
This user manual describes all items concerning the operation of this CNC system in detail. However, it is impossible to give particular descriptions for all unnecessary or unallowable operations due to length limitation and products application conditions；Therefore, the items not presented herein should be considered impractical or unallowable.

PREFACE

Your Excellency,

We are honored by your purchase of this GSK 25i CNC Machining System made by GSK CNC Equipment Co., Ltd.

This book is “PARAMETER” section of the User Manual Volume Ⅲ.

The incorrect operation may cause the accident, so only the professional can operate the system.

Please read this manual carefully before operation!

Attention:

The power supply fixed on/in the cabinet is exclusively used for the CNC system made by GSK.

It can't be applied to other purposes; otherwise it may cause serious danger.

SAFETY PRECAUTIONS

Before installing, connecting, programming and operating, please read the manual of the product and that of the machine carefully. And operate strictly according to the regulations of the manuals.

This manual includes the precautions for protecting user and machine tool. The precautions are classified into Warning and Caution according to their bearing on safety, and supplementary information is described as Note. Read these Warnings, Cautions and Notes carefully before operation.

Warning

The user may be injured or the equipment be damaged if operation instructions and procedures are not observed.

Caution

The equipment may be damaged if operation instructions or procedures are not observed.

Remark

It is used to indicate the supplementary information other than Warning and Caution.

STATEMENT

- This manual describes various possibilities as much as possible. However, operations allowable or unallowable cannot be explained one by one due to so many possibilities that may involve with, so the contents that are not specially stated in this manual shall be considered as unallowable.

Caution

- Functions, technical indexes (such as precision and speed) described in this user manual are only for this system. Actual function deployment and technical performance of the machine with this CNC system are set by the machine manufacturer design, so functions and technical indexes are subject to the user manual from machine manufacturer.
- Refer to the user manual of the machine manufacturer for the function and meaning of keys on control panel.

Precautions

■ Delivery and storage

- Packing box over 6 layers in pile is NOT allowed.
- Never climb the packing box, neither stand on it, nor place heavy objects on it.
- Do not move or drag the products by the cables connected to it.
- Forbid collision or scratch to the panel and display screen.
- Avoid dampness, insolation and drenching.

■ Open-package inspection

- Confirm that the products are the required ones.
- Check that the products are not damaged in delivery.
- Confirm that the parts in packing box are in accordance with the packing list.
- Contact us in time if any inconsistence, shortage or damage is found.

■ Connection

- Only qualified personnel can connect the system or check the connection.
- The system must be earthed, and the earth resistance must NOT be greater than 0.1 Ω. The earth wire can NOT be replaced by zero wire.
- The connection must be correct and firm to avoid any fault or unexpected consequence.
- Connect with surge diode in the specified direction to avoid damage to the system.
- Switch off power supply before plugging out or opening the electric cabinet.

■ Troubleshooting

- Only competent personnel are supposed to inspect the system or machine.
- Switch off power supply before troubleshooting or changing components.
- Check for fault when the short circuit or the overload occurs. Restart can only be done after troubleshooting.
- Frequent switching on/off of the power is forbidden, and the interval time should be at least 1 min.

SAFETY RESPONSIBILITY

Manufacturer's Responsibility

——Be responsible for the danger which should be eliminated and/or controlled on design and configuration of the provided CNC systems and accessories.

——Be responsible for the safety of the provided CNC systems and accessories.

——Be responsible for the provided information and advice for the users.

User's Responsibility

——Be trained with the safety operation of CNC system and familiar with the safety operation procedures.

——Be responsible for the dangers caused by adding, changing or altering the original CNC systems and the accessories.

——Be responsible for the failure to observe the provisions in the manual for operation, adjustment, maintenance, installation and storage.

All specifications and designs are subject to change without notice.

This manual is kept by the end user.

We are full of heartfelt gratitude to you for supporting us in the use of GSK's products.

Contents

PARAMETERS.....1

CHAPTER Ⅰ PARAMETER DISPLAY 3

CHAPTER Ⅱ PARAMETERE SETTING IN MDI MODE.....4

CHAPTER Ⅲ SETTING OR MAINTAINING THE SYSTEM PARAMETERS BY PC INSTRUCTION CONTROL UNIT SOFTWARE.....6

3.1 EDITING SYSTEM PARAMETERS 6

3.2 EDITING PITCH ERROR COMPENSATION DATA 7

CHAPTER Ⅳ PARAMETER EXPLANATION 8

4.1 SETTING PARAMETERS (1～99).....8

4.2 COMMUNICATION AND CONFIGURATION PARAMETERS (100～999).....9

4.3 COORDINATE PARAMETERS (1000～1199) 11

4.4 FEEDRATE PARAMETERS (1200～1399).....18

4.5 INTERPOLATION AND ACCELERATION/DECELERATION CONTROL PARAMETERS (1400～1599).....21

4.6 DISPLAY EDITING PARAMETERS (1600～1799) 26

4. 7 PROGRAMMING PARAMETERS (1800～1999).....28

4.8 CANNED CYCLE PARAMETERS (2000～2099).....31

4.9 RIGID TAPPING PARAMETERS (2100～2299) 32

4.10 PARAMETERS OF INPUT AND OUTPUT（2400～2599） 35

4.11 TOOL ADMINISTRATION PARAMETERS (2600～2799).....37

4.12 PITCH ERROR COMPENSATION PARAMETERS (2800～2999) 39

4.13TURNING CYCLE PARAMETERS（3000～3199） 41

4.14 SERVO PARAMETERS (4000～4999) 44

4.15 SPINDLE CONTROL PARAMETERS (5000～5999) 61

4.16 USER MACRO PROGRAM PARAMETERS (6000～6999).....79

4.17 PLC AXIS CONTROL PARAMETERS（7000～7199） 81

4.18 FIVE-AXIS MACHINING PARAMETERS （8000～8999） 82

APPENDIX 84

APPENDIX Ⅰ PRECISION COMPENSATION.....85

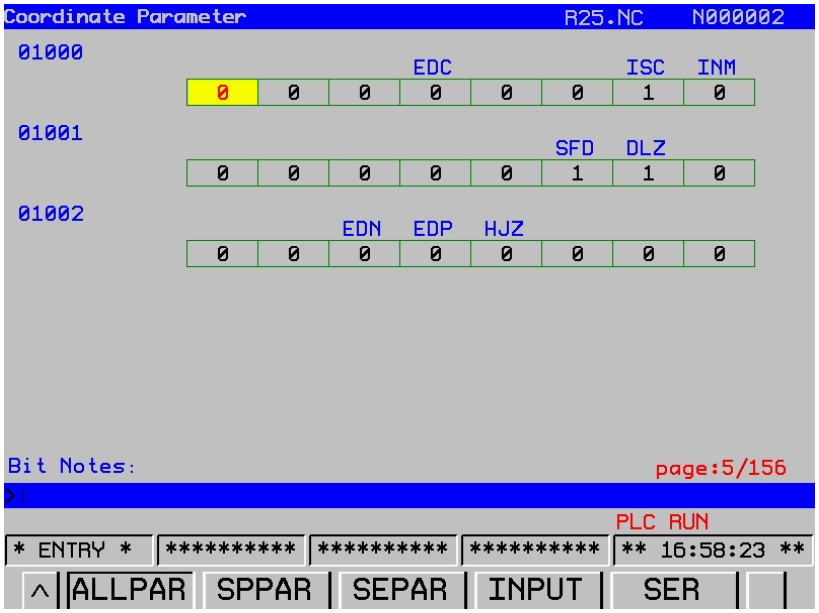
APPENDIX Ⅱ RECORD OF THE USER MANUAL REVISION.....96

PARAMETERS

CHAPTER Ⅰ PARAMETER DISPLAY

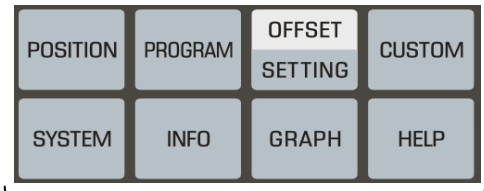
The operations are shown below:

(1) Enter the parameter screen after the function key SYSTEM on MDI panel is controlled for many times, or press the **[Parameter]** and **[Operation]** soft keys subsequently after pressing the function key SYSTEM once.



Return to the menu keys

Soft Keys



Function keys

(2) The parameter screen consists of multiple pages. Use two steps to display the page that contains the parameter you want to display.

(a) The required relative parameters are selected using the soft key, and then the page to be found by the page keys or cursor move keys.

(b) The parameter numbers to be displayed are input from keyboard, and press the **[search]** softkey to search, then the specified parameter page is displayed, and the cursor is positioned to the specified parameter (the data part is turned into the selected color).

CHAPTER Ⅱ PARAMETERE SETTING in MDI MODE

The operation steps of parameters setting are shown below:

(1) Enter the offset setting page by pressing the OFFSET SETTING and firstly input the corresponding password.

To prevent the machining program and CNC parameters from being maliciously modified, the GSK 25i offers an authority setting function and the password can be divided into 9 levels, from the higher to the lower level, such as the 0 level (the system high level), the 1st level (the system service), the 2nd level (the machine manufacturer), the 3rd level (the installation and debugging), the 4th level (the terminal administration), as well as the 5th level (the operator 1 level), the 6th level (the operator 2 level), the 7th level (the operator 3 level) and the lowest default level (see the figure 2-1).

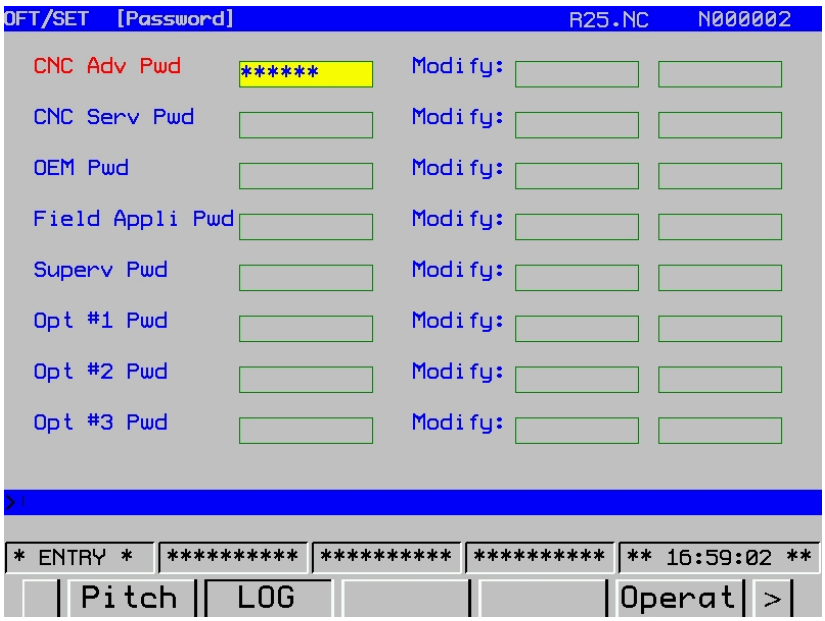


Fig. 2-1

Level 0: the highest authority, reserved by the developer.

Level 1: It is used for the system manufacturer service, which can modify various data.

Level 2: The PLC program, PLC note and the pitch error compensation are modified. The PLC and the pitch error compensation files are input or output. The user customized interface authority is modified/ input or output.

Level 3: The NC parameter and PLC source data can be rewritten; the PLC operation is started/stopped; the alarm/operation messages are eliminated; and the files are input or output, and the system, interpolation and positional control maintenance software can be upgraded.

Level 4: The program, tool offset, setting, workpiece coordinate system offset and macro program value are modified; these files are input or output and it also has the authority to modify the password.

The 5th, 6th and 7th levels: The operation is authorized to the corresponding person with bit-parameter by the end user administrator.

The lowest level default by the system: it is an authority operation donated with bit-parameter by the end user administrator; no password inputs.

The bit-parameter definitions are authorized by the end user administrator, refer to the following table:

Bit	Significance	Note
0	Modify/input or output the authority of G code program.	Authority when the bit parameter is set to 1
1	Modify the authority of geometrical tool offset/input or output tool offset.	Authority when the bit parameter is set to 1
2	Modify the authority of wear tool offset/input or output tool offset.	Authority when the bit parameter is set to 1
3	Modify the authority of setting	Authority when the bit parameter is set to 1
4	Modify/input or output the authority of a workpiece coordinate system offset.	Authority when the bit parameter is set to 1
5	Modify/input or output the authority of a macro program value	Authority when the bit parameter is set to 1
6	Reserved	
7	Reserved	

(2) Input the password of the corresponding level, press INPUT. If the password is correct, the system doesn't display any message; otherwise, "the password is wrong" is displayed.

(3) After the corresponding parameters are rewritten, the password is cancelled after logging out and each operator level authority becomes valid.

CHAPTER Ⅲ SETTING or MAINTAINING the SYSTEM PARAMETERS by PC INSTRUCTION CONTROL UNIT SOFTWARE

3.1 Editing System Parameters

The system parameter of the software can be edited on PC software, and the corresponding backup parameter files can be uploaded and downloaded through the internet. (Refer to the Fig. 3-1 and Fig. 3-2)

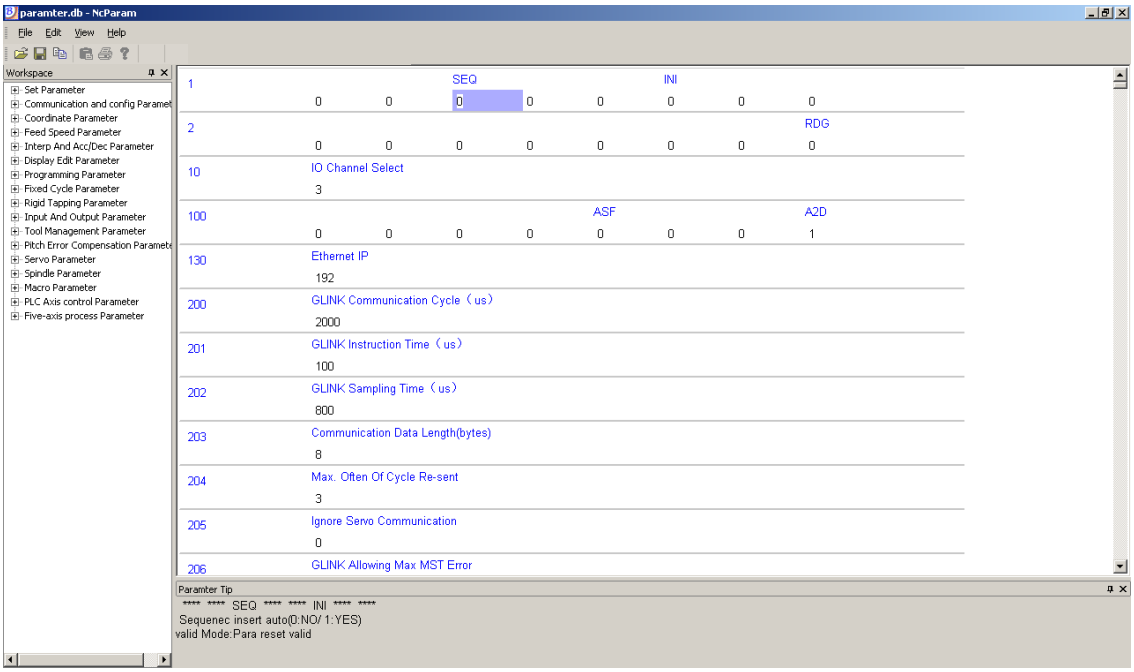


Fig.3-1 Editing the system parameters

3.2 Editing Pitch Error Compensation Data

Editing the pitch error compensation data is shown as the Fig. 3-2.

