is high when the tapping shaft is moving forward.

Default value: 0 0 0 1 1 1 1 0

0	0	9

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

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

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

Bit1 0: Z axis alarm signal is a high level alarm;

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

Bit2 0:Y axis alarm signal is a high level alarm;

The 1:Y-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 alarm.

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

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

0	1	0

****	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : The parameter setting switch (0:yes 1:no) is turned on at boot time

BIT1 : Set page switch at boot time (0: Yes 1: No) is reduced

BIT4 : M99 workpiece count (1: Yes 0: No) plus 1

BIT5 : The number of artifacts arrived, reset (1: yes 0: no) cleared

BIT6 : M30 number of workpieces (0: Yes 1: No) plus 1

Default value: 0 0 0 1 1 0 0 0

0	1	1

RVCS	****	****	****	NORF	ZNIK	****	****

Bit0 0: The X axis is the read bus;

1: The X axis is not a read bus.

Bit1 0: The Z axis is the read bus;

1: The Z axis is not a read bus.

Bit2 0: Y axis is a read bus;

The 1:Y axis is not a read bus.

Bit3 0: 4 axis is a read bus;

The 1:4 axis is not a read bus.

Bit4 0:5 axis is a read bus;

The 1:5 axis is not a read bus.

Bit6 0: System boot to set the spindle speed;

1: The spindle speed is not set when the system is started.

Bit7 0: Backlash compensation is fixed frequency;

1: The backlash compensation method is acceleration and deceleration.

Default value: 0 0 0 0 0 0 0 0

0	1	2

****	WSFT	TCAR	****	****	****	****	ISOT

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

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

Bit3 0: Installment password level Machine tool factory level;

1: Installment payment password level system manufacturer level.

Bit4 0: JOG runtime acceleration and deceleration linear type;

1: Acceleration and deceleration step type when J OG is running.

Bit5 0: The function of the test cutting knife is invalid;

1: The test cutting knife function is effective.

Bit6 0:No.0 Tool complement translation workpiece coordinate system is invalid;

1:No.0 Tool complement translation workpiece coordinate system is valid.

Bit7 0: G76 angle parameter limit is valid;

1: The G76 angle parameter restriction is not valid.

Default value: 0 0 1 0 1 0 0 1

0	1	3

HPF	**RHPG**	****	**HW5**	**HW4**	**HWY**	**HWZ**	**HWX**

Bit0 0: The coordinates of the X-axis handwheel increase when rotating clockwise;

1:The coordinates increase when the X-axis handwheel rotates counterclockwise.

Bit1 0: Z axis handwheel rotates clockwise when the coordinates increase;

1: The coordinates of the Z-axis handwheel increase when rotating counterclockwise.

Bit2 0:Y axis handwheel rotates clockwise when the coordinates increase;

The coordinates increase when the 1:Y handwheel rotates counterclockwise.

Bit3 0:4th Axis handwheel increases when rotating clockwise;

The coordinates increase when the 1:4th axis handwheel rotates counterclockwise.

Bit4 0:5th Axis handwheel increases when rotating clockwise;

1:5th Axis handwheel increases when rotating counterclockwise.

Bit5 0: The amount of movement by coordinates when the X-axis handwheel or single step moves;

1: X-axis handwheel or single-step movement according to the amount of machine tool movement;

Bit6 0: Does not use electronic handwheel drive function;

1: Use the electronic handwheel drive function.

Bit7 0: The hand wheel wheel rotation displacement amount is not fully operated;

1: The hand wheel wheel rotation displacement amount is all running.

Default value: 1 1 0 0 0 0 0 0

0	1	4

****	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0

BIT5 : Controls the enable of each axis via the G39 signal (0: no 1: yes).

BIT6 : Memory knife function (0: off 1: on).

Default value: 0 1 0 0 0 0 0 0 0

1	6	4

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

Bit0 0: Mechanical zero point does not remember;

1: Mechanical zero point memory.

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

1: The reference point is not established when the G28 command alarms.

Bit2 0: The reference point is not created, and the instructions other than G28 are specified not alarmed;

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

Bit3 0: Manually return to the reference point after the reference point is memorized to take fast speed;

1: Manually return to the reference point after the reference point is memorized to take the manual speed.

Bit4 0: The arc is processed over-limit;

1: The arc is not processed over-limit.

Bit6 0: Manually return to the reference point after the reference point is memorized to take the fast speed;

1: Manually return to the reference point after the reference point is memorized to take the manual speed.

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 0 0 0 1

1	6	8

WLOE	HLOE	GTAP	THRD	CBOL	CLSE	FBOL	FLSE

Bit0 0: Fast running is linear;

1: Fast running is front acceleration and deceleration S type / rear acceleration and deceleration index type.

Bit1 0: acceleration and deceleration before fast running mode;

1: Acceleration and deceleration after fast running mode.

Bit2 0: The cutting feed is linear;

1: The cutting feed is the front acceleration and deceleration S type / rear acceleration and deceleration index type.

Bit3 0: acceleration and deceleration before cutting feed mode;

1: Acceleration and deceleration after cutting feed mode.

Bit4 0: The acceleration and deceleration mode of thread processing is the front acceleration and deceleration linear type;

1: The acceleration and deceleration mode of thread processing is the front acceleration and deceleration S type.

Bit5 0: Rigid tapping acceleration and deceleration mode is front acceleration and deceleration linear type;

1: The rigid tapping acceleration and deceleration mode is the front acceleration and deceleration S type.

Bit6 0: JOG running select linear acceleration and deceleration;

1: JOG runs to select exponential acceleration and deceleration.

Bit7 0: Handwheel running select linear acceleration and deceleration;

1: Handwheel running select exponential acceleration and deceleration.

Default value: 1 0 0 0 1 1 0 1

1	7	2	****	****	****	CCN	SUP	****	RFO	LRP

Bit0 0: Positioning (G00) The interpolation trajectory is non-linear;

1: Positioning (G00) The interpolation trajectory is linear.

Bit1 0: When fast feed, fast feed magnification does not stop;

1: When fast feed, stop when fast feed magnification is F0.

Bit3 0: The starting form of the tool radius compensation is type A;

1: The starting form of the tool radius compensation is type B.

Bit4 0:G28, G30 instructions moved to the midpoint, without cancellation of radius compensation;

1:G28, G30 instructions move to the midpoint, cancel radius compensation.

Bit6 0: Input mode, % execution does not cancel radius compensation;

1: Input mode, % execution cancellation radius compensation.

Bit7 0: The maximum control speed of the cutting feed is not controlled separately;

1: The maximum control speed of the cutting feed is controlled separately.

Default value: 0 0 0 1 0 0 0 0 0

1	7	3	AALM	****	****	MNT	CANT	****	CLV	CCV

Bit0 0: Macro program common variable #100~#199, not empty after reset;

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

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

1: Macro program local variable #1~#50, cleared 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.

Bit4 0: The number of processed parts is powered off memory;

1: The number of processed parts is not remembered.

Bit7 0: Do not ignore external user alarm No;

1: Ignore external user alarm yes.

Default value: 0 0 0 0 0 0 0 0 0 0

1	7	4	G13	G01	****	****	****	****	****	****

Bit0 0: The driver communication mode is pulsed;

1: The drive communication mode is bus

Bit2 0: Need to return to zero after an emergency stop;

1: There is no need to return to zero after an emergency stop

Bit3 0: Emergency stop does not need to return to zero and does not output reset signal;

1: The emergency stop does not need to return to zero to output the reset signal.

Bit6 0: G00 mode when powered on or cleared state;

1: G01 mode when powered on or cleared.

Bit7 0: Set G12 when power is turned on or when the state is cleared;

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

Default value: 1 0 0 0 1 1 0 0

1	7	5	SPFD	SAR	THDA	VAL5	VAL4	VALY	VALZ	VALX

Bit0 0: X axis move key in the opposite direction;

1: The X axis moves the key direction without reversing.

Bit1 0: Z axis move the key in the opposite direction;

1: The Z axis moves the key direction without reversing.

Bit2 0: Y axis move key direction reversed;

1:Y axis move the key direction without reversing.

Bit3 0:4th Axis Move Key Direction Reversed;

1:4th Axis Move Key Direction Is Not Reversed.

Bit4 0:5th Axis Move Key Direction Reversed;

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

Bit5 0: Threading for linear acceleration and deceleration;

1: Thread processing is exponential acceleration and deceleration.

Bit6 0: Spindle SAR signal is not checked before cutting;

1: Check the spindle SAR signal before cutting.

Bit7 0: Allows the spindle to stop rotating when cutting feed;

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

Default value: 0 0 0 0 0 0 0 0 0 0

1	7	6	****	****	****	****	****	**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

1	7	7	AD2	****	****	****	****	BFA	LZR	UOT2

Bit0 0: Inside the no-entry zone of the second stroke limit;

1: Outside the no-entry area of the second stroke limit.

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

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

Bit2 0: When the overrun command is issued, the alarm is issued before the overrun;

1: When the overrun command is issued, the alarm is alarmed after the overrun.

Bit3 0: The soft limit of the zeroback method is valid;

1: The soft limit of the zero-back method is invalid.

Bit7 0: In the same paragraph, no alarm is required when two or more identical addresses are

instructed;

1: In the same paragraph, the alarm is issued when two or more of the same address is instructed.

Default value: 1 0 0 0 0 1 1 1

1	7	8	****	****	BIT5	BIT4	****	****	BIT1	BIT0

BIT0 : Whether axis 5 is set to analog spindle (0:no 1:yes).

BIT1 : Whether the Y axis is set to the analog spindle (0:no 1:yes).

BIT4 : Selected when the 5th axis is set to the analog spindle (0: 1st spindle 1: 2nd spindle).

BIT5 : Y axis is selected when the analog spindle is set (0: 1st spindle 1: 2nd spindle).

Default value: 0 0 0 0 0 0 0 0 0 0

1	7	9	****	****	BIT5	BIT4	BIT3	****	BIT1	BIT0

BIT0 : Backup parameters (0: No 1: Yes) are divided into password levels

BIT3 : G10 function (0: No 1: Yes) supports re-decoding function

Default value: 0 0 0 0 0 0 0 0 0 0

1	8	0	NAT	RRW	****	****	****	WARP	PETP	SPOS

Bit0 0: Location & Monitor display relative coordinates;

1: Position & Progress monitor shows the amount of movement remaining.

Bit1 0: Press the edit key without switching 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: Reset the cursor to return the beginning of the program in the editing mode is valid;

1: Reset the cursor back to the beginning of the program in any way valid.

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 0 1 0

1	8	1	****	****	****	**ZMI5**	**ZMI4**	**ZMIY**	**ZMIZ**	**ZMIX**

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

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

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

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

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

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

Bit3 0:4th Axis returns to the reference point in the positive direction;

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

Bit4 0:5th Axis returns to the reference point in the positive direction;

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

Default value: 0 0 0 0 0 0 0 0 0 0

1	8	2	****	****	****	****	****	****	****	BIT0

BIT0 : Threading (0: Normal 1: High Speed).

1	8	3	****	****	****	****	****	****	****	****

retain

Default value: 0 0 0 0 0 0 0 0 0 0

1	8	4	****	****	NE9	NE8	****	****	LS1	LS0

Bit1, Bit0: LS1LS0 Interface Language Selection (00:Chinese 01:English 10:Russian 11:Spanish).

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

1: It is forbidden to edit subroutines with program numbers 8000~8999.

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

1: It is forbidden to edit subroutines with program numbers 9000~9999.

Default value: 0 0 1 1 0 0 0 0

1	8	5	****	****	****	****	****	****	PRPD	PLA

Bit0 0: PLC axis control function is invalid;

1: PLC axis control function is effective.

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

1: PLC axis fast movement speed to take the input value.

Default value: 0 0 0 0 0 0 0 0 0 0

1	8	6	RTORI	SRS	****	****	****	TCRG	****	****

Bit2 0: When rigid tapping is canceled, wait for G61.0 to change to 0;

1: When rigid tapping is canceled, do not wait for G61.0 to become 0.

Bit6 0: Spindle selection signal is SWSn when multi-spindle rigid tapping;

1: The spindle selection signal is RRTSPn when multi-spindle rigid tapping.

Bit7 0: When M29 is executed, the spindle does not return to machine tool zero;

1: When M29 is executed, the spindle returns the machine to zero.

Default value: 0 0 0 0 0 0 0 0 0 0

1	8	7	****	****	**RCSY**	****	****	****	**ROSY**	**ROTY**

Bit0 0: Set the Y axis type to straight line;

1: Set the Y axis type to rotation axis.

Bit1 0: When the Y axis is set to the axis of rotation, the type is type A of the axis of rotation;

1: When the Y axis is set to the axis of rotation, the type is type B of the axis of rotation.

Bit2 0: Set the Z axis type to straight axis;

1: Set the Z axis type to rotation axis.

Bit3 0: When the Z axis is set to the axis of rotation, the type is type A of the axis of rotation;

1: When the Z axis is set to the axis of rotation, the type is type B of the axis of rotation.

Bit5 0: Y axis of the Cs axis function is effective;

The Cs axis function of the 1:Y axis is invalid.

Default value: 0 0 0 0 0 0 0 1 0

1	8	8	****	****	****	****	****	RRLY	RABY	ROAY

When bit0 0:Y axis is the axis of rotation, the absolute coordinate loop function is invalid;

When the 1:Y axis is the axis of rotation, the absolute coordinate loop function is effective.

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

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

When the Bit2 0:Y axis is the axis of rotation, the relative coordinate loop function is invalid;

When the 1:Y axis is the axis of rotation, the relative coordinate loop function is effective.

Bit3 0: When the Z axis is the axis of rotation, the absolute coordinate loop function is invalid;

1: When the Z axis is the axis of rotation, the absolute coordinate loop function is effective.

Bit4 0: When the Z axis is the axis of rotation, rotate nearby;

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

Bit5 0: When the Z axis is the axis of rotation, the relative coordinate loop function is invalid;

1: When the Z axis is the axis of rotation, the relative coordinate loop function is effective.

Default value: 0 0 0 0 0 1 0 1

1	8	9	****	****	RCS4	****	****	****	ROS4	ROT4

Bit0 0: Set the 4th axis type to linear axis;

1: Set the 4th axis type to rotary axis.

Bit1 0: When the 4th axis is set to the axis of rotation, the type is type A of the axis of rotation;

1: When the 4th axis is set to the axis of rotation, the type is type B of the axis of rotation.

Bit2 0: Set the X axis type to straight axis;

1: Set the X axis type to rotation axis.

Bit3 0: When the X axis is set to the axis of rotation, the type is the axis of rotation A;

1: When the X axis is set to the axis of rotation, the type is the type of rotation axis B.

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

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

Default value: 0 0 0 0 0 0 0 1 0

1	9	0	****	****	****	****	****	RRL4	RAB4	ROA4

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

When the 1:4th axis is the axis of rotation, the absolute coordinate loop function is active.

When the Bit1 0:4th axis is the axis of rotation, rotate nearby;

When the 1:4th axis is the axis of rotation, rotate in the direction of the symbol.

When the Bit2 0:4th axis is the axis of rotation, the relative coordinate loop function is invalid;

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

When Bit3 0:X axis is the axis of rotation, the absolute coordinate loop function is invalid;

When the 1:X axis is the axis of rotation, the absolute coordinate loop function is valid.

