LNC-T800

Software Application Manual

2008/5 Ver：V04.00.000(4408110062)

Leading Numerical Controller

LNC Technology Co., Ltd.

Table Of Contents

1 SYSTEM STRUCTURE

This chapter describes the axis layout and system software of LNC-T800.

1.1 Axis Layout

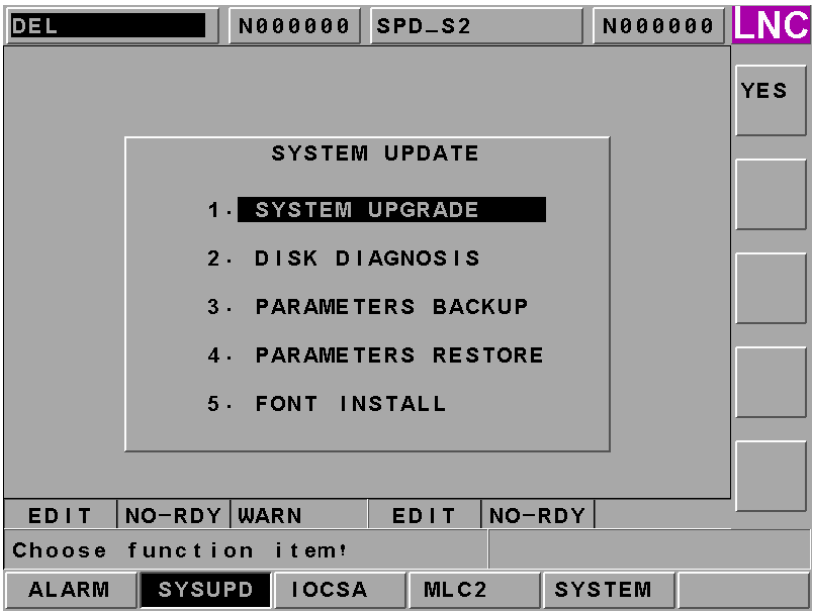
System	Axis	Note
1st System	X1 Y1 Z1 C1+S1-1 S1-2 S1-3	1. C1 + S1-1: C1 works with the first spindle of the 1st system. 2. S1-2 : The 2nd spindle of the 1st system 3. S1-3: The 3rd spindle of the 1st system
2nd System	X2 Y2 Z2 C2+S2-1 S2-2 S2-3	1. C2 + S2-1: C2 works with the 1st spindle of the 2nd system. 2. S2-2: The 2nd spindle of the 1st system 3. S2-3: The 3rd spindle of the 1st system.

1.2 System Software

Applicable after T800 V4.00.000 (included)

2 SOFTWARE MAINTENANCE

This chapter describes controller's System Upgrade, Disk Diagnosis, Parameters Backup, Parameters Restore and Font Install. This function can only be started under the status of "NC Not Ready". First, press **EMG-STOP,** then press **DGNOS** on MDI panel. After that, press **System Update,** and the screen will be shown as below. Users can use up and down keys to select the work items that they want to proceed. After the item has been selected, click **OK**, then the assigned function will be executed.



<Fig. 2-1> System Update

System Upgrade

After selecting "system upgrade", click "**OK**" . There are two update methods available.

「1.General Disk/Net」: Update via Network drives or a diskette.

「2.RS232 Transmission」: Update by RS232

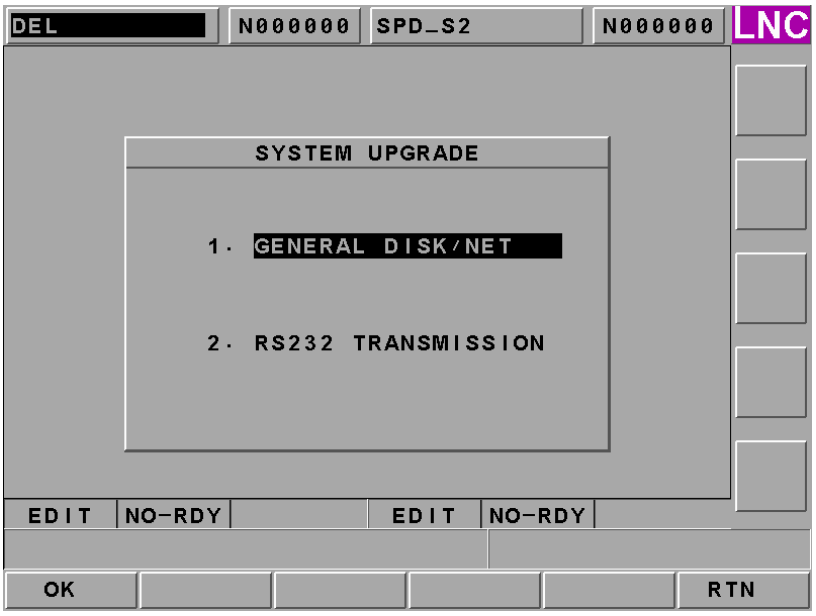


Fig. 2-2 System Upgrade

Please select a proper method according to the need. Then, click 【**OK**】.

1. Upgrade Description of 「1. General Disk/Net」:

   a. When this method is selected, the dialog box to select the path for file upgrade will pop up as the figure below.

   【Column A】: When the cursor stays here, use the up and down keys to move the cursor to column B, which displays the source path of the upgrade files. If users know the source path , they can also input the source path in this column directly.

   【Column B】: When the cursor stays here, use the left and right keys to move the cursor to column A. The column serves as the source directory for selecting the upgrade files. The content includes disk number and the directory name. Press up and down keys to move the cursor to the assigned directory and press **INPUT**, at this moment, the path just selected will be displayed in column A, and all the folders as well as the disk numbers under the path will be displayed in column B.

   b. After selecting the source path, move the cursor to column A, and click 【**OK**】.

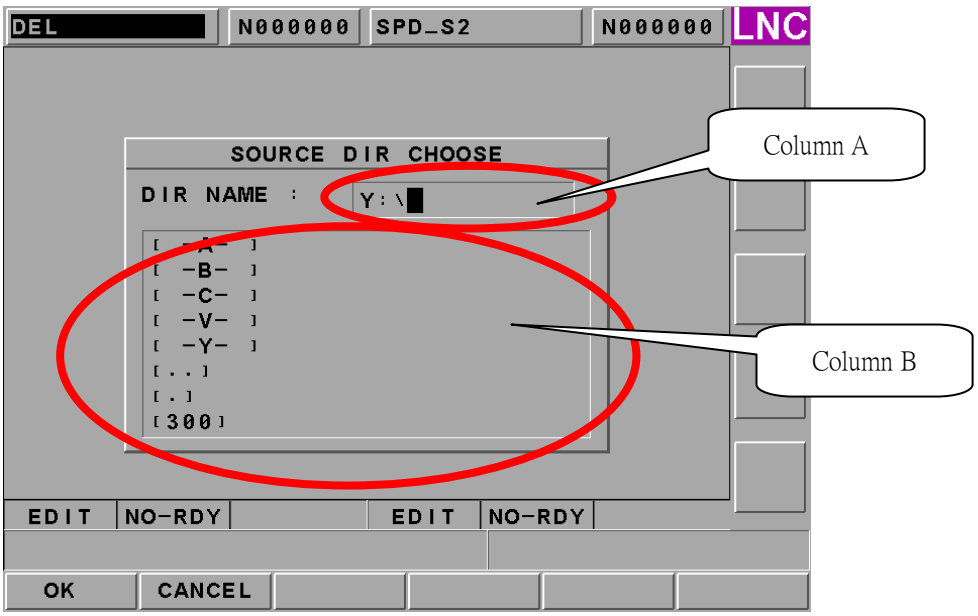


Fig. 2-3 Upgrade Screen

c. After selecting the path, users will be asked again if they want to execute upgrade function from this path, if yes, please click 【**OK**】

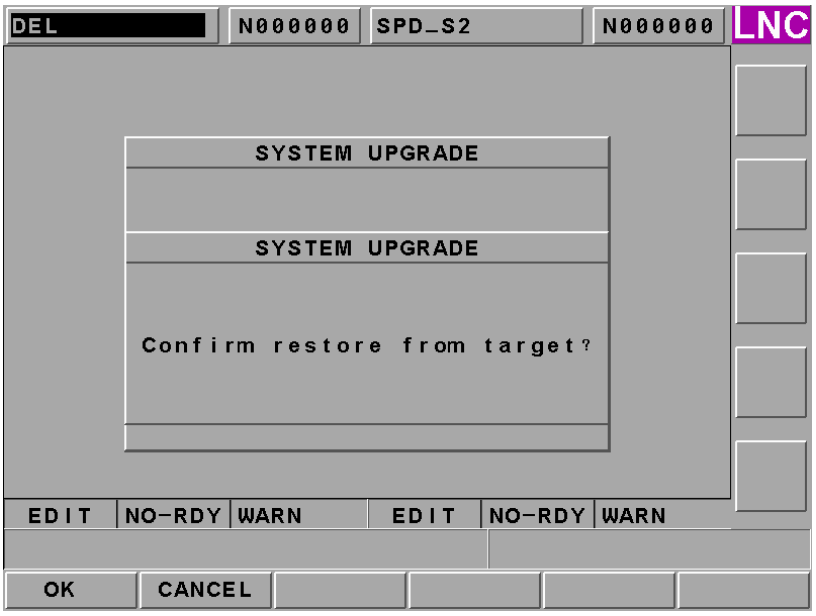


Fig. 2-4 Upgrade Confirmation Screen

d. The designated path is incorrect. The error message as below will be shown.

Fig. 2-5 Upgrade Path Error Screen

e. If the source path is correct, it will quit the system automatically and go to the installation page.

2. Upgrade Description of 「RS 232 Transmission」
   When executing this function, users need to verify if the hardware connection is normal. PC side has to execute LNC Tools software developed by LNC Technology. Co.. The protocol of both ends should be agreeable. (For detailed description, please refer to Appendix A)
   a. Select the source path of upgrade files. This path is the one connected to PC. (About the description of columns and function keys, users can refer to upload, download, and DNC function description in file management.)

Fig. 2-6 Upgrade Path Selection

b. After selecting the path, press 【**Upgrade**】. Users will be asked again if they want to re-execute upgrade from this path, if yes, please click 【**OK**】.

Fig. 2-7 Upgrade Path Confirm

c. If the source path is correct, users will quit the system automatically and go to the installation page.

Installation Description：

Quit the system, and the screen will be shown as below. The Current Version of the software in the CF card will be displayed on the screen. If this is the first time to install, the message “Not Install” as well as the Installing Version to install will be shown. Press “N” if to quit executing system installation, then the system will reboot automatically, then re-enter the system. To install the system, press “Y” to start installation. When completing the installation, the system will also reset and enter the system.

```
=======================================
WELCOME TO INSTALL LNC-T800 SERIES
=======================================
Current Version:
   T800_VER_00.00.028

Installing Version:
   T800_VER_00.00.028

Are you sure to install?[Y,N]?
```

Fig. 2-8 Before Upgrade

2.1 Disk Diagnosis

The dialog box as below will show up. Click 【**OK**】 and return to DOS mode.

Fig. 2-1 Disk Diagnosis Confirmation Screen

Users can choose either to use A drive or C drive. If users do not choose, the system will use the default C drive.

```
  Welcome maintenance utility ...
What DRIVE to DIAG[A,C]?
```

Fig. 2-2 Select the Drive number to be checked

There are four types of working items for users to choose：（1）Anti-virus （2）Hard drive scanning （3）Hard drive reset （4）Exit

```
  Welcome maintenance utility ...
What DRIVE to DIAG[A,C]?C

1.PCscan
  Virus checking
2.DISK doctor
  disk diagnostic and errer-fix
3.DEFRAG
  Disk access performance enhancement

0.Quit

Choise an Option[0,1,2,3]?
```

Fig. 2-3 Hardware checking Options

2.2 Parameters Backup

The dialog box will pop up when this function is selected. Use up and down keys to move the cursor to the item to be imported and press “Single” to backup the chosen item. If users want to backup all types of parameters, press “Select All” and then, press 【OK】.

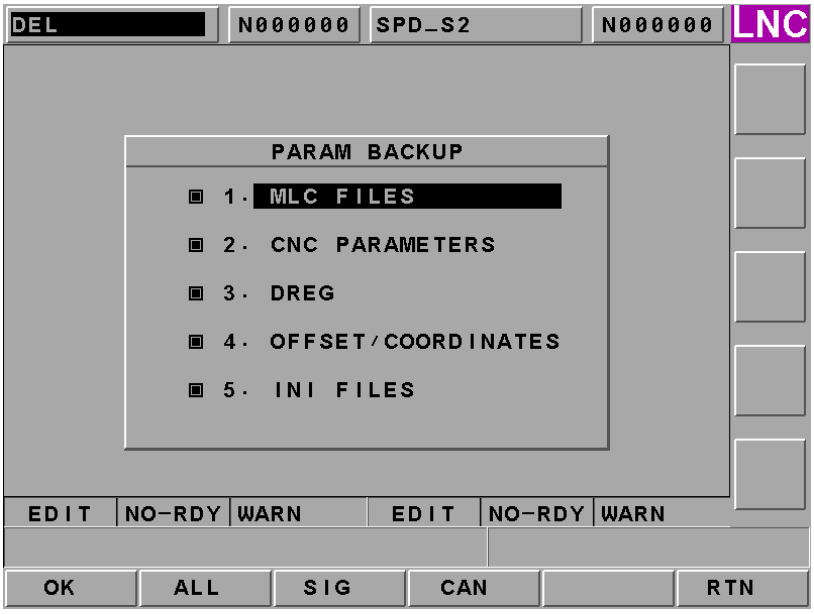


Fig. 2-1 PARAM Backup Selection

Select the method to backup the parameter

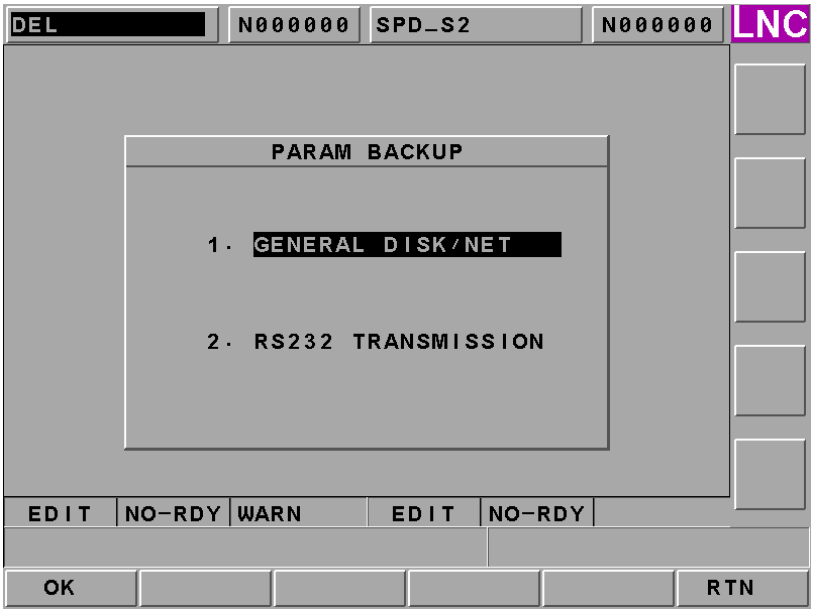


Fig. 2-2 Parameter Backup methods Selection

1. If「1. General Disk/Net」is selected, the parameters backup description will pop up as below. Select the designated path to save parameters, then press 【**OK**】.

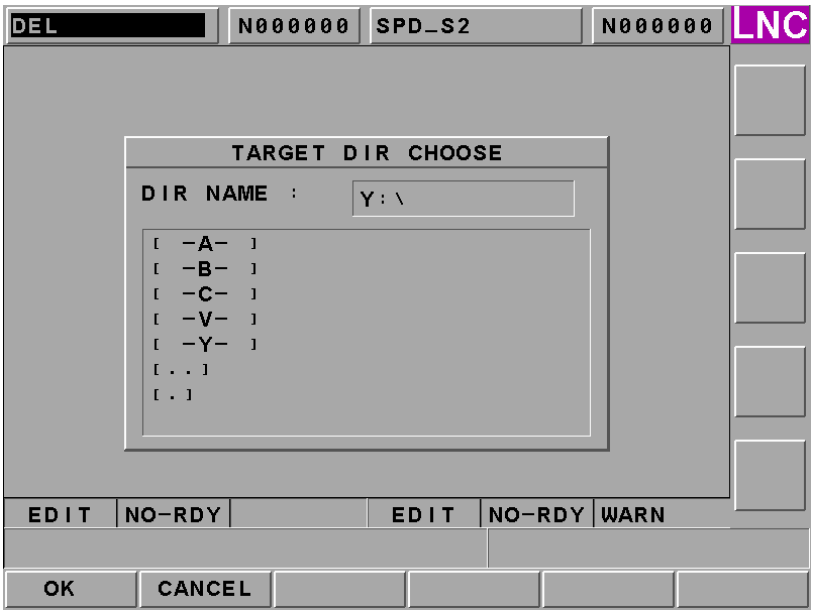


Fig. 2-3 Parameter Backup Path Selection 1

2. If「2.RS232 Transmission」is selected, the dialog box as below will show up. Select the designated path, then press OK. When executing this function, users need to verify if the hardware connection is normal, and PC side needs to execute the LNCTools software developed by LNC Technology Co.. Please verify if the protocol of both ends are agreeable. (For detailed description, please refer to Appendix A)

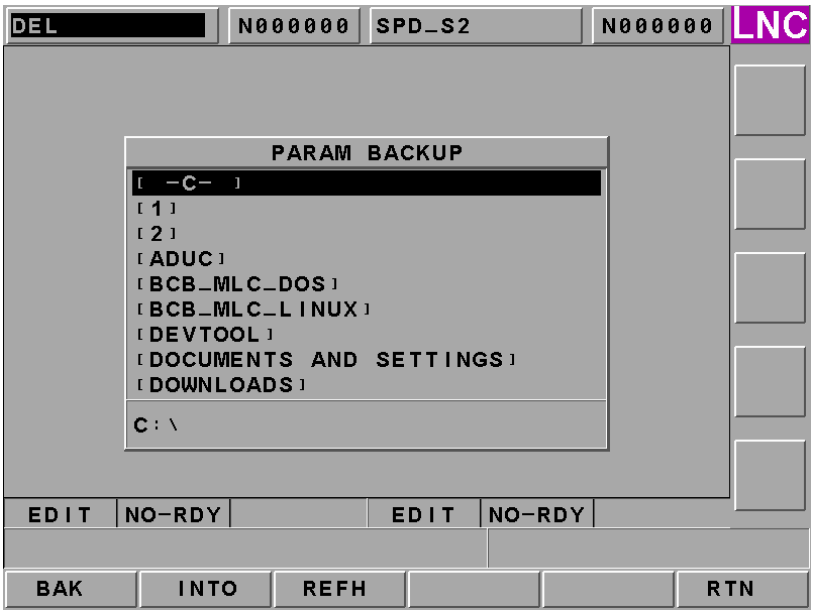


Fig. 2-4 Parameter Backup Path Selection

2.3 Parameters Restore

Use up and down keys to move the cursor to the designated lead-in item and press 【**SEL**】, which means to import the file of that type. If users want to import all types of parameters, they can press 【**ALL**】. After selection, press 【**OK**】.

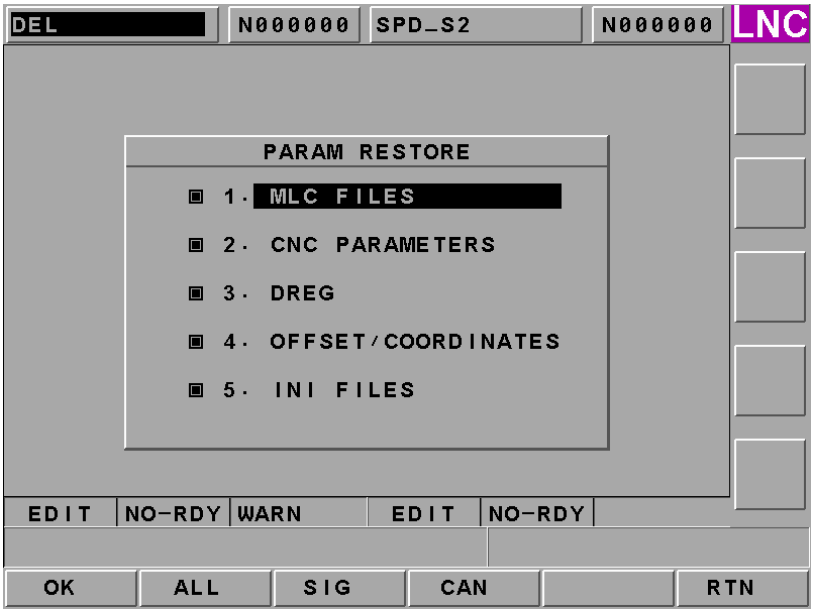


Fig. 2-1 Parameter Items Selection

Select the method of PARAM Restore.

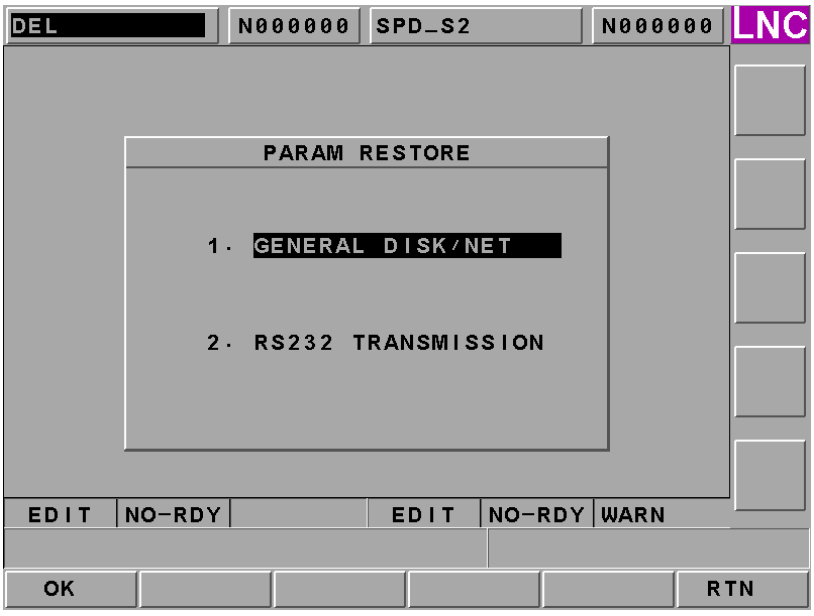


Fig. 2-2 PARAM Restore Selection Screen

1. If 「1. General Disk/Net」 for PARAM RESTORE is selected, the dialog box as below will show up. Please use up and down keys to switch to directory selection sub-window at input line. Or, switch to input line at directory selection sub-window by pressing left and right keys. After selecting or entering the source path, please verify if the cursor stops at the input line, if not, please move it to the input line first and press 【OK】 to import a parameter file.

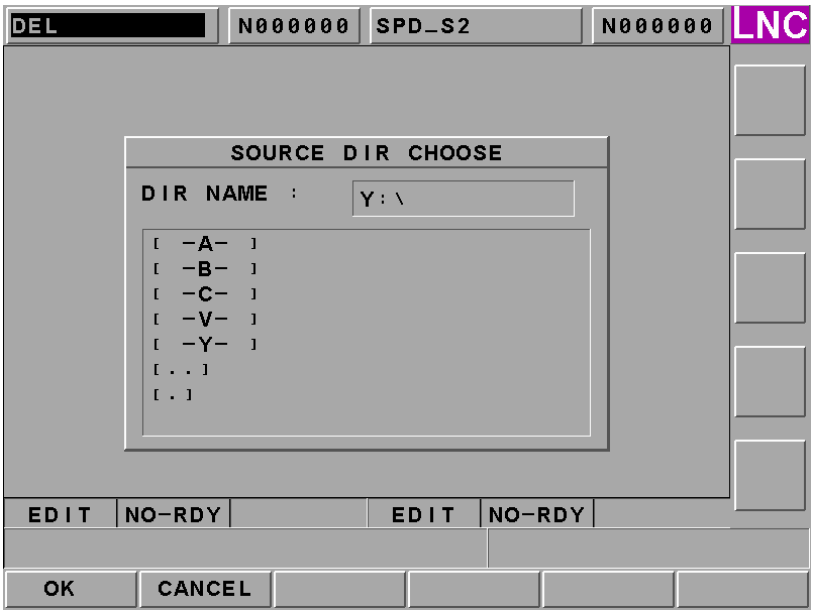


Fig. 2-3 PARAM RESTORE Path Selection 1

2. If「2.RS232 TRANSMISSION」for PARAM RESTORE is selected, the dialog box as below will show up. Select the designated imported path, and press【**OK**】. When executing this function, users need to verify if hardware connection is normal, and PC side has to execute the LNCTools software developed by LNC Technology Co.. The protocol of both ends should be confirmed to be agreeable. (For detailed description, please refer to Appendix A)

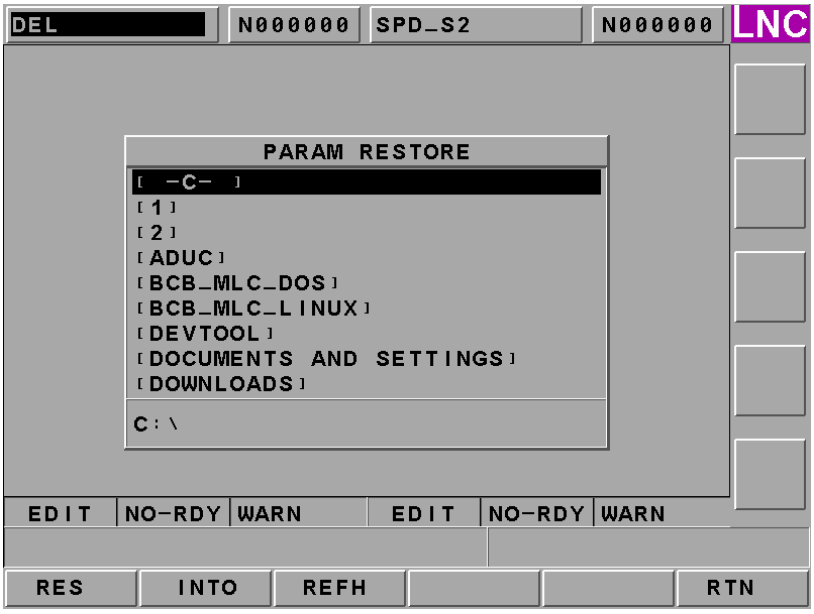


Fig. 2-4 PARAM RESTORE Path

When parameters restored function is completed , the computer will reboot automatically and enter the system.

2.4 Font Install

Select the method to import parameters.

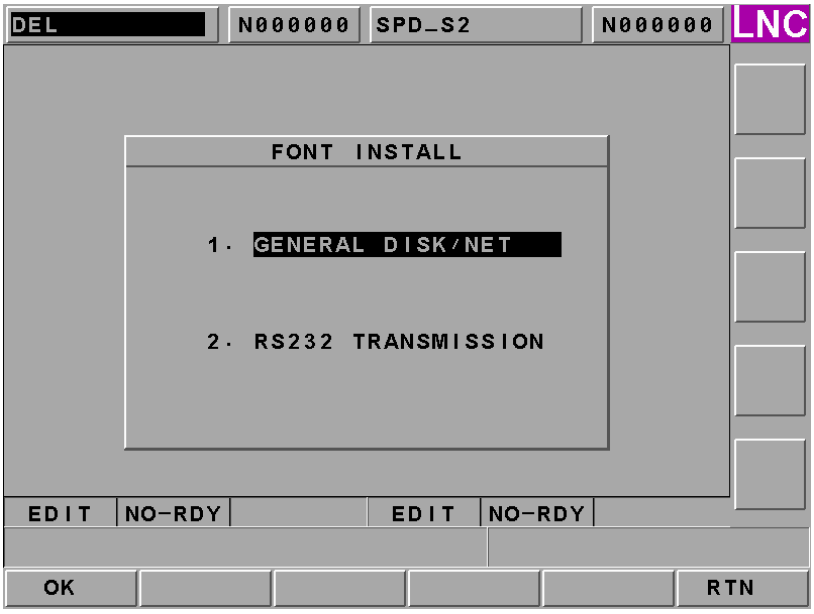


Fig. 2-1 PARAM RESTORE Options

1. If 「1. General Disk/Net」 is selected to install text font, the dialog box as below will pop up. Users can use up and down keys to switch to directory selection sub-window. Please use left and right keys to switch to input line at directory selection sub-window. After entering or selecting a source path, please verify if the cursor stops at input line, if not, please move it to input line first, then press【**OK**】.

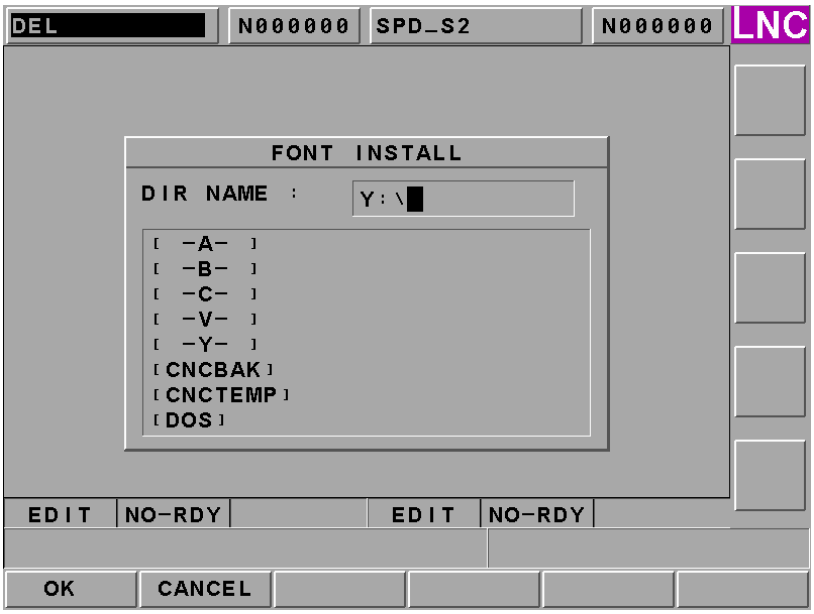


Fig. 2-2 Font Install Path Selection 1

2. Performing「2. RS232 Transmission」fonts installation, a dialog box as below will pop up. Select the path for installation and press 【**OK**】. When executing this function, users need to verify if the hardware connection is normal, and PC side needs to execute the LNC Tools software developed by LNC Technology Co.. The protocol of both ends should be confirmed to be identical. (For detailed description, please refer to Appendix A)

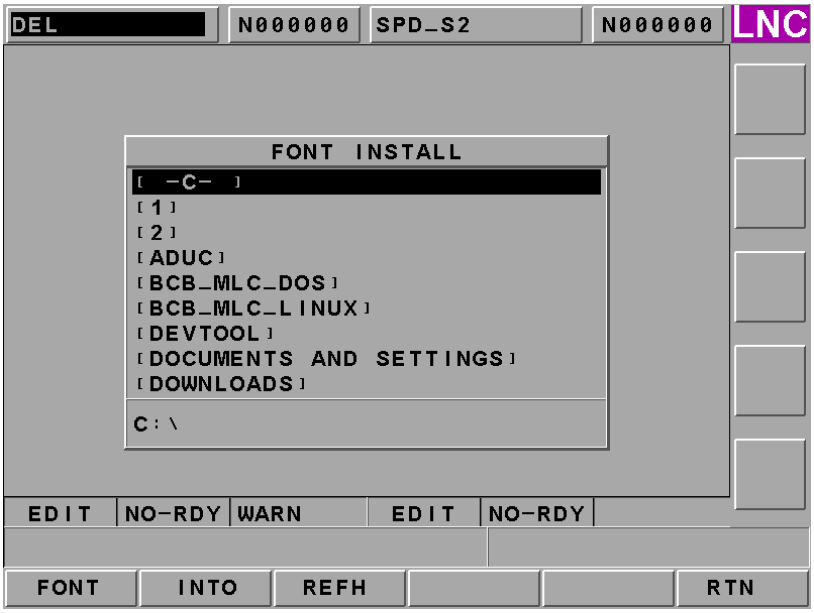


Fig. 2-3 Fonts Install Path Selection 2

3. After 【OK】 key is clicked, a message box will appear to ask users if the path is correct. If yes, please click 【OK】

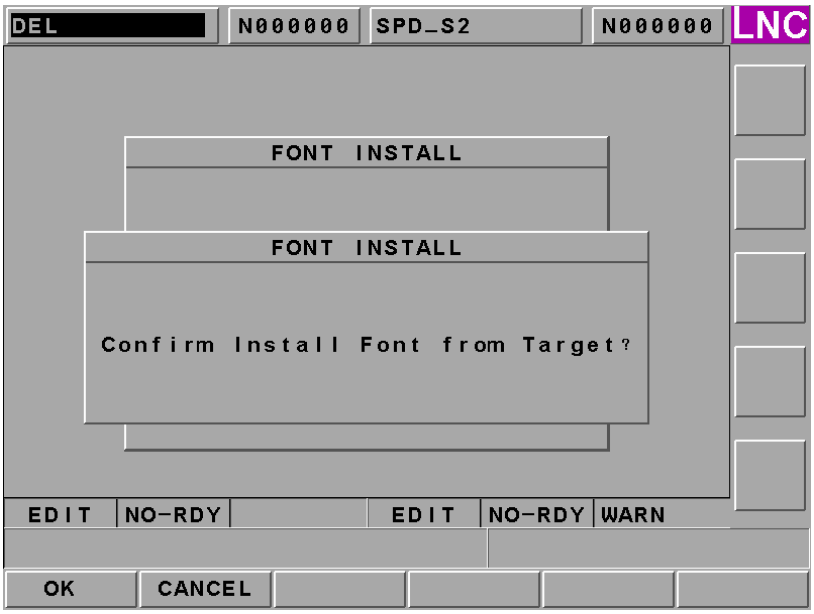


Fig. 2-4 Fonts Install Confirmation Screen

1. If the path is correct, users will exit the system and the screen is shown as below. Press “Y” and the fonts install will start.

```
24x24 Font 3.0 of LNC serial
Install on First Disk[C:\LncT800]
Make sure for INSTALL C:\LncT800[Y,N]?
```

Fig. 2-5 Fonts Install Confirmation Screen

2. When the installation is done, the screen is shown as below. Press any key to continue, the computer will reboot automatically.

```
16x15 Font 3.0 of LNC serial
Install on First Disk[C:\LncT800]
Make sure for INSTALL C:\LncT800[Y,N]?Y
Please wait,file preparing ...
Please wait,file installing ...
C:\LncT800\:Finish !!
Press any key to continue . . .
```

Fig. 2-6 Fonts Install Completion

3 SYSTEM PARAMETERS

This chapter describes controller's parameter list and description. For the detailed description, please check the corresponding function numers in the manual. The parameter setting is as following:

1. Verify the machine is under the status of "NC Ready".
2. Switch to <PARAM> Group.
3. Press <System Parameter.> to switch to Parameter screen.
4. Use up, down, left, right keys and page up, page down to move the cursor to the parameter which is going to be modified. If the parameter numbers that are going to be modified are verified, enter Pxxxx in the input line first and press <INPUT> to position the parameter.
5. Move to where the parameter is. Enter the set value on the input line and press <INPUT>.
6. At this moment, the dialog box of asking users to enter the password will appear. Enter the correct password, then users can modify parameter's set value.
7. The default value of the password is 0000, but it can be changed. If it is changed, please remember the new one; otherwise, the parameter will be unable to be modified.

NOTE: Definitions of validated symbols are as below.

⊙：Validated after rebooting

R：Validated after RESET

Blank：Validated immediately

3.1 Parameter List

No.	Type	Description	Active	Level	Page
2	Axes	[S1] Maximun following error of X axis(μ m)	R	Maker	**63**
3	Axes	[S1] Maximun following error of Y axis(μ m)	R	Maker	**63**
4	Axes	[S1] Maximun following error of Z axis(μ m)	R	Maker	**63**
5	Axes	[S1] Maximun following error of 4th axis(μ m)	R	Maker	**63**
6	Axes	[S1] X axis in-position check window(μ m)	R	Maker	**64**
7	Axes	[S1] Y axis in-position check window(μ m)	R	Maker	**64**
8	Axes	[S1] Z axis in-position check window(μ m)	R	Maker	**64**
9	Axes	[S1] 4th axis in-position check window(μ m)	R	Maker	**64**
10	Axes	[S1] X axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
11	Axes	[S1] Y axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
12	Axes	[S1] Z axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
13	Axes	[S1] 4th axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
14	Axes	[S1] G01 acc/dec time(ms)	⊙	Maker	**65**
16	Spindle	[S1] 1st spindle rotary acc/dec time.(ms/1000rpm)	⊙	Maker	**81**
18	Axes	[S1] Thred cutting acc/dec time(ms)	⊙	Maker	**65**
19	Origin	[S1] Deal with zero point return on dog(0:Warning,1:Auto)	R	Maker	**148**
20	Origin	[S1] Default of return home finish(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**148**
21	Spindle	[S1] Spindle orientation speed(RPM)	R	Maker	**81**
30	Origin	[S1] Zero point shift amount of X axis(μ m)	R	Maker	**149**
31	Origin	[S1] Zero point shift amount of Y axis(μ m)	R	Maker	**149**
32	Origin	[S1] Zero point shift amount of Z axis(μ m)	R	Maker	**149**
33	Origin	[S1] Zero point shift amount of 4th axis(μ m/0.001deg)	R	Maker	**149**
34	Origin	[S1] Pause time of X axis zero point return(10ms)	R	Maker	**149**
35	Origin	[S1] Pause time of Y axis zero point return(10ms)	R	Maker	**149**
36	Origin	[S1] Pause time of Z axis zero point return(10ms)	R	Maker	**149**
37	Origin	[S1] Pause time of 4th axis zero point return(10ms)	R	Maker	**149**
38	CMP.	[S1] Backlash compensation unit(0:Pulse,1: μ m)	⊙	Maker	**137**
40	Axes	[S1] Minim μ m feedrate override of rapid travel(%)	R	End User	**65**
41	Operation	[S1] G00 linear interpolation(0:No,1:Yes)	R	End User	**160**
43	Operation	[S1] Interpolation exact positioning(+1:X,+2:Y,+4:Z,+8:4th,+16:G00)	R	End User	**160**
44	CMP.	[S1] Backlash compensation of X axis(μ m)	R	Maker	**137**

No.	Type	Description	Active	Level	Page
45	CMP.	[S1] Backlash compensation of Y axis(μ m)	R	Maker	**137**
46	CMP.	[S1] Backlash compensation of Z axis(μ m)	R	Maker	**137**
47	CMP.	[S1] Backlash compensation of 4th axis(μ m)	R	Maker	**137**
48	Origin	[S1] Set zero point by now position(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**150**
49	Spindle	[S1] 1st spindle 1st gear nember on motor side	⊙	Maker	**82**
50	Spindle	[S1] 1st spindle 1st gear nember on axis side	⊙	Maker	**83**
51	Spindle	[S1] 1st spindle 2nd gear nember on motor side	⊙	Maker	**82**
52	Spindle	[S1] 1st spindle 2nd gear nember on axis side	⊙	Maker	**83**
62	Axes	[S1] pitch unit of screw(0:mm,1:inch)	⊙	Maker	**66**
63	Operation	[S1] Set relative coordinate with absolute coordinate(0:No,1:Yes)	R	End User	**161**
64	Origin	[S1] Dog type(0:NC,1:NO)	⊙	Maker	**150**
65	Axes	[S1] Enable absolute encoder(bit0~3,X:+1,Y:+2,Z:+4,4th:+8)	⊙	Maker	**66**
66	Axes	[S1] 4th axis type(0:Rotary 1:Linear)	⊙	Maker	**66**
68	Axes	[S1] X axis gear number of motor side(Denominator)	⊙	Maker	**67**
69	Axes	[S1] Y axis gear number of motor side(Denominator)	⊙	Maker	**67**
70	Axes	[S1] Z axis gear number of motor side(Denominator)	⊙	Maker	**67**
71	Operation	[S1] Check range of G22(0:Outter,1:Inner)	R	End User	**161**
72	Axes	[S1] 4th axis gear number of motor side(Denominator)	⊙	Maker	**67**
73	Operation	[S1] Enable acc/dec funciton of G31(0:No,1:Yes)	⊙	Maker	**161**
74	Operation	[S1] Enable macro trace under single block(0:No,1:Yes)	R	End User	**162**
76	Origin	[S1] Set absolute coordinate after zero point return(0:No,1:Yes)	R	Maker	**150**
77	Origin	[S1] G00 operation without zero point return(0:Disable,1:Enable)	R	End User	**151**
79	Origin	[S1] X axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)	R	Maker	**151**
80	Origin	[S1] Y axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)	R	Maker	**151**
81	Origin	[S1] Z axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)	R	Maker	**151**
82	Origin	[S1] 4th axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)	R	Maker	**151**
83	Operation	[S1] Enable G00 under dry run(0:Disable,1:Enable)	R	End User	**162**
84	Spindle	[S1] Orientation by (0:Sensor,1:Encoder)	R	Maker	**84**
89	Operation	[S1] M code of part counter	R	End User	**163**
90	Spindle	[S1] 1st spindle display type of speed(0:Command,1:Actual)		Maker	**84**
91	Operation	[S1] 4th axis feedrate merge into HMi disaply(0:Yes,1:No)	R	Maker	**163**

No.	Type	Description	Active	Level	Page
94	Operation	Edit file O9XXX(0:No,1:Yes)		Maker	**163**
95	Spindle	[S1] Minimun speed of 1st spindle(RPM)	R	Maker	**85**
96	Spindle	[S1] Maximun speed of 1st spindle(RPM)	R	Maker	**85**
98	Spindle	[S1] 1st spindle offset of output voltage (0.3mV/unit)	R	Maker	**85**
100	Axes	[S1] X axis gear number of screw side(Numeerator)	⊙	Maker	**68**
101	Axes	[S1] Y axis gear number of screw side(Numeerator)	⊙	Maker	**68**
102	Axes	[S1] Z axis gear number of screw side(Numeerator)	⊙	Maker	**68**
103	Axes	[S1] 4th axis gear number of screw side(Numeerator)	⊙	Maker	**68**
104	Axes	[S1] X axis pitch of screw(μ m)	⊙	Maker	**68**
105	Axes	[S1] Y axis pitch of screw(μ m)	⊙	Maker	**68**
106	Axes	[S1] Z axis pitch of screw(μ m)	⊙	Maker	**68**
107	Axes	[S1] 4th axis pitch of screw(μ m)	⊙	Maker	**68**
112	CMP.	[S1] Total section of X axis pitch error compensation	⊙	Maker	**138**
113	CMP.	[S1] Total section of Y axis pitch error compensation	⊙	Maker	**138**
114	CMP.	[S1] Total section of Z axis pitch error compensation	⊙	Maker	**138**
115	CMP.	[S1] Total section of 4th axis pitch error compensation	⊙	Maker	**138**
117	CMP.	[S1] Enable backlash compensation(+1:X,+2:Y,+4:Z,+8:4th)	R	Maker	**138**
118	CMP.	[S1] Direction of pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**139**
119	CMP.	[S1] Enable pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**139**
120	Origin	[S1] Direction of zero point return(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**152**
122	Operation	[S1] Name od 4th axis(0:A,1:B,2:C,3:U,4:V,5:W)	⊙	Maker	**164**
123	Operation	[S1] Unit of system afetr power on(0:mm G21,1:inch G20)	⊙	End User	**164**
124	Manufacture	[S1] Moving command of system afetr power on(0:G00,1:G01)	⊙	End User	**126**
125	Manufacture	[S1] Number of tool compensation T code(0:Low 2 digits,1:High 2 digits)	R	Maker	**126**
126	Manufacture	[S1] Enable T0 offset cancel(0:No,1:Yes)	R	End User	**126**
127	Manufacture	[S1] Digits of T code(0:4 digits,1:2 digits)	R	Maker	**127**
128	Operation	[S1] Definition of low 2 digits of T code(0:00,1:Low 2 digits)	R	Maker	**164**
130	Manufacture	[S1] Unit of input value(0:Minimum unit of system,1:As system unit)	⊙	End User	**127**
131	Operation	[S1] Type of tool tool nose radius compensation(0:A,1:B)	R	Maker	**165**
132	Operation	[S1] Measurement of X axis(0:Diameter,1:Radius)	⊙	Maker	**165**
135	Manufacture	[S1] Default coordinate of system(0:Absolute G90,1:Relative G91)	⊙	End User	**127**

No.	Type	Description	Active	Level	Page
140	Operation	[S1] Common variables in RESET(0:Clear,1:Keep)	R	End User	**165**
141	Operation	[S1] Local variables in RESET(0:Clear,1:Keep)	R	End User	**166**
145	Operation	[S1] Default of plane(0:ZX,1:YZ,2:XY)	⊙	Maker	**166**
146	Operation	[S1] M code of calling macro O9001	R	Maker	**167**
147	Operation	[S1] M code of calling macro O9002	R	Maker	**167**
148	Operation	[S1] M code of calling macro O9003	R	Maker	**167**
149	Operation	[S1] Default feedrate of system(mm/min)	⊙	End User	**167**
150	Manufacture	[S1] G83/G87 return amount(μ m)	R	End User	**128**
152	Operation	[S1] Trajectory optimization of 4th rotation axis(0:Linear,1:Shortest)	R	End User	**168**
153	Operation	[S1] G code type(0:B,1:A,2:C)	⊙	Maker	**168**
154	Manufacture	[S1] Over cutting check of G71/G72 profile(0:Yes,1:No)	R	End User	**128**
155	Operation	[S1] Feedrate unit of system(0:mm/rev,1:mm/min)	⊙	End User	**169**
160	Spindle	[S1] 1st spindle encoder mount(0:Spindle side,1:Motor side)	⊙	Maker	**86**
161	Operation	[S1] M code of calling macro O9004	R	Maker	**167**
162	Operation	[S1] M code of calling macro O9005	R	Maker	**167**
163	Operation	[S1] M code of calling macro O9006	R	Maker	**167**
164	Operation	[S1] M code of calling macro O9007	R	Maker	**167**
165	Operation	[S1] M code of calling macro O9008	R	Maker	**167**
166	Operation	[S1] G code of calling macro O9010	R	Maker	**169**
167	Operation	[S1] G code of calling macro O9011	R	Maker	**169**
168	Operation	[S1] G code of calling macro O9012	R	Maker	**169**
169	Operation	[S1] T code calling macro O9020(0:No,1:Yes)	R	Maker	**170**
170	Operation	[S1] TGM code call macro display(0:No,1:Yes)	R	Maker	**170**
172	Axes	[S1] Acc/Dec type for rapid travel(0:Linear,1:S curve)	⊙	Maker	**69**
173	Axes	[S1] Acc/Dec type for cutting(0:Linear,1:S curve)	⊙	Maker	**70**
175	Origin	[S1] Source of dog signal(0:Local,1:Remote)	⊙	Maker	**152**
176	Operation	[S1] Local port NO for G31 P1(0:Disable,1~8:Card1,101~108:Card2)	R	Maker	**171**
177	Operation	[S1] Contact type of G31 P1(0:NC,1:NO)	R	Maker	**171**
178	Spindle	[S1] 1st spindle 3rd gear nember on motor side	⊙	Maker	**82**
179	Spindle	[S1] 1st spindle 3rd gear nember on axis side	⊙	Maker	**83**
180	Operation	[S1] Enable manual return(0:Disable,1:Enable)	R	End User	**172**
181	Spindle	[S1] 1st spindle 4th gear nember on motor side	⊙	Maker	**82**
182	Spindle	[S1] 1st spindle 4th gear nember on axis side	⊙	Maker	**83**

No.	Type	Description	Active	Level	Page
184	Spindle	[S1] Sensor number for spindle orientation(1~2:Card1,101~102:Card2)	R	Maker	**86**
185	Spindle	[S1] Sensor type for spindle orientation(0:NC,1:NO)	R	Maker	**86**
187	Manufacture	[S1] Feedrate clamping of circle or arc(0:No,1:Yes)	R	End User	**129**
188	Axes	[S1] Position loop gain for feedrate clamping of arc(1/s)	R	Maker	**71**
189	Spindle	[S1] 1st spindle init. speed(RPM)	⊙	End User	**87**
190	Spindle	[S1] Spindle positioning command(0:A/B,1:CW/CCW,2:P/D,3:Vcmd)	⊙	Maker	**87**
196	Manufacture	[S1] Plunge chamfering length of G78(G92)(0.1 pitch)	R	End User	**130**
197	Manufacture	[S1] Plunge chamfering angle of G78(G92)(Degree)	R	End User	**130**
198	Manufacture	[S1] Retract chamfering length of G78(G92)(0.1 pitch)	R	End User	**130**
199	Manufacture	[S1] Retract chamfering angle of G78(G92)(Degree)	R	End User	**130**
200	Operation	[S1] Feedrate display(0:Command,1:Feedback)	R	End User	**172**
201	Operation	[S1] Measurement of Y axis(0:Diameter,1:Radius)	⊙	Maker	**165**
202	Operation	Language of display(0:English,1:Traditional Chinese,2:Simplified Chinese)	⊙	End User	**172**
203	Operation	[S1] Program reset in MEM mode(0:No,1:Yes)	R	End User	**173**
204	Origin	[S1] Set zero point by NC record(+1:X,+2:Y,+4:Z,+8:4th)	R	Maker	**152**
205	Operation	Wear value(0:Absolute,1:Relative)	R	End User	**173**
206	Operation	Enable wear offset compensation for manufacturing(0:No,1:Yes)	R	End User	**173**
207	Operation	Wear clear(0:No,1:All,2:Corr.)	R	End User	**173**
211	Operation	[S1] Stop preinterpreter M code 1	R	End User	**173**
212	Operation	[S1] Stop preinterpreter M code 2	R	End User	**173**
213	Operation	[S1] Stop preinterpreter M code 3	R	End User	**173**
214	Operation	[S1] Stop preinterpreter M code 4	R	End User	**173**
215	Operation	[S1] Stop preinterpreter M code 5	R	End User	**173**
216	Operation	[S1] Stop preinterpreter M code 6	R	End User	**173**
217	Operation	[S1] Stop preinterpreter M code 7	R	End User	**173**
218	Operation	[S1] Stop preinterpreter M code 8	R	End User	**173**
219	Operation	[S1] Stop preinterpreter M code 9	R	End User	**173**
220	Operation	[S1] Stop preinterpreter M code 10	R	End User	**173**
231	Operation	[S1] Information of X axis hide(0:No,1:Yes)		Maker	**174**
232	Operation	[S1] Information of Y axis hide(0:No,1:Yes)		Maker	**174**
233	Operation	[S1] Information of Z axis hide(0:No,1:Yes)		Maker	**174**
234	Operation	[S1] Information of 4th axis hide(0:No,1:Yes)		Maker	**174**
235	Operation	[S1] Contact type of G31 P2(0:NC,1:NO)	R	Maker	**171**

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236	Operation	[S1] Contact type of G31 P3(0:NC,1:NO)	R	Maker	**171**
237	Operation	[S1] Contact type of G31 P4(0:NC,1:NO)	R	Maker	**171**
238	Operation	Geometric value(0:Absolute,1:Relative)	R	End User	**175**
239	Operation	Max wear value to input(LU)		End User	**175**
240	Spindle	[S1] Position gain for spindle positioning(1/s)	R	Maker	**87**
242	Operation	[S1] Local port NO for G31 P2(0:Disable,1~8:Card1,101~108:Card2)	R	Maker	**171**
243	Operation	[S1] Local port NO for G31 P3(0:Disable,1~8:Card1,101~108:Card2)	R	Maker	**171**
244	Operation	[S1] Local port NO for G31 P4(0:Disable,1~8:Card1,101~108:Card2)	R	Maker	**171**
249	Operation	RAMDISK error message(0:OFF,1:ON)	⊙	Maker	**175**
293	Origin	[S1] Zero point return type(0:DOG,1:REF.)(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**152**
298	Spindle	[S1] 2nd spindle speed arrival range(RPM)	R	Maker	**92**
299	Spindle	[S1] 2nd spindle check range of zero speed(RPM)	R	Maker	**94**
351	Operation	[S1] Feedrate override unit of knob(0:10%,1:1%)	⊙	Maker	**175**
352	Operation	[S1] Jog override unit of knob(0:10%,1:1%)	⊙	Maker	**176**
353	Operation	[S1] Rapid traverse override unit of knob(0:4 section,1:1%)	⊙	Maker	**176**
354	Spindle	[S1] 1st spindle override unit(0:10%,1:1%)	⊙	Maker	**88**
355	Spindle	[S1] 2nd spindle override unit(0:10%,1:1%)	⊙	Maker	**88**
356	Spindle	[S1] 3rd spindle override unit(0:10%,1:1%)	⊙	Maker	**88**
357	Spindle	[S1] Bell-shape acc/dec time of 1st spindle(ms)	⊙	Maker	**88**
358	Spindle	[S1] Bell-shape acc/dec time of 2nd spindle(ms)	⊙	Maker	**88**
359	Spindle	[S1] Bell-shape acc/dec time of 3rd spindle(ms)	⊙	Maker	**88**
360	Operation	Option color set(0~3)	⊙	End User	**177**
361	Operation	Black color set(0~16)	⊙	End User	**177**
362	Operation	Blue color set(0~16)	⊙	End User	**177**
363	Operation	Green color set(0~16)	⊙	End User	**177**
364	Operation	Cyan color set(0~16)	⊙	End User	**177**
365	Operation	Red color set(0~16)	⊙	End User	**177**
366	Operation	Magenta color set(0~16)	⊙	End User	**177**
367	Operation	Brown color set(0~16)	⊙	End User	**177**
368	Operation	White color set(0~16)	⊙	End User	**177**
369	Operation	Gray color set(0~16)	⊙	End User	**177**
370	Operation	Light blue color set(0~16)	⊙	End User	**177**
371	Operation	Light green color set(0~16)	⊙	End User	**177**

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372	Operation	Light cyan color set(0~16)	⊙	End User	**177**
373	Operation	Light red color set(0~16)	⊙	End User	**177**
374	Operation	Light magenta color set(0~16)	⊙	End User	**177**
375	Operation	Yellow color set(0~16)	⊙	End User	**177**
376	Operation	Light white color set(0~16)	⊙	End User	**177**
377	Operation	Cursor color set(0~16)	⊙	End User	**177**
378	Operation	Mark color set(0~16)	⊙	End User	**177**
379	Operation	Up edge color set(0~16)	⊙	End User	**177**
380	Operation	Down edge color set(0~16)	⊙	End User	**177**
381	Operation	Is the color of button contrast(0:No,1:Yes)	⊙	End User	**177**
388	Operation	Port of file communication(0:Disable,1:COM1,2:COM2)	⊙	Maker	**177**
389	Operation	Rate of file communication(bps)	R	Maker	**178**
390	Operation	Data bit of file communication(5~8 bit)	R	Maker	**178**
391	Operation	Stop bit of file communication(0:1 bit,1:1.5 or 2bit)	R	Maker	**178**
392	Operation	Odd even check of file communication(0:Disable,1:Odd,2:Even)	R	Maker	**178**
393	Operation	Code of file communication(0:ASCII,1:EIA,2:ISO)	R	Maker	**179**
394	Operation	The screen saver wait time(min)	⊙	End User	**179**
400	Operation	[S1] G code of calling macro O9013	R	Maker	**169**
401	Operation	[S1] G code of calling macro O9014	R	Maker	**169**
500	Operation	[S1] Positive direction value of X axis for 1st soft no go area(μ m)	R	Maker	**180**
501	Operation	[S1] Negative direction value of X axis for 1st soft no go area(μ m)	R	Maker	**180**
502	Operation	[S1] Positive direction value of Y axis for 1st soft no go area(μ m)	R	Maker	**180**
503	Operation	[S1] Negative direction value of Y axis for 1st soft no go area(μ m)	R	Maker	**180**
504	Operation	[S1] Positive direction value of Z axis for 1st soft no go area(μ m)	R	Maker	**180**
505	Operation	[S1] Negative direction value of Z axis for 1st soft no go area(μ m)	R	Maker	**180**
506	Operation	[S1] Positive direction value of 4th axis for 1st soft no go area(μ m)	R	Maker	**180**
507	Operation	[S1] Negative direction value of 4th axis for 1st soft no go area(μ m)	R	Maker	**180**
512	Operation	[S1] Positive direction value of X axis for 2nd soft no go area(μ m)	R	Maker	**180**
513	Operation	[S1] Negative direction value of X axis for 2nd soft no go area(μ m)	R	Maker	**180**
514	Operation	[S1] Positive direction value of Y axis for 2nd soft no go area(μ m)	R	Maker	**180**

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515	Operation	[S1] Negative direction value of Y axis for 2nd soft no go area(μ m)	R	Maker	**180**
516	Operation	[S1] Positive direction value of Z axis for 2nd soft no go area(μ m)	R	Maker	**180**
517	Operation	[S1] Negative direction value of Z axis for 2nd soft no go area(μ m)	R	Maker	**180**
518	Operation	[S1] Positive direction value of 4th axis for 2nd soft no go area(μ m)	R	Maker	**180**
519	Operation	[S1] Negative direction value of 4th axis for 2nd soft no go area(μ m)	R	Maker	**180**
544	Axes	[S1] X axis handle Acc/Dec time(ms)	⊙	Maker	**71**
545	Axes	[S1] Y axis handle Acc/Dec time(ms)	⊙	Maker	**71**
546	Axes	[S1] Z axis handle Acc/Dec time(ms)	⊙	Maker	**71**
547	Axes	[S1] 4th axis handle Acc/Dec time(ms)	⊙	Maker	**71**
550	Axes	[S1] X axis handle max feedrate(μ m/min)	R	Maker	**72**
551	Axes	[S1] Y axis handle max feedrate(μ m/min)	R	Maker	**72**
552	Axes	[S1] Z axis handle max feedrate(μ m/min)	R	Maker	**72**
553	Axes	[S1] 4th axis handle max feedrate(μ m/min)	R	Maker	**72**
663	Spindle	[S1] Acc/dec time for spindle positioning(ms)	⊙	Maker	**88**
664	Spindle	[S1] 2nd spindle 1st gear nember on motor side	⊙	Maker	**82**
665	Spindle	[S1] 2nd spindle 1st gear nember on axis side	⊙	Maker	**83**
666	Spindle	[S1] 2nd spindle 2nd gear nember on motor side	⊙	Maker	**82**
667	Spindle	[S1] 2nd spindle 2nd gear nember on axis side	⊙	Maker	**83**
668	Spindle	[S1] 2nd spindle 3rd gear nember on motor side	⊙	Maker	**82**
669	Spindle	[S1] 2nd spindle 3rd gear nember on axis side	⊙	Maker	**83**
670	Spindle	[S1] 2nd spindle 4th gear nember on motor side	⊙	Maker	**82**
671	Spindle	[S1] 2nd spindle 4th gear nember on axis side	⊙	Maker	**83**
672	Spindle	[S1] 3rd spindle 1st gear nember on motor side	⊙	Maker	**82**
673	Spindle	[S1] 3rd spindle 1st gear nember on axis side	⊙	Maker	**83**
674	Spindle	[S1] 3rd spindle 2nd gear nember on motor side	⊙	Maker	**82**
675	Spindle	[S1] 3rd spindle 2nd gear nember on axis side	⊙	Maker	**83**
676	Spindle	[S1] 3rd spindle 3rd gear nember on motor side	⊙	Maker	**82**
677	Spindle	[S1] 3rd spindle 3rd gear nember on axis side	⊙	Maker	**83**
678	Spindle	[S1] 3rd spindle 4th gear nember on motor side	⊙	Maker	**82**
679	Spindle	[S1] 3rd spindle 4th gear nember on axis side	⊙	Maker	**83**
680	Spindle	[S1] Number of 1st spindle clockwise M code	⊙	Maker	**89**
681	Spindle	[S1] Number of 1st spindle counterclockwise M code	⊙	Maker	**89**

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682	Spindle	[S1] Number of 1st spindle stop M code	⊙	Maker	**89**
683	Spindle	[S1] Number of 1st spindle clockwise M code	⊙	Maker	**89**
684	Spindle	[S1] Number of 1st spindle counterclockwise M code	⊙	Maker	**89**
685	Spindle	[S1] Number of 1st spindle stop M code	⊙	Maker	**89**
686	Spindle	[S1] Number of 1st spindle clockwise M code	⊙	Maker	**89**
687	Spindle	[S1] Number of spindle counterclockwise M code	⊙	Maker	**89**
688	Spindle	[S1] Number of spindle stop M code	⊙	Maker	**89**
689	Spindle	[S1] Number of remote 1st spindle clockwise M code	⊙	Maker	**89**
690	Spindle	[S1] Number of remote spindle counterclockwise M code	⊙	Maker	**89**
691	Spindle	[S1] Number of remote spindle stop M code	⊙	Maker	**89**
692	Spindle	[S1] Number of remote 1st spindle clockwise M code	⊙	Maker	**89**
693	Spindle	[S1] Number of remote spindle counterclockwise M code	⊙	Maker	**89**
694	Spindle	[S1] Number of remote spindle stop M code	⊙	Maker	**89**
695	Spindle	[S1] Number of remote 1st spindle clockwise M code	⊙	Maker	**89**
696	Spindle	[S1] Number of remote spindle counterclockwise M code	⊙	Maker	**89**
697	Spindle	[S1] Number of remote spindle stop M code	⊙	Maker	**89**
800	Axes	[S1] X axis rapid travel in-position check windows(μ m)	R	Maker	**72**
801	Axes	[S1] Y axis rapid travel in-position check windows(μ m)	R	Maker	**72**
802	Axes	[S1] Z axis rapid travel in-position check windows(μ m)	R	Maker	**72**
803	Axes	[S1] 4th axis rapid travel in-position check windows(μ m)	R	Maker	**72**
804	Operation	Monitor power management(0:CRT->Panel,1:Panel->CRT,2:Disable)		End User	**181**
806	Manufacture	[S1] Maximum error amount during corner cutting(μ m)	R	End User	**131**
808	Manufacture	[S1] Automatic corner override(0:Disable,1:Enable)	R	End User	**131**
809	Manufacture	[S1] Maximum circle/arc contour error(μ m)	R	End User	**131**
810	Spindle	[S1] Spindle position check time(ms)	R	Maker	**90**
811	CMP.	[S1] Set G code of spike compensation(0:G2G3,1:all)	R	Maker	**140**
812	CMP.	[S1] Spike compensation value of X axis in positive moving(μ m)	R	Maker	**141**
813	CMP.	[S1] Spike compensation time of X axis in positive moving	R	Maker	**141**
814	CMP.	[S1] Delay time of X axis spike compensation in positive moving	R	Maker	**142**
815	CMP.	[S1] Spike compensation value of X axis in negative moving(μ m)	R	Maker	**142**
816	CMP.	[S1] Spike compensation time of X axis in negative moving	R	Maker	**143**

