Changes for the Better

MITSUBISHI ELECTRIC

MITSUBISHI CNC

700/70 Series

Setup Manual

High Productivity
High Accuracy
Easy Operability

MITSUBISHI CNC

Introduction

This manual is the alarm/parameter guide required to use the MITSUBISHI CNC700/70 Series.
This manual is prepared on the assumption that your machine is provided with all of the MITSUBISHI CNC700/70 Series functions. Confirm the functions available for your NC before proceeding to operation by referring to the specification issued by the machine tool builder.

Notes on Reading This Manual

(1) This manual explains general parameters as viewed from the NC.
     For information about each machine tool, refer to manuals issued from the machine tool builder.
     If the descriptions relating to "restrictions" and "allowable conditions" conflict between this manual and the machine tool builder's instruction manual, the later has priority over the former.

(2) This manual is intended to contain as much descriptions as possible even about special operations.
     The operations to which no reference is made in this manual should be considered impossible.

(3) The "special display unit" explained in this manual is the display unit incorporated by the machine tool builder, and is not the MITSUBISHI standard display unit.

⚠ **Caution**

⚠ **If the descriptions relating to the "restrictions" and "allowable conditions" conflict between this manual and the machine tool builder's instruction manual, the latter has priority over the former.**

⚠ **The operations to which no reference is made in this manual should be considered "impossible".**

⚠ **This manual is complied on the assumption that your machine is provided with all optional functions. Confirm the functions available for your machine before proceeding to operation by referring to the specification issued by the machine tool builder.**

⚠ **In some NC system versions, there may be cases that different pictures appear on the screen, the machine operates in a different way or some function is not activated.**

Precautions for Safety

Always read the specifications issued by the machine tool builder, this manual, related manuals and attached documents before installation, operation, programming, maintenance or inspection to ensure correct use. Understand this numerical controller, safety items and cautions before using the unit.
This manual ranks the safety precautions into "DANGER", "WARNING" and "CAUTION".

⚠ **DANGER**	When the user may be subject to imminent fatalities or major injuries if handling is mistaken.

⚠ **WARNING**	When the user may be subject to fatalities or major injuries if handling is mistaken.

⚠ **CAUTION**	When the user may be subject to injuries or when physical damage may occur if handling is mistaken.

Note that even items ranked as " ⚠ **CAUTION**", may lead to major results depending on the situation. In any case, important information that must always be observed is described.

⚠ DANGER

Not applicable in this manual.

⚠ WARNING

Not applicable in this manual.

⚠ CAUTION

1. Items related to product and manual

⚠ If the descriptions relating to the "restrictions" and "allowable conditions" conflict between this manual and the machine tool builder's instruction manual, the latter has priority over the former.

⚠ The operations to which no reference is made in this manual should be considered impossible.

⚠ This manual is complied on the assumption that your machine is provided with all optional functions. Confirm the functions available for your machine before proceeding to operation by referring to the specification issued by the machine tool builder.

⚠ In some NC system versions, there may be cases that different pictures appear on the screen, the machine operates in a different way on some function is not activated.

2. Items related to faults and abnormalities

❶ If the battery low alarm is output, save the machining programs, tool data and parameters to an input/output device, and then replace the battery. If the BATTERY alarm occurs, the machining programs, tool data and parameters may be damaged. After replacing the battery, reload each data item.

⚠ **CAUTION** [Continued]

3. Items related to maintenance

⚠ Do not replace the battery while the power is ON.

⚠ Do not short-circuit, charge, heat, incinerate or disassemble the battery.

⚠ Dispose of the spent battery according to local laws.

🚫 Do not connect or disconnect the connection cables between each unit while the power is ON.

🚫 Do not pull the cables when connecting/disconnecting it.

⚠ Do not replace cooling fan while the power is ON.

⚠ Dispose of the replaced cooling fan according to the local laws.

⚠ Do not replace backlight while the power is ON.

⚠ Dispose of the spent backlights according to the local laws.

⚠ Do not touch backlight while the power is ON. Failure to observe this could result in electric shocks due to high voltage.

⚠ Do not touch backlight while LCD panel is in use. Failure to observe this could result in burns.

⚠ LCD panel and backlight are made of glass, so do not apply impacts or pressure on them. Failure to observe this could result in breakage.

⚠ Incorrect connections could cause the devices to damage. Connect the cable to the designated connector.

⚠ Do not replace control units while the power is ON.

⚠ Do not replace display units while the power is ON.

⚠ Do not replace keyboard units while the power is ON.

⚠ Do not replace DX units while the power is ON.

⚠ Do not replace hard disk units while the power is ON.

⚠ Dispose of the replaced hard disk unit according to the local laws.

⚠ Hard disk unit is a precision device, so do not drop or apply strong impacts on it.

4. Items related to servo parameters and spindle parameters

⚠ Do not adjust or change the parameter settings greatly as operation could become unstable.

⚠ In the explanation on bits, set all bits not used, including blank bits, to "0".

CONTENTS

I Procedures for Starting up

II Explanation of Alarms

III Explanation of Parameters

I Procedures for Starting Up

1. Procedures for Starting Up 700 Series

This section explains the normal work required to newly start up the MITSUBISHI CNC 700 Series.
Start up the system following these setup procedures.

1.1 Outline of Hardware Configuration

The names of the hardware used in this section's explanations are explained below.

Display unit

Keyboard

Back   Next   IC card interface on front of   Tab right   INPUT
                            display unit

Control unit

LED1   LED2

SW1   CS1

Upper rotary switch

CS2

Lower rotary switch

1.2 Outline of Setup Procedures

The procedures for setting up are explained with a flow chart.

```
                    ┌──────────────┐
                    │    Start     │
                    └──────────────┘
                            │
        ┌───────────────────────────────────┐   Refer to 3.1
        │      Connecting the control unit   │
        │      and peripheral devices        │
        └───────────────────────────────────┘
                            │
```

Connect the control unit with the peripheral devices (servo/spindle drive, auxiliary axis, remote I/O).

```
        ┌───────────────────────────────────┐   Refer to 3.2
        │   Erasing the backed up data (SRAM)│
        └───────────────────────────────────┘
                            │
```

Erase the backed up data (SRAM).
Set CS1 to "0" and CS2 to "C" to erase the SRAM.

```
        ┌───────────────────────────────────┐
        │     Turning the power ON again.    │
        └───────────────────────────────────┘
                            │
        ┌───────────────────────────────────┐   Refer to 3.3
        │      Inputting the parameters      │
        └───────────────────────────────────┘
                            │
```

If there is no parameter file, input the parameters with system setup or by manual input operation.
If there is a parameter file, input the parameters with input/output screen.

```
        ┌───────────────────────────────────┐
        │     Turning the power ON again.    │
        └───────────────────────────────────┘
                            │
        ┌───────────────────────────────────┐   Refer to 3.4
        │      Formatting the file system    │
        └───────────────────────────────────┘
                            │
```

Format the file system

```
        ┌───────────────────────────────────┐
        │     Turning the power ON again.    │
        └───────────────────────────────────┘
                            │
        ┌───────────────────────────────────┐   Refer to 700/70 Series Instruction Manual
        │       Setting the data/time        │
        └───────────────────────────────────┘
                            │
```

Set the data and time in the integrated time display pop-up window.

```
        ┌───────────────────────────────────┐   Refer to 3.5
        │     Inputting the ladder program   │
        └───────────────────────────────────┘
                            │
```

Input the ladder program using "GX Developer" or "PLC Onboard".

```
        ┌───────────────────────────────────┐   Refer to 3.6
        │       Setting the credit system    │
        └───────────────────────────────────┘
                            │
```

This is necessary only if the credit system is valid.

```
        ┌───────────────────────────────────┐   Refer to 3.7
        │      Setting the handy terminal    │
        └───────────────────────────────────┘
                            │
```

Input the customized data of handy terminal.
(Note) This is necessary only if the handy terminal is connected.

```
        ┌───────────────────────────────────┐
        │    Inputting the machining program │
        └───────────────────────────────────┘
                            │
                    ┌──────────────┐
                    │     End      │
                    └──────────────┘
```

Carry out the procedures below if necessary.

