CNC Controller

Parameter Manual

V2.42

Content

1 Overview

1.1 Assigning Parameter Number

The table below lists the numbers (ID) of all types of parameters CNC system.

Parameter Type	ID	Description
NC parameter	000000 to 009999	This type of parameter occupies 10000 ID numbers.
Machine user parameter	010000 to 019999	This type of parameter occupies 10000 ID numbers.
Channel parameter	040000 to 049999	This type of parameter is divided by channel, and each channel occupies 1000 ID numbers.
Coordinate axis parameter	100000 to 199999	This type of parameter is divided by axis, and each axis occupies 1000 ID numbers.
Error compensation parameter	300000 to 399999	This type of parameter is divided by axis, and each axis occupies 1000 ID numbers.
Device interface parameter	500000 to 599999	This type of parameter is divided by device, and each device occupies 1000 ID numbers.
Data table parameter	700000 to 799999	This type of parameter occupies 100000 ID numbers.

1.2 Data Type of Parameter

Data type of parameter includes the following:

- INT4: the parameter value can only be an integer.
- BOOL: the parameter value can either be 0 or be 1.
- REAL: the parameter value can be an integer or a decimal.
- STRING: the parameter value is a string including 1 to 7 characters.
- HEX4: the parameter is entered and displayed in hexadecimal.
- ARRAY: the parameter is entered and displayed in array, with a comma (,) or a period (.) to separate the data. The value ranges from 0 to 127.

1.3 Access Level and Permission

1. Corresponding passwords must be entered to modify and save the parameters at each level.
2. If users load the system with a high-level permission, the lower-level parameters can be modified.
3. Cure parameter (access level 5) cannot be modified, which is automatically configured by CNC, and solidified at factory.
4. The parameters at all access levels are shown in the table below:

Access Level of Parameter	**Object-oriented**	**Identity**
1	Manager	ACCESS_USER
2	Machine manufacturer	ACCESS_MAC
3	CNC manufacturer	ACCESS_NC
4	Administrator	ACCESS_RD
5	Operator	ACCESS_VENDER

1.4 Activation

The system has defined four activations:

ACT_SAVE： After the parameter is modified, press “save” to activate the modification.

ACT_NOW： The parameter takes effect immediately after modification, which is mainly for adjusting servo parameters.

ACT_RST： After the modified parameter is saved, press RESET button to activate it.

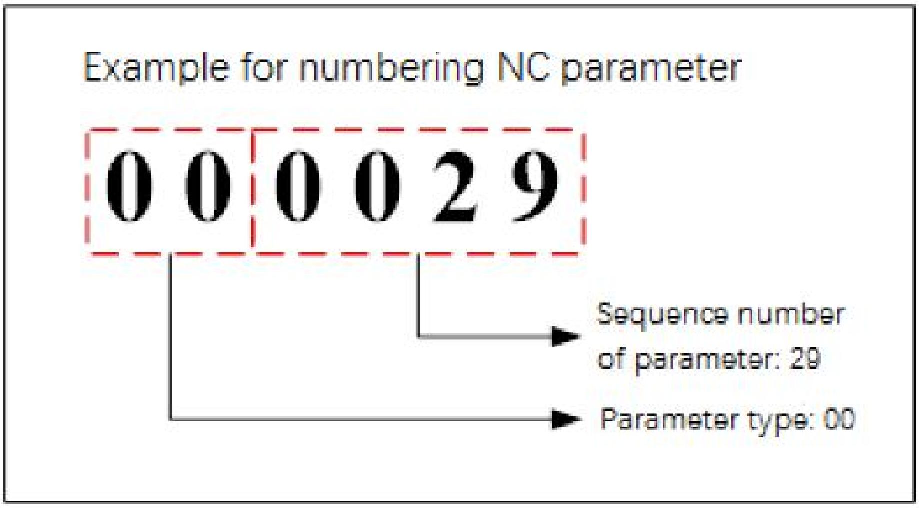
ACT_PWR：After the modified parameter is saved, restart the CNC to activate it.

2 NC Parameter

Explanation on NC parameter number:

The last four numbers: sequence number of NC parameter

The first two numbers: parameter type. NC parameter is 00.



2.1 Interpolation Period

Parameter number	000001
Parameter name	Interpolation period
Data unit	us
Data type	INT4
Valid range	500 to 8000
Default value	1000
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

Interpolation period is the interval at which the CNC interpolator operates an interpolation. It is one of the important CNC parameters. Adjusting this parameter can affect the surface accuracy of workpiece. Shorter interpolation period works a smoother contour of the processed parts than higher one.

Note

Interpolation period is influenced by the interpolation operation time and the period of system position control. Reducing the interpolation period can improve the surface smoothness of the machined workpiece, but may increase the load on operating the interpolation. Users and machine debuggers are not allowed to modify this parameter.

2.2 Number of Statements Executed by PLC2 Period

Parameter number	000002
Parameter name	Number of Statements Executed by PLC2 Period
Data type	INT4
Valid range	1 to 300
Default value	200
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

Two-level PLC mode is adopted, high speed PLC1 and low speed PLC2. PLC1 performs the operations which require higher real-time, such as mode switching, operational control and the like. PLC1 operates once per scanning cycle. PLC2 performs the operations with lower real-time requirements, such as panel indicator light control, and PLC2 only executes the specified lines within one scanning cycle.

This parameter can set the number of statement lines which is executed in each cycle, to adjust the response rate of PLC2. The greater the set value, the more the PLC2 statements executed per cycle, and the more rapid the PLC2 responses.

2.3 Angle Calculation Resolution

Parameter number	000005
Parameter name	Angle calculation resolution
Data type	INT4
Valid range	10 to 1000000
Default value	100000
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

This parameter is used to set the smallest unit of angle calculation for CNC system.

Note

This parameter is generally configured only once before the machine leaves the factory, and must be set to a multiple of 10. Users and machine debuggers cannot freely change this parameter.

After this parameter is changed, reboot the CNC system.

Example

If this parameter is set to 100000, the precision of angle calculation will be 0.00001 degree.

2.4 Length Calculation Resolution

Parameter number	000006
Parameter name	Length Calculation Resolution
Data type	INT4
Valid range	10 to 1000000
Default value	100000
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

This parameter is to set the smallest unit of length calculation for CNC system.

Note

This parameter is generally configured only once before the machine leaves the factory, and must be set to a multiple of 10. Users and machine debuggers cannot freely change this parameter.

After this parameter is changed, reboot the CNC system.

Example

If this parameter is set to 1000000, the precision of length calculation for CNC system will be 0.000001mm, that is, the resolution reaches to a nanometer level. At this point, the CNC can handle the programming instruction of nanometer level.

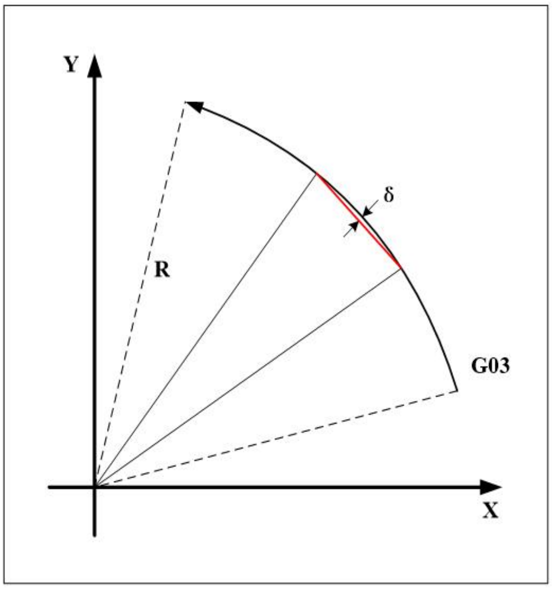
2.5 Allowable Error for Circular Interpolation Contour

Parameter number	000010
Parameter name	Allowable error for circular interpolation contour
Data unit	mm
Data type	REAL
Valid range	0.001 to 10
Default value	0.005
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

Allowable error for circular interpolation contour is the difference of arc height (or approximation error) between theoretical circular path and actual interpolation path. The approximation error is relevant to interpolation cycle T, feedrate F and circular radius R. When R and T are certain, the approximation error grows with F increasing.

The system limits F to keep the approximation error in an allowable scope.

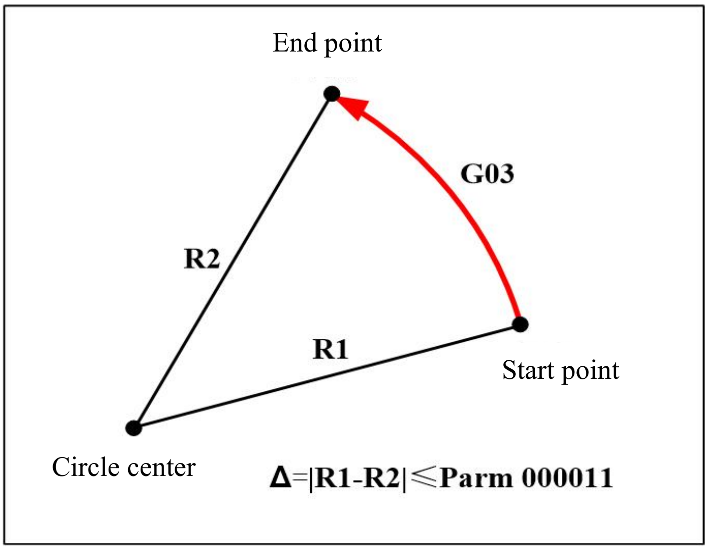


2.6 Programming Circular Radius Error

Parameter number	000011
Parameter name	Programming circular radius error
Data unit	mm
Data type	REAL
Valid range	0.001 to 10
Default value	0.1
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

During the circular programming, A tiny difference between the distance (radius) from center to start point and the distance(radius) from center to end point may exist. The maximum error for the radius is set by this parameter. The system will alarm if the value set by this parameter is exceeded.



2.7 Length Compensation Axis Selection

Parameter number	000012
Parameter name	Length compensation axis selection
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter is to set the axis to which the tool length compensation G43/G44 is applied.

0： The tool length compensation is applied to Z-axis at all times.

1： The coordinate plane selection modal G commands G17, G18 and G19, which correspond to axis Z, Y and X one to one, are used to switch the tool length compensation axis.

Example

If this parameter is set to 0, the tool length compensation will be applied to X-axis for “G43 Z5 H02”. Note that when two or more axes specified in this block, an alarm is generated.

2.8 G00 Type

Parameter number	000013
Parameter name	G00 type
Data type	BOOL

Valid range	0-2
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter determines whether G00 performs the interpolation like G01.

0： G00 does not perform the interpolation.

1： G00 performs the interpolation.

2： G00 performs linear interpolation. For multiple axes, running speed of axes is calculated based on the running time of axis which runs the longest distance, and the interpolation is performed. When G00 type is 2, users set acceleration/deceleration time and jerk time through logical axis parameter 1**212 (acceleration time when G00 is 2) and 1**213 (jerk time when G00 is 2); After that, users move axes.

2.9 Automatically Restore Tool Length Compensation after G53/G28

Parameter number	000014
Parameter name	Automatically restore tool length compensation after G53/G28
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

After G53 command is executed, tool length compensation is:

0： Not restored automatically.

1： Restored automatically.

2.10 Enable System Time Display

Parameter number	000018
Parameter name	Enable system time display
Data type	BOOL
Valid range	0, 1
Default value	1

Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

On the human-machine interface of CNC, current system time is:

0: Not shown.

1: Shown.

Note

When this parameter is set to 0, other times of system are still displayed, such as machining time.

2.11 Automatic Alarm Window Display

Parameter number	000020
Parameter name	Automatic alarm window display
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

Alarm information window is:

0: Not automatically displayed.

1: Automatically displayed when the system generates a new alarm.

2.12 Enable Graphic Preview

Parameter number	000022
Parameter name	Enable graphic preview
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

The graphic preview is displayed by default when loading program. When the program is large, it will take more time to preview.

0: The graphic preview is not enabled when loading program;

1: The system automatically performs graphic preview. The larger the program, the longer the time it takes for previewing.

2.13 G Code Line No. Display Mode

Parameter number	000024
Parameter name	G code line No. of display mode
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

On the human-machine interface, number of G code line is:

0: Not displayed.

1: Only displayed on the editing interface.

2: Only displayed on the program-running interface.

3: Displayed on both the editing interface and the program-running interface.

Note

The G code line number displayed can be up to four digits, that is, numbers less than 100000 can be displayed.

2.14 Display in Metric/Inch

Parameter number	000025
Parameter name	Display in metric/inch
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_SAVE

Milling/Turning	Milling, turning

Description

0: The interface display is in inch unit.

1: The interface display is in metric unit.

2.15 Number of Decimal Places for Position Value

Parameter number	000026
Parameter name	Number of decimal places for position value
Data type	UINT1
Valid range	0 to 5
Default value	4
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

To set number of decimal places for position values on the human-machine interface, including machine coordinate, workpiece coordinate, distance-to-go and so on.

2.16 Number of Decimal Places for Speed Value

Parameter number	000027
Parameter name	Number of decimal places for speed value
Data type	UINT1
Valid range	0 to 3
Default value	2
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

To set number of decimal places for speed values on the human-machine interface, such as feedrate F, etc.

2.17 Number of Decimal Places for RPM Value

Parameter number	000028

Parameter name	Number of decimal places for RPM value
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

To set number of decimal places for RPM values on the human-machine interface, including spindle speed S, etc.

2.18 Time to Activate Screensaver

Parameter number	000030
Parameter name	Time to activate screensaver
Data unit	min
Data type	UINT1
Valid range	0 to 60
Default value	5
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

This parameter is to set the amount of idle time that must elapse before the screensaver is activated

2.19 Whether to Externally Connect to UPS

Parameter number	000033
Parameter name	Whether to externally connect to UPS
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

0：CNC is not configured with UPS.

1：CNC has been configured with UPS.

Note

If CNC is not configured with UPS, this parameter must be set to 0; otherwise, magazine data may not be saved.

2.20 Enable Operation Tips

Parameter number	000034
Parameter name	Enable operation tips
Data type	HEX4
Valid range	0 to 7
Default value	0x7
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

Use binary to set whether there is a confirmation prompt for the corresponding operation.

Bit 0: rerun

Bit 1: 【Tool compensation】->【Relative actual】

Bit 2: 【Tool compensation】->【Current position】

If all bits are set to 0, there will not operation tips; if all bits are set to 1, operation tips will be given.

2.21 Root Directory Name of Online Disk Server

Parameter number	000035
Parameter name	Root directory name of online disk server
Data type	STRING[8]
Valid range	0 to 7
Default value	PROG
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The directory name of the shared folder on the server computer when using a network disk.

2.22 Online Disk Server IP Address 1

Parameter number	000036
Parameter name	Online disk server IP address 1
Data type	UINT1
Valid range	0 to 255
Default value	192
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the system is connected to Ethernet or LAN, users need to set the online disk server IP address 1, for example, the 192 field in 192.168.0.1..

2.23 Online Disk Server IP Address 2

Parameter number	000037
Parameter name	Online disk server IP address 2
Data type	UINT1
Valid range	0 to 255
Default value	168
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the system is connected to Ethernet or LAN, users need to set the online disk server IP address 2, for example, the 168 field in 192.168.0.1..

2.24 Online Disk Server IP Address 3

Parameter number	000038
Parameter name	Online disk server IP address 3
Data type	UINT1
Valid range	0 to 255
Default value	20
Access level	ACCESS_USER
Activation	ACT_SAVE

Milling/Turning	Turning, milling

Description

When the system is connected to Ethernet or LAN, users need to set the online disk server IP address 3, for example, the 0 field in 192.168.0.1..

2.26 Online Disk Server IP Address 4

Parameter number	000039
Parameter name	Online disk server IP address 4
Data type	UINT1
Valid range	0 to 255
Default value	1
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the system is connected to Ethernet or LAN, users need to set the online disk server IP address 4, for example, the 1 field in 192.168.0.1..

2.26 Online Disk Server Port Number

Parameter number	000040
Parameter name	Online disk server port number
Data type	INT4
Valid range	0 to 65535
Default value	21
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the system is connected to Ethernet or LAN, users need to set the online disk server port number. Generally the default is 21.

2.27 Online Disk Server Access ID

Parameter number	000041

Parameter name	Online disk server access ID
Data type	STRING[8]
Valid range	0 to 65535
Default value	admin
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

User name of online disk server access.

2.28 Online Disk Server Access Password

Parameter number	000042
Parameter name	Password of online disk server access
Data type	STRING[8]
Valid range	0 to 65535
Default value	admin
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The password to access the online disk server.

2.29 Network Disconnection Determination threshold

Parameter number	000043
Parameter name	Network disconnection determination threshold
Data type	INT4
Valid range	300 to 10000
Default value	500
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the shortest time that the system can detect when the network is disconnected.

2.30 Online Disk Mapping Type

Parameter number	000044
Parameter name	Online disk mapping type
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Network sharing mode:

0: Network

1: FTP

Users need to set this parameter to 0, 1 when using the network or FTP function.

2.31 Local Port Number

Parameter number	000049
Parameter name	Local port number
Data type	INT4
Valid range	0 to 65535
Default value	10001
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used when PC is connected, and it is 10001 by default. The settings on software during sampling and PLC online debugging must be the same with this parameter.

2.32 Whether to Enable Networking

Parameter number	000050
Parameter name	Whether to enable networking
Data type	INT4
Valid range	0, 1
Default value	0

Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The network is,

0: Not turned on;

1: turned on.

This parameter must be set to 1 when FTP or shared disk is used.

2.33 Serial Port Hardware Type

Parameter number	000051
Parameter name	Serial port hardware type
Data type	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Serial port function is turned off

1: SYGOLE RFID tool management

2: BALLUFF RFID tool management

5: Digital display MPG

6: DNC transmission

2.34 Serial Port Number

Parameter number	000052
Parameter name	Serial port number
Data type	UNIT1
Valid range	0 to 1000
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set serial port type and serial port number. The value /100 indicates the serial port type, and the value of %100 indicates the serial port number.

0 to 99 represent ordinary serial ports COM1 to COM100;

100 to 199 represent USB

2.35 Length of Sent and Received Data Bit

Parameter number	000053
Parameter name	Length of sent and received data bit
Data type	UNIT1
Valid range	5 to 8
Default value	8
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of data bit of serial port, in the unit of bit.

2.36 Stop Bit

Parameter number	000054
Parameter name	Stop bit
Data type	INT4
Valid range	1 to 2
Default value	1
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of stop bit of serial port, in the unit of bit.

2.37 Parity Bit

Parameter number	000055
Parameter name	Parity bit
Data type	UINT1

Valid range	0 to 2
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of parity bit of serial port, in the unit of bit.

0: There is no parity bit;

1: Odd check bit;

2: Even check bit.

2.38 Baud Rate

Parameter number	000056
Parameter name	Baud rate
Data type	INT4
Valid range	300 to 115200
Default value	9600
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the data transmission rate of serial port. The same baud rate must be set both on system end and serial port end.

2.39 Static IP/Dynamic IP

Parameter number	000057
Parameter name	Static IP/dynamic IP
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

IP address is a fixed value or is automatically obtained dynamically.

0: Static IP

1: Dynamic IP

2.40 Circular Intersection Tolerance

Parameter number	000058
Parameter name	Circular intersection tolerance
Data unit	mm
Data type	REAL
Valid range	0.000 to 1
Default value	0.01
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used to set the tolerance between the end point of a line segment and the starting point of the next line segment when the straight line is connected to the arc, the arc is connected to the straight line, and the arc is connected to the arc.

2.41 Center Distance Threshold for Concyclic Determination

Parameter number	000059
Parameter name	Center distance threshold for concyclic determination
Data type	REAL
Valid range	0.01 to 0.5
Default value	0.1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The maximum circle center distance error to determine whether the two arcs are concyclic.

2.42 Number of Data-saved Tools

Parameter number	000060
Parameter name	Number of data-saved tools

Data type	INT4
Valid range	0 to 1000
Default value	100
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

To set the number of tools, data (tool offset, tool wear, radius, tool nose direction, length, etc.) of which can be saved in system. The value set by this parameter must be larger than the total number of tools in each channel.

2.43 T Command Tool Offset Tool Compensation No.: Number of Digits

Parameter number	000061
Parameter name	T command tool offset tool compensation: number of digits
Data type	INT
Valid range	2
Default value	2
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

To set the number of digits of number after T command, generally two digits. The first two-digit is tool number, and the last two-digit is tool compensation.

2.44 Enable Tool Wear Accumulation

Parameter number	000064
Parameter name	Enable tool wear accumulation
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	Turning

Description

To set whether the tool wear value is the input value or the input value plus original value

0: Input value;

1: Input value plus original value.

2.45 Enable Lathe Tool Diameter Display

Parameter number	000065
Parameter name	Enable lathe tool diameter display
Data type	HEX4
Valid range	0 to 1FF
Default value	0x1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

To set the coordinate value display of lathe tool on X-axis and Y-axis in the tool table.

0x1 X-axis diameter display;

0x2 Y-axis diameter display;

0x3 X-axis and Y-axis diameter display.

2.46 Maximum Number of Interpreted Blocks per Interpreter Cycle

Parameter number	000071
Parameter name	Maximum number of interpreted blocks in interpreter cycle
Data type	INT4
Valid range	0 to 50
Default value	20
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The maximum number of blocks per cycle of interpreter.

2.47 Whether to Turn off Machining Time Display

Parameter number	000072
Parameter name	Whether to turn off machining time display

Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Machining time is displayed;

1: Machining time is not displayed.

2.48 Tracking Error Hysteresis Period

Parameter number	000073
Parameter name	Tracking error hysteresis period
Data type	INT4
Valid range	1 to 20
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

Different EtherCAT drives have different cycles of uploading data. When the system fetches the tracking error of the data operation from the bus drive, there will be a transmission hysteresis. This parameter is used to set the number of hysteresis periods.

2.49 Automatically Save G code after Exit

Parameter number	000076
Parameter name	Automatically save G code after exit
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

After modifying G codes and exiting editing interface,

0: Prompt users whether to save G codes;

1: automatically save G codes.

2.50 Max. Program Preview Time

Parameter number	000077
Parameter name	Max. program preview time
Data type	INT4
Valid range	0 to 100000 (s)
Default value	10
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter sets the maximum time for program preview during program loading.

0: From the start of program preview to the termination of program preview;

Others: When the program preview time exceeds this value, the preview is ended.

2.51 Enable Power-on Password

Parameter number	000078
Parameter name	Enable power-on password
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: No password is needed for power-on;

1: There is a password for power-on, and the permission obtained is based on the permission set in system.

2.52 Networking

Parameter number	000079

Parameter name	Networking
Data type	HEX4
Valid range	0 to 0X3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

After parameter 000050 is enabled, a non-zero value of this parameter takes effect:

0X01: Automatically connect to network at boot;

0X02: If network is disconnected abnormally, it will be reconnected automatically.

2.53 Log File Save Type

Parameter number	000080
Parameter name	Log file save type
Data type	INT4
Valid range	0 to 3
Default value	2
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: When number of log entries saved is beyond the limit set by this parameter, the oldest logs are deleted.

1: The logs which have been saved for more than the limit number of days set by the related parameter shall be deleted.

2: The oldest logs when number of logs saved is beyond the limit, as well as the logs which have been saved for more than the limit number of days, shall be deleted.

3: Logging is deactivated.

2.54 Internet Server IP Addresses 1-4

Parameter number	000081 to 000084
Parameter name	Internet server IP addresses 1 to 4
Data type	UINT1
Valid range	0 to 255
Default value	0

Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used to connect to the IP address of internet server.

2.55 Internet Server Port

Parameter number	000085
Parameter name	Internet server port
Data type	UINT1
Valid range	0 to 65535
Default value	10002
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used for the port number at the time of network connection.

2.56 Local Default Gateways 1 to 4

Parameter number	000086 to 000089
Parameter name	Local default gateways 1 to 4
Data type	UINT1
Valid range	0 to 255
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used to set the default gateway.

2.57 Data Uploading

Parameter number	000090

Parameter name	Data uploading
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Data is not uploaded;

1: Data is uploaded to the Cloud.

The data includes: machine status, alarm message, number of processed parts.

2.58 Subnet Masks 1 to 4

Parameter number	000091 to 000094
Parameter name	Subnet masks 1 to 4
Data type	UINT1
Valid range	0 to 255
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set default subnet mask.

2.59 Cloud Communication Mode

Parameter number	000095
Parameter name	Cloud communication mode
Data type	UINT1
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the cloud communication mode.

0: Network communication;

1: Narrowband communication

Note: If the CNC controller uses narrowband communication, this parameter must be set to 1; if other communications are used, this parameter is set to 0.

2.60 Remote File Transfer Authorization

Parameter number	000096
Parameter name	Remote file transfer authorization
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

User file capture authorization

0: is disabled;

1: is enabled.

2.61 Online Disk Server Access ID 2

Parameter number	000097
Parameter name	Online disk server access ID 2
Data type	STRING[8]
Valid range	
Default value	admin
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to extend the ID set by the NC parameter 000041.

Example

If parameter 000041 is set to 1234567, and parameter 000097 is set to admin12, the server login password is 1234567admin12.

2.62 Allowable Input Range of Tool Wear

Parameter number	000098
Parameter name	Allowable input range of tool wear (mm)
Data type	REAL
Valid range	0.1 to 1000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

To limit the valid input wear value of lathe tool compensation table (irrelevant with diameter/radius parameters).

0: Wear value of tool compensation table is not limited;

n: When the value is larger than 0 (n), then the invalid value ranges from -n to n.

2.63 Interface Refresh Period

Parameter number	000120
Parameter name	Interface refresh period
Data type	INT4
Valid range	50 to 300
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set refresh period of interface.

2.64 Interpolation Type

Parameter number	000200
Parameter name	Interpolation type
Data type	INT4
Valid range	0, 1

Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0: S-shaped acceleration and deceleration

1: Filter smoothing acceleration and deceleration before interpolation

2.65 Interpolation 1st Smoothing Period

Parameter number	000201
Parameter name	Interpolation 1st smoothing period
Data type	INT4
Valid range	0 to 60
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Before enabling smoothing function before interpolation, there are two smoothing to be performed.

This parameter is to set the period of the first speed smoothing calculation. The larger the value, the smoother the speed curve, which may affect efficiency and corner precision.

Note: This parameter can limit the jerk of a single axis. Calculation formula: j=2*a/n(m/s3)

2.66 Interpolation 2nd Smoothing Period

Parameter number	000202
Parameter name	Interpolation 2nd smoothing period
Data type	INT4
Valid range	0 to 30
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Before enabling smoothing function before interpolation, there are two smoothing to be performed.

This parameter is to set the period of the second speed smoothing calculation. The larger the value, the smoother the speed curve, which may affect efficiency and corner precision.

2.67 Command Smoothing Type

Parameter number	000203
Parameter name	Command smoothing type
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Turn off third-order smoother;

1: Turn on third-order smoother; When number of command smoothing periods keeps unchanged, more smoother acceleration and smaller smoothing error can be obtained.

2.68 Speed Detector: Number of Discrete Verification Points

Parameter number	000250
Parameter name	Speed detector: number of discrete verification points
Data type	INT4
Valid range	3-10
Default value	3
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the number of discrete verification points in travel space acceleration constraint function. The larger the set value, the more accurate the speed constraint calculation, but the higher the IPC operation load.

2.69 Trigonometric Function Selection

Parameter number	000349
Parameter name	Trigonometric function selection
Data type	BOOL

Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Trigonometric function calculation is in radian;

1: Trigonometric function calculation is in angle;

2.70 G16 Pole Mode Selection

Parameter number	000350
Parameter name	G16 pole mode selection
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: FANUC mode, the radius pole is specified as the programming start point in incremental programming;

1: Original mode, the radius pole is specified as the programming start point.

2.71 FTP Sharing Mode

Parameter number	000352
Parameter name	FTP sharing mode
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used to switch FTP working mode.

1: Normal mode;

1: The working mode can be used for CAXA connection.

2.72 5-axis Function Application

Parameter number	000353
Parameter name	5-axis Function Application
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	5-axis

Description

This parameter is to enable 5-axis function interface.

0: Turn off 5-axis function interface;

1: Turn on 5-axis function interface, including RTCP automatic calibration interface.

Note: Must enable system parameter 353 to use RTCP auto calibration function.

2.73 HMI Type

Parameter number	000354
Parameter name	HMI type
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to set the mode of workpiece zero coordinate.

1: Normal coordinate mode;

1: Fine coordinate mode.

2.74 Threshold for Insufficient Free System Disk Space Prompt

Parameter number	000355

Parameter name	Threshold for insufficient free system disk space prompt
Data type	INT4
Valid range	3 to 10
Default value	5
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used to set the threshold of insufficient free space prompt of system disk. If 5 is set, the prompt occurs when the free space of system disk is less than 5%.

2.75 API Logging Level

Parameter number	000357
Parameter name	API logging level
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the API log recording level.

0: Turn off the AIP logging function;

1: ERR level;

2: WARN level;

3: INFO level:

4: DEBU level.

2.76 Default Permission

Parameter number	000359
Parameter name	Default permission
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_USER

Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: The default permission is ACCESS_USER after CNC is turned on.

1: The default permission is ACCESS_VENDER after CNC is turned on.

2.77 Disable Program Word Segmentation Display

Parameter number	000361
Parameter name	Disable program word segmentation display
Data type	UINT1
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: The program word segmentation display is enabled;

1: The program word segmentation display is disabled.

2.78 Displayed Coordinate Column on Main Interface

Parameter number	000362
Parameter name	Displayed coordinate column on main interface
Data type	UINT1
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: One column of coordinates is displayed on main interface.

1: Two columns of coordinates are displayed on main interface.

2.79 Display in small Character

Parameter number	000363
Parameter name	Display in small character
Data type	UINT1
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Normal display;

1: Display in small character.

2.80 One-click Offset

Parameter number	000364
Parameter name	One-click offset
Data type	UINT1
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disabled;

1: Enabled.

2.81 Machine Type

Parameter number	000368
Parameter name	Machine type
Data type	INT4
Valid range	0 to 9999999
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE

Milling/Turning	Turning, milling

Description

This parameter is to set the machine tool type.

The machine type is defined as a 7-digit integer (0 to 9999999).

The first two digits: machine classification, which means milling machines, lathes or other major types

Middle two digits: definition of machine tool structure, such as vertical lathe, horizontal lathe, etc.

The last three digits: machine specifications, detailed configuration classification description of machine tools (related to supporting hardware)

0 to 99999: milling machine

100000 to 199999: Lathe

200000 to 299999: Grinding machine

300000 to 399999: Glass machine

400000 to 499999: Five-axis machine tool

500000 to 599999: Mill-lathe combo

600000 to 699999: Drilling Center

2.82 Magazine Type

Parameter number	000369
Parameter name	Magazine type
Data type	INT4
Valid range	0 to 99999
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the magazine type.

The magazine type is defined as a 5-digit integer number (0 to 99999).

The first two digits: machine classification, which means milling machines, lathes or other major types

The last three digits: the detailed classification of magazine

0 to 999: Magazine of milling machine

1000 to 1999: Magazine for lathe

2000 to 2999: Magazine for grinder

3000 to 3999: Magazine of glass machine

2.83 Intelligent Function

Parameter number	000370
Parameter name	Intelligent function
Data type	HEX4
Valid range	0X0 to 0XFFFF
Default value	0XFFFF
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to enable or disable the intelligent function, and set by bit.

Bit 0: Health protection function switch (0: off 1: on)

Bit 1: Switch of thermal error debugging without temperature sensor.

Bit 2: Fault recording function switch.

Bit 3: None.

Bit 4: Screw load diagram switch.

Bit 5: Technique parameter evaluation switch.

Bit 6: Broken tool detection switch.

Bit 7: One-click restore switch.

Bit 8: Power-on consistency detection switch.

Bit 9: Servo self-tuning switch.

Bit 10: Spindle load diagram switch.

Bit 15: Current/power switching.

2.84 MDI Mode Switching

Parameter number	000371
Parameter name	MDI mode switching
Data type	UINT1
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: MCPMDI

1: NCMDI

2.85 Multi-cutting-edge

Parameter number	000372
Parameter name	Multi-cutting-edge
Data type	INT4
Valid range	0 to 9
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The multi-cutting-edge interface can be enabled by the parameter.

0: Disable multi-cutting-edge function;

1-9: Enable multi-cutting-edge tool compensation interface.

2.86 Servo Tuning: Sampling Start M Code

Parameter number	000373
Parameter name	Servo tuning: sampling start M code
Data type	INT4
Valid range	1 to 299
Default value	15
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the M code for sampling start in the servo adjusting menu. When an M code is set by this parameter, the sampling starts from this line. Please note that the meaningless M code cannot be set.

2.87 Servo Tuning: Sampling End M Code

Parameter number	000374
Parameter name	Servo tuning: sampling end M code
Data type	INT4
Valid range	1 to 299

Default value	16
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the M code for sampling end in the servo adjusting menu. When an M code is set by this parameter, the sampling ends at this line. Please note that the meaningless M code cannot be set.

2.88 Workpiece Measurement: Manual Measurement

Parameter number	000375
Parameter name	Workpiece measurement: manual measurement
Data type	HEX4
Valid range	0x0 to 0x3f
Default value	0x2
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	5-axis, milling

Description

The parameter is to enable workpiece measurement function.

Bit 0: Whether to enable manual measurement by X+X-Y+Y-Z+Z- on interface for workpiece measurement;

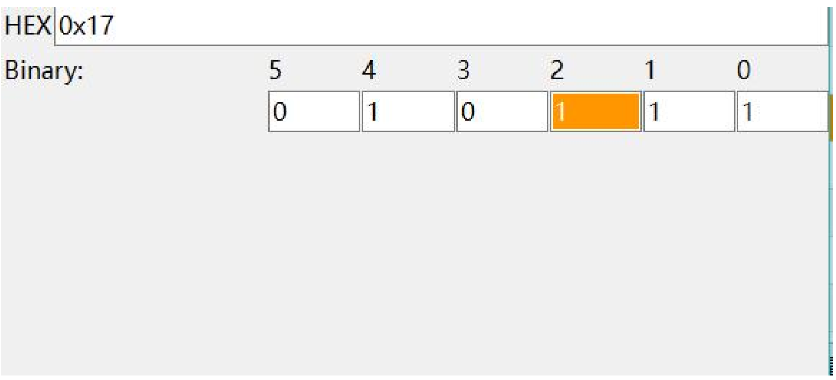
Bit 1: Whether a prompt appears when manual measurement is enabled by X+X-Y+Y-Z+Z- on interface for workpiece measurement;

Bit 2: Tool compensation is added to the measurement result;

Bit 3: For workpiece measurement-angle measurement result, the shortest path of rotation is not performed.

Note

To use 3D-ROT function, users must enable bit 2 of system parameter 375.



2.89 HMI Display

Parameter number	000376
Parameter name	HMI display
Data type	HEX4
Valid range	0x0 to 0x1FFFF
Default value	0x0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to control the HMI interface display, and set by bit. 0: Off; 1: On;

Bit 0: Automatically adjust display scaling of coordinate module and program display module on machining interface;

Bit 1: Naming of coordinate system is same with FANUC, including machine coordinate (machine actual), absolute coordinate (workpiece actual), relative coordinate (relative actual), distance-to-go (remaining feed);

Bit 2: Whether to enable tool attribute display and setting;

Bit 3: Disable Automatic focus moving after table input;

Bit 4: FTP file message text uses UTF-8 code parsing;

Bit 5: Enable graphics display of slant-bed lathe;

Bit 6: Display actual feedrate as command speed;

Bit 7: Enable tool life management interface of old version.

2.90 With/Without Temperature Sensor

Parameter number	000377
Parameter name	With/Without temperature sensor
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Enable thermal error compensation interface without temperature sensor in servo tuning;

1: Enable thermal error compensation interface with temperature sensor in servo tuning;

2.91 Serial Port Application 2: Serial Port Hardware Type

Parameter number	000380
Parameter name	Serial port application 2: serial port hardware type
Data type	INT4
Valid range	0-10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Serial port function is turned off

1: SYGOLE RFID tool management

2: BALLUFF RFID tool management

5: Digital display MPG

6: DNC transmission

2.92 Serial Port Application 2: Serial Port No.

Parameter number	000381
Parameter name	Serial port application 2: serial port No.
Data type	UNIT1
Valid range	0 to 1000
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set serial port type and serial port number. The value /100 indicates the serial port type, and the value of %100 indicates the serial port number.

0 to 99 represent ordinary serial ports COM1 to COM100;

100 to 199 represent USB

2.93 Serial Port Application 2: Length of Sent and Received Data Bit

Parameter number	000382
Parameter name	Serial port application 2: length of sent and received data bit
Data type	UNIT1
Valid range	5 to 8
Default value	8
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of data bit of serial port, in the unit of bit.

2.94 Serial Port Application 2: Stop Bit

Parameter number	000383
Parameter name	Serial port application 2: stop bit
Data type	INT4
Valid range	1 to 2
Default value	1
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of stop bit of serial port, in the unit of bit.

2.95 Serial Port Application 2: Parity Bit

Parameter number	000384
Parameter name	Serial port application 2: parity bit
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of parity bit of serial port, in the unit of bit.

0: There is no parity bit;

1: Odd check bit;

2: Even check bit.

2.96 Serial Port Application 2: Baud Rate

Parameter number	000385
Parameter name	Serial port application 2: baud rate
Data type	INT4
Valid range	300 to 115200
Default value	9600
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the data transmission rate of serial port. The same baud rate must be set both on system end and serial port end.

2.97 Serial Port Application 3: Serial Port Hardware Type

Parameter number	000386
Parameter name	Serial port application 3: serial port hardware type
Data type	INT4
Valid range	0-10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Serial port function is turned off

1: SYGOLE RFID tool management

2: BALLUFF RFID tool management

5: Digital display MPG

6: DNC transmission

2.98 Serial Port Application 3: Serial Port No.

Parameter number	000387
Parameter name	Serial port application 3: serial port No.
Data type	UNIT1
Valid range	0 to 1000
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set serial port type and serial port number. The value /100 indicates the serial port type, and the value of %100 indicates the serial port number.

0 to 99 represent ordinary serial ports COM1 to COM100;

100 to 199 represent USB

2.99 Serial Port Application 3: Length of Sent and Received Data Bit

Parameter number	000388
Parameter name	Serial port application 3: length of sent and received data bit
Data type	UNIT1
Valid range	5 to 8
Default value	8
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of data bit of serial port, in the unit of bit.

2.100 Serial Port Application 3: Stop Bit

Parameter number	000389
Parameter name	Serial port application 3: stop bit
Data type	INT4
Valid range	1 to 2
Default value	1
Access level	ACCESS_USER

Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of stop bit of serial port, in the unit of bit.

2.101 Serial Port Application 3: Parity Bit

Parameter number	000390
Parameter name	Serial port application 3: parity bit
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of parity bit of serial port, in the unit of bit.

0: There is no parity bit;

1: Odd check bit;

2: Even check bit.

2.102 Serial Port Application 3: Baud Rate

Parameter number	000391
Parameter name	Serial port application 3: baud rate
Data type	INT4
Valid range	300 to 115200
Default value	9600
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the data transmission rate of serial port. The same baud rate must be set both on system end and serial port end.

2.103 Serial Port Application 4: Serial Port Hardware Type

Parameter number	000392
Parameter name	Serial port application 4: serial port hardware type
Data type	INT4
Valid range	0-10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Serial port function is turned off

1: SYGOLE RFID tool management

2: BALLUFF RFID tool management

5: Digital display MPG

6: DNC transmission

2.104 Serial Port Application 4: Serial Port No.

Parameter number	000393
Parameter name	Serial port application 4: serial port No.
Data type	UNIT1
Valid range	0 to 1000
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set serial port type and serial port number. The value /100 indicates the serial port type, and the value of %100 indicates the serial port number.

0 to 99 represent ordinary serial ports COM1 to COM100;

100 to 199 represent USB

2.105 Serial Port Application 4: Length of Sent and Received Data Bit

Parameter number	000394
Parameter name	Serial port application 4: length of sent and received data bit
Data type	UNIT1

Valid range	5 to 8
Default value	8
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of data bit of serial port, in the unit of bit.

2.106 Serial Port Application 4: Stop Bit

Parameter number	000395
Parameter name	Serial port application 4: stop bit
Data type	INT4
Valid range	1 to 2
Default value	1
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of stop bit of serial port, in the unit of bit.

2.107 Serial Port Application 4: Parity Bit

Parameter number	000396
Parameter name	Serial port application 4: parity bit
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of parity bit of serial port, in the unit of bit.

0: There is no parity bit;

1: Odd check bit;

2: Even check bit.

2.108 Serial Port Application 4: Baud Rate

Parameter number	000397
Parameter name	Serial port application 4: baud rate
Data type	INT4
Valid range	300 to 115200
Default value	9600
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the data transmission rate of serial port. The same baud rate must be set both on system end and serial port end.

2.109 Serial Port Application 5: Serial Port Hardware Type

Parameter number	000398
Parameter name	Serial port application 5: serial port hardware type
Data type	INT4
Valid range	0-10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Serial port function is turned off

1: SYGOLE RFID tool management

2: BALLUFF RFID tool management

5: Digital display MPG

6: DNC transmission

2.110 Serial Port Application 5: Serial Port No.

Parameter number	000399
Parameter name	Serial port application 5: serial port No.
Data type	UNIT1

Valid range	0 to 1000
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set serial port type and serial port number. The value /100 indicates the serial port type, and the value of %100 indicates the serial port number.

0 to 99 represent ordinary serial ports COM1 to COM100;

100 to 199 represent USB

2.111 Serial Port Application 5: Length of Sent and Received Data Bit

Parameter number	000400
Parameter name	Serial port application 5: length of sent and received data bit
Data type	UNIT1
Valid range	5 to 8
Default value	8
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of data bit of serial port, in the unit of bit.

2.112 Serial Port Application 5: Stop Bit

Parameter number	000401
Parameter name	Serial port application 5: stop bit
Data type	INT4
Valid range	1 to 2
Default value	1
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of stop bit of serial port, in the unit of bit.

2.113 Serial Port Application 5: Parity Bit

Parameter number	000402
Parameter name	Serial port application 5: parity bit
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of parity bit of serial port, in the unit of bit.

0: There is no parity bit;

1: Odd check bit;

2: Even check bit.

2.114 Serial Port Application 5: Baud Rate

Parameter number	000403
Parameter name	Serial port application 2: baud rate
Data type	INT4
Valid range	300 to 115200
Default value	9600
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the data transmission rate of serial port. The same baud rate must be set both on system end and serial port end.

2.115 Check for Upgrade at Power-on

Parameter number	000404
Parameter name	Check for upgrade at power-on
Data type	INT4
Valid range	0 to 2

Default value	1
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: System doesn't check for new version;

1: Check for new version at power-on, and prompt users once;

2: Check for new version at power-on, and prompt users to upgrade every time.

Note

Enter the highest permission at the time of manual check. In Maint-System upgrade-Upgrade network-Version check, if there is an available version, the upgrade pack version, size and features will be displayed, and remote upgrade is available.

2.116 Cloud Communication Network Card SN

Parameter number	000405
Parameter name	Cloud communication network card SN
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set local network card:

0: Local network card is eth0;

1: Local network card is eth1.

2.117 Confirmation for MDI

Parameter number	000406
Parameter name	Confirmation for MDI
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC

Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: After editing on MDI interface, can cycle start directly;

1: After editing on MDI, must press "confirm" to cycle start.

2.118 FS Display Mode

Parameter number	000408
Parameter name	FS display mode
Data type	HEX4
Valid range	0x0-0xF
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

To set the display of feedrate as well as command speed and actual speed when a spindle is configured in the channel, only for lathe.

n0x01: F actual, displayed as command value

n0x02: F command, displayed as actual value

n0x04: S actual, displayed as command value

n0x08: S command, displayed as actual value

2.119 Bus Alarm Mask

Parameter number	000409
Parameter name	Bus alarm mask
Data type	HEX4
Valid range	0x0 to 0xF
Default value	0x0
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set bus mask by bit. 0: Off; 1: On

Bit 0: Virtual device (turned on by default);

Bit 1: NCUC bus;

Bit 2: ECAT bus;

Bit 3 M3 bus

For example, if 6 (0110 in binary) is set, NCUS bus and ECAT bus are selected. If NCUC bus is normal, and ECAT is not connected, then ECAT alarm will be issued.

2.120 UM Mode Input

Parameter number	000410
Parameter name	UM mode input
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

2.121 Cancel Pop-up Window with Reset

Parameter number	000411
Parameter name	Cancel pop-up window with reset
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When there is a pop-up window, press Reset button to close the window.

2.122 Net Port 1: Default Gateways 1 to 4

Parameter number	000417 to 000420
Parameter name	Net port 1: default gateways 1 to 4
Data type	UINT1
Valid range	0 to 255
Default value	192/168/1/11

Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used to set the default gateway of net port 1.

2.123 Net Port 1: Subnet Masks 1 to 4

Parameter number	000421 to 000422
Parameter name	Net port 1: subnet masks 1 to 4
Data type	UINT1
Valid range	0 to 255
Default value	255/255/255/0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the default network mask of net port 1.

2.124 Net Port 1: Local Port Number

Parameter number	000425
Parameter name	Net port 1: local port number
Data type	INT4
Valid range	0 to 65535
Default value	10001
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Port address of network port 1. This parameter is used when PC is connected, and it is 10001 by default. The settings on software during sampling and PLC online debugging must be the same with this parameter.

2.125 Net Port 1: Static IP/Dynamic IP

Parameter number	000426
Parameter name	Net port 1: static IP/dynamic IP
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

IP address is a fixed value or is automatically obtained dynamically.

0: Static IP

1: Dynamic IP

2.126 Ultrasonic Function

Parameter number	000427
Parameter name	Ultrasonic function
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disable ultrasonic function;

1: Enable CONFROFE ultrasonic function;

2: Enable RIFA ultrasonic function.

2.127 Measurement Position Type

Parameter number	000428
Parameter name	Measurement position type
Data type	INT4
Valid range	0, 1
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Measurement point of general IO or high-speed IO stored by channel variable #1360.

0 (default): Position of general IO measurement point;

1: Position of high-speed IO measurement point.

2.128 Collision Check Interface Display

Parameter number	000429
Parameter name	Collision check interface display
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Milling

Description

After enabling collision check interface and restarting system, “Collision check” menu is displayed on the menu bar under machining main interface.

0: Off;

1: On.

2.129 System Command Increment Cache

Parameter number	000430
Parameter name	System command increment cache
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The parameter is generally set to 0; when feed forward prediction is required, 1 is set.

Note: The scenario where 0 is required includes slave axis following, chip breaking, etc.

2.130 Speed Command Resolution Level Filter

Parameter number	000431
Parameter name	Speed command resolution level filter
Data type	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the threshold of filter:

0: Disable;

1-10: Threshold of resolution.

2.131 Disable Thermal Deformation Real-time Calculation

Parameter number	000432
Parameter name	Disable thermal deformation real-time calculation
Data type	INT4
Valid range	0-2
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Not disable;

1: Disable after cycle start;

2: Disable after executing M400.

2.132 Disable Thermal Error Compensation

Parameter number	000433
Parameter name	Disable thermal error compensation
Data type	INT4

Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Not disable;

1: Disable.

2.133 Auto Permission Logout time

Parameter number	000430
Parameter name	Auto permission logout time (s)
Data type	INT4
Valid range	0-100000
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When current permission is higher than default permission and system has not been operated over the set time, the permission is automatically logged out and set as default permission.

0: Not logged out.

2.134 Bus Reconnection

Parameter number	000435
Parameter name	Bus reconnection
Data type	HEX4
Valid range	0-0x1
Default value	0
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the reconnection of bus, set by bit.

0: Off; 1: On

2.135 G Code Print Type

Parameter number	000436
Parameter name	G code print type
Data type	INT4
Valid range	0-3
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disable the function;

1: Only perform file printout;

2: Perform file printout and the pop-up box displays print content. The pop-up box will be closed automatically;

3: Perform file printout and the pop-up box displays print content. The pop-up box need to be closed automatically.

2.136 G Code Print Pop-up Box

Parameter number	000437
Parameter name	G code print pop-up box
Data type	INT4
Valid range	1-9999
Default value	5
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the pop-up time for the pop-up box when G code print type is 2.

2.137 Language

Parameter number	000438
Parameter name	Language

Data type	HEX4
Valid range	0-0x3
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the language of system. Chinese is the default.

Bit 0: English

Bit 1: Russian

2.138 Diameter Mark Display

Parameter number	000438
Parameter name	Diameter mark display
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether the diameter mark is displayed for the coordinate module.

0: No; 1: Yes

2.139 Display Back Tool on Tool Offset Interface

Parameter number	000440
Parameter name	Display back tool on tool offset interface
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

On tool offset interface, the back tool is,
0: not displayed; 1: displayed

2.140 Go to Current Tool Offset No. when Entering Tool Offset Table

Parameter number	000440
Parameter name	Go to current tool offset No. when entering tool offset table
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When this parameter is enabled, the cursor will automatically go to the position of the current tool offset of tool offset table.

2.141 Confirm Lathe Tool Offset Wear Input

Parameter number	000442
Parameter name	Confirm lathe tool offset wear input
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: When setting tool offset and wear, their values are set directly without confirmation;
1: When setting tool offset and wear, their values need to be manually confirmed.

2.142 Machining Interface Display

Parameter number	000443
Parameter name	Machining interface display
Data type	HEX4
Valid range	0-F

Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the display contents to be added on the machining interface at the time of display switching.

Bit 0: Position view; Bit 1: Absolute coordinate;

Bit 2: Relative coordinate; Bit 3: Machine actual.

2.143 Parameter Consistency Check

Parameter number	000447
Parameter name	Parameter consistency check
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To perform parameter consistency comparison for parameter modification. If the check is not passed, the parameter setting before modification will be restored.

0: Not perform the check ; 1: Perform the check

2.144 Edit Program Display

Parameter number	000448
Parameter name	Edit program display
Data type	HEX4
Valid range	0-0x03
Default value	0x2
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Bit 0: To control the full-screen/semi-screen display of foreground editing

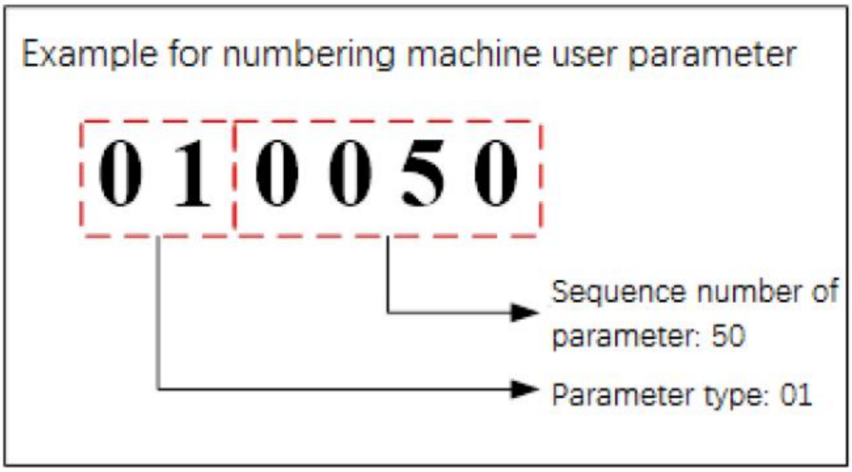
Bit 1: To control the full-screen/semi-screen display of background editing.

3 Machine User Parameter

Explanation on number of machine user parameter:

The first three digits: sequence number of machine user parameter.

The last two digits: parameter type. The type of machine user parameter is 01.



3.1 Maximum Number of Channels

Parameter number	010000
Parameter name	Maximum number of channels
Data type	INT4
Valid range	1 to 4
Default value	1
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the maximum number of channels which the system allows opening. The default setting is 1. When there are two channels, 2 is set.

3.2 Cutting Type of Channel

Parameter number	010001 to 010004
Parameter name	Cutting type of channel 1 to channel 3
Data type	UINT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To specify the type of each workstation.

0: Milling system.

1: Lathe system.

2: Milling-lathe combination system.

Example

A workpiece is to be processed in two workstations: one is for milling, and the other is for turning. Then the parameters can be configured as below:

Parm010001 “Cutting type of channel 0” is set to 0.

Parm010002 “Cutting type of channel 1” is set to 1.

3.3 Channel Display Axis Flag

Parameter number	010017-010023
Parameter name	Channels 0-3 display axis flag【1】
Data type	HEX4
Valid range	0x0 to 0xFFF
Default value	0x7 / 0x0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The axis in each workstation can be displayed selectively on the human-machine interface based on the actual needs.

This group of parameters is effective after being set. Bit 0 to bit 31 represent the selection flags of axis 0 to axis 31 respectively. When the system supports 64 axes at maximum, bit 0 to bit 31 of the extended parameter "Workstation display axis flag 【2】" represent the selection flags of axis 32 to axis 63 respectively. While a display axis is configured with a workstation, the specified bit of the display axis flag in this workstation needs to be set to 1.

Note

This group of parameters is input and displayed in hexadecimal.

Different models of CNC support different maximum numbers of axes. Refer to the CNC specifications manual for details.

Example

Suppose that workstation 1 includes two channels and 10 axes (coordinate axis 0, 2, 4, 5, 6, 7, 8, 10, 13, 17). Only the first 5 axes can be shown on the human-machine interface. At this point, Parm010017 "Workstation 1 display axis flag【1】" is set to 0x75 (It is input in hexadecimal, and bit 0, 2, 4, 5, 6 are set to 1)

3.4 Display Coordinate Axis Dynamically

Parameter number	010041
Parameter name	Display coordinate axis dynamically
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC

Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

By the setting of this parameter, the coordinate of spindle is not shown in the speed mode, but shown after being switched to the position mode.

0：The coordinate of spindle is shown both in speed mode and position mode.

1：The coordinate of spindle is not shown in speed mode, and shown after being switched to the position mode.

Note

Only when logical axis number of spindle exists in PARM010017/010018 “Workstation display axis flag” is this parameter effective.

3.5 Tool Measuring Gauge Type

Parameter number	010042
Parameter name	Tool measuring gauge type
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the type of tool measuring gauge.

0：Contact type, which includes the tool length measurement, and doesn’t include radius measurement.

1：Non-contact type. It is generally the laser measuring device, which can measure both tool length and tool radius.

3.6 Circular Speed Strategy of Radius Compensation

Parameter number	010044
Parameter name	Circular speed strategy of radius compensation
Data type	INT4
Valid range	0 to 29
Default value	0

Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To adjust the circular speed after radius compensation.

0：This function is disabled.

1： The speed after radius compensation = (Circular radius after radius compensation/Circular radius before radius compensation) *Programmed speed.

2：The speed after radius compensation = sqrt(Circualr radius after radius compensation/Circular radius before radius compensation)*Programmed speed.

11 to 19：The speed after radius compensation = Programmed speed*（0.1 to 0.9）

3.7 Radius Compensation=Radius Plus/Minus Wear

Parameter number	010045
Parameter name	Radius compensation=radius plus/minus wear
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0： Radius compensation = The radius value set - Wear value of radius

1： Radius compensation = The radius value set + Wear value of radius

3.8 Radius Compensation Interference

Parameter number	010046
Parameter name	Radius compensation interference
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When an interference of radius compensation occurs,

0：Running stops with an alarm.

1：The interference path is automatically changed to prevent overcutting from occurring. (Interference avoidance function).

3.9 Hard Reset Lag Time (ms)

Parameter number	010048
Parameter name	Hard reset lag time (ms)
Data type	INT4
Valid range	0 to 30000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set delay time of hard reset. After emergency stop is released, system will delay a period to wait until servo and other hardware get ready, then reset software system.

3.10 Maximum Number of Allowable Axes on Machine

Parameter number	010049
Parameter name	Maximum number of allowable axes on machine
Data type	INT4
Valid range	0 to 32
Default value	10
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set how many logical axes can be used on machine.

Example

When this parameter is set to 10, 10 logical axes (axis 0 to axis 9) are allowed to be used on the machine. If another logical axis (the logical axis of which number is larger than 9) is configured to this channel at this point, no control command of this axis will be output.

3.11 Total of PMC and Coupling Slave Axes

Parameter number	010050
Parameter name	Total of PMC and coupling slave axis
Data type	INT4
Valid range	0 to 16
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the total of the PMC axis which is used for auxiliary action and the slave axis in coupling axis.

Note

For different models of CNC systems, the maximum number of controlled axes in a channel may be different. Refer to the CNC specifications manual for details.

Example

If CNC needs to control 2 PMC axes and three pairs of synchronous axes (three slave axes), this parameter will be set to 5.

3.12 PMC and Coupling Slave Axis No.

Parameter number	010051-010082
Parameter name	Number of PMC and coupling slave axes
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The logical number of the PMC axis which is used for auxiliary action and the slave axis in coupling axis.

Note

Effective number of this group of parameters depends on Parm010050 “Total of PMC and Coupling slave axis”.

Example

CNC is configured with three PMC axes (axes 5, 6, 7) and two pairs of synchronous axes of which the salve axes are axis 2 and axis 3 respectively. The parameters can be configured as below:

Parm010050 “Total of PMC and coupling slave axes” is set to 5

Parm010051 “PMC and coupling salve axis No.【0】” is set to 5.

Parm010052 “PMC and coupling slave axis No.【1】” is set to 6.

Parm010053 “PMC and coupling slave axis No.【2】” is set to 7.

Parm010054 “PMC and coupling slave axis No.【3】” is set to 2.

Parm010055 “PMC and coupling slave axis No.【4】” is set to 3.

Parm010056 “PMC and coupling slave axis No.【5】” to Parm010066 “Number of PMC and coupling slave axis【15】” are not effective. Then set them to -1.

3.13 Drilling-tapping Canned Cycle Type

Parameter number	010083
Parameter name	Drilling-tapping canned cycle type
Data type	UINT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets which system's drilling-tapping canned cycle command is compatible.

0：Original

1：SYNTEC

2：MITSUBISHI

3：FANUC

3.14 Peck Tapping/ Deep-hole Tapping

Parameter number	010084
Parameter name	Peck tapping/ Deep-hole tapping
Data type	INT4

Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the tapping mode.

0： Peck tapping. The retract distance is specified by the feed distance in G74 or G84 which is set by the parameter 010087.

1： Deep hole tapping. The tool retreats to R reference level after each tapping.

This parameter takes effect only when the value of Q (feed amount) has been specified in G74 or G84.

3.15 G73 Retract Distance

Parameter number	010085
Parameter name	G73 retract distance
Data type	REAL
Valid range	0 to 99999.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

This parameter is to set the retract distance for high-speed deep-hole drilling cycle G73. The value set by this parameter is equivalent to the variable K in G73 command of CNC system.

3.16 G83 Retract Distance

Parameter number	010086
Parameter name	G83 retract distance
Data type	REAL
Valid range	0 to 99999.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the retract distance for G83 “deep hole drilling cycle”, and the value set by this parameter is equivalent to the variable K in G83 of the CNC system.

3.17 G74/G84 Retract Distance

Parameter number	010087
Parameter name	G74/G84 retract distance
Data type	REAL
Valid range	0 to 9999.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

To set the retract distance in G74/G84 tapping cycle. This parameter is effective only in peck tapping, and the set value is equivalent to the variable K in G74/G84 of the CNC system.

3.18 Tool Offset Direction after Boring Spindle Orientation Stops

Parameter number	010088
Parameter name	Tool offset direction after boring spindle orientation stops
Data type	INT4
Valid range	0 to 5
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

To set the offset direction of tool after the spindle orientation is completed.

0：X+

1：X-

2：Y+

3：Y-

4：Z+

5：Z-

3.19 T Command Control Mode

Parameter number	010089
Parameter name	T command control mode
Data type	HEX4
Valid range	0x0 to 0xFF
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the tool-change mode with T command, and tool machining mode in binary.

Bit 0: When 0 is set, only tool selection function can be enabled by T command, which is used for the magazine with a tool preselection function, such as the arm magazine. When 1 is set, both tool selection and tool change can be enabled by T command, such as the magazine of drilling-tapping center.

Bit 1: when 0 is set, the tool machining mode is turned off. When 1 is set, the tool machining mode is turned on.

3.20 Chip Breaking Machining Acceleration Verification

Parameter number	010090
Parameter name	Chip breaking machining acceleration verification
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

0: Not perform machining acceleration verification;

1: Perform machining acceleration verification.

3.21 #500 to #999 User Macro Variables

Parameter number	010091
Parameter name	#500 to #999 user macro variables
Data type	BOOL

Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set whether the macro variables from #500 to #900 are used as the user macro variables.

0： #500 to #900 cannot be used as user macro variables.

1： #500 to #900 can be used as user macro variables, which work the same with Mitsubishi and FANUC.

Note: No using in V2.42, and it will cause subprogram multi-level nesting after it is enabled.

3.22 Not Refresh Coordinate when C in Speed Mode

Parameter number	010092
Parameter name	Not refresh coordinate when C in speed mode
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether spindle coordinates is refreshed in speed mode.

0：In speed mode, the coordinate value of spindle is refreshed.

1：In speed mode, the coordinate value of spindle is not refreshed.

3.23 Run Preloaded Program before Main Program

Parameter number	010093
Parameter name	Run preloaded program before main program
Data type	HEX4
Valid range	0x0 to 0xF
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_SAVE

Milling/Turning	Turning, milling

Description

To set whether to run the preloading program PRE_RUN.CYC before the loaded program in current channel runs.

0x0: No

0x1: Yes

3.24 Tapping Retract Magnification

Parameter number	010094
Parameter name	Tapping retract magnification
Data type	INT4
Valid range	1-50
Default value	10
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the magnification of retract in G74/G84 tapping cycle, in the unit of 0.1.

Example

When 20 is set, tool retracts at 2.0 times speed. If a value smaller than 10 is set, tool will retract at 1 time speed by default.

3.25 Truss Channel No.

Parameter number	010095
Parameter name	Truss channel No.
Data type	INT4
Valid range	-1 to 4
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the corresponding channel number of the truss channel. 1 is for the channel No. of single-channel lathe truss, and 2 is for the channel No. of dual-channel lathe truss.

3.26 Power-off Time Record Diagnosis

Parameter number	010096
Parameter name	Power-off time record diagnosis
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_RD
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disable the function;

1: Enable the function.

After this function is used, disable it on time; otherwise, it will cause continuous consumption of disk space.

To disable the function, clear the log file starting with ACFAIL in [Manage data] ->[Log].

3.27 G02/G03 Converts to G01 when lack of parameters

Parameter number	010098
Parameter name	G02/G03 converts to G01 when lack of parameters
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to set the processing method when there is no center or radius specified in G02/G03 programming.

0: Alarm

1: Convert to G01

3.28 Enable Big/Small Tool Magazine Management Interface

Parameter number	010099
Parameter name	Enable big/small tool magazine management interface
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

0: The big/small tool attributes setting interface is not enabled

1: The big/small tool attributes setting interface is enabled

3.29 Spindle Type of Gang Drilling Machine

Parameter number	010100
Parameter name	Spindle type of gang drilling machine
Data type	INT4
Valid range	1 to 1999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: There is no gang drill;

1: A spindle pulse gang drill;

2: More than one spindle plus gang drill.

3.30 Start Tool No. of Gang Drill

Parameter number	010101
Parameter name	Start tool No. of gang drill
Data type	INT4
Valid range	0 to 100
Default value	0
Access level	ACCESS_MAC

Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Starting tool No. of gang drill.

3.31 Number of Gang Drills

Parameter number	010102
Parameter name	Number of gang drills
Data type	INT4
Valid range	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Number of drills from the starting tool number for gang drill.

3.32 New Function of Turning Center

Parameter number	010103
Parameter name	New function of turning center
Data type	HEX4
Valid range	0x0 to 0xFFFFFFFF
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The parameter value is displayed in hexadecimal=		
Bit	**Value**	**Function**
0	**0x1**	The interface modification F/S function is turned on, that is, the machining configuration column is displayed
1	**0x2**	The coordinate system superimposition function is effective
0, 1	**0x3**	Turn on interface modification F/S and coordinate system superimposition

2	**0x4**	G97 command is not read ahead
3	**0x8**	Determine the finishing direction of G71
4	**0x10**	Whether to maintain the spindle rpm at constant linear speed when switching to other status in G96 mode
5	**0x20**	M99 workpiece count is turned on
6	**0x40**	Turn on FANUC single block function
7	**0x80**	Turn on the T command of lathe gang tool
8	**0x100**	Enable lathe tool rotation direction control
9	**0x200**	Enable C axis H increment
10	**0x400**	Enable coordinate system modal between program and MDI
11	**0x800**	Function for longitudinal lathe (gang tool, call subprogram by T command)
12	**0x1000**	Both UVW incremental programming and actual UVW exist
13	**0x2000**	Immediately update modification of workpiece zero with lathe tool compensation and wear
14	**0x4000**	Tool compensation and coordinate system modal between program and MDI

Note

1. When the coordinate system is established by the T command after the coordinate system superimposition is turned on, the workpiece zero point is the superimposition of the tool coordinate system and the G5x coordinate system

2. When inputting the precutting diameter and precutting length, the tool offset value is the current actual machine position plus the G5x coordinate system and the external offset zero point.

3. It is not allowed to set F, S through the interface during processing

4. Mask can be used in conjunction with each other. If the F/S function and coordinate system addition function are required, the mask can be set to 0x3.

3.33 New Function Debugging

Parameter number	010104
Parameter name	New function debugging
Data type	HEX4
Valid range	0x0 to 0xFFFFFFFF
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The parameter value is displayed in hexadecimal=		
Bit	**Value**	**Function**
0	**0x1**	Turn on the G68 spatial rotation function
1	**0x2**	Turn on the one-click tool lifting function
2	**0x4**	Allow the line in blue to display the content of the canned cycle. When the canned cycle is running, the interface will display the running position of the internal canned cycle for easy viewing, and when single block mode is allowed, the canned cycle is also executed in single block
3	**0x8**	When it is 1, G91G52 adds to zero point; when it is 0, G91G52 does not add to zero point
7	**0x80**	When this point is in effect, M99 will not produce exact stop
8	**0x100**	When this point is in effect, for example #50100=2, if #50100 is configured as a floating point type, then the type of 2 will be converted to a floating point type. #50100=2.3, if #50100 is configured as an integer, then the type of 2.3 is converted to an integer
9	**0x200**	Synchronous M code is in the same line with the traverse command. If the synchronous M code has no response after the traverse command is executed, a prompt will be given
10	**0x400**	When this point is effective, regardless of scanning G0 or G1 in any line, the execution will move the program position at the G0 speed; if this point is not effective, it will move to the program position with the default value of G01 and channel parameter 04X030; After the two move to the program position, they still restore and return with the original channel modal G0 or G1 and the modal speed value in the channel
11	**0x800**	Enable grinding technology
12	**0x1000**	0: 25M for program editing at the maximum; 0: 50M for program editing at the maximum;
16	**0x10000**	If the point is effective, when exchanging axis with GET and GETD commands, corresponding exchange of coordinate system is performed
17	**0x20000**	When the point is effective, if Z axis is locked, then perform loop await when executing G code line which includes Z axis;
18	**0x40000**	If the point is effective, a syntax alarm is issued when G code line limit is detected
19	**0x80000**	Call subprogram from JOG.CYC manually; otherwise call it form USERDEF.CYC
20	**0x100000**	When the point is effective, if M command doesn’t match S command, an alarm will be issued

21	**0x200000**	Save breakpoint when emergency stop
24	**0x1000000**	Self-adaptive speed control
27	**0x8000000**	In the second execution, return to zero at G00 speed
28	**0x10000000**	Enable line No. synchronization when radius compensation is enabled

3.34 Tool Life Alarm Strategy

Parameter number	010105
Parameter name	Tool life alarm strategy
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to set the alarm strategy when multiple tool life management modes are activated at the same time.

0: Alarm when the life of any management mode exceeds the maximum life.

1: Alarm when the weighted sum of life in all management modes exceeds the maximum life.

3.35 Find One Zero in Incremental Zero Return

Parameter number	010107
Parameter name	Find one zero in incremental zero return
Data type	BOOL
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

After this parameter is enabled, system searches for motor Z pulse in the first zero return after incremental motor is powered on, afterwards, it directly moves to the 0 position of machine coordinate, increasing zero return efficiency.

3.36 Machine Protection Area: Internal Inhibition Mask

Parameter number	010110
Parameter name	Machine protection area: internal inhibition mask
Data type	UINT1
Valid range	0 to 6
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The protected areas can be set for the important parts of machine, such as tail stock, magazine and the like, to avoid a machine damage caused by mis operation. The protected area has two properties (internal property and external property) for user to choose.

This parameter, which takes effect after being set, is to specify the internal property for the protection area of CNC. It is input and displayed in decimal.

For example, if the internal inhibition is used on machine protected-area 0 and 2, this parameter will be set to 5. Meanwhile, this bit of protected area 0 and 2 for the parameter "Machine protection area: external inhibition mask" must be set to 0. Internal inhibition mask and external inhibition mask cannot be set at the same time.

3.37 Machine Protection Area: External Inhibition Mask

Parameter number	010111
Parameter name	Machine protection area: external inhibition mask
Data type	UINT1
Valid range	0 to 63
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Tu	Turning, milling

Description

This parameter, which is valid after being set, is to specify the external property for the protection area of CNC. It is input and displayed in decimal.

For example, if a machine needs to be configured with two machine protection areas on which the external inhibition is used. Machine protection areas 1 and 2 are of external inhibition, this parameter will be set to 6. Meanwhile, the bit of internal inhibition must be set to 0 for the two protection areas.

3.38 Positive/Negative Boundary of Machine Protections Area

Parameter number	010112 to 010123
Parameter name	X, Y, Z positive/negative boundary of machine protection areas【0】to【1】
Data unit	mm or degree
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the negative and positive boundary values for the machine protection area along X-axis, Y-axis and Z-axis.

Note

Note that the positive boundary value must not be set less than the negative boundary value.

Example

A machine needs to be configured with one machine protection area (external inhibition), the following parameters are configured.

Parm010110 "Number of machine protection areas" is set to 1 (machine protection area【0】takes effect);

Parm010111 "Property of machine protection area" is set to 1 (decimal input, and bit 0 is set to 1);

Parm010112 "Negative boundary X of machine protection-area【0】" is set to 10.5;

Parm010113 "Positive boundary X of machine protection area【0】" is set to 40.2;

Parm010114 "Negative boundary Y of machine protection area【0】" is set to 10.0;

Parm010115 "Positive boundary Y of machine protection area【0】" is set to 60.0;

Parm010116 "Negative boundary Z of machine protection area【0】" is set to 15.0;

Parm010117 "Positive boundary Z of machine protection area【0】" is set to 55.0.

3.39 Tool Interference Check

Parameter number	010148
Parameter name	Tool interference check
Data unit	
Data type	INT4
Valid range	0, 1
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Tu	Turning, milling

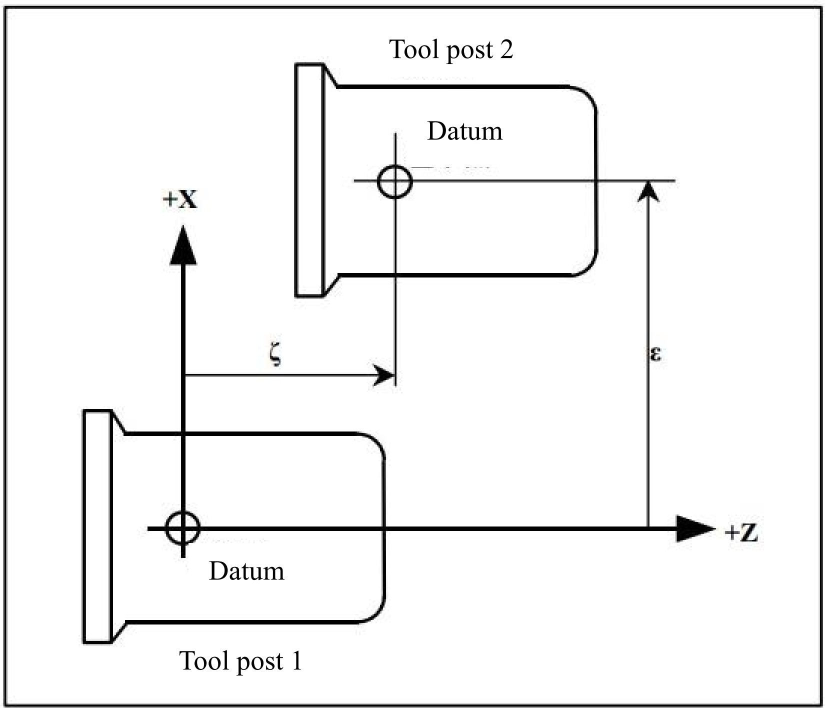
Description

To check whether interference occurs between tools in two channels. If the interference happened, and alarm will be issued and channel axis stops moving.

Note

The data on tool shape interface is relevant with parameter 40127 (starting tool No.), parameter 40128 (number of tools), parameter 60 (number of data-saved tools).

Example



3.40 Distance between Two Tool Post Origins/Tool Interference Direction

Parameter number	010148-010154
Parameter name	Distance between two tool post origins/Tool interference direction
Data unit	mm
Data type	REAL/INT4
Valid range	-21474.0 to 27474
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Tu	Turning, milling

Description

Home two channels first, and set distance between datum points of the two tool posts; set motion relationship between the two tool posts (machine structures of the two channels are consistent, and movement vector of corresponding axes of the two channels are parallel). In positive direction, when the first tool moves close to the second tool in positive direction, it is 1, and when the first tool moves away from the second tool, it is 0.

Parameters 010149,010151,010153: distance between origins of two axes in two channels

Parameters 010150,010152,010154: motion direction between two axes in two channels

Tens	Units
Axis motion relationship in channel 1	Axis motion relationship in channel 0

Parm010148 “Tool interference check” is set to 1

Parm010149 “Distance between two origins X”

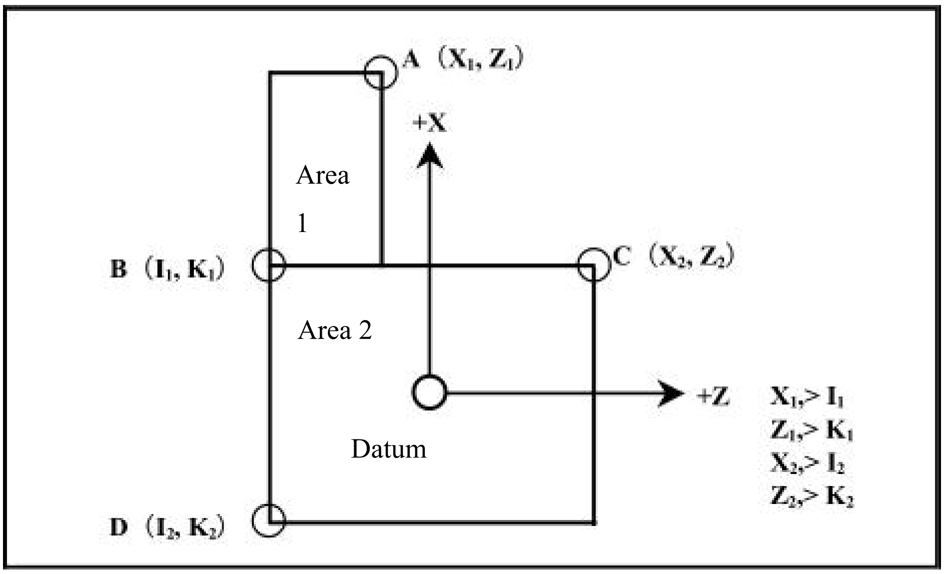
Parm010150 “Two axis moving directions X”

Parm010151 “Distance between two origins Y”

Parm010152 “Two axis moving directions Y”

Parm010153 “Distance between two origins Z”

Parm010154 “Two axis moving directions Z”



The data on tool shape interface is relevant with parameter 40127 (starting tool), parameter 40128 (number of tools), parameter 000060 (number of tools saved).

3.41 F Speed Display in Feed per Revolution

Parameter number	010160
Parameter name	F speed display in feed per revolution
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is to control the display mode of F. This parameter is set to 0 when the feed per minute is used, and the system status bar displays F in feed per minute (mm/min). This parameter is set to 1 when the feed per revolution is used, and the F is displayed in mm/rev.

3.42 Multiple Repetitive Cycle Error Range (0-1mm)

Parameter number	010161
Parameter name	Multiple repetitive cycle Error Range (0-1mm)
Data unit	mm
Data type	REAL
Valid range	0.0 to 1.0
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is special to the G code of FANUC mode, and it functions as a non-monotonic alarm tolerance in Z direction of multiple repetitive cycle.

3.43 Multiple Repetitive Pocket Roughing: Lowest Point

Parameter number	010162
Parameter name	
Data type	BOOL
Valid range	0-1
Default value	0

Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is the special one when G code edit mode is in FANUC which is used for the alarm tolerance when the start point of multiple repetitive cycle is not the highest point.

3.44 Dual Channel Synchronization Mode

Parameter number	010163
Parameter name	Dual channel synchronization mode
Data type	BOOL
Valid range	0-1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

When two channels run a same G code, whether to ensure the synchronization of two channels before interpolation machining (G01, G02), avoiding inconsistent workpiece zero of the two channels and inconsistent spindle speed arrival time.

3.45 Fanuc Command Support

Parameter number	010164
Parameter name	Fanuc command support
Data unit	BOOL
Data type	INT4
Valid range	0x0 to 0xFFFF
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

0x2: The G code is edited in Fanuc mode, and coordinate system addition function is enabled;

0x1: The G code is edited in the original mode

3.46 Time Lag in Reference Point Return

Parameter number	010165
Parameter name	Time lag in reference point return
Data unit	ms
Data type	INT4
Valid range	1 to 10000
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

In reference point return mode 1, reference point return stopper is triggered first, and then axis rotates to look for Z pulse. The axis returns to zero after Z pulse is found. There is lag time in the process. The parameter is to set the delay time from finding the Z pulse to the completion of reference point return in the process of the reference point return.

3.47 Max. Time for Exact Stop Check

Parameter number	010166
Parameter name	Max. time for exact stop check
Data unit	ms
Data type	INT4
Valid range	0 to 5000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the maximum time required to check the tolerance of coordinate axis positioning after the rapid traverse positioning (G00) to a location.

Note

This parameter takes effect only when the parameter of coordinate axis Parm 100060 “positioning tolerance” is not set to 0.

3.48 Max. Time for Synchronous M code Response

Parameter number	010167
Parameter name	Max. time for synchronous M code response
Data unit	ms
Data type	INT4
Valid range	0 to 3000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When synchronization M code is on the same line with traverse command, system check whether the synchronization M code is completed after traverse command is executed. If the M code response signal is not checked in the time specified by the parameter, an alarm will be issued.

3.49 Enable G64 Exact Stop Check at Corner

Parameter number	010169
Parameter name	Enable G64 exact stop check at corner
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether the exact stop check is performed at the corner in G64.

If 1 is set, CNC will enable the function of exact stop check at the corner in G64 modal.

Note

In modal G64, if the lengths of two linear feeds are not longer than 5mm, and the vector angle between them is not larger than 36 degrees, CNC will automatically perform an arc transition without being restricted by this parameter.

3.50 M Codes of G1007-G1020

Parameter number	010170 to 010183

Parameter name	M codes of G1007-G1020
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to manually call the subprogram. When the set M code is called, the user-defined canned cycle corresponding to the parameter will be called. For example, if the M code corresponding to G1007 is set to 44, then the system will call the user-defined canned cycle %1007 when calling M44.

3.51 Max. 3D Radius Error

Parameter number	010218
Parameter name	Max. 3D radius error
Data unit	mm
Data type	REAL
Valid range	0 to 99999.0
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

3D radius compensation error is the difference between the command position after 3D radius compensation and theoretical radius compensation position. When calculated error at the time of 3D radius compensation is larger than the set allowable max. error, system will alarm. If the parameter is not set or set as 0, the default is 1mm.

3.52 3D Radius Compensation Interference Check

Parameter number	010219
Parameter name	3D radius compensation interference check
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC

Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

3D radius compensation interference check is,

0: disabled; 1: enabled

3.53 Channels 1-4: Modal G Display Customization

Parameter number	010220 to 010230
Parameter name	Channels 1-4: modal G command display customization 【1】【2】
Data type	BYRE[8]
Valid range	0 to 127
Default value	1,2,6,8,9,10,11,12 / 13,14,17, 19, 0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Based on the actual needs, the currently used modal G command in each workstation can be displayed selectively.

By setting of the parameter 【1】 and the parameter【2】, up to 16 groups of modal G commands can be displayed in each workstation.