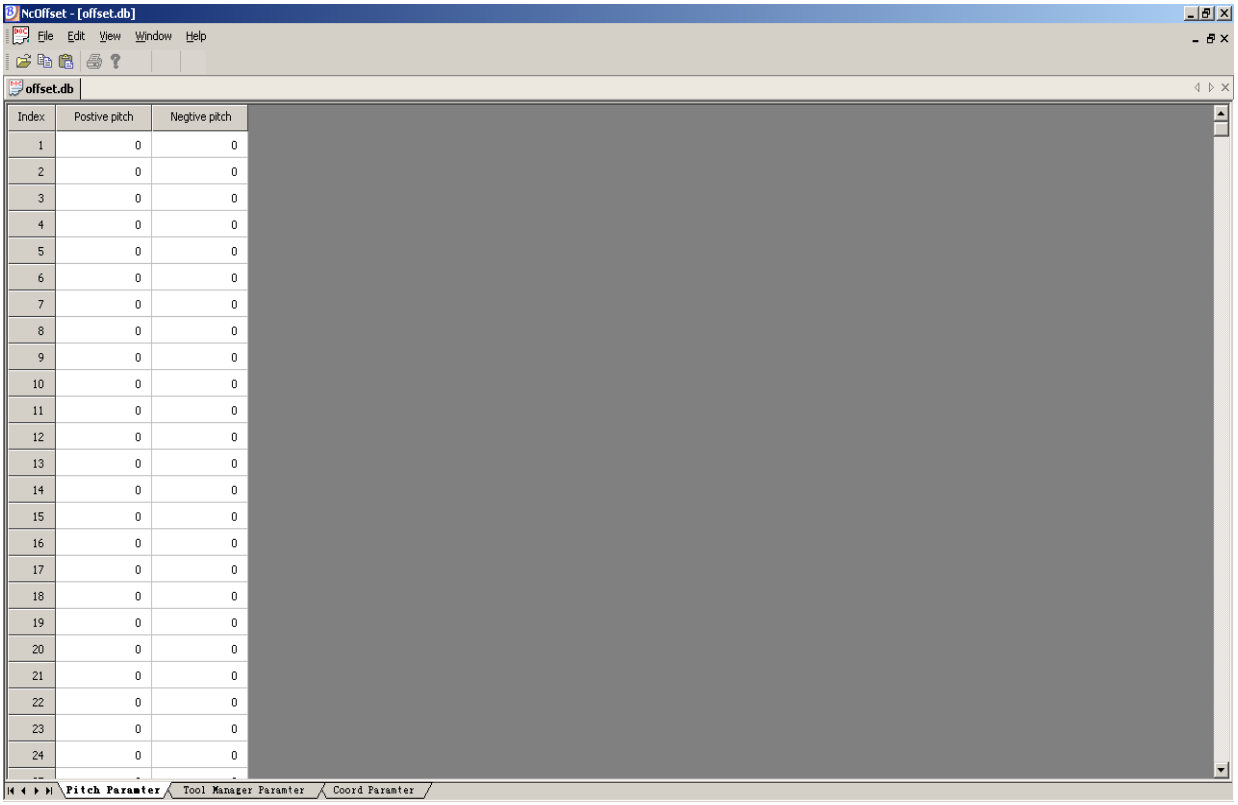


Fig. 3-2 Editing the pitch error compensation data

CHAPTER Ⅳ PARAMETER EXPLANATION

[Parameter type]

The system parameters can be divided into several types based upon the following parameters (refer to the table. 4-1).

Table 4-1 Data type and effective data range

Data type	Effective data range
Bit	0 or 1
Bit axis	0 or 1
Integrated	-999999～999999
Integral axis	-999999～999999
Real number	-999999.9999～999999.9999
Real number axis	-999999.9999～999999.9999

The displayed number of axis type parameter is set by NO.800 for setting the total axis number.

[Parameter explanation format]

The system parameter can be defined based on the following format.

Parameter number	Parameter significance explanation

It is important to notice that the cautions may occur in the notice column to remind the user

Note
1. Notice 1
2. Notice 2
3. Notice 3
4. ……

4.1 Setting Parameters (1～99)

	7#	6#	5#	4#	3#	2#	1#	0#
0001			SEQ					

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0　0 0 0 0
[Valid mode] Valid immediately

SEQ: Automatic insertion of sequence numbers
0：Not performed
1：Performed

Remark:
The incremental of sequence number is set in parameter NO.1621.

	7#	6#	5#	4#	3#	2#	1#	0#
0002								RDG

[Data type] Bit
[Data range] 0 or 1
[**Default] 0** 0 0 0 0 0 0 0 0
[Valid mode] Valid after restarting

RDG: Remote diagnosis is
0: Not performed
1: Performed

0010	I/O CHANNEL selection (exclusive for DNC)	3

[Data type] Integrated type
[Data range] 0-4
[Valid mode] Valid after resetting

Remark:
I/O channel is exclusive for DNC.

Setting value	Significance
0	RS232C serial port
1	Reserved
2	Reserved
3	USB interface
4	Ethernet interface

4.2 Communication and Configuration Parameters (100～999)

	7#	6#	5#	4#	3#	2#	1#	0#
0100					ASF			A2D

[Data type] Bit type
[Data range] 0 or 1
[**Default]** 0 0 0 0 1 0 0 1
[Valid mode] Valid after restarting

A2D: DSP loading mode
0：DSP directly start mode
1：Loading DSP using CNC program
ASF: Whether the file is automatically saved during the file is loaded
0: No
1: Yes

0130	Ethernet IP address	1192

[Data type] Integrated type
[Data range] 0～255255
[Valid mode] Valid after resetting

Remark:
For example: The value of IP:192.168.2.10 is 2010 (192.168 is a fixed value)

200	GSK-LINK communication period	2000

[Data type] Integrated type
[Data unit] us
[Data range] 100～2000
[Valid mode] Valid after restarting

201	GSK-LINK command time	100

[Data type] Integrated type
[Data unit] us
[Data range] 1～2000
[Valid mode] Valid after restarting

202	GSK-LINK sampling time	800

[Data type] Integrated type
[Data unit] us
[Data range] 1～2000
[Valid mode] Valid after restarting

Remark:
The set command time and sampling time should be in the set communication period range; otherwise, the system is operated based on GSK-LINK communication period command time and sampling time.

204	The maximum period repeated times	3

[Data type] Integrated type
[Data unit] Time
[Data range] 0～32
[Valid mode] Valid after restarting

205	Servo communication ignorance	0

[Data type] Integrated type
[Data unit]
[Data range] 0～1
[Valid mode] Valid immediately

Remark:
The system may ignore the servo net communication when it is set to 1, which is mainly used for debugging.

206	MST max. mistakes allowed by GLINK communication	1

[Data type] Integrated type
[Data unit] Time
[Data range] 0～16
[Valid mode] Valid immediately

Remark:
If it is set as 0, GSK-LINK communication MST mistake check is ignored.

800	Selecting the system control axis number	3

[Data type] Integrated type
[Data range] 2～8
[Valid mode] Valid after restarting

801	Selecting the system linkage axis number	3

[Data type] Integrated type
[Data range] 2～8
[Valid mode] Valid after restarting

810	Waiting time of screen saver	50

[Data type] Integrated type
[Data unit] Min.
[Data range] 0～9999
[Valid mode] Valid immediately

811	System interpolation period time ms	2

[Data type] Real number type
[Data unit] ms
[Data range] 1～4
[Valid mode] Valid after restarting

820	Selecting the system spindle number	1

[Data type] Real number type
[Data range] 1～ 3
[Valid mode] Valid immediately

4.3 Coordinate Parameters (1000～1199)

	7#	6#	5#	4#	3#	2#	1#	0#
1000				EDC			ISC	INM

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 1 0
[Valid mode] Valid after restarting

INM: Least command increment on the linear axis
0：In mm (Metric system)
1：In inches (Inch system)

ISC：The least move unit
0：0.001mm or 0.001deg
1：0.0001mm or 0.0001deg

EDC: Whether use the external deceleration function
0: No
1: Yes

	7#	6#	5#	4#	3#	2#	1#	0#
1001						SFD	DLZ	

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

Parameters

DLZ: Function setting the reference position without dog
0：Disabled
1：Enabled
SFD: The function for shifting the reference position is
0：Not used
1：Used

Remark:
1. When parameter DLZ (N1001#1) is set as 0, the parameter is invalid; the parameter DLZ (N1001#1) is set as 1, the parameter is valid.
2. When parameter SFD (N1001.2) is set as 1, the reference point offset amount of each axis in parameter N4120 is valid. At present, the parameter N4120 is invalid.

	7#	6#	5#	4#	3#	2#	1#	0#
1002			EDN	EDP	HJZ			

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 1 0 0 0
[Valid] Valid after resetting

HJZ: When a reference position is already set in JOG mode:
0: Reference position return is performed with deceleration dogs.
1: Reference position return is performed at rapid traverse speed.
If the position detection device of the absolute type is used, the parameter is invalid.
EDP: External deceleration signal in the positive direction for each axis
0: Valid only for the rapid traverse
1: Valid for rapid traverse and cutting feed
EDN: External deceleration signal in the negative direction for each axis
0: Valid only for rapid traverse
1: Valid for rapid traverse and cutting feed

	7#	6#	5#	4#	3#	2#	1#	0#
1004	**HIDEn**		**ZMIn**					

[Data type] Bit axis
[Data range] 0 or 1
[Default] 0 0 0 0 0 1 0 0
[Valid mode] Valid after resetting

ZMIx: Reference position return direction is set for each axis
0: In negative
1: In positive
HIDEn **:** Whether the axis is hidden
0: No
1: Yes

1020	Programming axis name for each axis	88

[Data type] Integrated axis
[Data range] 65~67, 85~90
[Valid mode] Valid immediately

Remark:
The display name is ASCII code, and the allowable input values are X 88, Y 89, Z 90, A 65, B 66, C 67, U 85, V 86 and W 87.

1021	The subscript of each axis name	32

[Data type] Integrated axis type
[Data range] 0～90
[Valid mode] Valid immediately

Remark:
0～9 are digits, 65～90 are ASCII codes，32 is blank.

1022	Servo logic address for each axis	0

[Data type] Integrated axis type
[Data range] 0～25
[Valid mode] Valid immediately

Remark:
The setting of servo logic address is related to the connection of servo network, the 1st slave station connected from the system P1 terminal is 0, according to this, servo logic address is its corresponding set value; Usually, set a same value both the control axis number and the controlled axis number.

	7#	6#	5#	4#	3#	2#	1#	0#
1023		**RABx**	**RRLx**			**ROSn**	**ROTn**	

[Data type] Bit axis
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

ROTn: Each axis is the rotation axis or the parallel axis
0: Parallel axis
1: Rotation axis
ROSn: The rotation axis coordinate axis type
0: Rotation axis type (the principle of close to the target)
1: Linear axis type
RRLx: Display in relative coordinate
0: Command value
1: In 360°
RABx : Display in absolute coordinate
0: Command value
1: In 360°

ROSx and **ROTx** used in combination
0 0 Linear axis type
1) Conversion between inch/metric system
2) All the coordinate values are the linear axis type (not recycle in 0°~360°).
3) The stored pitch error compensation is the linear axis type.

0 1 Rotation axis type
1) Conversion between inch/metric system.
2) The machine coordinate value is within 0°~360°.
The relative coordinate and the absolute coordinate values are set by the parameters RRLx and RABx to select the coordinate is displayed in the numerical value or based on 0°~360°.
3) The rotation axis is moved based on the rotation direction closer to the target.
4) The stored pitch error compensation is the rotation axis type.

5) The automatic reference position return (G28 G30) is started from the reference position return direction, the movement distance should not exceed one circumference.

1 0 Setting is invalid
1 1 Linear axis type
1) Not convert between inch/metric system.
2) The machine coordinate value, the relative coordinate value and the absolute coordinate value are linear axis type (not displayed on 0°~360°).
3) The rotation axis is moved on the direction specified by the command value code.
4) The stored pitch error compensation is the linear axis type.
5) It can't be used with the cycle function of the rotation axis and the function of the index table meanwhile.

1024	The attribute of each axis in the basic coordinate system	0

[Data type] Integrated axis type
[Data range] 0～7
[Valid mode] Valid after resetting

Setting value	Meaning
0	Neither the basic 3 axes nor the parallel axis
1	X axis of the basic 3 axes
2	Y axis of the basic 3 axes
3	Z axis of the basic 3 axes
5	The axis parallel to X axis
6	The axis parallel to Y axis
7	The axis parallel to Z axis

	7#	6#	5#	4#	3#	2#	1#	0#
1030	**ITI**	**IDX**				**ABS**	**REL**	

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 1 1 0
[Valid mode] Valid after resetting

REL: Relative coordinate display of the index rotation axis
0: Out of 360°
1: Within 360°
ABS: Absolute coordinate display of the index rotation axis
0: Out of 360°
1: Within 360°
IDX: Index table indexing sequence.
0: Type A
1: Type B
ITI: The index function of the index table is:
0: Disabled
1: Enabled

	7#	6#	5#	4#	3#	2#	1#	0#
1031								**G_RET**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

G_RET: Whether the cursor is returned to the program head after resetting
0: No (with condition)
1: Yes

1040	External workpiece origin offset value	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

1041	The origin offset amount of workpiece coordinate system 1(G54)	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

1042	The origin offset amount of workpiece coordinate system 2(G55)	0

[Data type] Real number axis
[Data unit] mm
[Data range] -9999.9999～9999.9999
[Valid mode] Valid immediately

1043	The origin offset amount of workpiece coordinate system 3(G56)	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

1044	The origin offset amount of workpiece coordinate system 4(G57)	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

1045	The origin offset amount of workpiece coordinate system 5(G58)	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

1046	The origin offset amount of workpiece coordinate system 6(G59)	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

1050	Coordinate value of the 1st reference position on each axis in the mechanical coordinate system	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1051	Coordinate value of the 2nd reference position on each axis in the mechanical coordinate system	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1052	Coordinate value of the 3rd reference position on each axis in the mechanical coordinate system	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1053	Coordinate value of the 4th reference position on each axis in the mechanical coordinate system	0

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1060	Movement amount per revolution of the feeding axis	0

[Data type] Real number axis
[Data unit] mm or degree
[Data range] 0～999.9999
[Valid mode] Valid after resetting

1068	Rotation angle amount per revolution of the rotation axis	360

[Data type] Real number axis
[Data unit] Degree
[Data range] 0.001～9999.9999
[Valid mode] Valid after resetting

Remark: This parameter is used during cylindrical interpolation.

	7#	6#	5#	4#	3#	2#	1#	0#
1070		LZR			OT3	OT2		OUT

[Data type] Bit
[Data range] 0 or 1
[Default] 0 1 0 0 0 0 0 0
[Valid mode] Valid after resetting

OUT: The forbidden area of the stored stroke check 2
0: Inside
1: Outside
OT2: Whether stored stroke check 2 is checked for each axis is set.
0: Not checked.
1: Checked.
OT3: Whether stored stroke inside check 3 is checked for each axis is set.
0: Not checked.
1: Checked.
LZR: Whether detect the stroke 1 before the machine coordinate system is set
0: Not checked
1: Checked

1080	The boundary coordinate value of the stored stroke check 1 in the positive direction on each axis.	9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1081	The boundary coordinate values of the stored stroke check 1 in the negative direction on each axis.	-9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1082	The boundary coordinate values of the stored stroke check 2 in the positive direction on each axis.	9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1083	The boundary coordinate values of the stored stroke check 2 in the negative direction on each axis.	-9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1084	The boundary coordinate values of the stored stroke check 3 in the positive direction on each axis.	9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1085	The boundary coordinate value of the stored stroke check 3 in the negative direction on each axis.	-9999

[Data type] Real number axis
[Data unit] mm

[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

1086	The boundary coordinate value II of the stored stroke check 1 in the positive direction on each axis.	9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

Remark:
When PLC signal G007#6 EXLM is set as “1”, the stored stroke limit boundary values are set by NO.1086 and NO.1087.

1087	The boundary coordinate value II of the stored stroke check 1 in the negative direction on each axis.	-9999

[Data type] Real number axis
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid after resetting

Remark:
When PLC signal G007#6 EXLM is set as “1”, the stored stroke limit boundary values are set by NO.1086 and NO.1087.

4.4 Feedrate Parameters (1200～1399)

	7#	6#	5#	4#	3#	2#	1#	0#
1200		RDR		RF0				RPD

[Data type] Bit
[Data range] 0 or 1
[**Default**] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

RPD: After power on, whether he manual rapid traverse is enabled before the reference position return
0: Disabled
1: Enabled
RF0: When the rapid feedrate override is F0,
0: The machine tool does not stop moving.
1: The machine tool stops moving.
RDR: When the rapid feeding is performed,
0: Dry run is disabled.
1: Dry run is enabled.

1210	Dry run speed (common to all axes)	4000

[Data type] Real number
[Data unit] mm/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

Remark:
The dry run speed is set when the manual feedrate is set to 100%.

1211	The cutting feedrate occurs by default in the automatic mode (common to all axes)	100

[Data type] Real number
[Data unit] mm/min
[Data range] 0～10000
[Valid mode] Valid after restarting

Remark:
The defaulted feedrate value is set before commanding the cutting feedrate.

1224	The maximum cutting composite feedrate (common to all axes)	10000

[Data type] Real number
[Data unit] mm/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1225	Maximum cutting feedrate for each axis in the automation mode	10000

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

Remark:
1. The max. cutting feedrate of each axis is set in Auto mode and the feedrate of each axis is limited by the setting value during cutting.
2. The parameter is only valid in the linear interpolation. The speed of the arc and the cylindrical interpolations are limited by #1224.
3. Each axis setting value is 0, the machine doesn't move for any axis movement; while the program is always running in the current block.

1226	Rapid traverse rate for each axis in the automation mode	15000

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

Remark:
The rapid traverse rate is set when the rapid feedrate override is set to 100%.

1231	F0 speed of rapid traverse override (common to all axes)	100

[Data type] Real number
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1232	Feedrate in manual continuous feed (JOG feed) for each axis	1000

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

Remark:
JOG feedrate is set when manual feedrate override is 100%.

1233	Manual rapid traverse rate for each axis	10000

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1234	FL rate of the reference position return for each axis	The linear rotation axis is 300/ the rotation axis is 75.

