HNC-8 Series CNC Controller

Parameter Manual

V2.4

Content

1 Overview

1.1 Assigning Parameter Number

The table below lists the numbers (ID) of all types of parameters for HNC-8 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 for HNC-8 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	Workshop	ACCESS_USER
2	Machine manufacturer	ACCESS_MAC
3	CNC manufacturer	ACCESS_NC
4	Administrator	ACCESS_RD
5	Operator	ACCESS_VENDER

1.4 Activation

HNC-8 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.

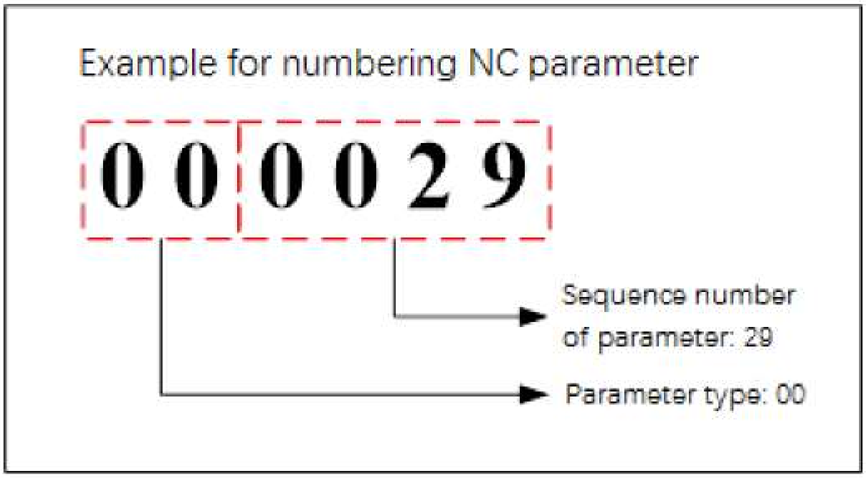
ACT_PWR：After the modified parameter is saved, restart the CNC to activate it.

2 NC Parameter

Explanation on NC parameter number:

Bit 0 to bit 3: sequence number of NC parameter

Bit 4 to bit 5: 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	100 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. User and machine debugger 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 1000
Default value	200
Access level	ACCESS_RD
Activation	ACT_PWR
Milling/Turning	Milling, turning

Description

HNC-8 adopts two-level PLC mode, 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.

Note

This parameter is generally configured only once before the machine leaves the factory, and must be set to a multiple of 10. User and machine debugger cannot freely change this parameter.
After this parameter is changed, reboot the NC system.

Example

If this parameter is set to 100000, the precision of angle calculation for CNC 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.

Note

This parameter is generally configured only once before the machine leaves the factory, and must be set to a multiple of 10. User and machine debugger cannot freely change this
parameter.
After this parameter is changed, reboot the NC system.

Example

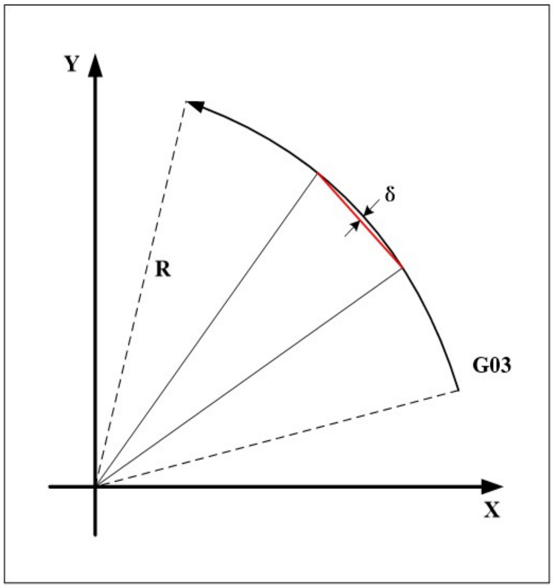
If this parameter is set to 100000, the precision of length calculation for NC system will be 0.000001mm, that is, the resolution reaches to a nanometer level. At this point, the CNC can handle the programming instruction of nanometer level.

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 arch height (or approximation error) between theoretical circular path and actual interpolation path. The approximation error is relevant to interpolation cycle T, feedrate F and arc radius R. When R and T are certain, the approximation error grows with F increasing.
HNC-8 limits F to keep the approximation error in an allowable scope.

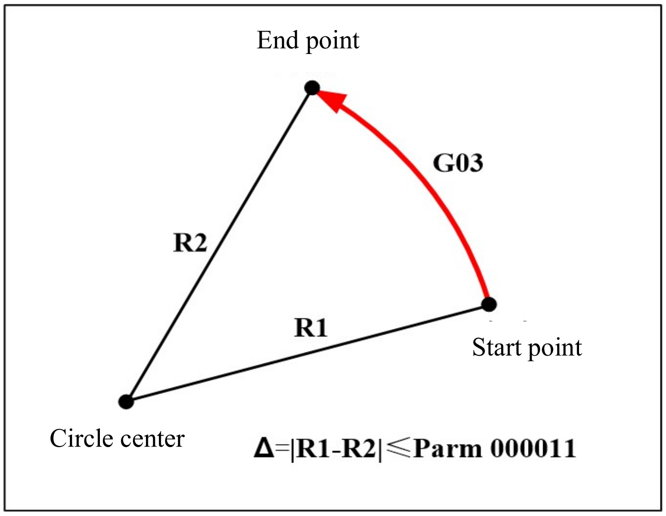


2.6 Tolerance of Arc Radius

Parameter number	000011
Parameter name	Tolerance of arc radius
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 the center to start point and the distance(radius) from the 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 Tool Axis Selection

Parameter number	000012
Parameter name	Tool 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 Enable G00 Interpolation

Parameter number	000013
Parameter name	Enable G00 interpolation
Data type	BOOL

Valid range	0/1
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.

2.9 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_PWR
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 can be 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

On the graphic interface, the last programmed path is: When loading program, the system will preview the graphic of program by default. When the program is large, it will take mre 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	Display mode of G code line
Data type	INT4
Valid range	0 to 3
Default value	3
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	INT4
Valid range	0 to 6
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, remaining feed 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	INT4
Valid range	0 to 6
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 Rotary Speed Value

Parameter number	000028
Parameter name	Number of decimal places for rotary speed value
Data type	INT4
Valid range	0 to 6
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE

Milling/Turning	Milling, turning

Description

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

2.18 Language

Parameter number	000029
Parameter name	Language
Data type	INT4
Valid range	0 to 99
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Milling, turning

Description

To set the display language, achieving switching between Chinese interface and English interface.

0： Chinese.

1： English.

2.10 Screensaver Wait Time

Parameter number	000030
Parameter name	Screensaver wait time
Data unit	us
Data type	INT4
Valid range	1000 to 100000
Default value	80000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling, turning

Description

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

2.20 Time Interval to Refresh Interface

Parameter number	000032
Parameter name	Time interval to refresh interface
Data unit	us
Data type	INT4
Valid range	1000 to 100000
Default value	80000
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling, turning

Description

This parameter is used to set the time interval at which the human-machine interface is refreshed. The unit is us.

2.21 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, tool magazine and other system data may not be saved.

2.22 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_NOW
Milling/Turning	Milling, turning

Description

Use binary to indicate 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.

2.23 Name of Root Directory of Online Disk Server

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

Description

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

2.24 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_NOW
Milling/Turning	Turning, milling

Description

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

2.25 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_NOW
Milling/Turning	Turning, milling

Description

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

2.26 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_NOW
Milling/Turning	Turning, milling

Description

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

2.27 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_NOW
Milling/Turning	Turning, milling

Description

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

2.28 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_NOW
Milling/Turning	Turning, milling

Description

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

2.29 User Name of Online Disk Server Access

Parameter number	000041
Parameter name	User name of online disk server access
Data type	STRING[8]
Valid range	0 to 65535
Default value	admin
Access level	ACCESS_USER
Activation	ACT_NOW
Milling/Turning	Turning, milling

Description

User name of online disk server access.

2.30 Password of Online Disk Server Access

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_NOW
Milling/Turning	Turning, milling

Description

The password to access the online disk server.

2.31 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_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

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

2.32 Online Disk Mapping Type

Parameter number	000044
Parameter name	Online disk mapping type
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR

Milling/Turning	Turning, milling

Description

Network sharing mode:

0: Network

1: FTP

2: Cloud

Users need to set this parameter to 0, 1, 2 when using the network or FTP function.

2.33 Local IP Address

Parameter number	000045 to 000048
Parameter name	Local IP address
Data type	INT4
Valid range	0 to 255
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set IP address of CNC system. The four parameters are the four address bits respectively.

2.34 Local Port Number

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

Description

This number 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.

2.35 Whether to Turn on Network

Parameter number	000050
Parameter name	Whether to turn on network
Data type	INT4
Valid range	0 to 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.

2.36 Serial Port Hardware Type

Parameter number	000051
Parameter name	Serial port hardware type
Data type	INT4
Valid range	0 to 5
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: Serial port function is turned off;

1: Serial port application and RFID tool life management are turned on;

3: Support digital display MPG.

2.37 Serial Port Number

Parameter number	000052
Parameter name	Serial port number
Data type	UNIT1
Valid range	0 to 5

Default value	0
Access level	ACCESS_VENDER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

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

0 to 99 represent the ordinary serial ports COM1 to COM100;

100 to 199 represent the USB

2.38 Length of Sent and Received Data Bit

Parameter number	000052
Parameter name	Length of sent and received data bit
Data type	UNIT1
Valid range	5 to 8
Default value	8
Access level	ACCESS_VENDER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of data bit during DNC communication, in the unit of bit.

2.39 Stop Bit

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

Description

To set the length of stop bit during DNC communication, in the unit of bit.

2.40 Parity Bit

Parameter number	000055
Parameter name	Parity bit
Data type	UINT1
Valid range	1 to 2
Default value	0
Access level	ACCESS_VENDER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To set the length of parity bit during DNC communication, in the unit of bit.

0: There is not parity bit;

1: Odd check bit;

2: Even check bit.

2.41 Baud Rate

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

Description

To set the data transmission rate during DNC communication. The system side and the PC side must be set to the same baud rate.

2.42 Static IP/Dynamic IP

Parameter number	000057
Parameter name	Static IP/dynamic IP
Data type	INT4
Valid range	0 to 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

2.43 Arc Intersection Tolerance

Parameter number	000058
Parameter name	Arc 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 the previous line segment and the starting point of the next 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.

2.44 Threshold of Distance between Two Concyclic Arc Centers

Parameter number	000059
Parameter name	Threshold of distance between two concyclic arc centers
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.

2.45 Number of Data-saved Tools

Parameter number	000060
Parameter name	Number of data-saved tools
Data type	INT4
Valid range	0 to 999
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.

2.46 T Command Tool Offset Tool Compensation Number Digits

Parameter number	000061
Parameter name	T command tool offset tool compensation number 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 tool offset number.

2.47 Enable Tool Wear Accumulation

Parameter number	000064
Parameter name	T command tool offset tool compensation number digits
Data type	BOOL
Valid range	0 to 1
Default value	1
Access level	ACCESS_VENDER

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.

2.48 Enable Lathe Tool Diameter Display

Parameter number	000065
Parameter name	Enable lathe tool diameter display
Data type	INT4
Valid range	0 to 1FF
Default value	0
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.

2.49 Tolerance of Deviation between Theoretical and actual semicircle centers

Parameter number	000066
Parameter name	Tolerance of deviation between theoretical and actual semicircle centers
Data type	REAL
Valid range	0 to 0.1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the allowable value of arc center error correction, that is, this parameter value is the maximum error between the actual diameter and the diameter set by the program of semicircle. Set this parameter to 0 to turn off this function, and the setting of 0.1 means that the maximum semicircle diameter error is 0.1.

2.50 Maximum Number of Interpreted Blocks in 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 interpreted in a cycle of interpreter.

2.51 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 to 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.

2.52 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_SAVE
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.

2.53 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_NC
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 completed.

2.54 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_NC
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.

2.55 Internet Server IP Address 1 to Internet Server IP Address 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.

2.56 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_VENDER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

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

2.57 Local Default Gateways 1 to 4

Parameter number	000085
Parameter name	Local default gateways 1 to 4

Data type	UINT1
Valid range	0 to 255
Default value	0
Access level	ACCESS_VENDER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is used to set the default gateway.

2.58 Data Uploading Switch

Parameter number	000090
Parameter name	Data uploading switch
Data type	BOOL
Valid range	0 to 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 iCloud of HCNC.

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

2.59 Subnet Masks 1 to 3

Parameter number	000091 to 000094
Parameter name	Subnet masks 1 to 3
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 the local default gateway.

2.60 Cloud Communication Mode

Parameter number	000095
Parameter name	Cloud communication mode
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 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.

2.61 Remote File Transfer Authorization

Parameter number	000096
Parameter name	Remote file transfer authorization
Data type	INT4
Valid range	0 to 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.

2.62 Display Coordinate Selection

Parameter number	000102

Parameter name	Display coordinate selection
Data type	INT4
Valid range	0 to 5
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to set the coordinate type of display column in the machining interface.

0: Machine actual

1: Machine command

2: Workpiece actual

3: Workpiece command

4: Remaining feed

5: Relative actual

2.63 Trigonometric Function Selection, 0: Radian, 1: Angle

Parameter number	000349
Parameter name	Trigonometric function selection, 0: radian, 1: angle
Data type	BOOL
Valid range	0 to 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;

2.64 G16 Pole Mode Selection

Parameter number	000349
Parameter name	G16 pole mode selection
Data type	INT4
Valid range	0 to 2
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: HCNC mode, the radius pole is specified as the programming start point.

2.65 FTP Sharing Mode

Parameter number	000352
Parameter name	FTP sharing mode
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
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 is enabled.

2.66 HMI Type

Parameter number	000354
Parameter name	HMI type
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 mode of workpiece zero coordinate.

1: Normal coordinate mode;

1: Fine coordinate mode.

2.67 Threshold of Insufficient Free Space Prompt of System Disk

Parameter number	000355
Parameter name	Threshold of insufficient free space prompt of system disk
Data type	INT4
Valid range	5 to 100
Default value	30
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 30 is set, the prompt occurs when the free space of system disk is less than 30%.

2.68 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.

2.69 Empty MDI Program After Exit MDI

Parameter number	000358
Parameter name	Empty MDI program after exit MDI

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

Description

0: MDI program is not emptied after users exit MDI.

1: Program is emptied after users exit MDI.

2.70 Default Permission

Parameter number	000359
Parameter name	Default permission
Data type	INT4
Valid range	0 to 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.

2.71 Disable Program Word Segment Display

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

Description

0: The program word segment display is enabled;

1: The program word segment display is disabled.

2.72 Displayed Coordinate Columns on Main Interface

Parameter number	000362
Parameter name	Displayed coordinate columns on main interface
Data type	UINT1
Valid range	0 to 1
Default value	0
Access level	ACCESS_VENDER
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.

2.73 Small Character is Displayed

Parameter number	000363
Parameter name	Small character is displayed
Data type	UINT1
Valid range	0 to 1
Default value	0
Access level	ACCESS_VENDER
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0: Normal display;

1: Display in small character.

2.74 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

2.75 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: Glass machine tool

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: Glass machine tool

2.76 Smart Switch

Parameter number	000370
Parameter name	Smart switch
Data type	INT4
Valid range	0X0 to 0XFFFF
Default value	0XFFFF
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

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

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

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

Bit 2: Fault recording function switch.

Bit 3: None.

Bit 4: Screw load diagram switch.

Bit 5: Process 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 15: Current/power switch.

2.77 Sampling Start M Code of Servo Adjusting

Parameter number	000373
Parameter name	Sampling start M code of servo adjusting
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.

2.78 Sampling End M Code of Servo Adjusting

Parameter number	000374
Parameter name	Sampling end M code of servo adjusting
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.

2.79 HMI Display Parameter

Parameter number	000376
Parameter name	HMI display parameter
Data type	INT4
Valid range	0X0~0X11
Default value	16
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to control the HMI interface display, and set by bit.

Bit 0: Whether to turn on the increasing or reducing of display lines according to the change of the axis number on the main interface program module;

0: on; 1: off.

Bit 1: The coordinate name display is

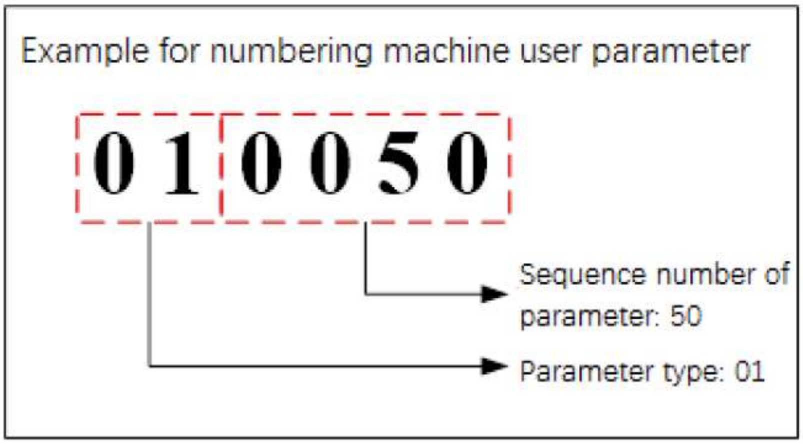
0: not consistent with Fanuc; 1: consistent with Fanuc.

3 Machine User Parameter

Explanation on number of machine user parameter:

Bit 0 to bit 3: sequence number of machine user parameter.

Bit 4 to bit 5: 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 2
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 010008
Parameter name	Cutting type of channel 1 to channel 8
Data type	INT4
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 Selection Mark

Parameter number	010009 to 010016
Parameter name	Selection marks of channel 1 to channel 8
Data type	INT4
Valid range	0~15
Default value	1 or 0
Access level	Machine manufacturer
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

Multiple spindles and their drive feed axes may work at a workpiece-clamping position, that is a workstation corresponds to more than one channels.

This group of parameters is effective after being set. Bit 0 to bit 7 represent the selection marks of channel 0 to channel 7 respectively. While a channel is being configured with a workstation, the specified bit of channel selection mark of the workstation needs to be set to 1.

Note

This group of parameters is input and displayed in decimal.

A workstation corresponds to more than one channels. However, a channel can only be assigned to a workstation.

The maximum number of workstations and maximum number of channels vary with CNC system types. Refer to the HNC-8 CNC specifications manual for details.

Example

A workpiece is processed in two workstations. Workstation 1 consists of channel 0 (for drilling and boring) and channel 1 (for turning); workstation 2 consists of channel 2 (for milling). Then the parameters can be configured as below:

Parm010009 “Channel selection mark of workstation 1” is set to 3. That is, the bit 0 and bit 1 are set to 1.

Parm010010 “Channel selection mark of workstation 2” is set to 4. That is, the bit 2 is set to 1.

3.4 Displayed Axis Mark in Channel

Parameter number	010017/010018 to 010031/ 010032
Parameter name	Displayed axis marks in channel 1 to channel 8【1】【2】
Data type	HEX4
Valid range	0x0 to 0xFFFFFFFF
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 according to the actual needs.

This group of parameters is effective after being set. Bit 0 to bit 31 of "Display axis mark of station【1】" represent the selection mark of axis 0 tp axis 31 respectively. When the system supports 64 axes at maximum, bit 0 to bit 31 of the extension parameter "Display axis mark of station【2】" represent the selection mark of axis 32 to axis 63 respectively. While a displayed axis is configured with a workstation, the specified bit of mark of the displayed axis 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 HNC-8 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 "mark of displayed axis in workstation 1 【1】" is set to 0x75 (It is input in hexadecimal, and bit 0, 2, 4, 5, 6 are set to 1)

3.5 Customization of Load-current-displayed Axis in Channel

Parameter number	010033 to 010040
Parameter name	Customization of load-current-displayed axis in channel 1 to channel 8
Data type	ARRAY
Valid range	0 to 127
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

According to the actual requirements, users can set the load current of which axis in each workstation will display on the human-machine interface.

This group of parameters is the array parameter to specify the number of axis in each workstation the load current of which can be displayed. Separate the entered the axis numbers with commas (,) or periods (.).

Note

The array parameter supports up to 8 data to be input simultaneously, and its value ranges from 0 to 127.

Example

Workstation 1 consists of 5 axes: three feed axes (coordinate axis 0, 1, 2), and two spindles (coordinate axis 8, 9).

If the load current of feed axis in workstation 1 needs to be shown on the interface, Parm010033 “customization of load-current-displayed axis in workstation 1” should be set to “0,1,2”.

If the load current of spindle in workstation 1 needs to be shown on the interface, Parm010033 “customization of load-current-displayed axis in workstation 1” should be set to “8,9”.

If the load current of all axes in workstation 1 needs to be shown on the interface, Parm010033 “customization of load-current-displayed axis in workstation 1” should be set to “0,1,2,8,9”.

3.6 Coordinate Axis is Displayed Dynamically

Parameter number	010041
Parameter name	Coordinate axis is displayed dynamically
Data type	BOOL
Valid range	0/1
Default value	0
Access level	ACCESS_NC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

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

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

1：The coordinate of spindle is not shown in the velocity mode, but shown after switched to the position mode.

Note

Only when logical axis number of spindle exists in PARM010017/010018 “displayed axis mark in workstation” is this parameter effective.

3.7 Tool Measuring Gage Type

Parameter number	010042

Parameter name	Tool measuring gage 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 gage.

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.

3.8 Remove Manual Intervention When Warning Occurs During POST

Parameter number	010043
Parameter name	Remove manual intervention When warning occurs during POST
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_USER
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0: When a warning occurs in the process of POST (Power On Self Test), press any key to skip the warning.

1: Manual intervention is disabled.

3.9 Circular Speed Strategy of Radius Compensation

Parameter number	010044
Parameter name	Circular speed strategy of radius compensation
Data type	INT4
Valid range	0 to 19
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 = (Arc radius after radius compensation/Arc radius before radius compensation) *Programmed speed.

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

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

3.10 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

3.11 Radius Compensation Interference Control

Parameter number	010046
Parameter name	Radius compensation interference control
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When an interference of the radius compensation occurs,

0：Running stops with an alarm.

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

3.12 Number of Blocks Where Radius Compensation Interference Check is Performed

Parameter number	010047
Parameter name	Number of blocks where radius compensation interference check is performed
Data type	INT4
Valid range	2 to 9
Default value	2
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the number of programming blocks where the interference check is performed. The setting ranges from 2 to 9. For example, if this parameter is set to 4, then three programming blocks will be checked.

3.13 Maximum Number of Axis Allowed by Machine

Parameter number	010049
Parameter name	Maximum number of axis allowed by machine
Data type	INT4
Valid range	0 to 128
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, control instruction of this axis will not be output.

3.14 Total of PMC and Coupling Slave Axis

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 types of CNC systems, the maximum number of control axes in motion control channel may be different. Refer to the HNC-8 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.

3.15 Number of PMC and Coupling Slave Axes

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 (axis 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 axis” is set to 5

Parm010051 “Number of PMC and coupling salve axis【0】” is set to 5.

Parm010052 “Number of PMC and coupling slave axis【1】” is set to 6.

Parm010053 “Number of PMC and coupling slave axis【2】” is set to 7.

Parm010054 “Number of PMC and coupling slave axis【3】” is set to 2.

Parm010055 “Number of PMC and coupling slave axis【4】” is set to 3.

Parm010056 “Number of PMC and coupling slave axis【5】” to Parm010066 “Number of PMC and coupling slave axis【15】”are not effective. Then set them to -1.

3.16 Type of Drilling-tapping Canned Cycle

Parameter number	010083
Parameter name	Type of drilling-tapping canned cycle
Data type	INT4
Valid range	0 to 3
Default value	2
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：HNC8

1：SYNTEC

2：MITSUBISHI

3：FANUC

3.17 Peck Tapping/ Deep-hole Tapping

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

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

Description

To set the tapping mode.

0： Peck tapping. The retracted 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.

3.18 Retract Distance in G73 (mm)

Parameter number	010085
Parameter name	Retract distance in G73 (mm)
Data type	REAL
Valid range	0 to 9999.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_RST
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 HCNC CNC system.

3.19 Retract Distance in G83 (mm)

Parameter number	010086
Parameter name	Retract distance in G83 (mm)
Data type	REAL
Valid range	0 to 9999.0
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 HCNC CNC system.

3.20 Retract Distance in G74/G84 (mm)

Parameter number	010087
Parameter name	Feed distance in G74/G84 (mm)
Data type	REAL
Valid range	0 to 9999.0
Default value	0.1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Milling

Description

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

3.21 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_RST
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-

3.22 T Command Control Mode

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

Description

To set the tool-change mode with T command, and tooling 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.

3.23 Whether to Wait When User Macro Variable is Used

Parameter number	010090
Parameter name	Whether to wait when user macro variable is used
Data type	HEX4
Valid range	0 to FF
Default value	0x0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Milling

Description

To set whether to wait when user macro variable is set and used in binary.

Bit 0

0: Write user macro variable without wait.

1: Write user macro variable with wait.

Bit 1

0: Read user macro variable without wait.

1: Read user macro variable with wait.

3.24 Enable #500 to #999 to be User Macro Variables

Parameter number	010091
Parameter name	Enable #500 to #999 to be user macro variables
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 macro variables from #500 to #900 are used as the user macro variables.

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

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

3.25 Coordinate of Axis C is not Refreshed in Velocity Mode

Parameter number	010092
Parameter name	Coordinate of axis C is not refreshed in velocity mode
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set whether the coordinate of spindle is refreshed in velocity mode.

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

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

3.26 Straight line of Extremely Short Length Filtering

Parameter number	010096
Parameter name	Straight line of extremely short length filtering
Data type	REAL
Valid range	0.0 to 0.005

Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To filter the miscellaneous points in processing. When the length of the line in processing is less than the set value of this parameter, the line and the previous line will be combined into a line segment for processing.

3.27 Incremental Filtering of Reverse Line (mm)

Parameter number	010097
Parameter name	Straight line of extremely short length filtering
Data type	REAL
Valid range	0.0 to 0.005
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used to set the maximum length of the abnormal reverse block in the trajectory of the filtering program. When the length of the abnormal reverse line segment is less than the set value, the system automatically filters the line segment to ensure the smoothness of the trajectory and speed.

3.28 Whether G02/G03 is Converted to G01 when lack of parameters

Parameter number	010098
Parameter name	Whether G02/G03 is converted 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 mode when there is no center or radius specified in G02/G03 programming.

0: Prompt with alarm

1: Converted to G01

3.29 Whether Enable Big/Small Tool Magazine Management Interface

Parameter number	010099
Parameter name	Whether 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

3.30 New Function of Turning Center

Parameter number	010103
Parameter name	New function of turning center
Data type	INT4
Valid range	0/1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0x1: The interface modification F/S function is turned on, that is, the machining configuration column is displayed;

0x2: The coordinate system superimposition function is effective;

0x4: G97 command is not read ahead;

0x8: Determine the finishing direction of G71;

0x10: Switch to other states in G96 mode, whether to maintain the spindle speed at constant linear speed;

0x20: M99 workpiece counting is turned on;

0x80: Turn on the T command of the lathe gang tooling;

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 superimposed on 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. The mask can be superimposed. If the F/S function and coordinate system superimposition function are required, the mask can be filled with 0x3.

3.30 New Function Debugging Parameter

Parameter number	010104
Parameter name	New function debugging parameter
Data type	INT4
Valid range	0 to FF
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

0x1: Turn on the G68 spatial rotation function

0x2: Turn on the one-click tool lifting function

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.

0x8: When it is 1, G91G52 superimposes zero point; when it is 0, G91G52 does not superimpose zero point

0x20: In the windows simulation version, the biip.dat file is generated

0x40: In the windows simulation version, when an interpolation point is generated, the interpolator is stopped, and the interpolator is not executed until the interpolation point is taken out by the interface

0x80: When this point is in effect, M99 will not produce exact stop, that is to say, the programming speed will not drop suddenly, but it will cause continuous operation problems in the single-block canned cycle.

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, and there is a problem of missing floating-point numbers

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

0X400: When this point is effective, regardless of scanning G0 or G1 in any line, the execution will move the program position with 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.

3.32 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 span in all management modes exceeds the maximum life span.

3.33 Internal Inhibition Mask of Machine Protected-Area

Parameter number	010110
Parameter name	Internal inhibition mask of machine protected-area
Data type	INT4
Valid range	0 to 63
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, tool magazine and the like, to avoid a machine damage caused by misoperation. 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 “external inhibition mask of machine protected-area” must be set to 0. Internal inhibition mask and external inhibition mask cannot be enabled at the same time.

3.34 External Inhibition Mask of Machine Protected-Area

Parameter number	010111
Parameter name	External inhibition mask of machine protected-area
Data type	INT4
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 protected areas on which the external inhibition is used, this parameter will be set to 6. Meanwhile, the bit of internal inhibition must be set to 0 for the two protected areas.

3.35 Positive/Negative Boundary of Machine Protected-Area

Parameter number	010112 to 010147
Parameter name	Positive/Negative boundary of machine protected-areas【0】to【5】along axis X, Y, Z
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 protected area along X-axis, Y-axis and Z-axis.

Note

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

Example

A machine needs to be configured with one machine protected-area with external inhibition, the following parameters must be set.

Parm010110 “Number of machine protected-area” is set to 1 (machine protected-area【0】takes effect);

Parm010111 “Property of machine protected-area” is set to 1 (decimal input, and bit 0 is set to 1);

Parm010112 “Negative boundary along Axis X for machine protected-area【0】” is set to 10.5;

Parm010113 “Positive boundary along Axis X for machine protected-area【0】” is set to 40.2;

Parm010114 “Negative boundary along Axis Y for machine protected-area【0】” is set to 10.0;

Parm010115 “Positive boundary along Axis Y for machine protected-area【0】” is set to 60.0;

Parm010116 “Negative boundary along Axis Z for machine protected-area【0】” is set to 15.0;

Parm010117 “Positive boundary along Axis Z for machine protected-area【0】” is set to 55.0.

3.36 F Speed Display in Feed per Revolution

Parameter number	010160
Parameter name	F speed display in feed per revolution
Data unit	BOOL
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.

3.37 Error Range of Multiple Repetitive Cycle (0-1mm)

Parameter number	010161
Parameter name	Error range of multiple repetitive cycle (0-1mm)
Data unit	BOOL
Data type	REAL
Valid range	0.1 to 1.1
Default value	0.0
Access level	ACCESS_MAC
Activation	ACT_RST
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.

3.37 Fanuc Command Support

Parameter number	010164
Parameter name	Fanuc command support
Data unit	
Data type	INT4
Valid range	0X0~0XFFFF
Default value	0X0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

0X2: The G code is edited in Fanuc mode;

0X1: The G code is edited in HCNC mode

3.39 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

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.

3.40 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	2000
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.

3.41 Enable Exact Stop Check at Corner in G64

Parameter number	010169
Parameter name	Enable exact stop check at corner in G64
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 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 modal G64.

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.

3.42 M Code Corresponding to G1007 to M Code Corresponding to G1020

Parameter number	010170 to 010183
Parameter name	M code corresponding to G1007 to M code corresponding to G1020
Data type	INT4
Valid range	0 to 100
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.

3.34 Customization of Modal G Command Display

Parameter number	010220 to 010224
Parameter name	Customization of modal G command display in channel
Data type	ARRAY
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 parameter 【1】 and parameter【2】in customization of modal G command display, 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.

3.44 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.

3.45 User Parameter

Parameter number	010300 to 010499
Parameter name	User parameter【0】to【199】

Data type	INT4
Valid range	-500000 to 500000
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【0】to user parameter【199】correspond to P0 to P199 in PLC.

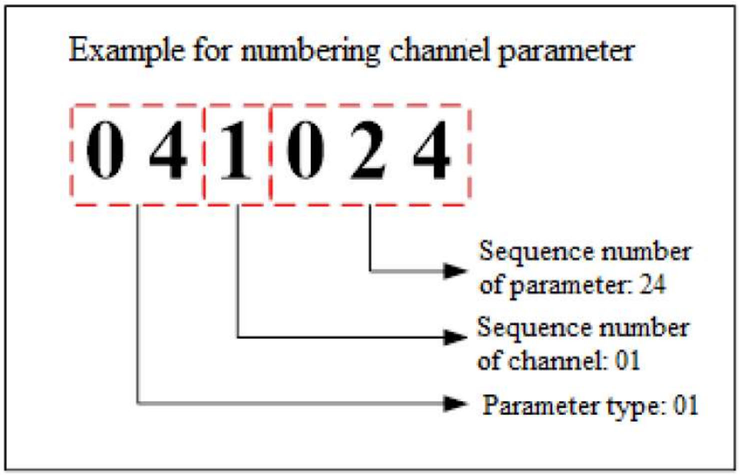
4 Channel Parameter

Explanation on Channel parameter number:

Bit 0 to bit 2: sequence number of channel parameter.

Bit 3: sequence number of channel

Bit 4 to bit 5: parameter type. The type of channel parameter is 04.



Note: Channel 0 is taken as an example to illustrate the following channel parameters (bit 3 of their numbers are 0).

4.1 Channel Name

Parameter number	040000
Parameter name	Channel name
Data type	STRING
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 HNC-8 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	INT4
Valid range	-2 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

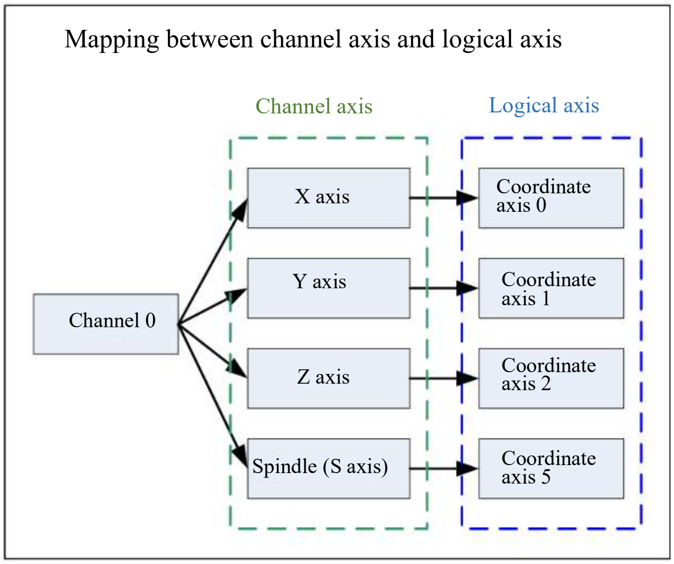
Description

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.



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

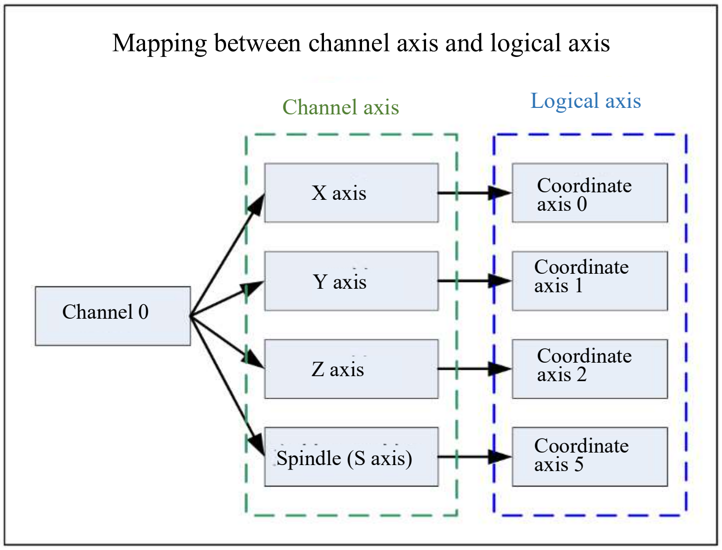
Parameter number	040010 to 040013
Parameter name	Axis numbers of spindles 0, 1, 2, 3
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

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 coordinate axes
Data type	STRING
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 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
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 in HNC-8. 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: Progarmming name of spindle 1.