Note

The array parameter supports up to 8 data to be entered simultaneously, and it can be set to a value ranging from 0 to 127.

3.54 System-occupied Program Storage Path

Parameter number	010244
Parameter name	System-occupied program storage path
Data type	STRING [7]
Valid range	Seven characters
Default value	bin
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

- The parameter is to set storage path of G code/canned cycle which has been occupied program number in the system.
- The parameter needs to be used with machine user parameters 010500 to 010539.
- The storage path name should be the combination of letters and numbers (7 characters are supported at the most), and should not include other characters. The name cannot be set as prog; otherwise, it is handled with the default path bin.
- When the parameter is not set, the storage path is bin by default.

3.55 Number of G Code Process Control Command Search Lines

Parameter number	010252
Parameter name	Number of G code process control command search lines
Data type	INT
Valid range	0-100000
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

- The parameter is to set maximum number of G code lines can be searched when searching ENDIF for IF command and ENDW for WHILE command during G code running.
- When the parameter is smaller than 2000, system searches 2000 lines by default.
- When no matches are found within command line, system will alarm.

3.56 Verification

Parameter number	010253
Parameter name	Verification
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When this parameter is set to 1, verification is enabled. Users can press the verification key again to cancel verification and reset.

3.57 Program Management: Enter to Activate Edit

Parameter number	010254
Parameter name	Program management: Enter to activate edit
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

In the Select Program, when this function is enabled, press Enter to enter program edit; after it is disabled, press Enter to load program.

3.58 User Macro Variable Waiting Control

Parameter number	010256
Parameter name	User macro variable waiting control
Data type	HEX4
Valid range	0-0xFF
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether to wait when using user-defined macro variable.

Bit n0: 0: not wait for writing user-defined macro variable; 1: wait for writing user-defined macro variable;

Bit n1: 0: not wait for reading user-defined macro variable; 1: wait for reading user-defined macro variable.

3.59 Subprogram Disabling when Handle Backward

Parameter number	010259
Parameter name	Subprogram disabling when hand backward

Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When handle backward function is enabled, when subprogram is encountered during the execution of main program, advancing or retracting is,

0: not disabled; 1: disabled

3.60 G Code File Key

Parameter number	010299
Parameter name	G code file key
Data type	STRING [7]
Valid range	Seven characters
Default value	123456
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the keys for the computer-encrypted G code. For example, the password for an encrypted G code is 123456. If this parameter is not set to 123456 in CNC, the gibberish will appear when this G code is called.

Refer to the user manual for details.

3.62 Spindle Override

Parameter number	010300-010307
Parameter name	Spindle override [50]-[120]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Override coefficient of spindle speed. 50 indicates that the actual speed is 50% of command speed.

3.62 Feedrate Override

Parameter number	010308-010328
Parameter name	Feedrate override [1]-[120]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Override coefficient of G01 feedrate. 50 indicates that the actual feedrate is 50 % of command speed.

3.63 Machine Lubrication Time

Parameter number	010329
Parameter name	Machine lubrication time (s)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set single continuous oiling time.

3.64 Lubrication Stop Time

Parameter number	010330
Parameter name	Lubrication stop time (s)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0

Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Machine oiling time interval.

3.65 Number of Orientation Position Command Pulses

Parameter number	010332
Parameter name	Number of orientation position command pulses
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set number of orientation position command pulses.

3.66 Lower Panel With/Without MPG

Parameter number	010333
Parameter name	Lower panel with/without MPG
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Lower panel is,

0: without MPG; 1: with MPG

3.67 Lower Panel with MPG: G0 and G1 Share Override

Parameter number	010334

Parameter name	Lower panel with MPG: G0 and G1 share override
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Not share; 1: Share.

3.68 MPG Emergency Stop

Parameter number	010335
Parameter name	MPG emergency stop
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

MPG emergency stop is,

0: disabled; 1: enabled

3.69 Magazine

Parameter number	010336
Parameter name	Magazine
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Control mode of magazine:

0: Count; 1: PMC axis; 2: TDS SANJET

3.70 Spindle Rotatable: Z Limit

Parameter number	010337
Parameter name	Spindle rotatable: Z limit (um)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the lowest Z axis position under the condition that spindle can rotate.

3.71 Magazine Rotatable: Z Limit

Parameter number	010338
Parameter name	Magazine rotatable: Z limit (um)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the lowest Z axis position under the condition that magazine can rotate.

3.72 Workpiece Single-count

Parameter number	010339
Parameter name	Workpiece single-count
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE

Milling/Turning	Turning, milling

Description

To set single count when using workpiece count. When a value smaller than 1 is set, it is regarded as 1.

3.73 Tool Change: 1st Buffer Point

Parameter number	010340
Parameter name	Tool change: 1st buffer point (um)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the first buffer position in the process of tool change.

3.74 Workpiece Count by M64

Parameter number	010341
Parameter name	Workpiece count by M64
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

M code used for the count function:

0: M64; 1: M30

3.75 Tool Position Timing

Parameter number	010342
Parameter name	Tool position timing
Data type	INT4

Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Tool position timing is,

0: disabled; 1: enabled

3.76 Timing Alarm: Min. Time

Parameter number	010343
Parameter name	Timing alarm: min. time (ms)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the smallest time for tool position timing alarm.

3.77 Timing Alarm: Max. Time

Parameter number	010344
Parameter name	Timing alarm: max. time (ms)
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the largest time for tool position timing alarm.

3.78 User Parameter

Parameter number	010345 to 010349
Parameter name	User parameter [45]-[49]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set P variable value in PLC, such as the override value for the spindle speed and feedrate.

User parameter ［45］ to user parameter ［49］ correspond to P45 to P49 in PLC.

3.79 Max. Spindle Speed

Parameter number	010350
Parameter name	Max. spindle speed
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To limit the largest speed of spindle with this parameter.

3.80 Spindle Gear 1: Min. speed

Parameter number	010351
Parameter name	Spindle gear 1: min. speed
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To limit the smallest speed of spindle at gear stage 1with this parameter.

3.81 Spindle Gear 1: Max. speed

Parameter number	010352
Parameter name	Spindle gear 1: max. speed
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To limit the largest speed of spindle at gear stage 1with this parameter.

3.82 Spindle Gear 1: Gear Ratio Numerator

Parameter number	010353
Parameter name	Spindle gear 1: gear ratio numerator
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set numerator of gear ratio when spindle is at gear stage 1.

3.83 Spindle Gear 1: Gear Ratio Denominator

Parameter number	010354
Parameter name	Spindle gear 1: gear ratio denominator
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER

Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set denominator of gear ratio when spindle is at gear stage 1.

3.84 User Parameter

Parameter number	010355 to 010379
Parameter name	User parameter [55]-[79]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set P variable value in PLC, such as the override value for the spindle speed and feedrate.

User parameter ［55］ to user parameter ［79］ correspond to P55 to P79 in PLC.

3.85 Rapid Traverse Override

Parameter number	010380 to 010390
Parameter name	Rapid traverse override [0]-[100]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set override magnification of G00 feed value. 50 indicates the actual speed is 50% of max. speed in rapid traverse.

3.86 User Parameter

Parameter number	010391 to 010440

Parameter name	User parameter [91]-[140]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set P variable value in PLC, such as the override value for the spindle speed and feedrate.

User parameter ［91］ to user parameter ［140］ correspond to P91 to P140 in PLC.

3.87 User Parameter

Parameter number	010462 to 010496
Parameter name	User parameter [162]-[196]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set P variable value in PLC, such as the override value for the spindle speed and feedrate.

User parameter [162] to user parameter [196] correspond to P162 to P196 in PLC.

3.88 User Parameter

Parameter number	010498 to 010499
Parameter name	User parameter [198]-[199]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set P variable value in PLC, such as the override value for the spindle speed and feedrate.

User parameter［198］to user parameter［199］correspond to P198 to P199 in PLC.

3.89 Occupied Program No.

Parameter number	010500 to 010539
Parameter name	Occupied program No.
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To identify the occupied subprogram numbers 1 to 40. This program number should not be used by users for creating G code; otherwise, an alarm will be issued.

3.90 User Parameter

Parameter number	010540 to 010999
Parameter name	User parameter [540]-[1999]
Data type	INT4
Valid range	-2147483647 to 2147483647
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set P variable value in PLC, such as the override value for the spindle speed and feedrate.

User parameter [540] to user parameter [1999] correspond to P540 to P1999 in PLC.

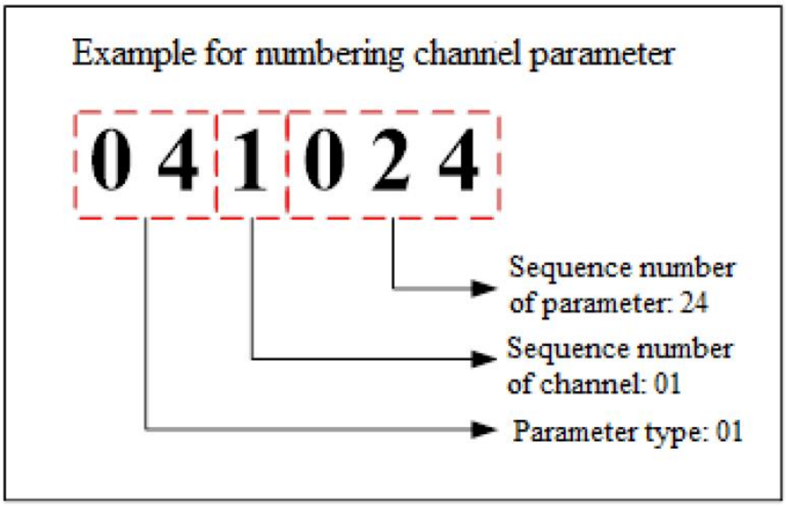
4 Channel Parameter

Explanation on Channel parameter number:

The first two digits: sequence number of channel parameter.

The third number: sequence number of channel

The last two digits: parameter type. The type of channel parameter is 04.



Note: Channel 0 is taken as an example to illustrate the following channel parameters. The third number of the parameter number is 0).

4.1 Channel Name

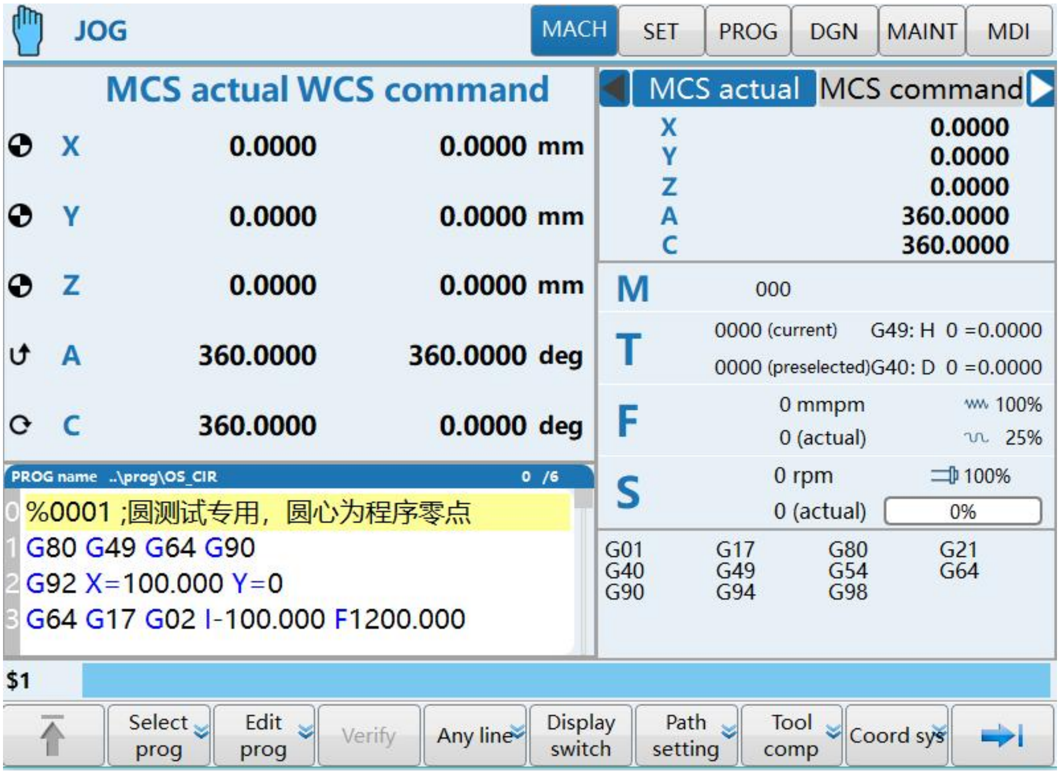
Parameter number	040000
Parameter name	Channel name
Data type	STRING[5]
Valid range	One to four characters
Default value	CH
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set a name for a channel. For example, the name of channel 0 is set to “CH0”, and the name of channel 1 is set to “CH1”.

The status bar on the human-machine interface can show the name of the currently-working channel.

When the channel is switched, the channel name shown on the status bar changes accordingly.



Note

For different types of CNC, the allowable maximum numbers of channels may be different. Refer to the CNC specifications manual for details.

4.2 Coordinate Axis No.

Parameter number	040001 to 040009
Parameter name	X, Y, Z, A, B, C, U, V, W axis No.
Data type	INT1
Valid range	-3 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

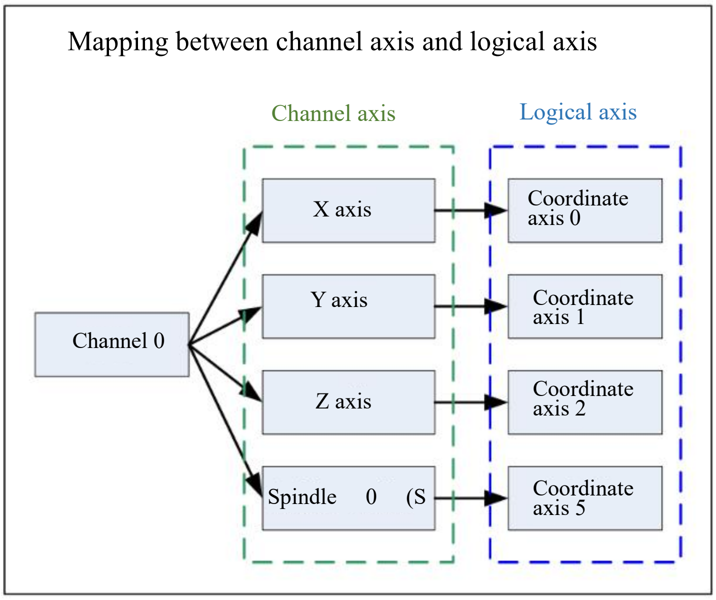
This group of parameters is used to configure the axis number for each feed axis in the current channel, achieving the mapping between feed axis and logical axis.

0 to 127： Number of feed axis in the current channel.

-1： The feed axis in the current channel has no mapping logical axis, and it is an invalid axis.

-2: The feed axis in current channel is reserved for C/S axis switching. In position mode, the axis type is rotary axis after switching.

-3: The feed axis in current channel is reserved for C/S axis switching. In position mode, the axis type is linear axis after switching.



Note

A logical axis can only be assigned to one channel axis (feed axis or spindle) in a channel, and cannot be associated with multiple channel axes.

If a logical axis has been assigned to a common channel, it will not be assigned to a motion control channel again.

4.3 Axis No. of Spindle

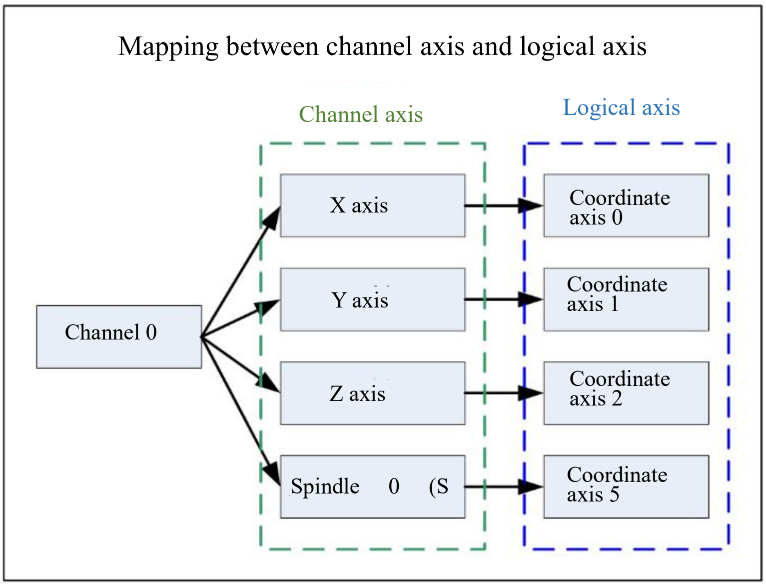
Parameter number	040010 to 040013
Parameter name	Axis numbers of spindles 0, 1, 2, 3
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To configure the axis number for each spindle in the current channel, achieving the mapping between the spindle and the logical axis.

0 to 127：Axis number of spindle in the current channel.

-1：The spindle in the current channel has no mapping logical axis, and it is an invalid axis.



Note

A logical axis can only be assigned to one channel axis (feed axis or spindle) in a channel, and cannot be associated with multiple channel axes.

If a logical axis has been assigned to the common channel, then it will not be assigned to the motion control channel again.

4.4 Programming Name of Coordinate Axis

Parameter number	040014 to 040022
Parameter name	Programming names of X, Y, Z, A, B, C, U, V, W
Data type	STRING[4]
Valid range	One to three characters
Default value	“X”, “Y”, “Z”, “A”, “B”, “C”, “U”, “V”, “W”
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When CNC is configured with multiple channels, users can customize the programming name of coordinate axis to distinguish the axes in each channel at the time of programming.

This group of parameters is to set the programming name of the feed axis in the current channel. The default name is based on the coordinate axis (X, Y, Z, A, B, C, U, V, W) of Cartesian coordinate system.

Example

Channel 0 and channel 1 are configured with coordinate axis X, Y, and Z. For the purpose of distinction, the parameter can be set as below:

CH0

Parm040014 “Programming name of axis X” is set to “X1”.

Parm040015 “Programming name of axis Y” is set to “Y1”.

Parm040016 “Programming name of axis Z” is set to “Z1”.

CH1

Parm041014 “Programming name of axis X” is set to “X2”.

Parm041015 “Programming name of axis Y” is set to “Y2”.

Parm041016 “Programming name of axis Z” is set to “Z2”.

After configuration of parameter takes effect, users can program as follows:

G130 P0；　　　Switch to CH0

G01 X1=100 Y1=70 F500

G130 P1；　　　Switch to CH1

G01 X2=50 Z2=48 F600

……

4.5 Programming Name of Spindle

Parameter number	040023 to 040026
Parameter name	Programming names of spindles 0, 1, 2, 3
Data type	STRING[4]
Valid range	One to three characters
Default value	“S”, “S1”, “S2”, “S3”
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Every channel supports up to 4 spindles. Users can customize the name of spindle in each channel to distinguish the spindles at the time of programming.

Parm040023: Programming name of spindle 0.

Parm040024: Programming name of spindle 1.

Parm040025: Programming name of spindle 2.

Parm040026: Programming name of spindle 3.

Example

Channel 0 is configured with spindle 0 and spindle 1 which named S and S1 respectively. The parameters can be set as below:
Parm40023 “Programming name of spindle 0” is set to “S0”.
Parm40024 “Programming name of spindle 1” is set to “S1”.

After parameter configuration takes effect, users can program as follows:
M3 S=500
M4 S1=1000

4.6 Spindle Speed Display Mode

Parameter number	040027
Parameter name	Spindle speed display mode
Data type	INT4
Valid	0 to 15
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description
This parameter takes effect after being set. It is to specify the speed display mode of the spindle in each channel. Bit 0 to bit 3 respectively correspond to the speed display mode of spindle 0 to spindle 3. When 1 is set, the command speed is displayed; when 0 is set, the actual speed is displayed.

Note
This parameter is input and displayed in decimal.

Example
Channel 0 is configured with spindle 0 and spindle 1 which respectively named S and S1. If the actual speed is to be displayed for spindle S, and the specified speed is to be displayed for spindle S1, this parameter should be set to 2.

4.7 Displayed Axis No. of Spindle

Parameter number	040028
Parameter name	Displayed axis No. of spindle
Data type	BYTE[4]
Valid range	0 to 15

Default value	5
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the logical axis number of the spindle in the current channel. Set the logical axis numbers for all spindles in the current channel. If this parameter is not set, the spindle speed cannot be displayed.

Note

There is no "," on the panel. Therefore, use "." to separate the logical axis numbers.

Example

Channel 0 is configured with spindle 0 and spindle 1 of which the logical axis numbers are 5 and 6 respectively, then this parameter is set to 5.6

4.8 Emergency Stop: Max. Deceleration Time

Parameter number	040029
Parameter name	Emergency stop: max. deceleration time
Data unit	Ms
Data type	INT4
Valid	0 to 5000
Default value	1000
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

A time value (unit: ms) is set by this parameter, the axis will stop within this time when the next emergency stop is pressed. If the time written is too short, the servo will alarm.

4.9 Default Feedrate in Channel

Parameter number	040030
Parameter name	Default feedrate in channel
Data unit	mm/min
Data type	REAL
Valid range	0 to 10000

Default value	1000
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the feedrate is not specified for the program in the current channel, CNC uses the default feedrate set by this parameter to execute the program.

Note

The default feedrate is consistent with the F function added in the program, which is valid for G01 but invalid for G00.

When using the feed per revolution, if the speed is missing, the default feed per revolution is controlled by parameter 040044, and has nothing to do with this parameter.

4.10 Feedrate in Dry Run

Parameter number	040031
Parameter name	Feedrate in dry run
Data unit	mm/min
Data type	REAL
Valid range	0 to 100000
Default value	5000
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

If CNC is switched to dry run mode, the machine will use the feedrate set by this parameter to execute the program.

Refer to User Manual for details.

4.11 Diameter Programming

Parameter number	040032
Parameter name	Diameter programming
Data type	HEX4
Valid range	0-1FF
Default value	0x0

Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	Turning

Description

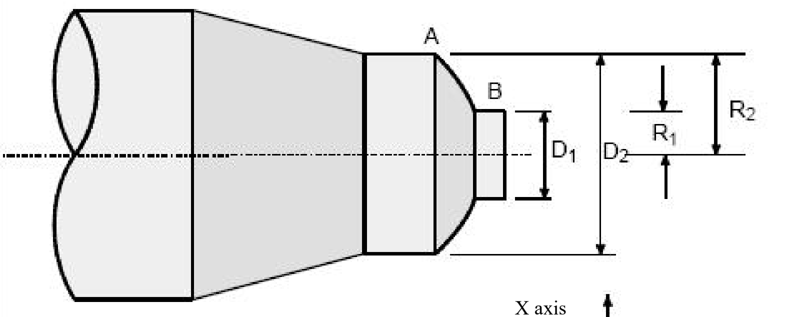
The radial size of the workpiece is usually dimensioned in diameter. Therefore, the program can be documented directly with the marked diameter for convenience. At that point, a programmed unit in diameter is equivalent with the distance the radical feed axis travels in half a unit.

0X0: Programming in radius.

0X1: X-axis diameter programming is turned on.

0X2: Y-axis diameter programming is turned on.

0X3: X,Y-axis diameter programming is turned on.



D1, D2: diameter programming

R1, R2; radius programming

Note

This parameter takes effect only when Parm10001 “Workstation 1 machine type” is set to 1 (lathe);

This parameter works differently from Parm000065 “enable diameter display in lathe”;

When the parameter is enabled and the programming mode is G36, the diameter programming takes effect.

4.12 UVW Incremental Programming

Parameter number	040033
Parameter name	UVW incremental programming
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

UVW command can be used to create the incremental program. U, V and W respectively represent the incremental feed value along axes X, Y, and Z in the channel.

0：UVW command cannot be used for incremental programming.

1：UVW command can be used for incremental programming.

This parameter is generally set to 1 for lathes, and set to 0 for milling machines.

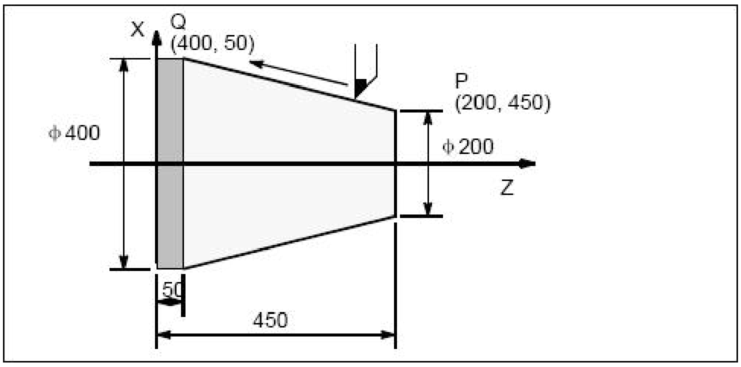
Note

Incremental programming in UVW can only be effective to X, Y, and Z axes in the channel.

Example

Parm040032 “Diameter programming” is set to 1.

Parm040033 “UVW incremental programming” is set to 1.



For the workpiece shown in the above figure, the programmed path from P to Q can be achieved in the following three ways:

G01 U200 W-400 F100

G01 X400 W-400 F100

G01 U200 Z50 F100

4.13 Chamfering

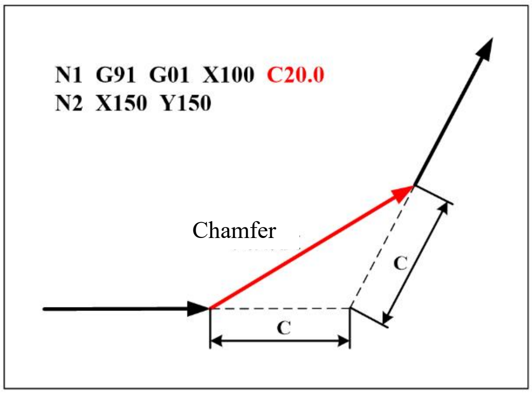
Parameter number	040034
Parameter name	Chamfering
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The support supports the programming for the chamfer and the fillet between the interpolation paths of straight line and straight line, straight line and arc, arc and arc.

0：The chamfering function is disabled.

1：The chamfering function is enabled.



4.14 Angle Programming

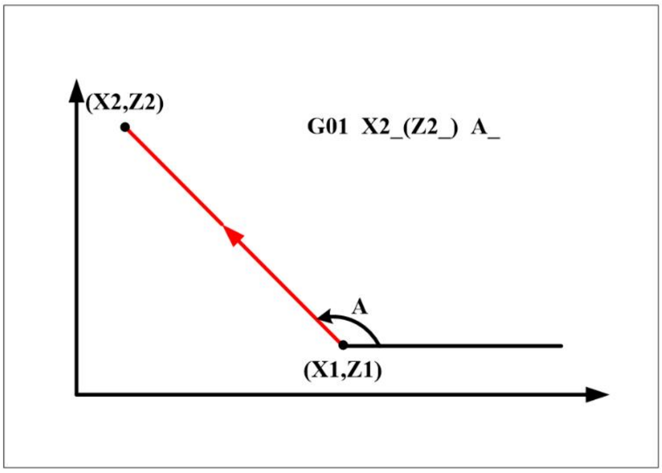
Parameter number	040035
Parameter name	Angle programming
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

For programming convenience, the angle on drawings can be used directly for programming.

0：The angle programming is disabled.

1：The angle programming is enabled.



Note

Angle programming function is generally used for the lathe system.

When this function is used for the milling machines, C and A may be the programming commands of rotary axes. Address characters must avoid any ambiguity.

4.15 Turning Multiple Repetitive Cycle: Shielding Word

Parameter number	040036
Parameter name	Turning multiple repetitive cycle: shielding word
Data type	HEX4
Valid range	0 to FF
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Shielding bit of multiple repetitive cycle:

0x0001: The roughing arc is shielded, and the straight line is used for the arc segment;

0x0002: The alarm of axial margin of pocket is shielded;

0x0004: Finishing is shielded;

4.16 Handwheel Acceleration/Deceleration Time Coefficient

Parameter number	040037
Parameter name	Handwheel acceleration/deceleration time coefficient
Data type	REAL
Valid range	1 to 100.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the movement acceleration by handwheel. Based on the axis parameter “Rapid traverse acceleration/deceleration time constant”, calculate the handwheel acceleration/deceleration time through the setting of this parameter to change the handwheel acceleration. The formula is:

Converted value of handwheel acceleration/deceleration time = Time constant of rapid traverse acceleration/deceleration * Time constant coefficient of handwheel acceleration/deceleration

Example

The axis parameter “rapid traverse acceleration/deceleration time constant” is set to 8ms, and the corresponding rapid traverse acceleration is 0.2g. When the time constant coefficient of handwheel acceleration/deceleration is 0.25, the converted value of handwheel acceleration/deceleration time is 2ms, and the corresponding handwheel acceleration changes to 1g.

4.17 Handwheel Acceleration/Deceleration Jerk Time Constant Coefficient

Parameter number	040038
Parameter name	Handwheel acceleration/deceleration jerk time constant coefficient
Data type	REAL
Valid range	1 to 100.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the movement jerk by handwheel. Based on the axis parameter “rapid traverse acceleration/deceleration jerk time constant”, calculate the handwheel acceleration/deceleration jerk time through the setting of this parameter to change the handwheel jerk. The formula is:

Converted value of handwheel acceleration/deceleration jerk time = Time constant of rapid traverse acceleration/deceleration jerk * Time constant coefficient of handwheel acceleration/deceleration jerk.

Example

Suppose that the current rapid traverse acceleration is 0.05g (0.49m/s^2), and the axis parameter “time constant of rapid traverse acceleration/deceleration jerk” is set to 64ms, then the rapid traverse jerk is 0.49/0.64≈7.6m/s^3. When the time constant coefficient of handwheel acceleration/deceleration jerk is 2, the converted value of handwheel acceleration/deceleration jerk time is 128ms, and the corresponding handwheel jerk is changed to 3.8 m/s^3.

4.18 Handwheel Machining Speed Coefficient

Parameter number	040039
Parameter name	Handwheel machining speed coefficient
Data type	REAL
Valid range	0.5 to 2.0

Default value	1.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the machining is performed with handwheel, this parameter is used to control the sensitivity of the handwheel. When handwheel speed is certain, the feedrate grows within the override 100% with increasing value set by this parameter. The smaller the value, the smaller the feedrate override.

4.19 Machine Structure Type

Parameter number	040040
Parameter name	Machine structure type
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to describe the structure of machine tool.

0: Rectangular coordinate system machine;

1: General-used 5-axis machine tool

2−: Other machine tools

4.20 Lathe Horizontal/Vertical Graphics

Parameter number	040041
Parameter name	Lathe horizontal/vertical graphics
Data type	UINT1
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the graphic simulation of the lathe.

0: Horizontal lathe

1: Vertical lathe

4.21 Dynamic Display on Coordinate System Interface

Parameter number	040042
Parameter name	Dynamic display on coordinate system interface
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Static display of coordinate system on coordinate system interface;

1: Dynamic display of coordinate system on coordinate system interface.

4.22 Constant Linear Speed: Max. Clamping Speed

Parameter number	040043
Parameter name	Constant Linear Speed: max. clamping speed
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disable; 1: Enable, maximum clamping speed for constant linear speed.

4.23 Default FPR Speed in Channel

Parameter number	040044
Parameter name	Default feed/rev speed in channel
Data type	REAL
Valid range	0.001 to 100

Default value	0.1
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the program running in the channel doesn't specify the speed in feed/rev, the setting of this value is used as the feed/rev speed of system.

Note

The parameter only controls the default F speed when using feed per revolution. The default speed in feed per minute is controlled by parameter 040030.

4.24 Standard Neighborhood Radius

Parameter number	040045
Parameter name	Standard neighborhood radius
Data type	REAL
Valid range	0.0 to 10.0
Default value	1.35
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used to set the neighborhood radius length based on neighborhood speed planning and cannot be changed. It is recommended to use the default value.

Note: For the lathe system, when G64 is used, this value cannot be changed, only the default value can be filled in.

4.25 Single Point Deceleration Angle Factor

Parameter number	040046
Parameter name	Single point deceleration angle factor
Data type	REAL
Valid range	0.5 to 2.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

Along the tool path, when the tangent vector angle value between two adjacent blocks is greater than a certain threshold (the default is 10°), the end point of the block is used as the deceleration point of the end. This parameter is used to adjust the angle determination threshold.

Threshold = 10 * Single point deceleration angle factor

Note: For the lathe system, when G64 is used, this value cannot be changed, only the default value can be filled in.

4.26 Corner Ratio Criterion: Min. Corner Ratio

Parameter number	040047
Parameter name	Corner ratio criterion: min. corner ratio
Data type	REAL
Valid range	1.5 to 10.0
Default value	3.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the determination threshold for the corner ratio of the front and rear ends of the block in the relatively long line segment criterion.

Note: When the lathe uses G64, this value cannot be changed, and only the default value can be filled in.

4.27 Relative Long Line Segment Criterion: Min. Corner Ratio

Parameter number	040048
Parameter name	Relative long line segment criterion: min. corner ratio
Data type	REAL
Valid range	0.0 to 5.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the determination threshold for the corner ratio of the front and rear ends of the block in the relatively long line segment criterion.

Note: When the lathe uses G64, this value cannot be changed, and only the default value can be filled in.

4.28 Criterion Combination Mode

Parameter number	040049
Parameter name	Criterion combination mode
Data type	INT4
Valid range	0x0 to 0x12
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the criterion combination mode and the curvature calculation optimization mode.

Bit 0

0: Corner criterion, relatively long line segment criterion, and inflection point criterion take effect.

1: The relatively long line segment criterion and the inflection point criterion take effect.

2: The relatively long line segment criterion and the corner criterion take effect.

Bit 1

0: Curvature radius calculation mode 1, default mode.

1: Curvature radius calculation mode 2.

Note: When the lathe uses G64, this value cannot be changed, only the default value can be filled in.

4.29 Max. Feedrate Magnification

Parameter number	040050
Parameter name	Max. feedrate magnification
Data type	REAL
Valid range	1.0 to 2.0
Default value	1.2
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to limit the magnification of feedrate override.

4.30 Circular Deceleration Radius

Parameter number	040051
Parameter name	Circular deceleration radius
Data type	REAL
Valid range	0.0 to 9999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When circular radius in program is smaller than this set value, the deceleration is performed to avoid large machine vibration due to sharp turn of trajectory caused by excessively small radius.

4.31 Circular Deceleration Speed

Parameter number	040052
Parameter name	Circular deceleration speed
Data type	REAL
Valid range	0.0 to 999999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

Generally, if the radius of the arc is too small, it needs to be processed to avoid excessive vibration of the machine tool due to the sharp turning of the trajectory. Therefore, when the radius of the arc is a certain small value, the speed reduction processing is required. This parameter sets the speed after the speed reduction is processed. In G05.1Q0 modal, it sets speed at the time of circular deceleration.

4.32 Enable 5-axis IJK Setting

Parameter number	040053
Parameter name	Enable 5-axis IJK setting
Data type	BOOL
Valid range	0, 1
Default value	0

Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

IJK displayed is added for coordinate system.

4.33 G05.1Q1 Circular Deceleration Radius

Parameter number	040054
Parameter name	G0.5.1Q1 circular deceleration radius
Data type	REAL
Valid range	0.0 to 9999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

In G05.1Q1, when circular radius in program is smaller than the set value, the deceleration is performed.

4.34 G05.1Q1 Circular Deceleration Speed

Parameter number	040055
Parameter name	G05.1Q1 circular deceleration speed
Data type	REAL
Valid range	0.0 to 999999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

In G05.1Q1 modal, when circular radius in program is smaller than the set value, the deceleration is performed.

4.35 G05.1Q2 Circular Deceleration Radius

Parameter number	040056

Parameter name	G0.5.1Q2 circular deceleration radius
Data type	REAL
Valid range	0.0 to 9999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

In G05.1Q2 modal, when circular radius in program is smaller than the set value, the deceleration is performed.

4.36 G05.1Q2 Circular Deceleration Speed

Parameter number	040057
Parameter name	G05.1Q2 circular deceleration speed
Data type	REAL
Valid range	0.0 to 999999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

In G05.1Q2 modal, when circular radius in program is smaller than the set value, the deceleration is performed.

4.37 Auto Breakpoint Return Program No.

Parameter number	040059
Parameter name	Auto breakpoint return program No.
Data type	INT4
Valid range	0 to 1999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The program number is the sequence number of the program in USERDEF.CYC. During manual intervention of breakpoint return, the program will be called.

4.38 Merge Technology Parameter in 2nd Machining Code

Parameter number	040067
Parameter name	Merge technology parameter in 2nd machining code
Data type	UINT1
Valid range	0 to 3
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

0: Not merge technique parameter correction command in the loaded second machining code;

1: Merge technique parameter correction command in the loaded second machine code;

2: Merge technique parameter correction command in the loaded second machine code, and not be verified during loading;

3: Merge technique parameter correction command in the loaded second machine code, and not perform verification and program name check.

4.39 Motion Planning Mode

Parameter number	040069
Parameter name	Motion planning mode
Data type	UINT1
Valid range	0 to 2
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

There are motion planning modes for small line interpolation. Only one motion plan mode is in the version 1.1.

4.40 Small Line Segment Length: Upper Limit

Parameter number	040070
Parameter name	Small line segment length: upper limit
Data unit	mm
Data type	REAL
Valid range	0.01 to 20
Default value	1.5
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To be used with the lower limit of small line's length to form the reginal range of the small line spline fitting.

External fitting of the block larger than the length threshold is not performed. Keep the running on a straight line, but internally tangent transition will be performed near the starting and end point of block.

4.41 Exact Stop Corner Threshold

Parameter number	040071
Parameter name	Exact stop corner threshold
Data unit	Degree
Data type	REAL
Valid range	0 to 180
Default value	150
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. Definition of block corner: External angle between two adjacent blocks on moving direction;

2. When block corner is larger than exact stop corner threshold, speed reduces to 0 when program executes the corner to ensure sharp angle;

3. When block corner is smaller than exact stop corner threshold, the internally tangent spline transition at the corner will be performed within tolerance range to ensure continuity of path; meanwhile, the speed at the corner is limited by the curvature of transition spline.

4.42 Internally Tangent Corner Threshold

Parameter number	040072
Parameter name	Internally tangent corner threshold
Data unit	Degree
Data type	REAL
Valid range	1 to 50
Default value	20
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

It is used with exact stop corner to determine the angle range for internally tangent spline between blocks;

1. When external corner of block is larger than the threshold, internally tangent spline transition is directly performed at corner;
2. When external corner of block is smaller than the threshold, system will try to establish external spline fitting first; if the fitting spline is over the contour tolerance, it will come to internally tangent spline transition.
3. Path error of internally spline transition is within the set tolerance of small line segment contour.

4.43 Small Line Segment Path: Allowable Contour Error

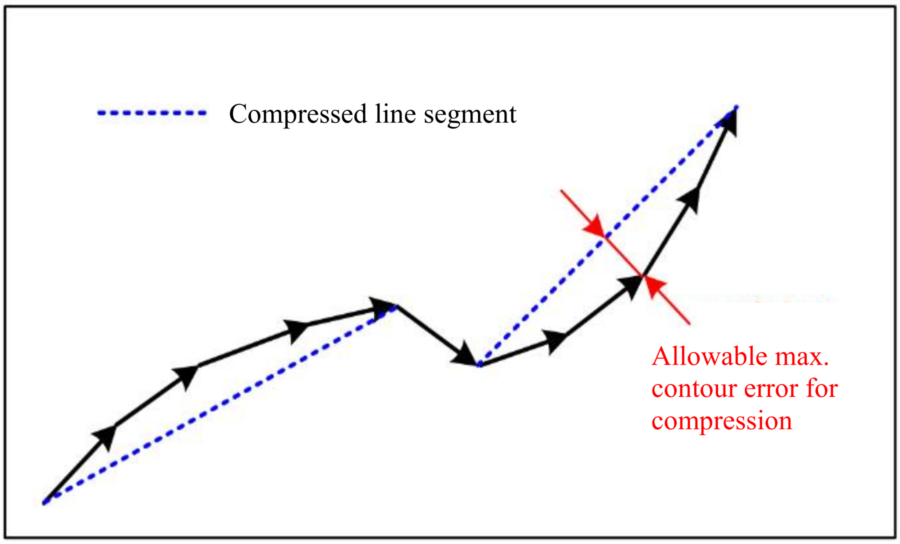
Parameter number	040073
Parameter name	Small line segment path: allowable contour error (mm)
Data unit	mm
Data type	REAL
Valid range	0.001 to 5
Default value	0.01
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. During continuous small line segment interpolation, spline fitting of small line segment can be performed based on the actual programmed path.
2. This parameter is to set the allowable path error between the fit spline and the original programmed path.
3. When the fitting error exceeds the value set by this parameter, the spline is not handled. (Keep straight

line or converts to internally tangent spline transition)

4. Path error of the internally tangent spline transition also meets the set value.



4.44 Deceleration Factor at Corner

Parameter number	040074
Parameter name	Deceleration factor at corner
Data type	INT4
Valid range	1 to 200
Default	100
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. When performing internally tangent spline path transition between blocks, the speed is limited by the curvature of transition spline, and the limit speed at circular transition corner can be controlled by the parameter;

2. The smaller the value is set, the lower the speed at the corner, the more stable the machine runs, the longer running time at the corner, and the efficiency is reduced. The value of 100 indicates the factor is 100%.

4.45 Small Line Segment Length: Lower Limit

Parameter number	040075
Parameter name	Small line segment length: lower limit
Data unit	mm

Data type	REAL
Valid range	0.001 to 1
Default value	0.01
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. To be used with the upper limit of small line's length to form the reginal range of the small line spline fitting.

2. When block length is larger than the set value, system will determine whether to perform external splie based on path tolerance.

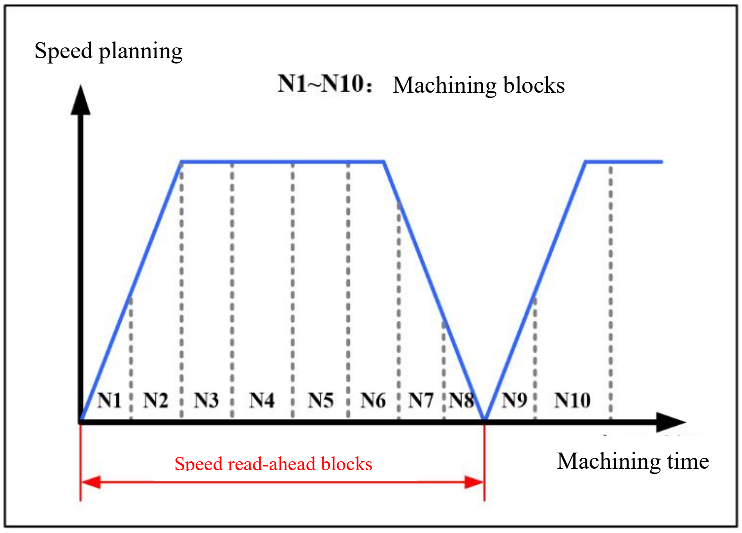
3. When block length is smaller than the set value, system will determine it as a noise segment and make a filtering.

4.46 Number of Read-ahead Blocks

Parameter number	040080
Parameter name	Number of read-ahead blocks
Data type	INT4
Valid range	0 to 500
Default value	200
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the number of program blocks (lines) which is allowed to be read ahead. If the program lines are interpreted in advance, the motion path can be planned early, and acceleration and deceleration can be controlled optimally.



4.47 Speed Fluctuation Range Coefficient

Parameter number	040081
Parameter name	Speed fluctuation range coefficient (mm)
Data unit	mm
Data type	REAL
Valid range	0.0 to 0.3
Default value	0.2
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the allowable speed fluctuation range of speed interval identification;

When the quality of the original path is poor, the larger the set value is, the longer the unit length of the speed. The smaller the set value is, the shorter unit the length of speed

4.48 Number of Command Speed Smoothing Cycles

Parameter number	040082
Parameter name	Number of command speed smoothing cycles
Data type	INT4
Valid range	0 to 100
Default value	20
Access level	ACCESS_NC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

The speed smoothing can achieve command filter smoothing, speed reducing, acceleration fluctuation, machine vibration reducing, and efficiency improving.

The larger the number of command speed smoothing, and more stable the speed, the smaller than machine vibration, by the interpolation path differs more greatly form the programmed path. When the parameter is 0, the function is turned off.

4.49 Centripetal Acceleration

Parameter number	040084
Parameter name	Centripetal acceleration
Data type	REAL
Valid range	1.0 to 10000.0
Default value	500.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. When path curvature is not 0, this parameter limit the feedrate of path;

2. With the same radius of path, the smaller the set centripetal acceleration, the smaller the speed limit of calculation;

3. Conversion formula: Speed limit speed * Speed limit value = Centripetal acceleration * Estimated curvature radius of block

4.50 Machining Acceleration Time Coefficient

Parameter number	040086
Parameter name	Machining acceleration time coefficient
Data type	REAL
Valid range	0.01 to 100.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the acceleration rate of axis in the machining. Based on the axis parameter “time constant coefficient of machining acceleration/deceleration”, calculate the machining acceleration/deceleration time to change the acceleration. The formula is:

Converted value of machining acceleration/deceleration time = Time constant of machining acceleration/deceleration * Time constant coefficient of machining acceleration/deceleration

Example

The time constant of machining acceleration/deceleration is set to 8ms, and the corresponding acceleration is 0.2g. When time constant coefficient of machining acceleration is 0.4, the converted value of machining acceleration/deceleration time is 4ms, and the corresponding acceleration is changed to 0.5g.

4.51 Machining Jerk Time Coefficient

Parameter number	040087
Parameter name	Machining jerk time coefficient
Data type	REAL
Valid range	0.01 to 100.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the jerk in the machining. Based on the axis parameter “time constant of machining acceleration/deceleration jerk”, calculate the machining acceleration/deceleration jerk time through this parameter to change the machining jerk. The formular is:

Converted value of machining jerk time = Time constant of machining acceleration/deceleration jerk * Machining acceleration time coefficient

Example

Suppose that the current machining acceleration is 0.05g (0.49m/s^2). The axis parameter “time constant of machining acceleration/deceleration jerk” is set to 64ms, then the jerk is 0.49/0.64≈7.6m/s^3. When machining acceleration jerk time coefficient is 0.5, the converted value of machining acceleration/deceleration jerk time is 32ms, and the corresponding jerk is changed to 15.2m/s^3.

4.52 Self-adaptive Centripetal Acceleration

Parameter number	040088

Parameter name	Self-adaptive centripetal acceleration
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0：Self-adaptive centripetal acceleration is disabled.

1：Self-adaptive centripetal acceleration is enabled.

Note: When it is enabled, the centripetal acceleration in the section 4.51 is determined by the smallest one of all logical axis acceleration.

4.53 Max. Angle threshold for Collinearity Determination

Parameter number	040089
Parameter name	Max. angle threshold for collinearity determination (degree)
Data type	REAL
Valid range	0.001 to 3.0
Default value	0.1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the maximum external angle for determining two adjacent line segments to be collinear. When the external angle is less than this value (angle), the two line segments are determined to be collinear, otherwise not collinear.

Note

The parameter cannot be set to 0 in rigid tapping.

4.54 Cylindrical Interpolation: Rotary Axis No.

Parameter number	040090
Parameter name	Cylindrical interpolation: rotary axis No.
Data type	INT4
Valid range	-1 to 127

Default value	5
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

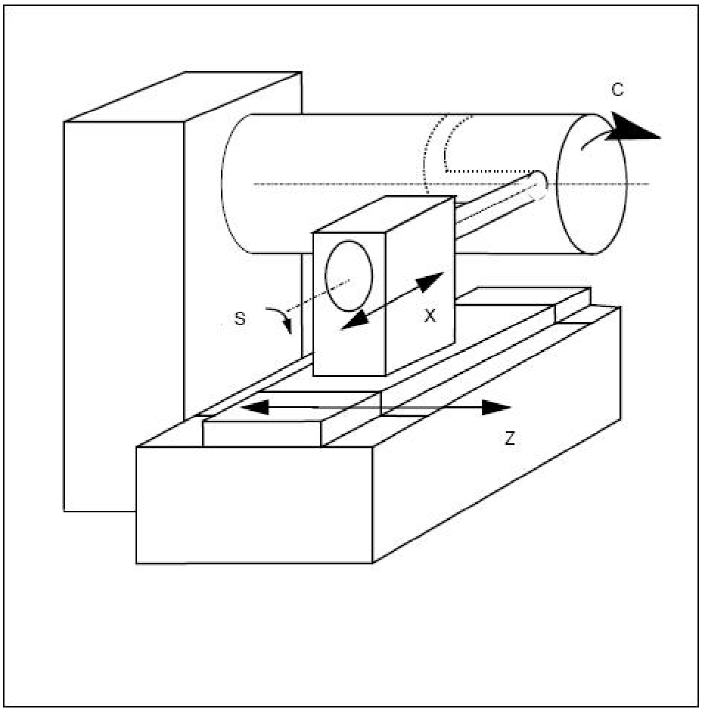
Cylindrical interpolation converts the movement amount of the rotary axis specified with angle to the movement amount along the circumference, and performs linear interpolation and circular interpolation between the expanded cylindrical surface and other axes. It is mainly used for groove milling.

This parameter specifies the number of the rotation axis for cylindrical interpolation. The default value is the rotary axis C, as shown in the figure below.

If users want to specify cylindrical interpolation, in addition to this parameter, users also need to specify two other parameters:

Parm040091 "Linear axis number of cylindrical interpolation " and Parm040092 "Parallel axis number of cylindrical interpolation ".

The default values of these two parameters are Z axis and Y axis respectively, as shown in the figure below.



Note

When performing cylindrical interpolation, users also need to pay attention to programming restrictions. For details, please refer to the Interpolation Function Chapter of "Programming Manual".

4.55 Cylindrical Interpolation: Linear Axis No.

Parameter number	040091

Parameter name	Cylindrical interpolation: linear axis No.
Data type	INT4
Valid range	-1 to 127
Default value	2
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the linear axis number for the cylindrical interpolation. Z axis is the default.

4.56 Cylindrical Interpolation: Parallel Axis No.

Parameter number	040092
Parameter name	Cylindrical interpolation: parallel axis No.
Data type	INT4
Valid range	-1 to 127
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the parallel axis number for the cylindrical interpolation. Y axis is the default.

4.57 Reference Point Return Axis for Lathe Tool Change

Parameter number	040093
Parameter name	Reference point return axis for lathe tool change
Data type	INT4
Valid range	0 to 127
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

This function is used to specify an axis to return to the reference point (the second reference point in the parameter setting) when changing the tool, that is, an axis will return to reference point while the T command in the program is executed.

The value and corresponding function of this parameter are as follows:

0: Reference point return in tool change is turned off.

1 (2^0): Reference point return of axis 0 in tool change.

2 (2^1): Reference point return of axis 1 in tool change.

4 (2^2): Reference point return of axis 2 in tool change.

It can be found that the homing axis number is a power series of 2. In addition, users can also add the values, for example, if set to 3 (2^0+2^1), then the axis 0 and the axis 1 will return to reference point together while changing the tool; if set to 7 ($2^0+2^1+2^2$)

Then the three axes (axes 0, 1, 2) all return to reference point.

Note

The reference point return here is the second reference point return. And the reference point return speed is the rapid traverse speed.

4.58 Power-off: Machine Type

Parameter number	040094
Parameter name	Power-off: machine type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Lathe-mill combo

Description

Parameter used for lathe-mill combination.

After machine is powered on,

0: automatically selected the machine type before power off;

1: select machine type as milling;

2. select machine type as lathe.

4.59 Polar Interpolation: Linear Axis No.

Parameter number	040095
Parameter name	Polar interpolation: linear axis No.
Data type	INT4
Valid range	-1 to 127

Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

Polar coordinate interpolation is a method to control machining path, by which the contour can be directly programmed in the plane, and then the programming path in Cartesian coordinate system is broken up into the actions of linear axis (tool moving) and rotary axis (workpiece rotation). This function is mainly used for milling of the bar end face on the turning center.

This parameter is to specify the number of linear axis in polar coordinate interpolation. The parameters about the polar coordinate interpolation include:

Parm040096 “Rotary axis No. in polar coordinate interpolation”.

Parm040097 “Imaginary axis No. in polar coordinate interpolation”.

Parm040098 “Linear axis coordinate of rotation center in polar coordinate interpolation”.

Parm040099 “Imaginary axis eccentricity in polar coordinate interpolation”.

4.60 Polar Interpolation: Rotary Axis No.

Parameter number	040096
Parameter name	Polar Interpolation: rotary axis No.
Data type	INT4
Valid range	-1 to 127
Default value	5
Access	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

Polar interpolation is a method to control machining path, by which the contour can be directly programmed in the plane, and then the programming path in Cartesian coordinate system is broken up into the actions of linear axis (tool moving) and rotary axis (workpiece rotation). This parameter is to set the number of rotary axis in polar coordinate interpolation.

4.61 Polar Interpolation: Imaginary Axis No.

Parameter number	040097
Parameter name	Polar Interpolation: imaginary axis No.
Data type	INT4

Valid range	-1 to 127
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

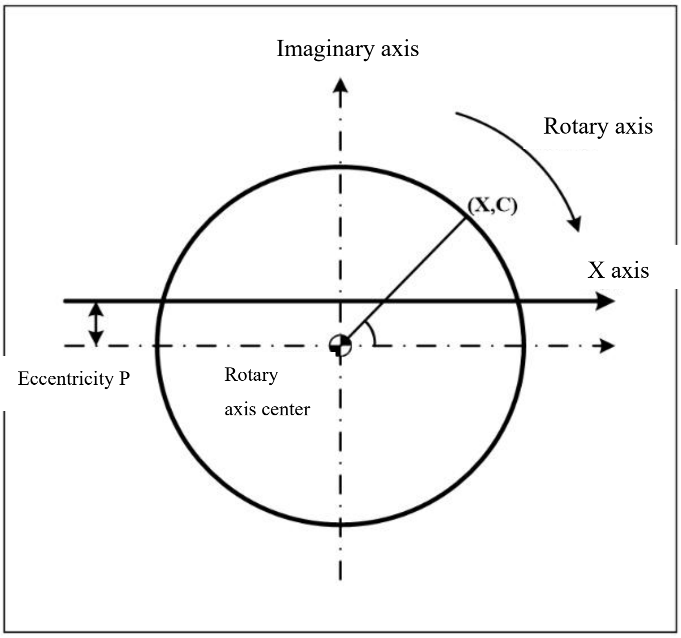
Polar interpolation is a method to control machining path, by which the contour can be directly programmed in the plane, and then the programming path in Cartesian coordinate system is broken up into the actions of linear axis (tool moving) and rotary axis (workpiece rotation). This parameter is to set the axis number of the imaginary axis in polar coordinate interpolation.

4.62 Polar Interpolation: Imaginary Axis Eccentricity

Parameter number	040099
Parameter name	Polar interpolation: imaginary axis eccentricity
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

During polar interpolation, the linear axis may exist deviation (eccentricity) in the direction of imaginary axis, which means that the center of rotary axis is not on the linear axis. At this point the setting of this parameter can compensate for this deviation.



(X,C) The point on the X-C plane (the center of rotary axis is treated as zero of X-C plane).

X X coordinate value on X-C plane.

C Imaginary axis coordinate value on X-C plane.

P Eccentricity in the direction of imaginary axis.

4.63 Pole Processing Mode

Parameter number	040100
Parameter name	Pole processing mode
Data type	INT4
Valid range	1 to 3
Default value	1
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

There are three processing modes for polar coordinate interpolation passing poles

1: Alarm

2: Pass poles along the linear axis

3: Rotary axis rotates 180 degrees at the pole

4.64 Number of Tools on Spindle

Parameter number	040101
Parameter name	Number of tools on spindle

Data type	INT4
Valid range	1 to 2
Default value	2
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

1: F, S, T interface display mode is lathe interface;

2: Both lathe tool and milling tool are displayed in T area, but only when the lathe-mill combo system is used, the display takes effect.

4.65 Dynamic Axis Switching Mask

Parameter number	040102
Parameter name	Dynamic axis switching mask
Data type	HEX4
Valid range	0x0 to 0xFF
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set based on axis to be switched.

For example, 0x1 is for XZ switching; 0x2 is for YZ switching.

4.66 Thread Infeed Max. Proportion

Parameter number	040103
Parameter name	Thread infeed max. proportion
Data type	REAL
Valid range	0.0-10.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

4.67 G94/G95 Modal Setting at Power-on

Parameter number	040104
Parameter name	G94/G95 modal setting at power on
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

When 1 is set, G95 feed per revolution is the default at the time of system power on; when 0 is set, G94 feed per minute is the default at the time of system power on. If G94 or G95 is set in the program, then the setting in the program shall prevail.

4.68 G96 Min. Speed

Parameter number	040105
Parameter name	G96 min. speed
Data type	REAL
Valid range	0.0-9999.0
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Allowable error for starting point of thread. With this parameter, offset angle of each axis can be changed at the time of multi-start thread machining. The angular offset of each starting point is calculated by dividing 360° of number of spirals.

4.69 UVW Imaginary Axis Mask in G94.2

Parameter number	040106
Parameter name	UVW imaginary axis mask in G94.2
Data type	HEX4
Valid range	0-7
Default value	0

Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

UVW axis programming is not supported in G94.2, and only UVW imaginary axes are supported. This parameter is to set mask of UVW imaginary axes.

4.70 G61/G64 Modal by Default

Parameter number	040107
Parameter name	G61/G64 modal by default
Data type	BOOL
Valid range	0, 1
Default value	Lathe:0; Milling machine: 1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

After the power is on, the default is G61 exact stop or G64 continuous cutting.

0: G61 exact stop.

1: G64 continuous cutting.

4.71 G01/G00 Modal by Default

Parameter number	040108
Parameter name	G01/G00 modal by default
Data type	BOOL
Valid range	0, 1
Default value	Lathe:0; Milling machine: 1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Default G01/G00 modal setting: 0 is set for G01, and 1 for G00.

4.72 Enable Z Pulse Search in G28

Parameter number	040110
Parameter name	Enable Z pulse search in G28
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether Z pulse is searched or not while reference position return is being performed by G28 command.

0: Z pulse search is not performed.

1: Z pulse search is performed.

Note

This parameter is only for incremental motors, and must be set to 0 for absolute motors. Both 0 and 1 of this parameter can work on incremental motors.

4.73 G28/G30 Positioning Rapid Traverse Selection

Parameter number	040111
Parameter name	G28/G30 positioning rapid traverse selection
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

After returning to machine reference point with G28 at G01 speed,

0: return to machine zero at G01 speed;

1: return to machine zero at G00 speed.

4.74 G28 Intermediate Point Works One Time

Parameter number	040112

Parameter name	G28 intermediate point works one time
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether the middle point in G28 command can work once (only work on the first G29 command after G28) or several times (the return to the middle point in G28 can be performed several times by G29).

0: The middle point in G28 can work several times.

1: The middle point in G28 only works one time.

4.75 Any Line Mode Selection

Parameter number	040113
Parameter name	Any line mode selection
Data type	UINT1
Valid range	0-3
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set how the command of any line is performed.

0：Non-scanning mode. The command before the targe line shall not yield modality.

1：Scanning mode without Z-axis return. The command before the targe line shall yield modality, but the modal motion command of Z axis shall not be inherited.

2：Scanning mode with Z-axis return.

Note

If circular interpolation command is in the target line which executes the command of any line, the circular interpolation parameter error will be given by system, unless the current coordinate is at the start point of the circular interpolation.

4.76 Axis In-position Order in Any Line

Parameter number	040114
Parameter name	Axis in-position order in any line
Data type	INT4
Valid range	0~999999999
Default value	211
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the sequence in which the axis moves. This parameter is the numerical parameter, and the numeric value is XYZABCUVW from low to high. The setting of 0 indicates that the axis configuration is not performed.

Example

For milling system, 040114=211: Axes X and Y move in place, and then axis Z starts to move.

For lathe system, 040114=101: Axes X and Z move to the position simultaneously.

4.77 G00 Jerk Type

Parameter number	040117
Parameter name	G00 jerk type
Data type	INT4
Valid range	0-2
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used when G00 type is 0.

0: Linear jerk;

1: Sine jerk;

2: Triangle jerk.

4.78 MPG Jerk Type

Parameter number	040118

Parameter name	MPG jerk type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Linear jerk;

1: Sine jerk;

2: Triangle jerk.

4.79 Discretize Arc into Straight Lines

Parameter number	040119
Parameter name	Discretize arc into straight lines
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set whether G02/G03 command is discretized into G01 command for interpolation after preprocessing.

0: No. Perform interpolation based on G02/G03;

1: Yes. G02/G03 is discretized into G01 small line segments based on the setting of parameters 040120 to 040122.

4.80 Discrete Arc: Sagitta Error

Parameter number	040120
Parameter name	Discrete arc: sagitta error
Data type	REAL
Valid range	0.0 to 100.0
Default value	0.005
Access level	ACCESS_NC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To limit the maximum sagitta error between straight line segment and circular path after G02/G03 discretization. The smaller the sagitta error, the higher the discrete path accuracy, and the larger the data size.

4.81 Discrete Arc: Max. Step Length

Parameter number	040121
Parameter name	Discrete arc: max. step length
Data type	REAL
Valid range	0.0 to 100.0
Default value	0.3
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To limit the maximum length of the straight line segment after G02/G03 discretization. The smaller the step length, the higher the discrete path accuracy, and the larger the data size.

4.82 Discrete Arc: Max. Corner

Parameter number	040122
Parameter name	Discrete arc: max. corner
Data type	REAL
Valid range	0.0 to 360.0
Default value	5.73
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To limit the maximum external corner between two adjacent straight-line segments after G02/G03 discretization; the smaller the corner, the higher the discrete path accuracy, and the larger the data size.

4.83 HERMITE Spline Curve: Number of Sampling Points

Parameter number	040123
Parameter name	HERMITE spline curve: number of sampling points
Data type	INT4
Valid range	2 to 100
Default value	80
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

1. Number of sampling points ranges from 2 to 100. The default 80 can meet various of machining requirements. If there is no special requirement, 80 is an optimal value to balance speed optimization and IPC operation load.
2. The greater the number of sampling points and the higher the fitting curve accuracy, the higher the IPC operation load, the smaller the speed fluctuation, and vice versa;
3. It takes effect only when the channel parameter 040610 is set as 0x2 (enable US mapping).

4.84 NURBS Spline Curve: Number of Sampling Points

Parameter number	040124
Parameter name	NURBS spline curve: number of sampling points
Data type	INT4
Valid range	2 to 100
Default value	80
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

1. Number of sampling points ranges from 2 to 100. The default 80 can meet various of machining requirements. If there is no special requirement, 80 is an optimal value to balance speed optimization and IPC operation load.
2. The greater the number of sampling points and the higher the fitting curve accuracy, the higher the IPC operation load, the smaller the speed fluctuation, and vice versa;
3. It takes effect only when the channel parameter 040610 is set as 0x2 (enable US mapping).

4.85 Starting Magazine Number

Parameter number	040125
Parameter name	Starting magazine number
Data type	INT4
Valid range	1 to 32
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the staring number of magazine in the channel (the number of the first magazine). If n is set, then the magazine numbering starts from n. The default value is 1.

4.86 Number of Magazines

Parameter number	040126
Parameter name	Number of magazines
Data type	INT4
Valid range	0 to 32
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the quantity of magazines. The maximum value is 32, that is, up to 32 magazines are supported. The default value is 0.

4.87 Starting Tool Number

Parameter number	040127
Parameter name	Starting tool number
Data type	INT4
Valid range	1 to 1000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE

Milling/Turning	Turning, milling

Description

To set the starting tool number of magazine in the tool compensation table in the current channel, which is used with the channel parameter “Number of tools”.

4.88 Number of Tools

Parameter number	040128
Parameter name	Number of tools
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the quantity of tools in the current channel, and it is consistent with the quantity of tool positions of magazine in the current channel. For example, the starting tool number in channel 0 is set to 1, number of tools is set to 5, the starting tool number in channel 1 is set to 6, and the number of tools is set to 10, then the saved data of tools 1 to 5 in the tool compensation table (for lathe system, tool offset is also included) belongs to the magazine of channel 0, and the saved data of tools 6 to 15 belongs to the magazine of channel 1.

4.89 Tool Life Management

Parameter number	040130
Parameter name	Tool life management
Data type	UINT1
Valid range	0 to 3
Default value	0
Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0：Tool life function is disabled.

1：Tool life function is enabled, and grouping is not supported.

2：Tool life function is enabled, and grouping function is turned on. Tool grouping indicates that the same tools are placed in a group. T command specifies the tool group number when this parameter is set to 2. The tool management selects the tool in the specified group whose life doesn't run out, and outputs a command with a T code signal to load the ignored number of tool life management (channel parameter 040133) together with the group number that users want to specified.

For example: If the ignored number of tool life management is 100, then the first group of tool command is called as T101, and the second group is T102. When Tool number is smaller than the ignored number, the T code is regarded at the usual T code.

3: Tool life grouping is enabled, and grouping is supported. T command specifies the tool number (only for milling machine). Tool management will prioritize the currently specified tool number, and output it as a T code signal. If the currently specified tool number has reached the end of its life, the tool number with the shortest life will be selected from the same group of tools and output as a T code signal.

4.90 Limit and Tool Protection in Protection Area

Parameter number	040131
Parameter name	Limit and tool p`rotection in Protection area
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0： The function of limit and tool protection in protected area is disabled.

1： The function of limit and tool protection in protected area is enabled.

4.91 Distance from Z Tool Protection to Negative Limit

Parameter number	040132
Parameter name	Distance from Z tool protection to negative limit
Data type	REAL
Valid range	0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the distance between tool protection of Z axis and negative limit. When 040131 is enabled and the length compensation is used in the program, the tool nose can be below the negative software limit of Z axis, but cannot be below the specified position which is below the negative software limit of Z axis. Otherwise, an alarm is issued.

4.92 T Command Life Management: Ignored Number

Parameter number	040133
Parameter name	T command life management: ignore number
Data type	INT4
Valid range	0 to 1000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

After the tool grouping function is turned on, T command plus ignored tool number plus tool can be used to call the tool.

For example, if the ignored tool number is 100, T101 is used to call the first group of tool in the current channel.

4.93 Clear Synchronization When Channel Reset

Parameter number	040134
Parameter name	Clear synchronization when channel reset
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

After the synchronization of master and slave axes is established,

0: The synchronization is not cleared after RESET button is pressed;

1: The synchronization is cleared after RESET button is pressed

4.94 Milling Tool Group: Length Compensation

Parameter number	040135
Parameter name	Milling tool group: length compensation
Data type	INT4
Valid range	0 to 1000
Default value	99
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Length compensation number of milling tool group after the tool grouping is turned on.

4.95 Milling Tool Group: Radius Compensation

Parameter number	040136
Parameter name	Milling tool group: radius compensation
Data type	INT4
Valid range	0 to 1000
Default value	99
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Radius compensation number of milling tool group after the tool grouping is turned on.

4.96 Exact Stop Check Mode When G00 is 2

Parameter number	040137
Parameter name	Exact stop check mode when g00 is 2
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

When the parameter is set to 0, the exact stop check is performed based on command position, and the check position tolerance needs to be set by the parameter 040138.
When the parameter is set to 1, the exact stop check is performed based on actual position, and the check position tolerance needs to be set by the logical axis parameter 10x060 positioning tolerance.

4.97 Command Check Tolerance when G00 is 2

Parameter number	040138
Parameter name	Command check tolerance when G00 is 2 (mm)
Data type	REAL
Valid range	0.0 to 1000.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description
When parameter 040137 is set to 0, the parameter is to set the position tolerance of command position in exact stop.

4.98 Parameter Modification Takes Effect Immediately After Single Block Stops

Parameter number	040139
Parameter name	Parameter modification takes effect immediately after single block stops
Data type	BOOL
Valid range	0, 1
Default value	0.
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

4.99 Smoother

Parameter number	040227
Parameter name	Smoother
Data type	INT4
Valid range	0 to 3

Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Tuning, milling

Description

0: Disable the smoother; 1: Enable the smoother.

The smoother can smooth the path rapidly and effectively within the tolerance. Comparing with original machining path, the machining path combined of smoothed command points has more smooth length and angle.

4.100 Smoothing Rate

Parameter number	040229
Parameter name	Smoothing rate
Data type	REAL
Valid range	10.-3.0
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Tuning, milling

Description

The problem of coordinate point fluctuation may exist after path resampling. The smoothing rate can adjust the problem. The larger the set value, the better the smoothing effect, but the more the precision loss, and vice versa.

4.101 Smoothing Hold Angle

Parameter number	040229
Parameter name	Smoothing hold angle
Data type	INT4
Valid range	0 to 90
Default value	20
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Tuning, milling

Description

When external angle of program block is larger than the set value, the path points keep unchanged; when external angle is smaller than the set value, coordinates of block is adjusted within tolerance during smoothing.

4.102 Smoothing Sampling Length

Parameter number	040230
Parameter name	Smoothing sampling length
Data type	REAL
Valid range	0.001 to 1.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Tuning, milling

Description

Reference length of block in sampling at the time of path smoothing. The smaller the set value, the larger number of smoothed blocks, and the less the smoothing rate affects the path; vice versa.

Note: In the system, self-adaptive adjustment of sampling length is performed based on feedrate and path curvature.

4.103 Smoothing Path Accuracy

Parameter number	040231
Parameter name	Smoothing path accuracy
Data type	REAL
Valid range	0.005 to 5.0
Default value	0.01
Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	Tuning, milling

Description

The contour tolerance when processing smoothing. When a smaller value is set, the path is closer to the original path, but the smoothing effect gets worse; vice versa.

4.104 Smoothing: Upper Limit

Parameter number	040232

Parameter name	Smoothing: upper limit
Data type	REAL
Valid range	0.01 to 10.0
Default value	1.5
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The length threshold to determine whether to perform smoothing. When the block length is larger than the threshold, the smoothing is not performed, and the original block is maintained; otherwise, smoothing is performed.

4.105 Smoothing: Noise Filtering Length

Parameter number	040233
Parameter name	Smoothing: P1-P3 noise filtering length
Data type	REAL
Valid range	0.001 to 0.05
Default value	0.01
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the program block length is smaller the set value, system will determine whether to filter the block based on tolerance.

4.106 Smoothing: Tool Axis Vector Hold Angle

Parameter number	040234
Parameter name	Smoothing: tool axis vector hold angle
Data type	INT4
Valid range	1 to 90
Default value	20
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

For multi-axis smoothing, when rotary axis angle in block is larger than the set value, the path points keep unchanged to ensure accuracy; when rotary axis angle in block is smaller than the set vale, smoothing of block is performed, and tool axis is adjusted within setting tolerance during smoothing.

4.107 Smoothing: Tool Axis Vector Accuracy

Parameter number	040235
Parameter name	Smoothing: tool axis vector accuracy
Data type	REAL
Valid range	0.001 to 45
Default value	0.1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

In smoothing of multi-axis path, to set allowed change amount of tool axis in the block which is generated by smoothing sampling; the tool axis vector angle before and after smoothing doesn’t exceed the set value.

4.108 3-point Positioning: Actual Path Error

Parameter number	040252
Parameter name	3-point positioning: actual path error
Data type	REAL
Valid range	0.0 to 100.0
Default value	10.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. Used for three-point positioning function;
2. When the actual measurement position error is larger than the set value, an alarm will be issued;
3. When distance between any two selected points is smaller than the set value, an alarm will be issued;
4. In the triangle made up of three points, when sum of short sides minus long side is smaller than 2 times of set value, an alarm of three collinear points is issued.

4.109 3-point Positioning: Deflection Angle Amplitude

Parameter number	040253
Parameter name	3-point positioning: deflection angle amplitude
Data type	REAL
Valid range	0.0 to 15.0
Default value	3.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. Used for three-point positioning function;

2. If the last three-digit output of G39 (IJK output used for G68.3 E2/E3, that is, coordinate system rotation angle) is larger than the set value, an alarm "tool posture no-solution" is issued.

4.110 3-point Positioning: Pole Transition Mode

Parameter number	040254
Parameter name	3-point positioning: pole transition mode
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Used for three-point positioning function.

0: Reverse ABC at the position of pole based on tool axis, which may cause reverse rotation of rotary axis at the position of pole;

1: Programming ABC is directly used at the position of pole;

2: Deal with ABC by larger circular interpolation.

4.111 Hide Axis on Coordinate System Interface

Parameter number	040264
Parameter name	Hide axis on coordinate system interface
Data type	HEX4

Valid range	0 to 1FF
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set whether hide effective coordinate axes on coordinate system interface.

Bit 0 to bit 8: Channel axes 0 to 8 hiding flag, that is, bits 1to 8 represent axes XYZABCUVW.

1: Hide; 0: Not hide.

4.112 View Selection (Mill)

Parameter number	040265
Parameter name	View selection (mill)
Data type	HEX4
Valid range	0x0 to x0FFFF
Default value	0x0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Tuning, milling

Description

Current graphic view is saved in graphic simulation function.

4.113 User Analog Input Point Offset

Parameter number	040300
Parameter name	User analog input point offset
Data type	INT4
Valid range	0 to 99999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the offset of the user analog input point in the channel.

4.114 User Analog Output Point Offset

Parameter number	040301
Parameter name	User analog output point offset
Data type	INT4
Valid range	0 to 99999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the offset of the user analog output point in the channel.

4.115 Oblique Axis Control

Parameter number	040310
Parameter name	Oblique axis control
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

It is generally used by grinders. The grinding wheel of the grinder is tilted during processing to process the corners of the workpiece.

0: The oblique axis function is turned off;

1: The oblique axis function is turned on.

4.116 Orthogonal Axis Number

Parameter number	040311
Parameter name	Orthogonal axis number
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_NC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The axis number filled in is for the orthogonal axis at the time of tilted machining of grinder, generally the Z axis (axis 2).

4.117 Oblique Axis Number

Parameter number	040312
Parameter name	Oblique axis number
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The axis number filled in is for the oblique axis at the time of tilted machining of grinder, generally the X axis (axis 0)

4.118 Inclination Angle

Parameter number	040313
Parameter name	Inclination angle
Data type	REAL
Valid range	-360.0 to 360.0
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The clockwise angle between the oblique axis and the vertical line, generally a negative value.

4.119 Jog Acceleration Deceleration Time Coefficient

Parameter number	040315

Parameter name	Jog acceleration deceleration time coefficient
Data type	REAL
Valid range	0.1-10
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the acceleration in Jog mode. Take the axis parameter " machining acceleration deceleration time constant" as a datum value, convert the machining acceleration deceleration time through "jog acceleration deceleration time coefficient" to change the acceleration;

The formula: Jog acceleration deceleration converted value = Rapid traverse acceleration deceleration time constant * Jog acceleration deceleration time coefficient

4.120 Tool Radius Compensation Program Number

Parameter number	040330
Parameter name	Tool radius compensation program number
Data type	INT4
Valid range	0 to 1999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Fill in this parameter with the program number of a canned cycle program in a USERDEF file, and the meaning of the G41 command becomes to call this canned cycle.

4.121 Tool Length Compensation Program Number

Parameter number	040331
Parameter name	Tool length compensation program number
Data type	INT4
Valid range	0 to 1999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE

Milling/Turning	Milling

Description

Fill in this parameter with the program number of a canned cycle program in a USERDEF file, and the meaning of the G43 command becomes to call this canned cycle.

4.122 G5X Program Number

Parameter number	040332
Parameter name	G5X program number
Data type	INT4
Valid range	0 to 1999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Fill in this parameter with the program number of a canned cycle program in a USERDEF file, and the meaning of the G54 command becomes to call this canned cycle.

4.123 M00 Program Number

Parameter number	040333
Parameter name	M00 program number
Data type	INT4
Valid range	0 to 1999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Fill in this parameter with the program number of a canned cycle program in a USERDEF file, and the meaning of the M00 command becomes to call this canned cycle.

4.124 Groups 1-3: Electronic Gearbox Master Axis No.

Parameter number	040340/040347/040354

Parameter name	Groups 1-3: electronic gearbox master axis No.
Data type	INT4
Valid range	0 to 64
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

The electronic gearbox function can control the transmission ratio of the synchronous axis through programming, and perform high-precision motion coupling control on the rotary axis and spindle. Through the coordination of programming commands and channel parameters, up to 3 groups (6 axes, including master axes and slave axes) can be controlled.

It can be used for dual-spindle synchronous-workpiece-exchange control, polygon machining, gear hobbing machine and other applications.

This parameter is used to set the default number of the master axis of the first group of electronic gearbox: set the logical axis number of the master axis when the axis synchronization is set.

4.125 Groups 1-3: Electronic Gearbox Salve Axis No.

Parameter number	040341/040348/040355
Parameter name	Groups 1-3: electronic gearbox slave axis No.
Data type	INT4
Valid range	0 to 64
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

This parameter is used to set the default number of the slave axis of the electronic gearbox: set the logical axis number of the slave axis when the axis synchronization is set.

4.126 Groups 1-3: Electronic Gearbox Master Axis Part

Parameter number	040342/040349/040356
Parameter name	Groups 1-3: electronic gearbox master axis part
Data type	REAL
Valid range	-1000.00 to 1000.00

Default value	1.00
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

The default part of electronic gearbox master axis: the numerator of the transmission ratio between master axis and slave axis.

4.127 Groups 1-3: Electronic Gearbox Slave Axis Part

Parameter number	040343/040350/040357
Parameter name	Groups 1-3: electronic gearbox slave axis part
Data type	REAL
Valid range	-1000.00 to 1000.00
Default value	1.00
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

The default part of the first group of electronic gearbox slave axis: the denominator of the transmission ratio between master axis and slave axis.

4.128 Groups 1-3: Electronic Gearbox Synchronization Type

Parameter number	040344/040351/040358
Parameter name	Groups 1-3: electronic gearbox synchronization type
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

The synchronization type of electronic gearbox:

1: Master and slave axes are synchronous based on command.

2: Master and slave axes are synchronous based on actual feedback.

4.129 Groups 1-3: Electronic Gearbox Phase ON

Parameter number	040345/040352/040359
Parameter name	Groups 1-3: electronic gearbox phase ON
Data type	INT
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

Electronic gearbox phase is turned on: to set whether to enable the phase angle synchronization when master and slave axes are synchronous.

0: The phase angle synchronization is turned off;

1: The phase angle synchronization is turned on.

4.130 Groups 1-3: Electronic Gearbox Phase Angle

Parameter number	040346/040353/040360
Parameter name	Groups 1-3: electronic gearbox phase angle
Data type	REAL
Valid range	0.00 to 360.00
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning

Description

The default phase angle of electronic gearbox: to set the phase angle difference when the synchronization of the master and slave axes is enabled.

4.131 Spindle Superimposition: Master Axis No.

Parameter number	040361
Parameter name	Spindle superimposition: master axis No.
Data type	INT4
Valid range	0 to 64

Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

If there are more than two spindles on the machine tool, two spindles are used for tapping actions, spindle 1 does not stop rotating, and spindle 2 performs rotary tapping on spindle 1, at this time, the speed of spindle 2 is equal to the command speed of spindle 2 plus the superimposition speed of spindle 2. The superimposition speed of spindle 2 needs to be synchronized with the command speed of spindle 1, which is the spindle superimposition function.

This parameter is used to set the default logical axis number of the master axis in superimposition tapping.

4.132 Spindle Superimposition: Slave Axis No.

Parameter number	040362
Parameter name	Spindle superimposition: slave axis No.
Data type	INT4
Valid range	0 to 64
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter is used to set the default logical axis number of the slave axis in superimposition tapping.

4.133 Spindle Superimposition Proportion

Parameter number	040363
Parameter name	Spindle superimposition proportion
Data type	INT4
Valid range	-1, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter is to set the directions of slave and master axes when using the superimposition tapping:

1: Slave axis has the same rotation direction and speed with master axis

-1: Slave axis has the same speed with master axis, and slave axis direction is opposite to the master axis direction.

Note: Only 1 and -1 are supported by this parameter; otherwise, an alarm will be generated. The master axis must be spindle, and the slave axis must be the feed spindle.

4.134 VFC Spindle Rigid Tapping: Spindle Acceleration Coefficient

Parameter number	040364/040369/040374/040379
Parameter name	VFC spindle 0 rigid tapping: spindle acceleration coefficient
Data type	REAL
Valid range	0.00 to 1000.00
Default value	0.00
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

This parameter is to set the acceleration coefficient of spindle. It can be calculated by system via “Servo tuning”-“SPD acc/dec”.