Bit4 0: When the X axis is the axis of rotation, rotate nearby;

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

Bit5 0: When the X axis is the axis of rotation, the relative coordinate loop function is invalid;

When the 1:X axis is the axis of rotation, the relative coordinate loop function is effective.

Default value: 0 0 0 0 0 1 0 1

1	9	1	****	****	RCS5	****	****	****	ROS5	ROT5

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

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

Bit1 0: When the 5th axis is set to the axis of rotation, the type is type A of the axis of rotation;

1: When the 5th axis is set to the axis of rotation, the type is type B of the axis of rotation.

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

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

Default value: 0 0 0 0 0 0 0 1 0

1	9	2	****	****	****	****	****	RRL5	RAB5	ROA5

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

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

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

When the 1:5th 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 loop function is invalid;

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

Default value: 0 0 0 0 0 1 0 1

1	9	3	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : The X axis reads the absolute coordinates (0: positive 1: negative) direction

BIT1 : The Z axis reads the absolute coordinates (0:positive 1:negative) direction

BIT2 : The Y axis reads the absolute coordinates (0: positive 1: negative) direction

BIT3: The 4 axis reads the absolute coordinates (0:positive 1:negative) direction

BIT4: 5 axis reads the absolute coordinates (0: positive 1: negative) direction

Default value: 0 0 0 0 0 0 0 0 0 0

1	9	4	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : The X-axis reads the absolute encoder bits (0:17 bits 1:23 bits).

BIT1 : The Z axis reads the absolute encoder bits (0:17 bits 1:23 bits).

BIT2 : The Y axis reads absolute encoder bits (0:17 bits 1:23.) bits).

BIT3 : 4 axes read absolute encoder bits (0:17 bits 1:23.) bits).

BIT4: 5 axes read absolute encoder bits (0:17 bits 1:23 bits).

Default value: 0 0 0 0 0 0 0 0 0 0

1	9	5	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

1	9	6	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT4: (0: No 1: Yes) Enables the multi-spindle function

Default value: 0 0 0 0 0 0 0 0 0 0

1	9	7	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0: Whether the X axis is shielded with a soft limit alarm (0: No 1: Yes).

BIT1 : Z axis is shielded with soft limit alarm (0: No 1: Yes).

BIT2 : Y axis is shielded with soft limit alarm (0: No 1: Yes).

BIT3 : Whether axis 4 is shielded with a soft limit alarm (0: No 1: Yes).

BIT4 : Soft limit alarm for axis 5 (0: No 1: Yes).

Default value: 0 0 0 0 0 0 0 0 0 0

1	9	8	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

1	9	9	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	0	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	1	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	2	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	3	****	****	****	ABP5	ABP4	ABPY	ABPZ	ABPX

Bit0 0: X-axis pulse output in pulse + direction;

The 1:X-axis pulse is output as quadrature in two phases.

Bit1 0: Z-axis pulse is output in pulse + direction;

1: The Z-axis pulse is output as quadrature in two phases.

Bit2 0: Y axis pulse output in pulse + direction;

The 1:Y axis pulse is output as two phases quadrature.

Bit3 0:4th axis pulse output in pulse + direction;

The 1:4th shaft pulse is output quadrature in two phases.

Bit4 0:5th axis pulse output in pulse + direction;

The 1:5th axis pulse is output as quadrature in both phases.

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	4	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	5	YTP	****	ABP5	****	MCL	MKP	****	SEQ

Bit0 0: Does not automatically insert sequence numbers;

1: Automatically insert sequence numbers.

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

1: Delete the compiled program after the program is executed in the program status interface.

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

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

Bit5 0: Do not display the start screen;

1: Display the splash screen.

Bit7 0: The third axis is not a linkage axis;

1: The third axis is linked to the axis.

Default value: 0 0 0 0 0 0 0 0 0 0

2	0	6	YTP	****	ABP5	****	MCL	MKP	****	SEQ

Bit0 0: The 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 0

2	0	7	MDLY	SBM	****	SIM	****	MDL	****	CNI

Bit0 0: Radius compensation interference check is not performed;

1: Radius compensation interference check is performed.

Bit2 0: The one-way positioning G code is not set to a modal code;

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

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

1: Indexing command and other control axis command same section alarm.

Bit6 0: Single segments cannot be used in macro program instruction statements;

1: A single segment can be used in a macro program instruction statement.

Bit7 0: Delay in macro program instruction statements;

1: There is no delay in the macro program instruction statement.

Default value: 0 0 0 0 0 0 0 0 0 1

2	0	8	ZCL	****	****	****	****	****	MAOB	SIOD

Bit1 0: Select the A mode when there is no signal to return to zero;

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

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 1

2	0	9	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

retain

Default value: 0 0 0 0 0 0 0 0 0 0

2	1	0	CALT	ALS	****	****	****	****	****	****

Bit6 0: The automatic corner magnification function is invalid;

1: The automatic corner magnification function is effective.

Bit7 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 0 0 0 0

2	1	1	****	****	TDR	****	****	****	****	****

Bit5 0: During tapping, the empty run is invalid;

1: During tapping, empty running is effective.

Default value: 0 0 0 0 0 0 0 0 0 0

2	1	2	DWL	****	SOC	RSC	****	****	****	****

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

1:G0 positioning is calculated when the G96 spindle speed is calculated according to the current coordinates.

Bit5 0: G96 spindle speed clamped before spindle magnification;

1: G96 spindle speed clamped spindle magnification.

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

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

Default value: 0 0 0 0 0 0 0 0 0 0

2	1	3	OVU	DOV	TDR	****	ORI	****	PCP	SSOG

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

1: The spindle control mode is servo when tapping.

Bit1 0: Tapping unchanged is 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 stop on time;

1: At the beginning of flexible tapping, the spindle is quasi-stop.

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

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

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

1: When rigid tapping and retracting, the magnification is effective.

Bit7 0: Rigid tapping retraction magnification is 1%;

1: Rigid tapping retraction magnification is 10%.

Default value: 0 0 0 0 0 0 0 0 0 0

2	1	4	LEDT	LOPT	OHPG	****	****	SOVD	FOVD	ROVD

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

1: Fast running magnification adjustment using band switch.

Bit1 0: Cutting feed rate adjustment using the operator panel button;

1: Cutting feed rate adjustment uses a band switch.

Bit2 0: Spindle speed magnification adjustment using the operator panel buttons;

1: Spindle speed magnification adjustment uses band switch.

Bit5 0: Does not use external hand wheels;

1: Use the external hand wheel.

Bit6 0: No external operator panel lock is used;

1: Use the external operator panel lock.

Bit7 0: Does not use an external edit lock;

1: Use an external edit lock.

Default value: 0 0 0 0 0 0 0 0 0 0

2	1	5	****	****	****	****	LALM	EALM	SALM	FALM

Bit0 0: Do not ignore the feed shaft drive alarm;

1: Ignore the feed shaft drive alarm.

Bit1 0: Do not ignore the spindle drive alarm;

1: Ignore spindle drive alarm.

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.

Default value: 0 0 0 0 0 0 0 0 0 0

3.1.2 Data Parameters

0	1	5	X-axis pulse output multiplier factor
0	1	6	Z-axis pulse output multiplier factor

[Data Range] 1 ～ 65536

[Default] 1

0	1	7	X-axis pulse output divider factor
0	1	8	Z-axis pulse output crossover factor

[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 motor's one-turn feedback

L: The amount of movement of the motor corresponding to the machine tool in one turn

[Default] 1

0	1	9	The length of the ejection when cutting a thread

[Data Range] 0 ~ 225

Thread ejection width = THDCH×0.1× Thread lead

[Default] 5

0	2	1	Voltage bias compensation value when the spindle analog voltage output is 10V

[Data Unit] v

[Data range] -0.2 ～ 0.2

[Default] 0

0	2	2	The X-axis moves fast at the highest speed (radius value).
0	2	3	The Z axis moves fast at maximum speed

[Data Units].

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

[Data Range] 0 ～ 90000

[Default] 5000

0	2	4	When the X axis is moving fast, the acceleration and deceleration time constant value (S type pre-acceleration and deceleration).
0	2	5	When the Z axis is moving fast, the acceleration and deceleration time constant value (S-type front acceleration and deceleration).

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 100

0	2	6	Constant acceleration and deceleration time for the short shaft when the thread is tailed

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 100

0	2	7	X and Z axis cutting feed upper limit speed

[Data Units].

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

[Data range] 10 ～ 15000
[Default] 8000

0	2	8

The starting speed of the X and Z axes of thread cutting

[Data Units].

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

[Data Range] 6 ～ 8000
[Default] 50

0	2	9

Cutting feed and manual feed acceleration and deceleration time constants (exponential post-acceleration and deceleration).

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 60

0	3	0

The starting speed of the X and Z axes of thread cutting

[Data Units].

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

[Data Range] 0 ～ 8000
[Default] 50

0	3	1

The set speed at a manual feed rate of 100%.

[Data Units].

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

[Data Range] 0 ～ 8000
[Default] 1260

0	3	2

The fast moving speed when the shaft fast movement magnification is F0

[Data Units].

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

[Data Range] 6 ～ 4000
[Default] 400

0	3	3

The X and Z axes return to the low speed rate of the machine's zero point

[Data Units].

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

[Data Range] 6 ～ 4000
[Default] 40

0	3	4
0	3	5

The amount of X-axis backlash compensation
Amount of backlash compensation for the Z-axis

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0 ～ 0.5000
[Default] 0

Note: The X axis is the radius value.

0	3	6

Voltage bias compensation value when the spindle analog voltage output is 0V

[Data Unit] v
[Data Range] -0.1000 ～ 0.1000
[Default] 0

0	3	7	The maximum speed corresponding to the first gear of the spindle
0	3	8	The maximum speed corresponding to the first gear of the spindle
0	3	9	Corresponds to the maximum speed of the 3rd gear of the spindle
0	4	0	Corresponds to the maximum speed of the 4th gear of the spindle

[Data Unit] r/min
[Data range] 10 ～ 99999

[Default] 6000

0	4	1

The starting speed of acceleration and deceleration during manual feed, the termination speed of deceleration

[Data Units].

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

[Data Range] 0 ～ 8000

[Default] 40

0	4	2

The increment value of the segment number when the program segment number is automatically inserted

[Data Range] 1 ～ 400

[Default] 10

0	4	3

The minimum speed of the spindle under constant linear speed (G96) control

[Data Unit] r/min

[Data Range] 0 ～ 9999

[Default] 100

0	4	4

Baud rate of serial communication

[Data Unit] bit/s

[Data range] 1200 、2400、4800、9600、19200、38400、57600、 115200

[Default] 115200

0	4	5
0	4	6

X-axis forward maximum stroke (first stroke limit).

Z-axis forward maximum stroke (first stroke limit).

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999

[Default] 9999.9999

Note: When the CNC parameter is NO. Bit2 **of 001 is specified for the diameter, and the X axis is set with the diameter value;**

When the BIT2 bit is set to a radius specified, the X axis is set with the radius value.

0	4	7
0	4	8

X-axis negative maximum stroke (first stroke limit).

Z-axis negative maximum stroke (first stroke limit).

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999

[Default] -9999.9999

Note: When the CNC parameter is NO. Bit2 of 001 is specified for the diameter, and the X axis is set with the diameter value;

When the BIT2 bit is set to a radius specified, the X axis is set with the radius value.

0	5	1

G71/G72 the amount of a single tool feed during cyclic turning

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0.0010 ～ 99.9999

[Default] 0

0	5	2

G71, G72 cycle turning during single retract volume

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0 ～ 99.9999

[Default] 0

0	5	3

G73 The amount of retracted X-axis during cyclic turning

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] - 9999.9999 ～ 9999.9999

[Default] 0

0	5	4

G73 The amount of retracted in the Z axis during cyclic turning

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] - 9999.9999 ～ 9999.9999
[Default] 0

0	5	5

G73 Number of cuts for cyclic turning

[Data Units]. times
[Data Range] 1 ～ 9999
[Default] 1

0	5	6

G74, G75 cycle turning Z axis retract volume

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0 ～ 99.9999
[Default] 0

0	**5**	**7**

G76 Number of repetitions of cyclic finishing

[Data Units]. times
[Data Range] 1 ～ 99
[Default] 1

0	5	8

Tip angle in the G76 cycle

[Data Units]. degrees
[Data Range] 0 ～ 99
[Default] 0

0	5	9

Minimum depth of cutting in the G76 cycle

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0 ～ 99.9999
[Default] 0

0	6	0

G76 finishing allowance in cycles

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0 ～ 99.9999
[Default] 0

0	6	5

Spindle shift time 1

0	6	6	Spindle shift time 2

[Data Unit] ms
[Data Range] 0 ～ 60000
[Default] 1000

0	6	7	The voltage (mV) output when the spindle is shifted

[Data Unit] mV
[Data Range] 0 ～ 10000
[Default] 100

0	6	8	The rotation speed of the spindle in manual (hand vein, etc.).

[Data Unit] r/min
[Data Range] 0 ～ 3000
[Default] 0

0	6	9	Low pressure alarm time width

[Data Unit] ms
[Data Range] 0 ～ 60000
[Default] 0

0	7	0	The number of spindle encoder lines

[Data Units]. Line/turn
[Data range] 100 ～ 5000
[Default] 1024

0	7	1	Reset signal output time

[Data Unit] ms
[Data range] 50 ～ 400
[Default] 200

0	7	2	Spindle speed reaches signal delay detection time

[Data Unit] ms
[Data Range] 0 ～ 4080
[Default] 0

0	7	3	The spindle motor speed is clamped to the maximum speed

[Data Range] 0 ～ 4095
Setpoint = (spindle motor maximum clamping speed / spindle motor maximum speed) ×4095.
[Default] 4095

0	7	4	Spindle motor speed is clamped to the minimum speed

[Data Range] 0 ～ 4095
Setpoint = (spindle motor minimum clamp speed / spindle motor maximum speed) ×4095.
[Default] 0

0	7	5

Maximum spindle speed

[Data Unit] r/min

[Data Range] 0 ～ 9999

[Default] 6000

0	7	6

Cutting feed speed when powered on

[Data Units].

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

[Data Range] 0 ～ 9999

[Default] 300

0	7	8

The maximum amount of time to move the maximum tool position when changing tools

[Data Unit] ms

[Data range] 100 ～ 60000

[Default] 15000

0	8	0

M code execution duration

[Data Unit] ms

[Data range] 100 ～ 5000

[Default] 500

0	8	1

S code execution duration

[Data Unit] ms

[Data range] 100 ～ 5000

[Default] 500

0	8	2

The delay time from the forward rotation of the tool holder to the start of the tool holder reversal locking

[Data Unit] ms

[Data Range] 0 ～ 4000

[Default] 0

0	8	3

The alarm time when the tool holder lock*TCP signal was not received

[Data Unit] ms

[Data Range] 0 ～ 4000

[Default] 500

0	8	4

Total number of cutter bits selected

[Data Unit] ms
[Data Range] 1 ～ 32
[Default] 4
NOTE: When using the row tool holder, set to 1.