Parm040025: Progarmming name of spindle 2.

Parm040026: Progarmming 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 Max. Emergency Stop Deceleration Time

Parameter number	040029
Parameter name	Max. emergency stop 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 Dryrun

Parameter number	040031
Parameter name	Feedrate in dryrun
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 dryrun mode, the machine will use the feedrate set by this parameter to execute the program.

Refer to HNC-818 User Manual for details.

4.11 Enable Diameter Programming

Parameter number	040032
Parameter name	Enable diameter programming
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_RD

Activation	ACT_SAVE
Milling/Turning	Turning

Description

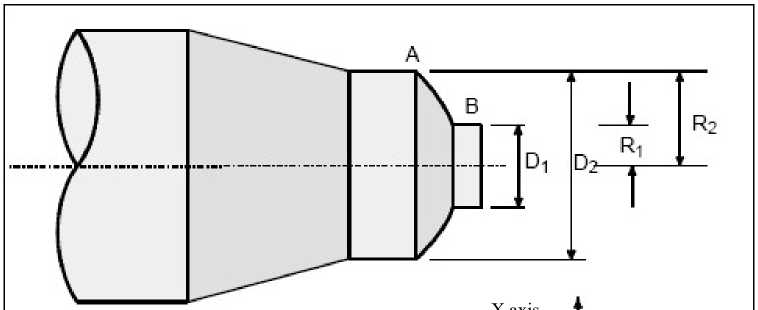
The radial size of the workpiece is usually dimensioned in diameter. Therefore, the program can be documented directly with the marked diameter for convenience. At that point, a programmed unit in diameter is equivalent with the distance the radical feed axis travels in half a unit.

0X0: Programming in radius.

0X1: Programming in diameter.

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

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



D1, D2: diameter programming

R1, R2; radius programming

Note

This parameter takes effect only when Parm10001 “Machine type of workstation 1” is set to 1 (lathe).

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

4.12 Enable UVW Incremental Programming

Parameter number	040033
Parameter name	Enable 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.

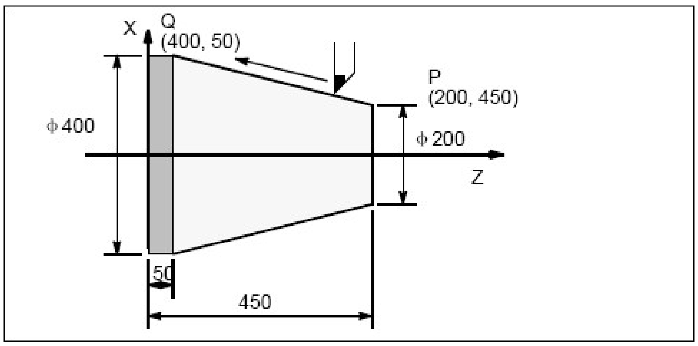
Note

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

Example

Parm040032 “enable diameter programming” is set to 1.

Parm040033 “enable 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 Enable Chamfer

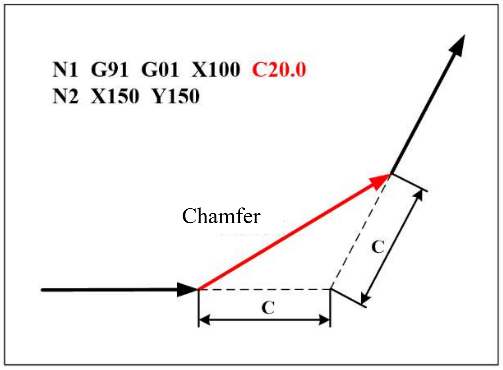
Parameter number	040034
Parameter name	Enable chamfer
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

HNC-8 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 chamfer function is disabled.

1：The chamfer function is enabled.



4.14 Enable Angle Programming

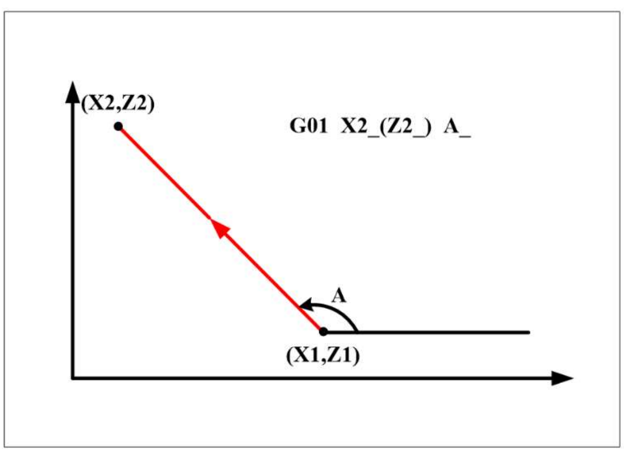
Parameter number	040035
Parameter name	Enable angle programming
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

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

0：The programming with the angle is disabled.

1：The programming with the angle 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 Enable Angle Programming

Parameter number	040036
Parameter name	Enable angle programming
Data type	HEX4
Valid range	0 to FF
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Shielding bit of multiple repetitive cycle options:

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

0x0002: The alarm of the 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	0.1 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 “time constant of rapid traverse acceleration/deceleration” 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 Time Constant Coefficient of Handwheel Acceleration/Deceleration Jerk

Parameter number	040038
Parameter name	Time constant coefficient of handwheel acceleration/deceleration jerk
Data type	REAL
Valid range	0.1 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 "time constant of rapid traverse acceleration/deceleration jerk", calculate the handwheel acceleration or 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 Velocity Coefficient

Parameter number	040039
Parameter name	Handwheel machining velocity 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: Right-angle 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 Circular Deceleration Radius

Parameter number	040042
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

To set the maximum radius value of the arc along which the speed is reduced. When radius of programmed arc is smaller than the setting of this parameter, the cutting feed is performed at the speed set by the parameter 040043; when the radius of programmed arc is larger than the setting of this parameter, the deceleration control is not performed. If 0 is set, the circular deceleration function will not work.

4.22 Circular Deceleration Speed

Parameter number	040043
Parameter name	Circular deceleration speed
Data type	REAL
Valid range	0.0 to 99999.0
Default value	0.0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the target speed of the arc along which the deceleration is performed. When the radius of programmed arc is smaller than the value set by the parameter "circular deceleration radius" (040042), the cutting feed is performed at the speed set by this parameter; when the radius of programmed arc is larger than the value set by the parameter "circular deceleration radius" (040042), the deceleration control is not performed. If 0 is set, the circular deceleration function will not work.

4.23 Default Feed/Rev 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.

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 Single Point Deceleration Angle Factor

Parameter number	040047
Parameter name	Single point deceleration angle factor
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 Single Point Deceleration Angle Factor

Parameter number	040048
Parameter name	Single point deceleration angle factor
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	0X0~0X12
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, inflection point criterion takes effect.

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

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

Bit 1

0: Curvature radius calculation mode 1, default mode.

1: The 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. Magnification for Feedrate

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

Description

This parameter is to limit the magnification of feedrate override.

4.30 G05.1Q0 Circular Deceleration Radius

Parameter number	040051
Parameter name	G05.1Q0 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

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 radius value. In G05.1Q0 modal, if the arc radius in the program is less than this set value, the speed reduction of the arc is performed.

4.31 G05.1Q0 Circular Deceleration Speed

Parameter number	040052
Parameter name	G05.1Q0 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 G05.1Q1 Circular Deceleration Radius

Parameter number	040053
Parameter name	G05.1Q1 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

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 radius value. In G05.1Q1 modal, if the arc radius in the program is less than this set value, the speed reduction of the arc is performed.

4.33 G05.1Q1 Circular Deceleration Speed

Parameter number	040054
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

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 G05.1Q1 modal, it sets speed at the time of circular deceleration.

4.34 G05.1Q2 Circular Deceleration Radius

Parameter number	040055
Parameter name	G05.1Q2 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

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 radius value. In G05.1Q2 modal, if the arc radius in the program is less than this set value, the speed reduction of the arc is performed.

4.35 G05.1Q2 Circular Deceleration Speed

Parameter number	040056
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

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 G05.1Q2 modal, it sets speed at the time of circular deceleration.

4.36 G05.1Q3 Circular Deceleration Radius

Parameter number	040057
Parameter name	G05.1Q3 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

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 radius value. In G05.1Q3 modal, if the arc radius in the program is less than this set value, the speed reduction of the arc is performed.

4.37 G05.1Q3 Circular Deceleration Speed

Parameter number	040058
Parameter name	G05.1Q3 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 G05.1Q3 modal, it sets speed at the time of circular deceleration.

4.39 Technology Parameter Consolidating of 2nd Machining Code

Parameter number	040067
Parameter name	Technology parameter consolidating of 2nd machining code
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Milling

Description

0: not merge the trajectory fitting optimization command in the loaded second machining code

1: merge the trajectory fitting optimization command in the loaded second machine code

4.40 Motion Planning Mode

Parameter number	040069
Parameter name	Motion planning mode
Data type	INT4

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

Description

There are motion planning modes for small line interpolation in HNC-8. Only one motion plan mode is in the version 1.1.

4.41 Upper Limit of Small Line's Length

Parameter number	040070/040140/040160/040180
Parameter name	Upper limit of small line's length
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.

4.42 Minimum Corner of Corner Smoothing (Degree)

Parameter number	040071/040141/040161/040181
Parameter name	Minimum corner of corner smoothing
Data unit	Degree
Data type	REAL
Valid range	0 to 180
Default value	160
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

During continuous small lines interpolation, users may reduce the local speed based on the actual programmed path. When the sharpness of the contour cusp needs to be highlighted, the speed at the top of corner must be reduced to zero. This parameter is to set the value of this angle. If the machined angle is less than this value, exact stop will be performed; if the machined angle is greater than this value, other determinations will be used to reduce the speed of this angle.

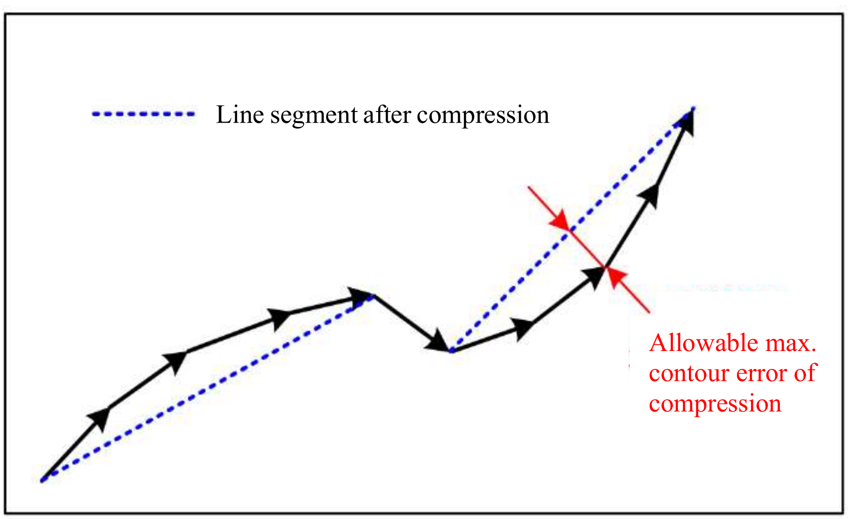
Set the largest directed angle between two small lines which can be compressed and merged to 45 degrees, then this parameter is set to 45.

4.43 Allowable Contour Error of Small Line Programmed-path

Parameter number	040073/040143/040163/040183
Parameter name	Allowable contour error of small line programmed-path
Data unit	mm
Data type	REAL
Valid range	0.001 to 5
Default value	0.005
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

During continuous small lines interpolation, users may compress and merge the small lines based on the actual programmed path. This parameter is to set the allowable contour error between the small lines to be compressed and merged and the original programmed path. When the contour error exceeds the value set by this parameter, the small lines will not be compressed.



4.44 Deceleration Factor for Corner

Parameter number	040074/040144/040164/040184
Parameter name	Deceleration factor for corner
Data type	INT4
Valid range	1 to 150
Default	20
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

For the broken lines that the degree of corner is greater than the minimum interior angle of smooth corner (010071) (the circular transition is performed for the feed at corner), the corner deceleration factor can control the deceleration rate at the corner. The smaller the value is set, the lower the deceleration rate at the corner, the smaller the roundness of the corner, and the higher the theoretical contour accuracy. However, the time for milling at the corner becomes longer.

4.45 Lower Limit of Small Line's Length

Parameter number	040075/040145/040165/040185
Parameter name	Lower limit of small line's length
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

During the spline interpolation, the spline smoothing (fitting) needs to be performed on the small lines based on the actual programmed path. This parameter is to set the shortest length of the small line where the smoothing can be performed. If the length of the small line is less than the set value, the small line will not be smoothed.

4.46 Arc is Discreted to Straight Line

Parameter number	040079/040149/040169/040189
Parameter name	Arc is discreted to straight line

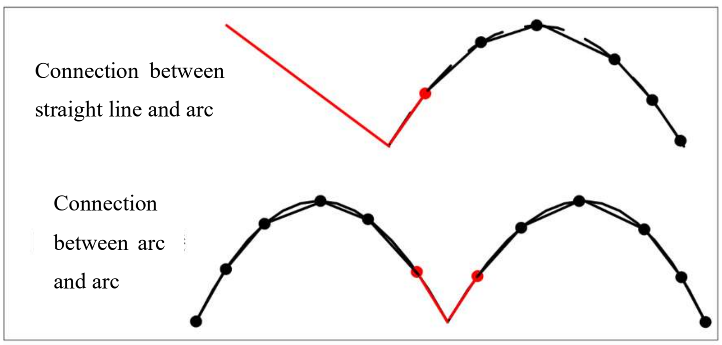
Data type	BOOL
Valid range	0/1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Through the setting of this parameter, the arc can be discretized into micro lines which are connected. Then the connection between arc and straight line or arc and arc is equivalent to the connection of straight line to straight line, and therefore the corner deceleration can be used to handle the velocity at the joint.

0：The function that arc is discretized into straight line is disabled.

1：The function that arc is discretized into straight line is enabled.

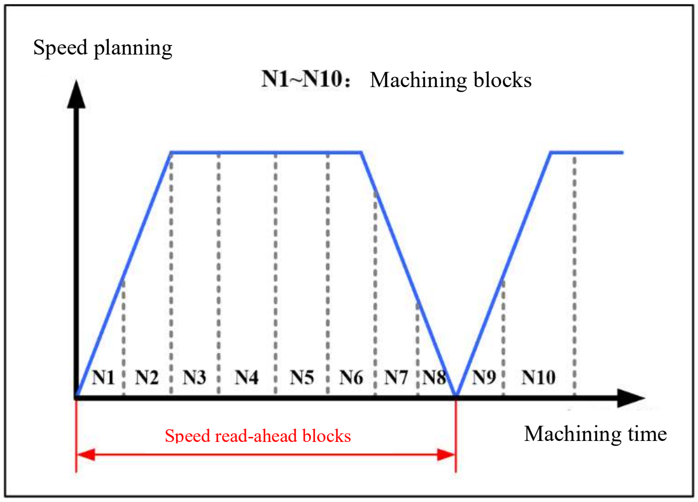


4.47 Number of Read-ahead blocks

Parameter number	040080/040150/040170/040190
Parameter name	Number of read-ahead blocks
Data type	INT4
Valid range	0 to 2000
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. Therefore, the shape error at the corner of the workpiece or on the arc of small radius can be reduced, and the machining speed can be increased.



4.48 Number of Command Speed Smoothing Cycles

Parameter number	040082/040152/040172/040192
Parameter name	Number of command speed smoothing cycle
Data type	INT4
Valid range	0 to 50
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Through the smooth transition of command speed, the fluctuation of velocity can be reduced to keep the speed stable in the high-speed control. Therefore, the vibration in the machining can be reduced, and the efficiency can be improved. This parameter is to set the number of command speed smoothing cycles. The more stable the speed, the less the vibration of machine, however, the machining accuracy is reduced. When this parameter is set to 0, this function is disabled.

4.49 Centripetal Acceleration

Parameter number	040084/040154/040174/040194
Parameter name	Centripetal acceleration
Data type	REAL
Valid range	1.0 to 100000.0
Default value	1000.0
Access level	ACCESS_NC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

From Newton's second law, a force causes the object to generate an acceleration rate. The acceleration rate produced by a centripetal force is the centripetal acceleration which is a physical quantity to indicate the changing rate for the velocity direction of circular movement. The centripetal acceleration only changes the speed direction but not the magnitude of speed. Maximum centripetal acceleration is used to set the maximum value of the centripetal acceleration.

4.50 Time Coefficient of Machining Acceleration/Deceleration

Parameter number	040086/040156/040176/040196
Parameter name	Time constant coefficient of machining acceleration/deceleration
Data type	REAL
Valid range	0.01 to 100.0
Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST

Description

This parameter is to set the acceleration rate of axis for 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 axis parameter "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 Time Coefficient of Machining Jerk

Parameter number	040087/040157/040177/040197
Parameter name	Time Coefficient of Machining Jerk
Data type	REAL
Valid range	0.01 to 100.0

Default value	1.0
Access level	ACCESS_NC
Activation	ACT_RST

Description

To set the jerk for 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 Preprocessing Smoothing OFF

Parameter number	040088/040158/040178/040198
Parameter name	Preprocessing smoothing OFF
Data type	BOOL
Valid range	0/1
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

0：Prespocessing smoothing is enabled.

1：Prespocessing smoothing is disabled.

Note

This parameter must be set to 1; otherwise, the programming coordinate error may occur.

4.53 Max. Angle threshold for Collinearity Determination

Parameter number	040089/040159/040179/040199
Parameter name	Max. angle threshold for collinearity determination

Data type	REAL
Valid range	0 to 180
Default value	0.017
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

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

Note

When upgrading the version, be sure to set this parameter to the default value. If this parameter is 0, it will cause the rigid tapping exception.

4.54 Rotary Axis No. of Cylindrical Interpolation

Parameter number	040090
Parameter name	Rotary axis No. of cylindrical interpolation
Data type	INT4
Valid range	-1 to 127
Default value	5
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

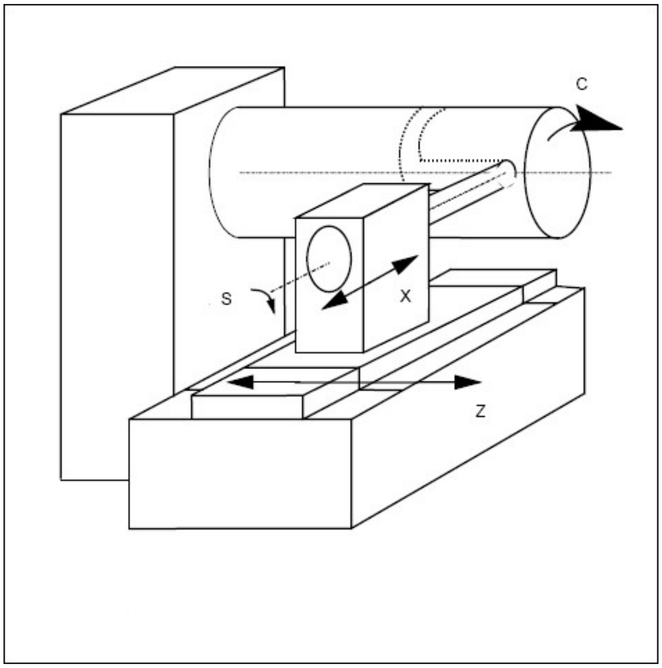
Cylindrical surface interpolation converts the movement amount of the rotary axis specified with angle to the movement amount along the circumference, and performs linear interpolation and circular interpolation between the expanded cylindrical surface and other axes. It is mainly used for groove milling.

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.



Description

When performing cylindrical interpolation, users also need to pay attention to programming restrictions. For details, please refer to the Interpolation Function Chapter of "HNC-8 Programming Manual".

4.55 Linear Axis No. of Cylindrical Interpolation

Parameter number	040091
Parameter name	Linear axis No. of cylindrical interpolation
Data type	INT4
Valid range	-1 to 127
Default value	5
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 Parallel Axis No. of Cylindrical Interpolation

Parameter number	040092
Parameter name	Parallel axis No. of cylindrical interpolation
Data type	INT4

Valid range	-1 to 127
Default value	5
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 unit	BOOL
Data type	INT4
Valid range	0 to 7
Default value	0
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.

Description

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

4.58 Linear Axis No. in Polar Coordinate Interpolation

Parameter number	040095
Parameter name	Linear Axis No. in Polar Coordinate Interpolation
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”.

4.59 Rotary Axis No. in Polar Coordinate Interpolation

Parameter number	040096
Parameter name	Rotary Axis No. in Polar Coordinate Interpolation
Data type	INT4
Valid range	-1 to 127
Default value	5
Access	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 parameter is to set the number of rotary axis in polar coordinate interpolation.

4.60 Imaginary Axis No. in Polar Coordinate Interpolation

Parameter number	040097
Parameter name	Imaginary Axis No. in Polar Coordinate Interpolation
Data type	INT4
Valid range	-1 to 127
Default value	1
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 parameter is to set the axis number of the imaginary axis in polar coordinate interpolation.

4.61 Linear axis Coordinate of Rotation Center in Polar Coordinate Interpolation

Parameter number	040098
Parameter name	Linear axis Coordinate of Rotation Center in Polar Coordinate Interpolation
Data type	REAL
Valid range	-21474.0 to 21474.0
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 parameter is to set the axis number of rotation center of polar coordinate interpolation on linear axis.

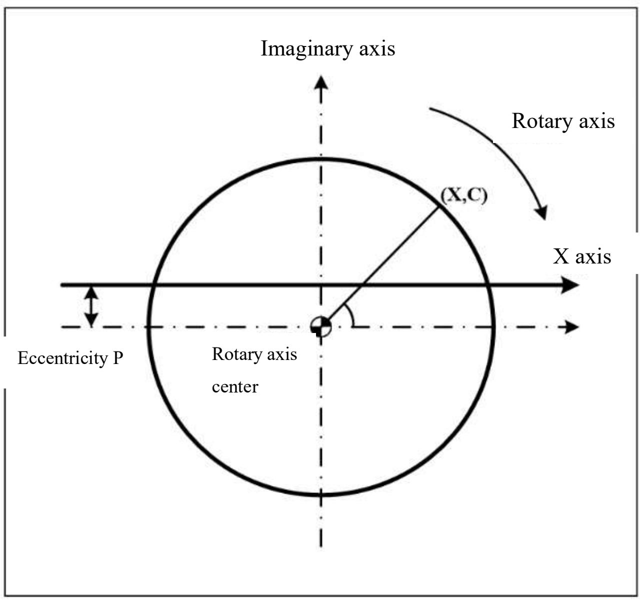
4.62 Imaginary Axis Eccentricity in Polar Coordinate Interpolation

Parameter number	040099

Parameter name	Imaginary Axis Eccentricity in Polar Coordinate Interpolation
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

Description

During polar coordinate 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

0: Passing poles is not processed

1: Alarm

2: Pass poles along the linear axis

3: Rotary axis rotates 180 degrees at the pole

4.64 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 to 1
Default value	0
Access level	ACCESS_VENDER
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.

4.65 G61/G64 Modal Setting at Power on

Parameter number	040107
Parameter name	G61/G64 Modal Setting at Power on
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 of system, the default is G61 exact stop or G64 continuous cutting.

0: G61 exact stop.

1: G64 continuous cutting.

4.66 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 performed.

1: Z pulse search is not performed.

Note

This parameter is only for incremental motors, and must be set to 0 for absolute motors. Both 0 and 1 set by this parameter can work on incremental motors.

4.67 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 reference point return has been done by G28 at the speed specified by G01,

0: Reference point return is performed by G28 at the speed specified by G01.

1: Reference point return is performed by G28 at the speed specified by G00.

4.68 G28 Intermediate Point Valid Once

Parameter number	040112
Parameter name	G28 Intermediate Point Valid Once
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 (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 once.

4.41 Any Line Mode Selection

Parameter number	040113
Parameter name	Any line mode selection
Data type	INT4
Valid range	0 to 3
Default value	1
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 with 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 without 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.

4.42 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 in place simultaneously.

4.71 M Code in Any Line

Parameter number	040115 to 040124
Parameter name	M code in any line
Data type	ARRAY
Valid range	/
Default value	/
Access level	ACCESS_NC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set identifiable M code in the any line mode. This parameter is of BYTE[8] type, which supports up to 8 numbers to be input, and each number is separated by "," or ".". Only the M code appearing in the parameter can be restored. Up to 10 groups of M codes can be grouped, 8 M codes in each group.

Example

Group 1 of M code is configured as 3,4,5, indicating that M3, M4, and M5 is a group of identifiable M codes.

4.72 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 magazine number 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.

4.73 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.

4.74 Starting Tool Number

Parameter number	040127
Parameter name	Starting tool number

Data type	INT4
Valid range	0 to 1000
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the starting number of tool of magazine in the tool compensation table in the current channel, which is used with the channel parameter “Number of tools”.

4.75 Number of Tools

Parameter number	040128
Parameter name	Number of tools
Data type	INT4
Valid range	0 to 1000
Default value	99
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 3, 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.

4.76 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_VENDER
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

0：Tool life function is disabled.

1：Tool life function is enabled.

2：Tool life grouping function is turned on, and the T command specifies the tool group number. The tool management selects the tool whose life doesn't run out from the specified group, 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: Suppose the ignored number of tool life management is 100, when users want to specify tool group 1, and the command T101 is below the ignored number of tool life management, the T code is regarded as a normal T code.

3: Turn on the tool life grouping function, and the T command specifies the tool number. 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.

4.77 Limit and Tool Protection in Protected Area

Parameter number	040131
Parameter name	Limit and Tool Protection in Protected 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.

4.78 Distance from axis Z Tool Protection to Negative Limit

Parameter number	040132
Parameter name	Distance from axis Z Tool Protection to Negative Limit
Data type	REAL
Valid range	0~100.0
Default value	0

Access level	ACCESS_MAC
Activation	ACT_NOW
Milling/Turning	Turning, milling

Description

This parameter is to set the distance between tool protection of Z axis and negative limit. When the function of limit and tool protection (040131) in protected area is enabled, 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.

4.79 T Command Life Management Ignore 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 tool ignore number plus tool can be used to call the tool.

For example, if the tool ignore number is 100, T101 is the used call the first group of tool in the current channel.

4.80 Clear Synchronization after Channel Reset

Parameter number	040134
Parameter name	Clear synchronization after channel reset
Data type	INT4
Valid range	0 to 1
Default value	100
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

4.81 Length Compensation of Milling Tool Group

Parameter number	040135
Parameter name	Length compensation of milling tool group
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.

4.82 Radius Compensation of Milling Tool Group

Parameter number	040136
Parameter name	Radius compensation of milling tool group
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.

4.83 G05.1Q1 Preprocessing Smoothing OFF

Parameter number	040158
Parameter name	G05.1Q1 preprocessing smoothing OFF
Data type	BOOL
Valid range	0/1
Default value	1

Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The preprocessing smoothing

0: is not turned off;

1: is turned off.

Note

This parameter is 1 at factory, and must be set to 1 when preprocessing smoothing is not needed; otherwise the machine motion will be affected.

4.84 G05.1Q2 Preprocessing Smoothing OFF

Parameter number	040178
Parameter name	G05.1Q2 preprocessing smoothing OFF
Data type	BOOL
Valid range	0/1
Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The preprocessing smoothing

0: is not turned off;

1: is turned off.

Note

This parameter is 1 at factory, and must be set to 1 when preprocessing smoothing is not needed; otherwise the machine motion will be affected.

4.85 G05.1Q2 Preprocessing Smoothing OFF

Parameter number	040198
Parameter name	G05.1Q2 preprocessing smoothing OFF
Data type	BOOL
Valid range	0/1

Default value	1
Access level	ACCESS_NC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The preprocessing smoothing

0: is not turned off;

1: is turned off.

Note

This parameter is 1 at factory, and must be set to 1 when preprocessing smoothing is not needed; otherwise the machine motion will be affected.

4.86 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_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the offset of the user analog input point in the channel.

4.87 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_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the offset of the user analog output point in the channel.

4.88 Enable Oblique Axis Control

Parameter number	040310
Parameter name	Enable oblique axis control
Data type	BOOL
Valid range	0/1
Default value	0
Access level	ACCESS_NC
Activation	ACT_RST
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.

4.89 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)

4.90 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)

4.91 Slope Angle

Parameter number	040313
Parameter name	Slope 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.

4.92 Program Number of Tool Radius Compensation

Parameter number	040330
Parameter name	Program number of tool radius compensation
Data type	REAL
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.

4.93 Program Number of Tool Length Compensation

Parameter number	040331
Parameter name	Program number of tool length compensation
Data type	REAL
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.

4.94 Program Number of G5X

Parameter number	040332
Parameter name	Program number of G5X
Data type	REAL
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.

4.95 Program Number of M00

Parameter number	040333
Parameter name	Program number of M00
Data type	REAL
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.

4.96 Master Axis No. of Electronic Gearbox

Parameter number	040340
Parameter name	Master axis number of electronic gearbox
Data type	INT
Valid range	0 to 64
Default value	0
Access level	ACCESS_MAC
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.

4.97 Slave Axis No. of Electronic Gearbox

Parameter number	040341
Parameter name	Slave axis number of electronic gearbox
Data type	INT
Valid range	0 to 64
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

This parameter is used to set the default number of the slave axis of the first group of electronic gearbox: set the logical axis number of the slave axis when the axis synchronization is set.

4.98 Master Axis Proportion of Electronic Gearbox

Parameter number	040342
Parameter name	Master axis number of electronic gearbox
Data type	REAL
Valid range	1.00 to 1000.00
Default value	1.00
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

The default proportion of the first group of electronic gearbox master axis: the numerator of the transmission ratio between master axis and slave axis.

4.99 Slave Axis Proportion of Electronic Gearbox

Parameter number	040343
Parameter name	Slave axis number of electronic gearbox
Data type	REAL
Valid range	1.00 to 1000.00
Default value	1.00
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

The default proportion of the first group of electronic gearbox slave axis: the denominator of the transmission ratio between master axis and slave axis.

4.100 Synchronization Type of Electronic Gearbox

Parameter number	040344
Parameter name	Synchronization type of electronic gearbox
Data type	INT

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

Description

The synchronization type of the first group of electronic gearbox:

1: Master and slave axes are synchronous in command.

2: Master and slave axes are synchronous in actual feedback.

4.101 Electronic Gearbox Phase ON

Parameter number	040345
Parameter name	Electronic gearbox phase ON
Data type	INT
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

The first group of 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.

4.102 Electronic Gearbox Phase Angle

Parameter number	040346
Parameter name	Electronic gearbox phase angle
Data type	INT
Valid range	0.00 to 360.00
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

The default phase angle of the first group of electronic gearbox: to set the phase angle difference at the synchronization of the master and slave axes.

4.103 Master Axis No. of Spindle Bearing

Parameter number	040361
Parameter name	Master axis No. of spindle bearing
Data type	INT
Valid range	0 to 64
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

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, at this time, the speed of spindle 2 is equal to the command speed of spindle 2 plus the bearing speed of spindle 2. The bearing speed of spindle 2 needs to be synchronized with the command speed of spindle 1, which is the spindle bearing function.

This parameter is used to set the default logical axis number of the master axis when using the bearing tapping.

4.104 Slave Axis No. of Spindle Bearing

Parameter number	040362
Parameter name	Slave axis No. of spindle bearing
Data type	INT
Valid range	0 to 64
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

This parameter is used to set the default logical axis number of the slave axis when using the bearing tapping.

4.105 Spindle Bearing Ratio

Parameter number	040363
Parameter name	Spindle bearing ratio
Data type	INT
Valid range	-1 to 1
Default value	1
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

This parameter is to set the directions of slave and master axes when using the bearing 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, alarm will be generated. The master axis must be spindle, and the slave axis must be the feed spindle.

4.106 Spindle Acceleration Coefficient of PWM Spindle Rigid Tapping

Parameter number	040364/040369/040374/040379
Parameter name	Spindle acceleration coefficient of PWM spindle rigid tapping
Data type	REAL
Valid range	0.00 to 1000.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is to set the acceleration coefficient of spindle. It can be calculated by system via the “spindle acceleration/deceleration option in the “servo adjusting”.

4.107 Spindle Deceleration Coefficient of PWM Spindle Rigid Tapping

Parameter number	040365/040370/040375/040380
Parameter name	Spindle deceleration coefficient of PWM spindle rigid tapping
Data type	REAL

Valid range	0.00 to 1000.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is to set the deceleration coefficient of spindle. It can be calculated by system via the "spindle acceleration/deceleration option in the "servo adjusting".

4.108 Spindle Delay Time of PWM Spindle Rigid Tapping

Parameter number	040366/040371/040376/040381
Parameter name	Spindle delay time of PWM spindle rigid tapping
Data type	REAL
Valid range	0.00 to 1000.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is to set the spindle delay time at the time of following tapping mode. It can be calculated by system via the "spindle acceleration/deceleration option in the "servo adjusting".

4.109 Speed Compensation Coefficient of PWM Spindle Rigid Tapping

Parameter number	040367/040372/040377/040382
Parameter name	Speed compensation coefficient of PWM spindle rigid tapping
Data type	REAL
Valid range	0.00 to 500.00
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning

Description

This parameter is to set the spindle speed coefficient at the time of following tapping. It can be calculated by system via the "spindle acceleration/deceleration option in the "servo adjusting".

4.110 Speed Compensation Coefficient of PWM Spindle Rigid Tapping

Parameter number	040368/040373/040378/040383
Parameter name	Speed compensation coefficient of PWM spindle rigid tapping
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 the "spindle acceleration/deceleration option in the "servo adjusting".

4.111 Initial Direction of Tool (X)

Parameter number	040400
Parameter name	Initial direction of tool (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 is to set the initial direction of tool. If the initial direction of tool is parallel with the X axis, this parameter is set to 1.0.

4.112 Initial Direction of Tool (Y)

Parameter number	040401
Parameter name	Initial direction of tool (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, this parameter is set to 1.0.

4.113 Initial Direction of Tool (Z)

Parameter number	040402
Parameter name	Initial direction of tool (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, this parameter is set to 1.0.

4.114 Pole Angle Range

Parameter number	040407
Parameter name	Pole angle range
Data type	REAL
Valid range	0.00 to 360.0
Default value	0.00
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning

Description

The pole area is defined by the angle, that is, for a conical area with the pole axis as the axis and the angle as the cone angle, what is in this area is the pole range. When the tool passes near the pole, since the direction of the rotary axis is uncertain, it will overspeed if there is no corresponding handling.

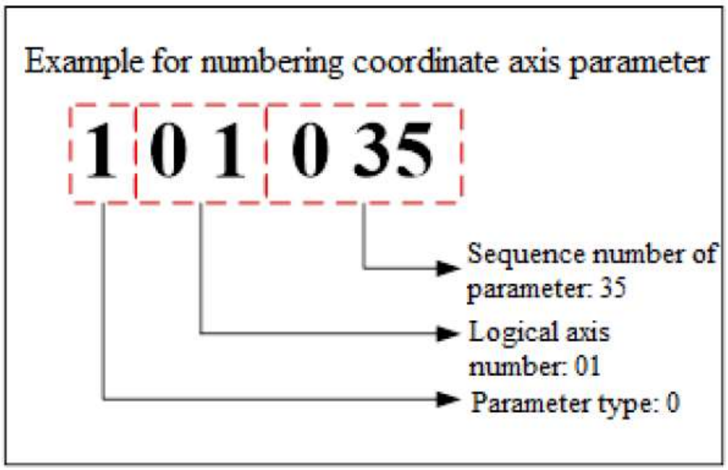
5 Parameter of Coordinate Axis

Explanation on coordinate axis parameter number:

Bit 0 to bit 2: sequence number of coordinate axis parameter.

Bit 3 to bit 4: logical axis number.

Bit 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 Display Axis Name

Parameter number	100000
Parameter name	Display axis 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 "programming name of axis". 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	INT4
Valid range	0 to 10
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
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.