1	Adjustment of dog-type reference position return	Refer to 3.8
2	Absolute position detection system	Refer to 3.9
3	Auxiliary axis operation	Refer to 3.10
4	Data sampling	Refer to 3.11
5	Data backup	Refer to 3.12

2. Procedures for Starting Up 70 Series

This section explains the normal work required to newly start up the MITSUBISHI CNC 70 Series.
Start up the system following these setup procedures.

2.1 Outline of Hardware Configuration

The names of the hardware used in this section's explanations are explained below.

Display unit   Keyboard

Back   Next   CF card interface on front   Tab right   INPUT
                                 of display unit

Control unit

Left rotary switch   Right rotary switch

2.2 Outline of Setup Procedures

The procedures for setting up are explained with a flow chart.

```
                    ┌─────────────────────┐
                    │        Start        │
                    └─────────────────────┘

        ┌──────────────────────────────────┐
        │  Connecting the control unit      │   Refer to 3.1
        │  and peripheral devices           │
        └──────────────────────────────────┘
                    Connect the control unit with the peripheral devices (servo/spindle drive,
                    and remote I/O).

        ┌──────────────────────────────────┐
        │  Erasing the backed up data (SRAM)│   Refer to 3.2
        └──────────────────────────────────┘
                    Erase the backed up data (SRAM).
                    Set RSW1 to "0" and RSW2 to "C" to erase the SRAM.
        ┌──────────────────────────────────┐
        │  Turning the power ON again.      │
        └──────────────────────────────────┘

        ┌──────────────────────────────────┐
        │  Setting up with M70 SETUP        │   Refer to 3.13
        │  INSTALLER                        │
        └──────────────────────────────────┘
                    Install the language data, custom data and custom startup screen.
        ┌──────────────────────────────────┐
        │  Turning the power ON again.      │
        └──────────────────────────────────┘

        ┌──────────────────────────────────┐
        │  Inputting the parameters         │   Refer to 3.3
        └──────────────────────────────────┘
                    If there is no parameter file, input the parameters with system setup or
                    by manual input operation.
                    If there is a parameter file, input the parameters with input/output screen.
        ┌──────────────────────────────────┐
        │  Turning the power ON again.      │
        └──────────────────────────────────┘

        ┌──────────────────────────────────┐
        │  Formatting the file system       │   Refer to 3.4
        └──────────────────────────────────┘
                    Format the file system
        ┌──────────────────────────────────┐
        │  Turning the power ON again.      │
        └──────────────────────────────────┘

        ┌──────────────────────────────────┐
        │  Setting the data/time            │   Refer to 700/70 Series Instruction Manual
        └──────────────────────────────────┘
                    Set the data and time in the integrated time display pop-up window.
        ┌──────────────────────────────────┐
        │  Inputting the ladder program     │   Refer to 3.5
        └──────────────────────────────────┘
                    Input the ladder program using "GX Developer".
        ┌──────────────────────────────────┐
        │  Setting the credit system        │   Refer to 3.6
        └──────────────────────────────────┘
                    This is necessary only if the credit system is valid.
        ┌──────────────────────────────────┐
        │  Inputting the machining program  │
        └──────────────────────────────────┘

                    ┌─────────────────────┐
                    │         End         │
                    └─────────────────────┘
```

Carry out the procedures below if necessary.

1	Adjustment of dog-type reference position return	Refer to 3.8
2	Absolute position detection system	Refer to 3.9
3	Data sampling	Refer to 3.11
4	Data backup	Refer to 3.12

3. Setup Details

3.1 Connecting the Control Unit and Peripheral Devices

Connect the control unit with the peripheral devices (servo/spindle drive, auxiliary axis, remote IO, handy terminal).

Refer to "Mitsubishi CNC 700 Series Connection Manual" (IB-1500034), "Mitsubishi CNC 70 Series Connection Manual" (IB-1500254), "MDS-D Specifications Manual" (IB-15000011), and "MDS-DH Specifications Manual" (IB-1500003) for details.

(1) 700 Series

Operation panel I/O unit

Control unit

MITSUBISHI

Machine operation panel

Handy terminal
Serial connection (RS-232C)

Handy terminal handle

Auxiliary axis

Servo drive
Spindle drive

(2) 70 Series

Control unit

Servo drive
Spindle drive

Operation panel I/O unit

Serial communicaton
(RS-232C)

Handle

Machine operation
panel

3.1.1 Setting the MDS-D/DH Series Rotary Switch and DIP Switch

(1) Rotary switch setting

Before turning on the power, the axis No. must be set with the rotary switch. The rotary switch settings will be validated when the drive units are turned ON.
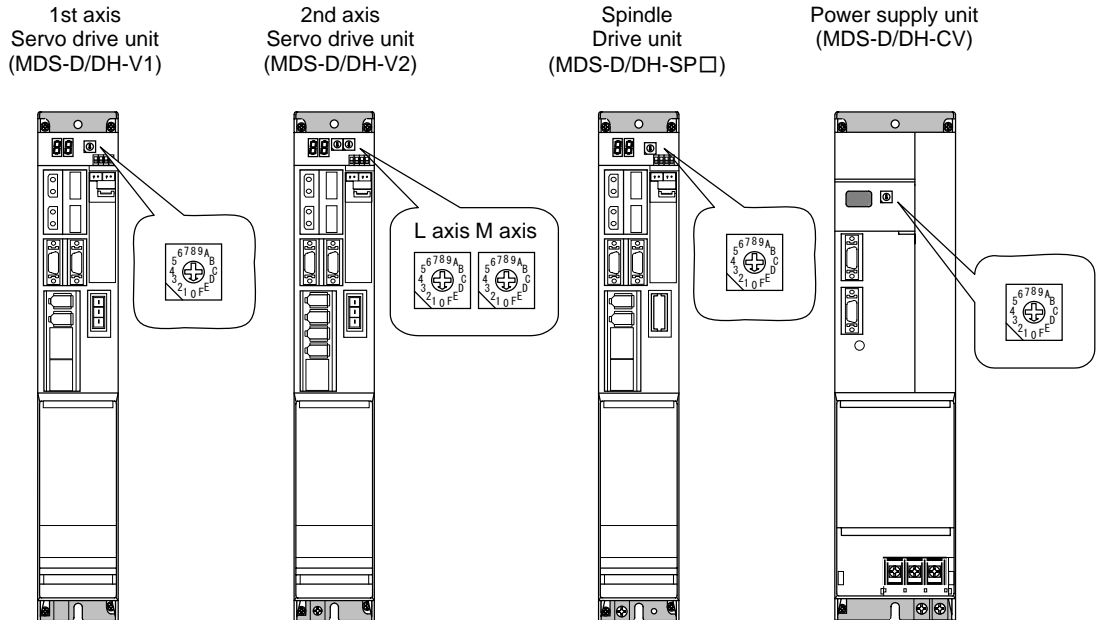
Rotary switch setting	Details	
	MDS-D/DH-V1/V2/SP□ setting	**MDS-D/DH-CV setting**
0	1st axis	Normal setting
1	2nd axis	Setting prohibited
2	3rd axis	
3	4th axis	
4	5th axis	External emergency stop valid (CN23 used)
5	6th axis	Setting prohibited
6	7th axis	
7	8th axis	
8	9th axis	
9	10th axis	
A	11th axis	
B	12th axis	
C	13th axis	
D	14th axis	
E	15th axis	
F	16th axis	

(2) DIP switch setting

Setting the DIP switches is necessary prior to turning ON the power. Setting of the DIP switches at the time of turning ON the power is validated. The DIP switches shall be as the standard setting (all the switches OFF).

The switches are OFF when facing bottom as illustrated.

Turn this switch ON for the drive unit to which the terminator is connected.
Note that the switch must be turned OFF when the network configuration is valid.

M axis Setting unused axis

L axis Setting unused axis

Unused axis can be set by turning the switches ON.
When there is unused axis for the 2-axis drive unit, set unused axis.

(Note) If the NC system is compatible with A1 or the prior version, set "1" to the base specifications parameter "#1240 set12/bit4" and turn the last DIP switch ON.

3.1.2 Setting the MDS-D-SVJ3/SPJ3 Series Rotary Switch

Before turning on the power, the axis No. must be set with the rotary switch. The rotary switch settings will be validated when the drive units are turned ON.