0	8	5	The knife holder reverses the locking time

[Data Unit] ms
[Data Range] 0 ～ 4000
[Default] 1000

0	8	6	The lower spindle magnification value

[Data Unit] ms
[Data Range] 0 ～ 4000
[Default] 0

0	8	7	Spindle stop (M05) output when spindle braking delays output

[Data Unit] ms
[Data Range] 0 ～ 10000
[Default] 0

0	8	9	Spindle brake output time

[Data Unit] ms
[Data Range] 0 ～ 60000
[Default] 50

0	9	0	The number of bits allowed for the M code

[Data Range] 1 ～ 2
[Default] 2

0	9	1	The number of bits allowed for the S code

[Data Range] 1 ～ 6
[Default] 5

0	9	2	The number of allowed digits for the T code

[Data Range] 1 ～ 6
[Default] 4

0	9	3	Disables the opening number of the tool offset amount entered by MDI

[Data Range] 0 ～ 9999
[Default] 0

0	9	4	The number of tool offsets entered by MDI is prohibited

[Data Range] 0 ～ 9999

[Default] 0

0	9	5	Pause time when one-way positioning

[Data Unit] s

[Data Range] 0 ～ 10

[Default] 0

0	9	6	X-axis unidirectional positioning direction and overrange
0	9	7	Z-axis unidirectional positioning direction and overrange volume

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -99.9999 ～ 99.9999

[Default] 0

0	9	8	The position number of the pitch error compensation corresponding to the zero position of the X-axis machine tool
0	9	9	The position number of the pitch error compensation position corresponding to the zero position of the Z-axis machine tool

[Data Range] 0 ～ 255

[Default] 0

1	0	2	X-axis pitch error compensates for interval distance
1	0	3	Z-pitch error compensates for interval distance

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 1 ～ 9999.9999

[Default] 10

1	0	6	The spindle speed fluctuation alarm limit value during threading (set to 0 indicates no detection).

[Data Units] %

[Data Range] 0 ～ 100

[Default] 0

1	0	7	The speed of the short shaft when threading the tail (set to 0 at the speed of the thread cut feed).

[Data Units].

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

[Data Range] 0 ～ 8000
[Default] 0

1	0	8

Spindle jog time

[Data Unit] ms
[Data Range] 0 ～ 60000
[Default] 3000

1	0	9

Rotation speed when the spindle is jogged

[Data Unit] r/min
[Default] 40

1	1	0

Encoder to spindle gear ratio parameter: Number of spindle gears

[Data Range] 1 ～ 255
[Default] 1

1	1	1

Encoder to spindle gear ratio parameter: The number of encoder gears

[Data Range] 1 ～ 255
[Default] 1

1	1	2

Lubrication on-time (lubrication is not limited by time when set to 0).

[Data Unit] ms
[Data Range] 0 ～ 60000
[Default] 0

1	1	3

The high-speed speed of the X and Z axes back to the zero point of the machine tool

[Data Units].

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

[Data range] 10 ～ 9999
[Default] 4000

1	1	4

X-axis machine zero offset

1	1	5

Z-axis machine zero offset

[Data Units].

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

[Data Range] 0 ～ 100

[Default] 0

1	1	6	X-axis forward maximum stroke (second stroke limit).
1	1	7	Z-axis forward maximum stroke (second stroke limit).

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999

[Default] 9999

1	1	8	X-axis negative maximum stroke (second stroke limit).
1	1	9	Z-axis negative maximum stroke (second stroke limit).

[Data Units].

Set the unit data units

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999

[Default] -9999

1	2	0	Machine coordinates of reference point 1 of the X axis
1	2	1	Coordinates of the machine at reference point 1 of the Z axis
1	2	2	Machine coordinates of the second reference point of the X axis
1	2	3	Coordinates of the machine tool at the second reference point of the Z axis
1	2	4	Machine coordinates of the 3rd reference point of the X axis
1	2	5	Coordinates of the machine tool at the 3rd reference point of the Z axis
1	2	6	Machine coordinates of the 4th reference point of the X axis
1	2	7	Coordinates of the machine tool at the 4th reference point of the Z axis

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999
[Default] 0

1	2	8	G54_X the workpiece origin offset of the X-axis workpiece coordinate system 1
1	2	9	G54_Z the workpiece origin offset of Z-axis workpiece coordinate system 1

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999
[Default] 0

1	3	0	G55_X the workpiece origin offset of the X-axis workpiece coordinate system 2
1	3	1	G55_Z the workpiece origin offset for Z-axis workpiece coordinate system 2

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999
[Default] 0

1	3	2	G56_X the workpiece origin offset of the X-axis workpiece coordinate system 3
1	3	3	G56_Z the workpiece origin offset for Z-axis workpiece coordinate system 3

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999
[Default] 0

1	3	4	G57_X the workpiece origin offset of the X-axis workpiece coordinate system 4
1	3	5	G57_Z the workpiece origin offset of Z-axis workpiece coordinate system 4

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999

[Default] 0

1	3	6	G58_X the workpiece origin offset for the X-axis workpiece coordinate system 5
1	3	7	G58_Z the workpiece origin offset of the Z-axis workpiece coordinate system 5

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999

[Default] 0

1	3	8	G59_X the workpiece origin offset for the X-axis workpiece coordinate system 6
1	3	9	G59_Z the workpiece origin offset for Z-axis workpiece coordinate system 6

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999

[Default] 0

1	4	0	The positive and negative limits of the amount of tool wear entered each time in the tool bias & wear interface

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0.001 ～ 99.9999

[Default] 1

1	4	6	Y-axis pulse output multiplier factor
1	4	7	4th axis pulse output multiplier factor
1	4	8	5th axis pulse output multiplier factor

[Data Significance] 5th Shaft pulse output multiplier factor.

[Data Range] 1 ～ 65536

[Default] 1

1	4	9	Y-axis pulse output multiplier factor
1	5	0	4th axis pulse output multiplier factor
1	5	1	5th axis pulse output multiplier factor

[Data Range] 1 ～ 65536

[Default] 1

1	5	3	The ladder number currently in use

[Data Range] 0 ～ 15

[Default] 1

1	5	4	The maximum arc radius error

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0.0001 ～ 1

[Default] 0.01

1	5	5	Y-axis maximum fast movement speed
1	5	6	4th axis maximum fast moving speed
1	5	7	5th axis maximum fast moving speed

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] 0 ～ 90000

[Default] 5000

1	5	8	When the Y axis is moving fast, the acceleration and deceleration time constant value (S type pre-acceleration and deceleration).
1	5	9	When the 4th axis is moving fast, the acceleration and

1	6	0

deceleration time constant value (S-type front acceleration and deceleration).

When the 5th axis is moving fast, the acceleration and deceleration time constant value (S-type front acceleration and deceleration).

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 100

1	6	2

The starting speed of the acceleration and deceleration of the CS shaft

[Data Units] deg/min
[Data Range] 0 ～ 4000
[Default] 10

1	6	3

Acceleration and deceleration time constant for the CS shaft

[Data Unit] ms
[Data Range] 0 ～ 4000
[Default] 100

1	6	6

The starting speed of the rigid tapping straight acceleration and deceleration

[Data Units].

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

[Data Range] 0 ～ 4000
[Default] 10

1	6	7

Straight-line acceleration and deceleration time constant during rigid tapping

[Data Unit] ms
[Data Range] 0 ～ 4000
[Default] 200

1	**6**	**9**

The magnification value at rigid tapping and retracting (when set to 0, the magnification is fixed at 100%)

[Data range] 0.8 ～ 1.2
[Default] 1

1	7	1

The maximum spindle speed allowed by rigid tapping

[Data Unit] r/min

[Data Range] 0 ～ 6000
[Default] 800

1	7	4	Y-axis back to the low speed of the machine zero point
1	7	5	4th axis back to the low speed of the machine zero point
1	7	6	5th axis back to the low speed of the machine zero point

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] 6 ～ 400
[Default] 40

1	7	7	The high-speed speed of the Y axis back to the zero point of the machine tool
1	7	8	4th high speed of the shaft back to the zero point of the machine tool
1	7	9	5th axis back to the machine machine zero point of high speed

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data range] 10 ～ 9999
[Default] 4000

1	8	0	Amount of Y-axis backlash compensation
1	8	1	4th axis backlash compensation amount
1	8	2	5th axis backlash compensation amount

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] 0 ～ 0.5
[Default] 0

1	8	3	Y-pitch error compensates for interval distance

1	8	4	4th pitch error compensates for interval distance
1	8	5	5th pitch error compensates for interval distance

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] 1 ～ 9999.9999

[Default] 10

1	8	6	Y-pitch error compensates for interval distance
1	8	7	The position number of the pitch error compensation corresponding to the zero point of the 4th axis machine tool
1	8	8	The position number of the pitch error compensation corresponding to the zero point of the 5th axis machine tool

[Data Range] 0 ～ 255

[Default] 0

1	8	9	Y-axis machine zero offset
1	9	0	4th axis machine zero offset
1	9	1	5th axis machine zero offset

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] 0 ～ 100

[Default] 0

1	9	2	Y-axis forward maximum travel
1	9	3	4th axis forward maximum stroke
1	9	4	5th axis forward maximum stroke

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] -9999.9999 ～ 9999.9999

[Default] 9999.9999

1	9	5	Y axis negative maximum stroke
1	9	6	4th axis negative maximum stroke
1	9	7	5th axis negative maximum stroke

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] - 9999.9999 ～ 9999.9999

[Default] -9999.9999

2	0	1	Coordinates of the machine tool at reference point 1 of the Y axis
2	0	2	4th axis 1st reference point machine coordinates
2	0	3	5th axis 1st reference point machine coordinates
2	0	4	Coordinates of the machine tool at the 2nd reference point of the Y axis
2	0	5	4th axis 2nd reference point machine coordinates
2	0	6	5th axis 2nd reference point machine coordinates
2	0	7	Coordinates of the Y-axis reference point 3
2	0	8	4th axis 3rd reference point machine coordinates
2	0	9	5th axis 3rd reference point machine coordinates
2	1	0	Coordinates of the machine tool at the 4th reference point of the Y axis
2	1	1	4th axis 4th reference point machine coordinates
2	1	2	5th axis 4th reference point machine coordinates

[Data Units].

Set the	Data units
Metric	mm/min
Imperial	inch/min
Rotary	deg/min

[Data Range] -9999.9999 ～ 9999.9999

[Default] 0

2	2	5	The axis name definition for the Y axis
2	2	6	The axis name definition for the 4th axis
2	2	7	The axis name definition for the 5th axis

[Data Range] 2 、3、4、5

Axis	Setpoi	Axis	Setpoi
A	3	C	5
B	4	Y	2

[Default] 225 The default value is 2, the default value for 226 is 3, and the default value for 227 is 4

2	3	7	The axis that acts as a counting reference when the surface speed is controlled

[Data Range].

Setpo	significance
0	X-axis
1	Z-axis
2	Y-axis
3	4th axis
4	5th axis

[Default] 0

2	3	8	Arc interpolation controls the accuracy

[Data Range] 0 ～ 0.5

[Default] 0.03

2	4	0	X-axis pitch error compensation magnification
2	4	1	Z-pitch error compensation magnification
2	4	2	Y-pitch error compensation magnification
2	4	3	4th spindle pitch error compensation magnification
2	4	4	5th spindle pitch error compensation magnification

[Data Range] 0 ～ 9999.9999

[Default] 0.001

2	4	5	Backlash compensation determines the accuracy of the reverse (X0.0001).

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0.0001 ～ 1

[Default] 0.01

2	4	6	The offset step of the X-axis clearance compensated at a fixed frequency
2	4	7	The compensation step of the Z-axis clearance compensated at a fixed frequency
2	4	8	The compensation step of the Y-axis clearance compensated at a fixed frequency
2	4	9	The compensation step of the 4th axis clearance compensated in a fixed frequency manner
2	5	0	The compensation step of the 5th axis clearance compensated in a fixed frequency manner

[Data Range] 0 ～ 99.9999
[Default] 0.003

2	5	1

The time constant compensated by the backlash in the form of a rising and falling speed

[Data Unit] ms
[Data Range] 0 ～ 400
[Default] 20

2	5	2

Exponential acceleration and deceleration acceleration clamping constant

[Data Unit] ms
[Data Range] 0 ～ 1000
[Default] 50

2	5	3

Exponential acceleration and deceleration of FL speed

[Data Units].

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

[Data Range] 0 ～ 9999
[Default] 10

2	5	4

The handwheel does not operate completely in a way that the acceleration clamps the constant

[Data Range] 0 ～ 1000
[Default] 50

2	5	5

The amount of rewind or leave blank during the deep hole tapping cycle

[Data Units].

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

[Data Range] 0 ～ 100
[Default] 0

2	5	6

Linear acceleration and deceleration time constant for spindle and tapping shaft (gear 1).

2	5	7

Linear acceleration and deceleration time constant for spindle and tapping shaft (gear 2).

2	5	8

Linear acceleration and deceleration time constant for spindle and tapping shaft (gear 3).

[Data Unit] ms
[Data Range] 0 ～ 9999
[Default] 200

2	5	9	The time constant between the spindle and tapping shaft when retracting the knife (gear 1st gear).
2	6	0	The time constant between the spindle and tapping shaft when retracting the knife (gear 2).
2	6	1	The time constant of the spindle and tapping shaft when retracting the tool (gear 3).

[Data Unit] ms
[Data Range] 0 ～ 9999
[Default] 200

2	6	3	Spindle command multiplier factor (CMR) (gear 1st gear).
2	6	4	Spindle command multiplier factor (CMR) (gear 2nd gear).
2	6	5	Spindle command multiplier factor (CMR) (gear 3rd gear).

[Data Range] 0 ～ 9999
[Default] 512

2	6	6	Spindle command divider factor (CMD) (gear 1st gear).
2	6	7	Spindle command divider factor (CMD) (gear 2).
2	6	8	Spindle command divider factor (CMD) (gear 3rd gear).

[Data Range] 0 ～ 9999
[Default] 125

2	7	0	External workpiece origin X-axis offset
2	7	1	External workpiece origin Z-axis offset
2	7	2	External workpiece origin Y-axis offset
2	7	3	External workpiece origin 4TH axis offset
2	7	4	External workpiece origin 5TH axis offset

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -999.999 ～ 999.999
[Default] 0

2	7	5	The workpiece origin offset of the G54Y axis workpiece coordinate system 1
2	7	6	The workpiece origin offset of the G544th axis workpiece coordinate system 1
2	7	7	G54 5th axis workpiece coordinate system 1 of the workpiece origin offset

2	7	8	The workpiece origin offset of the G55 Y-axis workpiece coordinate system 2
2	7	9	The workpiece origin offset of the G55 4th axis workpiece coordinate system 2
2	8	0	The workpiece origin offset of the G55 5th axis workpiece coordinate system 2
2	8	1	The workpiece origin offset of the G56 Y-axis workpiece coordinate system 3
2	8	2	G56 4th axis workpiece coordinate system 3 of the workpiece origin offset
2	8	3	G56 5th axis workpiece coordinate system 3 of the workpiece origin offset
2	8	4	G57 Y-axis workpiece coordinate system 4 of the workpiece origin offset
2	8	5	G57 4th axis workpiece coordinate system 4 of the workpiece origin offset
2	8	6	G57 5th axis workpiece coordinate system 4 of the workpiece origin offset
2	8	7	G58 The workpiece origin offset of the G58 Y-axis workpiece coordinate system 5
2	8	8	G58 4th axis workpiece coordinate system 5 workpiece origin offset
2	8	9	G58 5th axis workpiece coordinate system 5 for the workpiece origin offset
2	9	0	G59 Y-axis workpiece coordinate system 6 of the workpiece origin offset
2	9	1	G59 4th axis workpiece coordinate system 6 of the workpiece origin offset
2	9	2	G59 5th axis workpiece coordinate system 6 of the workpiece origin offset

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] - 9999.9999 ～ 9999.9999

[Default] 0

2	9	3	Forward maximum stroke of the Y axis (second stroke limit).
2	9	4	4th axis forward maximum stroke (second stroke limit).
2	9	5	5th axis forward maximum stroke (second stroke limit).