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817	CMP.	[S1] Delay time of X axis spike compensation in negative moving	R	Maker	**143**
818	CMP.	[S1] Spike compensation value of Y axis in positive moving(μ m)	R	Maker	**141**
819	CMP.	[S1] Spike compensation time of Y axis in positive moving	R	Maker	**141**
820	CMP.	[S1] Delay time of Y axis spike compensation in positive moving	R	Maker	**142**
825	CMP.	[S1] Spike compensation value of Y axis in negative moving(μ m)	R	Maker	**142**
826	CMP.	[S1] Spike compensation time of Y axis in negative moving	R	Maker	**143**
827	CMP.	[S1] Delay time of Y axis spike compensation in negative moving	R	Maker	**143**
828	CMP.	[S1] Spike compensation value of Z axis in positive moving(μ m)	R	Maker	**141**
829	CMP.	[S1] Spike compensation time of Z axis in positive moving	R	Maker	**141**
830	CMP.	[S1] Delay time of Z axis spike compensation in positive moving	R	Maker	**142**
831	CMP.	[S1] Spike compensation value of Z axis in negative moving(μ m)	R	Maker	**142**
832	CMP.	[S1] Spike compensation time of Z axis in negative moving	R	Maker	**143**
833	CMP.	[S1] Delay time of Z axis spike compensation in negative moving	R	Maker	**143**
834	Origin	[S1] Access time of absolute encoder(sec)	R	Maker	**153**
835	Spindle	[S1] Enable M code for spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
836	Spindle	[S1] Release M code for spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
837	Spindle	[S1] The start M code for spindle positioning(0:Disable,1~10000)	⊙	Maker	**91**
838	Spindle	[S1] Number of M code for spindle positioining(1~10000)	R	Maker	**91**
839	Spindle	[S1] Tolerance for spindle positioning(0.001deg)	R	Maker	**91**
840	CMP.	[S1] Enable X axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
841	CMP.	[S1] Saturation time of X axis in TDC(sec)	⊙	Maker	**144**
842	CMP.	[S1] Total compensation value of X axis in TDC(μ m)	⊙	Maker	**145**
843	CMP.	[S1] Restored time of X axis in TDC(sec)	⊙	Maker	**145**
851	CMP.	[S1] Enable Y axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
852	CMP.	[S1] Saturation time of Y axis in TDC(sec)	⊙	Maker	**144**
853	CMP.	[S1] Total compensation value of Y axis in TDC(μ m)	⊙	Maker	**145**
854	CMP.	[S1] Restored time of Y axis in TDC(sec)	⊙	Maker	**145**
856	CMP.	[S1] Enable Z axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
857	CMP.	[S1] Saturation time of Z axis in TDC(sec)	⊙	Maker	**144**

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858	CMP.	[S1] Total compensation value of Z axis in TDC(μ m)	⊙	Maker	**145**
859	CMP.	[S1] Restored time of Z axis in TDC(sec)	⊙	Maker	**145**
861	CMP.	[S1] Enable 4th axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
862	CMP.	[S1] Saturation time of 4th axis in TDC(sec)	⊙	Maker	**144**
863	CMP.	[S1] Total compensation value of 4th axis in TDC(μ m)	⊙	Maker	**145**
864	CMP.	[S1] Restored time of 4th axis in TDC(sec)	⊙	Maker	**145**
866	Operation	[S1] Local input port number for measuring(1~2:Card1,101~102:Card2)	R	Maker	**181**
867	Operation	[S1] Sensor type for measuring(0:NC,1:NO)	R	Maker	**181**
868	Operation	[S1] Tool offset number for measuring(0~30)	R	End User	**182**
869	Operation	[S1] Enable axis acc\dec function for measuring(0:No,1:Yes)	⊙	Maker	**182**
870	Operation	[S1] Use cutting signal(0:NO,1:YES)	R	Maker	**182**
871	Operation	[S1] Waitting time for using cutting signal(ms)	R	Maker	**183**
872	Manufacture	[S1] Plunge rate ratio of G78(G92)	R	Maker	**132**
873	Manufacture	[S1] Retract rate ratio of G78(G92)	R	Maker	**132**
875	Spindle	[S1] 2nd spindle init. speed(RPM)	⊙	End User	**87**
876	Spindle	[S1] Maximun speed of 2nd spindle(RPM)	R	Maker	**85**
877	Spindle	[S1] Minimun speed of 2nd spindle(RPM)	R	Maker	**85**
878	Spindle	[S1] 3rd spindle init. speed(RPM)	⊙	End User	**87**
879	Spindle	[S1] Maximun speed of 3rd spindle(RPM)	R	Maker	**85**
880	Spindle	[S1] Minimun speed of 3rd spindle(RPM)	R	Maker	**85**
881	Spindle	[S1] 3rd spindle speed arrival range(RPM)	R	Maker	**92**
882	Spindle	[S1] 3rd spindle check range of zero speed(RPM)	R	Maker	**94**
884	Spindle	[S1] 2nd spindle offset of output voltage (0.3mV/unit)	R	Maker	**85**
885	Spindle	[S1] 2nd spindle rotary acc/dec time.(ms/1000rpm)	⊙	Maker	**81**
887	Spindle	[S1] 3rd spindle offset of output voltage (0.3mV/unit)	R	Maker	**85**
888	Spindle	[S1] 3rd spindle rotary acc/dec time.(ms/1000rpm)	⊙	Maker	**81**
892	Spindle	[S1] 2nd spindle encoder mount(0:Spindle side,1:Motor side)	⊙	Maker	**86**
896	Spindle	[S1] 3rd spindle encoder mount(0:Spindle side,1:Motor side)	⊙	Maker	**86**
897	Spindle	[S1] 2nd spindle display type of speed(0:Command,1:Actual)		Maker	**84**
898	Spindle	[S1] 3rd spindle display type of speed(0:Command,1:Actual)		Maker	**84**
899	Operation	[S1] use CE rule(0:No,1:Yes)	R	Maker	**183**
900	CMP.	[S1] Spike compensation value of 4th axis in positive moving(μ m)	R	Maker	**141**

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901	CMP.	[S1] Spike compensation time of 4th axis in positive moving	R	Maker	**141**
902	CMP.	[S1] Delay time of 4th axis spike compensation in positive moving	R	Maker	**142**
903	CMP.	[S1] Spike compensation value of 4th axis in negative moving(μ m)	R	Maker	**142**
904	CMP.	[S1] Spike compensation time of 4th axis in negative moving	R	Maker	**143**
905	CMP.	[S1] Delay time of 4th axis spike compensation in negative moving	R	Maker	**143**
995	Operation	Enable Debug Function for PLC(0:No,1:L1,2:L2,3:L1+L2)	⊙	End User	**183**
1000	Axes	[S1] X axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
1001	Axes	[S1] Y axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
1002	Axes	[S1] Z axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
1003	Axes	[S1] 4th axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
1004	Axes	[S1] The maximum feedrate for cutting(μ m/min)	R	Maker	**73**
1006	Operation	[S1] 1st soft limit positive direction value of X axis(μ m)	R	Maker	**184**
1007	Operation	[S1] 1st soft limit negative direction value of X axis(μ m)	R	Maker	**184**
1008	Operation	[S1] 1st soft limit positive direction value of Y axis(μ m)	R	Maker	**184**
1009	Operation	[S1] 1st soft limit negative direction value of Y axis(μ m)	R	Maker	**184**
1010	Operation	[S1] 1st soft limit positive direction value of Z axis(μ m)	R	Maker	**184**
1011	Operation	[S1] 1st soft limit negative direction value of Z axis(μ m)	R	Maker	**184**
1012	Operation	[S1] 1st soft limit positive direction value of 4th axis(μ m)	R	Maker	**184**
1013	Operation	[S1] 1st soft limit negative direction value of 4th axis(μ m)	R	Maker	**184**
1014	Origin	[S1] Absolute coordinate of X axis after zero point return(μ m)	R	Maker	**153**
1015	Origin	[S1] Absolute coordinate of Y axis after zero point return(μ m)	R	Maker	**153**
1016	Origin	[S1] Absolute coordinate of Z axis after zero point return(μ m)	R	Maker	**153**
1017	Origin	[S1] Absolute coordinate of 4th axis after zero point return(μ m)	R	Maker	**153**
1018	CMP.	[S1] Length of each section for X axis pitch error compensation(μ m)	⊙	Maker	**146**
1019	CMP.	[S1] Length of each section for Y axis pitch error compensation(μ m)	⊙	Maker	**146**
1020	CMP.	[S1] Length of each section for X axis pitch error compensation(μ m)	⊙	Maker	**146**
1021	CMP.	[S1] Length of each section for 4th axis pitch error compensation(μ m)	⊙	Maker	**146**
1022	Origin	[S1] Shift amount of X axis from 2nd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**

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1024	Origin	[S1] Shift amount of Z axis from 2nd zero point to 1st zero point(μ m)	R	Maker	**154**
1025	Origin	[S1] Shift amount of 4th axis from 2nd zero point to 1st zero point(μ m)	R	Maker	**154**
1026	Origin	[S1] Shift amount of X axis from 3rd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**
1027	Origin	[S1] Shift amount of Y axis from 3rd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**
1028	Origin	[S1] Shift amount of Z axis from 3rd zero point to 1st zero point(μ m)	R	Maker	**154**
1029	Origin	[S1] Shift amount of 4th axis from 3rd zero point to 1st zero point(μ m)	R	Maker	**154**
1030	Origin	[S1] Shift amount of X axis from 4th zero point to 1st zero point(radius)(μ m)	R	Maker	**155**
1031	Origin	[S1] Shift amount of Y axis from 4th zero point to 1st zero point(radius)(μ m)	R	Maker	**155**
1032	Origin	[S1] Shift amount of Z axis from 4th zero point to 1st zero point(μ m)	R	Maker	**155**
1033	Origin	[S1] Shift amount of 4th axis from 4th zero point to 1st zero point(μ m)	R	Maker	**155**
1034	Operation	[S1] 2nd soft limit positive direction value of X axis(μ m)	R	Maker	**184**
1035	Operation	[S1] 2nd soft limit negative direction value of X axis(μ m)	R	Maker	**184**
1036	Operation	[S1] 2nd soft limit positive direction value of Y axis(μ m)	R	Maker	**184**
1037	Operation	[S1] 2nd soft limit negative direction value of Y axis(μ m)	R	Maker	**184**
1038	Operation	[S1] 2nd soft limit positive direction value of Z axis(μ m)	R	Maker	**184**
1039	Operation	[S1] 2nd soft limit negative direction value of Z axis(μ m)	R	Maker	**184**
1040	Operation	[S1] 2nd soft limit positive direction value of 4th axis(μ m)	R	Maker	**184**
1041	Operation	[S1] 2nd soft limit negative direction value of 4th axis(μ m)	R	Maker	**184**
1042	Axes	[S1] G31 initial feedrate(μ m/min)	R	Maker	**73**
1043	Manufacture	[S1] G83 drilling(0:High,1:Normal)		End User	**132**
1044	Manufacture	[S1] G87 drilling(0:High,1:Normal)		End User	**133**
1045	Manufacture	[S1] G83~G89 P2 pause time(ms)		End User	**133**
1046	CMP.	[S1] Start position of X axis pitch error compensation(μ m)	⊙	Maker	**146**
1047	CMP.	[S1] Start position of Y axis pitch error compensation(μ m)	⊙	Maker	**146**
1048	CMP.	[S1] Start position of Z axis pitch error compensation(μ m)	⊙	Maker	**146**
1049	CMP.	[S1] Start position of 4th axis pitch error compensation(μ m)	⊙	Maker	**146**
1054	Spindle	[S1] 1st spindle speed arrival range(RPM)	R	Maker	**92**

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1059	Spindle	[S1] Acc/dec time of spindle 1 rigid tapping	R	Maker	**93**
1061	Axes	[S1] The maximum feedrate of thread cutting(μ m/min)	R	Maker	**74**
1062	Spindle	[S1] Basic angle for spindle semi-fix positioning(0.001deg)	R	Maker	**93**
1063	Spindle	[S1] 1st spindle check range of zero speed(RPM)	R	Maker	**94**
1064	Spindle	[S1] Velocity compensation of spindle 1 rigid tapping	R	Maker	**94**
1065	Spindle	[S1] Acceleration compensation of spindle 1 rigid tapping	R	Maker	**95**
1066	Spindle	[S1] Filter factor of spindle 1 velocity in rigid tapping(0~20)	R	Maker	**95**
1069	Spindle	[S1] Check range of spindle 1 stop in rigid tapping(Pulse)	R	Maker	**96**
1070	Spindle	[S1] Filter factor of spindle 1 acceleration in rigid tapping(0~20)	R	Maker	**96**
1075	Spindle	[S1] Maximum servolag in spindle positioning(Pulse)	R	Maker	**97**
1076	Spindle	[S1] Deceleration time of spindle 1 rigid tapping per 1000RPM(ms)	R	Maker	**97**
1081	Manufacture	[S1] Depth of cut for G71/G72(μ m)	R	End User	**133**
1082	Manufacture	[S1] Escaping amount of G71/G72(μ m)	R	End User	**133**
1083	Manufacture	[S1] Distance of relief in X axis direction(μ m)	R	End User	**134**
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1085	Manufacture	[S1] Count of G73 manufacture	R	End User	**134**
1086	Manufacture	[S1] Return amount of G74/G75(μ m)	R	End User	**134**
1087	Manufacture	[S1] Manufacture count of G76(mm)/chemfering length(rr)(4 digits)	R	End User	**135**
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1095	Spindle	[S1] Home of spindle CH positioning(0.001deg)	R	Maker	**98**
1096	Operation	The Minimum No. Of Waiting M-Code(0:Disable,100~9999)	⊙	End User	**185**
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1098	Origin	[S1] Absolute encoder error range(pulse)	R	Maker	**155**
1099	Manufacture	[S1] Opposite tool distance in G68(μ m)	R	Maker	**136**
1100	Axes	[S1] X axis feedrate for jog(μ m/min)	R	Maker	**74**
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1103	Axes	[S1] 4th axis feedrate for jog(μ m/min)	R	Maker	**74**
1104	Origin	[S1] 1st speed of X axis zero point return(μ m/min)	R	Maker	**155**

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1106	Origin	[S1] 1st speed of Z axis zero point return(μ m/min)	R	Maker	**155**
1107	Origin	[S1] 1st speed of 4th axis zero point return(μ m/min)	R	Maker	**155**
1108	Origin	[S1] 2nd speed of X axis zero point return(μ m/min)	R	Maker	**157**
1109	Origin	[S1] 2nd speed of Y axis zero point return(μ m/min)	R	Maker	**157**
1110	Origin	[S1] 2nd speed of Z axis zero point return(μ m/min)	R	Maker	**157**
1111	Origin	[S1] 2nd speed of 4th axis zero point return(μ m/min)	R	Maker	**157**
1112	Origin	[S1] Local I number of X axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
1113	Origin	[S1] Local I number of Y axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
1114	Origin	[S1] Local I number of Z axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
1115	Origin	[S1] Local I number of 4th axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
1117	Spindle	[S1] Speed of spindle CH positioning(0.001deg/min)	R	Maker	**98**
1118	Spindle	[S1] Enable M code for remote spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
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1121	Spindle	[S1] JOG speed of type 1 of 1st spindle(RPM)	R	Maker	**98**
1122	Spindle	[S1] JOG speed of type 1 of 2nd spindle(RPM)	R	Maker	**98**
1123	Spindle	[S1] JOG speed of type 1 of 3rd spindle(RPM)	R	Maker	**98**
1124	Spindle	[S1] JOG speed of type 2 of 1st spindle(RPM)	R	Maker	**99**
1125	Spindle	[S1] JOG speed of type 2 of 2nd spindle(RPM)	R	Maker	**99**
1126	Spindle	[S1] JOG speed of type 2 of 3rd spindle(RPM)	R	Maker	**99**
1130	Axes	[S1] Superimpose X axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1131	Axes	[S1] Superimpose Y axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1132	Axes	[S1] Superimpose Z axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1133	Axes	[S1]Superimpose 4th axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1135	Axes	[S1] Master axis name of X axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1136	Axes	[S1] Master axis name of Y axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1137	Axes	[S1] Master axis name of Z axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1138	Axes	[S1] Master axis name of 4th axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
1140	Axes	[S1] Direction of X axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
1141	Axes	[S1] Direction of Y axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**

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1142	Axes	[S1] Direction of Z axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
1143	Axes	[S1] Direction of 4th axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
1150	Axes	[S1] Direction of movement of X axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
1151	Axes	[S1] Direction of movement of Y axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
1152	Axes	[S1] Direction of movement of Z axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
1153	Axes	[S1] Direction of movement of 4th axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
1157	Operation	Key code(0:Disable,1:Enable)	⊙	End User	**185**
1158	Operation	Show F2~F12 for function key(0:Disable,1:Enable)	⊙	End User	**185**
1159	Operation	Set read timeout time(sec)		End User	**186**
1160	Operation	[S1] X+ distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
1161	Operation	[S1] X- distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
1162	Operation	[S1] Z+ distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
1163	Operation	[S1] Z- distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
1164	Spindle	[S1] Acc/dec time of spindle 2 rigid tapping	R	Maker	**93**
1165	Spindle	[S1] Acc/dec time of spindle 3 rigid tapping	R	Maker	**93**
1166	Spindle	[S1] Velocity compensation of spindle 2 rigid tapping	R	Maker	**94**
1167	Spindle	[S1] Velocity compensation of spindle 3 rigid tapping	R	Maker	**94**
1168	Spindle	[S1] Acceleration compensation of spindle 2 rigid tapping	R	Maker	**95**
1169	Spindle	[S1] Acceleration compensation of spindle 3 rigid tapping	R	Maker	**95**
1170	Spindle	[S1] Filter factor of spindle 2 velocity in rigid tapping(0~20)	R	Maker	**95**
1171	Spindle	[S1] Filter factor of spindle 3 velocity in rigid tapping(0~20)	R	Maker	**95**
1172	Spindle	[S1] Filter factor of spindle 2 acceleration in rigid tapping(0~20)	R	Maker	**96**
1173	Spindle	[S1] Filter factor of spindle 3 acceleration in rigid tapping(0~20)	R	Maker	**96**
1174	Spindle	[S1] Check range of spindle 2 stop in rigid tapping(Pulse)	R	Maker	**96**
1175	Spindle	[S1] Check range of spindle 3 stop in rigid tapping(Pulse)	R	Maker	**96**
1176	Spindle	[S1] Deceleration time of spindle 2 rigid tapping per 1000RPM(ms)	R	Maker	**97**
1177	Spindle	[S1] Deceleration time of spindle 3 rigid tapping per 1000RPM(ms)	R	Maker	**97**
1201	Spindle	Master axis number of 1st synchronous control(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**99**

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1202	Spindle	Slave axis number of 1st synchronous control(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**99**
1203	Spindle	Master axis encoder pulses per rev of 1st synchronous control(Pulse)	⊙	Maker	**99**
1204	Spindle	Slave axis encoder pulses per rev of 1st synchronous control(Pulse)	⊙	Maker	**99**
1205	Spindle	Tracking direction of 1st synchronous control(0:Same,1:Opposite)	⊙	Maker	**100**
1206	Spindle	Master axis reference point signal of 1st synchronous control(0:Index,1:Sensor)	⊙	Maker	**100**
1207	Spindle	Slave axis reference point signal of 1st synchronous control(0:Index,1:Sensor)	⊙	Maker	**100**
1208	Spindle	Master axis sensor number of 1st synchronous control(1~2:Card1,101~102:Card2)	⊙	Maker	**101**
1209	Spindle	Slave axis sensor number of 1st synchronous control(1~2:Card1,101~102:Card2)	⊙	Maker	**101**
1210	Spindle	Master axis sensor type of 1st synchronous control(0:NC,1:NO)	⊙	Maker	**101**
1211	Spindle	Master axis sensor type of 1st synchronous control(0:NC,1:NO)	⊙	Maker	**101**
1212	Spindle	Control type of 1st synchronous control(0:Simple,1:Tracking)	⊙	Maker	**101**
1213	Spindle	Slave axis command type of 1st synchronous control(0:Pulse,1:Vcmd)	⊙	Maker	**102**
1214	Spindle	Slave axis closed loop gain of 1st synchronous control(1/sec)	R	Maker	**102**
1215	Spindle	Slave axis change command type Kp gain of 1st synchronous control(1/sec)	R	Maker	**102**
1216	Spindle	Slave axis change command type Ki gain of 1st synchronous control(ms)	R	Maker	**103**
1217	Spindle	Slave axis change command type check time of 1st synchronous control(ms)	R	Maker	**103**
1218	Spindle	Slave axis change command type check range of 1st synchronous control(Pulse)	R	Maker	**103**
1219	Spindle	Velocity compensation gain of 1st synchronous control(0~100000)	R	Maker	**104**
1220	Spindle	Acc/Dec compensation gain of 1st synchronous control(-100000~100000)	R	Maker	**104**
1221	Spindle	Velocity compensation filter of 1st synchronous control(0:Disable,1~19)	R	Maker	**104**
1222	Spindle	Acc/Dec compensation filter of 1st synchronous control(0:Disable,1~19)	R	Maker	**104**
1223	Spindle	Synchronous command wait time of 1st synchronous control(ms)	R	Maker	**105**
1224	Spindle	Slave axis Acc/Dec time of 1st synchronous control(ms/1000rpm)	R	Maker	**105**
1225	Spindle	Phase of 1st synchronous phase control(0.001deg)	R	Maker	**105**
1226	Spindle	Reference point velocity of 1st synchronous phase control(0.001deg/ms)	R	Maker	**106**
1227	Spindle	Tracking tolerance of 1st synchronous control(0.001deg)	R	Maker	**106**
1228	Spindle	Finished signal check time of 1st synchronous control(ms)	R	Maker	**106**

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1230	Spindle	Master axis Acc/Dec time when 1st synchronous control finished(ms/1000rpm)	R	Maker	**107**
1231	Spindle	Master axis number of 2nd synchronous control(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**99**
1232	Spindle	Slave axis number of 2nd synchronous control(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**99**
1233	Spindle	Master axis encoder pulses per rev of 2nd synchronous control(Pulse)	⊙	Maker	**99**
1234	Spindle	Slave axis encoder pulses per rev of 2nd synchronous control(Pulse)	⊙	Maker	**99**
1235	Spindle	Tracking direction of 2nd synchronous control(0:Same,1:Opposite)	⊙	Maker	**100**
1236	Spindle	Master axis reference point signal of 2nd synchronous control(0:Index,1:Sensor)	⊙	Maker	**100**
1237	Spindle	Slave axis reference point signal of 2nd synchronous control(0:Index,1:Sensor)	⊙	Maker	**100**
1238	Spindle	Master axis sensor number of 2nd synchronous control(1~2:Card1,101~102:Card2)	⊙	Maker	**101**
1239	Spindle	Slave axis sensor number of 2nd synchronous control(1~2:Card1,101~102:Card2)	⊙	Maker	**101**
1240	Spindle	Master axis sensor type of 2nd synchronous control(0:NC,1:NO)	⊙	Maker	**101**
1241	Spindle	Master axis sensor type of 2nd synchronous control(0:NC,1:NO)	⊙	Maker	**101**
1242	Spindle	Control type of 2nd synchronous control(0:Simple,1:Tracking)	⊙	Maker	**101**
1243	Spindle	Slave axis command type of 2nd synchronous control(0:Pulse,1:Vcmd)	⊙	Maker	**102**
1244	Spindle	Slave axis closed loop gain of 2nd synchronous control(1/sec)	R	Maker	**102**
1245	Spindle	Slave axis change command type Kp gain of 2nd synchronous control(1/sec)	R	Maker	**102**
1246	Spindle	Slave axis change command type Ki gain of 2nd synchronous control(ms)	R	Maker	**103**
1247	Spindle	Slave axis change command type check time of 2nd synchronous control(ms)	R	Maker	**103**
1248	Spindle	Slave axis change command type check range of 2nd synchronous control(Pulse)	R	Maker	**103**
1249	Spindle	Velocity compensation gain of 2nd synchronous control(0~100000)	R	Maker	**104**
1250	Spindle	Acc/Dec compensation gain of 2nd synchronous control(-100000~100000)	R	Maker	**104**
1251	Spindle	Velocity compensation filter of 2nd synchronous control(0:Disable,1~19)	R	Maker	**104**
1252	Spindle	Acc/Dec compensation filter of 2nd synchronous control(0:Disable,1~19)	R	Maker	**104**
1253	Spindle	Synchronous command wait time of 2nd synchronous control(ms)	R	Maker	**105**
1254	Spindle	Slave axis Acc/Dec time of 2nd synchronous control(ms/1000rpm)	R	Maker	**105**
1255	Spindle	Phase of 2nd synchronous phase control(0.001deg)	R	Maker	**105**

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1256	Spindle	Reference point velocity of 2nd synchronous phase control(0.001deg/ms)	R	Maker	**106**
1257	Spindle	Tracking tolerance of 2nd synchronous control(0.001deg)	R	Maker	**106**
1258	Spindle	Finished signal check time of 2nd synchronous control(ms)	R	Maker	**106**
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1260	Spindle	Master axis Acc/Dec time when 2nd synchronous control finished(ms/1000rpm)	R	Maker	**107**
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1262	Spindle	Slave axis number of 3rd synchronous control(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**99**
1263	Spindle	Master axis encoder pulses per rev of 3rd synchronous control(Pulse)	⊙	Maker	**99**
1264	Spindle	Slave axis encoder pulses per rev of 3rd synchronous control(Pulse)	⊙	Maker	**99**
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1270	Spindle	Master axis sensor type of 3rd synchronous control(0:NC,1:NO)	⊙	Maker	**101**
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1285	Spindle	Phase of 3rd synchronous phase control(0.001deg)	R	Maker	**105**
1286	Spindle	Reference point velocity of 3rd synchronous phase control(0.001deg/ms)	R	Maker	**106**
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4935	Hardware	Output maximum of 8th A/D conversion(-4096~4096)	⊙	Maker	**124**
4940	Hardware	COM1 base address(0:Disable,744~1016)	⊙	Maker	**124**
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4942	Hardware	COM1 IRQ number(3~7)	⊙	Maker	**125**
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5003	Axes	[S2] Maximun following error of Y axis(μ m)	R	Maker	**63**
5004	Axes	[S2] Maximun following error of Z axis(μ m)	R	Maker	**63**
5005	Axes	[S2] Maximun following error of 4th axis(μ m)	R	Maker	**63**
5006	Axes	[S2] X axis in-position check window(μ m)	R	Maker	**64**
5007	Axes	[S2] Y axis in-position check window(μ m)	R	Maker	**64**
5008	Axes	[S2] Z axis in-position check window(μ m)	R	Maker	**64**
5009	Axes	[S2] 4th axis in-position check window(μ m)	R	Maker	**64**
5010	Axes	[S2] X axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
5011	Axes	[S2] Y axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
5012	Axes	[S2] Z axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
5013	Axes	[S2] 4th axis rapid travel acc/dec time(ms)	⊙	Maker	**64**
5014	Axes	[S2] G01 acc/dec time(ms)	⊙	Maker	**65**
5016	Spindle	[S2] 1st spindle rotary acc/dec time.(ms/1000rpm)	⊙	Maker	**81**
5018	Axes	[S2] Thred cutting acc/dec time(ms)	⊙	Maker	**65**
5019	Origin	[S2] Deal with zero point return on dog(0:Warning,1:Auto)	R	Maker	**148**
5020	Origin	[S2] Default of return home finish(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**148**
5021	Spindle	[S2] Spindle orientation speed(RPM)	R	Maker	**81**
5030	Origin	[S2] Zero point shift amount of X axis(μ m)	R	Maker	**149**
5031	Origin	[S2] Zero point shift amount of Y axis(μ m)	R	Maker	**149**
5032	Origin	[S2] Zero point shift amount of Z axis(μ m)	R	Maker	**149**
5033	Origin	[S2] Zero point shift amount of 4th axis(μ m/0.001deg)	R	Maker	**149**
5034	Origin	[S2] Pause time of X axis zero point return(10ms)	R	Maker	**149**
5035	Origin	[S2] Pause time of Y axis zero point return(10ms)	R	Maker	**149**
5036	Origin	[S2] Pause time of Z axis zero point return(10ms)	R	Maker	**149**
5037	Origin	[S2] Pause time of 4th axis zero point return(10ms)	R	Maker	**149**
5038	CMP.	[S2] Backlash compensation unit(0:Pulse,1: μ m)	⊙	Maker	**137**
5040	Axes	[S2] Minimum feedrate override of rapid travel(%)	R	End User	**65**
5041	Operation	[S2] G00 linear interpolation(0:No,1:Yes)	R	End User	**160**
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5044	CMP.	[S2] Backlash compensation of X axis(μ m)	R	Maker	**137**
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5046	CMP.	[S2] Backlash compensation of Z axis(μ m)	R	Maker	**137**
5047	CMP.	[S2] Backlash compensation of 4th axis(μ m)	R	Maker	**137**
5048	Origin	[S2] Set zero point by now position(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**150**
5049	Spindle	[S2] 1st spindle 1st gear nember on motor side	⊙	Maker	**82**
5050	Spindle	[S2] 1st spindle 1st gear nember on axis side	⊙	Maker	**83**
5051	Spindle	[S2] 1st spindle 2nd gear nember on motor side	⊙	Maker	**82**
5052	Spindle	[S2] 1st spindle 2nd gear nember on axis side	⊙	Maker	**83**
5062	Axes	[S2] pitch unit of screw(0:mm,1:inch)	⊙	Maker	**66**
5063	Operation	[S2] Set relative coordinate with absolute coordinate(0:No,1:Yes)	R	End User	**161**
5064	Origin	[S2] Dog type(0:NC,1:NO)	⊙	Maker	**150**
5065	Axes	[S2] Enable absolute encoder(bit0~3,X:+1,Y:+2,Z:+4,4th:+8)	⊙	Maker	**66**
5066	Axes	[S2] 4th axis type(0:Rotary 1:Linear)	⊙	Maker	**66**
5068	Axes	[S2] X axis gear number of motor side(Denominator)	⊙	Maker	**67**
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5071	Operation	[S2] Check range of G22(0:Outter,1:Inner)	R	End User	**161**
5072	Axes	[S2] 4th axis gear number of motor side(Denominator)	⊙	Maker	**67**
5073	Operation	[S2] Enable acc/dec funciton of G31(0:No,1:Yes)	⊙	Maker	**161**
5074	Operation	[S2] Enable macro trace under single block(0:No,1:Yes)	R	End User	**162**
5076	Origin	[S2] Set absolute coordinate after zero point return(0:No,1:Yes)	R	Maker	**150**
5077	Origin	[S2] G00 operation without zero point return(0:Disable,1:Enable)	R	End User	**151**
5079	Origin	[S2] X axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)	R	Maker	**151**
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5083	Operation	[S2] Enable G00 under dry run(0:Disable,1:Enable)	R	End User	**162**
5084	Spindle	[S2] Orientation by (0:Sensor,1:Encoder)	R	Maker	**84**
5089	Operation	[S2] M code of part counter	R	End User	**163**
5090	Spindle	[S2] 1st spindle display type of speed(0:Command,1:Actual)		Maker	**84**
5091	Operation	[S2] 4th axis feedrate merge into HMi disaply(0:Yes,1:No)	R	Maker	**163**
5095	Spindle	[S2] Minimun speed of 1st spindle(RPM)	R	Maker	**85**

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5100	Axes	[S2] X axis gear number of screw side(Numeerator)	⊙	Maker	**68**
5101	Axes	[S2] Y axis gear number of screw side(Numeerator)	⊙	Maker	**68**
5102	Axes	[S2] Z axis gear number of screw side(Numeerator)	⊙	Maker	**68**
5103	Axes	[S2] 4th axis gear number of screw side(Numeerator)	⊙	Maker	**68**
5104	Axes	[S2] X axis pitch of screw(μ m)	⊙	Maker	**68**
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5119	CMP.	[S2] Enable pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)	⊙	Maker	**139**
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5122	Operation	[S2] Name od 4th axis(0:A,1:B,2:C,3:U,4:V,5:W)	⊙	Maker	**164**
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5127	Manufacture	[S2] Digits of T code(0:4 digits,1:2 digits)	R	Maker	**127**
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5147	Operation	[S2] M code of calling macro O9002	R	Maker	**167**
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5155	Operation	[S2] Feedrate unit of system(0:mm/rev,1:mm/min)	⊙	End User	**169**
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5180	Operation	[S2] Enable manual return(0:Disable,1:Enable)	R	End User	**172**
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5184	Spindle	[S2] Sensor number for spindle orientation(1~2:Card1,101~102:Card2)	R	Maker	**86**
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5188	Axes	[S2] Position loop gain for feedrate clamping of arc(1/s)	R	Maker	**71**
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5198	Manufacture	[S2] Retract chamfering length of G78(G92)(0.1 pitch)	R	End User	**130**
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5211	Operation	[S2] Stop preinterpreter M code 1	R	End User	**173**
5212	Operation	[S2] Stop preinterpreter M code 2	R	End User	**173**
5213	Operation	[S2] Stop preinterpreter M code 3	R	End User	**173**
5214	Operation	[S2] Stop preinterpreter M code 4	R	End User	**173**
5215	Operation	[S2] Stop preinterpreter M code 5	R	End User	**173**
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5217	Operation	[S2] Stop preinterpreter M code 7	R	End User	**173**
5218	Operation	[S2] Stop preinterpreter M code 8	R	End User	**173**
5219	Operation	[S2] Stop preinterpreter M code 9	R	End User	**173**
5220	Operation	[S2] Stop preinterpreter M code 10	R	End User	**173**
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5232	Operation	[S2] Information of Y axis hide(0:No,1:Yes)		Maker	**174**
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5236	Operation	[S2] Contact type of G31 P3(0:NC,1:NO)	R	Maker	**171**
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5243	Operation	[S2] Local port NO for G31 P3(0:Disable,1~8:Card1,101~108:Card2)	R	Maker	**171**
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5299	Spindle	[S2] 2nd spindle check range of zero speed(RPM)	R	Maker	**94**
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5353	Operation	[S2] Rapid traverse override unit of knob(0:4 section,1:1%)	⊙	Maker	**176**
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5356	Spindle	[S2] 3rd spindle override unit(0:10%,1:1%)	⊙	Maker	**88**
5357	Spindle	[S2] Bell-shape acc/dec time of 1st spindle(ms)	⊙	Maker	**88**
5358	Spindle	[S2] Bell-shape acc/dec time of 2nd spindle(ms)	⊙	Maker	**88**
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5400	Operation	[S1] G code of calling macro O9018	R	Maker	**169**
5401	Operation	[S1] G code of calling macro O9019	R	Maker	**169**
5500	Operation	[S2] Positive direction value of X axis for 1st soft no go area(μ m)	R	Maker	**180**
5501	Operation	[S2] Negative direction value of X axis for 1st soft no go area(μ m)	R	Maker	**180**
5502	Operation	[S2] Positive direction value of Y axis for 1st soft no go area(μ m)	R	Maker	**180**
5503	Operation	[S2] Negative direction value of Y axis for 1st soft no go area(μ m)	R	Maker	**180**
5504	Operation	[S2] Positive direction value of Z axis for 1st soft no go area(μ m)	R	Maker	**180**
5505	Operation	[S2] Negative direction value of Z axis for 1st soft no go area(μ m)	R	Maker	**180**
5506	Operation	[S2] Positive direction value of 4th axis for 1st soft no go area(μ m)	R	Maker	**180**
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5512	Operation	[S2] Positive direction value of X axis for 2nd soft no go area(μ m)	R	Maker	**180**
5513	Operation	[S2] Negative direction value of X axis for 2nd soft no go area(μ m)	R	Maker	**180**
5514	Operation	[S2] Positive direction value of Y axis for 2nd soft no go area(μ m)	R	Maker	**180**
5515	Operation	[S2] Negative direction value of Y axis for 2nd soft no go area(μ m)	R	Maker	**180**
5516	Operation	[S2] Positive direction value of Z axis for 2nd soft no go area(μ m)	R	Maker	**180**
5517	Operation	[S2] Negative direction value of Z axis for 2nd soft no go area(μ m)	R	Maker	**180**

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5545	Axes	[S2] Y axis handle Acc/Dec time(ms)	⊙	Maker	**71**
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5552	Axes	[S2] Z axis handle max feedrate(μ m/min)	R	Maker	**72**
5553	Axes	[S2] 4th axis handle max feedrate(μ m/min)	R	Maker	**72**
5663	Spindle	[S2] Acc/dec time for spindle positioning(ms)	⊙	Maker	**88**
5664	Spindle	[S2] 2nd spindle 1st gear nember on motor side	⊙	Maker	**82**
5665	Spindle	[S2] 2nd spindle 1st gear nember on axis side	⊙	Maker	**83**
5666	Spindle	[S2] 2nd spindle 2nd gear nember on motor side	⊙	Maker	**82**
5667	Spindle	[S2] 2nd spindle 2nd gear nember on axis side	⊙	Maker	**83**
5668	Spindle	[S2] 2nd spindle 3rd gear nember on motor side	⊙	Maker	**82**
5669	Spindle	[S2] 2nd spindle 3rd gear nember on axis side	⊙	Maker	**83**
5670	Spindle	[S2] 2nd spindle 4th gear nember on motor side	⊙	Maker	**82**
5671	Spindle	[S2] 2nd spindle 4th gear nember on axis side	⊙	Maker	**83**
5672	Spindle	[S2] 3rd spindle 1st gear nember on motor side	⊙	Maker	**82**
5673	Spindle	[S2] 3rd spindle 1st gear nember on axis side	⊙	Maker	**83**
5674	Spindle	[S2] 3rd spindle 2nd gear nember on motor side	⊙	Maker	**82**
5675	Spindle	[S2] 3rd spindle 2nd gear nember on axis side	⊙	Maker	**83**
5676	Spindle	[S2] 3rd spindle 3rd gear nember on motor side	⊙	Maker	**82**
5677	Spindle	[S2] 3rd spindle 3rd gear nember on axis side	⊙	Maker	**83**
5678	Spindle	[S2] 3rd spindle 4th gear nember on motor side	⊙	Maker	**82**
5679	Spindle	[S2] 3rd spindle 4th gear nember on axis side	⊙	Maker	**83**
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5681	Spindle	[S1] Number of 1st spindle counterclockwise M code	⊙	Maker	**89**
5682	Spindle	[S1] Number of 1st spindle stop M code	⊙	Maker	**89**
5683	Spindle	[S1] Number of 1st spindle clockwise M code	⊙	Maker	**89**
5684	Spindle	[S1] Number of 1st spindle counterclockwise M code	⊙	Maker	**89**
5685	Spindle	[S1] Number of 1st spindle stop M code	⊙	Maker	**89**

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5686	Spindle	[S1] Number of 1st spindle clockwise M code	⊙	Maker	**89**
5687	Spindle	[S1] Number of spindle counterclockwise M code	⊙	Maker	**89**
5688	Spindle	[S1] Number of spindle stop M code	⊙	Maker	**89**
5689	Spindle	[S1] Number of remote 1st spindle clockwise M code	⊙	Maker	**89**
5690	Spindle	[S1] Number of remote spindle counterclockwise M code	⊙	Maker	**89**
5691	Spindle	[S1] Number of remote spindle stop M code	⊙	Maker	**89**
5692	Spindle	[S1] Number of remote 1st spindle clockwise M code	⊙	Maker	**89**
5693	Spindle	[S1] Number of remote spindle counterclockwise M code	⊙	Maker	**89**
5694	Spindle	[S1] Number of remote spindle stop M code	⊙	Maker	**89**
5695	Spindle	[S1] Number of remote 1st spindle clockwise M code	⊙	Maker	**89**
5696	Spindle	[S1] Number of remote spindle counterclockwise M code	⊙	Maker	**89**
5697	Spindle	[S1] Number of remote spindle stop M code	⊙	Maker	**89**
5800	Axes	[S2] X axis rapid travel in-position check windows(μ m)	R	Maker	**72**
5801	Axes	[S2] Y axis rapid travel in-position check windows(μ m)	R	Maker	**72**
5802	Axes	[S2] Z axis rapid travel in-position check windows(μ m)	R	Maker	**72**
5803	Axes	[S2] 4th axis rapid travel in-position check windows(μ m)	R	Maker	**72**
5806	Manufacture	[S2] Maximum error amount during corner cutting(μ m)	R	End User	**131**
5808	Manufacture	[S2] Automatic corner override(0:Disable,1:Enable)	R	End User	**131**
5809	Manufacture	[S2] Maximum circle/arc contour error(μ m)	R	End User	**131**
5810	Spindle	[S2] Spindle position check time(ms)	R	Maker	**90**
5811	CMP.	[S2] Set G code of spike compensation(0:G2G3,1:all)	R	Maker	**140**
5812	CMP.	[S2] Spike compensation value of X axis in positive moving(μ m)	R	Maker	**141**
5813	CMP.	[S2] Spike compensation time of X axis in positive moving	R	Maker	**141**
5814	CMP.	[S2] Delay time of X axis spike compensation in positive moving	R	Maker	**142**
5815	CMP.	[S2] Spike compensation value of X axis in negative moving(μ m)	R	Maker	**142**
5816	CMP.	[S2] Spike compensation time of X axis in negative moving	R	Maker	**143**
5817	CMP.	[S2] Delay time of X axis spike compensation in negative moving	R	Maker	**143**
5818	CMP.	[S2] Spike compensation value of Y axis in positive moving(μ m)	R	Maker	**141**
5819	CMP.	[S2] Spike compensation time of Y axis in positive moving	R	Maker	**141**
5820	CMP.	[S2] Delay time of Y axis spike compensation in positive moving	R	Maker	**142**
5825	CMP.	[S2] Spike compensation value of Y axis in negative moving(μ m)	R	Maker	**142**

No.	Type	Description	Active	Level	Page
5826	CMP.	[S2] Spike compensation time of Y axis in negative moving	R	Maker	**143**
5827	CMP.	[S2] Delay time of Y axis spike compensation in negative moving	R	Maker	**143**
5828	CMP.	[S2] Spike compensation value of Z axis in positive moving(μ m)	R	Maker	**141**
5829	CMP.	[S2] Spike compensation time of Z axis in positive moving	R	Maker	**141**
5830	CMP.	[S2] Delay time of Z axis spike compensation in positive moving	R	Maker	**142**
5831	CMP.	[S2] Spike compensation value of Z axis in negative moving(μ m)	R	Maker	**142**
5832	CMP.	[S2] Spike compensation time of Z axis in negative moving	R	Maker	**143**
5833	CMP.	[S2] Delay time of Z axis spike compensation in negative moving	R	Maker	**143**
5834	Origin	[S2] Access time of absolute encoder(sec)	R	Maker	**153**
5835	Spindle	[S2] Enable M code for spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
5836	Spindle	[S2] Release M code for spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
5837	Spindle	[S2] The start M code for spindle positioning(0:Disable,1~10000)	⊙	Maker	**91**
5838	Spindle	[S2] Number of M code for spindle positioining(1~10000)	R	Maker	**91**
5839	Spindle	[S2] Tolerance for spindle positioning(0.001deg)	R	Maker	**91**
5840	CMP.	[S2] Enable X axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
5841	CMP.	[S2] Saturation time of X axis in TDC(sec)	⊙	Maker	**144**
5842	CMP.	[S2] Total compensation value of X axis in TDC(μ m)	⊙	Maker	**145**
5843	CMP.	[S2] Restored time of X axis in TDC(sec)	⊙	Maker	**145**
5851	CMP.	[S2] Enable Y axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
5852	CMP.	[S2] Saturation time of Y axis in TDC(sec)	⊙	Maker	**144**
5853	CMP.	[S2] Total compensation value of Y axis in TDC(μ m)	⊙	Maker	**145**
5854	CMP.	[S2] Restored time of Y axis in TDC(sec)	⊙	Maker	**145**
5856	CMP.	[S2] Enable Z axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
5857	CMP.	[S2] Saturation time of Z axis in TDC(sec)	⊙	Maker	**144**
5858	CMP.	[S2] Total compensation value of Z axis in TDC(μ m)	⊙	Maker	**145**
5859	CMP.	[S2] Restored time of Z axis in TDC(sec)	⊙	Maker	**145**
5861	CMP.	[S2] Enable 4th axis TDC function(0:Disable,1:Enable)	⊙	Maker	**144**
5862	CMP.	[S2] Saturation time of 4th axis in TDC(sec)	⊙	Maker	**144**
5863	CMP.	[S2] Total compensation value of 4th axis in TDC(μ m)	⊙	Maker	**145**
5864	CMP.	[S2] Restored time of 4th axis in TDC(sec)	⊙	Maker	**145**

No.	Type	Description	Active	Level	Page
5866	Operation	[S2] Local input port number for measuring(1~2:Card1,101~102:Card2)	R	Maker	**181**
5867	Operation	[S2] Sensor type for measuring(0:NC,1:NO)	R	Maker	**181**
5868	Operation	[S2] Tool offset number for measuring(0~30)	R	End User	**182**
5869	Operation	[S2] Enable axis acc\dec function for measuring(0:No,1:Yes)	⊙	Maker	**182**
5870	Operation	[S2] Use cutting signal(0:NO,1:YES)	R	Maker	**182**
5871	Operation	[S2] Waitting time for using cutting signal(ms)	R	Maker	**183**
5872	Manufacture	[S2] Plunge rate ratio of G78(G92)	R	Maker	**132**
5873	Manufacture	[S2] Retract rate ratio of G78(G92)	R	Maker	**132**
5875	Spindle	[S2] 2nd spindle init. speed(RPM)	⊙	End User	**87**
5876	Spindle	[S2] Maximun speed of 2nd spindle(RPM)	R	Maker	**85**
5877	Spindle	[S2] Minimun speed of 2nd spindle(RPM)	R	Maker	**85**
5878	Spindle	[S2] 3rd spindle init. speed(RPM)	⊙	End User	**87**
5879	Spindle	[S2] Maximun speed of 3rd spindle(RPM)	R	Maker	**85**
5880	Spindle	[S2] Minimun speed of 3rd spindle(RPM)	R	Maker	**85**
5881	Spindle	[S2] 3rd spindle speed arrival range(RPM)	R	Maker	**92**
5882	Spindle	[S2] 3rd spindle check range of zero speed(RPM)	R	Maker	**94**
5884	Spindle	[S2] 2nd spindle offset of output voltage (0.3mV/unit)	R	Maker	**85**
5885	Spindle	[S2] 2nd spindle rotary acc/dec time.(ms/1000rpm)	⊙	Maker	**81**
5887	Spindle	[S2] 3rd spindle offset of output voltage (0.3mV/unit)	R	Maker	**85**
5888	Spindle	[S2] 3rd spindle rotary acc/dec time.(ms/1000rpm)	⊙	Maker	**81**
5892	Spindle	[S2] 2nd spindle encoder mount(0:Spindle side,1:Motor side)	⊙	Maker	**86**
5896	Spindle	[S2] 3rd spindle encoder mount(0:Spindle side,1:Motor side)	⊙	Maker	**86**
5897	Spindle	[S2] 2nd spindle display type of speed(0:Command,1:Actual)		Maker	**84**
5898	Spindle	[S2] 3rd spindle display type of speed(0:Command,1:Actual)		Maker	**84**
5899	Operation	[S2] use CE rule(0:No,1:Yes)	R	Maker	**183**
5900	CMP.	[S2] Spike compensation value of 4th axis in positive moving(μ m)	R	Maker	**141**
5901	CMP.	[S2] Spike compensation time of 4th axis in positive moving	R	Maker	**141**
5902	CMP.	[S2] Delay time of 4th axis spike compensation in positive moving	R	Maker	**142**
5903	CMP.	[S2] Spike compensation value of 4th axis in negative moving(μ m)	R	Maker	**142**
5904	CMP.	[S2] Spike compensation time of 4th axis in negative moving	R	Maker	**143**
5905	CMP.	[S2] Delay time of 4th axis spike compensation in negative moving	R	Maker	**143**

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6000	Axes	[S2] X axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
6001	Axes	[S2] Y axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
6002	Axes	[S2] Z axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
6003	Axes	[S2] 4th axis maximum feedrate for rapid travel(μ m/min)	R	Maker	**73**
6004	Axes	[S2] The maximum feedrate for cutting(μ m/min)	R	Maker	**73**
6006	Operation	[S2] 1st soft limit positive direction value of X axis(μ m)	R	Maker	**184**
6007	Operation	[S2] 1st soft limit negative direction value of X axis(μ m)	R	Maker	**184**
6008	Operation	[S2] 1st soft limit positive direction value of Y axis(μ m)	R	Maker	**184**
6009	Operation	[S2] 1st soft limit negative direction value of Y axis(μ m)	R	Maker	**184**
6010	Operation	[S2] 1st soft limit positive direction value of Z axis(μ m)	R	Maker	**184**
6011	Operation	[S2] 1st soft limit negative direction value of Z axis(μ m)	R	Maker	**184**
6012	Operation	[S2] 1st soft limit positive direction value of 4th axis(μ m)	R	Maker	**184**
6013	Operation	[S2] 1st soft limit negative direction value of 4th axis(μ m)	R	Maker	**184**
6014	Origin	[S2] Absolute coordinate of X axis after zero point return(μ m)	R	Maker	**153**
6015	Origin	[S2] Absolute coordinate of Y axis after zero point return(μ m)	R	Maker	**153**
6016	Origin	[S2] Absolute coordinate of Z axis after zero point return(μ m)	R	Maker	**153**
6017	Origin	[S2] Absolute coordinate of 4th axis after zero point return(μ m)	R	Maker	**153**
6018	CMP.	[S2] Length of each section for X axis pitch error compensation(μ m)	⊙	Maker	**146**
6019	CMP.	[S2] Length of each section for Y axis pitch error compensation(μ m)	⊙	Maker	**146**
6020	CMP.	[S2] Length of each section for X axis pitch error compensation(μ m)	⊙	Maker	**146**
6021	CMP.	[S2] Length of each section for 4th axis pitch error compensation(μ m)	⊙	Maker	**146**
6022	Origin	[S2] Shift amount of X axis from 2nd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**
6023	Origin	[S2] Shift amount of Y axis from 2nd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**
6024	Origin	[S2] Shift amount of Z axis from 2nd zero point to 1st zero point(μ m)	R	Maker	**154**
6025	Origin	[S2] Shift amount of 4th axis from 2nd zero point to 1st zero point(μ m)	R	Maker	**154**
6026	Origin	[S2] Shift amount of X axis from 3rd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**
6027	Origin	[S2] Shift amount of Y axis from 3rd zero point to 1st zero point(radius)(μ m)	R	Maker	**154**
6028	Origin	[S2] Shift amount of Z axis from 3rd zero point to 1st zero point(μ m)	R	Maker	**154**

No.	Type	Description	Active	Level	Page
6029	Origin	[S2] Shift amount of 4th axis from 3rd zero point to 1st zero point(μ m)	R	Maker	**154**
6030	Origin	[S2] Shift amount of X axis from 4th zero point to 1st zero point(radius)(μ m)	R	Maker	**155**
6031	Origin	[S2] Shift amount of Y axis from 4th zero point to 1st zero point(radius)(μ m)	R	Maker	**155**
6032	Origin	[S2] Shift amount of Z axis from 4th zero point to 1st zero point(μ m)	R	Maker	**155**
6033	Origin	[S2] Shift amount of 4th axis from 4th zero point to 1st zero point(μ m)	R	Maker	**155**
6034	Operation	[S2] 2nd soft limit positive direction value of X axis(μ m)	R	Maker	**184**
6035	Operation	[S2] 2nd soft limit negative direction value of X axis(μ m)	R	Maker	**184**
6036	Operation	[S2] 2nd soft limit positive direction value of Y axis(μ m)	R	Maker	**184**
6037	Operation	[S2] 2nd soft limit negative direction value of Y axis(μ m)	R	Maker	**184**
6038	Operation	[S2] 2nd soft limit positive direction value of Z axis(μ m)	R	Maker	**184**
6039	Operation	[S2] 2nd soft limit negative direction value of Z axis(μ m)	R	Maker	**184**
6040	Operation	[S2] 2nd soft limit positive direction value of 4th axis(μ m)	R	Maker	**184**
6041	Operation	[S2] 2nd soft limit negative direction value of 4th axis(μ m)	R	Maker	**184**
6042	Axes	[S2] G31 initial feedrate(μ m/min)	R	Maker	**73**
6043	Manufacture	[S2] G83 drilling(0:High,1:Normal)		End User	**132**
6044	Manufacture	[S2] G87 drilling(0:High,1:Normal)		End User	**133**
6045	Manufacture	[S2] G83~G89 P2 pause time(ms)		End User	**133**
6046	CMP.	[S2] Start position of X axis pitch error compensation(μ m)	⊙	Maker	**146**
6047	CMP.	[S2] Start position of Y axis pitch error compensation(μ m)	⊙	Maker	**146**
6048	CMP.	[S2] Start position of Z axis pitch error compensation(μ m)	⊙	Maker	**146**
6049	CMP.	[S2] Start position of 4th axis pitch error compensation(μ m)	⊙	Maker	**146**
6054	Spindle	[S2] 1st spindle speed arrival range(RPM)	R	Maker	**92**
6056	Spindle	[S2] The offset angle for spindle orientation(0.001deg)	R	Maker	**92**
6059	Spindle	[S2] Acc/dec time of spindle 1 rigid tapping	R	Maker	**93**
6061	Axes	[S2] The maximum feedrate of thread cutting(μ m/min)	R	Maker	**74**
6062	Spindle	[S2] Basic angle for spindle semi-fix positioning(0.001deg)	R	Maker	**93**
6063	Spindle	[S2] 1st spindle check range of zero speed(RPM)	R	Maker	**94**
6064	Spindle	[S2] Velocity compensation of spindle 1 rigid tapping	R	Maker	**94**
6065	Spindle	[S2] Acceleration compensation of spindle 1 rigid tapping	R	Maker	**95**

No.	Type	Description	Active	Level	Page
6066	Spindle	[S2] Filter factor of spindle 1 velocity in rigid tapping(0~20)	R	Maker	**95**
6069	Spindle	[S2] Check range of spindle 1 stop in rigid tapping(Pulse)	R	Maker	**96**
6070	Spindle	[S2] Filter factor of spindle 1 acceleration in rigid tapping(0~20)	R	Maker	**96**
6075	Spindle	[S2] Maximum servolag in spindle positioning(Pulse)	R	Maker	**97**
6076	Spindle	[S2] Deceleration time of spindle 1 rigid tapping per 1000RPM(ms)	R	Maker	**97**
6081	Manufacture	[S2] Depth of cut for G71/G72(μ m)	R	End User	**133**
6082	Manufacture	[S2] Escaping amount of G71/G72(μ m)	R	End User	**133**
6083	Manufacture	[S2] Distance of relief in X axis direction(μ m)	R	End User	**134**
6084	Manufacture	[S2] Distance of relief in Z axis direction(μ m)	R	End User	**134**
6085	Manufacture	[S2] Count of G73 manufacture	R	End User	**134**
6086	Manufacture	[S2] Return amount of G74/G75(μ m)	R	End User	**134**
6087	Manufacture	[S2] Manufacture count of G76(mm)/chemfering length(rr)(4 digits)	R	End User	**135**
6088	Manufacture	[S2] Tool nose angle for G76(Degree)	R	End User	**135**
6089	Manufacture	[S2] Minimum cutting depth for for G76(μ m)	R	End User	**135**
6090	Manufacture	[S2] Allowed error amount of G76(μ m)	R	End User	**135**
6095	Spindle	[S2] Home of spindle CH positioning(0.001deg)	R	Maker	**98**
6098	Origin	[S2] Absolute encoder error range(pulse)	R	Maker	**155**
6099	Manufacture	[S2] Opposite tool distance in G68(μ m)	R	Maker	**136**
6100	Axes	[S2] X axis feedrate for jog(μ m/min)	R	Maker	**74**
6101	Axes	[S2] Y axis feedrate for jog(μ m/min)	R	Maker	**74**
6102	Axes	[S2] Z axis feedrate for jog(μ m/min)	R	Maker	**74**
6103	Axes	[S2] 4th axis feedrate for jog(μ m/min)	R	Maker	**74**
6104	Origin	[S2] 1st speed of X axis zero point return(μ m/min)	R	Maker	**155**
6105	Origin	[S2] 1st speed of Y axis zero point return(μ m/min)	R	Maker	**155**
6106	Origin	[S2] 1st speed of Z axis zero point return(μ m/min)	R	Maker	**155**
6107	Origin	[S2] 1st speed of 4th axis zero point return(μ m/min)	R	Maker	**155**
6108	Origin	[S2] 2nd speed of X axis zero point return(μ m/min)	R	Maker	**157**
6109	Origin	[S2] 2nd speed of Y axis zero point return(μ m/min)	R	Maker	**157**
6110	Origin	[S2] 2nd speed of Z axis zero point return(μ m/min)	R	Maker	**157**
6111	Origin	[S2] 2nd speed of 4th axis zero point return(μ m/min)	R	Maker	**157**
6112	Origin	[S2] Local I number of X axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
6113	Origin	[S2] Local I number of Y axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**

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6114	Origin	[S2] Local I number of Z axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
6115	Origin	[S2] Local I number of 4th axis DOG(1~28:Card1,101~128:Card2)	⊙	Maker	**157**
6117	Spindle	[S2] Speed of spindle CH positioning(0.001deg/min)	R	Maker	**98**
6118	Spindle	[S2] Enable M code for remote spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
6119	Spindle	[S2] Release M code for remote spindle CH positioning(0:Disable,1~10000)	⊙	Maker	**90**
6121	Spindle	[S2] JOG speed of type 1 of 1st spindle(RPM)	R	Maker	**98**
6122	Spindle	[S2] JOG speed of type 1 of 2nd spindle(RPM)	R	Maker	**98**
6123	Spindle	[S2] JOG speed of type 1 of 3rd spindle(RPM)	R	Maker	**98**
6124	Spindle	[S2] JOG speed of type 2 of 1st spindle(RPM)	R	Maker	**99**
6125	Spindle	[S2] JOG speed of type 2 of 2nd spindle(RPM)	R	Maker	**99**
6126	Spindle	[S2] JOG speed of type 2 of 3rd spindle(RPM)	R	Maker	**99**
6130	Axes	[S2] Superimpose X axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6131	Axes	[S2] Superimpose Y axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6132	Axes	[S2] Superimpose Z axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6133	Axes	[S2]Superimpose 4th axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6135	Axes	[S2] Master axis name of X axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6136	Axes	[S2] Master axis name of Y axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6137	Axes	[S2] Master axis name of Z axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6138	Axes	[S2] Master axis name of 4th axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)	⊙	Maker	**75**
6140	Axes	[S2] Direction of X axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
6141	Axes	[S2] Direction of Y axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
6142	Axes	[S2] Direction of Z axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
6143	Axes	[S2] Direction of 4th axis synchronous control(0:Same,1:Inverse)	⊙	Maker	**76**
6150	Axes	[S2] Direction of movement of X axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
6151	Axes	[S2] Direction of movement of Y axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
6152	Axes	[S2] Direction of movement of Z axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
6153	Axes	[S2] Direction of movement of 4th axis in superimposed control(0:Same,1:Inverse)	⊙	Maker	**76**
6160	Operation	[S2] X+ distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**

No.	Type	Description	Active	Level	Page
6161	Operation	[S2] X- distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
6162	Operation	[S2] Z+ distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
6163	Operation	[S2] Z- distance from mechanical origin to workpiece surface(μ m)	R	Maker	**186**
6164	Spindle	[S2] Acc/dec time of spindle 2 rigid tapping	R	Maker	**93**
6165	Spindle	[S2] Acc/dec time of spindle 3 rigid tapping	R	Maker	**93**
6166	Spindle	[S2] Velocity compensation of spindle 2 rigid tapping	R	Maker	**94**
6167	Spindle	[S2] Velocity compensation of spindle 3 rigid tapping	R	Maker	**94**
6168	Spindle	[S2] Acceleration compensation of spindle 2 rigid tapping	R	Maker	**95**
6169	Spindle	[S2] Acceleration compensation of spindle 3 rigid tapping	R	Maker	**95**
6170	Spindle	[S2] Filter factor of spindle 2 velocity in rigid tapping(0~20)	R	Maker	**95**
6171	Spindle	[S2] Filter factor of spindle 3 velocity in rigid tapping(0~20)	R	Maker	**95**
6172	Spindle	[S2] Filter factor of spindle 2 acceleration in rigid tapping(0~20)	R	Maker	**96**
6173	Spindle	[S2] Filter factor of spindle 3 acceleration in rigid tapping(0~20)	R	Maker	**96**
6174	Spindle	[S2] Check range of spindle 2 stop in rigid tapping(Pulse)	R	Maker	**96**
6176	Spindle	[S2] Deceleration time of spindle 2 rigid tapping per 1000RPM(ms)	R	Maker	**97**
6177	Spindle	[S2] Deceleration time of spindle 3 rigid tapping per 1000RPM(ms)	R	Maker	**97**
6304	Axes	[S2]Is work coordinate auto setting when switch to composite control(0:No,1:Yes)	⊙	Maker	**77**
6305	Axes	Value rel. ref. point of X1 to work coord. of X2 when into C.C.(μ m)	R	Maker	**77**
6306	Axes	Value rel. ref. point of Y1 to work coord. of Y2 when into C.C.(μ m)	R	Maker	**77**
6307	Axes	Value rel. ref. point of Z1 to work coord. of Z2 when into C.C.(μ m)	R	Maker	**77**
6308	Axes	Value rel. ref. point of [S1]4th to work coord. of [S2]4th when into C.C.(μ m)	R	Maker	**77**
6309	Axes	[S2] The direction of X1 and X2 when composite control(0:Same,1:Reverse)	R	Maker	**78**
6310	Axes	[S2] The direction of Y1 and Y2 when composite control(0:Same,1:Reverse)	R	Maker	**78**
6311	Axes	[S2] The direction of Z1 and Z2 when composite control(0:Same,1:Reverse)	R	Maker	**78**
6312	Axes	[S2] The direction of [S1]4th and [S2] when composite control(0:Same,1: Reverse)	R	Maker	**78**
6400	Axes	[S2] Proportion axis(0:Disable,1:Enable)	⊙	Maker	**78**
6412	Axes	[S2] X axis address for servo communication(-1:Disable,0~15)	⊙	Maker	**79**
6413	Axes	[S2] Y axis address for servo communication(-1:Disable,0~15)	⊙	Maker	**79**