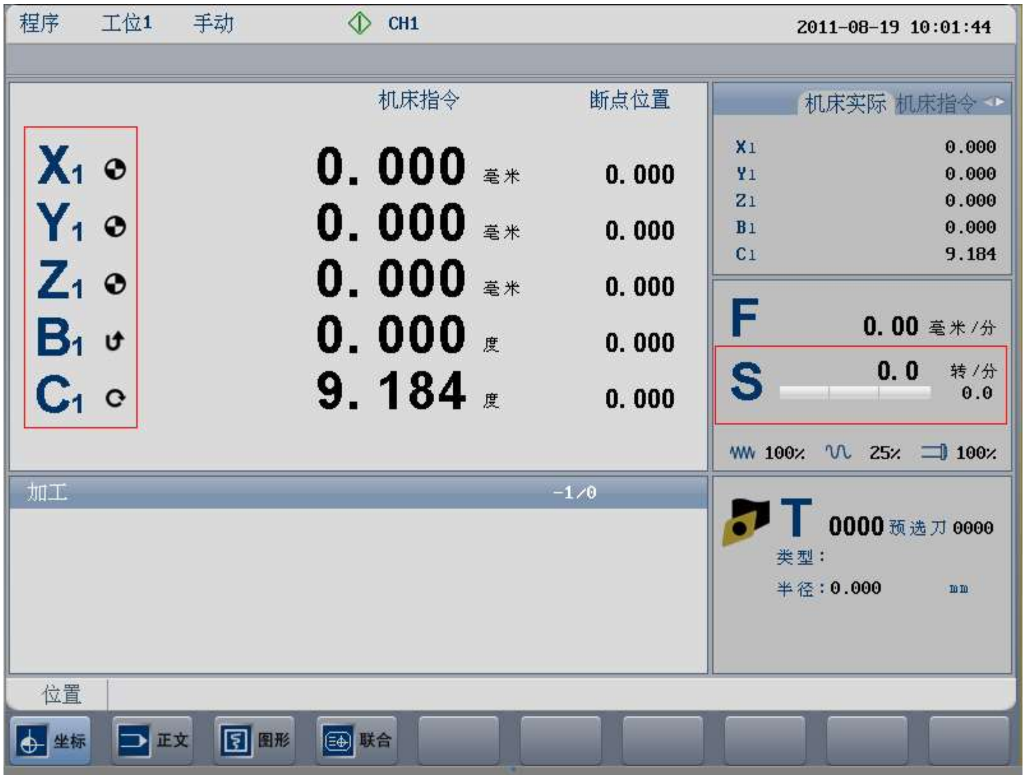
1：Linear axis.

2：Swing axis, and coordinate value of display angle is not restricted.

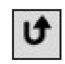
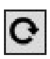
3：Rotary axis. Coordinate value of display angle must be within the specified scope. If the actual coordinate is out of the specified scope, it is displayed in modulus.

9：The traverse axis is used as the spindle, and the amplifier is for feed axis.

10：Spindle.



Note

After the reference position return, the axis name and the label ( for the linear axis,  for the swing axis,  for the rotary axis) are displayed. The spindle can be views via spindle speed S.

Example

If an actual machine contains three feed axes, a swing axis, a rotary axis, and a spindle. The display will be as shown above after the reference position return of each axis.

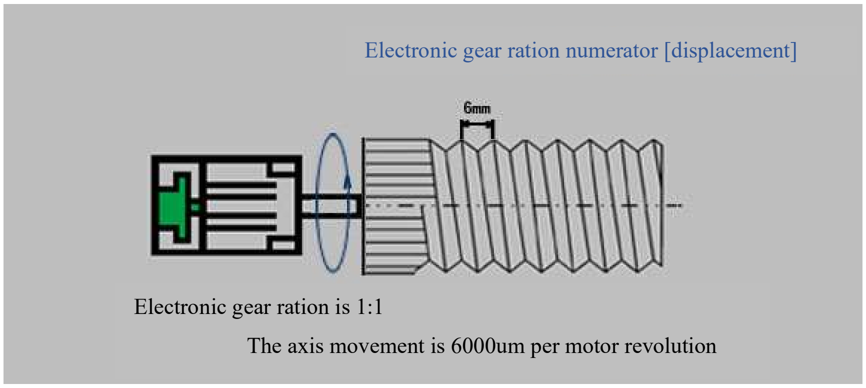
5.3 Electronic Gear ratio Numerator [position]

Parameter number	100004
Parameter name	Electronic gear ratio numerator [position]
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

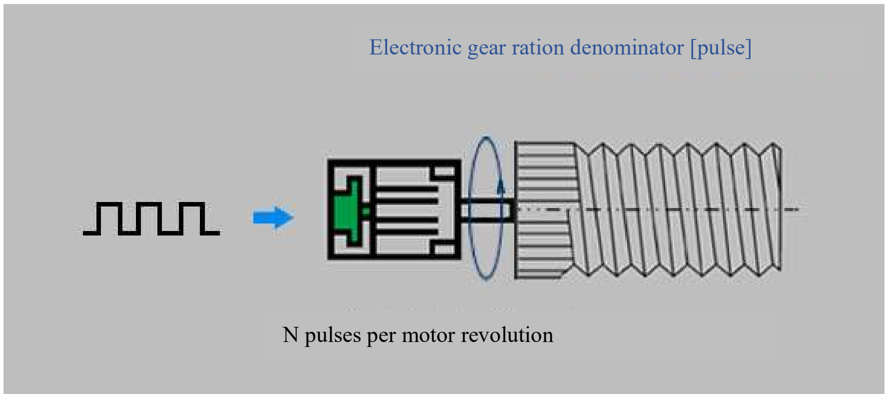
If the screw lead is 6mm, the mechanical transmission ratio is 1:1, the electronic gear ratio numerator here is 6000 before being reduced.

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

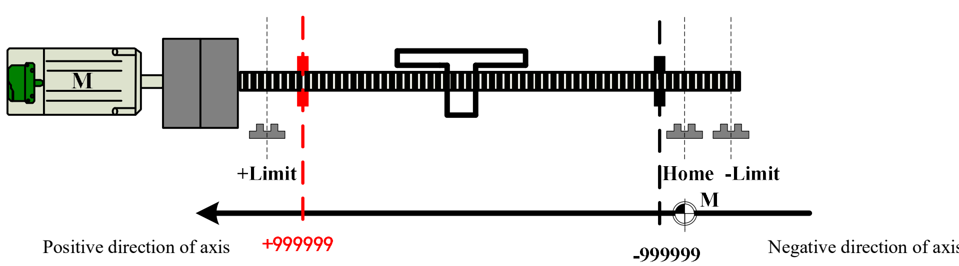
Parm100004 “numerator of electronic gear ratio” is set to 1, and Parm100005 “denominator of electronic gear ratio” is set to 10.

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

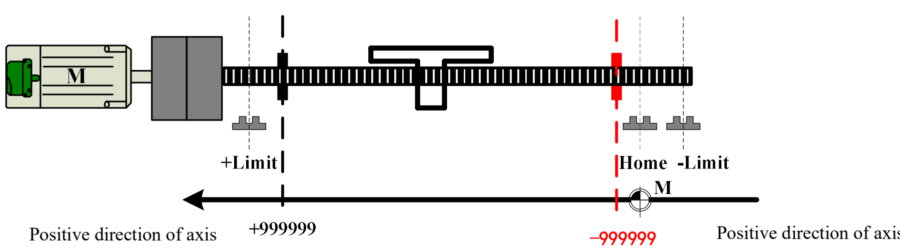
The first software limit of the logical axis 0 is effective, and the second positive software limit coordinates of the logical axes 1 and 2 are effective, then G1.2, G81.2, and G161.2 are set to 1 in the ladder diagram.

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.

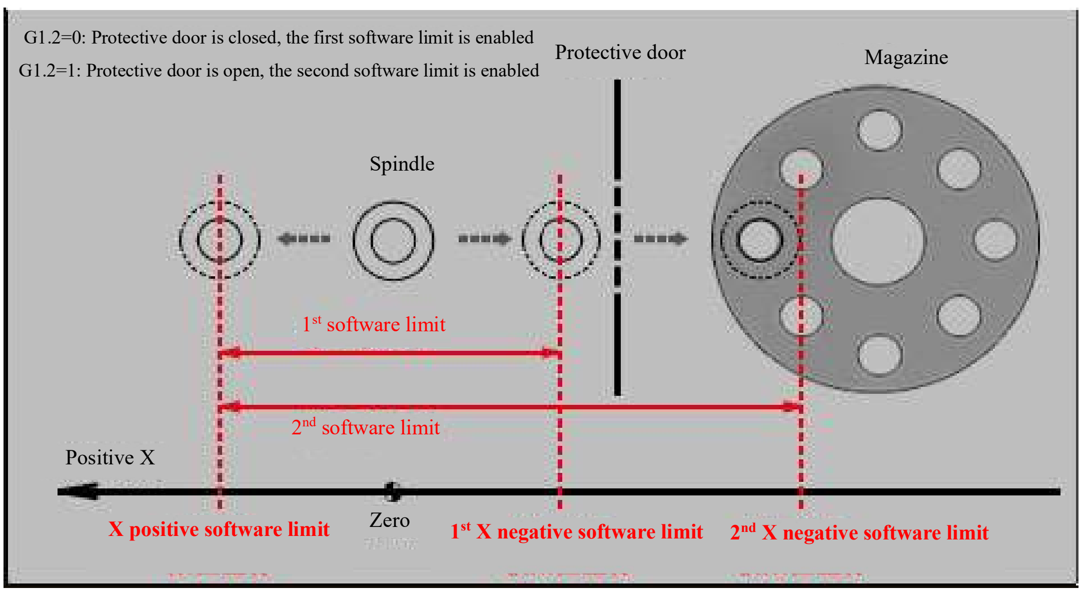
When the third bit of G((80*logical axis number)+1) is 1, the positive software limit coordinate is not effective, and the second positive software limit coordinate is effective.

5.7 Second Positive Software Limit Coordinate

Parameter number	100008
Parameter name	Second 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

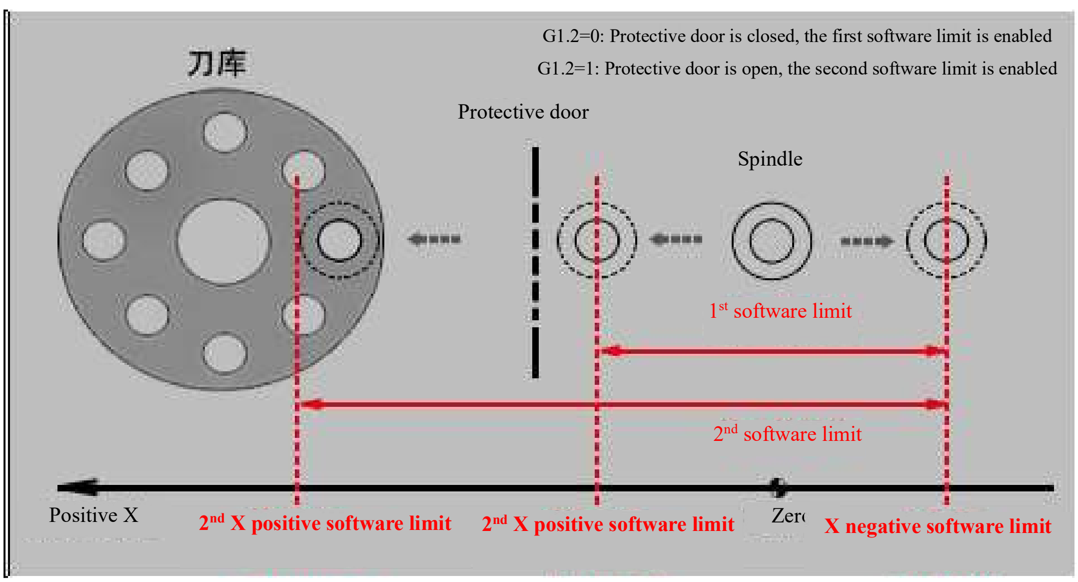
At the time of normal machining, the first positive software limit is enabled, and G1.2 is set to 0. When the tool needs to be changed, set G1.2 to 1, then the first positive software limit is disabled and the second positive software limit is enabled. After the tool has been changed, set G1.2 to 0 in the ladder diagram to revert to the first software limit.

5.8 Second Negative Software Limit Coordinate

Parameter number	100009
Parameter name	Second 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	2
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

The reference position return mode for HNC-8 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.

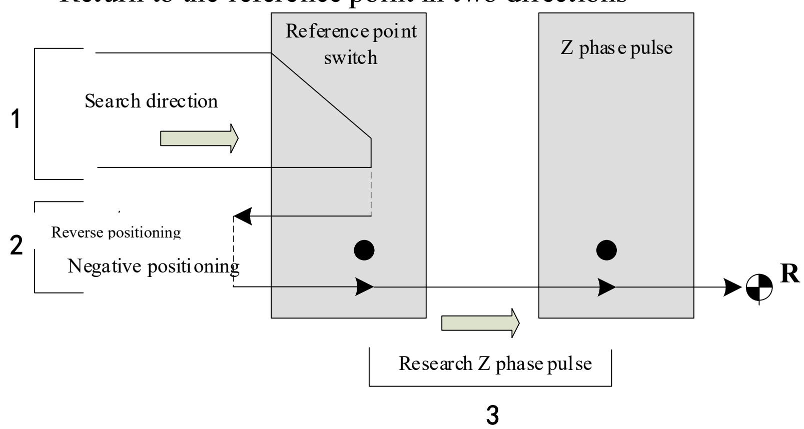
4： Distance-coded reference point return mode 1

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.

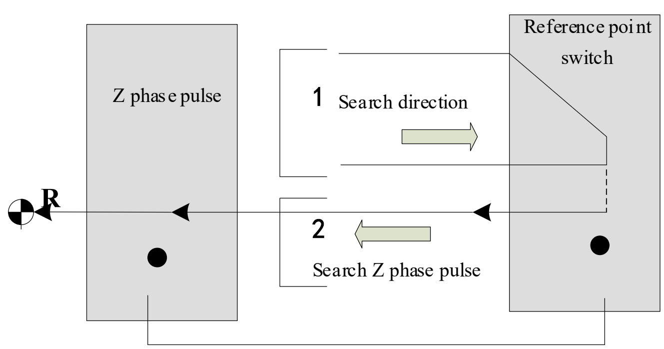
5： Distance-coded reference point return mode 2

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



+– **Return to the reference point**



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

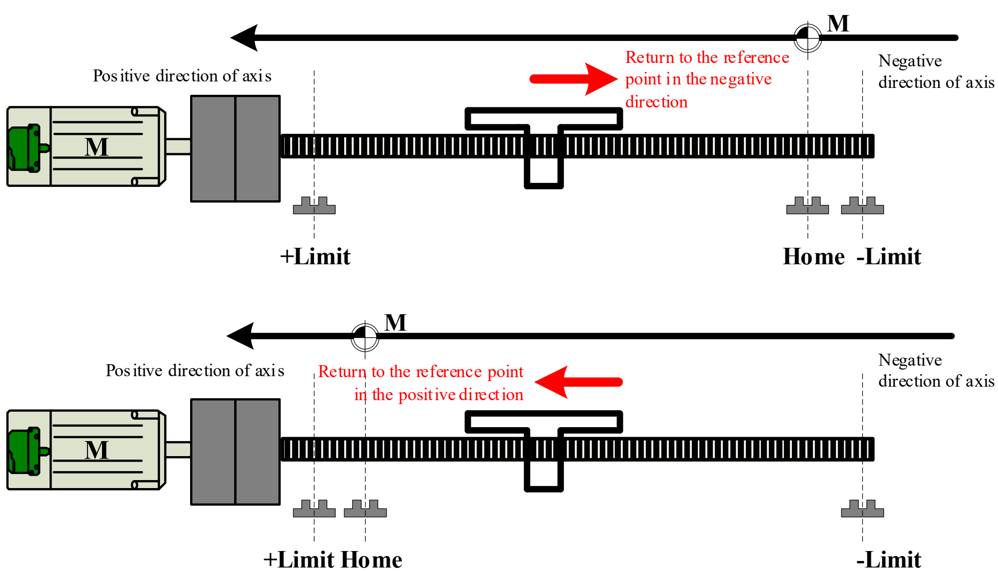
Description

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).

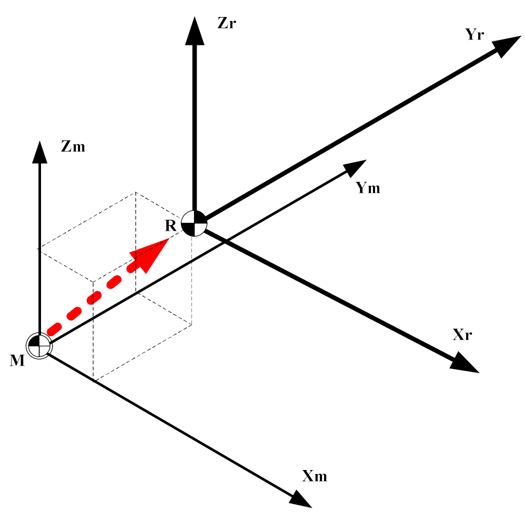
The distance-coded reference point return direction is controlled by PLC. Therefore, this parameter must be set to 0 when distance-coded reference point return is performed.

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

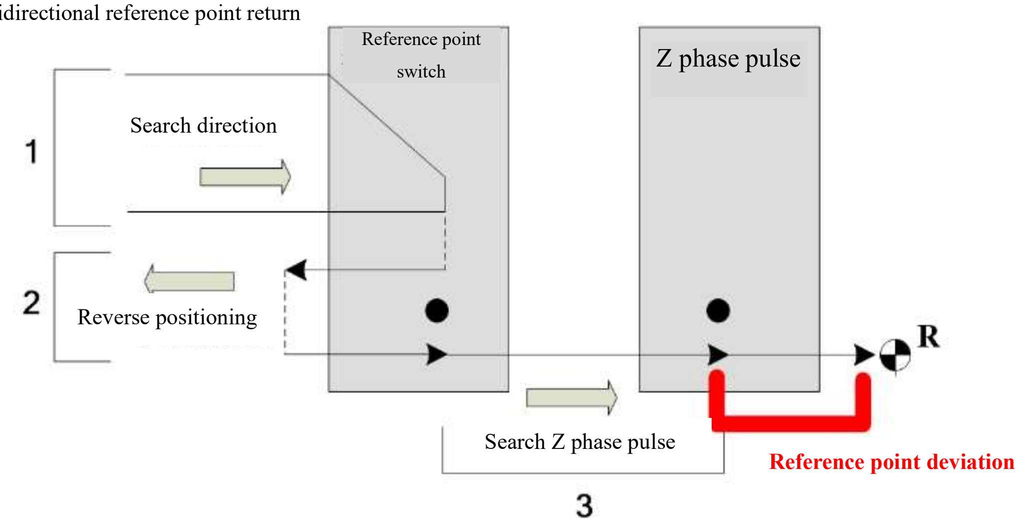
Parameter number	100013
Parameter name	Offset after Reference Point Return
Data unit	mm
Data type	REAL
Valid range	0 to 100.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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



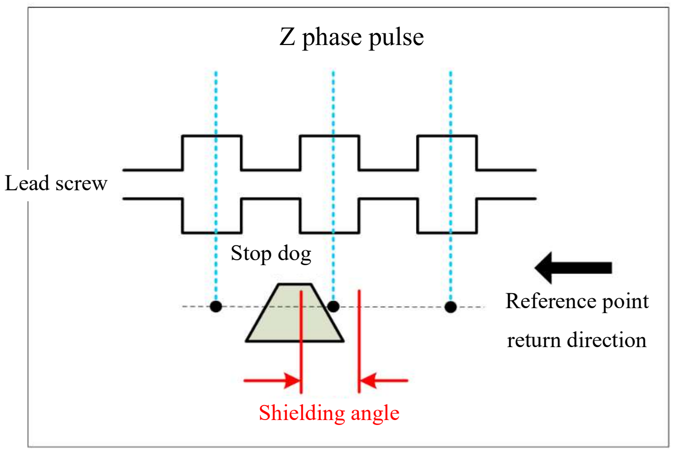
5.13 Shielding Angle of Z Pulse in Reference Point Return

Parameter number	100014
Parameter name	Shielding Angle of Z Pulse in Reference Point Return
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 (user 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

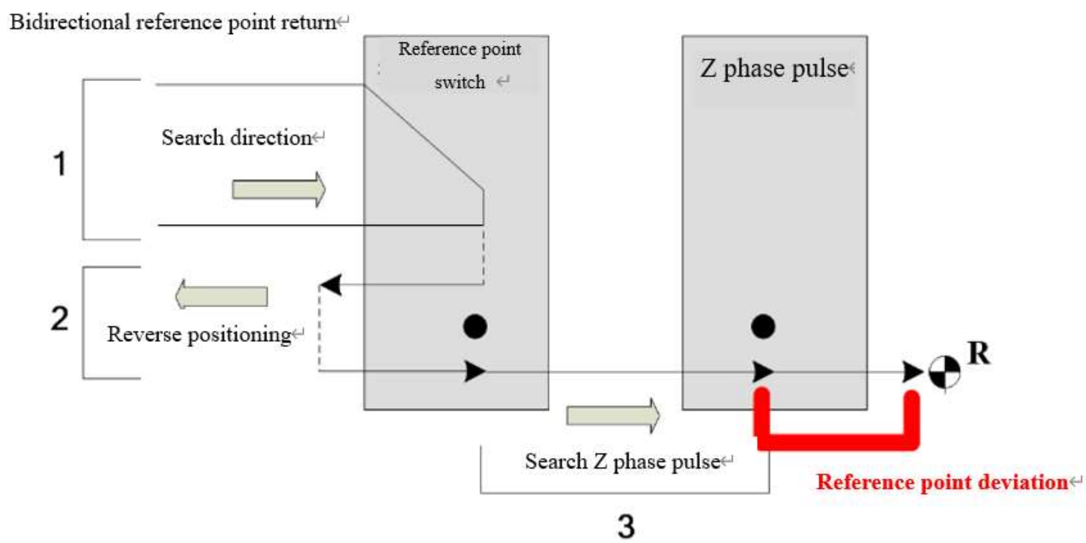
Parameter number	100015
Parameter name	Reference Point Return High Speed
Data unit	mm/min
Data type	REAL

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 position 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

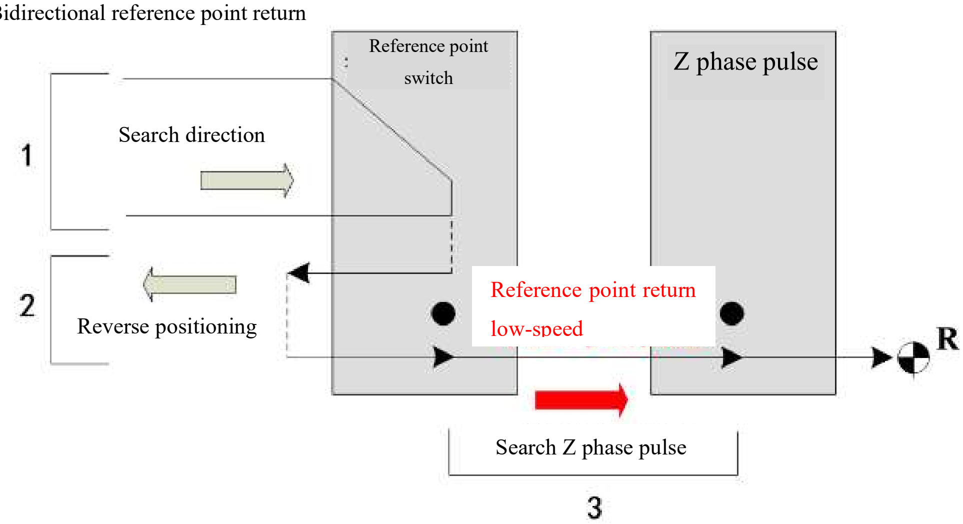
Parameter number	100016
Parameter name	Reference Point Return Low Speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 500000.0
Default value	500
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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

Bidirectional reference point return



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。

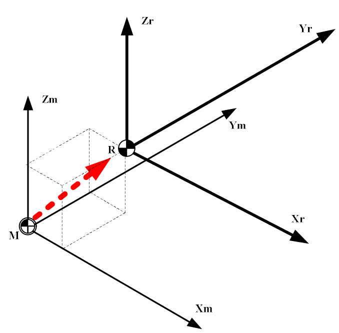
This parameter is set to 18000.

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.



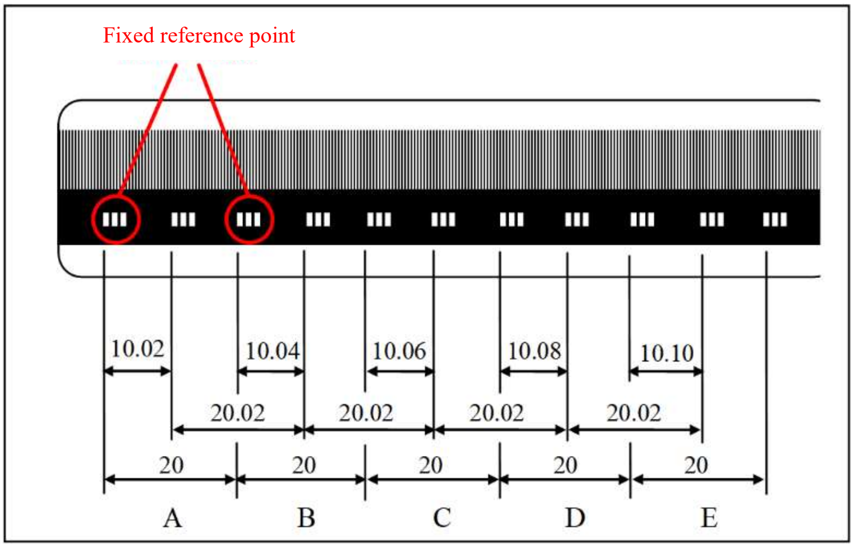
5.17 Distance Between Distance-coded Reference Points

Parameter number	100018
Parameter name	Interval between distance-coded reference points
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.

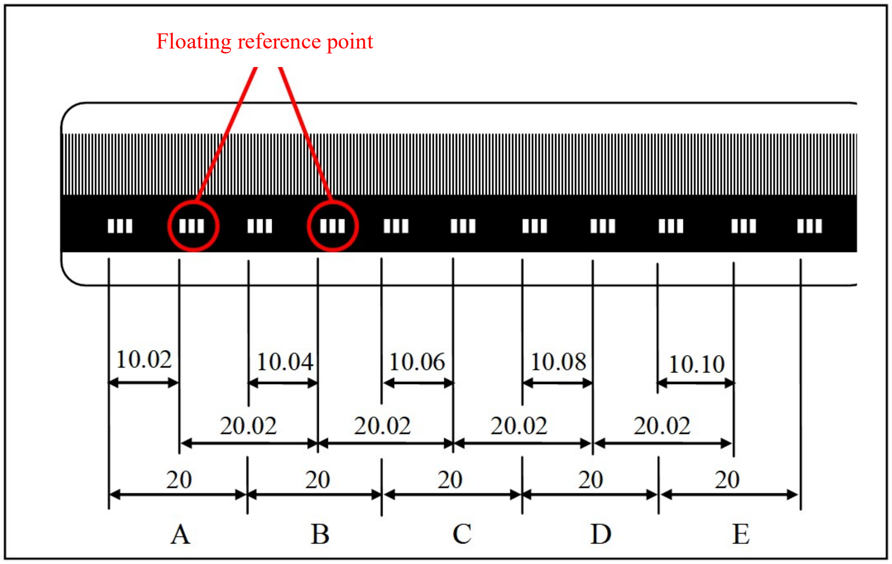


5.18 Interval Deviation

Parameter number	100019
Parameter name	Interval 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 difference between the floating reference point interval and fixed reference point interval.

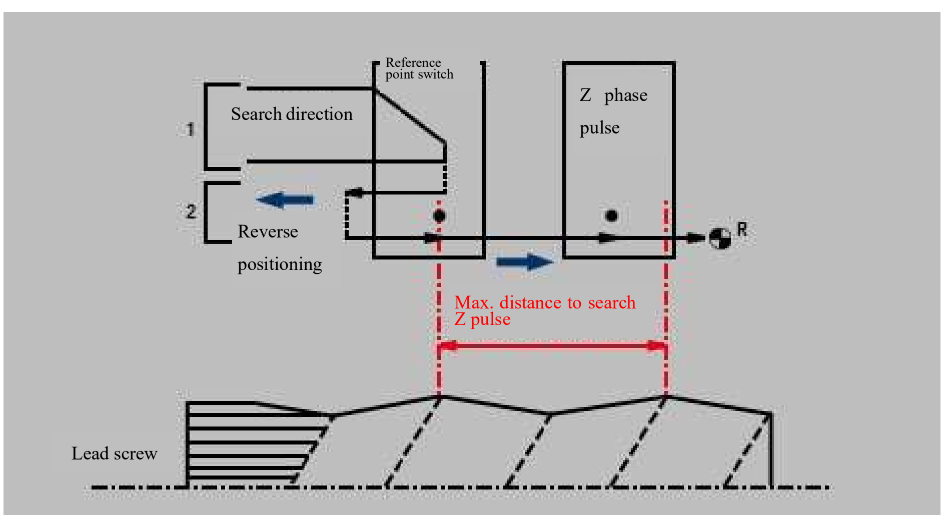


5.19 Maximum Search Distance for Z Pulse

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

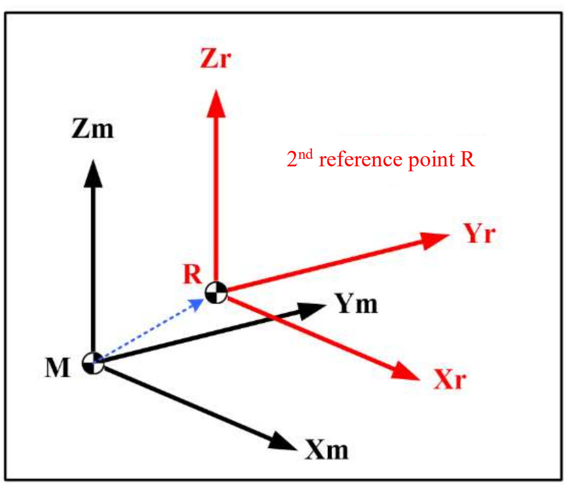
If a screw pitch is 10, the maximum search distance for Z pulse is 10.

5.20 Second Reference Point Coordinate

Parameter number	100021
Parameter name	Second 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. P2 can return to this reference point via G30 command.



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

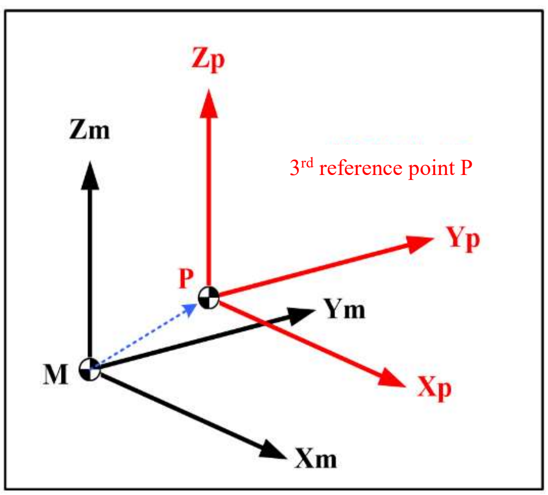
Axis 0, axis 1 and axis 2 respectively move to the second reference position. When the three bits of F0.8, F80.8, and F160.8 in ladder diagram are 1, the machine has been in the second reference position.

5.21 Third Reference Point Coordinate

Parameter number	100022
Parameter name	Third 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. P3 can return to this reference point via G30 command.



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

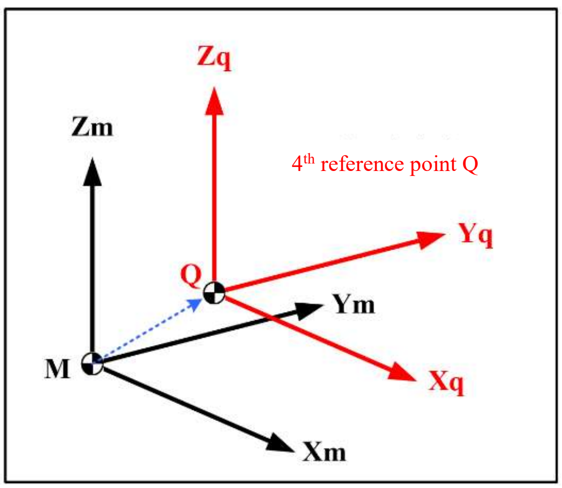
Axis 0, axis 1 and axis 2 respectively move to the third reference position. When the three bits of F0.9, F80.9, and F160.9 in ladder diagram are 1, the machine has been in the third reference position.

5.22 Fourth Reference Point Coordinate

Parameter number	100023
Parameter name	Fourth 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. P4 can return to this reference point via G30 command.



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 F0.9, F80.9, and F160.9 in ladder diagram are 1, the machine has been in the fourth reference position.

5.23 Fifth Reference Point Coordinate

Parameter number	100024
Parameter name	Fifth 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. P5 can return to this reference point via G30 command.

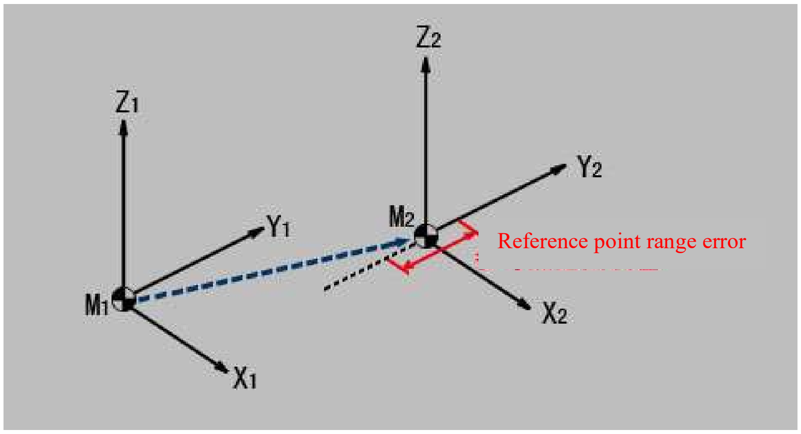
5.24 Reference Point Deviation Range

Parameter number	100025
Parameter name	Reference point deviation 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 error range of reference position.

When the positional deviation between the actual machine position and reference position is less than this parameter, axis has been determined to be at reference point, and the mark of reference-in-place in status flag word is set to 1.



Note

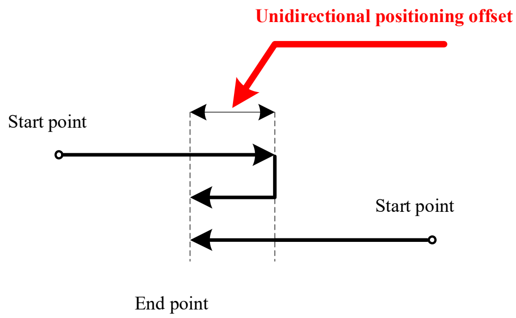
This parameter can define a deviation range.

5.25 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.

5.26 Converted Radius of Rotary Axis

Parameter number	100031
Parameter name	Converted Radius of Rotary Axis
Data unit	mm
Data type	REAL
Valid range	0.001 to 1000000
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.

$360=2\Pi R$

$R=360/2\ /\Pi=57.3$

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.