[Data Units].

Set the	Data units
Metric	mm

Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999

[Default] 9999

2	9	6	Y-axis negative maximum stroke (second stroke limit).
2	9	7	4th axis negative maximum stroke (second stroke limit).
2	9	8	5th axis negative maximum stroke (second stroke limit).

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] -9999.9999 ～ 9999.9999

[Default] -9999

3	0	5	L-type time constant for acceleration and deceleration before the fast X-axis
3	0	6	L-type time constant for acceleration and deceleration before the fast Z-axis

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 100

3	0	7	L-type time constant for acceleration and deceleration before the fast X-axis
3	0	8	Fast Z-axis front acceleration and deceleration S-type time constant

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 100

3	0	9	L-type time constant for acceleration and deceleration after fast X-axis
3	1	0	L-type time constant for acceleration and deceleration after fast Z-axis

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 80

3	1	1	Fast X-axis post-acceleration and deceleration E-type time constant
3	1	2	Fast Z-axis post-acceleration and deceleration E-type time constant

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 60

3	1	3

L-type time constant for acceleration and deceleration before cutting feed

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 100

3	1	4

Acceleration and deceleration S-type time constant before cutting feed

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 100

3	1	5

Acceleration and deceleration L-type time constant after cutting feed

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 80

3	1	6

Acceleration and deceleration E-type time constant after cutting feed

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 60

3	1	7

Linear acceleration and deceleration time constant for each axis JOG feed

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 100

3	1	8

Exponential acceleration and deceleration time constant for each axis JOG feed

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 120

3	1	9

Handwheel linear acceleration and deceleration time constant

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 120

3	2	0	Handwheel exponential acceleration and deceleration time constant

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 80

3	2	1	Linear acceleration and deceleration time constant in thread cutting (spindle 1 gear or spindle without gear).
3	2	2	Linear acceleration and deceleration time constant in thread cutting (spindle 2nd gear).
3	2	3	Linear acceleration and deceleration time constant in thread cutting (spindle 3rd gear).

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 100

3	2	4	S acceleration and deceleration time constant in thread cutting (spindle 1 gear or spindle without gear).
3	2	5	In thread cutting S acceleration and deceleration time constant (spindle 2 gear).
3	2	6	S acceleration and deceleration time constant in thread cutting (spindle 3 gear).

[Data Unit] ms

[Data Range] 1 ～ 4000

[Default] 100

3	2	7	The amount of clearance compensation for spindle reversal (gear 1st gear).
3	2	8	The amount of clearance compensation for spindle reversal (gear 2).
3	2	9	The amount of clearance compensation for spindle reversal (gear 3).

[Data Units].

Set the	Data units
Metric	mm
Imperial	inch

[Data Range] 0 ～ 99.9999

[Default] 0

3	3	0	Cutting feed in place accuracy

[Data Units].

Set the	Data units
Metric	mm

Imperial	inch

[Data Range] 0.01 ～ 0.5

[Default] 0.03

3	3	1

Arc interpolation normal acceleration limit

[Data Units].

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

[Data range] 100 ～ 5000

[Default] 1000

3	3	2

The lower limit of the arc interpolation normal acceleration embedding

[Data Units].

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

[Data Range] 0 ～ 2000

[Default] 200

3	3	3

Handwheel incomplete operation mode maximum clamping speed

[Data Units].

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

[Data Range] 0 ～ 3000

[Default] 2000

3	3	4

Handwheel/step gives the highest clamping speed

[Data Units].

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

[Data Range] 0 ～ 3000

[Default] 1000

3	4	5	L-type time constant for acceleration and deceleration before fast Y axis
3	4	6	L-type time constant for acceleration and deceleration before fast 4th axis
3	4	7	L-type time constant for acceleration and deceleration before

			fast 5th axis

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 100

3	4	8	Fast Y-axis front acceleration and deceleration S-type time constant
3	4	9	Fast 4th axis front acceleration and deceleration S-type time constant
3	5	0	Fast 5th axis front acceleration and deceleration S-type time constant

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 100

3	5	1	L-type time constant for acceleration and deceleration after fast Y-axis
3	5	2	L-type time constant for acceleration and deceleration after fast 4th axis
3	5	3	L-type time constant for acceleration and deceleration after fast 5th axis

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 80

3	5	4	Fast Y-axis post-acceleration and deceleration E-type time constant
3	5	5	Fast 4th axis rear acceleration and deceleration E-type time constant
3	5	6	Fast 5th axis post-acceleration and deceleration E-type time constant

[Data Unit] ms
[Data Range] 1 ～ 4000
[Default] 60

3	5	7	Y-axis unidirectional positioning direction and overrange
3	5	8	4th axis unidirectional positioning direction and overrange
3	5	9	5th axis unidirectional positioning direction and overrange

[Data Units].

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

[Data Range] -99.9999 ～ 99.9999

[Default] 0

3	6	3	Gain adjustment data for the spindle speed analog output

[Data range] 0.98 ～ 1.02
[Default] 1

3	6	4	The maximum setting value corresponding to the frequency converter

[Data range] 4000 ～ 65536
[Default] 65535

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

[Data Range] 0 ～ 9999
[Default] 0

Chapter 4 Machine tool debugging methods and steps

This chapter introduces the trial operation method and its steps when the system is first energized, and after debugging according to the following operation steps, the corresponding machine tool operation can be carried out.

4.1 Emergency Stops and Limits

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

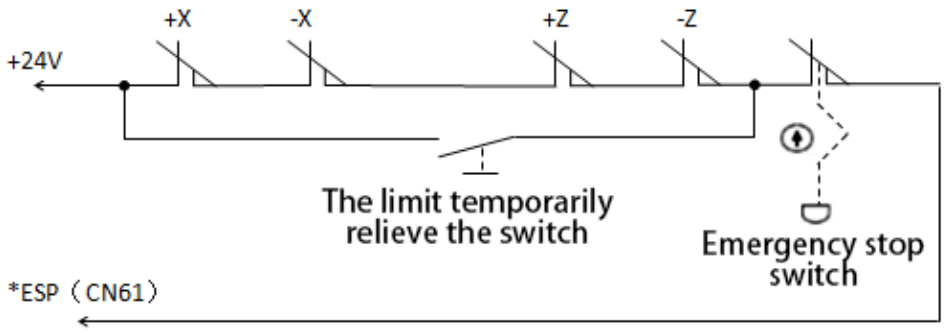


Figure 4-1

At this point, the BIT3 bit (ESP) of the status parameter No 176 needs to be set to 0.

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

Slowly move each axis in manual or handwheel mode to verify the validity of the over-range limit switch, the correctness of the alarm display, and the validity of the over-range release button; When there is an overreach or pressing the emergency stop button, the CNC will appear "emergency stop" alarm, if it is overrun, then press the overreach to lift the button, press the reset key to cancel the alarm and move in the opposite direction to cancel the overreach.

4.2 Driver unit settings

Set status parameters BIT4, BIT3, BIT2, BIT1, BIT0 bits (5ALM, 4ALM, YALM, ZALM, XALM, respectively, correspond to 5th, respectively 4th, Y, Z, X axis), bit4 of the state parameter No 009 when supporting the company's drive unit, BIT3, BIT2, BIT1, BIT0 bits are set to 1.

If the machine movement direction does not match the direction required by the command, the BIT4, BIT3, BIT2, BIT1 and BIT0 bits of the status parameters No 008 can be modified (DIR4, DIR5, DIRY, DIRZ, DIRX correspond to 5th, 4th, Y, Z, X axis).

The manual direction can be moved via the parameters NO 175 bits BIT4, BIT3, BIT2, BIT1 and BIT0 bits (5VAL , 4VAL, YVAL, ZVAL, XVAL correspond to 5th, 4th, respectively , Y, Z, X axis move keys) to change.

4.3 Gear ratio adjustment

When the machine tool movement distance is inconsistent with the displacement distance displayed by the CNC coordinates, the data parameters No 015 ~ No 018, No 146 ~ No 151 can be modified to adjust the electronic gear ratio to adapt to different mechanical transmission ratios.

Calculation formula:

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

CMR: Instruction multiplier coefficients (data parameters No 015, No 016, No 146, No 147, No 148).

CMD: Instruction divider coefficient (data parameters No 017, No 018, No 149, No 150, No 151).

α: Pulse equivalent, the motor accepts an angle at which the pulse rotates

L: Lead of the lead screw

δ: The smallest unit of the current input for the CNC

ZM: The number of teeth of the lead screw end gear

ZD: The number of teeth of the gear at the motor end

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 of the screw is 4 mm;
X, Z axis electronic gear ratio:

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

Then the data parameters No 015(CMRX)=2, No 017(CMDX)=1; № 016（CMRZ）=2， № 018（CMDZ）=1 。

When the electron gear ratio numerator is greater than the denominator, the maximum speed allowed by the CNC will decrease. Example: Z when the data parameters No 016 (CMRZ) = 2, No 018 (CMDZ) = 1 The maximum speed allowed for the shaft is 8000mm/min.

When the electron gear ratio numerator is not equal to the denominator, the positioning accuracy of the CNC may decrease. Example: When the data parameter No 016(CMRZ)=1 and No 018(CMDZ)=5, the input increment is No pulse is output at 0.004, and one pulse is output when the input increment reaches 0.005.

When matching stepper drive, as far as possible to choose the drive unit with step subdivision function, while reasonably selecting the mechanical transmission ratio, as far as possible to maintain the CNC electronic gear ratio set to 1:1, to avoid the CNC electronic gear ratio of the molecular and denominator disparity is too large.

4.4 Acceleration and deceleration characteristics adjustment

Adjust the relevant CNC parameters according to factors such as the characteristics of the drive unit, the motor and the load size of the machine:

Data parameters No 022, No 023, No 155, No 156, No 157: X, Z, Y, 4th, 5th axis fast movement speed;

Data parameters No 024, No 025, No 158, No 159, No 160: X, Z, Y, the acceleration and deceleration time constant when the 4th and 5th axes are moving fast;

Data parameter No 026: Exponential acceleration and deceleration time constant of the X axis during thread cutting;

Data parameter No 028: start/ stop speed of exponential acceleration and deceleration during thread cutting;

Data parameter No 029: Constant of acceleration and deceleration time for cutting feed and manual feed;

Data parameter No 030: start/ stop speed of acceleration and deceleration during cutting feed;

Data parameter No 041: start/ stop speed of acceleration and deceleration during manual feed;

BIT5 (SMZ) of status parameter No 007: Whether the speed of the adjacent cutting feed segment transitions smoothly.

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 movement, and the higher the efficiency during machining.

When the acceleration and deceleration time constants are the same, the higher the start/stop speed of acceleration and deceleration, the faster the acceleration and deceleration process, the greater the impact of the machine tool movement, and the higher the efficiency during processing; The lower the start/end speed of acceleration and deceleration, the slower the acceleration and deceleration process, the smaller the impact of machine movement, and the lower the efficiency during machining.

The principle of acceleration and deceleration characteristic adjustment is to appropriately reduce the acceleration and deceleration time constant and increase the start/ stop speed of acceleration and deceleration under the premise that the drive unit does not alarm, the motor does not lose step and the machine tool movement has no obvious impact, so as to improve the processing efficiency. The acceleration and deceleration time constant is set too small, and the start/end speed of acceleration and deceleration is set too high, which can easily cause the drive unit alarm, motor step failure or machine tool vibration.

When the status parameter No 007 of BIT5 (SMZ) = 1, at the intersection of the trajectory of the cutting feed, the feed speed should be reduced to the starting speed of acceleration and deceleration, and then accelerated to the command speed of the adjacent program segment, and the intersection of the trajectory will achieve accurate positioning, but the processing efficiency will be reduced; BIT5 = 0, the adjacent cutting trajectory directly in the way of acceleration and deceleration for smooth transition, the feed speed at the end of the previous trajectory is not necessarily reduced to the starting speed, at the intersection of the trajectory to form an arc transition (non-accurate positioning), this trajectory transition mode workpiece surface finish is good, processing efficiency is high.

When matching a stepper motor drive, in order to avoid step loss, the BIT5 bit of the status parameter No 007 should be set to 1.

When supporting the stepper motor drive device, the fast movement speed is too high, the acceleration and deceleration time constant is too small, and the start/stop speed of acceleration and deceleration is too high, which can easily lead to motor step failure. The recommended parameters are set as follows (at an electronic gear ratio of 1:1):

Data parameters No 022 ≤ 2500 Data parameters No 023 ≤ 5000

Data parameters No 155 ≤ 5000 Data parameters No 158 ≥ 350

Data parameters No 024 ≥ 350 Data parameters No 025 ≥ 350

Data parameters No 029 ≥ 150 Data parameters No 028 ≤ 100

Data parameters No 026 ≥ 200 Data parameters No 030 ≤ 50

When the AC servo drive device is matched, the starting speed can be set to a higher level, and the acceleration and deceleration time constant can be set to a smaller one to improve the processing efficiency. If you want to get the best acceleration and deceleration characteristics, you can try to set the acceleration and deceleration time constant to 0, which is achieved by adjusting the acceleration and deceleration parameters of the AC servo. The recommended parameters are set as follows (at an electronic gear ratio of 1:1):

Data parameter No 022 = 5000 Data parameter No 023 = 10000

Data parameter No 155 = 10000 Data parameter No 158 ≤ 60
Data parameters No 024 ≤ 60 Data parameters No 025 ≤ 60
Data parameters No 029 ≤ 50 Data parameters No 028 ≤ 500
Data parameters No 026 ≤ 50 Data parameters No 030 ≤ 400

The above parameter setting value is the recommended value, and the specific setting should refer to the characteristics of the drive unit, the motor and the actual situation of the machine load.

4.5 Machine zero adjustment

Relevant 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;
PCX: X axis zero signal;
PCY: Y axis zero signal;
PCZ: Z axis zero signal;
PC4: 4th axis zero signal;
PC5: 5th axis zero signal;

Diagnostic data

Signal	DECX	DECZ	DECY		
Diagnostic address	X0.3	X1.3	X0.0		
Interface pins	CN61. 15	CN61.22	CN61.01		

Control parameters

K	2	2

BIT7	BIT6	BIT5	BIT4	BIT3	****	****	****

BIT3: 5-axis deceleration signal is valid with +24V (0: disconnect 1: turn on).
BIT4 : X-axis deceleration signal is valid with +24V (0: disconnect 1: on).
BIT5 : Z-axis deceleration signal is valid with +24V (0: disconnect 1: switched on).
BIT6: Y-axis deceleration signal is valid with +24V (0: disconnect 1: switched on).
BIT7: 4-axis deceleration signal is valid with +24V (0: disconnect 1: turn on).

0	0	6	****	****	BIT5	****	****	****	****	****

BIT5 : Zeroback mode selects the stop (0:back 1:front).

0	0	7	****	****	****	****	BIT3	BIT2	BIT1	BIT0

BIT0 : 1st axis back to zero (0: none 1: yes) one-turn signal (X axis).

BIT1 : 2nd axis back to zero (0: none 1: yes) one-turn signal (Z axis).

BIT2 : 3rd axis back to zero (0: none 1: yes) one-turn signal (Y axis).

BIT3 : 4th axis back to zero (0: none 1: yes) one-turn signal (4 axes).