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0~15000
[Valid mode] Valid after resetting

1235	Reference position return speed for each axis	The linear rotation axis is 4000 /the rotation axis is 2000.

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～100000
[Valid mode] Valid after resetting

1236	The 2nd FL speed of reference position return for each axis	The linear rotation axis is 7 /The rotation axis is 2.

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～15000
[Valid mode] Valid after resetting

1239	The maximum manual feedrate	10000

[Data type] Real number
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1240	The maximum speed of single-step operation	10000

[Data type] Real number
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1241	The maximum MPG feedrate	15000

[Data type] Real number
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1250	The external deceleration speed during cutting feed	1000

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1251	The external deceleration speed during rapid traverse	1000

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～1000000
[Valid mode] Valid after resetting

1260	The safe limit speed during rapid traverse and cutting feed	100

[Data type] Real number axis
[Data unit] mm/min or degree/min
[Data range] 0～10000
[Valid mode] Valid after resetting

Remark:
When PLC signal G019#6 FV is set as “1”, it is the top speed during rapid traverse and cutting feed.

4.5 Interpolation and Acceleration/Deceleration Control Parameters (1400～1599)

	7#	6#	5#	4#	3#	2#	1#	0#
1400		PACD			PPCK			

[Data type] Bit
[Data range] 0 or 1
[**Default**] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

PPCK: In-position check
0: Not performed
1: Performed
PACD: The acceleration/deceleration mode before the interpolation
0: Linear type
1: S type

	7#	6#	5#	4#	3#	2#	1#	0#
1401	**ALS**			**WFM**				

[Data type] Bit
[Data range] 0 or 1
[**Default**] 0 0 0 1 0 0 0 0
[Valid mode] Valid after resetting

WFM: MPG interpolation mode
0: It is treated by the impounding reservoir mode
1: It is treated by the real-time mode
ALS: Automatic corner feed function
0: Invalid
1: Valid

	7#	6#	5#	4#	3#	2#	1#	0#
1403			RCOK	RBK			HXS	

[Data type] Bit
[Data range] 0 or 1
[**Default]** 0 0 0 1 0 0 1 0
[Valid mode] Valid after resetting

HXS: The rotation directions of MPG and each axis
0: Different
1: Same
RBK: The backlash compensation is performed between the cutting and rapid traverse.
0: Not separately
1: Separately
RCOK: Backlash compensation
0: Not performed
1: Performed

1406	Number of pre-read blocks during pre-read treatment	1000

[Data type] Integrated
[Data unit] Block
[Data range] 0～2000
[Valid mode] Valid after resetting

1407	The maximum number of the program blocks of Nurbs curve interpolation	200

[Data type] Integrated
[Data unit] Block
[Data range] 10～500
[Valid mode] Valid after resetting

1409	Number of prospective treatment blocks	10

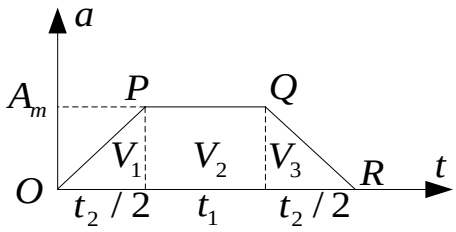
[Data type] Integrated
[Data unit] block
[Data range] 1～2000
[Valid mode] Valid after resetting

Remark:
The number of the prospective program blocks is set when the prospect is used.

1410	Acceleration/deceleration type S and time constant T1 are specified before the rapid traverse feed is performed	64

[Data type] Integrated axis
[Data unit] ms
[Data range] 1～4000
[Valid mode] Valid after resetting

The parameter value of its corresponding number is indicated by the P+ parameter number, such as, PA1233 means the NO. 1233 parameter. The acceleration/deceleration calculation mode of type S is shown below, where, the t_1 indicates a uniform acceleration time, t_2 means a jerk and decelerating acceleration time, and A_m is the maximum acceleration.



As the above figure mentioned, the ladder area is: $V_m = \frac{(t_1+t_1+t_2)*A_m}{2}$

The maximum acceleration speed calculation is concluded: $A_m = \frac{V_m}{(2t_1+t_2)}$

And, the calculation of jerk time is: $J_m = \frac{2A_m}{t_2}$

The linear acceleration/deceleration can be regarded as a special example when the type S acceleration/deceleration is on the state of $t_2=0$.Before the G00 rapid traverse, the maximum acceleration calculation format of acceleration/deceleration type S is:

$A_{m00} = \frac{2\times P_{1226}}{(2\times P_{1410}+P_{1411})}$, And the maximum acceleration calculation format of jerk type S before the G00 rapid traverse is $J_{m00} = \frac{2A_{m00}}{P_{1411}}$.

Remark:
When the acceleration or jerk calculation is used this format during the actual application; it is very necessary to note that the unit conversion must be performed in terms of the unit of parameters.

1411	S type acceleration/deceleration time constant T_2 at the rapid feed	256

[Data type] Integral axis
[Data unit] ms
[Data range] 0～4000
[Valid mode] Valid after resetting

Remark:
When the acceleration or jerk calculation is used this format during the application; it is very necessary to note that the unit conversion must be performed in terms of the unit of parameters.

1440	The maximum acceleration speed	The linear rotation axis is 0.4/the rotation axis is 100

[Data type] Real number axis
[Data unit] m/s^2, the rotation axis is: degree/s^2, a general rotation axis value is up to 250 times of the parallel axis.
[Data range] 0～25000
[Valid mode] Valid after resetting

Note
It is only valid to the linear acceleration/deceleration control.

1442	The maximum acceleration speed of the arc interpolation feed	0.5

[Data type] Real number
[Data unit] m/s^2
[Data range] 0～25000
[Valid mode] Valid after resetting

1444	Mechanical zero return acceleration speed by default	The linear rotation axis is 0.139/ The rotation axis is 80

[Data type] Real number axis
[Data unit] m/s^2, the rotation axis is: $degree/s^2$, a general rotation axis value is up to 250 times of the parallel axis.
[Data range] 0～25000
[Valid mode] Valid after resetting

1445	The acceleration speed is performed during deceleration when dwelling or RESET in the process of operation	0.5

[Data type] Real number
[Data unit] m/s^2
[Data range] 0～25000
[Valid mode] Valid after resetting

1446	MPG acceleration speed	0.5

[Data type] Real number
[Data unit] m/s^2
[Data range] 0～25000
[Valid mode] Valid after resetting

1447	Manual acceleration speed	0.5

[Data type] Real number
[Data unit] m/s^2
[Data range] 0～25000
[Valid mode] Valid after resetting

1472	Arc interpolation control accuracy	0.001

[Data type] Real number
[Data unit] mm
[Data range] 0～1
[Valid mode] Valid after resetting

1473	The maximum contour error of the system	0.005

[Data type] Real number
[Data unit] mm
[Data range] 0～1
[Valid mode] Valid after resetting

1480	The acceleration/deceleration S type time constant T1 before cutting feed	16

[Data type] Integral axis
[Data unit] ms

[Data range] 0～4000
[Valid mode] Valid after resetting

The maximum acceleration calculation format of acceleration/deceleration type S before the G01 rapid traverse is:

$A_{m01} = \frac{2 \times P_{1225}}{(2 \times P_{1480} + P_{1481})}$, and the maximum jerk calculation format of acceleration/ deceleration type S before the G01 rapid traverse is $J_{m01} = \frac{2 A_{m01}}{P_{1481}}$.

Remark:
When the acceleration or jerk calculation is used this format during the actual application; it is very necessary to note that the unit conversion must be performed in terms of the unit of parameters.

1481	Acceleration/deceleration S type time constant T2 before cutting feed	256

[Data type] Integral axis
[Data unit] ms
[Data range] 0～4000
[Valid mode] Valid after resetting

1493	The minimum acceleration speed during Nurbs interpolation	1．000

[Data type] Real number
[Data unit] m/s^2
[Data rang] 0～25000
[Valid mode] Valid after resetting

Remark:
When the acceleration or jerk calculation is used this format during the actual application; it is very necessary to note that the unit conversion must be performed in terms of the unit of parameters.

1494	Judge the least corner of Nurbs interpolation deceleration point	10

[Data type] Real number
[Data unit] deg
[Data range] 0～30
[Valid mode] Valid after resetting

1495	The least corner angle of fold line transition	150

[Data type] Real number
[Data unit] deg
[Data range] 120~180
[Valid mode] Valid after resetting

1500	The boundary corner of two blocks in the automatic corner deceleration	0

[Data type] Real number
[Data unit] deg
[Data range] 0~60
[Valid mode] Valid after resetting

1501	The allowable max. speed variable amount	120

[Data type] Real number
[Data unit] mm/min
[Data range] 0～1000
[Valid mode] Valid after resetting

1505	The lowest deceleration speed based on acceleration during arc interpolation	200

[Data type] Real number
[Data unit] mm/min
[Data range] 0～9999.9999
[Valid mode] Valid after resetting

4.6 Display Editing Parameters (1600～1799)

	7#	6#	5#	4#	3#	2#	1#	0#
1601			ENG	CHI				

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 1　0 0 0 0
[Valid mode] Valid after resetting

ENG, CHI: Language selection

ENG	CHI	**Language display**
0	0	**Simplified Chinese**
0	1	
1	1	**English**
1	0	

	7#	6#	5#	4#	3#	2#	1#	0#
1605		**NPA**				**MKP**	**RDGN**	

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0　0 0 0 1
[Valid mode] Valid immediately

RDGN: Diagnosis data during resetting
0: Not clear
1: Clear
MKP: M02, M30 or % is in MDI, whether MDI program is automatically deleted
0: Not automatically deleted
1: Automatically deleted
NPA: Whether switch into the alarm interface when the alarm occurs
0: No
1:Yes

	7#	6#	5#	4#	3#	2#	1#	0#
1610				NE9				NE8

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 1　0 0 0 0
[Valid mode] Valid immediately

NE8: Whether forbid the subprogram edit of the program numbers from 8000 to 8999

0: Not forbid
1: Forbid
The following operations are not allowed in the forbidden state
1) Deleting the program (#O8000-#O8999 can't be deleted)
2) Outputting the program
3) Editing the logged program
4) Logging in the program
5) Displaying the program

NE9: Whether forbid the subprogram edit of the program numbers from 9000 to 9999

0: Not forbid
1: Forbid
The following operations are not allowed in the forbidden state
1) Deleting the program (#O9000-#O9999 can't be deleted)
2) Outputting the program
3) Editing the logged program
4) Logging in the program
5) Displaying the program

1621	The incremental value when the sequence number is automatically inserted	10

[Data type] Integrated
[Data range] 0～9999
[Valid mode] Valid immediately

1640	The required machining part quantity is 1	0

[Data type] Integrated
[Data range] 0～999999
[Valid mode] Valid immediately

1641	The required machining parts quantity is 2	0

[Data type] Integrated
[Data range] 0～999999
[Valid mode] Valid immediately

1642	The required machining parts quantity is 3	0

[Data type] Integrated
[Data range] 0～999999
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
1687						DEF3	DEF2	DEF1

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 1
[Valid mode] Valid immediately

Remark:
DEF1-DEF3, the default color configuration program, the above-mentioned configuration color can become valid only when all default bits are set to 0.

4. 7 Programming Parameters (1800～1999)

1800	G80	G50	G69	G15	G50.1			DPI

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

DPI: The decimal point is ignored when programming
0: It is treated as the least set unit
1: It is regarded as mm, sec
G50.1: Whether G51.1 mode is cleared during resetting
0: Clear the mode
1: Not clear the mode
G15: Whether G16 mode is cleared during resetting
0: Clear the mode
1: Not clear the mode
G69: Whether G68 mode is cleared during resetting
0: Clear the mode
1: Not clear the mode
G50: Whether G51 mode is cleared during resetting
0: Clear the mode
1: Not clear the mode
G80: The canned cycle mode is cleared during resetting
0: Clear the mode
1: Not clear the mode

	7#	6#	5#	4#	3#	2#	1#	0#
1801					G91	G19	G18	G01

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

G01: When the system is powered on or the state is cleared, the mode is
0: G00 mode
1: G01 mode
G18, G19: When the power is turned on or the state is cleared, the plane selection is:

G19	G18	Plane selection
0	0	G17
0	1	G18
1	0	G19

G91: When the power is turned on or the state is cleared:
0: G90 mode
1: G91 mode

	7#	6#	5#	4#	3#	2#	1#	0#
1803		**M3B**						

[Data type] Bit
[Data range] 0 or 1
[Default] 0 1 0 0 0 0 0 0
[Valid mode] Valid immediately
M3B: Number of M codes which can be commanded in one program
0: 1
1: Max. 3

1810	Allowable error of arc radius	0.01

[Data type] Real number
[Data unit] mm
[Data range] 0.0005～0.1
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
1850		XSC			SCL			RIN

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 1 0 0 0
[Valid mode] Valid immediately

RIN: The rotation angle of its coordinate rotation
0: Absolute coordinate command
1: G90/G91 command
SCL: Scaling function
0: Disabled
1: Enabled
XSC: Scaling based on each axis
0: Disabled (dedicated by P)
1: Enabled (dedicated by IJK)

1860	The rotation angle is used when the angle in coordinate rotation is not commanded	0

[Data type] Real number
[Data unit] deg
[Data range] -360.000～ 360.000
[Valid mode] Valid immediately

1861	The scaling override is used when the scaling command override does not occur.	1

[Data type] Real number
[Data range] 0～999999.9999
[Valid mode] Valid immediately

1862	Scaling override for each axis	1

[Data type] Real number axis
[Data range] -999999.9999– 999999.9999
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
1870								MDL

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately
MDL: Single direction positioning G code (G60)
0: The mode code does not set
1: Mode code

1880	The direction and overtravel amount of single direction positioning for each axis	0

[Data type] Real number axis

[Data unit] mm
[Data range] -1000～1000
[Valid mode] Valid immediately

1931	The least angle of the index table	0

[Data type] Real number
[Data unit] deg
[Data range] 0～360.000
[Valid mode] Valid immediately

1932	Setting the index axes of the index table	0

[Data type] Integrated
[Data range] 0～8
[Valid mode] Valid after resetting

	7#	6#	5#	4#	3#	2#	1#	0#
1940	SKF							

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

SKF: Whether G31 skip command is valid to the dry run, override and automatic acceleration/deceleration is:
0: Valid
1: Invalid

	7#	6#	5#	4#	3#	2#	1#	0#
1950	MOU							MIN

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

MOU: Whether input the M, S, T and B codes when the program is restarted:
0: Not output
1: Output
MIN: Manual intervention and return function:
0: Invalid
1: Valid

1960	The move sequence for each axis when the program is restarted or the manual intervention functions	1，1，3，2，2

[Data type] Integral axis
[Data range] 1～Controllable axis number
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
1971	ESC	ESR						

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

ESR: External program number index
0: Invalid
1: Valid
ESC: The reset is input from ESTB input to start indexing
0: Index performed
1: Index not performed

4.8 Canned Cycle Parameters (2000～2099)

	7#	6#	5#	4#	3#	2#	1#	0#
2000	PCP		RD2	RD1				FXY

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

FXY: The drilling axis in the drilling canned cycle is:
0: Always the Z-axis
1: The axis selected by the program

RD2, RD1 Set the retraction axis direction of G76 or G87

RD2	RD1	G17	G18	G19
0	0	+X	+Z	+Y
0	1	-X	-Z	-Y
1	0	+Y	+X	+Z
1	1	-Y	-X	-Z

PCP: Rigid tapping
0: High-speed peck tapping
1: Not perform high-speed peck tapping

2010	The retraction amount d of high-speed peck tapping cycle G73	0.5

[Data type] Real number
[Data unit] mm
[Data range] 0～100
[Valid mode] Valid immediately

2011	Clearance d of canned cycle G83	0.5

[Data type] Real number
[Data unit] mm
[Data range] 0～100
[Valid mode] Valid immediately

2034	Clearance of small diameter peck drilling cycle	0.5

[Data type] Real number
[Data unit] mm
[Data range] 0～100
[Valid mode] Valid immediately

4.9 Rigid Tapping Parameters (2100～2299)

2105	Setting the synchronous error width during rigid tapping	1000

[Data type] Integrated
[Data unit] Detection unit
[Data range] 0～999999
[Valid mode] Valid immediately

2106	In-position width of the tapping axis during the rigid tapping	100

[Data type] Integrated
[Data unit] Detection unit
[Data range] 0～32767
[Valid mode] Valid immediately

2107	In-position width of the spindle during the rigid tapping	100

[Data type] Integrated
[Data unit] Detection unit
[Data range] 0～32767
[Valid mode] Valid immediately

2112	Retraction or clearance amounts in tapping cycle	0.5

[Data type] Real number
[Data unit] mm
[Data range] 0～100
[Valid mode] Valid immediately

2113	The default time without specifying P during rigid tapping	350

[Data type] Integrated
[Data unit] ms
[Data range] 350～1000
[Valid mode] Valid immediately

Remark:
1. The parameter is only valid in the parameters G74,G84 and G88.
2. The parameter also means: The dwell time of the spindle CCW rotation during G74 and G84 cutting and retraction.