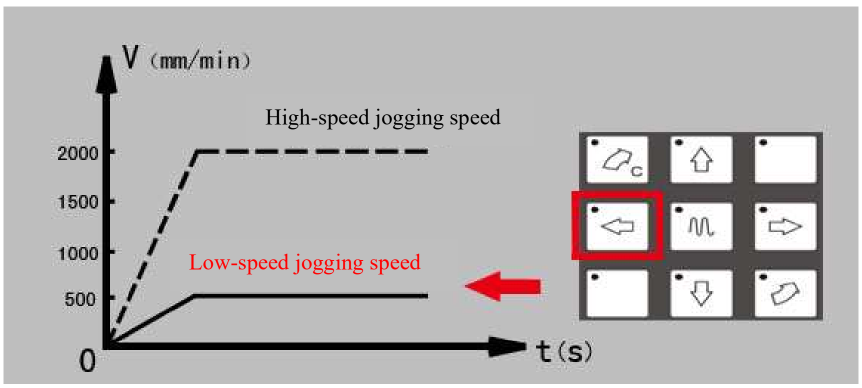
Maximum speed of current axis =3000*2*3.1415*57.3=1079532mm/min。

5.27 Low-speed Jogging Speed/High-speed Jogging speed

Parameter number	100032/100033
Parameter name	Speed for Low-speed Inching
Data unit	mm/min
Data type	REAL
Valid range	0 to 3600000.0
Default value	2000
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 rotation axis.

5.28 Maximum Rapid Traverse Speed

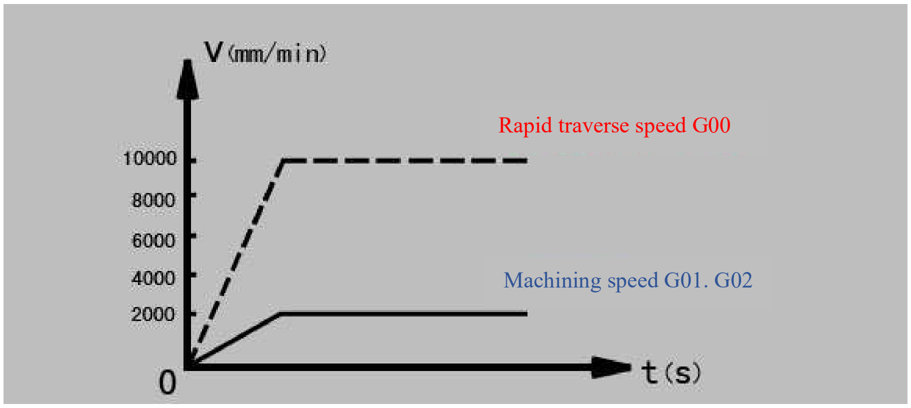
Parameter number	100034
Parameter name	Maximum Rapid Traverse Speed
Data unit	mm/min
Data type	REAL
Valid range	0 to 3600000
Default value	8000
Access level	ACCESS_MAC
Activation	ACT_RST

Milling/Turning	Turning, milling

Description

To set the upper limit of velocity for rapid traverse positioning (G00)

Maximum speed for rapid traverse of rotary axis = Maximum speed of axis *2 * PI * Converted radius of rotation axis



Note

Maximum rapid traverse speed must be the largest value of all parameters about 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.

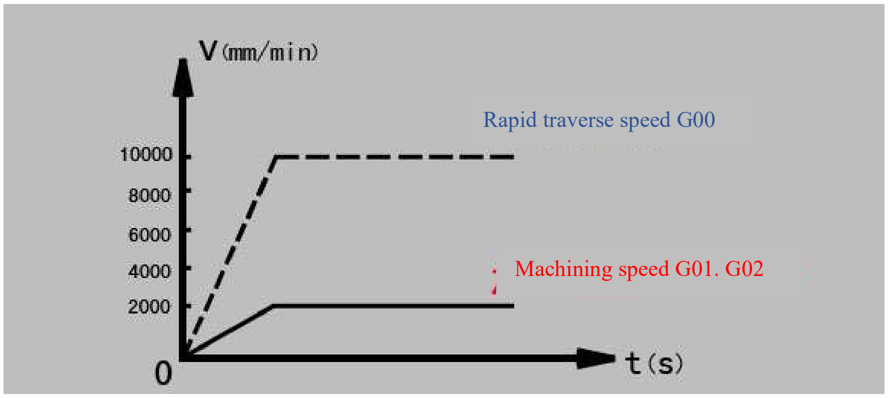
Rotary axis is influenced by converted radius of rotation axis.

5.29 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_RST
Milling/Turning	Turning, milling

Description

To set the upper limit of speed at which the axis moves for 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.

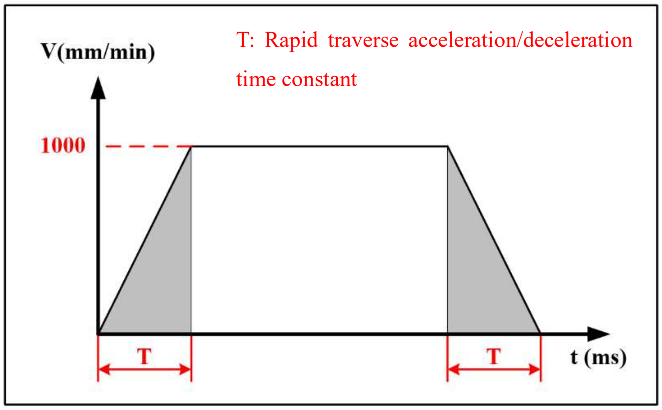
Rotary axis is influenced by converted radius of rotation axis.

5.30 Time Constant of Rapid Traverse Acceleration/Deceleration

Parameter number	100036
Parameter name	Time Constant of Rapid Traverse Acceleration/Deceleration
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	16
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 the moment of inertia of motor, moment of inertia of load, acceleration capabilities of drive.

The comparison of common acceleration/deceleration time constant with acceleration is as follow:

Time constant of rapid travers acceleration/deceleration	2ms	8ms	16ms	32ms	64ms
acceleration	1g	0.2g	0.1g	0.05g	0.02g

Example

If the time constant of rapid traverse acceleration and deceleration is set to 4ms, the acceleration in rapid travers will be calculated as below:

1000mm/60s≈16.667mm/s

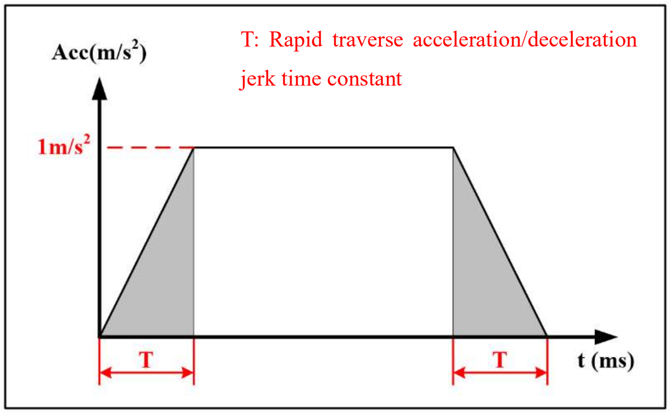
16.667/0.004≈4167mm/s^2 ≈0.425g (1g=9.8m/s^2)

5.31 Time Constant of Rapid Traverse Acceleration/Deceleration Jerk

Parameter number	100037
Parameter name	Time Constant of Rapid Traverse Acceleration/Deceleration Jerk
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	128
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

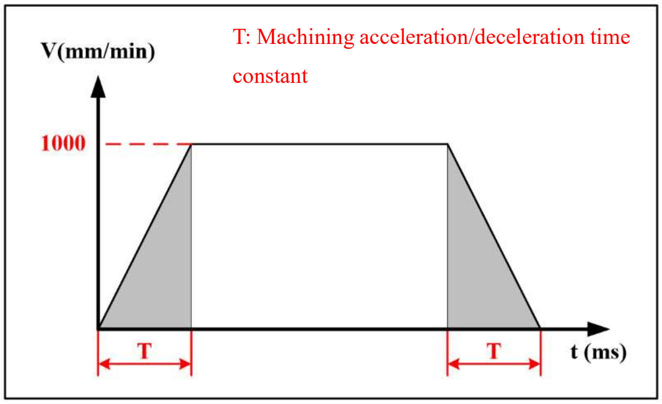
Suppose the acceleration in rapid traverse is 0.2g ($1.96m/s^2$), the time constant of acceleration and deceleration jerk in rapid traverse is set to 8ms, then the jerk is $1.96/0.008=245m/s^3$.

5.32 Time Constant of Machining Acceleration/Deceleration

Parameter number	100038
Parameter name	Time Constant of Machining Acceleration/Deceleration
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 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:

Time constant of machining acceleration and deceleration	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

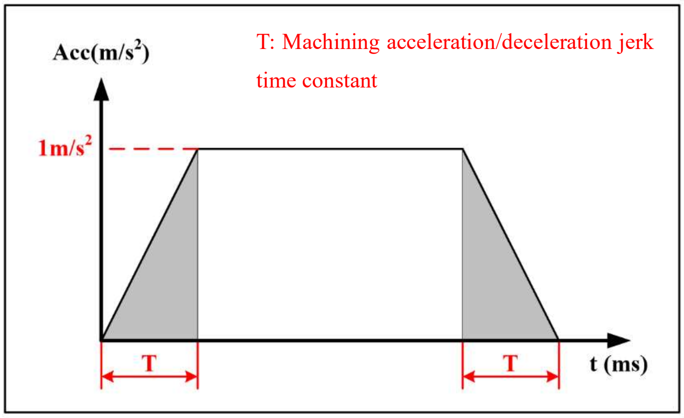
16.667/0.006≈2778mm/s^2≈0.283g (1g=9.8m/s^2)

5.33 Time Constant of Machining Acceleration/Deceleration Jerk

Parameter number	100039
Parameter name	Time Constant of Machining Acceleration/Deceleration Jerk
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	128
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.

5.34 Threading Acceleration Time Constant (ms)

Parameter number	100040
Parameter name	Threading acceleration time constant (ms)
Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	8.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used for the acceleration time constant during chasing of Z pulse of the spindle when the threading starts to be processed. If this parameter is too small, it will cause high acceleration and vibration when at the time of thread turning. If this parameter is set too large, the machine tool will not be able to chase the Z pulse, and the second turning for threading will not be successful.

5.35 Threading Deceleration Time Constant (ms)

Parameter number	100041
Parameter name	Threading deceleration time constant (ms)

Data unit	ms
Data type	REAL
Valid range	0 to 2000.0
Default value	8.0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

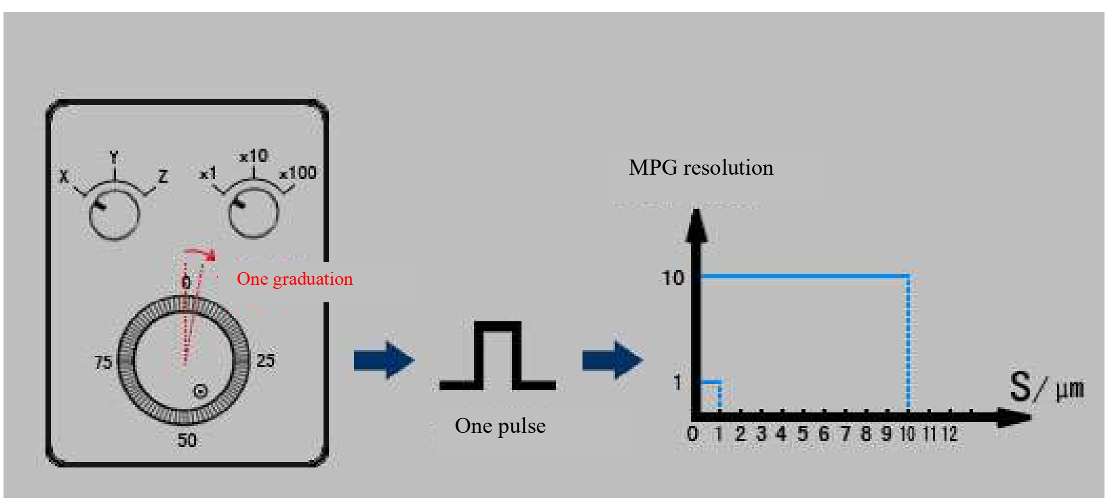
This parameter is used for the acceleration time constant during chasing of Z pulse of the spindle when the threading starts to be processed. If this parameter is too small, it will cause high acceleration and vibration when at the time of thread turning. If this parameter is set too large, the machine tool will not be able to chase the Z pulse, and the second turning for threading will not be successful.

5.36 MGP Pulse Revolution

Parameter number	100043
Parameter name	MPG pulse revolution
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 which 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 Number of Handwheel Buffering Periods

Parameter number	100045
Parameter name	Number of Handwheel Buffering Periods
Data unit	Interpolation period
Data type	INT4
Valid range	0 to 10000
Default value	100
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

When the handwheel is rotated within the number of handwheel buffering periods, the machine moves at a low speed. When the number of handwheel buffering period is exceeded, the machine accelerates.

5.39 Handwheel Max. Speed

Parameter number	100047
Parameter name	Handwheel max. speed
Data type	REAL
Valid range	0.0 to 1.0
Default value	0.003
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter sets the allowable maximum speed during execution in handwheel.

.5.39 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 , the actual speed of axis is over the product of this system and the axis command speed, the system will alarm the axis overspeed.

.5.40 1m/min Tracking Error during Threading Repair

Parameter number	100049
Parameter name	1m/min tracking error during 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.

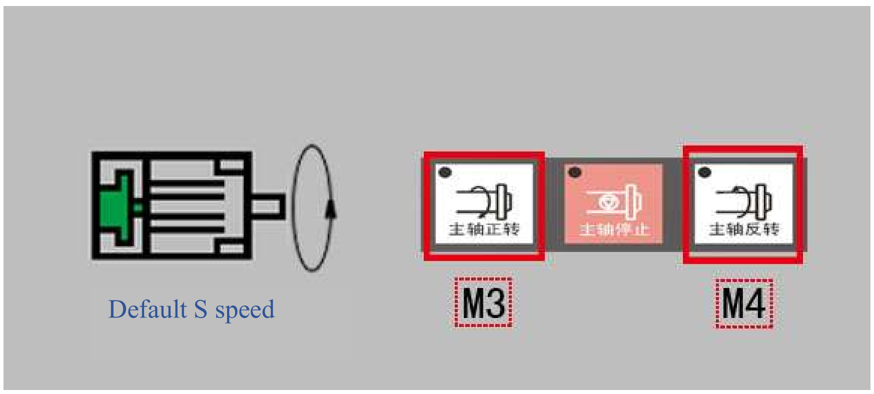
5.41 Default Speed S

Parameter number	100050

Parameter name	Default Speed S
Data unit	r/min
Data type	REAL
Valid range	0 to 100000.0
Default value	10
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.

5.42 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 in a certain range based on the situation of machine.

The actual fluctuation range of spindle speed = ±the command spindle speed * allowable fluctuation rate of spindle speed

5.43 Allowable Spindle Speed Fluctuation Rate in Threading

Parameter number	100052
Parameter name	Allowable Spindle Speed Fluctuation Rate in Threading
Data type	REAL
Valid range	0 to 1
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.

5.44 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 one 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.

5.45 Zero Speed Tolerance of Feed Spindle

Parameter number	100056
Parameter name	Zero speed tolerance of feed spindle
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.

5.46 Maximum Period Overlapping of External Commands

Parameter number	100057
Parameter name	Maximum period overlapping of external commands
Data type	REAL
Valid range	0 to 1mm
Default value	0.1mm
Access level	ACCESS_NC
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.

Description

Excessively large value of this parameter may cause machine overspeed.

5.47 Allowable Error for Positioning

Parameter number	100060
Parameter name	Allowable Error for Positioning
Data unit	mm
Data type	REAL
Valid range	0.0 to 1000.0
Default value	0.1
Access level	ACCESS_USER
Activation	ACT_RST
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 orientation doesn’t work on the current axis.

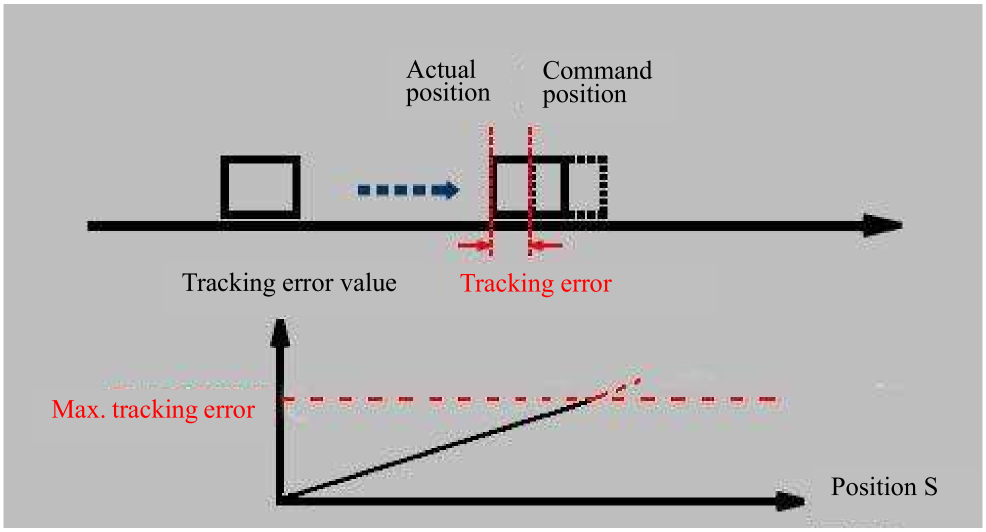
Larger than 0: After the maximum time for exact stop check set by Parm010166 has been reached, if the machine coordinate of current axis is still out of this parameter setting, CNC will alarm.

5.45 Maximum Tracking Error for 1m/min

Parameter number	100061
Parameter name	Maximum Tracking Error of 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 “working mode of encoder” 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.

5.49 Automatic Adjustment of Flexibility Synchronization

Parameter number	100062
Parameter name	Automatic Adjustment of Flexibility Synchronization
Data type	INT4
Valid range	0 to 1
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".

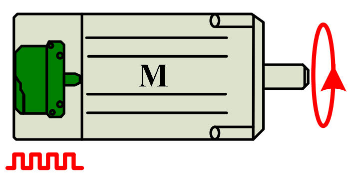
The adjustment can be performed automatically when the synchronization error is larger than the setting of Parm100106 and smaller than the setting of Parm100107; otherwise, the alarm is issued.

5.50 Number of Pulses per Axis Revolution

Parameter number	100067
Parameter name	Number of Pulses per Axis Revolution
Data unit	Pulse
Data type	INT4
Valid range	1024 to 999999999
Default value	131072
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).

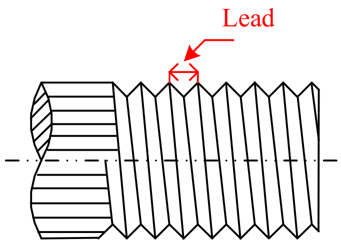
5.51 Lead Screw Lead

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.



5.52 Rotary Axis Speed Display Coefficient

Parameter number	100073
Parameter name	Rotary axis speed display coefficient
Data type	REAL
Valid range	0 to 1000.0
Default value	0.0028
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

When this parameter is set to 1.0, the display unit of rotary axis speed is the standard deg/min.

For rotary axes with high-speed requirements, the speed F displayed in deg/min is often very large. At this time, the speed display of the rotary axis can be adjusted by setting this parameter. For example, when this parameter is set to 0.0028, the display unit of the rotary axis speed F will be converted to rev/min.

Description

This parameter only affects the speed display of specified axis, and cannot work on other axes.

Example

When performing high-speed rigid tapping at the speed of 100rev/min, the rotary axis speed F=100rev/min × 360degrees = 36000deg/min. If this parameter is set to 0.0028, the rotary axis speed will be displayed in rev/min, that is, the display speed is F=100.0.

5.53 Type of Indexing/Positioning Axis

Parameter number	100077
Parameter name	Type of Index/Positioning Axis
Data type	INT4
Valid range	0 to 2
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

To set the type of index axis and positioning axis, and to enable the function of automatic release-clamping of the axis.

0：Index and 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, the output F(AX*80+1.13) axis release register will be cleared after release in position; until there is no movement command for this axis in the next block, F(AX *80+1.15) axis clamping register is output and cleared after clamping in position.

2：When there is a movement command of this axis in the executed G code, the output F(AX*80+1.13) axis clamping register will be cleared after release in position, and F(AX *80+1.15) axis clamping register is output immediately after this block is completed, and cleared after clamping in position.

5.54 Initial Value of Indexing/Positioning Axis

Parameter number	100078
Parameter name	Initial Value of Index/Positioning Axis
Data type	0.0000 to 9999.0000
Valid range	REAL
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE

Milling/Turning	Turning, milling

Description

This parameter is to set the initial degree of indexing for the index axis or positioning axis.

5.55 Indexing/Positioning Axis Spacing

Parameter number	100079
Parameter name	Index/Positioning Axis Spacing
Data type	0 to 9999
Valid range	INT4
Default value	0.0000
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

This parameter is used to set the command position of the index movement, and it must be an integer multiple of this value. This parameter takes effect only when the indexing/positioning axis is turned on.

5.56 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

Correspond to the M code of the fourth axis lock, generally 40 is set.

5.57 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

Correspond to the M code of the fourth axis release, generally 41 is set.

5.58 Path Mode of Rotary Axis

Parameter number	100082
Parameter name	Path mode of rotary axis
Data type	BOOL
Valid range	0, 1
Default value	1
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

Description

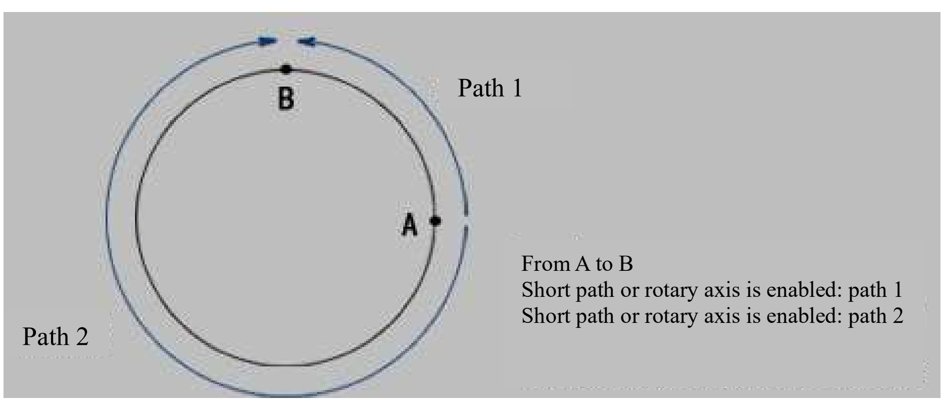
0: General mode. When the command coordinate value is greater than the current position, CW rotation is performed, when smaller than the current position, CCW rotation is performed.

1: Short path rotation mode.

2: Positive-direction rotation mode (unidirectional)

3: Negative-direction rotation mode (unidirectional)

To use this function, Parm100001 Axis Type must be set to 3 (rotary axis type), and the parameter Feedback Position Loop Enable 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

	Sequence No.	Actual movement	Display value
G90 A0;			
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

5.59 Threshold of Axis Overload Determination

Parameter number	100087
Parameter name	Threshold of axis overload determination
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 current load current to motor rated current, used for collision protection.

0: Invalid.

Others: Max. value of axis overload determination. When the axis load percentage is larger than this parameter, system will set the axis register to the overload status.

5.60 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.

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 amplifier 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.

5.54 Encoder Count Bit

Parameter number	100094
Parameter name	Encoder count digits
Data type	INT4
Valid range	0 to 32
Default value	29
Access level	ACCESS_MAC

Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

This parameter is to set based on count 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 encoder. 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.

5.62 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.

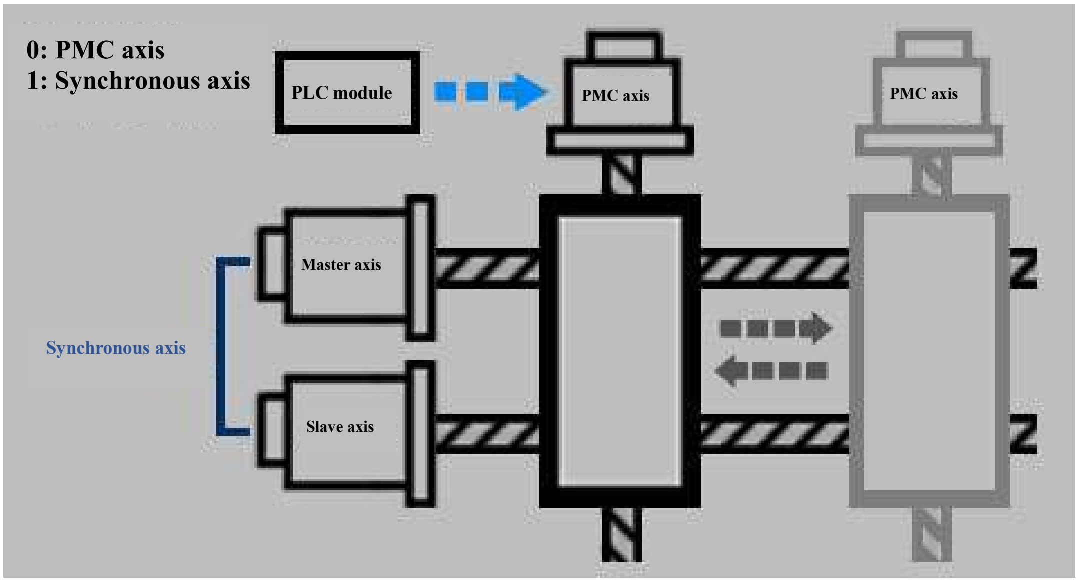
This parameter is to specify the type of current axis, PMC axis and coupling axis. The coupling axis is the axis with a synchronization multi-coupling relationship.

-1: Common axis, which can be spindle, linear axis, and rotary axis.

0: PMC axis.

1: Synchronous axis.

≥2：For future extension.

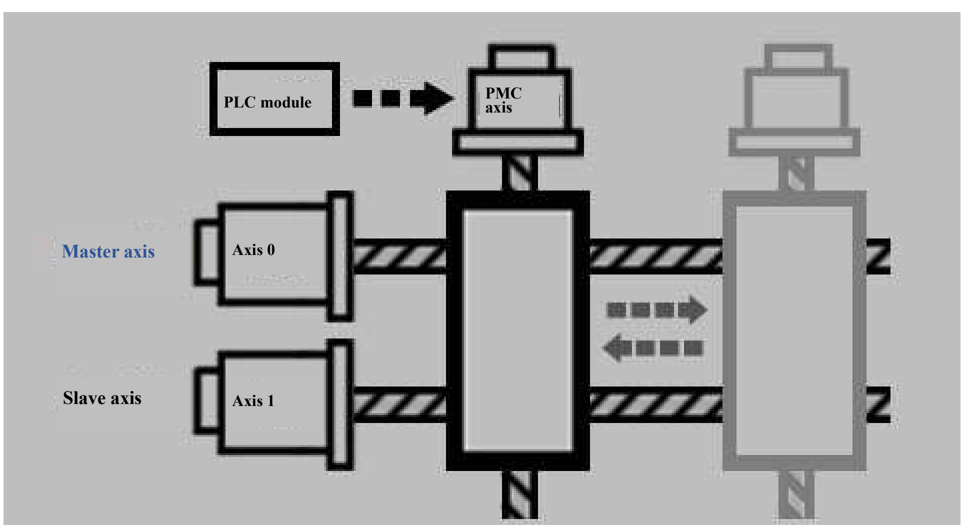


5.63 Master Axis No.

Parameter number	100101 to 100105
Parameter name	Number of master axes 1 to 5
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.



Note

This parameter is valid only when Parm100100 “type of PMC and coupling axis” is set to 1 (synchronous axis).

Example

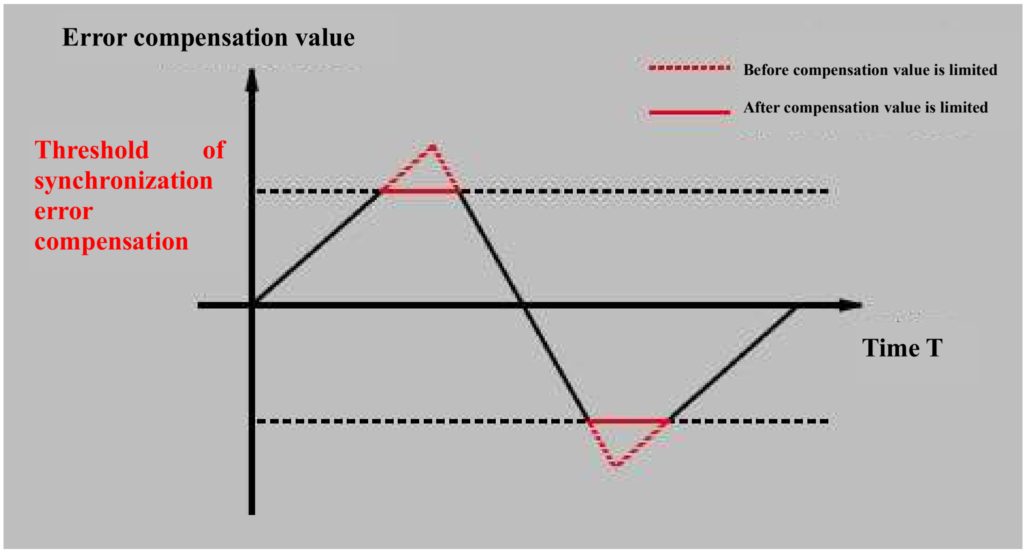
There is a synchronous axis group (the master axis X and the slave axis U), then the parameter must be set:
Suppose that in CH0, the auxiliary axis U is configured to axis 6, and axis X is configured to Axis 0.
Set the axis parameter “motion control (MC) axis type” to 1 for the axis 6 and set the axis parameter “MC axis parameter (master axis No. of synchronization)” to 0 for the axis 6.

5.64 Threshold of Synchronization Position Error Compensation

Parameter number	100106
Parameter name	Threshold of Synchronization Position Error Compensation
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.



5.65 Threshold of Synchronization Position Error Alarm

Parameter number	100107
Parameter name	Threshold of Synchronization Position Error Alarm
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

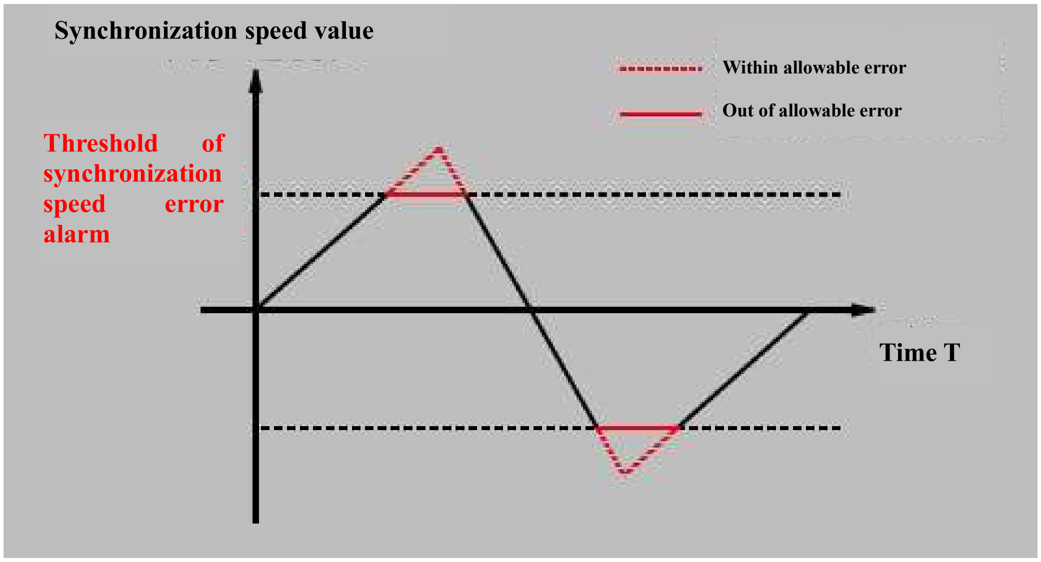
When the synchronization position error is beyond this parameter setting, an alarm is issued.

5.59 Threshold of Synchronization Velocity Error Alarm

Parameter number	100108
Parameter name	Threshold of Synchronization Velocity Error Alarm
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 synchronization speed error is beyond the value set by this parameter, an alarm is issued.

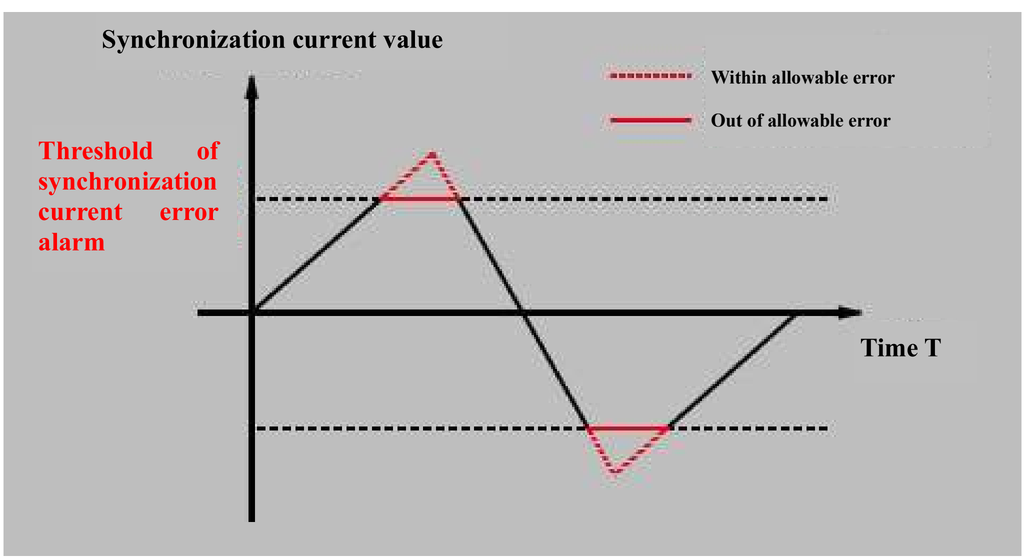


5.67 Threshold of Synchronization Current Error Alarm

Parameter number	100109
Parameter name	Threshold of Synchronization Current Error Alarm
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.



5.68 Mode of Slave Axis Display in Synchronization

Parameter number	100126
Parameter name	Mode of Slave Axis Display 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.

5.69 Synchronization Axis is Mirrored

Parameter number	100127
Parameter name	Synchronization Axis is Mirrored
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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.

5.70 Inverted Positive Direction of Synchronous Axis

Parameter number	100128

Parameter name	Inverted Positive Direction of Synchronous Axis
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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.

5.71 Machine Zero Deviation of Synchronous Axis

Parameter number	100129
Parameter name	Machine Zero Deviation of Synchronous Axis
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

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.

5.72 Maximum Error Compensation Rate

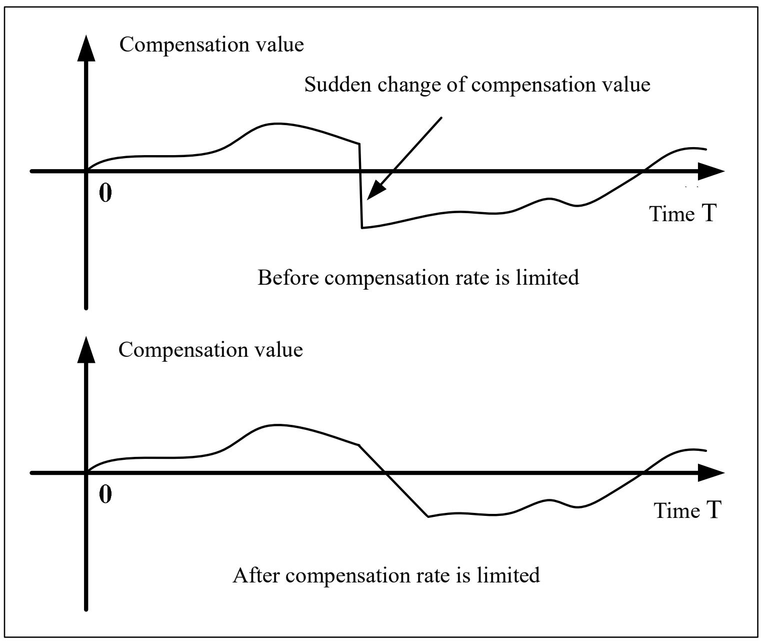
Parameter number	100130
Parameter name	Maximum Error Compensation Rate
Data unit	mm, degree
Data type	REAL
Valid range	0 to 1.0
Default value	0.01

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.