4.135 VFC Spindle Rigid Tapping: Spindle Deceleration Coefficient

Parameter number	040365/040370/040375/040380
Parameter name	VFC spindle 0 rigid tapping: spindle deceleration coefficient
Data type	REAL
Valid range	0.00 to 1000.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

This parameter is to set the deceleration coefficient of spindle. It can be calculated by system via “Servo tuning”-“SPD acc/dec”.

4.136 VFC Spindle Rigid Tapping: Spindle Delay Time

Parameter number	040366/040371/040376/040381
Parameter name	VFC spindle rigid tapping: spindle delay time
Data type	REAL
Valid range	0.00 to 10000.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

This parameter is to set the spindle delay time at the time of following tapping mode. It can be calculated by system via "Servo tuning"-"SPD acc/dec".

4.137 VFC Spindle Rigid Tapping: Speed Compensation Coefficient

Parameter number	040367/040372/040377/040382
Parameter name	VFC spindle rigid tapping: speed compensation coefficient
Data type	REAL
Valid range	0.00 to 500.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

This parameter is to set the spindle speed coefficient at the time of following tapping. It can be calculated by system via "Servo tuning"-"VFC rigid tapping".

4.138 VFC Spindle Rigid Tapping: Acceleration Compensation

Parameter number	040368/040373/040378/040383
Parameter name	VFD spindle rigid tapping: acceleration compensation
Data type	REAL
Valid range	-20.00 to 20.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE

Milling/Turning	Turning

Description

This parameter is to set the acceleration compensation value of spindle at the time of following tapping. It can be calculated by system via "Servo tuning"-"VFC rigid tapping".

4.139 5-axis Normal Thermal Error Compensation Type

Parameter number	040384
Parameter name	5-axis normal thermal error compensation type
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The thermal error compensation is used to compensate for the thermal deformation of machine spindle, and the parameter is to set the compensation type.

0: disable thermal error compensation;

1: offset compensation.

Parameters need to be set including:

Parm 040385: 5-axis normal thermal error start temperature

Parm 040386:5-axis normal thermal error number of temperature points

Parm 040387: 5-axis normal thermal error temperature interval

Parm 040388: 5-axis normal thermal error sensor No.

Parm 040389: 5-axis normal thermal error start parameter

The above parameters are used to set thermal error offset table and corresponding temperature sensor. With compensation algorithm, system queries offset table based on current measurement temperature value to calculate thermal error offset K (T).

The compensation axis is Z axis, and the mathematical model of offset compensation is: $Dz = -K(T)$

4.140 5-axis Normal Thermal Error: Start Temperature

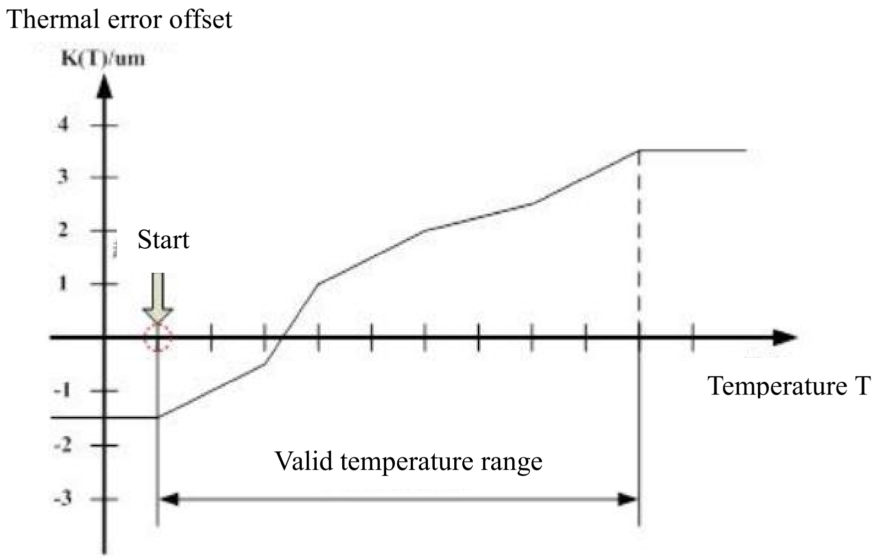
Parameter number	040385
Parameter name	5-axis normal thermal error: start temperature (℃)
Data type	REAL
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The parameter is valid when thermal error compensation type is set to 1.

The 5-axis normal thermal error is obtained by calibrating thermal error offset at equally spaced temperatures. The parameter is to set left boundary of valid temperature range in 5-axis normal thermal error offset table.



Note

When measured temperature value of temperature sensor is smaller than the start temperature specified by the parameter, the thermal error temperature value at the start temperature will be used to establish corresponding thermal error model.

4.141 5-axis Normal Thermal Error: Number of Temperature Points

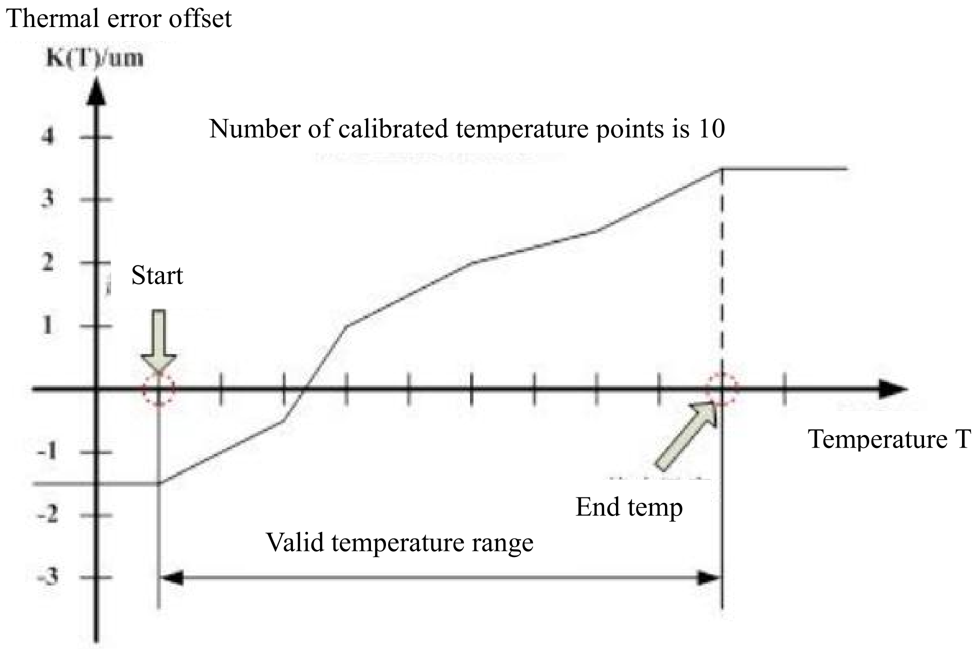
Parameter number	040386
Parameter name	5-axis normal thermal error: number of temperature points
Data type	INT4
Value range	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The parameter is valid when thermal error compensation type is set to 1.

The 5-axis normal thermal error is obtained by calibrating thermal error offset at equally spaced temperatures. The parameter is to set number of temperature points.

The thermal error offset values at the calibrated temperatures are stored in the thermal error offset table. Therefore, number of calibrated temperature points determines length of thermal error table.



Note

Thermal error offset table is invalid when the parameter is set to 0.

4.142 5-axis Normal Thermal Error: Temperature Interval

Parameter number	040387
Parameter name	5-axis normal thermal error: temperature interval (°C)
Data type	REAL
Value range	0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

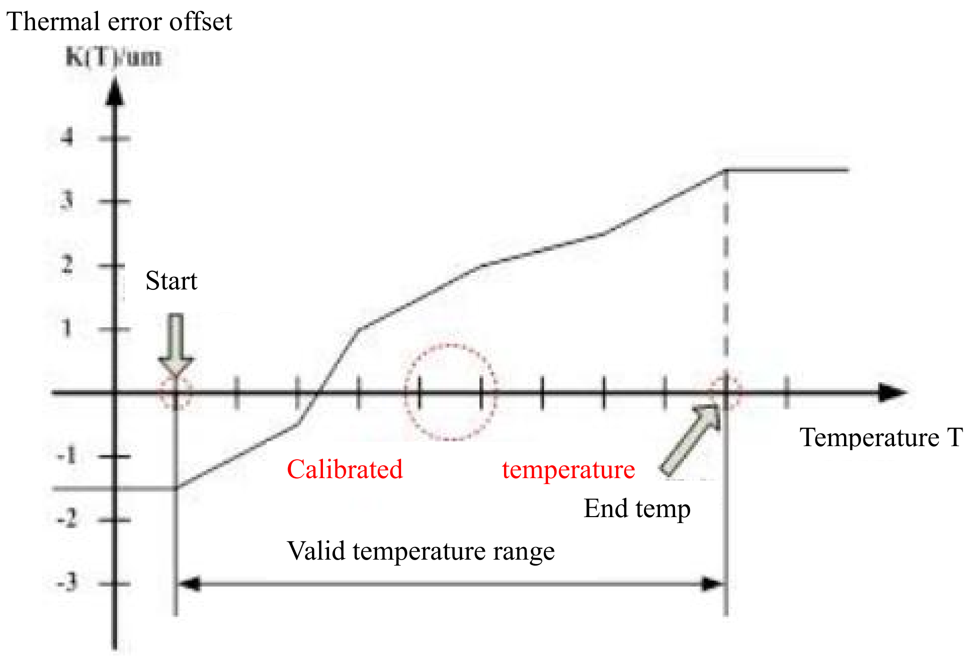
Description

The parameter is valid when thermal error compensation type is set to 1.

The 5-axis normal thermal error is obtained by calibrating thermal error offset at equally spaced temperatures. The parameter is to set interval of calibrated temperature.

After setting 5-axis normal thermal error measured start temperature, measured number of temperature points, and measured temperature interval, the valid temperature range is determined. The formula is as follows:

Measured end temperature = Measured start temperature +(Number of measure temperature points -1) × Measured temperature interval



Note

When this parameter is set to 0, the thermal error offset table is invalid!

When measured temperature value of temperature sensor is larger than the measured end temperature of thermal error offset able, the thermal error offset a the end temperature will be used to establish corresponding thermal error model.

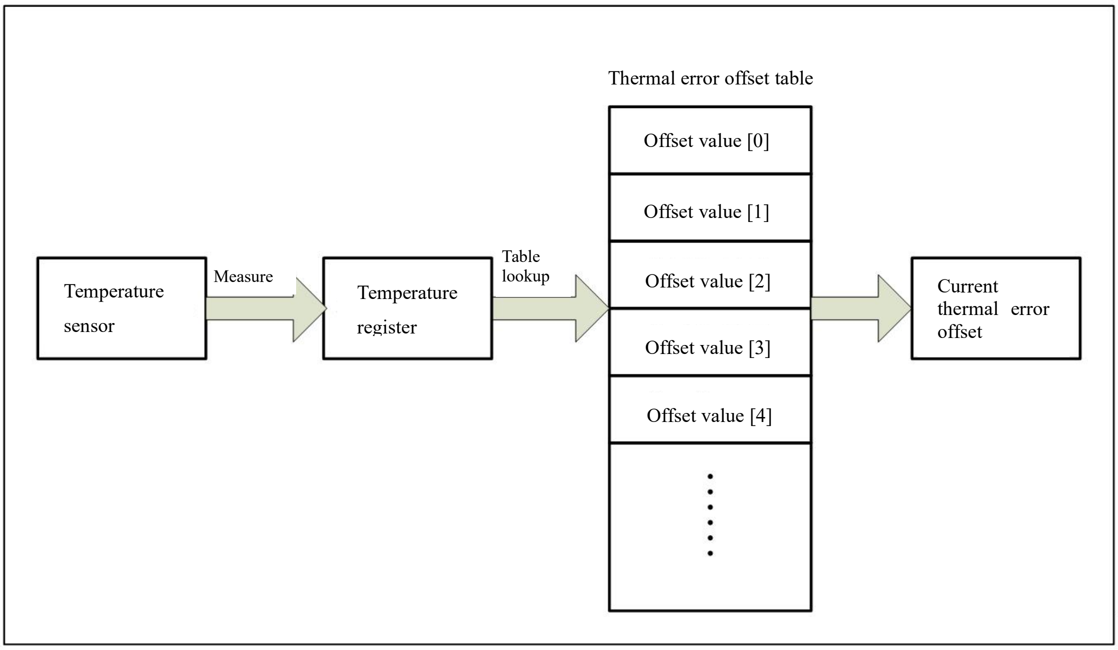
4.143 5-axis Normal Thermal Error: Sensor No.

Parameter number	040388
Parameter name	5-axis normal thermal error: sensor No.
Data type	INT4
Value range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

This parameter is to set the number of temperature sensor which is associated with the current thermal error offset table. The thermal error compensation algorithm queries thermal error offset table based on the temperature (it is stored in the corresponding temperature register) which is measured by this temperature sensor.



Note

Up to 20 temperature sensors can be connected to the system. When the number of temperature sensor is out of range (from 0 to 19), the thermal error compensation is invalid!

4.144 5-axis Normal Thermal Error: Start Parameter

Parameter number	040389
Parameter name	5-axis normal thermal error: start parameter
Data type	INT4
Value range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1.

This parameter is to set the start parameter number of thermal error offset table in data table parameters.

After the start parameter number is set, the storage interval of thermal error offset table in data table parameters is determined. The sequence of thermal error is arranged in order of temperature, from lowest to highest, with this parameter number being the first address.

For linear axis, the thermal error offset value is in the unit of mm; for swivel axis or rotary axis, the unit is degree.

Note

While users are specifying the start parameter of thermal error offset table, avoid an overlap with other data tables which have been used, and the specified storage interval is not allowed to be out of range of data table parameters.

The sign of absolute thermal error offset K(T) is determined by the thermal deformation direction of spindle. For example, for Z axis compensation, if the thermal deformation of spindle is along positive Z axis of machine Cartesian coordinate system, the absolute thermal error offset is positive, otherwise negative.

4.145 5-axis Constant Feed: Interpolation Calculation Mode

Parameter number	040390
Parameter name	5-axis constant feed: interpolation calculation mode
Data type	INT4
Value range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0: Default compositing calculation mode;

1: Constant feed proportion formation.

4.146 5-axis Constant Feed: Acceleration Limit Coefficient

Parameter number	040391
Parameter name	5-axis constant feed: acceleration limit coefficient
Data type	REAL
Value range	0 to 1.0
Default value	0.3
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the acceleration jerk coefficient in speed planning during constant feed machining. The larger the set value, the smaller the acceleration jerk, and the lower the efficiency.

4.147 5-axis Constant Feed: Rotary Axis Travel Coefficient

Parameter number	040392
Parameter name	5-axis constant feed: rotary axis travel coefficient
Data type	REAL
Value range	0 to 1.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the coefficient of rotary axis to the total travel when the interpolation formation mode is set to 2. The larger the set value, the larger the proportion of the rotary axis.

4.148 5-axis Spatial Circular Interpolation Travel Calculation

Parameter number	040393
Parameter name	5-axis spatial circular interpolation travel calculation
Data type	INT4
Value range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the calculation method of speed planning and interpolation travel at the time of spatial circular CIP command machining

0: Default composite calculation method;

2: Constant feed proportion travel calculation.

4.149 5-axis Acceleration Constraint

Parameter number	040394
Parameter name	5-axis acceleration constraint
Data type	INT4
Value range	0, 1
Default value	0

Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to whether to enable acceleration constraint during heavy-duty 5-axis RTCP machining. When 1 is set to enable it, the acceleration can be limited but the efficiency is reduced.

4.150 RTCP Parameter Switching

The 5-axis system supports 4 groups of RTCP functions. RTCP parameters are switched by G145 q command. q ranges from 1 to 4.

G145 q1, group 1 of parameters from 040400 to 040437;

G145 q2, group 2 of parameters from 040450 to 040487;

G145 q3, group 3 of parameters from 040500 to 040537;

G145 q4, group 4 of parameters from 040550 to 040587;

We here take G145 q1 as an example to describe the parameter structure of RTCP functions. Groups 2, 3, 4 of parameters are similar with group 1 of parameters.

4.151 Initial Tool Direction X

Parameter number	040400/040450/040500/040550
Parameter name	Initial tool direction X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set initial direction of tool. If the initial tool direction is parallel with X axis, then set parameters 040401 and 040402 to 0, and 040400 to 1.0

4.152 Initial Tool Direction Y

Parameter number	040401/040451/040501/040551
Parameter name	Initial tool direction Y
Data type	REAL

Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

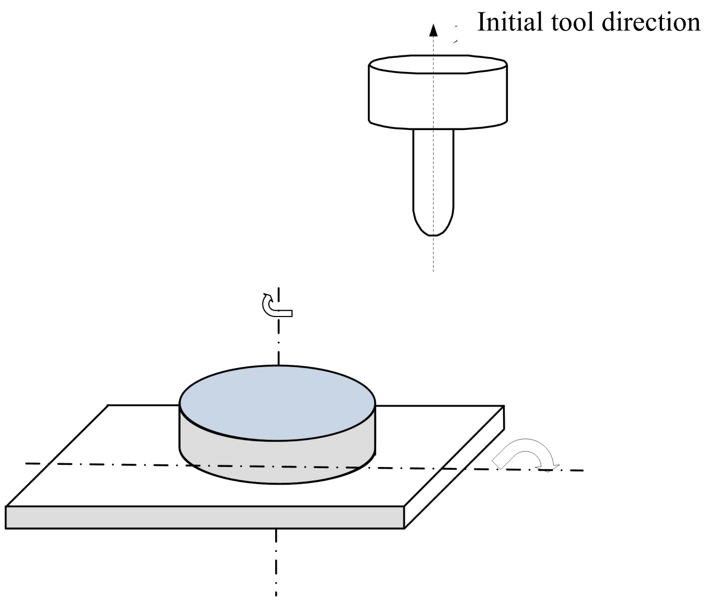
This parameter is to set the initial direction of tool. If the initial direction of tool is parallel with the Y axis, then set parameters 040400 and 040402 to 0, and this parameter to 1.0.

4.153 Initial Tool Direction Z

Parameter number	040402/040452/040502/040552
Parameter name	Initial tool direction Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter is to set the initial direction of tool. If the initial direction of tool is parallel with the Z axis, then set parameters 040400 and 040401 to 0, and this parameter to 1.0.



As shown above, generally, the initial tool direction is parallel with Z axis. Then the parameters are set as following:

Parameter 040400: set to 0.0

Parameter 040401: set to 0.0

Parameter 040402: set to 1.0

4.154 RTCP Tool Setting Mode

Parameter number	040403/040453/040503/040553
Parameter name	RTCP tool setting mode
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

System provides two tool setting modes for users: tool setting of spindle end face and tool setting of tool nose.

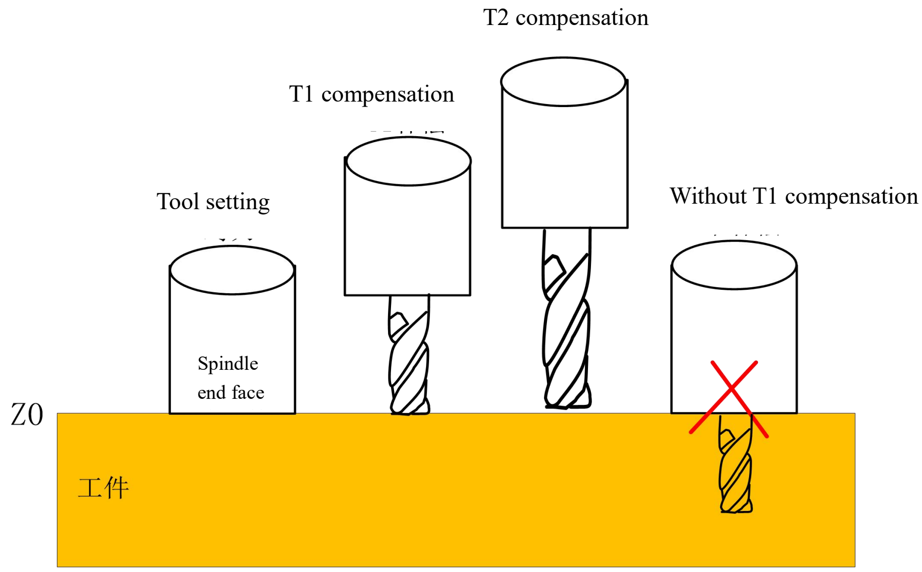
- Tool setting of spindle end face

The setting of 0 indicates the tool setting of spindle end face. After tool setting is completed on Z, it is necessary to offset a tool length in the negative direction, and set the spindle end face as the workpiece coordinate origin. In this tool setting mode, there is no need to perform tool setting again after tool change, and the previously set coordinate system can continue to be used.

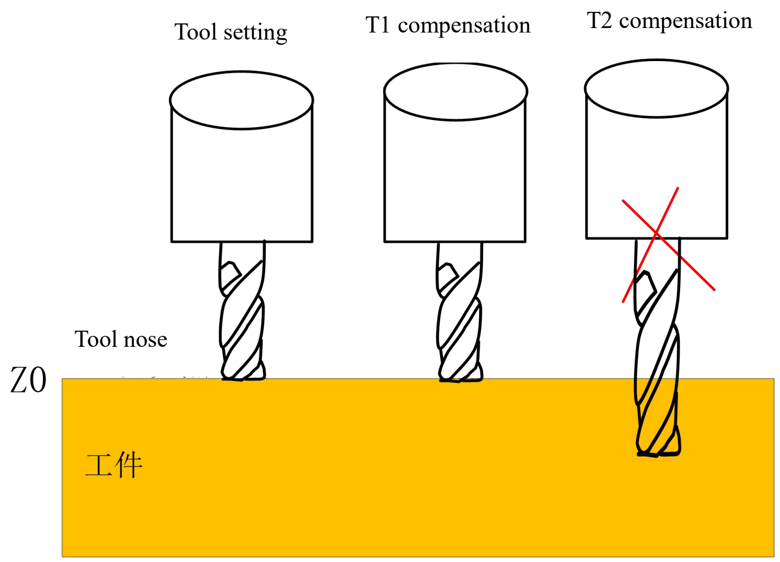
- Tool setting of tool nose

The setting of 1 indicates the tool setting of tool nose. In this mode, the tool nose is set as the workpiece coordinate origin after tool setting on Z is completed.

Illustration



(a) Tool setting spindle end face



(b) Tool setting of tool nose

Note

- During tool setting of spindle end face, if RTCP mode is not enabled, when Z axis moves to the area near workpiece origin, the interference between tool and workpiece may occur.
- During tool setting of tool nose, tool setting must be performed again after tool change, and new workpiece origin is set.

4.155 W Axis Compensation

Parameter number	040404/040454/040504/040554
Parameter name	W axis compensation

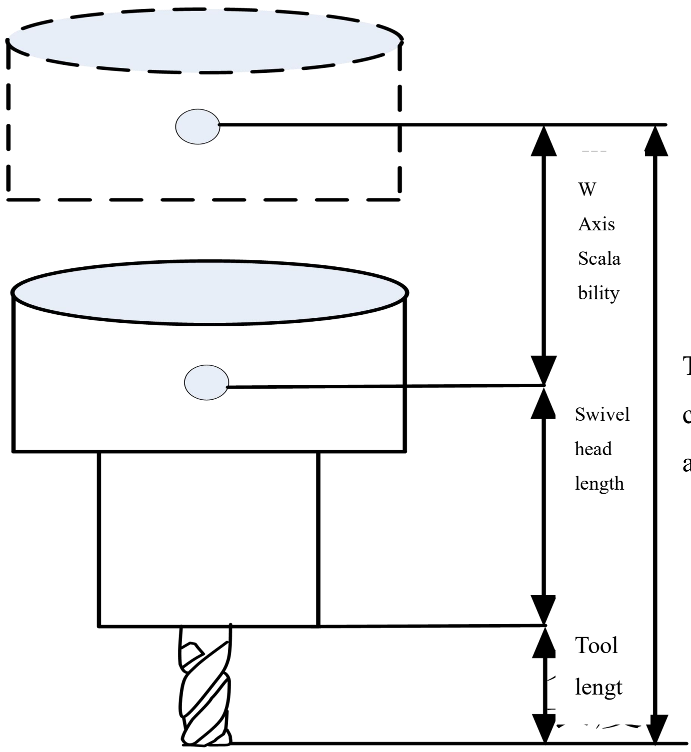
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

Install W axis on Z axis of 5-axis machine, and use scalability of W axis to compensate the travel on Z and enlarge the machining range. After movement on W axis occurs, the tool center also changes. System provides real-time compensation of W axis to ensure tool moves based on workpiece position.

When 1 is set, W axis compensation function is turned on. Turning off is the default.

Illustration



Note

- To effectively use W axis compensation function, it is necessary to ensure that the W axis is at the machine origin during calibration of the structural parameter.
- When setting workpiece coordinate origin, W axis is at the machine origin.

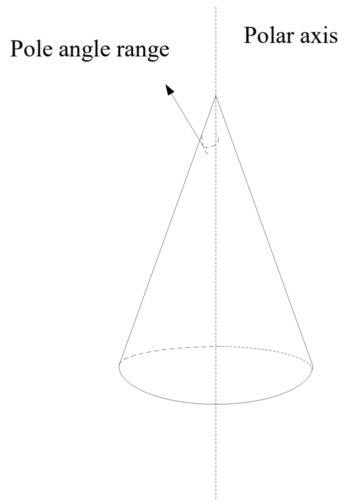
4.156 Pole Angle Range

Parameter number	040407/040457/040507/040557
Parameter name	Pole angle range
Data type	REAL
Valid range	0.0 to 360
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The pole area is defined by the angle, that is, for a conical area with the pole axis as the axis line and the angle as the cone angle, what is in this area is the pole range. When the tool passes near the pole, due to the uncertainty of the direction of rotary axis, if there is no corresponding handling, it will cause the rotary axis to overspeed.

Illustration



4.157 Swivel Head Indexing

Parameter number	040408/040458/040508/040558
Parameter name	Swivel head indexing
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

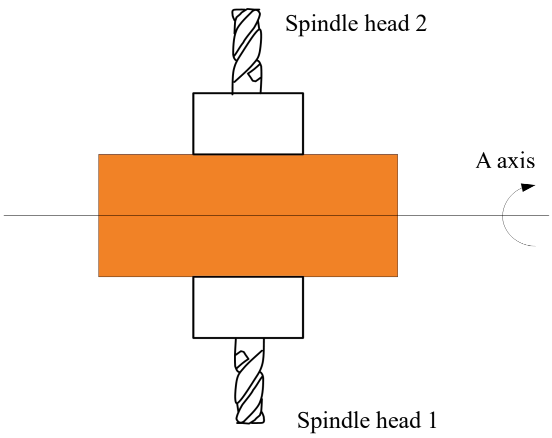
Description

After swivel head indexing function is turned on, the RTCP compensation position has nothing to do with the workpiece origin of rotary axis. During multi-spindle head RTCP swivel machining, when the spindle head needs to be switched, there is no need to consider the current angular position of rotary axis of the spindle head, and just create the tool path program directly in the workpiece coordinate system.

Swivel head indexing:

- When 0 is set, swivel head indexing is turned off (default). During RTCP compensation, Calculation angle of rotary axis = Workpiece coordinate of rotary axis + Workpiece origin of rotary axis
- When 1 is set, swivel head indexing is turned on. During RTCP compensation, Calculation angle of rotary axis = Workpiece coordinate of rotary axis

Illustration



Example

%0001
G43.4H1
G54 (Spindle head 1, A axis coordinate system 0 degree)
M98P1002
G49
G55 (Spindle head 2, A axis coordinate system 180 degrees)
G43.4H1
M98P1002
G49
M30

```
%1002
G01 X30Y30Z30A30
G01 X0Y0Z0A0
M99
```

4.158 90° Head Bidirectional Tool Length Compensation

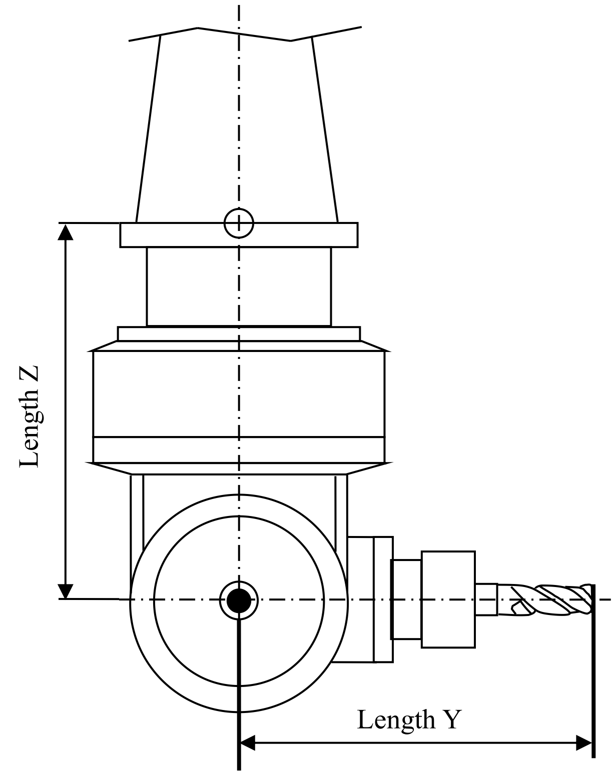
Parameter number	040409/040459/040509/040559
Parameter name	90° head bidirectional tool length compensation
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The 90° angle milling head is an important spindle accessory. It has two right-angled sides forming L-shaped structure. The 5-axis machine's processing technology is enriched and its processing range is expanded by working with the 90° angle head, and the conversion between vertical and horizontal processing is easily achieved. The tool length of the ordinary milling head is only along the spindle direction, and the tool length compensation only needs to be performed on Z axis; while the 90° angle milling head contains two directions for tool length, and bidirectional tool length compensation is required for the 90° angle head.

Set the channel parameter 040409 to 1 to enable the bidirectional tool length compensation. At this point, the length compensation X and Y values are effective, and system will perform the compensation based on the values.

Illustration



Note

(1) The initial tool direction must be set to (0,0,1) for this function. Channel parameters 040400 to 040402 indicate the initial tool direction.

(2) In tool compensation table, any of X, Y, and Z can set geometric amount, wear amount, and matrix amount.

(3) Generally, the length on two directions of L-shaped 90° angle head need to be set, and the signs are determined based on the direction that tool nose points to spindle center.

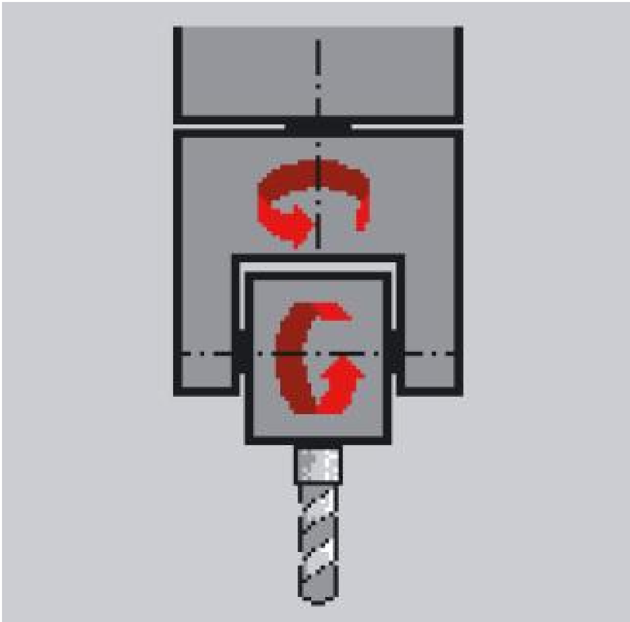
4.159 Swivel Head Structure Type

Parameter number	040410/040460/040510/040560
Parameter name	Swivel head structure type
Data type	STRING [7]
Valid range	
Default value	
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter setting works on the rotary axis name of swivel head, and master axis is before slave axis.

Illustration



Dual swivel head structure

Example

For the machine tool with CA dual rotary head, if master axis is C axis and slave axis is A axis, then the swivel head structure type is CA.

4.160 Swivel Head Rotary Axis 1 Direction Vector X

Parameter number	040411/040461/040511/040561
Parameter name	Swivel head rotary axis 1 direction vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction vector of the first rotary axis for the swivel head (master axis), and supports any axis line direction.

4.161 Swivel Head Rotary Axis 1 Direction Vector Y

Parameter number	040412/040462/040512/040562
Parameter name	Swivel head rotary axis 1 direction vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction vector of the first rotary axis for the swivel head (master axis), and supports any axis line direction.

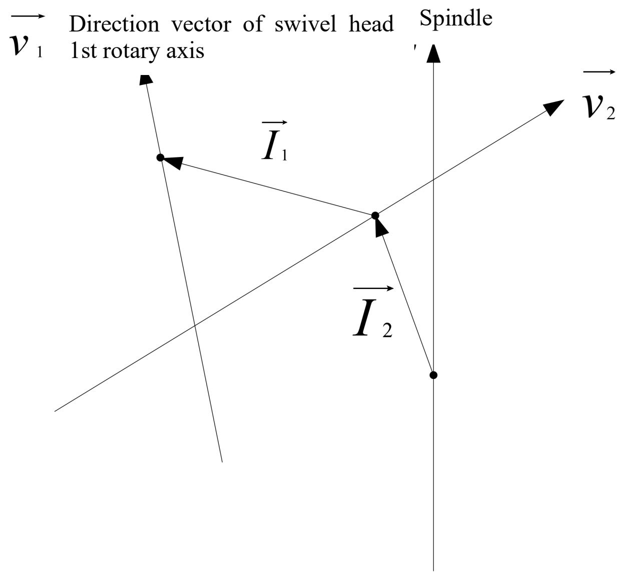
4.162 Swivel Head Rotary Axis 1 Direction Vector Z

Parameter number	040413/040463/040513/040563
Parameter name	Swivel head rotary axis 1 direction vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction vector of the first rotary axis for the swivel head (master axis), and supports any axis line direction.

Illustration



Example

For the 5-axis machine tool with CA dual swivel head structure, if the master axis is C axis, then the direction vector of the first rotary axis for the swivel head is set as following,

- Parm40411 *Direction vector (X) of 1st rotary axis of swivel head* is set to 0
- Parm40412 *Direction vector (Y) of 1st rotary axis of swivel head* is set to 0
- Parm40413 Direction vector (Z) of 1st rotary axis of swivel head is set to 1

4.163 Swivel Head Rotary Axis 2 Direction Vector X

Parameter number	040414/040464/040514/040564
Parameter name	Swivel head rotary axis 1 direction vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

The parameter is to set the direction vector of the second rotary axis for the swivel head (slave axis), and supports any axis line direction.

4.164 Swivel Head Rotary Axis 2 Direction Vector Y

Parameter number	040415/040465/040515/040565
Parameter name	Swivel head rotary axis 2 direction vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction vector of the second rotary axis for the swivel head (slave axis), and supports any axis line direction.

4.165 Swivel Head Rotary Axis 2 Direction Vector Z

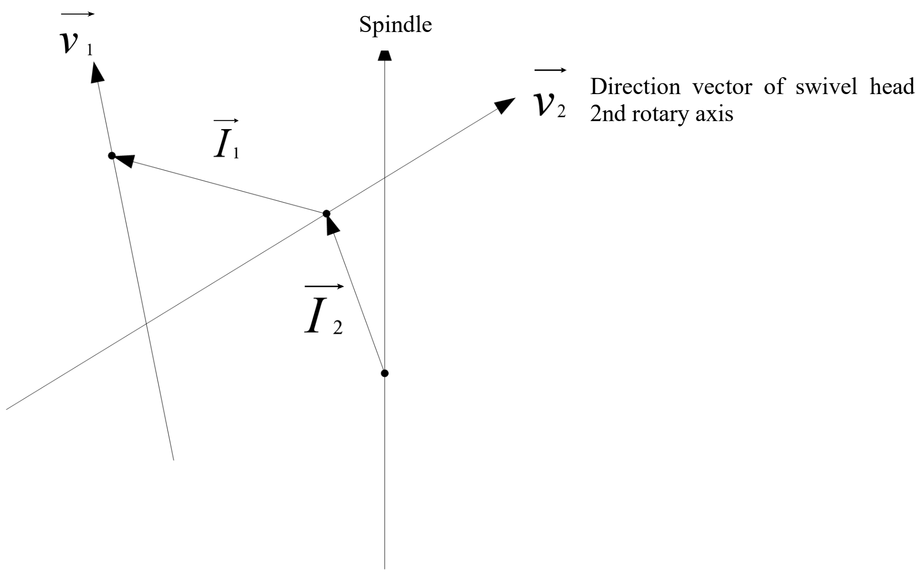
Parameter number	040416/040466/040516/040566
Parameter name	Swivel head rotary axis 2 direction vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

The parameter is to set the direction vector of the second rotary axis for the swivel head (slave axis), and supports any axis line direction.

Illustration



Example

For the 5-axis machine tool with CA dual rotary head structure, if the slave axis is A axis, then the direction vector of the second rotary axis for the swivel head is set as following,

- Parm40414 *Direction vector (X) of 2nd rotary axis of swivel head* is set to 1
- Parm40415 *Direction vector (Y) of 2nd rotary axis of swivel head* is set to 0
- Parm40416 *Direction vector (Z) of 2nd rotary axis of swivel head* is set to 0

4.166 Swivel Head Rotary Axis 1 Offset Vector X

Parameter number	040417/040467/040517/040567
Parameter name	Swivel head rotary axis 1 offset vector X
Data type	REAL
Valid range	-21474.0 to 21474.0

Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets the offset vector of the first rotary axis of the swivel head, that is, the offset vector of the master axis relative to the slave axis.

4.167 Swivel Head Rotary Axis 1 Offset Vector Y

Parameter number	040418/040468/040518/040568
Parameter name	Swivel head rotary axis 1 offset vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets the offset vector of the first rotary axis of the swivel head, that is, the offset vector of the master axis relative to the slave axis.

4.168 Swivel Head Rotary Axis 1 Offset Vector Z

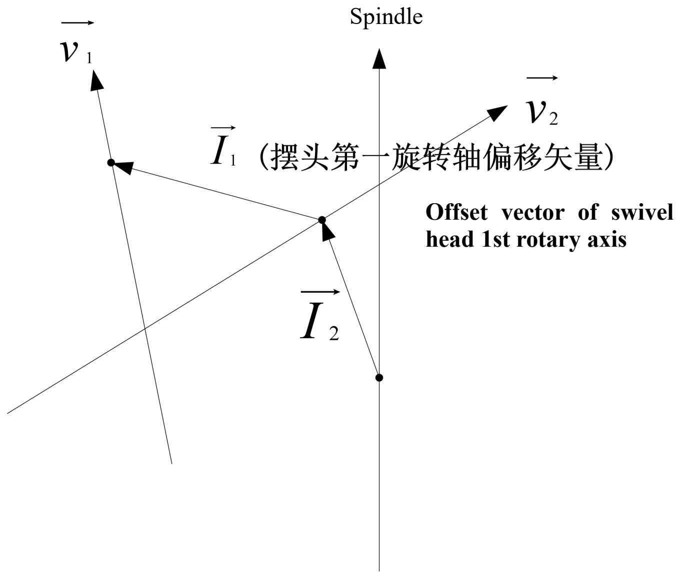
Parameter number	040419/040469/040519/040569
Parameter name	Swivel head rotary axis 1 offset vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets the offset vector of the first rotary axis of the swivel head, that is, the offset vector of the master axis relative to the slave axis.

Illustration



Example

For the 5-axis machine tool with CA dual swivel head, if the offset vector of master axis C axis relative to slave axis A axis is (0,-10,0), the direction vector of 1st rotary axis of swivel head is set as following.

- Parm40417 *Offset vector (X) of 1st rotary axis of swivel head* is set to 0
- Parm40418 *Offset vector (Y) of 1st rotary axis of swivel head* is set to -10
- Parm40419 *Offset vector (Z) of 1st rotary axis of swivel head* is set to 0

4.169 Swivel Head Rotary Axis 2 Offset Vector X

Parameter number	040420/040470/040520/040570

Parameter name	Swivel head rotary axis 2 offset vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets the offset vector of the second rotary axis of the swivel head, that is, the offset vector of slave axis relative to the center of spindle end face (control point).

4.170 Swivel Head Rotary Axis 2 Offset Vector Y

Parameter number	040421/040471/040521/040571
Parameter name	Swivel head rotary axis 2 offset vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets the offset vector of the second rotary axis of the swivel head, that is, the offset vector of slave axis relative to the center of spindle end face (control point).

4.171 Swivel Head Rotary Axis 2 Offset Vector Z

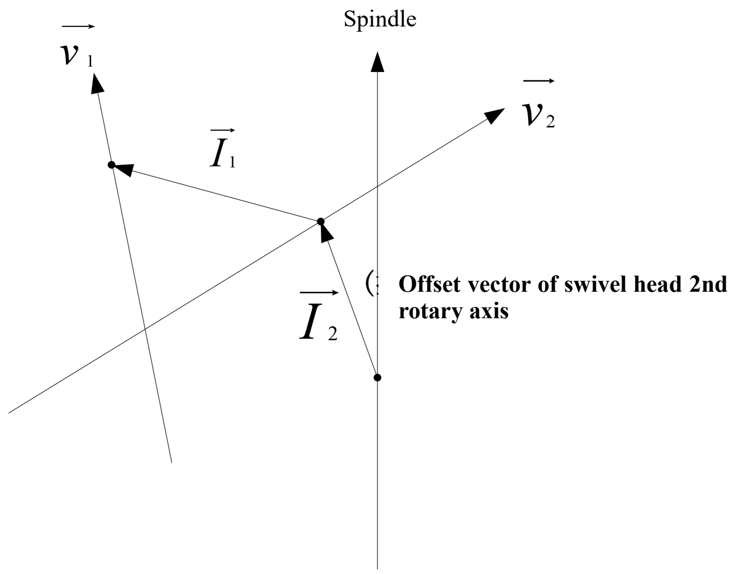
Parameter number	040422/040472/040522/040572

Parameter name	Swivel head rotary axis 2 offset vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

This parameter sets the offset vector of the second rotary axis of the swivel head, that is, the offset vector of slave axis relative to the center of spindle end face (control point).

Illustration



Example

For the 5-axis machine with CA dual rotary head, if the offset vector of slave axis A axis relative to spindle end face center (control point) is (-10, -10, 80), the offset vector of the second rotary axis for the swivel head is set as following,

- Parm40420 *Offset vector (X) of 2nd rotary axis of swivel head* is set to -10
- Parm40421 *Offset vector (Y) of 2nd rotary axis of swivel head* is set to -10
- Parm40422 Offset vector (Z) of 2nd rotary axis of swivel head is set to 80

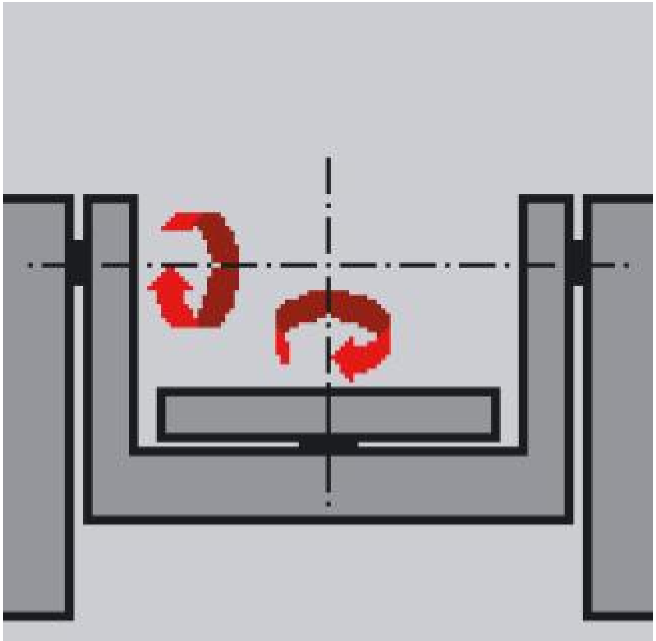
4.172 Rotary Table Structure Type

Parameter number	040425/040475/040525/040575
Parameter name	Rotary table structure type
Data type	STRING [7]
Valid range	
Default value	
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the name of rotary axis for rotary table, and master axis is before slave axis.

Illustration



Example

The 5-axis machine tool with AC dual rotary table, if master axis is A axis and slave axis is C axis, the rotary table structure type is AC.

4.173 Rotary Table Rotary Axis 1 Direction Vector X

Parameter number	040426/040476/040526/040576
Parameter name	Rotary table rotary axis 1 direction vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction of master axis for rotary table. The direction is opposite to swivel head direction. It supports direction of any axis.

4.174 Rotary Table Rotary Axis 1 Direction Vector Y

Parameter number	040427/040477/040527/040577
Parameter name	Rotary table rotary axis 1 direction vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction of master axis for rotary table. The direction is opposite to swivel head direction. It supports direction of any axis.

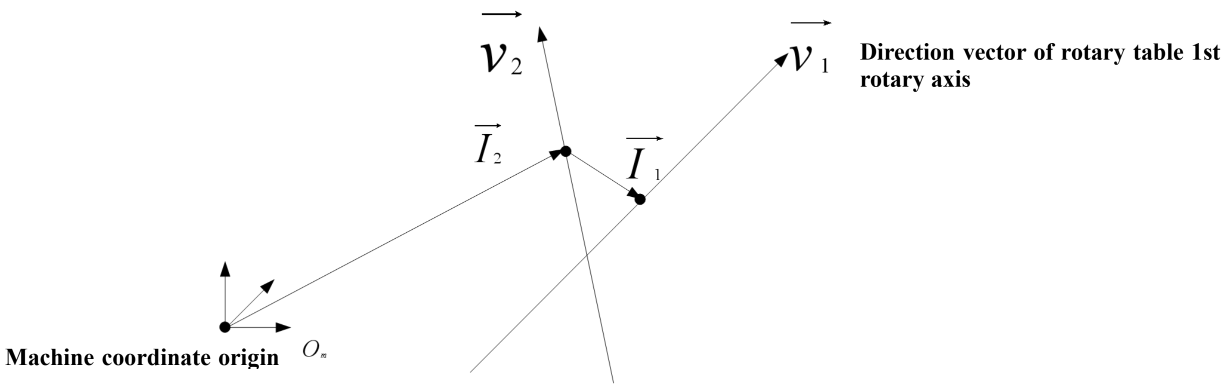
4.175 Rotary Table Rotary Axis 1 Direction Vector Z

Parameter number	040428/040478/040528/040578
Parameter name	Rotary table rotary axis 1 direction vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction of master axis for rotary table. The direction is opposite to swivel head direction. It supports direction of any axis.

Illustration



Example

For the 5-axis machine with AC dual rotary table, if the master axis is A axis, the direction vector of 1st rotary axis of rotary table is set as following,

- Parm40426 *Direction vector (X) of 1st rotary axis of rotary table* is set to -1
- Parm40427 *Direction vector (Y) of 1st rotary axis of rotary table* is set to 0

- Parm40428 *Direction vector (Z) of 1st rotary axis of rotary table* is set to 0

4.176 Rotary Table Rotary Axis 2 Direction Vector X

Parameter number	040429/040479/040529/040579
Parameter name	Rotary table rotary axis 2 direction vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction of slave axis for rotary table. The direction is opposite to swivel head direction. It supports direction of any axis.

4.177 Rotary Table Rotary Axis 2 Direction Vector Y

Parameter number	040430/040480/040530/040580
Parameter name	Rotary table rotary axis 2 direction vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction of slave axis for rotary table. The direction is opposite to swivel head direction. It supports direction of any axis.

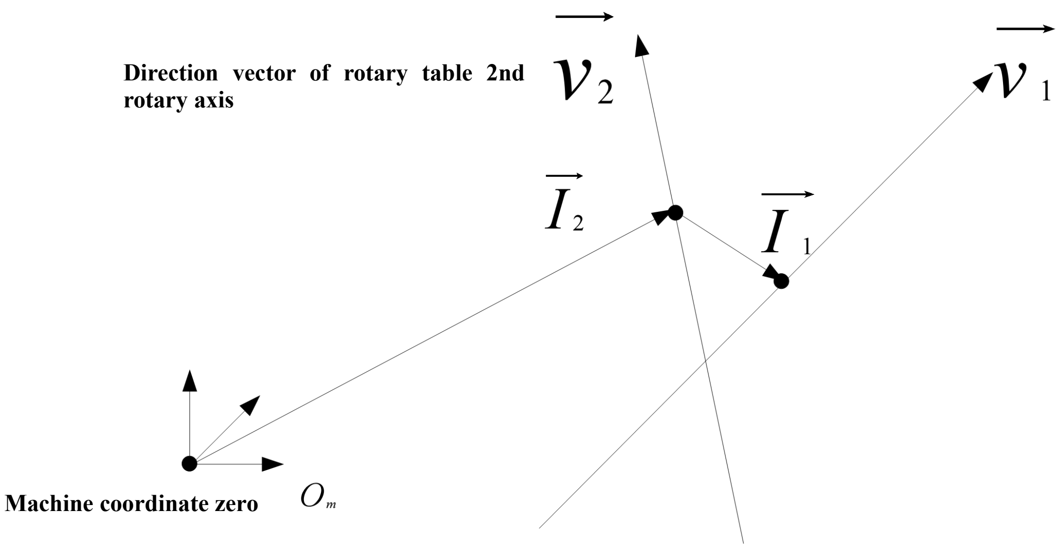
4.178 Rotary Table Rotary Axis 2 Direction Vector Z

Parameter number	040431/040481/040531/040581
Parameter name	Rotary table rotary axis 2 direction vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the direction of slave axis for rotary table. The direction is opposite to swivel head direction. It supports direction of any axis.

Illustration



Example

For the 5-axis machine tool with AC dual rotary table, if slave axis is C axis, direction vector of 2nd rotary axis of rotary table is set as below.

- Parm40429 *Direction vector (X) of 2nd rotary axis of rotary table* is set to 0
- Parm40430 *Direction vector (Y) of 2nd rotary axis of rotary table* is set to 0
- Parm40431 *Direction vector (Z) of 2nd rotary axis of rotary table* is set to -1

4.179 Rotary Table Rotary Axis 1 Offset Vector X

Parameter number	040432/040482/040532/040582
Parameter name	Rotary table rotary axis 1 offset vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the offset vector of the first axis for rotary table, that is, the offset vector of master axis relative to slave axis.

4.180 Rotary Table Rotary Axis 1 Offset Vector Y

Parameter number	040433/040483/040533/040583
Parameter name	Rotary table rotary axis 1 offset vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the offset vector of the first axis for rotary table, that is, the offset vector of master axis relative to slave axis.

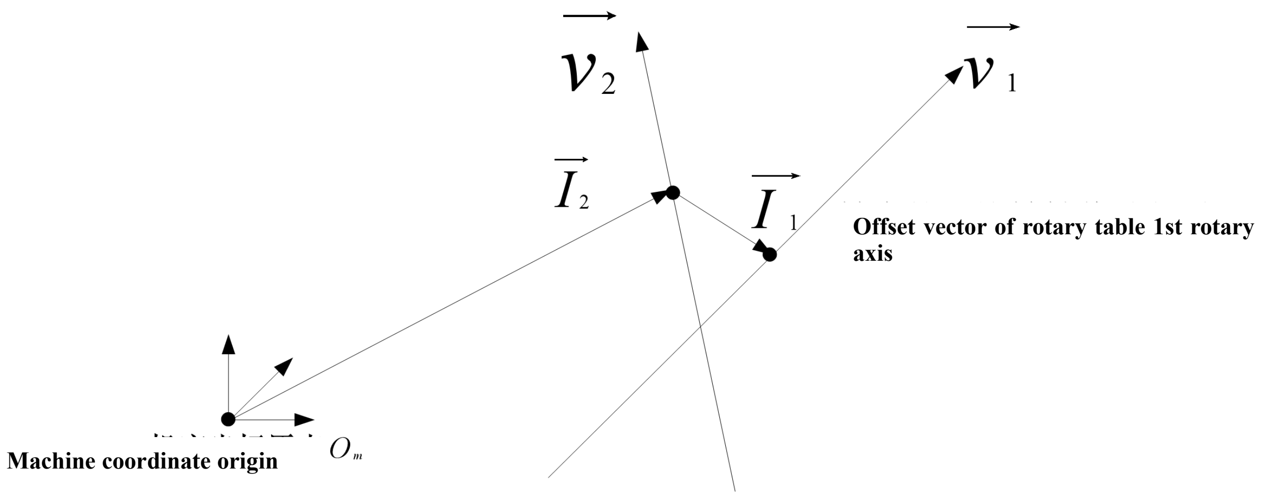
4.181 Rotary Table Rotary Axis 1 Offset Vector Z

Parameter number	040434/040484/040534/040584
Parameter name	Rotary table rotary axis 1 offset vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the offset vector of the first axis for rotary table, that is, the offset vector of master axis relative to slave axis.

Illustration



Example

For the 5-axis machine with AC dual rotary table, if the offset vector of master axis A axis relative to slave axis C axis is (0,10,0), then

- Parm40432 *Offset vector (X) of 1st rotary axis of rotary table* is set to 0
- Parm40433 *Offset vector (Y) of 1st rotary axis of rotary table* is set to 10
- Parm40434 Offset vector (Z) of 1st rotary axis of rotary table is set to 0

4.182 Rotary Table Rotary Axis 2 Offset Vector X

Parameter number	040435/040485/040535/040585
Parameter name	Rotary table rotary axis 2 offset vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the offset vector of 2nd rotary axis of rotary table, that is, the offset vector of slave axis relative to machine zero.

4.183 Rotary Table Rotary Axis 2 Offset Vector Y

Parameter number	040436/040486/040536/040586
Parameter name	Rotary table rotary axis 2 offset vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the offset vector of 2nd rotary axis of rotary table, that is, the offset vector of slave axis relative to machine zero.

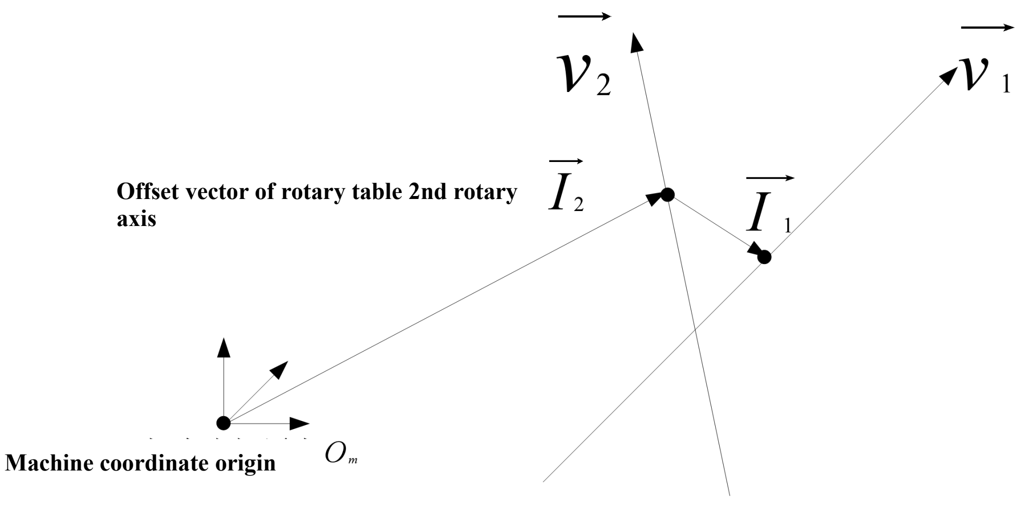
4.184 Rotary Table Rotary Axis 2 Offset Vector Z

Parameter number	040437/040487/040537/040587
Parameter name	Rotary table rotary axis 2 offset vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

The parameter is to set the offset vector of 2nd rotary axis of rotary table, that is, the offset vector of slave axis relative to machine zero.

Illustration



Example

For the machine tool with AC dual rotary table, if the offset vector of slave axis C axis relative to machine zero is (-20,-40,-150), then

- Parm40435 *Offset vector (X) of 2nd rotary axis of rotary table* is set to -20
- Parm40436 *Offset vector (Y) of 2nd rotary axis of rotary table* is set to -40
- Parm40437 *Offset vector (Z) of 2nd rotary axis of rotary table* is set to -150

4.185 7-axis RTCP

Parameter number	040588
Parameter name	7-axis RTCP
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

0: Disable 7-axis RTCP;

1: Enable 7-axis RTCP.

4.186 Swivel Head Rotary Axis 3 Direction Vector X

Parameter number	040589
Parameter name	Swivel head rotary axis 3 direction vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

To set direction vector (slave axis) of the third rotary axis for swivel head. Any axis line direction is supported.

4.187 Swivel Head Rotary Axis 3 Direction Vector Y

Parameter number	040590
Parameter name	Swivel head rotary axis 3 direction vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set direction vector (slave axis) of the third rotary axis for swivel head. Any axis line direction is supported.

4.188 Swivel Head Rotary Axis 3 Direction Vector Z

Parameter number	040591
Parameter name	Swivel head rotary axis 3 direction vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

To set direction vector (slave axis) of the third rotary axis for swivel head. Any axis line direction is supported.

4.189 Swivel Head Rotary Axis 3 Offset Vector X

Parameter number	040592
Parameter name	Swivel head rotary axis 3 offset vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set offset vector of the third rotary axis for swivel head, that is, the offset of slave axis relative to end face center of spindle (control point).

4.190 Swivel Head Rotary Axis 3 Offset Vector Y

Parameter number	040593
Parameter name	Swivel head rotary axis 3 offset vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

To set offset vector of the third rotary axis for swivel head, that is, the offset of slave axis relative to end face center of spindle (control point).

4.191 Swivel Head Rotary Axis 3 Offset Vector Z

Parameter number	040594
Parameter name	Swivel head rotary axis 3 offset vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set offset vector of the third rotary axis for swivel head, that is, the offset of slave axis relative to end face center of spindle (control point).

4.192 Rotary Table Rotary Axis 3 Direction Vector X

Parameter number	040595
Parameter name	Rotary table rotary axis 3 direction vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

To set the direction vector of the third rotary axis for rotary table (slave axis), and any axis line direction is supported.

4.193 Rotary Table Rotary Axis 3 Direction Vector Y

Parameter number	040596
Parameter name	Rotary table rotary axis 3 direction vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the direction vector of the third rotary axis for rotary table (slave axis), and any axis line direction is supported.

4.194 Rotary Table Rotary Axis 3 Direction Vector X

Parameter number	040597
Parameter name	Rotary table rotary axis 3 direction vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

To set the direction vector of the third rotary axis for rotary table (slave axis), and any axis line direction is supported.

4.195 Rotary Table Rotary Axis 3 Offset Vector X

Parameter number	040598
Parameter name	Rotary table rotary axis 3 offset vector X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the offset vector of the third rotary axis for rotary table, that is, offset vector of slave axis relative to spindle end face center (control point).

4.196 Rotary Table Rotary Axis 3 Offset Vector Y

Parameter number	040599
Parameter name	Rotary table rotary axis 3 offset vector Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Milling

Description

To set the offset vector of the third rotary axis for rotary table, that is, offset vector of slave axis relative to spindle end face center (control point).

4.197 Rotary Table Rotary Axis 3 Offset Vector Z

Parameter number	040600
Parameter name	Rotary table rotary axis 3 offset vector Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the offset vector of the third rotary axis for rotary table, that is, offset vector of slave axis relative to spindle end face center (control point).

4.198 Dual 5-axis Vertical RTCP

Parameter number	040601
Parameter name	Dual 5-axis vertical RTCP
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Turning

Description

0: Disable dual 5-axis vertical RTCP;

1: Enable dual 5-axis vertical RTCP.

4.199 Function Switch

Parameter number	040610 to 040641
Parameter name	Function switch
Data type	HEX4
Valid range	0x0 to 0xFFFFFFF
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling, turning

Description

The smoothing function is not enabled by default. 0x80 is set for enabling smoother. 0x80: enable smoother; 0x0: disable smoother

4.200 Option Switch

Parameter number	040642 to 040673
Parameter name	Option switch
Data type	HEX4
Valid range	0x0 to 0xFFFFFFF
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_SAVE

Milling/Turning	Milling, turning

4.201 Manual Anti-collision

Parameter number	040674
Parameter name	Manual anti-collision
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

4.202 Auto Anti-collision

Parameter number	040675
Parameter name	Auto anti-collision
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

4.203 Collision Check Model: X Zero Offset

Parameter number	040676
Parameter name	Collision check model: X zero offset
Unit	mm

Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Milling

Description

Difference between model origin and actual machine zero on X. For the vertical machine with rotary table, the collision check model X zero offset is usually the same as offset vector X of rotary table rotary axis 2.

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4.204 Collision Check Model: Y Zero Offset

Parameter number	040677
Parameter name	Collision check model: Y zero offset
Unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Milling

Description

Difference between model origin and actual machine zero on Y. For the vertical machine with rotary table, the collision check model X zero offset is usually the same as offset vector Y of rotary table rotary axis 2.

4.205 Collision Check Model: Z Zero Offset

Parameter number	040676
Parameter name	Collision check model: Z zero offset
Unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Milling

Description

Difference between model origin and actual machine zero on Z. For the vertical machine with rotary table, the collision check model X zero offset is usually the same as offset vector Z of rotary table rotary axis 2.

4.206 Tool Initial Secondary Direction X

Parameter number	040601
Parameter name	Tool initial secondary direction X
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the initial secondary direction of tool. If the direction is parallel to X axis, this parameter is set to 1.0

4.207 Tool Initial Secondary Direction Y

Parameter number	040602
Parameter name	Tool initial secondary direction Y
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the initial secondary direction of tool. If the direction is parallel to Y axis, this parameter is set to 1.0

4.207 Tool Initial Secondary Direction Z

Parameter number	040603
Parameter name	Tool initial secondary direction Z
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

To set the initial secondary direction of tool. If the direction is parallel to Z axis, this parameter is set to 1.0

4.208 Enable Dual-5-axis Vertical RTCP

Parameter number	040604
Parameter name	Enable dual-5-axis vertical RTCP
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

Dual-axis vertical RTCP function is,

0: disabled; 1: enabled

4.209 Function Switch

Parameter number	040610-040641
Parameter name	Function switch
Data type	HEX4
Valid range	0x0-0xFFFFFFF
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

【040610 function switch】: the smoothing function is not enabled by default. When bit 7 is set to 1, the smoother function is valid.

4.210 Option Switch

Parameter number	040642-040673
Parameter name	Option switch
Data type	HEX4
Valid range	0x0-0xFFFFFFF
Default value	0x0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

【040642 option switch】, bit 3: enable over quadrant jump compensation.

4.211 Manual Anti-collision

Parameter number	040674
Parameter name	Manual anti-collision
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disable; 1: Enable

4.212 Auto Anti-collision

Parameter number	040675
Parameter name	Auto anti-collision
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Disable; 1: Enable

4.213 Collision Detection Model Zero Offset X

Parameter number	040676
Parameter name	Collision detection model zero offset X
Data unit	mm
Data type	REAL
Valid range	-21474.0-21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Milling

Description

Collision detection model zero offset X indicates the offset between model origin and actual machine zero on X. For the vertical machine with rotary table, it is usually the same as the rotary table rotary axis 2 offset vector X.

4.214 Collision Detection Model Zero Offset Y

Parameter number	040677
Parameter name	Collision detection model zero offset Y
Data unit	mm
Data type	REAL
Valid range	-21474.0-21474.0
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Milling

Description

Collision detection model zero offset Y indicates the offset between model origin and actual machine zero on Y. For the vertical machine with rotary table, it is usually the same as the rotary table rotary axis 2 offset vector Y.

4.215 Collision Detection Model Zero Offset Z

Parameter number	040678
Parameter name	Collision detection model zero offset Z
Data unit	mm
Data type	REAL
Valid range	-21474.0-21474.0
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Milling

Description

Collision detection model zero offset Z indicates the offset between model origin and actual machine zero on Z. For the vertical machine with rotary table, it is usually the same as the rotary table rotary axis 2 offset vector Z.

4.216 Axis Display on Lathe Tool Offset Setting Interface

Parameter number	040679
Parameter name	Axis display on lathe tool offset setting interface
Data type	BYTE[8]
Default value	0, 1, 2
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning

Description

To configure the display axis on tool compensation interface:

-1: XYZBC are displayed based on the valid axis configured in channel;

Non-zero: XZ and set logical axis are displayed.

For example: When Y, B, C logical axes numbers are 1, 4, 5, then XYZ are displayed in tool compensation table.

4.217 Rapid Traverse from Intermediate Point to Zero in G28/G30

Parameter number	040684
Parameter name	Rapid traverse from intermediate point to zero in G28/G30
Data type	BOOL
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The rapid traverse from intermediate point to zero is,

0: at G01 speed; 1: at G00 speed.

4.218 Master/Slave Motion Space Smoothing Type

Parameter number	040685
Parameter name	Master/Slave motion space smoothing type
Data type	INT4
Default value	0
Valid range	0-5
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To enable the travel space acceleration constraint function k. 0: disable; 1: enable, and the master motion is XYZ.

When the travel space acceleration constraint function is enabled, users need to set the channel parameter 040610 to 0x20 to enable the US mapping; otherwise, it may keep it from reaching the best constraint.

4.219 Master Motion Axis Type

Parameter number	040686
Parameter name	Master motion axis type
Data type	STRING[10]
Default value	XYZ
Valid range	0-5
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the master motion axis number in travel space.

4.220 Slave Motion Axis Type

Parameter number	040687
Parameter name	Slave motion axis type
Data type	STRING[10]
Default value	AC
Valid range	0-5
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the slave motion axis number in travel space.

4.221 Master Motion Space Block Upper Limit Interpolation Period Magnification

Parameter number	040688
Parameter name	Master motion space block upper limit interpolation period magnification
Data type	REAL
Default value	35
Valid range	0-1000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

If the length of current block is larger than the set value * interpolation period * current block speed limit value, the speed limit of long block in master/slave motion space is performed to avoid long low-speed block.

4.222 Master Motion Space Machining Speed Coefficient

Parameter number	040689
Parameter name	Master motion space machining speed coefficient
Data type	REAL
Default value	0.8
Valid range	0-0.9
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

After enabling the master/slave motion space, the larger the set value, the higher the machining efficiency, but the lower the machining stability.

4.223 Master Motion Space Machining Path Curvature Upper Limit

Parameter number	040690
Parameter name	Master motion space machining path curvature upper limit
Data type	REAL
Default value	50
Valid range	0-1000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

If the machining path at a position in master/slave motion space exceeds the set value, it is regarded as the big curvature point.

This parameter need to be used with the parameter 040689.

4.224 Curvature Extremum Position Offset Upper Limit Interpolation Period Magnification

Parameter number	040691
Parameter name	Curvature extremum position offset upper limit interpolation period magnification
Data type	REAL
Default value	20
Valid range	0-100
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

On the machining path of master/slave motion space, the position offset at the curvature extremum indicates the distance between the curvature extremum of this machining path and the closest block end. If it exceeds the set value * Interpolation period * current block speed limit, and this position is the large curvature point, the big curvature path of mater slave motion space is performed to avoid occurring of speed peak.

4.225 Master/Slave Motion Space Spline Lower Limit Interpolation Period Magnification

Parameter number	040692
Parameter name	Master/Slave motion space spline lower limit interpolation period magnification
Data type	REAL
Default value	2
Valid range	0-5
Access level	ACCESS_NC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

If the soothing spline length of master/slave coordination space is smaller than the set value * Interpolation period * current block speed limit, then the short spline of master/slave motion space is performed to avoid the second speed deceleration in short time.

4.226 Master/Slave Motion Space Interval Lower Limit Interpolation Period Magnification

Parameter number	040693
Parameter name	Master/Slave motion space interval lower limit interpolation period magnification
Data type	REAL
Default value	20
Valid range	0-50
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

It is used to eliminate short speed units and solve the problem of processing speed fluctuations that may occur after enabling the master-slave motion space.

If the length of the speed interval is less than the set value * interpolation period * the average speed of the current speed interval, the short speed interval of the master-slave motion space is processed.

The larger the set value, the smaller the fluctuation of the processing speed curve, but the processing efficiency will decrease.

If the parameter is 0, the function is disabled.

4.227 Master/Slave Motion Lock Lower Limit Interpolation Period Magnification

Parameter number	040694
Parameter name	Master/Slave motion space interval lower limit interpolation period magnification

Data type	REAL
Default value	0.3
Valid range	0-2
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

If the current block length is smaller than the set value * Interpolation period * Current block speed limit, the speed limit of short block in master/slave motion space is performed to avoid occurring of speed peak. When it is set to 0, this function is disabled.

4.228 Master/Slave Motion Space Big Corner Speed Coefficient

Parameter number	040695
Parameter name	Master/Slave motion space big corner speed coefficient
Data type	REAL
Default value	0.7
Valid range	0-1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

For the position of big corner program block, if the machining speed is too high, the machining quality will be reduced. The smaller the set value, the smaller the transition speed of big corner program block position, and more stable the machining, but the lower the machining efficiency.;

4.229 Master/Slave Motion Space Connection Acceleration Coefficient

Parameter number	040696

Parameter name	Master/Slave motion space connection acceleration coefficient
Data type	REAL
Default value	0.7
Valid range	0-1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

For the position of connection between long program block and short program block, the dramatic change of machining speed may occur. The smaller the set value, the smaller the acceleration limit at the position of connection between long program block and short program block, the more stable the machining, but the machining efficiency is reduced.

4.230 Space Error Compensation

Parameter number	040700
Parameter name	Space error compensation
Data type	INT4
Default value	0
Valid range	0-2
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Space error compensation function in current channel is,

0: Enabled; 1: Disabled.

4.231 Machine Structure Chain

Parameter number	040701
Parameter name	Machine structure chain
Data type	STRING[10]
Default value	CAYXZ
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The character string of machine axes from work table to tool, case insensitive.

4.232 2nd Axis Perpendicularity to Datum Axis

Parameter number	040702
Parameter name	2nd axis perpendicularity to datum axis
Data type	REAL
Default value	0.0
Valid range	-1000 to 1000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The perpendicularity error of L2 (the linear axis second closest to work table) relative to L1 (the linear axis closest to work table). Unit: mm

4.233 3rd Axis Perpendicularity to Datum Axis

Parameter number	040703
Parameter name	3rd axis perpendicularity to datum axis
Data type	REAL
Default value	0.0
Valid range	-1000 to 1000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The perpendicularity error of L3 (the linear axis furthest from work table) relative to L1 (the linear axis closest to work table). Unit: mm

4.234 2nd Axis Perpendicularity to 3rd Axis

Parameter number	040704
Parameter name	2nd axis perpendicularity to 3rd axis
Data type	REAL
Default value	0.0
Valid range	-1000 to 1000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The perpendicularity error of L3 (the linear axis furthest from work table) relative to L2 (the linear axis second closest to work table). Unit: mm

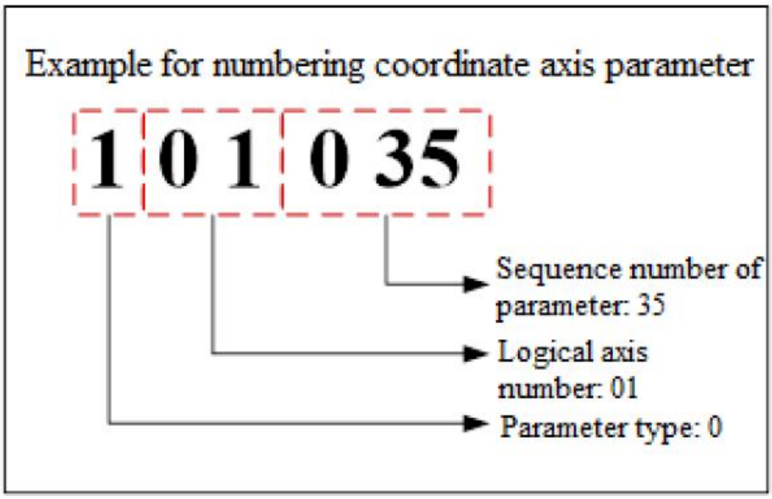
5 Coordinate Axis Parameter

Explanation on coordinate axis parameter number:

First two digits: sequence number of coordinate axis parameter.

Digit 3 to digit 4: logical axis number.

Digit 5: type of parameter. The type of coordinate axis parameter is 1.



Note: Axis 0 is taken as an example to illustrate the below coordinate axes (bit 3 and bit 4 of their numbers are 0).

5.1 Axis Display Name

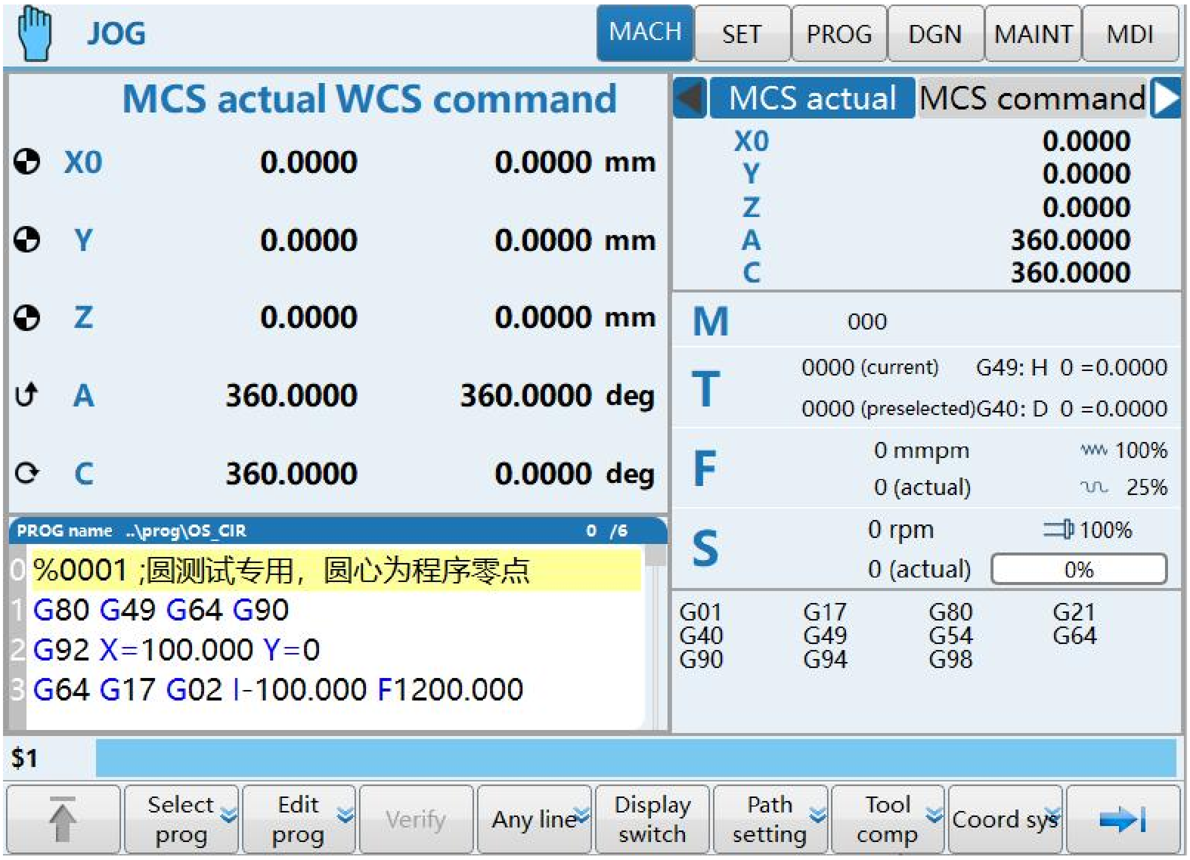
Parameter number	100000
Parameter name	Axis display name
Data type	STRING
Valid range	1 to 2 characters
Default value	AX
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the display name of the specified axis on the interface.

For the CNC with multiple channels, the name must be a letter and a number to differentiate the address words in the programs for each channel; otherwise, the name is displayed improperly. The axis is usually named X0 or X1.

If Parm100000 is set to X0, the interface will display as below:



Note

This parameter is different from Parm040015 to 040023 “axis programming name”. The former is used for interface display, and the latter is for programming. It is suggested that the name set by this parameter be kept consistent with the name set by Parm040015 to 040023.

The following characters cannot be used for axis name setting: D, F, H, M, EQ, LT, GT, GE, LE, PI.

Example

If the machine actually contains three feed axis and a spindle, they can be named X1, Y1, Z1 and S1.

5.2 Axis Type

Parameter number	100001
Parameter name	Axis type
Data type	UINT1
Valid range	0 to 11
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The configured physical axes have their own uses. This parameter is to set the type of axis.

0：Not configured, the default value.

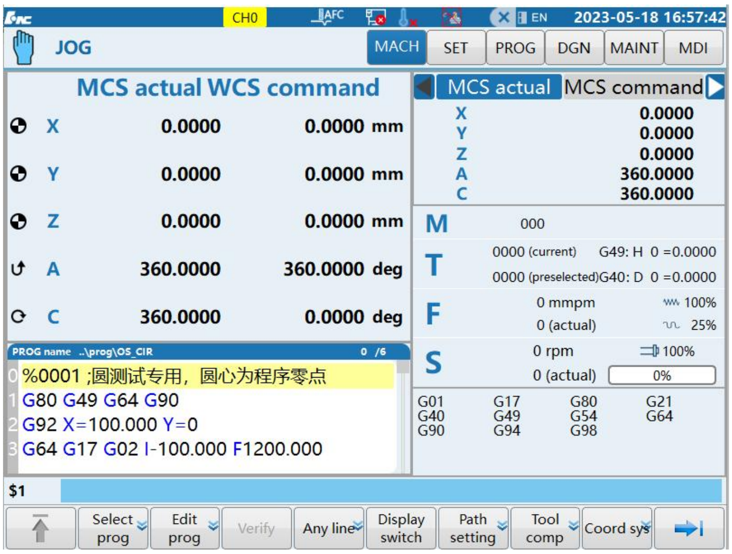
1：Linear axis.

2：Swivel axis, and coordinate value of display angle is not restricted.

3：Rotary axis. Coordinate value of display angle must be within the specified scope. If the actual coordinate is out of the specified scope, it is displayed in modulus.

9：The traverse axis is used as the spindle, and the drive is for feed axis.

10：Spindle.



Note

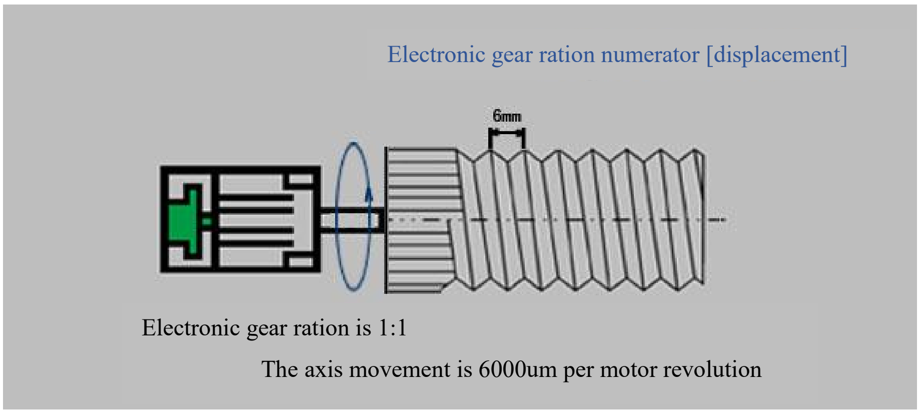
After the reference position return, the axis name and the label (for the linear axis, for the swivel axis, for the rotary axis) are displayed. The spindle can be viewed via spindle speed S.

5.3 Electronic Gear Ratio Numerator [Displacement]

Parameter number	100004
Parameter name	Electronic gear ratio numerator [Displacement]
Data unit	um, 0.001degree
Data type	INT4
Valid range	-99999999~99999999
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

For the linear axis, this parameter is to set the travel distance of machine tool per revolution of motor.
For the rotary axis, this parameter is to set the travel angle of machine tool per revolution of motor.



Note

The unit is um for the linear axis, and 0.001 degree for the rotary axis.

Example

If the screw lead is 6mm, the mechanical transmission ratio is 1:1, the electronic gear ratio numerator here is 6000 before being reduced.