No.	Type	Description	Active	Level	Page
6414	Axes	[S2] Z axis address for servo communication(-1:Disable,0~15)	⊙	Maker	**79**
6415	Axes	[S2] 4th axis address for servo communication(-1:Disable,0~15)	⊙	Maker	**79**
6418	Axes	[S2] Maximun following error in static X axis(μ m)	R	Maker	**79**
6419	Axes	[S2] Maximun following error in static Y axis(μ m)	R	Maker	**79**
6420	Axes	[S2] Maximun following error in static Z axis(μ m)	R	Maker	**79**
6421	Axes	[S2] Maximun following error in static 4th axis(μ m/0.001deg)	R	Maker	**79**
7000	Axes	[S2] X axis max. feedrate for rapid travel in superimpose control(μ m/min)	R	Maker	**80**
7001	Axes	[S2] Y axis max. feedrate for rapid travel in superimpose control(μ m/min)	R	Maker	**80**
7002	Axes	[S2] Z axis max. feedrate for rapid travel in superimpose control(μ m/min)	R	Maker	**80**
7003	Axes	[S2] 4th axis max. feedrate for rapid travel in superimpose control(μ m/min)	R	Maker	**80**
7004	Axes	[S2] The maximum feedrate for cutting in superimpose control(μ m/min)	R	Maker	**80**
7051	Origin	[S2] REF. type of X axis(0:Index,1:Sensor)	⊙	Maker	**158**
7052	Origin	[S2] REF. type of Y axis(0:Index,1:Sensor)	⊙	Maker	**158**
7053	Origin	[S2] REF. type of Z axis(0:Index,1:Sensor)	⊙	Maker	**158**
7054	Origin	[S2] REF. type of 4th axis(0:Index,1:Sensor)	⊙	Maker	**158**
7055	Origin	[S2] REF. type of X axis(0:NC,1:NO)	⊙	Maker	**158**
7056	Origin	[S2] REF. type of Y axis(0:NC,1:NO)	⊙	Maker	**158**
7057	Origin	[S2] REF. type of Z axis(0:NC,1:NO)	⊙	Maker	**158**
7058	Origin	[S2] REF. type of 4th axis(0:NC,1:NO)	⊙	Maker	**158**
7059	Origin	[S2] REF. local I number of X axis(1~2:Card1,101~102:Card2)	⊙	Maker	**159**
7060	Origin	[S2] REF. local I number of Y axis(1~2:Card1,101~102:Card2)	⊙	Maker	**159**
7061	Origin	[S2] REF. local I number of Z axis(1~2:Card1,101~102:Card2)	⊙	Maker	**159**
7062	Origin	[S2] REF. local I number of 4th axis(1~2:Card1,101~102:Card2)	⊙	Maker	**159**
7175	Spindle	[S2] Check range of spindle 3 stop in rigid tapping(Pulse)	R	Maker	**96**
8001 ~ 8200	CMP.	[S2] Compensation value of X axis 1st~200th section pitch error(μ m)	R	Maker	**146**
8201 ~ 8400	CMP.	[S2] Compensation value of Y axis 1st~200th section pitch error(μ m)	R	Maker	**147**
8401 ~ 8600	CMP.	[S2] Compensation value of Z axis 1st~200th section pitch error(μ m)	R	Maker	**147**
8601 ~ 8800	CMP.	[S2] Compensation value of 4th axis 1st~200th section pitch error(μ m)	R	Maker	**147**
9010	Hardware	[S2] Channel no for X axis(0:Disable,1~6:Card1,11~16:Card2)	⊙	Maker	**111**

No.	Type	Description	Active	Level	Page
9011	Hardware	[S2] Channel no for Y axis(0:Disable,1~6:Card1,11~16:Card2)	⊙	Maker	111
9012	Hardware	[S2] Channel no for Z axis(0:Disable,1~6:Card1,11~16:Card2)	⊙	Maker	111
9013	Hardware	[S2] Channel no for 4th axis(0:Disable,1~6:Card1,11~16:Card2)	⊙	Maker	111
9030	Hardware	[S2] X axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)	⊙	Maker	111
9031	Hardware	[S2] Y axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)	⊙	Maker	111
9032	Hardware	[S2] Z axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)	⊙	Maker	111
9033	Hardware	[S2] 4th axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)	⊙	Maker	111
9040	Hardware	[S2] X axis pulse command inverse(0:No,1:Yes)	⊙	Maker	112
9041	Hardware	[S2] Y axis pulse command inverse(0:No,1:Yes)	⊙	Maker	112
9042	Hardware	[S2] Z axis pulse command inverse(0:No,1:Yes)	⊙	Maker	112
9043	Hardware	[S2] 4th axis pulse command inverse(0:No,1:Yes)	⊙	Maker	112
9050	Hardware	[S2] X axis pulse output width(0~25000ns)	⊙	Maker	112
9051	Hardware	[S2] Y axis pulse output width(0~25000ns)	⊙	Maker	112
9052	Hardware	[S2] Z axis pulse output width(0~25000ns)	⊙	Maker	112
9053	Hardware	[S2] 4th axis pulse output width(0~25000ns)	⊙	Maker	112
9060	Hardware	[S2] X axis position loop gain(1/s)	⊙	Maker	113
9061	Hardware	[S2] Y axis position loop gain(1/s)	⊙	Maker	113
9062	Hardware	[S2] Z axis position loop gain(1/s)	⊙	Maker	113
9063	Hardware	[S2] 4th axis position loop gain(1/s)	⊙	Maker	113
9070	Hardware	[S2] X axis servo analog input gain(RPM/1V)	⊙	Maker	113
9071	Hardware	[S2] Y axis servo analog input gain(RPM/1V)	⊙	Maker	113
9072	Hardware	[S2] Z axis servo analog input gain(RPM/1V)	⊙	Maker	113
9073	Hardware	[S2] 4th axis servo analog input gain(RPM/1V)	⊙	Maker	113
9090	Hardware	[S2] X axis revolution of encoder(Pulse)	⊙	Maker	114
9091	Hardware	[S2] Yaxis revolution of encoder(Pulse)	⊙	Maker	114
9092	Hardware	[S2] Z axis revolution of encoder(Pulse)	⊙	Maker	114
9093	Hardware	[S2] 4th axis revolution of encoder(Pulse)	⊙	Maker	114
9100	Hardware	[S2] X axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	114
9101	Hardware	[S2] Y axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	114
9102	Hardware	[S2] Z axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	114
9103	Hardware	[S2] 4th axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	114

No.	Type	Description	Active	Level	Page
9110	Hardware	[S2] X axis encoder signal inverse(0:No,1:Yes)	⊙	Maker	**115**
9111	Hardware	[S2] Y axis encoder signal inverse(0:No,1:Yes)	⊙	Maker	**115**
9112	Hardware	[S2] Z axis encoder signal inverse(0:No,1:Yes)	⊙	Maker	**115**
9113	Hardware	[S2] 4th axis encoder signal inverse(0:No,1:Yes)	⊙	Maker	**115**
9120	Hardware	[S2] X axis encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**115**
9121	Hardware	[S2] Y axis encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**115**
9122	Hardware	[S2] Z axis encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**115**
9123	Hardware	[S2] 4th axis encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**115**
9200	Hardware	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**116**
9201	Hardware	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**116**
9202	Hardware	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**116**
9203	Hardware	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**116**
9204	Hardware	[S2] Axis number of mpg dry-run handle signal(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**116**
9210	Hardware	[S2] X axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)	⊙	Maker	**116**
9211	Hardware	[S2] Y axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)	⊙	Maker	**116**
9212	Hardware	[S2] Z axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)	⊙	Maker	**116**
9213	Hardware	[S2] 4th axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)	⊙	Maker	**116**
9214	Hardware	[S2] Handle for mpg dry-run signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)	⊙	Maker	**116**
9220	Hardware	[S2] X axis handle signal inverse(0:No,1:Yes)	⊙	Maker	**117**
9221	Hardware	[S2] Y axis handle signal inverse(0:No,1:Yes)	⊙	Maker	**117**
9222	Hardware	[S2] Z axis handle signal inverse(0:No,1:Yes)	⊙	Maker	**117**
9223	Hardware	[S2] 4th axis handle signal inverse(0:No,1:Yes)	⊙	Maker	**117**
9224	Hardware	[S2] Handle for mpg dry-run signal inverse(0:No,1:Yes)	⊙	Maker	**117**
9230	Hardware	[S2] X axis handle input multiply(x1~100)	⊙	Maker	**117**
9231	Hardware	[S2] Y axis handle input multiply(x1~100)	⊙	Maker	**117**
9232	Hardware	[S2] Z axis handle input multiply(x1~100)	⊙	Maker	**117**
9233	Hardware	[S2] 4th axis handle input multiply(x1~100)	⊙	Maker	**117**
9234	Hardware	[S2] Handle for mpg dry-run input multiply(x1~100)	⊙	Maker	**117**
9300	Hardware	[S2] Channel no for 1st Spindle(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**118**
9301	Hardware	[S2] Channel no for 2nd Spindle(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**118**
9302	Hardware	[S2] Channel no for 3rd Spindle(0:Disable,1~9:Card1,11~19:Card2)	⊙	Maker	**118**

No.	Type	Description	Active	Level	Page
9310	Hardware	[S2] 1st spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)	⊙	Maker	**118**
9311	Hardware	[S2] 2nd spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)	⊙	Maker	**118**
9312	Hardware	[S2] 3rd spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)	⊙	Maker	**118**
9320	Hardware	[S2] 1st spindle pulse command inverse(0:No,1:Yes)	⊙	Maker	**119**
9321	Hardware	[S2] 2nd spindle pulse command inverse(0:No,1:Yes)	⊙	Maker	**119**
9322	Hardware	[S2] 3rd spindle pulse command inverse(0:No,1:Yes)	⊙	Maker	**119**
9330	Hardware	[S2] 1st spindle pulse output width(0~25000ns)	⊙	Maker	**119**
9331	Hardware	[S2] 2nd spindle pulse output width(0~25000ns)	⊙	Maker	**119**
9332	Hardware	[S2] 3rd spindle pulse output width(0~25000ns)	⊙	Maker	**119**
9340	Hardware	[S2] 1st spindle position loop gain(1/s)	⊙	Maker	**120**
9341	Hardware	[S2] 2nd spindle position loop gain(1/s)	⊙	Maker	**120**
9342	Hardware	[S2] 3rd spindle position loop gain(1/s)	⊙	Maker	**120**
9350	Hardware	[S2] 1st spindle servo analog input gain(RPM/1V)	⊙	Maker	**120**
9351	Hardware	[S2] 2nd spindle servo analog input gain(RPM/1V)	⊙	Maker	**120**
9352	Hardware	[S2] 3rd spindle servo analog input gain(RPM/1V)	⊙	Maker	**120**
9360	Hardware	[S2] 1st spindle revolution of encoder(Pulse)	⊙	Maker	**120**
9361	Hardware	[S2] 2nd spindle revolution of encoder(Pulse)	⊙	Maker	**120**
9362	Hardware	[S2] 3rd spindle revolution of encoder(Pulse)	⊙	Maker	**120**
9370	Hardware	[S2] 1st spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	**121**
9371	Hardware	[S2] 2nd spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	**121**
9372	Hardware	[S2] 3rd spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)	⊙	Maker	**121**
9380	Hardware	[S2] 1st spindle encoder signal inverse(0:No,1:Yes)	⊙	Maker	**121**
9381	Hardware	[S2] 2nd spindle encoder signal inverse(0:No,1:Yes)	⊙	Maker	**121**
9382	Hardware	[S2] 3rd spindle encoder signal inverse(0:No,1:Yes)	⊙	Maker	**121**
9390	Hardware	[S2] 1st spindle encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**122**
9391	Hardware	[S2] 2nd spindle encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**122**
9392	Hardware	[S2] 3rd spindle encoder input multiply(1:x1,2:x2,4:x4)	⊙	Maker	**122**

3.2 Parameter Description

3.2.1 Servo Parameters

2	[S1] Maximun following error of X axis(μ m)
3	[S1] Maximun following error of Y axis(μ m)
4	[S1] Maximun following error of Z axis(μ m)
5	[S1] Maximun following error of 4th axis(μ m)
5002	[S2] Maximun following error of X axis(μ m)
5003	[S2] Maximun following error of Y axis(μ m)
5004	[S2] Maximun following error of Z axis(μ m)
5005	[S2] Maximun following error of 4th axis(μ m)

Range： 1 ~ 3000000
Active： Enable after RESET
Level： Maker
Default： 30000
Unit： μ m
Function： N/A
Description： This parameter sets the max. servo lag for each axis. When the servo lag of some axis exceeds this parameter's set value, the alarm will be triggered.

In situations when the servo axis is in constant velocity, the following error can be found in the below formula:
lag = F/Kp
In this formula, F is the override, and Kp is the position loop gain.
As indicated by the formula, the larger the override is, the more the servo lag will be. Hence, simply input the highest speed of each axis into the formula above, and the max. servo lag of each axis will be produced.

Example:
If X axis travels at a constant speed in RAPID TRAVERSE, its position loop gain is 100sec-1, the speed of G00 is 20000mm/min, and the servo lag would be:
lag = （20000000 μ m / 60s） / （100s-1） = 3333.3 μ m
When the machine functions normally, the servo lag amount of X axis should not exceed 3334 μ m at any time. Hence, the recommendation is to multiply this value by a safe coefficient (about 1.1) and enter the product into the corresponding parameter.

6	[S1] X axis in-position check window(μm)
7	[S1] Y axis in-position check window(μm)
8	[S1] Z axis in-position check window(μm)
9	[S1] 4th axis in-position check window(μm)
5006	[S2] X axis in-position check window(μm)
5007	[S2] Y axis in-position check window(μm)
5008	[S2] Z axis in-position check window(μm)
5009	[S2] 4th axis in-position check window(μm)

Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 200
Unit： μm
Function： N/A
Description： This parameter sets the in-position check window of each axis in the Exact Stop mode(apply G09 or G61 command). When some axis's | command position – actual position | ≦ this parameter's set value, this means that this axis has completed cutting feed and stopped.

10	[S1] X axis rapid travel acc/dec time(ms)
11	[S1] Y axis rapid travel acc/dec time(ms)
12	[S1] Z axis rapid travel acc/dec time(ms)
13	[S1] 4th axis rapid travel acc/dec time(ms)
5010	[S2] X axis rapid travel acc/dec time(ms)
5011	[S2] Y axis rapid travel acc/dec time(ms)
5012	[S2] Z axis rapid travel acc/dec time(ms)
5013	[S2] 4th axis rapid travel acc/dec time(ms)

Range： 0 ~ 2000
Active： Enable after restart system
Level： Maker
Default： 150
Unit： ms
Function： N/A
Description： This parameter sets each axis's acceleration & deceleration time of rapid traverse. The smaller the parameter is, the faster each axis reaches the designated motion speed. However, this might also cause vibration of each axis. If the set value exceeds the tolerance of the above values, the alarm will be triggered.

14	[S1] G01 acc/dec time(ms)
5014	[S2] G01 acc/dec time(ms)

Range： 0 ~ 2000
Active： Enable after restart system
Level： Maker
Default： 80
Unit： ms
Function： N/A
Description： This parameter sets the cutting feed acceleration & deceleration time of all servo axes. The smaller the parameter is, the faster the servo axis reaches the designated motion speed. However, this might also cause vibration of servo axis. If the set value exceeds the tolerance of the above values, the alarm will be triggered.

18	[S1] Thred cutting acc/dec time(ms)
5018	[S2] Thred cutting acc/dec time(ms)

Range： 0 ~ 1000
Active： Enable after restart system
Level： Maker
Default： 50
Unit： ms
Function： N/A
Description： This parameter sets the acceleration & deceleration duration of cutting axis under the command of lathe tapping. The smaller the parameter is, the faster the cutting axis reaches the designated motion speed. However, this might also cause vibration of cutting axis. If the set value exceeds the tolerance of the above values, the alarm will be triggered.

40	[S1] Minimum feedrate override of rapid travel(%)
5040	[S2] Minimum feedrate override of rapid travel(%)

Range： 0 ~ 25
Active： Enable after RESET
Level： End User
Default： 10
Unit： %
Function： N/A
Description： This parameter sets the actual override value in percentage when the override rotary switch of rapid traverse is turned to 0%. For example, if this parameter is set to 10, and the rotary switch of rapid traverse is turned to 0%, then the actual corresponding value is 10%.

62	[S1] pitch unit of screw(0:mm,1:inch)
5062	[S2] pitch unit of screw(0:mm,1:inch)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： This parameter sets the unit system for the ball screw pitch of servo axis to be metric or imperial.

65	[S1] Enable absolute encoder(bit0~3,X:+1,Y:+2,Z:+4,4th:+8)
5065	[S2] Enable absolute encoder(bit0~3,X:+1,Y:+2,Z:+4,4th:+8)

Range： 0 ~ 15
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060035
Description： The corresponding Bit of each axis is set to 0, an incremental encoder is applied.
The corresponding Bit of each axis is set to 1, an absolute encoder is applied.

66	[S1] 4th axis type(0:Rotary 1:Linear)
5066	[S2] 4th axis type(0:Rotary 1:Linear)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： If the 4th axis is a linear axis, the ball screw's pitch should be set according to its actual value; if the 4th axis is a rotary axis, the ball screw's pitch should be set to 360 (which indicates 360°).

68	**[S1] X axis gear number of motor side(Denominator)**
69	**[S1] Y axis gear number of motor side(Denominator)**
70	**[S1] Z axis gear number of motor side(Denominator)**
72	**[S1] 4th axis gear number of motor side(Denominator)**
5068	**[S2] X axis gear number of motor side(Denominator)**
5069	**[S2] Y axis gear number of motor side(Denominator)**
5070	**[S2] Z axis gear number of motor side(Denominator)**
5072	**[S2] 4th axis gear number of motor side(Denominator)**

Range： 1 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： This parameter sets the tooth number of each axis motor, which equals to setting an axis's denominator in gear ratio.

$$\text{Gear ratio of axis} = \frac{\text{Ball screw's tooth number(this parameter)}}{\text{Motor's tooth number}}$$

If the gear ratio of some axis is larger than 1, motor speed is decelerated by ball screw; if smaller than 1, motor speed is accelerated by ball screw. Please refer to the following formula for the setting method:

Motor's tooth number × Motor's rotation speed = Ball screw's tooth number × Ball screw's rotation speed

100	[S1] X axis gear number of screw side(Numeerator)
101	[S1] Y axis gear number of screw side(Numeerator)
102	[S1] Z axis gear number of screw side(Numeerator)
103	[S1] 4th axis gear number of screw side(Numeerator)
5100	[S2] X axis gear number of screw side(Numeerator)
5101	[S2] Y axis gear number of screw side(Numeerator)
5102	[S2] Z axis gear number of screw side(Numeerator)
5103	[S2] 4th axis gear number of screw side(Numeerator)

Range： 1 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description：

This parameter sets the ball screw's tooth number of each axis, which equals to setting the numerator in gear ratio of each axis.

$$\text{Gear ratio of axis} = \frac{\text{Ball screw's tooth number(this parameter)}}{\text{Motor's tooth number}}$$

If the gear ratio of some axis is larger than 1, motor speed is decelerated by ball screw; if smaller than 1, motor speed is accelerated by ball screw. Please refer to the following formula for the setting method:

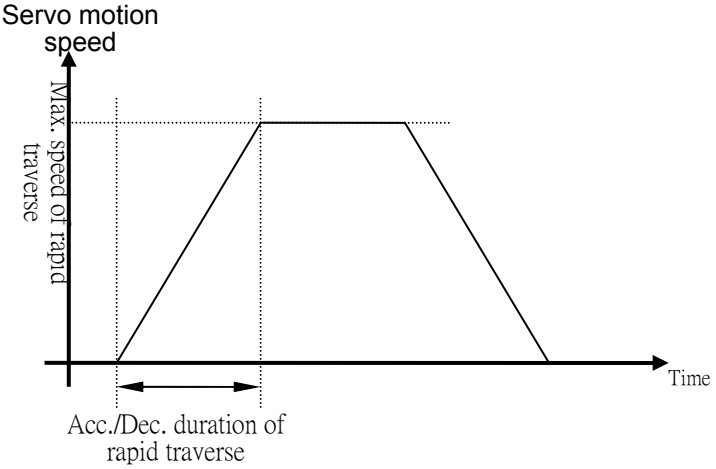
Motor's tooth number × Motor's rotation speed = Ball screw's tooth number × Ball screw's rotation speed

104	[S1] X axis pitch of screw(μ m)
105	[S1] Y axis pitch of screw(μ m)
106	[S1] Z axis pitch of screw(μ m)
107	[S1] 4th axis pitch of screw(μ m)
5104	[S2] X axis pitch of screw(μ m)
5105	[S2] Y axis pitch of screw(μ m)
5106	[S2] Z axis pitch of screw(μ m)
5107	[S2] 4th axis pitch of screw(μ m)

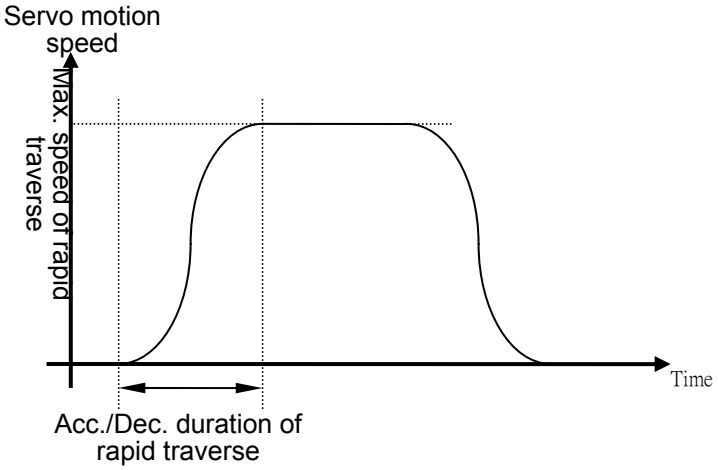
Range： 1 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 360
Unit： μ m
Function： N/A
Description： This parameter sets the ball screw pitch of each axis.

172	**[S1] Acc/Dec type for rapid travel(0:Linear,1:S curve)**
5172	**[S2] Acc/Dec type for rapid travel(0:Linear,1:S curve)**

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description：



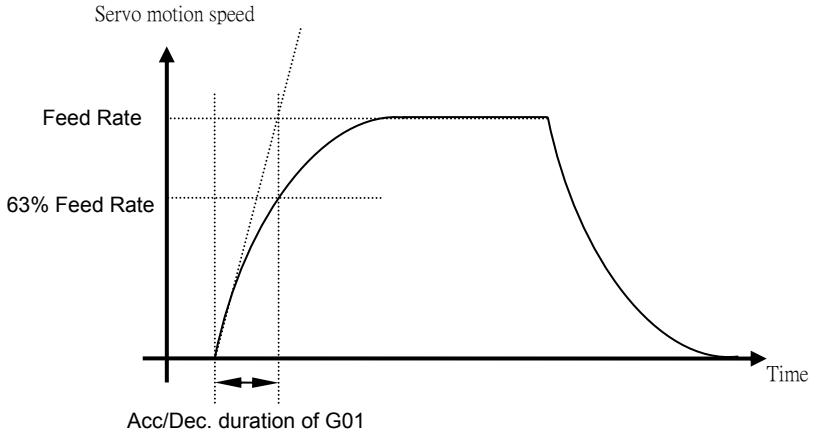
Linear acc/dec



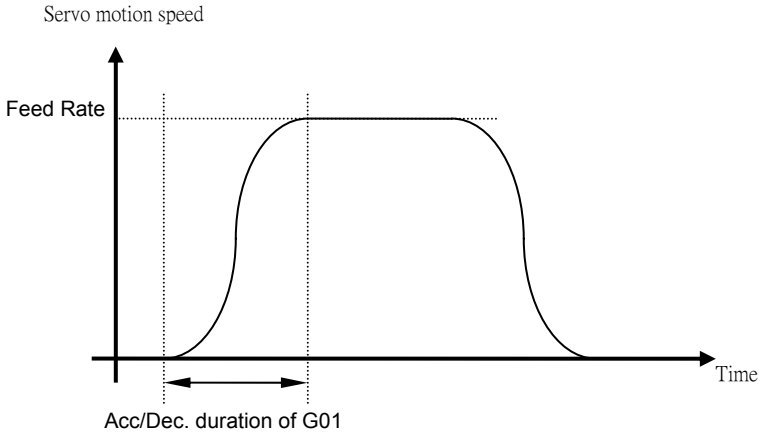
S-curve acc/dec

173	**[S1] Acc/Dec type for cutting(0:Linear,1:S curve)**
5173	**[S2] Acc/Dec type for cutting(0:Linear,1:S curve)**

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description：



Expolantional acc./dec.



S-curve acc./dec.

188	**[S1] Position loop gain for feedrate clamping of arc(1/s)**
5188	**[S2] Position loop gain for feedrate clamping of arc(1/s)**

Range： 1 ~ 32767
Active： Enable after RESET
Level： Maker
Default： 30
Unit： 1/sec
Function： N/A
Description： This parameter is to calculate the actual contour of ARCH error set by “Arch feed rate auto clamp function”. In pulse type, because position control loop is processed by servo driver, NC is unable to obtain the set value of this parameter. In order to allow NC to obtain the set value of this parameter when “Arch feed rate auto clamp” function is enabled, a position loop gain must be set manually in advance. Please note that the position loop gains of each axis must be the same otherwise the actual contour of Arch command will become an ellipse.
Please also refer to the descriptions of related parameters: Feedrate clamping of circle or arc (0: No, 1: Yes) & Maximum circle/arc contour error (μm).

544	**[S1] X axis handle Acc/Dec time(ms)**
545	**[S1] Y axis handle Acc/Dec time(ms)**
546	**[S1] Z axis handle Acc/Dec time(ms)**
547	**[S1] 4th axis handle Acc/Dec time(ms)**
5544	**[S2] X axis handle Acc/Dec time(ms)**
5545	**[S2] Y axis handle Acc/Dec time(ms)**
5546	**[S2] Z axis handle Acc/Dec time(ms)**
5547	**[S2] 4th axis handle Acc/Dec time(ms)**

Range： 0 ~ 300
Active： Enable after restart system
Level： Maker
Default： 0
Unit： ms
Function： TI060026
Description： MPG moving command is dealt via acceleration & deceleration. (0: not applied, 1~300: applied)
T800：[S1]0544~0547，[S2] 5544~5547。

550	[S1] X axis handle max feedrate(μm/min)
551	[S1] Y axis handle max feedrate(μm/min)
552	[S1] Z axis handle max feedrate(μm/min)
553	[S1] 4th axis handle max feedrate(μm/min)
5550	[S2] X axis handle max feedrate(μm/min)
5551	[S2] Y axis handle max feedrate(μm/min)
5552	[S2] Z axis handle max feedrate(μm/min)
5553	[S2] 4th axis handle max feedrate(μm/min)

Range： 60000 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 2000000
Unit： μm/min
Function： TI060026
Description： Limit the maximum moving speed of MPG on each axis. Users should notice not to exceed the actual max. moving speed when setting this parameter.
T800：[S1]0550~0553，[S2] 5550~5553。

800	[S1] X axis rapid travel in-position check windows(μm)
801	[S1] Y axis rapid travel in-position check windows(μm)
802	[S1] Z axis rapid travel in-position check windows(μm)
803	[S1] 4th axis rapid travel in-position check windows(μm)
5800	[S2] X axis rapid travel in-position check windows(μm)
5801	[S2] Y axis rapid travel in-position check windows(μm)
5802	[S2] Z axis rapid travel in-position check windows(μm)
5803	[S2] 4th axis rapid travel in-position check windows(μm)

Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： μm
Function： N/A
Description： This parameter sets the in-position check window range of the corresponding servo axes when the exact stop function of rapid positioning is enabled. When some axis's
| command position – actual position | ≦ this parameter's set value,
this means that this axis has already completed rapid positioning and stopped

1000	[S1] X axis maximum feedrate for rapid travel(μm/min)
1001	[S1] Y axis maximum feedrate for rapid travel(μm/min)
1002	[S1] Z axis maximum feedrate for rapid travel(μm/min)
1003	[S1] 4th axis maximum feedrate for rapid travel(μm/min)
6000	[S2] X axis maximum feedrate for rapid travel(μm/min)
6001	[S2] Y axis maximum feedrate for rapid travel(μm/min)
6002	[S2] Z axis maximum feedrate for rapid travel(μm/min)
6003	[S2] 4th axis maximum feedrate for rapid travel(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 5000000
Unit： μm/min
Function： TI060034
Description： The corresponding parameter of this servo axis sets the max. motion speed during rapid traverse. It is not the feed rate designated by F code.

1004	[S1] The maximum feedrate for cutting(μm/min)
6004	[S2] The maximum feedrate for cutting(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 2000000
Unit： μm/min
Function： N/A
Description： This parameter sets the following values:
The max. feed rate of the linear cutting command G01;
The max. feed rate of the curve cutting command G02/03;
The feed rate of the cutting commands G01/02/03 in DRY RUN mode.
When the F code command set by users exceeds this parameter's set value, NC will limit this feed rate to this parameter's set value automatically.

1042	[S1] G31 initial feedrate(μm/min)
6042	[S2] G31 initial feedrate(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 2000
Unit： μm/min
Function： TI060031
Description： If assigning a feed rate in the block of G31 command, the block would take the command value as its feed rate. If there is no feed rate assigned in the block of G31 command, the feed rate is set by this parameter.

1061	[S1] The maximum feedrate of thread cutting(μm/min)
6061	[S2] The maximum feedrate of thread cutting(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 10000000
Unit： μm/min
Function： N/A
Description： The cutting feed rate is decided by the spindle's rotation speed and thread pitch during lathe tapping. If the feed rate produced by these two elements exceeds the set value of this parameter, the alarm"will be triggered to prevent any danger that might be caused by false programming.

1100	[S1] X axis feedrate for jog(μm/min)
1101	[S1] Y axis feedrate for jog(μm/min)
1102	[S1] Z axis feedrate for jog(μm/min)
1103	[S1] 4th axis feedrate for jog(μm/min)
6100	[S2] X axis feedrate for jog(μm/min)
6101	[S2] Y axis feedrate for jog(μm/min)
6102	[S2] Z axis feedrate for jog(μm/min)
6103	[S2] 4th axis feedrate for jog(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 2000000
Unit： μm/min
Function： TI060034
Description： This parameter sets the moving speed of each servo axis in JOG mode.

1130	[S1] Superimpose X axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
1131	[S1] Superimpose Y axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
1132	[S1] Superimpose Z axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
1133	[S1]Superimpose 4th axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
6130	[S2] Superimpose X axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
6131	[S2] Superimpose Y axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
6132	[S2] Superimpose Z axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)
6133	[S2]Superimpose 4th axis with this setting axis(0:Disable,1~4:X1~C1,11~14:X2~C2)

Range： 0 ~ 14
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060028
Description： 0: not applied (default value)

1: X-axis in the same system	11: X-axis in the other system
2: Y-axis in the same system	12: Y-axis in the other system
3: Z-axis in the same system	13: Z-axis in the other system
4: The 4th axis in the same system	14: The 4th -axis in the other system

1135	[S1] Master axis name of X axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
1136	[S1] Master axis name of Y axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
1137	[S1] Master axis name of Z axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
1138	[S1] Master axis name of 4th axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
6135	[S2] Master axis name of X axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
6136	[S2] Master axis name of Y axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
6137	[S2] Master axis name of Z axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)
6138	[S2] Master axis name of 4th axis syn. control(0:Disable,1~4:X1~C1,11~14:X2~C2)

Range： 0 ~ 14
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050013
Description： 0: not applied (default value)

1: X-axis in system 1	11: X-axis in system 2
2: Y-axis in system 1	12: Y-axis in system 2
3: Z-axis in system 1	13: Z-axis in system 2
4: The 4th axis in system 1	14: The 4th -axis in system 2

1140	[S1] Direction of X axis synchronous control(0:Same,1:Inverse)
1141	[S1] Direction of Y axis synchronous control(0:Same,1:Inverse)
1142	[S1] Direction of Z axis synchronous control(0:Same,1:Inverse)
1143	[S1] Direction of 4th axis synchronous control(0:Same,1:Inverse)
6140	[S2] Direction of X axis synchronous control(0:Same,1:Inverse)
6141	[S2] Direction of Y axis synchronous control(0:Same,1:Inverse)
6142	[S2] Direction of Z axis synchronous control(0:Same,1:Inverse)
6143	[S2] Direction of 4th axis synchronous control(0:Same,1:Inverse)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050013
Description： This parameter sets if the direction of slave axis's moving amount is the same as the master axis. The default value is 0, which indicates the same direction as master axis.

1150	[S1] Direction of movement of X axis in superimposed control(0:Same,1:Inverse)
1151	[S1] Direction of movement of Y axis in superimposed control(0:Same,1:Inverse)
1152	[S1] Direction of movement of Z axis in superimposed control(0:Same,1:Inverse)
1153	[S1] Direction of movement of 4th axis in superimposed control(0:Same,1:Inverse)
6150	[S2] Direction of movement of X axis in superimposed control(0:Same,1:Inverse)
6151	[S2] Direction of movement of Y axis in superimposed control(0:Same,1:Inverse)
6152	[S2] Direction of movement of Z axis in superimposed control(0:Same,1:Inverse)
6153	[S2] Direction of movement of 4th axis in superimposed control(0:Same,1:Inverse)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060028
Description： 0：same direction
1：opposite direction

1300	The axis to interchange with X axis in composite control(0:Disable,1~4:X2~C2)
1301	The axis to interchange with Y axis in composite control(0:Disable,1~4:X2~C2)
1302	The axis to interchange with Z axis in composite control(0:Disable,1~4:X2~C2)
1303	The axis to interchange with 4th axis in composite control(0:Disable,1~4:X2~C2)

Range： 0 ~ 4
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060027
Description： 0：not applied
1：X-axis in system 2
2：Y-axis in system 2
3：Z-axis in system 2
4：The 4th-axis in system 2

1304	[S1]Is work coordinate auto setting when switch to composite control(0:No,1:Yes)
6304	[S2]Is work coordinate auto setting when switch to composite control(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： TI060027
Description： In composite control, this parameter is set to 0, which indicates that the part coordinate system is not set automatically; set to 1 indicates set automatically.

1305	Value rel. ref. point of X2 to work coord. of X1 when into C.C.(μm)
1306	Value rel. ref. point of Y2 to work coord. of Y1 when into C.C.(μm)
1307	Value rel. ref. point of Z2 to work coord. of Z1 when into C.C.(μm)
1308	Value rel. ref. point of [S2]4th to work coord. of [S1]4th when into C.C.(μm)
6305	Value rel. ref. point of X1 to work coord. of X2 when into C.C.(μm)
6306	Value rel. ref. point of Y1 to work coord. of Y2 when into C.C.(μm)
6307	Value rel. ref. point of Z1 to work coord. of Z2 when into C.C.(μm)
6308	Value rel. ref. point of [S1]4th to work coord. of [S2]4th when into C.C.(μm)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： TI060027
Description： This parameter is the offset amount. Please set to 0.

1309	[S1] The direction of X1 and X2 when composite control(0:Same,1:Reverse)
1310	[S1] The direction of Y1 and Y2 when composite control(0:Same,1:Reverse)
1311	[S1] The direction of Z1 and Z2 when composite control(0:Same,1:Reverse)
1312	[S1] The direction of [S1]4th and [S2] when composite control(0:Same,1: Reverse)
6309	[S2] The direction of X1 and X2 when composite control(0:Same,1:Reverse)
6310	[S2] The direction of Y1 and Y2 when composite control(0:Same,1:Reverse)
6311	[S2] The direction of Z1 and Z2 when composite control(0:Same,1:Reverse)
6312	[S2] The direction of [S1]4th and [S2] when composite control(0:Same,1: Reverse)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060027
Description： In composite control, if part coordinate system is set automatically, the coordinate direction of system 1 and 2 is in the same direction or not.

1400	[S1] Proportion axis(0:Disable,1:Enable)
6400	[S2] Proportion axis(0:Disable,1:Enable)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060032
Description： The controlling axis of angular servo axis. T800：[S1]1400，[S2]6400。

1410	Servo communication port(0:Disable,1:COM1,2:COM2)

Range： 0 ~ 2
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Set the transmission port for servo communication.

0: not applied

1:COM1

2:COM2

1411	Servo communication type(0:Disable,1:M)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Set the servo motor for servo communication
0: not applied
1: M

1412	[S1] X axis address for servo communication(-1:Disable,0~15)
1413	[S1] Y axis address for servo communication(-1:Disable,0~15)
1414	[S1] Z axis address for servo communication(-1:Disable,0~15)
1415	[S1] 4th axis address for servo communication(-1:Disable,0~15)
6412	[S2] X axis address for servo communication(-1:Disable,0~15)
6413	[S2] Y axis address for servo communication(-1:Disable,0~15)
6414	[S2] Z axis address for servo communication(-1:Disable,0~15)
6415	[S2] 4th axis address for servo communication(-1:Disable,0~15)

Range： -1 ~ 15
Active： Enable after restart system
Level： Maker
Default： -1
Unit： N/A
Function： N/A
Description： Set the servo motor's number corresponding to each axis. This parameter needs to be the same as the number on servo motor driver. Set it to 0 indicates that servo axis does not apply servo communication function. T800：[S1]1412~1415，[S2] 6412~6415。

1418	[S1] Maximun following error in static X axis(μm)
1419	[S1] Maximun following error in static Y axis(μm)
1420	[S1] Maximun following error in static Z axis(μm)
1421	[S1] Maximun following error in static 4th axis(μm/0.001deg)
6418	[S2] Maximun following error in static X axis(μm)
6419	[S2] Maximun following error in static Y axis(μm)
6420	[S2] Maximun following error in static Z axis(μm)
6421	[S2] Maximun following error in static 4th axis(μm/0.001deg)

Range： 1 ~ 3000000
Active： Enable after RESET
Level： Maker
Default： 50
Unit： μm/0.001deg
Function： N/A
Description： This parameter sets the servo lag when servo axis stops. If the servo lag of each axis exceeds the corresponding parameter's set value, the alarm will be

triggered.

2000	[S1] X axis max. feedrate for rapid travel in superimpose control(μm/min)
2001	[S1] Y axis max. feedrate for rapid travel in superimpose control(μm/min)
2002	[S1] Z axis max. feedrate for rapid travel in superimpose control(μm/min)
2003	[S1] 4th axis max. feedrate for rapid travel in superimpose control(μm/min)
7000	[S2] X axis max. feedrate for rapid travel in superimpose control(μm/min)
7001	[S2] Y axis max. feedrate for rapid travel in superimpose control(μm/min)
7002	[S2] Z axis max. feedrate for rapid travel in superimpose control(μm/min)
7003	[S2] 4th axis max. feedrate for rapid travel in superimpose control(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 5000000
Unit： μm/min
Function： TI060028
Description： In superposition control, the max. motion speed of servo axis's rapid traverse is decided by the corresponding parameter's set value of this servo axis, not the feedrate assigned by F code command. In superposition control, the max. speed of rapid traverse for slave axis can not be lower than or equal to the max. speed of rapid traverse for the master axis which tends to superpose. Otherwise, the alarm will be triggered.

2004	[S1] The maximum feedrate for cutting in superimpose control(μm/min)
7004	[S2] The maximum feedrate for cutting in superimpose control(μm/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 2000000
Unit： μm/min
Function： TI060028
Description： In superposition control, this parameter sets the following values:
The max. feed rate of the linear cutting command G01;
The max. feed rate of the curve cutting command G02/03;
The feed rate of the cutting commands G01/02/03 in DRY RUN mode.
When the F code command assigned by the user exceeds this parameter's set value, NC will automatically use the feed rate as this parameter's set value.

3.2.2 Spindle Parameters

16	[S1] 1st spindle rotary acc/dec time.(ms/1000rpm)
885	[S1] 2nd spindle rotary acc/dec time.(ms/1000rpm)
888	[S1] 3rd spindle rotary acc/dec time.(ms/1000rpm)
5016	[S2] 1st spindle rotary acc/dec time.(ms/1000rpm)
5885	[S2] 2nd spindle rotary acc/dec time.(ms/1000rpm)
5888	[S2] 3rd spindle rotary acc/dec time.(ms/1000rpm)

Range： 0 ~ 10000
Active： Enable after restart system
Level： Maker
Default： 500
Unit： N/A
Function： N/A
Description： This parameter sets the acceleration and deceleration of spindle per 1000rpm.

21	[S1] Spindle orientation speed(RPM)
5021	[S2] Spindle orientation speed(RPM)

Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 100
Unit： RPM
Function： N/A
Description： This parameter sets the spindle's rotation speed during orientation. This parameter also decides the spindle's rotation speed when the spindle is being oriented. To prevent deviation caused by different rotation speeds, please do not change the set value of this parameter after finishing the orientation adjustment of the spindle.

49	[S1] 1st spindle 1st gear nember on motor side
51	[S1] 1st spindle 2nd gear nember on motor side
178	[S1] 1st spindle 3rd gear nember on motor side
181	[S1] 1st spindle 4th gear nember on motor side
664	[S1] 2nd spindle 1st gear nember on motor side
666	[S1] 2nd spindle 2nd gear nember on motor side
668	[S1] 2nd spindle 3rd gear nember on motor side
670	[S1] 2nd spindle 4th gear nember on motor side
672	[S1] 3rd spindle 1st gear nember on motor side
674	[S1] 3rd spindle 2nd gear nember on motor side
676	[S1] 3rd spindle 3rd gear nember on motor side
678	[S1] 3rd spindle 4th gear nember on motor side
5049	[S2] 1st spindle 1st gear nember on motor side
5051	[S2] 1st spindle 2nd gear nember on motor side
5178	[S2] 1st spindle 3rd gear nember on motor side
5181	[S2] 1st spindle 4th gear nember on motor side
5664	[S2] 2nd spindle 1st gear nember on motor side
5666	[S2] 2nd spindle 2nd gear nember on motor side
5668	[S2] 2nd spindle 3rd gear nember on motor side
5670	[S2] 2nd spindle 4th gear nember on motor side
5672	[S2] 3rd spindle 1st gear nember on motor side
5674	[S2] 3rd spindle 2nd gear nember on motor side
5676	[S2] 3rd spindle 3rd gear nember on motor side
5678	[S2] 3rd spindle 4th gear nember on motor side

Range： 1 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： This parameter sets the tooth number of some spindle in each gear, which equals to setting the denominator in gear ratio of some spindle in each gear.

Gear ratio of the spindle in the N^{th} gear

$$= \frac{\text{Tooth number of spindle in the } N^{th} \text{ gear}}{\text{Tooth number of motor in the } N^{th} \text{ gear(parameter value)}}$$

In this formula, n = 1~4
If the spindle's gear ratio is larger than 1, there is a deceleration relationship between motor and the spindle; if the ratio is smaller than 1, there is an acceleration relationship between motor and the spindle. Please refer to the following formula for the setting method:

Motor's tooth number × Motor's rotation speed = Spindle tooth number × Spindle's rotation speed

50	[S1] 1st spindle 1st gear nember on axis side
52	[S1] 1st spindle 2nd gear nember on axis side
179	[S1] 1st spindle 3rd gear nember on axis side
182	[S1] 1st spindle 4th gear nember on axis side
665	[S1] 2nd spindle 1st gear nember on axis side
667	[S1] 2nd spindle 2nd gear nember on axis side
669	[S1] 2nd spindle 3rd gear nember on axis side
671	[S1] 2nd spindle 4th gear nember on axis side
673	[S1] 3rd spindle 1st gear nember on axis side
675	[S1] 3rd spindle 2nd gear nember on axis side
677	[S1] 3rd spindle 3rd gear nember on axis side
679	[S1] 3rd spindle 4th gear nember on axis side
5050	[S2] 1st spindle 1st gear nember on axis side
5052	[S2] 1st spindle 2nd gear nember on axis side
5179	[S2] 1st spindle 3rd gear nember on axis side
5182	[S2] 1st spindle 4th gear nember on axis side
5665	[S2] 2nd spindle 1st gear nember on axis side
5667	[S2] 2nd spindle 2nd gear nember on axis side
5669	[S2] 2nd spindle 3rd gear nember on axis side
5671	[S2] 2nd spindle 4th gear nember on axis side
5673	[S2] 3rd spindle 1st gear nember on axis side
5675	[S2] 3rd spindle 2nd gear nember on axis side
5677	[S2] 3rd spindle 3rd gear nember on axis side
5679	[S2] 3rd spindle 4th gear nember on axis side

Range： 1 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： This parameter sets the motor's tooth number of some spindle in each gear, which equals to setting the numerator in gear ratio of some spindle in each gear.

Gear ratio of the spindle in the N^{th} gear

$$= \frac{\text{Tooth number of spindle in the } N^{th} \text{ gear (parameter value)}}{\text{Tooth number of motor in the } N^{th} \text{ gear}}$$

In this formula, n = 1~4

If the gear ratio is larger than 1, there is a deceleration relationship between motor and the spindle; if the ratio is smaller than 1, there is an acceleration relationship between motor and the spindle. Please refer to the following formula for the setting method:
Motor's tooth number × Motor's rotation speed = Spindle tooth number × Spindle's rotation speed

84	**[S1] Orientation by (0:Sensor,1:Encoder)**
5084	**[S2] Orientation by (0:Sensor,1:Encoder)**

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0: Use a positioning sensor as the reference for spindle orientation.
1. Use an encoder index as the reference for spindle orientation.

90	**[S1] 1st spindle display type of speed(0:Command,1:Actual)**
897	**[S1] 2nd spindle display type of speed(0:Command,1:Actual)**
898	**[S1] 3rd spindle display type of speed(0:Command,1:Actual)**
5090	**[S2] 1st spindle display type of speed(0:Command,1:Actual)**
5897	**[S2] 2nd spindle display type of speed(0:Command,1:Actual)**
5898	**[S2] 3rd spindle display type of speed(0:Command,1:Actual)**

Range： 0 ~ 1
Active： Enable Immediately
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： 0：Display the command value
1：Display the actual value
If some spindle motor does not have an encoder, please set this parameter to 0 in case RPM check can not reach the assigned speed.

95	[S1] Minimun speed of 1st spindle(RPM)
96	[S1] Maximun speed of 1st spindle(RPM)
876	[S1] Maximun speed of 2nd spindle(RPM)
877	[S1] Minimun speed of 2nd spindle(RPM)
879	[S1] Maximun speed of 3rd spindle(RPM)
880	[S1] Minimun speed of 3rd spindle(RPM)
5095	[S2] Minimun speed of 1st spindle(RPM)
5096	[S2] Maximun speed of 1st spindle(RPM)
5876	[S2] Maximun speed of 2nd spindle(RPM)
5877	[S2] Minimun speed of 2nd spindle(RPM)
5879	[S2] Maximun speed of 3rd spindle(RPM)
5880	[S2] Minimun speed of 3rd spindle(RPM)

Range： 0 ~ 999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： RPM
Function： N/A
Description： This parameter sets the RPM range to prevent any part's damage of the machine caused by executing a command at a RPM that exceeds the acceptable range.

98	[S1] 1st spindle offset of output voltage (0.3mV/unit)
884	[S1] 2nd spindle offset of output voltage (0.3mV/unit)
887	[S1] 3rd spindle offset of output voltage (0.3mV/unit)
5098	[S2] 1st spindle offset of output voltage (0.3mV/unit)
5884	[S2] 2nd spindle offset of output voltage (0.3mV/unit)
5887	[S2] 3rd spindle offset of output voltage (0.3mV/unit)

Range： -5000 ~ 5000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： 0.3mV
Function： N/A
Description： This parameter sets the offset value of the spindle's voltage command. After the required voltage command is deduced based on the spindle command RPM, minus this parameter's set value from the voltage command, then the user can obtain the actual voltage command that needs to be sent to the spindle's A/C. The present DAC of the system's motion card is 16 bits, which corresponds to ±10V, so the dpi is 10/32768 = 0.3mV, which is the unit of this parameter.

160	[S1] 1st spindle encoder mount(0:Spindle side,1:Motor side)
892	[S1] 2nd spindle encoder mount(0:Spindle side,1:Motor side)
896	[S1] 3rd spindle encoder mount(0:Spindle side,1:Motor side)
5160	[S2] 1st spindle encoder mount(0:Spindle side,1:Motor side)
5892	[S2] 2nd spindle encoder mount(0:Spindle side,1:Motor side)
5896	[S2] 3rd spindle encoder mount(0:Spindle side,1:Motor side)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0: Spindle's feedback encoder is onto the spindle.
1: Spindle's feedback encoder is onto the motor.

184	[S1] Sensor number for spindle orientation(1~2:Card1,101~102:Card2)
5184	[S2] Sensor number for spindle orientation(1~2:Card1,101~102:Card2)

Range： 1 ~ 102
Active： Enable after RESET
Level： Maker
Default： 101
Unit： N/A
Function： N/A
Description： 1~2：Corresponding to the 1st motion control card's 1~2 Local Input.
101~102：Corresponding to the 2nd motion control card's 1~2 Local Input.

185	[S1] Sensor type for spindle orientation(0:NC,1:NO)
5185	[S2] Sensor type for spindle orientation(0:NC,1:NO)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： 0: The signal type of spindle orientation sensor is normally close. (NC)
1: The signal type of spindle orientation sensor is normally open. (NO)

189	[S1] 1st spindle init. speed(RPM)
875	[S1] 2nd spindle init. speed(RPM)
878	[S1] 3rd spindle init. speed(RPM)
5189	[S2] 1st spindle init. speed(RPM)
5875	[S2] 2nd spindle init. speed(RPM)
5878	[S2] 3rd spindle init. speed(RPM)

Range： 0 ~ 999999
Active： Enable after restart system
Level： End User
Default： 0
Unit： RPM
Function： N/A
Description： When the system is started, this parameter is the default initial rotation speed of the spindle.

190	[S1] Spindle positioning command(0:A/B,1:CW/CCW,2:P/D,3:Vcmd)
5190	[S2] Spindle positioning command(0:A/B,1:CW/CCW,2:P/D,3:Vcmd)

Range： 0 ~ 3
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：A/B PHASE
1：CW/CCW
2：PULSE/DIRECTION
3：Close loop.

240	[S1] Position gain for spindle positioning(1/s)
5240	[S2] Position gain for spindle positioning(1/s)

Range： 0 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 30
Unit： 1/S
Function： N/A
Description： When the spindle's command type is close loop, this parameter sets the spindle's close loop gain during positioning (1/Sec). The purpose is to adjust each spindle's rigidness.

354	[S1] 1st spindle override unit(0:10%,1:1%)
355	[S1] 2nd spindle override unit(0:10%,1:1%)
356	[S1] 3rd spindle override unit(0:10%,1:1%)
5354	[S2] 1st spindle override unit(0:10%,1:1%)
5355	[S2] 2nd spindle override unit(0:10%,1:1%)
5356	[S2] 3rd spindle override unit(0:10%,1:1%)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： This parameter is the unit of the spindle's RPM switch. 0：10%，1：1%

357	[S1] Bell-shape acc/dec time of 1st spindle(ms)
358	[S1] Bell-shape acc/dec time of 2nd spindle(ms)
359	[S1] Bell-shape acc/dec time of 3rd spindle(ms)
5357	[S2] Bell-shape acc/dec time of 1st spindle(ms)
5358	[S2] Bell-shape acc/dec time of 2nd spindle(ms)
5359	[S2] Bell-shape acc/dec time of 3rd spindle(ms)

Range： 0 ~ 1000
Active： Enable after restart system
Level： Maker
Default： 50
Unit： ms
Function： N/A
Description： This parameter sets the time in the bell-shaped segment during spindle acceleration and deceleration.

663	[S1] Acc/dec time for spindle positioning(ms)
5663	[S2] Acc/dec time for spindle positioning(ms)

Range： 0 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 100
Unit： ms
Function： N/A
Description： This parameter sets the acceleration/deceleration of the spindle during orientation (including spindle adjustment).

680	[S1] Number of 1st spindle clockwise M code
681	[S1] Number of 1st spindle counterclockwise M code
682	[S1] Number of 1st spindle stop M code
683	[S1] Number of 1st spindle clockwise M code
684	[S1] Number of 1st spindle counterclockwise M code
685	[S1] Number of 1st spindle stop M code
686	[S1] Number of 1st spindle clockwise M code
687	[S1] Number of spindle counterclockwise M code
688	[S1] Number of spindle stop M code
689	[S1] Number of remote 1st spindle clockwise M code
690	[S1] Number of remote spindle counterclockwise M code
691	[S1] Number of remote spindle stop M code
692	[S1] Number of remote 1st spindle clockwise M code
693	[S1] Number of remote spindle counterclockwise M code
694	[S1] Number of remote spindle stop M code
695	[S1] Number of remote 1st spindle clockwise M code
696	[S1] Number of remote spindle counterclockwise M code
697	[S1] Number of remote spindle stop M code
5680	[S1] Number of 1st spindle clockwise M code
5681	[S1] Number of 1st spindle counterclockwise M code
5682	[S1] Number of 1st spindle stop M code
5683	[S1] Number of 1st spindle clockwise M code
5684	[S1] Number of 1st spindle counterclockwise M code
5685	[S1] Number of 1st spindle stop M code
5686	[S1] Number of 1st spindle clockwise M code
5687	[S1] Number of spindle counterclockwise M code
5688	[S1] Number of spindle stop M code
5689	[S1] Number of remote 1st spindle clockwise M code
5690	[S1] Number of remote spindle counterclockwise M code
5691	[S1] Number of remote spindle stop M code
5692	[S1] Number of remote 1st spindle clockwise M code
5693	[S1] Number of remote spindle counterclockwise M code
5694	[S1] Number of remote spindle stop M code
5695	[S1] Number of remote 1st spindle clockwise M code
5696	[S1] Number of remote spindle counterclockwise M code
5697	[S1] Number of remote spindle stop M code

Range： 0 ~ 10000
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： When part programs execute the S code of spindle's RPM command, the system will find the working spindle that the part program is applying according to M code, and send the command to that spindle. Each spindle needs to log in the M codes of clockwise, counterclockwise, stop to the corresponding parameters, and the system can find the working spindle number correctly.

810	[S1] Spindle position check time(ms)
5810	[S2] Spindle position check time(ms)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： ms
Function： N/A
Description： This parameter is the check duration of spindle orientation. (ms).

835	[S1] Enable M code for spindle CH positioning(0:Disable,1~10000)
1118	[S1] Enable M code for remote spindle CH positioning(0:Disable,1~10000)
5835	[S2] Enable M code for spindle CH positioning(0:Disable,1~10000)
6118	[S2] Enable M code for remote spindle CH positioning(0:Disable,1~10000)

Range： 0 ~ 10000
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050011
Description： When system executes the M code defined by this parameter, spindle enters C(H) positioning mode. When the set value is 0, that indicates spindle C(H) positioning is not applied.

836	[S1] Release M code for spindle CH positioning(0:Disable,1~10000)
1119	[S1] Release M code for remote spindle CH positioning(0:Disable,1~10000)
5836	[S2] Release M code for spindle CH positioning(0:Disable,1~10000)
6119	[S2] Release M code for remote spindle CH positioning(0:Disable,1~10000)

Range： 0 ~ 10000
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050011
Description： When the system executes the M code defined by this parameter, the spindle will quit C(H) positioning mode. When the set value is 0, that indicates the spindle C(H) positioning is not applied.

837	**[S1] The start M code for spindle positioning(0:Disable,1~10000)**
838	**[S1] Number of M code for spindle positioining(1~10000)**
5837	**[S2] The start M code for spindle positioning(0:Disable,1~10000)**
5838	**[S2] Number of M code for spindle positioining(1~10000)**

Range： 1 ~ 10000
Active： Enable after RESET
Level： Maker
Default： 5
Unit： N/A
Function： N/A
Description： From the start M-code（α） of semi-fixed positioning, M code numbers（n）of semi-fixed positioning, and the reference angle（β）of semi-fixed orientation, the incremental angle offset corresponding to M-code will be obtained as below:

M code	Angle Offset	ex. Reference angle offset β=30°
Mα	β	30°
M(α+1)	2β	60°
M(α+2)	3β	90°
：	：	：
M(α+n)	(n+1)β	

839	**[S1] Tolerance for spindle positioning(0.001deg)**
5839	**[S2] Tolerance for spindle positioning(0.001deg)**

Range： 0 ~ 32767
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： 0.001deg
Function： N/A
Description： This parameter sets the tolerance of the spindle during orientation. When executing spindle orientation, if the deviation between the spindle's stop position and the actual reference mark is smaller than this parameter's set value, spindle orientation is deemed as finished. However, if the deviation is larger than this parameter's set value, the alarm will be triggered.

298	[S1] 2nd spindle speed arrival range(RPM)
881	[S1] 3rd spindle speed arrival range(RPM)
1054	[S1] 1st spindle speed arrival range(RPM)
5298	[S2] 2nd spindle speed arrival range(RPM)
5881	[S2] 3rd spindle speed arrival range(RPM)
6054	[S2] 1st spindle speed arrival range(RPM)

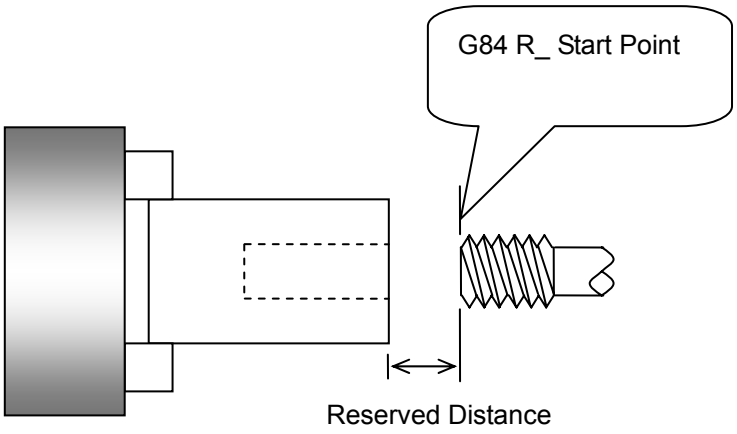
Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 50
Unit： RPM
Function： N/A
Description： When spindle RPM indicates the actual speed, the system will calculate the actual RPM by using the feedback signal of the spindle encoder. When | Spindle's actual RPM － Spindle's command RPM | this parameter's set value, the system will set the corresponding S BIT to ON to notify PLC that the spindle's actual RPM already reaches the command value. If this parameter's set value is too small, the system might detect a speed deviation between the actual RPM and the command RPM that is not in the tolerance range, and hence the system would not set the corresponding S BIT to ON to finish S code or M3, M4 command.

1056	[S1] The offset angle for spindle orientation(0.001deg)
6056	[S2] The offset angle for spindle orientation(0.001deg)

Range： -360000 ~ 360000
Active： Enable after RESET
Level： Maker
Default： 30000
Unit： 0.001deg
Function： N/A
Description： During spindle orientation, this parameter sets the offset amount between the orientation stop point and the reference point.

1059	[S1] Acc/dec time of spindle 1 rigid tapping
1164	[S1] Acc/dec time of spindle 2 rigid tapping
1165	[S1] Acc/dec time of spindle 3 rigid tapping
6059	[S2] Acc/dec time of spindle 1 rigid tapping
6164	[S2] Acc/dec time of spindle 2 rigid tapping
6165	[S2] Acc/dec time of spindle 3 rigid tapping

Range： 0 ~ 32767
Active： Enable after RESET
Level： Maker
Default： 0
Unit： ms
Function： N/A
Description： This parameter sets the acceleration/deceleration duration of the slave axis during rigid tapping. The bigger the set value is, the longer the time for spindle and slave axis (ex. Z axis) to reach synchronization will be. Therefore, the default distance during tapping is also needed to be longer. The diagram is shown as below.
T800：[S1]1059、1164~1165，[S2]6059、6164~6165。



1062	[S1] Basic angle for spindle semi-fix positioning(0.001deg)
6062	[S2] Basic angle for spindle semi-fix positioning(0.001deg)

Range： -360000 ~ 360000
Active： Enable after RESET
Level： Maker
Default： 30000
Unit： 0.001deg
Function： N/A
Description： This parameter sets the reference angle's offset（β）of spindle during semi-fixed orientation. When the angle is positive, spindle rotates according to the direction that encoder increases. When the angle is negative, spindle rotates according to the direction that encoder decreases.

299	[S1] 2nd spindle check range of zero speed(RPM)
882	[S1] 3rd spindle check range of zero speed(RPM)
1063	[S1] 1st spindle check range of zero speed(RPM)
5299	[S2] 2nd spindle check range of zero speed(RPM)
5882	[S2] 3rd spindle check range of zero speed(RPM)
6063	[S2] 1st spindle check range of zero speed(RPM)

Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 10
Unit： RPM
Function： N/A
Description： When the spindle's RPM shows the actual speed, the system will calculate the actual RPM by using the feedback signals of the spindle's encoder. When the spindle's actual RPM is equal to this parameter's set value, the system will set S BIT to ON to notify PLC that the spindle's actual RPM has already reached zero speed.

1064	[S1] Velocity compensation of spindle 1 rigid tapping
1166	[S1] Velocity compensation of spindle 2 rigid tapping
1167	[S1] Velocity compensation of spindle 3 rigid tapping
6064	[S2] Velocity compensation of spindle 1 rigid tapping
6166	[S2] Velocity compensation of spindle 2 rigid tapping
6167	[S2] Velocity compensation of spindle 3 rigid tapping

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： During rigid tapping, set the compensation amount of slave axis's speed. The larger the set value is, the better the error compensation in constant speed section during tapping will be. But if the value exceeds some amount, larger vibration of the machine will be produced. The effects will be negative, and make the deviation larger and larger. For detailed adjustment steps, please refer to Rigid Tapping Adjustment.
T800：[S1]1064、1066~1067，[S2] 6064、6066~6067。

1065	[S1] Acceleration compensation of spindle 1 rigid tapping
1168	[S1] Acceleration compensation of spindle 2 rigid tapping
1169	[S1] Acceleration compensation of spindle 3 rigid tapping
6065	[S2] Acceleration compensation of spindle 1 rigid tapping
6168	[S2] Acceleration compensation of spindle 2 rigid tapping
6169	[S2] Acceleration compensation of spindle 3 rigid tapping

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： During rigid tapping, set the compensation amount of the slave axis's acceleration speed. The larger the set value is, the better the compensation in acceleration and deceleration speed section during tapping will be. The error in this section will also be smaller. But if the value exceeds some amount, larger vibration of the machine will be produced, and hence the effects will be negative. The deviation will be larger and larger. For detailed adjustment steps, please refer to Rigid Tapping Adjustment.
T800：[S1]1065、1068~1069，[S2]6065、6068~6069。

1066	[S1] Filter factor of spindle 1 velocity in rigid tapping(0~20)
1170	[S1] Filter factor of spindle 2 velocity in rigid tapping(0~20)
1171	[S1] Filter factor of spindle 3 velocity in rigid tapping(0~20)
6066	[S2] Filter factor of spindle 1 velocity in rigid tapping(0~20)
6170	[S2] Filter factor of spindle 2 velocity in rigid tapping(0~20)
6171	[S2] Filter factor of spindle 3 velocity in rigid tapping(0~20)

Range： 0 ~ 20
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Set the filter intensity of slave axis's speed compensation during rigid tapping. If the speed compensative value (Pr. 1064, 1166, 1167) is added during rigid tapping, vibration of the machine is produced, and this parameter can be set to make the vibration during rigid tapping become smaller. But if the larger the set value is, the deviation of tapping will be bigger. Set the parameter to 0, which indicates not to enable this function, no filter effect.
T800：[S1]1066、1170~1171，[S2]6066、6170~6171。

1069	[S1] Check range of spindle 1 stop in rigid tapping(Pulse)
1174	[S1] Check range of spindle 2 stop in rigid tapping(Pulse)
1175	[S1] Check range of spindle 3 stop in rigid tapping(Pulse)
6069	[S2] Check range of spindle 1 stop in rigid tapping(Pulse)
6174	[S2] Check range of spindle 2 stop in rigid tapping(Pulse)
7175	[S2] Check range of spindle 3 stop in rigid tapping(Pulse)

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 20
Unit： Pulse
Function： N/A
Description： Set the check range when spindle stops in rigid tapping mode.
T800：[S1]1069、1174~1175，[S2]6069、6174~6175。

1070	[S1] Filter factor of spindle 1 acceleration in rigid tapping(0~20)
1172	[S1] Filter factor of spindle 2 acceleration in rigid tapping(0~20)
1173	[S1] Filter factor of spindle 3 acceleration in rigid tapping(0~20)
6070	[S2] Filter factor of spindle 1 acceleration in rigid tapping(0~20)
6172	[S2] Filter factor of spindle 2 acceleration in rigid tapping(0~20)
6173	[S2] Filter factor of spindle 3 acceleration in rigid tapping(0~20)

Range： 0 ~ 20
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Set the filter intensity of the slave axis's acceleration speed compensation during rigid tapping. If the acceleration speed compensative value (Pr. 1065, 1170, 1171) is added during rigid tapping, and the vibration of the machine is produced, this parameter can be set to make the vibration become smaller. But if the set value is larger, the deviation will be larger as well. Set this parameter to 0, which indicates not to enable this function, no filter effect.
T800：[S1]1070、1172~1273，[S2]6070、6172~6273。

1075	[S1] Maximum servolag in spindle positioning(Pulse)
6075	[S2] Maximum servolag in spindle positioning(Pulse)

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 4096
Unit： Pulse
Function： N/A
Description： This parameter sets the max. servo lag for spindle orientation. When the servo lag of spindle exceeds this parameter's set value, the alarm "MOT 4055 SERVO LAG OVERFLOW" will be triggered.