0	1	2	****	****	****	****	****	****	****	BIT0

BIT0 : After power-on, before returning to the machine zero, manual fast movement (0: invalid 1: effective).

1	8	1	****	****	****	BIT4	BIT3	BIT2	BIT1	BIT0

BIT0 : Select the (x) axis to zero back to zero in the (0: positive 1: negative) direction

BIT1 : Select the (Z) axis to return to zero in the (0: positive direction 1: negative direction).

BIT2 : Select the (Y) axis to zero back to zero in the (0: positive 1: negative) direction

BIT3 : Select the (4) axis to zero back to zero in the (0: positive 1: negative) direction

BIT4 : Select the (5) axis zero return direction as (0: positive 1: negative direction) back to zero

Data parameters

0	3	3	X, Z back to zero mechanical zero low speed speed (default: 40).
1	1	3	The high-speed speed of the X and Z axes back to the mechanical zero point (default: 4000).
1	7	4	The Y-axis returns to the low speed of the mechanical zero (default: 40).
1	7	5	4-axis low-speed speed back to mechanical zero (default: 40).
1	7	6	5-axis low speed back to mechanical zero (default: 40).
1	7	7	The high-speed speed of the Y axis back to the mechanical zero point (default: 4000).
1	7	8	4TH high speed of the axial return to the mechanical zero (default: 4000).
1	7	9	5TH high speed of the axis back to mechanical zero (default: 4000).

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

K parameters No 22 of BIT7, BIT6, BIT5, BIT4: X, Z When axis Y and 4 return to the zero point

of the machine tool, the effective level of the deceleration signal.

BIT5 (ZMOD) for status parameter No 006: X, Z, Y, 4th axis back to zero mode selection (0: Block after 1: Before the block) selected.

Status parameter No 007 of BIT0: Zeroback mode select :(0: None 1: Yes) a turn signal.

Data parameter No 033: Each axis returns the low speed of the machine tool's zero deceleration process.

Data parameter No 113: The high-speed speed at which each axis returns to the zero point of the machine tool.

Status parameters No 181 of BIT0, BIT1, BIT2 (MZRX, MZRZ, MZRY , MZR4, MZR5): Each axis returns to zero direction Select, return to zero in the positive direction, or return to zero in the negative direction.

Only after confirming that the overrun limit switch is valid can the machine return operation be performed. Usually the machine zero point is installed at the maximum stroke, the effective stroke of the zero bumper is more than 25 mm, to ensure a sufficient reduction distance, to ensure that the speed can be reduced, in order to ensure that the accurate return to zero. The faster the speed of performing the machine tool back to zero, the longer the zero collision block should be, otherwise the speed will not be reduced after the drag plate rushes through the zero collision block due to CNC acceleration and deceleration, machine tool inertia, etc., and there is not enough deceleration distance to affect the accuracy of the return to zero. There are usually two methods of machine tool zero connection:

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

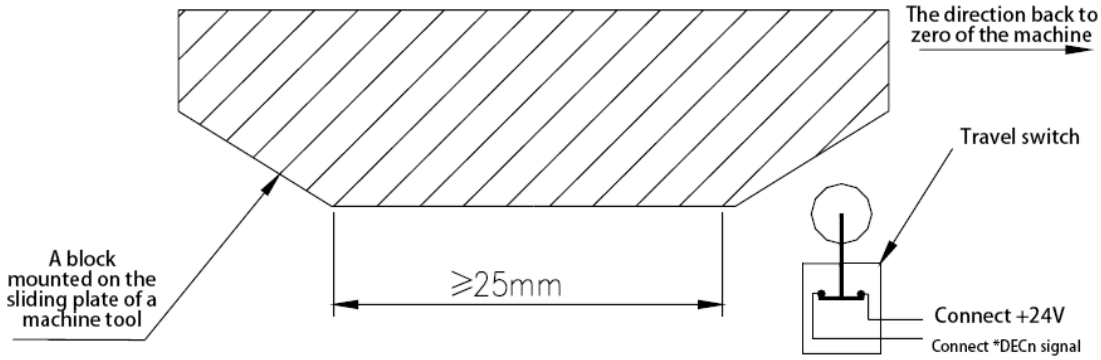


Figure 4-2

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

The parameter settings (recommended values) are as follows:

Status parameter No 006 of BIT5 (ZMOD) = 0
BIT0 (ZPLS) = 1 for status parameter No 007
Data parameter No 033=200
Data parameters No 181 BIT0 (MZRX), BIT1 (MZRZ), BIT2 (MZRY), BIT3 (MZR4), BIT4 (MZR5)=0

2, usually supporting the connection method of stepper motor: the use of a proximity switch at

the same time as a deceleration, zero point signal schematic diagram;

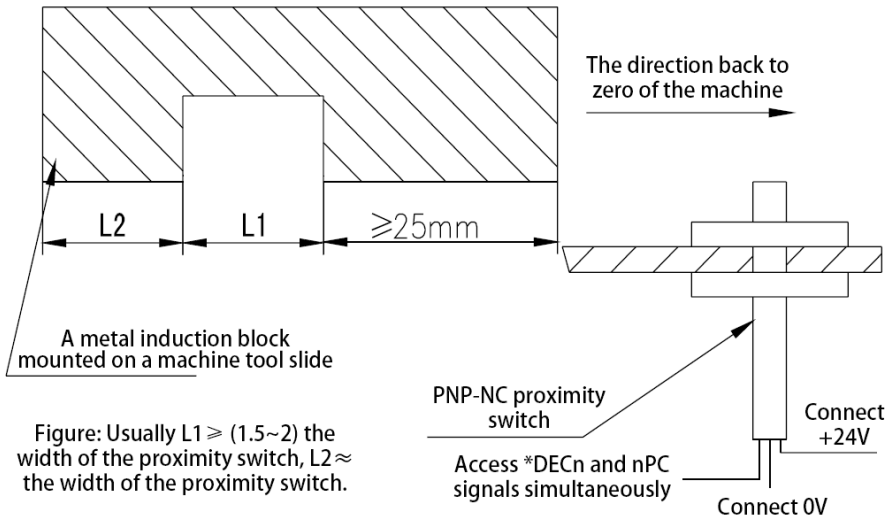


Figure 4-3

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

BIT5 (ZMOD) = 0 for status parameter No 006

BIT0 (ZPLS) = 0 for status parameter No 007

Data parameter No 033=200

Data parameters No 181 BIT0 (MZRX), BIT1 (MZRZ), BIT2 (MZRY), BIT3 (MZR4), BIT4 (MZR5)=0；

4.6 Spindle function adjustment

4.6.1 Spindle encoders

For the machine to be threaded, an encoder must be installed, and the number of lines of the encoder can be 100 to 5000 lines, which can be set in the data parameter NO.70. The transmission ratio of the encoder to the spindle (number of spindle teeth / number of encoder teeth) is 1/255 ~ 255, the number of spindle end teeth is set in the CNC data parameter NO.110, and the number of encoder end teeth is determined by Set in THE CNC data parameter NO.111. Synchronous belt drive (no sliding drive) must be used.

4.6.2 Spindle braking

After executing the M05 code, in order to make the spindle stop quickly to improve the processing efficiency, it is necessary to set a suitable spindle braking time, and when the motor energy consumption brake is used, the braking time is too long and easy to cause the motor to burn out.

Data parameter No 087: Delay time from spindle stop (M05) to spindle brake output.

Data parameter No 089: Spindle braking time.

4.6.3 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 of status parameter No 001: Select spindle speed switch control;

4.6.4 Spindle speed analog voltage control

The spindle speed analog voltage control can be realized through CNC parameter setting, and the interface output 0V ~ 10V analog voltage can control the frequency converter to achieve stepless speed change; Relevant parameters to adjust:

Bit4=1 of status parameter No 001: select spindle speed analog voltage control;

Data parameter No 021: voltage compensation (mv) at analog voltage output 10V;

Data parameter No 036: voltage compensation (mv) at analog voltage output 0V;

Data parameters No 037 ~ No 040: the maximum spindle speed 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 programmed speed is inconsistent with the speed detected by the encoder, the specified speed can be adjusted by adjusting the data parameters No 037 ~ No 040 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 parameters of 9999, adjust the spindle magnification 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 S9999 is input, 0V when S0 is input, and if the voltage value is deviated, the status parameters No 021 and No 036 can be adjusted Corrected voltage bias compensation value (usually correctly adjusted before leaving the factory, usually no adjustment is required). When the current gear is the highest speed, when the analog voltage of the CNC output is not 10V, adjust the data parameter No 021 so that the analog voltage of the CNC output is 10V; When the input speed is 0, the spindle still rotates slowly, which indicates that the analog voltage of the CNC output is higher than 0V, and the data parameter No 036 should be set to a smaller size.

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 037 ~ No 040 in the corresponding gear.

4.7 Backlash Compensation

The amount of inverting gap compensation is based on the actual measured gap as the input

value. The units are mm (metric machine tools) or inch (imperial machine tools). It can be measured with a dial gauge, dial gauge or laser detector, and the backlash compensation should be accurately compensated to improve the accuracy of the processing, so it is not recommended to use a handwheel or a single step to measure the backlash of the lead screw, it is recommended to measure the backlash as follows:

Edit the program (Z axis as an example):
O0001；
N10 G01 W10 F800；
N20 W15；
N30 W1；
N40 W-1；
N50 M30。
The backlash error compensation value should be set to zero before measurement;

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

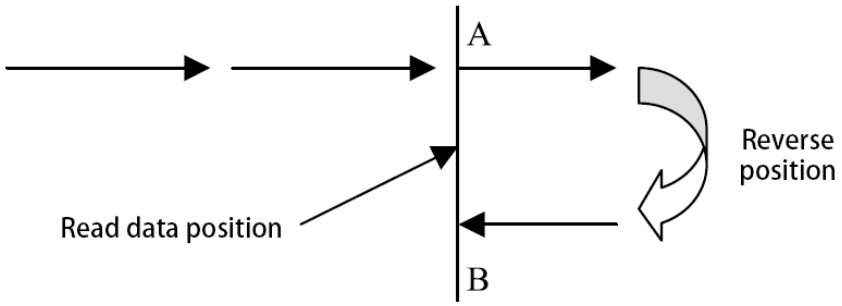


Fig. 4-4 Schematic diagram of the backlash measurement method

Backlash error compensation value = | Data recorded by point A – The data recorded by point B | ； Enter the calculated data into the CNC data parameters No 034, No 035, No 180, No 181, or No 182.
Data A: Read the data of the percentile table at A;
Data B: Read the data of the percentile table at B;
Note 1: The BIT7 of the CNC parameter No 011 can set the way of backlash compensation, and the data parameter No 246 ~ No 249 can set the backlash gap to a fixed frequency square
Compensation step of the formula compensation;
NOTE 2: The backlash is re-detected every 3 months after use.

4.8 Tool holder commissioning

The system can support a variety of tool holders, and the specific parameter settings are subject to the instructions of the machine tool. The relevant parameter settings for the normal operation of the tool holder:
K parameter No 011 bit2 bit (TSGN): tool holder in place signal high/low level selection, if the tool position signal is active low to be connected to pull-up resistor;
Bit3 bit (CTCP) of K-parameter No 011: detect/ do not detect tool holder lock signal when

changing tools;
Bit4 bit (TCPS) of K-parameter No 011: tool holder lock signal high/low level selection;
Bit5 (CHET) of K parameter No 11: check/ do not check the tool position signal at the end of the tool change;
The combination and function of bit0 (CHT0B)0 in the tool change mode selection bit0 (CHT0B)0 of K parameter No 11 are detailed in the tool change control section;
Data parameter No 078: the upper limit of time required to change the tool;
Data parameter No 082: Delay time from the forward rotation stop of the tool holder to the start of the reverse locking;
Data parameter No 084: Total tool position selection;
Data parameter No 085: Tool holder reversal locking time.

When the tool is replaced for the first time, if the knife holder does not rotate, it may be due to the incorrect phase sequence connection of the three-phase power supply of the knife holder motor, at this time, the emergency stop button should be pressed immediately, cut off the power supply and check the wiring, such as the phase sequence connection of the three-phase power supply is incorrect, and any two phases in the three-phase power supply can be swapped.

Reverse locking time setting should be appropriate, the setting time can not be too long nor too short, reverse locking time is too long to damage the motor; Reverse locking time is too short the knife holder may not be locked, the way to check whether the knife holder is locked is: use the dial meter to tighten the knife holder, artificially pull the knife holder, and the dial gauge pointer should not float more than 0.01mm.

In commissioning, each tool position and the maximum converted tool position must be changed once to observe the correctness of the tool change and whether the time parameter setting is appropriate.

4.9 Single step/ handwheel adjustment

The operator panel 

keys can be selected as a single step operation mode or a hand wheel operation mode, which is selected by the Bit3 bit 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 one-step operation mode is valid, and the handwheel operation mode is invalid.

4.10 Other Adjustments

K	1	2						CCHU	NYQP	SLSP	SLQP

SLQP=1: The chuck control function is valid;
=0: The chuck control function is invalid.
SLSP=1: When the chuck function is valid, do not check whether the chuck is clamped;

=0: When the chuck function is valid, check whether the chuck is clamped, if the chuck is not clamped, the spindle cannot be started, otherwise an alarm is generated.

NYQP=1: Wild card mode, NQPJ is the wild card disk loose signal, WQPJ is the wild card disk tight signal;

=0: Internal card mode, NQPJ is the inner card plate tight signal, WQPJ is the internal card plate loose signal.

CCHU=1: Check the chuck in place signal, and the BIT7 of diagnostic parameter No 002 is the inner chuck tight / external chuck loose signal NQPJ, BIT6 is the outer chuck tight / Internal chuckle loose signal WQPJ, spindle shift in place detection signal M41I, M42I invalid.

=0: Do not check the chuck in place signal.

K	1	3								SPTW	SLTW

SLTW=1: The tailstock control function is effective;

=0: Invalid tailstock control function.

SPTW=1: Spindle rotation and tailstock advance and retreat are not interlocked, no matter what state the spindle is in, the tailstock can advance and retreat; Regardless of the state of the tailstock, the spindle can rotate;

=0: Spindle rotation and tailstock advance and retreat are interlocked, when the spindle rotates, the tailstock cannot exit;

When the tailstock is not entered, the spindle must not be activated.

1	7	6								MST	MSP

MST=0: The external cyclic 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 5 Diagnostic Information

This chapter describes diagnostic information for the CNC system for the system.

5.1 CNC diagnostics

This section of diagnostics is used to detect CNC interface signals and internal operating status and is not modifiable.