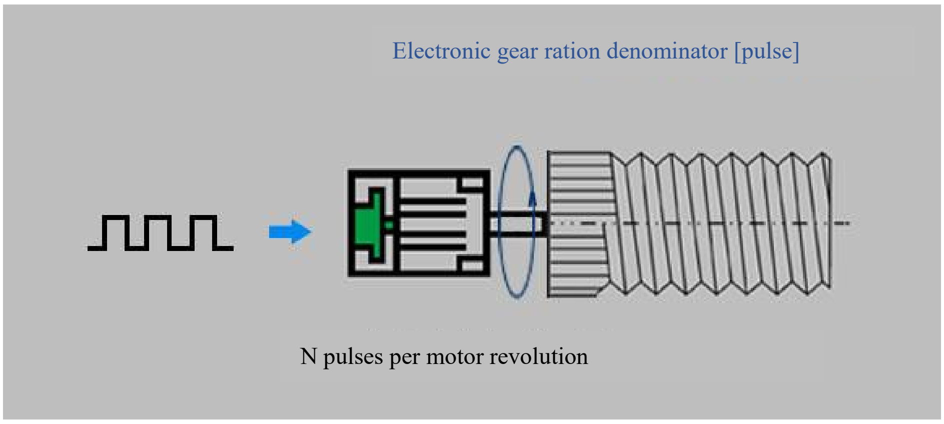
5.4 Electronic Gear Ratio Denominator [pulse]

Parameter number	100005

Parameter name	Electronic gear ratio denominator
Data type	INT4
Valid range	-99999999~99999999
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the number of pulse commands for one revolution of motor.



Example

For the servo motor with 2500PPR-encoder (10000 pulses required per revolution after four multiply frequency), the pitch of lead screw is 6mm, and the mechanical gear ratio is 2/3.

Each revolution of the motor moves the machine 6mm * 2/3 =4mm (4000 micrometers).

Then, 4000/(10000*4) = 1/10

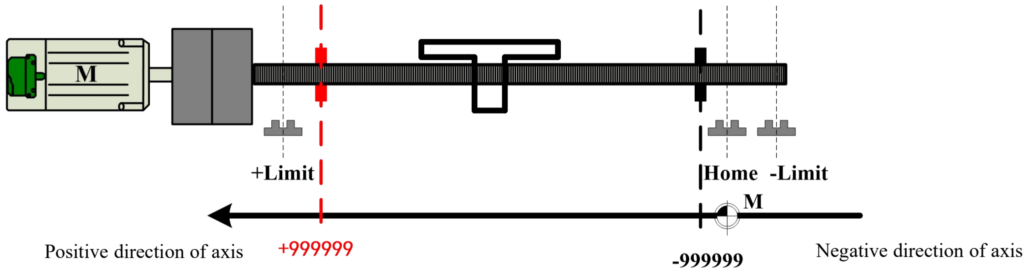
Parm100004 "numerator of electronic gear ratio" is set to 1, and Parm100005 "denominator of electronic gear ratio" is set to 10.

5.5 Positive Software Limit Coordinate

Parameter number	100006
Parameter name	Positive software limit coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	2000
Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The protective location for the software limit in the positive direction which is specified by the CNC software. The movement of traverse axis and rotary axis must not be beyond this limit value.



Note

This parameter is effective only after reference position return is completed.

Set a proper parameter value based on the mechanical travel of machine and the workpiece size. Excessively small value may result in software limit alarms.

When the third bit of G((80*logical axis number)+1) is 1, the positive software limit coordinate is not effective, and the second positive software limit coordinate is effective.

Example

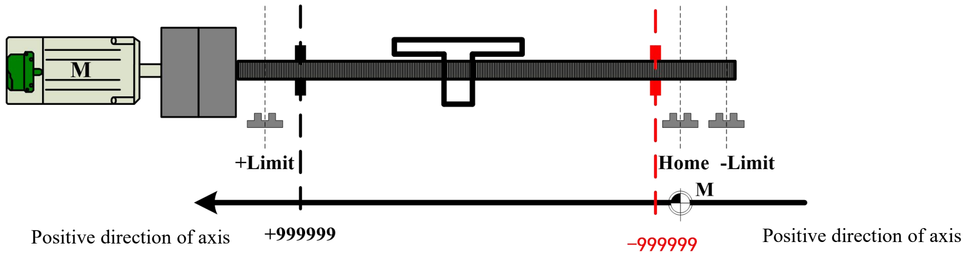
The first software limit of the logical axis 0 is effective, and the second positive software limit coordinates of the logical axes 1 and 2 are effective, then G1.2, G81.2, and G161.2 are set to 1 in the ladder diagram.

5.6 Negative Software Limit Coordinate

Parameter number	100007
Parameter name	Negative Software Limit Coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	-2000
Access level	ACCESS_USER
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The protective location of the software limit in the negative direction which is specified by the CNC software. The movement of traverse axis and rotary axis must not be beyond this limit value.



Note

This parameter is effective only after reference position return is completed.

Set a proper parameter value based on the mechanical travel of machine and the workpiece size. Excessively small value may result in software limit alarms.

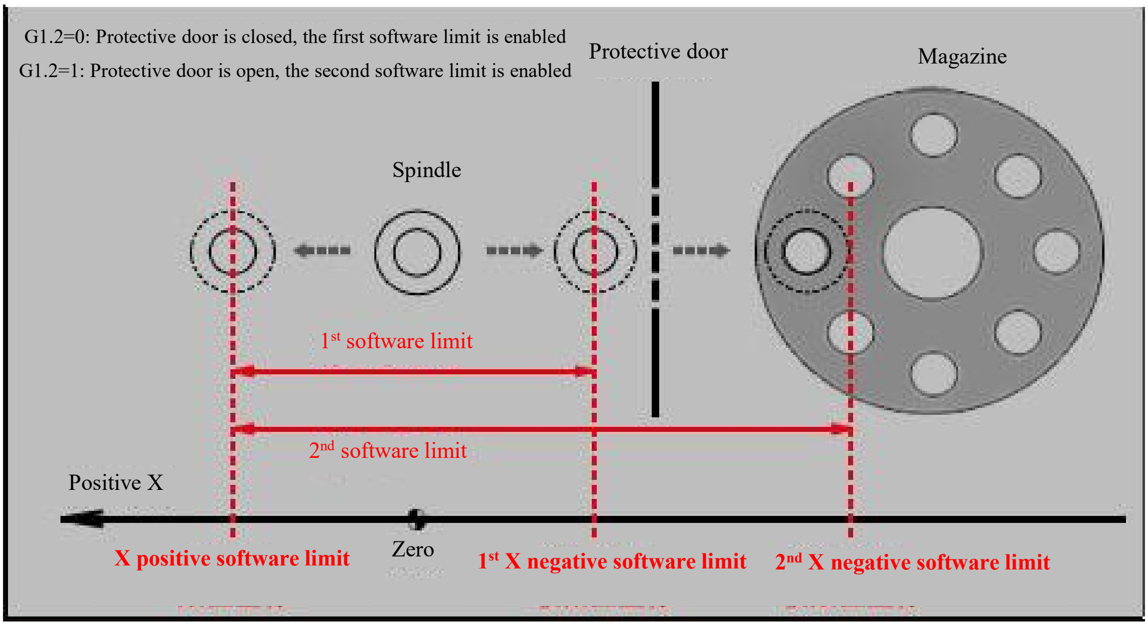
When the third bit of G((80*logical axis number)+1) is 1, the positive software limit coordinate is not effective, and the second positive software limit coordinate is effective.

5.7 2nd Positive Software Limit Coordinate

Parameter number	100008
Parameter name	2nd positive software limit coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The protective location of the software limit in the positive direction which is specified by the CNC software. When the second software limit is enabled, this parameter takes effective. The movement of traverse axis and rotary axis must not exceed this limit value.



Note

This parameter is effective only after reference position return is completed.

Set a proper parameter value based on the mechanical travel of machine and the workpiece size. Excessively small value may result in software limit alarms.

After the second software limit takes effect, the first software limit is invalid. This parameter is determined via G register.

Example

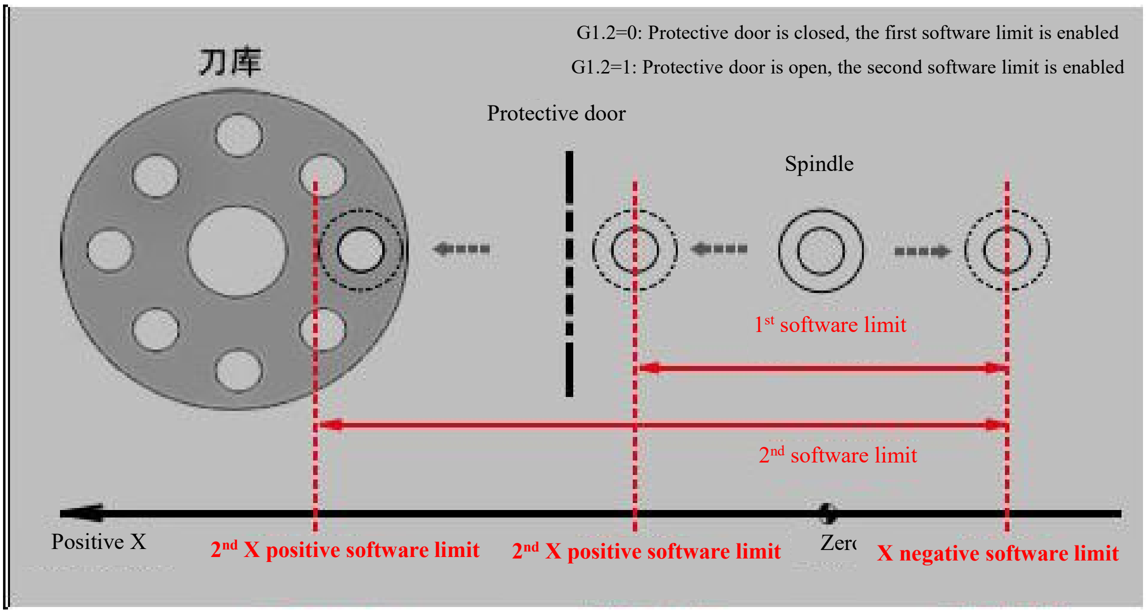
At the time of normal machining, the first positive software limit is enabled, and G1.2 is set to 0. When the tool needs to be changed, set G1.2 to 1, then the first positive software limit is disabled and the second positive software limit is enabled. After the tool has been changed, set G1.2 to 0 in the ladder diagram to revert to the first software limit.

5.8 2nd Negative Software Limit Coordinate

Parameter number	100009
Parameter name	2nd negative software limit coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	-2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The protective location of the software limit in the negative direction which is specified by the CNC software. The movement of traverse axis and rotary axis must not exceed this limit value.



Note

This parameter is effective only after reference position return is completed.

Set a proper parameter value based on the mechanical travel of machine and the workpiece size. Excessively small value may result in software limit alarms.

After the second software limit takes effect, the first software limit is invalid. This parameter is determined via G register.

Example

At the time of normal machining, the first negative software limit is enabled, and G1.2 is set to 0. When the tool needs to be changed, set G1.2 to 1, then the first negative software limit is disabled and the second negative software limit is enabled. After the tool has been changed, set G1.2 to 0 in the ladder diagram to revert to the first software limit.

5.9 Reference Point Return Mode

Parameter number	100010
Parameter name	Reference Point Return Mode
Data type	INT4
Valid range	0 to 5
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The reference position return mode for the CNC can be divided into the following:

0： Absolute coding

When the encoder is turned on, the positional value can be got immediately and be offered to CNC. After the power of CNC is off, the current machine position is not lost. Therefore, the system can search the reference position without moving the machine axis, and the machine runs promptly.

2： + -

From the current position, in the direction of reference point return, move to the reference point switch at the high speed of reference point return, and move at the low speed of reference point return in the opposite direction after pressing the reference point switch until the first Z pulse position is detected by system. Continue moving a distance based on the value set by Parm100013 “offset after reference point return”, after that, the reference point return is done.

3： + - +

From the current position, in the direction of reference point return, move to the reference point switch at the high speed of reference point return, and move away from the refence point switch in the opposite direction after pressing the reference point switch, then move back to search Z pulse at the low speed of reference point return until the first Z pulse position is detected by system. Continue moving a distance based on the value set by Parm100013 “offset after reference point return”, after that, the reference point return is done.

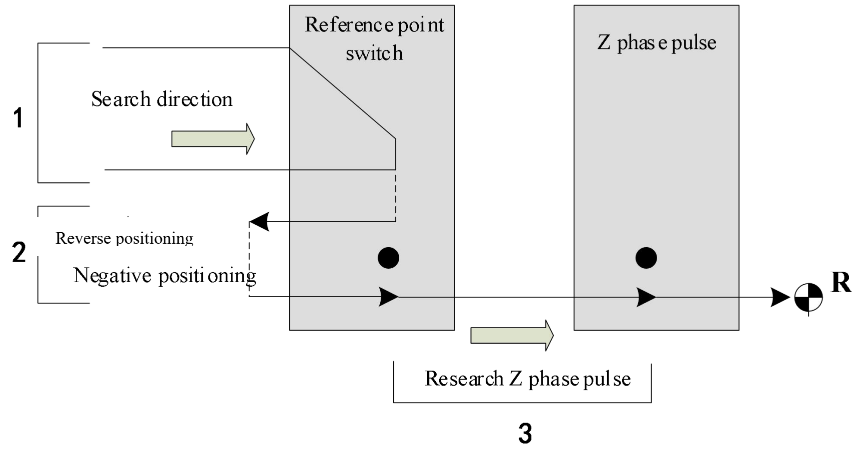
4： Distance-coded reference point return mode 1

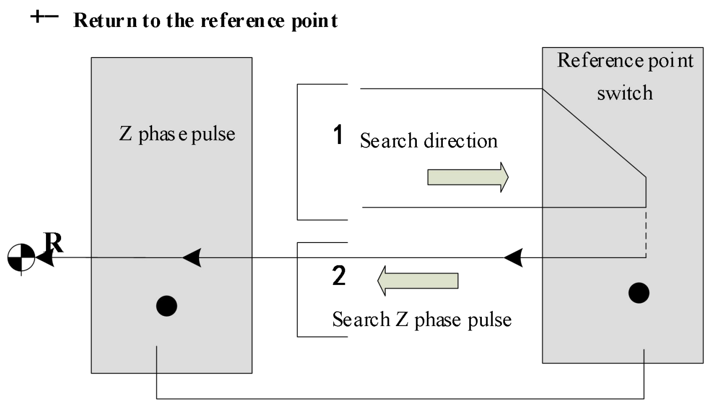
When the distance-coded grating ruler is mounted on the CNC, the machine can find out the reference position with moving a short distance to establish coordinate system. This parameter is set to 4 when the direction of grating scale feedback is the same with the reference point return direction.

5： Distance-coded reference point return mode 2

When the distance-coded grating ruler is mounted on the CNC, the machine can find out the reference position with moving a short distance to establish coordinate system. This parameter is set to 5 when the direction of grating scale feedback is the same with the reference point return direction.

Return to the reference point in two directions





Note

It is necessary to adapt reference point return mode based upon the feedback component type. After machine is turned on, and coordinate system is built, the program can run automatically. If an axis uses the incremental displacement measurement feedback system, this axis must return to reference point first.

5.10 Reference Point Return Direction

Parameter number	100011
Parameter name	Reference point return direction
Data type	INT4
Valid range	-1 to 1
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

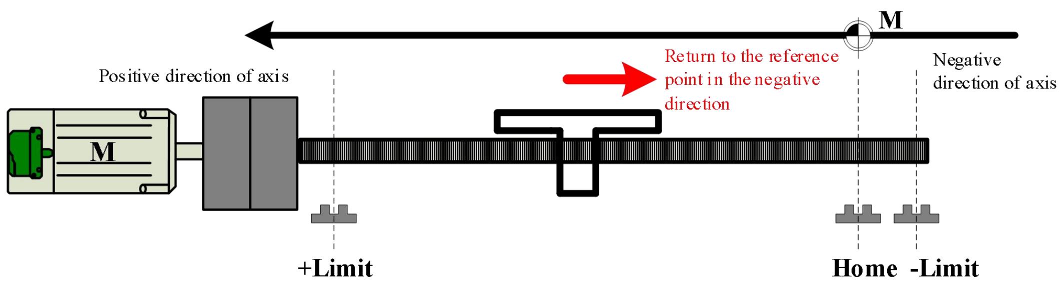
Description

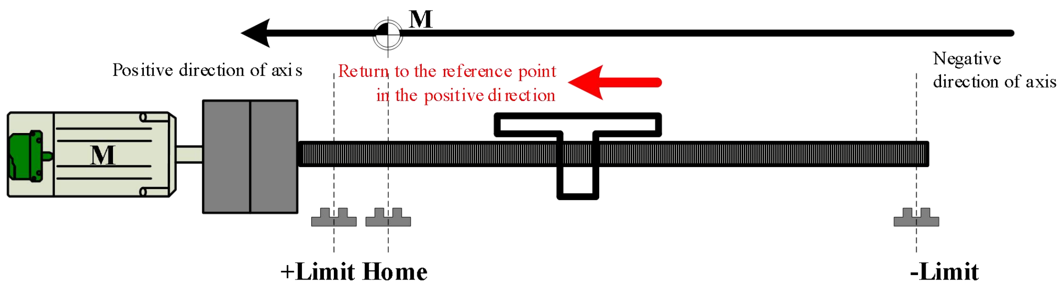
To set the initial direction where coordinate axis returns to reference position.

1: Positive direction.

-1: Negative direction.

0: No reference position return direction is specified (for distance-coded reference point return).





Note

The setting of this parameter depends on the position where switch of machine reference position is mounted. The wrong setting may cause a reference position return failure.

When this type of reference point return is used, "Working mode" of axis from device parameters must be set to 1 (the incremental encoder type).

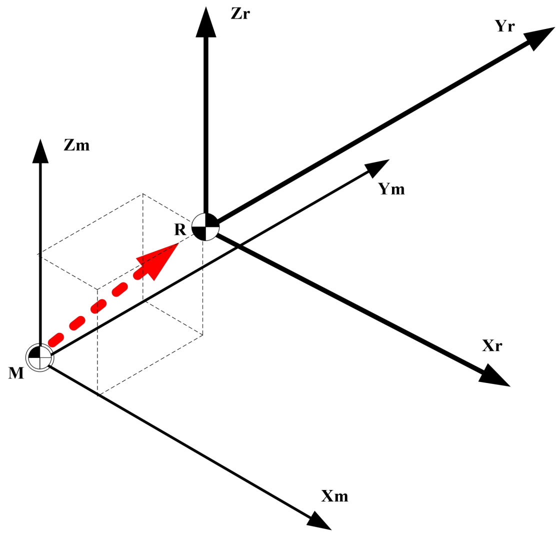
The distance-coded reference point return direction is controlled by PLC. Therefore, this parameter must be set to 0 when distance-coded reference point return is performed.

5.11 Encoder Feedback Offset

Parameter number	100012
Parameter name	Encoder Feedback Offset
Data unit	mm
Data type	REAL
Valid range	-9999999.0 to 9999999.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is mainly used for the motor with absolute encoder. The absolute encoder feeds back a random positional value on its first use. Users set this parameter to this value, then the current position is at zero of machine coordinate system.



Note

If the machine coordinate is not zeroed out after this parameter is set to the current coordinate position, press Alt and left or right arrow key to turn to "motor position" (at top right corner of interface) after the gear ratio of axis has been set, and then write down the motor position of each axis.

Encoder feedback offset = Motor position/number of pulses per revolution of axis * screw rod lead (mm)

Example

The motor position is 266700000, the screw rod lead is 4mm, and the number of pulses per axis revolution is 131072. When this position is set to zero of machine X axis, the encoder feedback offset =266700000/131072*4=8139.0381.

5.12 Offset after Reference Point Return

Parameter number	100013
Parameter name	Offset after reference point return
Data unit	mm
Data type	REAL
Valid range	-100.0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

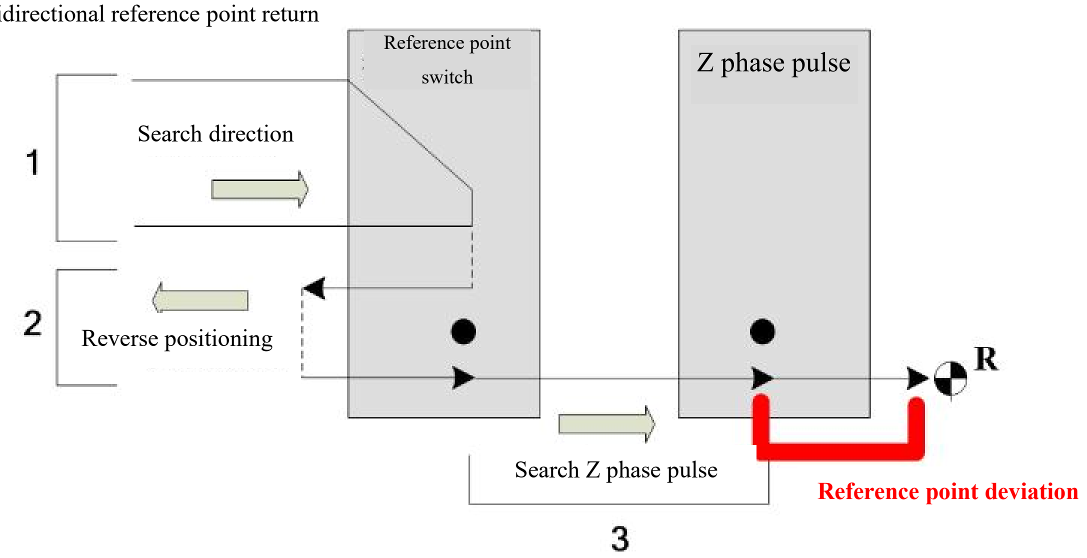
Milling/Turning	Turning, milling

Description

During reference point return, after Z pulse is detected, it may be not treated as the reference point. Then the system continues traveling one deviation value of reference point to a location which is set to the reference point.

0 is the default.

Bidirectional reference point return

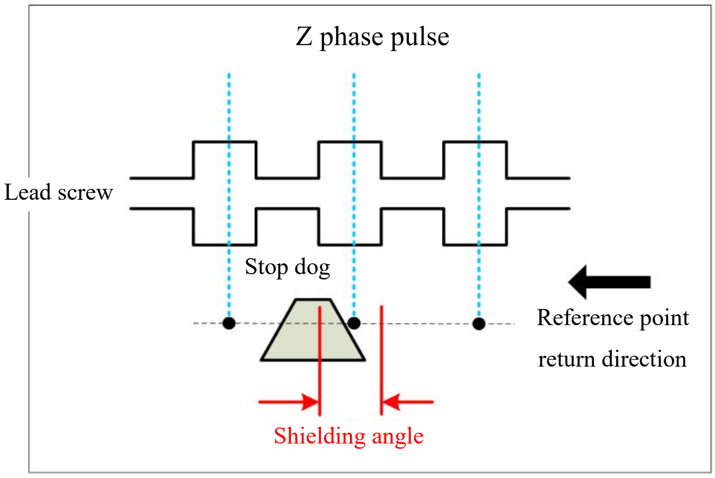


5.13 Reference Point Return: Z Pulse Shielding Angle

Parameter number	100014
Parameter name	Reference point return: Z pulse shielding angle
Data unit	Degree
Data type	REAL
Valid range	0 to 360.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

For the machine with incremental displacement measurement feedback system, if the homing dog of feed axis is too close to the position of motor Z pulse, it may cause a difference of one screw pitch between two reference position returns. Set a shielding angle by this parameter to ignore the Z pulse near the reference point signal, and to detect the next Z pulse signal, which ensures position for each reference point return is the same.



Note

This parameter is usually used in the situation that the homing dog has been fixed and cannot be moved and its installation location is not ideal.

Example

When screw rod pitch is 10, Z pulse offset for reference point return is 9.8 (users can view "Z pulse offset" for each reference point return in the indication-value display bar), which means that the homing stopper is very close to Z pulse position. At this point Z pulse shielding angle for the reference point return can be set to 180 degrees (half of the screw pitch), then Z pulses within first half of the screw pitch can be ignored in the event of Z pulse search.

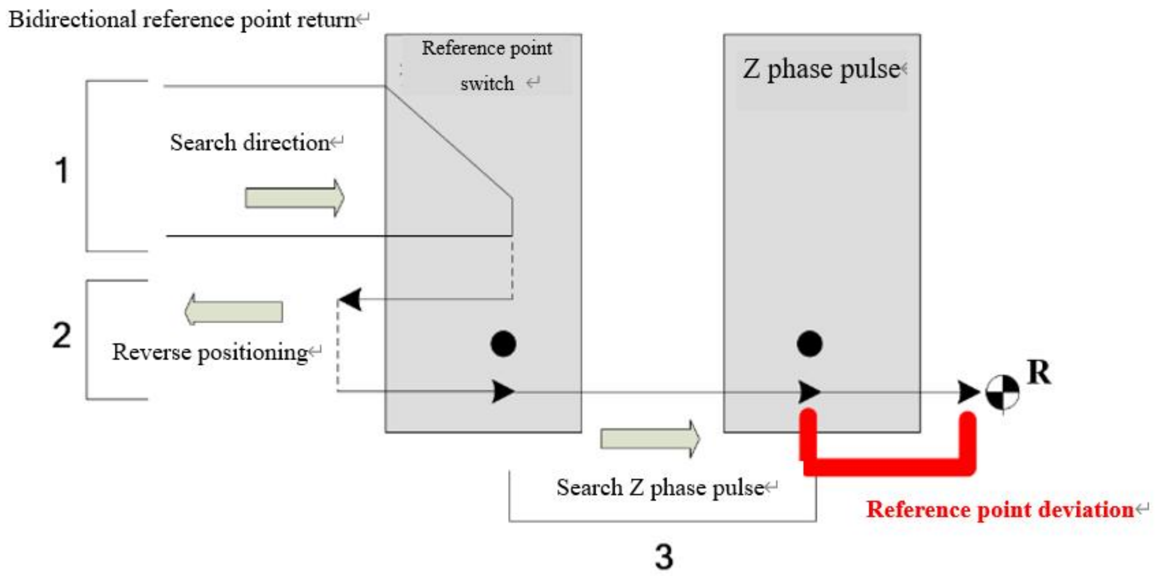
5.14 Reference Point Return High Speed

Parameter number	100015
Parameter name	Reference point return high speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 10000.0
Default value	3000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

During reference point return, to set the rapid-traverse speed before the reference point switch is pressed. This speed unit for the rotary axis is mm/min. The speed at which the rotary axis performs high-speed reference point return is related with the two parameters: the axis speed in reference point return and PARM100031.

Speed at which the rotary axis performs high-speed reference point return = Axis speed in reference point return *2 *PI *Converted radius of rotary axis



Note

This parameter setting must be smaller than the highest speed of rapid traverse. If the speed to return to reference point is set too high, the distance between reference point switch and limit switch nearby should not be too small to avoid excessively quick speed of reference point return which may result in an emergency stop for the limit switch being pushed before machine slows down. In addition, effective travel of reference point switch must not be too short (If the travel is too short, the machine will pass the reference point switch before slowing down to cause a reference point return failure).

Example

If the rotary axis performs high-speed reference point return at the speed of 100 revolutions, PARM100031 "converted radius of rotary axis" is 57.3.

Speed of high-speed reference point return is100*57.3*3.14*2=35984.4。

This parameter is set to 36000.

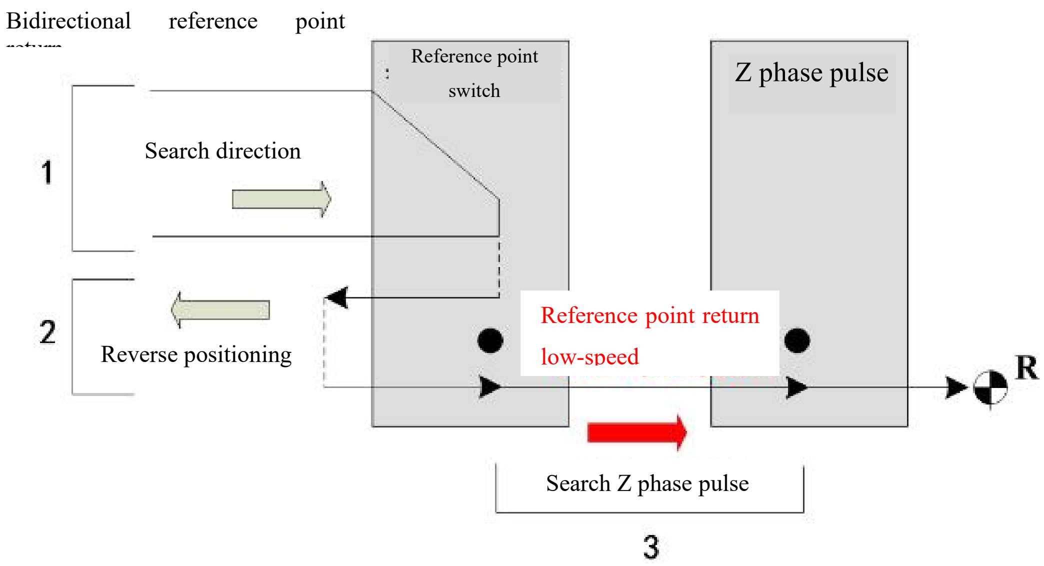
5.15 Reference Point Return Low Speed

Parameter number	100016
Parameter name	Reference point return low speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 2000.0
Default value	500
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

During reference point return, to set the traverse speed in deceleration positioning after the reference point switch is pressed. The unit of this speed is mm/min for rotary axis. The speed at which the rotary axis performs low-speed reference point return is related with the two parameters: the axis speed in reference point return and PARM100031.

The speed at which the rotary axis performs low-speed reference point return = Axis speed in reference point return*2*PI*Converted radius of rotary axis



Note

"Working mode" of axis in the device parameters must be set to 1 (incremental encoder type).

Example

If the rotary axis performs low-speed reference point return at the speed of 50 revolutions, PARM100031 "converted radius of rotary axis" is 57.3.

The speed at which the rotary axis performs low-speed reference point return is 50*57.3*3.14*2=17992.2。

This parameter is set to 18000.

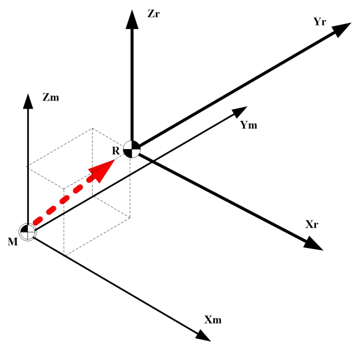
5.16 Reference Point Coordinate

Parameter number	100017
Parameter name	Reference point coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is mainly for distance-coded reference point return which is the nearby reference point return. The location, after the reference point return is done, is not the same for each time. A positional value is fed back on the first distance-coded reference point return, if users set this point to machine zero, this parameter can be set to this value. At this point the current position is at zero of machine coordinate system. This parameter is effective for both incremental motor and absolute motor, and it can change the coordinate value of machine zero.

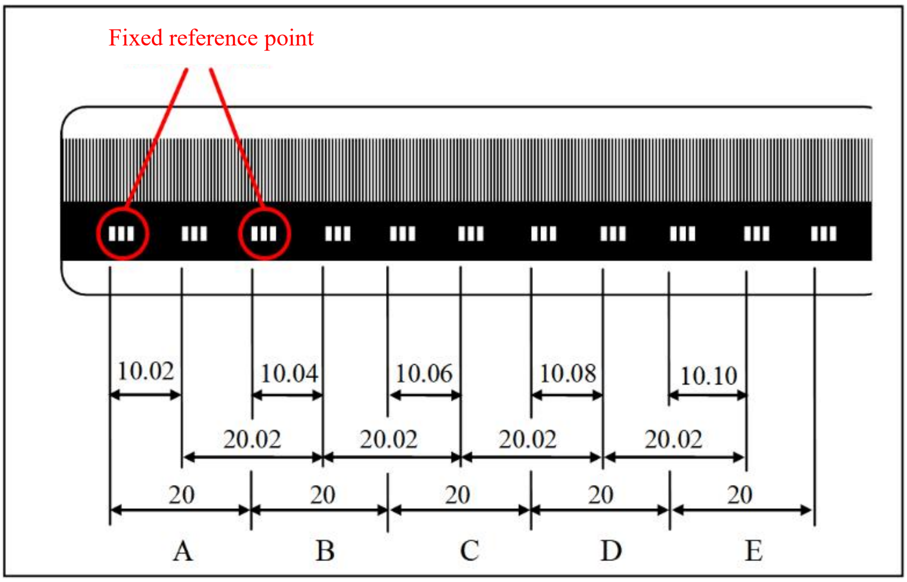


5.17 Distance-coded Reference Point Interval

Parameter number	100018
Parameter name	Distance-coded reference point interval
Data unit	mm
Data type	REAL
Valid range	0 to 100.0
Default value	20.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When incremental grating scale measurement system uses the distance-coded reference point, this parameter is to set the distance between two adjacent fixed reference points.

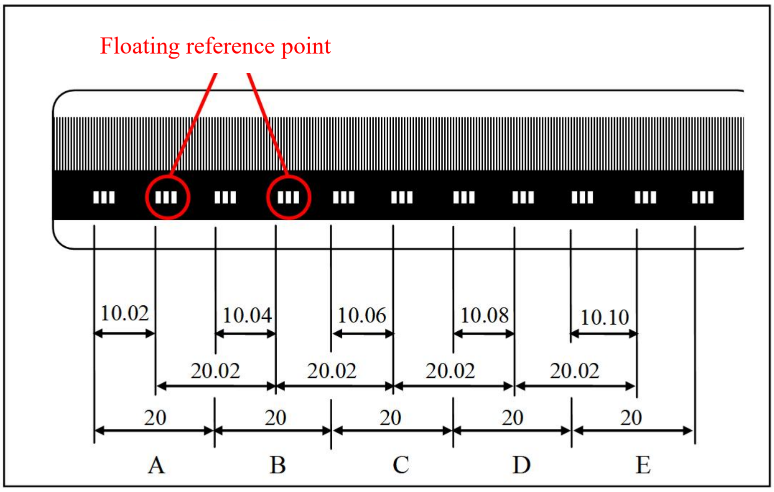


5.18 Interval Coding Deviation

Parameter number	100019
Parameter name	Interval coding deviation
Data unit	mm
Data type	REAL
Valid range	0.001 to 1.0
Default value	0.02
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When incremental grating scale measurement system uses the distance-coded reference point, this parameter is to set the incremental interval difference between the floating reference point and fixed reference point.

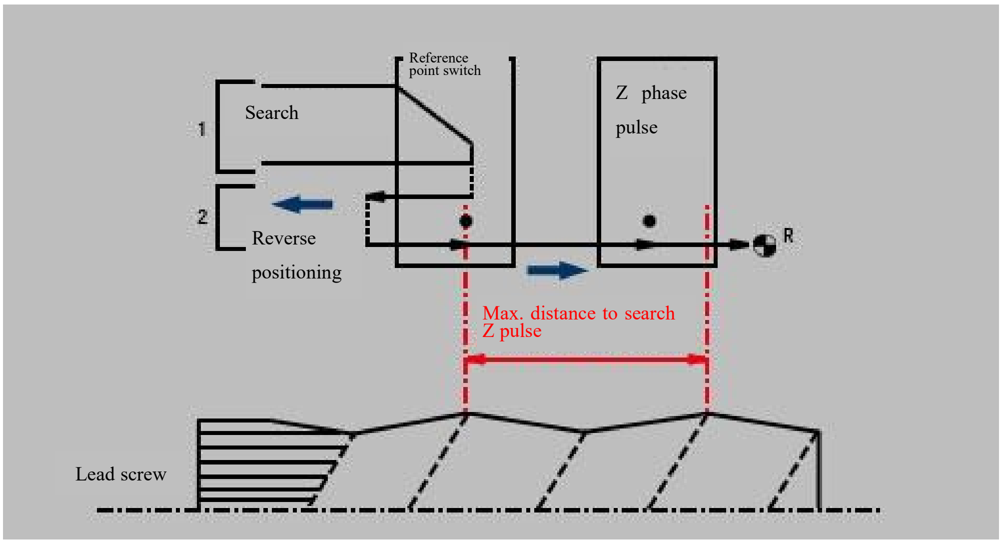


5.19 Maximum Search Distance for Z Pulse

Parameter number	100020
Parameter name	Maximum Search Distance for Z Pulse
Data unit	mm
Data type	REAL
Valid range	0 to 1000.0
Default value	10
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the distance where Z pulse is to be searched.



Note

Generally, the search distance for Z pulse is within one lead screw pitch.

Example

If a screw pitch is 10, the maximum search distance for Z pulse is 10.

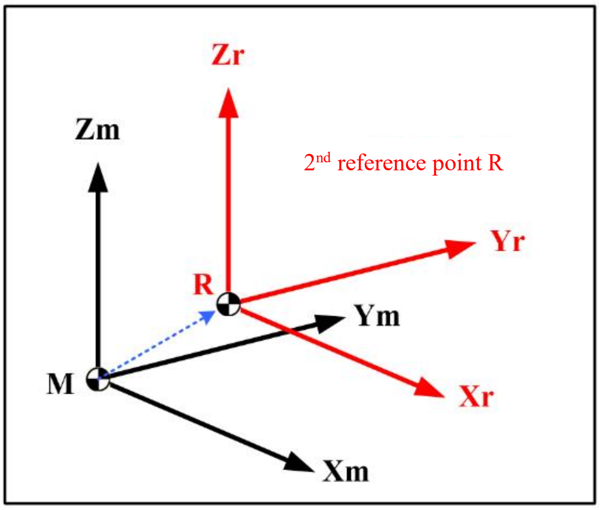
5.20 2nd Reference Point Coordinate

Parameter number	100021
Parameter name	2nd reference point coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0

Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Up to 5 reference points in the machine coordinate system can be specified in this system. This parameter is to set the coordinate value of the second reference point. The return to the reference point can be performed by the command G30 P2.



Note

When the actual machine position is in the coordinate of the second reference position, F (logical axis number *80).8 is 1. This register can determine whether axis is at the tool-changing point during tool changing.

Example

Axis 0, axis 1 and axis 2 respectively move to the second reference position. When the three bits of F0.8, F80.8, and F160.8 in ladder diagram are 1, the machine has been in the second reference position.

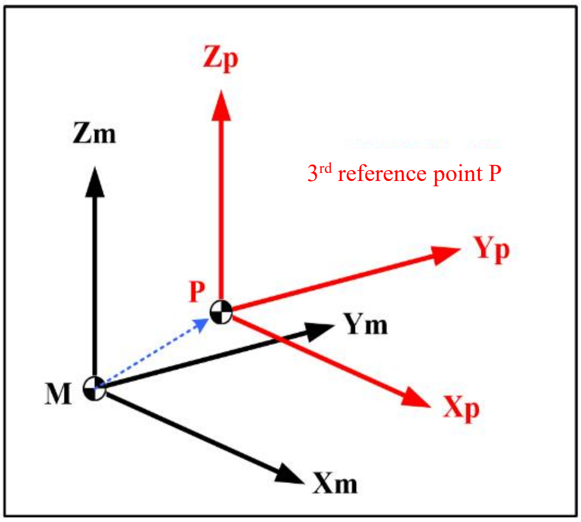
5.21 3rd Reference Point Coordinate

Parameter number	100022
Parameter name	3rd reference point coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Up to 5 reference points in the machine coordinate system can be specified in this system. This parameter is to set the coordinate value of the third reference point. The return to the reference point can be performed by the command G30 P3.



Note

When the actual machine position is in the coordinate of the third reference position, F (logical axis number *80).9 is 1. This register can determine whether axis is at the tool-changing point during tool changing.

Example

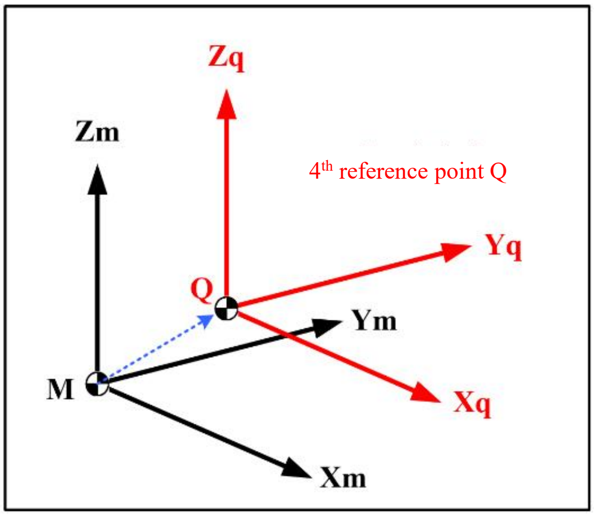
Axis 0, axis 1 and axis 2 respectively move to the third reference position. When the three bits of F0.9, F80.9, and F160.9 in ladder diagram are 1, the machine has been in the third reference position.

5.22 4th Reference Point Coordinate

Parameter number	100023
Parameter name	4th reference point coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Up to 5 reference points in the machine coordinate system can be specified in this system. This parameter is to set the coordinate value of the fourth reference point. The return to the reference point can be performed by the command G30 P4.



Note

When the actual machine position is in the coordinate of the fourth reference position, F (logical axis number *80).10 is 1. This register can determine whether axis is at the tool-changing point during tool changing.

Example

Axis 0, axis 1 and axis 2 respectively move to the fourth reference position. When the three bits of F0.10, F80.10, and F160.10 in ladder diagram are 1, the machine has been in the fourth reference position.

5.23 5th Reference Point Coordinate

Parameter number	100024
Parameter name	5th reference point coordinate
Data unit	mm
Data type	REAL
Valid range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Up to 5 reference points in the machine coordinate system can be specified in this system. This parameter is to set the coordinate value of the fifth reference point. The return to the reference point can be performed by the command G30 P5.

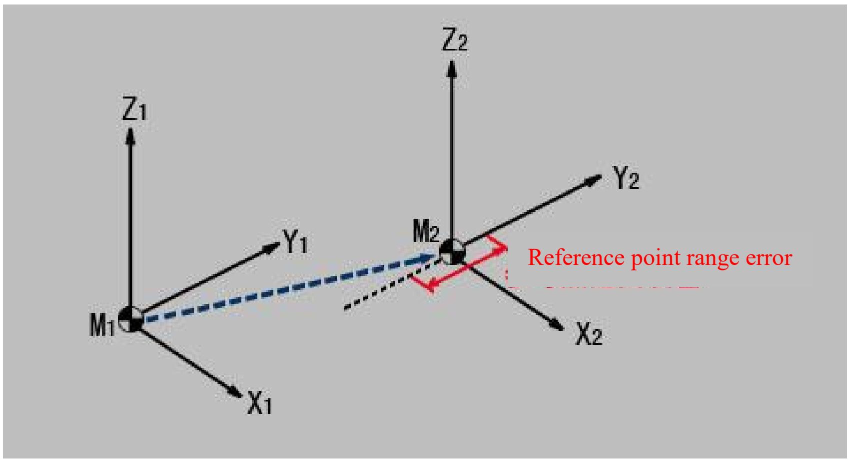
5.24 Reference Point Error Range

Parameter number	100025
Parameter name	Reference point error range
Data unit	mm
Data type	REAL
Valid range	0 to 10.0
Default value	0.01
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to determine whether axis currently is within the range of reference position.

When the positional error between the actual machine position and reference position is less than this parameter, axis has been determined to be at reference point, and the flag of reference-in-position in status word is set to 1.



Note

This parameter can define a deviation range.

5.25 Encoder 2 Electronic Gear Ratio Numerator [Displacement]

Parameter number	100028
Parameter name	Encoder 2 electronic gear ratio numerator
Data unit	um, 0.001deg
Data type	INT4

Valid range	-99999999 to 99999999
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

It is mainly used for full-closed loop and semi-closed loop diagnosis. Direction of the electronic gear ratio numerator in full-closed loop is set the same with that in semi-closed loop.

5.26 Encoder 2 Electronic Gear Ratio Denominator [Pulse]

Parameter number	100029
Parameter name	Encoder 2 electronic gear ratio denominator
Data type	INT4
Valid range	-99999999 to 99999999
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

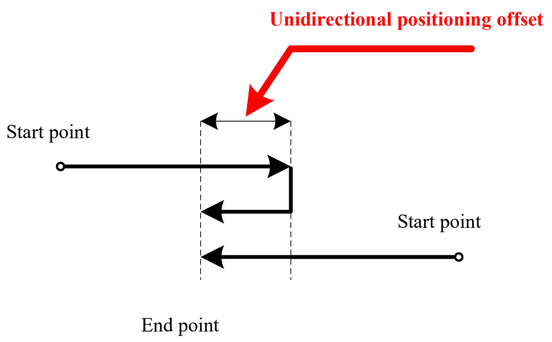
It is mainly used for full-closed loop and semi-closed loop diagnosis. Electronic gear ratio denominator in full-closed loop.

5.27 Unidirectional Positioning (G60) Offset

Parameter number	100030
Parameter name	Unidirectional positioning (G60) offset
Data unit	mm
Data type	REAL
Valid range	-100.0 to 100.0
Default value	10
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To eliminate the influence of backlash of feed screw nut at the time of positioning, the coordinate axis can be specified to go to the target position in a fixed direction. That is, whether end point is in positive direction or negative direction of start point, the direction which is close to end point is fixed. When this parameter is set to a positive value, positive positioning is performed with G60; when this parameter is set to a negative value, negative positioning is performed with G60. When positioning direction with G60 is in opposite to specified motion direction, axis continues moving a distance after getting to the end point, then moves to the end point in opposite to the direction specified by G60. This parameter is to specify this distance and positioning direction of G60.



Note

The value set by this parameter should be greater than the backlash of corresponding axis.

5.28 Converted Radius of Rotary Axis

Parameter number	100031
Parameter name	Converted Radius of Rotary Axis
Data unit	mm
Data type	REAL
Valid range	0.0001 to 10000.0
Default value	57.3
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the radius of current rotary axis. This parameter sets the rotary axis speed from angular speed to linear speed.

Maximum speed (mm/min) of rotary axis = Maximum speed of axis *2*PI* Converted radius of rotary axis

Note

The angle is 360 degrees per rotary axis revolution. If the rotary axis needs to rotate one revolution in a minute, the linear speed will be 360mm/min.

360=2∏R

R=360/2 /∏=57.3

Thus, the converted radius of rotary axis should be 57.3.

Example

The maximum speed of rotary axis is 3000 revolutions and converted radius of rotary axis is 57.3mm.

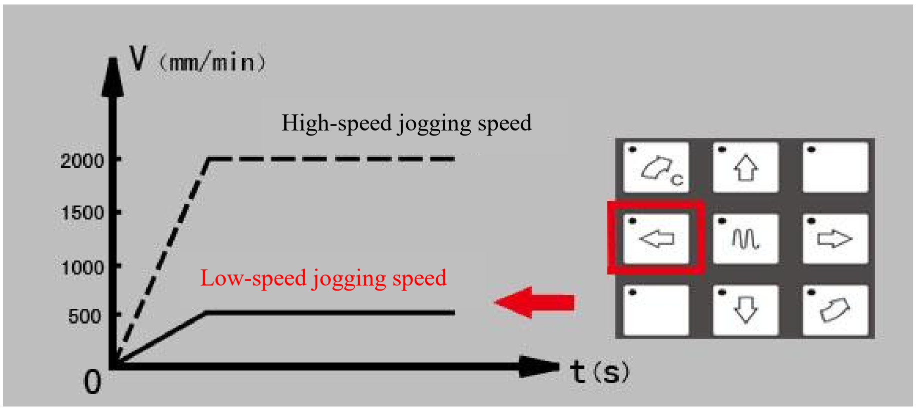
Maximum speed of current axis =3000*2*3.1415*57.3=1079532mm/min。

5.29 Low-speed Jogging Speed/High-speed Jogging speed

Parameter number	100032/100033
Parameter name	Low-speed jogging speed/High-speed jogging speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 3600000.0
Default value	2000/4000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Tu	Turning, milling

Description

To set the speed at which the low-speed jogging speed and high-speed jogging speed in JOG mode.



Note

When axis performs axis moving in JOG mode, the speed of axis is influenced by feedrate override.

Rotary axis is influenced by converted radius of rotary axis.

5.30 Maximum Rapid Traverse Speed

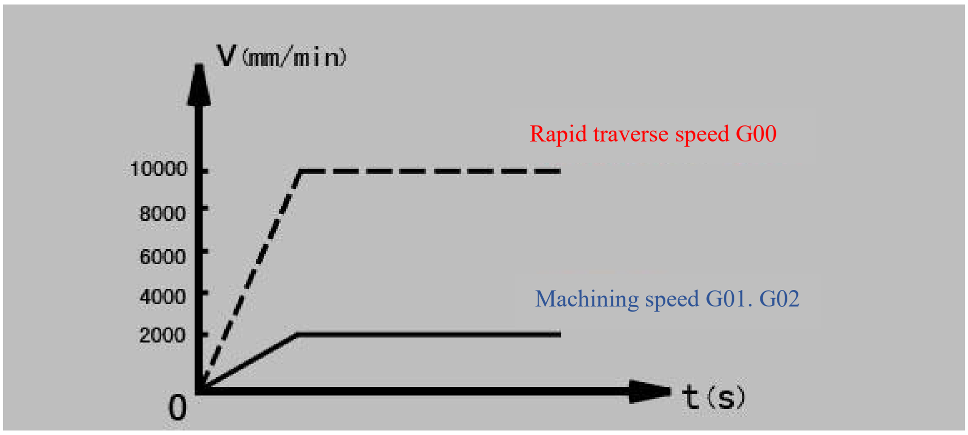
Parameter number	100034

Parameter name	Maximum rapid traverse speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 3600000
Default value	8000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the upper limit of speed in rapid traverse positioning (G00)

Maximum speed of rotary axis in rapid traverse = Maximum axis speed *2 * PI * Converted radius of rotary axis



Note

Maximum rapid traverse speed must be the largest value of all parameters of speed setting for this axis. The maximum rapid traverse speed is closely related to the ratio of numerator to denominator of external pulse equivalent. This parameter must be reasonably set, which must not be out of range of the motor speed. i.e. A rated motor speed is 2000 revolutions per minute. The motor is connected to a ball screw of 6mm lead through a pair of synchronous belts with the transmission ratio 1:1.5.

Maximum rapid traverse speed ≤2000×（1/1.5）×6= 8000mm/min.

Rotary axis is influenced by converted radius of rotary axis.

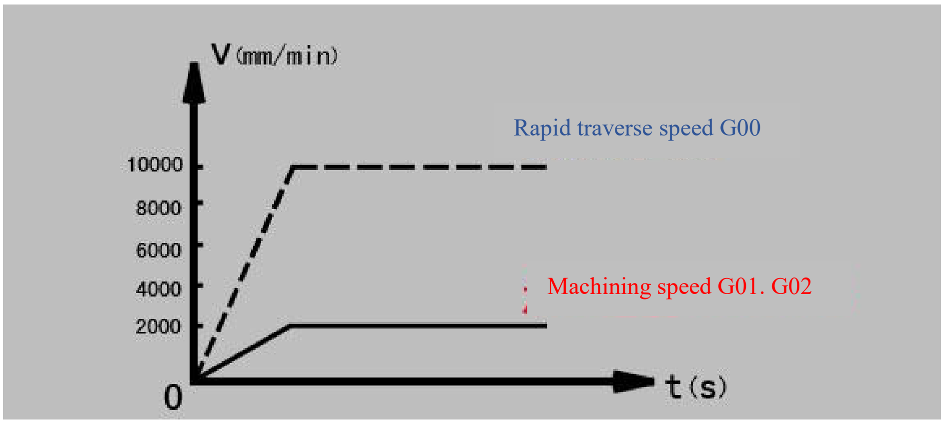
5.31 Maximum Machining Speed

Parameter number	100035
Parameter name	Maximum machining speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 3600000

Default value	6000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the upper limit of speed at which the axis moves in machining (G01, G02, etc.).



Note

This parameter is relevant to the machining requirements, mechanical transmission, and load. The maximum processing speed must be lower than the maximum rapid traverse speed.

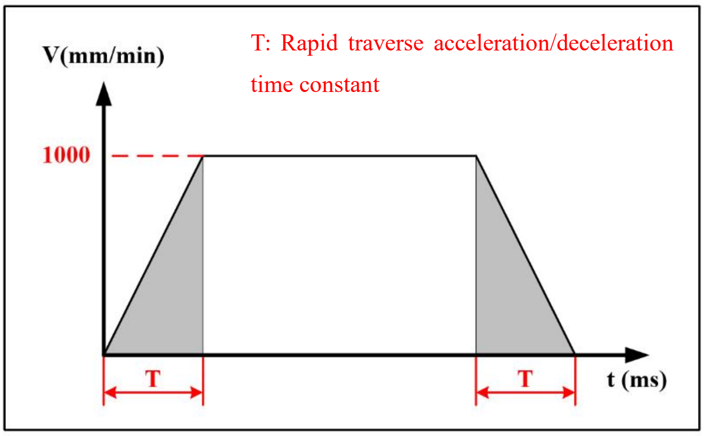
Rotary axis is influenced by converted radius of rotary axis.

5.32 Rapid Traverse Acceleration Deceleration Time Constant

Parameter number	100036
Parameter name	Rapid traverse acceleration deceleration time constant
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	5
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter specifies the time that the speed of linear axis goes from 0 to 1000mm/min or from 1000mm/min to 0 during rapid traverse (G00). This parameter determines the acceleration of axis in rapid traverse. The larger this time constant, the slower the acceleration and deceleration.



Note

This parameter is set based on motor inertia, load inertia, and drive acceleration ability.

The comparison of common acceleration deceleration time constant with acceleration is as follow:

Rapid traverse acceleration deceleration time constant	2ms	8ms	16ms	32ms	64ms
Acceleration	1g	0.2g	0.1g	0.05g	0.02g

Example

If the time constant of rapid traverse acceleration deceleration is set to 4ms, the acceleration in rapid traverse will be calculated as below:

1000mm/60s≈16.667mm/s

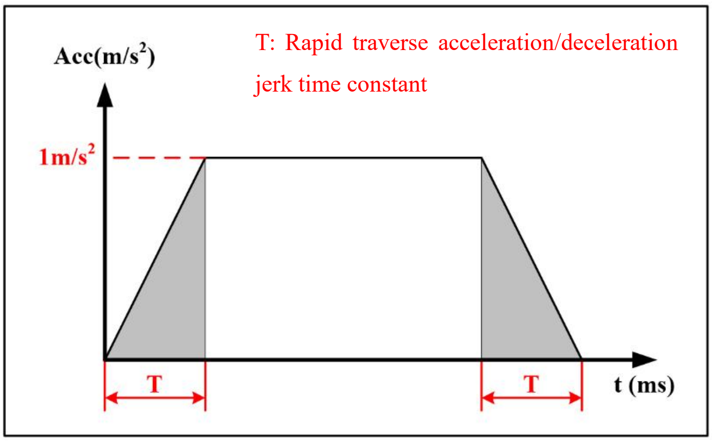
16.667/0.004≈4167mm/s^2 ≈0.425g (1g=9.8m/s^2)

5.33 Rapid Traverse Acceleration Deceleration Jerk Time Constant

Parameter number	100037
Parameter name	Rapid traverse acceleration deceleration jerk time constant
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	32
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter specifies the time that the acceleration of axis increases from 0 to 1 m/s^2 or reduces from 1 m/s^2 to 0 in rapid traverse (G00). This parameter determines the jerk in rapid traverse. The larger the time constant, the more gently the acceleration changes.



Note

This parameter is set based on the motor size, drive performance, and the load. This parameter is generally set to the value between 8 and 150.

Example

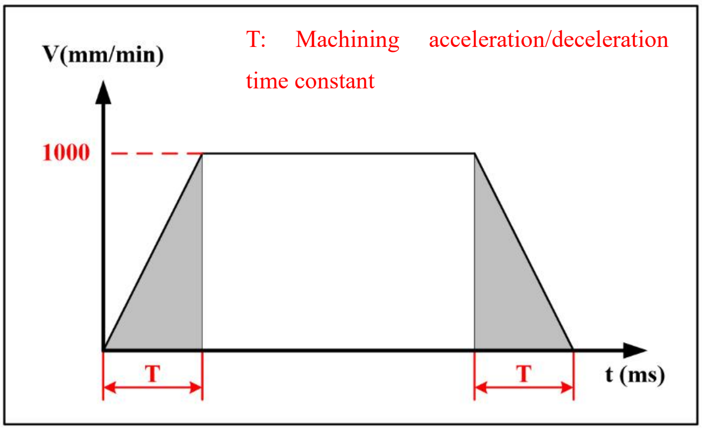
Suppose the acceleration in rapid traverse is 0.2g (1.96m/s^2), the time constant of acceleration and deceleration jerk in rapid traverse is set to 8ms, then the jerk is 1.96/0.008=245m/s^3.

5.34 Machining Acceleration Deceleration Time Constant

Parameter number	100038
Parameter name	Machining acceleration deceleration time constant
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	10
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the time that the speed of linear axis goes from 0 to 1000mm/min or from 1000mm/min to 0 during the machining such as G01, G02 and the like. This parameter determines the axis acceleration of machining. The larger the time constant of acceleration and deceleration in machining, the slower the acceleration and deceleration.



Note

This parameter is set based on the moment of inertia of motor, moment of inertia of load, acceleration capabilities of drive.

The comparison of common time constant with acceleration is as follows:

Machining acceleration deceleration time constant	2ms	8ms	16ms	32ms	64ms
Acceleration	1g	0.2g	0.1g	0.05g	0.02g

Example

The time constant of acceleration and deceleration in machining is set to 6ms, then the machining acceleration is calculated as below:

1000mm/60s≈16.667mm/s

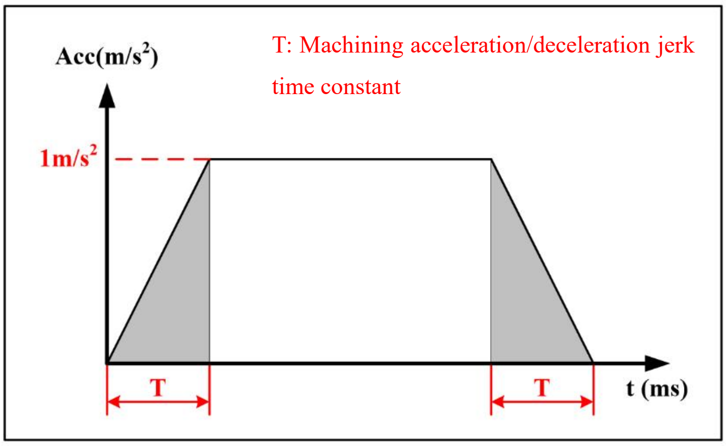
16.667/0.006≈2778mm/s^2≈0.283g (1g=9.8m/s^2)

5.35 Machining Acceleration Deceleration Jerk Time Constant

Parameter number	100039
Parameter name	Machining acceleration deceleration jerk time constant
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	32
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the time that the acceleration of axis increases from 0 to 1 m/s^2 or reduces from 1 m/s^2 to 0 during the machining such as G01, G02 and the like. This parameter determines the axis jerk of in machining. The larger the time constant, the more gently the acceleration changes.



Note

This parameter is set based on the motor size, drive performance, and the load. This parameter is generally set to the value between 8 and 150.

Example

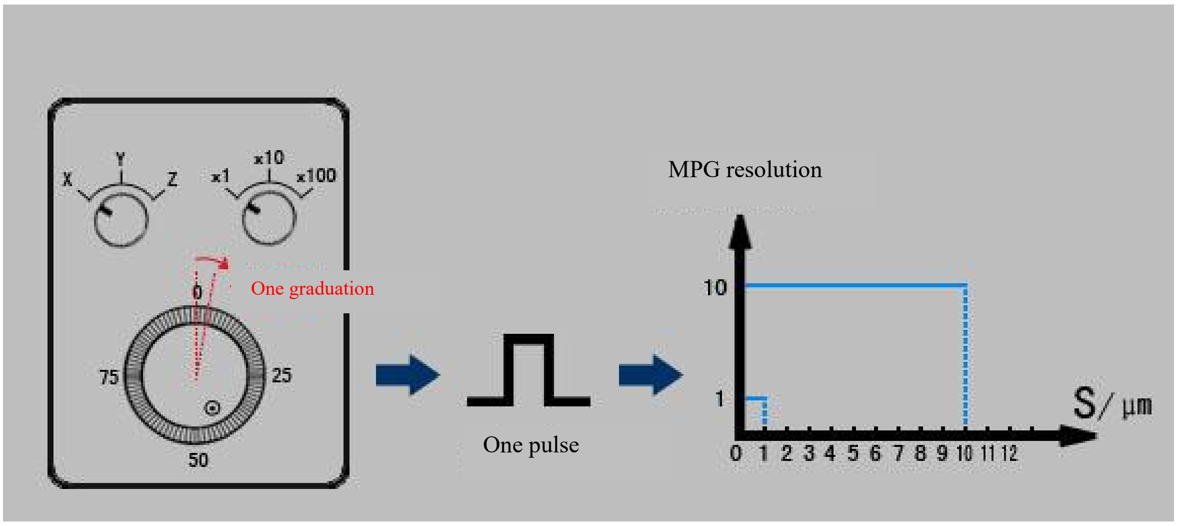
Suppose the machining acceleration is 0.05g (0.49m/s^2), the time constant of acceleration and deceleration in machining is set to 128ms, then the jerk is 0.49/0.128≈3.8m/s^3.

5.36 MGP Pulse Resolution

Parameter number	100043
Parameter name	MPG pulse resolution
Data unit	um
Data type	REAL
Valid range	0.001 to 1000.0
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the distance that the axis travels as the manual pulse generator is rotated one graduation to generate one pulse when the handwheel override is ×1.



Note

When Parm010001 "machine type in workstation" is set to 1 (lathe), and Parm040032 "Diameter/Radius programming" is also set to 1, the MPG pulse resolution corresponding to X axis needs to be set to 0.5.

Example

For lathe in the handwheel mode, if X axis needs to move 0.0001mm as the manual pulse generator is rotated one graduation, this parameter should be set to 0.05. If Z axis needs to move 0.0001mm as the manual pulse generator is rotated one graduation, this parameter should be set to 0.1.

5.37 MPG Grading Speed

Parameter number	100044
Parameter name	MPG grading speed mm/min
Data unit	Interpolation period
Data type	REAL
Valid range	10 to 3600000
Default value	500
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

There are two modes of traverse speed when rotating MPG:

In the first mode, tool can move to the specified position in effective time, and the maximum MPG speed is executed; in the second mode, tool cannot move to the specified position in effective time, the generated pulse which is not executed moves the axis at this set speed.

5.38 Number of MPG Buffering Periods

Parameter number	100045
Parameter name	Number of MPG buffering periods
Data unit	Interpolation period
Data type	INT4
Valid range	0 to 10000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the MPG is rotated within the number of MPG buffering periods, the machine moves at a low speed. When the number of MPG buffering periods is exceeded, the machine accelerates.

5.39 MPG Smoothing Period

Parameter number	100046
Parameter name	MPG smoothing period
Data unit	Interpolation period
Data type	INT4
Valid range	10 to 1000
Default value	50
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set how far the axis overshoots atter rapid rotation of MPG stops suddenly.

The larger the parameter is set, the father the axis overshoots.

When the parameter is set too small, the pulse that the axis doesn’t move will be discarded.

5.40 MPG Maximum Speed

Parameter number	100047
Parameter name	MPG maximum speed
Data type	REAL
Valid range	0.0 to 3600000.0

Default value	6000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter sets the allowable maximum speed during rotation of MPG.

5.41 Overspeed Alarm Coefficient

Parameter number	100048
Parameter name	Overspeed alarm coefficient
Data type	REAL
Valid range	1.1 to 2.0
Default value	1.3
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter sets the coefficient when the system issues the axis overspeed alarm, that is, when the actual speed of axis is over the product of this system and the axis command speed, the system will alarm the axis overspeed.

5.42 1m/min Tracking Error in Threading Repair

Parameter number	100049
Parameter name	1m/min tracking error in threading repair
Data type	REAL
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is used to set the necessary parameter “1m/min tracking error” that needs to be predicted during threading repair and threading at variable speed.

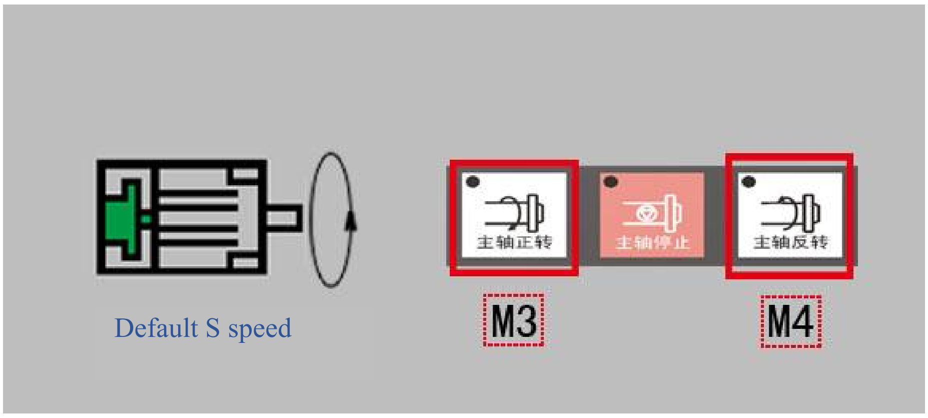
Use different speeds to turn the same thread without messy teeth, so as to realize the rough machining and finishing of thread turning with different speeds. Variable speed threading and thread repair functions must be based on the thread lead direction to set the X or Z axis 1xx049 axis parameter [1m/min tracking error (mm)]. If this parameter is not set or set incorrectly, it may cause disordered teeth.

5.43 Default Speed S

Parameter number	100050
Parameter name	Default Speed S
Data unit	rad/min
Data type	REAL
Valid range	0 to 100000.0
Default value	100.0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When the spindle is set to a clockwise rotation (M03) or a counterclockwise rotation (M04) without speed S, the default speed S which is specified by this parameter is used.



Note

If in a block, the spindle speed is specified after M3 command, then in the next block, M3 command without spindle speed specified will be executed at the speed specified in the last block. The default speed S only can work in the situation that the spindle speed has never been specified.

Example

If this parameter is set to 1000, the speed at which M3 is executed or the spindle rotates clockwise will be 1000rev/min.

5.44 Allowable Spindle Speed Fluctuation Rate

Parameter number	100052
Parameter name	Allowable spindle speed fluctuation rate
Data type	REAL
Valid range	0 to 1
Default value	0.15
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to check whether it is normal that the spindle rotation speed is fluctuated within a certain range based on the situation of machine.

The actual fluctuation range of spindle speed = ±command spindle speed * allowable fluctuation rate of spindle speed

5.45 Allowable Spindle Speed Fluctuation Rate in Threading

Parameter number	100054
Parameter name	Allowable spindle speed fluctuation rate in threading
Data type	REAL
Valid range	0.0 to 1.0
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter sets the allowable fluctuation rate of spindle speed during threading.

5.46 Feed Spindle Orientation Angle

Parameter number	100055
Parameter name	Feed spindle orientation angle
Data unit	Degree
Data type	REAL
Valid range	0 to 360
Default value	0

Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the angle for spindle orientation after the feed axis motor is switched the motor used for spindle.

Note

This parameter is effective only in the situation that the axis parameter is set to 9, and the motor for feed axis is used for spindle.

5.47 Feed Spindle: Zero Speed Tolerance

Parameter number	100056
Parameter name	Feed spindle zero speed tolerance
Data unit	Pulse
Data type	INT4
Valid range	0 to 10000
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to determine whether the spindle is at zero speed or not after the motor for feed axis is used for spindle.

Note

This parameter is effective only in the situation that the axis parameter is set to 9, and the motor for feed axis is used for spindle.

5.48 Maximum Period Overlapping of External Commands

Parameter number	100057
Parameter name	Maximum period overlapping of external commands
Data type	REAL
Valid range	0 to 1
Default value	1

Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used for the supportable movement amount per period at the time of handwheel interruption. When smaller than this value, system will move the handwheel interruption amount based on this value; when larger than this value, system will move this value.

Note

Excessively large value of this parameter may cause machine overspeed.

5.49 Externally Import Load

Parameter number	100058
Parameter name	Externally import load
Data type	BOOL
Valid range	0 to 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0 is the default value.

0: Display data of load current is obtained from drive;

1: Display data of load current is obtained from G[axNo80+65].

5.50 Thread Cutting Start Tolerance

Parameter number	100059
Parameter name	Thread cutting start tolerance
Data type	REAL
Valid range	0 to 0.1
Default value	0.003
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

5.51 Positioning Tolerance

Parameter number	100060
Parameter name	Positioning tolerance
Data unit	mm
Data type	REAL
Valid range	0.0 to 1000.0
Default value	0.1
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the allowable error of exact stop in G00 (rapid traverse positioning).

0：The allowable error for positioning doesn’t work on the current axis.

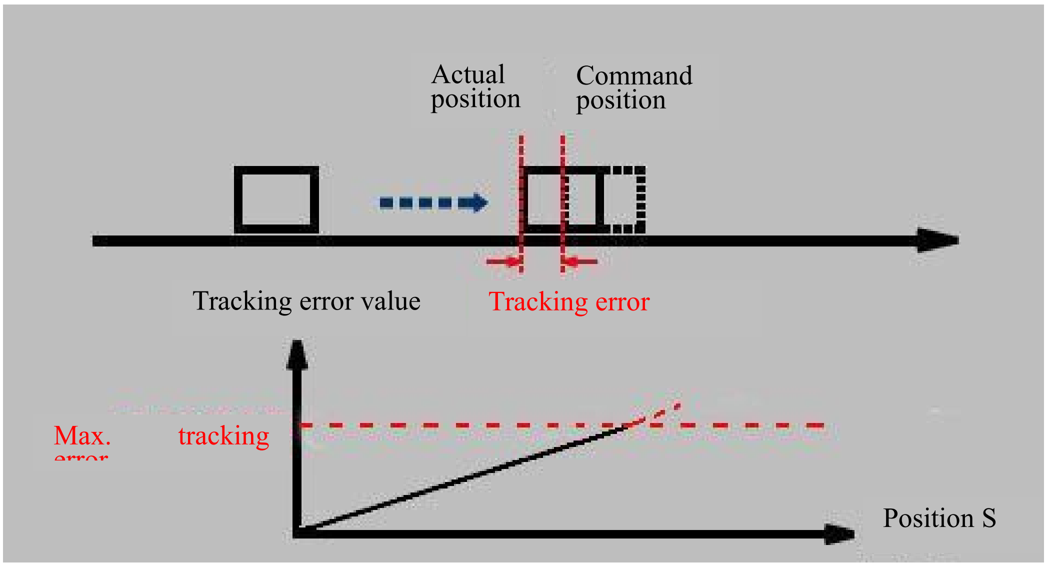
Larger than 0: After the maximum time for exact stop check set by Parm010166 has been reached, if the machine coordinate of current axis is still out of this parameter setting, CNC will alarm.

5.52 Maximum Tracking Error for 1m/min

Parameter number	100061
Parameter name	Maximum tracking error for 1m/min
Data type	REAL
Valid range	0.001 to 1000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the allowable maximum error when coordinate axis moves at 1m per minute. When Parm100090 “encoder working mode” is set to 0, the tracking error is calculated by the servo drive, and CNC directly gets the tracking error from the servo drive. When Parm100090 is set to 1, the tracking error is calculated by system.



Note

During the motion of coordinate axis, CNC monitors in real time whether the following error of axis is in the range set by this parameter. The allowable tracking error is generally between 0.1 and 1. If this parameter is set too small, the system will go down for the large positioning error; if this parameter is set too large, the machining precision will be affected. Generally, the value set by this parameter increases with the machine size and speed; the poorer the mechanical transmission of machine and the accuracy, the larger the set value; the quicker the machine motion speed, the larger this value.

5.53 Auto Adjustment of Flexibility Synchronization

Parameter number	100062
Parameter name	Auto adjustment of flexibility synchronization
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set whether the automatic adjustment function of synchronization axis is enabled.

0： The automatic adjustment function of synchronization axis is disabled.

1： The automatic adjustment function of synchronization axis is enabled.

Note

This parameter takes effect only after the synchronous axis has returned to reference point, and is influenced by Parm100106 “threshold of synchronization position error compensation” and Parm100107 "threshold of synchronization position error alarm".

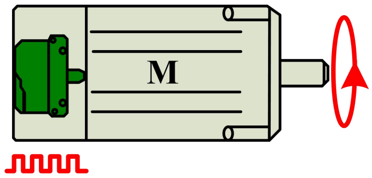
The adjustment can be performed automatically when the synchronization error is larger than the setting of Parm100106 and smaller than the setting of Parm100107; otherwise, the alarm is issued.

5.54 Number of Pulses per Axis Revolution

Parameter number	100067
Parameter name	Number of pulses per axis revolution
Data unit	Pulse
Data type	UINT4
Valid range	1024 to 999999999
Default value	10000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter specifies the number of pulses received by CNC per revolution of axis used, which is the number of pulses feeding back to CNC as the control axis of servo motor or servo drive rotates a revolution. It generally is the actual number of pulses of positional encoder in servo motor. When there is a reduction ratio, it is the number of pulses per motor revolution times reduction ratio.



Example

Number of pulses per motor revolution is 131072, which is driven to axis with a reduction ratio 40:1, then this parameter is set to 5242880 (131072*40).

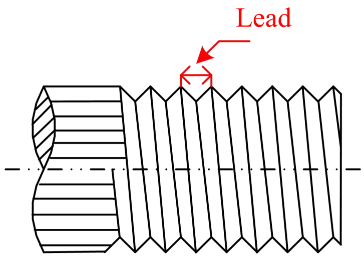
5.55 Lead Screw Lead

Parameter number	100068
Parameter name	Lead screw lead
Data unit	mm
Data type	REAL
Valid range	0 to 99999
Default value	10
Access level	ACCESS_MAC

Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The axial distance between two adjacent teeth.



5.56 Encoder 2: Number of Pulses per Revolution

Parameter number	100076
Parameter name	Encoder 2: number of pulses per revolution
Data type	UINT4
Valid range	1024 to 999999999
Default value	10000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Maily used for full-closed loop/semi-closed loop diagnosis. Number of corresponding full-closed loop pulses per motor revolution.

5.57 Indexing/Positioning Axis Type

Parameter number	100077
Parameter name	Indexing/Positioning axis type
Data type	HEX4
Valid range	0x0 to 0xF
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the type of indexing axis/positioning axis, and to enable the function of automatic release/clamping of the axis.

0：Indexing/positioning axis is disabled, and automatic release/clamping is disabled.

1: When there is a movement command of this axis in the executed G code, system automatically unlocks with the parameter "Indexing/Positioning axis unlock M code", until there is no movement command for this axis in the next block, system will automatically lock with the parameter "Indexing/Positioning axis lock M code".

3: When there is a movement command of this axis in the executed G code, system automatically unlocks with the parameter "Indexing/Positioning axis unlock M code", until the block is completed, system will automatically lock with the parameter "Indexing/Positioning axis lock M code".

5.58 Indexing/Positioning Axis Start Value

Parameter number	100078
Parameter name	Index/Positioning axis start value
Data type	-9999.0000 to 9999.0000
Valid range	REAL
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is to set the starting degree of indexing for the index axis/positioning axis.

5.59 Indexing/Positioning Axis Interval

Parameter number	100079
Parameter name	Index/Positioning axis interval
Data type	0 to 9999.0
Valid range	REAL
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to set the command position of the indexing movement, and it must be an integer multiple of this value. This parameter takes effect only when the indexing/positioning axis is turned on.

5.60 Indexing/Positioning Axis Lock M Code

Parameter number	100080
Parameter name	Indexing/Positioning axis lock M code
Data type	0 to 1000
Valid range	INT4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Corresponding M code for locking the fourth axis, generally 40 is set.

5.61 Indexing/Positioning Axis Unlock M Code

Parameter number	100081
Parameter name	Indexing/Positioning axis unlock M code
Data type	0 to 1000
Valid range	INT4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

Corresponding M code for unlocking the fourth axis, generally 41 is set.

5.62 Rotary Axis Path Mode

Parameter number	100082
Parameter name	Rotary axis path mode
Data type	BOOL
Valid range	1 to 3
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

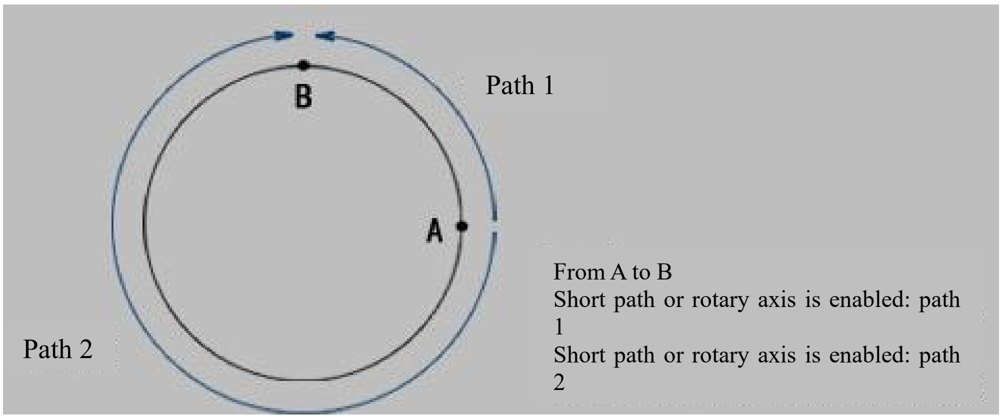
Description

0: General mode. When the command coordinate value is greater than the current position, CW rotation is performed, when smaller than the current position, CCW rotation is performed.

1: Short path rotation mode.

2: Positive-direction rotation mode (unidirectional)

3: Negative-direction rotation mode (unidirectional)



Note

To use this function, Parm100001 Axis Type must be set to 3 (rotary axis type), and the parameter Enable Feedback Position Loop in the device parameters must be set to 1. When the rotary axis is specified in incremental mode, the movement direction of the rotary axis is the sign of the increment, and the movement amount is the command amount.

Example

G90 A0;	Sequence No.	Actual movement	Display value
N1 G90 A-150.0;	N1	-150	210
N2 G90 A540.0;	N2	-30	180
N3 G90 A-620.0;	N3	-80	100
N4 G91 A380.0;	N4	+380	120
N5 G91 A-840.0;	N5	-840	0

5.63 Axis Overload Determination Threshold

Parameter number	100087
Parameter name	Axis overload determination threshold
Data type	REAL
Valid range	0 to 200
Default value	100
Access level	ACCESS_MAC

Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The percentage of axis load current to motor rated current, used for collision protection.

0: Invalid.

Others: Max. value for axis overload determination. When the axis load percentage is larger than this parameter, system will set the axis register to the overload status.

5.64 Indexing Axis Not Move Threshold

Parameter number	100088
Parameter name	Indexing axis not move threshold (mm)
Data type	REAL
Valid range	0.0 to 10.0
Default value	0.1
Access level	ACCESS_USER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When the difference between end position o indexing axis and current coordinates is smaller than this parameter, system determines that the indexing axis doesn't need to be moved. Therefore, locking/unlocking is not performed to increase efficiency.

5.65 Encoder Working Mode

Parameter number	100090
Parameter name	Encoder working mode
Data type	HEX4
Valid range	0x0 to 0xFFFF
Default value	0x100
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter sets the usage of the motor encoder for the specified axis bit by bit, in hexadecimal.

8th bit: tracking error monitoring mode for feed axis.

0：The tracking error is operated by servo drive, and is directly gotten by CNC from servo drive.
1：The tracking error is operated by CNC on an encoder feedback basis.

If the servo drive does not upload the tracking error, and this parameter is set to 0, CNC will not display and monitor the tracking error of feed axis.

12th bit: whether to enable rollover count of absolute encoder.
0： The function of rollover count of absolute encoder is disabled. The pulse counting of absolute encoder is only effective within the range of single count.
1： The function of rollover counting of absolute encoder is enabled. Recording number of rollovers can increase the count range of encoder.

For the linear axis with a super-long travel, and the linear axis or rotary axis with a large reduction ratio, if the absolute encoder is used, the rollover counting function of absolute encoder must be enabled to prevent the machine coordinate from being lost after power off caused by axis running in one direction for a long time.

Note
This parameter is input and displayed in hexadecimal.

Example
There is a rotary axis A (logical axis 3, device 10) with a reduction ratio 180:1. An absolute encoder with 17-bit of single turn, 12-bit of multi-turn is used. To prevent the machine coordinate from being lost after power off caused by axis running in one direction for a long time, the parameters are configured as below.
Coordinate axis parameter PARM103090 “encoder working mode” is set to 0x1100.
Coordinate axis parameter PARM103094 “encoder count bits” is set to 29.
Coordinate axis parameter PARM103067 “number of pulses per axis revolution” is set to 23592960（131078*180）
Device interface parameter PARM510014 “feedback position cycle” is set to 1.
Device interface parameter PARM510015 “number of feedback position cycle pulses” is set to 23592960.