2120	Limit value of position offset amount during the tapping axis moving of the rigid tapping	30000

[Data type] Integrated
[Data unit] Detection unit
[Data range] 0～999999
[Valid mode] Valid immediately

2121	Limit value of position offset amount during the spindle moving of the rigid tapping	30000

[Data type] Integrated
[Data unit] Detection unit

[Data range] 0～999999
[Valid mode] Valid immediately

2122	Limit value of position offset amount during the tapping axis stopping of the rigid tapping	1000

[Data type] Integrated
[Data unit] Detection unit
[Data range] 0～32767
[Valid mode] Valid immediately

2123	Limit value of position offset amount during the spindle stopping of the rigid tapping	1000

[Data type] Integrated
[Data unit] Detection unit
[Data range] 0～32767
[Valid mode] Valid immediately

2140	The maximum speed of spindle (the 1st gear) in rigid tapping	1000

[Data type] Integrated
[Data unit] rpm
[Data range] 0～9999
[Valid mode] Valid after resetting

2141	The maximum speed of spindle (the 2nd gear) in rigid tapping	1000

[Data type] Integrated
[Data unit] rpm
[Data range] 0～9999
[Valid mode] Valid after resetting

2142	The maximum speed of spindle (the 3rd gear) in rigid tapping	1000

[Data type] Integrated
[Data unit] rpm
[Data range] 0～9999
[Valid mode] Valid after resetting

2143	The maximum speed of spindle (the 4th gear) in rigid tapping	1000

[Data type] Integrated
[Data unit] rpm
[Data range] 0～9999
[Valid mode] Valid after resetting

2170	The position control circuit gain is performed (the 1st gear) between spindle and tapping axis when the rigid tapping is performed.	1000

[Data type] Integrated
[Data unit] 0.01/s
[Data range] 0～9999
[Valid mode] Valid immediately

2171	The position control circuit gain is performed (the 2nd gear) between spindle and tapping axis when the rigid tapping is performed.	1000

[Data type] Integrated
[Data unit] 0.01/s
[Data range] 0～9999
[Valid mode] Valid immediately

2172	The position control circuit gain is performed (the 3rd gear) between spindle and tapping axis when the rigid tapping is performed.	1000

[Data type] Integrated
[Data unit] 0.01/s
[Data range] 0～9999
[Valid mode] Valid immediately

2173	The position control circuit gain is performed (the 4th gear) between spindle and tapping axis when the rigid tapping is performed.	1000

[Data type] Integrated
[Data unit] 0.01/s
[Data range] 0～9999
[Valid mode] Valid immediately

2180	Spindle circuit gain coefficient in rigid tapping (the 1st gear)	1000

[Data type] Integrated
[Data range] 0～32767
[Valid mode] Valid immediately

2181	Spindle circuit gain coefficient in rigid tapping (the 2nd gear)	1000

[Data type] Integrated
[Data range] 0～32767
[Valid mode] Valid immediately

2182	Spindle circuit gain coefficient in rigid tapping (the 3rd gear)	1000

[Data type] Integrated
[Data range] 0～32767
[Valid mode] Valid immediately

2183	Spindle circuit gain coefficient in rigid tapping (the 4th gear)	1000

[Data type] Integrated
[Data range] 0～32767
[Valid mode] Valid immediately

2210	Spindle backlash compensating value of rigid tapping (the 1st gear)	10

[Data type] Integrated
[Data unit] Detection unit
[Data range] 1～127
[Valid mode] Valid after resetting

2211	Spindle backlash compensating value of rigid tapping (the 2nd gear)	10

[Data type] Integrated
[Data unit] Detection unit
[Data range] 1～127
[Valid mode] Valid after resetting

2212	Spindle backlash compensating value of rigid tapping (the 3rd gear)	10

[Data type] Integrated
[Data unit] Detection unit
[Data range] 1～127
[Valid mode] Valid after resetting

2213	Spindle backlash compensating value of rigid tapping (the 4th gear)	10

[Data type] Integrated
[Data unit] Detection unit
[Data range] 1～127
[Valid mode] Valid after resetting

4.10 Parameters of Input and Output（2400～2599）

	7#	6#	5#	4#	3#	2#	1#	0#
2401	**LTM**		**DEC**		**SWI**			**PLCP**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

PLCP: Whether PLC parameter data file is upgraded
0: Not upgrade
1: Upgrade
SWI: Whether the symbol of the position switch is valid
0: Invalid
1: Valid
DEC: The deceleration signal during the reference position return
0: Decelerate when it is 0
1: Decelerate when it is 1
LTM: Process method of the hardware limit
0: Decelerate when it is the hardware limit
1: Stop immediately

2410	The dwell times of the selective signals MF, SF, TF and BF	64

[Data type] Integrated
[Data unit] ms
[Data range] 16～32767
[Valid mode] Valid immediately

2411	The acceptable width of finish signals of M, S, T and B signals	64

[Data type] Integrated

[Data unit] ms
[Data range] 16～32767
[Valid mode] Valid immediately

2412	Addresses assigned to the skip signals	0

[Data type] Integrated
[Data range] 0～127
[Valid mode] Valid immediately

Remark:
It is invalid when the parameter is less than 10.

2413	Addresses assigned to the measuring in-position signals	0

[Data type] Integrated
[Data range] 0～127
[Valid mode] Valid immediately

Remark:
It is invalid when the parameter is less than 10.

2418	Time of the resetting signal output	600

[Data type] Integrated
[Data unit] ms
[Data range] 0～1000
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
2430								**EMS**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

EMS: Extended the external mechanical origin offset function
0: Invalid
1: Valid

2431	The signal starting address used in the extended external mechanical origin offset function	100

[Data type] Integrated
[Data unit] ms
[Data range] 0～1844
[Valid mode] Valid immediately

2500-2531	The servo axis corresponding to the position switch	0

[Data type] Integrated
[Data range] 0～8
[Valid mode] Valid immediately

Remark:
1. The position switch function is valid when bit SWI is 1.
2. The position switch is invalid when it is 0.

2532-2563	The positive max. range of the position switch	0

[Data type] Real number
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

2564-2595	The negative max. range of the position switch	0

[Data type] Real number
[Data range] -999999.9999 ～ 999999.9999
[Valid mode] Valid immediately

4.11 Tool Administration Parameters (2600～2799)

	7#	6#	5#	4#	3#	2#	1#	0#
2600							TLB	SUB

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 1 1
[Valid mode] Valid immediately

SUB: Tool start-up type of the tool radius compensation
0: Type A
1: Type B
TLB: Tool length compensation selection
0: Tool compensation A (Always Z axis irrespective of plane specification)
1: Tool compensation B (Axis vertical to the specified plane)

	7#	6#	5#	4#	3#	2#	1#	0#
2601	ODI	LVK				CCN		

[Data type] Bit
[Data range] 0 or 1
[Default] 1 0 0 0 0 1 0 0
[Valid mode] Valid immediately

CCN: Whether cutter compensation is cancelled when G28 commands the tool moves to the intermediate position
0: The cutter compensation is cancelled.
1: The cutter compensation is cancelled until the tool moves to the reference position.
LVK: During resetting, the tool length offset value is
0: Not cleared
1: Cleared
ODI: The cutter compensation amount is set by:
0: The diameter value
1: The radius value

	7#	6#	5#	4#	3#	2#	1#	0#
2602						TPH	CNI	OIM

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

OIM: When the unit is switched between the inch and metric systems, whether the manual input data are converted:
0: Not automatically converted
1: Automatically converted
CNI: Interference check for radius compensation is:
0: Performed
1: Not performed
TPH: The addresses of the commanded tool position offset numbers G45-G48
0: With H code
1: With D code

2610	The vector limit value is ignored when cutter compensation moves along with the corner outside.	0.01

[Data type] Real number
[Data unit] mm
[Data range] 0～100
[Valid mode] Valid immediately

2611	The maximum amount of tool wear compensation value	60

[Data type] Real number
[Data unit] mm
[Data range] 0～100.0000
[Valid mode] Valid immediately

2651	Automatic tool length compensation measuring speed	1000

[Data type] Real number
[Data unit] mm/min
[Data range] 0～15000
[Valid mode] Valid immediately

2652	The value r of automatic tool length compensation measure	0

[Data type] Real number
[Data range] 0～10000
[Valid mode] Valid immediately

2653	The value e of automatic tool length compensation	0

[Data type] Real number
[Data range] 0～10000
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
2700			EIS			LTM	GS2	GS1

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

GS2 and GS1 are composed of the tool number combination

GS2	GS1	Group	Tool number
0	0	1～16	1～16

0	1	1～32	1～8
1	0	1～64	1～4
1	1	1～128	1～2

LTM: Tool life
0: Specified by the usage times
1: Specified by time
EIS: When the tool life is measured based on time:
0: The life is counted every four seconds.
1: The life is counted every second.

2710	The omission number of tool life administration	0

[Data type] Integrated
[Data range] 0～9999
[Valid mode] Valid after resetting

2711	M code for restarting tool life count	0

[Data type] Integrated
[Data range] 0～255
[Valid mode] Valid after resetting

2712	The rest of tool life (frequency of use)	0

[Data type] Integrated
[Data range] 0～9999
[Valid mode] Valid after resetting

2713	The rest of tool life (usage time)	0

[Data type] Integrated
[Data unit] min
[Data range] 0～9999
[Valid mode] Valid after resetting

4.12 Pitch Error Compensation Parameters (2800～2999)

	7#	6#	5#	4#	3#	2#	1#	0#
2800							WDIR	SCRW

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

SCRW: Pitch compensation
0: Not performed
1: Performed
WDIR: Pitch compensation selection
0: Unidirectional
1: Bidirectional

2806	The pitch error compensation value of the reference position return	0

[Data type] Integral axis

[Data unit] Detection unit
[Data range] -32768 ~ 32767
[Valid mode] Valid after resetting

The pitch error compensation amount absolute value on the reference position is the backlash value of the reference position when the reference position return is operated in the negative direction and if the set direction (parameter ZMI<No.1004#5>) of the reference position return is positive; Or The pitch error compensation amount absolute value on the reference position is also the backlash value of the reference position when the reference position return is operated in the positive direction and if the set direction of the reference position return is negative. The backlash value is valid during the bidirectional pitch error compensating.

2810	Reference position pitch error compensation number for each axis	0

[Data type] Integral axis
[Data range] 0～1023
[Valid mode] Valid after resetting

2811	The farthest pitch error compensation point number for each axis in negative direction	0

[Data type] Integral axis
[Data range] 0～1023
[Valid mode] Valid after resetting

2812	The farthest pitch error compensation point number for each axis in positive direction	0

[Data type] Integral axis
[Data range] 0～1023
[Valid mode] Valid after resetting

Remark:
This parameter setting value is greater than that set by No.2810 (reference position pitch error compensation number).

2813	Pitch error compensation override for each axis	1

[Data type] Real number axis
[Data unit] %
[Data range] 1～100
[Valid mode] Valid after resetting

2814	The interval of pitch error compensation point for each axis	0

[Data type] Real number axis
[Data unit] mm
[Data range] 0～999999.9999
[Valid mode] Valid after resetting

Remark:
Pitch error compensation point is distributed in equidistant, the least value of interval = the maximum feedrate * (interpolation period/60000)* the compensation override.

4.13Turning cycle parameters（3000～3199）

3000								GMT

[Data type] Bit type
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after restarting

GMT: The system is when the power is ON
0: Machining center
1: Turning machine

	7#	6#	5#	4#	3#	2#	1#	0#
3001					DIA			

[Data type] Bit type
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

DIA: The commanded value of X axis is input in the program
0: Diameter input
1: Radius input

	7#	6#	5#	4#	3#	2#	1#	0#
3101		M5T		MACT		RTR		

[Data type] Bit type
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

RTR: Drilling cycle type
0: Non-high-speed peck
1: High-speed peck
MACT: Selecting function of G71-G7
0: Multiple cycles in turning machine
1: Grinding cycle of the grinding machine
M5T: Whether send the spindle stop command before M03/M04
0: Not send
1: Send

3111	Dwell time of the drilling cycle (G83 and G87)	0.0000

[Data type] Real number axis type
[Data unit] Second
[Data range] 0～9999
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
3112	M_T	R_T	U_PQ	TYP		RTR		

[Data type] Bit type
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

RTR: Drilling cycle type
0: Non-peck drilling
1: Peck drilling

TYP: Type of G71/G72 machining path
0: Type I
1: Type II

U_PQ: The unit is used when P/Q is commanded by G74/G75
0: 0.001mm
1: 1mm

R_T: G74/G75 return mode
0: Not retraction 0 in the first layer
1: Retraction 0 in the first layer

M_T: G74/G75 rapid/feeding retraction
0: Rapid retraction
1: Feeding retraction

3114	Retraction distance during the drilling cycle（G83, G87）	0.0000

[Data type] Real number type
[Data unit] 1 time
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

3130	Chamfering amount（0.1* screw pitch） of the thread cutting cycle（G76,G92）	0

[Data type] Integral type
[Data unit] 0.1 time
[Data range] 0～99
[Valid mode] Valid immediately

3132	Cutting amount of roughing cycle（G71,G72）	0.001

[Data type] Real number type
[Data unit] mm
[Data range] 0.001～99999.999
[Valid mode] Valid immediately

3133	Retraction amount of roughing cycle（G71,G72）	0.0001

[Data type] Real number type
[Data unit] mm
[Data range] 0.0001～99999.999
[Valid mode] Valid immediately

3135	Retraction amount in X axis direction of the closed cutting cycle (G73)	0

[Data type] Real number type
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

3136	Retraction amount in Z axis direction of the closed cutting cycle (G73)	0

[Data type] Real number type
[Data unit] mm
[Data range] -999999.9999～999999.9999
[Valid mode] Valid immediately

3137	Cutting times of the closed cutting cycle (G73)	1

[Data type] Integrated type
[Data unit] Frequency
[Data range] 1～999999
[Valid mode] Valid immediately

3139	Retraction amount of multiple cycle（G74,G75）	0

[Data type] Real number type
[Data unit] mm
[Data range] 0～99999.999
[Valid mode] Valid immediately

3140	Minimum cutting amount（0.001mm） of multiple thread cutting cycle G76	0

[Data type] Integrated type
[Data unit] 0.001mm
[Data range] 0～99999
[Valid mode] Valid immediately

3141	Finishing surplus（0.001mm）of multiple thread cutting cycle G76	0

[Data type] Integrated type
[Data unit] 0.001mm
[Data range] 0～99999
[Valid mode] Valid immediately

3142	Finishing cycle times of the multiple thread cutting cycle G76	1

[Data type] Integrated type
[Data unit] Frequency
[Data range] 1～99
[Valid mode] Valid immediately

3143	Tool nose angle（deg）of the multiple thread cutting cycle G76	0

[Data type] Integrated type
[Data unit] deg
[Data range] 0～99
[Valid mode] Valid immediately

3144	M codes switching into the machining center	0

[Data type] Integrated type
[Data range] 100～999
[Valid mode] Valid after resetting

3145	M codes switching into the turning machine	0

[Data type] Integrated type
[Data range] 100～999
[Valid mode] Valid after resetting

4.14 Servo Parameters (4000～4999)

	7#	6#	5#	4#	3#	2#	1#	0#
4000	**IGN8**	**IGN7**	**IGN6**	**IGN5**	**IGN4**	**IGNZ**	**IGNY**	**IGNX**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

IGNn: The servo axis is:
0: Not ignored
1: Ignored

	7#	6#	5#	4#	3#	2#	1#	0#
4001	**RAST**	**RDIR**	**DPOS**	**APC**	**APZ**		**SADJ**	**LVP**

[Data type] Bit axis
[Data range] 0 or 1
[Default] 0 0 0 0 1 0 0 0
[Valid mode] Valid immediately

LVP: Whether restore the default servo parameters
0: Not restore
1: Restore

Remark:
When LVP is changed from “0” to “1”, the system reads the servo motor default parameters through the drive.

SADJ: Whether operate servo parameter self-regulation
0: No
1: Yes

Remark:
When SADJ is changed from “0” into “1”, the system operates the servo parameters self-regulation. During self-regulating, the vibration will occur in the motor; for safety, the operator and the equipment must be out of the machine movement area.

APZ: Absolute encoder position and machine one are
0: Not consistent
1: Consistent

Remark:
When the absolute encoder is used, it should be set as “0” when the system is powered on at the first time or zero position is lost; while the system automatically changes APZ from “0” to “1” after the manual reference position return is completed; or in Jog mode, when the axis is moved into the position to be set as zero, APZ is changed from “0” into “1”, the zero position is set manually, the absolute encoder zero is consistent with the machine zero.

APC: Whether select the pulse servo
0: No
1: Yes
DPOS: The loop control of double positions is
0: Invalid
1: Valid
RDIR: The direction of the optical grating is
0: Positive
1: Negative
RAST: Whether use the optical grating
0: No
1: Yes

	7#	6#	5#	4#	3#	2#	1#	0#
4002							DPSS	PGTW

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

PGTW: The position gain switch function is
0: Invalid
1: Valid
DPSS: The double positions loop process mode is
0: Type A
1: Type B

4010	Range of the servo multi-ring values	65536

[Data type] Integral axis
[Data unit]
[Data range] 0～1000000
[Valid mode] Valid immediately

Remark:
If the input parameter is 0, the system processes as 65536.