When spindle rotates at a constant speed, its servo lag can be deduced from the formula below:

$\text{lag} = \frac{F}{Kp}$，In this formula, F is the RPM, and Kp is the close loop gain of spindle.

As indicated by the formula, the larger the RPM is, the more the servo lag will be. Hence, simply put the highest speed of spindle into the formula above, the max. servo lag of spindle will be produced.

When the machine functions normally, the servo lag amount of spindle should not exceed lag at any time. Hence, the recommendation is to multiply this value by a safe coefficient (about 1.1) and enter the corresponding parameter.

1076	[S1] Deceleration time of spindle 1 rigid tapping per 1000RPM(ms)
1176	[S1] Deceleration time of spindle 2 rigid tapping per 1000RPM(ms)
1177	[S1] Deceleration time of spindle 3 rigid tapping per 1000RPM(ms)
6076	[S2] Deceleration time of spindle 1 rigid tapping per 1000RPM(ms)
6176	[S2] Deceleration time of spindle 2 rigid tapping per 1000RPM(ms)
6177	[S2] Deceleration time of spindle 3 rigid tapping per 1000RPM(ms)

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： ms
Function： N/A
Description： Set the duration for spindle to stop per 1000rpm during rigid tapping. This parameter will affect hole-bottom's position during rigid tapping.
T800：[S1]1069、1174~1175，[S2]6069、6174~6175。

1095	[S1] Home of spindle CH positioning(0.001deg)
6095	[S2] Home of spindle CH positioning(0.001deg)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： 0.001deg
Function： TI050011
Description： The HOME position of spindle C(H) positioning (relative to the offset angle of the positioning reference point)

1117	[S1] Speed of spindle CH positioning(0.001deg/min)
6117	[S2] Speed of spindle CH positioning(0.001deg/min)

Range： 1 ~ 2000000
Active： Enable after RESET
Level： Maker
Default： 36000
Unit： 0.001deg/min
Function： TI050011
Description： The RPM when spindle executes C(H) positioning.

1121	[S1] JOG speed of type 1 of 1st spindle(RPM)
1122	[S1] JOG speed of type 1 of 2nd spindle(RPM)
1123	[S1] JOG speed of type 1 of 3rd spindle(RPM)
6121	[S2] JOG speed of type 1 of 1st spindle(RPM)
6122	[S2] JOG speed of type 1 of 2nd spindle(RPM)
6123	[S2] JOG speed of type 1 of 3rd spindle(RPM)

Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 200
Unit： RPM
Function： TI050012
Description： When the spindle type 1 JOG C BIT is ON, spindle will take the RPM set by this parameter to rotate.

1124	[S1] JOG speed of type 2 of 1st spindle(RPM)
1125	[S1] JOG speed of type 2 of 2nd spindle(RPM)
1126	[S1] JOG speed of type 2 of 3rd spindle(RPM)
6124	[S2] JOG speed of type 2 of 1st spindle(RPM)
6125	[S2] JOG speed of type 2 of 2nd spindle(RPM)
6126	[S2] JOG speed of type 2 of 3rd spindle(RPM)

Range： 1 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 200
Unit： RPM
Function： TI050012
Description： When the spindle type 2 JOG C BIT is ON, spindle will take the RPM set by this parameter to rotate.

1201	Master axis number of 1st synchronous control(0:Disable,1~9:Card1,11~19:Card2)
1202	Slave axis number of 1st synchronous control(0:Disable,1~9:Card1,11~19:Card2)
1231	Master axis number of 2nd synchronous control(0:Disable,1~9:Card1,11~19:Card2)
1232	Slave axis number of 2nd synchronous control(0:Disable,1~9:Card1,11~19:Card2)
1261	Master axis number of 3rd synchronous control(0:Disable,1~9:Card1,11~19:Card2)
1262	Slave axis number of 3rd synchronous control(0:Disable,1~9:Card1,11~19:Card2)

Range： 0 ~ 19
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0：Not applied .
1~9：Corresponding to the 1st motion card's 1~9 axes.
11~19：Corresponding to the 2nd motion card's 1~9 axes.

1203	Master axis encoder pulses per rev of 1st synchronous control(Pulse)
1204	Slave axis encoder pulses per rev of 1st synchronous control(Pulse)
1233	Master axis encoder pulses per rev of 2nd synchronous control(Pulse)
1234	Slave axis encoder pulses per rev of 2nd synchronous control(Pulse)
1263	Master axis encoder pulses per rev of 3rd synchronous control(Pulse)
1264	Slave axis encoder pulses per rev of 3rd synchronous control(Pulse)

Range： 1 ~ 32767
Active： Enable after restart system
Level： Maker
Default： 1024
Unit： pulse
Function： TI050010
Description： The pulses per rev of encoder.

1205	**Tracking direction of 1st synchronous control(0:Same,1:Opposite)**
1235	**Tracking direction of 2nd synchronous control(0:Same,1:Opposite)**
1265	**Tracking direction of 3rd synchronous control(0:Same,1:Opposite)**

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： The direction of synchronization control can be divided into 0: same, 1: opposite. Same indicates that the slave axis will follow the same direction as the master axis to perform synchronous motion. Opposite indicates that the slave axis will perform synchronous motion with the opposite direction of the master axis. The position of the master and slave axes is shown as the diagram below:

Same Direction

Opposite Direction

1206	**Master axis reference point signal of 1st synchronous control(0:Index,1:Sensor)**
1207	**Slave axis reference point signal of 1st synchronous control(0:Index,1:Sensor)**
1236	**Master axis reference point signal of 2nd synchronous control(0:Index,1:Sensor)**
1237	**Slave axis reference point signal of 2nd synchronous control(0:Index,1:Sensor)**
1266	**Master axis reference point signal of 3rd synchronous control(0:Index,1:Sensor)**
1267	**Slave axis reference point signal of 3rd synchronous control(0:Index,1:Sensor)**

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0: Index, 1: Sensor

1208	Master axis sensor number of 1st synchronous control(1~2:Card1,101~102:Card2)
1209	Slave axis sensor number of 1st synchronous control(1~2:Card1,101~102:Card2)
1238	Master axis sensor number of 2nd synchronous control(1~2:Card1,101~102:Card2)
1239	Slave axis sensor number of 2nd synchronous control(1~2:Card1,101~102:Card2)
1268	Master axis sensor number of 3rd synchronous control(1~2:Card1,101~102:Card2)
1269	Slave axis sensor number of 3rd synchronous control(1~2:Card1,101~102:Card2)

Range： 1 ~ 102
Active： Enable after restart system
Level： Maker
Default： 2
Unit： N/A
Function： TI050010
Description： 1~2： Corresponding to the 1st motion card's 1~2 Local Input.
101~102：Corresponding to the 2nd motion card's 1~2 Local Input.

1210	Master axis sensor type of 1st synchronous control(0:NC,1:NO)
1211	Master axis sensor type of 1st synchronous control(0:NC,1:NO)
1240	Master axis sensor type of 2nd synchronous control(0:NC,1:NO)
1241	Master axis sensor type of 2nd synchronous control(0:NC,1:NO)
1270	Master axis sensor type of 3rd synchronous control(0:NC,1:NO)
1271	Master axis sensor type of 3rd synchronous control(0:NC,1:NO)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0: The type of the sensor is normally close.
1: The type of the sensor is normally open.

1212	Control type of 1st synchronous control(0:Simple,1:Tracking)
1242	Control type of 2nd synchronous control(0:Simple,1:Tracking)
1272	Control type of 3rd synchronous control(0:Simple,1:Tracking)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0: Simple spindle synchronous control
1: Tracking spindle synchronous control

1213	**Slave axis command type of 1st synchronous control(0:Pulse,1:Vcmd)**
1243	**Slave axis command type of 2nd synchronous control(0:Pulse,1:Vcmd)**
1273	**Slave axis command type of 3rd synchronous control(0:Pulse,1:Vcmd)**

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0: The command type of slave axis is Pulse.
1: The command type of slave axis is closed loop.

1214	**Slave axis closed loop gain of 1st synchronous control(1/sec)**
1244	**Slave axis closed loop gain of 2nd synchronous control(1/sec)**
1274	**Slave axis closed loop gain of 3rd synchronous control(1/sec)**

Range： 0 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 30
Unit： 1/sec
Function： TI050010
Description： When the command type of the slave axis is closed loop, this parameter sets the close loop gain of the slave axis (1/Sec). The purpose is to adjust the rigidness of the slave axis

1215	**Slave axis change command type Kp gain of 1st synchronous control(1/sec)**
1245	**Slave axis change command type Kp gain of 2nd synchronous control(1/sec)**
1275	**Slave axis change command type Kp gain of 3rd synchronous control(1/sec)**

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 200
Unit： 1/sec
Function： TI050010
Description： When spindle synchronization control is tracking and the command type of slave axis is closed loop, this parameter sets the Kp gain of the slave axis's command type changing.

1216	Slave axis change command type Ki gain of 1st synchronous control(ms)
1246	Slave axis change command type Ki gain of 2nd synchronous control(ms)
1276	Slave axis change command type Ki gain of 3rd synchronous control(ms)

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 400
Unit： ms
Function： TI050010
Description： When spindle synchronous control is tracking and command type of slave axis is closed loop, this parameter sets the Ki gain of slave axis's command type changing.

1217	Slave axis change command type check time of 1st synchronous control(ms)
1247	Slave axis change command type check time of 2nd synchronous control(ms)
1277	Slave axis change command type check time of 3rd synchronous control(ms)

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 500
Unit： ms
Function： TI050010
Description： When spindle synchronous control is tracking and slave axis's command type is closed loop, this parameter sets the check duration of slave axis's command type changing.

1218	Slave axis change command type check range of 1st synchronous control(Pulse)
1248	Slave axis change command type check range of 2nd synchronous control(Pulse)
1278	Slave axis change command type check range of 3rd synchronous control(Pulse)

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 50
Unit： Pulse
Function： TI050010
Description： When the spindle synchronous control is Tracking and slave axis's command type is closed loop, this parameter sets the check range of slave axis's command type changing.

1219	**Velocity compensation gain of 1st synchronous control(0~100000)**
1249	**Velocity compensation gain of 2nd synchronous control(0~100000)**
1279	**Velocity compensation gain of 3rd synchronous control(0~100000)**

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： The speed compensation gain of synchronization control.

1220	**Acc/Dec compensation gain of 1st synchronous control(-100000~100000)**
1250	**Acc/Dec compensation gain of 2nd synchronous control(-100000~100000)**
1280	**Acc/Dec compensation gain of 3rd synchronous control(-100000~100000)**

Range： -100000 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： The acceleration compensation gain in synchronization control.

1221	**Velocity compensation filter of 1st synchronous control(0:Disable,1~19)**
1251	**Velocity compensation filter of 2nd synchronous control(0:Disable,1~19)**
1281	**Velocity compensation filter of 3rd synchronous control(0:Disable,1~19)**

Range： 0 ~ 19
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0: not through filter, the bigger the number is, the stronger the filter intensity will be.

1222	**Acc/Dec compensation filter of 1st synchronous control(0:Disable,1~19)**
1252	**Acc/Dec compensation filter of 2nd synchronous control(0:Disable,1~19)**
1282	**Acc/Dec compensation filter of 3rd synchronous control(0:Disable,1~19)**

Range： 0 ~ 19
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： 0: not through filter, the bigger the number is, the stronger the filter intensity will be.

1223	**Synchronous command wait time of 1st synchronous control(ms)**
1253	**Synchronous command wait time of 2nd synchronous control(ms)**
1283	**Synchronous command wait time of 3rd synchronous control(ms)**

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： ms
Function： TI050010
Description： This parameter sets the synchronous command wait time of the synchronous control

1224	**Slave axis Acc/Dec time of 1st synchronous control(ms/1000rpm)**
1254	**Slave axis Acc/Dec time of 2nd synchronous control(ms/1000rpm)**
1284	**Slave axis Acc/Dec time of 3rd synchronous control(ms/1000rpm)**

Range： 0 ~ 10000
Active： Enable after RESET
Level： Maker
Default： 500
Unit： ms/1000rpm
Function： TI050010
Description： This parameter sets the acceleration and deceleration duration when slave axis follows the master axis in synchronous control.

1225	**Phase of 1st synchronous phase control(0.001deg)**
1255	**Phase of 2nd synchronous phase control(0.001deg)**
1285	**Phase of 3rd synchronous phase control(0.001deg)**

Range： -360000 ~ 360000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： 0.001deg
Function： TI050010
Description： When phase control is enabled, this parameter is the angle difference between master axis and slave axis.

1226	**Reference point velocity of 1st synchronous phase control(0.001deg/ms)**
1256	**Reference point velocity of 2nd synchronous phase control(0.001deg/ms)**
1286	**Reference point velocity of 3rd synchronous phase control(0.001deg/ms)**

Range： 1 ~ 36000000
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： 0.001deg/ms
Function： TI050010
Description： When phase control is enabled, this parameter is the speed when the slave axis's reference point follows master axis's reference point. If the parameter is too small, the distance between the reference point of slave axis and master axis will become bigger. When the parameter is too big, the speed will be inconsistent.

1227	**Tracking tolerance of 1st synchronous control(0.001deg)**
1257	**Tracking tolerance of 2nd synchronous control(0.001deg)**
1287	**Tracking tolerance of 3rd synchronous control(0.001deg)**

Range： 0 ~ 360000
Active： Enable after RESET
Level： Maker
Default： 10000
Unit： 0.001deg
Function： TI050010
Description： When speed or phase control is completed, NC will set this parameter as a safe check range. When the range exceeds this parameter, the alarm will be displayed by NC.

1228	**Finished signal check time of 1st synchronous control(ms)**
1258	**Finished signal check time of 2nd synchronous control(ms)**
1288	**Finished signal check time of 3rd synchronous control(ms)**

Range： 0 ~ 100000
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： ms
Function： TI050010
Description： This parameter is the duration when the deviation of synchronous control is smaller than the tolerance error. The synchronous control is completed with this condition.

1229	**Tracking error in velocity compensation gain 0 of 1st synchronous control(Pulse)**
1259	**Tracking error in velocity compensation gain 0 of 2nd synchronous control(Pulse)**
1289	**Tracking error in velocity compensation gain 0 of 3rd synchronous control(Pulse)**

Range： -999999 ~ 999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI050010
Description： When synchronous control's speed compensation gain is 0, this parameter sets the steady deviation from 0rpm to 1000rpm in spindle synchronous control.

1230	**Master axis Acc/Dec time when 1st synchronous control finished(ms/1000rpm)**
1260	**Master axis Acc/Dec time when 2nd synchronous control finished(ms/1000rpm)**
1290	**Master axis Acc/Dec time when 3rd synchronous control finished(ms/1000rpm)**

Range： 0 ~ 10000
Active： Enable after RESET
Level： Maker
Default： 500
Unit： ms/1000rpm
Function： TI050010
Description： When synchronous control is finished, this parameter controls the acceleration and deceleration duration of the master axis.

3.2.3 Electronic Controlled Parameters

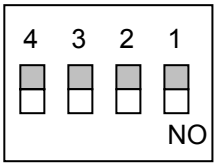
4000	Interrupt time(0.001ms)
Range：	2000 ~ 10000
Active：	Enable after restart system
Level：	Maker
Default：	3000
Unit：	0.001ms
Function：	N/A
Description：	Set the dwell cycle duration.

4001	Interrupt source(0:EPCIO1,1:EPCIO2,9:PC)
Range：	0 ~ 9
Active：	Enable after restart system
Level：	Maker
Default：	0
Unit：	N/A
Function：	N/A
Description：	0：The 1st motion card stops the source of the serving program. 1：The 2nd motion card stops the source of the serving program.

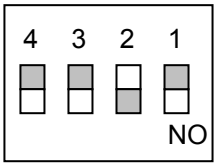
4002	1st motion control card I/O address(0:NO use,512~992)
4003	2nd motion control card I/O address(0:NO use,512~992)

Range： 0 ~ 992
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： If there are a lot of motion cards applied, please do not set this parameter to the same value. The addresses of the motions cards are as following:
0: not applied. Others are shown as the figure below. The white blocks are the extruding part of the DIP switch.

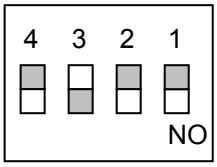
512：200H



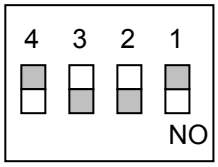
576：240H



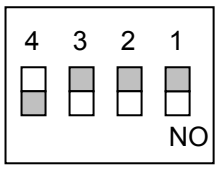
640：280H



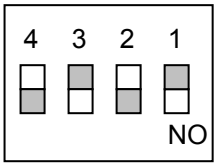
704：2C0H



768：300H



832：340H



4004	1st motion control card IRQ number(3~7)
4005	2nd motion control card IRQ number(3~7)

Range： 3 ~ 12
Active： Enable after restart system
Level： Maker
Default： 7
Unit： N/A
Function： N/A
Description： Set the IRQ Number of motion cards. If there are a lot of cards applied, please do not set this parameter to the same value.

4006	1st motion control card digital filter divider(KHz)
4007	2nd motion control card digital filter divider(KHz)

Range： 0 ~ 6666
Active： Enable after restart system
Level： Maker
Default： 0
Unit： KHz
Function： TI060038
Description： When the system detects a pulse signal and the frequency is larger than the digital filter frequency set by this parameter, the system will regard this signal as noise interference and make it filtered to ensure that the valid signals are not interrupted to cause distortion.

The valid minimum digital filter frequency of this function is 26KHz. When the parameter's set value is smaller than 26KHz, the system will take 26KHz as the filter frequency automatically.

The valid maximum digital filter frequency of this function is 6666KHz. When the parameter's set value is larger than 6666KHz, the system will take 6666KHz as the filter frequency automatically.

When this parameter is set to 0 (default value), it indicates that the digital filter frequency is not applied. The Encoder signal input frequency that the system can accept is no larger than 6666KHz.

4008	1st motion control card DA divider
4009	2nd motion control card DA divider

Range： 0 ~ 255
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： This parameter can set the DA divider of the motion control card. In general, please apply the default value.

4010	[S1] Channel no for X axis(0:Disable,1~6:Card1,11~16:Card2)
4011	[S1] Channel no for Y axis(0:Disable,1~6:Card1,11~16:Card2)
4012	[S1] Channel no for Z axis(0:Disable,1~6:Card1,11~16:Card2)
4013	[S1] Channel no for 4th axis(0:Disable,1~6:Card1,11~16:Card2)
9010	[S2] Channel no for X axis(0:Disable,1~6:Card1,11~16:Card2)
9011	[S2] Channel no for Y axis(0:Disable,1~6:Card1,11~16:Card2)
9012	[S2] Channel no for Z axis(0:Disable,1~6:Card1,11~16:Card2)
9013	[S2] Channel no for 4th axis(0:Disable,1~6:Card1,11~16:Card2)

Range： 0 ~ 16
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Not applied.
1~6：Corresponding to the 1st motion control card's 1~6 axes.
11~16：Corresponding to the 2nd motion control card's 1~6 axes.

4030	[S1] X axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
4031	[S1] Y axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
4032	[S1] Z axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
4033	[S1] 4th axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
9030	[S2] X axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
9031	[S2] Y axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
9032	[S2] Z axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)
9033	[S2] 4th axis output format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Vcmd)

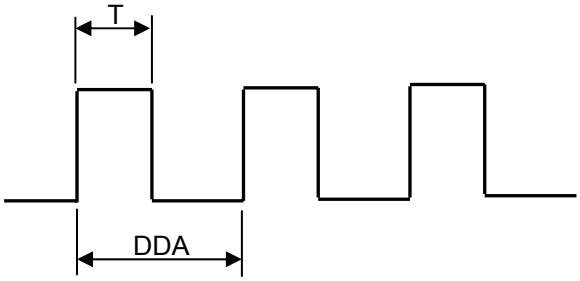
Range： 0 ~ 3
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：AB phase。
1：CW/CCW。
2：Pulse Direction。
3：Close loop.

4040	[S1] X axis pulse command inverse(0:No,1:Yes)
4041	[S1] Yaxis pulse command inverse(0:No,1:Yes)
4042	[S1] Z axis pulse command inverse(0:No,1:Yes)
4043	[S1] 4th axis pulse command inverse(0:No,1:Yes)
9040	[S2] X axis pulse command inverse(0:No,1:Yes)
9041	[S2] Y axis pulse command inverse(0:No,1:Yes)
9042	[S2] Z axis pulse command inverse(0:No,1:Yes)
9043	[S2] 4th axis pulse command inverse(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Pulse command is not inversed.
1：Pulse command is inversed.

4050	[S1] X axis pulse output width(0~25000ns)
4051	[S1] Y axis pulse output width(0~25000ns)
4052	[S1] Z axis pulse output width(0~25000ns)
4053	[S1] 4th axis pulse output width(0~25000ns)
9050	[S2] X axis pulse output width(0~25000ns)
9051	[S2] Y axis pulse output width(0~25000ns)
9052	[S2] Z axis pulse output width(0~25000ns)
9053	[S2] 4th axis pulse output width(0~25000ns)

Range： 0 ~ 25000
Active： Enable after restart system
Level： Maker
Default： 1000
Unit： ns
Function： N/A
Description： This parameter is the cycle width of the output signal of pulse command in each axis. The figure is shown as below. DDA is the dwell duration.



4060	[S1] X axis position loop gain(1/s)
4061	[S1] Y axis position loop gain(1/s)
4062	[S1] Z axis position loop gain(1/s)
4063	[S1] 4th axis position loop gain(1/s)
9060	[S2] X axis position loop gain(1/s)
9061	[S2] Y axis position loop gain(1/s)
9062	[S2] Z axis position loop gain(1/s)
9063	[S2] 4th axis position loop gain(1/s)

Range： 1 ~ 999
Active： Enable after restart system
Level： Maker
Default： 30
Unit： 1/s
Function： N/A
Description： When the Pulse command type of each servo axis is close loop, this parameter sets the close loop gain of each axis (1/sec). The purpose is to adjust the rigidness of servo axis.

4070	[S1] X axis servo analog input gain(RPM/1V)
4071	[S1] Y axis servo analog input gain(RPM/1V)
4072	[S1] Z axis servo analog input gain(RPM/1V)
4073	[S1] 4th axis servo analog input gain(RPM/1V)
9070	[S2] X axis servo analog input gain(RPM/1V)
9071	[S2] Y axis servo analog input gain(RPM/1V)
9072	[S2] Z axis servo analog input gain(RPM/1V)
9073	[S2] 4th axis servo analog input gain(RPM/1V)

Range： 1 ~ 10000
Active： Enable after restart system
Level： Maker
Default： 300
Unit： RPM/1V
Function： N/A
Description： When the Pulse command type of each servo axis is close loop, this parameter sets the servo voltage input gain for each axis.

4090	[S1] X axis revolution of encoder(Pulse)
4091	[S1] Yaxis revolution of encoder(Pulse)
4092	[S1] Z axis revolution of encoder(Pulse)
4093	[S1] 4th axis revolution of encoder(Pulse)
9090	[S2] X axis revolution of encoder(Pulse)
9091	[S2] Yaxis revolution of encoder(Pulse)
9092	[S2] Z axis revolution of encoder(Pulse)
9093	[S2] 4th axis revolution of encoder(Pulse)

Range： 1 ~ 999999
Active： Enable after restart system
Level： Maker
Default： 2500
Unit： N/A
Function： N/A
Description： This parameter sets the pulse per revolution of each axis.

4100	[S1] X axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
4101	[S1] Y axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
4102	[S1] Z axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
4103	[S1] 4th axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9100	[S2] X axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9101	[S2] Y axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9102	[S2] Z axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9103	[S2] 4th axis encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)

Range： 0 ~ 3
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：AB phase。
1：CW/CCW。
2：Pulse Direction。
3：Not Applied。

4110	[S1] X axis encoder signal inverse(0:No,1:Yes)
4111	[S1] Y axis encoder signal inverse(0:No,1:Yes)
4112	[S1] Z axis encoder signal inverse(0:No,1:Yes)
4113	[S1] 4th axis encoder signal inverse(0:No,1:Yes)
9110	[S2] X axis encoder signal inverse(0:No,1:Yes)
9111	[S2] Y axis encoder signal inverse(0:No,1:Yes)
9112	[S2] Z axis encoder signal inverse(0:No,1:Yes)
9113	[S2] 4th axis encoder signal inverse(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Encoder signal is not inversed。
1：Encoder signal is inversed。

4120	[S1] X axis encoder input multiply(1:x1,2:x2,4:x4)
4121	[S1] Y axis encoder input multiply(1:x1,2:x2,4:x4)
4122	[S1] Z axis encoder input multiply(1:x1,2:x2,4:x4)
4123	[S1] 4th axis encoder input multiply(1:x1,2:x2,4:x4)
9120	[S2] X axis encoder input multiply(1:x1,2:x2,4:x4)
9121	[S2] Y axis encoder input multiply(1:x1,2:x2,4:x4)
9122	[S2] Z axis encoder input multiply(1:x1,2:x2,4:x4)
9123	[S2] 4th axis encoder input multiply(1:x1,2:x2,4:x4)

Range： 1 ~ 4
Active： Enable after restart system
Level： Maker
Default： 4
Unit： N/A
Function： N/A
Description： When servo encoder’s signal type is set to A/B Phase, Encoder can set the feedback override from this parameter.
1：Encoder feedback x1。
2：Encoder feedback x2。
4：Encoder feedback x 4。

4200	[S1] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
4201	[S1] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
4202	[S1] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
4203	[S1] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
4204	[S1] Axis number of mpg dry-run handle signal(0:Disable,1~9:Card1,11~19:Card2)
9200	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
9201	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
9202	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
9203	[S2] Axis number of X axis handle signal(0:Disable,1~9:Card1,11~19:Card2)
9204	[S2] Axis number of mpg dry-run handle signal(0:Disable,1~9:Card1,11~19:Card2)

Range： 0 ~ 19
Active： Enable after restart system
Level： Maker
Default： 7
Unit： N/A
Function： TI060026
Description： 0：Not Applied。
1~9：Corresponding to the 1st motion control card's 1~9 Encoder。
11~19：Corresponding to the 2nd motion control card's 1~9 Encoder 1~9 Encoder。

4210	[S1] X axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
4211	[S1] Y axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
4212	[S1] Z axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
4213	[S1] 4th axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
4214	[S1] Handle for mpg dry-run signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
9210	[S2] X axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
9211	[S2] Y axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
9212	[S2] Z axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
9213	[S2] 4th axis handle signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)
9214	[S2] Handle for mpg dry-run signal format(0:A/B,1:CW/CCW,2:Pulse/Dir)

Range： 0 ~ 2
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060026
Description： 0：AB phase。
1：CW/CCW。
2：Pulse Direction。

4220	[S1] X axis handle signal inverse(0:No,1:Yes)
4221	[S1] Y axis handle signal inverse(0:No,1:Yes)
4222	[S1] Z axis handle signal inverse(0:No,1:Yes)
4223	[S1] 4th axis handle signal inverse(0:No,1:Yes)
4224	[S1] Handle for mpg dry-run signal inverse(0:No,1:Yes)
9220	[S2] X axis handle signal inverse(0:No,1:Yes)
9221	[S2] Y axis handle signal inverse(0:No,1:Yes)
9222	[S2] Z axis handle signal inverse(0:No,1:Yes)
9223	[S2] 4th axis handle signal inverse(0:No,1:Yes)
9224	[S2] Handle for mpg dry-run signal inverse(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060026
Description： 0：MPG signal is not inversed.
1：MPG signal is inversed.

4230	[S1] X axis handle input multiply(x1~100)
4231	[S1] Y axis handle input multiply(x1~100)
4232	[S1] Z axis handle input multiply(x1~100)
4233	[S1] 4th axis handle input multiply(x1~100)
4234	[S1] Handle for mpg dry-run input multiply(x1~100)
9230	[S2] X axis handle input multiply(x1~100)
9231	[S2] Y axis handle input multiply(x1~100)
9232	[S2] Z axis handle input multiply(x1~100)
9233	[S2] 4th axis handle input multiply(x1~100)
9234	[S2] Handle for mpg dry-run input multiply(x1~100)

Range： 1 ~ 100
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： TI060026
Description： This parameter sets the handle input multiply.

4300	[S1] Channel no for 1st Spindle(0:Disable,1~9:Card1,11~19:Card2)
4301	[S1] Channel no for 2nd Spindle(0:Disable,1~9:Card1,11~19:Card2)
4302	[S1] Channel no for 3rd Spindle(0:Disable,1~9:Card1,11~19:Card2)
9300	[S2] Channel no for 1st Spindle(0:Disable,1~9:Card1,11~19:Card2)
9301	[S2] Channel no for 2nd Spindle(0:Disable,1~9:Card1,11~19:Card2)
9302	[S2] Channel no for 3rd Spindle(0:Disable,1~9:Card1,11~19:Card2)

Range： 0 ~ 19
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Not applied。
1~9：Corresponding to the 1st motion control card's 1~9 axes.
11~19：Corresponding to the 2nd motion control card's 1~9 axes.

4310	[S1] 1st spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)
4311	[S1] 2nd spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)
4312	[S1] 3rd spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)
9310	[S2] 1st spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)
9311	[S2] 2nd spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)
9312	[S2] 3rd spd signal format(0:A/B,1:CW/CCW,2:P/D,3:DA10V,4:DA+-10V)

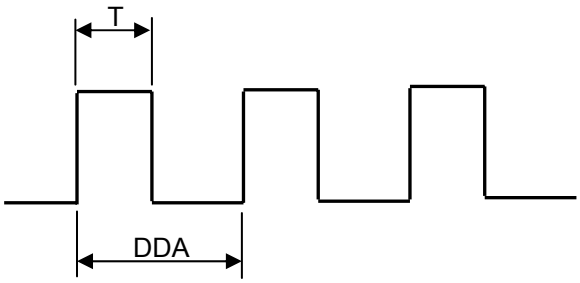
Range： 0 ~ 5
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：AB phase。
1：CW/CCW。
2：Pulse Direction。
3：DA(0V~10V)。
4：DA(-10V~10V)。

4320	[S1] 1st spindle pulse command inverse(0:No,1:Yes)
4321	[S1] 2nd spindle pulse command inverse(0:No,1:Yes)
4322	[S1] 3rd spindle pulse command inverse(0:No,1:Yes)
9320	[S2] 1st spindle pulse command inverse(0:No,1:Yes)
9321	[S2] 2nd spindle pulse command inverse(0:No,1:Yes)
9322	[S2] 3rd spindle pulse command inverse(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Pulse command is not inversed.
1：Pulse command is inversed.

4330	[S1] 1st spindle pulse output width(0~25000ns)
4331	[S1] 2nd spindle pulse output width(0~25000ns)
4332	[S1] 3rd spindle pulse output width(0~25000ns)
9330	[S2] 1st spindle pulse output width(0~25000ns)
9331	[S2] 2nd spindle pulse output width(0~25000ns)
9332	[S2] 3rd spindle pulse output width(0~25000ns)

Range： 0 ~ 25000
Active： Enable after restart system
Level： Maker
Default： 1000
Unit： ns
Function： N/A
Description： This parameter is Pulse command output signal of each spindle's cycle width. Figure is shown as below. In the figure, DDA is the dwell duration.



4340	[S1] 1st spindle position loop gain(1/s)
4341	[S1] 2nd spindle position loop gain(1/s)
4342	[S1] 3rd spindle position loop gain(1/s)
9340	[S2] 1st spindle position loop gain(1/s)
9341	[S2] 2nd spindle position loop gain(1/s)
9342	[S2] 3rd spindle position loop gain(1/s)

Range： 1 ~ 999
Active： Enable after restart system
Level： Maker
Default： 30
Unit： 1/s
Function： N/A
Description： When the Pulse command type of each spindle is close loop, this parameter is used to set the close loop gain (1/Sec) of each spindle. The purpose is to adjust the rigidness of each spindle.

4350	[S1] 1st spindle servo analog input gain(RPM/1V)
4351	[S1] 2nd spindle servo analog input gain(RPM/1V)
4352	[S1] 3rd spindle servo analog input gain(RPM/1V)
9350	[S2] 1st spindle servo analog input gain(RPM/1V)
9351	[S2] 2nd spindle servo analog input gain(RPM/1V)
9352	[S2] 3rd spindle servo analog input gain(RPM/1V)

Range： 1 ~ 10000
Active： Enable after restart system
Level： Maker
Default： 600
Unit： RPM/1V
Function： N/A
Description： When the Pulse command type of each spindle is close loop, this parameter is used to set the analog input gain of each spindle.

4360	[S1] 1st spindle revolution of encoder(Pulse)
4361	[S1] 2nd spindle revolution of encoder(Pulse)
4362	[S1] 3rd spindle revolution of encoder(Pulse)
9360	[S2] 1st spindle revolution of encoder(Pulse)
9361	[S2] 2nd spindle revolution of encoder(Pulse)
9362	[S2] 3rd spindle revolution of encoder(Pulse)

Range： 1 ~ 999999
Active： Enable after restart system
Level： Maker
Default： 1024
Unit： pulse
Function： N/A
Description： This parameter sets the pulse per revolution of each spindle.

4370	[S1] 1st spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
4371	[S1] 2nd spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
4372	[S1] 3rd spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9370	[S2] 1st spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9371	[S2] 2nd spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)
9372	[S2] 3rd spindle encoder signal format(0:A/B,1:CW/CCW,2:Pulse/Dir,3:Disable)

Range： 0 ~ 3
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：AB phase。
1：CW/CCW。
2：Pulse Direction。
3：Not applied.

4380	[S1] 1st spindle encoder signal inverse(0:No,1:Yes)
4381	[S1] 2nd spindle encoder signal inverse(0:No,1:Yes)
4382	[S1] 3rd spindle encoder signal inverse(0:No,1:Yes)
9380	[S2] 1st spindle encoder signal inverse(0:No,1:Yes)
9381	[S2] 2nd spindle encoder signal inverse(0:No,1:Yes)
9382	[S2] 3rd spindle encoder signal inverse(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Encoder signal is not inversed.
1：Encoder signal is inversed.

4390	[S1] 1st spindle encoder input multiply(1:x1,2:x2,4:x4)
4391	[S1] 2nd spindle encoder input multiply(1:x1,2:x2,4:x4)
4392	[S1] 3rd spindle encoder input multiply(1:x1,2:x2,4:x4)
9390	[S2] 1st spindle encoder input multiply(1:x1,2:x2,4:x4)
9391	[S2] 2nd spindle encoder input multiply(1:x1,2:x2,4:x4)
9392	[S2] 3rd spindle encoder input multiply(1:x1,2:x2,4:x4)

Range： 1 ~ 4
Active： Enable after restart system
Level： Maker
Default： 4
Unit： N/A
Function： N/A
Description： When the signal type of the spindle's encoder is set to A/B Phase, Encoder can set feedback rate by this parameter.
1：Encoder feedback x1。
2：Encoder feedback x2。
4：Encoder feedback x4。

4900	1st motion control card clock select(0:40Mhz,1:ISA bus)
4901	2nd motion control card clock select(0:40Mhz,1:ISA bus)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：The motion control card's clock select is 40Mhz.
1：The motion control card's clock select is ISA Bus。

4910	Base address of A/D conversion card(0:Disable,512~992)

Range： 0 ~ 992
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060016
Description： Set the base address of A/D conversion card.
0：Not applied.

4911	A/D conversion(0:Disable,1~8:Eanble)

Range： 0 ~ 8
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060016
Description：
0：Not applied.
1：Enable A/D conversion group 1.
2：Enable A/D conversion group 1~2.
3：Enable A/D conversion group 1~3.
4：Enable A/D conversion group 1~4.
5：Enable A/D conversion group 1~5.
6：Enable A/D conversion group 1~6.
7：Enable A/D conversion group 1~7.
8：Enable A/D conversion group 1~8.

4912	Voltage range of 1st A/D conversion(0~8)
4913	Voltage range of 2nd A/D conversion(0~8)
4914	Voltage range of 3rd A/D conversion(0~8)
4915	Voltage range of 4th A/D conversion(0~8)
4916	Voltage range of 5th A/D conversion(0~8)
4917	Voltage range of 6th A/D conversion(0~8)
4918	Voltage range of 7th A/D conversion(0~8)
4919	Voltage range of 8th A/D conversion(0~8)

Range： 0 ~ 8
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060016
Description：
0：-5V ~ +5V
1：-2.5V ~ +2.5V
2：-1.25V ~ +1.25V
3：-0.625V ~ +0.625V
4：0V ~ +10V
5：0V ~ +5V
6：0V ~ +2.5V
7：0V ~ +1.25V
8：-10V ~ +10V

4920	Output minimum of 1st A/D conversion(-4096~4096)
4921	Output maximum of 1st A/D conversion(-4096~4096)
4922	Output minimum of 2nd A/D conversion(-4096~4096)
4923	Output maximum of 2nd A/D conversion(-4096~4096)
4924	Output minimum of 3rd A/D conversion(-4096~4096)
4925	Output maximum of 3rd A/D conversion(-4096~4096)
4926	Output minimum of 4th A/D conversion(-4096~4096)
4927	Output maximum of 4th A/D conversion(-4096~4096)
4928	Output minimum of 5th A/D conversion(-4096~4096)
4929	Output maximum of 5th A/D conversion(-4096~4096)
4930	Output minimum of 6th A/D conversion(-4096~4096)
4931	Output maximum of 6th A/D conversion(-4096~4096)
4932	Output minimum of 7th A/D conversion(-4096~4096)
4933	Output maximum of 7th A/D conversion(-4096~4096)
4934	Output minimum of 8th A/D conversion(-4096~4096)
4935	Output maximum of 8th A/D conversion(-4096~4096)

Range： -4096 ~ 4096
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060016
Description： The maximum and minimum values after A/D conversion. The maximum value can not be larger than the minimum value in the same group; otherwise, the alarm will be triggered.

4940	COM1 base address(0:Disable,744~1016)

Range： 744 ~ 1016
Active： Enable after restart system
Level： Maker
Default： 1016
Unit： N/A
Function： N/A
Description： Set the base address of COM1.

0：Not applied.

4941	COM2 base address(0:Disable,744~1016)

Range： 744 ~ 1016
Active： Enable after restart system
Level： Maker
Default： 760
Unit： N/A
Function： N/A
Description： Set the base address of COM2.

0：Not applied.

4942 **COM1 IRQ number(3~7)**

Range： 3 ~ 7
Active： Enable after restart system
Level： Maker
Default： 4
Unit： N/A
Function： N/A
Description： Set the IRQ number of COM1.

4943 **COM2 IRQ number(3~7)**

Range： 3 ~ 7
Active： Enable after restart system
Level： Maker
Default： 3
Unit： N/A
Function： N/A
Description： Set the IRQ number of COM2.

3.2.4 Machining Parameters

124	[S1] Moving command of system afetr power on(0:G00,1:G01)
5124	[S2] Moving command of system afetr power on(0:G00,1:G01)

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： This parameter sets the default motion commands after NC starts. In MEM or MDI mode, users execute the commands below for the first time:

G91 X100. Y100. Z100.;
When this parameter is set to 0, the command above is the same as:
G91 G00 X100. Y100. Z100.;

When this parameter is set to 0, the command above is the same as:
G91 G01 X100. Y100. Z100.;

125	[S1] Number of tool compensation T code(0:Low 2 digits,1:High 2 digits)
5125	[S2] Number of tool compensation T code(0:Low 2 digits,1:High 2 digits)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060019
Description： 1：Take high 2 digits of T code as the tool compensation code.
0：Take low 2 digits of T code as the tool compensation code.

126	[S1] Enable T0 offset cancel(0:No,1:Yes)
5126	[S2] Enable T0 offset cancel(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： TI060019
Description： This parameter cancels tool compensation when users command is T0.

When this parameter is set to 1, it indicates that T0 command can be applied by the command of “cancel tool compensation.”

127	[S1] Digits of T code(0:4 digits,1:2 digits)
5127	[S2] Digits of T code(0:4 digits,1:2 digits)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060019
Description： When this parameter is set to 0, the input format of T code is Taabb, and aa is tool number, bb is compensative number.
When this parameter is set to 1, the input type of T code is Taa, at this time, the tool number and compensative number are both aa.

130	[S1] Unit of input value(0:Minimum unit of system,1:As system unit)
5130	[S2] Unit of input value(0:Minimum unit of system,1:As system unit)

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： In metric system, if this parameter is set to 0, and the commands as below are set in MDI mode：
G90 G00 X100. F1000.; X axis travels at the rate of 1mm/min to the position at 0.1mm.

If this parameter is set to 1：
G90 G00 X100. F1000.; X axis travels at the rate of 1000mm/min to the position at 100mm.

135	[S1] Default coordinate of system(0:Absolute G90,1:Relative G91)
5135	[S2] Default coordinate of system(0:Absolute G90,1:Relative G91)

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： The system’s default coordinate type is:
0：Absolute coordinates (G90)
1：Incremental coordinates (G91)

150	[S1] G83/G87 return amount(μm)
5150	[S2] G83/G87 return amount(μm)

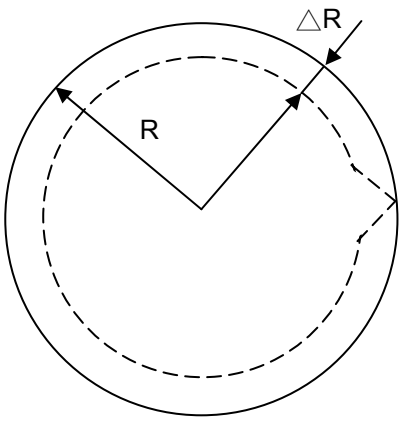
Range： 0 ~ 32767
Active： Enable after RESET
Level： End User
Default： 200
Unit： μm
Function： N/A
Description： This parameter sets the return distance of Z axis in G73 Peak command. The returning distance is used to clean the chips.

154	[S1] Over cutting check of G71/G72 profile(0:Yes,1:No)
5154	[S2] Over cutting check of G71/G72 profile(0:Yes,1:No)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： When executing G71/G72, set whether or not to enable profile check.

187	[S1] Feedrate clamping of circle or arc(0:No,1:Yes)
5187	[S2] Feedrate clamping of circle or arc(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： In the “acceleration/deceleration after interpolation” law, there will be an offset amount ΔR between Arc command and the actual path. $\Delta R = (\frac{1}{2K_p^2 R} + \frac{T^2}{24R})V^2$

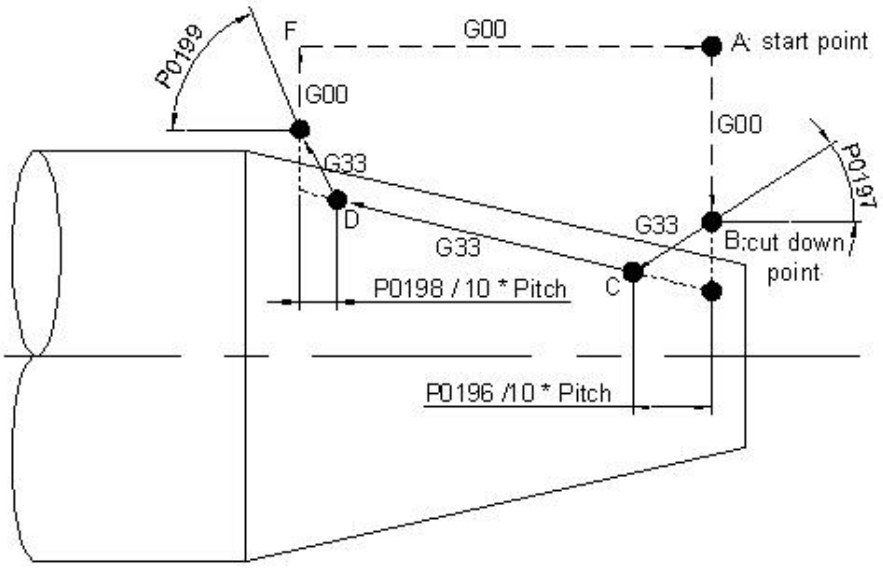


In the formula, $\frac{1}{2K_p^2 R}$ is the offset caused by servo lag. $\frac{T^2}{24R}$ is the offset caused by command lag (If acceleration/deceleration before interpolation law is adopted, then $\frac{T^2}{24R}$ is not calculated). K_p is position loop gain; T is the constant number of acceleration/deceleration time; R is arch radius; and V is the assigned feed rate. This formula is only applicable when the responding rate of speed loop is 3 ~ 10 times faster than (that of) position loop.

When AUTO ARC FEED RATE CLAMP function is enabled, the system will adjust the actual feed rate based on the assigned parameter (Maximum circle/arc contour error).
Please also refer to the relative parameters: Parameter “Position loop gain for feedrate clamping of arc” & “Maximum circle/arc contour error.”

196	[S1] Plunge chamfering length of G78(G92)(0.1 pitch)
197	[S1] Plunge chamfering angle of G78(G92)(Degree)
198	[S1] Retract chamfering length of G78(G92)(0.1 pitch)
199	[S1] Retract chamfering angle of G78(G92)(Degree)
5196	[S2] Plunge chamfering length of G78(G92)(0.1 pitch)
5197	[S2] Plunge chamfering angle of G78(G92)(Degree)
5198	[S2] Retract chamfering length of G78(G92)(0.1 pitch)
5199	[S2] Retract chamfering angle of G78(G92)(Degree)

Range： 0 ~ 85
Active： Enable after RESET
Level： End User
Default： 45
Unit： Degree
Function： N/A
Description： Parameters “Plunge chamfering length of G78(G92)” and “Plunge chamfering angle of G78(G92)” can set the angle and the reserved length when cutting down. Meanwhile, they can also make the position of one returning signal which is waiting for the spindle move up to the outside of cutting surface to avoid the unfinished thread when cutting down occurring on the part. Parameters “Retract chamfering length of G78(G92)& Retract chamfering angle of G78(G92) “ can also set the cut up length and angle of the final thread when the threading finishes, and avoid unfinished thread occurring. The figure is shown as below. The parameters are from system 1:



806	[S1] Maximum error amount during corner cutting(μ m)
5806	[S2] Maximum error amount during corner cutting(μ m)

Range： 0 ~ 32767
Active： Enable after RESET
Level： End User
Default： 50
Unit： μ m
Function： N/A
Description： This parameter influences the precision of machining. The smaller the set value is, the more the semblance is closer to the part program; nevertheless, the time required for machining is relatively longer. Also, because of some factors such as the fabrication of the machine, friction, etc., it is possible that the machine position could not reach the preset checking range, and hence the system could not finish the execution of the block in the part program. The recommended minimum value of this parameter is around 10 μ m.

808	[S1] Automatic corner override(0:Disable,1:Enable)
5808	[S2] Automatic corner override(0:Disable,1:Enable)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： If the Automatic corner override function is enabled, the system will accelerate/decelerate the corner between tool paths automatically to make path offset remain within the parameter “Maximum error amount during corner cutting.”

809	[S1] Maximum circle/arc contour error(μ m)
5809	[S2] Maximum circle/arc contour error(μ m)

Range： 1 ~ 32767
Active： Enable after RESET
Level： End User
Default： 30
Unit： μ m
Function： N/A
Description： This parameter influences the precision of spike. The smaller the set value is, the better the spike effect is, nevertheless, the time required for machining is relatively longer. Please set this parameter according to the offset range acceptable for the setting of arc sizes in actual practice. The recommended minimum set value of this parameter is around 10 μ m.

872	[S1] Plunge rate ratio of G78(G92)
5872	[S2] Plunge rate ratio of G78(G92)

Range： 1 ~ 10
Active： Enable after RESET
Level： Maker
Default： 2
Unit： N/A
Function： N/A
Description： When executing ball screw canned cycle of G78 (Type A is G92), this parameter can assign if increase the speed rate of cutting down.
Set to 1: The speed rate is the same as F.
Set to 2: 2 times of the assigned speed rate, and vice versa.

873	[S1] Retract rate ratio of G78(G92)
5873	[S2] Retract rate ratio of G78(G92)

Range： 1 ~ 10
Active： Enable after RESET
Level： Maker
Default： 2
Unit： N/A
Function： N/A
Description： When executing ball screw canned cycle of G78 (Type A is G92), this parameter can assign if increase the speed rate of cutting up.
Set to 1: The speed rate is the same as F.
Set to 2: 2 times of the assigned speed rate, and vice versa.

1043	[S1] G83 drilling(0:High,1:Normal)
6043	[S2] G83 drilling(0:High,1:Normal)

Range： 0 ~ 1
Active： Enable Immediately
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： 0：G83 drilling is in high-speed mode.
1：G83 drilling is in normal mode.

1044	**[S1] G87 drilling(0:High,1:Normal)**
6044	**[S2] G87 drilling(0:High,1:Normal)**

Range： 0 ~ 1
Active： Enable Immediately
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： 0：G87 drilling is in high-speed mode.
1：G87 drilling is in normal mode.

1045	**[S1] G83~G89 P2 pause time(ms)**
6045	**[S2] G83~G89 P2 pause time(ms)**

Range： 0 ~ 99999
Active： Enable Immediately
Level： End User
Default： 1000
Unit： ms
Function： N/A
Description： This parameter sets the hold duration of 83~G89 P2.

1081	**[S1] Depth of cut for G71/G72(μm)**
1082	**[S1] Escaping amount of G71/G72(μm)**
6081	**[S2] Depth of cut for G71/G72(μm)**
6082	**[S2] Escaping amount of G71/G72(μm)**

Range： 0 ~ 99999999
Active： Enable after RESET
Level： End User
Default： 1000
Unit： μm
Function： N/A
Description： The two parameters can assign the cutting depth and the tool retraction of the compound canned cycle of G71 & G72. When G71 & G72 ‘s command U & R are not decided, the two parameters can assign them.

1083	[S1] Distance of relief in X axis direction(μm)
1084	[S1] Distance of relief in Z axis direction(μm)
6083	[S2] Distance of relief in X axis direction(μm)
6084	[S2] Distance of relief in Z axis direction(μm)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： End User
Default： 1000
Unit： μm
Function： N/A
Description： Assign the compound canned cycle of G73's distance of relief in X axis and Z axis directions.
When G73 command U and W are not decided, the two parameters can assign them.

1085	[S1] Count of G73 manufacture
6085	[S2] Count of G73 manufacture

Range： 0 ~ 99999999
Active： Enable after RESET
Level： End User
Default： 5
Unit： N/A
Function： N/A
Description： This parameter sets the cutting times of compound canned cycle of G3.

1086	[S1] Return amount of G74/G75(μm)
6086	[S2] Return amount of G74/G75(μm)

Range： 0 ~ 99999999
Active： Enable after RESET
Level： End User
Default： 1000
Unit： μm
Function： N/A
Description： This parameter sets the return amount of G74 and G75.

1087	[S1] Manufacture count of G76(mm)/chemfering length(rr)(4 digits)
6087	[S2] Manufacture count of G76(mm)/chemfering length(rr)(4 digits)

Range： 101 ~ 9999
Active： Enable after RESET
Level： End User
Default： 101
Unit： N/A
Function： N/A
Description： Set the default value of repeating times (mm, times) during detailed machining, and the tool retraction's length of chamfer (rr, the min. unit) when executing G76.
The set value is 4 digits. Low 2 digits indicate the repeating times of machining and high 2 digits indicate the tool retraction's length of chamfer (rr).

1088	[S1] Tool nose angle for G76(Degree)
6088	[S2] Tool nose angle for G76(Degree)

Range： 0 ~ 90
Active： Enable after RESET
Level： End User
Default： 60
Unit： μm
Function： N/A
Description： The default value of the tool nose's angle when executing G76.

1089	[S1] Minimum cutting depth for for G76(μm)
6089	[S2] Minimum cutting depth for for G76(μm)

Range： 0 ~ 99999999
Active： Enable after RESET
Level： End User
Default： 50
Unit： μm
Function： N/A
Description： This parameter sets the default value of the minimum cutting depth of compound canned cycle G76.

1090	[S1] Allowed error amount of G76(μm)
6090	[S2] Allowed error amount of G76(μm)

Range： 0 ~ 99999999
Active： Enable after RESET
Level： End User
Default： 50
Unit： μm
Function： N/A
Description： This parameter assigns the completed tolerance amount of compound canned cycle G76. In other words, if G76 command's R value is not decided, this parameter can assign it.

1099	**[S1] Opposite tool distance in G68(μm)**
6099	**[S2] Opposite tool distance in G68(μm)**

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： TI060018
Description： This parameter sets the opposite tool distance in X axis mirror machining of G68. In diameter mode, this parameter's set vale is 2 times of the actual distance. Under different matches, this parameters' set value will be different as well.

3.2.5 Compensation Parameters

38	**[S1] Backlash compensation unit(0:Pulse,1: μm)**
5038	**[S2] Backlash compensation unit(0:Pulse,1: μm)**

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： This parameter sets the unit system of the backlash parameters and also the pitch compensation parameters.

44	**[S1] Backlash compensation of X axis(μm)**
45	**[S1] Backlash compensation of Y axis(μm)**
46	**[S1] Backlash compensation of Z axis(μm)**
47	**[S1] Backlash compensation of 4th axis(μm)**
5044	**[S2] Backlash compensation of X axis(μm)**
5045	**[S2] Backlash compensation of Y axis(μm)**
5046	**[S2] Backlash compensation of Z axis(μm)**
5047	**[S2] Backlash compensation of 4th axis(μm)**

Range： 0 ~ 32767
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the backlash compensation amount of each axis.

112	[S1] Total section of X axis pitch error compensation
113	[S1] Total section of Y axis pitch error compensation
114	[S1] Total section of Z axis pitch error compensation
115	[S1] Total section of 4th axis pitch error compensation
5112	[S2] Total section of X axis pitch error compensation
5113	[S2] Total section of Y axis pitch error compensation
5114	[S2] Total section of Z axis pitch error compensation
5115	[S2] Total section of 4th axis pitch error compensation

Range： 1 ~ 50
Active： Enable after restart system
Level： Maker
Default： 20
Unit： N/A
Function： N/A
Description： This parameter sets the total section of ball screw's pitch error compensation for each axis. The product of this parameter's set value & the parameters "Length of each section for some axis pitch error compensation" is the total length of pitch error that should be compensated for each axis. The present maximum compensation section number of each axis is 200 sections.

117	[S1] Enable backlash compensation(+1:X,+2:Y,+4:Z,+8:4th)
5117	[S2] Enable backlash compensation(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 15
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Bit0: Set to 1, Backlash Compensation function of X axis is enabled; set to 0, disabled.
Bit1: Set to 1, Backlash Compensation function of Y axis is enabled; set to 0, not disabled.
Bit2: Set to 1, Backlash Compensation function of Z axis is enabled; set to 0, not disabled.
Bit3: Set to 1, Backlash Compensation function of the 4^{th} axis is enabled; set to 0, disabled.

118	[S1] Direction of pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)
5118	[S2] Direction of pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 15
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Bit0：Set to 1, compensate pitch error towards the negative direction after X axis returns to zero point; set to 0, compensate pitch error towards the positive direction after X axis returns to zero point.
Bit1：Set to 1, compensate pitch error towards the negative direction after Y axis returns to zero point; set to 0, compensate pitch error towards the positive direction after Y axis returns to zero point.
Bit2：Set to 1, compensate pitch error towards the negative direction after Z axis returns to zero point; set to 0, compensate pitch error towards the positive direction after Z axis returns to zero point.
Bit3：Set to 1, compensate pitch error towards the negative direction after the 4th axis returns to zero point; set to 0, compensate pitch error towards the positive direction after the 4th axis returns to zero point.

119	[S1] Enable pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)
5119	[S2] Enable pitch error compensation(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 15
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Bit0：Set to 1, Pitch Error Compensation function of X axis is enabled; set to 0, disabled.
Bit1：Set to 1, Pitch Error Compensation function of Y axis is enabled; set to 0, disabled.
Bit2：Set to 1, Pitch Error Compensation function of Z axis is enabled; set to 0, disabled.
Bit3：Set to 1, Pitch Error Compensation function of the 4th axis is enabled; set to 0, disabled.

811	**[S1] Set G code of spike compensation(0:G2G3,1:all)**
5811	**[S2] Set G code of spike compensation(0:G2G3,1:all)**

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： When this parameter is set to 0, the spike compensation amount set by the ball-bar test is only applicable to G02/03 Arc Interpolation; set to 1, the default spike compensation amount will be added to all Motion G codes whenever some servo axis makes a counter motion.

812	[S1] Spike compensation value of X axis in positive moving(μ m)
818	[S1] Spike compensation value of Y axis in positive moving(μ m)
828	[S1] Spike compensation value of Z axis in positive moving(μ m)
900	[S1] Spike compensation value of 4th axis in positive moving(μ m)
5812	[S2] Spike compensation value of X axis in positive moving(μ m)
5818	[S2] Spike compensation value of Y axis in positive moving(μ m)
5828	[S2] Spike compensation value of Z axis in positive moving(μ m)
5900	[S2] Spike compensation value of 4th axis in positive moving(μ m)

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μ m
Function： N/A
Description： This parameter sets the spike value of each corresponding axis in the ball-bar test. When set to 0, this function is disabled.

813	[S1] Spike compensation time of X axis in positive moving
819	[S1] Spike compensation time of Y axis in positive moving
829	[S1] Spike compensation time of Z axis in positive moving
901	[S1] Spike compensation time of 4th axis in positive moving
5813	[S2] Spike compensation time of X axis in positive moving
5819	[S2] Spike compensation time of Y axis in positive moving
5829	[S2] Spike compensation time of Z axis in positive moving
5901	[S2] Spike compensation time of 4th axis in positive moving

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Please confirm the actual dwell cycle duration of the controller before setting these parameters. These parameters set the spike duration of each corresponding axial positive direction in the ball-bar test. When set to 0, this function is disabled.

814	[S1] Delay time of X axis spike compensation in positive moving
820	[S1] Delay time of Y axis spike compensation in positive moving
830	[S1] Delay time of Z axis spike compensation in positive moving
902	[S1] Delay time of 4th axis spike compensation in positive moving
5814	[S2] Delay time of X axis spike compensation in positive moving
5820	[S2] Delay time of Y axis spike compensation in positive moving
5830	[S2] Delay time of Z axis spike compensation in positive moving
5902	[S2] Delay time of 4th axis spike compensation in positive moving

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Please confirm the actual dwell cycle duration of the controller before setting these parameters. These parameters set the spike lag duration of each corresponding axial positive direction and direction-changing point in the ball-bar test.

815	[S1] Spike compensation value of X axis in negative moving(μ m)
825	[S1] Spike compensation value of Y axis in negative moving(μ m)
831	[S1] Spike compensation value of Z axis in negative moving(μ m)
903	[S1] Spike compensation value of 4th axis in negative moving(μ m)
5815	[S2] Spike compensation value of X axis in negative moving(μ m)
5825	[S2] Spike compensation value of Y axis in negative moving(μ m)
5831	[S2] Spike compensation value of Z axis in negative moving(μ m)
5903	[S2] Spike compensation value of 4th axis in negative moving(μ m)

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μ m
Function： N/A
Description： Please confirm the actual dwell cycle duration of the controller before setting these parameters.
These parameters set the spike value of each corresponding axial negative direction in the ball-bar test. When set to 0, this function is disabled.

816	[S1] Spike compensation time of X axis in negative moving
826	[S1] Spike compensation time of Y axis in negative moving
832	[S1] Spike compensation time of Z axis in negative moving
904	[S1] Spike compensation time of 4th axis in negative moving
5816	[S2] Spike compensation time of X axis in negative moving
5826	[S2] Spike compensation time of Y axis in negative moving
5832	[S2] Spike compensation time of Z axis in negative moving
5904	[S2] Spike compensation time of 4th axis in negative moving

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Please confirm the actual dwell cycle duration of the controller before setting this parameter.
These parameters set the spike duration of the negative direction of each corresponding axis in the ball-bar test. When set to 0, this function is disabled.

817	[S1] Delay time of X axis spike compensation in negative moving
827	[S1] Delay time of Y axis spike compensation in negative moving
833	[S1] Delay time of Z axis spike compensation in negative moving
905	[S1] Delay time of 4th axis spike compensation in negative moving
5817	[S2] Delay time of X axis spike compensation in negative moving
5827	[S2] Delay time of Y axis spike compensation in negative moving
5833	[S2] Delay time of Z axis spike compensation in negative moving
5905	[S2] Delay time of 4th axis spike compensation in negative moving

Range： 0 ~ 200
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Please confirm the actual dwell cycle duration of the controller before setting these parameters.
These parameters set the spike lag duration of each corresponding axial negative direction and direction-changing point in the ball-bar test. When set to 0, this function is disabled.

840	[S1] Enable X axis TDC function(0:Disable,1:Enable)
851	[S1] Enable Y axis TDC function(0:Disable,1:Enable)
856	[S1] Enable Z axis TDC function(0:Disable,1:Enable)
861	[S1] Enable 4th axis TDC function(0:Disable,1:Enable)
5840	[S2] Enable X axis TDC function(0:Disable,1:Enable)
5851	[S2] Enable Y axis TDC function(0:Disable,1:Enable)
5856	[S2] Enable Z axis TDC function(0:Disable,1:Enable)
5861	[S2] Enable 4th axis TDC function(0:Disable,1:Enable)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060039
Description： Set to 0: Disable thermal deformation compensation function.
Set to 1: Enable thermal deformation compensation function.

841	[S1] Saturation time of X axis in TDC(sec)
852	[S1] Saturation time of Y axis in TDC(sec)
857	[S1] Saturation time of Z axis in TDC(sec)
862	[S1] Saturation time of 4th axis in TDC(sec)
5841	[S2] Saturation time of X axis in TDC(sec)
5852	[S2] Saturation time of Y axis in TDC(sec)
5857	[S2] Saturation time of Z axis in TDC(sec)
5862	[S2] Saturation time of 4th axis in TDC(sec)

Range： 0 ~ 18000
Active： Enable after restart system
Level： Maker
Default： 60
Unit： sec
Function： TI060039
Description： This parameter sets the saturation time of each axis in thermal deformation function.

842	[S1] Total compensation value of X axis in TDC(μm)
853	[S1] Total compensation value of Y axis in TDC(μm)
858	[S1] Total compensation value of Z axis in TDC(μm)
863	[S1] Total compensation value of 4th axis in TDC(μm)
5842	[S2] Total compensation value of X axis in TDC(μm)
5853	[S2] Total compensation value of Y axis in TDC(μm)
5858	[S2] Total compensation value of Z axis in TDC(μm)
5863	[S2] Total compensation value of 4th axis in TDC(μm)

Range： -1000 ~ 1000
Active： Enable after restart system
Level： Maker
Default： 0
Unit： μm
Function： TI060039
Description： This parameter sets the total compensation value of each axis in thermal deformation.