Servo drive unit
(MDS-D-SVJ3)

Spindle drive unit
(MDS-D-SPJ3)
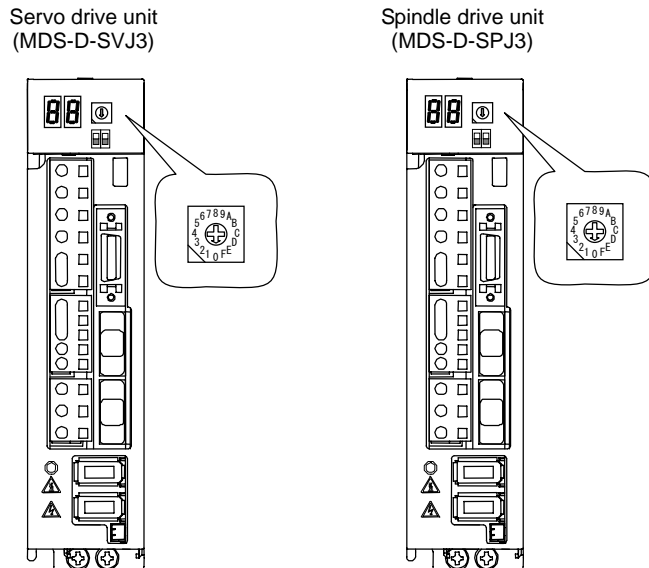
Setting the rotary switch	Details
	Setting the MDS-D-SVJ3/SPJ3
0	1st axis
1	2nd axis
2	3rd axis
3	4th axis
4	5th axis
5	6th axis
6	7th axis
7	8th axis
8	9th axis
9	10th axis
A	11th axis
B	12th axis
C	13th axis
D	14th axis
E	15th axis
F	16th axis

3.2 Erasing the Backed up Data (SRAM)

Use the following procedure if the backed up data (SRAM) needs to be cleared after the control unit is replaced, etc. (There is no influence on the option parameters even if the backup data is deleted.)

(1) 700 Series

(a) With the NC power OFF, set the upper rotary switch (CS1) on the control unit to "0" and the lower rotary switch (CS2) to "C". Then, turn the power ON.
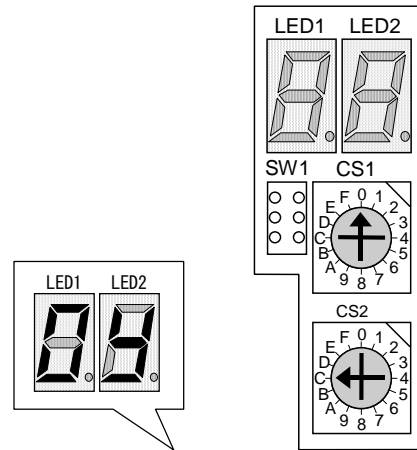
(b) The LED display will change from "08." → "00" → "01" ... "08". The process is completed when "0Y" is displayed. (Required time: 8 seconds)

(c) Turn the NC power OFF.

(d) Set the lower rotary switch (CS2) to "0".
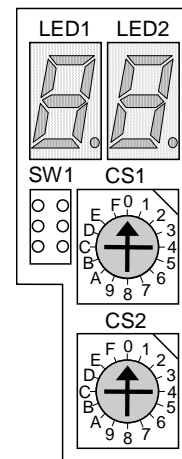
(e) After turning the power OFF and ON, do nothing, and then turn the power OFF and ON again.

(Note) After the SRAM is cleared and the NC power is turned ON, the IP addresses are initialized to the following values.

<Base common parameters>
  #1934 Local IP address   : 192.168.100. 1
  #1935 Local Subnet mask : 255.255.255. 0

To communicate with the screen, the parameter value and the "C:\WINDOWS\melcfg.ini" setting value must match. Confirm that "C:\WINDOWS\melcfg.ini" is set to the above value.

Last line of C:\WINDOWS\melcfg.ini

```
• • •
[HOSTS]
TCP1=192.168.100.1,683
```

(2) 70 Series

(a) With the NC power OFF, set the left rotary switch (RSW1) on the control unit to "0" and the right rotary switch (RSW2) to "C". Then, turn the power ON.
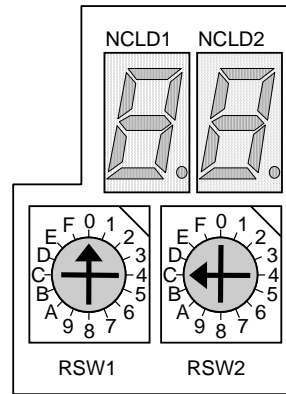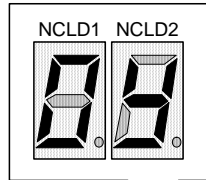
(b) The LED display will change from "08." → "00" → "01" ... "08". The process is completed when "0Y" is displayed. (Required time: 8 seconds)

(c) Turn the NC power OFF.

(d) Set the right rotary switch (RSW2) to "0".
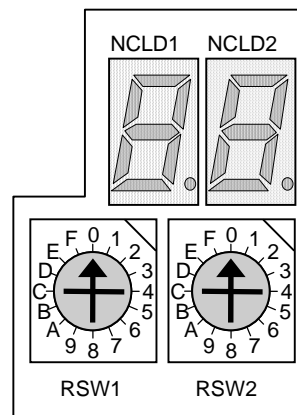
(e) After turning the power OFF and ON, do nothing, and then turn the power OFF and ON again.

3.3 Inputting the Parameters

3.3.1 When There is No Parameter File

If there is no parameter file (ALL.PRM), input the parameters with system setup or by manual input operation.

(1) Parameter input with system setup

With the system setup function, various setups necessary for the NC to initially startup are available by simply entering the minimum required items. File formatting can be done at the same time.

Items required for setting with system setup are as follows.

- Display language, number of spindle connections, number of auxiliary axis connections
  (for 700 Series only)
- Number of axes and command type for each part system
- Servo I/F connection channel and rotary switch setting for each spindle.
  Also, type of converter connected with each spindle drive.
- Servo I/F connection channel and rotary switch setting for each servo axis.
  Also, type of converter connected with each servo drive.

For details, refer to the section "system setup screen" in the instruction manual.

(2) Parameter input by manual input operation

(a) Select "MAINTENANCE (Mainte)" → "Mainte" → "Psswd input", and input "MPARA". Then, press INPUT.

(b) Select the "Retn" menu ◁ → "Param", and set the various parameters such as the base specifications parameters and axis specification parameters according to the machine configuration. The minimum required parameters are listed below. Refer to "III Explanation of Parameters" for details on each parameter.

(b-1) Set the number of NC axes, number of spindles and number of auxiliary axes, and then turn the power ON again.

Type	#	Item	
Base system parameter	1002	axisno	Number of axes
Base common parameters	1039	spinno	Number of spindles
	1044	auxno	MR-J2-CT connections (for 700 Series only)

(b-2)   Set the minimum required parameters such as the axis name.