5.73 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.

5.74 Feedback Deviation of Feed Axis

Parameter number	100132
Parameter name	Feedback Deviation of Feed Axis (mm)
Data unit	Mm, degree
Data type	REAL
Valid range	-10000.0 to 10000.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_SAVE
Milling/Turning	Turning, milling

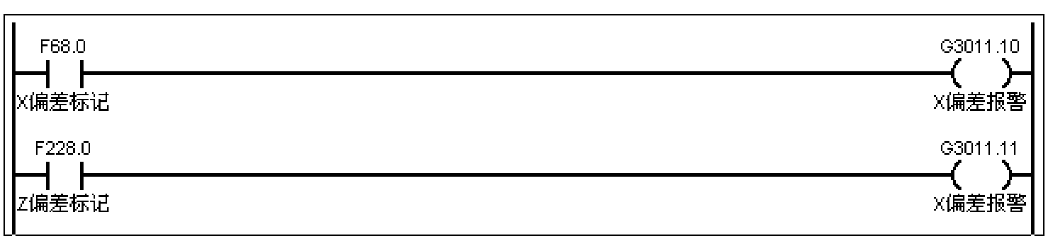
Description

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. User 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 Y in lathe, which respectively correspond to logical axes 0 and 1, then F68.0 and F228.0 can be determined.



5.75 Feedback Deviation of Feed Axis

Parameter number	100139
Parameter name	Feedback Deviation of Feed Axis (mm)
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

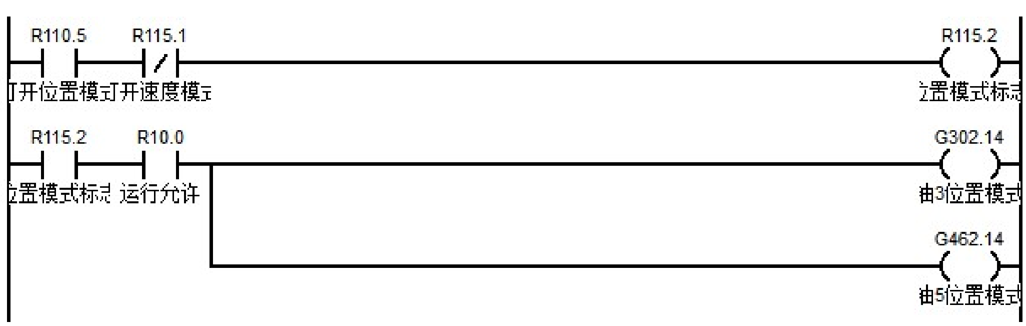
After the conditions for the axis mode switching are met, a command to switch the mode needs to be issued to the axis. The G commands used for the spindle switching mode are as follows (axis 5 is spindle 0 and axis 3 is spindle 1)

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.

5.76 S Command Needs Response

Parameter number	100155
Parameter name	S Command Needs Response
Data type	INT4
Valid range	0 to 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.

5.77 Spindle Analog Output

Parameter number	100156
Parameter name	Spindle Analog Output
Data type	INT4
Valid range	0 to 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：PWM DA spindle.

5.78 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.

5.79 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 stages.

5.80 Minimum Spindle Speed at Gear Stage

Parameter number	100159, 100165, 100171, 100177
Parameter name	Minimum Spindle Speed at Gear Stage
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.

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.

5.81 Maximum Spindle Speed at Gear Stage

Parameter number	100160, 100166, 100172, 100178
Parameter name	Maximum Spindle Speed at Gear Stage
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.

5.82 Transmission Ratio Numerator of Spindle at Gear Stage [Motor Speed]

Parameter number	100161, 100167, 100173, 100179
Parameter name	Transmission Ratio Numerator of Spindle at Gear Stage [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].

5.83 Transmission Ratio Denominator of Spindle at Gear Stage [Spindle Speed]

Parameter number	100162, 100168, 100174, 100180
Parameter name	Transmission Ratio Denominator of Spindle at Gear Stage [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].

5.84 Feedback Electronic Gear Ratio Numerator of Spindle at Gear Stage

Parameter number	100163, 100169, 100175, 100181
Parameter name	Feedback Electronic Gear Ratio Numerator of Spindle at Gear Stage
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.

5.85 Feedback Electronic Gear Ratio Denominator of Spindle at Gear Stage

Parameter number	100164, 100170, 100176, 100182
Parameter name	Feedback Electronic Gear Ratio Denominator of Spindle at Gear Stage
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.

5.86 Enable Speed at Switching Point

Parameter number	100183
Parameter name	Enable Speed at Switching Point
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

This parameter is a spindle parameter.

When there is an overlap between the speeds at gear stages, 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.

5.87 Speed at Switching Point of Gear Stages 1 and 2

Parameter number	100184
Parameter name	Speed at Switching Point of Gear Stages 1 and 2
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

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.

5.88 Speed at Switching Point of Gear Stages 2 and 3

Parameter number	100185
Parameter name	Speed at Switching Point of Gear Stages

	2 and 3
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

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.

5.89 Speed at Switching Point of Gear Stages 3 and 4

Parameter number	100186
Parameter name	Speed at Switching Point of Gear Stages 3 and 4
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

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.

5.90 Motor Speed When Gear-changing of Spindle

Parameter number	100187
Parameter name	Motor Speed When Gear-changing of Spindle
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

This parameter is a spindle parameter and is to set the spindle motor speed while the gear changing is being implemented.

5.83 Reference Position Return after Gear-changing of Spindle

Parameter number	100188
Parameter name	Reference Position Return after Gear-changing of Spindle
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

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.

5.92 Power off Position Tolerance

Parameter number	100197
Parameter name	Power off 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. 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.

5.93 Excessive Speed Response Periods

Parameter number	100198
Parameter name	Excessive speed response periods
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.

5.94 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.

5.95 Transmission Type

Parameter number	100200
Parameter name	Transmission type
Data type	INT4
Data range	0/999
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 shaft on the machine tool.

0: Variable speed gearbox transmission

1: Synchronous belt transmission

2: Direct transmission of coupling

5.96 Type of Guide Rail

Parameter number	100201
Parameter name	Type of guide rail
Data type	INT4
Data range	0/999
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.

5.97 3rd Positive Software Limit Coordinate (mm)

Parameter number	100202
Parameter name	3rd positive software limit coordinate (mm)
Data type	INT4
Data range	-25474/25474
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) to 1 in PLC.

5.98 3rd Negative Software Limit Coordinate (mm)

Parameter number	100204
Parameter name	4th negative software limit coordinate (mm)
Data type	INT4
Data range	-25474/25474
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) to 1 in PLC.

5.99 4th Positive Software Limit Coordinate (mm)

Parameter number	100204
Parameter name	4th positive software limit coordinate (mm)
Data type	INT4
Data range	-25474/25474
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.

5.100 4th Negative Software Limit Coordinate (mm)

Parameter number	100205
Parameter name	4th negative software limit coordinate (mm)
Data type	INT4
Data range	-25474/25474
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.

5.101 5th Positive Software Limit Coordinate (mm)

Parameter number	100206
Parameter name	4th positive software limit coordinate (mm)
Data type	INT4
Data range	-25474/25474
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 fourth 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 positve software limit.

5.102 5th Negative Software Limit Coordinate (mm)

Parameter number	100207
Parameter name	5^{th} negative software limit coordinate (mm)
Data type	INT4
Data range	-25474/25474
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.

5.103 Position Control Proportional Gain

Parameter number	100500
Parameter name	Position Proportional Gain/Position Control Proportional Gain
Data unit	0.1Hz
Data type	INT4
Valid range	20 to 10000/10 to 5000
Default value	400/200
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the position proportional gain for 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.

5.104 Position Feed Forward Gain/Torque Filter Time Constant

Parameter number	100501
Parameter name	Position Feed Forward Gain/Torque Filter Time Constant
Data unit	%1/0.1ms
Data type	INT4
Valid range	0 to 150/0 to 4999
Default value	0/40
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the position feed forward gain for 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 4 when low response is not required.

5.105 Velocity Proportional Gain/Velocity Control Proportional Gain

Parameter number	100502
Parameter name	Velocity Proportional Gain/Velocity Control Proportional Gain
Data type	INT4
Valid range	20 to 30000/ 25 to 32000
Default value	500/350
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the velocity proportional gain for 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 velocity control proportional gain for the 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.

5.106 Velocity Integral Time Constant/Velocity Control Integral Time Constant

Parameter number	100203
Parameter name	Velocity Integral Time Constant/Velocity Control Integral Time Constant
Data unit	ms
Data type	INT4
Valid range	15 to 500/5 to 32767
Default value	20/30
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the velocity integral time constant for 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.

④ Try to set a smaller value without causing the system oscillation.

⑤ This parameter is adjusted automatically after Parm100243 is correctly set.

This parameter sets the velocity control integral time constant 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.

5.107 Speed Feedback Filter Factor

Parameter number	100504
Parameter name	Speed Feedback Filter Factor
Data type	INT4
Valid range	0 to 7/0 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.

5.108 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_NOW

Description

This parameter can be set for traverse axis and spindle.

To set the check range of position out-of-tolerance alarm.

In the position control mode, when the count value of the position deviation counter is over this parameter value, the drive will issue an alarm.

For example, the spindle motor encoder is of 1024PPR, the number of pulses per motor revolution is 4096; if this parameter is set to 30, when the position tolerance is over 30 * 0.1 * 4096 = 12288 in the C-axis control mode, the drive will issue an alarm.

5.109 Maximum Speed Limit

Parameter number	100517
Parameter name	Maximum speed limit
Data type	INT4
Valid range	100 to 12000/1000 to 32000
Default value	2500/8400
Access level	ACCESS_MAC
Activation	ACT_NOW

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.

5.110 System Overload Torque Setting

Parameter number	100518
Parameter name	System overload torque setting
Data type	INT4
Valid range	30 to 200/10 to 200
Default value	120/100
Access level	ACCESS_MAC
Activation	ACT_NOW

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 limit at any time.

3. 30 to 200 indicates the setting range: 0.3 to 2 times the overload torque

4. After parm100243 / parm100559 is set correctly, this parameter can be adjusted automatically.

5.111 Overload Time Setting

Parameter number	100519
Parameter name	Overload time setting
Data unit	10ms/0.1s
Data type	INT4
Valid range	40 to 32000/10 to 30000
Default value	500/100
Access level	ACCESS_MAC
Activation	ACT_NOW

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 500 is set, the allowable overload time is 5s; 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.

This limit is valid at any time.

5.112 Control Mode Selection

Parameter number	100523
Parameter name	Control mode selection
Data type	INT4
Valid range	0 to 7
Default value	0/1
Access level	ACCESS_MAC
Activation	ACT_NOW

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: Analog 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

5.113 Number of Servo Motor Pole Pairs /Number of Spindle Motor Pole Pairs

Parameter number	100524
Parameter name	Number of servo motor pole pairs/Number of spindle motor pole pairs
Data type	INT4
Valid range	1 to 120/1 to 44
Default value	3/2
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 number of magnetic pole pairs for servo motor and spindle motor.

For example, the setting of 3 indicates that the number of magnetic pole pairs is 3.

② After Parm100243 or Parm100559 is correctly set, this parameter can be adjusted automatically.

5.114 Encoder Type/Encoder Resolution of Spindle Motor

Parameter number	100525
Parameter name	Encoder Type/Encoder Resolution of Spindle Motor
Data type	INT4
Valid range	0 to 20000/ 0 to 32001
Default value	6/0
Access level	ACCESS_MAC
Activation	ACT_NOW

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).

1：2000-ppr encoder (TTL square wave).

2：2500-ppr encoder (TTL square wave).

3：6000-ppr encoder (TTL square wave).

4：Absolute encoder of ENDAT2.1 protocol.

5：Absolute encoder of BISS protocol.

6：Absolute encoder of HiperFACE protocol.

7：TAMAGAWA encoder.

8,9：Reserved.

This parameter sets the encoder resolution for spindle motor.
To set based on the type of encoder mounted on the motor.

0：1024-ppr encoder (TTL square wave).

1：2048-ppr encoder (TTL square wave).

2：2500-ppr encoder (TTL square wave).

3：256-PPR sine cosine incremental encoder.

4：Absolute encoder of EQN1325/1313.

8: Resolver (16384-ppr)

Other sine cosine incremental encoders.

For example, the setting of 1200 represents the 1200-ppr sine cosine incremental encoder. The setting of 1201 indicates 1200-ppr TTL incremental encoder, and the number of pulses per motor revolution is 1200*4.

5.115 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 on 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 on the motor, this parameter sets the number of pulses of 16-bit resolution.

5.102 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.

5.117 Current Control Integral Time Constant

Parameter number	100528
Parameter name	Current Control Integral Time Constant
Data type	INT4
Valid range	1 to 2047/1 to 32767
Default value	100/50
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.

5.118 Status Control Word 1

Parameter number	100531
Parameter name	Status Control Word 1
Data type	HEX4
Valid range	-32768 to 32767

Default value	4097
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter can be set for the motion axis and the spindle.

16-bit control word can be generated based on the STA parameter.

5.119 Time Constant of Torque Command Filter/STB Status Word

Parameter number	100532
Parameter name	Time Constant of Torque Command Filter/STB Status Word
Data type	INT4 /HEX4
Valid range	0 to 500/-32768 to 32767
Default value	1/0
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the time constant of torque command filter for the traverse axis.

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.

16-bit control word can be generated based on the STB parameter.

5.120 Time Constant of Position Feed Forward Filter/IM Magnetic Flux Current

Parameter number	100533
Parameter name	Time Constant of Position Feed Forward Filter/IM Magnetic Flux Current
Data type	INT4 /INT4
Valid range	0 to 3000/ 10 to 80
Default value	0/60
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.

This parameter sets the IM magnetic flux current for the spindle.

① The calculation is implemented based on the no-load current Io of motor at the rated speed. This parameter is automatically set after the motor code (PA—59) is set.

② For 2.2KW to 11KW spindle motor, the no-load current is usually forty to sixty percent of motor rated current; for 15KW to 22KW spindle motor, the no-load current is usually thirty to forty percent of motor rated current.

③ If a large magnetic flux current is set, it will cause a flux saturation and motor oscillation, the velocity will fluctuate greatly. If a small magnetic flux current is set, the motor will be lack of excitation, causing a big decline of motor output torque.

5.107 User Password (Default Indicates Software Version)/Electric Time Constant of IM Spindle Rotor

Parameter number	100534
Parameter name	User Password (Default Indicates Software Version)/Electric Time Constant of IM Spindle Rotor
Data unit	0.1ms
Data type	INT4
Valid range	0 to 2806/1 to 15000
Default value	Current DSP version number/1500
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter sets the user password for the travers 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 extension parameter is 2003.

This parameter sets the electric time constant of IM spindle motor rotor.

① This parameter is calculated on the basis of motor rated flip-frequency fs1, rated load current In, and no-load current Io.

After the motor code (Parm100559) is set, this parameter is automatically set.

② This parameter is set to 1300 to 1800 for the spindle motor of 2.2KW to 11KW.

This parameter is set to 3000 to 4000 for the spindle motor of 15KW to 30KW.

③ If the time constant of rotor is too small or too large, there will be a big deviation on orientation angle of magnetic field, causing a big decline of motor output torque.

5.122 STB Status Control Word

Parameter number	100575
Parameter name	STB status control word
Data type	INT4
Valid range	-32767 to 32767
Default value	1
Access level	ACCESS_MAC
Activation	ACT_NOW

Description

This parameter is set for the traverse axis. 16-bit control word is set based on the STB parameter.

5.123 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.

5.124 1st Notch Filter Width

Parameter number	100577
Parameter name	1st Notch Filter Width
Data type	INT4
Valid range	0 to 20
Default value	2
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.

5.125 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.

5.126 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.

5.124 2nd Notch Filter Width

Parameter number	100580
Parameter name	2nd Notch Filter Width

Data type	INT4
Valid range	0 to 20
Default value	2
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.

5.128 2nd Notch Filter Depth

Parameter number	100581
Parameter name	2nd 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.

5.126 Notch Filter Application Mode

Parameter number	100582
Parameter name	Notch Filter Application Mode
Data type	INT4
Valid range	0 to 3
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 is 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.

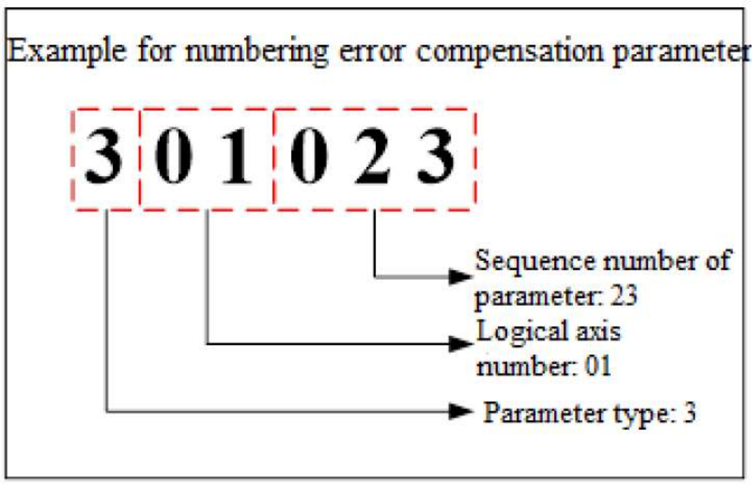
6 Error Compensation Parameter

Explanation on error compensation parameter number:

Bit 0 to bit 2: sequence number of error compensation parameter.

Bit 3 to bit 4: logical axis number of error compensation

Bit 5: 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 Type of Backlash Compensation

Parameter number	300000
Parameter name	Type of backlash compensation
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	-1.0 to 1.0
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, swing 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	-1.0 to 1.0
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 Thermal Error Compensation Type

Parameter number	300005
Parameter name	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 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 for thermal error offset table

Parm 300008：Number of measured temperature points for thermal error offset table

Parm 300009：Spacing between measured temperature points for thermal error offset table

Parm 300010：Temperature sensor number of thermal error offset table

Parm 300011：Initial 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 in thermal error compensation (P_0)

Parm 300012：Initial measured temperature for thermal error slope table

Parm 300013：Number of measured temperature points for thermal error slope table

Parm 300014：Spacing between measured temperature points for thermal error slope table

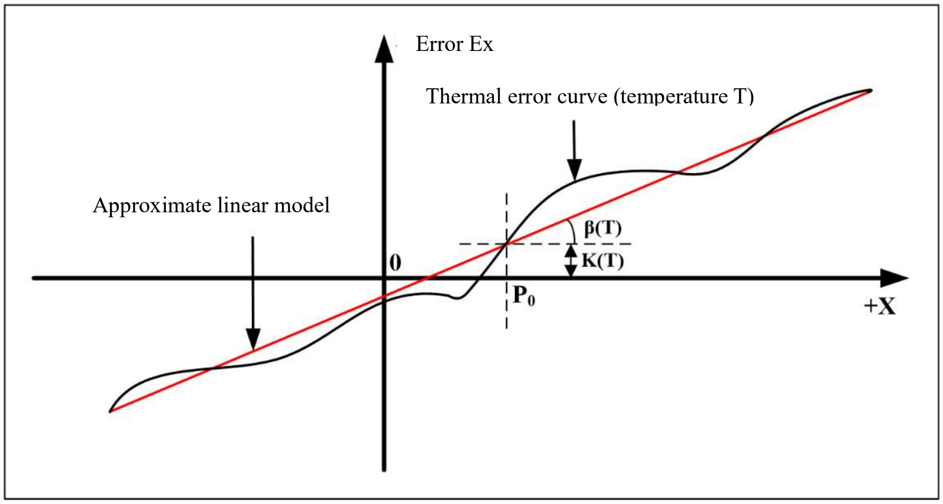
Parm 300015：Temperature sensor number or thermal error slope table

Parm 300016：Initial parameter No. 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:

$$\mathbf{Dx = -((Px - P_0) \times \tan\beta(T))}$$



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:

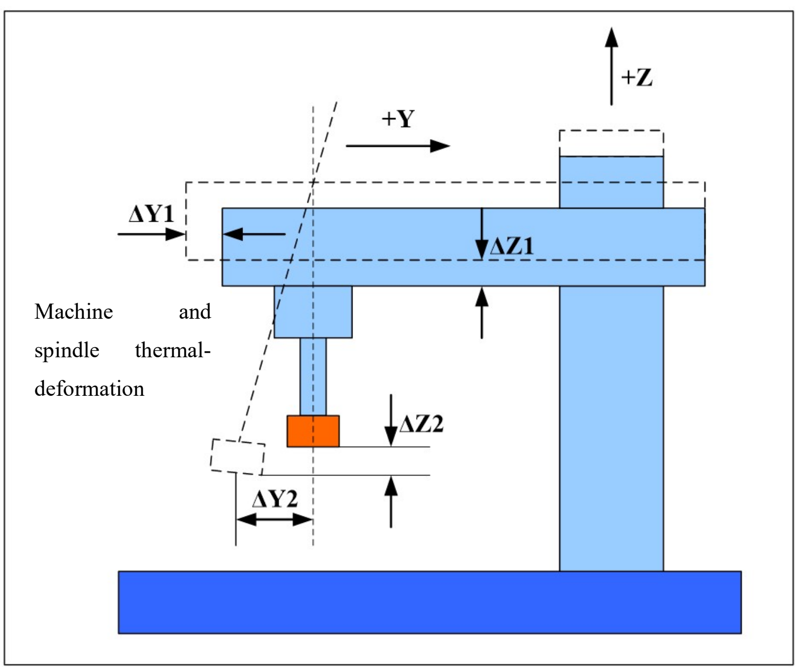
Dx＝－(K(T)+ (Px－P0)×tanβ(T))

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 ture:

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.



6.6 Reference Point Coordinate in Thermal Error Compensation

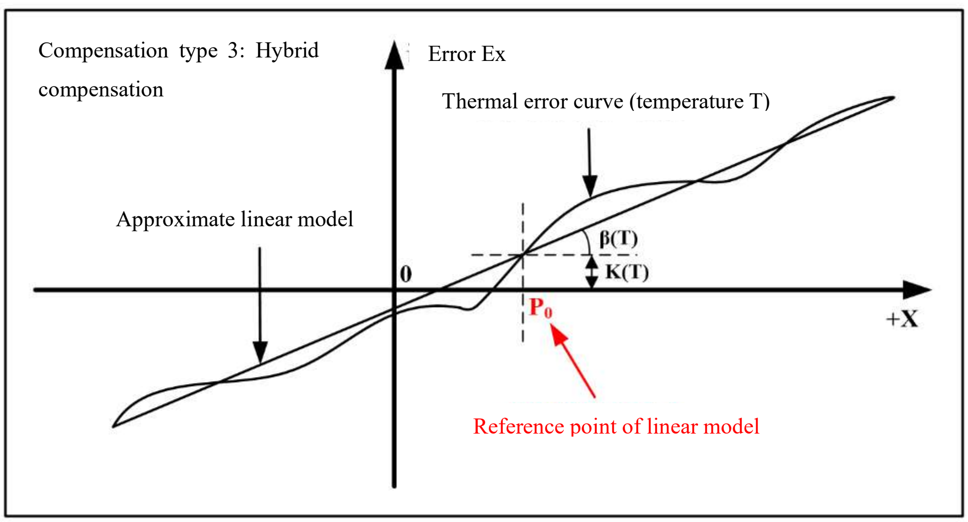
Parameter number	300006
Parameter name	Reference point coordinate in thermal error compensation
Data unit	mm, degree
Data type	REAL
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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 Initial Temperature for Thermal Error Offset Table

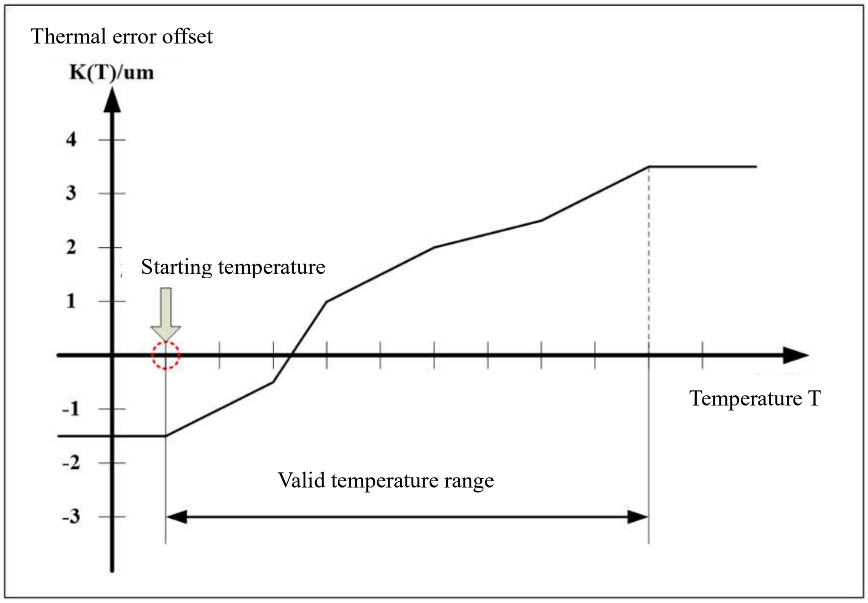
Parameter number	300007
Parameter name	Initial temperature for thermal error offset table
Data unit	℃
Data type	REAL

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

Description

This parameter is valid when the type of 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 initial temperature specified by this parameter, the thermal error offset of the initial temperature will be used to build the corresponding thermal error model.

6.8 Number of Temperature Points for Thermal Error Offset Table

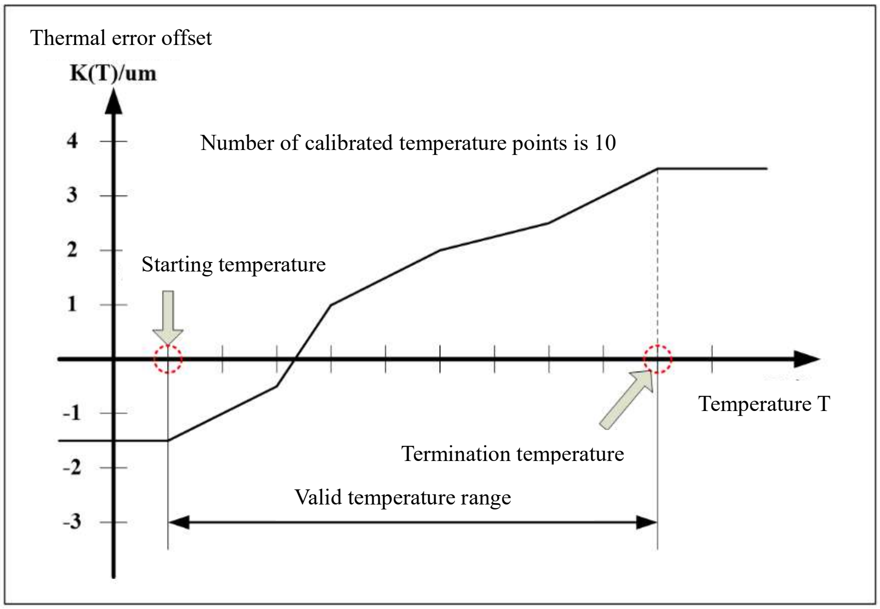
Parameter number	300008
Parameter name	Number of temperature points for thermal error offset table
Data unit	INT4
Data type	0 to 100
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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 Spacing Between Temperature Points for Thermal Error Offset Table

Parameter number	300009
Parameter name	Spacing between temperature points for thermal error offset table
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

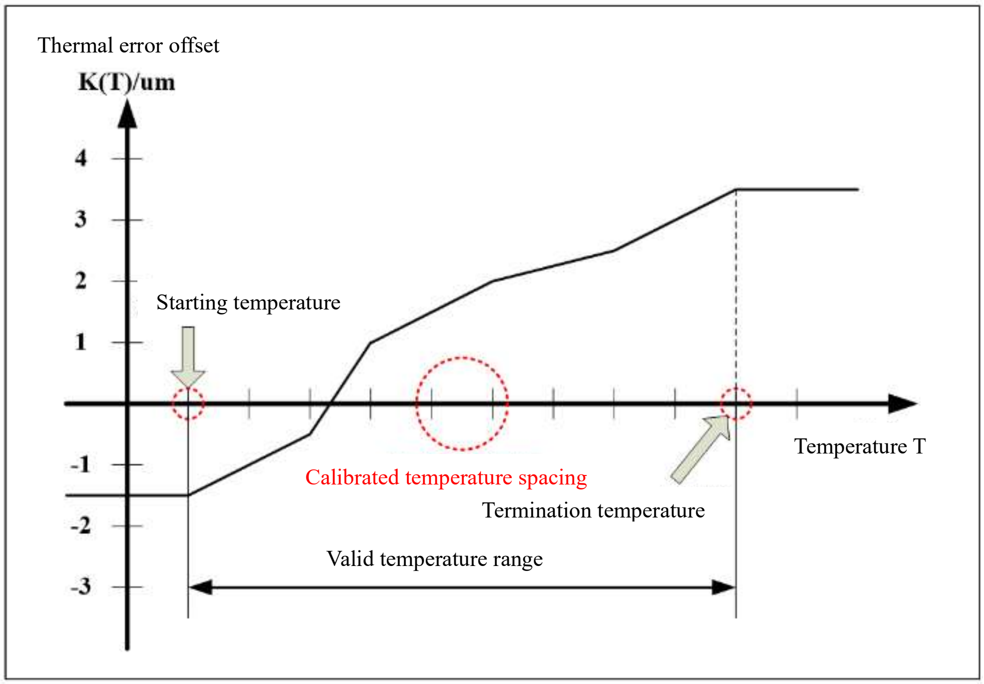
Description

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:

Termination temperature = Initial temperature + (Number of measured temperature points -1) × Spacing between measured temperature points



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 termination temperature of thermal error offset table, the thermal error offset of termination temperature will be used to build the corresponding thermal error model.

6.10 Sensor No. for Thermal Error Offset Table

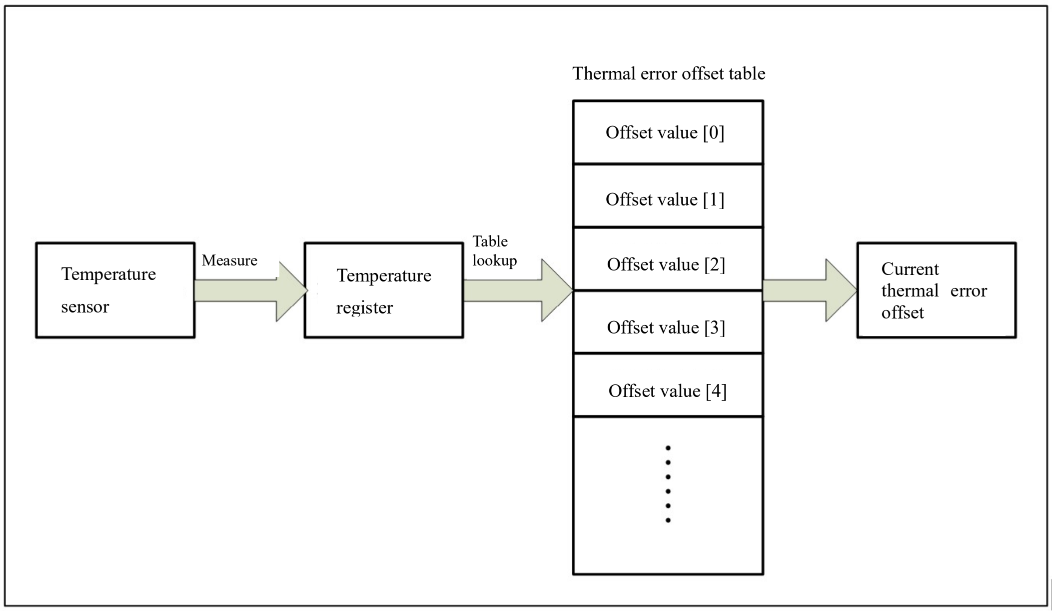
Parameter number	300010
Parameter name	Sensor No. for thermal error offset table
Data type	INT4
Valid range	−1 to 127
Default value	−1
Access level	ACCESS_MAC

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 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 HNC-8 system. When the number of temperature sensors is out of range (from 0 to 19), the thermal error compensation is invalid!

6.11 Initial Parameter of Thermal Error Offset Table

Parameter number	300011
Parameter name	Initial parameter of thermal error offset table
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

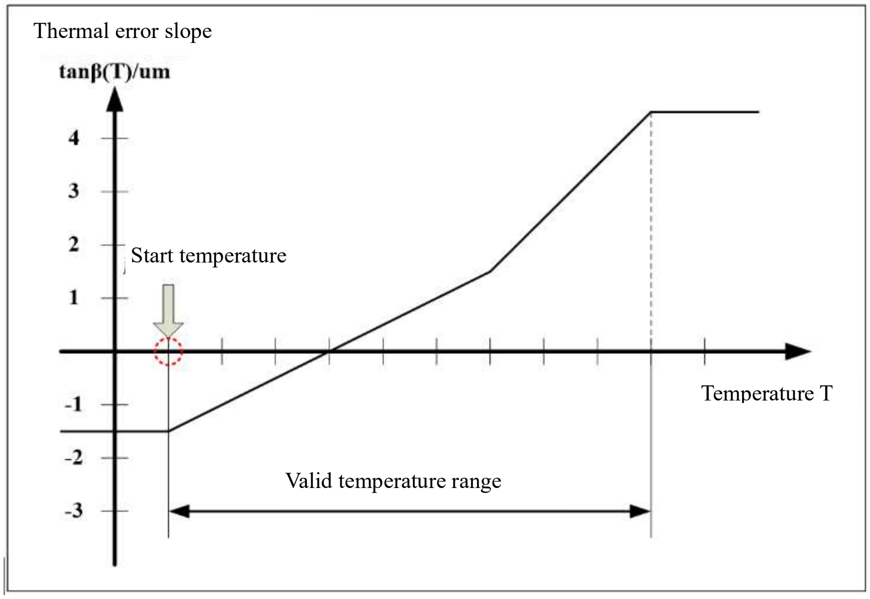
While users are specifying the initial parameter number of thermal error offset table, avoid an overlap with other data tables which have been used, and the specified storage interval is not allowed to be out of range of data table parameters.
The sign of absolute thermal error offset K(T) is determined 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 Initial Temperature for Thermal Error Slope Table

Parameter number	300012
Parameter name	Initial temperature for thermal error slope table
Data unit	℃
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 thermal error compensation is set to 2 or 3.
This parameter is to set the left boundary of effective temperature range for 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 Number of Temperature Points for Thermal Error Slope Table

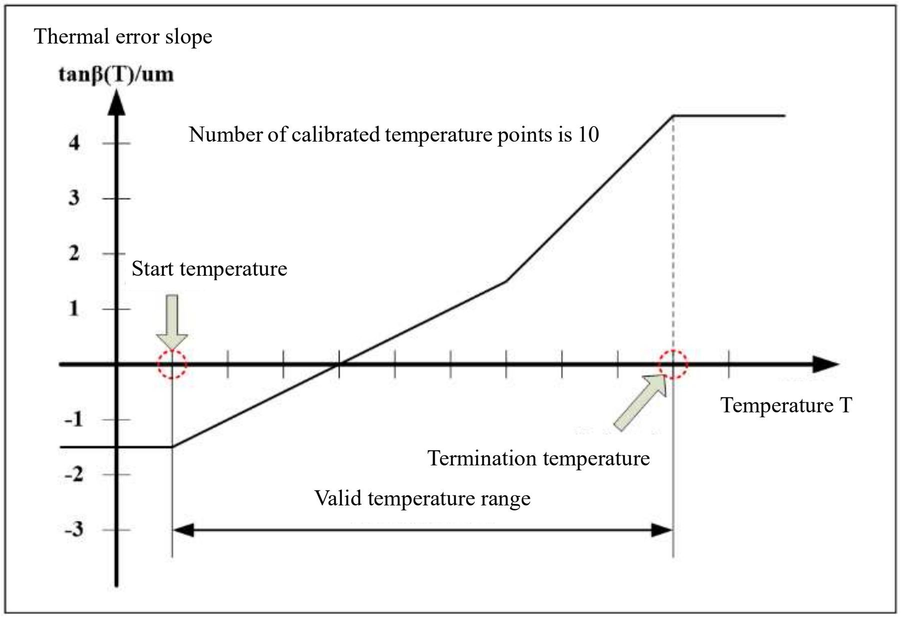
Parameter number	300013
Parameter name	Number of temperature points for thermal error slope table
Data type	INT4
Valid range	0 to 100
Default value	0
Access	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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 offset table is invalid!