4011	Range of the servo single ring value	131072

[Data type] Integral axis
[Data range] 0～1000000
[Valid mode] Valid immediately

Remark:
If the input parameter is 0, the system processes as 131072.

4013	Valid speed of the position gain switch	0

[Data type] Integral axis
[Data unit] rpm
[Data range] 0～10000
[Valid mode] Valid immediately

4016	Time constant of one time dwell in the double positions loop	300

[Data type] Integral axis

[Data unit] ms
[Data range] 0～1000
[Valid mode] Valid immediately

	7#	6#	5#	4#	3#	2#	1#	0#
4020							**ADJ**	**SYN**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

SYN: The feed axis synchronous symbol is
0: Invalid
1: Valid
ADJ: Whether the feed axis synchronously is corrected
0: Not correct
1: Correct

4021	Main control axis number	0

[Data type] Integral axis
[Data unit]
[Data range] 0～6
[Valid mode] Valid after resetting

4022	Allowable synchronous error amount of the machine coordinate	0

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 0～999999
[Valid mode] Valid immediately

4023	Allowable synchronous error amount of the position offset	0

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 0～999999
[Valid mode] Valid immediately

4024	Allowable compensation amount of the synchronous adjustment	0

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 0～999999
[Valid mode] Valid immediately

4025	Allowable error amount of the synchronous torque	0

[Data type] Integral axis
[Data unit] 10mA
[Data range] 0～999999
[Valid mode] Valid immediately

4026	Compensation zero range of the synchronous error	0

[Data type] Integral axis
[Data unit] 0.1um

[Data range] 0～999999
[Valid mode] Valid immediately

4027	Compensation gain of the synchronous error	1

[Data type] Integral axis
[Data unit]
[Data range] 1～1024
[Valid mode] Valid immediately

4100	Each axis pulse equivalent	1000

[Data type] Real number axis
[Data range] 1~999999
[Valid mode] Valid after resetting

4110	In-position width of each axis	100

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 1～32767
[Valid mode] Valid immediately

4111	The maximum allowable position offset amount when each axis is stopped	1000

[Data type] Real number axis
[Data unit] 0.1um
[Data range] 0～32767
[Valid mode] Valid immediately

4112	The max. allowable position offset amount when each axis moves	120000

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 0～999999
[Valid mode] Valid immediately

4114	Incremental grating signal period	0

[Data type] Integrated axis type
[Data unit] 0.1um
[Data range] 0～1000
[Valid mode] Valid immediately

4115	The allowable max. coordinate differential value between the optical grating and the servo encoder	0

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 0～999999
[Valid mode] Valid immediately

Remark:
1. When it is set as 0, the coordinate differential value is not detected.
2. During debugging and running the machine with the optical grating, it is recommended to use the default value detection function to realize the protection in the abnormal situation.

4116	Vibration control differential value between the optical grating and the servo encoder	0

[Data type] Integral axis
[Data unit] 0.1um
[Data range] 0～999999
[Valid mode] Valid immediately

Remark:
1. The vibration control isn't operated when it is set as 0.
2. It is valid during debugging the axis with the optical grating and it is used when the machine is vibrated seriously.
3. In the set range, it is controlled in the fully closed loop; out of the range, it is in the semi-closed loop control.

4120	Offset amount of each axis grid	0

[Data type] Real number axis
[Data unit] mm
[Data range] 0～10000
[Valid mode] Valid after resetting

4121	Backlash compensating value for each axis	0

[Data type] Real number axis
[Data unit] mm
[Data range] -9.9999～9.9999
[Valid mode] Valid after resetting

4122	Backlash compensating value in rapid traverse rate for each axis	0

[Data type] Real number axis
[Data unit] mm
[Data range] -9.9999～9.9999
[Valid mode] Valid after resetting

4123	Step width of backlash compensation	0.01

[Data type] Real number axis
[Data unit] mm
[Data range] 0～0.9999
[Valid mode] Valid after resetting

4200	Password	315

[Data type] Integral number axis
[Data range] 0～9999
[Valid mode] Valid immediately

4201	Motor type code	65

[Data type] Integral number axis
[Data range] 0～100
[Valid mode] Valid immediately

4202	Version number	420

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4203	Initial display state	0

[Data type] Integral number axis
[Data range] 0~21
[Valid mode] Valid immediately

4204	Control mode selection	0

[Data type] Integral number axis
[Data range] 0～7
[Valid mode] Valid immediately

4205	Speed proportional gain	155

[Data type] Integral number axis
[Data unit] 0.1
[Data range] 5～1280
[Valid mode] Valid immediately

4206	Speed integration time constant (ms)	200

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0～32767
[Valid mode] Valid immediately

4207	Torque command filter (%)	100

[Data type] Integral number axis
[Data unit] %
[Data range] 40~2000
[Valid mode] Valid immediately

4208	Speed check low-pass filter (%)	40

[Data type] Integral number axis
[Data unit] %
[Data range] 10~2000
[Valid mode] Valid immediately

4209	Position proportional gain	245

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~2000
[Valid mode] Valid immediately

4210	Position feed forward gain (%)	0

[Data type] Integral number axis
[Data unit] 0. 1
[Data range] 0~1280
[Valid mode] Valid immediately

4211	Position feed forward low-pass end rate (Hz)	300

[Data type] Integral number axis
[Data unit] Hz
[Data range] 1~2000
[Valid mode] Valid immediately

4212	Electron gear rate numerator	8192

[Data type] Integral number axis

[Data range] 1~999999
[Valid mode] Valid immediately

4213	Electron gear rate denominator	5000

[Data type] Integral number axis
[Data range] 1~999999
[Valid mode] Valid immediately

4214	Position pulse input mode	0

[Data type] Integral number axis
[Data range] 0~2
[Valid mode] Valid immediately

4215	Position pulse direction	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

Remark:
After rewriting the parameter, the system machine coordinate and the absolute coordinate values will be directly negated, calculated and displayed.

4216	The completion range of positioning	20

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4217	Position dynamic excess-error check range	3000

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4218	Position excess-error check is enabled	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4219	Differential proportional coefficient	100

[Data type] Integral number axis
[Data unit] Hz
[Data range] 15~15000
[Valid mode] Valid immediately

4220	Invalid drive forbiddance	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4221	JOG speed	100

[Data type] Integral number axis
[Data unit] rpm
[Data range] -6000~6000
[Valid mode] Valid immediately

4222	The speed command filter switch	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4223	The maximum speed limit	3000

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~6000
[Valid mode] Valid immediately

4224	Internal speed 1	0

[Data type] Integral number axis
[Data unit] rpm
[Data range] -6000~6000
[Valid mode] Valid immediately

4225	Internal speed 2	100

[Data type] Integral number axis
[Data unit] rpm
[Data range] -6000~6000
[Valid mode] Valid immediately

4226	Internal speed 3	300

[Data type] Integral number axis
[Data unit] rpm
[Data range] -6000~6000
[Valid mode] Valid immediately

4227	Internal speed 4	-100

[Data type] Integral number axis
[Data unit] rpm
[Data range] -6000~6000
[Valid mode] Valid immediately

4228	Arrival speed	500

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~6000
[Valid mode] Valid immediately

4229	The 2nd integration time constant of speed	300

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 1~32767
[Valid mode] Valid immediately

4230	Linear speed conversion numerator	10

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4231	Linear speed conversion denominator	1

[Data type] Integral number axis
[Data range] 0~32767

[Valid mode] Valid immediately

4232	Linear speed decimal point position	3

[Data type] Integral number axis
[Data range] 0~4
[Valid mode] Valid immediately

4233	The speed in the mode of motor check	100

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~6000
[Valid mode] Valid immediately

4234	The internal CCW torque limit	300

[Data type] Integral number axis
[Data unit] %
[Data range] 0~300
[Valid mode] Valid immediately

4235	The internal CW torque limit	-300

[Data type] Integral number axis
[Data unit] %
[Data range] -300~0
[Valid mode] Valid immediately

4238	Speed trial running torque limit	100

[Data type] Integral number axis
[Data unit] %
[Data range] 0~300
[Valid mode] Valid immediately

4239	Acceleration time ms	0

[Data type] Integral number axis
[Data unit] ms
[Data range] 0~10000
[Valid mode] Valid immediately

4240	Deceleration time ms	0

[Data type] Integral number axis
[Data unit] ms
[Data range] 0~10000
[Valid mode] Valid immediately

4241	Servo output pulse number	0

[Data type] Integral number axis
[Data unit] P/r
[Data range] 16~32767
[Valid mode] Valid immediately

4242	Servo response top frequency	200

[Data type] Integral number axis
[Data unit] Hz
[Data range] 50~600
[Valid mode] Valid immediately

4243	Speed from the internal or the external	1

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4244	Parameter self-regulating current input	30

[Data type] Integral number axis
[Data unit] %
[Data range] 1~2000
[Valid mode] Valid immediately

4245	The robot anti-collision current filtering time	5

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 1~32767
[Valid mode] Valid immediately

4246	Analog command and pulse output are negated	0

[Data type] Integral number axis
[Data range] 0~3
[Valid mode] Valid immediately

4247	Speed command gain	1000

[Data type] Integral number axis
[Data unit] 0.001ms
[Data range] 20~3000
[Valid mode] Valid immediately

4249	The robot collision position feedback excess-error detection	4

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4250	The robot static collision current detection	6

[Data type] Integral number axis
[Data unit] %
[Data range] 0~32767
[Valid mode] Valid immediately

4251	The robot dynamic collision current detection coefficient	150

[Data type] Integral number axis
[Data unit] %
[Data range] 0~32767
[Valid mode] Valid immediately

4252	Parameter self-regulating current limit value	40

[Data type] Integral number axis
[Data unit] %
[Data range] 1~100
[Valid mode] Valid immediately

4253	Parameter self-regulating speed low-pass filter end frequency	65

[Data type] Integral number axis
[Data unit] Hz
[Data range] 10~2000
[Valid mode] Valid immediately

4254	Speed command abnormal detection valve value	1000

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~3000
[Valid mode] Valid immediately

4255	Feedback speed abnormal detection valve value	1000

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~3000
[Valid mode] Valid immediately

4256	The output time is performed in advance when the feedback pulse is greater than 10000	20

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4257	Speed command feed forward gain	0

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~32767
[Valid mode] Valid immediately

4258	Acceleration command feed forward gain	0

[Data type] Integral number axis
[Data unit] 0.001
[Data range] -10000~10000
[Valid mode] Valid immediately

4259	Inertia stop decay coefficient	2

[Data type] Integral number axis
[Data range] 1~4
[Valid mode] Valid immediately

4260	Current proportional gain	1450

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~6000
[Valid mode] Valid immediately

4261	Current integration time constant	130

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 1~32767
[Valid mode] Valid immediately

4262	Current integration separation point	25

[Data type] Integral number axis
[Data unit] %
[Data range] 0~500
[Valid mode] Valid immediately

4263	Current proportion gain rate of change	200

[Data type] Integral number axis
[Data unit] %
[Data range] 0~500
[Valid mode] Valid immediately

4264	Current low-pass end rate	1000

[Data type] Integral number axis
[Data unit] Hz
[Data range] 0~10000
[Valid mode] Valid immediately

4265	Speed integration separation point	100

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~3000
[Valid mode] Valid immediately

4266	Speed proportion gain rate of change	100

[Data type] Integral number axis
[Data unit] %
[Data range] 0~500
[Valid mode] Valid immediately

4267	Deviated position corner 0	1000

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 100~2000
[Valid mode] Valid immediately

4268	Deviated position corner 1	1000

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 100~2000
[Valid mode] Valid immediately

4269	The position proportional gain change rate of deviated position corner 0	950

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 100~1000
[Valid mode] Valid immediately

4270	The position proportional gain change rate of deviated position corner 1	1700

[Data type] Integral number axis
[Data unit] 0.1
[Data range] 1000~3100
[Valid mode] Valid immediately

4271	Motor rotor inertia	133

[Data type] Integral number axis
[Data unit] 0.01
[Data range] 0~32767
[Valid mode] Valid immediately

4272	Motor rated torque	60

[Data type] Integral number axis
[Data unit] 0. 1
[Data range] 0~32767
[Valid mode] Valid immediately

4273	Motor rated revolving speed	2500

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~32767
[Valid mode] Valid immediately

4274	The allowable maximum current of current sampling circuit	2500

[Data type] Integral number axis
[Data unit] 0.01
[Data range] 0~32767
[Valid mode] Valid immediately

4275	Motor rated current	60

[Data type] Integral number axis
[Data unit] 0.01
[Data range] 0~1000
[Valid mode] Valid immediately

4276	The motor allowable maximum overload times	200

[Data type] Integral number axis
[Data unit] %
[Data range] 0~1000
[Valid mode] Valid immediately

4277	Correction coefficient of q axis current	200

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~1000
[Valid mode] Valid immediately

4278	Correction coefficient of d axis current	200

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~1000
[Valid mode] Valid immediately

4279	The allowable repeated maximum regulating time during the parameter self-regulation	1000

[Data type] Integral number axis
[Data range] 0~30000
[Valid mode] Valid immediately

4280	The 2nd integration time constant of current	500

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 1~32767
[Valid mode] Valid immediately

4281	Correction coefficient of speed PID	500

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~1000
[Valid mode] Valid immediately

4282	Current proportion gain during the parameter self-regulating	3000

[Data type] Integral number axis
[Data unit] 0.001
[Data range] 0~10000
[Valid mode] Valid immediately

4283	Dwell time of the main circuit overvoltage alarm	1

[Data type] Integral number axis
[Data unit] s
[Data range] 0~32767
[Valid mode] Valid immediately

4284	Dwell time of the main circuit brake alarm	1

[Data type] Integral number axis
[Data unit] s
[Data range] 0~32767
[Valid mode] Valid immediately

4285	Dwell time of the drive enable	150

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0~10000
[Valid mode] Valid immediately

4286	Dwell time of the module alarm	80

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0~10000
[Valid mode] Valid immediately

4287	Dwell time of the main circuit less voltage alarm	10

[Data type] Integral number axis
[Data unit] 0.1s
[Data range] 0~10000
[Valid mode] Valid immediately

4288	The communication error counter of absolute encoder	2

[Data type] Integral number axis
[Data range] 0~10000
[Valid mode] Valid immediately

4289	The longest time of completing the encoder set to 0	3000

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4290	The position loop received data are the incremental position or the absolute position	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4291	Encoder control mode	2

[Data type] Integral number axis
[Data range] 0~20
[Valid mode] Valid immediately

4292	Speed gain switching value at low speed	100

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~3000
[Valid mode] Valid immediately

4293	Speed gain switching coefficient at low speed	100

[Data type] Integral number axis
[Data unit] %
[Data range] 0~300
[Valid mode] Valid immediately

4294	Servo alarm display time in turn	15000

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0~32767
[Valid mode] Valid immediately

4295	Pole pair number	4

[Data type] Integral number axis
[Data range] 0~8
[Valid mode] Valid immediately

4296	Opened-loop operation voltage	1395

[Data type] Integral number axis
[Data unit] 0.01V
[Data range] 0~31000
[Valid mode] Valid immediately

4297	Opened-loop operation speed	18

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~3000
[Valid mode] Valid immediately

4298	SON enforcement is valid	0

[Data type] Integral number axis
[Data range] 0~1

[Valid mode] Valid immediately

4299	The voltage value when the encoder is set to 0	4000

[Data type] Integral number axis
[Data unit] 0.01V
[Data range] 0~31000
[Valid mode] Valid immediately

4300	Dwell time of the battery alarm	1000

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0~3000
[Valid mode] Valid immediately

4301	The parameter self-regulating speed of the filter low-pass end frequency 2	80

[Data type] Integral number axis
[Data unit] Hz
[Data range] 1~32767
[Valid mode] Valid immediately

4302	The adjustable pulse width output by Z pulse	30

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0~10000
[Valid mode] Valid immediately

4303	Start the robot hit-proof function	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4304	Speed filter end frequency 0	100

[Data type] Integral number axis
[Data unit] Hz
[Data range] 0~32767
[Valid mode] Valid immediately

4305	Speed filter end frequency 1	110

[Data type] Integral number axis
[Data unit] Hz
[Data range] 0~32767
[Valid mode] Valid immediately

4306	Speed filter end frequency 2	130

[Data type] Integral number axis
[Data unit] Hz
[Data range] 0~32767
[Valid mode] Valid immediately

4307	Speed filter end frequency 3	170

[Data type] Integral number axis
[Data unit] Hz
[Data range] 0~32767
[Valid mode] Valid immediately

4308	Inertia stop mode selection	1

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4309	Speed filter wave separation point 0	3

[Data type] Integral number axis
[Data unit] rpm
[Data range] 0~32767
[Valid mode] Valid immediately

4310	Speed filter wave separation point 1	10

[Data type] Integral number axis
[Data unit] r/min
[Data range] 0~32767
[Valid mode] Valid immediately