Type	#		Item
Base axis specification parameters	1013	axname	Axis name
	1021	mcp_no	Drive unit I/F channel No. (Servo)
	1022	axname2	2nd axis name
Base common parameters	1155	DOOR_m	Signal input device 1 for door interlock II common for part systems
	1156	DOOR_s	Signal input device 2 for door interlock II common for part systems
Axis specification parameters	2001	rapid	Rapid traverse rate
	2002	clamp	Cutting federate for clamp function
	2003	smgst	Acceleration/deceleration modes
	2004	G0tL	G0 time constant (linear)
	2005	G0t1	G0 time constant (primary delay)
	2007	G1tL	G1 time constant (linear)
	2008	G1t1	G1 time constant (primary delay)
	2102	skip_tL	Skip time constant linear
	2103	skip_t1	Skip time constant primary delay acceleration/ deceleration by software 2nd stage
Zero point return parameter	2029	grspc	Grid interval
Servo parameters	2201 : 2456	SV001 : SV256	Servo parameters
Spindle specification parameters	3001	slimt1	Limit rotation speed
	3005	smax1	Maximum rotation speed
	3024	sout	Spindle connection
	3025	enc_on	Spindle encoder
	3031	smcp_no	Drive unit I/F channel No. (Spindle)
	3105	sut	Speed reach range
	3107	ori_spd	Orientation command speed
	3109	zdetspd	Z phase detection speed
Spindle parameters	13001 : 13240	SP1001 : SP1240	Spindle parameters

(Setting example)   For 3 NC axes (X, Y, Z) and 1 spindle axis (S)
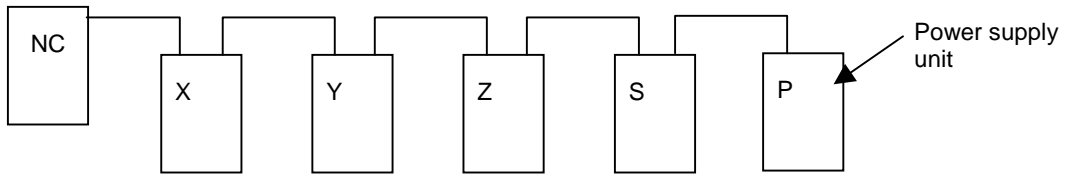
Drive unit rotary switch No.	0	1	2	3
#1021 mcp_no	1001	1002	1003	
#3031 smcp_no				1004

3rd axis for 1st channel

3.3.2 When a Parameter File is Available

If a parameter file is available, input the parameters using the input/output function.

(Example) When files are available on a compact flash (CF) card

(1) Insert the CF card into the IC card interface on the front of the display unit.

Display unit   Adapter   CF card
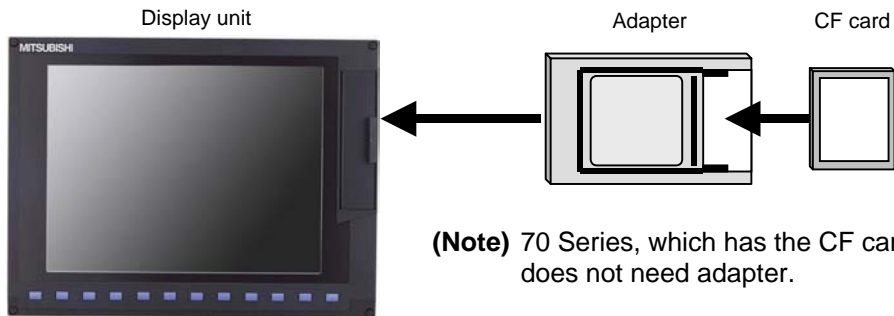
(Note) 70 Series, which has the CF card interface,
does not need adapter.

(2) Select "MAINTENANCE (EDIT)" → "Input/Output".
(3) Confirm that device A is selected, and then select "Device select" → "Memory card".
(4) Select "File name" → "From list" → "ALL.PRM", and then press INPUT.
(5) Press "Area change", and select device B.
(6) Select "Device select" → "Memory".
(7) Select "Dir" → "Param".
    * "ALL.PRM" is directly input as the file name.
(8) Press "Transfr A → B", and execute parameter input.

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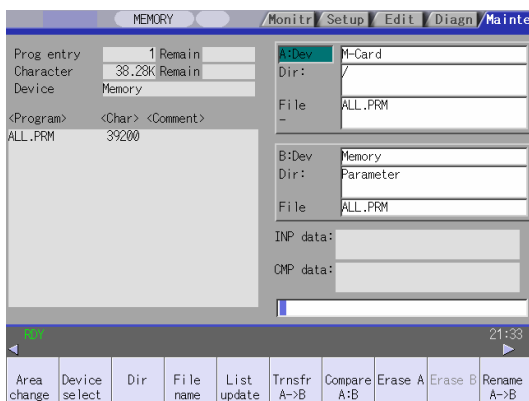
3.4 Formatting the File System

The base specification parameter "#1037 cmdtyp" must be set before the file system is formatted.

M System specifications: Set 1 or 2 according to the tool compensation type.
L System specifications : Select and set from 3 to 8 according to the G code list.

(1) Select "MAINTENANCE (Mainte)" → "NEXT" menu ◁ → "Format".
(2) The message "Format NC memory (Y/N)?" will appear. Press "Y".
(3) When the memory is correctly formatted, the message "Format complete" will appear.
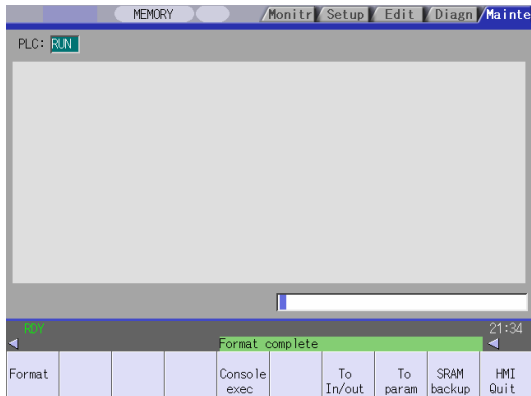
(Note) When the parameter is set with system setup, the file system does not need to be formatted.

3.5 Inputting the Ladder Program

The ladder program can be created and input using the GX Developer installed in an external personal computer or with the PLC onboard editing screen.
Refer to the "MITSUBISHI CNC 700 Series PLC Programming manual" (IB-1500036) for details.
The ladder program creation and input procedures are explained below with a flow chart.

(1) 700 Series

```
                          ┌──────────┐
                          │  Start   │
                          └────┬─────┘
                               ▼
                        ◇ Creation methods ◇
              ┌────────────────┴────────────────┐
              ▼                                 ▼
  ┌────────────────────────┐        ┌────────────────────────┐
  │ Create with GX Developer│        │ Create with PLC onboard │
  └───────────┬────────────┘        └───────────┬────────────┘
              ▼                                 ▼
        ◇ Writing method ◇           ┌────────────────────────┐
    ┌─────────┴─────────┐            │ Write to NC temporary  │
    ▼                   ▼            │ memory                 │
┌──────────────┐  ┌──────────────┐   └────────────────────────┘
│ Write with   │  │ Write with   │
│ GX Developer │  │ PLC onboard  │
└──────┬───────┘  └──────┬───────┘
       ▼                 ▼
◇ Connection method ◇  ┌──────────────────┐
 ┌─────┴─────┐         │ Save ladder      │
 ▼           ▼         │ program on IC card│
```

Write to NC temporary memory with Ethernet communication	Write to NC temporary memory with RS-232-C
Open ladder program in IC card with PLC onboard	
Write to NC temporary memory	