843	[S1] Restored time of X axis in TDC(sec)
854	[S1] Restored time of Y axis in TDC(sec)
859	[S1] Restored time of Z axis in TDC(sec)
864	[S1] Restored time of 4th axis in TDC(sec)
5843	[S2] Restored time of X axis in TDC(sec)
5854	[S2] Restored time of Y axis in TDC(sec)
5859	[S2] Restored time of Z axis in TDC(sec)
5864	[S2] Restored time of 4th axis in TDC(sec)

Range： 0 ~ 18000
Active： Enable after restart system
Level： Maker
Default： 60
Unit： sec
Function： TI060039
Description： This parameter sets the restored time of each axis in TDC.

1018	[S1] Length of each section for X axis pitch error compensation(μm)
1019	[S1] Length of each section for Y axis pitch error compensation(μm)
1020	[S1] Length of each section for X axis pitch error compensation(μm)
1021	[S1] Length of each section for 4th axis pitch error compensation(μm)
6018	[S2] Length of each section for X axis pitch error compensation(μm)
6019	[S2] Length of each section for Y axis pitch error compensation(μm)
6020	[S2] Length of each section for X axis pitch error compensation(μm)
6021	[S2] Length of each section for 4th axis pitch error compensation(μm)

Range： 0 ~ 99999999
Active： Enable after restart system
Level： Maker
Default： 30000
Unit： μm
Function： N/A
Description： Assume pitch error compensative interval of each axis is 10000μm, set this parameter to 10000.

1046	[S1] Start position of X axis pitch error compensation(μm)
1047	[S1] Start position of Y axis pitch error compensation(μm)
1048	[S1] Start position of Z axis pitch error compensation(μm)
1049	[S1] Start position of 4th axis pitch error compensation(μm)
6046	[S2] Start position of X axis pitch error compensation(μm)
6047	[S2] Start position of Y axis pitch error compensation(μm)
6048	[S2] Start position of Z axis pitch error compensation(μm)
6049	[S2] Start position of 4th axis pitch error compensation(μm)

Range： -99999999 ~ 99999999
Active： Enable after restart system
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： Assume the pitch error's start position of some axis is 0μm (mechanical coordinates), set this parameter to 0.

3001 ~ 3200	[S1] Compensation value of X axis 1st~200th section pitch error(μm)
8001 ~ 8200	[S2] Compensation value of X axis 1st~200th section pitch error(μm)

Range： -20000 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the pitch error of each section on X axis. (μm）

3201 ~ 3400	**[S1] Compensation value of Y axis 1st~200th section pitch error(μm)**
8201 ~ 8400	**[S2] Compensation value of Y axis 1st~200th section pitch error(μm)**

Range： -20000 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the pitch error of each section on Y axis（μm）.

3401 ~ 3600	**[S1] Compensation value of Z axis 1st~200th section pitch error(μm)**
8401 ~ 8600	**[S2] Compensation value of Z axis 1st~200th section pitch error(μm)**

Range： -20000 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the pitch error of each section on Z axis（μm）.

3601 ~ 3800	**[S1] Compensation value of 4th axis 1st~200th section pitch error(μm)**
8601 ~ 8800	**[S2] Compensation value of 4th axis 1st~200th section pitch error(μm)**

Range： -20000 ~ 20000
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the pitch error of each section on the 4^{th} axis（μm）.

3.2.6 HOME Parameters

19	**[S1] Deal with zero point return on dog(0:Warning,1:Auto)**
5019	**[S2] Deal with zero point return on dog(0:Warning,1:Auto)**

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0: Before executing HOME return again, the system should send an alarm to notify users to remove the corresponding axis away.
1: Before executing HOME return, NC should remove the servo axis (towards the opposite direction of HOME point) until the axis leaves DOG.

20	**[S1] Default of return home finish(+1:X,+2:Y,+4:Z,+8:4th)**
5020	**[S2] Default of return home finish(+1:X,+2:Y,+4:Z,+8:4th)**

Range： 0 ~ 15
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Bit0: Set to 0, after starting the machine, system will be the status of not finish HOME return.
Bit1: Set to 1, after starting the machine, system will take the machine position at present to be the position of finished HOME return.

30	[S1] Zero point shift amount of X axis(μ m)
31	[S1] Zero point shift amount of Y axis(μ m)
32	[S1] Zero point shift amount of Z axis(μ m)
33	[S1] Zero point shift amount of 4th axis(μ m/0.001deg)
5030	[S2] Zero point shift amount of X axis(μ m)
5031	[S2] Zero point shift amount of Y axis(μ m)
5032	[S2] Zero point shift amount of Z axis(μ m)
5033	[S2] Zero point shift amount of 4th axis(μ m/0.001deg)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μ m/0.001deg
Function： N/A
Description： Assume the offset amount of N (μm) is to be made to the mechanical reference point of each axis, set this parameter to N. To set different offset amount will change a zero point's position. However, this set value will not change the display of HOME coordinates after HOME return is executed. When this parameter's set value is a positive number, the mechanical reference point of each axis will travel in the direction away from DOG. When the set value is negative, the mechanical reference point of each axis will travel in the direction towards DOG.

34	[S1] Pause time of X axis zero point return(10ms)
35	[S1] Pause time of Y axis zero point return(10ms)
36	[S1] Pause time of Z axis zero point return(10ms)
37	[S1] Pause time of 4th axis zero point return(10ms)
5034	[S2] Pause time of X axis zero point return(10ms)
5035	[S2] Pause time of Y axis zero point return(10ms)
5036	[S2] Pause time of Z axis zero point return(10ms)
5037	[S2] Pause time of 4th axis zero point return(10ms)

Range： 100 ~ 2000
Active： Enable after RESET
Level： Maker
Default： 100
Unit： 10 ms
Function： N/A
Description： The dwell time set by these parameters are applied in the following three conditions:

a. To set the dwell time of decelerating stop when some axis travels toward the reference point in 1st speed and meets DOG.
b. To set the dwell time of decelerating stop when some axis travels away from DOG in 2nd speed and finds the motor INDEX.
c. To set the dwell time of decelerating stop when some axis finds and returns to the motor INDEX.

48	[S1] Set zero point by now position(+1:X,+2:Y,+4:Z,+8:4th)
5048	[S2] Set zero point by now position(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 15
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060035
Description： Bit 0: Set to 0, system will execute normal HOME return.
Bit 1: Set to 1, HOME return method is compulsive setting.

64	[S1] Dog type(0:NC,1:NO)
5064	[S2] Dog type(0:NC,1:NO)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：HOME DOG is normally close. (NC)
1：HOME DOG is normally open. (NO)

76	[S1] Set absolute coordinate after zero point return(0:No,1:Yes)
5076	[S2] Set absolute coordinate after zero point return(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： Please refer to parameter “Absolute coordinate of each axis after zero point return”. After each servo axis returns to the zero point, the display value of the absolute coordinates is decided by the following three values:

a. Parameter “Absolute coordinate of each axis after zero point return”
b. The set values of 00 coordinate system, G54 ~G59 coordinates.

Parameter “Absolute coordinate of each axis after zero point return” - 00 coordinate system’s set value + G54 ~ G59 coordinates’ set value

In addition,

a. This parameter sets whether parameter “Absolute coordinate of each axis after zero point return” set values are effective;
b. The set values of 00 coordinate system and G54 ~ G59 coordinate system are always effective.

77	**[S1] G00 operation without zero point return(0:Disable,1:Enable)**
5077	**[S2] G00 operation without zero point return(0:Disable,1:Enable)**

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： 0: G00 before HOME return is disabled. In AUTO and MDI modes, convert G00 to G01 automatically, the feed rate is set by F code (or preset by parameter “Default feedrate of system”). In JOG and RAPID modes, motions in RAPID mode or in JOG mode are the same. The feed rate is set by the values of parameter “Each axis feedrate for JOG”.
1: G00 before HOME return is effective. In AUTO and MDI modes, G00 functions normally, the feed rate of each axis is set by the values of parameter “Each axis maximum feedrate for rapid travel.” Feed rate of each axis is set by the values of parameter “Each axis feedrate for JOG” in JOG mode. In RAPID mode, the feed rate of each axis is set by the values of parameter “Each axis maximum feedrate for rapid travel.”

79	**[S1] X axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
80	**[S1] Y axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
81	**[S1] Z axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
82	**[S1] 4th axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
5079	**[S2] X axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
5080	**[S2] Y axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
5081	**[S2] Z axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**
5082	**[S2] 4th axis zero point is ahead of dog or behind dog(0:Behind,1:Ahead)**

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： 0: Zero point is after DOG: when each axis meets DOG, it continues to search for the zero point in the same direction.
1: Zero point is ahead DOG: when each axis meets DOG, it continues to search for the zero point in the opposite direction.

120	[S1] Direction of zero point return(+1:X,+2:Y,+4:Z,+8:4th)
5120	[S2] Direction of zero point return(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 15
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Bit0: Set to 0, HOME return is positive direction.
Bit1: Set to 1, HOME return is negative direction.

175	[S1] Source of dog signal(0:Local,1:Remote)
5175	[S2] Source of dog signal(0:Local,1:Remote)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0： HOME DOG signal is connected to Local Input.
1： HOME DOG signal is connected to Remote Input.

204	[S1] Set zero point by NC record(+1:X,+2:Y,+4:Z,+8:4th)
5204	[S2] Set zero point by NC record(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 15
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060035
Description： Bit0: Set to 0, system will execute normal HOME return.
Bit1: Set to 1, HOME return adopts the zero point recorded by NC.

293	[S1] Zero point return type(0:DOG,1:REF.)(+1:X,+2:Y,+4:Z,+8:4th)
5293	[S2] Zero point return type(0:DOG,1:REF.)(+1:X,+2:Y,+4:Z,+8:4th)

Range： 0 ~ 63
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Bit0: Set to 0, HOME return method is in DOG mode.
Bit1: Set to 1, HOME return method is in reference point mode.

834	**[S1] Access time of absolute encoder(sec)**
5834	**[S2] Access time of absolute encoder(sec)**

Range： 0 ~ 10
Active： Enable after RESET
Level： Maker
Default： 5
Unit： sec
Function： TI060035
Description： This parameter sets the duration limit for the absolute encoder to send feedback to NC.

1014	**[S1] Absolute coordinate of X axis after zero point return(μm)**
1015	**[S1] Absolute coordinate of Y axis after zero point return(μm)**
1016	**[S1] Absolute coordinate of Z axis after zero point return(μm)**
1017	**[S1] Absolute coordinate of 4th axis after zero point return(μm)**
6014	**[S2] Absolute coordinate of X axis after zero point return(μm)**
6015	**[S2] Absolute coordinate of Y axis after zero point return(μm)**
6016	**[S2] Absolute coordinate of Z axis after zero point return(μm)**
6017	**[S2] Absolute coordinate of 4th axis after zero point return(μm)**

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： Assume the expected absolute coordinates of each axis after returning to the zero point is 300μm, set this parameter to 300. This parameter's set value only changes the display value of each axis's coordinates after returning to the zero point, which will not affect the actual machine position of each axis after returning to the zero point. This parameter is only effective when parameter "Absolute coordinate after zero point return" is set to 1.

1022	[S1] Shift amount of X axis from 2nd zero point to 1st zero point(radius)(μm)
1023	[S1] Shift amount of Y axis from 2nd zero point to 1st zero point(radius)(μm)
1024	[S1] Shift amount of Z axis from 2nd zero point to 1st zero point(μm)
1025	[S1] Shift amount of 4th axis from 2nd zero point to 1st zero point(μm)
6022	[S2] Shift amount of X axis from 2nd zero point to 1st zero point(radius)(μm)
6023	[S2] Shift amount of Y axis from 2nd zero point to 1st zero point(radius)(μm)
6024	[S2] Shift amount of Z axis from 2nd zero point to 1st zero point(μm)
6025	[S2] Shift amount of 4th axis from 2nd zero point to 1st zero point(μm)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the corresponding offset amount of each axis's 2nd zero point to its 1st zero point. Assume the corresponding offset amount is 2000μm, set this parameter 2000.

1026	[S1] Shift amount of X axis from 3rd zero point to 1st zero point(radius)(μm)
1027	[S1] Shift amount of Y axis from 3rd zero point to 1st zero point(radius)(μm)
1028	[S1] Shift amount of Z axis from 3rd zero point to 1st zero point(μm)
1029	[S1] Shift amount of 4th axis from 3rd zero point to 1st zero point(μm)
6026	[S2] Shift amount of X axis from 3rd zero point to 1st zero point(radius)(μm)
6027	[S2] Shift amount of Y axis from 3rd zero point to 1st zero point(radius)(μm)
6028	[S2] Shift amount of Z axis from 3rd zero point to 1st zero point(μm)
6029	[S2] Shift amount of 4th axis from 3rd zero point to 1st zero point(μm)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description： This parameter sets the corresponding offset amount of each axis's 3rd zero point to its 1st zero point. Assume the corresponding offset amount is 2000μm, set this parameter 2000.

1030	[S1] Shift amount of X axis from 4th zero point to 1st zero point(radius)(μ m)
1031	[S1] Shift amount of Y axis from 4th zero point to 1st zero point(radius)(μ m)
1032	[S1] Shift amount of Z axis from 4th zero point to 1st zero point(μ m)
1033	[S1] Shift amount of 4th axis from 4th zero point to 1st zero point(μ m)
6030	[S2] Shift amount of X axis from 4th zero point to 1st zero point(radius)(μ m)
6031	[S2] Shift amount of Y axis from 4th zero point to 1st zero point(radius)(μ m)
6032	[S2] Shift amount of Z axis from 4th zero point to 1st zero point(μ m)
6033	[S2] Shift amount of 4th axis from 4th zero point to 1st zero point(μ m)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μ m
Function： N/A
Description： This parameter sets the corresponding offset amount of each axis's 4th zero point to its 1st zero point. Assume the corresponding offset amount is 2000μm, set this parameter 2000.

1098	[S1] Absolute encoder error range(pulse)
6098	[S2] Absolute encoder error range(pulse)

Range： 0 ~ 1000
Active： Enable after RESET
Level： Maker
Default： 30
Unit： pulse
Function： TI060035
Description： This parameter sets the maximum tolerance of the offset value between NC's internal encoder and the driver's absolute encoders.

1104	[S1] 1st speed of X axis zero point return(μ m/min)
1105	[S1] 1st speed of Y axis zero point return(μ m/min)
1106	[S1] 1st speed of Z axis zero point return(μ m/min)
1107	[S1] 1st speed of 4th axis zero point return(μ m/min)
6104	[S2] 1st speed of X axis zero point return(μ m/min)
6105	[S2] 1st speed of Y axis zero point return(μ m/min)
6106	[S2] 1st speed of Z axis zero point return(μ m/min)
6107	[S2] 1st speed of 4th axis zero point return(μ m/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 2000000
Unit： μ m/min
Function： N/A
Description： During HOME return, each axis travels to its zero point at the speed set by this

parameter.

1108	[S1] 2nd speed of X axis zero point return(μ m/min)
1109	[S1] 2nd speed of Y axis zero point return(μ m/min)
1110	[S1] 2nd speed of Z axis zero point return(μ m/min)
1111	[S1] 2nd speed of 4th axis zero point return(μ m/min)
6108	[S2] 2nd speed of X axis zero point return(μ m/min)
6109	[S2] 2nd speed of Y axis zero point return(μ m/min)
6110	[S2] 2nd speed of Z axis zero point return(μ m/min)
6111	[S2] 2nd speed of 4th axis zero point return(μ m/min)

Range： 1 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 200000
Unit： μ m/min
Function： N/A
Description： During HOME return, if DOG is met, each axis searches for the motor's zero point at the 2nd speed set by this parameter.

1112	[S1] Local I number of X axis DOG(1~28:Card1,101~128:Card2)
1113	[S1] Local I number of Y axis DOG(1~28:Card1,101~128:Card2)
1114	[S1] Local I number of Z axis DOG(1~28:Card1,101~128:Card2)
1115	[S1] Local I number of 4th axis DOG(1~28:Card1,101~128:Card2)
6112	[S2] Local I number of X axis DOG(1~28:Card1,101~128:Card2)
6113	[S2] Local I number of Y axis DOG(1~28:Card1,101~128:Card2)
6114	[S2] Local I number of Z axis DOG(1~28:Card1,101~128:Card2)
6115	[S2] Local I number of 4th axis DOG(1~28:Card1,101~128:Card2)

Range： 1 ~ 128
Active： Enable after restart system
Level： Maker
Default： 104
Unit： N/A
Function： N/A
Description： 1~28：Corresponding to the 1st motion control card's 1~28 Local Input.
101~128：Corresponding to the 2nd motion control card's 1~28 Local Input.

2051	[S1] REF. type of X axis(0:Index,1:Sensor)
2052	[S1] REF. type of Y axis(0:Index,1:Sensor)
2053	[S1] REF. type of Z axis(0:Index,1:Sensor)
2054	[S1] REF. type of 4th axis(0:Index,1:Sensor)
7051	[S2] REF. type of X axis(0:Index,1:Sensor)
7052	[S2] REF. type of Y axis(0:Index,1:Sensor)
7053	[S2] REF. type of Z axis(0:Index,1:Sensor)
7054	[S2] REF. type of 4th axis(0:Index,1:Sensor)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：The reference point of HOME return is Index.
1：The reference point of HOME return is sensor.

2055	[S1] REF. type of X axis(0:NC,1:NO)
2056	[S1] REF. type of Y axis(0:NC,1:NO)
2057	[S1] REF. type of Z axis(0:NC,1:NO)
2058	[S1] REF. type of 4th axis(0:NC,1:NO)
7055	[S2] REF. type of X axis(0:NC,1:NO)
7056	[S2] REF. type of Y axis(0:NC,1:NO)
7057	[S2] REF. type of Z axis(0:NC,1:NO)
7058	[S2] REF. type of 4th axis(0:NC,1:NO)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：The reference point of HOME return is Normally Close (NC).
1：The reference point of HOME return is Normally Open (NO).

2059	[S1] REF. local I number of X axis(1~2:Card1,101~102:Card2)
2060	[S1] REF. local I number of Y axis(1~2:Card1,101~102:Card2)
2061	[S1] REF. local I number of Z axis(1~2:Card1,101~102:Card2)
2062	[S1] REF. local I number of 4th axis(1~2:Card1,101~102:Card2)
7059	[S2] REF. local I number of X axis(1~2:Card1,101~102:Card2)
7060	[S2] REF. local I number of Y axis(1~2:Card1,101~102:Card2)
7061	[S2] REF. local I number of Z axis(1~2:Card1,101~102:Card2)
7062	[S2] REF. local I number of 4th axis(1~2:Card1,101~102:Card2)

Range： 1 ~ 102
Active： Enable after restart system
Level： Maker
Default： 101
Unit： N/A
Function： N/A
Description： 1~2：Corresponding to the 1st motion control card's 1~2 Local Input.
101~102：Corresponding to the 2nd motion control card's 1~2 Local Input.

3.2.7 Operation Parameters

41	**[S1] G00 linear interpolation(0:No,1:Yes)**
5041	**[S2] G00 linear interpolation(0:No,1:Yes)**

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： 0：No synchronic motion with G0.
1：Motion with G0 is the same as G01.

43	**[S1] Interpolation exact positioning(+1:X,+2:Y,+4:Z,+8:4th,+16:G00)**
5043	**[S2] Interpolation exact positioning(+1:X,+2:Y,+4:Z,+8:4th,+16:G00)**

Range： 0 ~ 31
Active： Enable after RESET
Level： End User
Default： 16
Unit： N/A
Function： N/A
Description： Bit0：Set to 1, Exact positioning check function of linear cutting (G01) of X axis is cancelled.
Bit1：Set to 1, Exact positioning check function of linear cutting (G01) of Y axis is cancelled.
Bit2：Set to 1, Exact positioning check function of linear cutting (G01) of Z axis is cancelled.
Bit3：Set to 1, Exact positioning check function of linear cutting (G01) of the 4th axis is cancelled.
Bit4：Set to 1, Exact positioning check function of RAPID TRAVERSE (G00) is enabled.
For linear cutting command (G01), if Exact positioning check function is to be enabled, except for setting the corresponding Bit of this parameter, G09 command (Exact positioning command, effective for blocks) or G61 command (Exact positioning mode, always effective, must be cancelled by G64 command) should be enabled additionally.
Once Exact positioning check function of G01 command is enabled, and any interpolation of G01 command is finished, NC will wait until the actual position of each enabled servo axis has entered the check windows (Parameter “Each axis in-position check window”) before executing the next block.
For Rapid Traverse command G00, setting this parameter’s Bit4 1 will activate Exact positioning function. When Exact positioning function of Rapid Traverse command is enabled, and any interpolation of Rapid Traverse command is finished, NC will wait until the actual positions of all servo axes have entered the range of check window (Parameter “Each axis rapid travel in-position check windows”) before executing the next block. However, if both the blocks before and after some Rapid Traverse command are Rapid Traverse commands, that Rapid Traverse command will not execute Exact positioning check.

63	[S1] Set relative coordinate with absolute coordinate(0:No,1:Yes)
5063	[S2] Set relative coordinate with absolute coordinate(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： The effective range of this parameter's set value is as below:
a. Display value of initial coordinates;
b. Display value of coordinates after HOME return is finished;
c. G54 ~ G59 commands (Coordinate system selection);
d. G92 command (Set coordinate values).

71	[S1] Check range of G22(0:Outter,1:Inner)
5071	[S2] Check range of G22(0:Outter,1:Inner)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： 0: The path check set by G22 is in the outside forbidden area, and tools can only travel inside the assigned check range. If there is any command that tries to motion some tool to the area outside the assigned check range, the alarm will be triggered.
1: The path check set by G22 is in the inside forbidden area, and tools can only travel outside the assigned check range. If there is any command that tries to motion some tool to the area inside the assigned check range, the alarm will be triggered.

73	[S1] Enable acc/dec funciton of G31(0:No,1:Yes)
5073	[S2] Enable acc/dec funciton of G31(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： TI060031
Description： 0：No, after G31 Skip signal is detected, do not decelerate or stop.
1：Yes, after G31 Skip signal is detected, decelerate according to the acceleration/deceleration duration set by Parameter "G01 acc/dec time."

74	[S1] Enable macro trace under single block(0:No,1:Yes)
5074	[S2] Enable macro trace under single block(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： 0: MACRO commands (not NC commands) will not be executed by single block.
1: MACRO commands (not NC commands) will be executed by single block.

83	[S1] Enable G00 under dry run(0:Disable,1:Enable)
5083	[S2] Enable G00 under dry run(0:Disable,1:Enable)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description：

In DRY RUN mode, the motion of RAPID TRAVERSE		
	This parameter's set value	
	0	1
RAPID mode	Each axis motions at G00 speed set respectively for each axis.	
G00 or commands equal to G00 in AUTO, MDI mode	Each axis motions at JOG speed set respectively for each axis.	Each axis motions at G00 speed set respectively for each axis.
G00, G53 commands of PMC axis function	Each axis motions at G00 speed set respectively for each axis.	

89	[S1] M code of part counter
5089	[S2] M code of part counter

Range： 0 ~ 99
Active： Enable after RESET
Level： End User
Default： 99
Unit： N/A
Function： N/A
Description： In addition to M02 & M30, users can also set M code commands for part count by using this parameter. However, M code commands for normal situations should be avoided, such as M00 (Program Hold), M01(Optional Program Hold), M3(Spindle rotates CW), etc. Please refer to Programmer Manual for the detail list of M code commands.

When the program meets this M code, the part count number on POS page will accumulate, and machining time will automatically turn to zero. If the accumulated part count number exceeds the preset maximum part count number, NC will send related S BIT to notify PLC to take the corresponding action.

91	[S1] 4th axis feedrate merge into HMi disaply(0:Yes,1:No)
5091	[S2] 4th axis feedrate merge into HMi disaply(0:Yes,1:No)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：The 4th axis is merged into FEEDRATE to display.
1：The 4th axis is not merged into FEEDRATE to display.

94	Edit file O9XXX(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable Immediately
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：Edit file O9XXX.
1：Unable to edit file O9XXX.

122	[S1] Name od 4th axis(0:A,1:B,2:C,3:U,4:V,5:W)
5122	[S2] Name od 4th axis(0:A,1:B,2:C,3:U,4:V,5:W)

Range： 0 ~ 5
Active： Enable after restart system
Level： Maker
Default： 2
Unit： N/A
Function： N/A
Description： Set to 0, the 4th axis is referred as A.
Set to 1, the 4th axis is referred as B.
Set to 2, the 4th axis is referred as C.
Set to 3, the 4th axis is referred as U.
Set to 4, the 4th axis is referred as V.
Set to 5, the 4th axis is referred as W.

123	[S1] Unit of system afetr power on(0:mm G21,1:inch G20)
5123	[S2] Unit of system afetr power on(0:mm G21,1:inch G20)

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： This parameter sets the default unit system after the system starts. Users can switch between the two unit systems by G20(imperial) & G21(metric).

128	[S1] Definition of low 2 digits of T code(0:00,1:Low 2 digits)
5128	[S2] Definition of low 2 digits of T code(0:00,1:Low 2 digits)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： TI060019
Description： When T code is set to 4 codes, and T command input is two digits, Txx:
0: Txx is regarded as T0.
1: Txx is regarded as Txx, meaning, tool number and compensation number are the same.

131	[S1] Type of tool tool nose radius compensation(0:A,1:B)
5131	[S2] Type of tool tool nose radius compensation(0:A,1:B)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0: Use type A cutter compensation.
1: Use type B cutter compensation.
Please refer to Programmer Manual for the description of cutter compensation types.

132	[S1] Measurement of X axis(0:Diameter,1:Radius)
201	[S1] Measurement of Y axis(0:Diameter,1:Radius)
5132	[S2] Measurement of X axis(0:Diameter,1:Radius)
5201	[S2] Measurement of Y axis(0:Diameter,1:Radius)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： This parameter sets the coordinate to be in diameter or radius mode when entering command.

140	[S1] Common variables in RESET(0:Clear,1:Keep)
5140	[S2] Common variables in RESET(0:Clear,1:Keep)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： TI060030
Description： 0:Press RESET, delete the values of global variables @1~@1499.
1:Press RESET, reserve the values of global variables @1~@1499.

141	[S1] Local variables in RESET(0:Clear,1:Keep)
5141	[S2] Local variables in RESET(0:Clear,1:Keep)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： TI060030
Description： 0: Press RESET, delete the values of local variables #01 ~ #33.
1: Press RESET, reserve the values of local variables #01 ~ #33.

145	[S1] Default of plane(0:ZX,1:YZ,2:XY)
5145	[S2] Default of plane(0:ZX,1:YZ,2:XY)

Range： 0 ~ 2
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0: Default plane is ZX.
1: Default plane is YZ.
2: Default plane is XY.

146	[S1] M code of calling macro O9001
147	[S1] M code of calling macro O9002
148	[S1] M code of calling macro O9003
161	[S1] M code of calling macro O9004
162	[S1] M code of calling macro O9005
163	[S1] M code of calling macro O9006
164	[S1] M code of calling macro O9007
165	[S1] M code of calling macro O9008
5146	[S2] M code of calling macro O9001
5147	[S2] M code of calling macro O9002
5148	[S2] M code of calling macro O9003
5161	[S2] M code of calling macro O9004
5162	[S2] M code of calling macro O9005
5163	[S2] M code of calling macro O9006
5164	[S2] M code of calling macro O9007
5165	[S2] M code of calling macro O9008

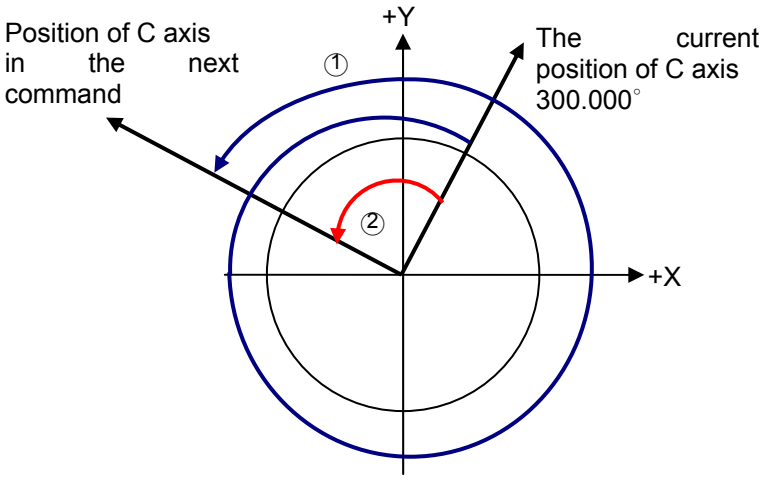
Range： 0 ~ 32767
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060019
Description： When NC executes some M code set by these parameters in a part program, NC will call and execute MACRO programs. If the parameter is set to 0, this function is disabled. Among the MACRO programs called by M code, all M codes set by the parameter are regarded as general M codes, which can not call a MACRO program.

149	[S1] Default feedrate of system(mm/min)
5149	[S2] Default feedrate of system(mm/min)

Range： 0 ~ 32767
Active： Enable after restart system
Level： End User
Default： 1000
Unit： mm/min
Function： N/A
Description： This parameter sets the default feed rate in AUTO or MDI mode.

152	[S1] Trajectory optimization of 4th rotation axis(0:Linear,1:Shortest)
5152	[S2] Trajectory optimization of 4th rotation axis(0:Linear,1:Shortest)

Range： 0 ~ 3
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： The following diagram shows the two paths of C axis to travel from 300.000 to -150.000° by or not by taking the shortest path. In path ①, C axis adopts the normal linear axis method to make the motion, and the coordinate after the motion is finished is shown as -150.000. In path ②, C axis travels by taking the shortest path, and the coordinate after the motion is finished is shown as 210.000.



153	[S1] G code type(0:B,1:A,2:C)
5153	[S2] G code type(0:B,1:A,2:C)

Range： 0 ~ 2
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： This parameter sets the type of G code command at present is A, B or C Type.

155	**[S1] Feedrate unit of system(0:mm/rev,1:mm/min)**
5155	**[S2] Feedrate unit of system(0:mm/rev,1:mm/min)**

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： This parameter sets the default unit system of cutting feed rate in AUTO or MDI mode; however, this parameter is invalid for G00 command.
0: Adopt G95 mode, in metric system mm/rev is applied; in imperial system, inch/rev is applied. In this case, cutting commands (G01/G02/G03) are only effective when cooperating with the rotation of spindle.
0: Adopt G94 mode, in metric system the unit mm/min is applied; in imperial system, inch/min is applied.

166	**[S1] G code of calling macro O9010**
167	**[S1] G code of calling macro O9011**
168	**[S1] G code of calling macro O9012**
400	**[S1] G code of calling macro O9013**
401	**[S1] G code of calling macro O9014**
5166	**[S2] G code of calling macro O9015**
5167	**[S2] G code of calling macro O9016**
5168	**[S2] G code of calling macro O9017**
5400	**[S1] G code of calling macro O9018**
5401	**[S1] G code of calling macro O9019**

Range： 0 ~ 199
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060019
Description： When NC executes some G code set by these parameters in a part program, NC will call and execute MACRO programs. If the parameter is set to 0, this function is disabled. Among the MACRO programs called by G code, all G codes set by the parameter are regarded as general G codes, which can not call a MACRO program.

169	[S1] T code calling macro O9020(0:No,1:Yes)
5169	[S2] T code calling macro O9021(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060019
Description： Pr.0169
0：T code does not call MACRO O9020.
1：T code calls MACRO O9020.
For T800, Pr.5169
0：T code does not call MACRO O9021.
1：T code calls MACRO O9021.

170	[S1] TGM code call macro display(0:No,1:Yes)
5170	[S2] TGM code call macro display(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060019
Description： 0：Do not show the MACRO programs called by TGM codes.
1：Show the MACRO programs called by TGM codes.

176	[S1] Local port NO for G31 P1(0:Disable,1~8:Card1,101~108:Card2)
242	[S1] Local port NO for G31 P2(0:Disable,1~8:Card1,101~108:Card2)
243	[S1] Local port NO for G31 P3(0:Disable,1~8:Card1,101~108:Card2)
244	[S1] Local port NO for G31 P4(0:Disable,1~8:Card1,101~108:Card2)
5176	[S2] Local port NO for G31 P1(0:Disable,1~8:Card1,101~108:Card2)
5242	[S2] Local port NO for G31 P2(0:Disable,1~8:Card1,101~108:Card2)
5243	[S2] Local port NO for G31 P3(0:Disable,1~8:Card1,101~108:Card2)
5244	[S2] Local port NO for G31 P4(0:Disable,1~8:Card1,101~108:Card2)

Range： 0 ~ 108
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060031
Description： 0： Not applied.
1~2：Corresponding to the 1st motion control card's 1~2 Local Input. The Local Input will record the values on absolute position recorder of each axis.
3~8：Corresponding to the 1st motion control card's 3~8 Local Input.
101~102：Corresponding to the 2nd motion control card's 1~2 Local Input. The Local Input will record the values on absolute position recorder of each axis.
103~108：Corresponding to the 2nd motion control card's 3~8 Local Input.

177	[S1] Contact type of G31 P1(0:NC,1:NO)
235	[S1] Contact type of G31 P2(0:NC,1:NO)
236	[S1] Contact type of G31 P3(0:NC,1:NO)
237	[S1] Contact type of G31 P4(0:NC,1:NO)
5177	[S2] Contact type of G31 P1(0:NC,1:NO)
5235	[S2] Contact type of G31 P2(0:NC,1:NO)
5236	[S2] Contact type of G31 P3(0:NC,1:NO)
5237	[S2] Contact type of G31 P4(0:NC,1:NO)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： TI060031
Description： 0: The signal G31SKIP is normal close (NC). When this SKIP signal turns from 1 to 0, the G31 single block will stop at once and the next block will be executed.
1: The signal G31SKIP is normal open (NO). When this SKIP signal turns from 0 to 1, the G31 block will stop at once and the next block will be executed.

180	[S1] Enable manual return(0:Disable,1:Enable)
5180	[S2] Enable manual return(0:Disable,1:Enable)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： In the middle of executing a part program in AUTO or MDI mode, if switching to MANUAL modes such as JOG, MPG, or RAPID, etc., the system will enter FEED HOLD status. If moving the machine manually away from its last position in AUTO or MDI mode, there are two options to return to MEM or MDI mode and resume the unfinished program:
1. Manual Return: Resume the unfinished program by moving the machine to its last position in AUTO or MDI mode.
2. Resume the unfinished program from the current position; however, there will be a shift amount for the following positions.

200	[S1] Feedrate display(0:Command,1:Feedback)
5200	[S2] Feedrate display(0:Command,1:Feedback)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： 0: Show the command value of feed rate on HMI.
1: The system calculates feed back values by using each axis's motor encoder (or the linear scale) and shows the value on HMI.

202	Language of display(0:English,1:Traditional Chinese,2:Simplified Chinese)

Range： 0 ~ 2
Active： Enable after restart system
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： 0: English
1: Traditional Chinese
2: Simplified Chinese

203	[S1] Program reset in MEM mode(0:No,1:Yes)
5203	[S2] Program reset in MEM mode(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： When switching to AUTO mode, whether or not to move the cursor to the head.

205	Wear value(0:Absolute,1:Relative)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： This parameter sets whether the wear compensation value of tools set on OFFSET page is an absolute or a relative value.

206	Enable wear offset compensation for manufacturing(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 1
Unit： N/A
Function： N/A
Description： Setting the wear offset while the machine is working is allowable or not.

207	Wear clear(0:No,1:All,2:Corr.)

Range： 0 ~ 2
Active： Enable after RESET
Level： End User
Default： 2
Unit： N/A
Function： N/A
Description： This parameter sets whether or not clear the tool’s compensation value while setting the profile compensation value on HMI page. .

211	[S1] Stop preinterpreter M code 1
212	[S1] Stop preinterpreter M code 2
213	[S1] Stop preinterpreter M code 3
214	[S1] Stop preinterpreter M code 4
215	[S1] Stop preinterpreter M code 5

216	[S1] Stop preinterpreter M code 6
217	[S1] Stop preinterpreter M code 7
218	[S1] Stop preinterpreter M code 8
219	[S1] Stop preinterpreter M code 9
220	[S1] Stop preinterpreter M code 10
5211	[S2] Stop preinterpreter M code 1
5212	[S2] Stop preinterpreter M code 2
5213	[S2] Stop preinterpreter M code 3
5214	[S2] Stop preinterpreter M code 4
5215	[S2] Stop preinterpreter M code 5
5216	[S2] Stop preinterpreter M code 6
5217	[S2] Stop preinterpreter M code 7
5218	[S2] Stop preinterpreter M code 8
5219	[S2] Stop preinterpreter M code 9
5220	[S2] Stop preinterpreter M code 10

Range： 0 ~ 299
Active： Enable after RESET
Level： End User
Default： 209
Unit： N/A
Function： TI060029
Description： When NC executes the M code set by this parameter in part program, the pre-interpretation will be stopped.

231	[S1] Information of X axis hide(0:No,1:Yes)
232	[S1] Information of Y axis hide(0:No,1:Yes)
233	[S1] Information of Z axis hide(0:No,1:Yes)
234	[S1] Information of 4th axis hide(0:No,1:Yes)
5231	[S2] Information of X axis hide(0:No,1:Yes)
5232	[S2] Information of Y axis hide(0:No,1:Yes)
5233	[S2] Information of Z axis hide(0:No,1:Yes)
5234	[S2] Information of 4th axis hide(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable Immediately
Level： Maker
Default： 0
Unit： N/A
Function： TI060036
Description： 0：The corresponding HMI information of the axis is shown.
1：The corresponding HMI information of the axis is hidden.

238	Geometric value(0:Absolute,1:Relative)

Range： 0 ~ 1
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： This parameter sets whether the tool's profile compensation value set on OFFSET page is an absolute or a relative value.

239	Max wear value to input(LU)

Range： 1 ~ 10000
Active： Enable Immediately
Level： End User
Default： 1000
Unit： LU
Function： N/A
Description： This parameter sets the check range of tool's wear input set on OFFSET page.

249	RAMDISK error message(0:OFF,1:ON)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0: When there is any abnormality of RAMDISK, do not show warning messages.
1: When there is any abnormality of RAMDISK, show warning messages.

351	[S1] Feedrate override unit of knob(0:10%,1:1%)
5351	[S2] Feedrate override unit of knob(0:10%,1:1%)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： This parameter is the unit of cutting feedrate switch.
0：10%，1：1%

352	[S1] Jog override unit of knob(0:10%,1:1%)
5352	[S2] Jog override unit of knob(0:10%,1:1%)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060034
Description： This parameter is the unit of JOG switch.
0：10%，1：1%

353	[S1] Rapid traverse override unit of knob(0:4 section,1:1%)
5353	[S2] Rapid traverse override unit of knob(0:4 section,1:1%)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060034
Description： This parameter is the unit of rapid traverse switch. 0:4-section switch, 1:1%

360	Option color set(0~3)
361	Black color set(0~16)
362	Blue color set(0~16)
363	Green color set(0~16)
364	Cyan color set(0~16)
365	Red color set(0~16)
366	Magenta color set(0~16)
367	Brown color set(0~16)
368	White color set(0~16)
369	Gray color set(0~16)
370	Light blue color set(0~16)
371	Light green color set(0~16)
372	Light cyan color set(0~16)
373	Light red color set(0~16)
374	Light magenta color set(0~16)
375	Yellow color set(0~16)
376	Light white color set(0~16)
377	Cursor color set(0~16)
378	Mark color set(0~16)
379	Up edge color set(0~16)
380	Down edge color set(0~16)
381	Is the color of button contrast(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： TI060020
Description： Adjustment of colors on HMI screen.

388	Port of file communication(0:Disable,1:COM1,2:COM2)

Range： 0 ~ 2
Active： Enable after restart system
Level： Maker
Default： 1
Unit： N/A
Function： N/A
Description： Set the transmission port for file transfer.

0: Not applied

1:COM1

2:COM2

389 **Rate of file communication(bps)**

Range： 9600 ~ 115200
Active： Enable after RESET
Level： Maker
Default： 9600
Unit： bps
Function： N/A
Description： Set the speed rate of file transfer.

390 **Data bit of file communication(5~8 bit)**

Range： 5 ~ 8
Active： Enable after RESET
Level： Maker
Default： 8
Unit： bit
Function： N/A
Description： Set the data bit of file transfer.

391 **Stop bit of file communication(0:1 bit,1:1.5 or 2bit)**

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： bit
Function： N/A
Description： Set the stop bit of file transfer.

392 **Odd even check of file communication(0:Disable,1:Odd,2:Even)**

Range： 0 ~ 2
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Set the odd and even check bit of file transfer.

393 **Code of file communication(0:ASCII,1:EIA,2:ISO)**

Range： 0 ~ 2
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： Set the codes of file transfer.

0：ASCII

1：EIA

2：ISO

394 **The screen saver wait time(min)**

Range： 0 ~ 9999
Active： Enable after restart system
Level： End User
Default： 0
Unit： min
Function： TI050023
Description： 1. When this parameter is set to 0, the screensaver is not applied.
2. When this parameter is not 0, the screensaver activates automatically after the system is not operated for a specified amount of time (time length set by the parameter). If screensaver has not activated and some key is pressed, wait time will be counted from the last keystroke. If screensaver already activates, pressing any key will immediately terminate it, and wait time will be counted from zero.

500	[S1] Positive direction value of X axis for 1st soft no go area(μm)
501	[S1] Negative direction value of X axis for 1st soft no go area(μm)
502	[S1] Positive direction value of Y axis for 1st soft no go area(μm)
503	[S1] Negative direction value of Y axis for 1st soft no go area(μm)
504	[S1] Positive direction value of Z axis for 1st soft no go area(μm)
505	[S1] Negative direction value of Z axis for 1st soft no go area(μm)
506	[S1] Positive direction value of 4th axis for 1st soft no go area(μm)
507	[S1] Negative direction value of 4th axis for 1st soft no go area(μm)
512	[S1] Positive direction value of X axis for 2nd soft no go area(μm)
513	[S1] Negative direction value of X axis for 2nd soft no go area(μm)
514	[S1] Positive direction value of Y axis for 2nd soft no go area(μm)
515	[S1] Negative direction value of Y axis for 2nd soft no go area(μm)
516	[S1] Positive direction value of Z axis for 2nd soft no go area(μm)
517	[S1] Negative direction value of Z axis for 2nd soft no go area(μm)
518	[S1] Positive direction value of 4th axis for 2nd soft no go area(μm)
519	[S1] Negative direction value of 4th axis for 2nd soft no go area(μm)
5500	[S2] Positive direction value of X axis for 1st soft no go area(μm)
5501	[S2] Negative direction value of X axis for 1st soft no go area(μm)
5502	[S2] Positive direction value of Y axis for 1st soft no go area(μm)
5503	[S2] Negative direction value of Y axis for 1st soft no go area(μm)
5504	[S2] Positive direction value of Z axis for 1st soft no go area(μm)
5505	[S2] Negative direction value of Z axis for 1st soft no go area(μm)
5506	[S2] Positive direction value of 4th axis for 1st soft no go area(μm)
5507	[S2] Negative direction value of 4th axis for 1st soft no go area(μm)
5512	[S2] Positive direction value of X axis for 2nd soft no go area(μm)
5513	[S2] Negative direction value of X axis for 2nd soft no go area(μm)
5514	[S2] Positive direction value of Y axis for 2nd soft no go area(μm)
5515	[S2] Negative direction value of Y axis for 2nd soft no go area(μm)
5516	[S2] Positive direction value of Z axis for 2nd soft no go area(μm)
5517	[S2] Negative direction value of Z axis for 2nd soft no go area(μm)
5518	[S2] Positive direction value of 4th axis for 2nd soft no go area(μm)
5519	[S2] Negative direction value of 4th axis for 2nd soft no go area(μm)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： TI060033
Description： Set the positive and negative values of the axes which are not included in the forbidden area to 0, meaning, that axis is not applied.
T800：[S1] 0500~0507、0512~0519，[S2] 5500~5507、5512~5519。

804	Monitor power management(0:CRT->Panel,1:Panel->CRT,2:Disable)

Range： 0 ~ 2
Active： Enable Immediately
Level： End User
Default： 0
Unit： N/A
Function： TI050034
Description： 1. When parameter is set to 0, the preset output is CRT display Channel. When the system is in the status of monitor power management, it will switch to Panel display Channel, and enter power save mode.

2. When the parameter is 1, it indicates that the default output is Panel display Channel. When the system enter monitor power save, it will switch to CRT display Channel, and enter power save mode.

3. When the parameter is >=2, it indicates that the system disables monitor power save management. At this time, system will not execute Channel switch.

866	[S1] Local input port number for measuring(1~2:Card1,101~102:Card2)
5866	[S2] Local input port number for measuring(1~2:Card1,101~102:Card2)

Range： 1 ~ 102
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： TI060025
Description： 1~2：Corresponding to the 1st motion control card's 1~2 Local Input.
101~102：Corresponding to the 2nd motion control card's 1~2 Local Input.

867	[S1] Sensor type for measuring(0:NC,1:NO)
5867	[S2] Sensor type for measuring(0:NC,1:NO)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 1
Unit： N/A
Function： TI060025
Description： 0：The signal connector type of tool measuring is normally close (NC).
1：The signal connector type of tool measuring is normally open (NO).

868	[S1] Tool offset number for measuring(0~30)
5868	[S2] Tool offset number for measuring(0~30)

Range： 0 ~ 30
Active： Enable after RESET
Level： End User
Default： 0
Unit： N/A
Function： TI060025
Description： When this parameter is set to 0, meaning, the corresponding R register decides the tool's offset number of manual measuring. When this parameter is not set to 0, the parameter's set value can decide the number in manual measuring status.

869	[S1] Enable axis acc\dec function for measuring(0:No,1:Yes)
5869	[S2] Enable axis acc\dec function for measuring(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after restart system
Level： Maker
Default： 0
Unit： N/A
Function： TI060025
Description： When this parameter is set to 0, meaning, do not execute acceleration/deceleration during measuring signal setting, instead, stop the servo axis's motion by the strongest power directly; set to 1, meaning, stop servo axis's motion by the acceleration and deceleration function.

870	[S1] Use cutting signal(0:NO,1:YES)
5870	[S2] Use cutting signal(0:NO,1:YES)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： TI060024
Description： 1: When NC is in AUTO mode, wait until "cutting signal" is ON, then cutting can be executed.
0: Do not need to wait for "cutting signal."

871	[S1] Waitting time for using cutting signal(ms)
5871	[S2] Waitting time for using cutting signal(ms)

Range： 0 ~ 32767
Active： Enable after RESET
Level： Maker
Default： 1000
Unit： ms
Function： TI060024
Description： When parameter “Use Cutting Signal” is set to 1, and enters the wait timing, then through the wait duration set by this parameter, the cutting feed start signal is checked then.

899	[S1] use CE rule(0:No,1:Yes)
5899	[S2] use CE rule(0:No,1:Yes)

Range： 0 ~ 1
Active： Enable after RESET
Level： Maker
Default： 0
Unit： N/A
Function： N/A
Description： 0：CE regulations are not applied.
1：CE regulations are applied.

995	Enable Debug Function for PLC(0:No,1:L1,2:L2,3:L1+L2)

Range： 0 ~ 3
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： N/A
Description： 0：Not applied.
1：Record the value of Level 1.
2：Record the value of Level 2.
3：Record the value of Level 1 and Level 2.

1006	[S1] 1st soft limit positive direction value of X axis(μ m)
1007	[S1] 1st soft limit negative direction value of X axis(μ m)
1008	[S1] 1st soft limit positive direction value of Y axis(μ m)
1009	[S1] 1st soft limit negative direction value of Y axis(μ m)
1010	[S1] 1st soft limit positive direction value of Z axis(μ m)
1011	[S1] 1st soft limit negative direction value of Z axis(μ m)
1012	[S1] 1st soft limit positive direction value of 4th axis(μ m)
1013	[S1] 1st soft limit negative direction value of 4th axis(μ m)
1034	[S1] 2nd soft limit positive direction value of X axis(μ m)
1035	[S1] 2nd soft limit negative direction value of X axis(μ m)
1036	[S1] 2nd soft limit positive direction value of Y axis(μ m)
1037	[S1] 2nd soft limit negative direction value of Y axis(μ m)
1038	[S1] 2nd soft limit positive direction value of Z axis(μ m)
1039	[S1] 2nd soft limit negative direction value of Z axis(μ m)
1040	[S1] 2nd soft limit positive direction value of 4th axis(μ m)
1041	[S1] 2nd soft limit negative direction value of 4th axis(μ m)
6006	[S2] 1st soft limit positive direction value of X axis(μ m)
6007	[S2] 1st soft limit negative direction value of X axis(μ m)
6008	[S2] 1st soft limit positive direction value of Y axis(μ m)
6009	[S2] 1st soft limit negative direction value of Y axis(μ m)
6010	[S2] 1st soft limit positive direction value of Z axis(μ m)
6011	[S2] 1st soft limit negative direction value of Z axis(μ m)
6012	[S2] 1st soft limit positive direction value of 4th axis(μ m)
6013	[S2] 1st soft limit negative direction value of 4th axis(μ m)
6034	[S2] 2nd soft limit positive direction value of X axis(μ m)
6035	[S2] 2nd soft limit negative direction value of X axis(μ m)
6036	[S2] 2nd soft limit positive direction value of Y axis(μ m)
6037	[S2] 2nd soft limit negative direction value of Y axis(μ m)
6038	[S2] 2nd soft limit positive direction value of Z axis(μ m)
6039	[S2] 2nd soft limit negative direction value of Z axis(μ m)
6040	[S2] 2nd soft limit positive direction value of 4th axis(μ m)
6041	[S2] 2nd soft limit negative direction value of 4th axis(μ m)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： -99999999
Unit： μ m
Function： TI060033
Description： This parameter sets the travel limit value of the 1st and 2nd soft paths for each axis's positive and negative direction. It is effective only when each axis has executed HOME return, otherwise the initial value 99999.999μm will be applied. If this parameter's set value is smaller than this parameter, the system alarm will be triggered. The positive 1st and 2nd soft travel limit for each axis can be switched from each other by using the corresponding C Bit. Please refer to the description of C BIT.

1096 **The Minimum No. Of Waiting M-Code(0:Disable,100~9999)**

Range： 0 ~ 9999
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： TI050001
Description： The minimum value of wait M code.

1097 **The Maximum No. Of Waiting M-Code(0:Disable,100~9999)**

Range： 0 ~ 9999
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： TI050001
Description： The maximum value of wait M code.

1157 **Key code(0:Disable,1:Enable)**

Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： TI060021
Description： 0：Cancel the Key Code function.
1：Enable the Key Code function.

1158 **Show F2~F12 for function key(0:Disable,1:Enable)**

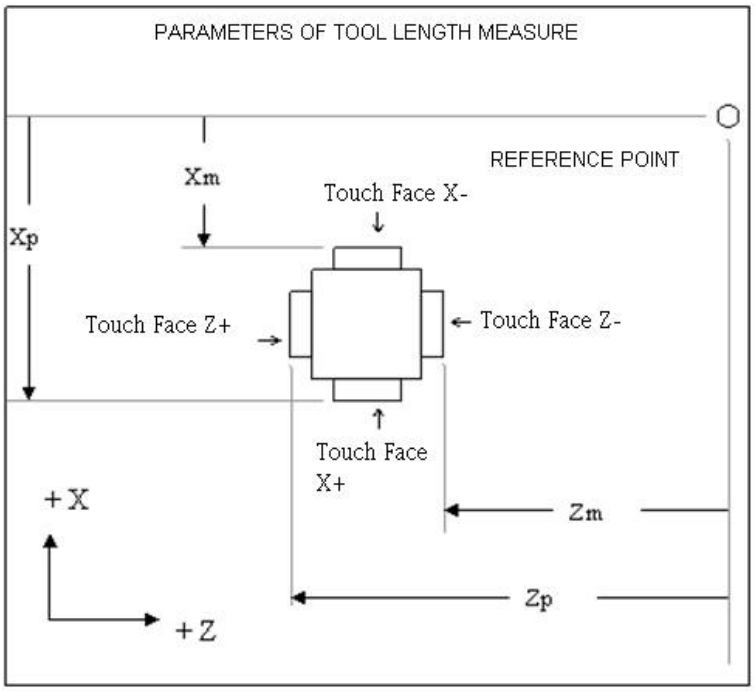
Range： 0 ~ 1
Active： Enable after restart system
Level： End User
Default： 0
Unit： N/A
Function： TI050024
Description： 0: The function keys F1~12 are not shown.
1: The function keys F1~12 are shown.

1159	Set read timeout time(sec)

Range： 0 ~ 30000
Active： Enable Immediately
Level： End User
Default： 30
Unit： sec
Function： TI050019
Description： Set the time of program reading overtime.

1160	[S1] X+ distance from mechanical origin to workpiece surface(μm)
1161	[S1] X- distance from mechanical origin to workpiece surface(μm)
1162	[S1] Z+ distance from mechanical origin to workpiece surface(μm)
1163	[S1] Z- distance from mechanical origin to workpiece surface(μm)
6160	[S2] X+ distance from mechanical origin to workpiece surface(μm)
6161	[S2] X- distance from mechanical origin to workpiece surface(μm)
6162	[S2] Z+ distance from mechanical origin to workpiece surface(μm)
6163	[S2] Z- distance from mechanical origin to workpiece surface(μm)

Range： -99999999 ~ 99999999
Active： Enable after RESET
Level： Maker
Default： 0
Unit： μm
Function： N/A
Description：



Parameter “X+ distance from mechanical origin to workpiece surface”: The distance between mechanical reference point and X+ mating face. It is the distance from the mechanical reference point to Touch Sensor’s positive

direction surface of X axis, see Xp in the figure above.

Parameter “X- distance from mechanical origin to workpiece surface”: The distance between mechanical reference point and X- mating face. It is the distance from the mechanical reference point to Touch Sensor’s negative direction surface of X axis, see Xm in the figure above.

Parameter “Z+ distance from mechanical origin to workpiece surface”：The distance between mechanical reference point and Z+ mating face. It is the distance from the mechanical reference point to Touch Sensor’s positive direction surface of Z axis, see Zp in the figure above.

Parameter “Z- distance from mechanical origin to workpiece surface”：The distance between mechanical reference point and Z- mating face. It is the distance from the mechanical reference point to Touch Sensor’s negative direction surface of Z axis, see Xp in the figure above.

4989	**Exchange of System screen(0:S1|S2,1:S2|S1)**
Range：	0 ~ 1
Active：	Enable after restart system
Level：	End User
Default：	0
Unit：	N/A
Function：	N/A
Description：	0: The 1st system is at the left side, and the 2nd system is at the right side. 1: The 1st system is at the right side, and the 2nd system is at the left side.

4 Ladder Diagram

This chapter describes the interface describtion and setting of the controller's diagram, including PLC configuration.

4.1 PLC Configuration(PLCIO.CFG)Setting

Under the main installation tables of content\MACHINE, the file title is PLCIO.CFG. This file sets the I/O plan and definitions of PLC, and the file's content is listed as below:

```
InputSignalInverse=0          // If I Bit is inversed or not. 0=No, 1=Yes.
OutputSignalInverse=0         // If O Bit is inversed or not. 0=No, 1=Yes.
BaseAddress=0x200             // Base Address of the motion card.
Set1Slave1=1                  // If to apply Slave1 of Set1 or not. 0=Do not Apply.
                                 1=Apply.
Set1Slave2=0                  // If to apply Slave2 of Set1 or not. 0=Do not Apply.
                                 1=Apply.
Set2Slave1=1                  // If to apply Slave1 of Set2 or not. 0=Do not Apply.
                                 1=Apply.
Set2Slave2=0                  // If to apply Slave2 of Set2 or not. 0=Do not Apply.
                                 1=Apply.
I      0      1      0x200   // Column[I or O][NUMBER][SET][ADDRESS][Add Notes]
I      8      1      0x201   // No blank line in-between.
I      16     1      0x202   // Either I or i will do.
I      24     1      0x203   // Either O or o will do.
I      32     1      0x204   // SET1 indicates SET1,SET=2 indicates SET2.
I      40     1      0x205   // Must start from IO.
I      48     1      0x206
I      56     1      0x207
I      64     2      0x200   // Due to EPCIO, O point must be an even number.
I      72     2      0x201
I      80     2      0x202
I      88     2      0x203
I      96     2      0x204
O      0      1      0x200
O      8      1      0x201
O      16     1      0x202
O      24     1      0x203
O      32     1      0x204
O      40     1      0x205
O      48     1      0x206
O      56     1      0x207
O      64     2      0x200
O      72     2      0x201
O      80     2      0x202
O      88     2      0x203
O      96     2      0x204
I      104    11     0x200   // SET1=11 indicates the first 4 Bits of Local IO,SET=12
                                 indicates the 4 Bits after Local IO.
                              // Only sets 4 Bits each time, and need to put Local
                                 IO together to declare.
I      108    12     0x200   // 0x200:0~7,0x201:8~15
O      104    11     0x201   // 0~7 and 12~15 : Local Input
I      112    12     0x201   // 8~11 : Local Output
```

NOTE：

I：0~63(Set 1)，64~103(Set 2)，104~111(Local I 0~7)，112~115(Local I 12~15)

O：0~63(Set 1)，64~103(Set 2)，104~107(Local I 9~11)

4.2 PLC INTERFACE

Pressing **<DGNOS>** on MDI panel and then press 【MLC2】, the screen will be shown as below. The 5 sub-function keys, such as【LAD】,【CNT】,【REG】,【DRG】,【TMR】will be on the screen. Press 【LAD】, the screen is shown as below.

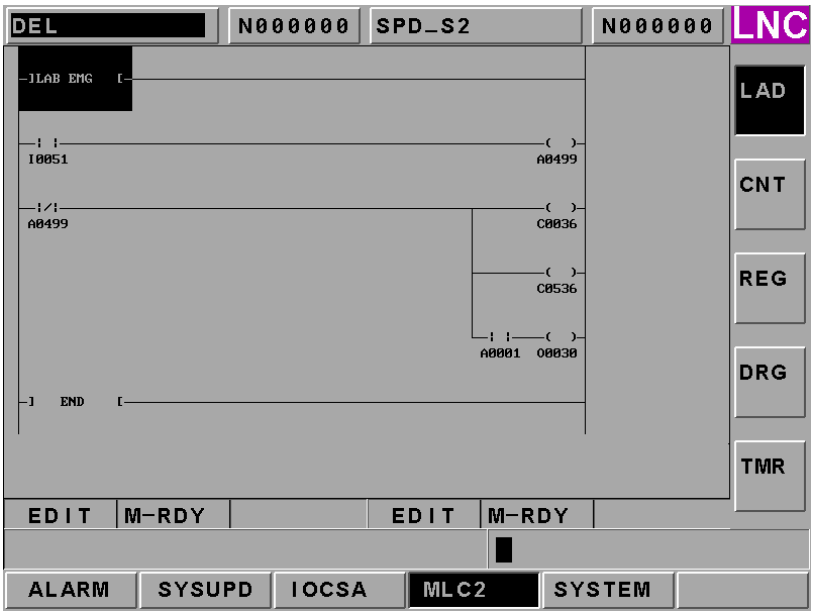


Fig 4-1 MLC2 Ladder Diagram

At the input line in 【LAD】, enter the wanted I, O, C, S, A, R, TM, etc., and add the number after the letters, then press <INPUT>, the position can be found. For example, enter TM001 or TM1, the position of it will be found.

Press 【CNT】, the screen is shown as below：

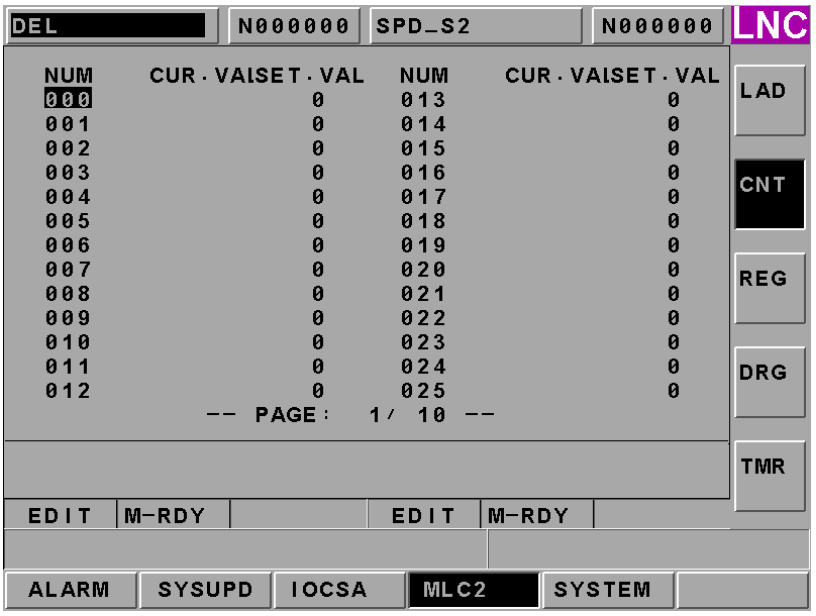


Fig 4-2 MLC2 Counter

Press 【REG】, the screen is shown as below：

Users can enter Rxxxx at the input line, then press <INPUT> to go to the position of that variable directly. For example, enter R123, then press <INPUT> to go to the position of R0123.

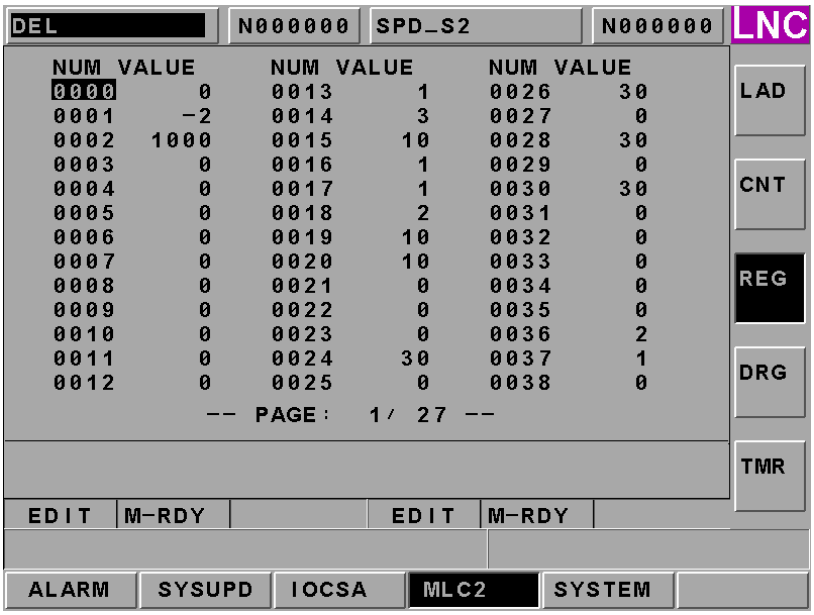


Fig 4-3 MLC2 Variable R

Press 【DRG】, the screen is shown as below：

Users can enter Dxxxx at the input line, then press <INPUT> to go to the position of that variable directly. For example, enter D123, then press <INPUT> to go to the position of D0123.