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			CN61.44	CN61.07	CN61.12	CN61.32	CN61.4
X0.5			X3.7	X0.6	X1.3	X2.3	X0.3

DECX、DECY、DECZ、DEC4、DEC5：X、Y、Z , 4th, 5th axis machine tool back to zero deceleration signal

ESP: Emergency stop signal

0	0	1
Foot number		
PCL fixed address		

***	***	***	***	***	***	***	SKIP
CN61.6							CN61. 36
X0.5							X2.7

5.1.2 CNC axis motion status and data diagnostic information

0	0	4

***	***	***	EN5	EN4	ENZ	ENY	ENX

EN5 ~ ENX: Shaft enable signal

0	0	5

***	***	***	SET5	SET4	SETZ	SETY	SETX

SET5 ~ SETX: Axis pulse inhibition 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	The number of X-axis output pulses
0	9	1	The number of pulses output in the Z axis
0	9	2	The number of pulses output from the Y axis
0	9	3	Number of pulses output for the 4th axis
0	9	4	Number of pulses output from the 5th axis

0	9	5	Tapping shaft 1 is the number of pulses output to the pulse driver via gear ratio
0	9	6	Tapping shaft 2 outputs the number of pulses to the pulse driver via gear ratio

5.1.3 Key Diagnostics

Diagnostic Information DGN.016 ~ DGN.022 is the diagnostic information for editing keyboard keys. When the corresponding key is pressed in the panel, the corresponding bit displays "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
Corresponding key				9	8	7	P Q	G *	N #	O ␣	// RESET //

0	1	1		6	5	4	W	U	Z	X	PGU
Corresponding key				6	5	4	W	U	Z	X	

0	1	2		3	2	1	R	K	J	I	PGD
Corresponding key				3	2	1	R V	K C	J B	I A	

0	1	3		-	0	.	T	S	M	RIGHT	CRU
Corresponding key				− + >	0	. / <	T Y	S]	M [	⇨	⇧

0	1	4		ALT	INS	EOB	F/E	D/L	H	LIEFT	CRD
Corresponding key				ALT	INS	EOB	F E	L D	H =	⇦	⇩

0	1	5		PLC	DGN	PAR	SET	ALM	OFT	PRG	POS
Corresponding key				PLC	DGN	PAR	SET	ALM	OFT	PRG	POS

0	1	6		***	***	***	DEL	CAN	CHG	OUT	IN
Corresponding key							DEL	CAN	CHG	OUT	IN

5.1.4 Miscellaneous

1	4	5	PLC execution time (ms).
1	4	6	Total system operation time (h).

5.2 PLC status

This section of diagnostics is used to detect machine tools→ PLC(X), PLC → machine tools (Y), CNC → PLC(F), PLC → CNC(G).) and alarm information address A, status of internal relays (R, K).

5.2.1 F address (CNC → PLC).

F000	OP	SA	STL	SPL				

OP: Automatically run the signal

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: Distributes the end signal

RST: Reset signal

AL: Alarm signal

F002	MDRN	CUT	MSTOP	SRNMV	THRD		RPDO	AL

MDRN: Empty run 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: DNC runs a selection heartbeat

MMDI: Manual data entry to select a heartbeat

MJ: JOG feed selection heartbeat

MH: Handwheel feed selection detection signal

MINC: Incremental feed selection heartbeat

F004	MPST	MREF	MAFL	MSBK	MABSM	MMLK	MBDT

MPST: Back to the program start point heartbeat

MREF: Manually returns the reference point heartbeat

MAFL: The accessibility feature locks the heartbeat

MSBK: Single-segment heartbeat

MABSM: Manual absolute value detection signal

MMLK: All shaft machines lock the detection signal

MBDT: Skip optional segment heartbeat

F007					TF	SF		MF

TF: Tool function select communication number

SF: Spindle speed select communication number

MF: Select the communication number for the accessibility function

F009	DM00	DM01	DM02	DM30				

DM00:M00 decoding signal

DM01:M01 decoding signal

DM02:M02 decoding signal

DM30: M30 decoding signal

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: Switching mode disables the signal

F015				EN5T	EN4T	ENY		

EN5T: 5th axis selection

EN4T: 4th axis selection

ENY: Y axis selection

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 Release Signal

F021		MST	MSP		MESP			

MST: Masks the external loop start signal
MSP: Masks external pause signal
MESP: Shields 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								RTAP

RTAP: Rigid tapping signal

F034	SSTOP	SCW	Z-	Z+	X-	X+		

SSTOP: Spindle stop softkey
SCW: Spindle forward soft key
Z-:Z- Softkey
Z+: Z+ softkey
X-:X- Softkey
X+: X+ softkey

F035	SCCW	MSTOP	AFLO	BDTO	SBKO	MLKO	DRNO	QFAST

SCCW: Spindle spindle counterclockwise to soft key
MSTOP: Select the Stop softkey
AFLO: Accessibility locks softkeys
BDTO: Program jump section softkey
SBKO: Single-segment softkey

MLKO: Machine lock soft key

DRNO: Empty run softkey

QFAST: Quick move softkey

F036	S-	S+	FAST-	FAST+			FEED-	FEED+

S-: Spindle magnification minus soft button

S+: Spindle magnification softkey

FAST-: Fast magnification minus soft button

FAST+: Fast magnification softkey

FEED-: Feed rate minus softkey

FEED+: Feed multiplier softkey

F037				ZP5	ZP4	ZP3	ZP2	ZP1

ZP5: Returns the reference point end signal ZP5

ZP4: Returns the reference point end signal ZP4

ZP3: Returns the reference point end signal ZP3

ZP2: Returns the reference point end signal ZP2

ZP1: Returns the reference point 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 motion direction signal MVD5

MVD4: Axis motion direction signal MVD4

MVD3: Axis motion direction signal MVD3

MVD2: Axis motion direction signal MVD2

MVD1: Axis motion 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

The ZP15:5TH axis returns the first reference point end signal

The ZP14:4TH axis returns the first reference point end signal

ZP13: The Y axis returns the first reference point end signal

ZP12: The Z axis returns the first reference point end signal

ZP11: The X axis returns the first reference point 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 end signal

F047	Total number of cutters							
F048		MST	MSP		MESP			

MST: Shields the external cyclic start signal

MSP: Masks external pause signal

MESP: Shields external emergency stop signal

F051				VAL5	VAL4	VAL3	VAL2	VAL1

VAL5:5 direction selection

VAL4:4 orientation selection

VALY:Y direction selection

VALZ: Z direction selection

VALX: X direction selection

F054	UO07	UO06	UO05	UO04	UO03	UO02	UO01	UO00

UO07: Macro output signal UO07

UO06: Macro output signal UO06

UO05: Macro output signal UO05

UO04: Macro output signal UO04

UO03: Macro output signal UO03

UO02: Macro output signal UO02

UO01: Macro output signal UO01

UO00: Macro output signal UO00

F055	UO15	UO14	UO13	UO12	UO11	UO10	UO09	UO08

UO15: Macro output signal UO15

UO14: Macro output signal UO14

UO13: Macro output signal UO13
UO12: Macro output signal UO12
UO11: Macro output signal UO11
UO10: Macro output signal UO10
UO09: Macro output signal UO09
UO08: Macro output signal UO08

F051				ZP25	ZP24	ZP23	ZP22	ZP21

The ZP25:5TH axis returns the second reference point end signal
The ZP24:4TH axis returns the second reference point end signal
ZP23: The Y axis returns the second reference point end signal
ZP22:72 The Z axis returns the second reference point end signal
ZP21: The X axis returns the second reference point end signal

F058				ZP35	ZP34	ZP33	ZP32	ZP31

The ZP35:5TH axis returns the third reference point end signal
The ZP34:4TH axis returns the third reference point end signal
ZP33: The Y axis returns the third reference point end signal
ZP32: The Z axis returns the third reference point end signal
ZP31: The X axis returns the third reference point end signal

F059				ZP45	ZP44	ZP43	ZP42	ZP41

The ZP45:5TH axis returns the fourth reference point end signal
The ZP44:4TH axis returns the fourth reference point end signal
ZP43: The Y axis returns to the fourth reference point end signal
ZP42: The Z axis returns the fourth reference point end signal
ZP41: The X axis returns the fourth reference point end signal

F060								TLIFE

TLIFE: The life of all the tools in the same group has been reached

F061								ESEND

ESEND: The number of parts required arrives at the signal

5.2.2 G address (PLC → CNC).

G signal

G004					FIN			

FIN: Accessibility end signal

G005		LEDT	AFL		LAXIS

LEDT: Edit the lock signal
AFL: The 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: Program restart signal

G007						ST		

ST: Cyclic start signal

G008	ERS	RRW	SP	P				

ERS: External reset signal

RRW: Reset and cursor return signal

SP: Feed-hold signal

P: Emergency stop signal

G009						M12	M32	COOL

M12: Chuck clamp signal

M32: Lubrication signal

COOL: Cool signal

G010	JV07	JV06	JV05	JV04	JV03	JV02	JV01	JV00

JV07: Manual move magnification signal JV07

JV06: Manual movement magnification signal JV06

JV05: Manual move rate signal JV05

JV04: Manual move rate signal JV04

JV03: Manual move magnification signal JV03

JV02: Manual move rate signal JV02

JV01: Manual movement magnification signal JV01

JV00: Manual move magnification signal JV00

G011	JV08	JV09	JV10	JV11	JV12	JV13	JV14	JV15

JV08: Manual move rate signal JV08

JV09: Manual move magnification signal JV09

JV10: Manual move multiplier signal JV10

JV11: Manual move magnification signal JV11

JV12: Manual move rate signal JV12

JV13: Manual move magnification signal JV13

JV14: Manual move rate signal JV14

JV15: Manual move magnification signal JV15

G012	FV07	FV06	FV05	FV04	FV03	FV02	FV01	FV00

FV07: Feed speed multiplier signal FV07
FV06: Feed speed multiplier signal FV06
FV05: Feed speed multiplier signal FV05
FV04: Feed speed multiplier signal FV04
FV03: Feed speed multiplier signal FV03
FV02: Feed speed multiplier signal FV02
FV01: Feed speed multiplier signal FV01
FV00: Feed speed multiplier 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				

SAR: Spindle speed arrival signal

G017					DECA	DECY	DECZ	DECX

DECA:4TH shaft back-to-zero deceleration signal detection
DECY: Y axis back to zero deceleration signal detection
DECZ: Z-axis back-to-zero deceleration signal detection
DECX: X-axis back-to-zero deceleration signal detection

G018					H4TH	HY	HZ	HX

H4TH: 4TH shaft handwheel feed selection signal
HY: Y-axis handwheel feed selection signal
HZ: Z-axis handwheel feed selection signal
HX: X-axis handwheel feed selection signal

G019	RT		MP2	MP1				

RT: Manual fast feed selection signal
MP2: Handwheel multiplier signal MP2
MP1: Hand wheel multiplier signal MP1

G021	SOV7	SOV6	SOV5	SOV4	SOV3	SOV2	SOV1	SOV0

SOV7: Spindle speed multiplier signal SOV7
SOV6: Spindle speed multiplier signal SOV6
SOV5: Spindle speed multiplier signal SOV5
SOV4: Spindle speed multiplier signal SOV4

SOV3: Spindle speed multiplier signal SOV3
SOV2: Spindle speed multiplier signal SOV2
SOV1: Spindle speed multiplier signal SOV1
SOV0: Spindle speed multiplier 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

G024			SRVB	SFRB				

SRVB: Spindle reversal signal
SFRB: Spindle forward signal

G026	CON							

CON: CS profile control switching signal

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 shaft and direction selection signal -J4
-J3: Feed shaft and direction selection signal -J3
-J2: Feed axis and direction selection signal -J2

-J1: Feed shaft and direction selection signal -J1

G030						+L4	+L3	+L2	+L1

+L4: Shaft overrange signal +L4

+L3: Shaft overrange signal +L3

+L2: Shaft overrange signal +L2

+L1: Shaft overrange signal +L1

G031						- L4	- L3	- L2	- L1

-L4: Shaft overrange signal -L4

-L3: Shaft overrange signal -L3

-L2: Shaft overrange signal -L2

-L1: Shaft overrange 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 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 working mode

DNC1: DNC runs a selection signal

MD4: Current Working Mode Option 3

MD2: Current Working Mode Option 2

MD1: Select 1 for the current working mode

G044	HDT	BECLP					MLK	BDT

HDT: Manual sequential tool change signal

MLK: Machine lock signal (PLC → CNC).

BDT: Program hop signal (PLC → CNC).

G046	DRN				KEY1		SBK	

DRN: Empty running signal

KEY1: Memory protection signal

SBK: Single-segment signal (PLC → CNC).

G048							GR2	GR1

GR2: Gear selection signal

GR1: Gear selection signal

G053	CDZ	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 shaft screw of the machine tool has more or less precision error, which will inevitably affect the machining accuracy of the parts, and the system has a storage-type screw pitch error compensation function that can accurately compensate for the pitch error of the screw.

6.2 Specifications

1. The amount of compensation set is related to factors such as the origin of compensation and the interval of compensation;
2. The pitch error compensation value is obtained from the root machine tool coordinate (mechanical coordinate) value and the pitch error compensation origin checklist;
3. The number of points compensated: up to 256 points per axis;
4. Axes that can be compensated: X, Z, Y, 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 in the rangeS N and N-1;
8. The setting method is the same as the input method of CNC parameters, see "Operation Instructions".

6.3 Parameter Setting

6.3.1 Screw complement function

Status parameters

0	0	3

		SCRW					

Bit5=1: The pitch error compensation function is effective;
Bit5=0: The pitch error compensation function is invalid.

6.3.2 Origin of pitch error compensation

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 origin of pitch error compensation is set by the data parameters No 098, No 099, No 186, No 187, And No 188. According to the actual demand, each axis can be set anywhere in 0 ~ 255.
Data parameters

0	9	8	The position number of the X-axis pitch error compensation origin
0	9	9	The position number of the origin of the Z-axis pitch error compensation

1	8	6	The position number of the origin of the Y-axis pitch error compensation
1	8	7	The position number of the 4th axis pitch error compensation origin
1	8	8	The position number of the 5th pitch error compensation origin

6.3.3 Compensation Interval

Pitch error compensation interval: No 102, No 103, No 183, No 184, No 185;
Input unit: metric machine tool: mm, imperial machine tool: inch;
Setting range: 1 ~ 9999.9999.
Status parameters

1	0	3	Z-pitch error compensation interval
1	0	2	X-axis pitch error compensation interval
1	8	3	Y-pitch error compensation interval
1	8	4	4th pitch error compensation interval
1	8	5	5th pitch error compensation interval

Note: The X-pitch error compensation interval is entered as a radius value.

6.3.4 Amount of Compensation

The amount of compensation for the pitch error of each axis is set by the parameter number of the following table, and the compensation amount is fixed to the radius value input, regardless of the diameter programming or radius programming, and the input value unit is mm (metric machine tool) or inch (inch machine tool).

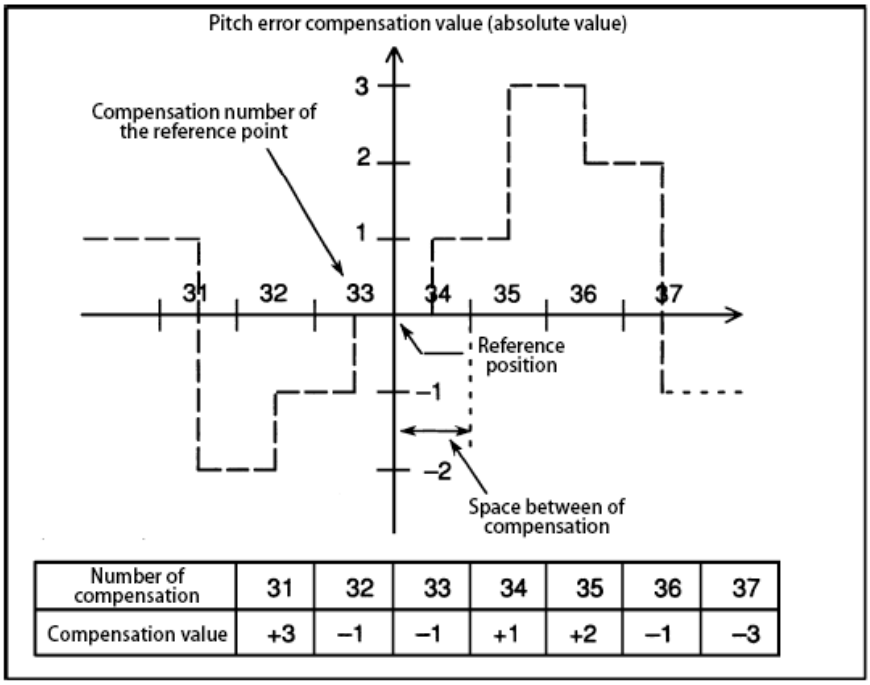
Compensat	X	Z	Y
000	**...**	**...**	**...**
001	**5**	**-2**	**3**
002	**-3**	**4**	**-1**
...	**...**	**...**	**...**
255	**...**	**...**	**...**

6.4 Precautions for Setting the Amount of Compensation

(1) The operation authority must be a second-level password to set and modify the screw supplement parameters.
(2) After setting the parameters of the pitch error compensation, the correct compensation can be carried out after returning to the zero point of the machine tool.