5.66 Encoder Count Bits

Parameter number	100094
Parameter name	Encoder count bits
Data type	INT4
Valid range	12 to 32

Default value	29
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set based on counting bits (single-turn + multi-turn) of absolute rotary pulse encoder. This parameter is set to 0 for the incremental rotary pulse encoder, linear grating ruler, and other types of encoders.

Suppose that the count digits of absolute rotary pulse encoder is N, then count of encoder ranges from 0 to 2^N-1.

Note

This parameter is only valid to the linear axis and swing axis. The setting of this parameter is unnecessary for the rotary axis and spindle.

If the count range of absolute encoder is less than the motion travel of feed axis, the count rollover may occur after the axis runs in one direction for a long time. At that point, 12th bit of coordinate axis parameter PARM103090 “encoder working mode” must be set to 1.

Example

If a linear feed axis is equipped with an absolute rotary pulse encoder, 17-bit single turn (number of encoder pulses per revolution is 2^{17}=131072) and 12-bit multi-turn, this parameter will be set to 17+12=29.

5.67 Establish Zero

Parameter number	100099
Parameter name	Establish zero
Data type	HEX4
Valid range	0x0 to 0x1
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Set by bit. 0: Off; 1: On.

Bit 0: Zero is, 0: established; 1: not established.

5.68 Axis Motion Control Mode

Parameter number	100100
Parameter name	Axis motion control mode
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

PMC axis is the axis which is not controlled by the program command. PMC axis is usually controlled by PLC.

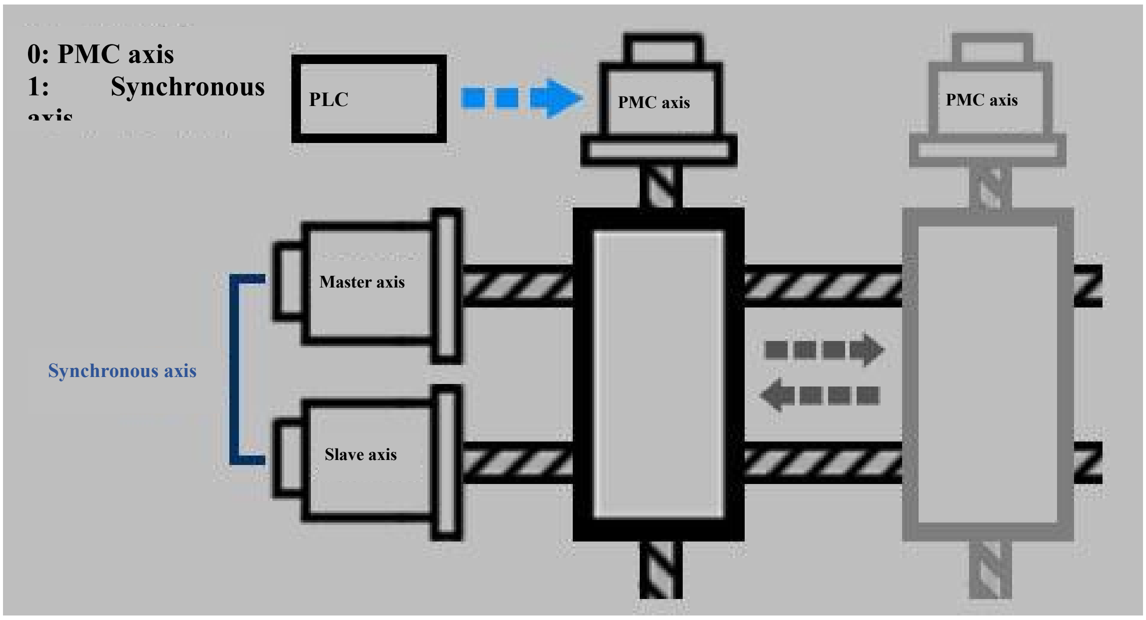
This parameter is to specify the type of current axis, PMC axis and coupling axis. The coupling axis is the axis with a synchronous multi-coupling relationship.

-1: Common axis, which can be spindle, linear axis, and rotary axis.

0: PMC axis.

1: Synchronous axis.

≥2: For future extension.



5.69 Master Axes 1-5 Numbers

Parameter number	100101 to 100105
Parameter name	Master axes 1 to 5 numbers
Data type	INT4
Valid range	-1 to 127

Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

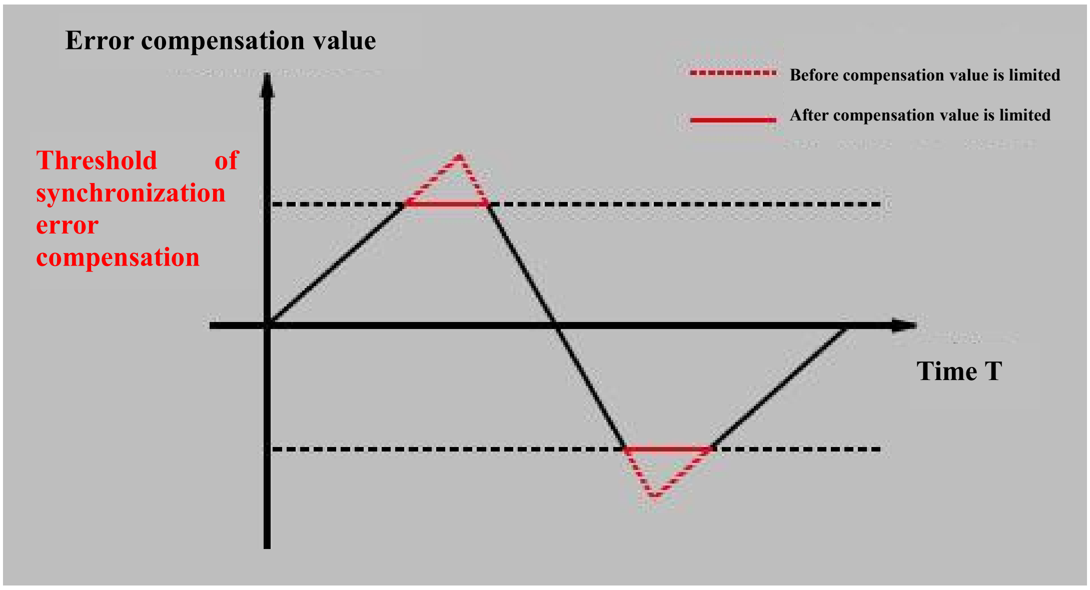
This parameter is to specify the number of master axis which leads the current axis to run synchronously. This parameter is valid only when Parm100100 “type of PMC and coupling axis” is set to 1 (synchronous axis).

5.70 Synchronization Position Error Compensation Threshold

Parameter number	100106
Parameter name	Synchronization position Error compensation threshold
Data unit	mm
Data type	REAL
Valid range	0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the allowable maximum value of synchronization position error compensation.

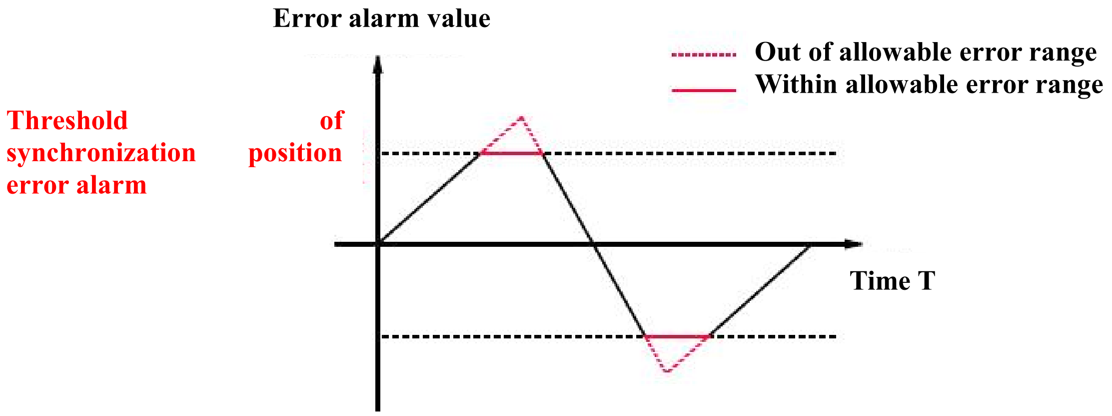


5.71 Synchronization Position Error Alarm Threshold

Parameter number	100107
Parameter name	Synchronization position error alarm threshold
Data unit	mm
Data type	REAL
Valid range	0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the synchronization position error is beyond this parameter setting, an alarm is issued.

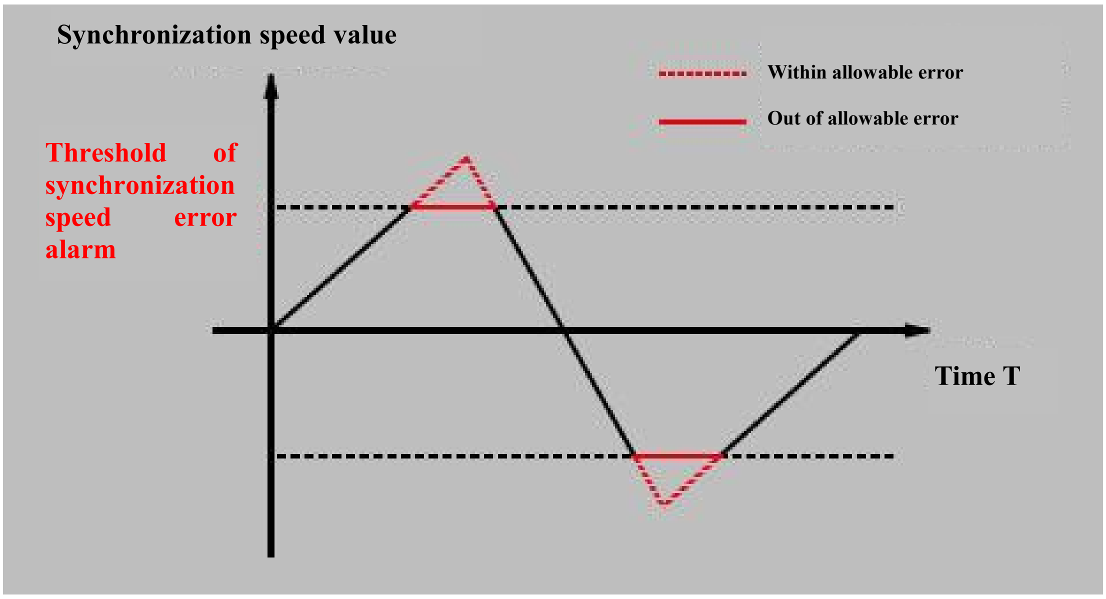


5.72 Synchronization Speed Error Alarm Threshold

Parameter number	100108
Parameter name	Synchronization speed error alarm threshold
Data unit	mm/min
Data type	REAL
Valid range	0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the speed synchronization error is beyond the value set by this parameter, an alarm is issued.

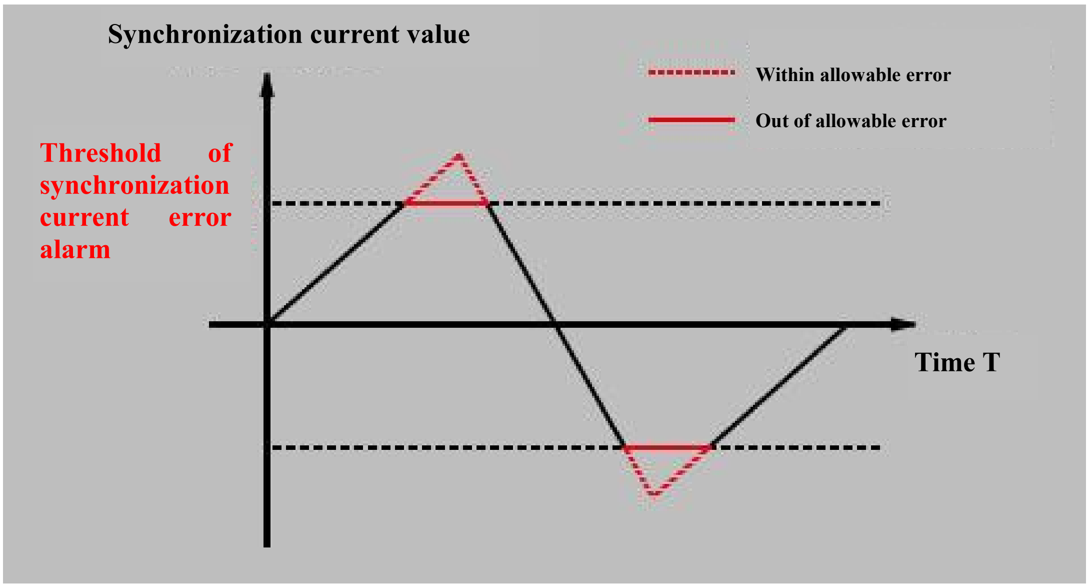


5.73 Synchronization Current Error Alarm Threshold

Parameter number	100109
Parameter name	Synchronization current error alarm threshold
Data unit	Ampere
Data type	REAL
Valid range	0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the synchronization current error is beyond the value set by this parameter, an alarm is issued.



5.74 Slave Axis Display Mode in Synchronization

Parameter number	100126
Parameter name	Slave axis display mode in synchronization
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the workpiece coordinate value calculation mode of the slave axis during the synchronization.

0： The workpiece coordinate of slave axis is calculated by the machine coordinate of it and is displayed.

1： The workpiece coordinate of slave axis is calculated by the machine coordinate of it plus the offset value and is displayed.

2： The workpiece coordinate display of slave axis is consistent with that of master axis.

5.75 Synchronization Axis is Mirrored

Parameter number	100127
Parameter name	Synchronization axis is mirrored
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the command direction of slave axis, when synchronization is performed by G118 without R.

0: During synchronization, the command direction of slave axis is the same with that of master axis.

1: During synchronization, the command direction of slave axis is opposite to that of master axis.

5.76 Synchronous Axis: Inverted Positive Direction

Parameter number	100128
Parameter name	Synchronous axis: inverted positive direction
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the inverted direction of positive direction of slave axis, while the synchronization is being performed by G118. This parameter is effective only when the slave axis display mode is set to 1 at the time of synchronization.

The inverted positive direction of slave axis is,

0： Disabled.

1： Enabled.

5.77 Synchronous Axis: Machine Zero Deviation

Parameter number	100129
Parameter name	Synchronous axis: machine zero deviation
Data unit	mm, degree
Data type	REAL
Valid range	-1000.0000 to 1000.0000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Through this parameter setting, when synchronization is performed with G118, workpiece coordinate of slave axis is displayed after adding to this value. Only when slave axis display mode is set to 1 is this parameter effective.

5.78 Maximum Error Compensation Rate

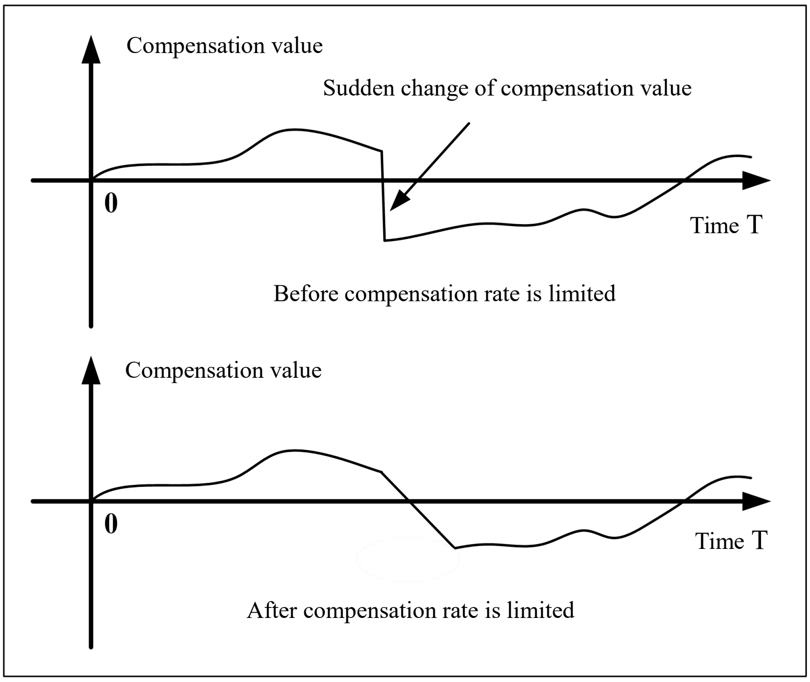
Parameter number	100130

Parameter name	Maximum error compensation rate
Data unit	mm, degree
Data type	REAL
Valid range	0 to 1.0
Default value	0.01
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The setting of this parameter can smooth the comprehensive error compensation value for the current axis to prevent the sudden change of compensation value from impacting the machine.

If the changes of comprehensive error compensation value between adjacent interpolation cycles is larger than the value set by this parameter, system will issue the message "Error compensation rate reaches limit". At that point, the program will continue running, and the change in comprehensive error compensation value will be limited to this maximum value.



Note

The smaller setting of this parameter makes the compensation stable, but reduces the response speed of error compensation.

5.79 Maximum Error Compensation Value

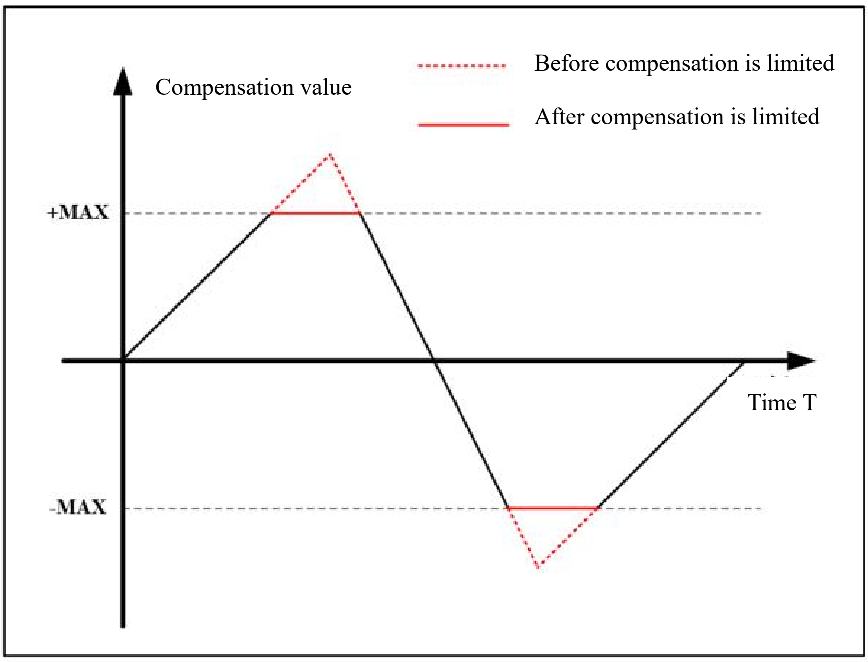
Parameter number	100131
Parameter name	Maximum error compensation value

Data unit	mm, degree
Data type	REAL
Valid range	0 to 10.0
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The allowable maximum displacement error compensation value of the current axis can be set by this parameter.

If the comprehensive error compensation value which is output to the current axis is larger than the value set by this parameter, system will issue the message “Error compensation value reaches limit”. At that point, the program will continue running, and the comprehensive error compensation value will be limited to this maximum value.



5.80 Feed Axis Feedback Deviation

Parameter number	100132
Parameter name	Feed axis feedback deviation (mm)
Data unit	mm, degree
Data type	REAL
Valid range	-10000.0 to 10000.0
Default value	0
Access level	ACCESS_MAC

Activation	ACT_NOW
Milling/Turning	Turning, milling

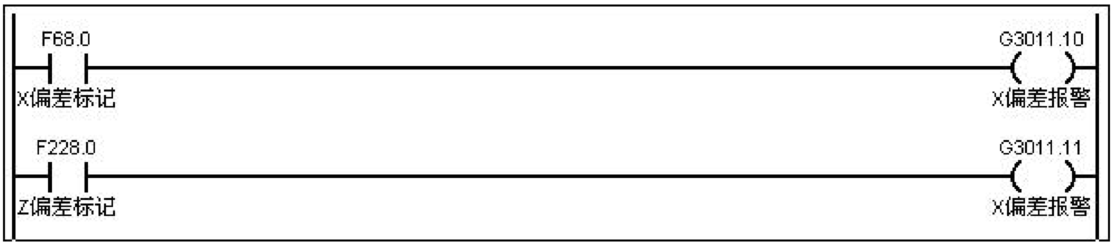
Description

In order to solve the sudden jump of the absolute motor when the power is turned on, set the "feed axis feedback deviation" in the coordinate axis parameters. When the value of this parameter is 0, the sudden jump of the motor position will not be monitored after power-on.

When the positional deviation of axis exceeds this deviation, F[logical axis No. *80+68] is set to 1. Users can decide whether the machine alarms or implements emergency stop based on the state of this register point.

Example

If there are two traverse axes X and Z in lathe, which respectively correspond to logical axes 0 and 1, then F68.0 and F228.0 can be determined.



5.81 Tangential Control: Master Axis Coordinate System Selection

Parameter number	100133
Parameter name	Tangential axis: master axis coordinate system selection
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Machine coordinate system; 1: Current coordinate system of the channel.

5.82 Tangential Control: Leader Axis Wait

Parameter number	100134
Parameter name	Tangential axis: leaser axis wait
Data type	BOOL

Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Disabled;

1: Rotary axis moves to target position, and then leader axis moves.

1 is recommended.

5.83 Tangential Control: Follower Axis Number

Parameter number	100135
Parameter name	Tangential axis: follower axis number
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Moving of follower axis. 0: XY; 1: XZ; 2: YZ.

The leader axis number is set by axis parameter 100101, and the follower axis follows the axis to move.

5.84 Tangential Control: Offset Angle

Parameter number	100136
Parameter name	Tangential axis: offset angle
Data Unit	mm, deg
Data type	REAL
Valid range	-180 to 180
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When the tangential following function is used, if angle is set here, the leader axis will offset the angle value at the time of rotation.

5.85 Tangential Following Deviation

Parameter number	100137
Parameter name	Tangential following deviation
Data Unit	mm, deg
Data type	REAL
Valid range	0.0 to 500.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Distance between offset point of tangential axis and machining point.

5.86 Difference between Full & Semi-closed Loop Alarm Threshold

Parameter number	100138
Parameter name	Difference between full & semi-closed loop alarm threshold
Data Unit	mm, deg
Data type	INT4
Valid range	0 to 99999999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW
Milling/Turning	Turning, milling

Description

Maximum difference between encoder feedback pulse of full-closed loop and semi-closed loop. When the value is exceeded, an alarm will be issued.

5.87 Spindle CS Switching Axis Number

Parameter number	100139
Parameter name	Spindle CS switching axis number
Data type	INT4

Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW
Milling/Turning	Turning, milling

Description

The spindle has two modes: position mode and speed mode. Both modes are used for rotation. The difference is that the speed can be adjusted in speed mode, and the rotation angle can be adjusted in position mode.

The system supports that the position mode or speed mode is the default after power on, and support one-click switching. When the spindle is switched to position mode, a corresponding rotary axis needs to be used to specify programming.

This parameter is used to set which one of the three rotary axes A, B, and C to switch to.

0, 3: Switch to C axis by default.

1: Switch to A axis by default.

2: Switch to B axis by default.

Example

After the conditions for the axis mode switching are met, a command to switch the mode needs to be issued to the axis. The G commands used for the spindle switching mode are as follows (axis 5 is spindle 0 and axis 3 is spindle 1)

G302.14: Axis 3 position mode

G462.14: Axis 5 position mode

G302.15: Axis 3 speed mode

G462.15: Axis 5 speed mode

After confirming to enable the position mode, G302.14 and G462.16 are turned on, and the position mode mark bit R115.2 is also turned on.

After confirming to switch to speed position mode, G302.15 and G462.15 are turned on, and system enters speed mode.

5.88 Invert Spindle Command Speed in Speed mode

Parameter number	100152
Parameter name	Spindle CS switching axis number
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW
Milling/Turning	Turning, milling

Description

To invert the spindle command speed in speed mode.

5.89 Spindle Manual Gear: User Parameter Address

Parameter number	100153
Parameter name	Spindle manual gear: user parameter address
Data type	INT4
Valid range	0 to 999
Default value	300
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

5.90 Number of Spindle Manual Gears

Parameter number	100154
Parameter name	Number of spindle manual gears

Data type	INT4
Valid range	0 to 4
Default value	3
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

5.91 S Command Needs Response

Parameter number	100155
Parameter name	S command needs response
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

0：Automatic gear-changing is disabled.

1：Based on the S command which is input and executed, the system determines which gear stage needs to be switched to, and enables automatic gear-shifting.

5.92 Spindle Analog Output

Parameter number	100156
Parameter name	Spindle Analog Output
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

This parameter is to set the type of spindle.

0：NCUC bus spindle servo.

1：VFC DA spindle.

5.93 Maximum Spindle Motor Speed

Parameter number	100157
Parameter name	Maximum spindle motor speed
Data unit	INT4
Data type	rpm/min
Valid range	0 to 20000
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter, and is to set the maximum speed of spindle motor.

5.94 Number of Spindle Gear Stages

Parameter number	100158
Parameter name	Number of spindle gear stages
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter, and to set the number of spindle gear stages.

5.95 Minimum Spindle Gear Speed

Parameter number	100159, 100165, 100171, 100177
Parameter name	Minimum spindle gear speed
Data unit	INT4
Data type	rpm/min
Valid range	0 to 20000
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter and is to set the minimum speed of spindle at the gear stage.

Parm 100159, Parm 100165, Parm 100171, Parm 100177: Minimum spindle speed at gear stage 1, minimum spindle speed at gear stage 2, minimum spindle speed at gear stage 3, minimum spindle speed at gear stage 4.

5.96 Maximum Spindle Gear Speed

Parameter number	100160, 100166, 100172, 100178
Parameter name	Maximum spindle gear speed
Data unit	INT4
Data type	rpm/min
Valid range	0 to 20000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter, and is to set the maximum speed of spindle at the gear stage.

Parm 100160, Parm 100166, Parm 100172, Parm 100178: Maximum spindle speed at gear stage 1, maximum spindle speed at gear stage 2, maximum spindle speed at gear stage 3, maximum spindle speed at gear stage 4.

5.97 Spindle Gear Transmission Ratio Numerator [Motor Speed]

Parameter number	100161, 100167, 100173, 100179
Parameter name	Spindle gear transmission ratio numerator [Motor Speed]
Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

This parameter is to set the transmission ratio numerator of spindle at the gear stage [motor side].

Parm 100161, Parm 100167, Parm 100173, Parm 100179: Transmission ratio numerator of spindle at gear stage 1 [motor speed], transmission ratio numerator of spindle at gear stage 2 [motor speed], transmission ratio numerator of spindle at gear stage 3 [motor speed], transmission ratio numerator of spindle at gear stage 4 [motor speed].

5.98 Spindle Gear Transmission Ratio Denominator [Spindle Speed]

Parameter number	100162, 100168, 100174, 100180
Parameter name	Spindle gear transmission ratio denominator [Spindle Speed]
Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter and is to set the transmission ratio denominator of spindle at the gear stage [spindle side].

Parm 100162, Parm 100168, Parm 100174, Parm 100180: Transmission ratio denominator of spindle at gear stage 1 [spindle speed], transmission ratio denominator of spindle at gear stage 2 [spindle speed], transmission ratio denominator of spindle at gear stage 3 [spindle speed], transmission ratio denominator of spindle at gear stage 4 [spindle speed].

5.99 Spindle Gear Feedback Electronic Gear Ratio Numerator

Parameter number	100163, 100169, 100175, 100181
Parameter name	Spindle gear feedback electronic gear ratio numerator
Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter, and is to set the feedback reduction ratio (motor side) of spindle at the gear stage. If spindle feedback is the second encoder and is directly connected to spindle, this parameter will be set to 1.

Parm 100163, Parm 100169, Parm 100175, Parm 100181: Feedback electronic gear ratio numerator of spindle at gear stage 1, feedback electronic gear ratio numerator of spindle at gear stage 2, feedback electronic gear ratio numerator of spindle at gear stage 3, feedback electronic gear ratio numerator of spindle at gear stage 4.

5.100 Spindle Gear Feedback Electronic Gear Ratio Denominator

Parameter number	100164, 100170, 100176, 100182
Parameter name	Spindle gear feedback electronic gear ratio denominator
Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter, and is to set the feedback reduction ratio (encoder side) of spindle at the gear stage. If the spindle feedback is the second encoder, and is directly connected to spindle, this parameter will be set to 1.

Parm 100164, Parm 100170, Parm 100176, Parm 100182: Feedback electronic gear ratio denominator of spindle at gear stage 1, feedback electronic gear ratio denominator of spindle at gear stage 2, feedback electronic gear ratio denominator of spindle at gear stage 3, feedback electronic gear ratio denominator of spindle at gear stage 4.

5.101 Enable Speed at Switching Point

Parameter number	100183
Parameter name	Enable Speed at Switching Point
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

When there is an overlap between gear speeds, if the given speed is higher than this parameter setting, and lower than the minimum speed at the target gear stage, the gear changing will start.

0：When there is no overlap between the speeds at gear stages, this parameter is set to 0.

1：When there is an overlap between the speeds at gear stages, this parameter is set to 1.

5.102 Gear Stages 1 & 2: Speed at Switching Point

Parameter number	100184
Parameter name	Gear stages 1 & 2: speed at switching point
Data unit	INT4
Data type	rpm/min
Valid range	0 to 20000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

This parameter is valid when the parameter “enable speed at switching point” is set to 1. When there is an overlap between the speed at gear stage 1 and the speed at gear stage 2, and the specified speed is higher than this parameter setting, the gear changing starts.

5.103 Gear Stages 2 & 3: Speed at Switching Point

Parameter number	100185
Parameter name	Gear stages 2 & 3: speed at switching point
Data type	INT4
Data unit	rpm/min
Valid range	0 to 20000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

This parameter is valid when the parameter “enable speed at switching point” is set to 1. When there is an overlap between the speed at gear 2 and the speed at gear 3, and the specified speed is higher than this parameter setting, the gear changing starts.

5.104 Gear Stages 3 & 4: Speed at Switching Point

Parameter number	100186
Parameter name	Gear stages 3 & 4: speed at switching point
Data type	INT4
Data unit	rpm/min
Valid range	0 to 20000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

This parameter is valid when the parameter “enable speed at switching point” is set to 1. When there is an overlap between the speed at gear 3 and the speed at gear 4, and the specified speed is higher than this parameter setting, the gear changing starts.

5.105 Motor Speed When Spindle Gear change

Parameter number	100187
Parameter name	Motor speed when spindle gear change
Data type	INT4
Data unit	rpm/min
Valid range	0 to 20000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter and is to set the spindle motor speed while the gear changing is being implemented.

5.106 Reference Position Return after Spindle Gear Change

Parameter number	100188
Parameter name	Reference position return after spindle gear change
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is a spindle parameter.

This parameter is to set whether it is necessary to reset the actual feedback pulse of the spindle motor after refinding the encoder Z pulse after the spindle gear stage is switched.

0： Reference position reference is not needed;

1： Reference position reference is needed.

5.107 Number of Feed Axis Gear Stages

Parameter number	100189
Parameter name	Number of feed axis gear stages
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When 2 is set, the function is enabled.

5.108 Feed Axis Gear 1 Transmission Ratio Numerator

Parameter number	100190
Parameter name	Feed axis gear 1 transmission ratio numerator
Data type	INT4
Valid range	-10000 to 10000
Default value	1

Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set transmission ratio numerator when feed axis is at gear stage 1.

5.109 Feed Axis Gear 1 Transmission Ratio Denominator

Parameter number	100191
Parameter name	Feed axis gear 1 transmission ratio denominator
Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set transmission ratio denominator when feed axis is at gear stage 1.

5.110 Feed Axis Gear 2 Transmission Ratio Numerator

Parameter number	100192
Parameter name	Feed axis gear 2 transmission ratio numerator
Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set transmission ratio numerator when feed axis is at gear stage 2.

5.111 Feed Axis Gear 2 Transmission Ratio Denominator

Parameter number	100193
Parameter name	Feed axis gear 2 transmission ratio denominator

Data type	INT4
Valid range	-10000 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The parameters 100189 to 100193 need to be matched each other for use.

For example, motor transmission ratio structure is: low gear speed reduction ratio is 1/24, and high gear speed reduction ratio is 4/1; gear transmission ratio is 19/49.

Feed axis 1 transmission ratio numerator is 19

Feed axis 1 transmission ratio denominator is 1176

Feed axis 2 transmission ratio numerator is 76

Feed axis 2 transmission ratio denominator is 4

5.112 Oscillation Stops Immediately

Parameter number	100194
Parameter name	Oscillation stops immediately
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1: Oscillation stops immediately during emergency stop and reset;

0: Slow down and stop after moving to R point during emergency stop and reset.

5.113 Oscillation Speed is Controlled by Override

Parameter number	100195
Parameter name	Oscillation speed is controlled by override
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1: Oscillation speed is affected by feedrate override;

0: Oscillation speed is affected by feedrate override, and is only given by G code.

5.114 Power-off Feedback Position Tolerance

Parameter number	100196
Parameter name	Power-off feedback position tolerance
Data type	INT4
Valid range	0 to 99999999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This function is disabled by the setting of 0 by default. Allowable error of feedback pulse after power-off. When the error is exceeded, an alarm will be issued.

5.115 Power-off Position Tolerance

Parameter number	100197
Parameter name	Power-off position tolerance
Data type	INT4
Valid range	0 to 99999999
Default value	16384
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This function is disabled by the setting of 0 by default. This parameter is valid when set to a value larger than 0. Its unit is pulse.

When the multi-turn position of absolute encoder (e.g. TAMAGAWA encoder) is stored by battery power, if the battery runs out and the multi-turn position is lost, an alarm will be issued. This parameter is related to the resolution of encoder. For example, the number of feedback pulses per revolution of absolute encoder is 131072, then this parameter is set to 131072.

5.116 Overspeed Response Period

Parameter number	100198
Parameter name	Overspeed response period
Data type	INT4
Valid range	0 to 32767
Default value	3
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the response time of excessive actual speed, in the unit of period. The default is 3. When the actual speed exceeds the speed for 3 periods, the system alarms accordingly.

5.117 Speed Integral Cycles Display

Parameter number	100199
Parameter name	Speed Integral Cycles Display
Data type	INT4
Valid range	-32767 to 32767
Default value	50
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Through this parameter, system can smooth the display of actual feed axis speed to stabilize the display of actual speed.

Note

If this parameter is set to 0, no actual speed will be displayed while the corresponding feed axis is moving.

5.118 Transmission Type

Parameter number	100200
Parameter name	Transmission type
Data type	INT4
Data range	0 to 999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW
Milling/turning	Turning, milling

Description

The transmission type is defined as a 2-digit integer number (0 to 99)

The transmission type value is set according to the hardware configuration of the drive axis on the machine tool.

0: Variable speed gearbox transmission

1: Synchronous belt transmission

2: Direct transmission of coupler

5.119 Guide Rail Type

Parameter number	100201

Parameter name	Guide rail type
Data type	UINT4
Data range	0 to 999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

The rail type is defined as a 2-digit integer number (0 to 99)

The rail type value is set based on the actual guide rail mounted on the machine tool.

0: Linear guide rail (default value)

1: Hard rail.

5.120 3rd Positive Software Limit Coordinate (mm)

Parameter number	100202
Parameter name	3rd positive software limit coordinate (mm)
Data unit	mm
Data type	REAL
Data range	-21474 to 21474
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Milling

Description

The third positive software limit prescribed by software. If needing to activate the third positive software limit of an axis, users must set G(axis number*80+1).3 to 1 in PLC.

5.121 3rd Negative Software Limit Coordinate (mm)

Parameter number	100203
Parameter name	3rd negative software limit coordinate (mm)
Data unit	mm
Data type	REAL
Data range	-21474 to 21474
Default value	-2000
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/turning	Milling

Description

The third negative software limit prescribed by software. If needing to activate the third positive software limit of an axis, users must set G(axis number*80+1).3 to 1 in PLC.

5.122 4th Positive Software Limit Coordinate (mm)

Parameter number	100204
Parameter name	4^{th} positive software limit coordinate (mm)
Data unit	mm
Data type	REAL
Data range	-21474 to 21474
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Milling

Description

The fourth positive software limit prescribed by software. If needing to activate the fourth positive software limit of an axis, users must set G(axis number*80+62).10 to 1 in PLC. It takes effect at the time with the fourth positive software limit.

5.123 4th Negative Software Limit Coordinate (mm)

Parameter number	100205
Parameter name	4^{th} negative software limit coordinate (mm)
Data unit	mm
Data type	REAL
Data range	-21474 to 21474
Default value	-2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Milling

Description

The fourth negative software limit prescribed by software. If needing to activate the fourth negative software limit of an axis, users must set G(axis number*80+62).10 to 1 in PLC. It takes effect at the time with the fourth negative software limit.

5.124 5th Positive Software Limit Coordinate (mm)

Parameter number	100206
Parameter name	4th positive software limit coordinate (mm)
Data unit	mm
Data type	REAL
Data range	-21474 to 21474
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Milling

Description

The fifth positive software limit prescribed by software. If needing to activate the fifth negative software limit of an axis, users must set G(axis number*80+62).11 to 1 in PLC. It takes effect at the same time with the fifth positive software limit.

5.125 5th Negative Software Limit Coordinate (mm)

Parameter number	100207
Parameter name	5th negative software limit coordinate (mm)
Data unit	mm
Data type	REAL
Data range	-21474 to 21474
Default value	-2000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Milling

Description

The fifth positive software limit prescribed by software. If needing to activate the fifth negative software limit of an axis, users must set G(axis number*80+62).11 to 1 in PLC. It takes effect at the same time with the fifth negative software limit.

5.126 Non-integer Ratio: Multi-turn Calculation

Parameter number	100208
Parameter name	Non-integer ratio: multi-turn calculation
Data type	INT4
Data range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

0: Not clear multi-turn when non-integer ratio;

1: Clear multi-turn when non-integer ratio.

5.127 Non-integer Ratio: Number of Axis Multi-turn Pulses

Parameter number	100209
Parameter name	Non-integer ratio: number of axis multi-turn pulses
Data type	INT4
Data range	1024 to 999999999
Default value	10000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Number of multi-turn pulses for non-integer denominator.

5.128 Enable Distance-coded reference Position

Parameter number	100210
Parameter name	Enable distance-coded reference position
Data type	INT4
Data range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

0: Coordinates of distance-coded reference point is disabled;

1: Coordinates of distance-coded reference point is enabled.

5.129 Distance-coded reference Position (mm)

Parameter number	100211
Parameter name	Distance-coded reference position (mm)
Data unit	mm
Data type	REAL
Data range	-21474.0 to 21474.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Due to nearby zero return for distance-coded zero return, it is not at the same position after zero return. A position value is fed back after the first distance-coded zero return. If users want to take the point as the machine zero, the current position will be zero of machine coordinate system.

Users can enter the position value into the parameter 100211 to make the above position as the machine zero.

5.130 Electronic Gearbox Compensation Period

Parameter number	100212
Parameter name	Electronic gearbox compensation period
Data type	INT4
Data range	0 to 10
Default value	3
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Used for compensate for the delay time of bus when electronic gear box is synchronized based on actual. Generally 1-2 is set.

5.131 Electronic Gearbox Compensation Filtering Period

Parameter number	100213
Parameter name	Electronic gearbox compensation filtering period
Data type	INT4
Data range	0 to 1000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

When the compensation period of the electronic gear box is valid, the electronic gear box filters the cycle time set by the parameter 213, and then the synchronization state is switched from waiting to synchronization completion.

5.132 Enable Tapping Synchronization

Parameter number	100214
Parameter name	Enable tapping synchronization
Data type	INT4
Data range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

0: Disable tapping synchronization error;

1: Enable tapping synchronization error.

5.133 Tapping Synchronization Deviation Limit

Parameter number	100215
Parameter name	Tapping synchronization deviation limit
Data unit	um
Data type	REAL
Data range	0 to 1000
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To set the maximum deviation of compensation. Due to large initial error of tapping, if all errors are calculated and compensated, the load that servo can afford will be exceeded. Generally, 20um is set.

5.134 G00 is 2: Acceleration Time

Parameter number	100216
Parameter name	G00 is 2: acceleration time
Data type	REAL
Data range	0 to 100000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To set the acceleration time when G00 type is 2. The time that axis accelerates from 0 to specified maximum rapid traverse speed in rapid traverse, in the unit ms.

5.135 G00 is 2: Jerk Time

Parameter number	100217
Parameter name	G00 is 2: jerk time
Data type	REAL
Data range	0 to 100000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To set the jerk time when G00 type is 2. The time that axis goes from 0 to the maximum in rapid traverse, in the unit ms.

5.136 Max. Error Smoothing Period

Parameter number	100218
Parameter name	Max. error smoothing period
Data type	INT4
Data range	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To smooth the total amount of error compensation, and specify the smoothing period as required. Unit: interpolation period.

5.137 In-position Check Range for Overlap

Parameter number	100219
Parameter name	In-position check range for overlap
Data type	REAL
Data range	0 to 10
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The range of merging between this block and the next block when intelligent overlap is enabled.

5.138 Enable Distance-coded Grating Position Check

Parameter number	100220
Parameter name	Enable distance-coded grating position check
Data type	INT4
Data range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To enable/disable check of the distance-coded third position.

5.139 Distance-coded Grating Position Check Threshold

Parameter number	100221
Parameter name	Distance-coded grating position check threshold
Data type	REAL
Data unit	mm
Data range	0 to 50
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To set the grating threshold of distance-coded third position check.

5.140 Position Variable Gain Compensation Type

Parameter number	100223
Parameter name	Position variable gain compensation type
Data type	INT4
Data range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

To specify the type of position variable-gain compensation.

0: Speed feedforward compensation, not position variable-gain compensation;

1: Triangle vertical compensation; \n2: Triangle non-vertical compensation;

3: Quadrilateral compensation.

Note: When 0 is set, must set the servo parameter PB72 to 0. When 1, 2, or 3 is set, must set the servo parameter 72 to 128.

5.141 Distance Per Linear Axis Revolution

Parameter number	100224
Parameter name	Distance per linear axis revolution (mm)
Data type	REAL
Data unit	mm
Data range	0 to 99999
Default value	10
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

Screw pitch of linear axis.

5.142 Side Length 1 in Variable Gain Compensation

Parameter number	100225
Parameter name	Side length 1 in variable gain compensation
Data type	REAL
Data unit	mm
Data range	0 to 99999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

Triangle: distance from "rotate center of rotary table" to "sliding block" when rotary table is at zero;
Quadrangle: vertical distance from "rotate center of rotary table" to "sliding block" when rotary table is at zero.

5.143 Side Length 2 in Variable Gain Compensation

Parameter number	100226
Parameter name	Side length 2 in variable gain compensation
Data type	REAL
Data unit	mm
Data range	0 to 99999

Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

Triangle: distance from "rotate center of rotary table" to "rotate center of motor frame" when rotary table is at zero;

Quadrangle: distance from "rotate center of rotary table" to "revolute pair between two pendulum rods" when rotary table is at zero.

5.144 Side Length 3 in Variable Gain Compensation

Parameter number	100227
Parameter name	Side length 3 in variable gain compensation
Data type	REAL
Data unit	mm
Data range	0 to 99999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

Triangle: distance from "rotate center of motor frame" to "sliding block" when rotary table is at zero;

Quadrangle: distance from "revolute pair between two pendulum rods" to "sliding block" when rotary table is at zero.

5.145 Slider Moving direction in Variable Gain Compensation

Parameter number	100228
Parameter name	Slider moving direction in variable gain compensation
Data type	INT4
Data range	-1 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

To specify the movement direction of sliding block when the parameter 223 is set to 2 (triangle non-vertical compensation) or 3 (quadrangle compensation):

-1: Center of sliding block is close to center of motor frame when rotary table rotates CW;

1: Center of sliding block is away from center of motor frame when rotary table rotates CW;

5.146 Deviation Angle in Variable Gain Compensation

Parameter number	100229
Parameter name	Deviation angle in variable gain compensation
Data type	REAL
Data range	-360 to 360
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

When parameter 223 is set to 1 (triangle vertical compensation), taking into account the possibility of non-0 degrees, this parameter represents the deviation angle of the vertical type.

5.147 Feedforward Control Type

Parameter number	100230
Parameter name	Feedforward control type
Data type	INT4
Data range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Feedforward control type:

0 (default): Over-quadrant compensation;

1: Feedforward control of single speed loop;

2: Feedforward control of single current loop;

3: Speed loop feedforward + Current loop feedforward control.

5.148 Speed Loop Feedforward: Speed Coefficient

Parameter number	100231
Parameter name	Speed loop feedforward: speed coefficient
Data type	REAL
Data range	0.0 to 200
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Percentage of speed loop feedforward compensation;

When other parameter are set correctly, theoretically, it is best to set this parameter to 100.

5.149 Current loop Feedforward: Acceleration Coefficient

Parameter number	100232
Parameter name	Current loop feedforward: speed coefficient
Data type	REAL
Data range	-200 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To specify the percentage of current loop feedforward compensation.

When other parameters are set correctly, the setting of 100 brings the best compensation theoretically.

5.150 Current Loop Swivel Axis: Initial Gravity Arm

Parameter number	100233
Parameter name	Current loop swivel axis: initial gravity arm
Data type	INT4
Data range	0 to 10000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/turning	Turning, milling

Description

Initial gravity arm of current loop swivel axis:

0 (default): off;

Non-zero: length of gravity arm.

5.151 Current Loop Swivel Axis: Gravity Compensation Coefficient

Parameter number	100234
Parameter name	Current loop swivel axis: gravity compensation coefficient
Data type	INT4
Data range	-100000 to 100000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

To specify percentage of swivel axis gravity moment compensation amount.

5.152 Feedforward Control: Transmission Ratio Numerator

Parameter number	100235
Parameter name	Feedforward control: transmission ratio numerator
Data type	REAL
Data range	-100000.0 to 100000.0
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

When transmission ratio of the axis exists, fill the actual transmission ratio numerator.

5.153 Feedforward Control: Transmission Ratio Denominator

Parameter number	100236
Parameter name	Feedforward control: transmission ratio denominator

Data type	REAL
Data range	-100000.0 to 100000.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

When transmission ratio of the axis exists, fill the actual transmission ratio denominator.

5.154 Speed Loop Feedforward Command: Non-integer Offset Period

Parameter number	100237
Parameter name	Speed loop feedforward command: non-integer offset period
Data type	INT4
Data range	-32 to 32
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

If need to use this offset, set the NC parameter 430 to 1 first;

0: not offset speed loop feedforward command;

Positive value indicates that the speed loop command is sent (this value /32) periods in advance;

A negative value indicates that the speed loop command is sent with a delay of (this value /32) periods.

5.155 Current Loop Feedforward Command: Non-integer Offset Period

Parameter number	100238
Parameter name	Current loop feedforward command: non-integer offset period
Data type	INT4
Data range	-32 to 32
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

If need to use this offset, set the NC parameter 430 to 1 first;

0: not offset speed loop feedforward command;

Positive value indicates that the speed loop command is sent (this value /32) periods in advance;

A negative value indicates that the speed loop command is sent with a delay of (this value /32) periods.

5.156 Speed Loop Feedforward Resolution

Parameter number	100239
Parameter name	Speed loop feedforward resolution
Data type	INT4
Data range	100 to 5000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

For NCUC bus, to set the feedforward resolution on CNC system end and servo end.

100 (default): 0.01rpm

1000: 0.1rpm

2500: 0.25rpm

5000: 0.5rpm

For other bus, 100 is set.

5.157 Motor Rotate Inertia (10^-3*kg*m^2)

Parameter number	100240
Parameter name	Motor rotate inertia
Data type	REAL
Data range	0 to1000000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Users can refer to your motor manual to get the motor rotate inertia.

5.158 Motor Load Inertia (10^-3*kg*m^2)

Parameter number	100241
Parameter name	Motor load inertia
Data type	REAL
Data range	0 to1000000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The total inertia of motor when the motor moves with mechanical structure (motor inertia + load inertia)

It can be identified by Servo debug->Inertia identification.

5.159 Current Loop Feedforward Rated Current

Parameter number	100242
Parameter name	Current loop feedforward rated current A
Data type	REAL
Data range	0 to100000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

Rated current of motor. The maximum current of compensation when performing current loop feedforward compensation. Users can refer to your motor manual, avoiding that the current feedforward compensation amount exceeds motor rated current.

5.160 Motor Torque Constant (Nm/A)

Parameter number	100243
Parameter name	Motor torque current Nm/A
Data type	REAL
Data range	0 to1000
Default value	30
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/turning	Turning, milling

Description

Users can refer to your motor manual to get the torque constant of motor. It also can be calculated by (rated torque/rated current),

5.161 Friction Feedforward

Parameter number	100244
Parameter name	Friction feedforward
Data type	INT4
Data range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

0: Disable friction feedforward;

1: Enable friction feedforward.

5.162 Positive Max. Static Friction Torque

Parameter number	100245
Parameter name	Max. static friction torque in positive direction
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The maximum static friction in the positive direction in the friction model is used for the compensation, unit: Nm.

5.163 Positive Coulomb Friction Torque

Parameter number	100246
Parameter name	Positive Coulomb friction torque
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The coulomb friction in positive direction in friction model is used for compensation. Unit: Nm.

5.164 Positive Stribeck Speed

Parameter number	100247
Parameter name	Positive Stribeck speed
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The positive Stribeck speed in friction model is used for compensation. Unit: mm/min.

5.165 Positive Viscous Friction Coefficient

Parameter number	100248
Parameter name	Positive viscous friction coefficient
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The viscous friction in positive direction in friction model is used for compensation. Unit: Nm.

5.166 Positive Viscous Friction Speed Index

Parameter number	100249
Parameter name	Positive viscous friction speed index
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The viscous friction speed index in positive direction in friction model is used for compensation.

5.167 Negative Max. Static Friction Torque

Parameter number	100250
Parameter name	Negative max. static friction torque
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The maximum static friction in the negative direction in the friction model is used for the compensation, unit: Nm.

5.168 Negative Coulomb Friction Torque

Parameter number	100251
Parameter name	Negative Coulomb friction torque
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/turning	Turning, milling

Description

The coulomb friction in negative direction in friction model is used for compensation. Unit: Nm.

5.169 Positive Stribeck Speed

Parameter number	100252
Parameter name	Negative Stribeck speed mm/min
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The negative Stribeck speed in friction model is used for compensation. Unit: mm/min.

5.170 Negative Viscous Friction Coefficient

Parameter number	100253
Parameter name	Negative viscous friction coefficient
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The viscous friction in negative direction in friction model is used for compensation. Unit: Nm.

5.171 Negative Viscous Friction Speed Index

Parameter number	100254
Parameter name	Negative viscous friction speed index
Data type	REAL

Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The viscous friction speed index in negative direction in friction model is used for compensation.

5.172 Control Hysteric Curve Shape Rho (10^-5)

Parameter number	100255
Parameter name	Negative viscous friction speed index
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The dynamic parameter Rho in friction model used for compensation. Unit: 10^5

5.173 Control Hysteric Curve Shape Sigma

Parameter number	100256
Parameter name	Control hysteric curve shape Sigma
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The dynamic parameter Sigma in friction model used for compensation.

5.174 Control Hysteric Curve Shape N

Parameter number	100257
Parameter name	Control hysteric curve shape N
Data type	REAL
Data range	-100000-100000
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/turning	Turning, milling

Description

The dynamic parameter N in friction model used for compensation.

5.175 Enable Centering Orientation

Parameter number	100276
Parameter name	Enable centering orientation
Data type	REAL
Data range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

Used for spindle.

5.176 EtherCat Rated Current Coefficient

Parameter number	100498
Parameter name	EtherCat rated current coefficient
Data type	REAL
Data range	0.0 to 99999.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

When obtaining load current of EtherCat device axis, the load current is axis feedback torque current times it.

5.177 EtherCat Rated Current

Parameter number	100499
Parameter name	EtherCat rated current
Data type	REAL
Data unit	A
Data range	0.0 to 99999.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/turning	Turning, milling

Description

Rated working current of EtherCat device axis.

Servo Axis:

5.178 Position Proportional Gain

Parameter number	100500
Parameter name	Position Proportional Gain (0.1Hz)
Data unit	0.1Hz
Data type	INT4
Valid range	10 to 5000
Default value	200
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the position proportional gain of the traverse axis.

① To set the proportional gain of position loop regulator

② The gain and rigidity increase with the value set by this parameter. When the frequency of command pulse is certain, the larger the set value, the smaller the position lag. However, the excessively large value may cause an oscillation or overshoot.

③ This parameter is set based on the type of servo and the load.

This parameter sets the position control proportional gain in C axis mode.

① To set the proportional gain of position loop regulator in the C axis mode.

② The gain and rigidity increase with the value set by this parameter. When the frequency of command pulse is certain, the larger the set value, the smaller the position lag. However, the excessively large value may cause an oscillation or overshoot.

③ This parameter is set based on the type of spindle servo unit and the load.

5.179 Position Feedforward Gain

Parameter number	100501
Parameter name	Position feedforward gain
Data unit	1%/0.01ms
Data type	INT4
Valid range	0 to 150
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the position feed forward gain of the traverse axis.

① To set the feed forward gain of position loop.

② When this parameter is set to 100%, position lag is always 0 at any frequency of pulse command.

③ The large feed forward gain of position loop improves the high-speed response of control system, but may cause a system oscillation.

④ This parameter is usually set to 0 when high response is not required.

This parameter sets the torque filter time constant for the spindle.

① To set the filter time constant of torque command.

② The large time constant decreases the response of control system, which may cause a system oscillation.

③ This parameter is usually set to 40 when low response is not required.

5.180 Speed Proportional Gain

Parameter number	100502
Parameter name	Speed proportional gain
Data type	INT4
Valid range	20 to 30000
Default value	500
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the speed proportional gain of the traverse axis.

① To set the proportional gain of speed regulator.

② This parameter is set based on the type of servo drive and the load. The gain and rigidity increase with the value set by this parameter. Generally, the larger the load inertia, the larger the set value.

④ Try to set a larger value without causing a system oscillation.

⑤ After Parm100234 is correctly set, this parameter is adjusted automatically.

This parameter sets the speed proportional gain in speed control mode for spindle.

① To set the proportional gain of speed regulator in the speed control mode.

② This parameter is set based on the type of spindle drive unit and the load. The gain and rigidity increase with the value set by this parameter. Generally, the larger the load inertia, the larger the set value.

③ Try to set a larger value without causing a system oscillation. After Parm100559 (motor code) is set, this parameter is adjusted automatically.

5.181 Speed Integral Time Constant

Parameter number	100503
Parameter name	Speed integral time constant
Data unit	ms
Data type	INT4
Valid range	1 to 5000
Default value	20
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the speed integral time constant of the traverse axis.

① To set the integral time constant of speed regulator.

② This parameter is set based on the type of servo drive and the load. The smaller this parameter is set, the higher the integral speed. Generally, the larger the load inertia, the larger the set value.

③ Try to set a smaller value without causing the system oscillation.

④ This parameter is adjusted automatically after Parm100243 (PA—43) is correctly set.

This parameter sets the speed integral time constant in speed control mode for the spindle.

① To set the integral time constant of speed regulator in the speed control mode. After Parm100559 (motor code) is set, this parameter can be set automatically.

② The smaller this parameter is set, the higher the integral speed. This parameter is set based on the type of spindle drive and the load. Generally, the larger the load inertia, the larger the set value.

③ Try to set a smaller value without causing the system oscillation.

5.182 Speed Feedback Filter Factor

Parameter number	100504
Parameter name	Speed feedback filter factor
Data type	INT4
Valid range	0 to 9
Default value	1
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

① To set the characteristics of speed feedback low-pass filter.

② The larger this parameter is set, the lower the cutoff frequency, and the less the noise of motor. If the load inertia is too large, reduce the set value properly. The large setting of this parameter may decrease the response and causes the oscillation.

③ The smaller this parameter is set, the higher the cutoff frequency, and the faster the speed feedback response. If a higher speed response is required, reduce the set value properly.

5.183 Max. Torque Output Magnification

Parameter number	100505
Parameter name	Max. torque output magnification
Data unit	1%
Data type	INT4
Valid range	30 to 500
Default value	250
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set the maximum output torque of servo motor;
2. The set value represent how many times the maximum output torque is compared to motor rated torque. For example, 250 represents that maximum motor output torque is 2.5 times the motor rated torque;
3. The limit is value at any time;
4. 30 to 500: 0.3 to 5 times motor rated torque;
5. The parameter is adjusted based on the set value of Parm100243.

5.184 Acceleration Time Constant

Parameter number	100506
Parameter name	Acceleration time constant
Data unit	1ms/1000rpm
Data type	INT4
Valid range	1 to 32000
Default value	200
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

PA--6: Time it takes for motor to go from 0 to 2000r/min;

PA—38: Time is takes for motor to go from 2000 to 0r/min;

The feature of acceleration and deceleration is linear.

5.185 Synchronization Error Compensation Integral Time Constant

Parameter number	100507
Parameter name	Synchronization error compensation integral time constant
Data type	INT4
Valid range	0 to 500
Default value	20
Access level	ACCESS_MAC
Activation	ACT_SAVE

5.186 Synchronization Error Compensation Gain

Parameter number	100508
Parameter name	Synchronization error compensation gain
Data type	INT4
Valid range	-256 to 256
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE

Description

To set gain of synchronization error compensation.

1. The larger the value, the more obvious the compensation effect;

2. When PA8 is set to 0, synchronization error compensation is turned off.

5.187 Torque Command Input Gain

Parameter number	100509
Parameter name	Torque command input gain
Data type	INT4
Valid range	100 to 300
Default value	100
Access level	ACCESS_MAC

Activation	ACT_PWR

5.189 Full-closed Loop Feedback Signal Count: Inverted Flag

Parameter number	100510
Parameter name	Full-closed loop feedback signal count: inverted flag
Data type	INT4
Valid range	-1023 to 1023
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Normal full-closed loop count;

512: Full-closed loop count is inverted.

5.190 Positioning Completion Range

Parameter number	100511
Parameter name	Positioning completion range
Data unit	0.0001rev
Data type	INT4
Valid range	0 to 3000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set range of positioning completion pulse in position control mode: PA—11*0.0001* number of pulses per motor revolution. For example, if set PA—11 to 1000, and 10000 pulses per motor revolution, then the positioning completion range is 1000*0.0001*10000=1000 pulses.
2. The parameter provides a basis for the drive unit to determine whether positioning is completed in position control mode. When the remaining number of pulses in deviation counter is smaller or equal to the range set by this parameter, the drive unit determines that the positioning is completed, and the switch signal is output as ON; otherwise it is OFF;

In position control mode (PA—23=0), positioning completion signal is output.

5.191 Position Out-of-tolerance Check Range

Parameter number	100512
Parameter name	Position out-of-tolerance check range
Data unit	0.1 revolution
Data type	INT4
Valid range	1 to 100/1 to 32767
Default value	20/30
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter can be set for traverse axis and spindle.

1. To set the check range of position out-of-tolerance alarm: PA—12*0.1rev or PA—12*0.1*number of pulses per motor revolution.

2. In the position control mode *(PA—23=0), when the count value of the position deviation counter is over this parameter value, the drive will issue an alarm. For example, when PA—12 is set to 20, and 10000 pulses per motor revolution is set, the position out-of-tolerance range is: 20*0.1=2 or 20*0.1*10000=20000 pulses.

5.192 Position Command Pulse Frequency Division Numerator

Parameter number	100513
Parameter name	Position command pulse frequency division numerator
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set frequency division numerator of position command pulse (electronic gear).

2. In position control mode (PA—23=0), the setting of PA—13 and PA—14 makes it convenient to match the pulse source, achieving the ideal control resolution (angle/pulse).

3. P x G =N x C

P: Number of input command pulses; G: Electronic gear ratio; N: Number of motor revolutions; C: Number of pulses per motor encoder revolution.

5.193 Position Command Pulse Frequency Division Denominator

Parameter number	100514
Parameter name	Position command pulse frequency division denominator
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set frequency division denominator of position command pulse (electronic gear).

2. In position control mode (PA—23=0), the setting of PA—13 and PA—14 makes it convenient to match the pulse source, achieving the ideal control resolution (angle/pulse).

3. P x G =N x C

P: Number of input command pulses; G: Electronic gear ratio; N: Number of motor revolutions; C: Number of pulses per motor encoder revolution.

5.194 Max. Positive Torque Output

Parameter number	100515
Parameter name	Max. positive torque output (%1)
Data type	INT4
Valid range	0 to 500
Default value	280
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set internal torque limit value of servo motor in CCW or CW direction.

2. The set value indicates the multiplication of motor rated torque. For example, the set value 250: max. motor output torque in CW/CCW direction is 2.5 times the motor rated torque.

3. When STA10 is set to 1, it is valid.

4. If the set value of PA—15 > PA—5, or |PA--16| >PA—5, the actual output magnification is limited as the allowable maximum torque output magnification PA—5.

5. 0 to 500 (-500 to 0): 0 to 5 times the positive/negative output torque.

6. PA--15≤PA—5; |PA--16|≤PA—5

5.195 Max. Negative Torque Output

Parameter number	100516
Parameter name	Max. negative torque output (%1)
Data type	INT4
Valid range	-500 to 0
Default value	-280
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set internal torque limit value of servo motor in CCW or CW direction.
2. The set value indicates the multiplication of motor rated torque. For example, the set value 250: max. motor output torque in CW/CCW direction is 2.5 times the motor rated torque.
3. When STA10 is set to 1, it is valid.
4. If the set value of PA—15 > PA—5, or |PA--16| >PA—5, the actual output magnification is limited as the allowable maximum torque output magnification PA—5.
5. 0 to 500 (-500 to 0): 0 to 5 times the positive/negative output torque.
6. PA--15≤PA—5; |PA--16|≤PA—5

5.196 Maximum Speed Limit

Parameter number	100517
Parameter name	Maximum speed limit (1rad/min)
Data type	INT4
Valid range	20 to 12000
Default value	2500
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter can be set for traverse axis and spindle.

1.To set the maximum limit value of servo drive/spindle motor

2. It has nothing to do with the rotation direction.

5.197 System Overload Torque

Parameter number	100518
Parameter name	System overload torque (%1)

Data type	INT4
Valid range	30 to 200
Default value	120
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter can be set for traverse axis and spindle.

1.To set the overload protection torque value of servo motor/spindle motor.

2. This limit is always valid at any time.

3. 30 to 200 indicates the setting range: 0.3 to 2 times the overload torque.

4. PA--18 ≤ PA--15

4. After PA--43 is set correctly, this parameter can be adjusted automatically.

5.198 Overload Time Setting

Parameter number	100519
Parameter name	Overload time setting (0.01s)
Data unit	10ms/0.1s
Data type	INT4
Valid range	40 to 32000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter can be set for traverse axis and spindle.

1.To set the overload time value allowed by the system.

2. The setting value for traverse axis is in the time unit, and the unit is 10ms. For example, if 1000 is set, the allowable overload time is 10s; the setting value for spindle is in the time unit, and the unit is 0.1s. For example, if 100 is set, the allowable overload time is 10s.

3. This limit is valid at any time.

5.199 Internal Speed

Parameter number	100520
Parameter name	Internal speed
Data unit	0.1rad/min
Data type	INT4

Valid range	-32000 to 32000
Default value	0/1
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

1. When PA--23=3, the parameter is set as the speed command;
2. The parameter is generally used during test or test running of motor and servo drive.

5.200 JOG Speed

Parameter number	100521
Parameter name	JOG speed
Data unit	1rad/min
Data type	INT4
Valid range	0 to 9000
Default value	300
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

1. To set JOG running speed;
2. The parameter is generally used during test or test running of motor and servo drive.

5.201 Pulse Command Input Mode

Parameter number	100522
Parameter name	Pulse command input mode
Data unit	1rad/min
Data type	INT4
Valid range	0 to 3
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Pulse mode or given internal mode (PA-20)

1: NCUC bus.

5.202 Control Mode Selection

Parameter number	100523
Parameter name	Control mode selection
Data type	INT4
Valid range	0 to 17
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter can be set for traverse axis and spindle.

To set the working mode of motor.

0: Position control mode, receiving the system position command

1: External speed mode, receiving the system speed command

3: Internal speed mode, receiving the internal speed command

4: Multi-segment speed mode

7: Zero calibration of motor encoder mode

5.203 Number of Servo Motor Pole Pairs

Parameter number	100524
Parameter name	Number of servo motor pole pairs
Data type	INT4
Valid range	1 to 120
Default value	3
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter can be set for both the traverse axis and the spindle.

1. To set the number of magnetic pole pairs for servo motor;

For example, the setting of 3 indicates that the number of magnetic pole pairs is 3.

2. After PA43 is correctly set, this parameter can be adjusted automatically.

5.204 Encoder Type

Parameter number	100525
Parameter name	Encoder type

Data type	INT4
Valid range	0 to 32767
Default value	7
Access level	ACCESS_MAC
Activation	ACT_PWR

This parameter sets the type of encoder for the traverse axis.

To set the encoder type of servo motor.

0: 1024-ppr encoder (TTL square wave)

1: 5000-ppr encoder (TTL square wave)

2: 2500-ppr encoder (TTL square wave)

3: 6000-ppr encoder (TTL square wave)

4: Absolute encoder of ENDAT2.15 protocol

5: Reserved

6: Absolute encoder of HiperFACE protocol

7: TAMAGAWA encoder

8: 1024-ppr sine cosine incremental encoder

9: Sine cosine distance-coded encoder

11: Heidenhain EnDat absolute grating ruler

12: Square wave incremental grating ruler

13: Sine cosine incremental grating ruler

14: Square wave distance-coded encoder

15: Sine cosine distance-coded encoder

18: 5nm linear grating ruler

19: Nikon encoder

25: 26-bit angular resolution BISS C

35: 18-bit angular encoder BISS C

5.205 Encoder Zero Offset

Parameter number	100526
Parameter name	Encoder zero offset
Data type	INT4
Valid range	-32767 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter can be set for traverse axis.

① To set the encoder offset of servo motor.

② When the incremental encoder is mounted for the motor (when PA--25=0，1，2，3), this parameter sets the number of pulses from zero pulse.

③ When the absolute encoder is mounted for the motor, this parameter sets the number of pulses of 16-bit resolution.

5.206 Current Control Proportional Gain

Parameter number	100527
Parameter name	Current control proportional gain
Data type	INT4
Valid range	10 to 32767/25 to 32767
Default value	2000/1000
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter can be set for both the traverse axis and the spindle.

① To set the proportional gain of current loop.

② When a big current noise occurs during the motor running, reduce the value set by this parameter properly.

③ Excessively small setting of this parameter may cause a response lag of velocity.

5.207 Current Control Integral Time

Parameter number	100528
Parameter name	Current control integral time
Data type	INT4
Valid range	1 to 30000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter can be set for both the traverse axis and the spindle.

① To set the integral time constant of current loop.

② If a big current noise occurs during the motor running, increase the value set by this parameter properly.

③ The excessively large value set by this parameter may cause a response lag of velocity.

5.208 2nd Position Command Pulse Frequency Division Numerator

Parameter number	100529
Parameter name	2nd position command pulse frequency division numerator
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set frequency division numerator of the second position command pulse (electronic gear).

2. In position control mode (PA—23=0), the setting of PA—13 and PA—14 makes it convenient to match the pulse source, achieving the ideal control resolution (angle/pulse).

3. This parameter is valid when STA—13 is set to 1.

5.209 Full Closed Loop Compensation

Parameter number	100530
Parameter name	Full closed loop compensation
Data type	INT4
Valid range	0 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Can be used for:

1. Semi-closed loop debugging is normal;

2. When transmission ratio is greater; can increase 5 each time.

5.210 Status Control Word 1

Parameter number	100531
Parameter name	Status Control Word 1
Data type	HEX4
Valid range	0x0 to 0xFFFF

Default value	0x1001
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

Control parameter setting. Correspond to STA0 to STA15, and convert the 16-bit binary number to 4-bit hexadecimal number for this parameter setting.

5.211 Torque Command Filter Time Constant

Parameter number	100532
Parameter name	Torque command filter time constant (0.1ms)
Data type	INT4
Valid range	0 to 30000
Default value	300
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

① To set the time constant of torque command filter.

② The larger the time constant, the slower the response of control system, which may make the system unstable, causing an oscillation.

5.212 Position Feed Forward Filter Time Constant

Parameter number	100533
Parameter name	Position feed forward filter time constant
Data type	INT4
Valid range	0 to 3000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the time constant of position feed forward filter for the traverse axis.

① To set the time constant of feed forward command filter.

② The smaller the time constant, the more rapid the response of control system, which may make the system unstable, causing an oscillation.

5.213 User Password (Default Indicates Software Version)

Parameter number	100534
Parameter name	User password (default indicates software version)
Data type	INT4
Valid range	-32000 to 32000
Default value	356
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter sets the user password for the traverse axis. (The default value indicates the version of software.)

① The default indicates the software version. For example, the setting of 220 represents the version 2.2.

② The password for saving parameter is 1230, and the password for extended parameter is 2003.

5.214 Position Command Smoothing Filter Period

Parameter number	100535
Parameter name	Position command smoothing filter period (1ms)
Data type	INT4
Valid range	0 to 3000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. This parameter sets the filter time constant of position command;
2. The smaller the filter time, the more rapid the response of control system;
3. The larger the filter time constant, the slower the response of control system. 0 can be set by this parameter.

5.215 Communication Baud Rate (2:9600bps)

Parameter number	100536
Parameter name	Communication baud rate
Data type	INT4
Valid range	0 to 33
Default value	2

Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: 2400bps

1: 4800bps

2: 9600bps

3: 79200bps

5.216 Axis Address

Parameter number	100537
Parameter name	Axis address
Data type	INT4
Valid range	1 to 2047
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To select DP-TP3 display content

1: Reserved

2: V phase current

3: Real-time torque current

4: Encoder feedback increment 200us of each position sampling period

5: Electronic angle 0-360°, unit: 0.1°

6: SIN/COS amplitude

7: Full-closed loop SIN/COS amplitude

8: TAMAGAWA encoder position offset 16384

9: Electronic angle 16-bit

5.217 Deceleration Time Constant

Parameter number	100538
Parameter name	Deceleration time constant (1ms/1000rpm)
Data type	INT4
Valid range	1 to 32000
Default value	200
Access level	ACCESS_MAC

Activation	ACT_PWR

Description

1. PA—6 indicates the acceleration time that motor goes from 0 to 2000r/min;
2. PA—38 indicates the deceleration time that motor goes from 2000 to 0r/min;
3. The acceleration and deceleration are linear.

5.218 4th Position Command Pulse Frequency Division Numerator

Parameter number	100539
Parameter name	4th position command pulse frequency division numerator
Data type	INT4
Valid range	-4096 to 4096
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set frequency division numerator of the second position command pulse (electronic gear).
2. In position control mode (PA—23=0), the setting of PA—13 and PA—14 makes it convenient to match the pulse source, achieving the ideal control resolution (angle/pulse).
3. This parameter is valid when STA—13 is set to 1.

5.219 Brake Output Delay

Parameter number	100540
Parameter name	Brake output delay
Data unit	1ms
Data type	INT4
Valid range	0 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the delay time of braking when externally given servo is disabled.

5.220 Allowable Brake Output Speed Threshold

Parameter number	100541
Parameter name	Allowable brake output speed threshold (1rpm)
Data unit	1rpm
Data type	INT4
Valid range	10 to 300
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

The braking can be activated when the electrode speed is lower than this value.

5.221 Speed Arrival Range

Parameter number	100542
Parameter name	Speed arrival range
Data unit	1rpm
Data type	INT4
Valid range	1 to 500
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set speed arrival range;

2. In speed control mode, if motor speed is smaller than this set value, the speed arrival switch signal is ON; otherwise, it is OFF.

5.222 Drive Specification/Motor Type Code

Parameter number	100543
Parameter name	Drive specification/motor type code
Data type	INT4
Valid range	0 to 3999
Default value	101
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Thousands

0: SV-180UD

Hundreds

0: 35A

1: 50A

2: 75A

9: 90A

3: 100A

4: 150A

5: 200A

6: 300A

7: 450A

The tens and hundreds indicate the motor type.

5.223 2nd Position Proportional Gain

Parameter number	100544
Parameter name	2nd position proportional gain
Data type	INT4
Valid range	20 to 10000
Default value	400
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set proportional gain of position loop regulator;

2. At the command pulse of the same frequency, the larger the set value, the higher the gain, and the greater the rigidity, the smaller the position hysteresis, but the excessively large value may cause an oscillation or overshoot;

3. The parameter is set based on servo model and load.

5.224 2nd Speed Proportional Gain

Parameter number	100545
Parameter name	2nd speed proportional gain
Data type	INT4
Valid range	20 to 30000
Default value	250

Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set feed forward gain of speed loop;

2. When 100% is set, the position hysteresis is always 0 at any frequency of command pulse;

3. The larger position feed forward gain can increase response of control system, but may cause an oscillation;

4. The parameter is set to 0 when there is no need for high response.

5.225 2nd Speed Integral Time Constant

Parameter number	100546
Parameter name	2nd speed integral time constant
Data unit	ms
Data type	INT4
Valid range	1 to 5000
Default value	20
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set integral time constant of speed regulator;

2. The smaller the set value, the more rapid the integral speed. The parameter is set based on servo drive model and load. Generally, the larger the load inertia, the larger the set value.

3. Try to set a smaller value without causing an oscillation;

4. After PA—43 is correctly set, this parameter can be adjusted automatically.

5.226 2nd Torque Command Filter Time Constant

Parameter number	100547
Parameter name	2nd torque command filter time constant
Data unit	0.1ms
Data type	INT4
Valid range	0 to 30000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set filter time constant of torque command;

2. The larger the time constant, the slower the response of control system, which may make the system unstable, causing an oscillation.

5.227 Gain Switching Threshold

Parameter number	100549
Parameter name	Gain switching threshold
Data type	INT4
Valid range	0 to 10000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Command frequency 0.1Kpps/unit;

Deviation pulse pulse

Motor speed 1rpm

5.228 Gain Switching Hysteresis Loop Width

Parameter number	100550
Parameter name	Gain switching hysteresis loop width
Data type	INT4
Valid range	1 to 10000
Default value	5
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Command frequency 0.1Kpps/unit;

Deviation pulse pulse

Motor speed 1rpm

5.229 Gain Switching Hysteresis Time

Parameter number	100551
Parameter name	Gain switching hysteresis time

Data type	INT4
Valid range	0 to 10000
Default value	2
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

The time from meeting switching condition to starting switching.

5.230 Position Gain Switching Delay Time

Parameter number	100552
Parameter name	Position gain switching delay time
Data unit	ms
Data type	INT4
Valid range	0 to 1000
Default value	5
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set first-order low-pass filter of position gain during gain switching. When the gain is switched, the gain value does not suddenly change from the PA parameter to the PB parameter, but after the slope is calculated according to the parameter, it changes step by step to another set of parameters (for the calculation of the step size switching).

5.231 Zero Speed Output Detection Range

Parameter number	100553
Parameter name	Zero output detection range (1rpm)
Data unit	1rpm
Data type	INT4
Valid range	0 to 100
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

When smaller than this set value, zero speed arrival signal is output.

5.232 Servo OFF: Motor Off Delay Time

Parameter number	100554
Parameter name	Servo OFF: motor off delay time
Data unit	ms
Data type	INT4
Valid range	0 to 3000
Default value	20
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

After externally given servo is disabled, the delay time to turn off PWM. When Z slipping when drive controls brake, set this parameter to a larger value.

5.233 Command Filter Time Constant

Parameter number	100555
Parameter name	Command filter time constant
Data unit	ms
Data type	INT4
Valid range	1 to 255
Default value	5
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set filter time constant of torque command;

2. The larger the time constant, the slower the response of control system, which makes the system unstable, may causing an oscillation.

5.234 Torque Inertia Ratio

Parameter number	100556
Parameter name	Torque inertia ratio
Data unit	Nm/Kgm2
Data type	INT4
Valid range	10 to 20000

Default value	1897
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set current inertia ratio of motor torque.

PB-12=Rated torque/ (Rated current × Rotor inertia 10-3Kgm2)

For example, 180ST-M23020HM1BB motor

Motor rated current: 15.0A

Motor rated torque: 23.0N. m

Motor rotor inertia: 6.628×10-3 Kgm2 (without braking)

Then PB-12=23.0 / (15×6.628×10-3)=231

5.235 Load Inertia Ratio

Parameter number	100557
Parameter name	Load inertia ratio
Data type	INT4
Valid range	10 to 300
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Ratio of load inertia to motor inertia.

5.236 Digital Output O Function

Parameter number	100558, 100565, 100566, 100567
Parameter name	Digital output O function
Data type	INT4
Valid range	-9 to 9
Default value	5
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Brake control function

0: invalid

1: valid

2: Servo is ready

3: Alarm output

4: Zero speed arrival

5: Positioning completion

6: Speed arrival

7: Torque is being limited

8: Electromagnetic brake output

9: Zero speed is being locked

The negative value indicates the inverted level.

5.237 Digital Input I Function

Parameter number	100559-100564
Parameter name	Digital input I function
Data type	INT4
Valid range	-21 to 22
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Invalid input

1: Enable servo

2: Clear alarm

3: Clear position deviation

4: Disable pulse input

5: Limit overtravel in negative direction

6: Limit overtravel in positive direction

7: Lock zero speed

8: Gain switching

9: Electronic gear switching switch 0

10: Electronic gear switching switch 1

11: Limit positive torque

12: Limit negative torque

13: Emergency stop

14: Internal speed 1

15: Internal speed 2

16: Internal speed 3

17: Mode switching

20: Motor CW

21: Motor CCW

22: Absolute position transmission

The negative value indicates inverted level.

5.238 Internal Speed

Parameter number	100568-100574
Parameter name	Internal speed 1-7
Data type	INT4
Valid range	-6000 to 6000
Default value	21
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To control motor run in internal speed by I/O point.

1. When PA—23=3, this parameter is set as speed command;
2. This parameter is generally used during test or test running of motor and servo drive.

5.239 Status Control Word 2

Parameter number	100575
Parameter name	Status control word 2
Data type	HEX4
Valid range	0x0 to 0xFFFF
Default value	0x65
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter is set for the traverse axis. Extended control parameter setting, correspond to STB0-STB15. After the 16-bit binary number is converted to the 4-bit hexadecimal number, it is filled into this parameter.

5.240 1st Notch Filter Frequency

Parameter number	100576
Parameter name	1st notch filter frequency

Data unit	HZ
Data type	INT4
Valid range	100 to 2000
Default value	1500
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

To set the vibrational frequency to be suppressed when a machinery resonance occurs.

5.241 1st Notch Filter Width

Parameter number	100577
Parameter name	1st notch filter width
Data type	INT4
Valid range	0 to 50
Default value	10
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

To set the width of vibrational frequency to be suppressed when a machinery resonance occurs.

5.242 1st Notch Filter Depth

Parameter number	100578
Parameter name	1st notch filter depth
Data type	INT4
Valid range	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

To set the depth of vibrational frequency to be suppressed when a machinery resonance occurs.

5.243 2nd Notch filter Frequency

Parameter number	100579
Parameter name	2nd notch filter frequency
Data unit	HZ
Data type	INT4
Valid range	100 to 2000
Default value	1500
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

To set the vibrational frequency to be suppressed when a machinery resonance occurs.

5.244 2nd Notch Filter Width

Parameter number	100580
Parameter name	2nd notch filter width
Data type	INT4
Valid range	0 to 50
Default value	10
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

To set the width of vibrational frequency to be suppressed when a machinery resonance occurs.

5.245 2nd Notch Filter Depth

Parameter number	100581
Parameter name	2nd notch filter depth
Data type	INT4
Valid range	0 to 100
Default value	40
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

To set the depth of vibrational frequency to be suppressed when a machinery resonance occurs.

5.246 Notch Filter Application Mode

Parameter number	100582
Parameter name	Notch filter application mode
Data type	INT4
Valid range	0 to 255
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is a traverse axis parameter.

This parameter is used to determine whether the two notch filters in the servo are enabled or not.

0： The notch filter is disabled.

1： Only the first notch filter is enabled.

2： Only the second notch filter is enabled.

3： Both the first notch filter and the second notch filter are enabled.

4: Enable vibration suppression filter.

5: Enable both suppression filter and notch filter.

8: Enable observer.