Write ladder program to NC ROM

End

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(2) 70 Series

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
                           ▼
              ┌────────────────────────┐
              │  Create with GX Developer │
              └────────────┬───────────┘
                           │
                           ▼
              ┌────────────────────────┐
              │  Write with GX Developer │
              └────────────┬───────────┘
                           │
                           ▼
                    ◇ Connection method ◇
              ┌────────────┴───────────┐
              ▼                        ▼
    ┌──────────────────┐    ┌──────────────────┐
    │ Write to NC temporary │    │ Write to NC temporary │
    │ memory with Ethernet  │    │ memory with RS-232-C  │
    │ communication         │    │                       │
    └──────────┬───────────┘    └──────────┬───────────┘
               └───────────┬───────────────┘
                           ▼
              ┌────────────────────────────┐
              │  Write ladder program to NC ROM │
              │                             │
              └────────────┬───────────────┘
                           ▼
                    ┌─────────────┐
                    │     End     │
                    └─────────────┘
```

3.6 Credit System

Encryption key and decryption code need to be set in order to validate credit system.

(1) Enter code key in the input/output screen.

    (a) Set the device name, directory and file name in [A:Dev].

    (b) Set "Memory" in device section and "/CRE" in directory section of [B:Dev].

➡ Contens in directory section/file name section will be written over.

Directroy section   "Encryption Key"
File name section   "ENCKEY.DAT"
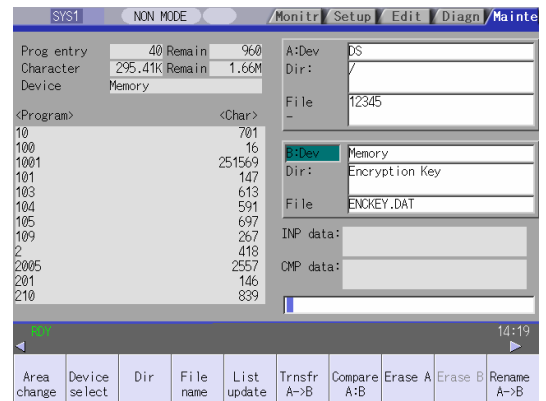
    (c) Press the menu key [Trnsfr A→B].

(2) Enter cancel code in the input/output screen.

    (a) Set the device name, directory and file name in [A:Dev].

    (b) Set "Memory" in device section and "/RLS" in directory section of [B:Dev].

➡ Contens in directory section/file name section will be written over.

Directory section   "Decryption Code"
File name section   "PASSCODE.DAT"

    (c) Press the menu key [Trnsfr A→B].

I - 19
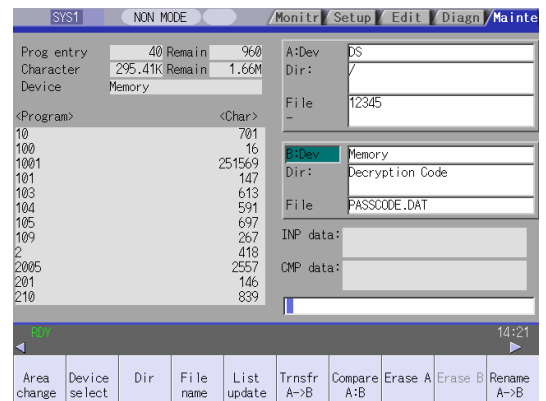
(3) | Turn the power ON again. | ➡ Confirm that the expiration date (time limit) is indicated in [DIAGN]-[Self diag] screen.
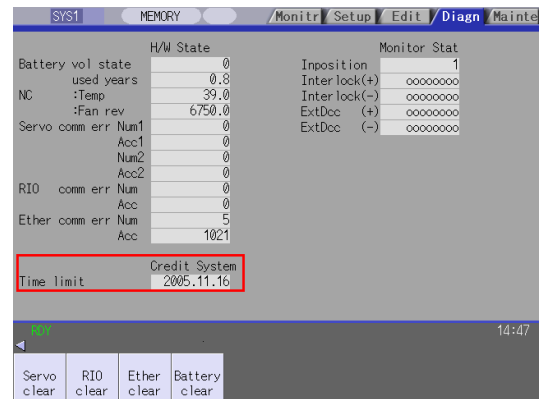
3.7 Setting the Handy Terminal

It is necessary to customize the display part composition, the key input, and the communication condition with NC, etc. to connect the handy terminal (HG1T-SB12UH-MK1346-L*).
Create the customized data by "NC Designer HT", and download to the handy terminal.

There are two inputting methods of the handy terminal's costomaized data.
(1) Connecting PC and the handy terminal, the data is input from "NC Designer HT".
(2) Connecting NC and the handy terminal, the data is input from CF (Compact Flash).

3.7.1 When Connecting with PC to Input

Project data (*.p1t) handled as customized data is created by customized data creation tool "NC Designer HT" and download to the handy terminal.

(1) Start the customized data creating tool "NC Designer HT" and create the project data (*.p1t).
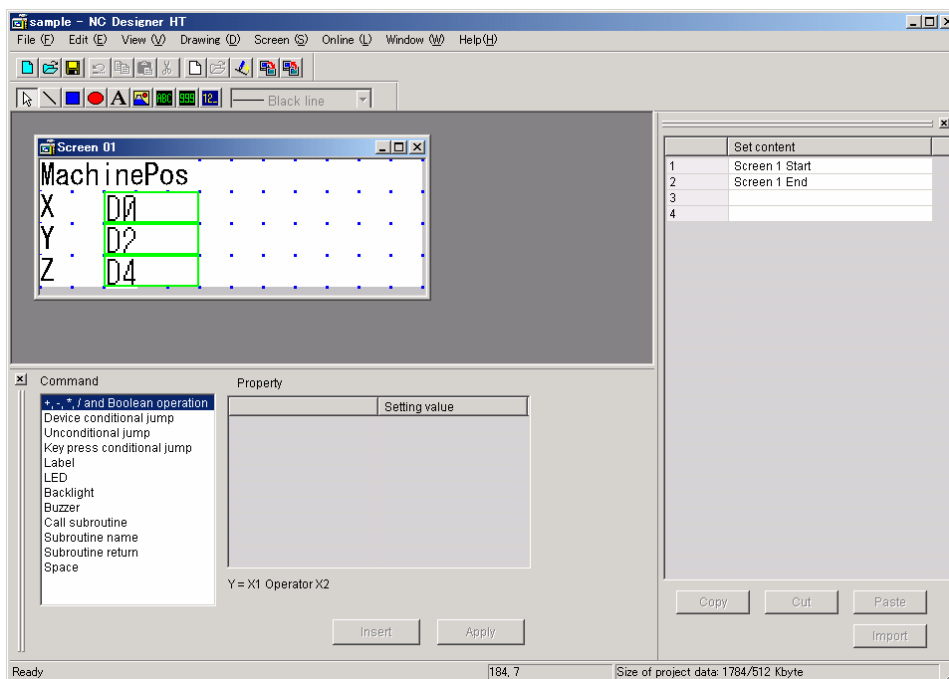
(2) Connect PC and the handy terminal with serial (RS-232C).

(3) Select [Online] - [Communication setting] from the menu of "NC Designer HT", confirm the communication condition is as follows.

Port	: Set the PC side port.
Transmission	: 19200 [bps]
Data	: 8 [bit]
Stop bit	: 1
Parity	: None
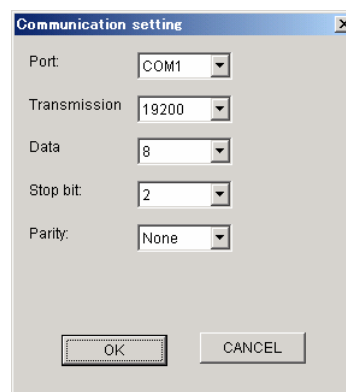
(4) Select [Online] - [Download] from the menu of "NC Designer HT".

(5) The following dialog box is displayed, so press the "Yes".
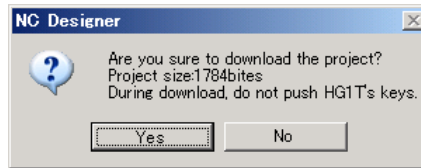
(6) If the passward is set to the downloaded costomazed data, the "Input password" dialog box is displayed. So input the passward, press the "OK".

(7) The costomaized data is downloaded to the handy terminal.

(8) When the download has been completed, the following dialog box is displayed.
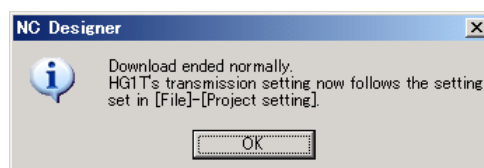
3.7.2 When Connecting with NC to Input

Download data (handy.cod) is created from project data (*.p1t) created by customized data creation tool "NC Designer HT", and the customized data is downloaded to the handy terminal.

(1) Start the customized data creating tool "NC Designer HT" and create the project data (*.p1t).
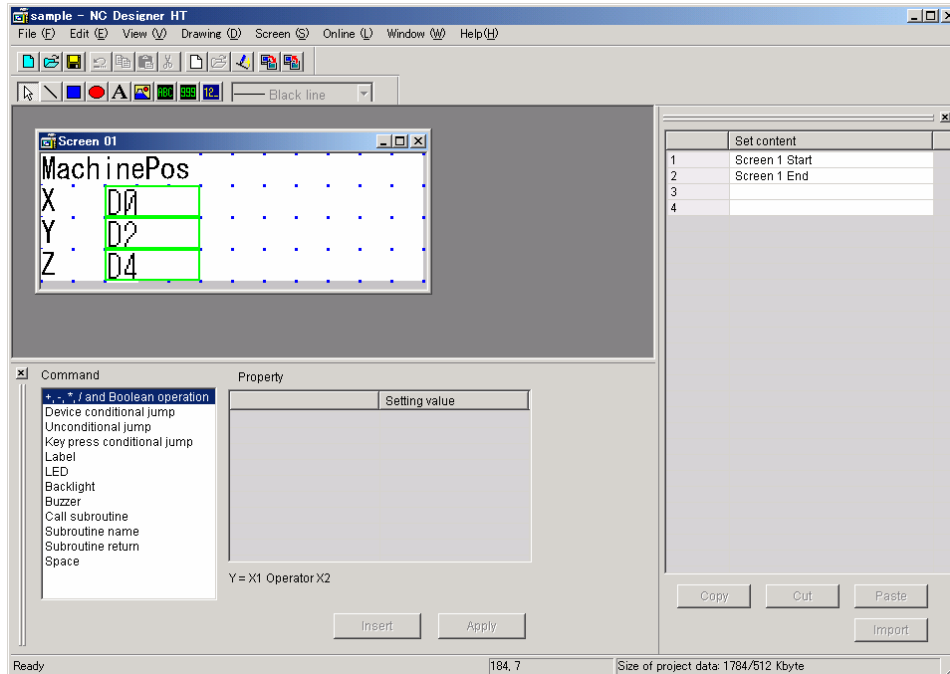