6.5 Examples of compensation parameter settings

(1) Data parameter No 099 (pitch error compensation origin) = 33, data parameter No 103 (compensation interval) = 10.000mm In the following example, the screw pitch error compensation point number of the reference point is 33.



Number of compensation	31	32	33	34	35	36	37
Compensation value	+3	–1	–1	+1	+2	–1	–3

Appendix 1 List of alarms

1. CNC alarm

Alarm	content	remark
0000	Modified the parameter that the power supply must be cut off	
0001	Failed to open file	
0002	The input data is out of scope	
0003	The copied or renamed program number exists	
0004	Address not found	
0005	There is no data after the address	
0006	Illegal use of negative signs	
0007	Illegal use of decimal points	
0008	The program file is too large to load completely	
0009	Enter an illegal address	
0010	Incorrect G code	
0011	No feed speed instructions	
0012	Insufficient disk space	

0013	The number of program files has reached the upper limit	
0014	G95 cannot be instructed, spindle is not supported	
0015	Commanded too many axes	
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	Exceeds the radius tolerance	
0021	The illegal planar axis was instructed	
0022	In the arc, R and IJK are all 0	
0023	Arc interpolation is specified both IJK and R	
0024	The helix interpolation rotation angle is 0	
0025	G12 cannot be in the same segment as other G Directives	
0026	File formats that are not supported by the system	
0027	The length knife complement directive cannot be in the same	
0028	Illegal plane selection	

0029	Illegal bias values	
0030	Illegal compensation number	
0031	Illegal P is instructed in G10	
0032	Illegal compensation value in G10	
0033	There is no intersection in the knife patch C or chamfer	
0034	The arc command cannot be established or canceled	
0035	The M99 directive did not cancel the C tool patch before	
0036	G31 cannot be instructed	
0037	The plane cannot be changed in tool complement C	
0038	Interference in the arc program segment	
0039	Tip positioning error in tool patch C	
0040	Change the coordinate system of the workpiece during tool	
0041	There is interference in tool complement C	
0042	There are more than ten non-move instructions in tool	
0043	Insufficient permissions	
0044	Instructions G27 to G30 are not allowed in a fixed loop	
0045	Address Q is not discovered or the Q value is 0 (G73/G83).	

0046	An illegal reference point returns an instruction	
0047	A mechanical return to zero is required before the instruction is	
0048	The Z plane should be higher than the R plane	
0049	The Z plane should be lower than the R plane	
0050	The position should be moved when changing the fixed loop	
0051	Incorrectly moved after chamfering or chamfer values are too	
0052	The mirroring function cannot be used for slot milling fixed cycles	
0053	Too many address directives	
0054	DNC transfer error	
0055	Incorrectly moved value in chamfer or invert R	
0056	M99 cannot be in the same segment as a macro program directive	
0057	Write file failed , must power off reboot .	
0058	No endpoint was found	
0059	No program numbers were found	
0060	No sequence numbers were found	
0061	The X-axis is not at the reference point	

0062	The Z 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 canceled before G10 can be executed	
0067	G10 does not support the setting format	
0068	The parameter switch is not turned on	
0069	Processing operation requires closing the USB flash drive	
0070	Insufficient memory capacity Insufficient memory	
0071	No data ends found	
0072	Too many programs	
0073	The program number is already in use	
0074	Illegal program number	
0075	protection	
0076	Address P is not defined	
0077	Subroutine nesting error	
0078	No program numbers were found	

0079	System usage time expires	
0080	Data entry is unreasonable	
0082	H code is instructed in G37	
0083	Non-ferrous axis directive in G37	
0084	The keys time out or short-circuit	
0085	Communication error	
0087	The X-axis reference point returns incomplete	
0088	The Z-axis reference point returns incomplete	
0089	The Y-axis reference point returns incomplete	
0090	The 4TH axis reference point returns unfinished	
0091	The TH5 axis reference point returns unfinished	
0092	Axis that is not at the reference point	
0094	P type (coordinate) is not allowed	
0095	Type P Is Not Allowed (EXT OFS CHG).	
0096	Type P Is Not Allowed (WRK OFS CHG).	
0097	Type P is not allowed (auto-execute).	

0098	G28 is found in sequential return	
0099	MDI is not allowed after retrieval	
0100	The parameter write is valid	
0101	Power failure memory data is confused , make sure the location is	
0110	Location data exceeds the allowable range Please return to zero	
0111	Compute data overflow	
0112	Divided by zero	
0113	Incorrect instructions	
0114	The macro program is malformed	
0115	Illegal variable	
0116	Write a protected variable	
0118	Curly brace nesting error	
0119	M00~M02, M06, M98, M99, M30 cannot be in the same	
0122	Quad macromodal - call	
0123	Macros cannot be used in DNC	
0124	The procedure 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	Illegal argument address	
0130	Illegal axis operation	
0131	Too many external alarm messages	
0132	No alarm numbers were found	
0133	Axis instructions that are not supported by the system	
0134	Rigid tapping cannot be used when the number of systems	
0135	Illegal Angle Directive	
0136	Illegal Axis Directive	
0139	The PLC control axis cannot be changed	
0142	Illegal proportionality rate	
0143	Zoom motion data overflow	
0144	Illegal plane selection	
0148	Illegal data settings	

0149	Format error in G10L3	
0150	Illegal tool set number	
0151	No tool set numbers were found	
0152	Tool data cannot be stored	
0153	The C tool patch was not cancelled before the tool change	
0154	Tools in unused life groups	
0155	Illegal T code in M06	
0156	No P/L instructions were found	
0157	Too many tool sets	
0158	Illegal tool life data	
0159	Tool data setting is not complete	
0160	Arcs in polar coordinate mode can only be programmed using R	
0161	The directive cannot be executed in polar coordinate mode	
0162	The G70~G76 directive is used in the input mode	
0163	The instruction cannot be executed in rotation mode	
0164	The instruction cannot be executed in zoom mode	
0165	Specify the directive within a separate program segment	

0166	No axes were 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	
0170	Tool radius compensation is not removed when entering or exiting	
0172	In the program segment that calls the subroutine , P is not an	
0173	The number of subroutine calls should be less than 9999	
0175	A fixed loop can only be executed in the G17 plane	
0176	The spindle speed is not specified	
0177	The spindle orientation feature is not supported	
0178	The spindle speed is not specified before the fixed cycle starts	
0181	Illegal M code	
0182	Illegal S code	
0183	Illegal T code	
0184	The selected cutter is out of range	
0185	L is too small or L is undefined	
0186	L is too large	

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 V is undefined	
0191	W is too small or W is undefined	
0192	Q is too small or Q is undefined	
0193	I is undefined o r I i s 0	
0194	J is undefined o r J i s 0	
0195	D is not defined o r D i s 0	
0198	Illegal axis selection	
0199	The macro directive is undefined	
0200	Illegal S-mode directive	
0201	The feed rate was not found in the rigid tapping	
0202	Location LSI overflow	
0203	The procedure is not correct in rigid tapping	
0204	Illegal axis operation	
0205	The rigid di-signal is off	

0206	The plane cannot be changed (rigid tapping).	
0207	The tapping data is not correct	
0208	The instruction cannot be executed in G10 mode	
0212	Illegal plane selection	
0224	Returns the reference point	
0231	G10 illegal format in L50 or L51	
0232	There are too many spiral interpolation axes for instructions	
0233	The device is busy	
0235	End of record	
0236	The program starts again with incorrect parameters	
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	
0243	The spindle pulse is abnormal	

0244	The threading speed exceeds the upper limit	
0245	The spindle speed fluctuation exceeds the limit value during	
0251	Emergency stop alarm	
0255	Thread segments cannot specify spindle speed	
0256	Thread lead out of range	
0257	The T directive is used in the program segment of the G71~G73	
0258	The address P or Q specifies that M98, M99, or M30 are	
0259	In the G71/G72 directive, the address Z(W)/X(U) is instructed in	
0260	Duplicate axis names , please modify the parameters NO.225~227	
0261	The tool offset number is out of the valid range (0~32).	
0262	The tool number is not within the range set by data parameter	
0263	In tool life management , the tool set number is out of range	
0264	The T instruction cannot be executed in the C tool patch,	
0265	G70~G76, G90, G92, G94, etc. can only be used in the G18 plane	
0266	Plane conversion instructions G17~G19 cannot be executed	
0267	G11 or G13.1 is missing from the program	
0268	In tool life management , there are no tools in the current tool set	

0269	In tool life management, the current tool set is not defined	
0270	The life of all tools in the same group has been reached	
0271	The tool life management function is invalid and the G10 L3	
0272	G11 cannot be programmed before G10	
0273	G33 does not move 0 in the X direction when tapping teeth	
0274	The number of thread indexing heads is greater than 65535 heads	
0275	In G90, the absolute value of R in the G92 directive is greater than	
0276	The absolute value of R in the G94 directive is greater than the	
0277	More than 31 finishing program segments are in the G70~G73	
0278	The Ns and Nf sequences of the finishing program segments in	
0279	The loop segment number Ns or Nf in the G70~G73 directive	
0280	The G70~G73 instruction did not enter the loop start loop end	
0281	Subroutines are called in the G70~G73 loop	
0282	There is no instruction G00 or G01 in the beginning of the	
0283	The prohibited G directive is used at the beginning of the	
0284	The prohibited G directive is used in the G70~G73 loop	

0285	The G70~G73 directive is used in the input mode	
0286	In the G71~G72 cyclic finishing program segment, the coordinate	
0287	The single-shot feed volume in the G71 or G72 is out of the	
0288	The amount of single retract in the G71 or G72 is out of the	
0289	The first paragraph of the G71 directive instructs Z or W	
0290	The first paragraph of the G72 directive instructs X or U	
0291	The total cutting capacity of the G73 is beyond the allowable	
0292	G73 has a cycle count of less than 1 or greater than 9999	
0293	The single retract R (e) in the G74 or G75 is out of the allowable	
0294	In G74 or G75, the amount of retract when cutting to the end	
0295	The amount of a single cut in the X or Z direction in the G74 or	
0296	The value of Z was not entered in the G74 directive	
0297	The value of Q in the G74 directive is 0 or not entered	
0298	The value of X was not entered in the G75 directive	
0299	The value of P in the G75 directive is 0 or not entered	
0300	G76 When machining taper threads, the starting point is between	
0301	The minimum cutth in the G76 directive is out of the allowable	

0302	G76 Finishing allowance is out of the allowable range	
0303	G76 Teeth height is less than finishing allowance or less than 0	
0304	G76 The number of cycles exceeds the allowable range	
0305	The G76 thread chamfer width is beyond the allowable range	
0306	The tip angle in the G76 directive is out of the allowable range	
0307	The amount of X or Z axis movement in the G76 directive is 0	
0308	The G76 Directive does not specify a thread tooth height p-value	
0309	The G76 directive does not specify a Q value for the first depth of	
0310	The cycle starts in a closed area formed at the beginning and end	
0311	Pitch less than 0 occurs during variable pitch thread cutting	
0312	The tooth height in the G76 instruction is less than the amount of	
0320	Additional axis commands have no chamfering function	
0321	The WHILE, END directive is used in the input mode	
0322	The macro statement format specifies an error	
0323	In macro statements , the DO, END label is not 1, 2, 3	
0324	The macro statement in DO, END format specifies error	

0325	Parentheses in macro statements do not match or the format is	
0326	The divisor in a macro statement cannot be 0	
0327	The arctangent ATAN format error specified in the macro	
0328	The number of objections to LNs in macro statements is 0 or	
0329	The opening square in a macro statement cannot be negative	
0330	The result of the tangent TAN in the macro statement is infinity	
0331	The number of operations in the ASIN or ACOS in the macro	
0332	The macro variable number or variable value in the macro	
0451	X-axis drive alarm	
0452	Z-axis drive alarm	
0453	Y-axis drive alarm	
0454	4TH Shaft Drive Alarm	
0455	TH5 axis drive alarm	
0456	Spindle drive alarm	
0500	Soft Limit Overrun : -X	
0501	Soft Limit Overrun : +X	
0502	Soft Limit Overrun : -Z	

0503	Soft Limit Overrun : +Z	
0504	Soft Limit Overreach : -Y	
0505	Soft Limit Overrun : +Y	
0506	Soft Limit Overflight : -4TH	
0507	Soft Limit Overreach : +4TH	
0508	Soft Limit Overrun : -Th5	
0509	Soft Limit Overrun : +Th5	
0510	Hard Limit Overrun : -X	
0511	Hard Limit Overreach : +X	
0512	Hard Limit Overrun :-Z	
0513	Hard Limit Overreach : +Z	
0514	Hard Limit Overrun : -Y	
0515	Hard Limit Overrun : +Y	
0516	Hard Limit Overrun : -4TH	
0517	Hard Limit Overrun : +4TH	
0518	Hard Limit Overrun : -Th5	

0519	Hard Limit Overreach : +Th5	
0740	Rigid tapping alarm : Variance	
0741	Rigid tapping alarm : Variance	
0742	Rigid tapping alarm : LSI overflow	
0751	The first spindle alarm (AL-XX) was detected	
0754	Spindle abnormal torque alarm	
1001	The address of the relay or coil is not set	
1002	The function instruction for the input code does not exist	
1003	The feature directive COM/COME is not used correctly	
1004	The user ladder exceeds the maximum allowable number of rows	
1005	The function directives END1 or END2 are not used correctly	
1006	There is an illegal output in the network	
1007	A hardware failure or system interruption error causes the PLC to	
1008	The function directive is not properly connected	
1009	The network horizontal line is not connected	
1010	A power outage while editing a ladder causes a loss of network in	
1011	Address data was not entered correctly	

1012	The input symbol is undefined or the input address is out of range	
1013	An illegal character or data out of range was specified	
1014	The CTR address is duplicated	
1015	The function directive JMP/LBL was not handled correctly or	
1016	Incomplete network structure	
1017	Network structures that are not currently supported appear	
1019	Duplicate TMR address	
1020	Parameter missing from function directive	
1021	The PLC performs a timeout and the system automatically stops	
1022	The function directive name is missing	
1023	The address or constant of the function directive parameter is out	
1024	There are unnecessary relays or coils	
1025	The function directive was not output correctly	
1026	The number of network connection lines is out of the support	
1027	The same output address is used in another place	
1028	Ladder file format error	

1029	The ladder file in use is missing	
1030	There are incorrect vertical lines in the network	
1031	The user data area is full, reduce the COD instruction datasheet	
1032	The first stage of the ladder diagram is too large to be executed	
1033	The SFT directive exceeded the maximum allowable number of	
1034	The function directive DIFU/DIFD is not used correctly	
1035	The conversion of the currently open ladder file was not	
1036	PLC abnormal stop alarm	
1037	The open ladder plot is inconsistent with the data parameter	
1039	The instruction or network is not in the executable range	
1040	The feature directive CALL/SP/SPE is not used correctly	
1041	Horizontal conduction lines are connected in parallel with the	
1042	The PLC system parameter file is not loaded	

2. PLC alarm

A000.0 Tool change time is too long

Alarm reason: When performing the tool change, the knife number was not found in the total time of the tool change no. 78;

Processing: Press [Reset Key] to cancel the alarm and check whether the knife position signal is normal.