5.247 Position Command Smoothing Coefficient

Parameter number	100583
Parameter name	Position command smoothing coefficient
Data type	INT4
Valid range	0 to 255
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Number of average moves of position command FIR filter.

5.248 Feedback Pulse Output

Parameter number	100584
Parameter name	Feedback pulse output
Data type	INT4
Valid range	1000 to 15000
Default value	2500
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Number of pulses (×4) per revolution that motor feedback which is output to upper computer.

5.249 Command Pulse Input

Parameter number	100585
Parameter name	Command pulse input
Data type	INT4
Valid range	1000 to 25000
Default value	2500
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Number of pulses per corresponding motor revolution output from upper computer (× 4);

When STB4 is 0, the electronic gear parameters PA13 and PA14 are valid;

When STB4 is 1, electronic gar is directly calculated from the command input pulses required per servo motor revolution. At that point, the electronic gear parameter is invalid.

5.250 Motor Rated Current

Parameter number	100586
Parameter name	Motor rated current
Data uit	0.01A
Data type	INT4
Valid range	100 to 15000
Default value	680
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set rated working current of servo motor;

2. After PA—43 is correctly set, this parameter is adjusted automatically.

5.251 Motor Rated Speed

Parameter number	100587
Parameter name	Motor rated speed
Data unit	1rad/min
Data type	INT4
Valid range	20 to 9000
Default value	2000
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set rated speed of servo motor.

5.252 Current Regulator Control Mode

Parameter number	100588
Parameter name	Current regulator control mode
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Current vector regulator

1: PI current regulator

5.253 Motor Stop Mode when Alarm

Parameter number	100589
Parameter name	Motor stop mode when alarm
Data type	INT4
Valid range	0 to 23
Default value	0

Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Units: motor stop mode after servo is disabled.

0: Ramp stop

1: Coast stop

2: Dynamic brake stop

Tens: Motor stop mode after servo alarm

0: Coast stop

1: Ramp stop

5.254 Linear Motor Polar Distance/High Number of Full Closed Loop Feedback Pulses

Parameter number	100590
Parameter name	Linear motor polar distance/high number of full closed loop feedback pulses
Data type	INT4
Valid range	0 to 1000
Default value	300
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Number of encoder 2 feedback pulses per motor revolution if rotary motor is used. PB-46 indicates the number above ten thousands, and PB-46 indicates the number below ten thousands. Number of full closed loop feedback pulses = PB-46 * 10000 + PB-47

Polar distance of linear motor when if linear motor is used.

5.255 Grating Ruler Resolution/Low Number of Full Closed Loop Feedback Pulses

Parameter number	100591
Parameter name	Grating ruler resolution/Low number of full closed loop feedback pulses
Data type	INT4
Valid range	0 to 10000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Number of encoder 2 feedback pulses per motor revolution if rotary motor is used. PB-46 indicates the number above ten thousands, and PB-46 indicates the number below ten thousands. Number of full closed loop feedback pulses = PB-46 * 10000 + PB-47

Polar distance of linear motor when if linear motor is used.

5.256 Open Loop Current Command Amplitude

Parameter number	100592
Parameter name	Open loop current command amplitude
Data unit	%
Data type	INT4
Valid range	-50 to 50
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Percentage of motor rated current.

5.257 Distance-coded Encoder Signal Period Increment

Parameter number	100593
Parameter name	Distance-coded encoder signal period increment
Data type	INT4
Valid range	50 to 30000
Default value	1250
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Distance coded grating ruler, number of incremental pulses of signal period.

5.258 Distance-coded: Number of Zero Pulses

Parameter number	100594
Parameter name	Distance-coded: number of zero pulses
Data type	INT4

Valid range	8 to 500
Default value	40
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the incremental period of distance-coded encoder signal.

5.259 Incremental Encoder: Pole Zero Finding Mode

Parameter number	100595
Parameter name	Incremental encoder: pole zero finding mode
Data type	INT4
Valid range	0 to 12
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Current vector control mode (motor moves slightly)

1: Open loop Z pulse finding mode (motor moves obviously)

2: High-frequency pulse injection mode (no moving of motor)

3: Direct current injection phase-finding mode (no moving of motor)

5.260 Motor Encoder Feedback Shift Coefficient

Parameter number	100596
Parameter name	Motor encoder feedback shift coefficient
Data type	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter represents the power of 2. When 1 is set, it means division by 2; when 2 is set, it means division by 4, and so on. It only applies to sine cosine feedback type, Heidenhain EnDat protocol, Tamagawa absolute feedback type.

5.261 Enabling Delay Time

Parameter number	100597
Parameter name	Enabling delay time
Data unit	0.1ms
Data type	INT4
Valid range	0 to 30000
Default value	300
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

After servo is enabled, the delay time of brake release.

5.262 Synchronization Error Check Range

Parameter number	100598
Parameter name	Synchronization error check range
Data type	INT4
Valid range	0 to 32000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

After STB14=0 and full closed loop is enabled, the parameter PB54 takes effect.

Synchronization error check threshold = Number of full closed loop feedback pulses per motor revolution * (PB54/1000).

5.263 Full Closed Loop Feedback Resolution Right Shift Bits

Parameter number	100599
Parameter name	Full closed loop feedback resolution right shift bits
Data type	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter represents the power of 2. When 1 is set, it means division by 2; when 2 is set, it means division by 4, and so on. It only applies to sine cosine feedback type, Heidenhain EnDat protocol, Tamagawa absolute feedback type.

5.264 Friction Compensation

Parameter number	100600
Parameter name	Friction compensation
Data type	HEX4
Valid range	0x0 to 0x15
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Friction compensation is,

0: disabled; 3: enabled.

5.265 Viscous Friction Coefficient

Parameter number	100601
Parameter name	Viscous friction coefficient
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

With the viscous friction coefficient, the viscous friction compensation value is set.

5.267 Gravity Torque Coefficient

Parameter number	100602
Parameter name	Gravity torque coefficient
Data type	INT4
Valid range	-80 to 80
Default value	0
Access level	ACCESS_MAC

Activation	ACT_PWR

Description

With the gravity torque coefficient, the gravity compensation value is set.

5.268 Positive Static Friction Coefficient

Parameter number	100603
Parameter name	Positive static friction coefficient
Data type	INT4
Valid range	0 to 30
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

With the positive static friction coefficient and negative static friction coefficient, the coulomb friction compensation value is set.

5.269 Negative Static Friction Coefficient

Parameter number	100604
Parameter name	Negative static friction coefficient
Data type	INT4
Valid range	0 to 30
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

With the positive static friction coefficient and negative static friction coefficient, the coulomb friction compensation value is set.

5.270 Current Limit

Parameter number	100605
Parameter name	Current limit
Data type	INT4
Valid range	0 to 111

Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Current limit is disabled;

1: Current limit is enabled.

(Note: this parameter only takes effect when the hardware current loop board software version 2.811 or higher is used)

2: Disable A49 alarm check

(Note: this parameter only takes effect when the hardware current loop board software version 2.841 or higher)

5.271 Current Limit Percentage

Parameter number	100606
Parameter name	Current limit percentage
Data type	INT4
Valid range	0 to 150
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To limit the percentage of rated current that the current can reach when the motor is stuck by external force, without overload or even burning the motor. The function needs to be used with system PLC.

Note: this parameter only takes effect when the hardware current loop board software version 2.811 or higher.

5.272 Synchronization Function Control Word

Parameter number	100608, 100609
Parameter name	Synchronization function control words 1-2
Data type	INT4
Valid range	0 to 11111
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Synchronization control word 1

Units: 0: disable synchronization function; 1: enable synchronization function

Tens: 0: master axis; 1: slave axis

Hundreds: Synchronization control mode selection

Thousands: 0: disable torque difference check between two axes; 1: enable torque difference check between two axes

Ten Thousands: 0: Slave axis speed command is not inverted; 1: slave axis speed command is inverted

Synchronization control word 2

0: Disable torque compensation; 1: Enable torque compensation.

5.273 Torque Compensator proportionality coefficient

Parameter number	100610
Parameter name	Torque compensator proportionality coefficient
Data type	INT4
Valid range	100 to 10000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

When two-axis synchronization is enabled, to set the coefficient of proportionality of torque compensator.

5.274 Torque Compensator Integral Coefficient

Parameter number	100611
Parameter name	Torque compensator integral coefficient
Data type	INT4
Valid range	1 to 10000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the integral coefficient of torque compensator when two-axis synchronization is enabled.

5.275 Torque Compensator Filter Coefficient

Parameter number	100612
Parameter name	Torque compensator filter coefficient
Data type	INT4
Valid range	0 to 20
Default value	2
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the filter coefficient of torque compensator when two-axis synchronization is enabled.

5.276 Anti-backlash Offset Torque

Parameter number	100613
Parameter name	Anti-backlash offset torque
Data type	INT4
Valid range	-80 to 80
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set percentage of rated torque.

5.277 Torque Deviation Protection Threshold

Parameter number	100614
Parameter name	Torque deviation protection threshold
Data type	INT4
Valid range	0 to 80
Default value	25
Access level	ACCESS_MAC
Activation	ACT_PWR

5.278 Full Closed Loop Control

Parameter number	100616

Parameter name	Full closed loop control
Data type	INT4
Valid range	0 to 255
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0, 4, 8: Enable speed feedforward low 16-bit

128, 132: Enable position variable-gain

0, 128: Enable tapping synchronization deviation

4, 132: Enable current feedforward

8: Enable speed feedforward high 16-bit

5.279 Variable Gain Reference Value

Parameter number	100618
Parameter name	Variable gain reference value
Data type	INT4
Valid range	0 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To be used with bit7 of parameter 72. To set the reference value when rotary axis is at 0°.

5.280 Circular Grating Bits

Parameter number	100620
Parameter name	Circular grating bits
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the number of circular grating bits when YUHENG OPTICS BISS-C circular grating is used as encoder 1.

5.281 Vibration Filter Frequency

Parameter number	100621
Parameter name	Vibration filter frequency
Data type	INT4
Valid range	100 to 1000
Default value	400
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

The parameter self-tuning will select to enable vibration filter or notch filter based on resonance frequency. PB38=1 to enable notch filter, and PB38=4 to enable vibration filter.

Resonance frequency 95% is recommended for the vibration suppression filter frequency

5.282 Vibration Filter Damping Coefficient

Parameter number	100622
Parameter name	Vibration filter damping coefficient
Data type	INT4
Valid range	10 to 250
Default value	60
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

60 is recommended for the vibration filter damping coefficient.

5.283 Torque Filter Time Constant

Parameter number	105501
Parameter name	Torque filter time constant (0.1ms)
Data type	INT4
Valid range	0 to 449
Default value	40
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

① To set the filter time constant of torque command.

② The large time constant decreases the response of control system, which may cause a system oscillation.

③ This parameter is usually set to 4 when low response is not required.

5.284 Deceleration Time Constant (0.1S/8000rpm)

Parameter number	105505
Parameter name	Declaration time constant (0.1S/8000rpm)
Data type	INT4
Valid range	0 to 1800
Default value	40
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

PA—5 indicates that the time it takes for motor to go from 8000r/min to 0r/min. PA—6 indicates that the time it takes for motor to go from 0r/min to 8000r/min.

The acceleration/deceleration is linear.

5.285 Speed Command Input Gain

Parameter number	105507

Parameter name	Speed command input gain
Data type	INT4
Valid range	10 to 30000
Default value	6000
Access level	ACCESS_MAC
Activation	ACT_NOW

5.286 Speed Command Zero-drift Compensation

Parameter number	105508
Parameter name	Speed command zero-drift compensation
Data type	INT4
Valid range	-256 to 256
Default value	40
Access level	ACCESS_MAC
Activation	ACT_PWR

5.287 Speed Command Gain Override

Parameter number	105508
Parameter name	Speed command gain override (1%)
Data type	INT4
Valid range	80 to 120
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

5.288 Maximum Torque Current Limit

Parameter number	105510
Parameter name	Speed command gain override (1%)
Data type	INT4
Valid range	10 to 300
Default value	200
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the maximum output torque current limit value of spindle motor.

1. 0.1 to 3 times the rated current of corresponding motor

2. The limit takes effect always.

5.289 Speed Arrival Range

Parameter number	105511
Parameter name	Speed arrival range (1rad/min)
Data type	INT4
Valid range	0 to 1000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set speed arrival range.

1. In speed control mode (PA—23=1, 3), if motor speed tracking error is smaller than the set value, the speed arrival signal is ON, otherwise it is OFF.

2. In speed control mode (PA—23=1), this parameter takes effect, and has nothing to do with rotate direction.

5.290 Speed Arrival Range

Parameter number	105511
Parameter name	Speed arrival range (1rad/min)
Data type	INT4
Valid range	0 to 1000
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

5.291 Position Out-of-tolerance Detection Range

Parameter number	105512
Parameter name	Position out-of-tolerance detection range
Data type	INT4
Valid range	1 to 32767
Default value	30

Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set the range within which the position error is allowed. If the range is exceeded, an alarm is issued.
2. In the C axis position control mode (PA—23=0), or in the C axis position control mode to which is switched from speed control mode through the switching switch, when the count value of the position deviation counter is over this parameter value, the alarm is issued.

5.292 Numerator of Transmission Ratio between Spindle and Motor

Parameter number	105513
Parameter name	Numerator of transmission ratio between spindle and motor
Data type	INT4
Valid range	1 to 32767
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the transmission ratio between spindle and motor.

For example, at the time of operation, as spindle rotates 3 revolutions, spindle motor rotates 5 revolutions, then PA--13=3, PA--14=5; as spindle rotates 5 times, spindle motor rotates 3 times, then PA--13=5, PA--14=3.

5.293 Denominator of Transmission Ratio between Spindle and Motor

Parameter number	105514
Parameter name	Denominator of transmission ratio between spindle and motor
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the transmission ratio between spindle and motor.

For example, at the time of operation, as spindle rotates 3 revolutions, spindle motor rotates 5 revolutions, then PA--13=3, PA--14=5; as spindle rotates 5 times, spindle motor rotates 3 times, then PA--13=5, PA--14=3.

5.294 Number of Spindle Motor Pole Pairs

Parameter number	105524
Parameter name	Number of spindle motor pole pairs
Data type	INT4
Valid range	1 to 100
Default value	2
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set number of motor pole pairs based on motor model;

2. For example, 2 indicates that number of spindle motor pole pairs is 2

5.295 Spindle Motor Encoder Resolution

Parameter number	105525
Parameter name	Spindle motor encoder resolution
Data type	INT4
Valid range	0 to 3601
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: 1024ppr (TTL square wave) incremental photoelectric encoder.

1: 2000ppr (TTL square wave) incremental photoelectric encoder.

2: 2500ppr (TTL square wave) incremental photoelectric encoder.

3: 256ppr sine cosine incremental encoder

8: Resolver (16384ppr)

Other sine cosine/incremental encoder

For example, when PA25 is set to 1200, it indicates 1200ppr sine cosine encoder, and the number of pulses per motor revolution is 1200*256; when PA25 is set to 1201, it indicates 1200ppr TTL incremental encoder, and the number of pulses per motor revolution is 1200*4.

5.296 Synchronous Spindle Motor Encoder Zero Offset Compensation

Parameter number	105526

Parameter name	Synchronous spindle motor encoder zero offset compensation
Data type	INT4
Valid range	-32767 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Number of zero pulses of incremental encoder and distance-coded encoder for synchronous spindle motor.

5.297 IM Flux Current

Parameter number	105533
Parameter name	IM flux current
Data type	INT4
Valid range	10 to 80
Default value	60
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. Based on the no-load current Io of the motor at rated speed to calculate, set the motor code (PA--59), then this parameter will be automatically set;

2. For 2.2KW to 11KW spindle motor, no-load current is usually 40% to 60% of motor rated current; For the spindle motor of 15KW to 22KW, the no-load current is usually 30% to 40% of motor rated current;

3. Large setting of flux current is easy to cause magnetic flux saturation, resulting in motor oscillation and greater fluctuation in speed; if the setting is too small, it will cause insufficient motor excitation, which will cause a large drop in motor output torque.

5.298 IM Spindle Motor Rotor Electrical Time Constant

Parameter number	105534
Parameter name	IM spindle motor rotor electrical time constant
Data type	INT4
Valid range	1 to 15000
Default value	1500
Access level	ACCESS_MAC

Activation	ACT_PWR

Description

1. Based on rated slip frequency fsl, rated load current In, and no-load current Io of the motor to calculate $\frac{1}{2\pi f_{sl}} \times \sqrt{(I_n / I_o)^2 - 1}$; this parameter will be automatically set after setting motor code (PA—59);

2. For 2.2KW to 11KW spindle motor, n1300-1800 is set; for the spindle motor of 15KW to 30KW, 3000-4000 is set;

3. Too large or small rotor time constant may cause obviously deviation of magnetic field orientation angle, leading in large falling of motor output torque.

5.299 IM Spindle Motor Rated Speed

Parameter number	105535
Parameter name	IM spindle motor rated speed (1rad/min)
Data type	INT4
Valid range	1 to 20000
Default value	1500
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set rated speed of asynchronous spindle motor based on motor model.

5.300 Min. IM Flux Current

Parameter number	105536
Parameter name	Min. IM flux current (0.01A)
Data type	INT4
Valid range	5 to 30
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0.1 or smaller times the parameter PA—53 or smaller is generally set. This parameter is automatically set after setting motor code (PA—59)

5.301 Spindle Orientation Completion Range

Parameter number	105537
Parameter name	Spindle orientation completion range
Data type	INT4
Valid range	0 to 100
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the minimum range of position error allowed when the spindle orientation is complete.

When the orientation position is reached and the position error is less than the set value, the orientation is complete. At the same time, the spindle drive unit outputs orientation completion signals.

5.302 Spindle Orientation Speed

Parameter number	105538
Parameter name	Spindle orientation speed (1rad/min)
Data type	INT4
Valid range	10 to 600
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set speed of spindle motor at the time of spindle orientation.

5.303 Spindle Orientation Position

Parameter number	105539
Parameter name	Spindle orientation position (pulse)
Data type	INT4
Valid range	-32767 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set the position of spindle orientation. Number of pulses per motor revolution correspond to 360°.

2. The value is set using zero pulse position of motor encoder or spindle encoder as a reference.

5.304 Indexing Orientation Incremental Angle

Parameter number	105541
Parameter name	Indexing orientation incremental angle
Data type	INT4
Valid range	0 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set incremental angle of indexing orientation;

2. Incremental angle of indexing orientation = PA—40 * 360/ppr0/8 * Indexing incremental orientation angle magnification.

ppr0: STA-13=0 Spindle motor photoelectric encoder resolution * 4

STA-13=1 Spindle encoder resolution * 4

Indexing incremental orientation angle magnification is determined by the switch amount INC_Sel1 and INC_Sel2.

5.305 DSP Software Version/User Password Setting

Parameter number	105541
Parameter name	DSP software version/user password setting
Data type	INT4
Valid range	0 to 2003
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

The default value indicates the software version.

1230: Password for parameter saving

2003: View extended parameter or modify limited parameter

315: View and modify extended parameter

5.306 Position Mode: Speed Proportional Gain

Parameter number	105542
Parameter name	Position mode: speed proportional gain
Data type	INT4
Valid range	25 to 32000
Default value	450
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

1. To set proportional gain of speed regulator in C-axis position control mode;

2. The larger the set value, the higher the gain, and the greater the rigidity. This parameter is set based on specific spindle drive unit model and load. Generally, the larger the load inertia, the larger the set value.

3. Try to set a larger value without causing an oscillation. This parameter is automatically set after setting motor code (PA—59).

5.307 Position Mode: Speed Integral Time Constant

Parameter number	105543
Parameter name	C axis position/Orientation mode: speed integral time constant
Data type	INT4
Valid range	5 to 32767
Default value	20
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

1. To set integral time constant of speed regulator in spindle orientation mode.

2. The smaller the set value, the quicker the integral speed. This parameter is set based on specific spindle drive unit model and load. Generally, the larger the load inertia, the larger the set value.

3. Try to set a smaller value without causing an oscillation.

5.308 Orientation Mode: Position Proportional Gain

Parameter number	105544
Parameter name	Orientation mode: position proportional gain
Data type	INT4
Valid range	10 to 5000
Default value	200

Access level	ACCESS_MAC
Activation	ACT_NOW

Description

1. To set proportional gain of position regulator in position orientation mode.

2. The larger the set value, the higher the gain, and the greater the rigidity. This parameter is set based on specific spindle drive unit model and load. Generally, the larger the load inertia, the larger the set value.

3. Try to set a larger value without causing an oscillation.

5.309 Orientation Mode: Flux Current

Parameter number	105545
Parameter name	Orientation mode: flux current
Data type	INT4
Valid range	30 to 150
Default value	110
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

1. To set motor flux current in orientation mode;

2. The set value indicates percentage of asynchronous motor flux current (PA--33) used in orientation mode.

5.310 Position Mode: Flux Current

Parameter number	105546
Parameter name	Position mode: flux current
Data type	INT4
Valid range	30 to 150
Default value	110
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

To set motor flux current in C axis position control mode (PA—23=0) or after switching speed control mode (PA—23=1, 3) to C axis position control mode by control mode switching switch. It indicates the percentage of rated exciting current of asynchronous motor used in C axis mode.

5.311 Spindle Encoder Resolution (4x)

Parameter number	105547
Parameter name	Spindle encoder resolution
Data type	INT4
Valid range	1 to 32767
Default value	4096
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

1. To set spindle encoder resolution based on the combination of PA47 and PA118;
2. PA118 * 10000 + PA47 = Spindle encoder resolution frequency quadrupling

For example, if spindle encoder resolution is 1200, then PA—47=1200*4=4800. If the spindle encoder is not used, then 4096 is set.

5.312 Orientation Start Offset Angle

Parameter number	105548
Parameter name	Orientation start offset angle
Data type	INT4
Valid range	0 to 18
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the starting offset angle of spindle orientation;

It is recommended to use this parameter when the number of pulses per spindle revolution is greater than 65536. At this time, the orientation position of the spindle is determined by the two parameters PA-48 and PA-39.

Example: the number of pulses per revolution of spindle is 217 = 131072 pulses; Expected orientation offset is 1500. Set PA-48 = 7 (orientation start offset Angle is 200 * 7 = 1400); Set PA-39 = 3641 (3641 corresponds to an offset angle of about 3641 * 366/131072 = 100)

5.313 C-axis Electronic Gear Ratio Numerator

Parameter number	105549
Parameter name	C-axis electronic gear ratio numerator
Data type	INT4

Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

In C-axis position control mode (PA--23=0), PA—0 position control mode position proportional gain adjusts feature of position loop, PA—42 position control mode speed proportional gain and PA—43 position control mode speed integral time constant adjust feature of speed loop, PA—27 current control proportional gain and PA—28 current control integral time adjust feature of current loop. PA-33 flux current and PA—46 position control flux current set flux current, and flux current is equal to PA—53 * PA—33 * PA—46.

5.314 C-axis Electronic Gear Ratio Denominator

Parameter number	105550
Parameter name	C-axis electronic gear ratio denominator
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

In C-axis position control mode (PA--23=0), PA—0 position control mode position proportional gain adjusts feature of position loop, PA—42 position control mode speed proportional gain and PA—43 position control mode speed integral time constant adjust feature of speed loop, PA—27 current control proportional gain and PA—28 current control integral time adjust feature of current loop. PA-33 flux current and PA—46 position control flux current set flux current, and flux current is equal to PA—53 * PA—33 * PA—46.

5.315 Serial Communication Baud Rate

Parameter number	105551
Parameter name	Serial communication baud rate
Data type	INT4
Valid range	0 to 5
Default value	2
Access level	ACCESS_MAC

Activation	ACT_PWR

Description

To set baud rate of RS232 serial communication.

5.316 Communication Substation Address

Parameter number	105552
Parameter name	Communication substation address
Data type	INT4
Valid range	1 to 63
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set substation address of RS232 serial communication.

5.317 IM Motor Rated Current

Parameter number	105553
Parameter name	IM motor rated current (0.1A)
Data type	INT4
Valid range	30 to 1500
Default value	188
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set rated current of asynchronous spindle motor based on motor model. This parameter is automatically set after setting motor code (PA—59).

5.318 Max. Load Current of IM Speed Point 2

Parameter number	105554
Parameter name	Max. load current of IM speed point 2
Data type	INT4
Valid range	10 to 300
Default value	180

Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This value should be smaller than or equal to PA-10 max. torque current limit.

5.319 IM 2nd Load Current Limit Speed

Parameter number	105555
Parameter name	IM 2nd load current limit speed (1r/min)
Data type	INT4
Valid range	500 to 30000
Default value	3000
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Must larger than or equal to PA-35 IM spindle motor rated speed.

5.320 PM Spindle Motor Rated Current

Parameter number	105556
Parameter name	PM spindle motor rated current (0.1A)
Data type	INT4
Valid range	100 to 3000
Default value	420
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set rated current of synchronous spindle motor based on motor model.

5.321 PM Spindle Motor Rated Speed

Parameter number	105557
Parameter name	PM spindle motor rated speed (1rad/min)
Data type	INT4
Valid range	10 to 30000
Default value	2000

Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set rated speed of synchronous spindle motor based on motor model.

5.322 PM Spindle Motor Flux-weakening Start Speed

Parameter number	105558
Parameter name	PM spindle motor flux-weakening start speed (1r/min)
Data type	INT4
Valid range	100 to 20000
Default value	2500
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set speed of flux-weakening start point for synchronous spindle motor based on motor model.

5.323 Drive Unit and Motor Type Code

Parameter number	105559
Parameter name	Drive unit and motor type code
Data type	INT4
Valid range	0 to 3799
Default value	202
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Hundreds indicates model of drive unit:

0：35A

1：50A

2：75A

9：90A

3：100A

4：150A

5：200A

6：300A

7：450A

Tens and units indicate motor code.

5.324 IM Spindle Motor Flux-weakening Current Coefficient

Parameter number	105561
Parameter name	PM spindle motor flux-weakening current override coefficient
Data type	INT4
Valid range	50 to 100
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set flux-weakening current override coefficient of asynchronous spindle motor.

5.325 IM Spindle Motor Voltage Controller Gain Correction

Parameter number	105562
Parameter name	IM spindle motor voltage controller gain correction
Data type	INT4
Valid range	0 to 32767
Default value	8192
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set voltage controller correction gain of asynchronous spindle motor.

5.326 IM Spindle Motor Voltage Utilization at Rated Speed

Parameter number	105563
Parameter name	IM spindle motor voltage utilization at rated speed
Data type	INT4
Valid range	70 to 100
Default value	90
Access level	ACCESS_MAC

Activation	ACT_PWR

Description

Given voltage of voltage controller for asynchronous spindle motor.

5.327 IM Spindle Motor Flux-weakening Torque Override Coefficient

Parameter number	105564
Parameter name	IM spindle motor flux-weakening torque override coefficient
Data type	INT4
Valid range	10 to 400
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

PA-53 Percentage of spindle motor rated current

For asynchronous spindle motor, properly increase this parameter value to reduce time of startup and brake response.

5.328 IM Spindle Motor No-load Rated Current

Parameter number	105565
Parameter name	IM spindle motor no-load rated current
Data type	INT4
Valid range	50 to 1200
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set current of asynchronous spindle motor without load.

5.329 IM Spindle Motor Rated Slip Frequency

Parameter number	105566
Parameter name	IM spindle motor rated slip frequency
Data type	INT4
Valid range	1 to 150

Default value	25
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set rated flip frequency of asynchronous spindle motor.

5.330 PM Motor Current Limit Value

Parameter number	105567
Parameter name	PM motor current limit value
Data type	INT4
Valid range	20 to 400
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

PA-56 Percentage of PM spindle motor rated current

For synchronous spindle motor, properly increase this parameter value to reduce time of startup and brake response.

5.331 PM Spindle Motor Constant Torque Area: Rated Filed Current in MTPA

Parameter number	105568
Parameter name	PM spindle motor constant torque area: rated field current in MTPA
Data type	INT4
Valid range	1 to 200
Default value	85
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

PA-56 Percentage of PM spindle motor rated current.

5.332 PM Motor Current Max. Limit

Parameter number	105570
Parameter name	PM motor current max. limit
Data type	INT4
Valid range	1 to 200
Default value	85
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

PA-56 Percentage of PM spindle motor rated current

5.333 Exciting Current Override Value

Parameter number	105571
Parameter name	Exciting current override value
Data type	INT4
Valid range	0 to 32767
Default value	8192
Access level	ACCESS_MAC
Activation	ACT_NOW

5.334 Torque Current Override Value

Parameter number	105572
Parameter name	Torque current override value
Data type	INT4
Valid range	0 to 32767
Default value	8192
Access level	ACCESS_MAC
Activation	ACT_NOW

5.335 Open Loop Max. Current

Parameter number	105573
Parameter name	Open loop max. current
Data type	INT4
Valid range	1 to 80

Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

PA-56 Percentage of PM spindle motor rated current

5.336 Synchronous Spindle with Incremental Encoder: Initial Pole Identification after Power-on

Parameter number	105574
Parameter name	Synchronous spindle with incremental encoder: initial pole identification after power-on
Data type	INT4
Valid range	0 to 2
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Current vector control mode (motor moves slightly)

1: Open loop Z pulse searching mode (motor moves obviously)

2: High frequency pulse injection mode (no moving of motor)

5.337 External IO Input Signal Filter Time

Parameter number	105575
Parameter name	External IO input signal filter time
Data type	INT4
Valid range	1 to 200
Default value	5
Access level	ACCESS_MAC
Activation	ACT_PWR

5.338 Synchronization Control Function Configuration 1

Parameter number	105576
Parameter name	Synchronization control function configuration 1
Data type	INT4

Valid range	0 to 11111
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Units:

0: Disable synchronization; 1: Enable synchronization;

Tens:

0: Master axis; 1: Slave axis

5.339 Synchronization Control Function Configuration 2

Parameter number	105577
Parameter name	Synchronization control function configuration 2
Data type	INT4
Valid range	0 to 11111
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Disable torque compensation; 1: Enable torque compensation.

5.340 Torque Compensator Proportionality Factor

Parameter number	105578
Parameter name	Torque compensator proportionality factor
Data type	INT4
Valid range	0 to 10000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_PWR

5.341 Torque Compensator Integral Factor

Parameter number	105580
Parameter name	Torque compensator integral factor
Data type	INT4

Valid range	0 to 20
Default value	2
Access level	ACCESS_MAC
Activation	ACT_PWR

5.342 Anti-backlash Offset Torque Percentage

Parameter number	105581
Parameter name	Anti-backlash offset torque percentage
Data type	INT4
Valid range	-80 to 80
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

5.343 Torque Difference Protection Threshold

Parameter number	105582
Parameter name	Torque difference protection threshold
Data type	INT4
Valid range	1 to 10000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_NOW

5.344 Endat2.2 High-resolution Motor Encoder Shift Bits

Parameter number	105584
Parameter name	Endat2.2 high-resolution motor encoder shift bits
Data type	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

5.345 DP-TPI Display Selection

Parameter number	105586

Parameter name	DP-TPI display selection
Data type	INT4
Valid range	0 to 15
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To display,

0: motor V phase current (Q15 format)

1: actual torque current value (Q15 format);

2: actual torque current value (unit: 0.1A);

3: feedback pulse increment of speed cycle (corresponding speed value);

4: Count value of motor encoder Z pulse after width determination;

5: motor encoder sine cosine signal amplitude;

6: encoder 2 sine cosine signal amplitude;

7: power factor angle (unit: 0.1 degrees);

8: motor output torque (unit: 0.1Nm);

9: motor output power (unit: 0.1kw);

10: motor pole electrical angle (unit: 0.1 degrees);

14: Count value of motor encoder 2 Z pulse after width determination;

16: Hardware capture count value of motor encoder Z pulse, each time the count value plus 1;

17: Hardware capture count value of motor encoder 2 Z pulse, each time the count value plus 1;

18: Software modification date.

5.346 DP-TPO Display Selection

Parameter number	105587
Parameter name	DP-TPO display selection
Data type	INT4
Valid range	0 to 15
Default value	4
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To display,

0: motor V phase current (Q15 format)

1: actual torque current value (Q15 format);

2: actual torque current value (unit: 0.1A);

3: feedback pulse increment of speed cycle (corresponding speed value);

4: Count value of motor encoder Z pulse after width determination;

5: motor encoder sine cosine signal amplitude;

6: encoder 2 sine cosine signal amplitude;

7: power factor angle (unit: 0.1 degrees);

8: motor output torque (unit: 0.1Nm);

9: motor output power (unit: 0.1kw);

10: motor pole electrical angle (unit: 0.1 degrees);

14: Count value of motor encoder 2 Z pulse after width determination;

16: Hardware capture count value of motor encoder Z pulse, each time the count value plus 1;

17: Hardware capture count value of motor encoder 2 Z pulse, each time the count value plus 1;

5.347 Synchronous Spindle Motor Zero Finding: Vector Working Time

Parameter number	105588
Parameter name	Synchronous spindle motor zero finding: vector working time
Data type	INT4
Valid range	0 to 32
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Working time of pole identification method of synchronous spindle with incremental encoder at the time of power-on.

The vector working time of synchronous spindle motor should be short enough to ensure that zero can be found rapidly and accurately, reducing startup time of machine and precision error.

5.348 IQ Amplitude Limit Filter

Parameter number	105589
Parameter name	IQ amplitude limit filter
Data type	INT4
Valid range	0 to 20
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

This parameter is used to calculate output power and torque of drive unit.

5.349 Gear-2 Spindle Orientation Position

Parameter number	105590
Parameter name	Gear-2 spindle orientation position
Data type	INT4
Valid range	0 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Used for orientation of spindle encoder and proximity switch

1. To set spindle orientation position. Number of pulses per revolution corresponds to 360°.

When using spindle motor encoder orientation, only one-gear orientation is allowed. PA—39 gear-1 spindle orientation position needs to be set.

When using spindle encoder orientation or proximity orientation, two-gear orientation is allowed. PA—39 gear-1 spindle orientation position and PA—90 gear-2 spindle orientation position need to be set.

2. The value is set using zero pulse position of motor encoder or spindle encoder as reference.

5.350 Gear-2 Spindle Orientation Start Offset Angle

Parameter number	105591
Parameter name	Gear-2 spindle orientation start offset angle
Data type	INT4
Valid range	0 to 18
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Used for orientation of spindle encoder and proximity switch

1. To set the starting offset angle of spindle orientation;

2. When using spindle motor encoder orientation, only one-gear orientation is allowed;

PA-48 is only used when number of pulses per spindle motor encoder revolution is larger than 32767, and spindle orientation position is larger than 32767.

At this point, spindle orientation position is determined b PA-48 and PA-39.

Gear 1 spindle orientation position = (PA-48 * number of motor feedback pulses per spindle revolution) /18 + PA-39

3. When using spindle encoder orientation, two-gear orientation can be achieved.

PA-48 and PA-91 are used only when number of pulses per spindle encoder revolution is larger than 32767, and spindle orientation position is larger than 32767.

At that point, gear-1 spindle orientation position is determined by PA-48 and PA-39

Gear-1 spindle orientation position = (PA-48 * Number of motor feedback pulses per spindle revolution) / 18 + PA-39

4. When using proximity switch orientation, two-gear orientation can be achieved.

PA-48 and PA-91 are used only when number of pulses per spindle encoder revolution is larger than 32767, and spindle orientation position is larger than 32767.

At that point, gear-1 spindle orientation position is determined by PA-48 and PA-39

Gear-1 spindle orientation position = (PA-48 * Number of motor feedback pulses per spindle revolution) / 18 + PA-39

5.351 Gear 2 spindle/Motor: Transmission Ratio Numerator

Parameter number	105592
Parameter name	Gear 2 spindle/motor: transmission ratio numerator
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Used for orientation of proximity switch.

5.352 Gear 2 Spindle/Motor: Transmission Ratio Denominator

Parameter number	105593
Parameter name	Gear 2 spindle/motor: transmission ratio denominator
Data type	INT4
Valid range	1 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Used for orientation of proximity switch.

To set spindle/motor transmission ratio. When using orientation of proximity switch, if there is only one gear of orientation, users need to set PA—13 gear 1 spindle/motor transmission numerator/PA—14 gear 1 spindle/motor transmission denominator. PA—92 gear 1 spindle/motor transmission numerator/PA—93 gear 1 spindle/motor transmission denominator is also needed to be set.

5.353 Current Limit Range

Parameter number	105594
Parameter name	Current limit range
Data type	INT4
Valid range	0 to 200
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To limit the percentage of rated current that the current can reach when the motor is stuck by external force, used with PLC.

5.354 Internal Test Mode Function Code

Parameter number	105595
Parameter name	Internal test mode function code
Data type	INT4
Valid range	-32767 to 32767
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Only used for internal test mode of spindle / PA95=111, the unit of speed command is ten times of the original.

5.355 Notch Filter Application Mode

Parameter number	105602
Parameter name	Notch filter application mode
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC

Activation	ACT_PWR

Description

0: Notch filter is invalid;

1: Notch filter 1 is valid;

2: Notch filter 2 is valid;

3: Both notch filter 1 and notch filter 2 are valid.

5.356 Gain Self-adaption Control

Parameter number	105603
Parameter name	Gain self-adaption control
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: Disable

1: Enable

5.357 Self-adaption Start Speed

Parameter number	105604
Parameter name	Self-adaption start speed
Data type	INT4
Valid range	0 to 500
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

When gain self-adaption control is enabled, to set starting speed of self-adaption. Unit: rpm.

5.358 Self-adaption End Speed

Parameter number	105605
Parameter name	Self-adaption end speed

Data type	INT4
Valid range	0 to 1500
Default value	600
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

When gain self-adaption control is enabled, to set end speed of self-adaption. Unit: rpm.

5.359 Proportional Gain Self-adaption Factor

Parameter number	105606
Parameter name	Proportional gain self-adaption factor
Data type	INT4
Valid range	0 to 500
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

When gain self-adaption control is enabled, to set proportional gain factor of self-adaption speed.

5.360 Integral Gain Self-adaption Factor

Parameter number	105607
Parameter name	Integral gain self-adaption factor
Data type	INT4
Valid range	0 to 500
Default value	100
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

When gain self-adaption control is enabled, to set integral gain factor of self-adaption speed.

5.361 Position Feedback Smoothing Coefficient

Parameter number	105608
Parameter name	Position feedback smoothing coefficient

Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To avoid the positional overtravel at high speed deceleration, and the large inertia spindle is generally set to 64 - 128.

5.362 Winding Switching

Parameter number	105609
Parameter name	Winding switching
Data type	INT4
Valid range	0 to 15
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

0: winding switching function is turned off

1: winding switching function is turned on

5.363 Winding Switching Delay Time

Parameter number	105610
Parameter name	Winding switching delay time
Data type	INT4
Valid range	10 to 3000
Default value	300
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set delta-star winding switching delay time when delta-star winding switching function is enabled.

5.364 Position Deceleration Control Smoothing Coefficient

Parameter number	105616
Parameter name	Position deceleration control smoothing coefficient
Data type	INT4
Valid range	-100 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

The larger the set value, the shorter the orientation deceleration time. Generally, 0 is set.

5.365 Pseudo-differential Feedforward Control Coefficient

Parameter number	105617
Parameter name	Pseudo-differential feedforward control coefficient
Data type	INT4
Valid range	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

Counterclockwise rotation mya occur when big inertia spindle stops in speed mode, at that point, users can change this parameter. Generally, 30-50 is set.

5.366 Spindle Encoder Resolution High-bit

Parameter number	105618
Parameter name	Spindle encoder resolution high-bit
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

To set the resolution of spindle encoder by the combination of PA47 and PA118.

Spindle encoder resolution = PA118*10000+PA47

5.367 Encoder Sin-Cos Signal Upload Selection

Parameter number	105619
Parameter name	Encoder sin-cos signal upload selection
Data type	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR

Description

2: Upload full-closed loop encoder sin-cos signal;

3: Upload motor encoder sin-cos signal.

5.368 Sin-Cos Encoder Compensation

Parameter number	105640
Parameter name	Sin-Cos encoder compensation
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

0: Disable compensation function;

1: Enable motor encoder sin-cos signal compensation;

2: Enable full-closed loop sin-cos signal compensation;

3: Enable both motor encoder and full-closed loop sin-cos signal compensation.

5.369 Motor Sin-Cos Encoder Microstepping

Parameter number	105642
Parameter name	Motor sin-Cos encoder microstepping
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC

Activation	ACT_NOW

Description

0: 256 microstepping

1: 512 microstepping

2: 1024 microstepping

3: 2048 microstepping

4: 4096 microstepping

5.370 Full-closed Loop Sin-Cos Encoder Microstepping

Parameter number	105643
Parameter name	Full-closed loop sin-cos encoder microstepping
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

0: 256 microstepping

1: 512 microstepping

2: 1024 microstepping

3: 2048 microstepping

4: 4096 microstepping

5.371 Motor Encoder Sin Signal Amplitude Offset Compensation

Parameter number	105644
Parameter name	Motor encoder sin signal amplitude offset compensation
Data type	INT4
Valid range	-500 to 500
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

5.372 Motor Encoder Cos Signal Amplitude Offset Compensation

Parameter number	105645

Parameter name	Motor encoder cos signal amplitude offset compensation
Data type	INT4
Valid range	-500 to 500
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

5.373 Motor Encoder Sin-Cos Signal Amplitude Mismatching Compensation

Parameter number	105646
Parameter name	Motor encoder sin-cos signal amplitude mismatching compensation
Data type	INT4
Valid range	512 to 5136
Default value	512
Access level	ACCESS_MAC
Activation	ACT_NOW

5.374 Full-closed Loop Sin Signal Amplitude Offset Compensation

Parameter number	105647
Parameter name	Full-closed loop sin signal amplitude offset compensation
Data type	INT4
Valid range	-500 to 500
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

5.375 Full-closed Loop Cos Signal Amplitude Offset Compensation

Parameter number	105648
Parameter name	Full-closed loop cos signal amplitude offset compensation
Data type	INT4
Valid range	-500 to 500
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

5.376 Full-closed Loop Sin-Cos Signal Amplitude Mismatching Compensation

Parameter number	105649
Parameter name	Full-closed loop sin-cos signal amplitude mismatching compensation
Data type	INT4
Valid range	512 to 1536
Default value	512
Access level	ACCESS_MAC
Activation	ACT_NOW

5.377 NCUC Bus Z Pulse Offset Upload

Parameter number	105651
Parameter name	NCUC bus Z-pulse offset upload
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

Semi-closed loop

0: The motor encoder square-wave latch value is taken as the Z-pulse reference for offset value loading;

1: The position latch value after motor encoder stepping is taken as the Z-pulse reference for offset value loading;

Full-closed loop

0: The spindle motor encoder square-wave latch value is taken as the Z-pulse reference for offset value loading;

1: The position latch value after spindle motor encoder stepping is taken as the Z-pulse reference for offset value loading;

Tens:

0: Clear A41 alarm when power on;

1: Not clear A41 alarm when power on.

5.378 Position Feedforward Compensation Override

Parameter number	105654
Parameter name	Position feedforward compensation override
Data type	INT4

Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

To compensation for the increasing error caused by enabling position differential feedback (PA108).

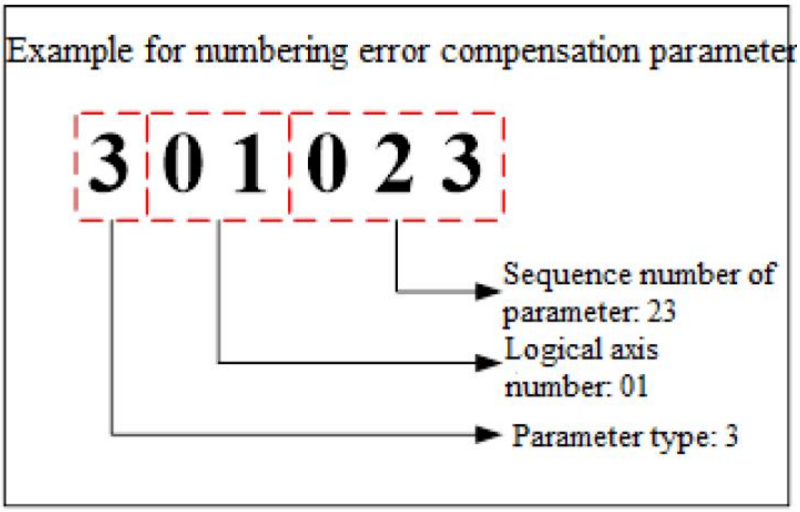
6 Error Compensation Parameter

Explanation on error compensation parameter number:

The first two digits: sequence number of error compensation parameter.

The middle two digits: logical axis number of error compensation

The fifth digit: type of parameter. The type is 3 for the error compensation parameter.



Note: Compensation axis 0 is taken as an example to illustrate the below error compensation parameters (bit 3 and bit 4 of their numbers are 0).

6.1 Backlash Compensation Type

Parameter number	300000
Parameter name	Backlash compensation type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the type of backlash compensation of the current axis.

0： Backlash compensation function is disabled.

1： Regular backlash compensation. The related parameters which need to be set include:

Parm 300001：Backlash compensation value.

Parm 300002：Backlash compensation rate.

2：The backlash compensation value in rapid traverse for the current axis is different from that in cutting feed, to realize high-precision compensation and processing. The related parameters need to be set include:

Parm 300001：Backlash compensation value.

Parm 300002：Backlash compensation rate.

Parm 300003：Rapid traverse backlash compensation value.

Note

The backlash compensation takes effect after the current axis returns to reference position.

6.2 Backlash Compensation Value

Parameter number	300001
Parameter name	Backlash compensation value
Data unit	mm, degree
Data type	REAL
Valid range	-10.0 to 10.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

This parameter is generally set to the measured backlash of the machine feed axis (linear axis, swivel axis, or rotary axis) in the common working area. No backlash compensation is required for the bidirectional pitch error compensation, and at this point, this parameter is set to 0.

When Parm300000 "Backlash compensation type" is set to 1, the backlash compensation value of the current axis is the value set by this parameter in both rapid traverse and cutting feed.

When Parm300000 "Backlash compensation type" is set to 2, the backlash compensation value of the current axis in cutting feed is the value set by this parameter, and in rapid traverse is the rapid traverse backlash compensation value set by Parm300003.

6.3 Backlash Compensation Rate

Parameter number	300002
Parameter name	Backlash compensation rate
Data unit	mm, degree
Data type	REAL
Valid range	0 to 1.0
Default value	0.01
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the backlash is larger, this parameter setting allows the backlash compensation to be spread across multiple interpolation cycles to be performed. If this set value is larger than 0, the backlash compensation will be completed within N interpolation cycles.

N= Backlash compensation value/ Backlash compensation rate

If backlash compensation rate is larger than the backlash compensation value, or is set to 0, the compensation will be completed in one interpolation cycle.

Note

The smaller value set by this parameter makes the compensation stabler but lowers the response of backlash compensation.

When Parm300150 "type of backlash compensation rate" is set to 0, this parameter takes effect; otherwise, this parameter doesn't work.

6.4 Rapid Traverse Backlash Compensation Value

Parameter number	300003
Parameter name	Rapid traverse backlash compensation value
Data unit	mm; degree
Data type	REAL
Valid range	-10.0 to 10.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the backlash compensation value for the current axis during rapid traverse(G00). CNC can realize higher-precision compensation and processing by differentiating backlash compensation values in rapid traverse from that in cutting feed.

When Parm300000 “Backlash compensation type” is set to 1, this parameter doesn’t work.

When Parm300000 “Backlash compensation type” is set to 2, the backlash compensation value of the current axis in rapid traverse is the value set by this parameter, and in cutting feed is the backlash compensation value set by Parm300001.

Note

The rapid traverse described in this parameter is only for G00 command, and it is for cutting feed at the time of axis jogging.

6.5 MPG Backlash Compensation Value

Parameter number	300004
Parameter name	MPG backlash compensation value
Data unit	mm; degree
Data type	REAL
Valid range	-10.0 to 10.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the backlash compensation value of current axis in MPG. By differentiating the backlash compensation value between rapid traverse and cutting feed, higher precision compensation and machining can be achieved.

6.5 Thermal Error Compensation Type

Parameter number	300005
Parameter name	Thermal error compensation type
Data type	INT4
Valid range	0 to 9
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The thermal error compensation function is used to perform the thermal deformation compensation of spindle and feed axis. This parameter is to set the type of thermal error compensation for the specified axis.

0：Thermal error compensation function is disabled.

1：Offset compensation.

It is mainly used for the thermal deformation compensation of machine spindle. The following parameters need to be set.

Parm 300007：Initial measured temperature of thermal error offset table

Parm 300008：Number of measured temperature points of thermal error offset table

Parm 300009：Measured temperature interval of thermal error offset table

Parm 300010：Temperature sensor number of thermal error offset table

Parm 300011：Starting parameter of thermal error offset table

The above parameters are to set for the thermal error offset table and the corresponding temperature sensor. The compensation algorithm queries the offset table to calculate the thermal error offset value K(T) according to the current measured temperature value.

Suppose the compensation axis is X axis, then the mathematical model of offset compensation is:

Dx＝－K(T)

2： Linear thermal expansion compensation

It is mainly used for the linear thermal expansion error compensation of feed axis. The following parameters need to be set.

Parm 300006：Reference point coordinate of thermal error compensation (P_0)

Parm 300012：Starting measured temperature of thermal error slope table

Parm 300013：Number of measured temperature points of thermal error slope table

Parm 300014：Measured temperature interval of thermal error slope table

Parm 300015：Temperature sensor number or thermal error slope table

Parm 300016：Staring parameter of thermal error slope table

The above parameters are to set for the thermal error slope table and the corresponding temperature sensor. The compensation algorithm queries the slope table to calculate the thermal expansion slope value tanβ(T) according to the current measured temperature value.

Suppose the compensation axis is X axis, then the mathematical model of linear thermal expansion compensation is:

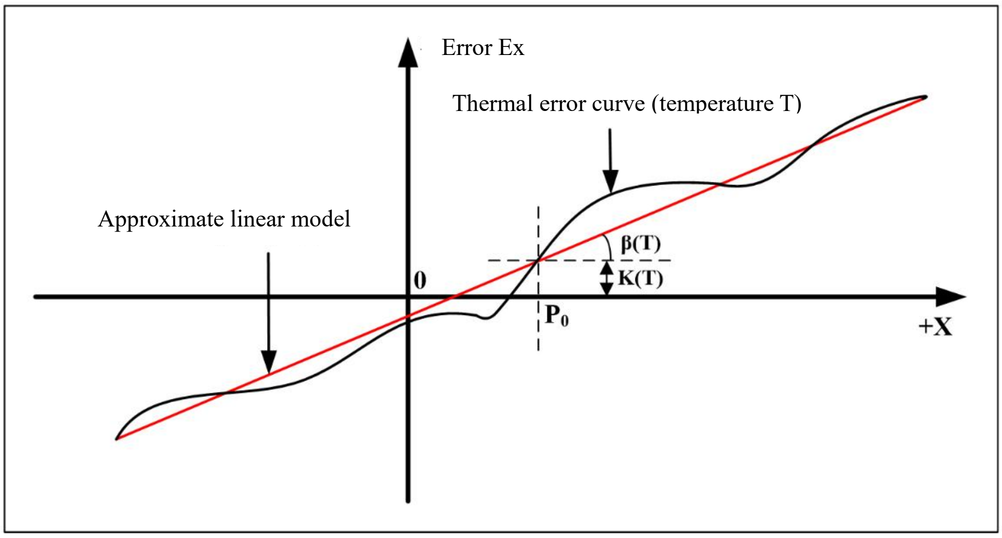
Dx＝－((Px－P0)×tanβ(T))

3： Composite compensation

It includes both Type 1 and Type 2 which are described above.

Suppose the compensation axis is X axis, then the mathematical model of composite compensation is:

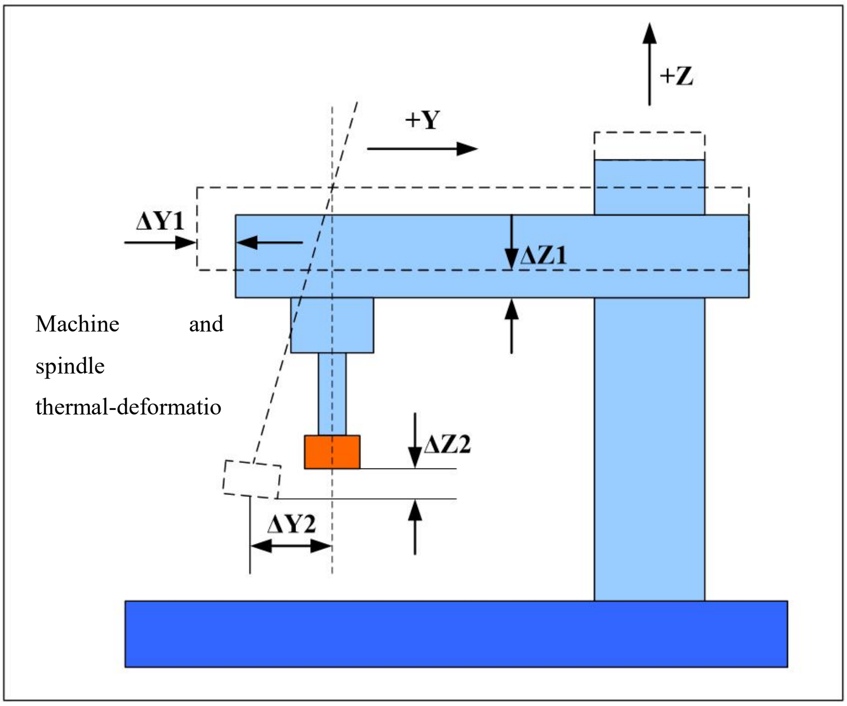
Dx＝－(K(T)+ (Px－P0)×tanβ(T))



Note: In the above mathematical models, Dx is the machine command coordinate compensation value of X axis, Px is the current machine command coordinate of X axis, and T is the temperature value at the feature point of thermal deformation.

The thermal error compensation of the current axis takes effect when a combination of the following conditions is true:

- The compensation axis has been returned to reference position.
- The type of thermal error compensation has been specified, and the related parameters of thermal error compensation has been correctly configured.



4: Bidirectional linear thermal expansion compensation

5: Bidirectional linear composite compensation

6: Predictive compensation based on big data

7: Bidirectional linear thermal expansion compensation with Z axis offset

8: Bidirectional composite linear compensation with Z axis offset

9: Compensation based on thermal mechanism model

6.6 Thermal Error Compensation: Reference Position

Parameter number	300006
Parameter name	Thermal error compensation: reference position
Data unit	mm, degree
Data type	REAL
Value range	0 to 9
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

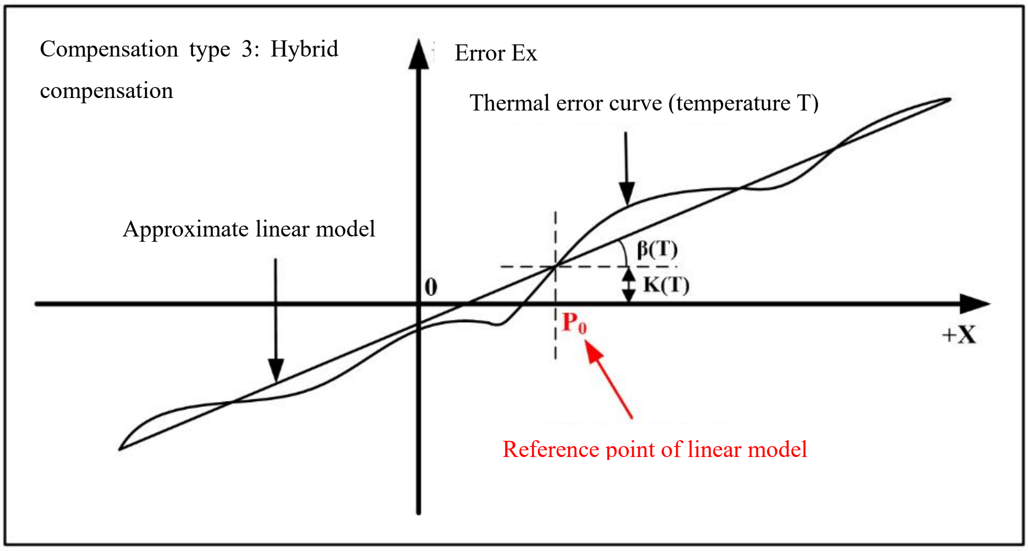
Description

This parameter takes effect when type of thermal error compensation is set to 2, 3, or 4.

In linear thermal expansion compensation, the curve of screw rod thermal-error can be approximately described via the linear model (the straight line with a certain slope), and this parameter is to specify the reference point coordinate of this linear model in the machine coordinate system.

When type of thermal error compensation is set to 2, the compensation value at the reference point is 0;

when type of thermal error compensation is set to 3 or 4, the compensation value at the reference point is determined by the absolute thermal compensation offset value K(T).



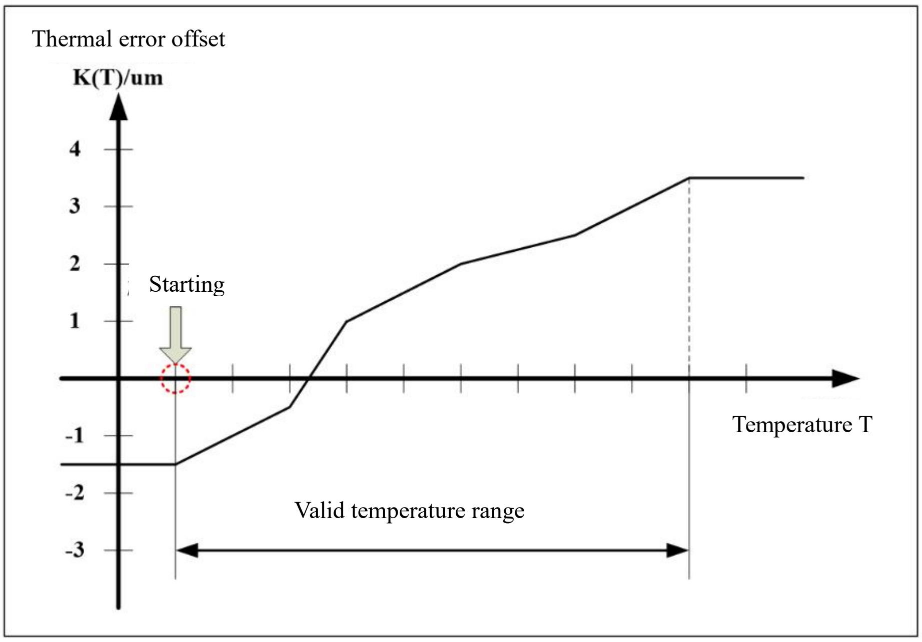
6.7 Thermal Error Offset Table: Initial Temperature

Parameter number	300007
Parameter name	Thermal error offset table: initial temperature
Data unit	℃
Data type	REAL
Value range	-200 to 200
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

The thermal error offset table is obtained through calibrating the thermal error offset values at equally-spaced temperature points. This parameter is to set the left boundary of effective temperature range of thermal error offset table.



Note

If the temperature measured by temperature sensor is lower than the starting temperature specified by this parameter, the thermal error offset of the starting temperature will be used to build the corresponding thermal error model.

6.8 Thermal Error Offset Table: Number of Temperature Points

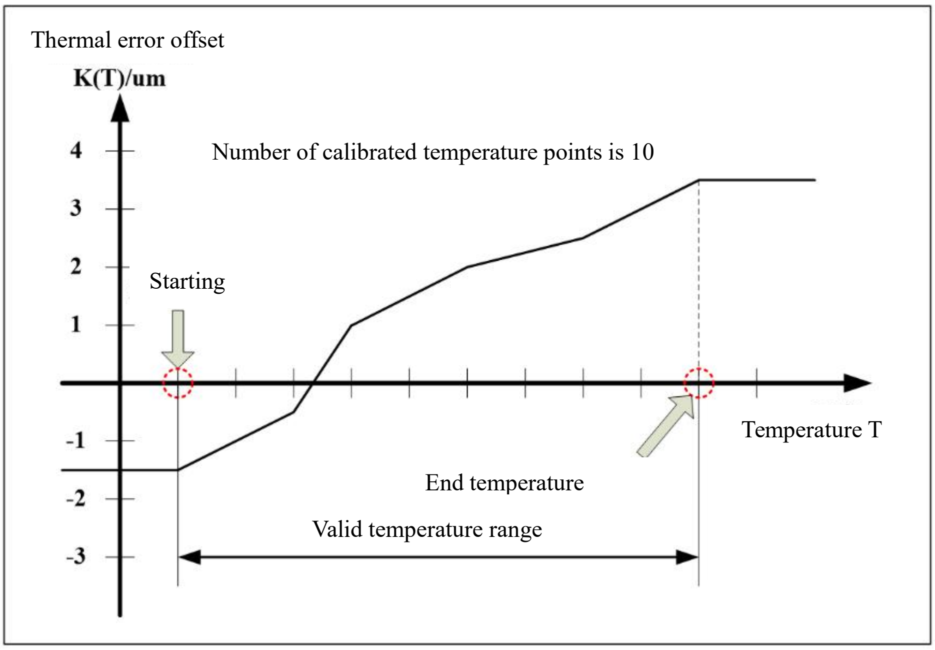
Parameter number	300008
Parameter name	Thermal error offset table: number of temperature points
Data unit	INT4
Data type	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

The thermal error offset table is obtained through calibrating the thermal error offset values at equally-spaced temperature points, and this parameter is to set the number of calibrated temperature points of thermal error offset table.

The thermal error offset at each calibrated temperature point is stored in the thermal error offset table at the specified location. Therefore, the number of calibrated temperature points determines the length of thermal error offset table.



Note

When this parameter is set to 0, the thermal error offset table is invalid!

6.9 Thermal Error Offset Table: Temperature Interval

Parameter number	300009
Parameter name	Thermal error offset table: temperature interval
Data unit	℃
Data type	REAL
Valid range	0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

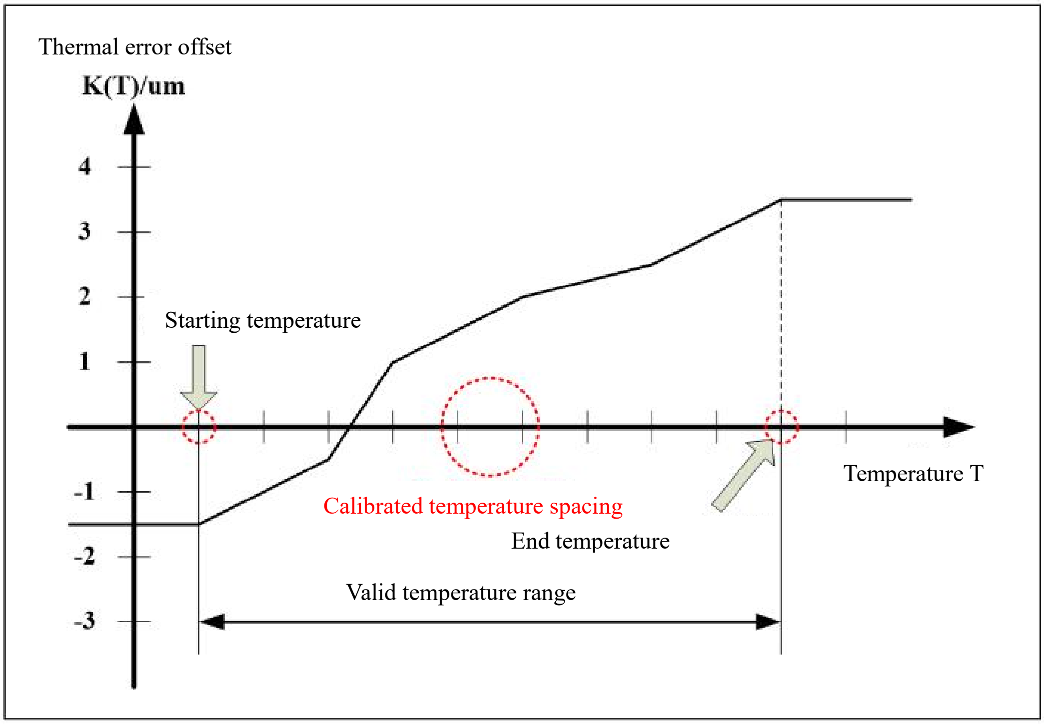
Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

The thermal error offset table is obtained through calibrating the thermal error offset values at equally-spaced temperature points, and this parameter is to set the space between calibrated temperature of thermal error offset table.

After the initial measured temperature for thermal error offset table, number of measured temperature points, and space between temperature points are set, the effective temperature range for thermal error offset table is determined. Then the formula to calculate the measured termination temperature is:

End temperature = Initial temperature + (Number of measured temperature points -1) × Measured temperature interval



Note

When this parameter is set to 0, the thermal error offset table is invalid!

If the temperature measured by temperature sensor is higher than the end temperature of thermal error offset table, the thermal error offset at the end temperature will be used to build the corresponding thermal error model.

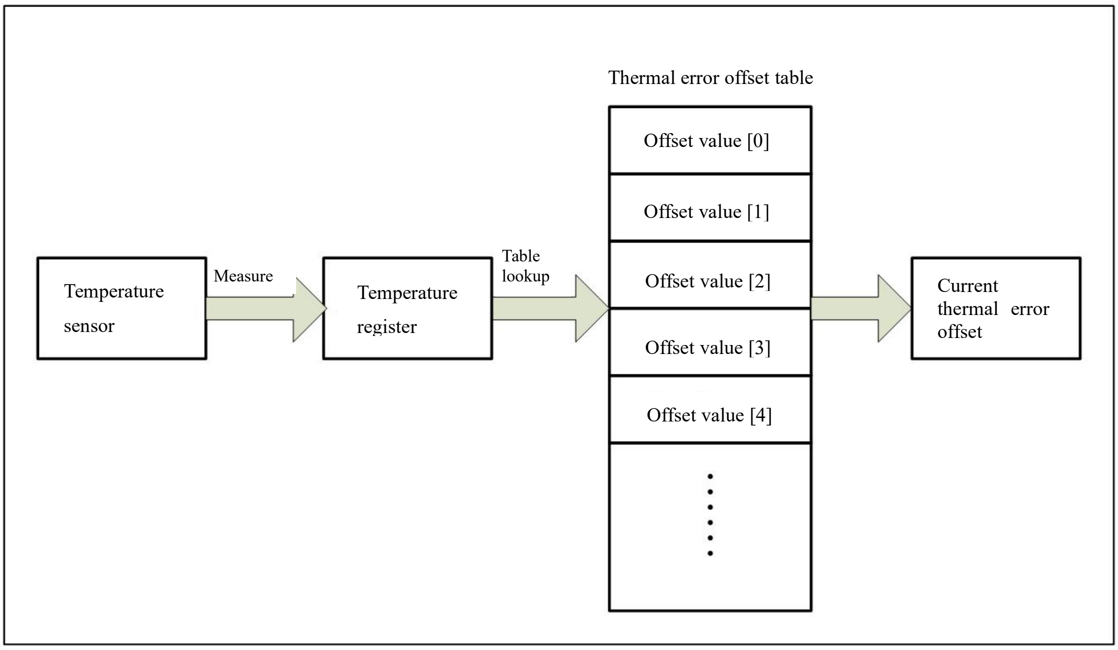
6.10 Thermal Error Offset Table: Sensor No.

Parameter number	300010
Parameter name	Thermal error offset table: sensor No.
Data type	INT4
Valid range	−1 to 127
Default value	−1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

This parameter is to set the temperature sensor number which is associated with the current thermal error offset table. The thermal error compensation algorithm queries thermal error offset table based on the temperature (it is stored in the corresponding temperature register) which is measured by this temperature sensor.



Note

Up to 20 temperature sensors can be connected to the system. When the temperature sensor number is out of range (from 0 to 19), the thermal error compensation is invalid!

6.11 Thermal Error Offset Table: Starting Parameter

Parameter number	300011
Parameter name	Thermal error offset table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

This parameter is to set the initial parameter number of thermal error offset table in data table parameters. After the initial parameter number is set, the storage interval of thermal error offset table in data table parameters is determined. The sequence of thermal error offset is arranged in order of temperature, from lowest to highest, with this parameter number being the first address.

The unit of thermal error offset is mm for linear axis, and degree for swing axis and rotary axis.

Note

While users are specifying the initial parameter number of thermal error offset table, avoid an overlap with other data tables which have been used, and the specified storage interval is not allowed to be out of range of data table parameters.

The sign of absolute thermal error offset K(T) is determined by the thermal deformation direction of spindle. For example, for X axis compensation, if the thermal deformation of spindle is along positive X axis of machine Cartesian coordinate system, the absolute thermal error offset is positive, otherwise negative.

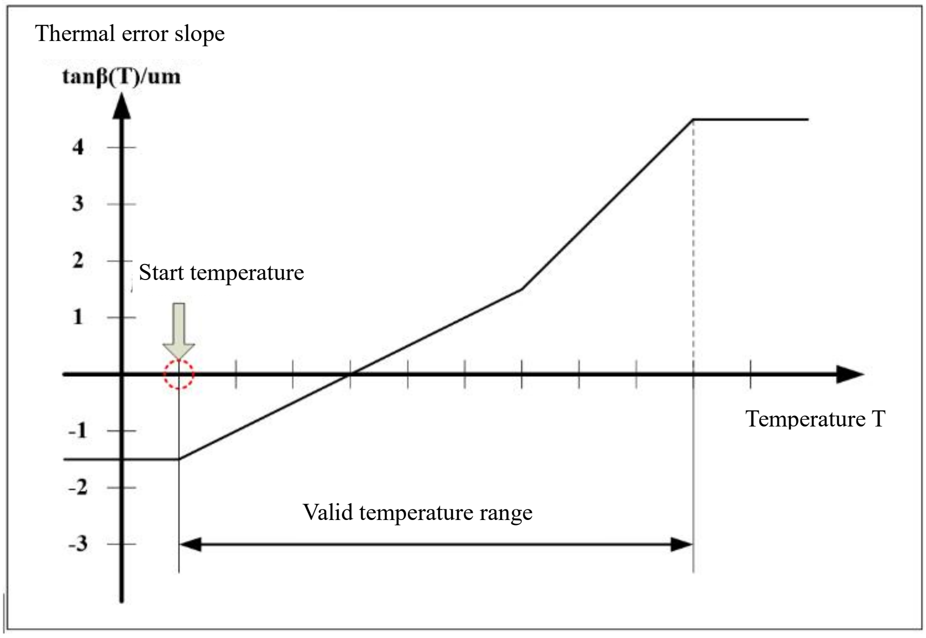
6.12 Thermal Error Slope Table: Starting Temperature

Parameter number	300012
Parameter name	Thermal error slope table: starting temperature
Data unit	℃
Data type	REAL
Value range	-200 to 200
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

This parameter is to set the left boundary of effective temperature range of thermal error slope table.



Note

If the temperature measured by temperature sensor is lower than the initial temperature specified by this parameter, the thermal error slope of the initial temperature will be used to build the corresponding thermal error model.

6.13 Thermal Error Slope Table: Number of Temperature points

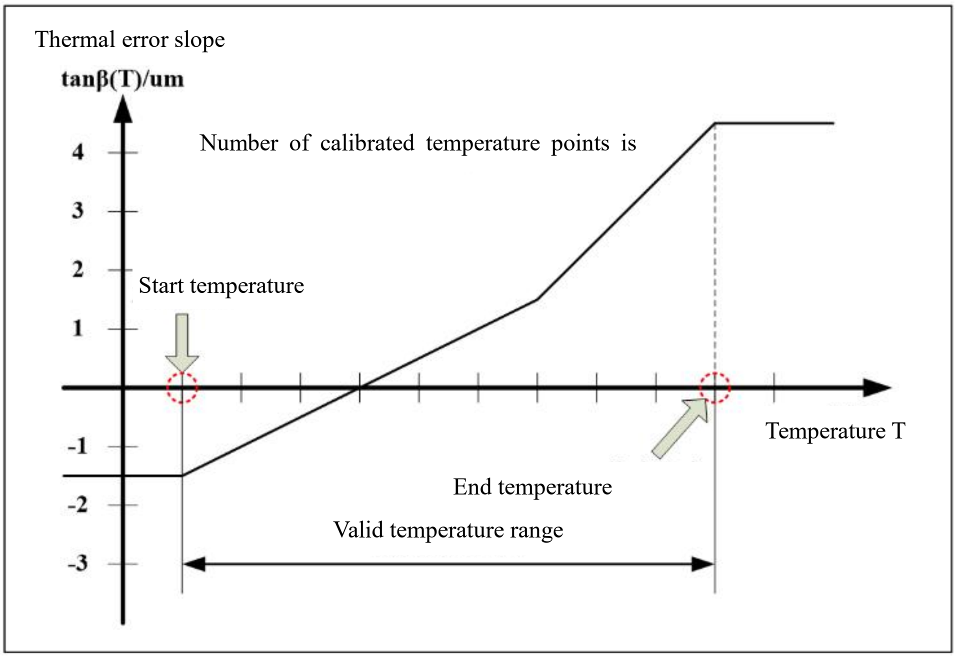
Parameter number	300013
Parameter name	Thermal error slope table: number of temperature points
Data type	INT4
Valid range	0 to 100
Default value	0
Access	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

The thermal error slope table is obtained through calibrating the linear thermal expansion slope values of screw rod at equally-spaced temperature points, and this parameter is to set the number of calibrated temperature points of thermal error slope table.

The linear thermal expansion slope at each calibrated temperature point is stored in the thermal error slope table at the specified location. Therefore, the number of calibrated temperature points determines the length of thermal error slope table.



Note

When this parameter is set to 0, the thermal error slope table is invalid!

6.14 Thermal Error Slope Table: Temperature Interval

Parameter number	300014
Parameter name	Thermal error slope table: temperature interval
Data unit	℃
Data type	REAL
Valid range	0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

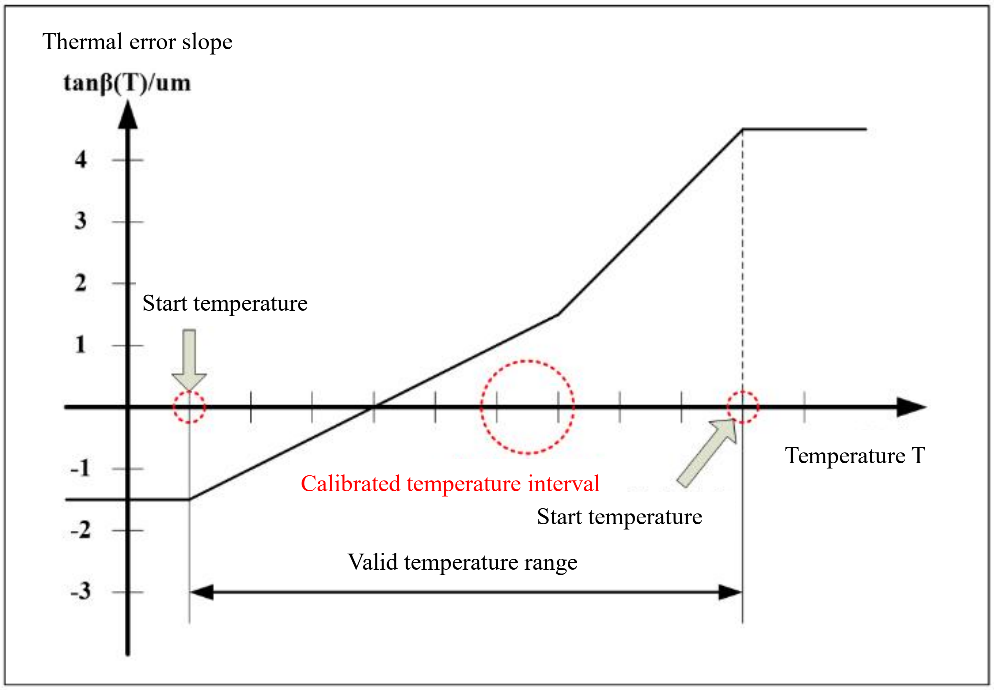
Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

The thermal error slope table is based on the linear thermal expansion slope values of screw rod at equally-spaced temperature points, and this parameter is to set the interval between measured temperature points.

After the initial temperature of thermal error slope table, number of measured temperature points, and interval between measured temperature points are set, the effective temperature range of thermal error slope table is determined. Then the formula to calculate the terminal temperature is:

End temperature = Starting measured temperature + (Number of measured temperature points - 1) × Interval between two temperature points



Note

When this parameter is set to 0, the thermal error slope table is invalid!

If the temperature measured by temperature sensor is larger than the end temperature, the thermal error slope at the end temperature will be used to build the corresponding thermal error model.

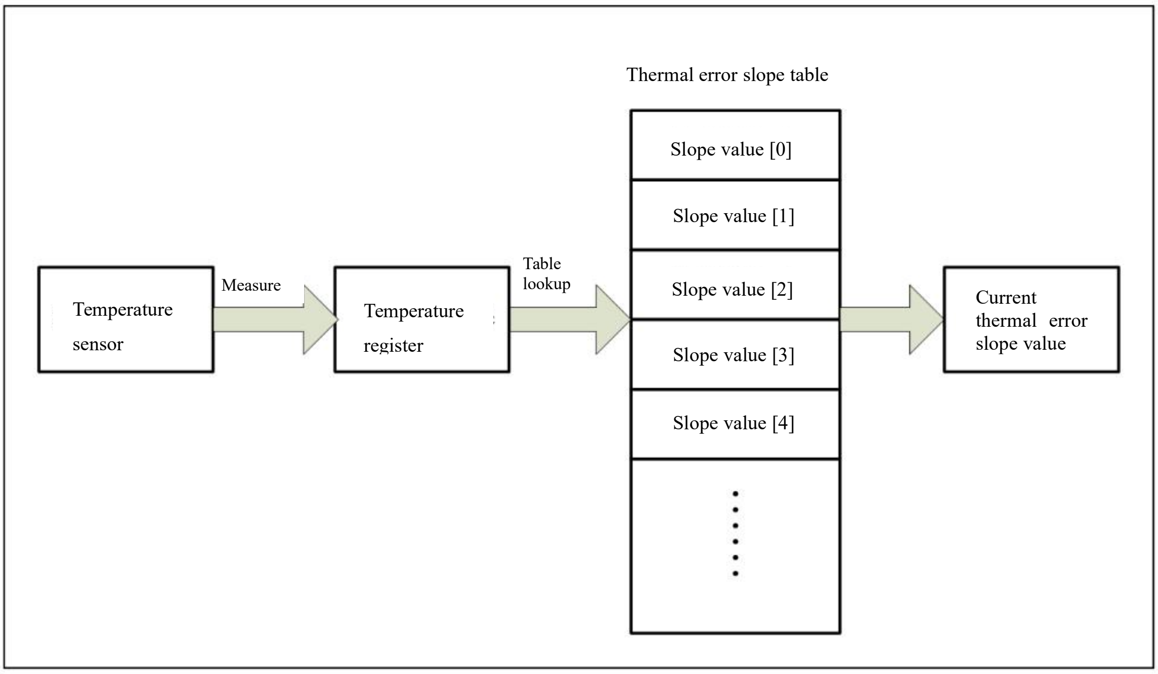
6.15 Thermal Error Slope Table: Sensor No.

Parameter number	300015
Parameter name	Thermal error slope table: sensor No.
Data type	INT4
Valid range	−1 to 127
Default value	−1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

This parameter is to set the number of temperature sensor which is associated with the current thermal error slope table. The thermal error compensation algorithm queries thermal error slope table based on the temperature (it is stored in the corresponding temperature register) which is measured by this temperature sensor.



Note

Up to 20 temperature sensors can be connected to the system. When the number of temperature sensor is out of range (from 0 to 19), the thermal error compensation is invalid!

6.16 Thermal Error Slope Table: Starting Parameter

Parameter number	300016
Parameter name	Thermal error slope table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

This parameter is to set the initial parameter number of thermal error slope table in data table parameters. After the initial parameter number is set, the storage interval of thermal error slope table in data table parameters is determined. The sequence of linear thermal expansion slope is arranged in order of temperature, from lowest to highest, with this parameter number being the first address.

For linear axis, the thermal error slope value is the displacement error (unit: mm) per 1m of feed with the positive command; for swivel axis and rotary axis, the thermal error slope value is the angular error (unit: degree) per 360 degrees of feed with positive command.

Note

While users are specifying the initial parameter number of thermal error slope table, avoid an overlap with other data tables which have been used, and the specified storage interval is not allowed to be out of range of data table parameters.