(2) Select [File] - [Writing download data] from the menu of "NC Designer HT", and save the download data named as "handy.cod" in the root directory of CF.

(3) Insert the CF created in the step (2) to the control unit.

(4) Set the passward which has been set to the handy terminal to "#11011 Handy TERM. PW."
(Note) When downloading the data for the first time, nothing is set to the parameter.

(5) NC power supply is turned OFF, and the handy terminal is connected with NC.
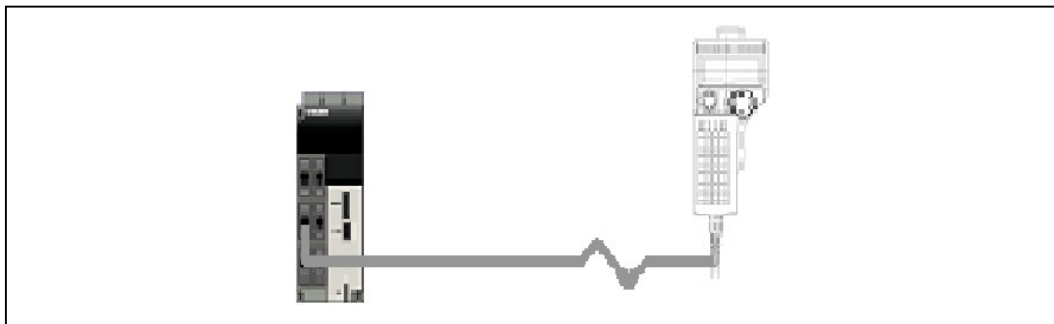
3.8 Adjustment of Dog-type Reference Position Return for Relative Position Detection

There are two types for the position detection system, the relative position detection and the absolute position detection. The methods of returning to the reference position include the dog-type reference position return and the dogless-type reference position return.

This section describes the method to adjust the dog-type reference position return for the relative position detection. Refer to the section "3.9 Absolute Position Detection System" for the method of adjusting the absolute position detection.

3.8.1 Dog-type Reference Position Return Operation

	Progress state		Operation of axis
(1)	Executes dog-type reference position return.	->	Starts moving in G28 rapid traverse rate.
(2)	Detects near-point dog while travelling.	->	Decelerates to a stop, then resumes moving in G28 approach speed.
(3)	Reaches the first grid point leaving near-point dog.	->	Stops.

This grid point where the axis stops with (3) is called the electrical zero point. Normally, this electrical zero point position is regarded as the reference position.
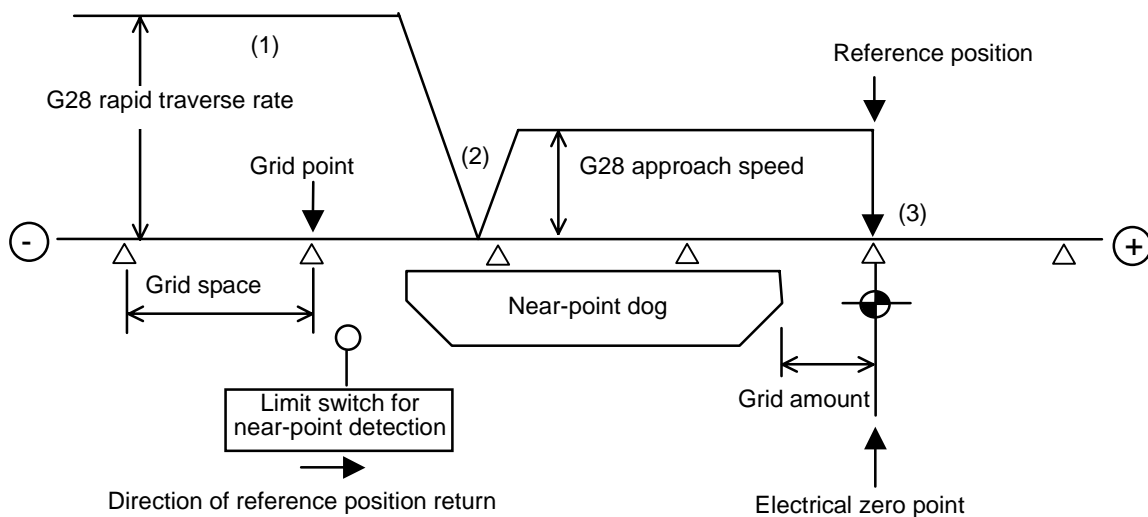
The first reference position return after turning the power ON is carried out with the dog-type reference position return. The second and following returns are carried out with either the dog-type reference position return or the high-speed reference position return, depending on the parameter.

High-speed reference position return is a function that directly positions to the reference position saved in the memory without decelerating at the near-point dog.

(Note) If reference position return has not been executed even once after turning the power ON, the program error (P430) will occur when movement commands other than G28 are executed.

3.8.2 Dog-type Reference Position Return Adjustment Procedures

Adjust the dog-type reference position return with the following steps.
Refer to the next page and followings for details of parameters and the calculation method for grid mask amount.

Procedures

(1) Set the following parameter to "0".
   ・Reference position shift amount (#2027 G28sft).
   ・Grid mask amount (#2028 grmask).
(2) Turn the power OFF and ON, and then execute reference position return.
(3) Confirm the grid space and grid amount values on DRIVE MONITOR screen.
(4) Calculate the grid mask amount with the calculation method for grid mask amount.
(5) Set the grid mask amount.
(6) Turn the power OFF and ON, and then execute reference position return.
(7) Confirm the grid space and grid amount values on DRIVE MONITOR screen.
   If the grid amount value is approx. half of the grid space, the grid mask amount has been set correctly.
   If the value is not approx. half, repeat the procedure from step (1).
(8) Set the reference position shift amount (#2027 G28sft).
(9) Turn the power OFF and ON, and then execute reference position return.
(10) Set the machine coordinate system offset amount (#2037 G53ofs).

Reference position return operation and parameter related drawing

#2025 G28rap
(G28 rapid traverse rate)

#2030 dir(-) (Reference position return direction)

Reference position
(Position returned to with the reference
position return command)

Basic machine coordinate
system zero point

#2026 G28crp (G28 approach speed)

Electrical zero point

Grid point

Near-point dog

Grid mask

#2029 grspc

(Grid space)

#2028 grmask

(Grid mask amount)

Grid amount

#2027 G28sft

(Reference position shift amount)

#2037 G53ofs

(Machine zero point offset)

The grid located at the near-point dog or
the grid mask area is not the electrical
zero point.

Grid amount is displayed on
the drive monitor screen.

The first grid out of the grid
mask is the electrical zero
point.

Reference point

The reference position is positioned when the dog-type reference position return is executed. Note that
the other method is available for the absolute position detection.
The reference position is positioned with the manual reference position return or G28 command in the
machining program.
Using parameters, the reference position can be shifted from the electrical zero point position.