A000.1 When the tool change is complete, the tool holder is not in place to alarm

Alarm reason: When the tool change is completed, the tool holder feedback signal is inconsistent with the tool number of the tool change instruction;

Process: Press [Reset Key] to cancel the alarm and change the knife again.

A000.2 Tool change did not complete alarm

Alarm reason: there is an alarm or reset during the tool change;

Process: Press [Reset Key] twice to cancel the alarm and change the tool again.

A000.3 The tool holder lock signal was not received

Alarm reason: when performing tool change locking, the lock signal was not detected within the specified time; (Ordinary knife holder time reference: No. 83).

Process: Press [Reset Key] to cancel the alarm and change the knife again.

A000.5 Before the system was powered off, the tool change error occurred

Alarm reason: when the tool change is not completed normally, the system is powered off;

Process: Press [Reset Key] to cancel the alarm and change the knife again.

A000.6 The pre-indexing of the AK31 tool change was not in place

Alarm reason: Select AK31 tool holder, perform the tool change, and the pre-indexing is not detected in place to release within 4 seconds;

Processing: Press [Reset Key] to cancel the alarm, check the pre-indexing sensor, and change the tool again.

A000.7 Turret locking is not loosened

Alarm reason: Select Liuxin hydraulic tool holder, perform the tool change, and the Sensor F signal is not detected within 4 seconds;

Process: Press [Reset Key] to cancel the alarm, check the Sensor F sensor, and change the tool again.

A001.0 Tailstock function is invalid and M10 and M11 codes cannot be executed

Alarm reason: When the tailstock function is not turned on, the M10/M11 code is executed;

Process: Press [Reset Key] to cancel the alarm.

A001.1 The spindle is rotating, and the tail shaft cannot be retracted

Alarm reason: the tailstock function and the spindle function are interlocked, and the tail shaft is reversed when the spindle is rotated;

Process: Press [Reset Key] to cancel the alarm.

A001.3 Tailstock advance is not detected and the spindle cannot be rotated

Alarm reason: the tailstock function and the spindle function are interlocked, and the tail axis is not forward to perform spindle rotation;

Process: Press [Reset Key] to cancel the alarm.

A001.4 A or B can have up to 8 knives

Alarm reason: Ordinary knife holder supports up to 8 knives, and alarm when the total number of knife positions of No. 84 is set to greater than 8;

Processing: Set the correct tool level.

A001.5 End of service life of the tool

Alarm reason: the service life of the tool in the tool set is reached;

Process: Press [Reset Key] to cancel the alarm.

A001.6 The opening time of the external loop is too long (connecting the normal opening point) K20.0

Alarm reason: the external loop starts a direct pass;

Processing: Check that the wiring is correct and the input signal level selection is correct K20.0.

A001.7 External pause open time is too long (normal closure point) K20.1

Alarm reason: external suspension in a direct pass;

Processing: Check that the wiring is correct and the input signal level selection is correct K20.1.

The A002.0 guard door is not closed and does not allow automatic operation

Alarm reason: in automatic mode, the protective door is not closed to start the program;

Processing: Close the guard door, if the guard door is closed, check whether the guard door signal input is normal.

A002.2 The number of processed parts completed the alarm

Alarm reason: alarm when the number of processed parts reaches the set number of parts;

Processing: Press [Reset Key] to cancel the alarm, and at the same time, you need to know the number of processed parts.

A002.3 When the spindle is rotating, the chuck must not be released

Alarm reason: chuck function and spindle function interlock, when the spindle rotates the chuck release;

Process: Press [Reset Key] to cancel the alarm.

A002.4 When the spindle is rotating, the clamping in place signal is invalid

Alarm reason: chuck function and spindle function interlock, detect chuck in place signal; When the spindle is rotating, no chuck clamping in place signal is received

Process: Press [Reset Key] to cancel the alarm.

A002.5 When the chuck clamp in place signal is invalid, the spindle must not be activated

Alarm reason: chuck function and spindle function interlock, detect chuck in place signal; Did not receive the chuck clamping in place signal, rotate the spindle;

Process: Press [Reset Key] to cancel the alarm.

A002.6 The chuck is released and the spindle must not be started

Alarm reason: chuck function and spindle function interlock; The chuck is not clamped, the spindle is rotated;

Process: Press [Reset Key] to cancel the alarm.

A003.0 Chuck function is invalid and the M12/M13 code cannot be executed

Alarm reason: when the chuck function is not turned on, the M12/M13 code is executed;

Process: Press [Reset Key] to cancel the alarm.

A003.1 Chuck clamp/release in place signal was not detected

Alarm reason: When detecting the chuck loosening clamping signal, when performing chuck release or clamping, the arrival signal was not detected within T043 time

Process: Press [Reset Key] to cancel the alarm.

A003.2 The target knife number was not found in Liuxin Turret

Alarm reason: After the turret is rotated, the alarm is called when the knife number is not found within 8 seconds

Process: Press [Reset Key] to cancel the alarm.

A003.3 Liuxin Turret did not receive a cutterhead stop and lock start signal SensorE

Alarm reason: After the turret rotates, the SensorE signal is not signaled within 8 seconds;

Process: Press [Reset Key] to cancel the alarm.

A003.7 The total number of common tool holders is greater than 4, and the external feed rate (address multiplexing) cannot be connected

Alarm reason: Ordinary tool holder T05-T08 signal and external feed rate address multiplexing

Processing: Note the selection of use

A004.1 The spindle analog voltage control state is not currently available and the spindle jog function cannot be performed

Alarm reason: When the spindle is controlled by the spindle switch, the spindle jog function is used

Process: Press [Reset Key] to cancel the alarm.

A004.2 M03, M04 code specified error

Alarm reason: The opposite instruction was executed in the forward or reverse rotation of the 1st spindle

Process: Press [Reset Key] to cancel the alarm.

A004.3 M63, M64 code specified error

Cause of alarm: The opposite instruction was executed in the forward or reverse rotation of the 2nd spindle

Process: Press [Reset Key] to cancel the alarm.

A004.4 Spindle shifting time is too long

Alarm reason: When executing the M41-M44 shift instruction, the shift was not completed within the T045 time

Process: Press [Reset Key] to cancel the alarm.

A004.5 Spindle speed/position switching time is too long

Alarm reason: when the spindle switches position or switches the speed mode, the switching completion signal is not received within 8 seconds;

Process: Press [Reset Key] to cancel the alarm.

A004.6 Spindle auto shift function is not turned on and the M41-M44 cannot be performed

Alarm reason: When the spindle automatic shift function is invalid, the M41-M44 shift instruction is executed;

Process: Press [Reset Key] to cancel the alarm.

A004.7 The AK31 pre-indexing did not loosen at the start of the tool change

Alarm reason: Select AK31 tool holder, perform the tool change, and still sense it when the pre-indexing is in place at the beginning;

Processing: Press [Reset Key] to cancel the alarm, check the pre-indexing sensor, and change the tool again.

A005.3 Clamping of the spindle is not allowed when the spindle is rotating or feeding

Alarm reason: spindle loosening state, spindle clamping when selecting the first spindle; The first spindle rotates, or the 5th axis (C axis) is moved when the first spindle position mode is moved; When the second spindle is selected for spindle clamping; The second spindle rotates, or the second spindle position mode moves the 4th axis (A axis) to perform the spindle clamping alarm;

Process: Press [Reset Key] to cancel the alarm.

A005.4 The spindle is clamped and does not allow rotation or feed

Alarm reason: spindle clamping state, spindle clamping when the first spindle is selected;

First spindle rotation, or movement of axis 5 (C axis) alarm when the first spindle position mode ; When the second spindle is selected for spindle clamping; Alarm when the second spindle is rotating, or moving the 4th axis (A axis) when the second spindle is in position mode;

Process: Press [Reset Key] to cancel the alarm.

A006.0 The three-digit switch is in a paused state and the program cannot start

Alarm reason: When the three-digit switch function is valid, the three-digit switch starts the program in the program pause state

Process: Press [Reset Key] to cancel the alarm.

A006.2 M50, M51 code specified error

Alarm reason: The opposite command was executed in the forward or reverse rotation of the Y-axis power head

Process: Press [Reset Key] to cancel the alarm.

A006.3 M53, M54 code specified error

Alarm reason: The opposite command was executed in the forward or reverse rotation of the 4-axis power head

Process: Press [Reset Key] to cancel the alarm.

A006.4 The three-position switch is in the paused state and must not start the spindle

Alarm reason: When the three-digit switch function is effective, the three-position switch starts the spindle rotation in the spindle stop state

Process: Press [Reset Key] to cancel the alarm.

A006.5 Three-position switch 1\2 is on at the same time, and the wiring is wrong

Alarm reason: When the three-digit switch function is effective, the three-digit switch 1\2 simultaneously turns on the alarm

Processing: Confirm that the wiring is correct.

A008.3 The power head cannot be rotated at the same time as the spindle

Alarm reason: When the spindle and the power head cannot be rotated at the same time, the spindle and the power head are rotated together

Process: Press [Reset Key] to cancel the alarm.

A008.4 The Y 4-axis power head cannot be rotated at the same time

Alarm reason: Alarm when the Y and 4-axis power heads rotate at the same time

Process: Press [Reset Key] to cancel the alarm.

A020.0 Guard door not closed warning

Alarm reason: The guard door was not closed when the guard door function was opened

Handling: Close the protective door

A020.1 Insufficient lubricating oil warning

Alarm reason: insufficient lubricating oil

Treatment: Add lubricating oil

A020.2 Insufficient barometric pressure warning

Alarm reason: insufficient air pressure (warns that the program will pause when the air pressure is insufficient)

Treatment: Wait for sufficient air pressure and the warning is canceled

A020.3 Knife holder not locking warning

Alarm reason: The system did not receive the tool holder lock signal without tool change. (This warning is invalid when using a row knife)

Processing: Manual tool change or tool change in input mode to complete the tool change

Appendix II List of common operations

classify	function	operate	Mode of operation	Displays the page	Password level	procedure switch	parameter switch	remark
Clear zero	The X-axis is zeroed relative to the coordinates	U 、 CAN		Relative coordinates				Part II, Section 1.3.1
	The Z axis is zeroed relative to the coordinates	U 、 CAN		Relative coordinates				
	The number of machined parts is	CAN + N#		Relative coordinates or absolute				

	cleared to zero			coordinates				
	Cutting time cleared to zero	CAN + M[						
	The X-axis tool offset value is cleared to zero	X 、 IN		Tool offset	Level 2, Level 3, Level 4			Part II, Section 7.4.4
	The Z-axis tool offset value is cleared to zero	Z 、 IN		Tool offset	Level 2, Level 3, Level 4			Part II, Section 7.4.4
Data settings	Status parameters	Parameter values, IN	Input method	Status parameters	Level 2, Level 3		open	Part II, Section 10.1.3
	Data parameters	Parameter values, IN	Input method	Data parameters	Level 2, Level 3		open	
	X-axis screw complement parameter input	X , compensation value, IN	Input method	Screw complement parameters	Level 2		open	
	Z-axis screw complement parameter input	Z , compensation value, IN	Input method	Screw complement parameters	Level 2		open	
	Macro variables	macro variable values, IN		Macro variables	Level 2, Level 3, Level 4			Part II, Section 1.3.3
	X-axis tool bias incrementa	U , bias		Tool offset	Level 2, Level			Part II, Section 7.4.2

	l input	increments			3, Level 4			
	Z-axis tool bias increased	W , bias increments		Tool offset	Level 2, Level 3, Level 4			
Retrieval	Retrieves down from the current position of the cursor	character ⇩	Edit by	Program content	Level 2, Level 3, Level 4	open		Part II , Section 6.1.3
	Retrieves from the cursor's current position upwards	character ⇧	Edit by	Program content	Level 2, Level 3, Level 4	open		Part II , Section 6.1.3
	Retrieves down from the current program	O 、 ⇩	Edit mode or Automatic mode	Program Contents Program Directory or Program Status	Level 2, Level 3, Level 4			Part II , Section 6.4.1
	Retrieves up from the current program	O 、 ⇧			Level 2, Level 3, Level 4			Part II , Section 6.4.1
	Retrieves the specified program	O , program name, ⇩			Level 2, Level 3, Level 4			Part II , Section 6.4.2
	Retrieval of status parameters, data parameters, or screw parameters	P , Parameter Number, IN		The appropriate page for the data				Title II 10.1 Section 3

	PLC state, PLC data detection	P Q , address number, IN		PLC status PLC data				Part II , Section 1.3.7
Delete	Characters are removed at the cursor	DEL	Edit by	Program content	Level 2, Level 3, Level 4	open		Part II, Section 6.1.6
		CAN	Edit by	Program content	Level 2, Level 3, Level 4	open		
	Single-program segment deletion	Cursor moves to the beginning of the line, DEL	Edit by	Program content	Level 2, Level 3, Level 4	open		The program segment has a program Paragraph Number Part II, Section 6.1.7
	Deletion of multiple program segments	CHG , , sequence number N #	、 edit manner	Program content	Level 2, Level 3, Level 4	open		Part II, Section 6.1.8
	Block deletion	CHG character DEL	Edit by	Program content	Level 2, Level 3, Level 4	open		Part II, Section 6.1.9

	Single program removal	O□, program name, DEL	Edit by	Program content	Level 2, Level 3, Level 4	open		Part II, Section 6.3.1
	All programs are deleted	O□、−+、9999、DEL	Edit by	Program content	Level 2, Level 3, Level 4	open		Part II, Section 6.3.2
rechristen	Renaming of the program	O□, program name,	Edit by	Program content	Level 2, Level 3, Level 4			
copy	Copy of the program	O□, program name, CHG		Program content	Level 2, Level 3, Level 4			
Switch settings	The parameter switch is turned on	L D		Switch settings	Level 2, Level 3			Part II, Section 10.1.1
	The program switch is turned on	L D		Switch settings	Level 2, Level 3, Level 4			
	Opens for autoordinal numbers	L D		Switch settings				
	Off of the parameter switch	W		Switch settings	Level 2, Level 3			
	The program switch is	W		Switch settings	Level 2,			

	turned off				Level 3, Level 4			
	Turn off of auto-sequence numbering	W		Switch settings				

Explanation 1: "Operation" in the "bar", "Indicates that the operation between the two keys is sequential, and "+" indicates that the operation between the two keys is carried out at the same time.

Example: , it means to press the key first, and then press the key; U 、 CAN U CAN

CAN **+** N # **means pressing both keys at the same time.**

Explanation 2: Blank spaces in the columns of operation mode, display page, password level, program switch, and parameter switch indicate that the corresponding function is independent of this item. __

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