4311	Speed filter wave separation point 2	35

[Data type] Integral number axis
[Data unit] r/min
[Data range] 0~32767
[Valid mode] Valid immediately

4312	Shield the motor type wrong alarm	0

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4313	Start the band-type brake stop function	1

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4314	Over-current alarm delay time	1

[Data type] Integral number axis
[Data unit] 0.5ms
[Data range] 0~200
[Valid mode] Valid immediately

4315	Dwell time of valid detection of power-on band-type brake on	1

[Data type] Integral number axis
[Data range] 0~1
[Valid mode] Valid immediately

4317	Delay time of band-type brake on	1500

[Data type] Integral number axis
[Data unit] 0.1ms
[Data range] 0~32767
[Valid mode] Valid immediately

4318	Band-type brake delay time	10000

[Data type] Integral number axis
[Data unit] 0.1ms

[Data range] 0~32767
[Valid mode] Valid immediately

4320	Speed display error compensation	4

[Data type] Integral number axis
[Data range] 0~32767
[Valid mode] Valid immediately

4.15 Spindle Control Parameters (5000～5999)

	7#	6#	5#	4#	3#	2#	1#	0#
5000	**LOOPS**	**GTT**				**ALMS**	**SWG**	**SAR**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 1 1 0
[Valid mode] Valid after resetting

SAR: The spindle speed arrival signal is:
0: Not checked
1: Checked
SWG: Spindle alarm switch
0: Ignored
1: Accepted and processed
ALMS: Spindle alarm valid level
0: Low level
1: High level
GTT: Spindle gear shifting mode selection
0: M type
1: T type
LOOPS: Spindle position control mode selection
0: Opened-loop
1: Closed-loop

	7#	6#	5#	4#	3#	2#	1#	0#
5001					**SVAL**			**SVD**

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid immediately

SVD: Spindle speed fluctuation detection
0: Invalid
1: Valid
SVAL: Spindle speed display selection
0: Commanded speed
1: Actual speed

	7#	6#	5#	4#	3#	2#	1#	0#
5002							**SCS**	**AXC**

[Data type] Bit type
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

SCS: Cs axis function
0: Invalid
1: Valid
AXC: Spindle positioning function
0: Invalid
1: Valid

5008	Spindle name	0

[Data type] Integrated type
[Data range] 0～255
[Valid mode] Valid after resetting

5010	Set the spindle speed range during starting the spindle speed fluctuation detecting	2

[Data type] Integral number axis
[Data unit] %
[Data range] 1～100
[Valid mode] Valid immediately

5011	The allowable spindle speed fluctuation rate during the spindle speed fluctuation detecting	10

[Data type] Integrated type
[Data unit] %
[Data range] 1～100
[Valid mode] Valid immediately

5012	The allowable spindle speed fluctuation value during the spindle speed fluctuation detecting	1000

[Data type] Integrated type
[Data unit] rpm
[Data range] 0～32767
[Valid mode] Valid immediately

5013	Time from the spindle speed command change to the spindle speed fluctuation detection start	2000

[Data type] Integrated type
[Data unit] ms
[Data range] 0～999999
[Valid mode] Valid immediately

5100	The gain regulation data (0.01%) of spindle speed analog output	10000

[Data type] Integrated type
[Data unit] 0.01%
[Data range] 1000～12500
[Valid mode] Valid after resetting

Set value=10/the real-time measured output analog voltage value during commanding the spindle max. speed * 10000

5101	The compensation value of spindle speed analog output offset voltage	0

[Data type] Integrated type
[Data range] -1024～1024
[Valid mode] Valid after resetting

Set zero floating compensation value of the spindle speed command analog voltage.

5102	Spindle acceleration	2222

[Data type] Real number
[Data unit] rev/(second * second)
[Data range] 0～99999
[Valid mode] Valid after resetting

5103	Spindle analog output direction	0

[Data type] Integrated type
[Data range] 0～1(0: Positive, 1: Negative)
[Valid mode] Valid after resetting

5105	The spindle maximum acceleration in rigid tapping	139

[Data type] Real number
[Data unit] rev/(second * second)
[Data range] 0～99999
[Valid mode] Valid after resetting

5106	The direction control of closed-loop spindle	0

[Data type] Integrated type
[Data range] 0～3
[Valid mode] Valid after resetting

Setting value	Command direction	Feedback direction
0	1	1
1	-1	-1
2	1	-1
3	-1	1

5108	Pulse number per revolution of the position encoder	4096

[Data type] Integrated type
[Data unit] Detection unit
[Data range] 1～32767
[Valid mode] Valid after resetting

5110	The motor revolving speed when the spindle gear shifting is performed	100

[Data type] Integrated type
[Data unit] r/min
[Data range] 0～100000
[Valid mode] Valid after resetting

5113	Time of checking the spindle speed arrival signal	64

[Data type] Integrated type
[Data unit] ms
[Data range] 0～255
[Valid mode] Valid after resetting

5114	The spindle default speed	1000

[Data type] Integrated type
[Data unit] rpm

[Data range] 0～100000
[Valid mode] Valid after resetting

5115	The spindle motor top revolving speed corresponding to 10V	6000

[Data type] Integrated type
[Data unit] rev/min
[Data range] 0～100000
[Valid mode] Valid after resetting

5116	Spindle speed upper limit	6000

[Data type] Integrated type
[Data unit] rev/min
[Data range] 0～100000
[Valid mode] Valid after resetting

5118	Spindle safety limit speed	100

[Data type] Real number
[Data unit] rev/min
[Data range] 0～6000
[Valid mode] Valid after resetting

Remark:
The spindle top speed is set when G033#4 SVL of PLC signal is set as “1”.

5120	The spindle maximum speed of gear 1	6000

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5121	The spindle maximum speed of gear 2	6000

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5122	The spindle maximum speed of gear 3	6000

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5123	The spindle maximum speed of gear 4	6000

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5130	Spindle speed shift point of gears 1 and 2	1500

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5131	Spindle speed shift point of gears 2 and 3	3000

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5135	Spindle speed shift point of gears 1 and 2 when the tapping cycle is performed	1500

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5136	Spindle speed shift point of gears 2 and 3 when the tapping cycle is performed	2000

[Data type] Real number
[Data unit] rpm
[Data range] 0～100000
[Valid mode] Valid after resetting

5160	Spindle low gear ratio numerator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5161	Spindle middle gear ratio numerator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5162	Spindle high gear ratio numerator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5163	Spindle low gear ratio denominator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5165	Spindle high gear ratio denominator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5166	Spindle middle-low gear ratio denominator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5167	Spindle middle-high gear ratio denominator	1

[Data type] Integral number
[Data range] 1～999999

[Valid mode] Valid after resetting

5168	Spindle high-speed gear ratio denominator	1

[Data type] Integral number
[Data range] 1～999999
[Valid mode] Valid after resetting

5200	The 1st gear position loop gain controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5201	The 2nd gear position loop gain controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5202	The 3rd gear position loop gain controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5203	The 4th gear position loop gain controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5210	The interpolation servo axis number (the 1st group) controlled by Cs spindle	0

[Data type] Integrated type
[Data range] 0～8
[Valid mode] Valid immediately

5211	The 1st gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5212	The 2nd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5213	The 3rd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5214	The 4th gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5220	The interpolation servo axis number (the 2nd group) controlled by Cs spindle	0

[Data type] Integrated type
[Data range] 0～8
[Valid mode] Valid immediately

5221	The 1st gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5222	The 2nd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5223	The 3rd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5224	The 4th gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5230	The interpolation servo axis number (the 3rd group) controlled by Cs spindle	0

[Data type] Integrated type
[Data range] 0～8
[Valid mode] Valid immediately

5231	The 1st gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5232	The 2nd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5233	The 3rd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5234	The 4th gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5240	The interpolation servo axis number (the 4th group) controlled by Cs spindle	0

[Data type] Integrated type
[Data range] 0～8
[Valid mode] Valid immediately

5241	The 1st gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5242	The 2nd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5243	The 3rd gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5244	The 4th gear position loop gain of the interpolation servo axis controlled by Cs spindle	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5250	The 1st gear position gain in the spindle positioning mode	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5251	The 2nd gear position gain in the spindle positioning mode	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5252	The 3rd gear position gain in the spindle positioning mode	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5253	The 4th gear position gain in the spindle positioning mode	300

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5300	Spindle password	510

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5301	Type code	10

[Data type] Integrated type
[Data range] 0～80
[Valid mode] Valid immediately

5302	Software version	400

[Data type] Integrated type
[Data range] 0～999
[Valid mode] Valid immediately

5303	Initial display state	0

[Data type] Integrated type
[Data range] 0～20
[Valid mode] Valid immediately

5304	Control mode selection	1

[Data type] Integrated type
[Data range] 0～5
[Valid mode] Valid immediately

5305	The 1st speed proportion gain	1500

[Data type] Integrated type
[Data range] 0～10000
[Valid mode] Valid immediately

5306	Speed integral time constant (ms)	20

[Data type] Integrated type
[Data range] 1～1000
[Valid mode] Valid immediately

5307	Torque command filtration (%)	100

[Data type] Integrated type
[Data range] 1～500
[Valid mode] Valid immediately

5308	Speed detection low-pass filtration (%)	100

[Data type] Integrated type
[Data range] 1～500
[Valid mode] Valid immediately

5309	Position proportion gain	40

[Data type] Integrated type
[Data range] 1～1000
[Valid mode] Valid immediately

5310	Position feed forward gain (%)	0

[Data type] Integrated type
[Data range] 0～100
[Valid mode] Valid immediately

5311	Position feed forward low-pass end rate (HZ)	300

[Data type] Integrated type
[Data range] 1～1200
[Valid mode] Valid immediately

5312	Electronic gear ratio numerator	1

[Data type] Integrated type
[Data range] 1～32767
[Valid mode] Valid immediately

5313	Electronic gear ratio denominator	1

[Data type] Integrated type
[Data range] 1～32767
[Valid mode] Valid immediately

5314	Reserved	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5315	Position pulse direction	0

[Data type] Integrated type
[Data range] 0～3
[Valid mode] Valid immediately

5316	Reserved	20

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5317	Position excess-error detection range	200

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5318	Position excess-error detection invalid	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5319	Position command smooth filter	0

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5320	Drive forbid invalid	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5321	JOG feedrate	120

[Data type] Integrated type
[Data range] -6000～6000
[Valid mode] Valid immediately

5322	Enable delay (ms)	0

[Data type] Integrated type
[Data range] 0～32767
[Valid mode] Valid immediately

5323	Max. speed limit	10000

[Data type] Integrated type
[Data range] 0～ 12000
[Valid mode] Valid immediately

5324	Reserved	0

[Data type] Integrated type
[Data range] -6000～ 6000
[Valid mode] Valid immediately

5325	Reserved	100

[Data type] Integrated type
[Data range] -6000～ 6000
[Valid mode] Valid immediately

5326	Reserved	300

[Data type] Integrated type
[Data range] -6000～ 6000
[Valid mode] Valid immediately

5327	Reserved	-100

[Data type] Integrated type
[Data range] -6000～ 6000
[Valid mode] Valid immediately

5328	Speed arrival range	500

[Data type] Integrated type
[Data range] 0～ 6000
[Valid mode] Valid immediately

5328	Speed arrival range	500

[Data type] Integrated type
[Data range] 0～6000

[Valid mode] Valid immediately

5329	Reserved	300

[Data type] Integrated type
[Data range] 1～32767
[Valid mode] Valid immediately

5330	Internal CW rotation torque limit	400

[Data type] Integrated type
[Data range] 0～400
[Valid mode] Valid immediately

5331	Internal CCW rotation torque limit	-400

[Data type] Integrated type
[Data range] -400～0
[Valid mode] Valid immediately

5332	Zero open loop torque limit	400

[Data type] Integrated type
[Data range] **0**～400
[Valid mode] Valid immediately

5333	The 2nd speed proportion gain	500

[Data type] Integrated type
[Data range] **0**～10000
[Valid mode] Valid immediately

5334	Reserved	0

[Data type] Integrated type
[Data range] **0**～10000
[Valid mode] Valid immediately

5335	Zero speed range	0

[Data type] Integrated type
[Data range] **0**～100
[Valid mode] Valid immediately

5336	Enable is off after brake or switch off enable directly	1

[Data type] Integrated type
[Data range] **0**～1
[Valid mode] Valid immediately

5337	The 1st gear ratio numerator	1

[Data type] Integrated type
[Data range] **1**～255
[Valid mode] Valid immediately

5338	The 1st gear ratio denominator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5339	The 2nd gear ratio numerator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5340	The 2nd gear ratio denominator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5341	The 3rd gear ratio numerator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5342	The 3rd gear ratio denominator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5343	The 4th gear ratio numerator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5344	The 4th gear ratio denominator	1

[Data type] Integrated type
[Data range] 1～255
[Valid mode] Valid immediately

5345	Speed operation command from the internal or the external	1

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5346	Positioning finish pulse range	3

[Data type] Integrated type
[Data range] 0～3000
[Valid mode] Valid immediately

5347	Positioning speed	300

[Data type] Integrated type
[Data range] 1～6000
[Valid mode] Valid immediately

5348	Speed command negate	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5349	Reserved	4

[Data type] Integrated type

[Data range] 0～32767
[Valid mode] Valid immediately

5350	Reserved	6

[Data type] Integrated type
[Data range] 0～32767
[Valid mode] Valid immediately

5351	Reserved	150

[Data type] Integrated type
[Data range] 0～32767
[Valid mode] Valid immediately

5352	Reserved	40

[Data type] Integrated type
[Data range] 1～100
[Valid mode] Valid immediately

5353	Positioning mode	1

[Data type] Integrated type
[Data range] 0～2
[Valid mode] Valid immediately

5354	Positioning source	1

[Data type] Integrated type
[Data range] 0～2
[Valid mode] Valid immediately

5355	Positioning position	500

[Data type] Integrated type
[Data range] 0～9999
[Valid mode] Valid immediately

5356	The 2nd code pulse number	1024

[Data type] Integrated type
[Data range] 0～10000
[Valid mode] Valid immediately

5357	Control mode switch	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5358	Reserved	0

[Data type] Integrated type
[Data range] -10000～10000
[Valid mode] Valid immediately

5359	Reserved	2

[Data type] Integrated type
[Data range] 1～4
[Valid mode] Valid immediately

5360	Maintain the current proportion gain	70

[Data type] Integrated type
[Data range] 1～500
[Valid mode] Valid immediately

5361	Current integral time constant	80

[Data type] Integrated type
[Data range] 1～10000
[Valid mode] Valid immediately

5362	Current integral separate point	50

[Data type] Integrated type
[Data range] 0～500
[Valid mode] Valid immediately

5363	Position offset value when the position mode is switched into the speed one	5

[Data type] Integrated type
[Data range] 0～400
[Valid mode] Valid immediately

5364	Current low-pass end rate	1000

[Data type] Integrated type
[Data range] 1～1500
[Valid mode] Valid immediately

5365	Speed integral separate point	300

[Data type] Integrated type
[Data range] 0～3000
[Valid mode] Valid immediately

5366	Exciting current	230

[Data type] Integrated type
[Data range] 10～1000
[Valid mode] Valid immediately

5367	Reserved	1000

[Data type] Integrated type
[Data range] 100～2000
[Valid mode] Valid immediately

5368	Time constant	6500

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5369	Reserved	950

[Data type] Integrated type
[Data range] 100～1000
[Valid mode] Valid immediatel

5370	Weak current control point	1000

[Data type] Integrated type
[Data range] 5～20000
[Valid mode] Valid immediately

5371	Motor rotor inertia	1050

[Data type] Integrated type
[Data range] 1～32767
[Valid mode] Valid immediately

5372	Motor rated torque	140

[Data type] Integrated type
[Data range] 1～1000
[Valid mode] Valid immediately

5373	Motor rated speed	10000

[Data type] Integrated type
[Data range] 0～15000
[Valid mode] Valid immediately

5374	Detection speed of the over-speed alarm	10000

[Data type] Integrated type
[Data range] 0～15000
[Valid mode] Valid immediately

5375	Motor rated current	93

[Data type] Integrated type
[Data range] 1～1000
[Valid mode] Valid immediately

5376	Maximum overload times allowed by the system	300

[Data type] Integrated type
[Data range] 0～500
[Valid mode] Valid immediately

5377	Overload torque starting detection point	117

[Data type] Integrated type
[Data range] 0～300
[Valid mode] Valid immediately

5378	Torque of the overload torque point	200

[Data type] Integrated type
[Data range] 0～300
[Valid mode] Valid immediately

5379	Maximum overload time of the overload torque point	400

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5380	Brake time of the maximum torque	100

[Data type] Integrated type
[Data range] 0～10000
[Valid mode] Valid immediately

5381	The magnifier saturation time of the maximum speed	450

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5382	Current gain equivalent constant	400