6.14 Spacing Between Temperature Points for Thermal Error Slope Table

Parameter number	300014
Parameter name	Spacing between temperature points for thermal error slope table
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

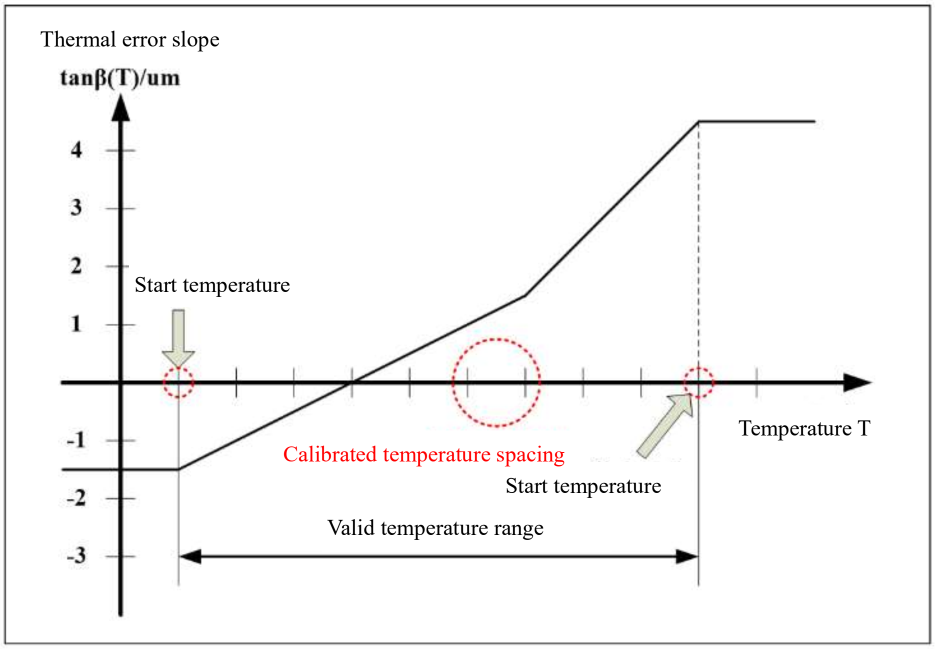
Description

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 space between measured temperature points.

After the initial temperature for thermal error slope table, number of measured temperature points, and space between measured temperature points are set, the effective temperature range for thermal error slope table is determined. Then the formula to calculate the terminal temperature is:

Termination temperature = Initial temperature + (Number of measured temperature points -1) × Spacing between two temperature points



Note

When this parameter is set to 0, the thermal error offset table is invalid!

If the temperature measured by temperature sensor is larger than the termination temperature, the thermal error slope at the position of termination temperature will be used to build the corresponding thermal error model.

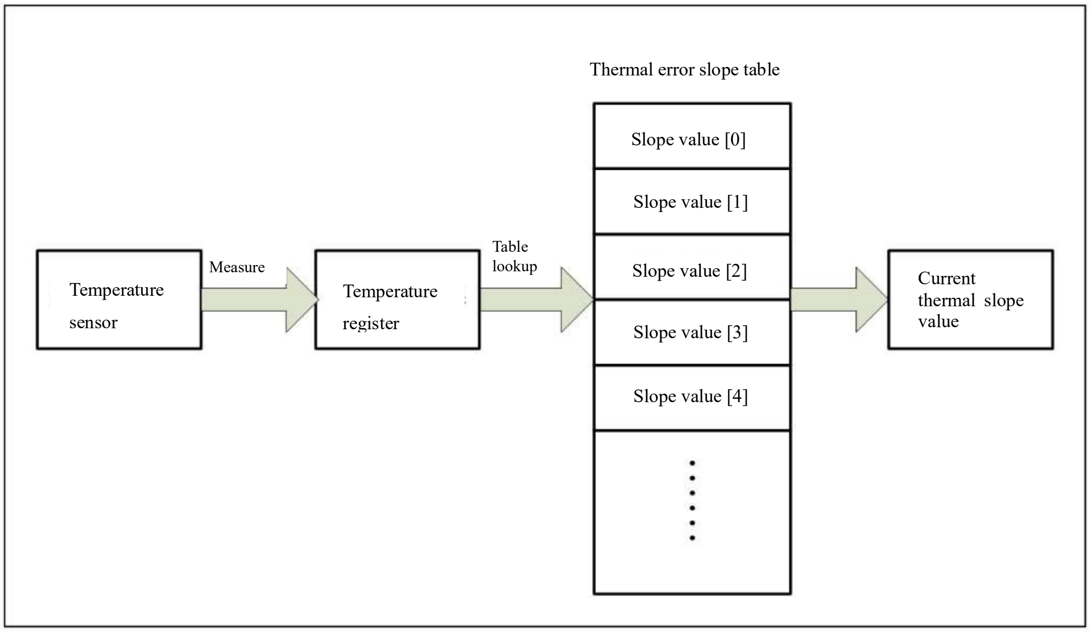
6.15 Sensor No. for Thermal Error Slope Table

Parameter number	300015
Parameter name	Sensor No. for thermal error slope table
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 HNC-8 system. When the number of temperature sensor is out of range (from 0 to 19), the thermal error compensation is invalid!

6.16 Initial Parameter of Thermal Error Slope Table

Parameter number	300016
Parameter name	Initial parameter of thermal error slope table
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 swing 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 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

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 spacing

Parm 300024：Enable pitch error modulus compensation

Parm 300025：Magnification for pitch error compensation

Parm 300026：Initial parameterof 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.

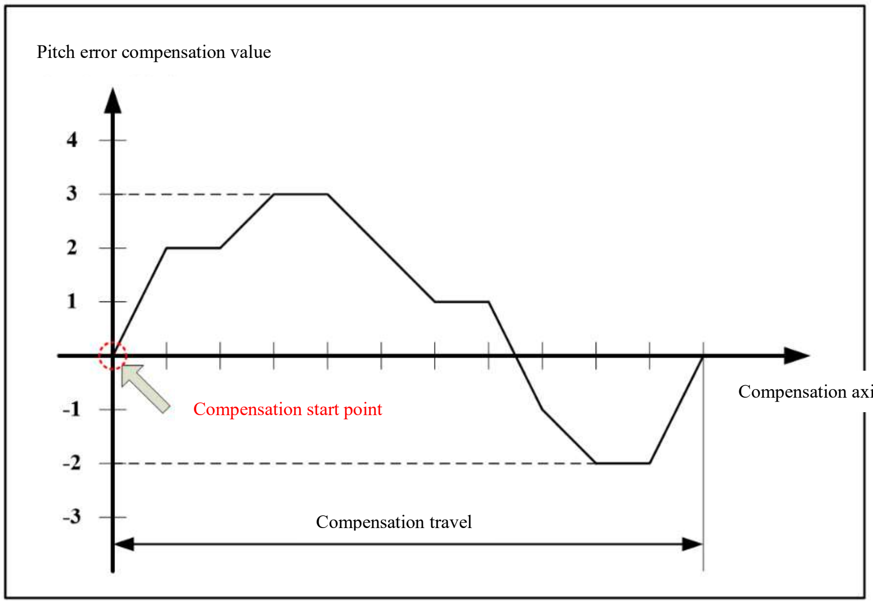
The type of pitch error compensation (1 or 2) has been specified, and the related parameters of pitch error compensation has been correctly configured.

6.19 Start Point Coordinate in Pitch Error Compensation

Parameter number	300021
Parameter name	Start point coordinate in pitch error compensation
Data unit	mm, degree
Data type	REAL
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.



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 start point coordinate 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 start point coordinate of pitch error compensation for axis Y should be set to 20mm.

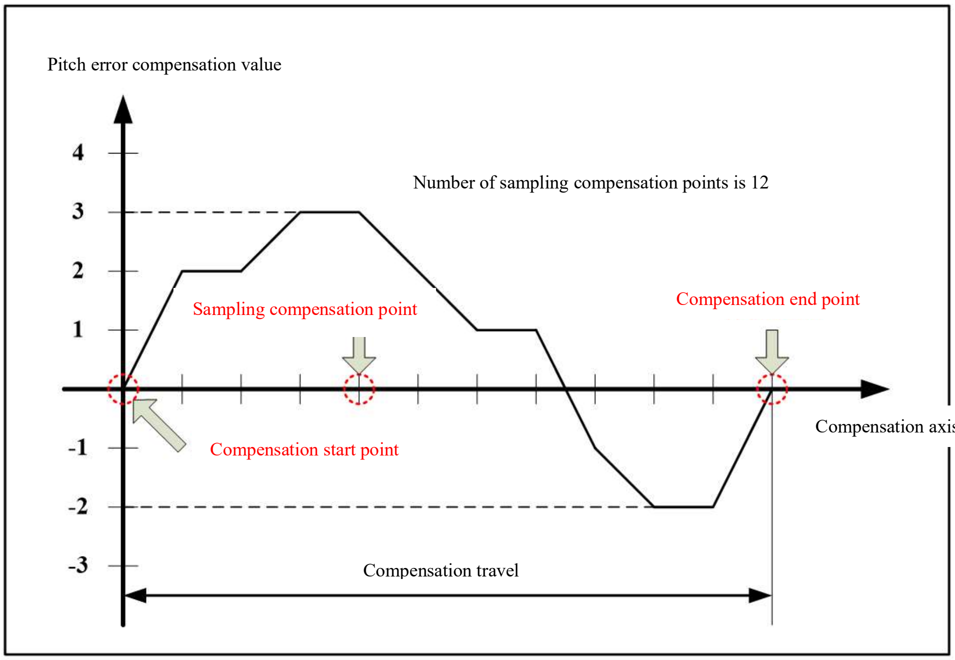
6.20 Number of Pitch Error Compensation Points

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.

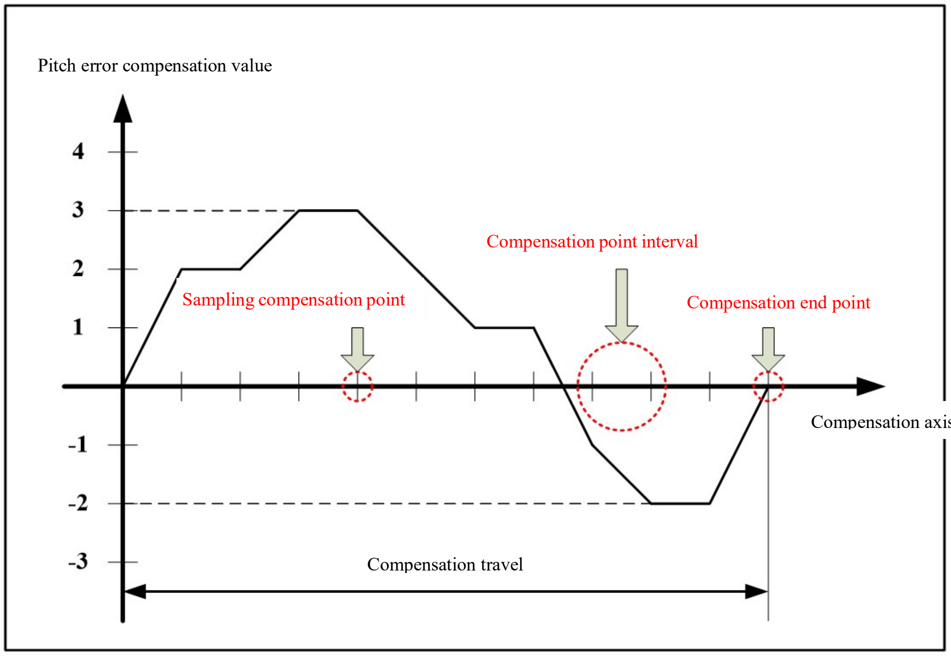
6.21 Pitch Error Compensation Point Spacing

Parameter number	300023
Parameter name	Pitch error compensation point spacing
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 spacing 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 spacing



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 Enable Pitch Error Modulus Compensation

Parameter number	300024
Parameter name	Enable 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

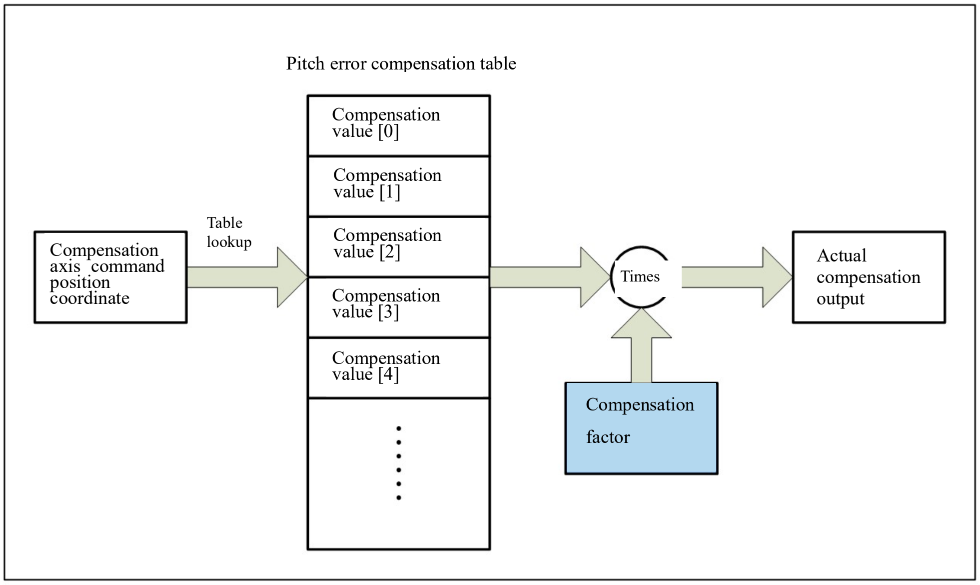
If the modulus compensation function is enabled, the compensation values at the compensation start point and the compensation end point must be set to the same value; otherwise, the saltation of compensation value may lead to an impact to the machine feed axis in the boundary of compensation travel.

6.23 Magnification for Pitch Error Compensation

Parameter number	300025
Parameter name	Magnification for pitch error compensation
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, no pitch error compensation value is output!

6.24 Initial Parameter of Pitch Error Compensation Table

Parameter number	300026
Parameter name	Initial parameter of pitch error compensation table
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

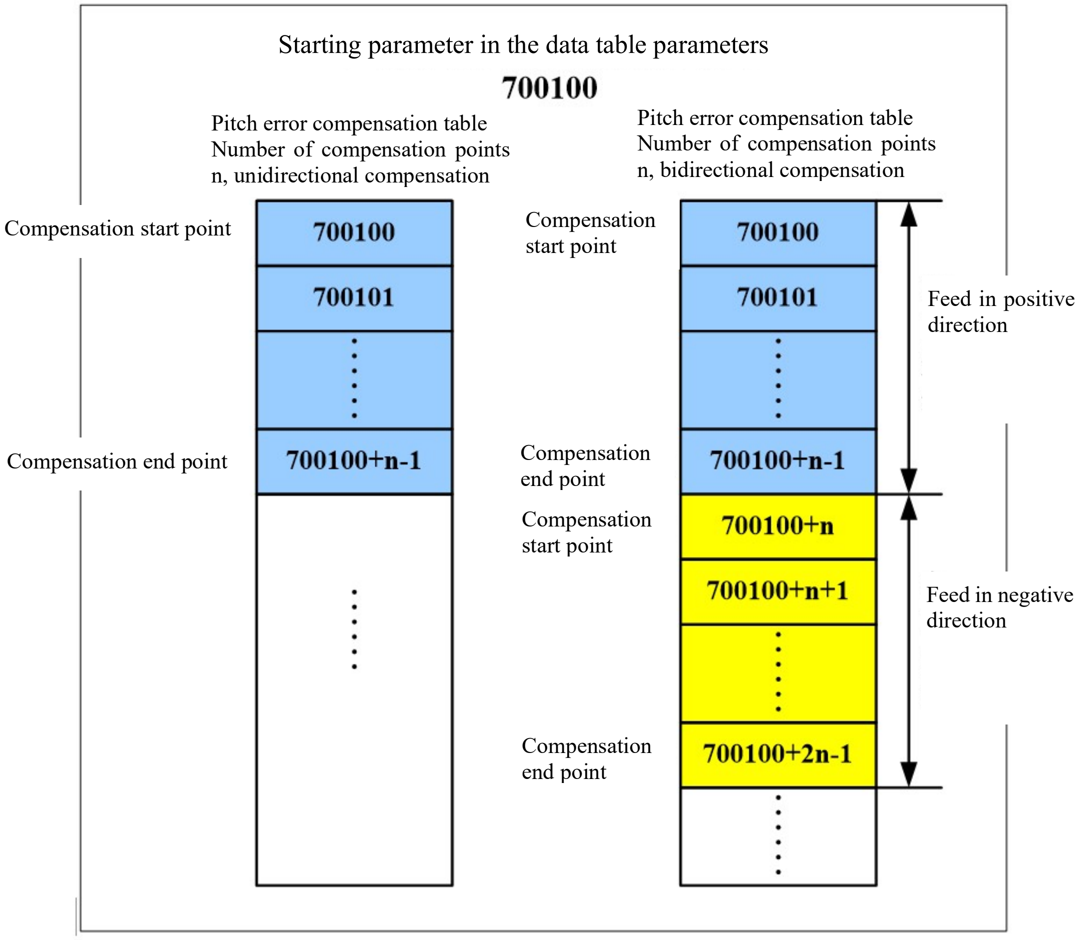
To set the initial parameter number of pitch error compensation table in the data table parameter.

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。

Parameter numbers of pitch error compensation table which are assigned to axis X are:

Initial parameter of positive compensation table：700000

Termination parameter of positive compensation table：700015

Initial parameter of negative compensation table：700016

Termination 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 point coordinate in verticality compensation 1 (P0), Reference point coordinate in verticality compensation 2 (P0).

Parm 300033, Parm 300043：Angle in verticality compensation 1 (θ), Angle in verticality compensation 2 (θ).

Suppose the datum axis is axis X, and the compensation axis is Y axis, then mathematical model of verticality compensation is:

$$D_y = (P_x - P_0) \times \theta$$

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.

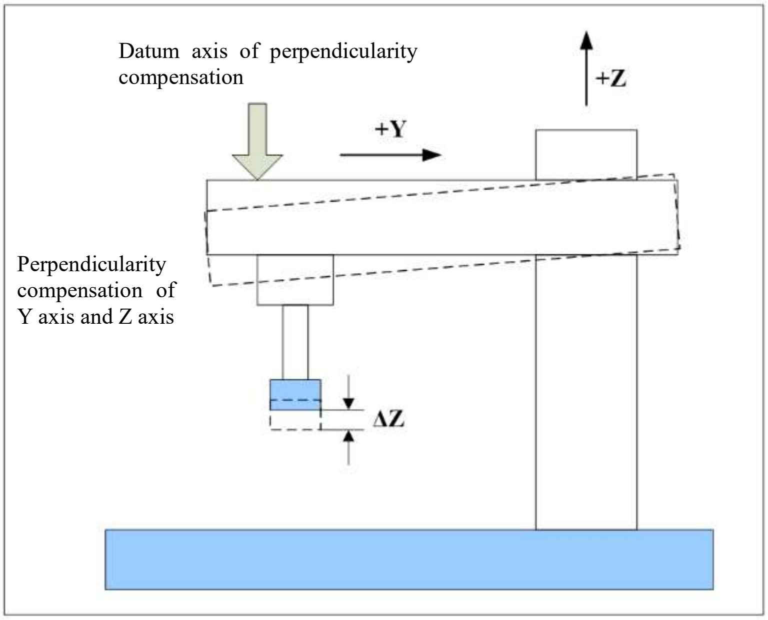
- The datum axis and compensation axis have been returned to reference point.
- This parameter is set to 1, and the related parameters of verticality compensation have been correctly set.

6.26 Datum Axis No. of Verticality Compensation

Parameter number	300031, 300041
Parameter name	Datum axis No. of verticality compensation
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, swing axis) or invalid axis, the verticality compensation will not work!

6.27 Reference Point Coordinate of Verticality Compensation

Parameter number	300032, 300042
Parameter name	Reference point coordinate of verticality compensation
Data unit	mm
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

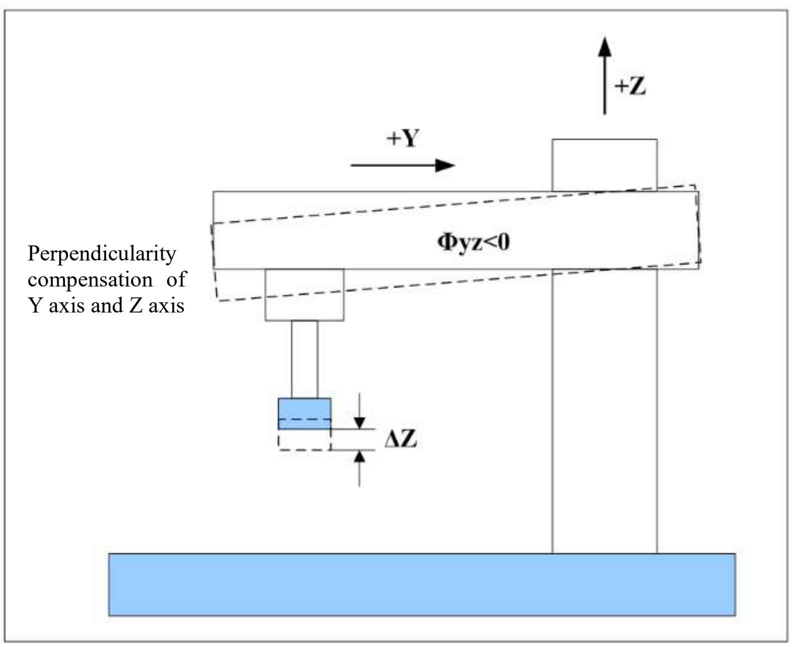
Parameter number	300033, 300043
Parameter name	Verticality compensation angle
Data unit	Degree
Data type	REAL
Default value	0
Access	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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 Datum Axis No. in Straightness Compensation

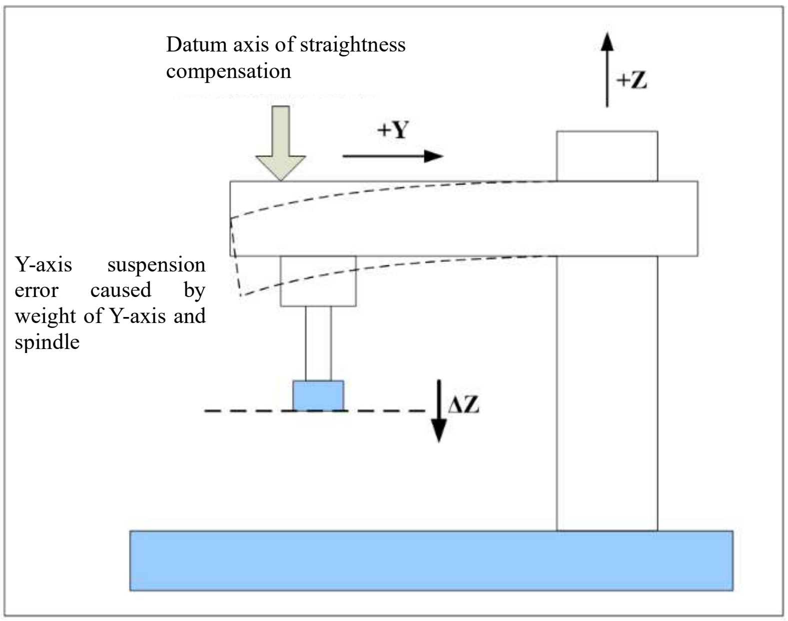
Parameter number	300050, 300065
Parameter name	Datum Axis No. in straightness compensation
Data type	INT4

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 swing 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 points 1, Number of straightness compensation points 2

Parm 300054, Parm 300069：Straightness compensation point spacing 1, Straightness compensation point spacing 2

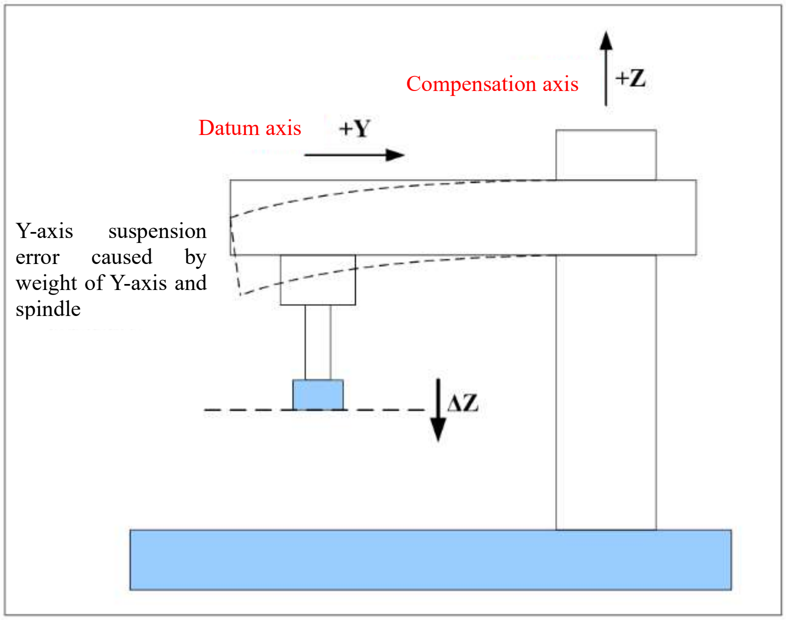
Parm 300055, Parm 300070：Straightness modulus compensation 1, Straightness modulus compensation 2.

Parm 300056, Parm 300071：Magnification for straightness compensation 1, Magnification for straightness compensation 2

Parm 300057, Parm 300072：Initial parameter of straightness compensation table 1, Initial 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.

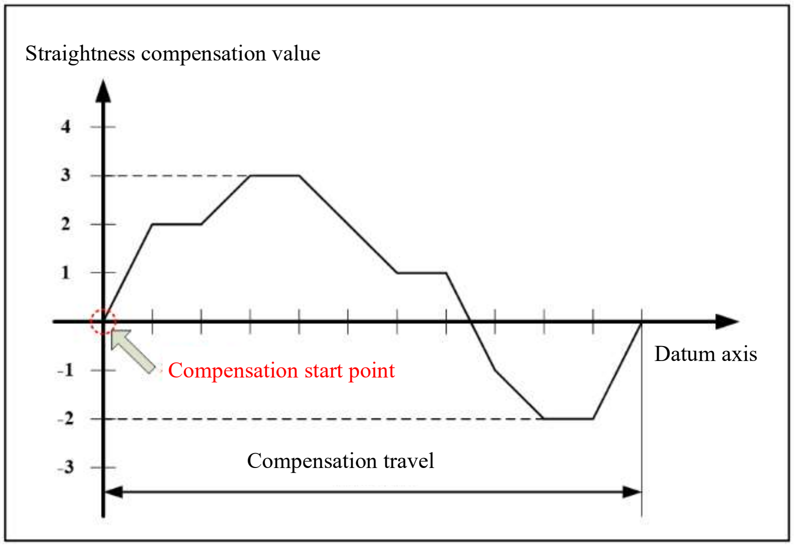


6.31 Start Point Coordinate in Straightness Compensation

Parameter number	300052, 300067
Parameter name	Start point Coordinate in straightness compensation
Data unit	mm, degree
Data type	REAL
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.



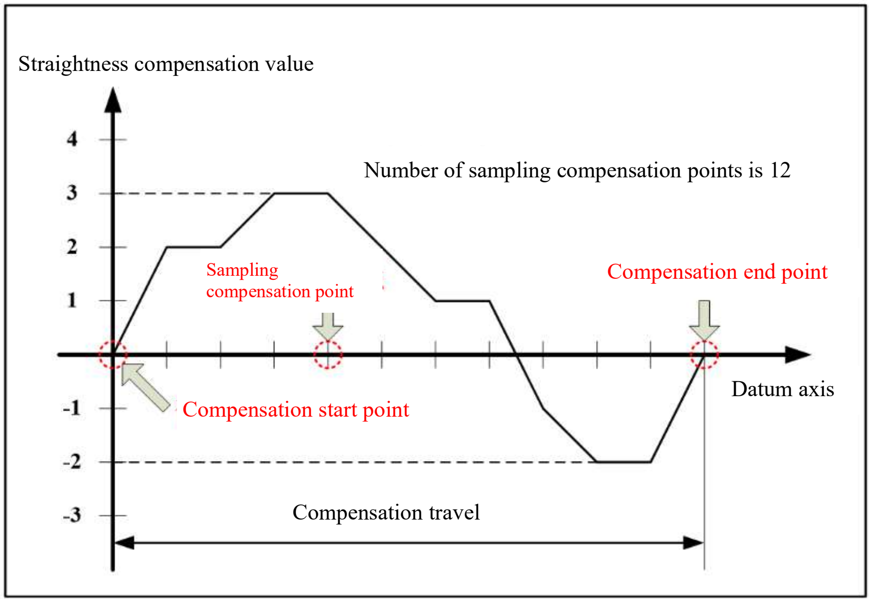
6.32 Number of Straightness Compensation Points

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!

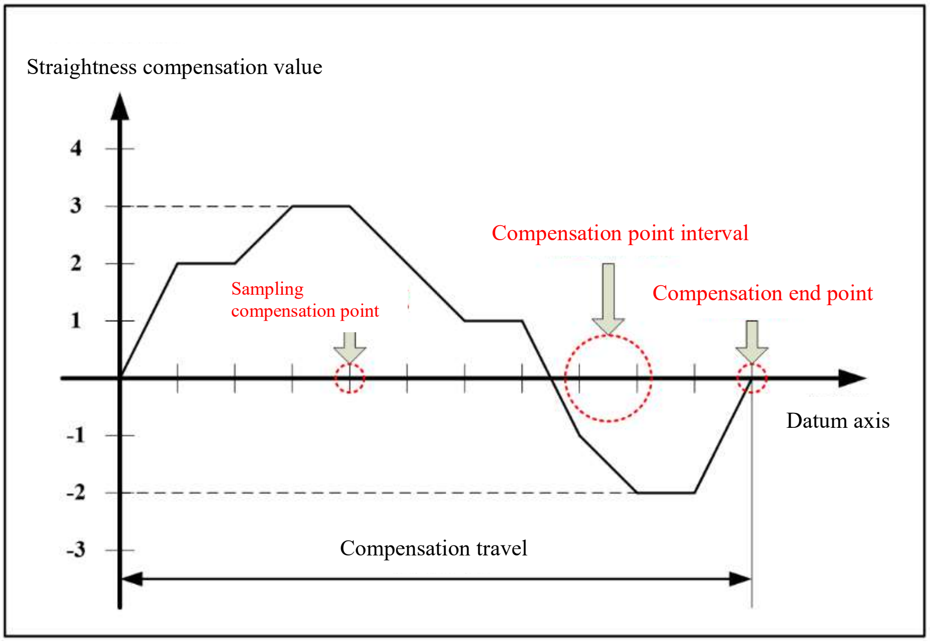
6.33 Straightness Compensation Point Spacing

Parameter number	300054, 300069
Parameter name	Straightness compensation point spacing
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, spacing between two compensation points 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 spacing



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

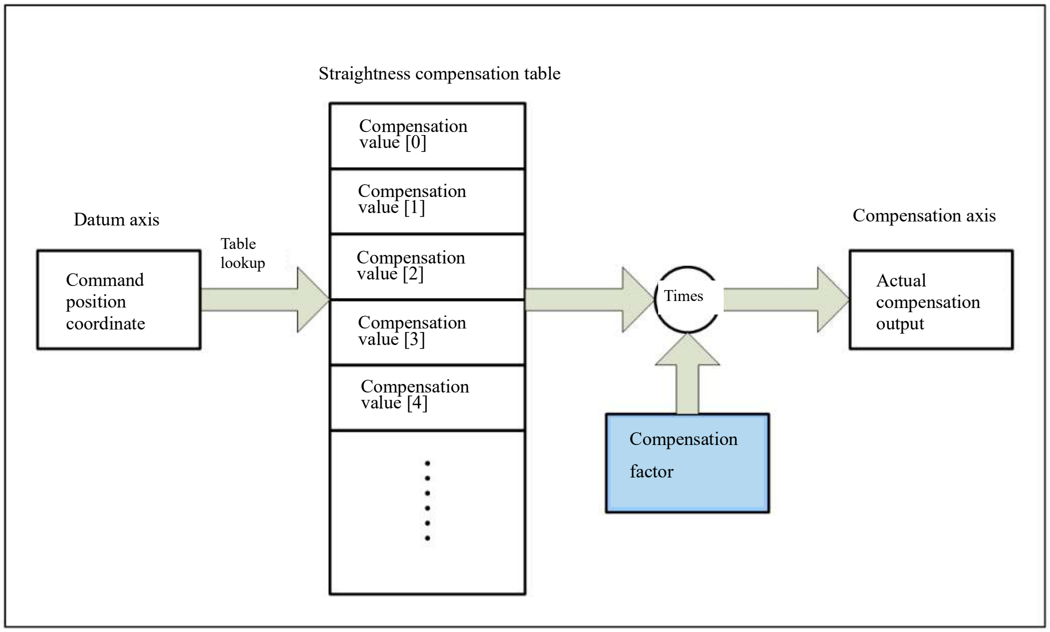
After the modulus compensation is enabled, the same compensation values at compensation start point and compensation end point must be set. Otherwise, the sudden change of compensation value may cause an impact to feed axis of machine at the boundary of compensation travel.

6.35 Magnification for Straightness Compensation

Parameter number	300056, 300071
Parameter name	Magnification for straightness compensation
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, no straightness compensation value will be output!