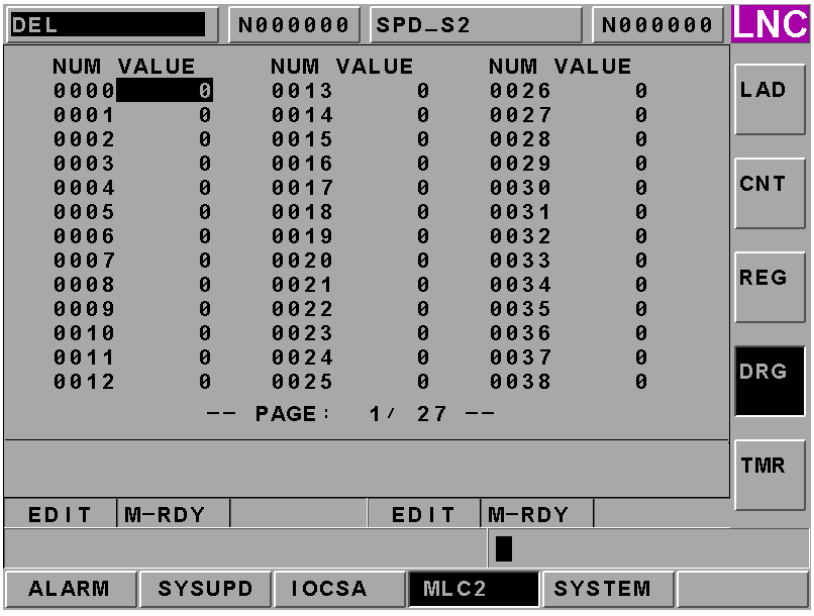


Fig 4-4 MLC2 Variable D

Press 【TMR】, the screen is shown as below：

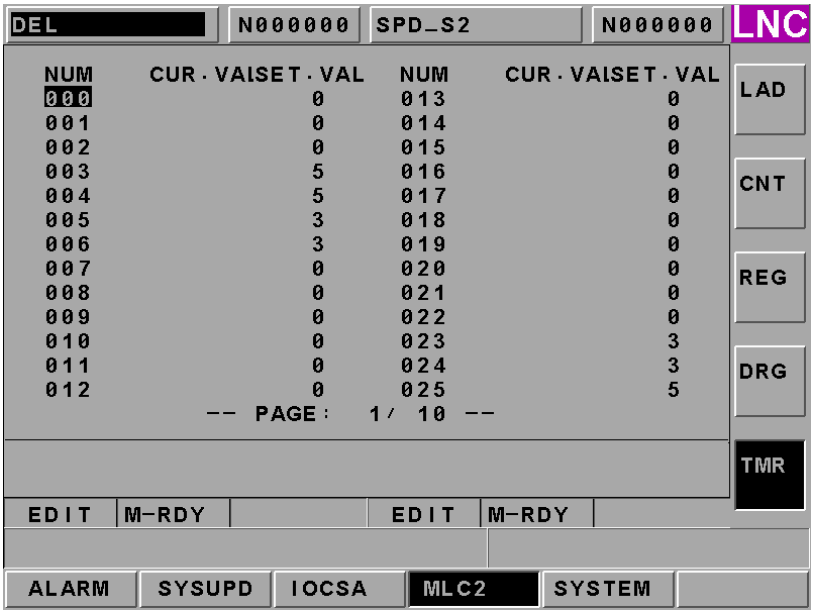


Fig 4-5 MLC2 Timer

5 C, S Bit and R Register

This chapter describes C, S, Bit and R Register of controllers. The definitions are as below.

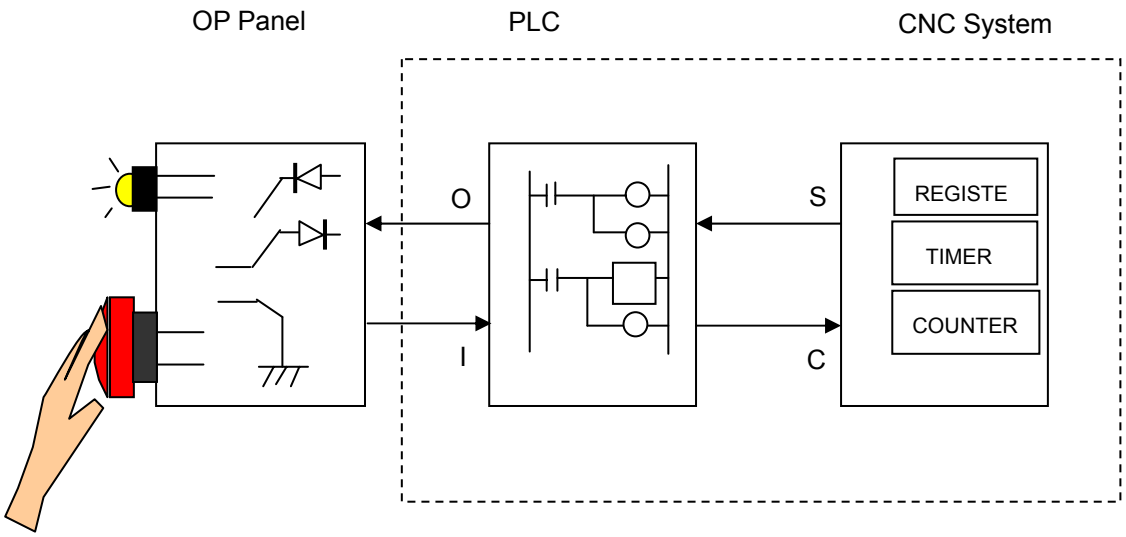


Fig 5-1 I/O & Internal Condition of the System

5.1 IOCSA Interface

I, O, C, S, A are used to inspect I/O and the internal condition of the system. Press 【DGNOS】on MDI panel, then press【IOCSA】, the screen will be shown as below. The 5 sub-function keys, 【I Bit】、【O Bit】、【C Bit】、【S Bit】、【A Bit】are shown below.

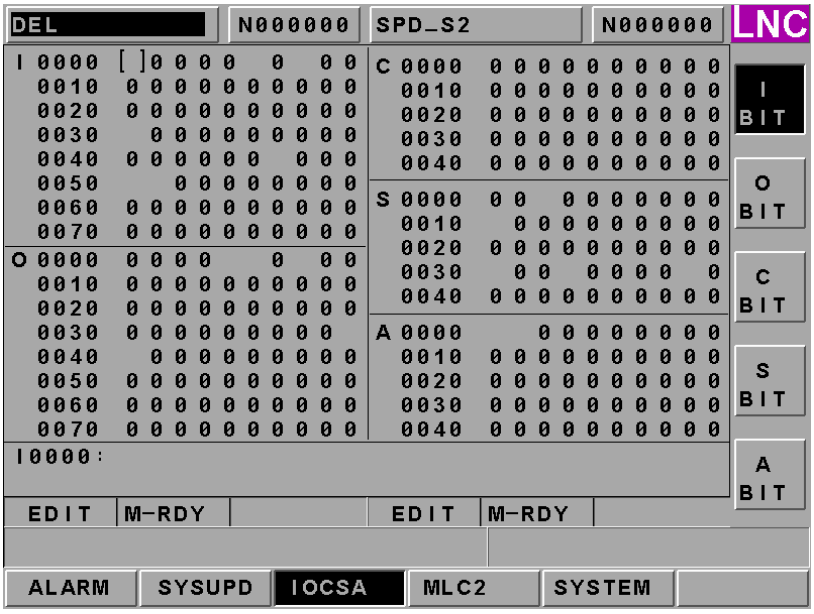


Fig 5-2 IOCSA Screen

This screen is divided into 5 parts. The assigned method of the focus point is to assign via sub-function keys. displayed at the right section of the screen . < PAGE ↑ > and < PAGE ↓ > keys are used to control the page switch of IOSCA. In IOSCA window, press up, down, left, and right keys to move the cursor to the specific position. During the process of moving, users can see the notes of some IOSCA. Besides, the positioning method is also provided. Only add the numbers that are going to be positioned after I, O, C, S, A, then press <INPUT> to go to the assigned position directly. For example, enter I111、O222、C121、S8、A124.

5.2 C bit

C bit is written by Ladder. The purpose is to inform the controller to execute that the corresponding function or action of that C bit is ON or OFF.

No.	Description	Function
C0	[S1]Cycle Start	N/A
C1	[S1]Feed Hold	N/A
C3	[S1]Prog. Protect	N/A
C4	[S1]Manual Return	N/A
C5	[S1]Condition Write of Manual Working Coordinate Measurement	TI060025
C6	[S1]+X Axis Direction	TI060034
C7	[S1]-X Axis Direction	TI060034
C8	[S1]+Y Axis Direction	TI060034
C9	[S1]-Y Axis Direction	TI060034
C10	[S1]+Z Axis Direction	TI060034
C11	[S1]+Z Axis Direction	TI060034
C12	[S1]-4th Axis Direction	TI060034
C13	[S1]+4th Axis Direction	TI060034
C14	[S1]Manual Tool Geometry Offset Measuring Mode Signal	N/A
C15	[S1]Condition Request of Manual Working Coordinate Measurement	TI060025
C16	[S1]Handle X Axis	TI060026
C17	[S1]Handle Y Axis	TI060026
C18	[S1]Handle Z Axis	TI060026
C19	[S1]Handle 4th Axis	TI060026
C20	[S1]MPG Dry Run	TI060026
C21	Wake up the screen saver signal	TI050023
C22	[S1]Cutting Command Release Signal	TI060024
C23	[S1]Rapid	TI060034
C24	[S1]Enable X Axis Synchronous Control	TI050013
C25	[S1]Enable Y Axis Synchronous Control	TI050013
C26	[S1]Enable Z Axis Synchronous Control	TI050013
C27	[S1]Enable 4th Axis Synchronous Control	TI050013
C28	[S1]JOG signal of type 2 of 1st spindle	TI050012
C29	[S1]JOG signal of type 2 of 2nd spindle	TI050012

No.	Description	Function
C30	[S1]JOG signal of type 2 of 3rd spindle	TI050012
C31	[S1]X Axis Home DOG Signal	N/A
C32	[S1]Y Axis Home DOG Signal	N/A
C33	[S1]Z Axis Home DOG Signal	N/A
C34	[S1]4th Axis Home DOG Signal	N/A
C36	[S1]Emergency Stop	N/A
C37	[S1]External Reset	N/A
C38	[S1]MST Finish	N/A
C40	[S1]Single Block	N/A
C41	[S1]Optional Block Skip	N/A
C42	[S1]Dry Run	N/A
C43	[S1]Machine Lock	N/A
C44	[S1]Optional Stop	N/A
C45	[S1]Z Axis Cancel	N/A
C46	[S1]Auxiliary Function Lock	N/A
C49	[S1]4th Axis Neglect	N/A
C50	[S1]+X Axis OT	N/A
C51	[S1]-X Axis OT	N/A
C52	[S1]+Y Axis OT	N/A
C53	[S1]-Y Axis OT	N/A
C54	[S1]+Z Axis OT	N/A
C55	[S1]-Z Axis OT	N/A
C56	[S1]+4th Axis OT	N/A
C57	[S1]-4th Axis OT	N/A
C59	[S1]X Axis Interlock	N/A
C60	[S1]Y Axis Interlock	N/A
C61	[S1]Z Axis Interlock	N/A
C62	[S1]4th Axis Interlock	N/A
C64	[S1]PLC Window Read/Write Signal	TI060022
C65	[S1]PLC Window Commanding Signal	TI060022
C66	[S1]X Axis:Select Axis Direction Signal of Handle INT	N/A
C67	[S1]Y Axis:Select Axis Direction Signal of Handle INT	N/A
C68	[S1]Z Axis:Select Axis Direction Signal of Handle INT	N/A

No.	Description	Function
C69	[S1]4th Axis:Select Axis Direction Signal of Handle INT	N/A
C72	[S1]JOG signal of type 1 of 1st spindle	TI050012
C73	[S1]JOG signal of type 1 of 2nd spindle	TI050012
C74	[S1]JOG signal of type 1 of 3rd spindle	TI050012
C75	[S1]X Axis Servo Alarm	N/A
C76	[S1]Y Axis Servo Alarm	N/A
C77	[S1]Z Axis Servo Alarm	N/A
C78	[S1]4th Axis Servo Alarm	N/A
C80	[S1]3rd Spindle CW	N/A
C81	[S1]3rd Spindle CCW	N/A
C82	[S1]1st Spindle CW	N/A
C83	[S1]1st Spindle CCW	N/A
C85	[S1]1st Spindle Orientation	N/A
C87	[S1]2nd Spindle CW	N/A
C88	[S1]2nd Spindle CCW	N/A
C89	[S1]X Axis Mirror Image	N/A
C90	[S1]Y Axis Mirror Image	N/A
C91	[S1]Z Axis Mirror Image	N/A
C92	[S1]4th Axis Mirror Image	N/A
C95	[S1]1st Spindle Semi-Constand Position	N/A
C97	[S1]1st Spindle Gear #1	N/A
C98	[S1]1st Spindle Gear #2	N/A
C99	[S1]1st Spindle Gear #3	N/A
C100	[S1]MACRO Variable $120	N/A
C101	[S1]MACRO Variable $121	N/A
C102	[S1]MACRO Variable $122	N/A
C103	[S1]MACRO Variable $123	N/A
C104	[S1]MACRO Variable $124	N/A
C105	[S1]MACRO Variable $125	N/A
C106	[S1]MACRO Variable $126	N/A
C107	[S1]MACRO Variable $127	N/A
C108	[S1]MACRO Variable $128	N/A
C109	[S1]MACRO Variable $129	N/A

No.	Description	Function
C110	[S1]MACRO Variable $130	N/A
C111	[S1]MACRO Variable $131	N/A
C112	[S1]MACRO Variable $132	N/A
C113	[S1]MACRO Variable $133	N/A
C114	[S1]MACRO Variable $134	N/A
C115	[S1]MACRO Variable $135	N/A
C116	[S1]1st Spindle Gear #1	N/A
C117	[S1]2nd Spindle Gear #2	N/A
C118	[S1]3rd Spindle Gear #3	N/A
C119	[S1]Z Axis is inhibited below 2nd Zero point	N/A
C120	[S1]Enable PMC Axis	TI060023
C121	[S1]1st Spindle Gear #1	N/A
C122	[S1]2nd Spindle Gear #2	N/A
C123	[S1]3rd Spindle Gear #3	N/A
C125	[S1]Enable Rigid Tapping	N/A
C128	[S1]Manual Tool Geometry Offset Measurment Touching Signal:+X	N/A
C129	[S1]Manual Tool Geometry Offset Measurment Touching Signal:-X	N/A
C130	[S1]X Axis Detach	TI060029
C131	[S1]Y Axis Detach	TI060029
C132	[S1]Z Axis Detach	TI060029
C133	[S1]4th Axis Detach	TI060029
C134	[S1]Clear Working Piece Number	N/A
C136	[S1]Lathe Thread-Cutting Cycle:Right Angle Tool-Shifting Enable Signal	N/A
C137	[S1]Lathe Thread-Cutting Cycle:Right Angle Tool-Lifting Enable Signal	N/A
C138	[S1]Manual Tool Geometry OFFSET Measurment Touching Signal:+Z	N/A
C139	[S1]Manual Tool Geometry OFFSET Measurment Touching Signal:-Z	N/A
C140	[S1]2nd +X Axis Software Limit Choice	TI060033
C141	[S1]2nd -X Axis Software Limit Choice	TI060033
C142	[S1]2nd +Y Axis Software Limit Choice	TI060033
C143	[S1]2nd -Y Axis Software Limit Choice	TI060033
C144	[S1]2nd +Z Axis Software Limit Choice	TI060033
C145	[S1]2nd -Z Axis Software Limit Choice	TI060033
C146	[S1]2nd +4th Axis Software Limit Choice	TI060033

No.	Description	Function
C147	[S1]2nd -4th Axis Software Limit Choice	TI060033
C158	[S1]5th Axis Home DOG Signal	N/A
C172	[S1]1st Spindle Release	TI050011
C173	[S1]1st Spindle Lock	TI050011
C174	[S1]Enable X axis superimpose control	TI060028
C175	[S1]Enable Y axis superimpose control	TI060028
C176	[S1]Enable Z axis superimpose control	TI060028
C177	[S1]Enable 4th axis superimpose control	TI060028
C181	[S1]X axis information hide	TI060036
C182	[S1]Y axis information hide	TI060036
C183	[S1]Z axis information hide	TI060036
C184	[S1]4th axis information hide	TI060036
C186	Enable Composite of X Axis of System 1	TI060027
C187	Enable Composite of Y Axis of System 1	TI060027
C188	Enable Composite of Z Axis of System 1	TI060027
C189	Enable Composite of 4th Axis of System 1	TI060027
C190	Velocity Control of 1st Synchronous Control	TI050010
C191	Phase Control of 1st Synchronous Control	TI050010
C192	Velocity Control of 2nd Synchronous Control	TI050010
C193	Phase Control of 2nd Synchronous Control	TI050010
C194	Velocity Control of 3rd Synchronous Control	TI050010
C195	Phase Control of 3rd Synchronous Control	TI050010
C196	Acc/Dec cmp. of 1st Synchronous Control	TI050010
C197	Acc/Dec cmp. of 2nd Synchronous Control	TI050010
C198	Acc/Dec cmp. of 3rd Synchronous Control	TI050010
C200	[S1]Proportion axis	TI060032
C201	[S1]Absolute encoder Reset Ready Signal:X Axis	TI060035
C202	[S1]Absolute encoder Reset Ready Signal:Y Axis	TI060035
C203	[S1]Absolute encoder Reset Ready Signal:Z Axis	TI060035
C204	[S1]Absolute encoder Reset Ready Signal:4th Axis	TI060035
C207	[S1]Absolute Encoder Data Ready Signal:X Axis	TI060035
C208	[S1]Absolute Encoder Data Ready Signal:Y Axis	TI060035
C209	[S1]Absolute Encoder Data Ready Signal:Z Axis	TI060035

No.	Description	Function
C210	[S1]Absolute Encoder Data Ready Signal:4th Axis	TI060035
C213	[S1]Absolute Encoder Data Bit0 Transmitting Signal:X Axis	TI060035
C214	[S1]Absolute Encoder Data Bit0 Transmitting Signal:Y Axis	TI060035
C215	[S1]Absolute Encoder Data Bit0 Transmitting Signal:Z Axis	TI060035
C216	[S1]Absolute Encoder Data Bit0 Transmitting Signal:4th Axis	TI060035
C219	[S1]Absolute Encoder Data Bit1 Transmitting Signal:X Axis	TI060035
C220	[S1]Absolute Encoder Data Bit1 Transmitting Signal:Y Axis	TI060035
C221	[S1]Absolute Encoder Data Bit1 Transmitting Signal:Z Axis	TI060035
C222	[S1]Absolute Encoder Data Bit1 Transmitting Signal:4th Axis	TI060035
C225	[S1]Enable 1st soft no go area	TI060033
C226	[S1]Enable 2nd soft no go area	TI060033
C241	[S1]PMC/INT switch signal:X axis(0:INT,1:PMC)	TI060023
C242	[S1]PMC/INT switch signal:Y axis(0:INT,1:PMC)	TI060023
C243	[S1]PMC/INT switch signal:Z axis(0:INT,1:PMC)	TI060023
C244	[S1]PMC/INT switch signal:4th axis(0:INT,1:PMC)	TI060023
C261	[S1]Start update coordinate by ABS servo communication:X axis	N/A
C262	[S1]Start update coordinate by ABS servo communication:Y axis	N/A
C263	[S1]Start update coordinate by ABS servo communication:Z axis	N/A
C264	[S1]Start update coordinate by ABS servo communication:4th axis	N/A
C267	[S1]Start origin setting by ABS servo communication:X axis	N/A
C268	[S1]Start origin setting by ABS servo communication:Y axis	N/A
C269	[S1]Start origin setting by ABS servo communication:Z axis	N/A
C270	[S1]Start origin setting by ABS servo communication:4th axis	N/A
C301	[S1] Disable Waiting M Code	TI050001
C302	HMI Screen	N/A
C303	HMI System	N/A
C500	[S2]Cycle Start	N/A
C501	[S2]Feed Hold	N/A
C503	[S2]Prog. Protect	N/A
C504	[S2]Manual Return	N/A
C505	[S2]Condition Write of Manual Working Coordinate Measurement	TI060025
C506	[S2]+X Axis Direction	TI060034
C507	[S2]-X Axis Direction	TI060034

No.	Description	Function
C508	[S2]+Y Axis Direction	TI060034
C509	[S2]-Y Axis Direction	TI060034
C510	[S2]+Z Axis Direction	TI060034
C511	[S2]+Z Axis Direction	TI060034
C512	[S2]-4th Axis Direction	TI060034
C513	[S2]+4th Axis Direction	TI060034
C514	[S2]Manual Tool Geometry Offset Measuring Mode Signal	N/A
C515	[S2]Condition Request of Manual Working Coordinate Measurement	TI060025
C516	[S2]Handle X Axis	TI060026
C517	[S2]Handle Y Axis	TI060026
C518	[S2]Handle Z Axis	TI060026
C519	[S2]Handle 4th Axis	TI060026
C520	[S2]MPG Dry Run	TI060026
C522	[S2]Cutting Command Release Signal	TI060024
C523	[S2]Rapid	TI060034
C524	[S2]Enable X Axis Synchronous Control	TI050013
C525	[S2]Enable Y Axis Synchronous Control	TI050013
C526	[S2]Enable Z Axis Synchronous Control	TI050013
C527	[S2]Enable 4th Axis Synchronous Control	TI050013
C528	[S2]JOG signal of type 2 of 1st spindle	TI050012
C529	[S2]JOG signal of type 2 of 2nd spindle	TI050012
C530	[S2]JOG signal of type 2 of 3rd spindle	TI050012
C531	[S2]X Axis Home DOG Signal	N/A
C532	[S2]Y Axis Home DOG Signal	N/A
C533	[S2]Z Axis Home DOG Signal	N/A
C534	[S2]4th Axis Home DOG Signal	N/A
C536	[S2]Emergency Stop	N/A
C537	[S2]External Reset	N/A
C538	[S2]MST Finish	N/A
C540	[S2]Single Block	N/A
C541	[S2]Optional Block Skip	N/A
C542	[S2]Dry Run	N/A
C543	[S2]Machine Lock	N/A

No.	Description	Function
C544	[S2]Optional Stop	N/A
C545	[S2]Z Axis Cancel	N/A
C546	[S2]Auxiliary Function Lock	N/A
C549	[S2]4th Axis Neglect	N/A
C550	[S2]+X Axis OT	N/A
C551	[S2]-X Axis OT	N/A
C552	[S2]+Y Axis OT	N/A
C553	[S2]-Y Axis OT	N/A
C554	[S2]+Z Axis OT	N/A
C555	[S2]-Z Axis OT	N/A
C556	[S2]+4th Axis OT	N/A
C557	[S2]-4th Axis OT	N/A
C559	[S2]X Axis Interlock	N/A
C560	[S2]Y Axis Interlock	N/A
C561	[S2]Z Axis Interlock	N/A
C562	[S2]4th Axis Interlock	N/A
C564	[S2]PLC Window Read/Write Signal	TI060022
C565	[S2]PLC Window Commanding Signal	TI060022
C566	[S2]X Axis:Select Axis Direction Signal of Handle INT	N/A
C567	[S2]Y Axis:Select Axis Direction Signal of Handle INT	N/A
C568	[S2]Z Axis:Select Axis Direction Signal of Handle INT	N/A
C569	[S2]4th Axis:Select Axis Direction Signal of Handle INT	N/A
C572	[S2]JOG signal of type 1 of 1st spindle	TI050012
C573	[S2]JOG signal of type 1 of 2nd spindle	TI050012
C574	[S2]JOG signal of type 1 of 3rd spindle	TI050012
C575	[S2]X Axis Servo Alarm	N/A
C576	[S2]Y Axis Servo Alarm	N/A
C577	[S2]Z Axis Servo Alarm	N/A
C578	[S2]4th Axis Servo Alarm	N/A
C580	[S2]3rd Spindle CW	N/A
C581	[S2]3rd Spindle CCW	N/A
C582	[S2]1st Spindle CW	N/A
C583	[S2]1st Spindle CCW	N/A

No.	Description	Function
C585	[S2]1st Spindle Orientation	N/A
C587	[S2]2nd Spindle CW	N/A
C588	[S2]2nd Spindle CCW	N/A
C589	[S2]X Axis Mirror Image	N/A
C590	[S2]Y Axis Mirror Image	N/A
C591	[S2]Z Axis Mirror Image	N/A
C592	[S2]4th Axis Mirror Image	N/A
C595	[S2]1st Spindle Semi-Constand Position	N/A
C597	[S2]1st Spindle Gear #1	N/A
C598	[S2]1st Spindle Gear #2	N/A
C599	[S2]1st Spindle Gear #3	N/A
C600	[S2]MACRO Variable $120	N/A
C601	[S2]MACRO Variable $121	N/A
C602	[S2]MACRO Variable $122	N/A
C603	[S2]MACRO Variable $123	N/A
C604	[S2]MACRO Variable $124	N/A
C605	[S2]MACRO Variable $125	N/A
C606	[S2]MACRO Variable $126	N/A
C607	[S2]MACRO Variable $127	N/A
C608	[S2]MACRO Variable $128	N/A
C609	[S2]MACRO Variable $129	N/A
C610	[S2]MACRO Variable $130	N/A
C611	[S2]MACRO Variable $131	N/A
C612	[S2]MACRO Variable $132	N/A
C613	[S2]MACRO Variable $133	N/A
C614	[S2]MACRO Variable $134	N/A
C615	[S2]MACRO Variable $135	N/A
C616	[S2]1st Spindle Gear #1	N/A
C617	[S2]2nd Spindle Gear #2	N/A
C618	[S2]3rd Spindle Gear #3	N/A
C619	[S2]Z Axis is inhibited below 2nd Zero point	N/A
C620	[S2]Enable PMC Axis	TI060023
C621	[S2]1st Spindle Gear #1	N/A

No.	Description	Function
C622	[S2]2nd Spindle Gear #2	N/A
C623	[S2]3rd Spindle Gear #3	N/A
C625	[S2]Enable Rigid Tapping	N/A
C628	[S2]Manual Tool Geometry Offset Measurment Touching Signal:+X	N/A
C629	[S2]Manual Tool Geometry Offset Measurment Touching Signal:-X	N/A
C630	[S2]X Axis Detach	TI060029
C631	[S2]Y Axis Detach	TI060029
C632	[S2]Z Axis Detach	TI060029
C633	[S2]4th Axis Detach	TI060029
C634	[S2]Clear Working Piece Number	N/A
C636	[S2]Lathe Thread-Cutting Cycle:Right Angle Tool-Shifting Enable Signal	N/A
C637	[S2]Lathe Thread-Cutting Cycle:Right Angle Tool-Lifting Enable Signal	N/A
C638	[S2]Manual Tool Geometry OFFSET Measurment Touching Signal:+Z	N/A
C639	[S2]Manual Tool Geometry OFFSET Measurment Touching Signal:-Z	N/A
C640	[S2]2nd +X Axis Software Limit Choice	TI060033
C641	[S2]2nd -X Axis Software Limit Choice	TI060033
C642	[S2]2nd +Y Axis Software Limit Choice	TI060033
C643	[S2]2nd -Y Axis Software Limit Choice	TI060033
C644	[S2]2nd +Z Axis Software Limit Choice	TI060033
C645	[S2]2nd -Z Axis Software Limit Choice	TI060033
C646	[S2]2nd +4th Axis Software Limit Choice	TI060033
C647	[S2]2nd -4th Axis Software Limit Choice	TI060033
C658	[S2]5th Axis Home DOG Signal	N/A
C672	[S2]1st Spindle Release	TI050011
C673	[S2]1st Spindle Lock	TI050011
C674	[S2]Enable X axis superimpose control	TI060028
C675	[S2]Enable Y axis superimpose control	TI060028
C676	[S2]Enable Z axis superimpose control	TI060028
C677	[S2]Enable 4th axis superimpose control	TI060028
C681	[S2]X axis information hide	TI060036
C682	[S2]Y axis information hide	TI060036
C683	[S2]Z axis information hide	TI060036
C684	[S2]4th axis information hide	TI060036

No.	Description	Function
C700	[S2]Proportion axis	TI060032
C701	[S2]Absolute encoder Reset Ready Signal:X Axis	TI060035
C702	[S2]Absolute encoder Reset Ready Signal:Y Axis	TI060035
C703	[S2]Absolute encoder Reset Ready Signal:Z Axis	TI060035
C704	[S2]Absolute encoder Reset Ready Signal:4th Axis	TI060035
C707	[S2]Absolute Encoder Data Ready Signal:X Axis	TI060035
C708	[S2]Absolute Encoder Data Ready Signal:Y Axis	TI060035
C709	[S2]Absolute Encoder Data Ready Signal:Z Axis	TI060035
C710	[S2]Absolute Encoder Data Ready Signal:4th Axis	TI060035
C713	[S2]Absolute Encoder Data Bit0 Transmitting Signal:X Axis	TI060035
C714	[S2]Absolute Encoder Data Bit0 Transmitting Signal:Y Axis	TI060035
C715	[S2]Absolute Encoder Data Bit0 Transmitting Signal:Z Axis	TI060035
C716	[S2]Absolute Encoder Data Bit0 Transmitting Signal:4th Axis	TI060035
C719	[S2]Absolute Encoder Data Bit1 Transmitting Signal:X Axis	TI060035
C720	[S2]Absolute Encoder Data Bit1 Transmitting Signal:Y Axis	TI060035
C721	[S2]Absolute Encoder Data Bit1 Transmitting Signal:Z Axis	TI060035
C722	[S2]Absolute Encoder Data Bit1 Transmitting Signal:4th Axis	TI060035
C725	[S2]Enable 1st soft no go area	TI060033
C726	[S2]Enable 2nd soft no go area	TI060033
C741	[S2]PMC/INT switch signal:X axis(0:INT,1:PMC)	TI060023
C742	[S2]PMC/INT switch signal:Y axis(0:INT,1:PMC)	TI060023
C743	[S2]PMC/INT switch signal:Z axis(0:INT,1:PMC)	TI060023
C744	[S2]PMC/INT switch signal:4th axis(0:INT,1:PMC)	TI060023
C745	[S2]PMC/INT switch signal:5th axis(0:INT,1:PMC)	TI060023
C746	[S2]PMC/INT switch signal:6th axis(0:INT,1:PMC)	TI060023
C761	[S2]Start update coordinate by ABS servo communication:X axis	N/A
C762	[S2]Start update coordinate by ABS servo communication:Y axis	N/A
C763	[S2]Start update coordinate by ABS servo communication:Z axis	N/A
C764	[S2]Start update coordinate by ABS servo communication:4th axis	N/A
C767	[S2]Start origin setting by ABS servo communication:X axis	N/A
C768	[S2]Start origin setting by ABS servo communication:Y axis	N/A
C769	[S2]Start origin setting by ABS servo communication:Z axis	N/A
C770	[S2]Start origin setting by ABS servo communication:4th axis	N/A

No.	Description	Function
C801	[S2] Disable Waiting M Code	TI050001
C4401	Key code(Shift OFF:ESC,Shift ON:ESC)	TI060021
C4402	Key code(Shift OFF:1,Shift ON:!)	TI060021
C4403	Key code(Shift OFF:2,Shift ON:@)	TI060021
C4404	Key code(Shift OFF:3,Shift ON:#)	TI060021
C4405	Key code(Shift OFF:4,Shift ON:$)	TI060021
C4406	Key code(Shift OFF:5,Shift ON:%)	TI060021
C4407	Key code(Shift OFF:6,Shift ON:^)	TI060021
C4408	Key code(Shift OFF:7,Shift ON:&)	TI060021
C4409	Key code(Shift OFF:8,Shift ON:*)	TI060021
C4410	Key code(Shift OFF:9,Shift ON:()	TI060021
C4411	Key code(Shift OFF:0,Shift ON:))	TI060021
C4412	Key code(Shift OFF:-,Shift ON:_)	TI060021
C4413	Key code(Shift OFF:=,Shift ON:+)	TI060021
C4414	Key code(Shift OFF:Backspace,Shift ON:Backspace)	TI060021
C4415	Key code(Shift OFF:Tab,Shift ON:Tab)	TI060021
C4416	Key code(Shift OFF:Q,Shift ON:Q)	TI060021
C4417	Key code(Shift OFF:W,Shift ON:W)	TI060021
C4418	Key code(Shift OFF:E,Shift ON:E)	TI060021
C4419	Key code(Shift OFF:R,Shift ON:R)	TI060021
C4420	Key code(Shift OFF:T,Shift ON:T)	TI060021
C4421	Key code(Shift OFF:Y,Shift ON:Y)	TI060021
C4422	Key code(Shift OFF:U,Shift ON:U)	TI060021
C4423	Key code(Shift OFF:I,Shift ON:I)	TI060021
C4424	Key code(Shift OFF:O,Shift ON:O)	TI060021
C4425	Key code(Shift OFF:P,Shift ON:P)	TI060021
C4426	Key code(Shift OFF:[,Shift ON:{)	TI060021
C4427	Key code(Shift OFF:],Shift ON:})	TI060021
C4428	Key code(Shift OFF:Enter,Shift ON:Enter)	TI060021
C4430	Key code(Shift OFF:A,Shift ON:A)	TI060021
C4431	Key codeKey code(Shift OFF:S,Shift ON:ESC)	TI060021
C4432	Key codeKey code(Shift OFF:D,Shift ON:ESC)	TI060021
C4433	Key codeKey code(Shift OFF:F,Shift ON:ESC)	TI060021

No.	Description	Function
C4434	Key codeKey code(Shift OFF:G,Shift ON:ESC)	TI060021
C4435	Key codeKey code(Shift OFF:H,Shift ON:ESC)	TI060021
C4436	Key codeKey code(Shift OFF:J,Shift ON:ESC)	TI060021
C4437	Key codeKey code(Shift OFF:K,Shift ON:ESC)	TI060021
C4438	Key codeKey code(Shift OFF:L,Shift ON:ESC)	TI060021
C4439	Key codeKey code(Shift OFF:Semicolon,Shift ON::)	TI060021
C4440	Key codeKey code(Shift OFF:',Shift ON:Double quotation marks)	TI060021
C4441	Key code(Shift OFF:`,Shift ON:~)	TI060021
C4442	Key code(Shift OFF:Left Shift,Shift ON:Left Shift)	TI060021
C4443	Key code(Shift OFF:\,Shift ON:|)	TI060021
C4444	Key code(Shift OFF:Z,Shift ON:Z)	TI060021
C4445	Key code(Shift OFF:X,Shift ON:X)	TI060021
C4446	Key code(Shift OFF:C,Shift ON:C)	TI060021
C4447	Key code(Shift OFF:V,Shift ON:V)	TI060021
C4448	Key code(Shift OFF:B,Shift ON:B)	TI060021
C4449	Key code(Shift OFF:N,Shift ON:N)	TI060021
C4450	Key code(Shift OFF:M,Shift ON:M)	TI060021
C4451	Key code(Shift OFF:,,Shift ON:<)	TI060021
C4452	Key code(Shift OFF:.,Shift ON:>)	TI060021
C4453	Key code(Shift OFF:/,Shift ON:?)	TI060021
C4454	Key code(Shift OFF:Right Shift,Shift ON:Right Shift)	TI060021
C4455	Key code(Shift OFF:*,Shift ON:*)	TI060021
C4457	Key code(Shift OFF:Space,Shift ON:Space)	TI060021
C4459	Key code(Shift OFF:F1,Shift ON:F1)	TI060021
C4460	Key code(Shift OFF:F2,Shift ON:F2)	TI060021
C4461	Key code(Shift OFF:F3,Shift ON:F3)	TI060021
C4462	Key code(Shift OFF:F4,Shift ON:F4)	TI060021
C4463	Key code(Shift OFF:F5,Shift ON:F5)	TI060021
C4464	Key code(Shift OFF:F6,Shift ON:F6)	TI060021
C4465	Key code(Shift OFF:F7,Shift ON:F7)	TI060021
C4466	Key code(Shift OFF:F8,Shift ON:F8)	TI060021
C4467	Key code(Shift OFF:F9,Shift ON:F9)	TI060021
C4468	Key code(Shift OFF:F10,Shift ON:F10)	TI060021

No.	Description	Function
C4471	Key code(Shift OFF:Num 7,Shift ON:Home)	TI060021
C4472	Key code(Shift OFF:Num 8,Shift ON:Up)	TI060021
C4473	Key code(Shift OFF:Num 9,Shift ON:PgUp)	TI060021
C4474	Key code(Shift OFF:-,Shift ON:-)	TI060021
C4475	Key code(Shift OFF:Num 4,Shift ON:Left)	TI060021
C4476	Key code(Shift OFF:Num 5,Shift ON:)	TI060021
C4477	Key code(Shift OFF:Num 6,Shift ON:Right)	TI060021
C4478	Key code(Shift OFF:+,Shift ON:+)	TI060021
C4479	Key code(Shift OFF:Num 1,Shift ON:End)	TI060021
C4480	Key code(Shift OFF:Num 2,Shift ON:Down)	TI060021
C4481	Key code(Shift OFF:Num 3,Shift ON:PgDn)	TI060021
C4482	Key code(Shift OFF:Num 0,Shift ON:Ins)	TI060021
C4483	Key code(Shift OFF:.,Shift ON:Del)	TI060021
C4487	Key code(Shift OFF:F11,Shift ON:F11)	TI060021
C4488	Key code(Shift OFF:F12,Shift ON:F12)	TI060021

5.3 S BITS

S bit is read by Ladder. The purpose is to read that the corresponding function or action of that S bit is ON or OFF.

No.	Description	Function
S0	[S1]Cycle Start Light	N/A
S1	[S1]Feed Hold Light	N/A
S2	[S1]EDIT Mode Light	TI060015
S3	[S1]AUTO Mode Light	TI060015
S4	[S1]MDI Mode Light	TI060015
S5	[S1]JOG Mode Light	TI060015
S6	[S1]INC JOG Mode Light	TI060015
S7	[S1]MPG Mode Light	TI060015
S8	[S1]Home Mode Light	TI060015
S10	[S1]Preparation Completed	N/A
S11	MDI keyboard press signal	TI050023
S16	[S1]X 1st Axis Point Return End	N/A
S17	[S1]Y 1st Axis Point Return End	N/A
S18	[S1]Z 1st Axis Point Return End	N/A
S19	[S1]4th 1st Axis Point Return End	N/A
S20	[S1]X 2nd Axis Point Return End	N/A
S21	[S1]Y 2nd Axis Point Return End	N/A
S22	[S1]Z 2nd Axis Point Return End	N/A
S23	[S1]4th 2nd Axis Point Return End	N/A
S28	[S1]Warning	N/A
S29	[S1]M Code Read	N/A
S30	[S1]Distribution EndAlarm	N/A
S31	[S1]Alarm	N/A
S32	[S1]Reset	N/A
S33	[S1]NC Ready	N/A
S35	[S1]MPG x1000 Ratio	N/A
S36	[S1]MPG x1 Ratio	N/A
S37	[S1]MPG x10 Ratio	N/A
S38	[S1]MPG x100 Ratio	N/A

No.	Description	Function
S39	[S1]Program Restart	N/A
S40	[S1]Single Block	N/A
S41	[S1]Optional Block Skip	N/A
S42	[S1]Dry Run	N/A
S43	[S1]Machine Lock	N/A
S44	[S1]Optional Stop	N/A
S45	[S1]Rapid Traverse	TI060034
S46	[S1]Z-Axis Neglect	N/A
S47	[S1]Auxiliary Function Lock	N/A
S52	[S1]2nd Spindle Zero Speed Arrival	N/A
S53	[S1]2nd Spindle Speed Arrival	N/A
S54	[S1]1st Spindle S Code	N/A
S55	[S1]2nd Spindle S Code	N/A
S56	[S1]3rd Spindle S Code	N/A
S57	[S1]3rd Spindle Zero Speed Arrival	N/A
S58	[S1]3rd Spindle Speed Arrival	N/A
S61	[S1]Key:Z Axis Neglect	N/A
S62	[S1]Key:MPG Dry Run	N/A
S63	[S1]Key:Auxiliary Function Lock	N/A
S68	[S1]MPG Dry Run	N/A
S69	[S1]T Code Read	N/A
S71	[S1]Key:Machine Lock	N/A
S72	[S1]Key:Dry Run	N/A
S73	[S1]Key:Optional Block Skip	N/A
S74	[S1]Key:Optional Stop	N/A
S79	[S1]PLC Window Finish	TI060022
S80	[S1]M00 Read	N/A
S81	[S1]M01 Read	N/A
S82	[S1]M02 Read	N/A
S83	[S1]M30 Read	N/A
S86	[S1]Orientation Finish	N/A
S88	[S1]1st Spindle Speed Arrival	N/A
S91	[S1]Not in Canned Cycle Mode	N/A

No.	Description	Function
S92	[S1]1st Spindle Zero Speed Arrival	N/A
S95	[S1]Spindle Semi-Constant Positioning Finish	N/A
S96	[S1]Request Signal of 1st Spindle Release	TI050011
S97	[S1]Request Signal of 1st Spindle Lock	TI050011
S100	[S1]MACRO Variable $320	N/A
S101	[S1]MACRO Variable $321	N/A
S102	[S1]MACRO Variable $322	N/A
S103	[S1]MACRO Variable $323	N/A
S104	[S1]MACRO Variable $324	N/A
S105	[S1]MACRO Variable $325	N/A
S106	[S1]MACRO Variable $326	N/A
S107	[S1]MACRO Variable $327	N/A
S108	[S1]MACRO Variable $328	N/A
S109	[S1]MACRO Variable $329	N/A
S110	[S1]MACRO Variable $330	N/A
S111	[S1]MACRO Variable $331	N/A
S112	[S1]MACRO Variable $332	N/A
S113	[S1]MACRO Variable $333	N/A
S114	[S1]MACRO Variable $334	N/A
S115	[S1]MACRO Variable $335	N/A
S120	[S1]PMC Axis Finish	TI060023
S128	[S1]Riding Tapping Mode	N/A
S130	[S1]X Axis Moving	TI060029
S131	[S1]Y Axis Moving	TI060029
S132	[S1]Z Axis Moving	TI060029
S133	[S1]4th Axis Moving	TI060029
S134	[S1]Max Working Piece Arrival	N/A
S154	[S1]Moving direction of X axis(0:- or stop,1:+)	TI050014
S155	[S1]Moving direction of Y axis(0:- or stop,1:+)	TI050014
S156	[S1]Moving direction of Z axis(0:- or stop,1:+)	TI050014
S157	[S1]Moving direction of 4th axis(0:- or stop,1:+)	TI050014
S160	[S1]Encoder Feedback Status of X Axis(0:OK,1:NG)	TI060037
S161	[S1]Encoder Feedback Status of Y Axis(0:OK,1:NG)	TI060037

No.	Description	Function
S162	[S1]Encoder Feedback Status of Z Axis(0:OK,1:NG)	TI060037
S163	[S1]Encoder Feedback Status of 4th Axis(0:OK,1:NG)	TI060037
S166	[S1]Return zero signal of X axis(0:N/A,1:OK)	N/A
S167	[S1]Return zero signal of Y axis(0:N/A,1:OK)	N/A
S168	[S1]Return zero signal of Z axis(0:N/A,1:OK)	N/A
S169	[S1]Return zero signal of 4th axis(0:N/A,1:OK)	N/A
S190	Velocity Control Finish of 1st Synchronous Control	TI050010
S191	Phase Control Finish of 1st Synchronous Control	TI050010
S192	Velocity Control Finish of 2nd Synchronous Control	TI050010
S193	Phase Control Finish of 2nd Synchronous Control	TI050010
S194	Velocity Control Finish of 3rd Synchronous Control	TI050010
S195	Phase Control Finish of 3rd Synchronous Control	TI050010
S201	[S1]Enter into Absolute Encoder Data Transmitting Mode:X Axis	TI060035
S202	[S1]Enter into Absolute Encoder Data Transmitting Mode:Y Axis	TI060035
S203	[S1]Enter into Absolute Encoder Data Transmitting Mode:Z Axis	TI060035
S204	[S1]Enter into Absolute Encoder Data Transmitting Mode:4th Axis	TI060035
S207	[S1]Absolute Encoder Data Transmitting:X Axis	TI060035
S208	[S1]Absolute Encoder Data Transmitting:Y Axis	TI060035
S209	[S1]Absolute Encoder Data Transmitting:Z Axis	TI060035
S210	[S1]Absolute Encoder Data Transmitting:4th Axis	TI060035
S213	[S1]Absolute Encoder Reset:X Axis	TI060035
S214	[S1]Absolute Encoder Reset:Y Axis	TI060035
S215	[S1]Absolute Encoder Reset:Z Axis	TI060035
S216	[S1]Absolute Encoder Reset:4th Axis	TI060035
S225	[S1]Is Machine coordinate in 1st no go area(0:Outside,1:Inside)	TI060033
S226	[S1]Is Machine coordinate in 2nd no go area(0:Outside,1:Inside)	TI060033
S261	[S1]Finish update coordinate by ABS servo communication:X axis	N/A
S262	[S1]Finish update coordinate by ABS servo communication:Y axis	N/A
S263	[S1]Finish update coordinate by ABS servo communication:Z axis	N/A
S264	[S1]Finish update coordinate by ABS servo communication:4th axis	N/A
S265	[S1]Finish update coordinate by ABS servo communication:5th axis	N/A
S266	[S1]Finish update coordinate by ABS servo communication:6th axis	N/A
S267	[S1]Finish origin setting by ABS servo communication:X axis	N/A

No.	Description	Function
S268	[S1]Finish origin setting by ABS servo communication:Y axis	N/A
S269	[S1]Finish origin setting by ABS servo communication:Z axis	N/A
S270	[S1]Finish origin setting by ABS servo communication:4th axis	N/A
S271	[S1]Finish origin setting by ABS servo communication:5th axis	N/A
S272	[S1]Finish origin setting by ABS servo communication:6th axis	N/A
S500	[S2]Cycle Start Light	N/A
S501	[S2]Feed Hold Light	N/A
S502	[S2]EDIT Mode Light	TI060015
S503	[S2]AUTO Mode Light	TI060015
S504	[S2]MDI Mode Light	TI060015
S505	[S2]JOG Mode Light	TI060015
S506	[S2]INC JOG Mode Light	TI060015
S507	[S2]MPG Mode Light	TI060015
S508	[S2]Home Mode Light	TI060015
S510	[S2]Preparation Completed	N/A
S516	[S2]X 1st Axis Point Return End	N/A
S517	[S2]Y 1st Axis Point Return End	N/A
S518	[S2]Z 1st Axis Point Return End	N/A
S519	[S2]4th 1st Axis Point Return End	N/A
S520	[S2]X 2nd Axis Point Return End	N/A
S521	[S2]Y 2nd Axis Point Return End	N/A
S522	[S2]Z 2nd Axis Point Return End	N/A
S523	[S2]4th 2nd Axis Point Return End	N/A
S528	[S2]Warning	N/A
S529	[S2]M Code Read	N/A
S530	[S2]Distribution EndAlarm	N/A
S531	[S2]Alarm	N/A
S532	[S2]Reset	N/A
S533	[S2]NC Ready	N/A
S535	[S2]MPG x1000 Ratio	N/A
S536	[S2]MPG x1 Ratio	N/A
S537	[S2]MPG x10 Ratio	N/A
S538	[S2]MPG x100 Ratio	N/A

No.	Description	Function
S539	[S2]Program Restart	N/A
S540	[S2]Single Block	N/A
S541	[S2]Optional Block Skip	N/A
S542	[S2]Dry Run	N/A
S543	[S2]Machine Lock	N/A
S544	[S2]Optional Stop	N/A
S545	[S2]Rapid Traverse	TI060034
S546	[S2]Z-Axis Neglect	N/A
S547	[S2]Auxiliary Function Lock	N/A
S552	[S2]2nd Spindle Zero Speed Arrival	N/A
S553	[S2]2nd Spindle Speed Arrival	N/A
S554	[S2]1st Spindle S Code	N/A
S555	[S2]2nd Spindle S Code	N/A
S556	[S2]3rd Spindle S Code	N/A
S557	[S2]3rd Spindle Zero Speed Arrival	N/A
S558	[S2]3rd Spindle Speed Arrival	N/A
S561	[S2]Key:Z Axis Neglect	N/A
S562	[S2]Key:MPG Dry Run	N/A
S563	[S2]Key:Auxiliary Function Lock	N/A
S568	[S2]MPG Dry Run	N/A
S569	[S2]T Code Read	N/A
S571	[S2]Key:Machine Lock	N/A
S572	[S2]Key:Dry Run	N/A
S573	[S2]Key:Optional Block Skip	N/A
S574	[S2]Key:Optional Stop	N/A
S579	[S2]PLC Window Finish	TI060022
S580	[S2]M00 Read	N/A
S581	[S2]M01 Read	N/A
S582	[S2]M02 Read	N/A
S583	[S2]M30 Read	N/A
S585		
S586	[S2]Orientation Finish	N/A
S588	[S2]1st Spindle Speed Arrival	N/A

No.	Description	Function
S591	[S2]Not in Canned Cycle Mode	N/A
S592	[S2]1st Spindle Zero Speed Arrival	N/A
S595	[S2]Spindle Semi-Constant Positioning Finish	N/A
S596	[S2]Request Signal of 1st Spindle Release	TI050011
S597	[S2]Request Signal of 1st Spindle Lock	TI050011
S600	[S2]MACRO Variable $320	N/A
S601	[S2]MACRO Variable $321	N/A
S602	[S2]MACRO Variable $322	N/A
S603	[S2]MACRO Variable $323	N/A
S604	[S2]MACRO Variable $324	N/A
S605	[S2]MACRO Variable $325	N/A
S606	[S2]MACRO Variable $326	N/A
S607	[S2]MACRO Variable $327	N/A
S608	[S2]MACRO Variable $328	N/A
S609	[S2]MACRO Variable $329	N/A
S610	[S2]MACRO Variable $330	N/A
S611	[S2]MACRO Variable $331	N/A
S612	[S2]MACRO Variable $332	N/A
S613	[S2]MACRO Variable $333	N/A
S614	[S2]MACRO Variable $334	N/A
S615	[S2]MACRO Variable $335	N/A
S620	[S2]PMC Axis Finish	TI060023
S628	[S2]Riding Tapping Mode	N/A
S630	[S2]X Axis Moving	TI060029
S631	[S2]Y Axis Moving	TI060029
S632	[S2]Z Axis Moving	TI060029
S633	[S2]4th Axis Moving	TI060029
S634	[S2]Max Working Piece Arrival	N/A
S654	[S2]Moving direction of X axis(0:- or stop,1:+)	TI050014
S655	[S2]Moving direction of Y axis(0:- or stop,1:+)	TI050014
S656	[S2]Moving direction of Z axis(0:- or stop,1:+)	TI050014
S657	[S2]Moving direction of 4th axis(0:- or stop,1:+)	TI050014
S660	[S2]Encoder Feedback Status of X Axis(0:OK,1:NG)	TI060037

No.	Description	Function
S661	[S2]Encoder Feedback Status of Y Axis(0:OK,1:NG)	TI060037
S662	[S2]Encoder Feedback Status of Z Axis(0:OK,1:NG)	TI060037
S663	[S2]Encoder Feedback Status of 4th Axis(0:OK,1:NG)	TI060037
S666	[S2]Return zero signal of X axis(0:N/A,1:OK)	N/A
S667	[S2]Return zero signal of Y axis(0:N/A,1:OK)	N/A
S668	[S2]Return zero signal of Z axis(0:N/A,1:OK)	N/A
S669	[S2]Return zero signal of 4th axis(0:N/A,1:OK)	N/A
S701	[S2]Enter into Absolute Encoder Data Transmitting Mode:X Axis	TI060035
S702	[S2]Enter into Absolute Encoder Data Transmitting Mode:Y Axis	TI060035
S703	[S2]Enter into Absolute Encoder Data Transmitting Mode:Z Axis	TI060035
S704	[S2]Enter into Absolute Encoder Data Transmitting Mode:4th Axis	TI060035
S707	[S2]Absolute Encoder Data Transmitting:X Axis	TI060035
S708	[S2]Absolute Encoder Data Transmitting:Y Axis	TI060035
S709	[S2]Absolute Encoder Data Transmitting:Z Axis	TI060035
S710	[S2]Absolute Encoder Data Transmitting:4th Axis	TI060035
S713	[S2]Absolute Encoder Reset:X Axis	TI060035
S714	[S2]Absolute Encoder Reset:Y Axis	TI060035
S715	[S2]Absolute Encoder Reset:Z Axis	TI060035
S716	[S2]Absolute Encoder Reset:4th Axis	TI060035
S725	[S2]Is Machine coordinate in 1st no go area(0:Outside,1:Inside)	TI060033
S726	[S2]Is Machine coordinate in 2nd no go area(0:Outside,1:Inside)	TI060033
S761	[S2]Finish update coordinate by ABS servo communication:X axis	N/A
S762	[S2]Finish update coordinate by ABS servo communication:Y axis	N/A
S763	[S2]Finish update coordinate by ABS servo communication:Z axis	N/A
S764	[S2]Finish update coordinate by ABS servo communication:4th axis	N/A
S765	[S2]Finish update coordinate by ABS servo communication:5th axis	N/A
S766	[S2]Finish update coordinate by ABS servo communication:6th axis	N/A
S767	[S2]Finish origin setting by ABS servo communication:X axis	N/A
S768	[S2]Finish origin setting by ABS servo communication:Y axis	N/A
S769	[S2]Finish origin setting by ABS servo communication:Z axis	N/A
S770	[S2]Finish origin setting by ABS servo communication:4th axis	N/A
S771	[S2]Finish origin setting by ABS servo communication:5th axis	N/A
S772	[S2]Finish origin setting by ABS servo communication:6th axis	N/A

No.	Description	Function
S4401	Key code:ESC	TI060021
S4402	Key code:1	TI000021
S4403	Key code:2	TI000021
S4404	Key code:3	TI000021
S4405	Key code:4	TI000021
S4406	Key code:5	TI000021
S4407	Key code:6	TI000021
S4408	Key code:7	TI000021
S4409	Key code:8	TI000021
S4410	Key code:9	TI000021
S4411	Key code:0	TI000021
S4412	Key code:-	TI000021
S4413	Key code:=	TI000021
S4414	Key code:Backspace	TI000021
S4415	Key code:Tab	TI000021
S4416	Key code:Q	TI000021
S4417	Key code:W	TI000021
S4418	Key code:E	TI000021
S4419	Key code:R	TI000021
S4420	Key code:T	TI000021
S4421	Key code:Y	TI000021
S4422	Key code:U	TI000021
S4423	Key code:I	TI000021
S4424	Key code:O	TI000021
S4425	Key code:P	TI000021
S4426	Key code:[	TI000021
S4427	Key code:]	TI000021
S4428	Key code:Enter	TI000021
S4429	Key code:Left Ctrl	TI000021
S4430	Key code:A	TI000021
S4431	Key code:S	TI000021
S4432	Key code:D	TI000021
S4433	Key code:F	TI000021

No.	Description	Function
S4434	Key code:G	TI000021
S4435	Key code:H	TI000021
S4436	Key code:J	TI000021
S4437	Key code:K	TI000021
S4438	Key code:L	TI000021
S4439	Key code:Semicolon	TI000021
S4440	Key code:'	TI000021
S4441	Key code:`	TI000021
S4442	Key code:Left Shift	TI000021
S4443	Key code:\	TI000021
S4444	Key code:Z	TI000021
S4445	Key code:X	TI000021
S4446	Key code:C	TI000021
S4447	Key code:V	TI000021
S4448	Key code:B	TI000021
S4449	Key code:N	TI000021
S4450	Key code:M	TI000021
S4451	Key code:,	TI000021
S4452	Key code:.	TI000021
S4453	Key code:/	TI000021
S4454	Key code:Right Shift	TI000021
S4455	Key code:*	TI000021
S4456	Key code:Left Alt	TI000021
S4457	Key code:Space	TI000021
S4458	Key code:Caps Lock	TI000021
S4459	Key code:F1	TI000021
S4460	Key code:F2	TI000021
S4461	Key code:F3	TI000021
S4462	Key code:F4	TI000021
S4463	Key code:F5	TI000021
S4464	Key code:F6	TI000021
S4465	Key code:F7	TI000021
S4466	Key code:F8	TI000021

No.	Description	Function
S4467	Key code:F9	TI000021
S4468	Key code:F10	TI000021
S4469	Key code:Num Lock	TI000021
S4470	Key code:Scroll Lock	TI000021
S4471	Key code:Num 7	TI000021
S4472	Key code:Num 8	TI000021
S4473	Key code:Num 9	TI000021
S4474	Key code:-	TI000021
S4475	Key code:Num 4	TI000021
S4476	Key code:Num 5	TI000021
S4477	Key code:Num 6	TI000021
S4478	Key code:+	TI000021
S4479	Key code:Num 1	TI000021
S4480	Key code:Num 2	TI000021
S4481	Key code:Num 3	TI000021
S4482	Key code:Num 0	TI000021
S4483	Key code:.	TI000021
S4487	Key code:F11	TI060021
S4488	Key code:F12	TI060021

5.4 R Register

Register is written or read by Ladder. The purpose is to inform the controller the values of that function or let the controller read the values of that function.

No.	Description	Function
R1	[S1]M Code Command(M0~M99)	N/A
R2	[S1]S Code Command of 1st Spindle(S0~S9999)	N/A
R3	[S1]T Code Command(T0~T9999)	N/A
R4	[S1]1st Spindle Actual Speed	N/A
R5	[S1]S Code Command of 2nd Spindle(S0~S9999)	N/A
R6	[S1]2nd Spindle Actual Speed	N/A
R7	[S1]S Code Command of 3rd Spindle(S0~S9999)	N/A
R8	[S1]3rd Spindle Actual Speed	N/A
R9	[S1]1st Spindle Actual Speed(+-)	N/A
R10	[S1]2nd Spindle Actual Speed(+-)	N/A
R11	[S1]3rd Spindle Actual Speed(+-)	N/A
R12	[S1]Manual Tool Geometry Measuring Number	TI060025
R13	Mode Select	TI060015
R14	[S1]MPG Ratio Select Other:x1,2:x10,3:x100	TI060026
R15	[S1]1st Spindle Rotaing Mode Override	N/A
R16	[S1]ATC Mode Feedrate Override	N/A
R17	[S1]JOG Mode Feedrate Override	N/A
R18	[S1]Rapid Traverse Mode Feedrate Override	N/A
R19	[S1]2nd Spindle Rotaing Mode Override	N/A
R20	[S1]3rd Spindle Rotaing Mode Override	N/A
R21	[S1]PMC Feedrate(mm/min)	N/A
R22	[S1]PMC motion type(0:G00,1:G01,53:G53)	N/A
R24	[S1]X axis command amount of PMC(mm)	TI060023
R25	[S1]X axis command amount of PMC(μ m)	TI060023
R26	[S1]Y axis command amount of PMC(mm)	TI060023
R27	[S1]Y axis command amount of PMC(μ m)	TI060023
R28	[S1]Z axis command amount of PMC(mm)	TI060023
R29	[S1]Z axis command amount of PMC(μ m)	TI060023
R30	[S1]4th axis command amount of PMC(mm)	TI060023
R31	[S1]4th axis command amount of PMC(μ m)	TI060023
R36	[S1]Rapid traverse feedrate override of PMC	TI060023

No.	Description	Function
R37	[S1]Feedrate override of PMC	TI060023
R40	[S1]PLC Alarm Message 1	N/A
R41	[S1]PLC Alarm Message 2	N/A
R42	[S1]PLC Alarm Message 3	N/A
R43	[S1]PLC Alarm Message 4	N/A
R44	[S1]PLC Alarm Message 5	N/A
R45	[S1]PLC Alarm Message 6	N/A
R50	Output value of 1st A/D conversion	TI060016
R51	Output value of 2nd A/D conversion	TI060016
R52	Output value of 3rd A/D conversion	TI060016
R53	Output value of 4th A/D conversion	TI060016
R54	Output value of 5th A/D conversion	TI060016
R55	Output value of 6th A/D conversion	TI060016
R56	Output value of 7th A/D conversion	TI060016
R57	Output value of 8th A/D conversion	TI060016
R60	[S1]PLC Window Function for Item Code	TI060022
R61	[S1]PLC Window Function for Item Code 1	TI060022
R62	[S1]PLC Window Function for Item Code 2	TI060022
R63	[S1]NC Overwrited PLC Window Function 1	TI060022
R64	[S1]NC Overwrited PLC Window Function 2	TI060022
R65	[S1]NC Overwrited PLC Window Function 3	TI060022
R66	[S1]NC Overwrited PLC Window Function 4	TI060022
R67	[S1]NC Overwrited PLC Window Function 5	TI060022
R68	[S1]NC Overwrited PLC Window Function 6	TI060022
R69	[S1]NC Overwrited PLC Window Function 7	TI060022
R70	[S1]NC Overwrited PLC Window Function 8	TI060022
R71	[S1]NC Overwrited PLC Window Function 9	TI060022
R72	[S1]NC Overwrited PLC Window Function 10	TI060022
R73	[S1]NC Overwrited PLC Window Function 11	TI060022
R74	[S1]NC Overwrited PLC Window Function 12	TI060022
R501	[S2]M Code Command(M0~M99)	N/A
R502	[S2]S Code Command of 1st Spindle(S0~S9999)	N/A
R503	[S2]T Code Command(T0~T9999)	N/A
R504	[S2]1st Spindle Actual Speed	N/A
R505	[S2]S Code Command of 2nd Spindle(S0~S9999)	N/A
R506	[S2]2nd Spindle Actual Speed	N/A

No.	Description	Function
R507	[S2]S Code Command of 3rd Spindle(S0~S9999)	N/A
R508	[S2]3rd Spindle Actual Speed	N/A
R509	[S2]1st Spindle Actual Speed(+-)	N/A
R510	[S2]2nd Spindle Actual Speed(+-)	N/A
R511	[S2]3rd Spindle Actual Speed(+-)	N/A
R512	[S2]Manual Tool Geometry Measuring Number	TI060025
R514	[S2]MPG Ratio Select Other:x1,2:x10,3:x100	TI060026
R515	[S2]1st Spindle Rotaing Mode Override	N/A
R516	[S2]ATC Mode Feedrate Override	N/A
R517	[S2]JOG Mode Feedrate Override	N/A
R518	[S2]Rapid Traverse Mode Feedrate Override	N/A
R519	[S2]2nd Spindle Rotaing Mode Override	N/A
R520	[S2]3rd Spindle Rotaing Mode Override	N/A
R521	[S2]PMC Feedrate(mm/min)	N/A
R522	[S2]PMC motion type(0:G00,1:G01,53:G53)	N/A
R524	[S2]X axis command amount of PMC(mm)	TI060023
R525	[S2]X axis command amount of PMC(μ m)	TI060023
R526	[S2]Y axis command amount of PMC(mm)	TI060023
R527	[S2]Y axis command amount of PMC(μ m)	TI060023
R528	[S2]Z axis command amount of PMC(mm)	TI060023
R529	[S2]Z axis command amount of PMC(μ m)	TI060023
R530	[S2]4th axis command amount of PMC(mm)	TI060023
R531	[S2]4th axis command amount of PMC(μ m)	TI060023
R536	[S2]Rapid traverse feedrate override of PMC	TI060023
R537	[S2]Feedrate override of PMC	TI060023
R540	[S2]PLC Alarm Message 1	N/A
R541	[S2]PLC Alarm Message 2	N/A
R542	[S2]PLC Alarm Message 3	N/A
R543	[S2]PLC Alarm Message 4	N/A
R544	[S2]PLC Alarm Message 5	N/A
R545	[S2]PLC Alarm Message 6	N/A
R560	[S2]PLC Window Function for Item Code	TI060022
R561	[S2]PLC Window Function for Item Code 1	TI060022
R562	[S2]PLC Window Function for Item Code 2	TI060022
R563	[S2]NC Overwrited PLC Window Function 1	TI060022
R564	[S2]NC Overwrited PLC Window Function 2	TI060022

No.	Description	Function
R565	[S2]NC Overwrited PLC Window Function 3	TI060022
R566	[S2]NC Overwrited PLC Window Function 4	TI060022
R567	[S2]NC Overwrited PLC Window Function 5	TI060022
R568	[S2]NC Overwrited PLC Window Function 6	TI060022
R569	[S2]NC Overwrited PLC Window Function 7	TI060022
R570	[S2]NC Overwrited PLC Window Function 8	TI060022
R571	[S2]NC Overwrited PLC Window Function 9	TI060022
R572	[S2]NC Overwrited PLC Window Function 10	TI060022
R573	[S2]NC Overwrited PLC Window Function 11	TI060022
R574	[S2]NC Overwrited PLC Window Function 12	TI060022

6 SYSTEM INFORMATION AND HARDWARE INFORMATION

This chapter describes the system information of the controller. Press **DGNOS** on MDI panel, next, press **SYSTEM**, and the two sub-functions **GBL** and **H.D** will be shown.