[Data type] Integrated type
[Data range] 1～5000
[Valid mode] Valid immediately

5383	Acceleration time	0

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5384	Deceleration time	500

[Data type] Integrated type
[Data range] 0～30000
[Valid mode] Valid immediately

5385	Repeated period of the keypad up/down keys	37

[Data type] Integrated type
[Data range] 2～200
[Valid mode] Valid immediately

5386	Current detection coefficient	200

[Data type] Integrated type
[Data range] 1～32767
[Valid mode] Valid immediately

5387	Zero clear of position offset is invalid in non-running state	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5388	Input terminal control is invalid during running	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5389	Encoder pulse number	2500

[Data type] Integrated type
[Data range] 1～10000
[Valid mode] Valid immediately

5390	Motor rated speed	6000

[Data type] Integrated type
[Data range] 10～20000
[Valid mode] Valid immediately

5391	Current of the encoder adjusting into zero	50

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5392	Starting detection point of the torque in the motor overheat	105

[Data type] Integrated type
[Data range] 10～300
[Valid mode] Valid immediately

5393	Torque corresponding to the motor overheat time constant	130

[Data type] Integrated type
[Data range] 10～300
[Valid mode] Valid immediately

5392	Torque starting detection point in the motor overheat	105

[Data type] Integrated type
[Data range] 10～300
[Valid mode] Valid immediately

5393	Torque corresponding to the motor overheat time constant	130

[Data type] Integrated type
[Data range] 10～300
[Valid mode] Valid immediately

5394	The motor overheat time constant	900

[Data type] Integrated type
[Data range] 10～10000
[Valid mode] Valid immediately

5395	The motor pole pairs	4

[Data type] Integrated type
[Data range] 1～10
[Valid mode] Valid immediately

5396	Open loop running current	20

[Data type] Integrated type
[Data range] 1～60
[Valid mode] Valid immediately

5397	Open loop running speed	150

[Data type] Integrated type
[Data range] 0～3000
[Valid mode] Valid immediately

5398	Internal enforce enable	0

[Data type] Integrated type
[Data range] 0～1
[Valid mode] Valid immediately

5399	Setting the module current	350

[Data type] Integrated type
[Data range] 10～5000
[Valid mode] Valid immediately

4.16 User Macro Program Parameters (6000～6999)

	7#	6#	5#	4#	3#	2#	1#	0#
6001						CCV	CLV	TCS

[Data type] Bit
[Data range] 0 or 1
[Default] 0 0 0 0 0 0 0 0
[Valid mode] Valid after resetting

TCS T code calling subprogram 9000
0: Invalid
1: Valid
CLV Local variables 1~33
0: Clear to “null” after resetting
1: Not clear after resetting
CCV Common variables 100~199
0: Clear to “null” after resetting
1: Not clear after resetting

6050	G code that calls the macro O9010	0
6051	G code that calls the macro O9011	0
6052	G code that calls the macro O9012	0
6053	G code that calls the macro O9013	0
6054	G code that calls the macro O9014	0
6055	G code that calls the macro O9015	0
6056	G code that calls the macro O9016	0
6057	G code that calls the macro O9017	0
6058	G code that calls the macro O9018	0
6059	G code that calls the macro O9019	0

[Data type] Integrated type
[Data range] 0~999
[Valid mode] Valid after resetting

These parameters are set the G codes that call the user macros of program numbers 9010~9019.

Remark:
When the set value is 0, it is invalid, so G00 can't call the macros.

6071	M code that calls the subprogram number O9001	6
6072	M code that calls the subprogram number O9002	0
6073	M code that calls the subprogram number O9003	0
6074	M code that calls the subprogram number O9004	0
6075	M code that calls the subprogram number O9005	0
6076	M code that calls the subprogram number O9006	0
6077	M code that calls the subprogram number O9007	0
6078	M code that calls the subprogram number O9008	0
6079	M code that calls the subprogram number O9009	0

[Data type] Integrated type
[Data range] 0~999
[Valid mode] Valid after resetting

These parameters are set the M codes that call the user macros of program numbers 9001 ~9009.

Note
Setting value 0 is invalid. No subprogram can be called by M00.

6080	M code that calls the subprogram number O9020	0
6081	M code that calls the subprogram number O9021	0
6082	M code that calls the subprogram number O9022	0
6083	M code that calls the subprogram number O9023	0

6084	M code that calls the subprogram number O9024	0
6085	M code that calls the subprogram number O9025	0
6086	M code that calls the subprogram number O9026	0
6087	M code that calls the subprogram number O9027	0
6088	M code that calls the subprogram number O9028	0
6089	M code that calls the subprogram number O9029	0

[Data type] Integrated type
[Data unit] 0~999
[Valid mode] Valid after resetting

These parameters are set the M codes that call the user macros of program numbers 9020~9029.

Note
Setting value 0 is invalid. No user macro program can be called by M00.

4.17 PLC axis control parameters（7000～7199）

7010	DI/DO group selection of each axis controlled by PLC axis	0

[Data type] Integral number axis
[Data unit] 0~4
[Valid mode] Valid after resetting

The parameters are set DI/DO group number used by the control axis commands of each axis which is controlled by PLC axis.

SET VALUE	MEANING
0	Not use PLC axis control
1	Use DI/DO signal of group A
2	Use DI/DO signal of group B
3	Use DI/DO signal of group C
4	Use DI/DO signal of group D

4.18 Five-axis machining parameters （8000～8999）

8010	Machine structure type	12

[Data type] Integrated type
[Data unit] 0~21
[Valid mode] Valid after resetting

	Machine structure type
2	Tool rotary type
12	Worktable rotary type
21	Compound type

8012	The axial direction of the 1st rotary axis	2

[Data type] Integrated type
[Data unit] 0~3
[Valid mode] Valid after resetting

	The axial direction of the 1st rotary axis
1	The axial direction revolving with X axis
2	The axial direction revolving with Y axis
3	The axial direction revolving with Z axis

8016	The axial direction of the 2nd rotary axis	3

[Data type] Integrated type
[Data unit] 0~5
[Valid mode] Valid after resetting

	The axial direction of the 2nd rotary axis
1	The axial direction revolving with X axis
2	The axial direction revolving with Y axis
3	The axial direction revolving with Z axis

8019	Tool axial direction	3

[Data type] Integrated type
[Data unit] 0~3
[Valid mode] Valid after resetting

	Tool axial direction
1	The axial direction revolving with X axis
2	The axial direction revolving with Y axis
3	The axial direction revolving with Z axis

8020	Rotary table position	0

[Data type] Real number axis
[Data unit] mm
[Data range] -10000～10000
[Valid mode] Valid after resetting

Remark:
It includes the coordinate parameters of the three axes X, Y and Z.

8021	The vector from the 1st rotary axis to the 2nd rotary axis	0

[Data type] Real number axis
[Data unit] mm
[Data range] -10000～10000
[Valid mode] Valid after resetting

Remark:
It includes the coordinate parameters of the three axes X, Y and Z.

8022	The vector from the tool axis to the tool rotary axis	0

[Data type] Real number axis
[Data unit] mm
[Data range] -10000～10000
[Valid mode] Valid after resetting

Remark:
It includes the coordinate parameters of the three axes X, Y and Z.

8023	The vector from the tool 2nd rotary axis to the tool 1st rotary axis	0

[Data type] Real number axis
[Data unit] mm
[Data range] -10000～10000
[Valid mode] Valid after resetting

Remark:
It includes the coordinate parameters of the three axes X, Y and Z.

APPENDIX

APPENDIX Ⅰ PRECISION COMPENSATION

1.1 Backlash compensation

（1）Common backlash compensation:

When No.1403#5 is set as “1”, No.1403#4 as “0”, the compensation value is set in parameter No.4121, the compensation value range of each axis is 0~±9999.9999mm.

（2）Backlash compensation respectively during rapid traverse and cutting feed:

When No.1403#5 and No.1403#4 are set as “1”, the different backlash in the reverse directions respectively compensate the backlash values during the rapid traverse or cutting feed, the machining of the higher precision can be realized based on the feedrate change. The measured backlash during cutting feed is set by No.4121, the measured backlash during rapid traverse is set by No.4122.

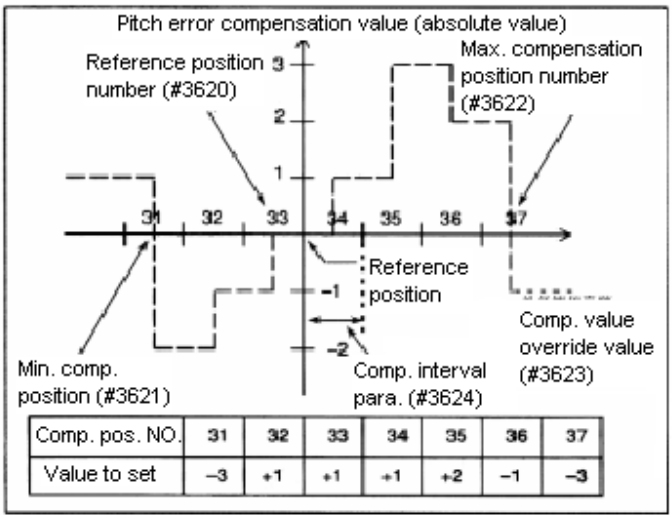
1.2 Unidirectional pitch error compensation

Overview

If the pitch error compensation data are specified, the pitch error of each axis can be compensated based on the detection unit. The compensation position of each axis compensation data is set according to the fixed interval. The compensation origin is the zero of each axis zero return of the machine. The compensation data are set based on the actual measured error.

The pitch error compensation data are set in the menu OFFSET SETTING on the “pitch error compensation” interface; the pitch error value can only be set or rewritten after “logging in” to obtain the authority of the machine manufacturer or above it.

When the pitch error compensation is operated, the following parameters must be set. The pitch error of each compensation point (each point is with the sequence number according to the position) is set based on these parameters.



Comp. pos. NO.	31	32	33	34	35	36	37
Value to set	–3	+1	+1	+1	+2	–1	–3

In the following example, the reference point is taken as the standard point for compensating, the serial number of the compensation number is set as 33.
Whether perform the pitch error compensation: Parameter 2800.0.
Select unidirectional or bidirectional for the pitch error compensation: Parameter 2800.1

The position number of pitch error compensation (each axis) of the reference point: Parameter 2810

The min. position number of the pitch error compensation (each axis): Parameter 2811.

The max. position number of the pitch error compensation (each axis): Parameter 2812.

Override of the pitch error compensation (each axis): Parameter 2813.

The compensation point interval of the pitch error compensation (each axis): Parameter 2814.

Remark:

1. Define the compensation position

To specify the compensation position for each axis, the compensation positive and negative directions should be specified on which the reference position is taken as the standard one. If the machine stroke exceeds the specified range in positive or negative directions, the pitch error compensation doesn't function for the stroke out of the range.

2. Compensation position point number

On the interface for setting the pitch error, there are total 1024 compensation points from 0~1023. The compensation points can be distributed for each axis at random with parameters, the compensation position number（parameter 2810）of the reference position, the min. position number（parameter 2811）and the max. position number（parameter 2812）must be set for each axis.

3. Intervals of compensation points

The compensation positions (points) are with the equal interval, which are set by parameter No.2814 and each axis can be set respectively.

The minimum compensation interval is limited, which can be calculated with the following formula:

The min. interval of the compensation point = the max. feedrate * (the interpolation cycle/60000) * compensation override

Unit: The min. interval of compensation: mm，inch，deg, the max. feedrate: mm/min，inch/min，deg/min.

(Example) When the maximum rapid traverse rate is 15000mm/min, the min. interval of the compensation point is 2mm.

For example

When it is the linear axis

The machine stroke range: -400mm ~ +800mm

The pitch error compensation point interval: 50mm

The compensation position number of the reference position is: 40.

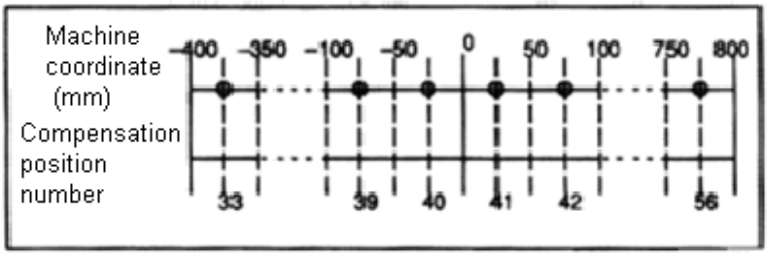
After specifying the above values, the farthest compensation position number in the negative direction is as below:

The farthest compensation position number in the negative direction = the compensation position number of the reference position – (the machine limit in the negative direction/compensation position interval) +1 = 40 - 400/50 +1=33

The farthest compensation position number in the positive direction is as below:

The farthest compensation position number in the positive direction = the compensation position number of the reference position + (the machine stroke in the positive direction/the compensation position interval) = 40+800/50 = 56

The corresponding relation between the machine coordinate value and the compensation position number is shown as below:



In the above figure, the compensation value is output in the position with symbol O.

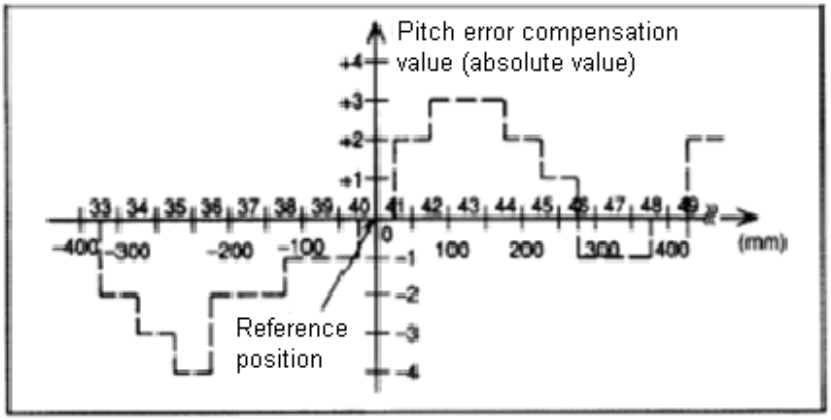
Therefore, the parameter is set as below:

PARAMETER	SET VALUE
2810: The compensation position number of the reference position	40
2811: Min. compensation position number	33
2812: Max. compensation position number	56
2813: Compensation override	1
2814:Pitch error compensation point interval	50

Output the compensation value between two coordinate values corresponding to the compensation position number.

The following is one example of the compensation amounts:

Point NO.	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	…	56
Compensation	-2	-1	-1	+2	0	+1	0	+1	+2	+1	0	-1	-1	-2	0	+1	+2	…	+1



When it is the rotary axis

Displacement each revolution: 360°

Interval of pitch error compensation point: 45°.

The compensation position number of the reference position: 60.

After specifying the above parameters, the rotary axis is

The farthest compensation position number in the negative direction = the compensation position number of the reference position

The farthest compensation position number in the positive direction is as below:

The farthest compensation position number in the positive direction = the compensation position number of the reference position + (the displacement each revolution/the compensation interval) = 60 + 360/45 = 68

Remark:

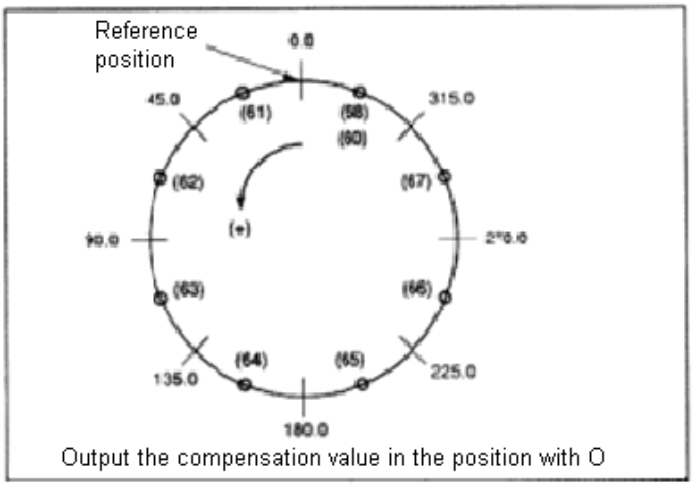
The compensation data of the rotary axis must be specified in the displacement range of one revolution in the positive direction. During the actual running, if the displacement of one revolution is in the negative direction, one more displacement of one revolution should be added to switch into the displacement of one revolution in the positive direction.

Example:

When the compensation value is set in -45°position, -45°+ 360°= 315°, the compensation value in -45°position should be set in the compensation sequence number corresponding to 315°.