6.36 Initial Parameter of Straightness Compensation Table

Parameter number	300057, 300072
Parameter name	Initial parameter of straightness compensation table
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

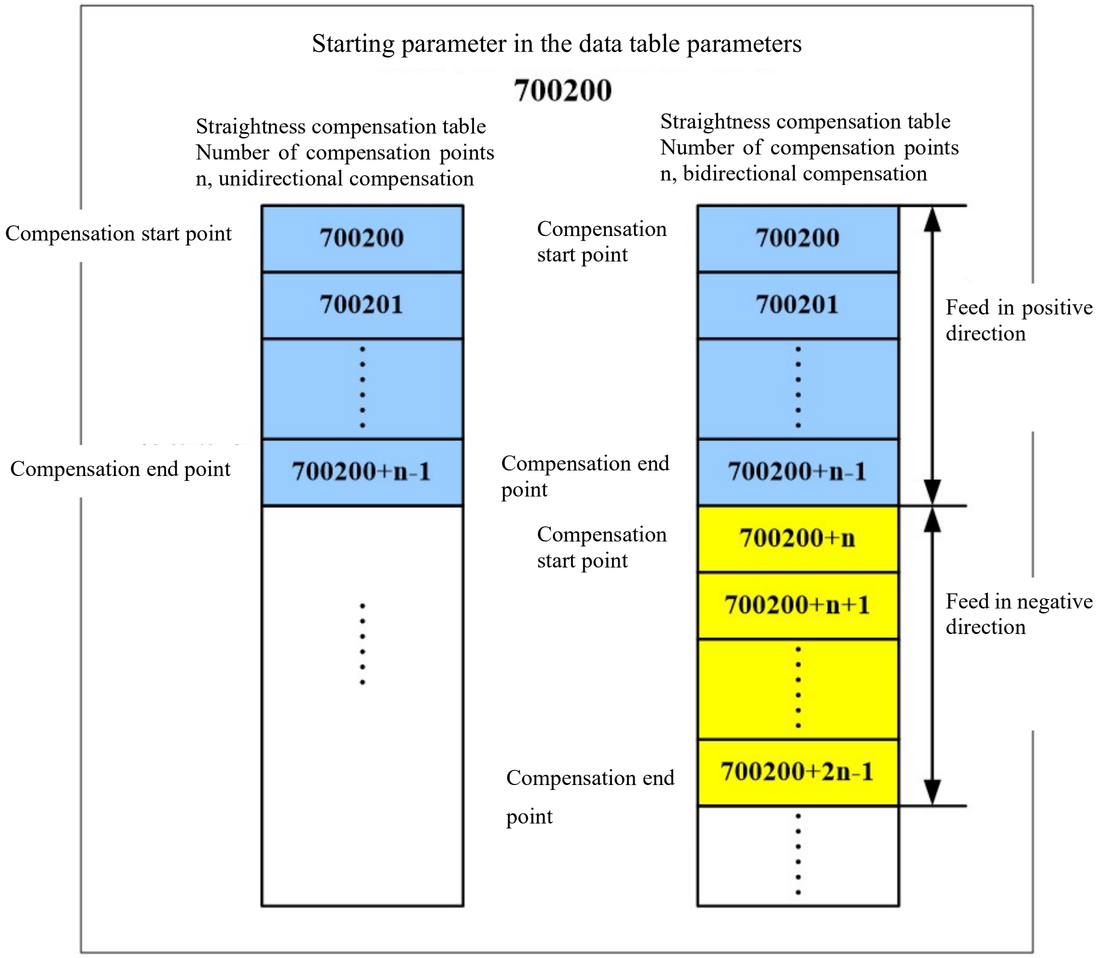
Description

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.

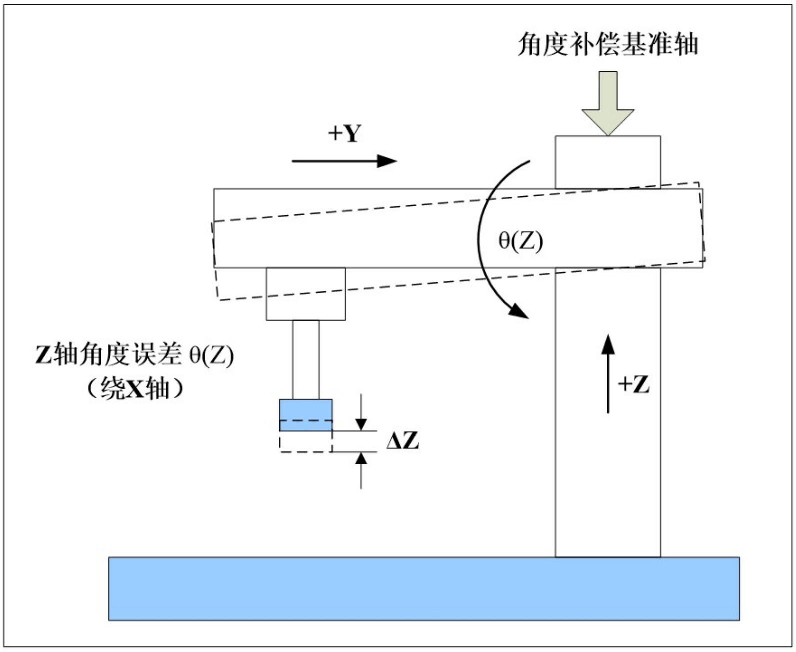
6.37 Datum Axis No. of Angular Compensation

Parameter number	300080, 300095
Parameter name	Datum axis No. of angular compensation
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 angular compensations, of which compensation datum axis numbers can be specified by Parm300080 and Parm300095 respectively, can be performed on each axis.



Note

The angular 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, swing axis) or invalid axis, the angular error compensation will not work.

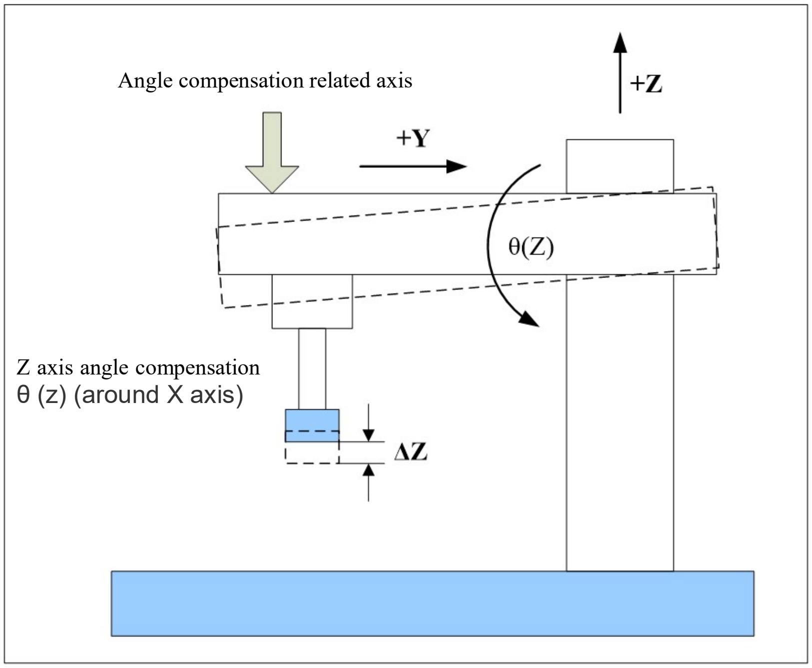
6.38 Associated Axis No. of Angular Compensation

Parameter number	300081, 300096
Parameter name	Associated axis No. of angular compensation
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 angular error of datum axis. After the datum axis number and associated axis number for angular error compensation are set, the transmission chain from the error-generated axis to compensation axis is identified.

Two angular compensations, of which compensation-associated axis numbers can be specified by Parm300083 and Parm300098 respectively, can be performed on each axis.



Note

The angular 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, swing axis) or invalid axis, the angular error compensation will not work.

6.39 Reference Point Coordinate of Angular Compensation

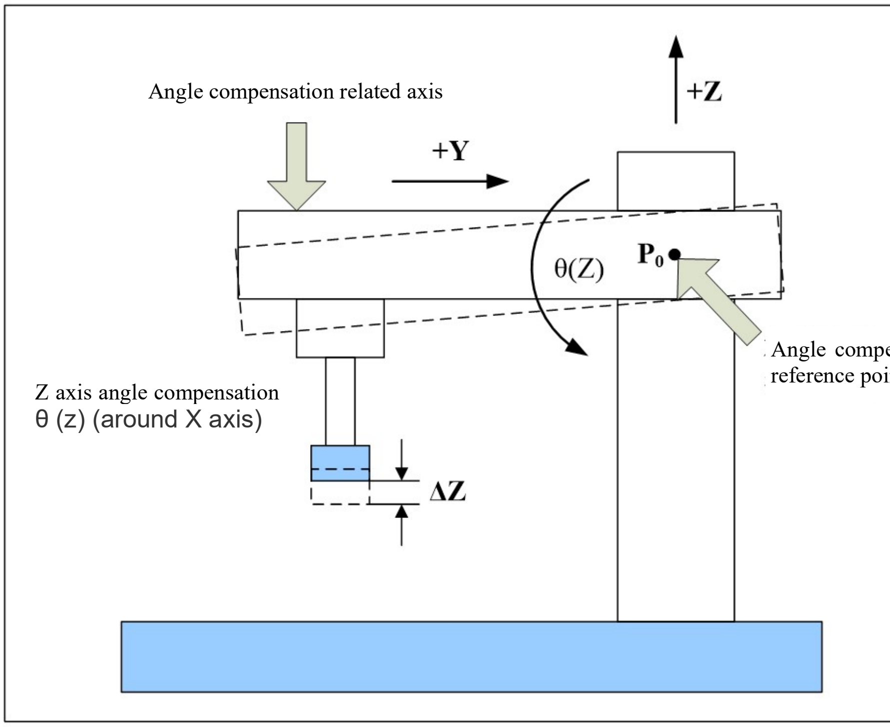
Parameter number	300082, 300097
Parameter name	Reference point coordinate of angular compensation
Data unit	mm
Data type	REAL
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is to set the coordinate of compensation reference point for the associated axis in angular compensation, and the angular error compensation value which is output to compensation axis at the compensation reference point is 0.

Two angular 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 Angular Compensation Type

Parameter number	300083, 300098
Parameter name	Angular 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 angular error compensation of the current axis.

0：The angular compensation is disabled.

1：The unidirectional angular compensation is enabled.

2：The bi-directional angular compensation is enabled.

Two angular compensations, of which types can be specified by Parm300083 and Parm300098 respectively, can be performed on each axis.

The configuration parameters about the angular compensation include:

Parm 300080, Parm 300095：Datum axis No. for angular compensation 1, Datum axis No. for angular compensation 2.

Parm 300081, Parm 300096：Associated axis No. for angular compensation 1, Associated axis No. for angular compensation 2.

Parm 300082, Parm 300097： Reference point coordinate for angular compensation 1, Reference point coordinate for angular compensation 2.

Parm 300084, Parm 300099：Start point coordinate in angular compensation 1, Start point coordinate in angular compensation 2.

Parm 300085, Parm 300100： Number of angular compensation points 1, Number of angular compensation points 2.

Parm 300086, Parm 300101： Angular compensation point spacing 1, Angular compensation point spacing 2.

Parm 300087, Parm 300102： Enable angular modulus compensation 1, Enable angular modulus compensation 2.

Parm 300088, Parm 300103： Magnification for angular compensation 1, Magnification for angular compensation 2.

Parm 300089, Parm 300104：Initial parameter of angular compensation table 1, Initial parameter of angular 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 angular error compensation is:

$Dz = (Py - P_0) \times A(x)$

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 angular 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 angular compensation has been set, and the parameters related to angular compensation have been correctly configured.

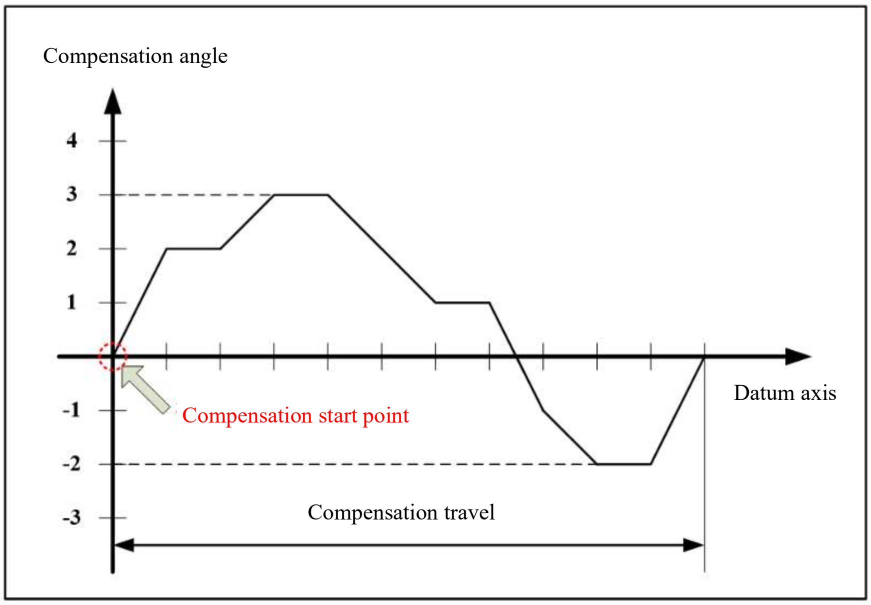
6.41 Start Point Coordinate in Angular Compensation

Parameter number	300084, 300099
Parameter name	Start point coordinate in angular compensation
Data unit	mm

Data type	REAL
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 angular error is generated. The coordinate value in machine coordinate system should be set.



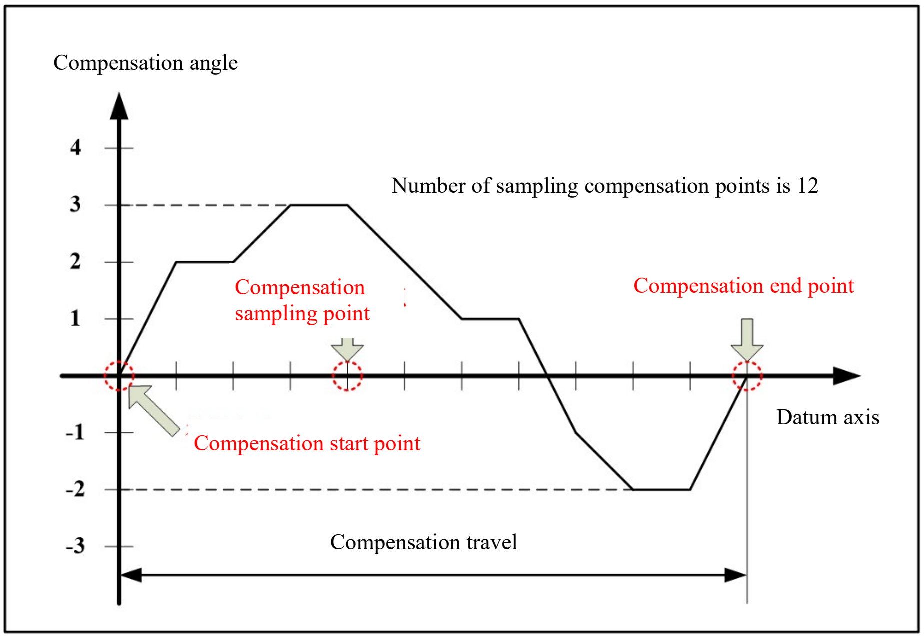
6.42 Number of Angular Compensation Points

Parameter number	300085, 300100
Parameter name	Number of angular 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 angular error generates.

Measured angular error (or compensation angle) at each sampling compensation point is stored in the angular compensation table of the specified location. Therefore, the number of sampling compensation points may determine the length of angular compensation table. Assume that the number of sampling compensation points is n, then the length of angular compensation table is n for the unidirectional compensation, and 2n for the bi-directional compensation.



Note

The angular compensation and the corresponding angular compensation table are invalid when the number of compensation points is set to 0.

6.43 Angular Compensation Point Spacing

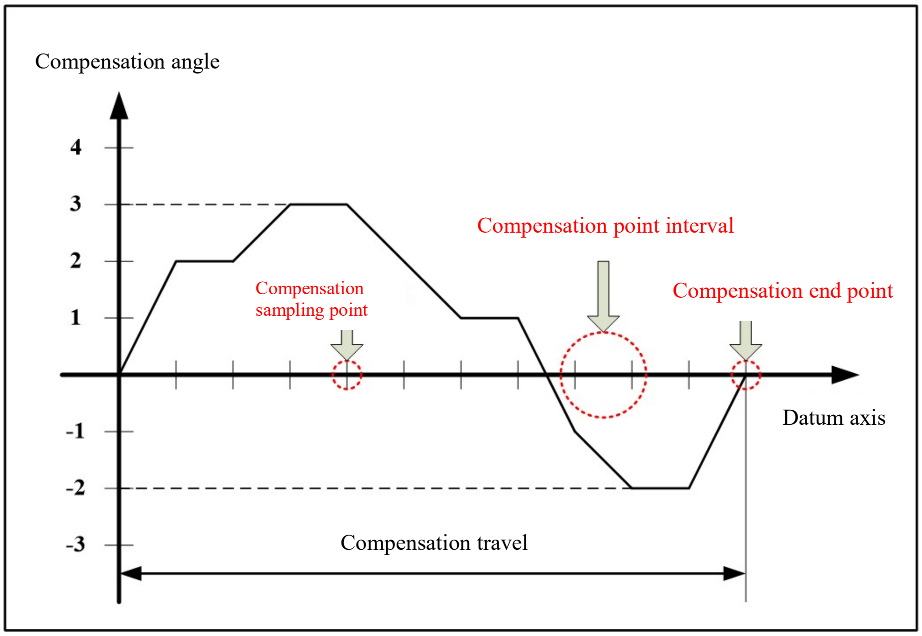
Parameter number	300086, 300101
Parameter name	Angular compensation point spacing
Data unit	mm
Data type	REAL
Valid range	0 to 10000.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

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 angular error is generated.

After the compensation start point, number of compensation points, spacing between two compensation points 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 spacing



Note

The angular compensation is invalid when the spacing between two compensation points is set to 0.

6.44 Enable Angular Modulus Compensation

Parameter number	300087, 300102
Parameter name	Enable angular 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

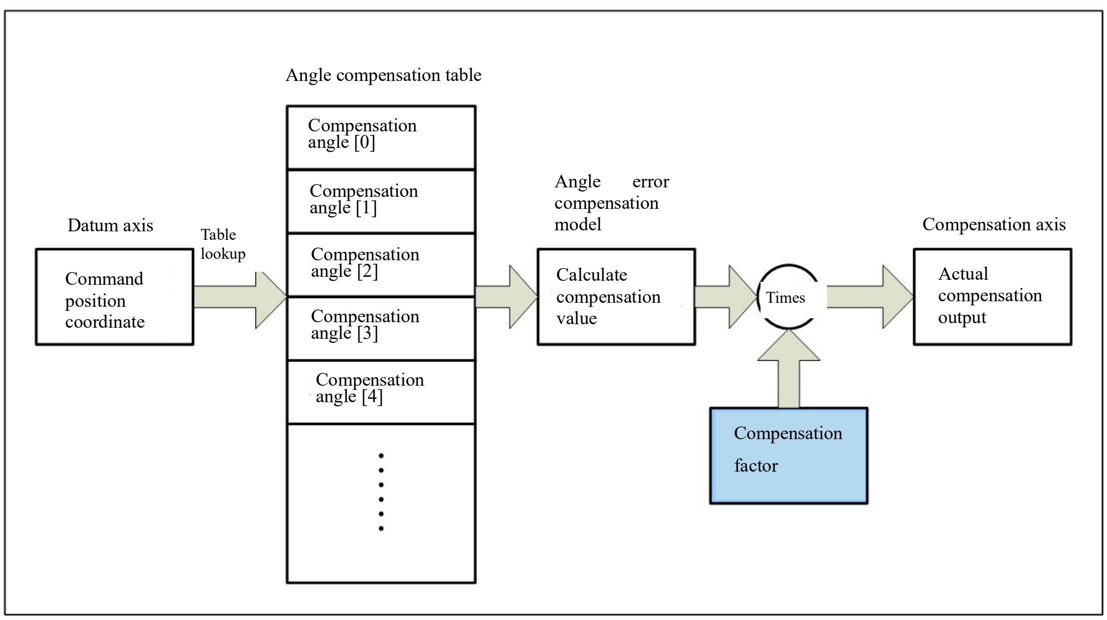
If the modulus compensation is enabled, the compensation angle at the compensation start point and the compensation end point must be set to same value; otherwise, the sudden changes of compensation value at the boundary of compensation travel will cause a shock to the feed axis of machine

6.45 Magnification for Angular Compensation

Parameter number	300088, 300103
Parameter name	Magnification for angular compensation
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 angular 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, no angular error compensation value is output.

6.46 Initial Parameter of Angular Compensation Table

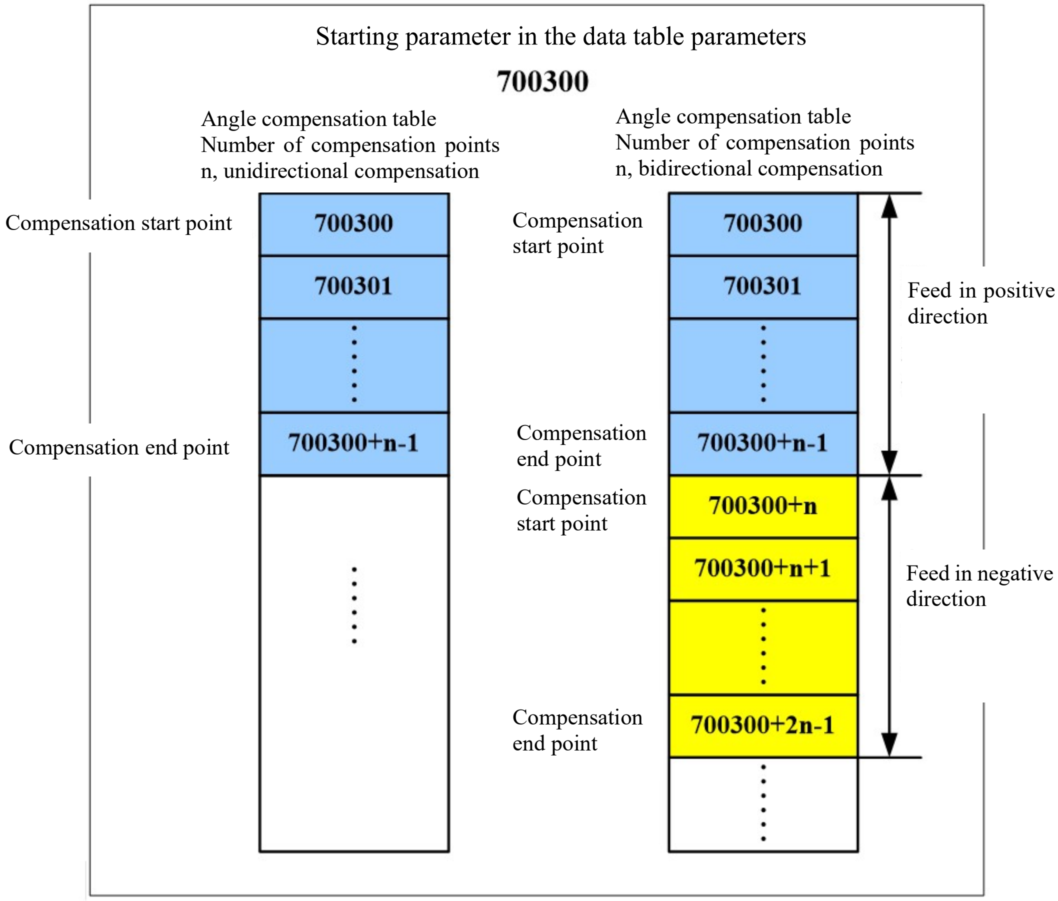
Parameter number	300089, 300104
Parameter name	Initial parameter of angular compensation table
Data type	INT4
Valid range	700000 to 719999
Default value	700000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the start parameter number of angular compensation table in the data table parameters.

The angular compensation table is used to store the compensation angle at each sampling compensation point. The compensation angle can be gained by the pre-calibrated angular error compensation of datum axis, with the basic unit degree.

After the start 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 angular 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 angular 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 Pass Quadrant Jump Compensation Type

Parameter number	300125
Parameter name	Pass 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 pass 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 pass quadrant jump compensation can be performed on the command position or command torque to avoid the jump.

The pass quadrant jump compensation of specified axis is

0：Disabled.

1：Enabled for the position loop.

2：Enabled for the current loop.

The configuration parameters about pass quadrant jump compensation of position loop include:

Parm 300126：Pass quadrant jump compensation value.

Parm 300127：Lag time of pass quadrant jump compensation.

Parm 300130：Acceleration time of pass quadrant jump compensation.

Parm 300131：Deceleration time of pass quadrant jump compensation.

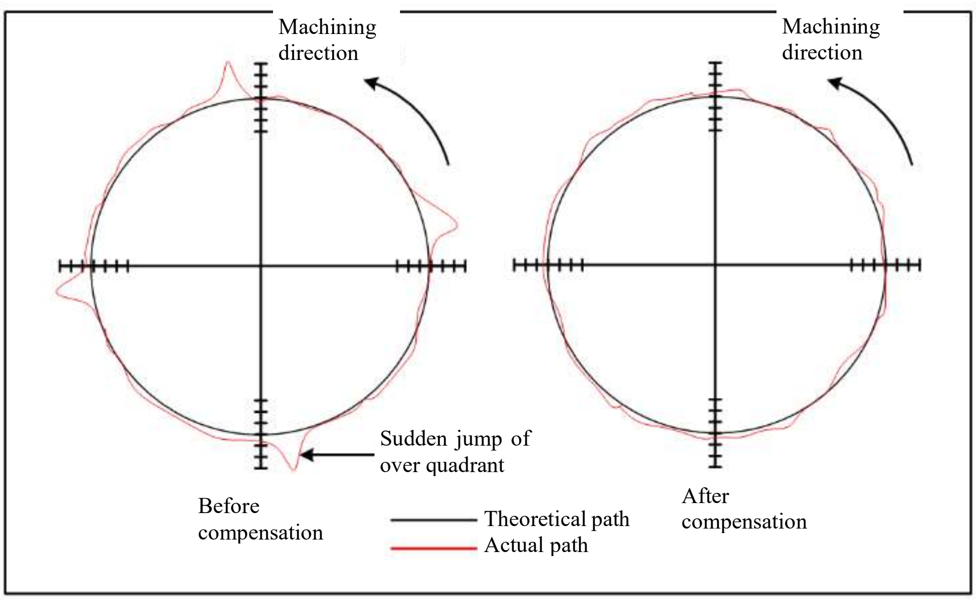
The configuration parameters about pass quadrant jump compensation of current loop include:

Parm 300127：Lag time of pass quadrant jump compensation.

Parm 300130：Acceleration time of pass quadrant jump compensation.

Parm 300131：Deceleration time of pass quadrant jump compensation.

Parm 300132：Torque value of pass quadrant jump compensation.



Note

The pass quadrant compensation is valid after the current axis has returned to reference point.

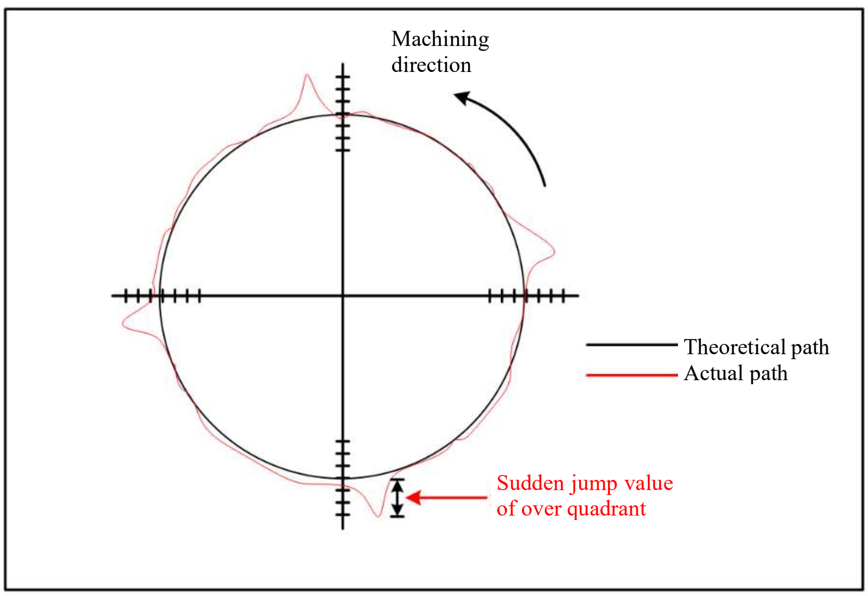
6.48 Pass Quadrant Jump Compensation Value

Parameter number	300126
Parameter name	Pass quadrant jump compensation value
Data unit	mm
Data type	REAL
Valid range	-1.0 to 1.0
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used for the pass quadrant compensation of position loop, generally is set to the maximum jump displacement when the pass quadrant of machine linear feed axis is reversed (e.g. pass quadrant of in-plane circular interpolation)

This jump value is generally measured by the in-plane circular grating or ballbar.



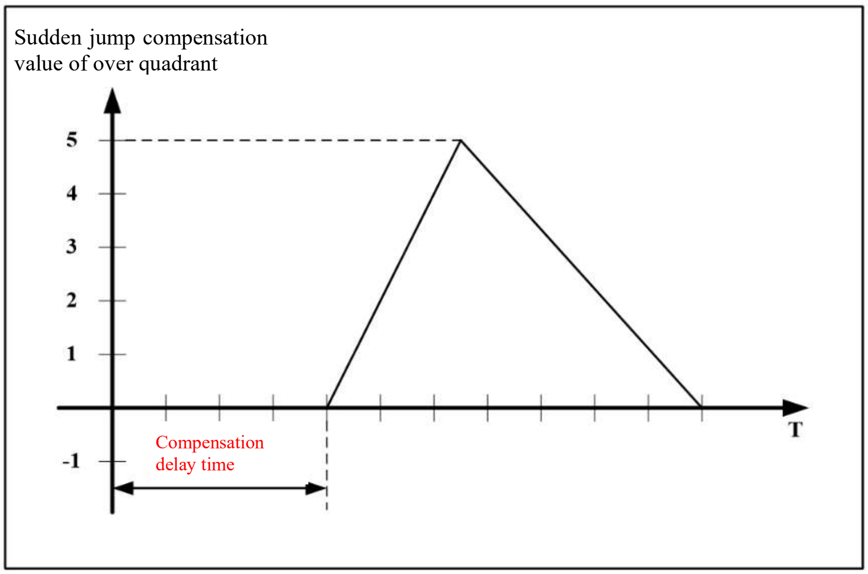
6.49 Lag Time of Pass Quadrant Jump Compensation

Parameter number	300127
Parameter name	Lag time of pass quadrant jump compensation
Data unit	ms
Data type	INT4
Valid range	0 to 10000
Default value	0

Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

The pass quadrant jump compensation is triggered when the linear feed axis of machine starts from the resting state, or the pass quadrant is reversed. This parameter is to set the delay time to trigger the compensation.



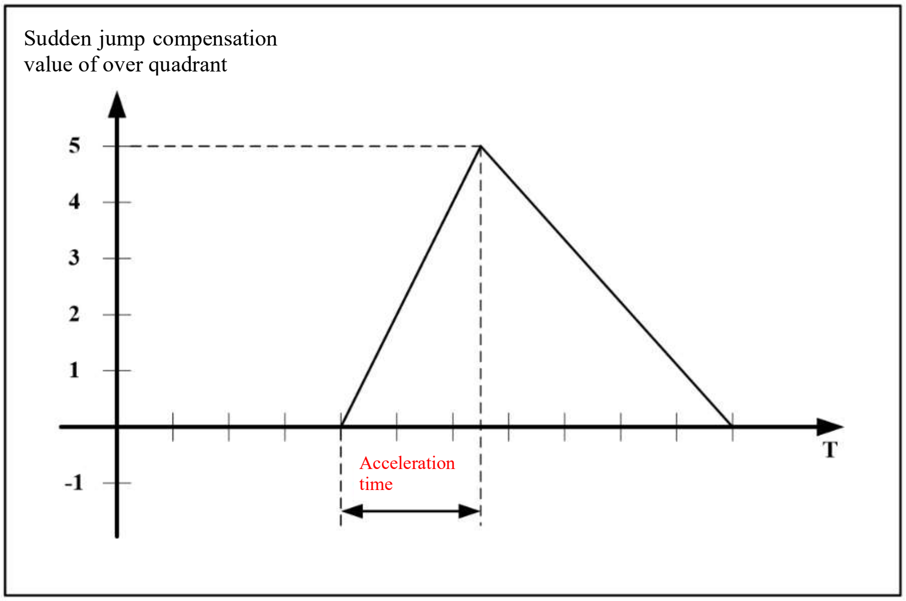
6.50 Acceleration Time of Pass Quadrant Jump Compensation

Parameter number	300130
Parameter name	Acceleration time of pass quadrant jump compensation
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

For the pass quadrant jump compensation of position loop, this parameter determines the time that the compensation value increases from 0 to the value specified by Parm300126.

For the pass quadrant jump compensation of current loop, this parameter determines the time that the compensation value increases from 0 to the value specified by Parm300132.



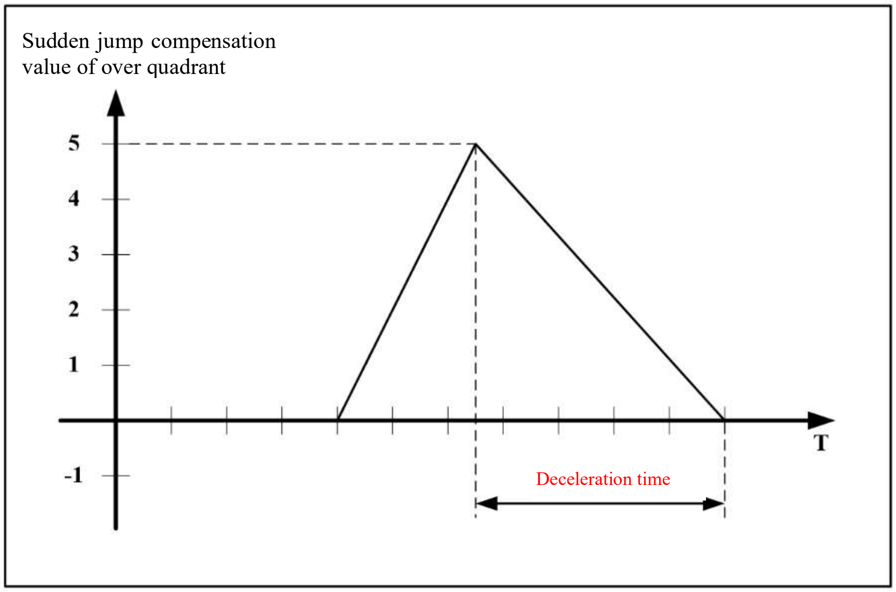
6.51 Deceleration Time of Pass Quadrant Jump Compensation

Parameter number	300131
Parameter name	Deceleration time of pass quadrant jump compensation
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

For the pass quadrant jump compensation of position loop, this parameter determines the time that the compensation value is reduced from the value specified by Parm300126 to 0.

For the pass quadrant jump compensation of current loop, this parameter determines the time that the compensation value is reduced from the value specified by Parm300132 to 0.



6.52 Torque Value of Pass Quadrant Jump Compensation

Parameter number	300132
Parameter name	Torque value of pass quadrant jump compensation
Data type	INT4
Valid range	-10000 to 10000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is used for the pass quadrant jump compensation in current loop. The set value determines the crest value of command torque on which the compensation needs to be performed when the axis starts or the pass quadrant is reversed.

(The output command torque of current loop for servo drive effectively ranges from -32767 to 32767).

Note

If the electronic gear ratio of current axis is negative, the command torque of compensation should be reversed.

6.53 Max. Torque of Pass Quadrant Jump Compensation

Parameter number	300134
Parameter name	Max. torque of pass quadrant jump compensation

Data type	INT4
Valid range	-10000 to 10000
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is the maximum torque of jump compensation in the speed loop feed forward mode. The over quadrant jump compensation value cannot be over the set value.

6.54 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：Initial parameter number 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 **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：Initial parameter number 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)

$$\mathbf{\tan\beta(T_0, T_1, T_2...) = C_t + A_0 \times T_0 + A_1 \times T_1 + A_2 \times T_2 + \ldots\ldots}$$

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.