6.17 Thermal Error Compensation Rate

Parameter number	300017
Parameter name	Thermal error compensation rate
Data type	REAL
Valid range	0 to 1.0
Default value	0.01
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter setting can smooth the thermal error compensation value for the current axis, to prevent a machine vibration caused by the saltation of thermal error compensation value.

When a value larger than 0 is set, CNC monitors changes of the thermal error compensation values between adjacent interpolation cycles in real time. If the change is larger than the value set by this parameter, it will be limited to the set value. When 0 is set, the smoothing of thermal error compensation value may not be performed, and at this point, the thermal error compensation value is not monitored.

Note

If a smaller value is set, the compensation will be smoother, but the response of thermal error compensation will be reduced.

6.18 Pitch Error Compensation Type

Parameter number	300020
Parameter name	Pitch error compensation type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used to enable or disable the pitch error compensation function for the current axis.

0：Pitch error compensation function is disabled.

1：Pitch error compensation function (unidirectional) is enabled.

2：Pitch error compensation function (bidirectional) is enabled.

The configuration parameters about pitch error compensation include:

Parm 300021：Start point coordinate in pitch error compensation.

Parm 300022：Number of pitch error compensation points

Parm 300023：Pitch error compensation point interval

Parm 300024：Enable pitch error modulus compensation

Parm 300025：Magnification for pitch error compensation

Parm 300026：Starting parameter of pitch error compensation table

The pitch error compensation of the current axis takes effect when a combination of the following conditions is true:

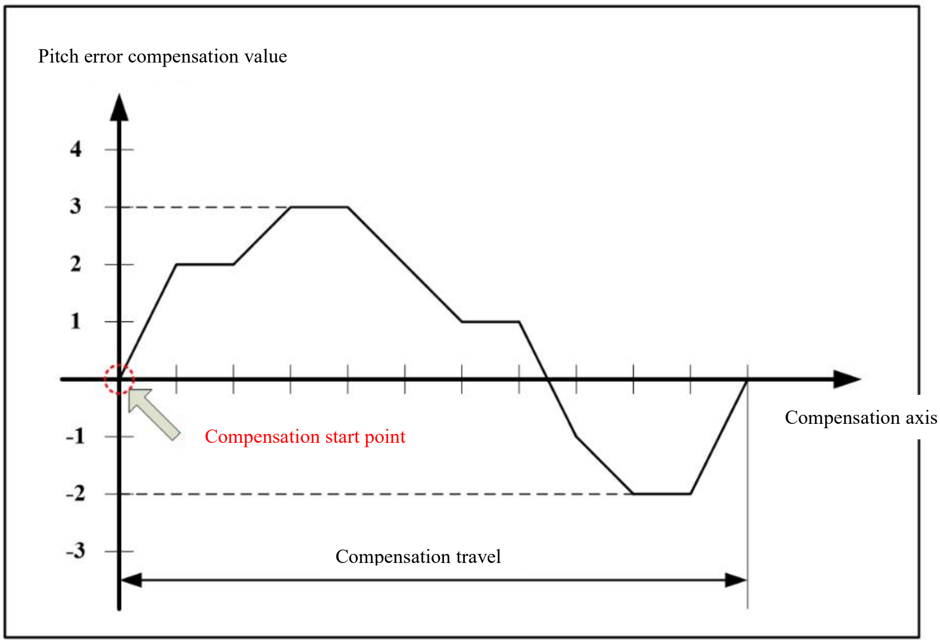
- The current compensation axis has been returned to the reference point.
- The type of pitch error compensation (1 or 2) has been specified, and the related parameters of pitch error compensation has been correctly configured.

6.19 Pitch Error Compensation: Starting Position

Parameter number	300021
Parameter name	Pitch error compensation: starting point
Data unit	mm, degree
Data type	REAL
Value range	-21747 to 21747
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the starting position of the compensation travel.



Note

Must be the coordinate value in machine coordinate system.

When the pitch error measurement is performed along the negative axis, the value set by this parameter should be the coordinate value of the end point (the end point of measurement travel).

Example

Reference position return along positive axis X is performed, the positive software limit is 2mm, and the negative software limit is -602mm. The measurement starts from the position of 0mm, goes along the negative direction of axis X, and ends at the position of -600mm. Therefore, the starting coordinates of pitch error compensation for axis X should be set to -600mm.

Reference position return along negative axis Y is performed, the positive software limit is 510mm, and the negative software limit is -10mm. The measurement starts from the position of 20mm, goes along the positive direction of axis Y, and ends at the position of 500mm. Therefore, the starting coordinates of pitch error compensation for axis Y should be set to 20mm.

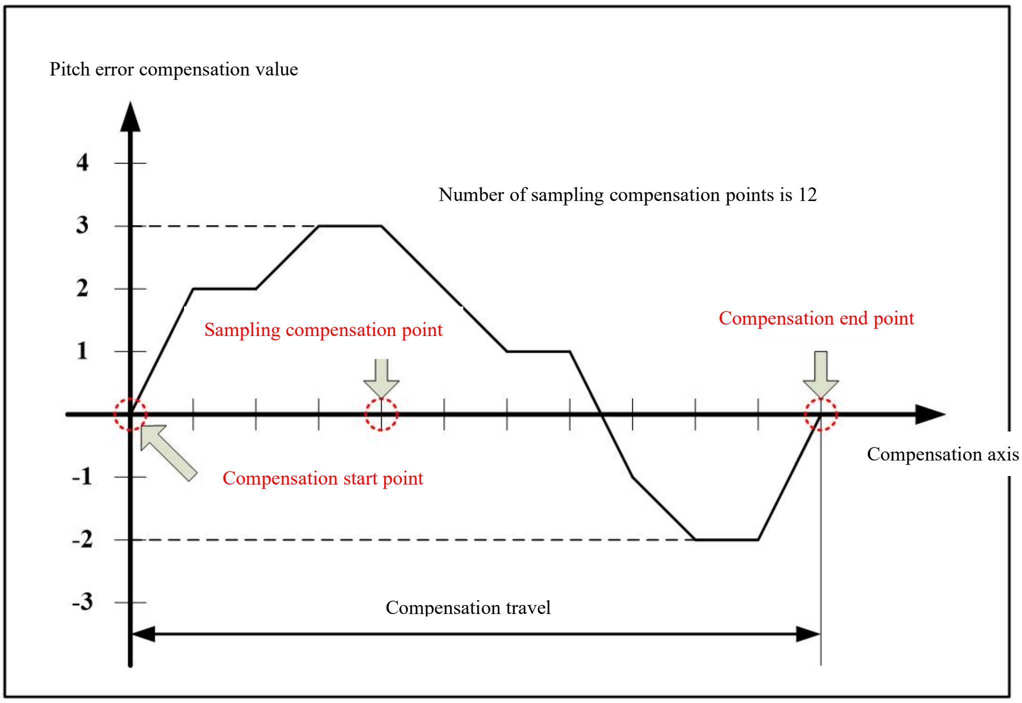
6.20 Number of Pitch Error Compensation Points

Parameter number	300022
Parameter name	Number of pitch error compensation points
Data type	INT4
Valid range	0 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the number of sampling compensation points within compensation travel.

The compensation value at each sampling compensation point is stored in the pitch error compensation table in specified location. Therefore, the number of sampling compensation points may determine the length of pitch error compensation table. Assume that the number of sampling compensation points is n, then the length of pitch error compensation table is n for the unidirectional compensation, and 2n for the bi-directional compensation.



Note

The pitch error compensation and the corresponding pitch error compensation table are invalid when the number of compensation points is set to 0.

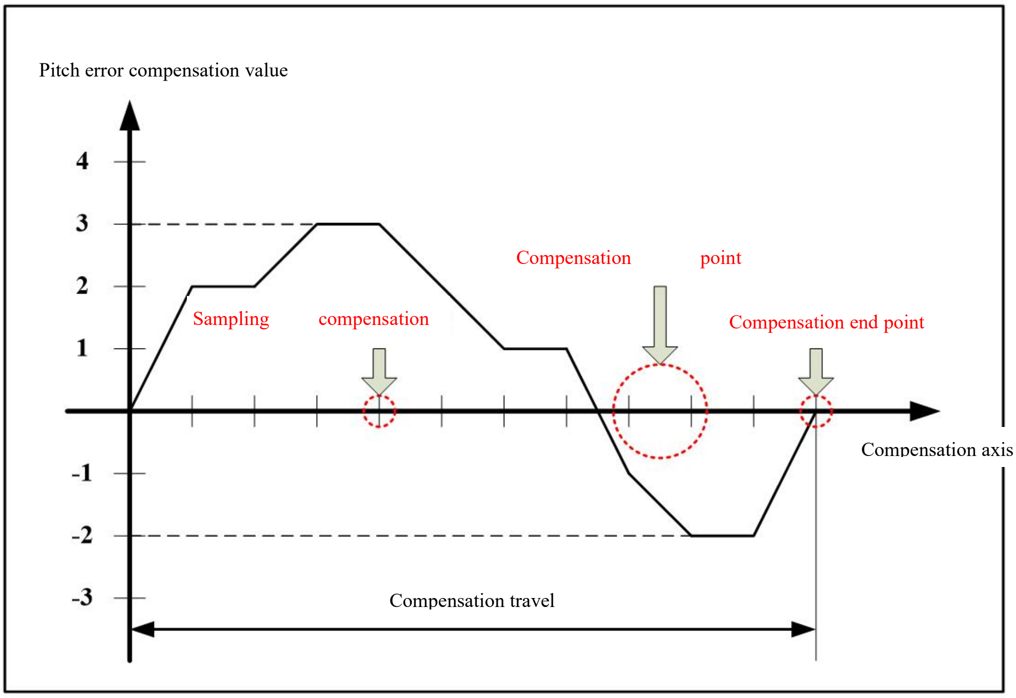
6.21 Pitch Error Compensation Point Interval

Parameter number	300023
Parameter name	Pitch error compensation point interval
Data unit	mm, degree
Data type	REAL
Valid range	0 to 10000.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the distance between two adjacent sampling compensation points within the range of compensation travel. After the compensation start point, number of compensation points, compensation point interval are identified, the formula to calculate the coordinate of compensation end point is:

Coordinate of compensation end point= Coordinate of compensation start point + (Number of compensation points -1) * Compensation point interval



Note

The pitch error compensation is invalid when the compensation point interval is set to 0.

Example

The starting coordinate of compensation travel is -25.0mm, the number of compensation points is 30, the compensation point spacing is 25.0mm. Then the compensation travel is 725.00mm, and the compensation end point coordinate is 700.0mm.

6.22 Pitch Error Modulus Compensation

Parameter number	300024
Parameter name	Pitch error modulus compensation
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0：The modulus compensation function is disabled.

1：The modulus compensation function is enabled.

When the modulus compensation function is disabled, if the feed command position of compensation axis is smaller than the coordinate of compensation start point, the compensation value at the compensation start point will be the compensation value of the current position; if the feed command position of compensation axis is larger than the coordinate of compensation end point, the compensation value at the compensation end point will be the compensation value of the current position.

When the modulus compensation function is enabled, the command position coordinates beyond the compensation travel range during the process of the query of pitch error compensation table will automatically "float" within the compensation travel range. At this time the compensation end point is the compensation starting point.

The modulus compensation function is mainly used for the rotary axis. When the modulus compensation is enabled, for the rotary axis with total travel of 360, the coordinate of compensation start point is set to 0°, and the coordinate of compensation end point is set to 360°.

Note

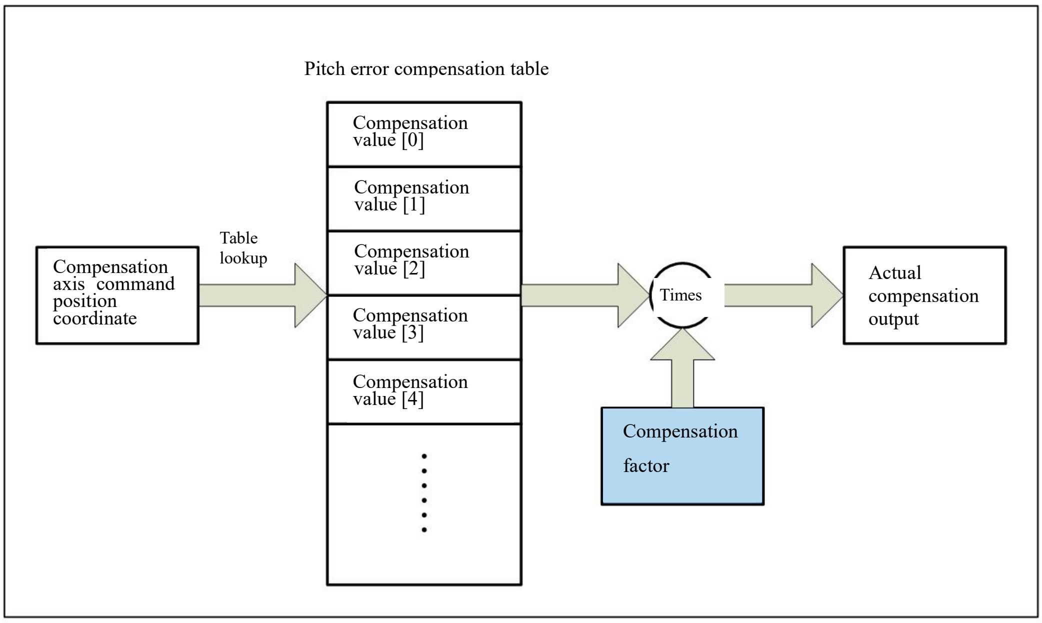
If the modulus compensation function is enabled, the compensation values at the compensation start point and the compensation end point must be set to the same value; otherwise, the saltation of compensation value may lead to an impact to the machine feed axis in the boundary of compensation travel.

6.23 Pitch Error Compensation Magnification

Parameter number	300025
Parameter name	Pitch error compensation magnification
Data type	REAL
Valid range	0 to 100.0
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

After being multiplied by the value set by this parameter, the pitch error compensation value is output to the compensation axis. Therefore, the actual compensation value can be zoomed in and out through this parameter setting.



Note

When this parameter is set to 0, there is no pitch error compensation value is output.

6.24 Pitch Error Compensation Table: Starting Parameter

Parameter number	300026
Parameter name	Pitch error compensation table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/Turning	Turning, milling

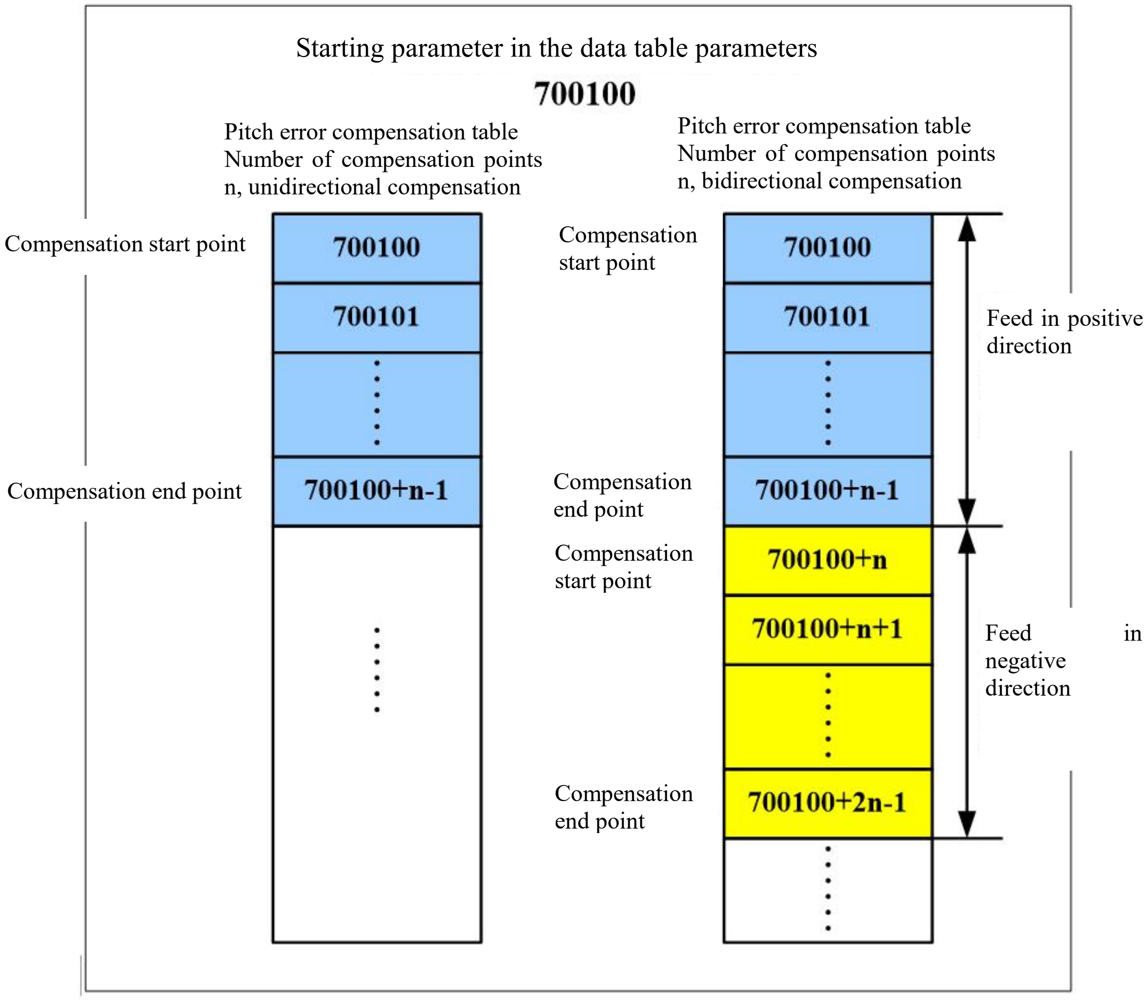
Description

To set the initial parameter number of pitch error compensation table in the data table parameter.

The pitch error compensation table is used to store the compensation value at each sampling compensation point which can be obtained by the machine pitch error pre-calibrated.

Compensation value = Command machine coordinate value – actual machine coordinate value

After the initial parameter number is set, the storage interval of pitch error compensation table in data table parameters is determined. The sequence of compensation value is arranged in order of coordinates of sampling compensation points, from smallest to largest, with this parameter number being the first address. If the compensation is bi-directional, the positive pitch compensation data, followed by the negative pitch compensation data should be input.



Note

The length of pitch error compensation table is determined by both compensation type (unidirectional, bi-directional) and number of compensation points. While users are specifying the initial parameter number of pitch error compensation table, avoid an overlap with other data tables which have been used, and the storage interval of compensation table is not allowed to be out of range of data table parameters.

Example

The compensation object is X axis. Reference point return in positive direction is performed. The positive software limit is 2mm, and the negative software limit is -602mm.

The related parameters of pitch error compensation are set as below:

Compensation type: 2 (bi-directional compensation)

Coordinate of compensation start point: -600.0mm

Number of compensation points: 16

Compensation point spacing: 40.0mm

Modulus compensation: 0 (disabled)

Compensation magnification: 1.0

Initial parameter of error compensation table: 700000

Sampling compensation points:

According to above, the compensation travel is 600mm, and from smallest to largest, the coordinates of compensation points are:

-600，-560，-520，-480，-440，-400，-360，-320，-280，-240，

-200，-160，-120，-80，-40，0

Parameters of pitch error compensation table which are assigned to axis X are:

Starting parameter of positive compensation table：700000

End parameter of positive compensation table：700015

Starting parameter of negative compensation table：700016

End parameter of negative compensation table：700031

Program for pitch error measurement is:

%0110

G54 ; G54 coordinate system must be the same with machine coordinate system.

G00 X0 Y0 Z0

WHILE TRUE

G91 G01X1 F2000; Move 1mm along X axis in positive direction.

G04 P100 ; Pause 0.1 second. This pause time must be less than the pause time of sampling point. Otherwise, the sampling task cannot be completed due to the dislocation of sampling points in the event of reversion.

G91 X-1 ; Move 1mm along X axis in negative direction, return to the measurement start location, eliminate the backlash, and at this point the measurement system is cleared out.

G04 P4000 ; Pause 4 seconds, the measurement system starts to record the pitch error data of negative feed.

M98 P1111 L15 ; Call the subprogram of negative motion 15 times, and the program No. is 1111

G91 X-1 F1000 ; Move 1mm along X axis in negative direction.

G04 P100 ; The pause time must be less than the pause time of sampling points. Otherwise, the sampling task cannot be completed due to the dislocation of sampling points in the event of reversion.

G91 X1 ; Move 1mm along X axis in positive direction, return to measurement start location, eliminate the backlash.

G04 P4000 ; Pause 4 seconds, the measurement system starts to record the pitch error data of positive feed.

M98 P2222 L15 ; Call the subprogram of positive motion 15 times, and the program No. is 2222.

ENDW ;Cycle program end.

M30 ;Stop and return.

%1111 ; Move subprogram along X axis in negative direction

G91 G00 X-40 F1000 ; Move 40mm along axis X in negative direction

G04 P4000 ; Pause 4 seconds, the measurement system records data.

M99 ;Subprogram ends.

%2222 ; Move subprogram along X axis in positive direction

G91 G00 X40 F500 ; Move 40mm along axis X in positive direction

G04 P4000 ; Pause 4 seconds, the measurement system records data.

M99 ;Subprogram ends.

Note: Before pitch error is measured, disable other compensation functions on this axis.

The calibration result is input as follows:

When the coordinate axis moves in the positive direction, the compensation value at each sampling compensation point is input into the data table parameters (parameter number 700000 to parameter number 700015) in turn.

When the coordinate axis moves in the negative direction, the compensation value at each sampling compensation point is input into the data table parameters (parameter number 70016 to parameter number 700031) in turn.

6.25 Enable Verticality Compensation

Parameter number	300030, 300040
Parameter name	Enable verticality compensation
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

This parameter is to enable or disable the verticality compensation function of the current axis.

0：Verticality compensation is disabled.

1：Verticality compensation is enabled.

Two verticality compensations can be performed on every axis, one is specified by Parm300030, and the other is specified by Parm300040.

The related parameters are:

Parm 300031, Parm 300041：Datum axis No. in verticality compensation 1, Datum axis No. in verticality compensation 2.

Parm 300032, Parm 300042：Reference position in verticality compensation 1 (P0), Reference position in verticality compensation 2 (P0).

Parm 300033, Parm 300043：Verticality compensation 1 angle (θ), Verticality compensation 2 angle (θ).

Suppose the datum axis is axis X, and the compensation axis is Y axis, then mathematical model of verticality compensation is:

$$\mathbf{Dy = (Px - P_0) \times \theta}$$

Dy is the machine command coordinate compensation value of axis Y, and Px is the current machine command coordinate of datum axis X.

The verticality compensation of the current axis takes effect when the combination of the following conditions is true.

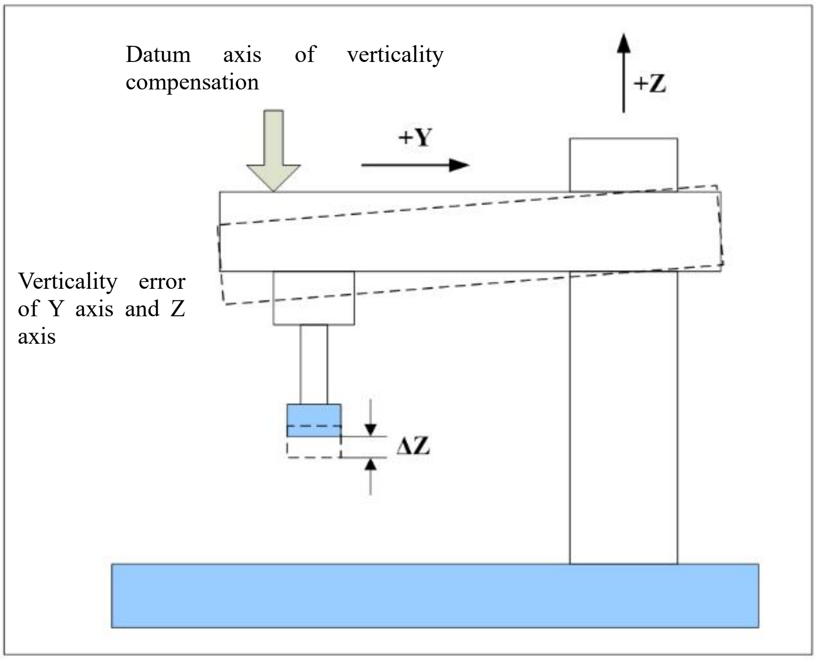
- The datum axis and compensation axis have been returned to reference point.
- This parameter is set to 1, and the related parameters of verticality compensation have been correctly set.

6.26 Verticality Compensation: Datum Axis No.

Parameter number	300031, 300041
Parameter name	Verticality compensation: datum axis No.
Data type	INT4
Valid range	-1 to 255
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the number of the axis on which the verticality error is generated. Motion of this axis may cause the command coordinate compensation of the compensation axis.



Note

Verticality compensation model is applied only to the linear axis compensation. If users configure the compensation datum-axis to the non-linear axis (e.g. rotary axis, swivel axis) or invalid axis, the verticality compensation will not work!

6.27 Verticality Compensation: Reference Position

Parameter number	300032, 300042
Parameter name	Verticality compensation: reference position
Data unit	mm
Value range	-21474 to 21474
Data type	REAL
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the coordinate of compensation reference point for the axis on which the verticality error is generated. The verticality compensation value at compensation reference point is 0.

Note

This parameter must be set to the coordinate value in machine coordinate system!

6.28 Verticality Compensation Angle

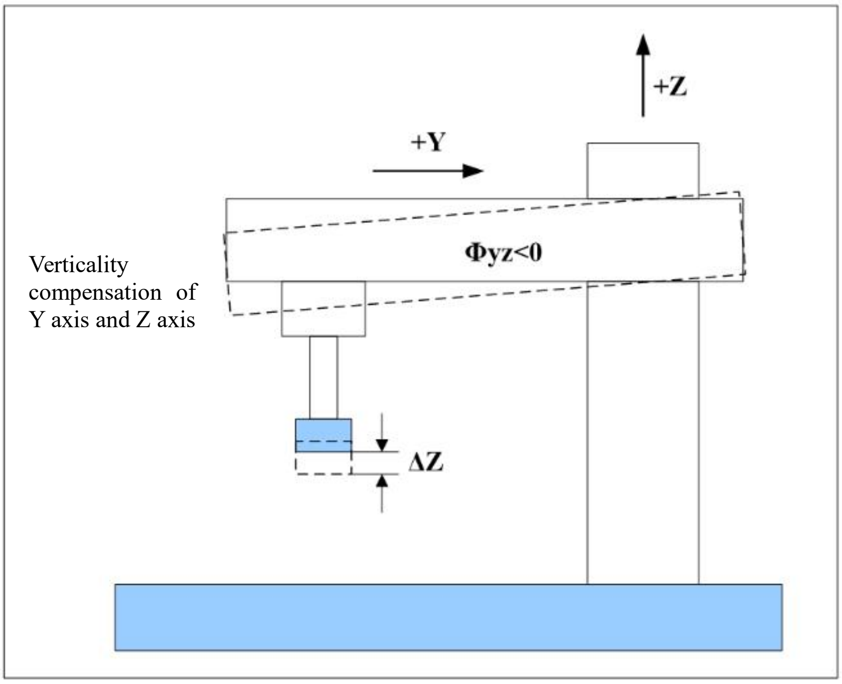
Parameter number	300033, 300043
Parameter name	Verticality compensation angle
Data unit	Degree
Data type	REAL
Default value	0
Access	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The verticality compensation angle between the datum axis and compensation axis is set by this parameter.

The sign of the verticality compensation angle can be determined by the angle between the datum axis and compensation axis.

- If the angle between the datum axis and compensation axis in the positive direction is greater than 90 degrees, the compensation angle Φ is positive.
- If the angle between the datum axis and compensation axis in the positive direction is smaller than 90 degrees, the compensation angle Φ is negative.



6.29 Straightness Compensation: Datum Axis No.

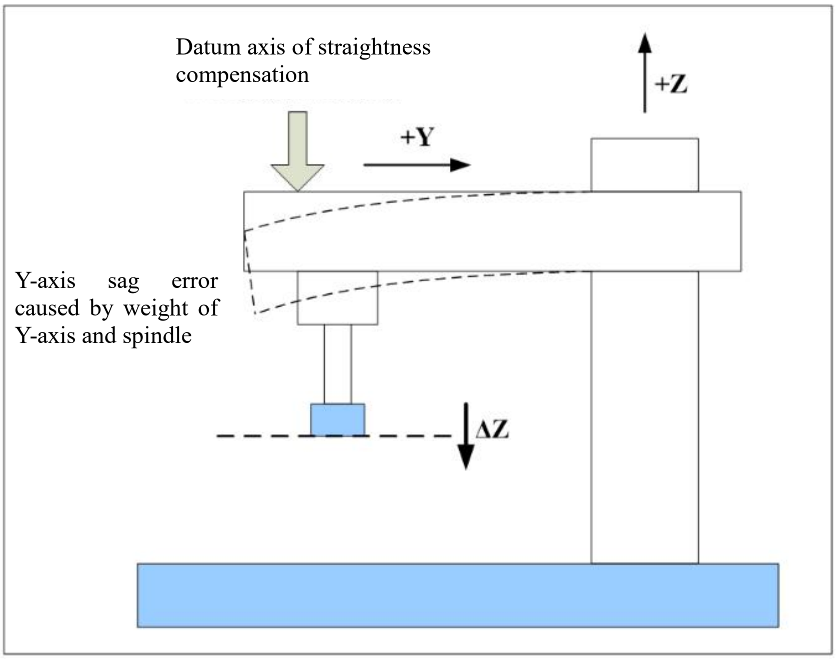
Parameter number	300050, 300065
Parameter name	Straightness compensation: datum axis No.

Data type	INT4
Valid range	-1 to 255
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the number of axis on which the straightness error is generated. Motion of this axis may cause the command coordinate compensation of compensation axis.

Two straightness compensations can be performed on every axis, then the datum axis number can be set by both Parm300050 and Parm300065.



Note

Datum axis in straightness compensation must be set to the common feed axis of machine (linear axis, rotary axis or swivel axis); otherwise, the straightness compensation doesn't work!

6.30 Straightness Compensation Type

Parameter number	300051, 300066
Parameter name	Straightness compensation type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The straightness compensation function is used for the drape error compensation of machine cantilever axis.

This parameter is to enable or disable the straightness compensation of the current axis.

0：Straightness compensation function is disabled.

1：Straightness compensation function (unidirectional) is enabled.

2：Straightness compensation function (bidirectional) is enabled.

Two straightness compensations, which are specified by Parm300051 and Parm300066 respectively, can be performed on every axis.

The configuration parameters which are related to the straightness compensation include:

Parm 300050, Parm 300065： Datum axis No. in straightness compensation 1, Datum axis No. in straightness compensation 2.

Parm 300052, Parm 300067：Start point coordinate in straightness compensation 1, Start point coordinate in straightness compensation 2.

Parm 300053, Parm 300068： Number of straightness compensation 1 points, Number of straightness 2 compensation points

Parm 300054, Parm 300069：Straightness compensation point 1 interval, Straightness compensation point 2 interval

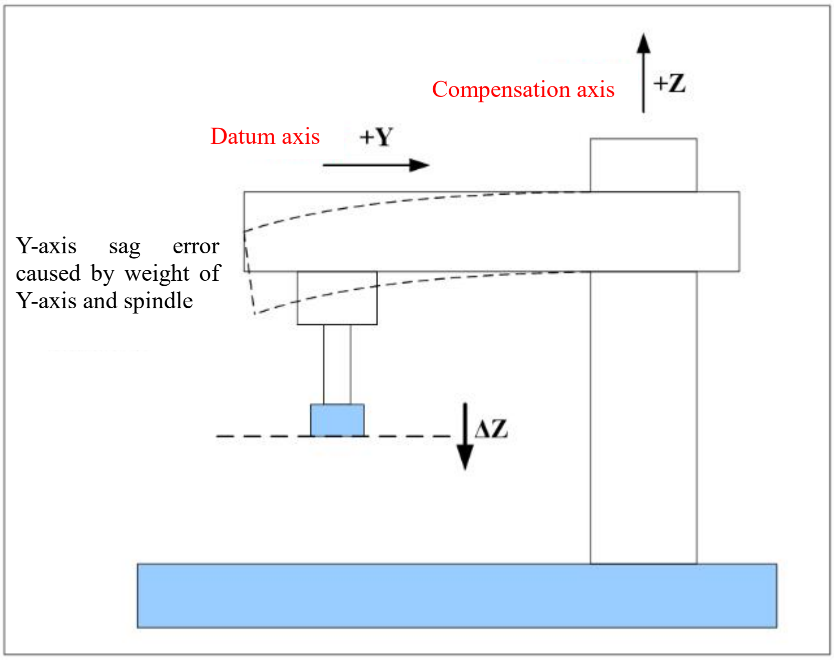
Parm 300055, Parm 300070： Straightness modulus compensation 1, Straightness modulus compensation 2.

Parm 300056, Parm 300071：Magnification of straightness compensation 1, Magnification of straightness compensation 2

Parm 300057, Parm 300072： Starting parameter of straightness compensation table 1, Starting parameter of straightness compensation table 2

The straightness compensation of the current axis takes effect when the combination of the following conditions is true.

- The datum axis and compensation axis have returned to reference point.
- This parameter is set to 1 or 2, and the related parameters of straightness compensation have been correctly set.

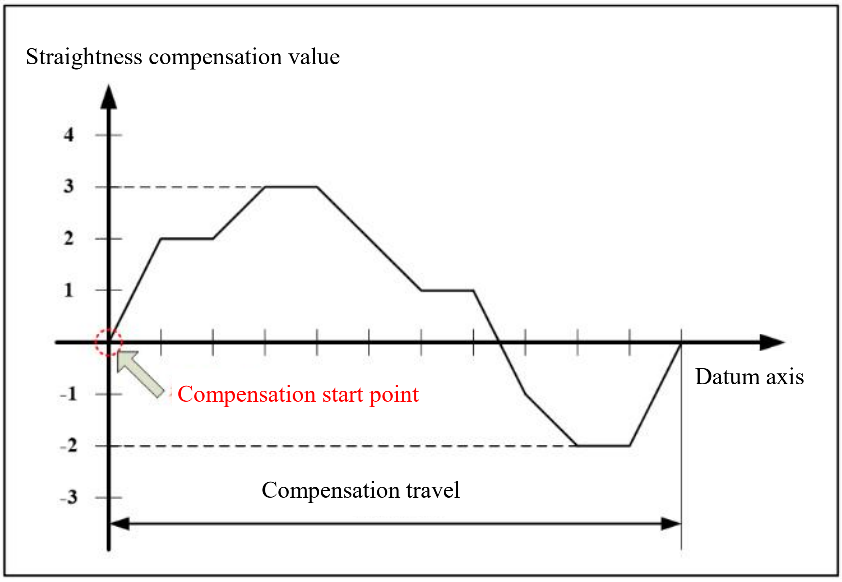


6.31 Straightness Compensation: Start Position

Parameter number	300052, 300067
Parameter name	Straightness compensation: start position
Data unit	mm, degree
Data type	REAL
Value range	-21474 to 21474
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the start point of the compensation travel for the axis (datum axis) on which the straightness error occurs. The coordinate value in machine coordinate system should be set.



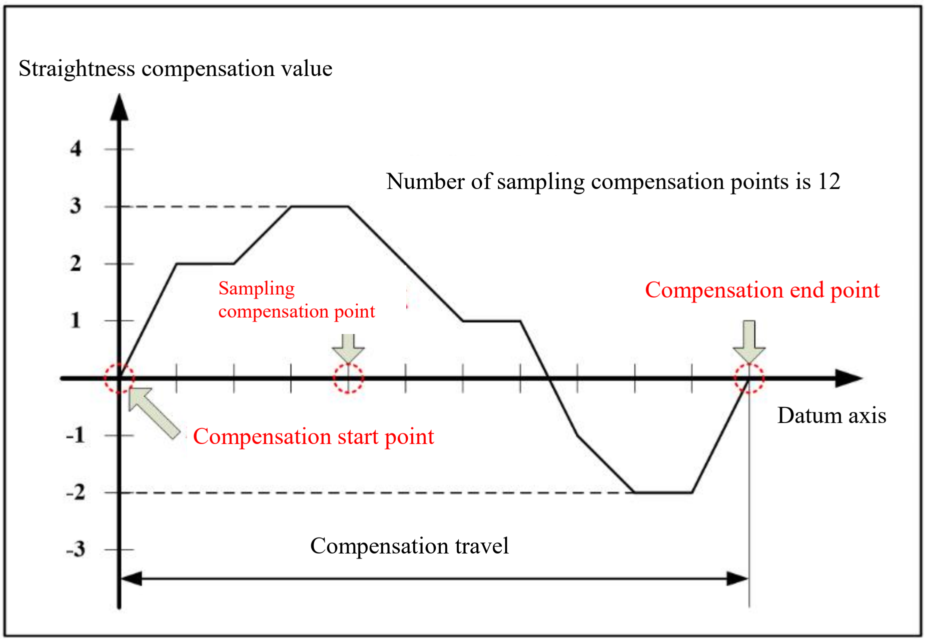
6.32 Number of Straightness Compensation Points

Parameter number	300053, 300068
Parameter name	Number of straightness compensation points
Data type	INT4
Valid range	0 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the number of sampling compensation points within the range of compensation travel for the axis (datum axis) on which the straightness error occurs.

Compensation at each sampling compensation point is stored in the straightness compensation table of the specified location. Therefore, the number of sampling compensation points may determine the length of straightness compensation table. Assume that the number of sampling compensation points is n, then the length of straightness compensation table is n for the unidirectional compensation, and 2n for the bi-directional compensation.



Note

The straightness compensation and the corresponding straightness compensation table are invalid when the number of compensation point is set to 0!

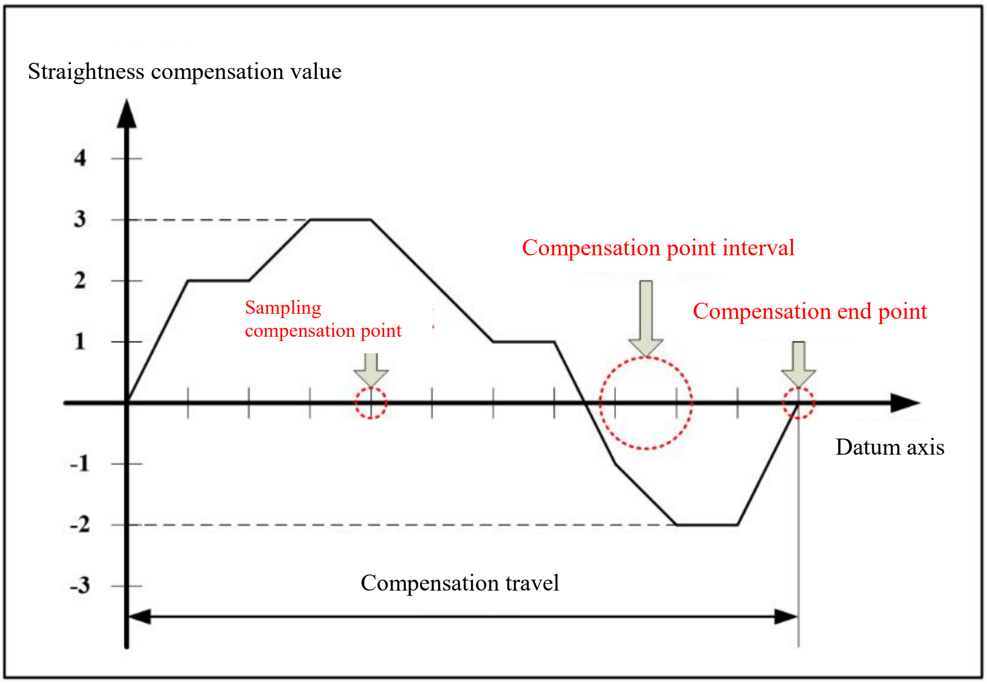
6.33 Straightness Compensation Point Interval

Parameter number	300054, 300069
Parameter name	Straightness compensation point interval
Data unit	mm, degree
Data type	REAL
Valid range	0 to 10000.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the distance between two adjacent sampling compensation points within the range of compensation travel of the axis (datum axis) on which the straightness error is generated. After the compensation start point, number of compensation points, compensation point interval are identified, the formula to calculate the coordinate of compensation end point is:

Coordinate of compensation end = Coordinate of compensation start point + (Number of compensation points -1) * Compensation point interval



Note

The straightness compensation is invalid when the compensation point spacing is set to 0.

6.34 Enable Straightness Modulus Compensation

Parameter number	300055, 300070
Parameter name	Enable straightness modulus compensation
Data type	BOOL
Valid range	0， 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0：Modulus compensation function is disabled.

1：Modulus compensation function is enabled.

After the modulus compensation is disabled, the compensation value at the start point of compensation is taken as the current position compensation value when the position of feed command for the compensation datum axis is smaller than the coordinate of compensation start-point; the compensation value at the end point of compensation is taken as the current position compensation value when the position of feed command for the compensation datum axis is larger than the coordinate of compensation end-point.

If the modulus compensation is enabled, the coordinate of command position which is beyond the range of compensation travel during the query to straightness compensation table will automatically stay within the range of compensation travel. At this point, the compensation end point is the compensation start point.

The modulus compensation is mainly used for the rotary axis. For the rotary axis with a full travel of 360 degrees, after the modulus compensation is enabled, the coordinate of compensation start point is set to 0 degree, and that of compensation end point is set to 360 degrees.

Note

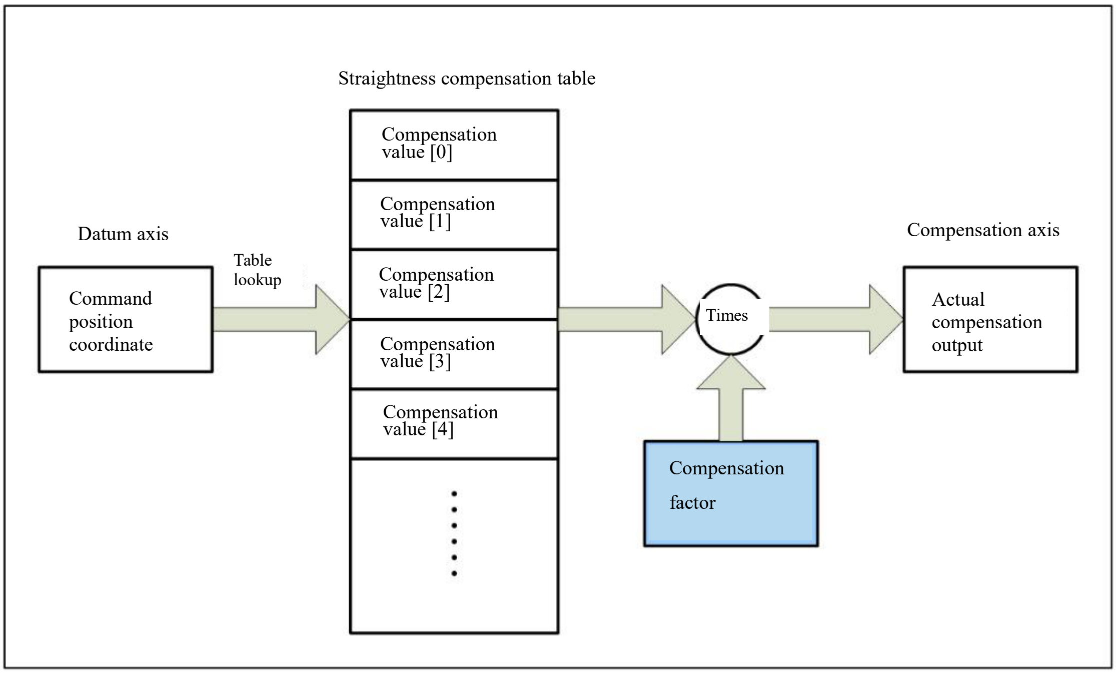
After the modulus compensation is enabled, the same compensation values at compensation start point and compensation end point must be set. Otherwise, the sudden change of compensation value may cause an impact to feed axis of machine at the boundary of compensation travel.

6.35 Straightness Compensation Magnification

Parameter number	300056, 300071
Parameter name	Straightness compensation magnification
Data type	REAL
Valid range	0 to 100.0
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

After being multiplied by the value set by this parameter, the straightness compensation value is output to the compensation axis. Therefore, the actual compensation value can be zoomed in and out through this parameter setting.



Note

If this parameter is set to 0, there is no straightness compensation value will be output!

6.36 Straightness Compensation Table: Starting Parameter

Parameter number	300057, 300072
Parameter name	Straightness compensation table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

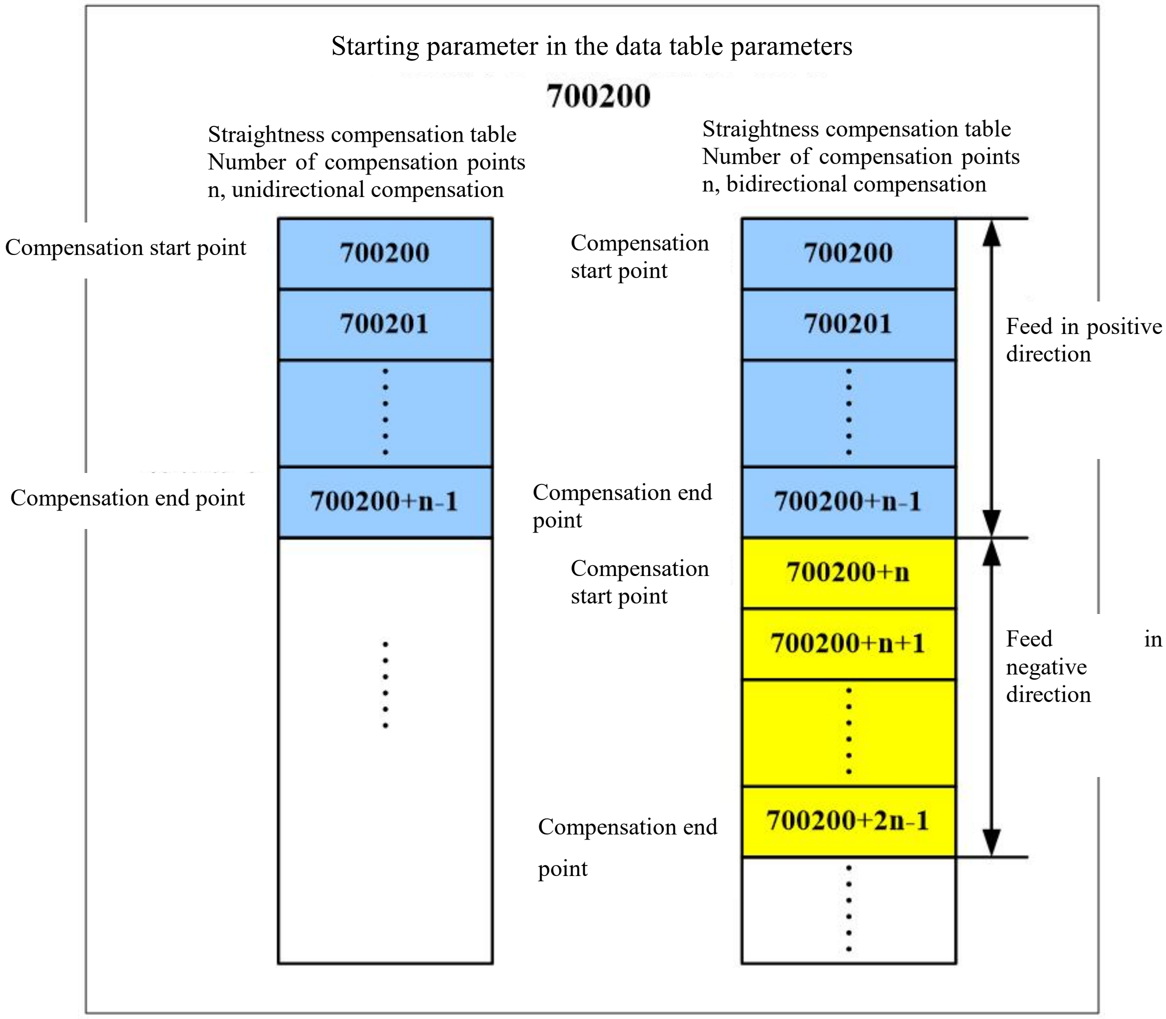
Description

This parameter is to set the start parameter number of straightness compensation table in data table parameters.

The straightness compensation table is used to store the compensation value at each sampling compensation point which can be gained by the pre-calibrated machine straightness error.

Compensation value =Command machine coordinate value – actual machine coordinate value

After the start parameter number is set, the storage interval of straightness compensation table in data table parameter is defined. The sequence of compensation value is arranged in order of sampling compensation point coordinate, from smallest to largest, with this parameter number being the first address. If the compensation is bi-directional, the positive compensation data, followed by the negative compensation data should be input.



Note

The length of straightness compensation table is determined by both compensation type (unidirectional, bi-directional) and number of compensation points. While users are specifying the initial parameter number of straightness compensation table, avoid an overlap with other data tables which have been used, and the storage interval of compensation table is not allowed to be out of range of data table parameter.

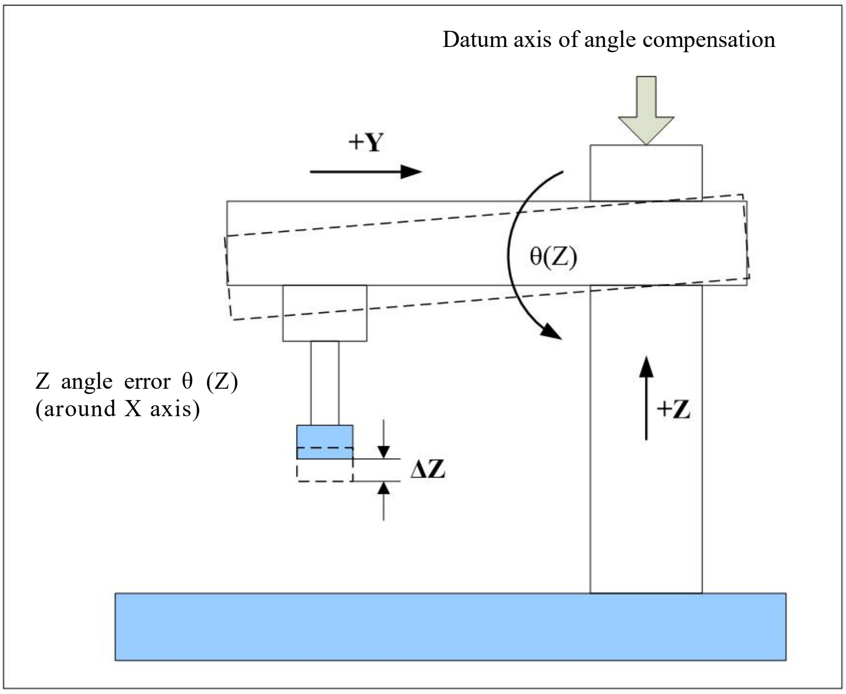
6.37 Angle Compensation: Datum Axis No.

Parameter number	300080, 300095
Parameter name	Angle compensation: datum axis No.
Data type	INT4
Valid range	-1 to 255
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the number of axis on which the angular error is generated.

Two angle compensations, of which compensation datum axis numbers can be specified by Parm300080 and Parm300095 respectively, can be performed on each axis.



Note

The angle error compensation model is applied only to the linear axis compensation. If users configure the compensation datum axis to the non-linear axis (e.g. rotary axis, swivel axis) or invalid axis, the angular error compensation will not work.

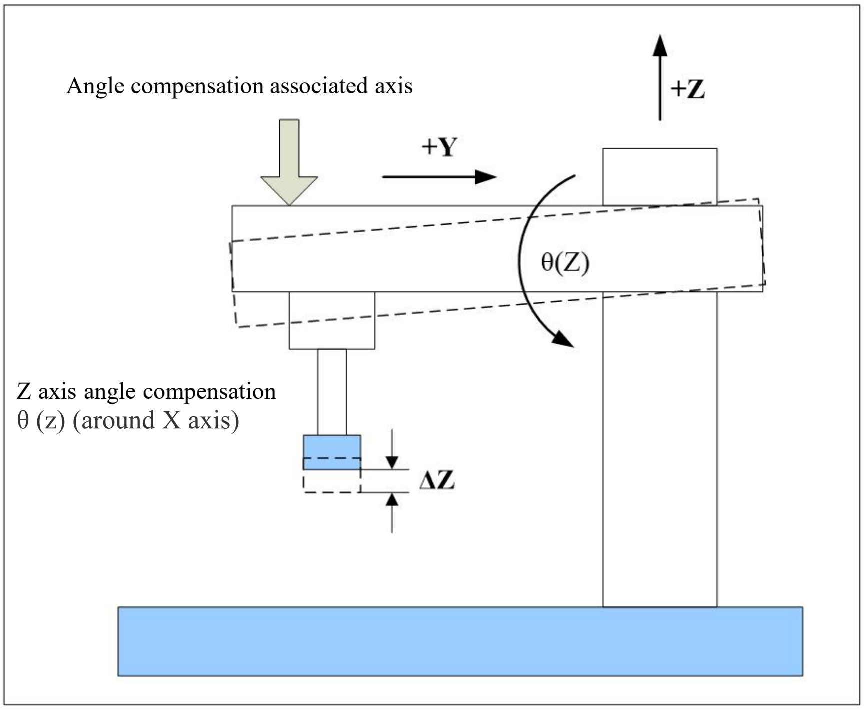
6.38 Angle Compensation: Associated Axis No.

Parameter number	300081, 300096
Parameter name	Angle compensation: associated axis No.
Data type	INT4
Valid range	-1 to 255
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the number of axis which is influenced by the angle error of datum axis. After the datum axis number and associated axis number of angle error compensation are set, the transmission chain from the error-generated axis to compensation axis is identified.

Two angle compensations, of which compensation-associated axis numbers can be specified by Parm300081 and Parm300096 respectively, can be performed on each axis.



Note

The angle error compensation model is applied only to the linear axis compensation. If users configure the compensation-associated axis to the non-linear axis (e.g. rotary axis, swivel axis) or invalid axis, the angular error compensation will not work.

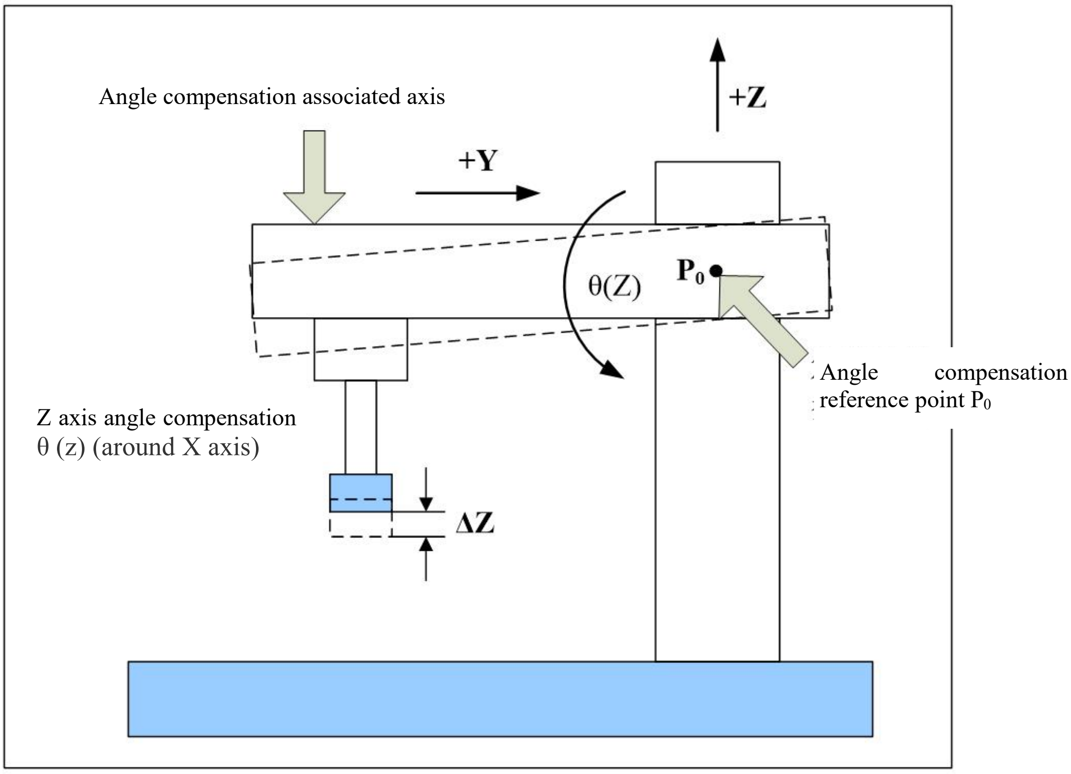
6.39 Angle Compensation: Reference Position

Parameter number	300082, 300097
Parameter name	Angle compensation: reference position
Data unit	mm
Data type	REAL
Range value	-21474 to 21474
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the coordinate of compensation reference point for the associated axis in angle compensation, and the angle error compensation value which is output to compensation axis at the compensation reference point is 0.

Two angle compensations, of which reference point coordinate can be specified by Parm300082 and Parm300097 respectively, can be performed on each axis.



Note

This parameter needs to be set to the coordinate value in machine coordinate system.

6.40 Angle Compensation Type

Parameter number	300083, 300098
Parameter name	Angle compensation type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to enable or disable the angle error compensation of the current axis.

0：The angle compensation is disabled.

1：The unidirectional angle compensation is enabled.

2：The bi-directional angle compensation is enabled.

Two angle compensations, of which types can be specified by Parm300083 and Parm300098 respectively, can be performed on each axis.

The configuration parameters about the angle compensation include:

- Parm 300080, Parm 300095： Datum axis No. of angle compensation 1, Datum axis No. of angle compensation 2.
- Parm 300081, Parm 300096： Associated axis No. of angle compensation 1, Associated axis No. of angle compensation 2.
- Parm 300082, Parm 300097： Reference point coordinate of angle compensation 1, Reference point coordinate of angle compensation 2.
- Parm 300084, Parm 300099：Start point coordinate in angle compensation 1, Start point coordinate in angle compensation 2.
- Parm 300085, Parm 300100： Number of angle compensation points 1, Number of angle compensation points 2.
- Parm 300086, Parm 300101： Angle compensation point 1 internal, Angular compensation point 2 interval.
- Parm 300087, Parm 300102： Enable angle modulus compensation 1, Enable angle modulus compensation 2.
- Parm 300088, Parm 300103： Magnification for angle compensation 1, Magnification for angle compensation 2.
- Parm 300089, Parm 300104： Initial parameter of angle compensation table 1, Initial parameter of angle compensation 2.

Suppose that the datum axis is X axis, associated axis is Y axis, and compensation axis is Z axis, then the mathematical model of angle error compensation is:

$$\mathbf{Dz = (Py - P_0) \times A(x)}$$

Dz is the compensation value of machine command coordinate of Z axis. A(x) is the compensation angle of datum X at the current position. Py is the current machine command coordinate of Y axis. P_0 is the compensation reference coordinate of Y axis.

The angle compensation of current axis takes effect when a combination of the following conditions is true.

- The datum axis, associated axis and compensation axis have returned to reference point.
- The type of angle compensation has been set, and the parameters related to angle compensation have been correctly configured.

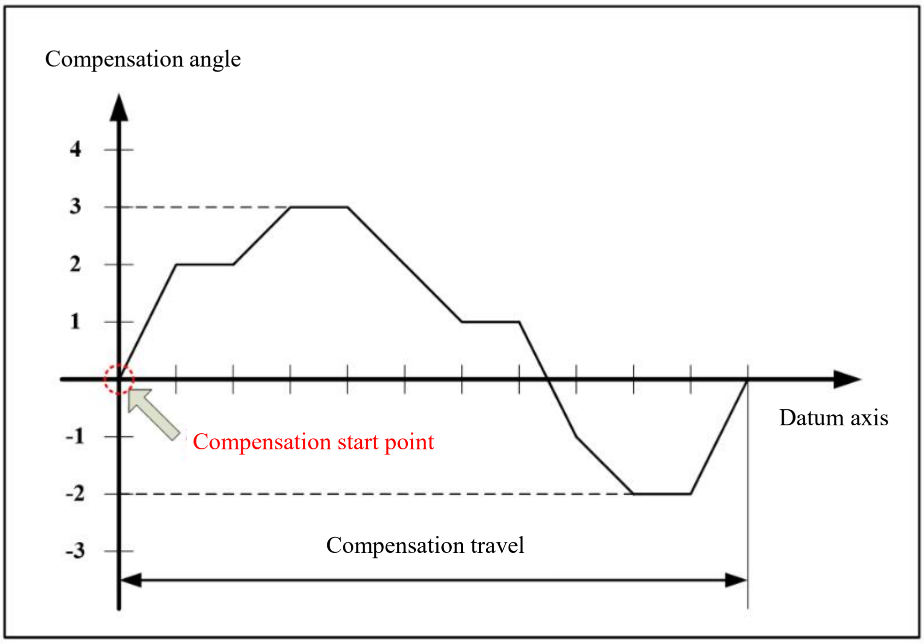
6.41 Angle Compensation: Starting Position

Parameter number	300084, 300099
Parameter name	Angle compensation: starting position

Data unit	mm
Data type	REAL
Value range	-21474 to 21474
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the start point of compensation travel of axis (datum axis) on which the angle error is generated. The coordinate value in machine coordinate system should be set.



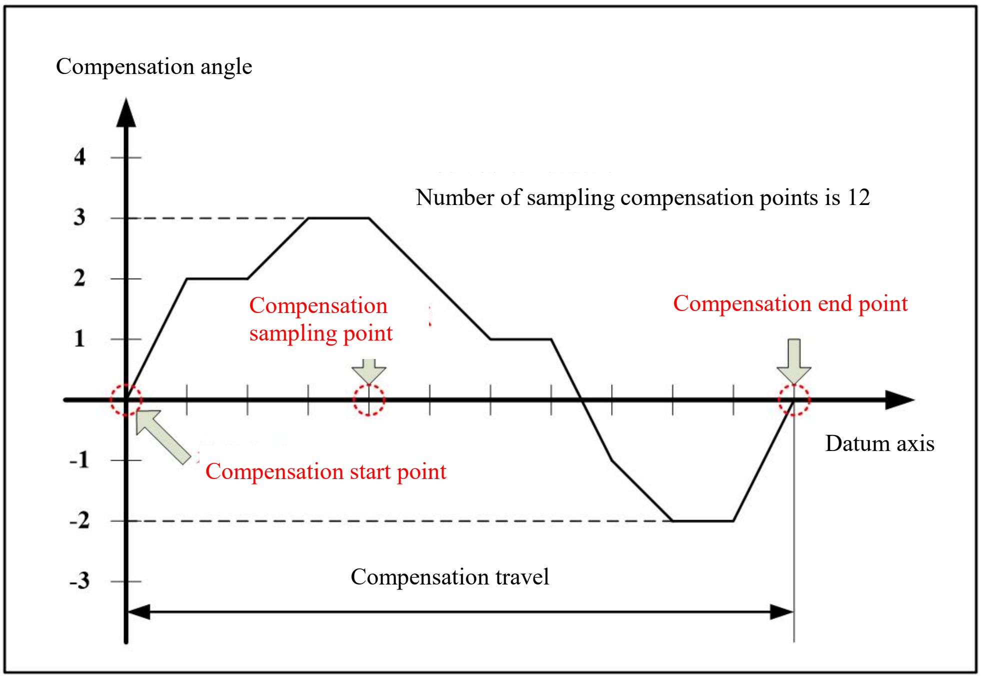
6.42 Number of Angle Compensation Points

Parameter number	300085, 300100
Parameter name	Number of angle compensation points
Data type	INT4
Valid range	0 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the number of sampling compensation points within the range of compensation travel of the axis (datum axis) on which the angle error generates.

Measured angle error (or compensation angle) at each sampling compensation point is stored in the angle compensation table of the specified location. Therefore, the number of sampling compensation points may determine the length of angle compensation table. Assume that the number of sampling compensation points is n, then the length of angle compensation table is n for the unidirectional compensation, and 2n for the bi-directional compensation.



Note

The angle compensation and the corresponding angle compensation table are invalid when the number of compensation points is set to 0.

6.43 Angle Compensation Point Interval

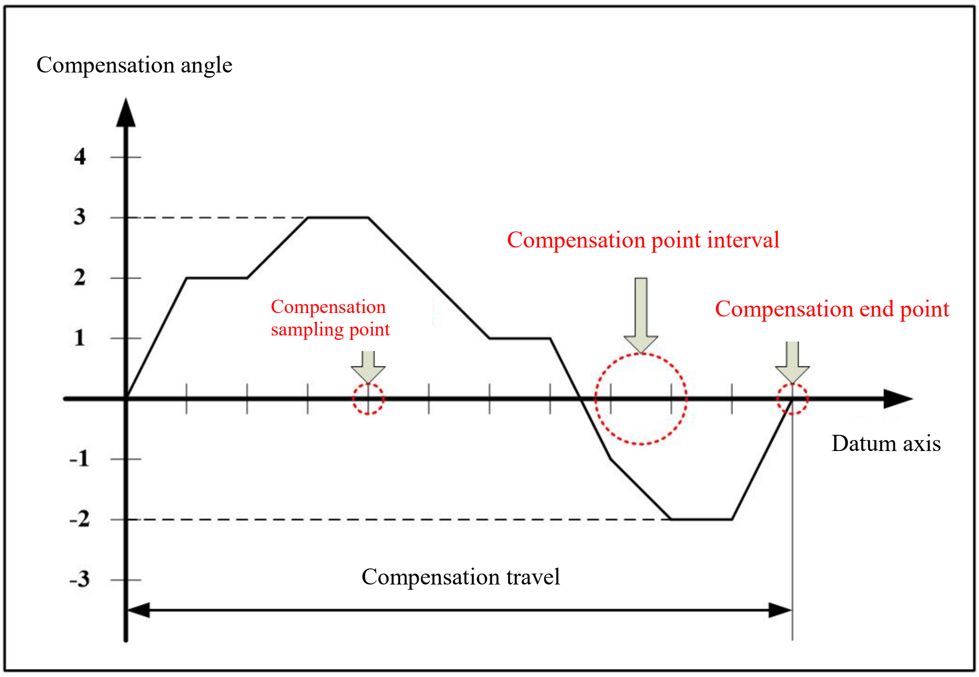
Parameter number	300086, 300101
Parameter name	Angle compensation point interval
Data unit	mm
Data type	REAL
Valid range	0 to 10000.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the distance between two adjacent sampling compensation points within the range of compensation travel of the axis (datum axis) on which the angle error is generated.

After the compensation start point, number of compensation points, compensation point interval are identified, the formula to calculate the coordinate of compensation end point is:

Coordinate of compensation end point=Coordinate of compensation start point + (Number of compensation points -1) * Compensation point interval



Note

The angle compensation is invalid when the compensation point interval is set to 0.

6.44 Enable Angle Modulus Compensation

Parameter number	300087, 300102
Parameter name	Enable angle modulus compensation
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0：Modulus compensation is disabled.

1：Modulus compensation is enabled.

After the modulus compensation is disabled, the compensation angle at the start point of compensation is taken as the current position compensation value when the position of feed command for the compensation datum axis is smaller than the coordinate of compensation start-point; the compensation angle at the end point of compensation is taken as the current position compensation value when the position of feed command for the compensation datum axis is larger than the coordinate of compensation end-point.

If the modulus compensation is enabled, the coordinate of command position which is beyond the range of compensation travel during the query to angle compensation table will automatically stay within the range of compensation travel. At this point, the compensation end point is the compensation start point.

Note

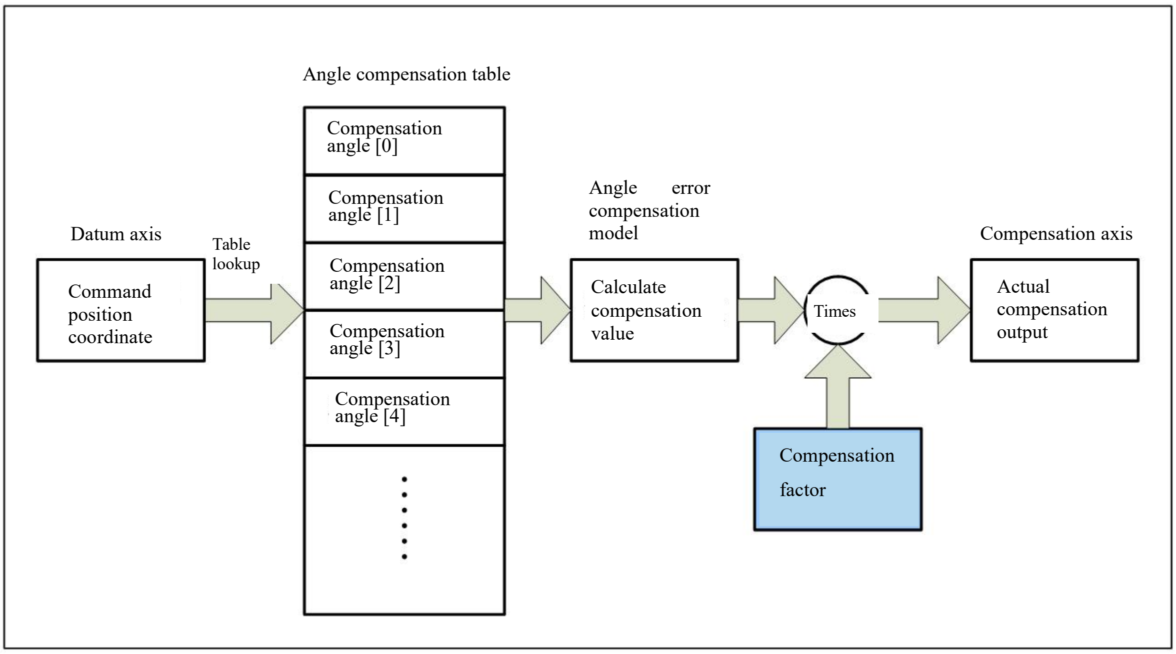
If the modulus compensation is enabled, the compensation angle at the compensation start point and the compensation end point must be set to same value; otherwise, the sudden changes of compensation value at the boundary of compensation travel will cause a shock to the feed axis of machine

6.45 Angle Compensation Magnification

Parameter number	300088, 300103
Parameter name	Angle compensation magnification
Data type	REAL
Valid range	0 to 100
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

After being multiplied by the value set by this parameter, the angle compensation value is output to the compensation axis. Therefore, the actual compensation value can be zoomed in and out through this parameter setting.



Note

When this parameter is set to 0, there is no angle error compensation value is output.

6.46 Angle Compensation Table: Starting Parameter

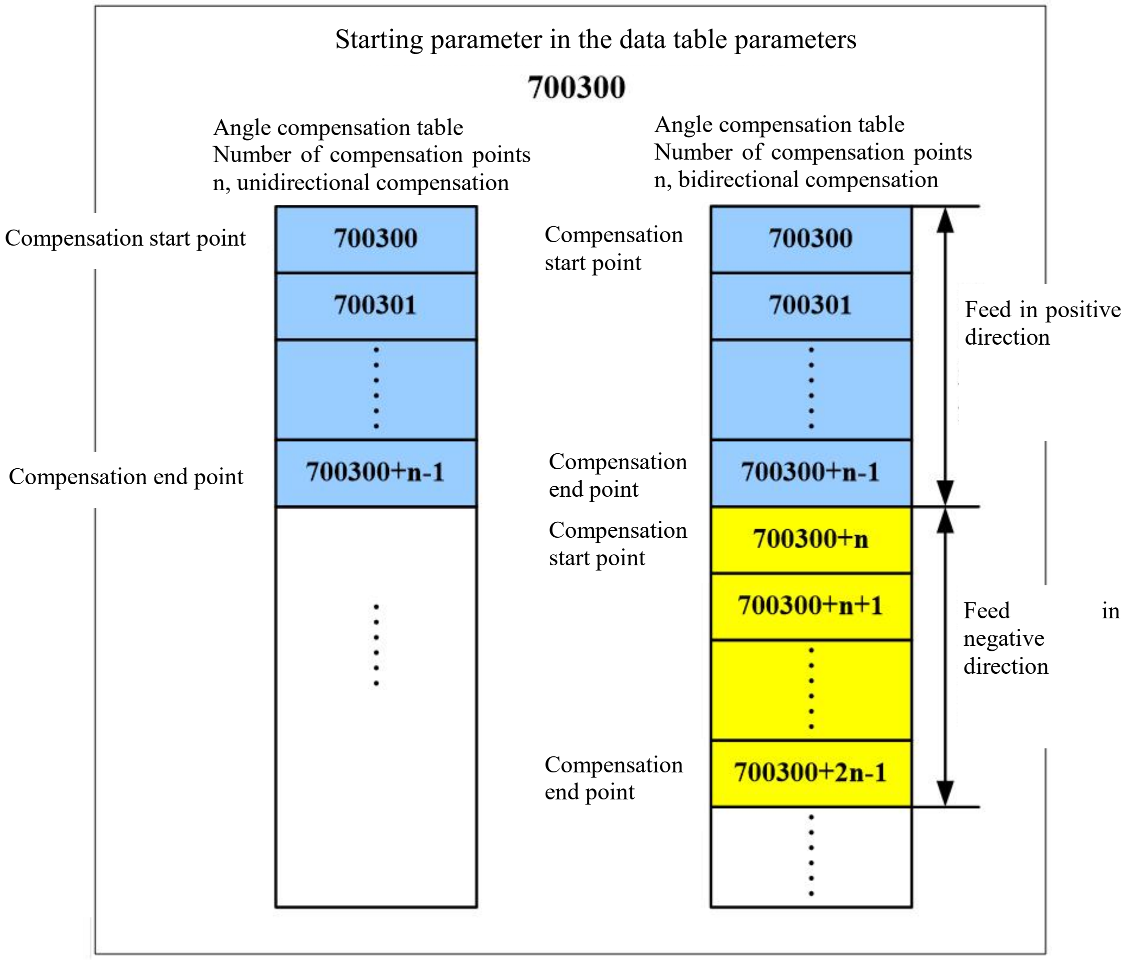
Parameter number	300089, 300104
Parameter name	Angle compensation table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the starting parameter number of angle compensation table in the data table parameters.

The angle compensation table is used to store the compensation angle at each sampling compensation point. The compensation angle can be gained by the pre-calibrated angle error compensation of datum axis, with the basic unit degree.

After the starting parameter number is set, the storage interval of angular compensation table in data table parameter is defined. The sequence of compensation value is arranged in order of sampling compensation point coordinates, from smallest to largest, with this parameter number being the first address. If the compensation is bi-directional, the positive compensation data, followed by the negative compensation data should be input.



Note

The length of angle compensation table is determined by both compensation type (unidirectional, bi-directional) and number of compensation points. While users are specifying the initial parameter number of angle compensation table, avoid an overlap with other data tables which have been used, and the storage interval of compensation table is not allowed to be out of range of data table parameter.

6.47 Over-quadrant Jump Compensation Type

Parameter number	300120
Parameter name	Over-quadrant jump compensation type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the axis starts from the resting state or the over-quadrant in circular interpolation is reversed, the static friction creates the jump, which causes the unsmooth contour machined (with burrs or steps on it).

The over-quadrant jump compensation can be performed on the command position or command torque to avoid the jump.

The over-quadrant jump compensation of specified axis is

0：Disabled.

1：Enabled for the position loop.

2：Enabled for the current loop.

The configuration parameters of over-quadrant jump compensation of position loop include:

Parm 300126：Over-quadrant jump compensation value.

Parm 300127：Lag time of over-quadrant jump compensation.

Parm 300130：Acceleration time of over-quadrant jump compensation.

Parm 300131：Deceleration time of over-quadrant jump compensation.

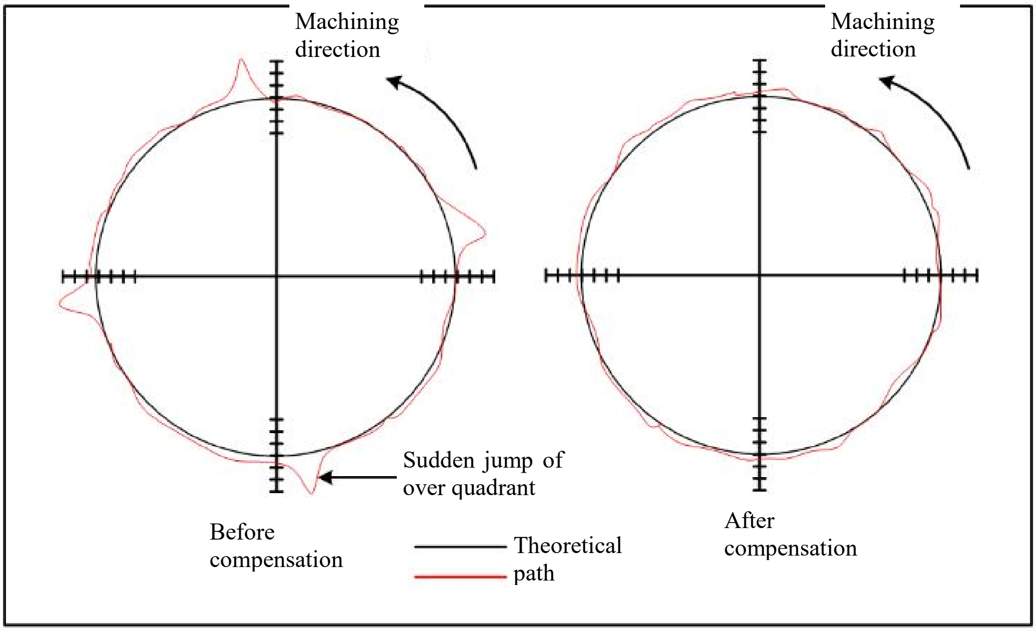
The configuration parameters about over-quadrant jump compensation of current loop include:

Parm 300127：Lag time of over-quadrant jump compensation.

Parm 300130：Acceleration time of over-quadrant jump compensation.

Parm 300131：Deceleration time of over-quadrant jump compensation.

Parm 300132：Torque value of over-quadrant jump compensation.



Note

The over quadrant compensation is valid after the current axis has returned to reference point.

6.48 Jump Jerk Time in Negative direction

Parameter number	300122

Parameter name	Jump jerk time in negative direction
Data unit	ms
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter determines the time it takes for compensation value go from 0 to the value specified by Parm300121.

6.49 Jump Deceleration Time in Negative direction

Parameter number	300123
Parameter name	Jump deceleration time in negative direction
Data unit	ms
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter determines the time it takes for compensation value go from the value specified by Parm300121 to 0.

6.50 Jump Torque in Positive Direction

Parameter number	300124
Parameter name	Jump torque in positive direction
Data type	INT4
Valid range	-100000 to 10000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1. When the parameter is used for position over quadrant jump compensation, it should generally be set to the maximum jump displacement value of linear feed axis at the time of over-quadrant reversing (such as over-quadrant of circular interpolation). The jump value is generally measured by a planar circular grating or a ballbar.
2. This parameter is used for the current loop over quadrant jump compensation, and its setting value determines the peak value of the command torque to be compensated when the axis is enabled or reversed at the time of over-quadrant (the current loop output command torque of the servo drive ranges from -32767 to 32767). If electronic gear ratio of the current axis is negative, the command torque compensation value should be reversed.

6.51 Jump Jerk Time in Positive Direction

Parameter number	300125
Parameter name	Jump jerk time in positive direction
Data uit	ms
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter determines the time that it takes for the compensation value go from 0 to the value specified by Parm300124.

6.52 Jump Deceleration Time in Positive Direction

Parameter number	300126
Parameter name	Jump deceleration time in positive direction
Data uit	ms
Data type	INT4
Valid range	0 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter determines the time that it takes for the compensation value go from the value specified by Parm300124 to 0.

6.53 Jump Compensation Max. Torque

Parameter number	300127
Parameter name	Jump compensation max. torque
Data type	INT4
Valid range	0 to 100000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The maximum compensated torque for speed loop jump.

6.54 Jump Peak Percentage

Parameter number	300128
Parameter name	Jump peak percentage
Data type	INT4
Valid range	0 to 100
Default value	10
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set jump peak percentage of compensation curve. The default 10 is set for the general machine.

6.55 Jump Valley Percentage

Parameter number	300129
Parameter name	Jump valley percentage
Data type	INT4
Valid range	0 to 100

Default value	50
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set jump valley percentage of compensation curve. The default 50 is set for the general machine.