Appendix

Then, the corresponding relation between the machine coordinate value and the compensation position number is as below:



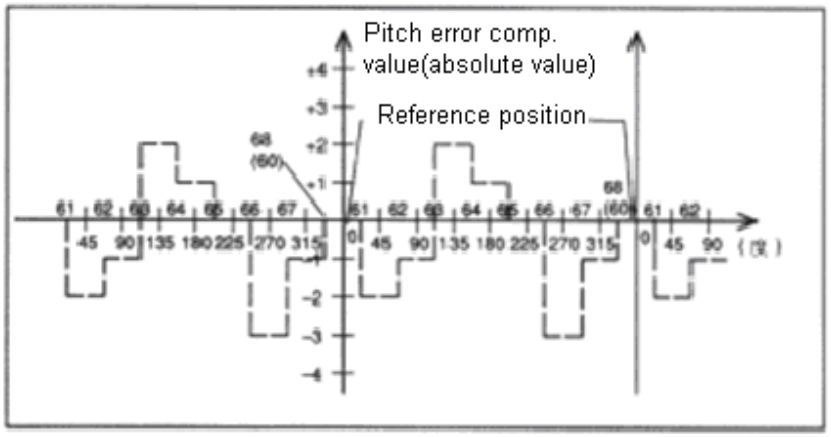
Therefore, the set parameters are as below:

PARAMETER	SET VALUE
2810:The compensation position number of the reference position	60
2811: Min. compensation position number	60
2812: Max. compensation position number	68
2813: Compensation override	1
2814:Pitch error compensation point interval	45
1068: Displacement per revolution	360

If the total sum of the compensation values from positions 61~68 is not 0, the compensation value of each revolution will be accumulated, and then, the position offset occurs. In the compensation positions of 60 and 68, the same value must be set.

The following is one example of the compensation amounts:

Point NO.	60	61	62	63	64	65	66	67	68
Compensation	+1	-2	+1	+3	-1	-1	-3	+2	+1



Appendix

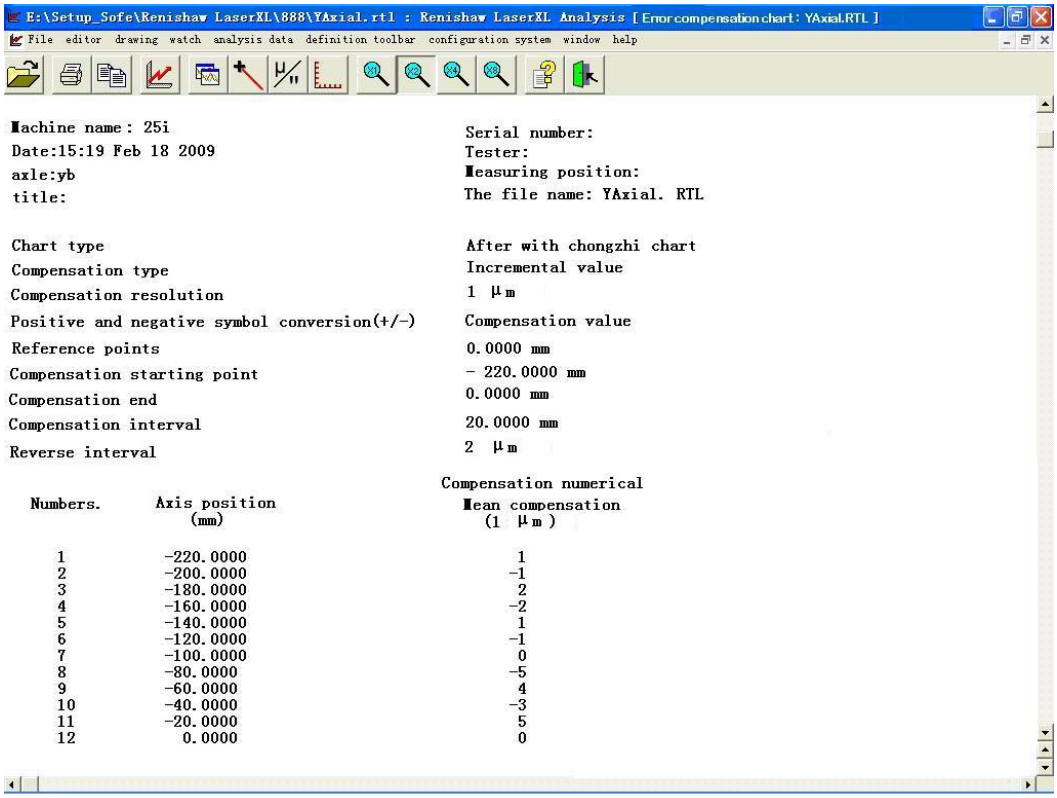
The compensation operation practice:

In the above example, the machine is operated after the reference point return in Jog mode:

0，-20，-40，-60，-80，-100，-120，-140，-160，-180，-200，-220，

-220，-200，-180，-160，-140，-120，-100，-80，-60，-40，-20，0

The data measured by the laser interference instrument are as below:



The error compensation value output is as below:

PARA.NO.	SETTING	REMARK
2800.1	0	Bidirectional pitch error compensation: 1: Valid/ 0: Invalid
2810	11	The pitch error compensation point number corresponding to the machine reference position
2811	1	The farthest pitch error compensation point number in the negative side during moving in the positive direction
2812	11	The farthest pitch error compensation point number in the positive side during moving in the positive direction
2813	1	Ratio of the compensation values
2814	20	Interval of the compensation points
1068	-	Revolving amount per revolution of the rotary axis

（Data of the positive compensation point during unidirectional compensation）

Positive point NO.	12	11	10	9	8	7	6	5	4	3	2	1
Compensation	0	+5	-3	+4	-5	0	-1	1	-2	+2	-1	1

Remark:

1. Range of the compensation value

Setting range of the compensation value: -7* compensation override (detection unit)~ 7* compensation override (detection unit). The compensation override of each axis can be respectively set in parameter No.2814, the range of the value is: 0～100.

2. Pitch error compensation of the rotary axis

For the rotary axis, the interval of the pitch error compensation points must be set as the integer multiples of one percent of the displacement per revolution (usually 360°). The total sum of all pitch error compensation values per revolution must be 0. Moreover, in the same position per revolution, the compensation value must be set same.

The compensation data of the rotary axis must be specified in the displacement of one revolution in the positive direction. During the actual running, if the displacement of one revolution is in the negative direction, one more displacement of one revolution must be added to switch into the displacement of one revolution in the positive direction.

Example:

When the compensation value in -45°position, -45°+ 360°= 315°, the compensation value in -45°position should be set in the compensation sequence number corresponding to 315°.

3. In the following situations, the pitch error compensation is not executed:

Remark: In the following situations, the pitch error compensation is not executed:

After power on, the machine doesn't return the reference position, but the situation doesn't include that the absolute position detector is used.

The interval between the pitch error compensation points is 0.

The compensation position number in positive or negative directions isn't in the range of 0～1023.

The compensation position number doesn't comply with the following relations: negative point number ≤ reference point number＜positive point number.

1.3 Bidirectional pitch error compensation

Overview

The bidirectional pitch error compensation function is to set the compensation amounts in the machine positive and reverse directions; therefore, compensation can be executed respectively in positive and reverse directions to improve the compensation precision. Moreover, when the stroke is moved in opposite direction, the compensation amount can be automatically calculated based on the compensation data, and compensation can be executed same as the method of compensating the common stored pitch error. The bidirectional pitch error compensation can reduce the machine position error during moving in positive and reverse directions.

Setting data

1. Setting the parameters: The following parameters should be set for each axis:

List 1.3.3（a）

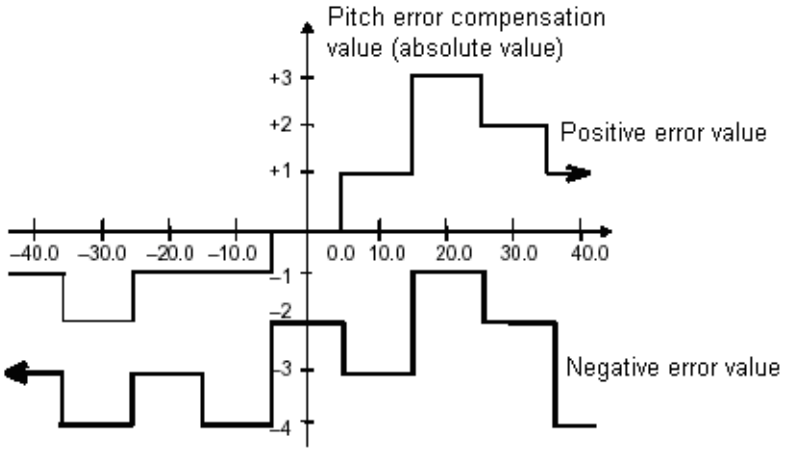
Para. NO.	Remark
2800.1	The bidirectional pitch error compensation: 1:Valid /0: Invalid
2806	The pitch error compensation value of the reference position return
2810	The pitch error compensation point number corresponding to the machine reference position
2811	The farthest pitch error compensation point number in the negative side during moving in the positive direction
2812	The farthest pitch error compensation point number in the positive side during moving in the positive direction
2813	Ratio of the compensation values
2814	Interval of the compensation points
1068	Revolution amount per revolution of the rotary axis

2. Pitch error compensation data

The pitch error compensation point numbers are corresponded to 0～1023 in positive direction, 0～1023 in reverse direction.

Data setting example

It is assumed that the direction of manual reference position return is positive (the linear axis), the pitch error is as the following figure (fig. 1.3.3(b)), the data are set as the following list (list 1.3.3(b)).



List 1.3.3(b)　Positive error compensation data

Compensation point NO.	20	21	22	23	24	25	26	27
Set compensation value	-1	+1	0	+1	+1	+2	-1	-1

Appendix

The pitch error data are always set the incremental value and the user should look from the negative direction (left direction of fig. 1.3.3(b)).

List 1.3.3(c) Negative error compensation data

Compensation point NO.	30	31	32	33	34	35	36	37
Set compensation value	-1	+1	-1	+2	-1	+2	-1	-2

After setting the positive compensation data, the pitch error compensation data of each point in the negative direction are set.

The pitch error data are always set the incremental value and the user should look from the negative direction.

List 1.3.3(d)

PARA. NO.	SETTING	REMARK
2800.1	1	The bidirectional pitch error compensation: 1:Valid / 0: Invalid
2806	-2	The pitch error compensation value of reference position return
2810	23	The pitch error compensation point number corresponding to the machine reference position
2811	20	The farthest pitch error compensation point number in the negative side during moving in the positive direction
2812	27	The farthest pitch error compensation point number in the positive side during moving in the positive direction
2813	1	Ratio of the compensation values
2814	10	Interval of the compensation points
1068	-	Amount per revolution of the rotary axis

Compensation operation practice:

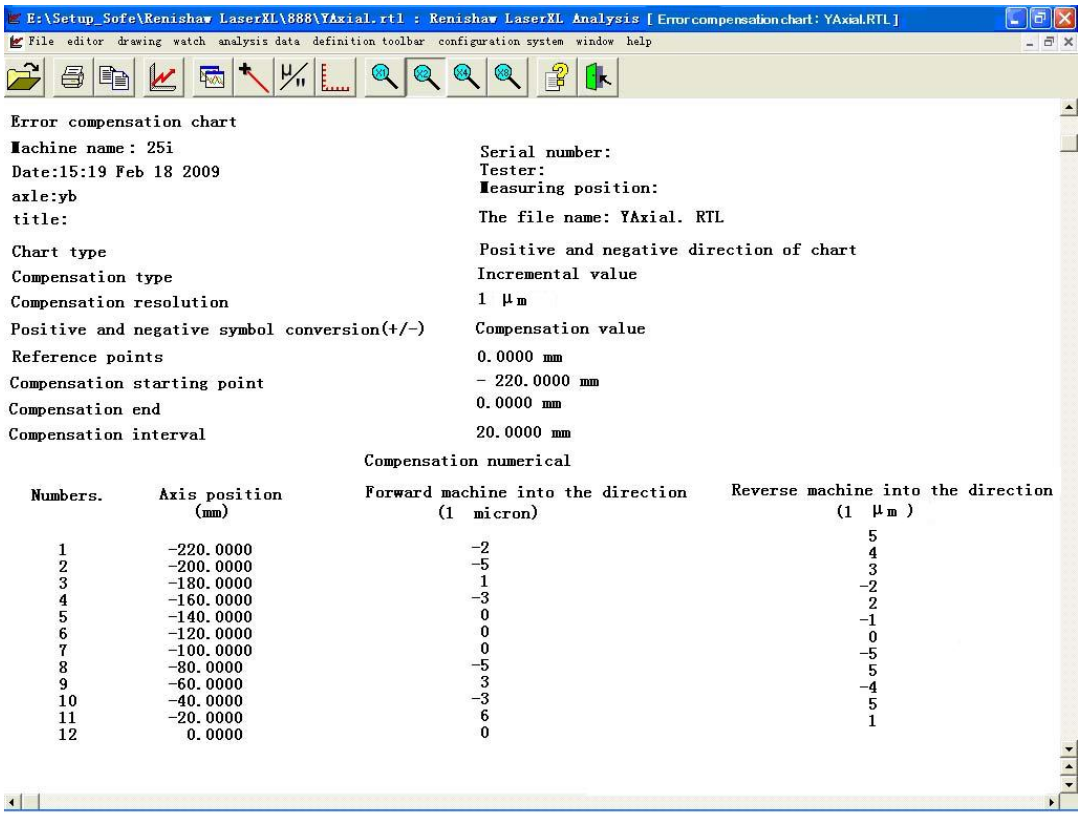
In the above example, after the manual reference point return, the machine is operated:

0，-20，-40，-60，-80，-100，-120，-140，-160，-180，-200，-220，

-220，-200，-180，-160，-140，-120，-100，-80，-60，-40，-20，0

When the bidirectional compensation is operated:

The data measured by the laser interference instrument are as below:



Output the error compensation values are as below:

PARA. NO.	SETTING	REMARK
2800.1	1	The bidirectional pitch error compensation: 1:Valid / 0: Invalid
2806	1	The pitch error compensation values of reference position return
2810	11	The pitch error compensation point number corresponding to the machine reference position
2811	1	The farthest pitch error compensation point number in the negative side during moving in the positive direction
2812	11	The farthest pitch error compensation point in the positive side during moving in the positive direction
2813	1	Ratio of the compensation values
2814	20	Interval of the compensation points
1068	-	Amount per revolution of the rotary axis

Negative point NO.	12	11	10	9	8	7	6	5	4	3	2	1
Compensation	1	+5	-4	+5	-5	0	-1	+2	-2	+3	+4	+5

Positive point NO.	12	11	10	9	8	7	6	5	4	3	2	1
Compensation	0	+6	-3	3	-5	0	0	0	-3	+1	-5	-2

APPENDIX Ⅱ RECORD of the USER MANUAL REVISION

VERSION NO.	REVISED DATE	REMARK
V1.0	**2009-12-20**	The 1st version of the basic manual
V1.1	**2010-3-26**	Some parameters are rewritten, the feed synchronous parameters, PMC parameters and five-axis machining parameters are added, which are corresponding to the version 3.1.6-10.03.18-2.
V1.2	**2010-3-30**	Some parameters are rewritten, the parameter default value and range are revised
V1.3	**2010-4-02**	Servo parameter definition
V1.4	**2010-4-08**	Some interpolation parameters are added, which are corresponding to the version V3.1.8-10.04.0.
V1.5	**2010-5-07**	The spindle speed fluctuation detection parameters are added, which are corresponding to the version V3.1.8-10.04.08-5.
V1.6	**2010-5-17**	The synchronous axis torque limit parameters and servo in-position width parameters are added, which are corresponding to the version V3.1.8-10.04.08-6.
V1.7	**2010-5-21**	The spindle parameters and the rigid tapping parameters are revised, which are corresponding to the version V3.2.0-10.05.24.
V1.8	**2010-7-09**	Some parameters are revised, which are corresponding to the version V3.2.0-10.07.09-4.
V1.9	**2010-8-4**	The pulse version parameters are deleted, some parameters are revised, which are corresponding to the version V3.2.0-10.07.09-4.
V2.0	**2010-8-16**	The position switches are added to 32, the servo multi-ring and signal ring parameters are added, the corresponding parameters are rewritten, which are corresponded to the version V3.2.1-2010-8-16_D.
V2.1	**2010-8-19**	Parameter 2113 is added, parameter 1800 is revised, and parameter 4120 is deleted, which are corresponding to the version V3.2.1-2010-8-18-D.
V2.2	**2010-8-25**	The extended external mechanical origin offset function parameters 2430 and 2431 are added, which are corresponding to the version V3.2.1-2010-8-25-D.
V2.3	**2010-9-8**	Bit parameter 1031 is deleted, the explanation is rewritten, which are corresponding to the version 172.
V2.4	**2010-9-15**	The double position loop parameters 4016 and bit

		parameter DPOS of 4001 are added, which are corresponding to the version V3.2.1-2010-9-15-D (177).
V2.5	**2011-5-12**	Some servo parameters are revised, which are corresponding to the version 3.2.6-7.
V2.6	**2011-07-20**	The parameters are collated, again, and the valid modes are added, which are corresponding to the version V3.2.7-8.
V2.7	**2011-12-14**	he parameters are added, and the valid modes are revised .The corresponding version is V3.4.0.
V2.8	**2012-06-26**	The system parameter interface, the parameter user manual and the codes (parameters) should be unified and verified. The corresponding version is V3.4.4-B9.
V2.9	**2013-05-08**	Turning cycle parameters and Spindle Control Parameters are added, which are corresponding to the version V3.4.4-B11.1.