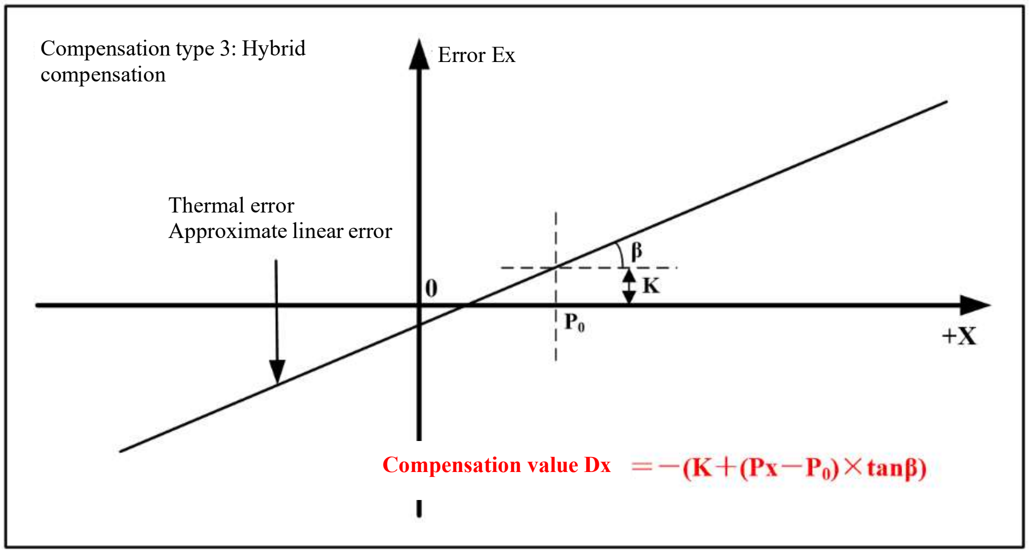
$$\mathbf{Dx = -((Px - P_0) \times \tan\beta)}$$

- 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 about multi-linear compensation has been properly configured.



6.55 Reference Point Coordinate of Thermal Error Multi-linear Compensation

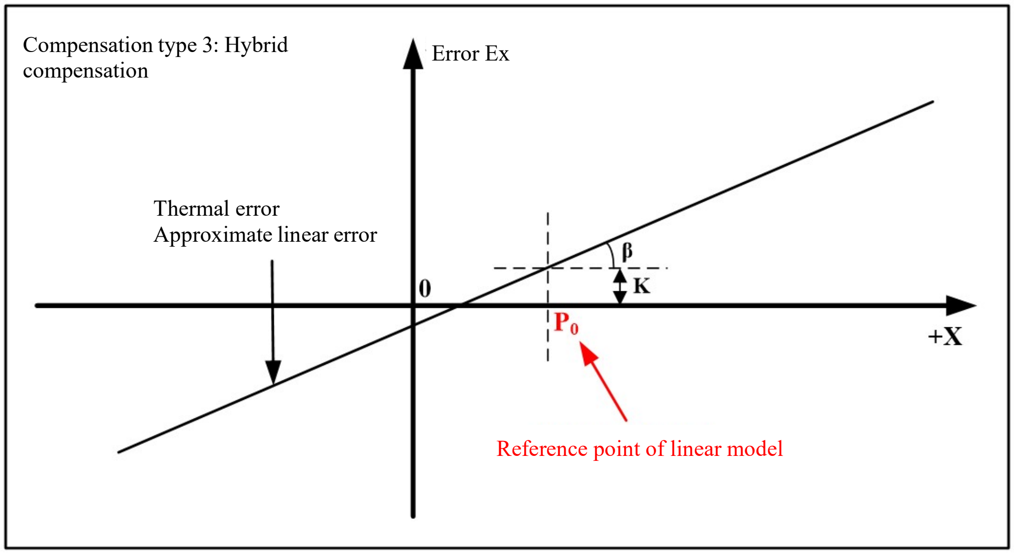
Parameter number	300136
Parameter name	Reference point coordinate of thermal error multi-linear compensation
Data unit	mm, degree
Data type	REAL
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

This parameter is valid when the type of multi-linear compensation is set to 2 or 3.

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 coordinate 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).



6.56 Spindle Offset Model Constant

Parameter number	300137
Parameter name	Spindle offset model constant
Data unit	um, 0.001degree
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 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.

6.56 Number of Access Sensors for Spindle Offset Model

Parameter number	300138

Parameter name	Number of access sensors for spindle offset model
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.

6.58 Sensor Series of Spindle Offset Model

Parameter number	300139
Parameter name	Sensor series of spindle offset model
Data type	ARRAY
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 (1 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.

6.59 Initial Parameter of Spindle Offset Model Coefficient Table

Parameter number	300140
Parameter name	Initial parameter of spindle offset model coefficient table
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.

6.59 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 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 constant of screw rod slope model Ct=9.7647.

6.61 Number of Access Sensors for Screw Rod Slope Model

Parameter number	300142
Parameter name	Number of access sensors for screw rod slope model
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 for 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 for screw rod slope model is 2.

6.62 Sensor Series of Screw Rod Slope Model

Parameter number	300143
Parameter name	Sensor series of screw rod slope model
Data type	ARRAY
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 (1 to 19).

Example

The multi-linear regression model of screw rod thermal-expansion slope tanβ for Axis X is:

$$\tan\beta(T_0, T_2) = 9.7647 + 5.8207T_0 - 1.047T_2$$

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.

6.63 Initial Parameter of Screw Rod Slope Model Coefficient Table

Parameter number	300144
Parameter name	Initial parameter of screw rod slope model coefficient table
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 initial 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.

6.64 Reverse Compensation Rate Type

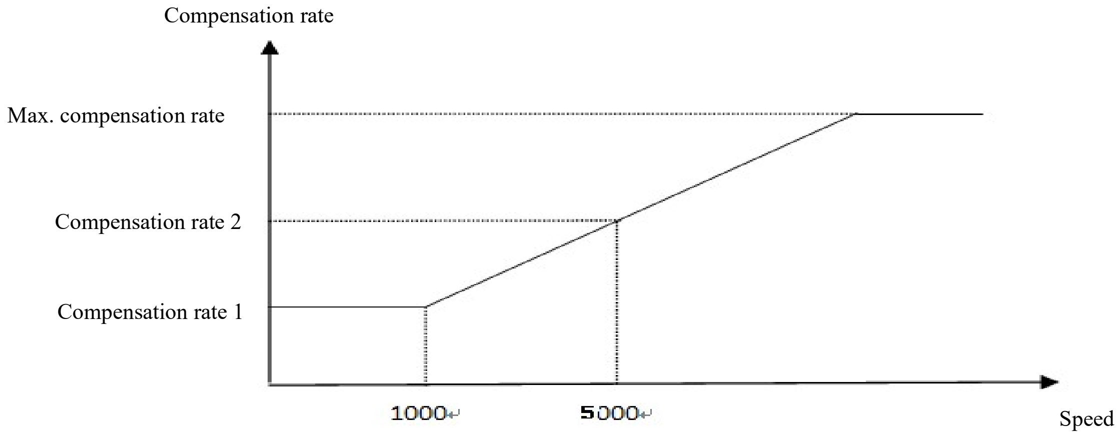
Parameter number	300150
Parameter name	Reverse compensation rate type
Data type	REAL
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the way to calculate the compensation in each 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.



6.65 Min. Reverse Compensation Time

Parameter number	300151
Parameter name	Min. reverse compensation time
Data type	REAL
Valid range	0.0000 to 1000.0000
Default value	0.0300
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.

6.65 Max. Reverse Compensation Time

Parameter number	300152
Parameter name	Max. reverse compensation time
Data type	REAL
Valid range	0.0000 to 1000.0000
Default value	0.0300
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

To set the optimum compensation rate to prosess the circle of radius 100mm at the speed 5000mm/min.

6.67 Feed Forward Compensation Type

Parameter number	300154
Parameter name	Feed forward Compensation type
Data type	INT4
Valid range	0 to 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

During the motion of machine, there is a tracking error between the specified position and actual position, which results in the error between the command contour and actual contour. The tracking error can be reduced via the feed forward compensation to increase the precision of contour.

0：The feed forward compensation is disabled.

1：The feed forward compensation is enabled.

6.68 Feed Forward Compensation Coefficient

Parameter number	300155
Parameter name	Feed forward compensation coefficient
Data type	REAL
Valid range	0.0000 to 1.0000
Default value	0.0000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Before the feed forward compensation speed is performed, users need to predict the actual speed. Users will subtract the predicted speed from the command speed in the current cycle to get the estimated tracking error before the feed forward compensation is performed. The feed forward compensation velocity coefficient is the velocity coefficient of estimated actual speed.

The model formula for estimating actual speed is:

$$Vp_i = k_1 * Vd_{i-1} + Vp_{i-1} - k_2 * a_{i-1}$$

P_i is the estimated actual speed in the current cycle.

d_{i-1} is the value of the command speed of the last cycle minus the estimated speed of the last cycle.

P_{i-1} is the estimated actual speed of the last cycle.

a_{i-1} is the command acceleration of the last cycle.

k1 is the speed feed forward coefficient.

k2 is the acceleration feed forward coefficient.

6.69 Advanced Cycles of Feed Forward Compensation

Parameter number	300156
Parameter name	Advanced cycles if feed forward compensation
Data type	REAL
Valid range	0.0000 to 1.0000
Default value	0.0000
Access level	ACCESS_MAC
Activation	ACT_RST
Milling/Turning	Turning, milling

Description

Before the feed forward compensation speed is performed, users need to predict the actual speed. Users will subtract the predicted speed from the command speed in the current cycle to get the estimated tracking error before the feed forward compensation is performed. The feed forward compensation velocity coefficient is the acceleration coefficient of estimated actual speed.

The model formula for estimating actual speed is:

$$Vp_i = k_1 * Vd_{i-1} + Vp_{i-1} - k_2 * a_{i-1}$$

P_i is the estimated actual speed in the current cycle.

d_{i-1} is the value of the command speed of the last cycle minus the estimated speed of the last cycle.

P_{i-1} is the estimated actual speed of the last cycle.

a_{i-1} is the command acceleration of the last cycle.

k1 is the speed feed forward coefficient.

k2 is the acceleration feed forward coefficient.

6.70 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

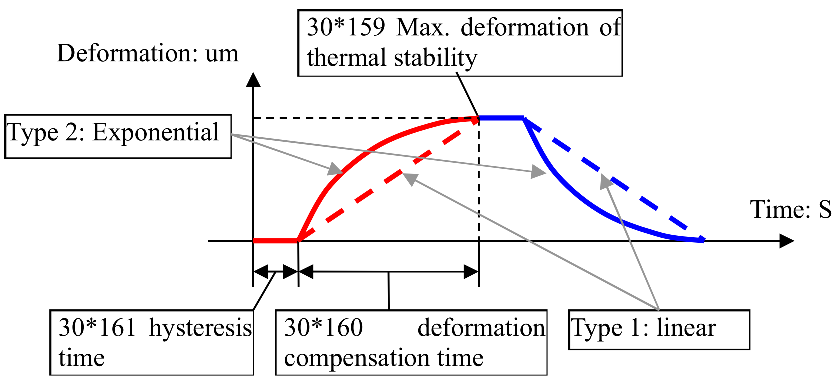
Description

The thermal error cannot be calculated without the temperature sensor. Therefore, the machining 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



6.71 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.

6.72 Time-type Thermal Error Compensation Value (mm)

Parameter number	300159
Parameter name	Time-type thermal error compensation coefficient
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)

6.73 Heating Compensation Seconds of Time-type Thermal Error

Parameter number	300160
Parameter name	Heating compensation seconds of time-type thermal error compensation
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 times (s) the machine to go from cold to thermal stability in the current working conditions.

6.74 Heat Transfer Lag Seconds of Time-type Thermal Error

Parameter number	300160
Parameter name	Heat transfer lag time of time-type thermal error
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 (s) of thermal transmission of the motion parts. It is used to estimate the time-type thermal error compensation.

6.75 Energy-consuming Type Thermal Error Compensation Type

Parameter number	300163
Parameter name	Energy-consuming type thermal error compensation type
Data type	INT4
Valid range	-1 to 2
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.

6.76 Energy-consuming Type Thermal Error Compensation Coefficient 1 (magnified 10E5 times)

Parameter number	300164
Parameter name	Energy-consuming type thermal error compensation coefficient 1 (magnified 10E5 times)
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. 1.41 is the default.

6.77 Energy-consuming Type Thermal Error Compensation Coefficient 2 (magnified 10E7 times)

Parameter number	300165
Parameter name	Energy-consuming type thermal error compensation coefficient 2 (magnified 10E7 times)
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. 1.0 is the default.

6.78 Energy-consuming Type Thermal Error Compensation Coefficient 3 (magnified 10E6 times)

Parameter number	300166
Parameter name	Energy-consuming type thermal error compensation coefficient 3 (magnified 10E6 times)
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. -4.1 is the default.

6.79 Energy-consuming Type Thermal Error Compensation Coefficient 4 (magnified 10E7 times)

Parameter	300167

number	
Parameter name	Energy-consuming type thermal error compensation coefficient 4 (magnified 10E7 times)
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. -8.21 is the default.

6.79 Energy-consuming Type Thermal Error Compensation Related Spindle

Parameter number	300168
Parameter name	Energy-consuming type thermal error compensation related spindle
Data type	INT4
Valid range	0 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.

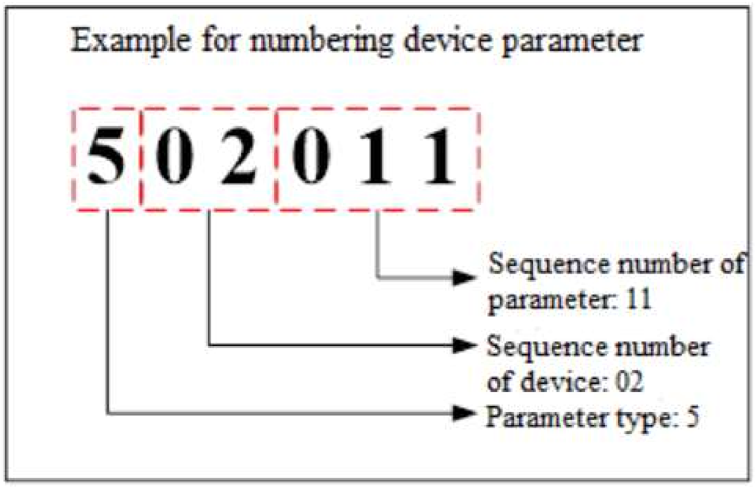
7 Device Interface Parameter

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).

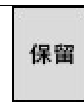
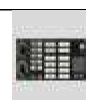
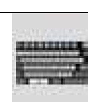
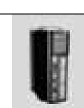
7.1 Device Identification Parameter

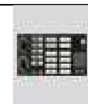
7.1.1 Device Name

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 HNC-8 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 HNC-8 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 Number of Device in Same Group

Parameter No.	500003
Parameter name	Number of device in same group
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 devices of 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.

7.2 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：HNC-8A type control panel.

2：HNC-8B type control panel.

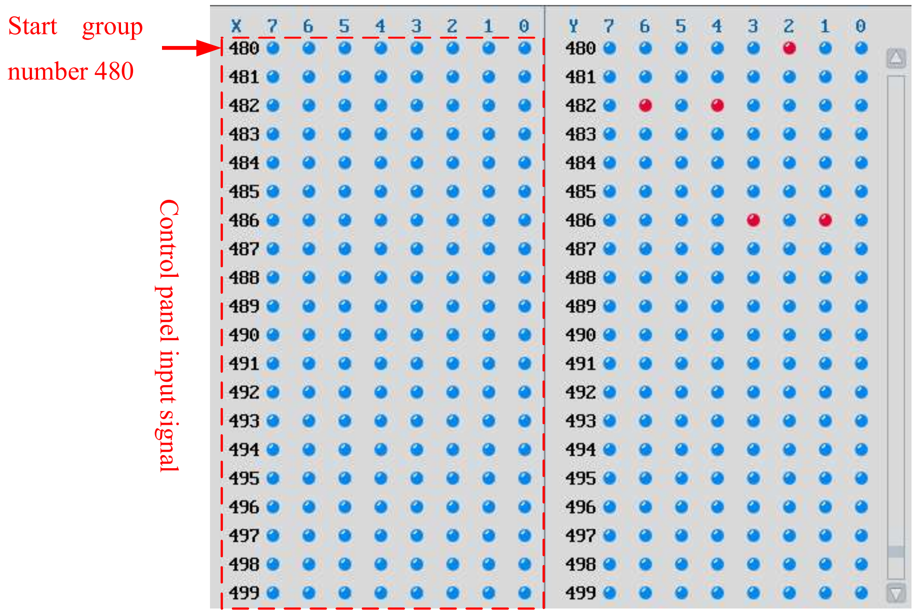
3：HNC-8C type control panel.

7.2.2 Start Group Number of Input Point

Parameter number	500012
Parameter name	Start group number of input point
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.



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 set 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:

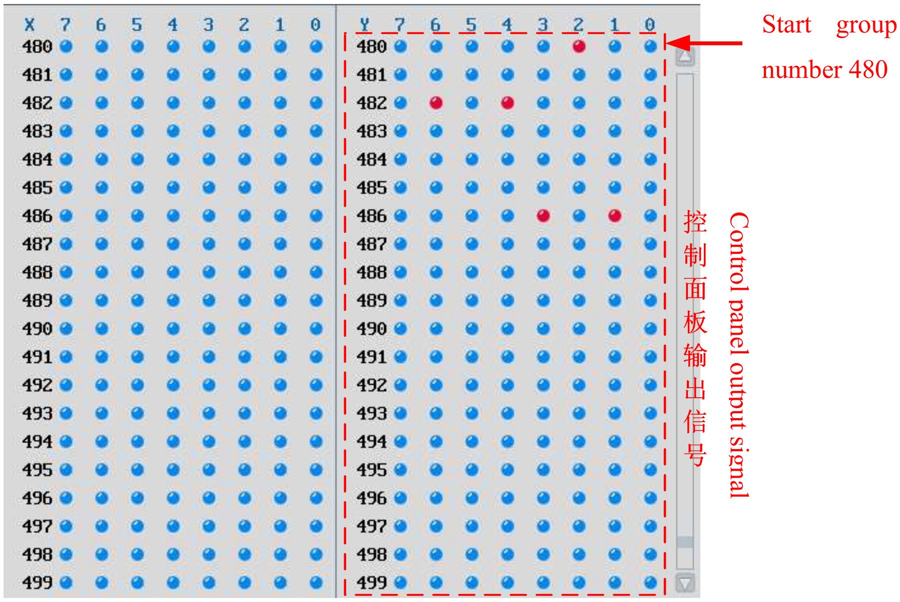
Type	Panel button	Band switch, feed override	Band switch, spindle override	Band switch, rapid traverse override	Axis selection by handwheel/override	Pulse increment of handwheel	Pulse counts of handwheel
A type	X480 to X485	X489	X487	X486	X488	X490 to X491	X492 to X493
B type	X480 to X486	X489	X487	----	X488	X490 to X491	X492 to X493
C type	X480 to X486	X487	X489	----	X488	X490 to X491	X492 to X493

7.2.4 Start Group Number of Output Point

Parameter number	500014
Parameter name	Start group number of output point
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.



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 set 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 Inverted Handwheel Direction Mark

Parameter number	500016
Parameter name	Inverted handwheel direction mark
Data type	BOOL
Valid range	0, 1
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

When the handwheel of bus control panel is rotated in the opposite direction of the axis feed, this parameter setting can change the direction where the handwheel is rotated.

0： The handwheel pulse is directly input to CNC.

1： The inverted handwheel pulse is input to CNC.

7.2.7 Handwheel Magnification Coefficient

Parameter number	500017
Parameter name	Handwheel magnification coefficient
Data type	INT4
Valid range	0 to 100
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

If the parameter setting is larger than 0, the number of handwheel pulses in bus control panel will be input to CNC after being multiplied by the handwheel magnification coefficient.

Note

Raising handwheel magnification coefficient increases the feed amount of axis by handwheel, but lowers the feed resolution by handwheel.

7.2.8 Coding Type of Band Switch

Parameter number	500018
Parameter name	Coding type of band switch
Data type	INT4
Valid range	0 to 1
Default value	1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

0： 8421 code is used for band switch.

1： Gray code is used for band switch.

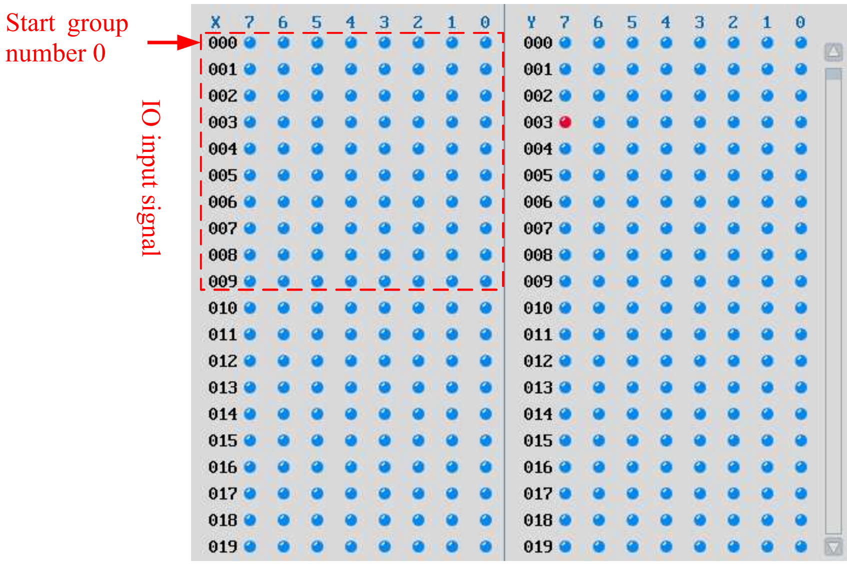
7.3 Bus IO Module

7.3.1 Start Group Number of Input Point

Parameter number	500012
Parameter name	Start group number of input point
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.

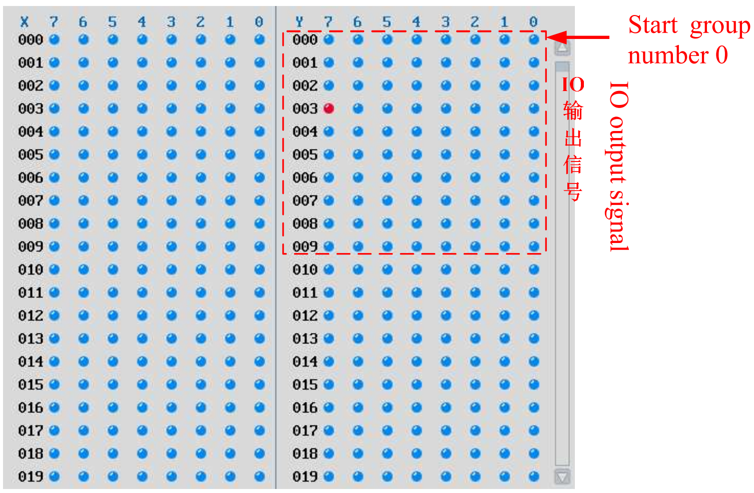
7.3.3 Start Group Number of Output Point

Parameter number	500014
Parameter name	Start group number of output point
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.

7.3.5 Type of Encoder A

Parameter number	500016
Parameter name	Type of encoder A
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The axis interface board device in bus IO module contains two encoder feedback interfaces (interface A and interface B). This parameter is to specify the type of the encoder which is plugged into interface A.

0 or 1：Incremental encoder.

3：Absolute encoder.

Note

This parameter is valid only on the axis interface board device in the bus IO module, and invalid on the input/output board device and AD/DA interface board device.

7.3.6 Number of Pulses Per Revolution of Encoder A

Parameter number	500015
Parameter name	Number of pulses per revolution of encoder A
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 the incremental encoder is plugged into the interface A, this parameter is set to the number of pulses per encoder revolution.

7.3.7 Type of Encoder B

Parameter number	500017
Parameter name	Type of encoder B
Data type	INT4
Valid range	0 to 4
Default value	0
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

The axis interface board device in bus IO module contains two encoder feedback interfaces (interface A and interface B). This parameter is to specify the type of the encoder which is plugged into interface B.

0 or 1： Incremental encoder.

3： Absolute encoder.

Note

This parameter is valid only on the axis interface board device in the bus IO module, and invalid on the input/output board device and AD/DA interface board device.

7.3.8 Number of Pulses Per Revolution of Encoder B

Parameter number	500018
Parameter name	Number of pulses per revolution of encoder B
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 the incremental encoder is plugged into the interface B, this parameter is set to the number of pulses per encoder revolution.

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：Velocity 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 instruction of CNC.

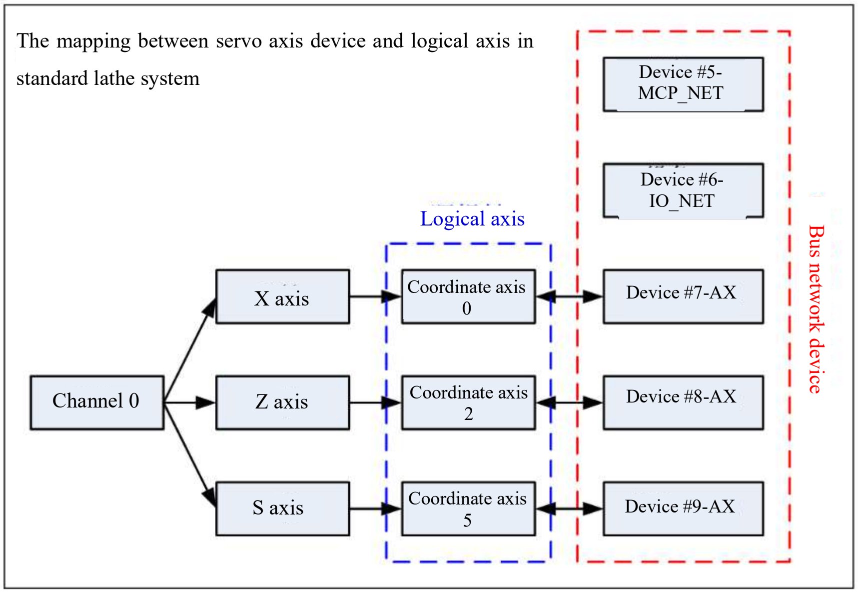
7.4.2 Logical Axis No.

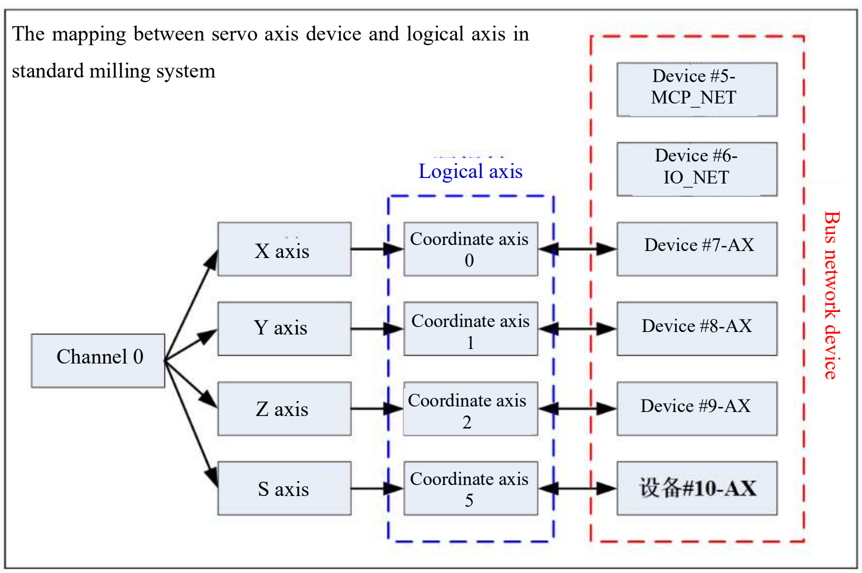
Parameter number	500011
Parameter name	Logical axis No.
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

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 Mark

Parameter number	500012
Parameter name	Inverted encoder feedback mark
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.

When the spindle actually rotates in the opposite direction to the spindle feedback speed, this parameter is set to 1.

7.4.4 Cycle Mode of Feedback Position

Parameter number	500014
Parameter name	Cycle mode of feedback position
Data type	INT4
Valid range	0 to 2
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 swing axis; this parameter is set to 1 for the rotary axis and spindle.

7.4.5 Number of Pulses in Feedback Position Cycle

Parameter number	500015
Parameter name	Number of pulses in feedback position cycle
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.

➢ 3: Velocity mode.

7.5.2 Logical Axis No.

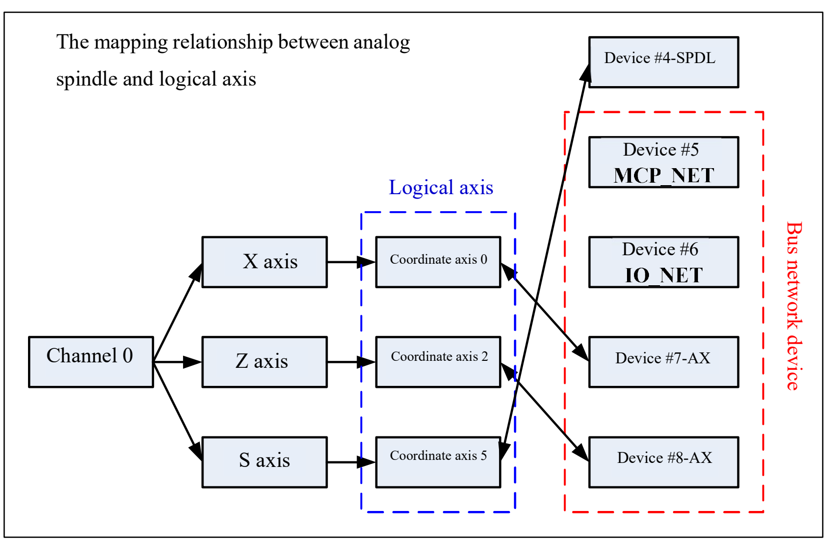
Parameter number	500011
Parameter name	Logical axis No.
Data type	INT4
Valid range	-1 to 127
Default value	-1
Access level	ACCESS_MAC
Activation	ACT_PWR
Milling/Turning	Turning, milling

Description

To build a mapping relationship between analog spindle device and logical axis.

-1: No mapping between device and logical axis.

0 to 127: Number of mapped logical axis.



7.5.3 Inverted Encoder Feedback Mark

Parameter number	500012
Parameter name	Inverted encoder feedback mark
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 to 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 Adjustment of Zero Drift in Spindle DA Output

Parameter number	500014

Parameter name	Adjustment for zero drift 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 Number of Pulses in Feedback Position Cycle

Parameter number	500015
Parameter name	Number of pulses in feedback position cycle
Data unit	Pulse
Data type	INT4
Valid range	1024 to 999999999
Default value	131072
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.

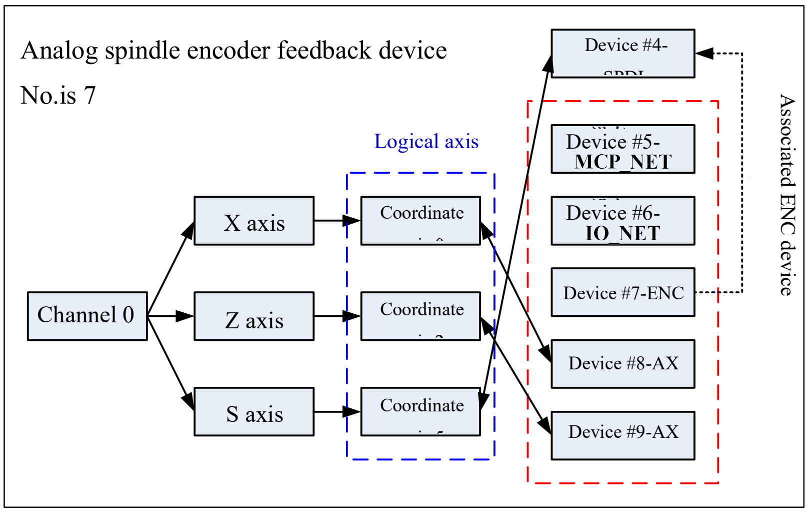
Parameter number	500016
Parameter name	Spindle encoder feedback device No.

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.

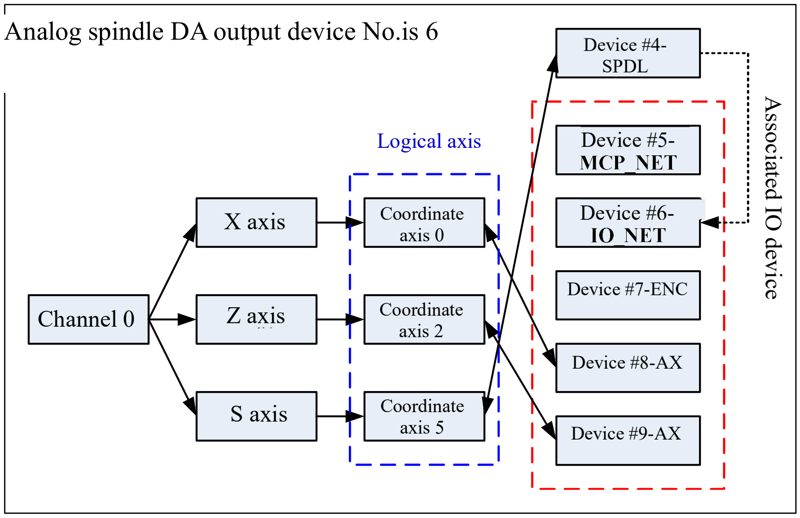


7.5.8 Spindle DA Output Device No.

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 to 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 HNC-8 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：Turning system 2：Turning-milling combo system
#010009	Channel selection mark of workstation 1	Multiple spindles and their drive feed axes can work at one workpiece champing position, which means one workstation can corresponds to multiple channels. For common lathes and milling machine, this parameter is set to 1.
#010017	Display axis mark of workstation 1	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	Load current display axis customization of workstation 1	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 for 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.
#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	Type of axis	This parameter is to set the type of physical axes which have their own uses. 0：Not set, the default. 1：Linear axis. 2：Swing 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 [position]	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 to be 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 for 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	Automatic graph erasure	On the interface of graphic display for tool path, 0：The previous programmed path is not automatically erased. 1：The previous programmed path is automatically erased at the start of path drawing.

#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	Customization of modal G command display in workstation 1	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 velocity 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	Number of velocity integral cycles display	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 velocity integral cycle will be averaged and then displayed. This parameter is usually set to 50.

9.4 Parameters for Velocity

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	Speed for low speed jogging	To set the moving speed of axis in JOG mode. The unit is mm/min for the traverse axis.
#100033	Speed for high speed jogging	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 (no 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 for 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 for 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 HNC-8 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	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 during 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 for Handwheel

Parameter No.	Parameter	Description
#100042	Handwheel 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	Handwheel buffering 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	Handwheel buffering periods	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 speed.
#100046	Handwheel overshoot coefficient	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	Handwheel speed evenness coefficient	This parameter setting is to avoid the speed unevenness while the manual pulse generator is being rotated.

9.7 Parameter for 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	Cutting type of workstation 1	This parameter group is to specify the type of each workstation. 0：Milling system 1：Turning system 2： Turning-milling combo 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.

9.8 Parameter on Acceleration/Deceleration Control

Parameter No.	Parameter	Description
#040069	Motion planning mode	There are two motion planning modes for small line interpolation in HNC-8 CNC. 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 and 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 on Bus Control Panel

Parameter No.	Parameter	Description
#500010	MCP type	To specify the type of bus control panel. 0：Invalid 1：HNC-8A type control panel 2：HNC-8B type control panel 3：HNC-8C type control panel
#500011	MCP handwheel No.	To specify the handwheel number of bus control panel. When multiple external handwheels are mounted with CNC, this parameter is set to distinguish the input signal of each handwheel
#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.
#500016	Inverted handwheel direction mark	When the handwheel is rotated in the opposite direction to the axis feed, this parameter can be set to change the direction of handwheel.
#500017	Handwheel 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 handwheel magnification coefficient.
#500018	Band switch code type	0：The band switch uses 8421 code. 1：The band switch uses grey code.

9.10 Parameter on 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 on 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：Velocity 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 mark	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.
#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	Type of encoder	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