6.1 System Information

Press **GBL** and the screen is as below. System data is to display screen of the system maintenance variable. This function is for designers and technical people to use.

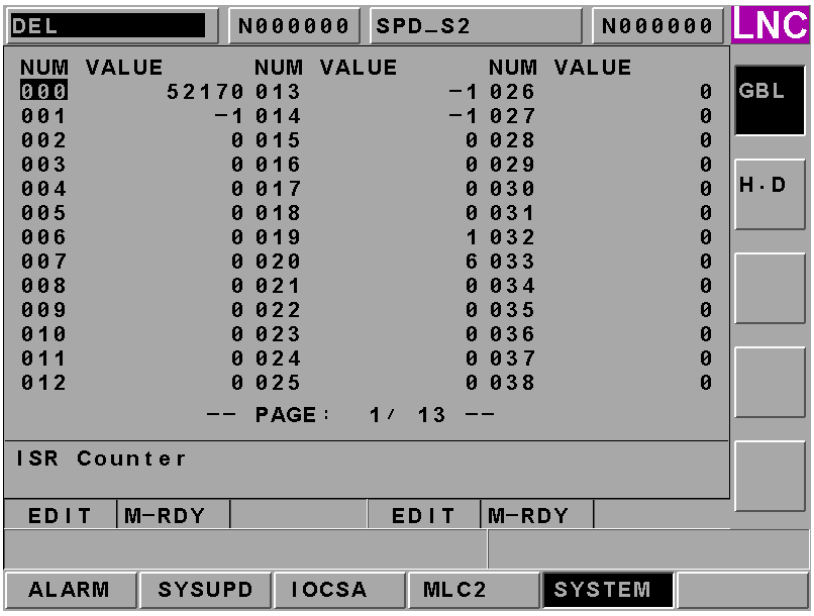


Fig 6.1-1 System Information/System

System Information List：

No.	Description	Function
0	ISR Counter	N/A
1	Encoder Counter of X Axis(Pulse)	N/A
2	Encoder Counter of Y Axis(Pulse)	N/A
3	Encoder Counter of Z Axis(Pulse)	N/A
4	Encoder Counter of 4th Axis(Pulse)	N/A
5	Servo Lag of X Axis(Pulse)	N/A
6	Servo Lag of Y Axis(Pulse)	N/A
7	Servo Lag of Z Axis(Pulse)	N/A
8	Servo Lag of 4th Axis(Pulse)	N/A
9	Encoder Counter of 1st Spindle(Pulse)	N/A
10	Encoder Counter of 2nd Spindle(Pulse)	N/A
11	Encoder Counter of 3rd Spindle(Pulse)	N/A
12	Servo Lag of 1st Spindle(Pulse)	N/A
13	Servo Lag of 2nd Spindle(Pulse)	N/A
14	Servo Lag of 3rd Spindle(Pulse)	N/A
15	Encoder Counter of X MPG Axis(Pulse)	N/A
16	Encoder Counter of Y MPG Axis(Pulse)	N/A
17	Encoder Counter of Z MPG Axis(Pulse)	N/A
18	Encoder Counter of 4th MPG Axis(Pulse)	N/A
19	1st Card Type	N/A
20	1st Card Version	N/A
21	2nd Card Type	N/A
22	2nd Card Version	N/A
23	Remote I/O Set 1 Status(0:OK,Other:NG)	N/A
24	Remote I/O Set 2 Status(0:OK,Other:NG)	N/A
25	Encoder Feedback Status of X Axis(0:OK,1:NG)	N/A
26	Encoder feedback Status of Y Axis(0:OK,1:NG)	N/A
27	Encoder feedback Status of Z Axis(0:OK,1:NG)	N/A
28	Encoder feedback Status of 4th Axis(0:OK,1:NG)	N/A
29	Is Home Sensor of X Axis on DOG(0:NO,1:YES)	N/A
30	Is Home Sensor of Y Axis on DOG(0:NO,1:YES)	N/A
31	Is Home Sensor of Z Axis on DOG(0:NO,1:YES)	N/A

No.	Description	Function
32	Is Home Sensor of 4th Axis on DOG(0:NO,1:YES)	N/A
33	Is Encoder of X Axis on INDEX(0:NO,1:YES)	N/A
34	Is Encoder of Y Axis on INDEX(0:NO,1:YES)	N/A
35	Is Encoder of Z Axis on INDEX(0:NO,1:YES)	N/A
36	Is Encoder of 4th Axis on INDEX(0:NO,1:YES)	N/A
37	In Position Check Flag(0:Normal,1:Position Check,2:Corner Check)	N/A
38	Is MST Code Executed(0:Normal,1:Executing)	N/A
39	1st Spindle Output Data(DA/Pulse)	N/A
40	2nd Spindle Output Data(DA/Pulse)	N/A
41	3rd Spindle Output Data(DA/Pulse)	N/A
42	Velocity estimate(For rigid tapping regulation)	N/A
43	Acceleration estimate(For rigid tapping regulation)	N/A
44	Position error of Hole bottom(For rigid tapping regulation)	N/A
45	Master/Client for spindle velocity command(0:Master,1:Client)	N/A
46	Axis number of spindle velocity command(0:1st,1:2nd,2:3rd)	N/A
47	1st spindle velocity command(rpm)	N/A
48	2nd spindle velocity command(rpm)	N/A
49	3rd spindle velocity command(rpm)	N/A
50	Standard check key(0:NG,1:OK)	N/A
51	CAM check key(0:NG,1:OK)	N/A
52	Type of 1st spindle synchronous(0:Velocity,1:Phase)	TI050010
53	Step of 1st spindle synchronous	TI050010
54	Alarm of 1st spindle syn.0:OK,1~2:O2C T,3~4:O2C O,5:M0,6:RO,7~12:VP	TI050010
55	Error of 1st spindle synchronous(Pulse)	TI050010
56	Max error of 1st spindle synchronous(+)(Pulse)	TI050010
57	Max error of 1st spindle synchronous(-)(Pulse)	TI050010
58	Acc/Dec cmp. value of 1st spindle syn.(Pulse)	TI050010
59	Phase error of 1st spindle synchronous(Pulse)	TI050010
60	Velocity compensation reference gain for 1st spindle synchronous	TI050010
61	Slave closed loop reference of 1st spindle syn.(Pulse)	TI050010
62	Type of 2nd spindle synchronous(0:Velocity,1:Phase)	TI050010
63	Step of 2nd spindle synchronous	TI050010
64	Alarm of 2nd spindle syn.0:OK,1~2:O2C T,3~4:O2C O,5:M0,6:RO,7~12:VP	TI050010
65	Error of 2nd spindle synchronous(Pulse)	TI050010

No.	Description	Function
66	Max error of 2nd spindle synchronous(+)(Pulse)	TI050010
67	Max error of 2nd spindle synchronous(-)(Pulse)	TI050010
68	Acc/Dec cmp. value of 2nd spindle syn.(Pulse)	TI050010
69	Phase error of 2nd spindle synchronous(Pulse)	TI050010
70	Velocity compensation reference gain for 2nd spindle synchronous	TI050010
71	Slave closed loop reference of 2nd spindle syn.(Pulse)	TI050010
72	Type of 3rd spindle synchronous(0:Velocity,1:Phase)	TI050010
73	Step of 3rd spindle synchronous	TI050010
74	Alarm of 3rd spindle syn.0:OK,1~2:O2C T,3~4:O2C O,5:M0,6:RO,7~12:VP	TI050010
75	Error of 3rd spindle synchronous(Pulse)	TI050010
76	Max error of 3rd spindle synchronous(+)(Pulse)	TI050010
77	Max error of 3rd spindle synchronous(-)(Pulse)	TI050010
78	Acc/Dec cmp. value of 3rd spindle syn.(Pulse)	TI050010
79	Phase error of 3rd spindle synchronous(Pulse)	TI050010
80	Velocity compensation reference gain for 3rd spindle synchronous	TI050010
81	Slave closed loop reference of 3rd spindle syn.(Pulse)	TI050010
82	In Position Check Error of X Axix(μ m)(for In Position Check or Corner Check)	N/A
83	In Position Check Error of Y Axis(μ m)(for In Position Check or Corner Check)	N/A
84	In Position Check Error of Z Axis(μ m)(for In Position Check or Corner Check)	N/A
85	In Position Check Error of 4th Axis(μ m)(for In Position Check or Corner Check)	N/A
86	Angular distance of 1st spindle pos. to ref. point(0.001 Deg)(semi-fixed)	TI050011
87	Distance of 1st spindle position to encoder index(Pulse)	N/A
88	Max error of rigid tapping(μ m)(For rigid tapping regulation)	N/A
89	Index interrupt counter of X axis encoder	N/A
90	Index interrupt counter of Y axis encoder	N/A
91	Index interrupt counter of Z axis encoder	N/A
92	Index interrupt counter of 4th axis encoder	N/A
93	Index interrupt counter of 1st spindle encoder	N/A
94	Index interrupt counter of 2nd spindle encoder	N/A
95	Index interrupt counter of 3rd spindle encoder	N/A
96	Interrupt status of 1st card local input(0:No,1:Yes)(Bit0~7:1~8)	N/A
97	Interrupt status of 2nd card local input(0:No,1:Yes)(Bit0~7:101~108)	N/A
98	Counter of system does not access BLOCK	N/A
99	Read value of X axis absolute encoder(Pulse)	TI060035

No.	Description	Function
100	Read value of Y axis absolute encoder(Pulse)	TI060035
101	Read value of Z axis absolute encoder(Pulse)	TI060035
102	Read value of 4th axis absolute encoder(Pulse)	TI060035
103	Command of 1st spindle C(H) orientation command(0:N/A,1:Master,2:Client)	TI050011
104	Grid mask of X axis(%)	N/A
105	Grid mask of Y axis(%)	N/A
106	Grid mask of Z axis(%)	N/A
107	Grid mask of 4th axis(%)	N/A
108	Send ISR counter for ABS servo communication	N/A
109	Receive ISR counter for ABS servo communication	N/A
110	Record value of origin for ABS servo communication:X axis	N/A
111	Read value of ABS servo communication:X axis	N/A
112	Update coordinate value of ABS servo communication:X axis	N/A
113	Status of ABS servo communication:X axis	N/A
114	Error code of ABS servo communication:X axis	N/A
115	Record value of origin for ABS servo communication:Y axis	N/A
116	Read value of ABS servo communication:Y axis	N/A
117	Update coordinate value of ABS servo communication Y axis	N/A
118	Status of ABS servo communication:Y axis	N/A
119	Error code of ABS servo communication:Y axis	N/A
120	Record value of origin for ABS servo communication:Z axis	N/A
121	Read value of ABS servo communication:Z axis	N/A
122	Update coordinate value of ABS servo communication:Z axis	N/A
123	Status of ABS servo communication:Z axis	N/A
124	Error code of ABS servo communication:Z axis	N/A
125	Record value of origin for ABS servo communication:4th axis	N/A
126	Read value of ABS servo communication:4th axis	N/A
127	Update coordinate value of ABS servo communication:5th axis	N/A
128	Status of ABS servo communication:4th axis	N/A
129	Error code of ABS servo communication:4th axis	N/A

6.2 HARDWARE INFORMATION

Press 【H.D】, the screen is as below. There are 5 diagnosis items, check the followings respectively:

1. EPCIO1.
2. EPCIO2.
3. Disk D: Display whether or not install the 2nd CF card on the hardware.
4. R.D: Display whether or not install RamDisk on the current hardware.
5. R.D Use: If RamDisk is installed, users can see whether or not the current RamDisk is enough from this position.

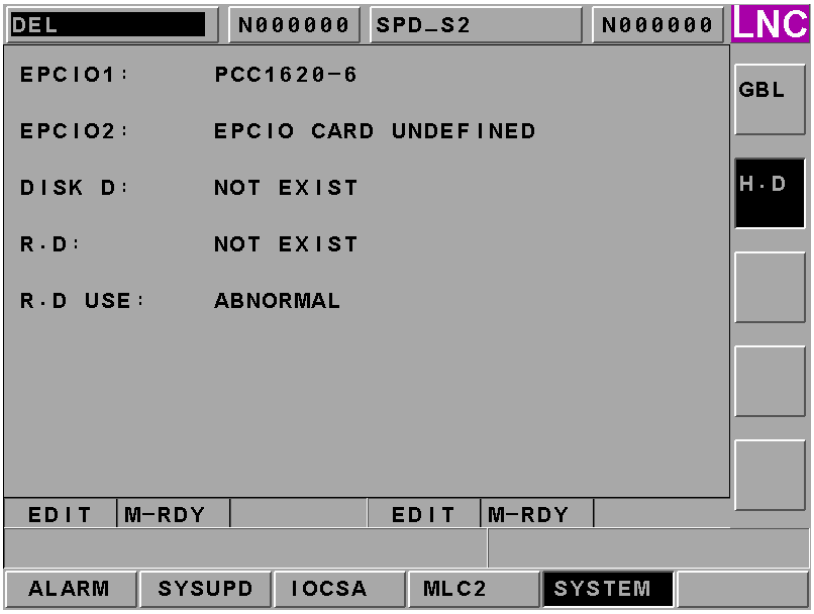


Fig 6.2-1 System information/H.D.

7 Machine Adjustment

This chapter describes the description of system information in the controller for the adjustment in each function. Besides, the steps of adjustment are stated in detail. Please refer to the corresponding function number in the manual.

7.1 RIGID TAPPING:

Description before adjustment：

1. Please verify if the driver's gain of each axis is adjusted to be OK first. (such as, position loop gain, speed loop gain) After rigid tapping adjustment is finished, and users want to change the driver's gain, it is necessary to adjust the parameters of rigid tapping again.
2. What is the M code of rigid tapping mode? See the example below, Ma is the M code.
3. Is it axial (Z-axis) rigid tapping or radical (X-axis) rigid tapping? If it is axial, apply G84; if it is radical, apply G88.

Steps Of Adjustment：

1. Move the machine to an apporiate position. (enough for X axis or Z axis to move 30mm)
2. Please write a program of rigid tapping, for continuous tests. (Note: no necessary for actual tapping)

   CASE 1：The 1st spindle rotates. Tapping tools are fixed, and Z axis moves. This adjustment applies the 1st spindle rigid tapping parameter.

G95 M3 S1000;	If G code is Type A, please change G95 to G99.
M29;	Enter Ragid Tapping Mode
G84 W-30 F1 P1000;	Execute Ragid Tapping
G80	Cancel Rigid Tapping Mode and G84 mode.
M30	

   CASE 2：The 1st spindle is fixed. Tapping Tools rotate (the 2nd or 3rd spindle rotates), and Z axis moves. This adjustment applies the 2nd or 3rd spindle rigid tapping parameter.

G95 Mβ S1000;	Mβ is the 2nd or 3rd spindle CW M code, such as M23 or M33. If G code is Type A, please change G95 to G99.
Mγ;	Mγ is the M code of spindle rigid tapping mode, such as M29.
G84 W-30 F1 P1000;	Execute rigid tapping.
G80	Cancel rigid tapping mode and G84 mode.
M30	

CASE 3：The 1st spindle is fixed. Tapping tools rotate (the 2nd or 3rd spindle rotate), and X axis moves.

This adjustment applies the 2nd or 3rd spindle rigid tapping parameter.

G95 Mβ S1000;	Mβ is the 2nd or 3rd spindle CW M code, such as M23 or M33. If G code is Type A, please change G95 to G99.
Mγ;	Mγ is the M code of spindle rigid tapping mode, such as M29.
G88 U-30 F1 P1000;	Execute rigid tapping.
G80	Cancel rigid tapping mode and G88 mode.
M30	

CASE 4：The 1st spindle is fixed. Tapping tools rotate (the 2nd or 3rd spindle rotate), and Y axis moves.

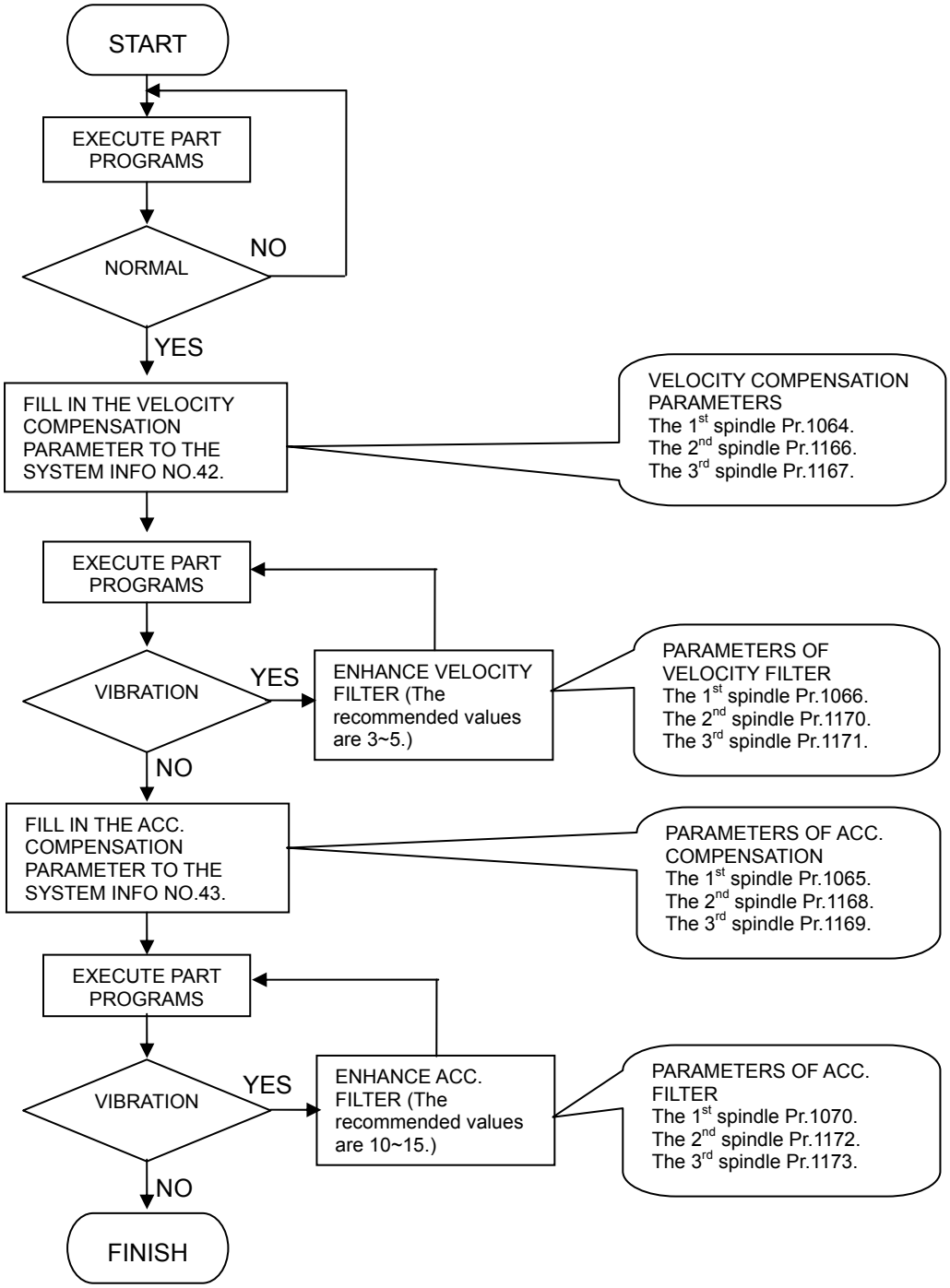
This adjustment applies the 2nd or 3rd spindle rigid tapping parameter.

G95 Mβ S1000;	Mβ is the 2nd or 3rd spindle CW M code, such as M23 or M33. If G code is Type A, please change G95 to G99.
Mγ;	Mγ is the M code of spindle rigid tapping mode, such as M29.
G188 V-30 F1 P1000;	Execute rigid tapping.
G80	Cancel rigid tapping mode and G88 mode.
M30	

3. According to the spindle used in rigid tapping mode, adjust the parameters as below first.

The 1st spindle RT Parameter	The 2nd spindle RT Parameter	The 3rd spindle RT Parameter	
P1059=?	P1164=?	P1165=?	**ACC./DEC. DURATION DURING RIGID TAPPING** According to the acceleration and deceleration duration accepted by the machine, set the duration. The shorter it is, the reserved accerleration distance before tapping will be shorter. In general, it is the same as the set duration of G01 acceleration/deceleration.
P1064=0	P1166=0	P1167=0	**SPEED COMPENSATION AMOUNT**
P1065=0	P1168=0	P1169=0	**ACC. COMPENSATION AMOUNT**
P1066=0	P1170=0	P1171=0	**SPEED FILTER INTENSITY**
P1070=0	P1172=0	P1173=0	**ACC. FILTER INTENSITY**
P1069=20	P1174=20	P1175=20	**CHECK RANGE OF SPINDLE STOP**
P1076=??	P1176=??	P1177=??	**DEC. DURATION OF SPINDLE PER 1000rpm.** If it has not been adjusted before, please estimate first. If it has been adjusted before, please do not modify it.

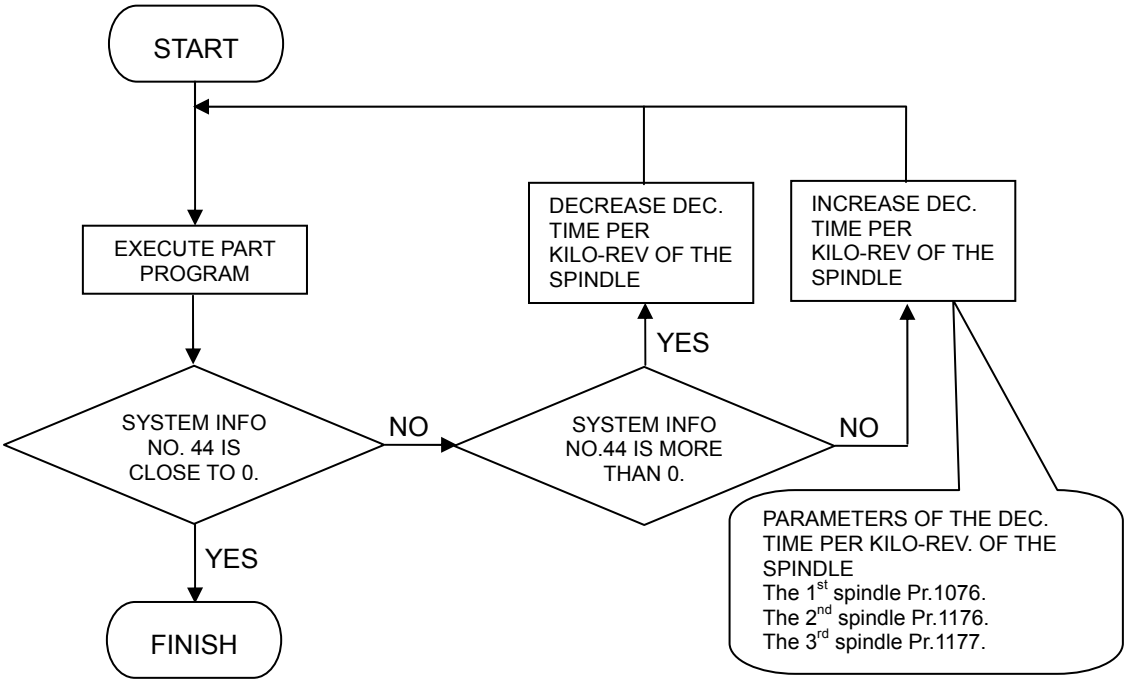
4. Adjust velocity and acceleration compensation amount.



5. Adjust the duration of staying at the hole-bottom.

   If the duration is too long, adjust the check range of spindle stop to bigger. (The 1st spindle is Pr.1069, the 2nd is Pr.1174, the 3rd is Pr.1175)

6. Adjust deceleration distance



※ NOTES:

1. When adjusting the driver's loop gain of servo axes (X and Z axes) every time, please adjust the steps 1,2,3,4 again.
2. After adjusting spindle driver, please adjust steps 5 and 6.
3. If the procedure of adjusting rigid tapping is not executed, the tools will be easily damaged during rigid tapping.
4. The adjusting order is from 1~6. Do not change the order randomly, otherwise, the parameters will be wrong.

7.2 Spindle CH Positioning Adjustment

Before adjustment：

1. Set Pr. 0835“[S1] Enable M code for spindle CH positioning(0:Disable,1~10000)”to 80, meaning, the M code of spindle CH positioning is M80.
2. Set Pr. 0836“[S1] Release M code for spindle CH positioning(0:Disable,1~10000)” to 81, meaning, the M code of spindle CH positioning release is M81.
3. Set Pr. 1095 “[S1] Home of spindle CH positioning(0.001deg)” to 0, meaning, there is no offset amount on spindle CH positioning point.

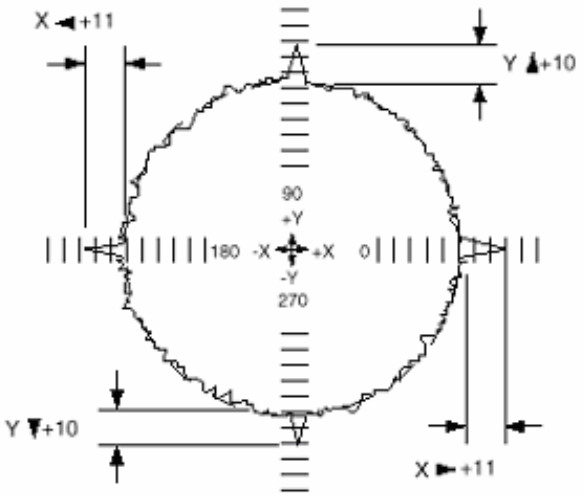
   Steps of Adjustmnet：
4. Set Pr. 1117 “[S1] Speed of spindle CH positioning(0.001deg/min)” to 36000. Adjust this parameter if the speed is too fast or slow during positioning.
5. Execute the programs below:

M80;	Spindle enters CH positioning
G04X5;	When spindle finishes CH positioning, and the spindle pin has finished the motion. Set the system information No.86 to Pr.1095. Repeat step 2 until the motion of M80 is smooth.
M81;	Spindle discharges CH positioning.

6. Set the value of Pr.1095 after adjustment into Pr.0033 “[S1] Zero point shift amount of 4th axis(μm/0.001deg)” to make the machanical position of spindle CH positioning C0 coordinate and the machanical position after C axis returns to HOME the same.

7.3 Pitch Error Compensation

The analysis diagram of the result of backlash measurement by using DOUBLE BALL BAR is shown as below. In the figure, the extrude path of each axis generated in the direction-changing area is called Reversal Spikes.



Take X axis's positive direction for example, the relative parameters for reversal spikes are set as below:

1. Pr.0812: [S1]Reversal spike compensation: +X

   Unit：μm

   Definition：This parameter sets the reversal spike compensation of the positive X axial direction. Take the figure above for example, the reversal spike of the positive X axial direction is 11μm, hence theoretically this parameter should be set to 11. However, because the current LNC series controllers adopt the control mode of pulse commands (spike compensation is to be added to the current loop), there will be some lag between the servo motor's actual response and the command value. According to experiences, this parameter should be set to 8 ~ 9 times of the actual value. Therefore, for the figure above, the recommendation is to set this parameter to 90. If this parameter is set to 0, this function is disabled.

2. Pr.0813: [S1] Spike compensation time of X axis in positive moving

   Unit：Dwell duration(see the set value of Pr.4000, 3000 means 3ms)

   Definition：This parameter sets the reversal spike compensation's duration of the positive X axial direction, which equals to the reversal spike duration (the spike's width) of the positive X axial direction as shown in the figure. The measuring software will provide the sampling rate of each measurement. Take Renishaw for instance, in the left half of the diagram, if the information "Sample: 7.81 per sec" is shown, it indicates the interval between two successive sampling points is $\frac{1}{7.81} = 128ms$. In order to show the shape of a spike in the diagram, at least 3 sampling points (duration is $2 \times 128 = 256ms$) are required. Under such condition, this

parameter should be set to $\frac{256}{3.6}=71$（586IPC）. If this parameter is set to 0, this function is disabled

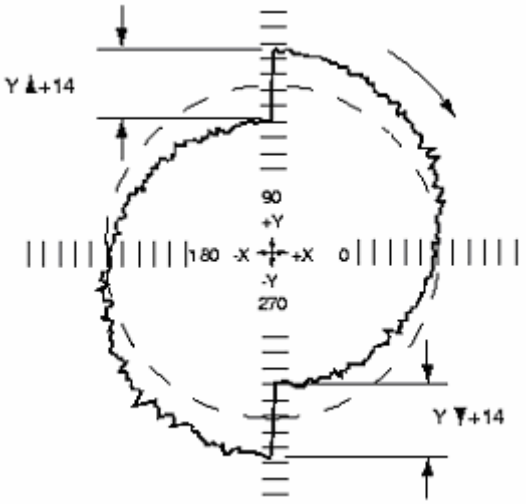
3. Pr.0814: [S1] Delay time of X axis spike compensation in positive moving

   Unit：Length of dwell duration (See the set value of Pr.4000, 3000 means 3ms)

   Definition：If some reversal spike of the positive X axial direction is not on the turnaround point (on X axis) but rather on the path after the axial direction has changed, this parameter must be set. For the calculation formula of the set value, please refer to the description of Pr.0813.

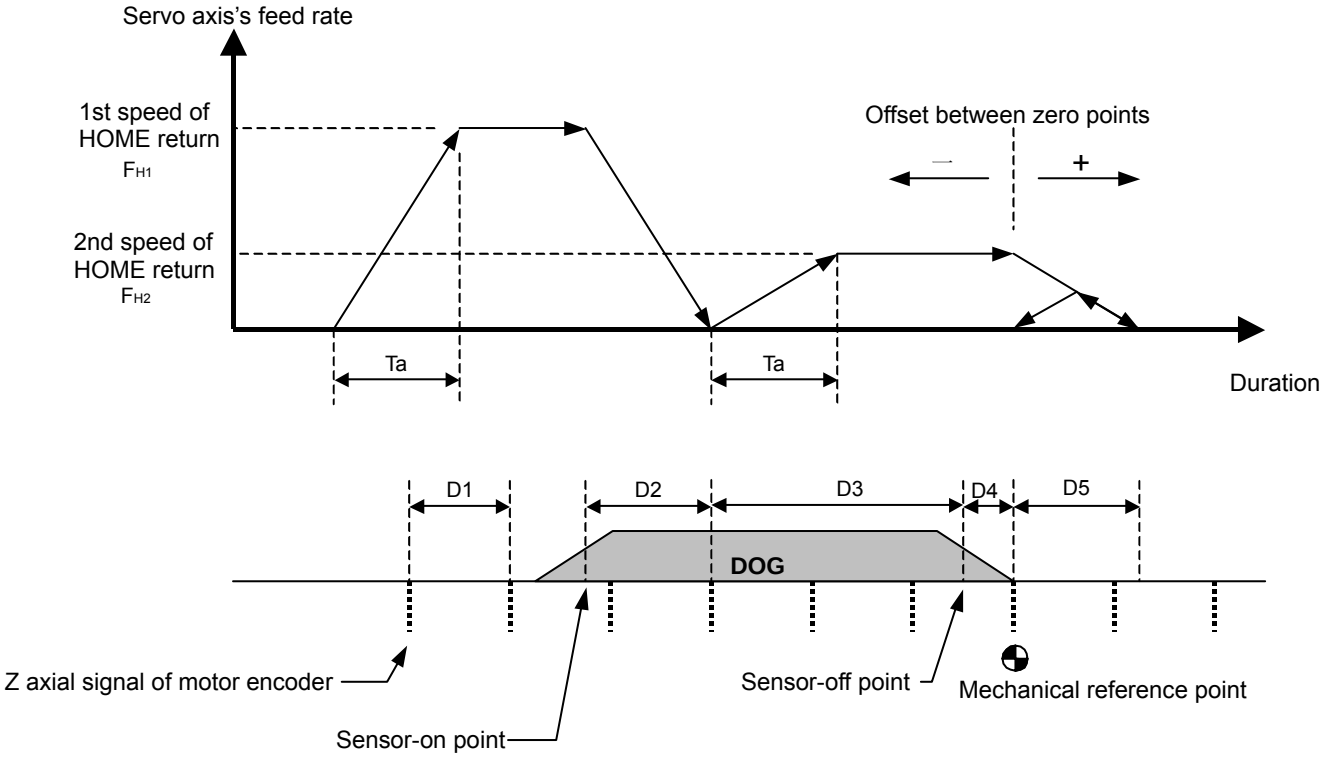
7.4 Backlash

The analysis figure of the result of backlash measurement by using DOUBLE BALL BAR is shown as below. (Only Y-axis is displayed). This is called positive backlash. From the figure, backlash of Y-axis is 14 μm. Please set this value as Pr.0045, and set BIT 1 of Pr. 0117 as 1, then Y-axis backlash compensation function is enabled.



7.5 HOME RETURN

- **ZERO POINT IS AFTER DOG**



1. D1 is the interval between 2 successive Z axial signals of the servo motor's encoder.
2. D2 is the traveling distance of DOG signal from the entering point to decelerate the 1st ( ) speed until it stops, the formula is as below：

   D2 ≒ servo lag + deceleration distance ≒ $\frac{F_{H1}}{K_p} + \frac{F_{H1} \cdot T_a}{2}$

   In the formula above, Kp is the position loop gain of the servo axis (sec-1), Ta is the G00 acceleration/deceleration time of the servo axis. If the distance from the point when DOG enters to its disappearace is smaller than D2, the alarm "MOT 4027 HOME DOG TOO SHORT" will be triggered.

3. D3 is the traveling distance of the servo motor from zero point to accelerate until it reaches the 2nd () speed, and DOG disappears. In order to obtain Z axial signal at the constant speed, the distance of D3 must be long enough so the servo motor can reach the same speed () as the 2nd () speed. The formula is as below：

   D3 $\geqq$ $\frac{F_{H2} \cdot T_a}{2}$ ，Ta is the G00 acceleration/deceleration duration of the servo axis.

   The length of DOG must be (D2 + D3) at least.

4. D4 is the internval of DOG from disappearing point to the appearance of next servo motor's ENCODER Z axial signal. To prevent confusion due to electric and mechanical delay, D4 should be approximately half length of D1, meaning, DOG's disappearing pint must be in the middle of two successive Z axial signals of the servo motor. If motor makes one revolution and does not find Z axial signal before DOG disappears, the alarm "MOT 4045 NO INDEX INTERRUPT" will be triggered to check if there is any mistakes of motor's wiring.

5. After DOG disappears, D5 is the traveling distance of the 1st Z axial signal of the servo motor from its entering to its stop point by acceleration at the 2nd () speed. The formula is as below：

   D5 $\fallingdotseq$ servo lag + decelration distance $\fallingdotseq$ $\frac{F_{H2}}{K_p} + \frac{F_{H2} \cdot T_a}{2}$

   In the formula, Kp is the position loop gain (sec-1) of the servo axis. Ta is the G00 acceleration/decelration duration of servo axis.

   The distance between the servo axis's mechanical zero point and over travel limit should be at least larger than D5, or the servo axis might trigger over travel limit during HOME return.

   The recommendation is to set the zero point's offset amount of the servo axis (Pr.0030 ~ Pr.0033) to be larger than D5 to prevent the servo axis from travel in the opposite direction.

Examples：

If the 1st speed of some servo motor to return to the zero point is 10m/min. the 2nd () speed is 200mm/min, G00 acceleration/deceleration distance is 150ms, position loop gain is 100sec^{-1}. When the zero point is after DOG, the shortest length required for DOG is calculated as below:

$$D2 \fallingdotseq \frac{10000/60}{100} + \frac{10000/60 \cdot 0.15}{2} \fallingdotseq 14.17mm$$

$$D3 \fallingdotseq \frac{200/60 \cdot 0.15}{2} \fallingdotseq 0.25mm$$

So the shortest length required by DOG would be:

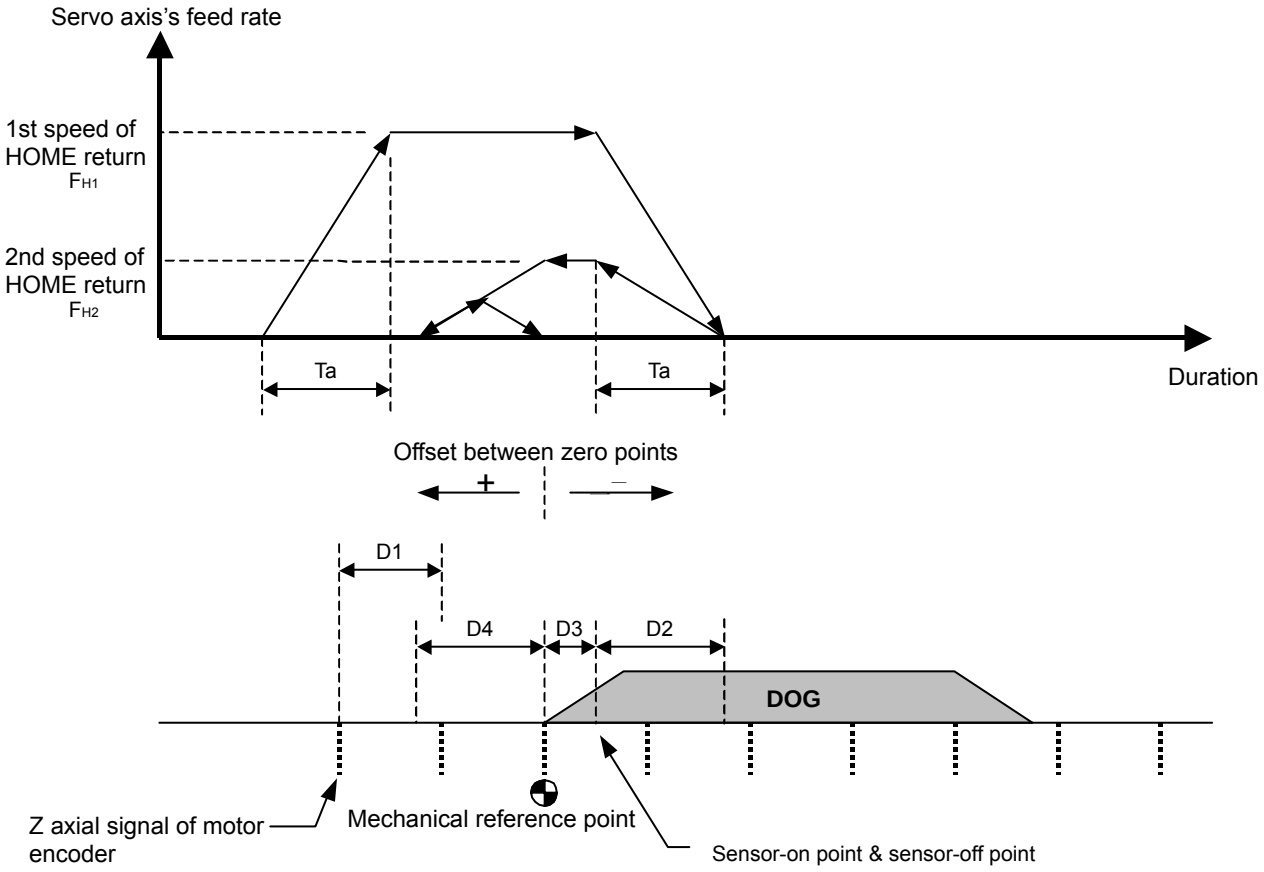
$$(D2 + D3) \fallingdotseq 14.42mm$$

Or

$$D5 \fallingdotseq \frac{200/60}{100} + \frac{200/60 \cdot 0.15}{2} \fallingdotseq 0.28mm$$

If the offset amount of some axis's zero point is set to be larger than 0.28mm, this would prevent that axis to motion in the negative direction before executing the last step of HOME RETURN.

- **ZERO POINT AHEAD DOG**



1. D1 is the interval between 2 consecutive Z axial signals of the servo motor's encoder.
2. D2 is the traveling distance of a DOG signal from the point when it is dectectd by the sensor (sensor-on point) to its final position when it decelerates at 1st speed until it fully stops (sensor-off point). The formula of D2 is as below：

   D2 ≒ Servo lag + Deceleration distance ≒ $\frac{F_{H1}}{K_p} + \frac{F_{H1} \cdot T_a}{2}$

   In the formula above, Kp is the position loop gain of the servo axis (sec-1), Ta is the G00 acceleration/deceleration time of the servo axis. If the distance between the sensor-on and sensor-off point is smaller than D2, the alarm "MOT 4027 HOME DOG TOO SHORT" will be triggered.
3. D2 is the traveling distance of a servo axis to accelerate from zero to the 2nd speed to arrive the sensor-off point. Generally speaking, the 2nd speed is slower than the 1st speed; therefore, the length of D2 is long enough to allow the servo motor to speed up and reach the constant rate same as the 2nd speed, which means that Z axial signals can be detected at a constant speed.

4. D3 is the distance between the sensor-off point and the next Z axial signal of a servo motor's encoder. To prevent interference caused by electric or mechanical delay, D3 should be approximately half length of D1, meaning, the sensor-off point should be around in the middie of two consecutive Z axial signals of the servo motor. If the motor makes one revolution but can not find a Z axial signal before DOG leaves the sensor area, the alarm "MOT 4045 NO INDEX INTERRUPT" will be triggered, in this case, please check if there is any mistakes about the motor's wiring.
5. D4 is the traveling distance between the point when the servo motor's 1st Z axial signal is detected by sensor and the stop point of the servo axis when it decelerates at the 2nd speed to fully stop. The formula of D5 is as below：

   D4 ≒ servo lag + deceleration distance ≒ $\frac{F_{H2}}{K_p} + \frac{F_{H2} \cdot T_a}{2}$

   In the formula, Kp is the position loop gain (sec-1) of the servo axis. Ta is the G00 acceleration/decelration duration of the servo axis.

   The recommendation is to set the zero point's offset amount of the servo axis to be larger than D4 to prevent the servo axis from traveling in the opposite direction.

7.6 SPINDLE SYNCHRONIZATION ADJUSTMENT

Please set and adjust the control of spindle synchronization according to the following steps：

1. Please write Ladder based on machine's needs.

   Group 1：M180 indicates C190=ON, M190 indicates C190=OFF, M181 indicates C191=ON, M191 indicates C191=OFF. Please set C196 to ON when the master axis and slave axis both clamp the part, otherwise, set C196 to OFF.

   Group 2：M182 indicates C192=ON, M192 indicates C192=OFF, M183 indicates C193=ON, M193 indicates C193=OFF. Please set C197 to ON when the master axis and slave axis both clamp the part, otherwise, set C197 to OFF.

   Group 3：M184 indicates C194=ON, M194 indicates C194=OFF, M185 indicates C195=ON, M195 indicates C195=OFF. Please set C198 to ON when the master axis and slave axis both clamp the part, otherwise, set C198 to OFF.

Related C, S Bit	Group 1	Group 2	Group 3
C bit: Enable velocity synchronization	C190	C192	C194
S bit: Finish velocity synchronization	S190	S192	S194
C BITS: Enable phase synchronization	C191	C193	C195
S BITS:Finish phase synchronization	S191	S193	S195
C BITS:Enable Acc. Compensation of synchronous control	C196	C197	C198

2. Please set the following parameters based on the machine's needs.

Related Parameters	Group 1	Group 2	Group 3
Master axis number of synchronous control	P1201	P1231	P1261
Slave axis number of synchronous control	P1202	P1232	P1262
Master axis encoder pulses per rev of synchronous control	P1203	P1233	P1263
Slave axis encoder pulses per rev of synchronous control	P1204	P1234	P1264
Tracking direction of synchronous control	P1205	P1235	P1265
Master axis reference point signal of synchronous control	P1206	P1236	P1266
Slave axis reference point signal of synchronous control	P1207	P1237	P1267
Master axis Local input number of synchronous control	P1208	P1238	P1268
Slave axis Local input number of synchronous control	P1209	P1239	P1269
Master axis Local input sensor type of synchronous control	P1210	P1240	P1270
Slave axis Local input sensor type of synchronous control	P1211	P1241	P1271
Control type of synchronous control	P1212	P1242	P1272
Slave axis command type of synchronous control	P1213	P1243	P1273

3. If the slave axis's command type is Vcmd, please set the following parameters.

Related Parameters	Group 1	Group 2	Group 3
Slave axis closed loop gain of synchronous control	P1214	P1244	P1274
Slave axis change command type Kp gain of synchronous control	P1215	P1245	P1275
Slave axis change command type Ki gain of synchronous control	P1216	P1246	P1276
Slave axis change command type check time of synchronous control	P1217	P1247	P1277
Slave axis change command type check range of synchronous control	P1218	P1248	P1278

4. Please set the tolerance error amount of synchronous control again according to machine's maximum tolerance range.(set 360000)

   Set the finish check duration of synchronous control to be 1000. It is ok to adjust this parameter according to the need of fast or slow when moving synchronously.

Related Parameters	Group 1	Group 2	Group 3
Tracking tolerance of synchronous control	P1227	P1257	P1287
Finished signal check time of synchronous control	P1228	P1258	P1288

5. Please set the velocity compensation gain of synchronous control to 0 first. Then, write the following programs in system 1. System 2 is empty. Assume the master axis is the 1st spindle in system 1, and slave axis is the 1st spindle in system 2. In addition, please observe the system info(Error of spindle synchronous) at the time when holding 4000ms and obtain the average value in steady status. The programs are as below:

```
M190.....; Discharge spindle speed synchronous control
M3 S0 .....; RPM of master axis is 0
G04 P2000.....; Hold 2000ms.
M180.....; Enable spindle speed synchronous control
G04 P2000.....; 2000ms Hold 2000ms.
M3 S1000 ..... ; Master axis 1000rpm
G04 P4000.....; Hold 4000ms
M3S0 .....; RPM of master axis is 0
G04 P2000.....; Hold 2000ms
M30..... ; Finish
```

Related Parameters	Group 1	Group 2	Group 3
Velocity compensation gain of synchronous control	P1219	P1249	P1279

6. Set the average value when system info(Error of spindle synchronous) is under steady status into the deviation value of velocity compensation zero gain and set it to 1000. Repeat the programs above. Observe the system info (Velocity compensation reference gain ;for spindle synchronous) at G04 P4000. Then, set the system info(Velocity compensation reference gain ;for spindle synchronous) into the velocity compensation gain of synchronous control. Repeat the programs above again. Observe the system info(Error of spindle synchronous) at G04 P4000 to see if it is 0 or changes between positive and negative. If it is close to positive or negative, please adjust subtly according to the methods stated above again. After adjustment, move the master axis between 0~3000rpm, at this moment, no matter what speed it is, system info (Error of spindle synchronous) should be steady and changes between positive and negative. If not, please adjust again according the methods stated above.

Related Parameters	Group 1	Group 2	Group 3
Tracking error in velocity compensation gain 0 of synchronous control	P1229	P1259	P1289
System Info (Error of spindle synchronous)	55	65	75
System Info (Velocity compensation reference gain; for spindle synchronous)	60	70	80

7. If the slave axis vibrates when master axis is at constant speed, increase the velocity compensation filter of synchronous and repeat step 6 until the vibration stops.

Related Parameters	Group 1	Group 2	Group 3
Velocity compensation filter of synchronous control	P1221	P1251	P1281

8. Switch spindle override to 0% to make master axis neither have RPM nor rotate. Then, clamp the circle part with master axis and slave axis and execute step 5 until G04 Pr.4000 stops. By the tuning software of slave axis, monitor its value of torsional force, and record it. Next, switch override to 10%, at this moment, master axis and slave axis both will rotate, and compare the difference between the value of torsional force on slave axis at this moment and the time when the override is 0%. Adjust the acceleration compensation gain of synchronous control to make its torsional force value the same when override is between 0% and 10%. From system info (Acc/Dec cmp. value of spindle syn.), you can learn the current compensation value and help adjustment. Repeat this method until master axis's CW/CCW is 0~3000rpm and the torsional force of slave axis is not changed.

Related Parameters	Group 1	Group 2	Group 3
Acc compensation gain of synchronous control	P1220	P1250	P1280
System info (Acc/Dec cmp. value of spindle syn.)	58	68	78

9. Please write the programs below in system 1, and system 2 is empty. Assume the master axis is the 1st spindle in system 1, the slave axis is the 1st spindle in system 2. Adjust the Reference point velocity of synchronous control and make the phase error decreases quickly. Users can know the current error amount from system info (Phase error of spindle synchronous) to help adjustment. The programs are as below:

```
M191 ..... ; Discharge spindle/phase control
M3 S1000 ..... ; Master axis RPM is 1000rpm
G04 P2000.....; Hold 2000ms
M181 ..... ; Enable spindle/phase control
G04 P2000.....; Hold 2000ms
M3S0 .....; Master axis RPM is 0.
G04 P2000.....; Hold 2000ms
M30 ..... ; Finish
```

Related Parameters	Group 1	Group 2	Group 3
Reference point velocity of synchronous phase control	P1226	P1256	P1286
System info (Phase error of spindle synchronous)	59	69	79

10. Adjust the parameters below according to different machines:

Related Parameters	Group 1	Group 2	Group 3
Synchronous command wait time ofsynchronous control	P1223	P1253	P1283
Slave axis Acc/Dec time of synchronous control	P1224	P1254	P1284
Tracking tolerance of synchronous control	P1227	P1257	P1287
Finished signal check time of synchronous control	P1228	P1258	P1288
Master axis Acc/Dec time when synchronous control finished	P1230	P1260	P1290

Alarm message is displayed during spindle synchronous control：

When MOT4133 SYNCHRONOUS ERROR OF SPINDLE is displayed, please check system info (Alarm of spindle syn.) to solve the problem. The definitions are as below：

Related Parameters	Group 1	Group 2	Group 3
System Info (Alarm of spindle syn.)	54	64	74

1：Error happens when slave axis is switched to closed loop.

2：In phase control, the RPM of master axis is zero.

3：Synchronous error exceeds the Tracking tolerance of synchronous control.

4~10：The status of C bit, which enables synchronous control, is OFF when synchronous control is not finished.

7.7 ORIGIN SETTING BY ABS SERVO COMMUNICATION

The operation steps for machine to use ABS servo communication for the first time：

1. Refer to the decription of servo motor driver's parameter finish, serial transmission line, parameter setting of controllers and related PLC writing.
2. After turning on the controller, loosen the emergency switch, and the absolute encoder of each axis will be read and updated coordinate. The symbol of ABS will be displayed on HMI during reading, and it will be disappeared when reading is finished.
3. When coordinate updating is finished, and the alarm of over soft limit is displayed, please start origin setting by ABS servo communication. When updating is finished, the alarm will be disappeared. Next, operator can correct the mechanical zero point, after the correction, start origin setting by ABS servo communication again.
4. If the alarm message "ABS ERROR OF X (Y, Z, 4th)AXIS FOR SERVO COMMUNICATION (MOT4110~4113)" is displayed on the steps above, please solve it according to the error code of system info.

No.	TITLE
SYS114	Error code of ABS servo communication:X axis (0:OK,-1:S.E.,-2:T.E.,-3:E.C.)
SYS119	Error code of ABS servo communication:Y axis (0:OK,-1:S.E.,-2:T.E.,-3:E.C.)
SYS124	Error code of ABS servo communication:Z axis (0:OK,-1:S.E.,-2:T.E.,-3:E.C.)
SYS129	Error code of ABS servo communication:4TH axis (0:OK,-1:S.E.,-2:T.E.,-3:E.C.)

0：Normal

-1：Double commands. Please check PLC to see if the writing is correct.

-2：Transmission error. Please check COM port's type, servo motor driver's parameters, serial transmission line and controller's parameters are set correctly.

-3：Servo motor driver sends back error codes. Please check if the controller's parameter setting is correct.

8 ALARM, WARNING & TROUBLESHOOTING

When the abnormal situation occurs, the alarm and warning messages will be triggered. When the alarm occurs, all the machining and axial moving will not continue; when warning occurs, machining and axial moving can work, but the action will be limited by the warning content. Press RESET on MDI panel to clear the alarm message. Please refer to the corresponding function numbers in the manual.

8.1 Alarm Interface

Pressing **<DGNOS>** on MDI panel and press 【**ALARM**】, the sub function screens will occur, which are 【**ALARM**】, 【**WARN**】, 【**HISMSG**】, 【**LOGHST**】 and 【**OP LOG**】. The alarm or message will show up on the screen when any alarm or PLC operation warning occur. In other words, users can know the description through this key.

【**ALARM**】: This page is mainly used to display the abnormal alarm message occurred in the system.

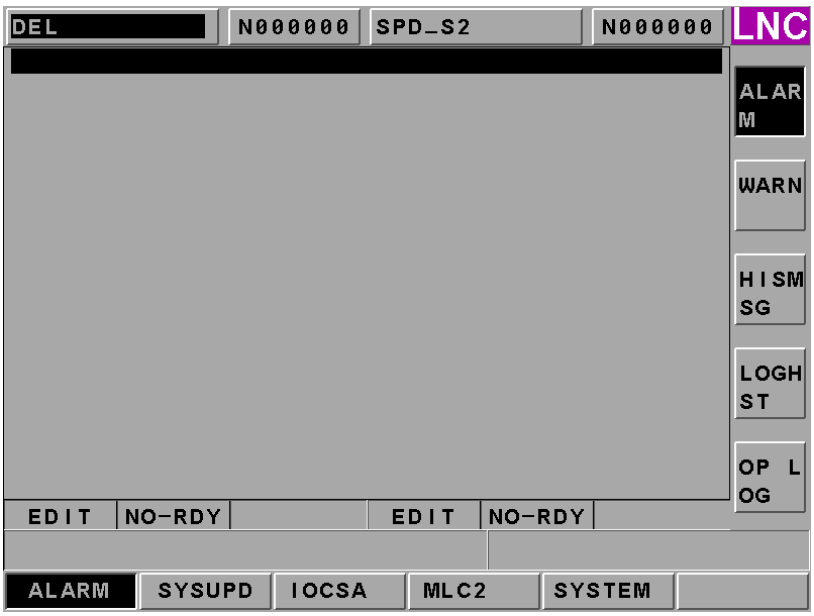


Fig. 8-1

【**WARN**】: This page is mainly used to display the abnormal warning message occurred in PLC.

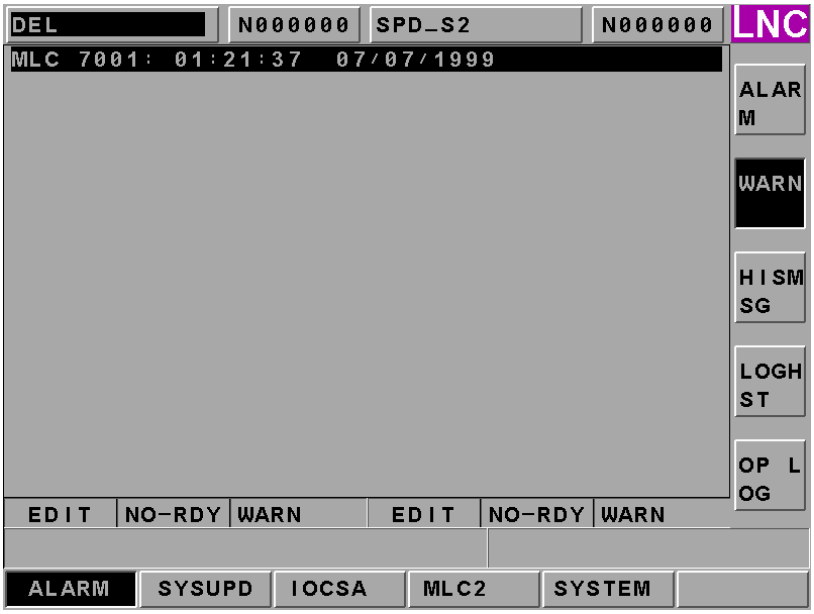


Fig. 8-2

【**HISMSG**】: This page displays the system version and the current operating status.

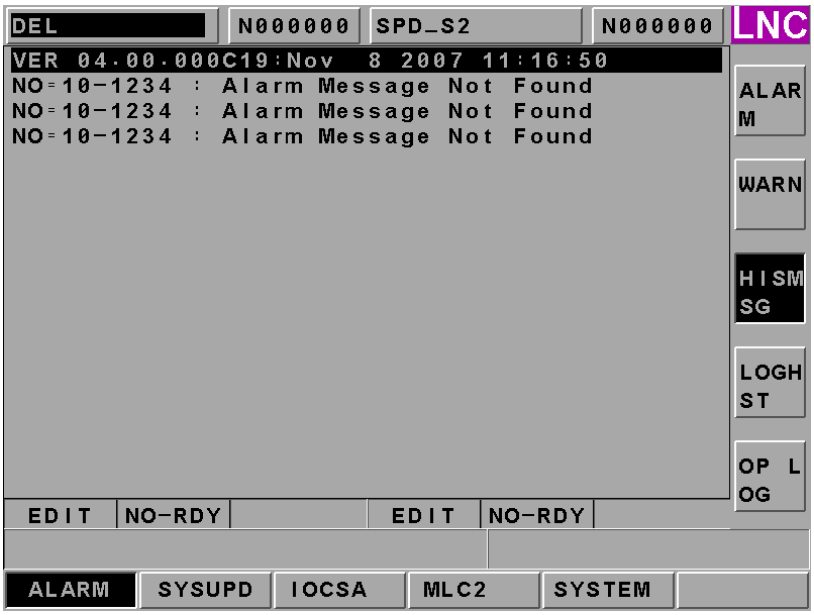


Fig. 8-3 HISMSG Page

【LOGHST】: This page shows alarm and warning message histories.

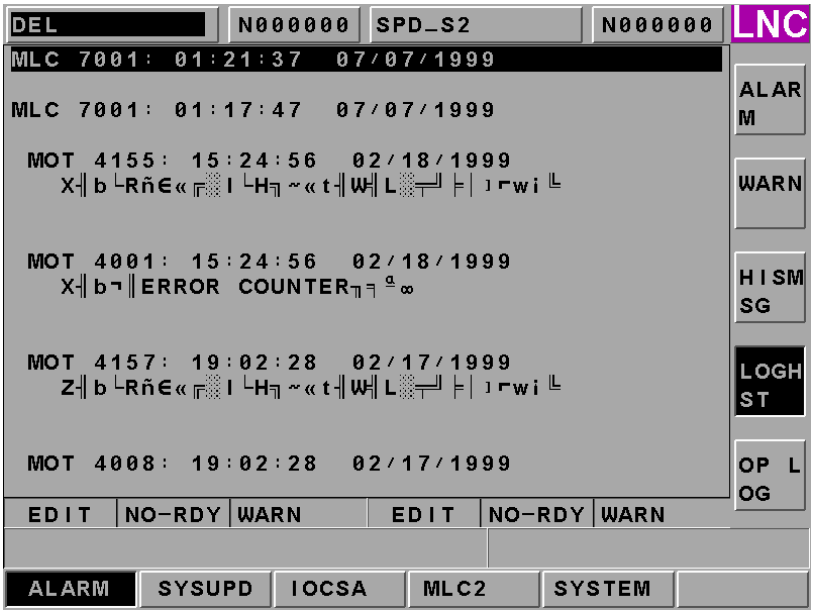


Fig. 8.1-4

【OP LOG】: This page displays the operation histories. Operation histories record the information as follows: file management, measure, tool offset, thermal, macro variables, coordinate, statistics, PLC's RG.D, system, users, controller's mode and status changing, press RESET, and S bit status changing. One record of the operation histories will be separated to two lines. The display format are as below:

Type 1：Related to operation page.

Time Date:

Page name: 【modified data 1｜modified data 2｜modified data 3｜…】(Previous value→ modified value)

Type 2：Not related to operation page.

Time Date:

【Act of pressing key｜controller information changing｜…】: Previous value→modified value

The format of "Time" is hh:mm:ss, hh presents hours; mm presents minutes, ss presents seconds. The format of "Date" is MM/DD/YYYY, MM presents months; DD presents dates; YYYY presents year. "Page Name" means which page has been modified. Next is the type of the modified data, which only appears one type at a time. "Previous value" displays the value before the data has been modified; "modified value" displays the value after the data has been modified.

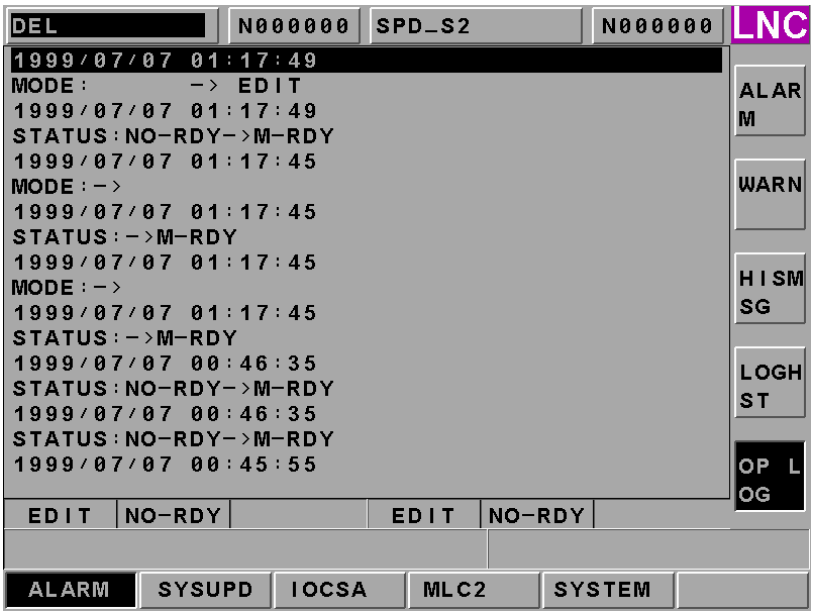

DEL
N000000
SPD_S2
N000000
LNC
1999/07/07 01:17:49
MODE: -> EDIT
1999/07/07 01:17:49
STATUS:NO-RDY->M-RDY
1999/07/07 01:17:45
MODE:->
1999/07/07 01:17:45
STATUS:->M-RDY
1999/07/07 01:17:45
MODE:->
1999/07/07 01:17:45
STATUS:->M-RDY
1999/07/07 00:46:35
STATUS:NO-RDY->M-RDY
1999/07/07 00:46:35
STATUS:NO-RDY->M-RDY
1999/07/07 00:45:55
ALARM
WARN
HISMSG
LOGHST
OP LOG
EDIT
NO-RDY
EDIT
NO-RDY
ALARM
SYSUPD
IOCSA
MLC2
SYSTEM

Fig. 8.1-5

8.2 OP ALARMS & WARNINGS

OP1001	X axis servo driver alarm
OP1002	Y axis servo driver alarm
OP1003	Z axis servo driver alarm
OP1004	4th axis servo driver alarm

Type： ALARM
Function： N/A
Description：
1. Some alarm is activated by the servo motor of the axis.
2. Please check the ERROR message of the servo motor for details.
3. Reboot the system.