6.56 Jump Slope Percentage

Parameter number	300130
Parameter name	Jump slope percentage
Data type	INT4
Valid range	0 to 100
Default value	50
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the jump slope percentage of compensation curve. The default 50 is set for the general machine.

6.57 Over-quadrant Jump Compensation: Starting Parameter

Parameter number	300131
Parameter name	Over-quadrant jump compensation: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Starting number of extended parameters of over-quadrant jump compensation. 9 groups are occupied by default, in total of 81 parameter numbers. This parameter must be set. Pay attention to avoid the conflict with addresses of other compensation parameters.

6.58 Thermal Error Multi-linear Compensation Type

Parameter number	300135
Parameter name	Thermal error multi-linear compensation type
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The thermal error multi-linear compensation is used for the thermal deformation of machine spindle and feed axis. With multi-linear regression model, it can set up a functional relation between temperature and thermal deformation offset of spindle as well as thermal expansion slope of screw rod. Hence, it is an advanced thermal-error compensation.

This parameter is to set the type of multi-linear compensation for the specified axis.

- 0: The thermal error multi-linear compensation is disabled.

- 1: The compensation is based on the spindle offset model.

This type is mainly used for the thermal deformation compensation of machine spindle. The related parameters which need to be set include:

- Parm 300137：Spindle offset model constant Ck
- Parm 300138：Number of access sensors for spindle offset model
- Parm 300139：Sensor series of spindle offset model
- Parm 300140：Starting parameter of coefficient table for spindle offset model

The multi-linear regression model of spindle offset can be set through the setting of the above parameters. (Suppose that the compensation axis is X axis)

$\mathbf{K(T_0, T_1, T_2...) = C_k + A_0 \times T_0 + A_1 \times T_1 + A_2 \times T_2 + \ldots\ldots}$

K is the spindle thermal-deformation offset (along X axis), A_0 to A_n are the temperature coefficients, T_0 to T_n are the collected temperature values. The compensation value Dx on X axis can be calculated by the formula $\mathbf{Dx = -K}$

- 2：The compensation based on the screw rod slope model

This type is mainly used for the linear thermal-expansion error compensation of machine feed axis. The related parameters which need to be set include:

Parm 300136：Reference point coordinate of multi-linear compensation (P0).

Parm 300141：Screw rod slope model constant Ct.

Parm 300142：Number of access sensors for screw rod slope model.

Parm 300143：Sensor series of screw rod slope model.

Parm 300144：Starting parameter of coefficient table for screw rod slope model.

The multi-linear regression model of screw rod slope can be set through the setting of the above parameters. (Suppose that the compensation axis is X axis)

$$\tan\beta(T_0, T_1, T_2...) = C_t + A_0 \times T_0 + A_1 \times T_1 + A_2 \times T_2 + \ldots\ldots$$

tanβ is the screw rod thermal-expansion slope value of X axis. A0 to An are the temperature coefficients. T0 to Tn are the collected temperature values. The compensation value Dx of X axis is calculated by the formula.

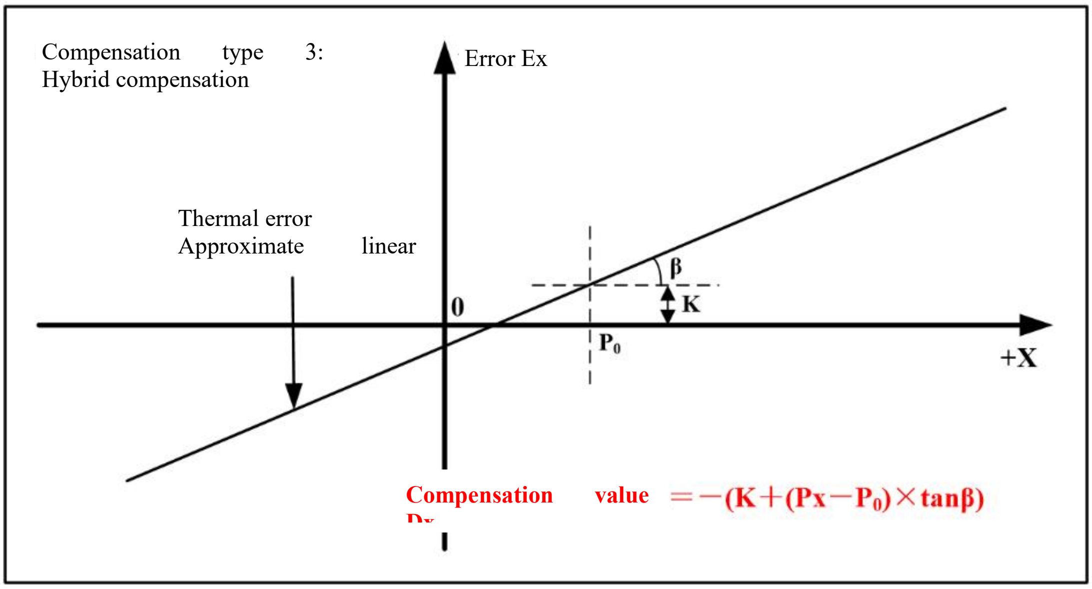
$$Dx = -((Px - P_0) \times \tan\beta)$$

➢ 3：Hybrid compensation

This type includes both type 1 and type 2.

Suppose that the compensation axis is X axis, then the compensation value Dx is calculated by the formula Dx＝－(K＋(Px－P0)×tanβ). The multi-linear compensation of the current axis takes effect when a combination of the following conditions is true.

- The compensation axis has been returned to reference point.
- The type of multi-linear compensation has been set, and parameters of multi-linear compensation has been properly configured.



6.59 Thermal Error Multi-linear Compensation: Reference Position

Parameter number	300136
Parameter name	Thermal error multi-linear compensation: reference position
Data unit	mm, degree
Data type	REAL

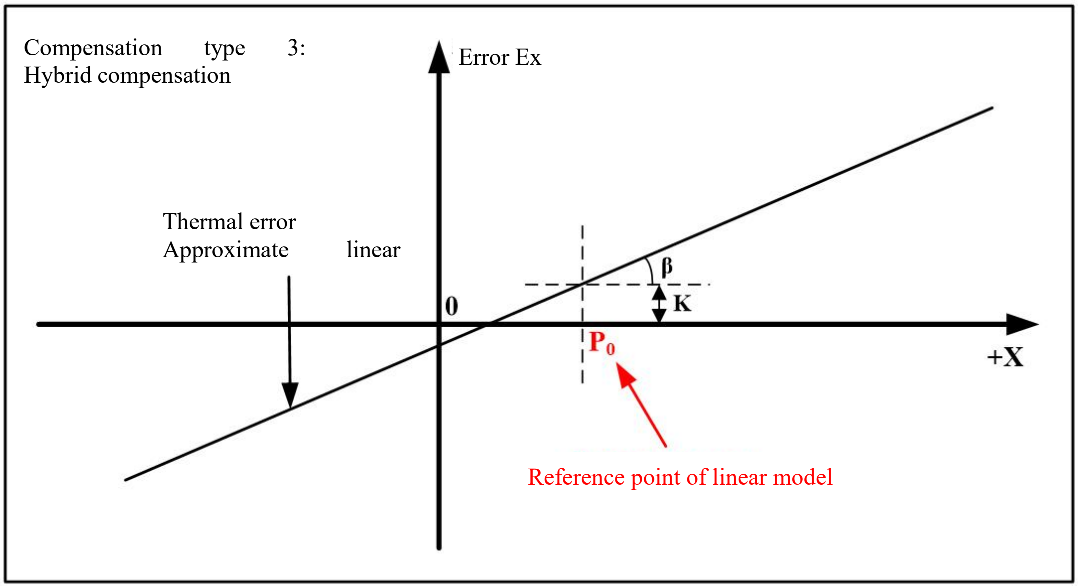
Value range	-21474 to 21474
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 2 or 3.

In linear thermal-expansion compensation, the thermal error curve of screw rod is approximately described through the linear model (the straight line with a certain slope). This parameter is to set the reference point coordinates (P0) of this linear model in machine coordinate system.

When the type of multi-linear compensation is 2, the compensation value at reference point is 0; when the type of multi-linear compensation is 3, the compensation value at reference point is determined by thermal error offset K(T).



6.60 Spindle Offset Model Constant

Parameter number	300137
Parameter name	Spindle offset model constant
Data unit	um, 0.001degree
Data type	REAL
Value range	-21474000 to 21474000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 1 or 3.

This parameter is to set the spindle offset model constant Ck.

Example

The multi-linear regression model of spindle thermal-deformation offset K (along X axis of machine) is:

$\mathbf{K(T_0, T_1, T_2) = -5.9937 + 7.4565T_0 - 1.4819T_1 - 5.9746T_2}$

In this model, the unit of offset K is um or 0.001 degrees. T_0 is the temperature of front bearing. T_1 is the temperature of rear bearing. T_2 is the environmental temperature. The constant of spindle offset model Ck= -5.9937.

6.61 Spindle Offset Model: Number of Access Sensors

Parameter number	300138
Parameter name	Spindle model offset: number of access sensors
Data type	INT4
Valid range	0 to 8
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 1 or 3.

The number of access sensors for spindle offset model determines the number of temperature variables in mathematical model.

Example

The multi-linear regression model of spindle thermal-deformation offset K (along X axis of machine) is:

$\mathbf{K(T_0, T_1, T_2) = -5.9937 + 7.4565T_0 - 1.4819T_1 - 5.9746T_2}$

In this model, the unit of offset K is um or 0.001 degree. T_0 is the temperature of front bearing. T_1 is the temperature of rear bearing. T_2 is the environmental temperature. The number of temperature variables for spindle offset model is 3, thus this parameter should set to 3.

6.62 Spindle Offset Model: Sensor Sequence

Parameter number	300139
Parameter name	Spindle offset model: sensor sequence
Data type	BYTE[8]

Valid range	0 to 127
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 1 or 3.

This parameter is an array parameter. It is to set the temperature sensor series corresponding to the temperature variables of spindle offset model, separating the number of each sensor with "." Or ",".

Note

The array parameter supports up to 8 data to be input simultaneously. Parm300138 "number of access sensors for spindle offset model" determines the length of sensor series for this parameter.

The compensation is invalid when the number of specified temperature sensor is out of range (0 to 19).

Example

The multi-linear regression model of spindle thermal deformation offset K (along X axis of machine) is:

$\mathbf{K(T_0, T_1, T_2) = -5.9937 + 7.4565T_0 - 1.4819T_1 - 5.9746T_2}$

In this model, the unit of offset K is um or 0.001 degrees. T_0 is the temperature of front bearing. T_1 is the temperature of rear bearing. T_2 is the environmental temperature. The sensor sequence of spindle offset model is 0, 1, 2.

6.63 Spindle Offset Model Coefficient Table: Starting Parameter

Parameter number	300140
Parameter name	Spindle offset model coefficient table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 1 or 3.

The coefficient series corresponding to the temperature variables of spindle offset model are configured in the data table parameters. Therefore, number of access sensors in the model determines the length of coefficient series.

This parameter is to set the start parameter number of coefficient series in the data table parameter.

Note

Avoid an overlap with other data tables which has been used while the start parameter number of coefficient table is being specified, and the storage interval of coefficient table is not allowed to go out of range of data table parameter.

Example

The multi-linear regression model of spindle thermal deformation offset K (along X axis of machine) is:

$$\mathbf{K(T_0, T_1, T_2) = -5.9937 + 7.4565T_0 - 1.4819T_1 - 5.9746T_2}$$

In this model, the unit of offset K is um or 0.001 degrees. T_0 is the temperature of front bearing. T_1 is the temperature of rear bearing. T_2 is the environmental temperature.

Suppose that the start parameter number of coefficient table for spindle offset model is 700100, then the coefficients 7.4565, -1.48189, and -5.9746 are filled in in turn from the data table parameter 700100.

6.64 Screw Rod Slope Model Constant

Parameter number	300141
Parameter name	Screw rod slope model constant
Data unit	um/m, 0.001degree/360degrees
Data type	REAL
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 2 or 3.

This parameter is to set the screw rod slope model constant Ct.

Example

The multi-linear regression model of X-axis screw rod thermal-expansion slope tanβ is:

$$\mathbf{\tan\beta(T_0, T_2) = 9.7647 + 5.8207T_0 - 1.047T_2}$$

In this model, the unit of tanβ is um/m or 0.001 degree/360 degrees. T_0 is the temperature of feature point of screw rod. T_2 is the environmental temperature. The constant of screw rod slope model Ct=9.7647.

6.65 Screw Rod Slope Model: Number of Access Sensors

Parameter number	300142
Parameter name	Screw rod slope model: number of access models

Data type	INT4
Valid range	0 to 8
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 2 or 3.

The number of access sensors in screw rod slope model determines the number of temperature variables in mathematical model.

Example

The multi-linear regression model of screw rod thermal-expansion slope tanβ for Axis X is:

$\mathbf{\tan\beta(T_0, T_2) = 9.7647 + 5.8207T_0 - 1.047T_2}$

In this model, the unit of tanβ is um/m or 0.001 degree/360 degrees. T_0 is the temperature of feature point of screw rod. T_2 is the environmental temperature. The number of access sensors in screw rod slope model is 2.

6.66 Screw Rod Slope Model: Sensor Sequence

Parameter number	300143
Parameter name	Screw rod slope model: sensor sequence
Data type	BYTE[8]
Valid range	0 to 127
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 2 or 3.

This parameter is an array parameter. It is to set the temperature sensor series corresponding to the temperature variables of screw rod slope model, separating the number of each sensor with "." Or ",".

Note

The array parameter supports up to 8 data to be input simultaneously. Parm300142 "number of access sensors for screw slope model" determines the length of sensor series for this parameter.

The compensation is invalid when the number of specified temperature sensors is out of range (0 to 19).

Example

The multi-linear regression model of screw rod thermal-expansion slope tanβ for Axis X is:

$\mathbf{tan\beta(T_0, T_2) = 9.7647 + 5.8207T_0 - 1.047T_2}$

In this model, the unit of tanβ is um/m or 0.001 degree/360 degrees. T_0 is the temperature of feature point of screw rod. T_2 is the environmental temperature. The sensor sequence of screw rod slope model is 0, 2.

6.67 Screw Rod Slope Model Coefficient Table: Starting Parameter

Parameter number	300144
Parameter name	Screw rod slope model coefficient table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 2 or 3.

The coefficient series corresponding to the temperature variables of screw rod slop model are configured in the data table parameters. Therefore, the number of sensors which accesses to the model determines the length of coefficient series.

This parameter is to set the starting parameter number of coefficient series in the data table parameters.

Note

Avoid an overlap with other data tables which has been used while the start parameter number of coefficient table is being specified.

Example

The multi-linear regression model of screw rod thermal-expansion slope tanβ for Axis X is:

$\mathbf{tan\beta(T_0, T_2) = 9.7647 + 5.8207T_0 - 1.047T_2}$

In this model, the unit of tanβ is um/m or 0.001 degree/360 degrees. T_0 is the temperature of feature point of screw rod. T_2 is the environmental temperature. Suppose that the start parameter number of coefficient table for screw rod slop model is 700200, then the coefficients 5.8207 and -1.047 should be filled in in turn from the data table parameter 700200.

6.68 Reverse Compensation Rate Type

Parameter number	300150

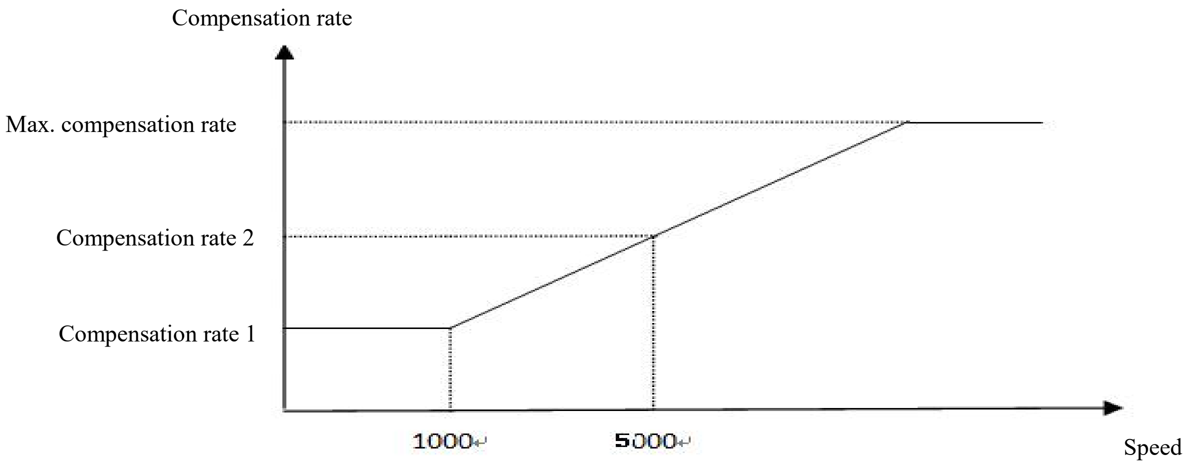
Parameter name	Reverse compensation rate type
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the way to calculate the compensation per interpolation cycle when the compensation is reversed.

0: Set a fixed value with Parm300142 “backlash compensation rate” to calculate the backlash compensation value.

1: The backlash compensation rate is proportional to the speed. The compensation rate of the current speed is calculated as shown in below figure.



6.69 Min. Reverse Compensation Time

Parameter number	300151
Parameter name	Min. reverse compensation time
Data type	REAL
Valid range	0.00 to 1000.00
Default value	0.03
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the optimum compensation rate to process the circle of radius 100mm at the speed 1000mm/min.

6.70 Max. Reverse Compensation Time

Parameter number	300152
Parameter name	Max. reverse compensation time
Data type	REAL
Valid range	0.0 to 1000.0
Default value	2
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the optimum compensation rate to process the circle of radius 100mm at the speed 5000mm/min.

6.71 Time-type Thermal Error Compensation Type

Parameter number	300157
Parameter name	Time-type thermal error compensation type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

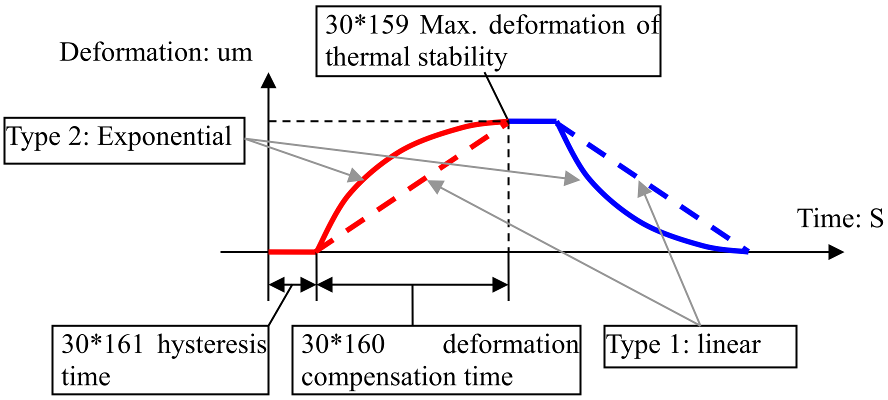
Description

The thermal error cannot be calculated without the temperature sensor. Therefore, the machine working times is used to estimate the thermal error.

0: The time-type thermal error compensation is disabled

1: Linear compensation

2: Exponential curve compensation



6.72 Time-type Thermal Error Compensation Coefficient

Parameter number	300158
Parameter name	Time-type thermal error compensation coefficient
Data type	REAL
Valid range	1 to 4
Default value	2.9
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the exponential curve compensation coefficient. It is valid when the time-type thermal error compensation type is set to 2.

6.73 Time-type Thermal Error Compensation Value (mm)

Parameter number	300159
Parameter name	Time-type thermal error compensation coefficient (mm)
Data type	REAL
Valid range	-100 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the maximum value of thermal stability (unit: mm)

6.74 Time-type Thermal Error: Heating Compensation Time

Parameter number	300160
Parameter name	Time-type thermal error: heating compensation time (s)
Data type	INT4
Valid range	0 to 700000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the seconds the machine goes from cold to thermal stability in the current working conditions.

6.75 Time-type Thermal Error: Heat Transfer Lag Time

Parameter number	300161
Parameter name	Time-type thermal error: heat transfer lag time
Data type	INT4
Valid range	0 to 700000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the delay time of thermal transmission of the motion parts. It is used to estimate the time-type thermal error compensation.

6.76 Time-type Thermal Error: Cooling Compensation Time

Parameter number	300162
Parameter name	Time-type thermal error: cooling compensation time
Data type	INT4
Valid range	0 to 700000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Total time of heat dissipation.

6.77 Energy-consuming Type Thermal Error Compensation Type

Parameter number	300163
Parameter name	Energy-consuming type thermal error compensation type
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The energy-consuming type thermal error compensation refers to using the current data of machine to calculate and estimate the thermal deformation amount of machine parts, and then perform the thermal compensation.

-1: Energy-consuming type thermal error compensation is disabled;

0: Data statistics;

1: Energy-consuming type thermal error compensation is enabled;

2: Compensation coefficient operation.

6.78 Energy-consuming Type Thermal Error Compensation Coefficient 1

Parameter number	300164
Parameter name	Energy-consuming type thermal error compensation coefficient 1
Data type	REAL
Valid range	0 to 10
Default value	1.41
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The one of parameters to estimate the energy-consuming type thermal error. It is the heating factor of feed axis motor forward rotation.

6.79 Energy-consuming Type Thermal Error Compensation Coefficient 2

Parameter number	300165
Parameter name	Energy-consuming type thermal error compensation coefficient 2 (x 10E7)
Data type	REAL
Valid range	0 to 10
Default value	1.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The one of parameters to estimate the energy-consuming type thermal error. It is the heating factor of feed axis motor reverse rotation.

6.80 Energy-consuming Type Thermal Error Compensation Coefficient 3

Parameter number	300166
Parameter name	Energy-consuming type thermal error compensation coefficient 3 (x 10E6)
Data type	REAL
Valid range	-10 to 0
Default value	-4.1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The one of parameters to estimate the energy-consuming type thermal error. It is the forced convection heat dissipation coefficient.

6.81 Energy-consuming Type Thermal Error Compensation Coefficient 4

Parameter number	300167
Parameter name	Energy-consuming type thermal error compensation coefficient 4
Data type	REAL
Valid range	-10 to 1
Default value	-8.21
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

The one of parameters to estimate the energy-consuming type thermal error. It is the natural heat dissipation coefficient.

6.82 Energy-consuming Type Thermal Error Compensation Associated Spindle

Parameter number	300168
Parameter name	Energy-consuming type thermal error compensation associated spindle
Data type	REAL
Valid range	-1 to 127
Default value	5
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Logical axis number of the compensated axis. The axis on which the compensation is performed can be determined.

6.83 Energy-consuming Type Thermal Error Compensation Associated Spindle Coefficient

Parameter number	300169 to 300171
Parameter name	Energy-consuming type thermal error compensation associated spindle coefficients 1-3
Data type	REAL
Valid range	-1000 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Spindle motor heating coefficient, forced-convection heat dissipation coefficient, natural heat dissipation coefficient.

6.84 Energy-consuming Type Thermal Error Compensation Expansion Zero

Parameter number	300172
Parameter name	Energy-consuming type thermal error compensation Expansion zero
Data type	REAL
Valid range	-21747 to 21747
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The position of thermal expansion zero of feed axis in machine coordinate system.

6.85 Energy-consuming Type Thermal Error Compensation Target Point

Parameter number	300173
Parameter name	Energy-consuming type thermal error compensation expansion zero
Data type	REAL
Valid range	-21747 to 21747
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The position of calibrated point of thermal compensation in machine coordinate system.

6.86 Energy-consuming Type Thermal Error Compensation Starting Point

Parameter number	300174
Parameter name	Energy-consuming type thermal error compensation starting point
Data type	REAL
Valid range	-21747 to 21747
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The position of calibrated point of thermal compensation in machine coordinate system.

6.87 Number of Thermal Mechanism Thermal Error Compensation Points

Parameter number	300175
Parameter name	Number of thermal mechanism thermal error compensation points
Data type	REAL
Valid range	0 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

6.88 Group 2 Thermal Error Compensation Type

Parameter number	300192
Parameter name	Thermal error group 2 compensation type
Data type	INT4
Value range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The second group of parameter to compensate the thermal deformation between machine spindle and feed axis. The thermal error compensation type of the specified axis is set by this parameter.

0: Disable thermal error compensation;

1: Offset compensation;

2: Linear thermal expansion compensation;

3: Hybrid compensation;

4: Bidirectional linear thermal expansion compensation;

5: Bidirectional linear hybrid compensation;

6: Predictive compensation based on big data;

7: Bidirectional linear thermal expansion compensation with Z offset;

8: Bidirectional linear hybrid compensation with Z offset;

9: Compensation based on thermal mechanism model.

6.89 Group 2 Thermal Error Compensation: Reference Position

Parameter number	300193
Parameter name	Group 2 thermal error compensation: reference position
Data unit	mm, degree
Data type	REAL
Value range	-999999999 to 999999999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter takes effect when type of thermal error compensation is set to 2, 3, or 4.

In linear thermal expansion compensation, the curve of screw rod thermal-error can be approximately described via the linear model (the straight line with a certain slope), and this parameter is to specify the reference point coordinate of this linear model in the machine coordinate system.

When type of thermal error compensation is set to 2, the compensation value at the reference point is 0; when type of thermal error compensation is set to 3 or 4, the compensation value at the reference point is determined by the absolute thermal compensation offset value K(T).

6.90 Group 2 Thermal Error Offset Table: Initial Temperature

Parameter number	300194
Parameter name	Group 2 thermal error offset table: initial temperature
Data unit	℃
Data type	REAL
Value range	-99999 to 99999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

The thermal error offset table is obtained through calibrating the thermal error offset values at equally-spaced temperature points. This parameter is to set the left boundary of effective temperature range of thermal error offset table.

6.91 Group 2 Thermal Error Offset Table: Number of Temperature Points

Parameter number	300195
Parameter name	Group 2 thermal error offset table: number of temperature points
Data unit	INT4
Data type	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

The thermal error offset table is obtained through calibrating the thermal error offset values at equally-spaced temperature points, and this parameter is to set the number of calibrated temperature points of thermal error offset table.

The thermal error offset at each calibrated temperature point is stored in the thermal error offset table at the specified location. Therefore, the number of calibrated temperature points determines the length of thermal error offset table.

6.92 Group 2 Thermal Error Offset Table: Temperature Interval

Parameter number	300196
Parameter name	Group 2 thermal error offset table: temperature interval
Data unit	℃
Data type	REAL
Valid range	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

The thermal error offset table is obtained through calibrating the thermal error offset values at equally-spaced temperature points, and this parameter is to set the space between calibrated temperature of thermal error offset table.

After the initial measured temperature for thermal error offset table, number of measured temperature points, and space between temperature points are set, the effective temperature range for thermal error offset table is determined. Then the formula to calculate the measured termination temperature is:

End temperature = Initial temperature + (Number of measured temperature points -1) × Measured temperature interval

6.93 Group 2 Thermal Error Offset Table: Sensor No.

Parameter number	300197
Parameter name	Group 2 thermal error offset table: sensor No.
Data type	INT4
Valid range	−1 to 127
Default value	−1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

This parameter is to set the temperature sensor number which is associated with the current thermal error offset table. The thermal error compensation algorithm queries thermal error offset table based on the temperature (it is stored in the corresponding temperature register) which is measured by this temperature sensor.

6.94 Group 2 Thermal Error Offset Table: Starting Parameter

Parameter number	300198
Parameter name	Group 2 thermal error offset table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 1 or 3.

This parameter is to set the initial parameter number of thermal error offset table in data table parameters. After the initial parameter number is set, the storage interval of thermal error offset table in data table parameters is determined. The sequence of thermal error offset is arranged in order of temperature, from lowest to highest, with this parameter number being the first address.

The unit of thermal error offset is mm for linear axis, and degree for swivel axis and rotary axis.

6.95 Group 2 Thermal Error Slope Table: Starting Temperature

Parameter number	300199
Parameter name	Group 2 thermal error slope table: starting temperature
Data unit	℃
Data type	REAL
Value range	-99999 to 999
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

This parameter is to set the left boundary of effective temperature range of thermal error slope table.

6.96 Group 2 Thermal Error Slope Table: Number of Temperature points

Parameter number	300200
Parameter name	Group 2 thermal error slope table: number of temperature points
Data type	INT4
Valid range	0 to 100
Default value	0
Access	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

The thermal error slope table is obtained through calibrating the linear thermal expansion slope values of screw rod at equally-spaced temperature points, and this parameter is to set the number of calibrated temperature points of thermal error slope table.

The linear thermal expansion slope at each calibrated temperature point is stored in the thermal error slope table at the specified location. Therefore, the number of calibrated temperature points determines the length of thermal error slope table.

6.97 Group 2 Thermal Error Slope Table: Temperature Interval

Parameter number	300201
Parameter name	Group 2 thermal error slope table: temperature interval
Data unit	℃
Data type	REAL
Valid range	0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

The thermal error slope table is based on the linear thermal expansion slope values of screw rod at equally-spaced temperature points, and this parameter is to set the interval between measured temperature points.

After the initial temperature of thermal error slope table, number of measured temperature points, and interval between measured temperature points are set, the effective temperature range of thermal error slope table is determined. Then the formula to calculate the terminal temperature is:

End temperature = Starting measured temperature + (Number of measured temperature points - 1) × Interval between two temperature points

6.98 Group 2 Thermal Error Slope Table: Sensor No.

Parameter number	300202
Parameter name	Group 2 thermal error slope table: sensor No.
Data type	INT4
Valid range	−1 to 127
Default value	−1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

This parameter is to set the number of temperature sensor which is associated with the current thermal error slope table. The thermal error compensation algorithm queries thermal error slope table based on the temperature (it is stored in the corresponding temperature register) which is measured by this temperature sensor.

6.99 Group 2 Thermal Error Slope Table: Starting Parameter

Parameter number	300203
Parameter name	Group 2 thermal error slope table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of thermal error compensation is set to 2 or 3.

This parameter is to set the initial parameter number of thermal error slope table in data table parameters.

After the initial parameter number is set, the storage interval of thermal error slope table in data table parameters is determined. The sequence of linear thermal expansion slope is arranged in order of temperature, from lowest to highest, with this parameter number being the first address.

For linear axis, the thermal error slope value is the displacement error (unit: mm) per 1m of feed with the positive command; for swivel axis and rotary axis, the thermal error slope value is the angular error (unit: degree) per 360 degrees of feed with positive command.

6.100 Group 2 Thermal Error Compensation Rate

Parameter number	300204
Parameter name	Group 2 thermal error compensation rate
Data type	REAL
Valid range	0 to 1.0
Default value	0.01
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter setting can smooth the thermal error compensation value for the current axis, to prevent a machine vibration caused by the saltation of thermal error compensation value.

When a value larger than 0 is set, CNC monitors changes of the thermal error compensation values between adjacent interpolation cycles in real time. If the change is larger than the value set by this parameter, it will be limited to the set value. When 0 is set, the smoothing of thermal error compensation value may not be performed, and at this point, the thermal error compensation value is not monitored.

6.101 Number of Space Error Compensation Points

Parameter number	300211
Parameter name	Number of space error compensation points
Data type	INT4
Valid range	0 to 2000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the number of sampling compensation points within compensation travel.

6.102 Space Error Compensation Point Interval

Parameter number	300212
Parameter name	Space error compensation point interval (mm, degree)
Data type	REAL
Valid range	0 to 10000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the distance between two adjacent sampling compensation points within compensation travel. Unit: mm, degree.

6.103 Enable Space Error Modulus Compensation

Parameter number	300213
Parameter name	Enable space error modulus compensation
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC

Activation	ACT_RST
Milling/Turning	Turning, milling

Description

1: Enable modulus compensation;

0: Disable modulus compensation.

6.104 Space Error Compensation Magnification

Parameter number	300214
Parameter name	Space error compensation magnification
Data type	REAL
Valid range	0 to 100
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The space error compensation value is output to the compensation axis after multiplying with the set value of the parameter, so the actual compensation value can be adjusted (amplified or reduced) by the parameter.

6.105 Space Error Compensation Table: Starting Parameter

Parameter number	300215
Parameter name	Space error compensation table: starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the starting parameter of the space error compensation table in the data table parameter.

6.106 Compensation Value Amplitude Constraint

Parameter number	300216
Parameter name	Compensation value amplitude constraint (μm, 0.001deg**)**
Data type	REAL
Valid range	0 to 1000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the maximum amplitude constraint of space error compensation, to limit the output of the maximum amplitude.

6.107 Compensation Value Derivative Constraint

Parameter number	300217
Parameter name	Compensation value derivative constraint (μm, 0.001deg**)**
Data type	REAL
Valid range	0 to 1000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the maximum derivative constraint for space error compensation, which is used to limit the output of the maximum derivative.

6.108 Compensation Value Second Derivative Constraint

Parameter number	300218
Parameter name	Compensation value second derivative constraint (μm, 0.001deg**)**
Data type	REAL
Valid range	0 to 1000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

To set the maximum second derivative constraint for space error compensation, which is used to limit the output of the maximum second derivative.

6.109 Compensation Value Third Derivative Constraint

Parameter number	300219
Parameter name	Compensation value third derivative constraint (μm, 0.001deg)
Data type	REAL
Valid range	0 to 1000
Default value	1000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the maximum third derivative constraint for space error compensation, which is used to limit the output of the maximum third derivative.

6.110 Install Worktable or Tool

Parameter number	300220
Parameter name	Install worktable or tool
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0: Not install worktable or tool;

1: Install worktable;

2: Install tool.

6.111 Offset Proxy Model Constant

Parameter number	300221
Parameter name	Offset proxy model constant (μm or 0.001deg)
Data type	INT4
Valid range	700000 to 719999
Default value	701000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the starting parameter of offset proxy model constant table in the data table parameter.

6.112 Offset Proxy Model: Number of Access Sensors

Parameter number	300222
Parameter name	Offset proxy model: number of access sensors
Data type	INT4
Valid range	0 to 8
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the number of access sensors in offset proxy model, that is, the number of thermal error model input variables.

6.113 Offset Proxy Model Coefficient Table Starting Parameter

Parameter number	300223
Parameter name	Offset proxy model coefficient table starting parameter
Data type	INT4
Valid range	700000 to 719999
Default value	702000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the starting parameter of offset proxy model coefficient table in the data table parameter.

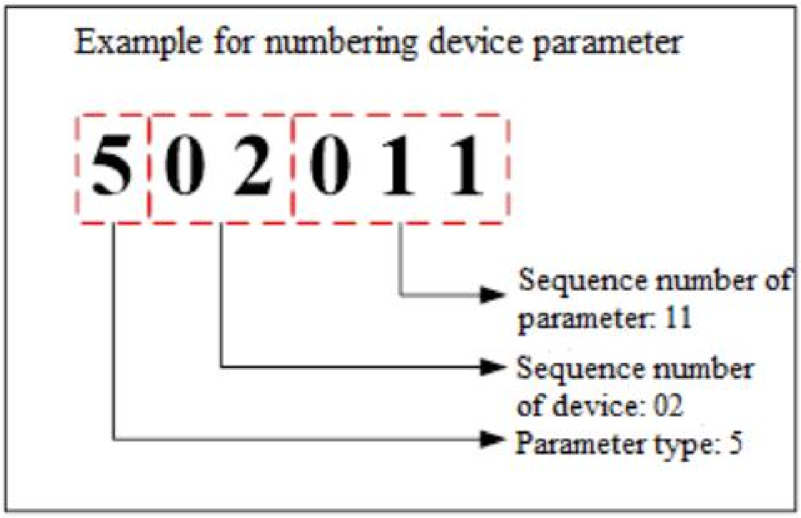
7 Device Interface Parameter

Explanation on device parameter number:

Bit 0 to bit 2: sequence number of device parameter.

Bit 3 to bit 4: sequence number of device.

Bit 5: type of parameter. The type is 5 for device parameter.



Note: Device 0 is taken as an example to illustrate the below device parameters (bit 3 and bit 4 of their numbers are 0).

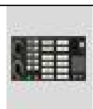
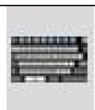
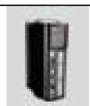
7.1 Device Identification Parameter

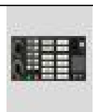
7.1.1 Device Name

Parameter No.	500000
Parameter name	Device name
Data type	STRING
Valid range	One to seven characters
Access level	Curing
Milling/turning	Turning, milling

Description

The devices supported by the CNC system are as shown in the below table:

Category	Name	Type	Connection	Graphic
Reserved	**RESERVE**	**1000**	**----**	
Analog spindle	**SP**	**1001**	**Local**	
Local IO module	**IO_LOC**	**1007**	**Local**	
Local control panel	**MCP_LOC**	**1008**	**Local**	
Handwheel	**MPG**	**1009**	**Local**	
Keyboard	**NCKB**	**1010**	**Local**	
Servo axis	**AX**	**2002**	**Bus network**	

Bus IO module	**IO_NET**	**2007**	**Bus network**	
Bus control panel	**MCP_NET**	**2008**	**Bus network**	

Note

This parameter is automatically configured (directly specified or identified from bus network) by CNC, and users are unable to change it.

7.1.2 Device Type

Parameter No.	500002
Parameter name	Device type
Data type	INT4
Access level	Curing
Milling/turning	Turning, milling

Description

The devices supported by the CNC are as shown in the table in section 7.1.1.

Note

This parameter is automatically configured (directly specified or identified from bus network) by CNC, and users are unable to change it.

7.1.3 Same Group: Device Number

Parameter No.	500003
Parameter name	Same group: device number
Data type	INT4
Access level	Curing
Milling/turning	Turning, milling

Description

When the same type of devices are connected to CNC, this parameter is for identifying the sequence number of device in the same type.

Note

This parameter is automatically configured (directly specified or identified from bus network) by CNC, and users are unable to change it.

7.1.3 Device ID

Parameter No.	500004
Parameter name	Device ID
Data type	HEX4
Access level	Curing
Milling/turning	Turning, milling

Description

The function that system reads and displays version number of firmware form NCUC substation.

For example, NCUC bus device MCP and IO substations can read IO firmware version No. from the IO device ID bar of the device interface parameter. If IO value is 0x13, then IO firmware number is V1.3; if MPC value is 0x12, the firmware number of bus adapter board is V1.2

Note

This parameter is automatically configured by CNC system (directly specified or identified from bus network), and users cannot modify it.

7.2 Bus Control Panel

7.2.1 MCP Type

Parameter number	500010
Parameter name	MCP type
Data type	INT4
Valid range	0 to 3
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To specify the type of bus control panel.

0：Invalid.

1：8A type control panel.

2：8B type control panel.

3：8C type control panel.

7.2.2 Input Point: Start Group No.

Parameter number	500012
Parameter name	Input point: start group No.
Data type	INT4
Valid range	30 to 482
Default value	480
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the location of input signal of bus control panel in X register.

480	0000 0000	000D	00H	480	0000 0100	004D	04H
481	0000 0000	000D	00H	481	0000 0000	000D	00H
482	0000 0000	000D	00H	482	0101 0001	081D	51H
483	0000 0000	000D	00H	483	0000 0000	000D	00H
484	0000 0000	000D	00H	484	0000 0000	000D	00H
485	0000 0000	000D	00H	485	0000 0000	000D	00H

$1

7.2.3 Number of Input Point Groups

Parameter number	500013
Parameter name	Number of input point groups
Data unit	Group (8-bit)
Data type	INT4
Valid range	0 to 128
Default value	30
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To identify the number of groups of input signals in the bus control panel.

Note

The number of groups of input signals in the bus control panel defaults to 30 groups. The change of this parameter cannot alter the actual number of groups of input points in control panel.

Example

For the bus control panel MCP_NET, the start group number of input point is set to 480, and the number of groups of input points is set to 30, then the distribution of input signals of control panel in X register is shown as below table:

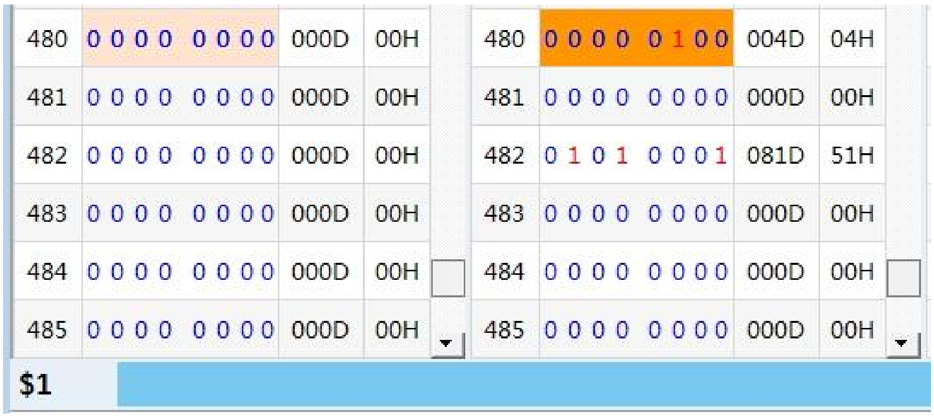
Type	**Panel button**	**Band switch, feed override**	**Band switch, spindle override**	**Band switch, rapid traverse override**	**Axis selection by handwheel/ override**	**Pulse increment of handwheel**	**Pulse counts of handwheel**
A type	X480 to X485	X489	X487	X486	X488	X490 to X491	X492 to X493
B type	X480 to X486	X489	X487	----	X488	X490 to X491	X492 to X493
C type	X480 to X486	X487	X489	----	X488	X490 to X491	X492 to X493

7.2.4 Output Point: Start Group Number

Parameter number	500014
Parameter name	Output point: start group number
Data type	INT4
Valid range	30 to 482
Default value	480
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the location of output signal of bus control panel in Y register.



480	0000 0000	000D	00H	480	0000 0100	004D	04H
481	0000 0000	000D	00H	481	0000 0000	000D	00H
482	0000 0000	000D	00H	482	0101 0001	081D	51H
483	0000 0000	000D	00H	483	0000 0000	000D	00H
484	0000 0000	000D	00H	484	0000 0000	000D	00H
485	0000 0000	000D	00H	485	0000 0000	000D	00H

$1

7.2.5 Number of Output Point Groups

Parameter number	500015
Parameter name	Number of output point groups
Data unit	Group (8-bit)
Data type	INT4
Valid range	0 to 128
Default value	30
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To identify the number of groups of output points in the bus control panel.

Note

The number of groups of output signals in the bus control panel defaults to 30 groups. The change of this parameter cannot alter the actual number of output point groups in control panel.

Example

For the bus control panel MCP_NET, the start group number of output point is set to 480, and the number of input point groups is set to 30, then the output signal (button light signal) of control panel in register uses the first 10 groups (from Y480 to Y489), the remaining 20 groups (from Y490 to Y509) are reserved.

7.2.6 Number of Additional Analog Spindles

Parameter number	500019

Parameter name	Number of additional analog spindles
Data type	INT4
Valid range	0 to 8
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Number of the additional analog spindles

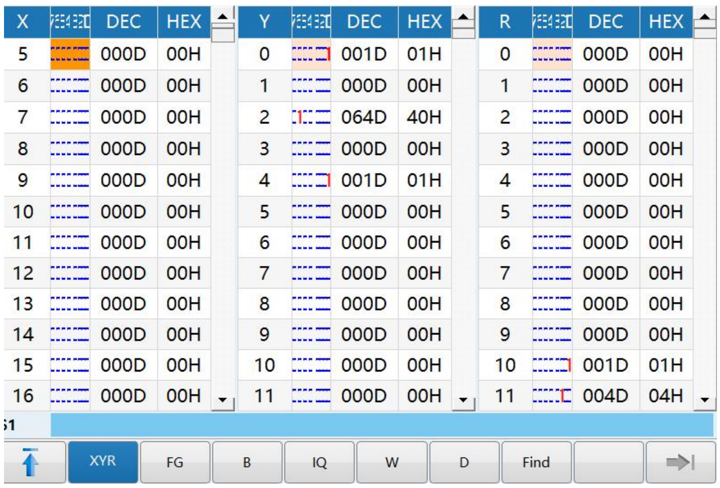
7.3 Bus IO Module

7.3.1 Input Point: Start Group Number

Parameter number	500012
Parameter name	Input points: start group number
Data type	INT4
Valid range	0 to 472
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the location of input signal of bus IO module in the X register.



7.3.2 Number of Input Point Groups

Parameter number	500013
Parameter name	Number of input point groups
Data unit	Group (8-bit)
Data type	INT4
Valid range	0 to 128
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the number of groups of input signals in the bus IO module.

Note

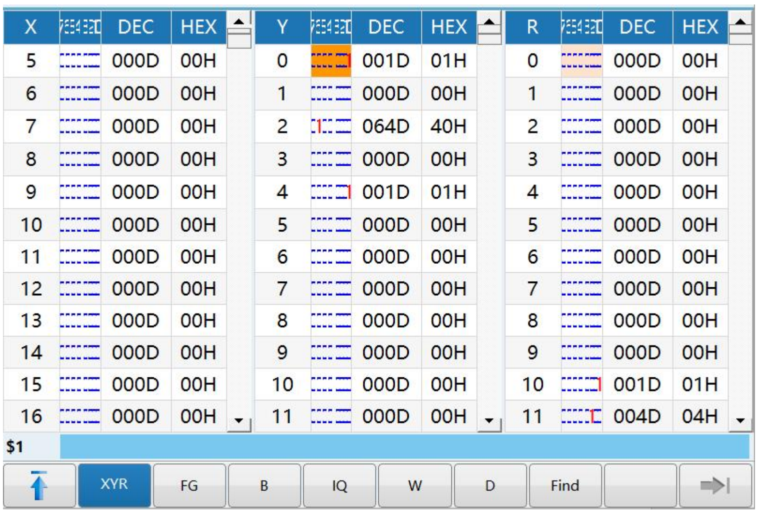
The number of groups of input points in bus IO module defaults to 10 groups. The change of this parameter cannot alter the actual number of groups of input points in bus IO module.

7.3.3 Output Point: Start Group Number

Parameter number	500014
Parameter name	Output point: start group number
Data type	INT4
Valid range	0 to 472
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the location of output signal of bus IO module in the Y register.



7.3.4 Number of Output Point Groups

Parameter number	500015
Parameter name	Number of output point groups
Data unit	Group (8-bit)
Data type	INT4
Valid range	0 to 128
Default value	10
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the number of groups of output signals in the bus IO module.

Note

The number of output point groups defaults to 10 groups. The change of this parameter cannot alter the actual number of output point groups in bus IO module.

7.4 Servo Axis

7.4.1 Working Mode

Parameter number	500010
Parameter name	Working mode
Data type	INT4

Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the default working mode of servo axis in bus network.

➢ 0：No position command output.

➢ 1：Incremental position mode.

➢ 2：Absolute position mode.

➢ 3：Speed mode.

➢ 4：Current mode (torque mode).

This parameter generally is set to 1 for feed axis, and 3 for spindle.

Note

This parameter only sets the default working mode of servo axis. In the practical application, the working mode of servo axis can be switched (e.g., C/S switching) by the control command of CNC.

7.4.2 Logical Axis No.

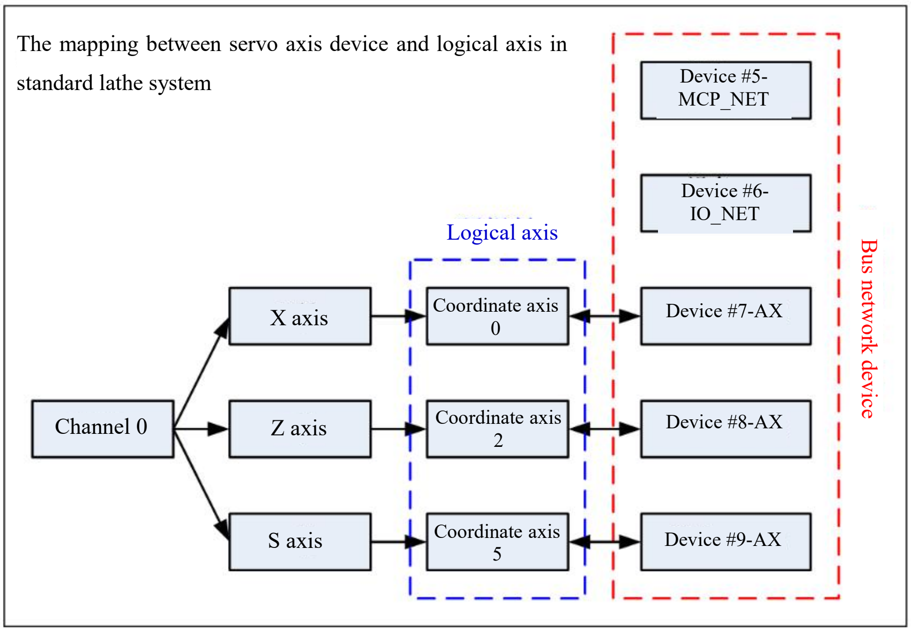
Parameter number	500011
Parameter name	Logical axis No.
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

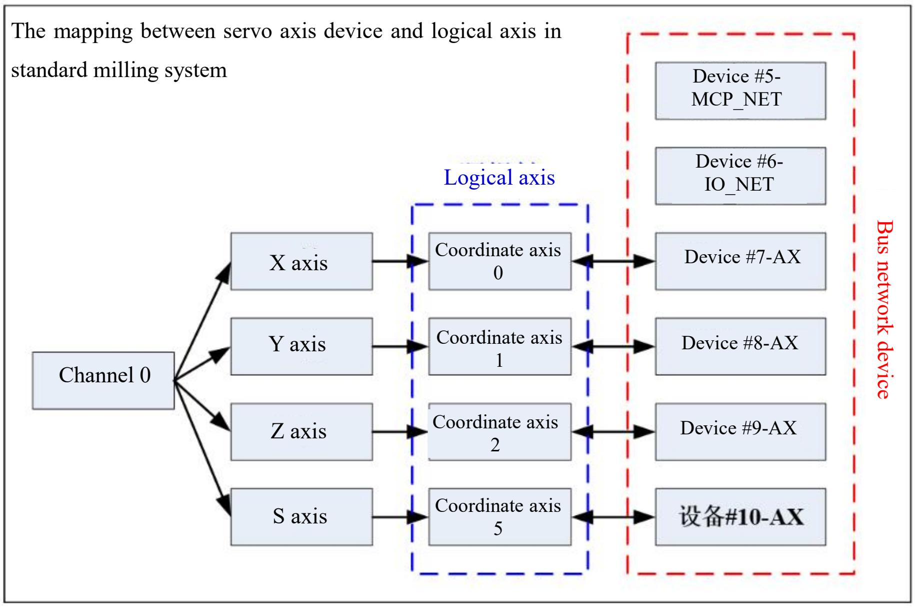
Description

This parameter is to build the mapping relationship between the servo axis device and the logical axis.

➢ -1：No mapping between the device and the logical axis.

➢ 0 to 127：Number of mapped logical axis.





7.4.3 Inverted Encoder Feedback Flag

Parameter number	500012
Parameter name	Inverted encoder feedback flag
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0： The encoder feedback is directly input to CNC.

1： The inverted encoder feedback is input to CNC.

2: Absolute position of encoder feedback is inverted, and the inverted incremental position is input to CNC system.

3: Absolute position of encoder is not inverted, and the inverted incremental position is input to CNC system.

When the spindle actually rotates in the opposite direction to the spindle feedback speed, this parameter is set to 1.

7.4.3 Command Pulse Output Type

Parameter number	500013
Parameter name	Command pulse output type
Data type	INT4
Valid range	0 to 3
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

7.4.4 Enable Feedback Position Cycle

Parameter number	500014
Parameter name	Enable feedback position cycle
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0：Cycle counting is not used for feedback position.

1：Cycle counting is used for feedback position.

2：This mode is used when the feed axis is switched to the spindle.

This parameter should be set to 0 for the linear feed axis and swivel axis; this parameter is set to 1 for the rotary axis and spindle.

7.4.5 Feedback Position Cycle: Number of Pulses

Parameter number	500015
Parameter name	Feedback position cycle: number of pulses
Data unit	Pulse
Data type	INT4
Valid range	100 to 999999999
Default value	10000
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When feedback position cycle is enabled, this parameter is to set the number of cycle pulses, and generally the number of pulses per revolution of axis.

7.4.6 Encoder Type

Parameter number	500016
Parameter name	Encoder type
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the type of servo axis encoder and the Z pulse signal feedback mode.

0 or 1：Incremental encoder, with Z pulse signal feedback.

2：Incremental linear grating scale, with distance-coded Z pulse signal feedback.

3：Absolute encoder, without Z pulse signal feedback.

4：Reserved.

7.5 Analog Spindle

7.5.1 Working Mode

Parameter number	500010
Parameter name	Working mode
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the working mode of analog spindle.

- 0： No control command is output.
- 1: Incremental position mode.
- 2: Absolute position mode;
- 3： Speed mode.
- 4: Current mode (torque mode)

7.5.2 Logical Axis No.

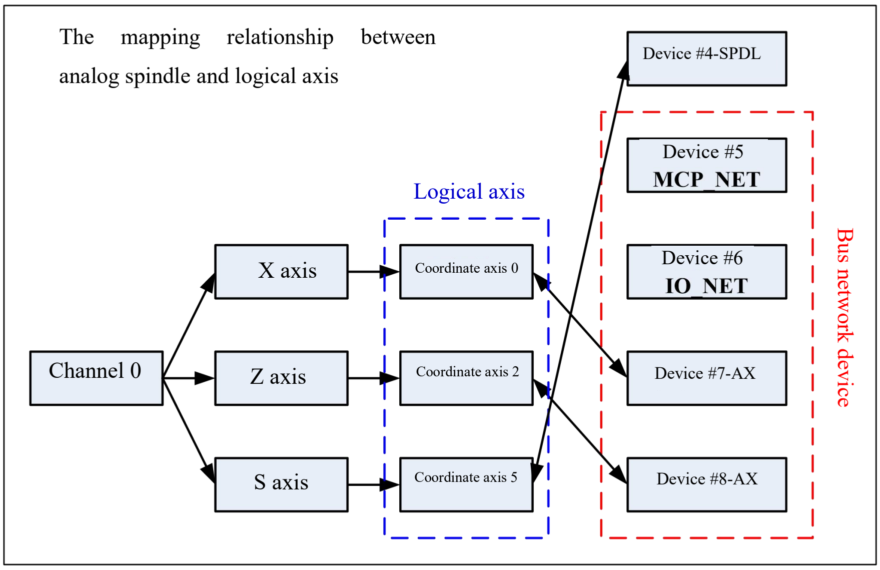
Parameter number	500011
Parameter name	Logical axis No.
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To build a mapping relationship between analog spindle device and logical axis.

-1：No mapping between device and logical axis.

0 to 127：Mapped logical axis number.



7.5.3 Inverted Encoder Feedback Flag

Parameter number	500012
Parameter name	Inverted encoder feedback flag
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0：Encoder feedback is directly input to CNC.

1：Inverted encoder feedback is input to CNC.

When spindle actually rotates in the opposite direction to the spindle feedback speed, this parameter can be set to 1.

7.5.4 Spindle DA Output Type

Parameter number	500013
Parameter name	Spindle DA output type
Data type	INT4
Valid range	0, 1
Default value	0

Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0： The output voltage is 0 to 10V for both the clockwise spindle rotation and the counter clockwise spindle rotation.

1： The output voltage for clockwise spindle rotation varies from that for counter clockwise spindle rotation. The output voltage ranges from -10V to 10V.

7.5.5 Zero Drift Adjustment in Spindle DA Output

Parameter number	500014
Parameter name	Zero drift adjustment in spindle DA output
Data unit	mv
Data type	INT4
Valid range	-1000 to 1000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When there is a zero drift in spindle DA output voltage, the output voltage can be calibrated by this parameter. The set value is subtracted from the actual output voltage of port.

Example

When the voltage of corresponding DA output port is 0.2V which is measured by multimeter (this voltage is normally around 0V) without the spindle speed output, this parameter should be set to 200 to calibrate the output voltage.

7.5.6 Feedback Position Cycle: Number of Pulses

Parameter number	500015
Parameter name	Feedback position cycle: number of pulses
Data unit	Pulse
Data type	INT4
Valid range	100 to 999999999

Default value	4096
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set the number of pulses in spindle encoder feedback cycle, which is generally the number of pulses per revolution of the spindle.

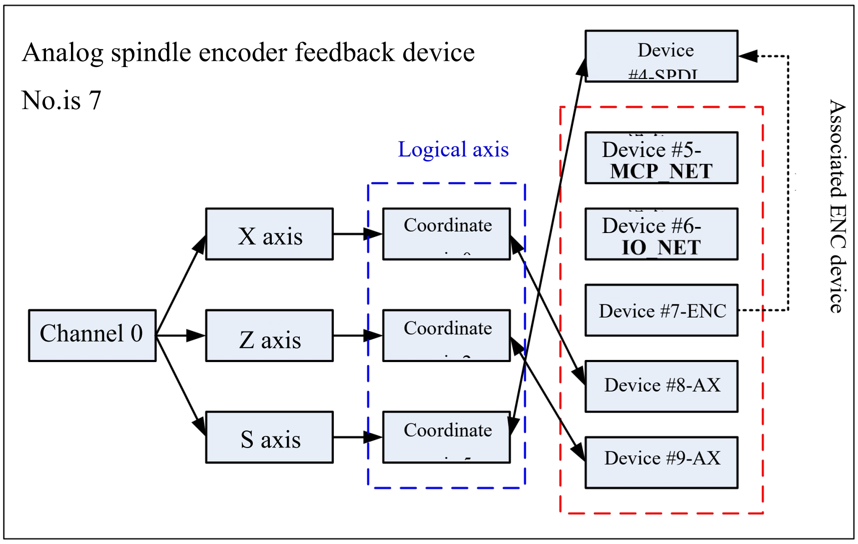
7.5.7 Spindle Encoder Feedback Device No.

Parameter number	500016
Parameter name	Spindle encoder feedback device No.
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When analog spindle feeds back pulse counts of encoder through the axis interface board device of bus IO module, this parameter is used to associate the analog spindle with encoder feedback device. It is generally set to the axis interface board device number in the bus IO module.

This parameter can be set to -1 if there is not spindle encoder feedback.

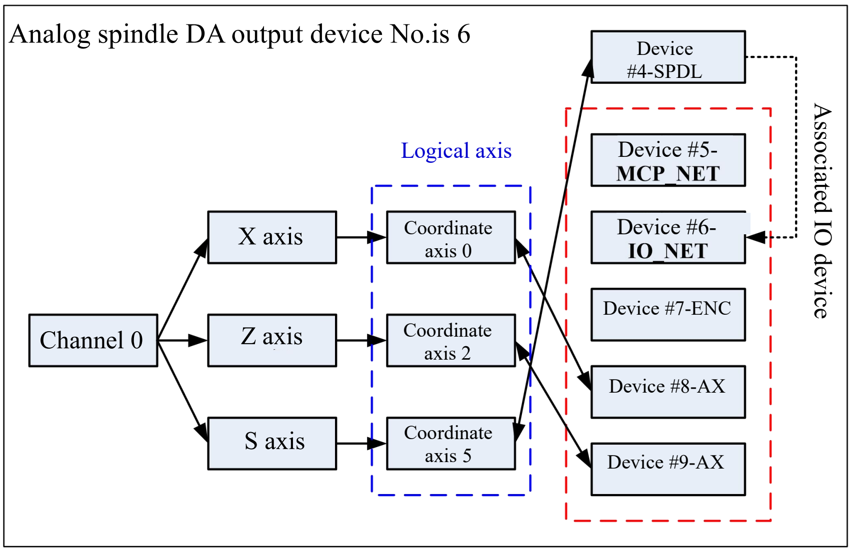


7.5.8 Spindle DA Output Device No.

Parameter number	500017
Parameter name	Spindle DA output device No.
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to associate analog spindle with DA output device, and it is generally set to the IO device number with AD/DA function.



7.5.9 Spindle Encoder Feedback Interface No.

Parameter number	500018
Parameter name	Spindle encoder feedback interface No.
Data type	INT4
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

An axis interface board device contains two encoder feedback interfaces. This parameter is to set the interface number which is used by the current analog spindle.

0：Encoder feedback interface A.

1：Encoder feedback interface B.

7.5.10 Spindle DA Output Interface No.

Parameter number	500019
Parameter name	Spindle DA output interface No.
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Two groups of Y registers (16-bit output) are used for one DA output interface. When IO device number corresponding to spindle DA output is specified, this parameter is to position Y register of DA output, which is the offset relative to the start group number of IO device output point.

Note

Must fully know the wiring of bus IO module and the position (group No.) of Y register of spindle DA output before this parameter is set, to avoid mutual interference between DA output and IO output caused by incorrect parameter setting.

Example

Suppose that DA output device is IO module IO_NET (device #6), of which the start group number of the output point is 10, Y10 to Y13 are used for IO output, and Y14 to Y19 are used for DA output, then analog spindle DA output can be configured as following:

Parm500017 "spindle DA output device No." is set to 6.

When the specified spindle DA output interface number is 2, the position of Y register of DA output is Y14 to Y15.

When the specified spindle DA output interface number is 3, the position of Y register of DA output is Y16 to Y17.

When the specified spindle DA output interface number is 4, the position of Y register of DA output is Y18 to Y19.

8 Parameter of Data Table

8.1 Parameter of Data Table

Parameter No.	700000 to 719999
Parameter name	Numerical value【0】to【19999】
Data type	REAL
Default	0
Access level	ACCESS_USER
Activation	ACT_SAVE

Description

The data table parameter is the retention parameter to record and save large amounts of data, such as logical error compensation table data, straightness compensation table data, and the like.

When the data table parameter is used, the initial position of data in the data table parameter which is the initial parameter number of data table generally needs to be specified.

Note

Different types of CNC may support different maximum numbers of data table parameters. Refer to "Manual of the CNC specifications" for the detail.

9 Brief Classification

9.1 Parameters for Lathe/Milling Machine Users

Parameter No.	Parameter	Description
#010000	Number of workstations	The number of positions where the workpiece is processed. 1 is set for the common lathe and milling machine.
#010001	Cutting type of workstation 1	This group of parameters is to specify the type of each workstation. 0： Milling system; 1： Lathe system; 2： Lathe-milling combo system
#010017	Workstation 1 display axis flag	The axis in each workstation is selectively displayed on human-machine interface of CNC. Axis 0, 2, and 5 are the standard configuration for the lathe, in which situation this parameter is set to 25. 5 is set when there is no C axis. Axis 0, 1, 2, and 5 are the standard configuration for the milling machine, in which situation this parameter is set to 27. 7 is set when there is no C axis.
#010033	Workstation 1 load current display axis customization	According to the real requirements, users can set the load current of which axis in each workstation will display on the human-machine interface. Standard setting for lathes is 0, 2, 5, and for milling machines is 0, 1, 2, 5.
#040001	X Axis No.	To configure the axis number of the feed axis X in the current channel. 0 is set for both the standard lathe and standard milling machine
#040002	Y Axis No.	To configure the axis number of the feed axis Y in the current channel. -1 is set for the standard lathe without Y axis. 1 is set for the standard milling machine.
#040003	Z Axis No.	To configure the axis number of the feed axis Z in the current channel. 2 is set for both the standard lathe and standard milling machine
#040006	C Axis No.	To configure the axis number of the rotary axis C in the current channel. -2 is set for the lathe and milling machine where the spindles are with the C axis function
#040010	Axis No. of spindle 0	This group of parameters is to configure the axis number of each spindle in the current channel. 5 is set for the standard

		lathe and milling machine with a single spindle

9.2 Parameters of Axis Control

Parameter No.	Parameter	Description
#040001 to #040009	Coordinate axis No.	This group of parameters is to configure the axis number with the feed axis in the current channel to achieve the mapping between feed axis and logical axis in the channel. 0 to 127：To specify the number of feed axis in the current channel. -1： The feed axis in the current channel, which doesn't have a mapped logical axis, is an invalid axis. -2： The feed axis in the current channel is reserved for C/S axis switching. The axis type is rotary axis after switching to position mode. -3： The feed axis in the current channel is reserved for C/S axis switching. The axis type is linear axis after switching to position mode.
#040010 to #040013	Axis No. of spindle 0/1/2/3	This group of parameters is to configure the axis number with the spindle in the current channel to achieve the mapping between spindle and logical axis in the channel. 0 to 127： To specify the axis number of spindles in the current channel. -1： The spindle in the current channel, which doesn't have a mapped logical axis, is an invalid axis.
#100001	Axis type	This parameter is to set the type of physical axes which have their own uses. 0：Not set, the default. 1：Linear axis. 2： Swivel axis. The angular coordinate value display is not restricted. 3：Rotary axis. The angular coordinate value within the specified range can be displayed. The modulus of actual coordinate will be displayed if the actual coordinate is beyond the range. 10：Spindle
#100004	Electronic gear ratio numerator [displacement]	For the linear axis, this parameter is to set the distance the machine moves per motor revolution. For the rotary axis, this parameter is to set the angle the machine moves per motor revolution.

#100005	Electronic gear ratio denominator [pulse]	This parameter is to set the number of pulse commands needed per motor revolution.
#100067	Number of pulses per axis revolution	To set the number of pulses the CNC received per motor revolution. That is, the number of pules, which is fed back to CNC from the servo drive or servo motor, is generally the actual number of pulses of position encoder in servo motor.
#100082	Enable shortest path for rotary axis	If this parameter is set to 1, the function of shortest path for the rotary axis is enabled. If a rotary axis is is specified to travel (in absolute command), it will move along the path which is the shortest one to the destination.
#100090	Encoder working mode	This parameter is to set the method to calculate the tracking error of feed axis. 0：The tracking error is calculated by servo drive. CNC directly gets the tracking error from servo drive. 100 (8th bit is set to 1): The tracking error is calculated by CNC. 1000 (12th bit is set to 1): For the linear axis with a super-long travel or the linear axis/rotary axis with a big reduction ratio, if the absolute encoder is used, the count rollover of encoder must be enabled to avoid machine coordinate being lost after the system is restarted which is caused by a long time running of axis in a single direction.

9.3 Parameters of Display Setting

Parameter No.	Parameter	Description
#000018	System time display	On the human-machine interface of CNC, the current system time is 0：Not displayed. 1：Displayed.
#000020	Automatic alarm window display	0：The alarm message window is not automatically displayed. 1：The alarm message window is automatically displayed when a new alarm is issued.
#000022	Enable graphic preview	0: Graphic preview is not performed when loading program; 1: Graphic preview is automatically performed when loading program. The larger the loaded program, the longer the time that needed for preview.
#000023	Feedrate F display mode	On the human-machine interface of CNC, feedrate F is 0：Displayed as the actual feedrate. 1：Dispayed as the command feedrate.

#000024	G code line No. display	G code line number is 0：Not displayed. 1：Displayed only on the edit interface. 2：Displayed only on the program running interface. 3：Displayed on both the edit interface and the program running interface.
#000025	Metric/Inch	The display on human-machine interface is, 0：In inch 1：In metric
#010220 to #010221	Workstation 1 modal G command display customization	The modal G command which is currently used in each workstation can be selectively displayed. This group of parameters is the array parameter, to set the group No. of modal G command which needs to be displayed in each workstation. The group numbers are separated with "." or ",".
#040027	Spindle speed display mode	To set the spindle speed display in each channel. Bit 0 to bit 3 respectively correspond to the spindle speed display of spindle 0 to spindle 3. The setting of 1 represents the command speed, and the setting of 0 represents the actual speed. This parameter takes effect after being set.
#100000	Display axis name	To set the display name of the specified axis on the interface. The parameter No. #101000 is for axis 1. And so on, for other logical axes.
#000026	Number of decimal places for positional value display	To set the number of decimal places for positional value to be displayed, which includes the machine coordinate, workpiece coordinate, remaining feed, and the like.
#000027	Number of decimal places for speed value display	To set the number of decimal places in velocity value to be displayed, including feedrate F, etc.
#000028	Number of decimal places for rotation speed value display	To set the number of decimal places in rotation speed value to be displayed, including spindle speed S, etc.
#000032	Time interval to refresh interface	This parameter is used to set the time interval at which the human-machine interface is refreshed. The unit is us.
#040000	Channel name	To set a name for a channel. For example, the name of channel 0 is set to "CH0", and the name of channel 1 is set to "CH1". The status bar on the human-machine interface can show the name of the current-working channel. When the channel is switched, the channel name shown on the status bar changes accordingly. The common lathe and milling machine only have one channel.

#100199	Display speed integral period	During the axis movement, if the speed is refreshed for each interpolation cycle, the display will be changed too frequently. Therefore, the speed which is operated within the number of speed integral cycle will be averaged and then displayed. This parameter is usually set to 50.

9.4 Parameters of Speed

Parameter No.	Parameter	Description
#040030	Default feedrate in channel	When the feedrate is not specified for the program in the current channel, CNC uses the default feedrate set by this parameter to execute the program.
#040031	Feedrate in dryrun	When CNC is in dryrun mode, the machine adopts the feedrate set by this parameter to execute the program.
#100015	Reference point return high speed	To set the rapid-traverse speed before the reference point switch is pressed during reference point return.
#100016	Reference point return low speed	During reference point return, to set the speed in deceleration positioning after the reference point switch is pressed. The unit of this speed is mm/min for the traverse axis.
#100032	Low-speed jogging speed	To set the moving speed of axis in JOG mode. The unit is mm/min for the traverse axis.
#100033	High-speed jogging speed	To set the rapid traverse speed of axis in JOG mode.
#100034	Maximum rapid traverse speed	To set the maximum speed in G00 rapid traverse positioning (without machining), when the rapid traverse override is the largest.
#100035	Maximum machining speed	To set the allowable maximum speed for machining while CNC is executing machining command (G01, G02, etc.).
#100031	Converted radius of rotary axis	This parameter is to convert the speed of rotary axis from angular speed to linear speed. When 57.3 is set, the speed of rotary axis is 360mm/min which is equivalent to 360degree/min.

9.5 Parameters of Axis Reference Point

Parameter No.	Parameter	Description
#010165	Time lag in reference point return	To set the time required to complete the reference point return of feed axis after Z pulse is found during the reference point return.
#100010	Reference point return mode	The reference point return mode for the CNC can be divided into the following:

		0：Absolute coding When the encoder is turned on, the positional value can be got immediately and be offered to CNC. After the power of CNC is off, the current machine position is not lost. Therefore, the system can search the reference position without moving the machine axis, and the machine runs promptly. 2： + - From the current position, in the direction of reference point return, move to the reference point switch at the high speed of reference point return, and move at the low speed of reference point return in the opposite direction after pressing the reference point switch, until the first Z pulse position is detected by system. Continue moving a distance based on the value set by Parm100013 “offset after reference point return”, after that, the reference point return is done. 3： + - + From the current position, in the direction of reference point return, move to the reference point switch at the high speed of reference point return, and move away from the refence point switch in the opposite direction after pressing the reference point switch, then move back to search Z pulse at the low speed of reference point return until the first Z pulse position is detected by system. Continue moving a distance based on the value set by Parm100013 “offset after reference point return”, after that, the reference point return is done. 4： Distance-coded reference point return 1 When CNC uses the grating scale with distance code, the machine can find out the reference position with moving a short distance, to establish coordinate system. This parameter is set to 4 (reference point return 1) when the direction of grating scale feedback is the same with the direction to return to reference point. 5： Distance-coded reference point return 2 When CNC uses the grating scale with distance code, the machine can find out the reference position with moving a short distance, to establish coordinate system. This parameter is set to 5 when the direction of grating scale feedback is opposite to the direction to return to reference point.

#100011	Reference point return direction	To set the initial moving direction of axis to search the reference point after the reference point return command is issued. -1: Negative direction 1: Positive direction 0: Distance-coded reference point return
#100012	Encoder feedback offset	This parameter is for the absolute motor. Since the absolute encoder will feed back a random position value when it is used for the first time, users can set the parameter to this value, and the current position is the position of the zero point of the machine coordinate system.
#100013	Offset after reference point return	During reference point return, after the system detects the Z pulse, it may not be used as the reference point, but the system will continue to pass a reference point deviation value before setting its coordinates as a reference point. The default setting is 0. Usually, this parameter is one quarter pitch.
#100014	Z pulse shielding angle in reference point return	During the reference point return of machine with incremental displacement measurement feedback system, there may be a difference of the machine movement distance per motor revolution between the two reference point return due to the position deviation of the reference point switch. When the Z pulse signal is too close to the reference point signal, set a mask angle, ignore the Z pulse before and after the reference point signal, and detect the next Z pulse signal, so as to solve the inconsistency in reference point return. Users can set this parameter by viewing the "Z pulse offset" in the indicating value. If it is a screw with a lead of 10, the Z pulse offset value is 9.8 after reference point return, at this time it is likely to affect the return to reference point. The position of half of the screw pitch is most suitable, users can set 180 here to make the screw rotate half a turn more, then the "Z pulse offset" is 4.8 at the time of reference point return.
#100015	Reference point return high speed	During reference point return, to set rapid traverse speed before the reference point switch is pressed.
#100016	Reference point return low speed	During reference point return, to set the speed in deceleration positioning after the reference point switch is pressed.
#100017	Reference point coordinate	This parameter is mainly for distance-coded reference point return which is the nearby reference point return. The location, after the reference point return is done, is not the same for each time. A positional value is fed back when the distance-coded reference point return is performed for the first time, if users set this point to

		machine zero, this parameter can be set to this value. At this time the current position is at zero of machine coordinate system. This parameter is effective for both incremental motor and absolute motor.
#100018	Distance-coded reference point interval	When incremental grating scale measurement system uses distance-coded reference point, this parameter is to set the distance between two adjacent reference point marks.
#100019	Interval deviation	When incremental grating scale measurement system uses distance-coded reference position, this parameter is to set the incremental spacing change of reference point marks.
#100020	Maximum search distance for Z pulse	To set the distance where Z pulse is to be searched. Generally, the search distance for Z pulse is within one lead screw pitch.

9.6 Parameters of MPG Setting

Parameter No.	Parameter	Description
#100042	MPG unit-speed coefficient	To set the maximum speed at which the axis moves as the manual pulse generator is rotated one graduation.
#100043	MPG pulse resolution	This parameter sets the distance the axis travels as the manual pulse generator is rotated one graduation to generate one pulse, when the handwheel override is × 1. If the lathe is in diameter display mode, this parameter is set to 0.5 for X axis, and 1 for Z axis.
#100044	MPG grading speed	The axis may not move to the specified position within the effective time in the handwheel mode. This parameter sets the speed that is generated from the unexecuted pulses which have been sent out to make the axis move.
#100045	MPG buffering period	When the handwheel is rotated within the number of handwheel buffering period, the machine moves at a low speed. When the number of handwheel buffering period is exceeded, the machine can move at the maximum handwheel speed.
#100046	MPG smoothing period	This parameter sets the overshoot distance of the axis after the handwheel is stopped suddenly during its rapid rotation. The larger this parameter is set, the longer the overshoot distance. If this parameter is set to a small value, some pulses which the axis has not used after the

		handwheel is stopped will be discarded.
#100047	MPG maximum speed	This parameter is set for the speed unevenness during rotation of handwheel.

9.7 Parameter of Diameter/Radius Setting in Lathe

Parameter No.	Parameter	Description
#000065	Enable lathe tool diameter display	To set the coordinate value on X axis of lathe tool in the tool table. 0：Display in radius; 1：Display in diameter This parameter is set to 1.
#010001	Workstation 1 cutting type	This parameter group is to specify the type of each workstation. 0: Milling system; 1: Lathe system; 2: Lathe-milling system This parameter is set to 1
#040032	Enable diameter programming	The radial size of workpiece for lathes is usually marked with diameter. For simplicity, the program can be directly documented with the marked diameter. At this point, the diametral variety of a programming unit corresponds to half a unit of movement for the radial feed axis. This parameter is to select the programming mode in the current channel. 0: Programming in radius; 1: Programming in diameter
#100043	MPG pulse resolution	This parameter sets the travel distance per pulse generated from one graduation of manual pulse generator when the handwheel override is × 1. This parameter is set to 0.5

9.8 Parameter of Acceleration/Deceleration Control

Parameter No.	Parameter	Description

#040069	Motion planning mode	There are two motion planning modes for small line interpolation. 0: Spline interpolation and acceleration/deceleration jerk time constant in rapid traverse are valid, and acceleration/deceleration jerk time constant in machining is invalid. 1: Spline interpolation is invalid. Acceleration/deceleration jerk time constant in rapid traverse and acceleration/deceleration jerk time constant in machining are valid.
#100036	Acceleration/deceleration time constant in rapid traverse	The acceleration/deceleration time constant in rapid traverse indicates the time that the linear axis goes from 0 to 1000mm/min or from 1000mm/min to 0 in rapid traverse (G00), as well as the rotary axis goes from 0 to 1000rad/min or 1000rad/min to 0. This parameter determines the acceleration in rapid traverse. The greater the time constant of acceleration/deceleration in rapid traverse, the lower the acceleration and deceleration.
#100037	Acceleration/deceleration jerk time constant in rapid traverse	To set the jerk of axis in rapid traverse (G00). The greater the time constant, the more gently the acceleration changes.
#100038	Acceleration/deceleration time constant in machining	Time constant of acceleration and deceleration in machining indicates the time that the linear axis goes from 0 to 1000mm/min or from 1000mm/min to 0, as well as the rotary axis goes from 0 to 1000rad/min, or from 1000rad/min to 0 in the machining. This parameter determines the acceleration in machining. The greater the time constant of acceleration and deceleration in machining, the slower the acceleration/ deceleration.
#100039	Acceleration/deceleration jerk time constant in machining	To set the jerk of axis in machining (G01, etc.). The greater the time constant, the more gently the acceleration changes.
#100040	Acceleration time constant in threading	Time constant of acceleration in threading is the time taht the axis goes from 0 to 1000mm/min in threading. This parameter determines the acceleration of specified axis in threading. The greater the time constant of acceleration in threading, the slower the acceleration.

#100041	Deceleration time constant in threading	Time constant of deceleration in threading is the time that the axis goes from 1000mm/min to 0 in threading. This parameter determines the deceleration of specified axis in threading. The greater the time constant of deceleration in threading, the slower the deceleration.

9.9 Parameter of Bus Control Panel

Parameter No.	Parameter	Description
#500010	MCP type	To specify the type of bus control panel. 0：Invalid 1：8A type control panel 2：8B type control panel 3：8C type control panel
#500011	MCP MPG No.	To specify the MPG number of bus control panel. When multiple external handwheels are mounted with CNC, this parameter is set to distinguish the input signal of each MPG
#500012	Initial group No. of input point	To set the position of input signal of bus control panel in register X
#500013	Number of input point groups	To mark the number of input signal groups of bus control panel
#500014	Initial group No. of output point	To set the position of output signal of bus control panel in register Y
#500015	Number of output point groups	To mark the number of output signal groups of bus control panel.
#500017	MPG magnification coefficient	When this parameter is set to a value larger than 0, the number of handwheel pulses is input to CNC after being multiplied by the MPG magnification coefficient.
#500018	Band switch code type	0：The band switch uses 8421 code. 1：The band switch uses grey code.

9.10 Parameter of Bus IO Module

Parameter No.	Parameter	Description
#500012	Initial group No. of input point	To set the position of input signal of bus IO module in X register.

#500013	Number of input point groups	This parameter is used to mark the number of input signal groups of bus IO module.
#500014	Initial group No. of output point	To set the position of output signal of bus IO module in Y register.
#500015	Number of output point groups	This parameter is used to mark the number of output signal groups of bus IO module.

9.11 Parameter of Servo Axis

Parameter No.	Parameter	Description
#500010	Working mode	To set the default working mode of servo axis in bus network. 1: Incremental position mode. 2: Absolute position mode. 3: Speed mode.
#500011	Logical axis No.	To set the mapping relationship between servo axis device and logical axis. -1: No mapping between the device and the logical axis. 0 to 127: Mapped logical axis number.
#500012	Inverted encoder feedback flag	0: Encoder feedback is directly input to CNC. 1: Inverted encoder feedback is input to CNC.
#500014	Enable Feedback position cycle	0: Cycle count is not used for feedback position. 1: Cycle count is used for feedback position. 2: This mode is used when feed axis servo drive is switched to spindle drive.
#500015	Number of feedback position cycle pulses	When the feedback position cycle is enabled, this parameter is to set the number of cycle pulses, generally, is set to number of pulses per axis revolution.
#500016	Encoder type	To specify the type of encoder for the servo axis and the Z pulse signal feedback mode. 0 or 1: Incremental encoder, with Z pulse signal feedback. 2: Incremental linear grating ruler, with distance-coded Z pulse signal feedback 3: Absolute encoder, without Z pulse signal feedback 4: Reserved.