OP1005	X axis over travel(+)
OP1006	X axis over travel(-)
OP1007	Y axis over travel(+)
OP1008	Y axis over travel(-)
OP1009	Z axis over travel(+)
OP1010	Z axis over travel(-)
OP1011	4th axis over travel(+)
OP1012	4th axis over travel(-)

Type： ALARM
Function： N/A
Description：
1. The axis triggers OVER TRAVEL limit (+) or (-).
2. Press OT (OVER TRAVEL) RELEASE key and move the machine away from the OVER TRAVEL limit by JOG.

OP1013	X axis detach/attach in moving
OP1014	Y axis detach/attach in moving
OP1015	Z axis detach/attach in moving
OP1016	4th axis detach/attach in moving

Type： ALARM
Function： TI060029
Description： Check if ladder leads through C bit 130(131/132/133) when the axis is moving.
T800：[S1]C130(131/132/133)，[S2]C630(631/632/633)。

OP1017	LNC system expired

Type： ALARM
Function： N/A
Description： The system is expired. Please contact the supplier.

OP1018 **Desired MACRO variables not exist**

Type： ALARM
Function： TI060022
Description： When applying PLC WINDOWS, check (R061 + R062 – 1) first, it should be smaller than 500.

OP1019 **Desired MACRO variables over range**

Type： ALARM
Function： TI060022
Description： Check if the values of macro global variables are between -32768 ~ 32767 when applying PLC WINDOWS.

OP1020 **Over PLC travel limit**

Type： ALARM
Function： N/A
Description： In auto and manual modes, trigger the PLC limit of each axis. (C050~C057)
T800：[S1] C050~C057，[S2] C550~C557。

OP1021 **Gear signal error**

Type： ALARM
Function： N/A
Description：

1. Spindle's gear signal is duplicated.
2. Check if C bit 097/098/099 have more than two set to ON.

T800：[S1] C097~C099，[S2] C597~C599。

OP1022 **Desired parameter variables over range**

Type： ALARM
Function： TI060022
Description： Check if the values are between -32768 ~ 32767 first when applying PLC WINDOWS.

OP1023 **Desired parameter variables not exist**

Type： ALARM
Function： TI060022
Description： Check if the read parameters exceed the range of valid parameters before applying PLC WINDOWS.

OP6001	**X axis over PLC travel limit(+)**
OP6002	**X axis over PLC travel limit(-)**
OP6003	**Y axis over PLC travel limit(+)**
OP6004	**Y axis over PLC travel limit(-)**
OP6005	**Z axis over PLC travel limit(+)**
OP6006	**Z axis over PLC travel limit(-)**
OP6007	**4th axis over PLC travel limit(+)**
OP6008	**4th axis over PLC travel limit(-)**

Type： WARNNING
Function： N/A
Description： Trigger the PLC limit (C050~C057) of each axis.
T800：[S1] C050~C057，[S2] C550~C557。

OP6013	**Return home direction is reverse of axis select direction for X axis**
OP6014	**Return home direction is reverse of axis select direction for Y axis**
OP6015	**Return home direction is reverse of axis select direction for Z axis**
OP6016	**Return home direction is reverse of axis select direction for 4th axis**

Type： WARNNING
Function： N/A
Description：

1. In HOME return mode, the direction that ladder returns to zero point is different from the direction of HOME return set by Pr.0120.
2. Modify ladder or Pr.0120 to make the direction the same.

8.3 PLC ALARMS & WARNINGS

PLC2001	R40=1
PLC2002	R40=2
PLC2003	R40=4
PLC2004	R40=8
PLC2005	R40=16
PLC2006	R40=32
PLC2007	R40=64
PLC2008	R40=128
PLC2009	R40=256
PLC2010	R40=512
PLC2011	R40=1024
PLC2012	R40=2048
PLC2013	R40=4096
PLC2014	R40=8192
PLC2015	R40=16384

Type： ALARM
Function： N/A
Description： Ladder fills in the value which is not 0 to R40.
T800：[S1]R040，[S2]R540。

PLC2017	R41=1
PLC2018	R41=2
PLC2019	R41=4
PLC2020	R41=8
PLC2021	R41=16
PLC2022	R41=32
PLC2023	R41=64
PLC2024	R41=128
PLC2025	R41=256
PLC2026	R41=512
PLC2027	R41=1024
PLC2028	R41=2048
PLC2029	R41=4096
PLC2030	R41=8192
PLC2031	R41=16384

Type： ALARM
Function： N/A
Description： Ladder fills in the value which is not 0 to R41.
T800：[S1]R041，[S2]R541。

PLC2033	R42=1
PLC2034	R42=2
PLC2035	R42=4
PLC2036	R42=8
PLC2037	R42=16
PLC2038	R42=32
PLC2039	R42=64
PLC2040	R42=128
PLC2041	R42=256
PLC2042	R42=512
PLC2043	R42=1024
PLC2044	R42=2048
PLC2045	R42=4096
PLC2046	R42=8192
PLC2047	R42=16384

Type： ALARM
Function： N/A
Description： Ladder fills in the value which is not 0 to R42.
T800：[S1]R042，[S2]R542。

PLC2049	R43=1
PLC2050	R43=2
PLC2051	R43=4
PLC2052	R43=8
PLC2053	R43=16
PLC2054	R43=32
PLC2055	R43=64
PLC2056	R43=128
PLC2057	R43=256
PLC2058	R43=512
PLC2059	R43=1024
PLC2060	R43=2048
PLC2061	R43=4096
PLC2062	R43=8192
PLC2063	R43=16384

Type： ALARM
Function： N/A
Description： Ladder fills in the value which is not 0 to R43.
T800：[S1]R043，[S2]R543。

PLC2065	R44=1
PLC2066	R44=2
PLC2067	R44=4
PLC2068	R44=8
PLC2069	R44=16
PLC2070	R44=32
PLC2071	R44=64
PLC2072	R44=128
PLC2073	R44=256
PLC2074	R44=512
PLC2075	R44=1024
PLC2076	R44=2048
PLC2077	R44=4096
PLC2078	R44=8192
PLC2079	R44=16384

Type： ALARM
Function： N/A
Description： Ladder fills in the value which is not 0 to R44.
T800：[S1]R044，[S2]R544。

PLC2081	R45=1
PLC2082	R45=2
PLC2083	R45=4
PLC2084	R45=8
PLC2085	R45=16
PLC2086	R45=32
PLC2087	R45=64
PLC2088	R45=128
PLC2089	R45=256
PLC2090	R45=512
PLC2091	R45=1024
PLC2092	R45=2048
PLC2093	R45=4096
PLC2094	R45=8192
PLC2095	R45=16384

Type： ALARM
Function： N/A
Description： Ladder fills in the value which is not 0 to R45.
T800：[S1]R045，[S2]R545。

8.4 INT ALARMS & WARNINGS

INT3001 **No such token**

Type： ALARM
Function： N/A
Description：

1. The input data of a part program contains some illegal symbols or words.
2. Correct the mistake.
3. Press RESET to eliminate the warning message.

INT3002 **Grammar error**

Type： ALARM
Function： N/A
Description：

1. The input data of a part program contains some grammatical mistakes.
2. Correct the mistakes.
3. Press RESET to eliminate the warning message.

INT3003 **Out of memory**

Type： ALARM
Function： N/A
Description：

1. The MACRO program contains an over-complex representation, such as too many brackets.
2. Modify the program to make it simpler or divide it into two blocks.
3. Press RESET to eliminate the warning message.

INT3004 **Execute node error**

Type： ALARM
Function： N/A
Description：

1. Some illegal formula is executed by the system.
2. Press RESET to eliminate the warning message.

INT3005 **Function error**

Type： ALARM
Function： N/A
Description： 1.Some illegal function is being executed by the system (this situation usually does not happen when the system works normally).
2.The system is malfunctioning, please notify your supplier.

INT3006 **Divided by 0**

Type： ALARM
Function： N/A
Description： 1.Some denominator of the MACRO program is 0.
2.Modify the denominator to a number other than 0.
3.Press RESET to eliminate the warning message.

INT3007 **Variable over range**

Type： ALARM
Function： N/A
Description： 1.Some number of the variables (global or local variables) exceeds the number range allowed.
2.Modify the number of the variable that exceeds the range.
3.Press RESET to eliminate the warning message.

INT3008 **Domain error**

Type： ALARM
Function： N/A
Description： 1. Some domain error in the function of the MACRO program takes place. For example, the parameter of a square root (SQRT) is negative; or the two parameters of an arctangent (ATAN) are 0.
2. Change the domain value.
3. Press RESET to eliminate the warning message.

INT3010 **Not allowable decimal point**

Type： ALARM
Function： N/A
Description： 1. The digital part of the input address contains an illegal decimal.
2. Correct the digital part of the address.

INT3011 **Word data over range**

Type： ALARM
Function： N/A
Description：
1. The digital part of the input address exceeds the range allowed.
2. Correct the digital part of the address.
3. Press RESET to eliminate the warning message.

INT3012 **Illegal MACRO parameter input**

Type： ALARM
Function： N/A
Description：
1. Some incorrect parameters are used in MACRO programs (G, L, N, O, P).
2. Correct these parameters.
3. Press RESET to eliminate the warning message.

INT3013 **Grammar error of comment**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. About the ungrammatical comment in part programs, the comment need to be /*……*/ in pairs when Pr.0042 is set to 0; the comment need to be (……) in pairs when Pr.0042 is set to 1.
3. Modify the comment in part programs to make it follow the grammar rules.

INT3014 **The argument is error in GET function**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. Apply ungrammatical GET command in part programs.
3. Modify the GET argument in part programs to make it follow the grammar rules.

"

INT3100 **Illegal G code**

Type： ALARM
Function： N/A
Description：
1. The input data contains some illegal G code.
2. Delete the illegal G code.
3. Press RESET to eliminate the warning message.

INT3111 **Lack of file name**

Type： ALARM
Function： N/A
Description：
1. The input data lacks the file name to be called (P address is blank).
2. Add the file name to be called.
3. Press RESET to eliminate the warning message.

INT3112 **Illegal file name**

Type： ALARM
Function： N/A
Description：
1. The input data contains an illegal file name.
2. Correct the file name.
3. Press RESET to eliminate the warning message.

INT3113 **file not found**

Type： ALARM
Function： N/A
Description：
1. The file to be executed is not found in the system.
2. Establish or modify the file to be executed.
3. Press RESET to eliminate the warning message.

INT3114 **End of file**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. The finish codes, such as M30, M02, M99, are not included in the end of file.
3. Modify the end of file to make it follow the rules.

INT3121 **Lack of sub return**

Type： ALARM
Function： N/A
Description：
1. The sub-program lacks a command of returning to the main program.
2. Add a command of returning to the main program in the sub-program.
3. Press RESET to eliminate the warning message.

INT3122 **Program Overflow**

Type： ALARM
Function： N/A
Description：
1. The sum of sub-programs & MACRO levels exceeds the limit (8 levels).
2. Reduce levels.
3. Press RESET to eliminate the warning message.

INT3123 **MACRO Overflow**

Type： ALARM
Function： N/A
Description：
1. The number of MACRO levels exceeds the limit (4 levels).
2. Reduce MACRO levels.
3. Press RESET to eliminate the warning message.

INT3124 **MACRO underflow**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. Call MACRO program (G66) is not executed before Cancel MACRO program (G67) in part programs.
3. Modify the program to apply G66 before G67 to make it follow the rules.

INT3125 **Without lable**

Type： ALARM
Function： N/A
Description：
1. The label name does not exist.
2. Please confirm if the label name is correct.
3. Press RESET to eliminate the warning message.

INT3126 **Block not found**

Type： ALARM
Function： N/A
Description：
1. The block number does not exist.
2. Check if the block number exists in the program.
3. Press RESET to eliminate the warning message.

INT3128 **Feedrate out of range**

Type： ALARM
Function： N/A
Description：
1. Check if G94 & G95 are executed properly.
2. Check if F value of the feed rate is too large.
3. Press RESET to eliminate the warning message and modify the values of G94, G95, or F value.

INT3129 **Illegal A command**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. The command of executing linear angle function has some mistakes.
3. Modify the command of executing linear angle function to make it follow the rules.

INT3130 **Coordinate error**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. The related command of executing coordinate switch in part program has some mistakes.
3. Modify the command to make it follow the rules.

INT3131 **Unknown plane**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. The illegal coordinate plane is executed in part programs.
3. Modify the related command to make it follow the rules.

INT3132 **Illegal radius**

Type： ALARM
Function： N/A
Description：
1. When G02 & G03 arc cutting commands are applied, the terminal coordinates are not on the arc.
2. Check the coordinate values of the center, direction, and the terminal positions.
3. Press RESET to eliminate the warning message.

INT3133 **Illegal A command in CAN CYCLE**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. There is an illegal A command in G73 command in part programs.
3. Modify the command to make it follow the rules.

INT3140 **Send TABLE1 error**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. TABLE 1 has a sending error in the interpreter.
3. Reboot and execute the program.

INT3141 **No free variables**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. There is no free variable in the interpreter.
3. Reboot and execute the program.

INT3150 **Insufficient data**

Type： ALARM
Function： N/A
Description：
1. The data of G codes to be executed is insufficient (Ex. P, R, & Z of G10 are insufficient).
2. Supplement the data required.
3. Press RESET to eliminate the warning message.

INT3151 **IP maintain error**

Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. IP has maintenance error when executing G27, G28 and G30 command.
3. Modify the command to make it follow the rules.

INT3152 **Run G27,G28,G29,G30 in CAN CYCLE**

Type： ALARM
Function： N/A
Description：
1. The commands of G27, G28, G29, & G30 are executed in Canned Cycle.
2. First, cancel the G codes above in Canned Cycle, then execute them again.
3. Press RESET to eliminate the warning message.

INT3153 **N0 such R point**

Type： ALARM
Function： N/A
Description：
1. The number of the reference point input by G30 is incorrect.
2. Modify the number of the reference point.
3. Press RESET to eliminate the warning message.

INT3154 **Illegal in CAN CYCLE**

Type： ALARM
Function： N/A
Description：
1. There is some illegal action executed in Canned Cycle.
2. First, cancel the illegal action before re-executing the next command.
3. Press RESET to eliminate the warning message.

INT3155 **Illegal profile path**

Type： ALARM
Function： N/A
Description：
1. The profile path assigned in Canned Cycle is illegal (Ex. Over-cutting).
2. Modify the illegal profile path then execute the command again.
3. Press RESET to eliminate the warning message.

INT3156 **Illegal G31 in compensation**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Do not execute G31 command in tool nose compensation mode.
3. Modify the G31 command to make it follow the rules.

INT3157 **P code out of range**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. P code is out of range in part programs.
3. Modify the P code in part programs to make it follow the rules.

INT3158 **G10 L/E code out of range**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. L/E code in G10 command is out of range.
3. Modify the codes in G10 command to make it follow the rules.

INT3160 **DNC: Incorrect read sequence**

Type： ALARM
Function： N/A
Description：

1. Check if there are any incorrect sub-programs or Skip Calling in the program.
2. Press RESET to eliminate the warning message and modify part programs.

INT3161 **DNC: Loss data packet**

Type： ALARM
Function： N/A
Description：

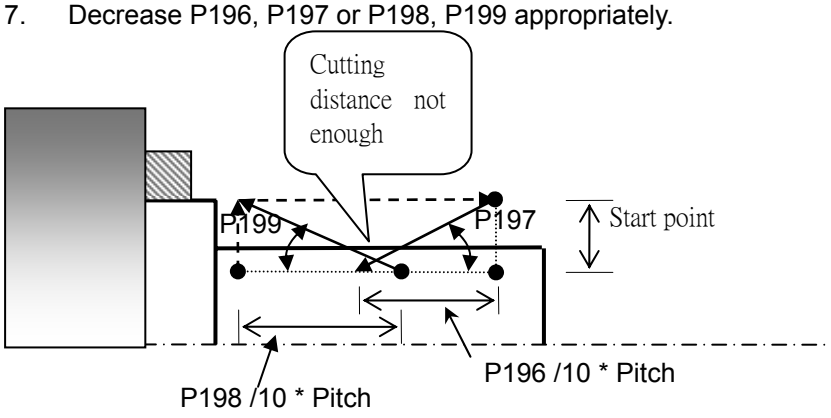
1. Press RESET to eliminate the warning message.
2. DNC RS232 lost data during transmission.
3. Please check if DNC RS232 connection is normal.

INT3162 **DNC: Program buffer overflow**

Type： ALARM
Function： N/A
Description：
1. Buffer area of the program exceeds the storage limit during the transmission of DNC RS232.
2. Whether or not the transmission is disconnected or loose
3. Press RESET to eliminate the warning message.

INT3170 **Cutting length in Z too short**

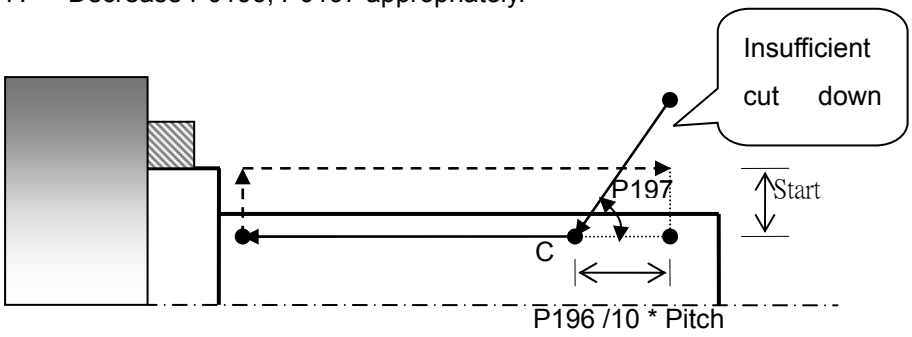
Type： ALARM
Function： N/A
Description：
1. Press RESET to eliminate the warning message.
2. The ball screw canned cycle's length is too short in G78 command.
3. The cutting distance (Z direction) is too short.
4. The length of cutting down or cutting up is too long to have sufficient cutting distance.
5. Increase cutting distance, for example, G78 X_Z_F1→ increase the amount of Z.
6. Cancel the function of angular cutting down and up. For example, M37 enables angular cutting up, and M38 cancels this function. Please refer to the machine maker's manual.
7. Decrease P196, P197 or P198, P199 appropriately.



INT3171 **Cut down chamfer over range**

Type： ALARM
Function： N/A
Description：

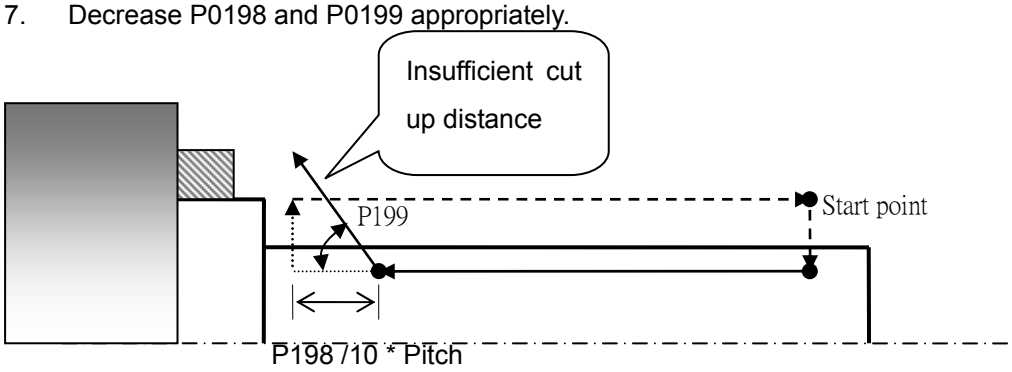
1. Press RESET to eliminate the warning message.
2. The screw canned cycle cut down chamfer of G78 is too big.
3. There is no sufficient cut down distance reserved when executing G78. (Pr.0196)
4. The cut down chamfer's angle (Pr.0197) is too big to have sufficient distance for cutting down.
5. Increase the cut down distance; in other words, increase the start point's position.
6. Cancel cut down chamfer function. For example, M37 enables angular cut down, and M38 cancels this function. (Please refer to the machine maker's manual)
7. Decrease P0196, P0197 appropriately.



INT3172 **Cut up chamfer over range**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. The screw canned cycle cut up chamfer of G78 is too big.
3. There is no sufficient cut up distance reserved when executing G78. (Pr.0198)
4. The cut up chamfer is too big (Pr.0199) to have sufficient cut up distance.
5. Increase cut up distance, in other words, increase the start point's position.
6. Cancel cut up chamfer function. For example, M39 enables angular cut up function, and M40 cancels this function. (Please to machine maker's manual.)
7. Decrease P0198 and P0199 appropriately.



INT3180 **Spindle C(H) address grammar error**

Type： ALARM
Function： TI050011
Description： Modify the code related to spindle C(H) positioning in part programs to make it follow the grammar rules.

INT3181 **Enable local and remote spindle CH positioning at the same time**

Type： ALARM
Function： TI050011
Description： Local and remote spindle C(H) positioning can not be enabled at the same time. Please modify the code related to spindle C(H) positioning.

INT3200 **The sequence NO. of GOTO command error**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. GOTO command skips to the single block with the serial number N will cause endless cycle. For example, N99 GOTO 99.
3. Modify the single block executing GOTO command to make it logical.

INT3201 **Compensation unit vector 0**

Type： ALARM
Function： N/A
Description：

1. The unit vector to be compensated is 0.
2. The system is malfunctioning, please notify your supplier.
3. Press RESET to eliminate the warning message.

INT3202 **Compensation start up arc**

Type： ALARM
Function： N/A
Description：

1. The initial compensation command is an arc command.
2. Please revise the arc command to a linear command.
3. Press RESET to eliminate the warning message.

INT3203 **Compensation cancel arc**

Type： ALARM
Function： N/A
Description：

1. The compensation command to be cancelled is an arc command.
2. Please revise the arc command to a linear command.
3. Press RESET to eliminate the warning message.

INT3204 **Compensation line determine 0**

Type： ALARM
Function： N/A
Description：

1. Compensation line’s determine is 0.
2. Check the program.
3. The system is malfunctioning, please notify your supplier.

INT3205 **Compensation vector length 0**

Type： ALARM
Function： N/A
Description：
1. In compensation calculation, the length vector is 0.
2. Check the program.
3. The system is malfunctioning, please notify your supplier.

INT3206 **Compensation interference**

Type： ALARM
Function： N/A
Description：
1. Some interference of over-cutting occurs.
2. Reduce the compensation radius or change the path of the part program.
3. Press RESET to eliminate the warning message.

INT3207 **Compensation no interection**

Type： ALARM
Function： N/A
Description：
1. There is no intersection deduced in compensation calculation.
2. Reduce the compensation radius or change the path of the part program.
3. Press RESET to eliminate the warning message.

INT3208 **The next block is illegal for chamfer or rounding**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Executing chamfer function in part programs. However, the cutting command not included in the next line causes chamfer unable to calculate and make it lose the validity.
3. Modify the next command of check chamfer command to see if it is comment or blank or the moving command of G0.

Next error command:

- Comment:

G00 X20.0 Z40.0
G01 X80.0 **,C10.0** F100.0
/* Test H**ere** ***/***
G01 Z10.0

- Blank

G00 X20.0 Z**40.0**
G01 X80.0 ,C10.0 F100.0

G01 Z10.0

- ;

G00 X20.0 Z40.0
G01 X80.0 ,C10.0 F100.0
;
G01 Z10.0

- G00

G00 X20.0 Z40.0
G01 X80.0 ,C10.0 F100.0
G00 Z10.0

INT3209 **The first cutting command block without movement(chamfer)**

Type： ALARM

Function： N/A

Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (, C). However, the 1st single block does not have cutting command and cause the chamfer function unable to calculate to lose its validity.
3. Modify the 1st single block command of check chamfer command (,C) to see if the movement or G0 command is not included.

Error command:

- Movement is not included in the 1st line:

```
G00 X20.0 Z40.0
G01 ,C10.0 F100.0
G01 Z10.0
```

- Command in the 1st line is G00:

```
G00 X20.0 Z40.0
G00 X80 ,C10.0 F100.0
G01 Z10.0
```

INT3210 **The second cutting command block without movement(chamfer)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (, C). However, the 2nd single block does not have cutting command and cause the chamfer function unable to calculate to lose its validity.
3. Modify the 2nd single block command of check chamfer command (,C) to see if the movement or G0 command is not included.
4. Modify the 2nd single block command of check chamfer command to see if the movement is excluded, and command is comment, semicolon, blank, or G0 moving command.

Error Command:

- Comment

```
G00 X20.0 Z40.0
G01 X80.0 ,C10.0 F100.0
/*    Test Here        */
G01 Z10.0
```

- Blank

```
G00 X20.0 Z40.0
G01 X80.0 ,C10.0 F100.0

G01 Z10.0
```

- ;

```
G00 X20.0 Z40.0
G01 X80.0 ,C10.0 F100.0
;
G01 Z10.0
```

- Goo

```
G00 X20.0 Z40.0
G01 X80.0 ,C10.0 F100.0
G00 Z10.0
```

- Movement not included

```
G00 X20.0 Z40.0
G01 X80 ,C10.0 F100.0
G01 X80
```

INT3211 **The length of (,C) is over than the length of first block(chamfer)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,C). However, the value of chamfer length (,C) exceeds the 1st block's length, so it loses its validity.
3. Modify the value of chamfer length (,C) in check chamfer command to see if it exceeds the 1st block's moving length.

Error command:

```
G00 X20.0 Z40.0
G01 X80 ,C40.0 F100.0
Z20.0
```

INT3212 **The length of (,C) is over than the length of second block(chamfer)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,C). However, the value of chamfer length exceeds the 2nd block's length, so it loses its validity.
3. Modify the value of chamfer length in check chamfer command to see if it exceeds the 2nd block's moving length.

Error commands:

```
G00 X20.0 Z40.0
G01 X80 ,C30.0 F100.0
Z20.0
```

INT3213 **The chord of arc of first block is too short(chamfer)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute the chamfer function (,C). However, the chord of arc in the 1st block is too short, and therefore, the chamfer function can not be calculated. It loses its validity.
3. Modify the chord of arc in the 1st block to see if it is equal to the value of (,C).

Error Command:

```
G00 X0 Z0
G02 Z10.0 R5. ,C10.0 F100.0
G01 Z20.0
```

Description: In the commands above, the value of (,C) is just equal to the chord of arc, so it needs to decrease the value of (,C) or increase the chord of arc.

INT3214 **The chord of arc of second block is too short(chamfer)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,C). However, the chord of arc in the 2nd block is too short to calculate the chamfer function. Therefore, it is invalid.
3. Modify the chord of arc in the 2nd block to see if it is equal the value of (,C).

Error Command:

```
G00 X0 Z0
G01 Z20. ,C10 F100.0
G02 Z30.0 R5.
G01 Z20.0
```

Description: In the commands above, the value of (,C) is just equal to the chord of arc, so it needs to decrease the value of (,C) or increase the chord of arc.

INT3215 **The included angle is illegal(chamfer)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,C). However, the included angle is illegal, so it causes the function can not be calculated so it is invalid.
3. Modify the included angle to see if it is 180° or 0°.

Error Command:

```
G00 X20.0 Z40.0
G01 X80 ,C10.0 F100.0
X20.0
```

INT3216 **The first cutting command block without movement(rounding)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,R). However, the 1st block command does not have cutting command, so chamfer function can not be calculated and loses its validity.
3. Modify the 1st block’ s command to see if the movement or G0 moving command is not included.

Error Command:

- Movement is not included in the 1st line:

```
G00 X20.0 Z40.0
G01 ,R10.0 F100.0
G01 Z10.0
```

- The 1st line is G00

```
G00 X20.0 Z40.0
G00 X80 ,R10.0 F100.0
G01 Z10.0
```

INT3217 **The first second command block without movement(rounding)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute the chamfer function (,R). However, the 2nd block does not have cutting command, so chamfer function can not be calculated and lose its validity.
3. Modify the 2nd block’ s command to see if the movement is not included, and the command is comment, semicolon, blank, or G0 moving command.

Error Command:

- Comment

```
G00 X20.0 Z40.0
G01 X80.0 ,R10.0 F100.0
/*    Test Here        */
G01 Z10.0
```

- Blank

```
G00 X20.0 Z40.0
G01 X80.0 ,R10.0 F100.0

G01 Z10.0
```

- ;

```
G00 X20.0 Z40.0
G01 X80.0 ,R10.0 F100.0
;
G01 Z10.0
```

- G00

```
G00 X20.0 Z40.0
G01 X80.0 ,R10.0 F100.0
G00 Z10.0
```

- Movement not included

```
G00 X20.0 Z40.0
G01 X80 ,R10.0 F100.0
G01 X80
```

INT3218 **The included angle is illegal(rounding)**

Type： ALARM

Function： N/A

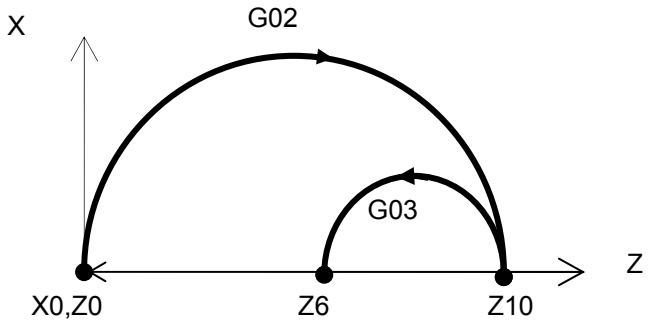
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,R). However, the included angle is illegal, so the function can not be calculated and lose its validity.
3. Modify the included angle between commands of the 1st and 2nd blocks.

Error Command:

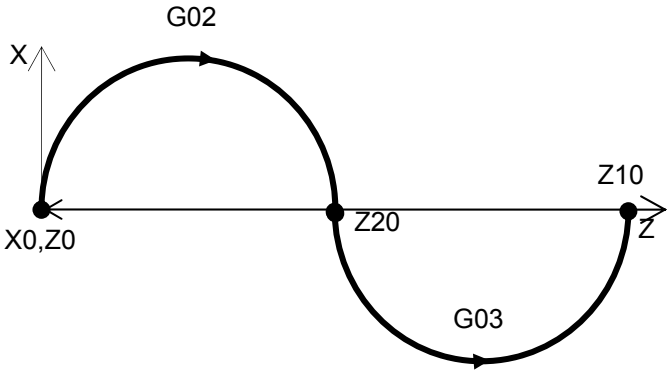
- Wrong Diagram A:

G00 X0 Z0
G02 Z10 R5 ,R4 F100.0
G03 Z6 R2



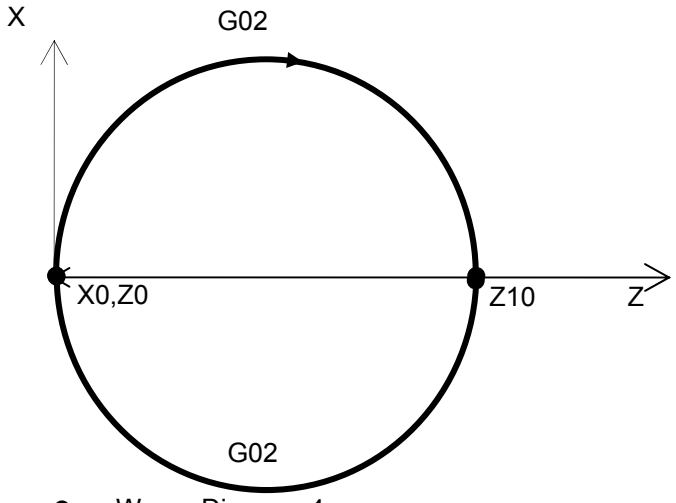
- Wrong Diagram B:

G00 X0 Z0
G02 Z10.0 R5 ,R4.0 F100.0
G03 Z20.0 R5



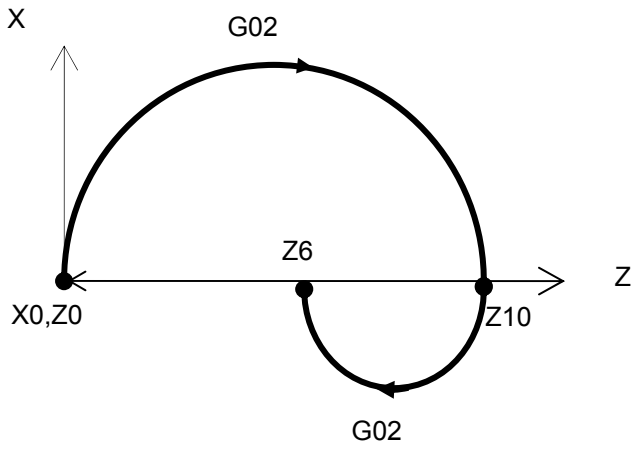
- Wrong Diagram C:

G00 X0 Z0
G02 Z10 R5. ,R4.0 F100.0
G02 Z0 R5.



- Wrong Diagram 4:

G00 X0 Z0
G02 Z10 R5. ,R4 F100.0
G02 Z6 R2



INT3219 **The value of (,R) is over than the length of first block(rounding)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute the chamfer function (,R). However, the value of (,R) is over than the 1st block's length, so it is invalid.
3. Modify the value of rounding to see if it exceeds the moving length in the 1st block.

Error Command:

G00 X20 Z40
G01 X60 ,R30.0 F100.0
G01 Z10.0

INT3220 **The value of (,R) is over than the length of second block(rounding)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,R). However, the value of (,R) is over than the length of the 2nd block, so it loses its validity.
3. Modify the value of rounding to see if it exceeds the moving length of the 2nd block.

Error Command:

```
G00 X20 Z40
G01 X80 ,R30.0 F100.0
G01 Z30.0
```

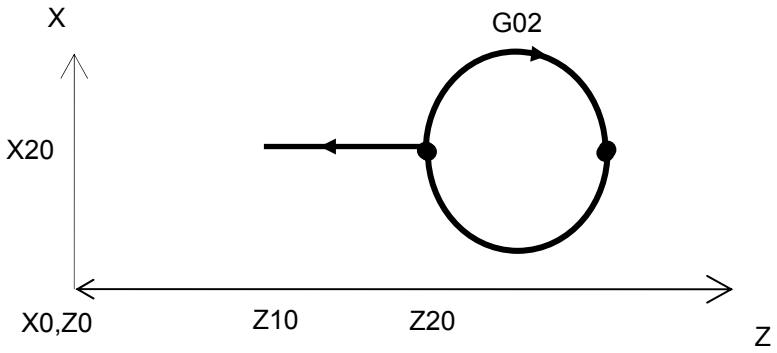
INT3221 **The arc command of first bolck is illegal(rounding)**

Type： ALARM
Function： N/A
Description：

1. 按下 RESET 清除錯誤警告。
2. 工件程式內使用倒角功能(,R)但因第一單節之圓弧指令錯誤導致倒角功能無法計算而失效。
3. 修改加工程式檢查倒角功能(,R)之第一單節的圓弧指令是否有錯。

錯誤指令下法說明如下:

```
G00 X20 Z20
G02 R5 ,R4 F100.0
G01 Z10.0
```



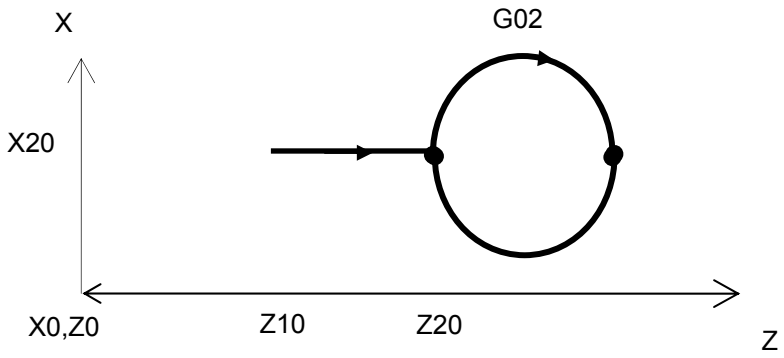
INT3222 **The arc command of second block is illegal(rounding)**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Execute chamfer function (,R). However, the arc command of the 2nd block is wrong, so it can not be calculated and lose its validity.
3. Modify the arc command in the 2nd block to see if it is wrong.

Error Command:

```
G00 X20 Z10
G01 Z20 ,R4 F100.0
G02 R5
```



INT3301 **This axis is slave axis in synchronous control**

Type： ALARM
Function： TI050013
Description： In synchronization control, do not give command to slave axis. Please check and modify the commands related to slave axis in part programs.

INT3302 **Illegal command in synchronous control**

Type： ALARM
Function： TI050013
Description： In synchronization control, limit the G code command related to coordinate. Please check and modify the G code command related to coordinate in part programs.

INT3303 **Illegal command G28 in superimposed control**

Type： ALARM
Function： TI060028
Description： In superposition control, limit G28 command related to coordinate. Please check and modify the command.

INT3999	The alarm NO. is exceeding

Type： ALARM

Function： N/A

Description：

1. Press RESET to eliminate the warning message.
2. Execute system variables ($) to send alarm. The alarm number is exceeding.
3. Modify the alarm number of system variables.

8.5 MOT ALARMS & WARNINGS

MOT4001	**X axis error counter overflow**
MOT4002	**Y axis error counter overflow**
MOT4003	**Z axis error counter overflow**
MOT4004	**4th axis error counter overflow**

Type： ALARM
Function： N/A
Description：

1. Some error counter of the axis on the motion card exceeds the limit (16-Bit).
2. Check if the speed set by the command is too fast.
3. Check if everything is normal with the servo driver.
4. Check if everything is normal with the motion of the machine.
5. Check if everything is normal with the board.

MOT4005	**Set first soft limit error**

Type： ALARM
Function： TI060033
Description：

1. Incorrect setting of parameters for the 1st travel soft-limit (the positive soft-limit is smaller than the negative soft-limit), please check Pr.1006 ~ Pr.1013.
2. Press RESET, and then set new values for the parameter.
3. If some parameter is reset, please reboot the system.

T800：[S1]Pr1006~1013，[S2]Pr6006~6013。

MOT4006	**X axis servo lag overflow**
MOT4007	**Y axis servo lag overflow**
MOT4008	**Z axis servo lag overflow**
MOT4009	**4th axis servo lag overflow**

Type： ALARM
Function： N/A
Description：

1. The servo lag of the axis exceeds the set value of Pr.0002.(0003/0004/0005)
2. Check if the assigned speed is too fast or the set value of Pr.00020002(0003/0004/0005) or the parameters in system 2 is too small.
3. Press RESET to continue the operation.
4. If some parameter is reset, please reboot the system.

T800：[S1]Pr0002~0005，[S2]Pr5002~5005。

MOT4010 **Mismatch waiting M code**

Type： ALARM
Function： TI050001
Description： 1. The M codes in system 1 & 2 are different when applying wait M code.
2. Check and modify the numbers related to wait M code to make the M codes in system 1 & 2 the same.

MOT4012 **No final line**

Type： ALARM
Function： N/A
Description： 1.Please contact maintenance staff.
2.Press RESET to resume the operation.

MOT4014 **X axis on home DOG**
MOT4015 **Y axis on home DOG**
MOT4016 **Z axis on home DOG**
MOT4017 **4th axis on home DOG**

Type： ALARM
Function： N/A
Description： 1.The axis is on HOME DOG.
2.Press RESET to remove the machine from HOME DOG in JOG mode to return to zero point.

MOT4018 **No return home**

Type： ALARM
Function： N/A
Description： 1. After the machine is rebooted, some axis does not return to the zero point.
2. Press RESET then return to zero point first.

MOT4019 **Over travel**

Type： ALARM
Function： N/A
Description： 1. The machine is over-traveling.
2. The axis meets （+） or（-）travel limit.
3. Press OT (over travel), and remove the machine from the travel limit in JOG.

MOT4020 **No residue data**

Type： ALARM
Function： N/A
Description：

1. Please contact maintenance staff.
2. Press RESET to resume the operation.

MOT4022 **First soft limit error**

Type： ALARM
Function： N/A
Description： 1. Some axis exceeds the first soft-limit.
2. Please check the set values of Pr.1006 ~ Pr.1013.
3. Press RESET to resume the operation in the opposite direction.
T800：[S1]Pr1006~1013，[S2]Pr6006~6013。

MOT4023 **Set second soft limit error**

Type： ALARM
Function： TI060033
Description： 1. The maximum value set by the parameter of the second soft-limit is smaller than the minimum value allowed.
2. Please check the set values of Pr.1034 ~ Pr.1041.
3. If some parameter is reset, the system must be restarted.
T800：[S1]Pr1034~1041，[S2]Pr6034~6041。

MOT4024 **second soft limit error**

Type： ALARM
Function： N/A
Description： 1. Some axis exceeds the second soft-limit.
2. Please check the set values of Pr.1034 ~ Pr.1041.
3. Press RESET to resume the operation.
T800：[S1]Pr1034~1041，[S2]Pr6034~6041。

MOT4025 **G10 P range error**

Type： ALARM
Function： N/A
Description： 1. The value of P exceeds the limit.
2. Please check the part program again.

MOT4026	**Encoder A/B phase error of X axis**
MOT4088	**Encoder A/B phase error of Y axis**
MOT4089	**Encoder A/B phase error of Z axis**
MOT4090	**Encoder A/B phase error of 4th axis**

Type： ALARM
Function： TI060037
Description： 1. Disconnection of the encoder or some mistake occurs to 5V power supply.
2. Stop the machine and check if any connection of the wiring is loose.

MOT4027	**Home DOG too short**

Type： ALARM
Function： N/A
Description： 1. DOG is too short or the speed is too fast during HOME return.
2. Extend the length of DOG or lower the speed to return to HOME.

MOT4030	**G01 ACC./DEC. time error**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of Pr.0014.
2. Reset the parameter and reboot the system.
T800：[S1]Pr0014，[S2]Pr5014。

MOT4031	**G00 ACC./DEC. time error of X axis**
MOT4032	**G00 ACC./DEC. time error of Y axis**
MOT4033	**G00 ACC./DEC. time error of Z axis**
MOT4034	**G00 ACC./DEC. time error of 4th axis**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of Pr.0010.
2. Reset the parameter and reboot the system.
T800：[S1]Pr0010~0013，[S2]Pr5010~5013。

MOT4035 **Set CMR error**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of CMR.
2. Check Pr.4120 ~ Pr.4123, Pr.4090 ~ Pr.4093, Pr.0068~0072, Pr.0100 ~ Pr.0107.
3. Reset the parameter and reboot the system.
T800：[S1]Pr4120 ~ 4123，4090 ~ 4093，0068~0072，0100 ~ 0107，
[S2]Pr9120 ~ 9123，9090 ~ 9093，5068~5072，5100 ~ 5107。

MOT4036 **Set In-Position check error**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of in-position check.
2. Check the set values of Pr.0006 ~ Pr.0009.
3. Reset the parameter and reboot the system.
T800：[S1]Pr0006~0009，[S2]Pr5006~5009。

MOT4037 **Set DMR error**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of DMR.
2. Check the set values of Pr.4120 ~ Pr.4123.
3. Reset the parameter and reboot the system.
T800：[S1]Pr4120~4123，[S2]Pr9120~9123。

MOT4038 **Set pulse/rev error**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of the pulse/rev of motor encoder.
2. Check the set values of Pr.4090 ~ Pr.4093.
3. Reset the parameter and reboot the system.
T800：[S1]Pr4090~4093，[S2]Pr9090~9093。

MOT4039 **Home low speed error**

Type： ALARM
Function： N/A
Description： 1. Invalid setting of the second speed of HOME return.
2. Check the set values of Pr.1108 ~ Pr.1111.
3. Reset the parameter and reboot the system.
T800：[S1]Pr1108~1111，[S2]Pr6108~6111。

MOT4040	X compensation NO. error
MOT4041	Y compensation NO. error
MOT4042	Z compensation NO. error
MOT4043	4th compensation NO. error

Type： ALARM
Function： N/A
Description： 1. Invalid setting of the CMP number of the axis.
2. Check the set value of Pr.0112~0115.
3. Reset the parameter and reboot the system.
T800：[S1]Pr0112~0115，[S2]Pr5112~5115。

MOT4044	Compensation interval error

Type： ALARM
Function： N/A
Description： 1. Invalid setting of the CMP intervals.
2. Check the set values of Pr.1018 ~ Pr.1021.
3. Reset the parameter and reboot the system.
T800：[S1]Pr1018~1021，[S2]Pr6018~6021。

MOT4045	No index interrupt

Type： ALARM
Function： N/A
Description： 1. There is an error when HOME index stops the signal or HOME DOG is too short.
2. Check the wiring of Z axial signal on the axis.

MOT4046	G27 Return home failure

Type： ALARM
Function： N/A
Description： 1. Check if it is under machine lock or other mechanic problems.
2. Press RESET to eliminate the status.

MOT4047	I/O communication error

Type： ALARM
Function： N/A
Description： 1. Check I/O board
2. Check all the wirings of I/O

MOT4048 **Spindle oritentation signal not release**

Type： ALARM
Function： N/A
Description： Whether or not it is executing tuning or positioning procedure, if the spindle is on orientation sensor in the beginning, it will move away by itself. Until orientation signal is cleared, it will enable tuning or orientation. If spindle rotates a round, and the sensor signal is still not cleared, the alarm will be triggered.
1. Check if the wiring of spindle orientation sensor has problems.
2. Check if the signal connecting point and type setting of spindle orientation sensor are correct.
3. Check if spindle orientation sensor is damaged.

MOT4049 **Spindle position error over tolerance**

Type： ALARM
Function： N/A
Description： When executing spindle positioning, it can not reach the correct orientation point.
1. Please check whether or not the system info No.0009, 0010, and 0011 on DGNOS page has any changes, but spindle does not rotate. If yes, it indicates that the Encoder signal of spindle motor has external interferences and cause system to make mistakes.
2. Check if the position rotational speed is too high, so spindle motor loses its step under Pulse Mode.

MOT4050 **Spindle oritentation signal not found**

Type： ALARM
Function： N/A
Description： During tuning or orientation, if spindle rotates a round but still can not find the orientation sensor, the alarm will be displayed.
1. Check if the wiring of spindle orientation sensor has problems.
2. Check if the connecting point and type setting of spindle orientation sensor is correct.
3. Check if the spindle orientation sensor is damaged.

MOT4051 **No spindle speed define**

Type： ALARM
Function： N/A
Description： 1. Spindle RPM command is not defined.
2. Spindle RPM command is not entered.
3. Please enter the rotational speed command S before tapping.

MOT4052 **Move error over limiit in rigtap**

Type： ALARM
Function： N/A
Description： Check if the adjustment of rigid tapping has been done.

MOT4053 **Spindle speed will over limit**

Type： ALARM
Function： N/A
Description： Please check if the spindle RPM exceeds the maximum RPM that the spindle can accept in this gear.

MOT4054 **Z axis feedrate will over limit**

Type： ALARM
Function： N/A
Description： Z axis cutting speed will be bigger than the maximum cutting speed set by Pr. 1004.
T800：[S1]Pr1004，[S2]Pr6004。

MOT4055 **Spindle servo lag over limit**

Type： ALARM
Function： N/A
Description： 1. Please check if there are any mistakes in ladder.
2. Please check if the spindle rotates during rigid tapping, if not, please check if the setting of spindle driver has problems.
3. Please check if the spindle Encoder wiring is loose or disconnected.
4. Please check if Pr.1075 is set too small.
T800：[S1]Pr1075，[S2]Pr6075。

MOT4056 **Thread cut ACC./DEC. time error**

Type： ALARM
Function： N/A
Description：
1. Please check the parameter to verify if Pr.0018 is set too big.
2. Please reboot if parameters are modified.
T800：[S1]Pr0018，[S2]Pr5018。

MOT4057 **Z axis over 2nd zero position limit**

Type： ALARM
Function： N/A
Description：

1. When C119 is set to On and the current mechanical coordinate is smaller than the set value of Pr.1024, the alarm will be triggered if moving toward negative direction.
2. Press RESET to eliminate the alarm message.
3. Remove Z axis from the area below the second zero point.

T800：[S1]C119，Pr1024，[S2] C619，Pr6024。

MOT4058 **Over soft limit**

Type： ALARM
Function： TI060033
Description：

1. Press RESET to eliminate the alarm message.
2. Please remove the machine toward correct direction in JOG or MPG, and alarm message will be eliminated automatically.

MOT4059 **Spindle error counter overflow**

Type： ALARM
Function： N/A
Description：

1. Some error counter of the axis on the motion card exceeds the limit (16-Bit).
2. Check if the speed set by the command is too faster.
3. Check if everything is normal with the servo driver.
4. Check if everything is normal with the motion of the machine.
5. Check if everything is normal with the transit board.

MOT4060 **G31 signal NO. and axis NO. not match**

Type： ALARM
Function： TI060031
Description：

1. Please set Pr.0176, 0232, and 0234 again.
2. Please reboot the system.

T800：[S1]Pr0176、0232~0234，[S2]Pr5176、5232~5234。

MOT4061	Thread cut feed over limit

Type： ALARM
Function： N/A
Description： When executing screw canned cycle (G78) or G33 tapping, the speed of X axis or Z axis exceeds the maximum tapping speed set by Pr.1061.

1. Check if the tapping pitch is too big or the spindle RPM is too fast.
2. Check if the maximum tapping speed of Pr.1061 in system 1 is too slow.
3. If executing screw canned cycle (G78) to cut screws, please check Pr.0872 (Plunge rate ratio of G78) and Pr.873 in system 1 (Retract rate ratio of G78) are set too big. If Plunge rate ratio of G78 is set too big, the alarm will be triggered when G78 cutting down. If Retract rate ratio of G78 is set too big, the alarm will be triggered when G78 cutting up.

T800：[S1]Pr1061、0872~0873，[S2]Pr6061、5872~5873。

MOT4062	X axis absoulte encoder value out of tolerance
MOT4065	Y axis absoulte encoder value out of tolerance
MOT4068	Z axis absoulte encoder value out of tolerance
MOT4071	4th axis absoulte encoder value out of tolerance

Type： ALARM
Function： TI060035
Description： After the axis searches for zero point again, NC will ask the axis's absolute encoder to return to zero. When it is done, NC will read the value of absolute encoder again to ensure that the encoder has correctly returned to zero. If the difference of the absolute enoder value and NC internal value is more than the set value of Pr.1098 in system 1, the alarm message will be triggered.

1. Check if the set value of Pr.1098 in system 1 is correct.
2. Check if the absolute encoder of the axis completes the action of returning to zero.
3. When the alarm occurs, please reboot the system.

T800：[S1]Pr1098，[S2]Pr6098。

MOT4063	X axis absoulte encoder transmission over time
MOT4066	Y axis absoulte encoder transmission over time
MOT4069	Z axis absoulte encoder transmission over time
MOT4072	4th axis absoulte encoder transmission over time

Type： ALARM
Function： TI060035
Description： When NC starts to read the absolute encoder of the axis, and the reading is not completed in the duration set by Pr.0834, the alarm will be triggered.

1. Check if the servo driver is set to absolute encoder.
2. Check if the related wiring of the hardware is loose or has bad connection.
3. Check if the Ladder program of the axis is correct. (For MITSUBISHI servo motor, to re-read absolute encoder, please servo off first, wait more than 20 ms to servo on. Check if the corresponding CS bits are correct.)
4. Check if the duration set by Pr.0834 is enough to finish reading for the absolute encoder.

T800：[S1]Pr0834, [S2]Pr5834.

MOT4064	X axis absoulte encoder check sum error
MOT4067	Y axis absoulte encoder check sum error
MOT4070	Z axis absoulte encoder check sum error
MOT4073	4th axis absoulte encoder check sum error

Type： ALARM
Function： TI060035
Description： The absolute encoder data read by the axis has CHECK SUM error.

1. Check if the related wiring is loose or has bad connection.
2. Check if the Ladder program of the axis is correct.

MOT4074	M code repeat assign,check parameter

Type： ALARM
Function： N/A
Description： During rigid tapping, the moving distance of axis is not enough; please lower down the spindle RPM.

MOT4075	Touch direction signal read error

Type： ALARM
Function： N/A
Description： When reading the C bit on touch direction, within 1 minute, the C bit on touch direction still unable to be read, this alarm message will be displayed.

MOT4076 **Touch signal is triggered in manual measure status**

Type： ALARM
Function： N/A
Description： Under the status of manual tool measuring, if the touch signal happens, NC will not detect the correct position during touching. Hence, NC will send out this alarm message.

MOT4077 **No semi-fixed M code**

Type： ALARM
Function： N/A
Description： NC is not at the semi-fixed M code, but it can receive semi-fixed running signal C bit.

1. Check if semi-fixed M code is sent out.
2. Check if the semi-fixed relative parameters are reasonable.

MOT4078 **The distance in rigid tapping isn't enough,Please decrease S command of spindle**

Type： ALARM
Function： N/A
Description： To execute rigid tapping command (such as G84, G88, G188) at the current rotation speed, the assigned movement is too small, and cause insufficient distance to make spindle inverse at the hole-bottom.

1. Check if there are assigned movement on G84, G88, G188 commands.
2. Lower down spindle RPM.
3. Increase tapping distance.

MOT4085 **The end point is not on the arc**

Type： ALARM
Function： N/A
Description：

1. Press RESET to eliminate the warning message.
2. Modify the part programs.

MOT4086 **In-Position check can not pass**

Type： ALARM
Function： N/A
Description：

1. Check if system info No.5~6 have remaining values. If yes, please check the connection of the axis is normal.
2. Check system info No.82~85 have remaining values.
3. Press emergency button and RESET to eliminate the alarm and servo lag.

MOT4087	Tapping distance over range

Type： ALARM
Function： N/A
Description：
1. The hole-bottom is too deep during rigid tapping.
2. Modify the part programs.
3. Press RESET to eliminate the alarm message.

MOT4092	No A/D conversion card

Type： ALARM
Function： TI060016
Description： There is no DAQ3718 A/D conversion card in this controller. Please set the address of A/D conversion card to 0, which indicates it is not applied.

MOT4093	Output maximum or minimum error of A/D conversion

Type： ALARM
Function： TI060016
Description： The set value of maximum output can not be smaller than the set value of minimum output.

MOT4104	PMC/INT output error of X axis
MOT4105	PMC/INT output error of Y axis
MOT4106	PMC/INT output error of Z axis
MOT4107	PMC/INT output error of 4th axis

Type： ALARM
Function： TI060023
Description： Modify the source of command to make it follow the rule of PMC axis.

MOT4110	ABS error of X axis for servo communication
MOT4111	ABS error of Y axis for servo communication
MOT4112	ABS error of Z axis for servo communication
MOT4113	ABS error of 4th axis for servo communication

Type： ALARM
Function： N/A
Description： It indicates ABS error of the axis for servo communication.
1. Please check if the serial transmission wiring is correct.
2. Check if the related parameters of the serial transmission on servo motor are set correctly.
3. Check if PLC writing is correct.
4. Press RESET to eliminate the alarm message.

MOT4116 **Repeat COM setting**

Type： ALARM
Function： N/A
Description： The setting of the transmission ports for servo transmission and file transmission are the same.
1. Please do not set the same value which is not 0 on Pr.1410 and Pr.0388.
2. Press RESET to eliminate the alarm message.

MOT4121 **X axis command under detached**
MOT4122 **Y axis command under detached**
MOT4123 **Z axis command under detached**
MOT4124 **4th axis command under detached**

Type： ALARM
Function： TI060029
Description： The axis is not controlled by NC at present, and hence it can not accept the axis's command or manual command.

MOT4125 **Spindle positioning ACC./DCC. time setting error**

Type： ALARM
Function： N/A
Description：
1. Please check if Pr.0663 is set too big.
2. If the parameter is modified, please reboot the system.

T800：[S1]Pr0663，[S2]Pr5663。

MOT4130 **Spindle numbers of system 1 and 2 are the same**

Type： ALARM
Function： N/A
Description：
1. The set values of Pr.4300~4302 are doubled.
2. After modifying the parameters, please reboot the system.

T800：[S1]Pr4300~4302，[S2]Pr9300~9302。

MOT4131 **Spindle positioning sensor NO. and axis NO. not match**

Type： ALARM
Function： N/A
Description：
1. Please refer to the setting of Pr.0184.
2. Please reboot the system.

T800：[S1]Pr0184，[S2]Pr5184。

MOT4132 **Remote system not in memory mode or spindle in rigtap mode**

Type： ALARM
Function： N/A
Description：

1. The remote system is not in auto mode or the calling spindle is in rigid tapping mode.
2. Please press RESET to eliminate the alarm message.
3. Modify the part programs.

MOT4133 **Synchronous error of spindle**

Type： ALARM
Function： TI050010
Description： Please check system info “Alarm of the spindle syn.” to solve the problem. The definitions are as below:
System info No.054 (Alarm of 1st spindle syn.).
System info No.064 (Alarm of 2nd spindle syn.)
System info No.074 (Alarm of 3rd spindle syn.)
1: Error occurs when slave axis switches to close loop.
2: The RPM of master axis is 0 under synchronous control.
3: The synchronous error exceeds the tolerance amount of synchronous control.
4~10: C bit to enable the control is OFF when synchronous control is not finished.

MOT4134 **Master and slave axis number not match of synchronous control**

Type： ALARM
Function： TI050010
Description：

1. The axis numbers of master axis and slave axis can not be the same.
2. One slave axis can not track multiple master axes at the same time.
3. Please refer to the setting methods of Pr.1201, 1202, 1231, 1261, 1262.
4. Please reboot the system.

MOT4135 **Sensor NO. and axis NO. not match of synchronous control**

Type： ALARM
Function： TI050010
Description：

1. Please refer to the setting of Pr.1208, 1209, Pr.1238, 1239, Pr.1268, 1206.
2. Please reboot the system.

MOT4136 **Velocity and phase are enabled of synchronous control**

Type： ALARM
Function： TI050010
Description： Enable the C bit of velocity and phase of synchronous control in the same group. Please check the program and ladder.

MOT4137 **Sensor NO. and axis NO. not match of zero point return**

Type： ALARM
Function： N/A
Description：

1. Please refer to the setting of Pr.2059~2062.
2. Please reboot the system.

T800：[S1]Pr2059~2062，[S2]Pr7059~7062。

MOT4138 **Synchronize With Illegal Setting Axis**

Type： ALARM
Function： TI050013
Description： The title of the master axis that is followed is set incorrectly in synchronous control. Please check if Pr.1135~1138 sets incorrect values.
T800：[S1]Pr1135~1138，[S2]Pr6135~6138。

MOT4139 **Synchronize Control Error of Servo Axis**

Type： ALARM
Function： TI050013
Description：

1. INT3301 or INT3302 are occurred during synchronous control, and the master axis that is followed is in the other system.
2. Please check and modify the commands related to slave axis in part programs, or check and modify the G code command related to coordinate in part programs.

MOT4140 **The parameters with composite control are repeating**

Type： ALARM
Function： TI060027
Description： The axis title of assigned composite control is doubled in Pr.1300~1303. Please modify the set values.

MOT4142 **No execute G40 before changed composite control mode**

Type： ALARM
Function： TI060027
Description： Before composite control, G40 is not executed. Please check if G40 is executed before switching to composite control.

MOT4143 **The same axis enable composite control and synchronous control at one time**

Type： ALARM
Function： TI060027
Description： Please check part programs. Do not enable composite control and synchronous control simultaneously at the same axis.

MOT4144 **Interchange axis has distance to go when enable or disable composite control**

Type： ALARM
Function： TI060027
Description： Please check part programs. The movement amount left should be 0 when enabling or disabling composite control.

MOT4145 **Measurement of Interchange axes are not differnet in composite control**

Type： ALARM
Function： TI060027
Description： Please check if Pr.1300~1303 and Pr.0132, 0201 are matching.

MOT4146 **Illegal setting axis in superimposed control**

Type： ALARM
Function： TI060028
Description： In superposition control, the axis title in the other system, which is going to superpose, is set incorrectly. Please check if Pr.1130~1133 or Pr.6130~6133 set incorrect values.

MOT4147 **Superimposed Control Error of Servo Axis**

Type： ALARM
Function： TI060028
Description：

1. INT3301 happens in superposition control, and the master axis that is going to superpose is in the other system.
2. Please check and modify the command related to slave axis in part programs. Or check and modify the G code commands related to coordinate.

MOT4148 **Maximum feedrate of rapid travel of superimposed Control error**

Type： ALARM
Function： TI060028
Description：

1. The maximum speed of rapid traverse on slave axis can not be lower than or equal to the maximum speed of rapid traverse on master axis in superposition control.
2. Please check Pr.2000~2003 and Pr.7000~7003 again.

MOT4149 **G68/69 can't be used in now composite axis**

Type： ALARM
Function： TI060027
Description： Please check if the title of composite axis is X1 and X2.

MOT4150 **Repeated command of 1st spindle CH positioning**

Type： ALARM
Function： TI050011
Description：

1. The same spindle C(H) positioning can not be enabled simultaneously. Please modify the program codes related to spindle C(H) positioning.
2. Press RESET to eliminate the alarm message.

MOT4151 **The numbers of axes are the same**

Type： ALARM
Function： N/A
Description：

1. The set values of Pr.4010~4013 are doubled.
2. Reboot after modifying the parameters.

T800：[S1]Pr4010~4013，[S2]Pr9010~9013。

MOT4152 **The numbers of spindles are the same**

Type： ALARM
Function： N/A
Description：

1. The set values of Pr.4300~4302 are doubled.
2. Please reboot after modifying the parameters.

T800：[S1]Pr4300~4302，[S2]Pr9300~9302。

MOT4153	**1st no go area setting error**
MOT4154	**2nd no go area setting error**

Type： ALARM
Function： TI060033
Description： 1. The negative direction value can not be bigger than the positive direction value in Pr.0500~0507 or 0512~0519.
2. After modifying the parameters, it is effective after RESET.
T800：[S1] 0500~0507、0512~0519，[S2] 5500~5507、5512~5519。

MOT4155	**Servo lag over the paramter in static X axis**
MOT4156	**Servo lag over the paramter in static Y axis**
MOT4157	**Servo lag over the paramter in static Z axis**
MOT4158	**Servo lag over the paramter in static 4th axis**

Type： ALARM
Function： N/A
Description：
1. When the axis is static, the servo lag is larger than the parameter “Maximum following error in static axis.”
2. Check the hardware wiring of the axis or increase the parameter’s value. (Maximum following error in static axis)
3. Press EMG to eliminate the servo lag.
4. Press RESET to eliminate the alarm message.

MOT4901	**System alarm**
MOT4902	**System alarm**
MOT4903	**System alarm**
MOT4950	**System alarm**
MOT4951	**System alarm**

Type： ALARM
Function： N/A
Description： Please contact the supplier.

MOT9001	X axis over soft limit(+)
MOT9002	X axis over soft limit(-)
MOT9003	Y axis over soft limit(+)
MOT9004	Y axis over soft limit(-)
MOT9005	Z axis over soft limit(+)
MOT9006	Z axis over soft limit(-)
MOT9007	4th axis over soft limit(+)
MOT9008	4th axis over soft limit(-)

Type： WARNNING
Function： TI060033
Description： Move the axis to the soft limit range in JOG or handwheel to eliminate the warning message.

MOT9009	X axis over G22 soft limit(+)
MOT9010	X axis over G22 soft limit(-)
MOT9011	Y axis over G22 soft limit(+)
MOT9012	Y axis over G22 soft limit(-)
MOT9013	Z axis over G22 soft limit(+)
MOT9014	Z axis over G22 soft limit(-)

Type： WARNNING
Function： TI060033
Description： Move the axis to G22 limit range in JOG or handwheel to eliminate the warning message.

MOT9015	Over cutting feed start signal waiting

Type： WARNNING
Function： TI060024
Description： Check if ”cutting signal“ is correct.