Grid point

The position detector has a Z-phase that generates one pulse per rotation. The 0-point position of this
Z-phase is the grid point. Thus, there is a grid point per rotation of the position detector, and the machine
has many grid points at a regular pitch.
The grid point can be set at intervals of grid space by setting the grid space (#2029 grspc). Thus, multiple
grid points can be set per detector rotation.

Grid amount

The grid amount is the distance from where the near-point detection limit switch leaves the near-point
dog to the grid point (electrical zero point) while the dog-type reference position return.
The grid amount can be confirmed on DRIVE MONITOR screen.
After setting the grid mask, the grid amount shows the distance from the grid mask OFF to the grid point.

G28 rapid traverse rate (#2025 G28rap)

Set the feedrate for dog-type reference position return in manual operation and automatic operation.
The rapid traverse rate (#2001 rapid) is applied for the feedrate during high-speed reference position
return.

G28 approach speed (#2026 G28crp)

Set the approach speed (creep speed) to the reference position after decelerating to a stop by the
near-dog detection. Since the creep speed is accelerated and decelerated in steps
(no-acceleration/deceleration), the mechanical shock, etc., could occur if the speed is too large.
The creep speed should be set between 100 and 300 mm/min., or within 500 mm/min. at the fastest.

Reference position shift amount (#2027 G28sft)

Set the shift amount to shift the reference position from the electrical zero point.
The shift direction can be set only in the reference position return direction.
If the reference position shift amount is "0", the grid point (electrical zero point) will be the reference
position.

Grid mask amount (#2028 grmask)

The first grid point after the dog OFF is regarded as the electrical zero point.
If the grid point is at the position where the near-point dog is kicked OFF, the position of electrical zero
point may differ because of the delay of the limit switch operation, at the grid point where the dog is
kicked OFF or the next grid point. This causes a deviation of reference position by the amount of the grid
space.
The position that the dog is kicked OFF should be at the approximate center of the grid space.

Reference position

Dog

Electrical zero point shits
depending on the speed of
limit switch delay.
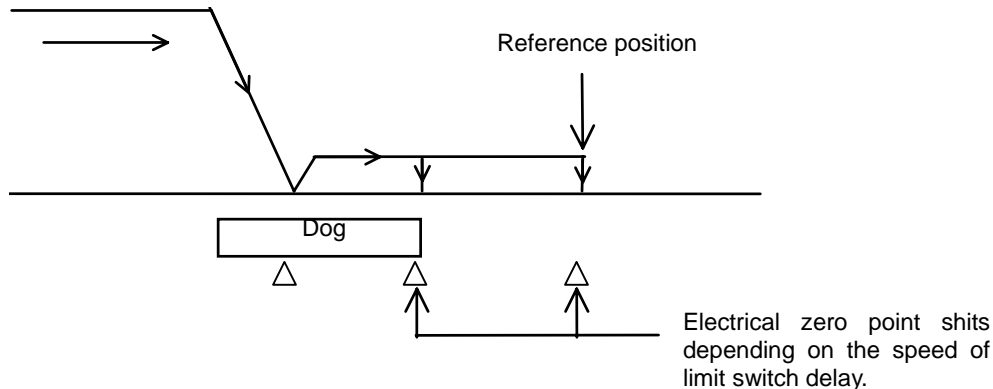
Adjustments can be made by changing the near-point dog or by setting the grid mask amount.
Setting the grid mask has the same effect as lengthening the near-point dog.
If the grid amount is approximate the grid space or 0, the grid point may be at the position of near-point
dog OFF, so set a grid mask.
Set the grid mask amount so that the grid amount is one-half of the grid space.
The grid mask amount can be set only in the reference position return direction.
The grid amount and grid space can be confirmed on the DRIVE MONITOR screen.
Refer to "calculation method for the grid mask amount" on the next page for the grid mask amount
values.

Calculation method for grid mask amount

When $\dfrac{\text{Grid space}}{2} <$ Grid amount   Grid mask amount = Grid amount $- \dfrac{\text{Grid space}}{2}$

Reference position (Position returned to with the reference position return command) Electrical zero point

Near-point dog

Grid mask

Grid mask amount

#2016

$\dfrac{\text{Grid space}}{2}$

Grid amount

When $\dfrac{\text{Grid space}}{2} >$ Grid amount   Grid mask amount = Grid amount $+ \dfrac{\text{Grid space}}{2}$

This will not be the electrical zero point due to the grid mask.
Reference position before grid mask is set.

Reference position after grid mask is set.

Near-point dog

Grid mask

Grid amount

$\dfrac{\text{Grid space}}{2}$

Grid mask amount

#2016

Grid amount after grid mask is set.

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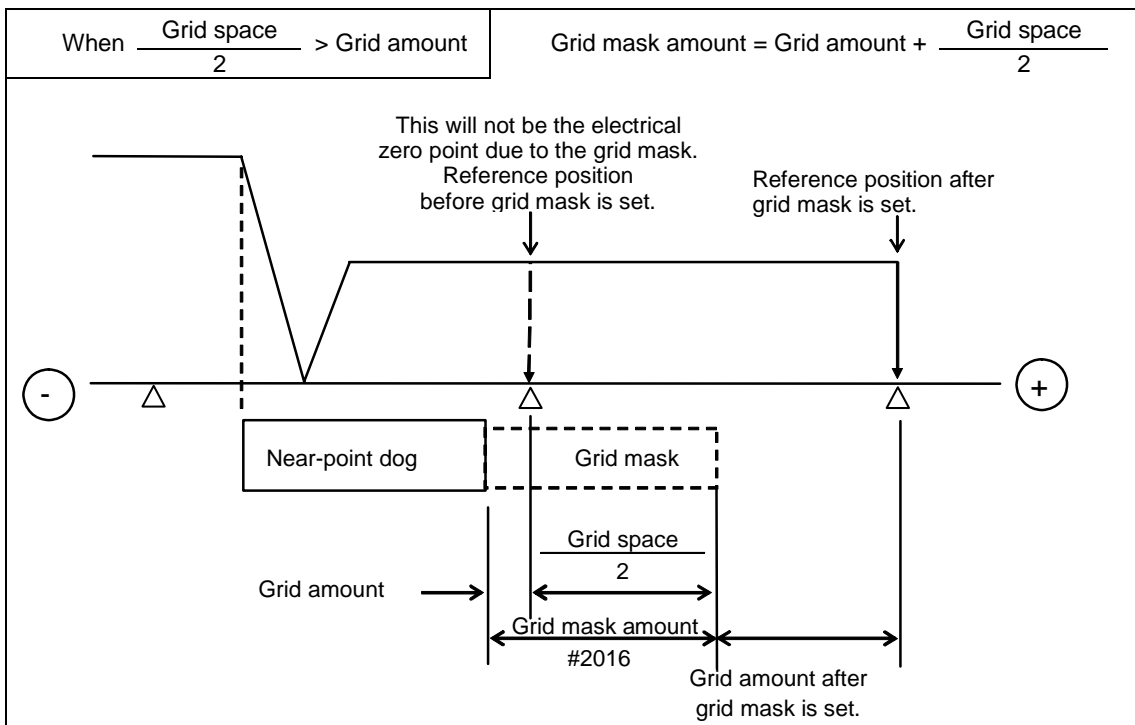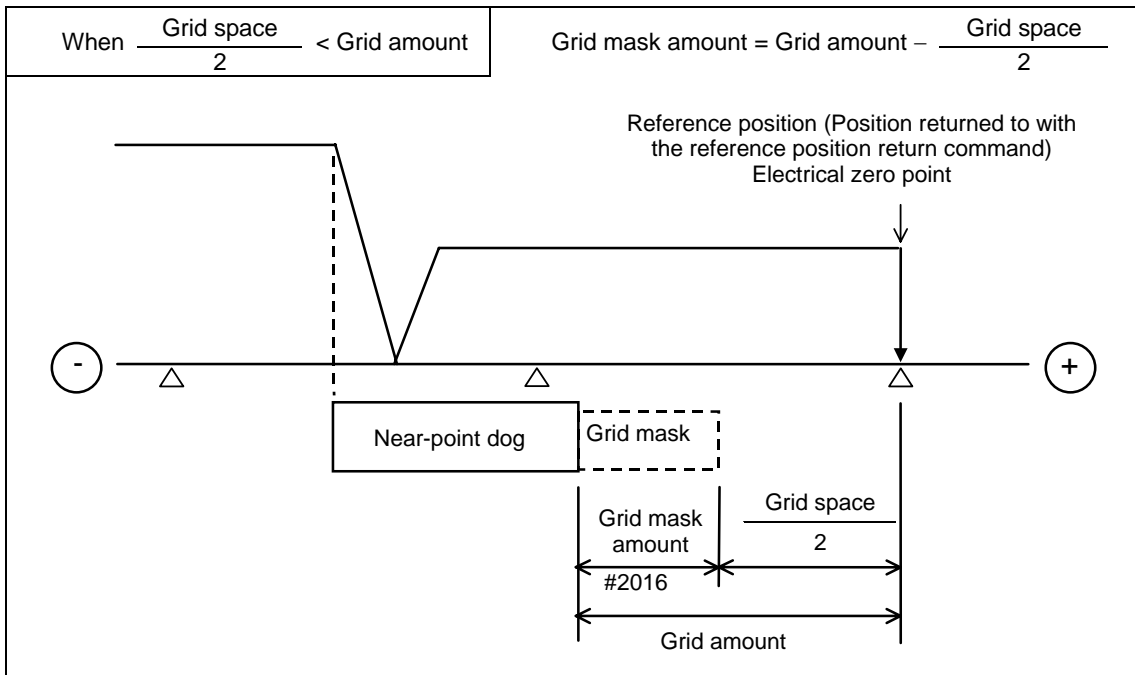
Grid space (#2029 grspc)

Set the distance between grids.
The normal grid space is the ball screw pitch value (#2218 PIT) or the movement amount per motor rotation set as a mm unit.
To make the grid space smaller, set a divisor of the grid space.

Calculation method for movement amount per motor rotation

(1) When linear feed mechanism is ball screw:

Movement amount per $\dfrac{\text{Motor side gear ratio}}{\text{Machine side gear ratio}}$ $*$ Ball screw pitch
motor rotation =

(2) When linear feed mechanism is rack & pinion:

Movement amount per $\dfrac{\text{Motor side gear ratio}}{\text{Machine side gear ratio}}$ $*$ Number of pinion gear teeth $*$ Rack pitch
motor rotation =

(3) For rotary axis:

Movement angle per   Motor side gear ratio
motor rotation= $\dfrac{}{\text{Machine side gear ratio}}$ $*$ 360

$N = \dfrac{PC1}{PC2} * PIT$	N = Movement amount per motor rotation PC1 = Motor side gear ratio PC2 = Machine side gear ratio PIT = Ball screw pitch

Reference position return direction (#2030 dir (–))

Set the direction to move after the limit switch kicks the dog causing a deceleration stop during dog-type reference position return. The direction is either positive "0" or negative "1".
Set "0" if the reference position is in the positive direction from the near-point dog.
Set "1" if the reference position is in the negative direction from the near-point dog.

(a) When reference position return direction is positive (+)
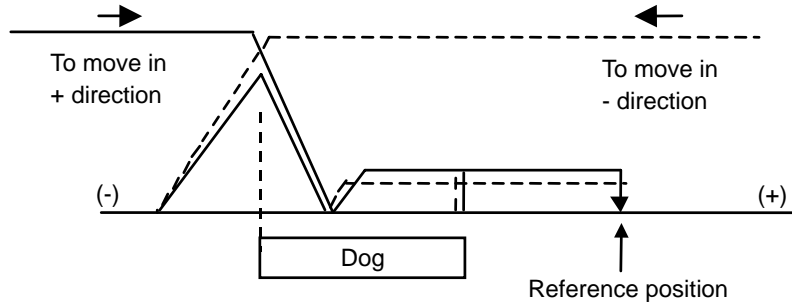
(b) When reference position return direction is negative (–)
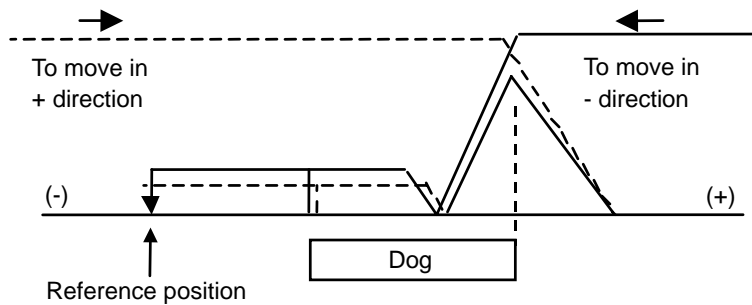
Axis with no reference position (#2031 noref)

Set "0" for the axis to carry out dog-type reference position return and the axis for absolute position detection.
Set "1" for the axis without carrying out reference position return during relative position detection.

Machine coordinate system offset (#2037 G53ofs)

Set the amount to shift the basic machine coordinate system zero point position from the reference position.
When "0" is set, the reference position will be the position of the basic machine coordinate system zero point.
In "G53ofs" parameter, set the position of the reference position looking from the basic machine coordinate system zero point with the coordinates of basic machine coordinate system. By the reference position return after the power is turned ON, the machine position will be set and the basic machine coordinate system will be established.

Selection of grid display type (#1229 set01/bit6)

Select the grid display type on DRIVE MONITOR screen during dog-type reference position return.
   0: Distance from dog OFF to electric zero point (including grid mask amount)
   1: Distance from dog OFF to electric zero point (excluding grid mask amount)

3.9 Absolute Position Detection System

The absolute position detection function detects the machine movement amount while the power is OFF. This allows automatic operation to be started without carrying out reference position return after the power is turned ON. This function is extremely reliable as it carries out a mutual check of the feedback amount from the detector, and checks the absolute position unique to the machine, etc.

To carry out the absolute position detection, the machine zero point must be determined, and the absolute position must be established. Following two methods are available depending on how the absolute position is established.

(1) Dogless-type absolute position detection

The absolute position is established by setting an arbitrary coordinate at an arbitrary position without using the dog.

The absolute position basic point can be determined with the following three methods.
- ・Machine end stopper method
- ・Marked point alignment method
- ・Marked point alignment method II

For the machine end stopper method, the manual initialization and automatic initialization methods can be used.

(2) Dog-type absolute position detection

The absolute position is established by executing dog-type reference position return.

The validity and method of the absolute position detection system can be selected with parameters for each axis. Note that the servo drive unit and detector must have the specifications compatible for the absolute position detection.

3.9.1 Dog-type Reference Position Return Operation

Using the mechanical basic position (machine end or marked point) or the electrical basic position (grid point immediately before the machine end or marked point) as the absolute position basic point, the basic machine coordinate system zero point will be set at the position "ZERO" value far from the absolute position basic point in the direction of reversed "ZERO" sign.

The reference position is set at the position "G53ofs" value far from the basic machine coordinate system's zero point.
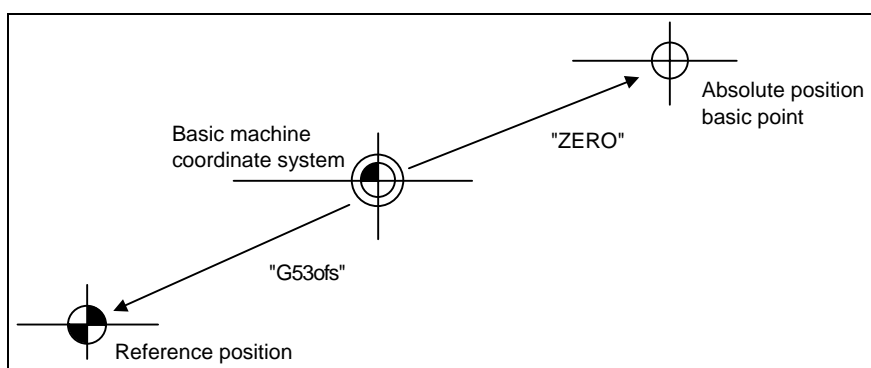
Dogless absolute position coordinate system

ZERO : Coordinate position of absolute position basic point looking from basic machine coordinate system zero point. (ABS. POSITION PARAMETER screen "#2 ZERO")

G53ofs : Coordinate position of reference position looking from basic machine coordinate system zero point. (axis specifications parameter "#2037 G53ofs")

(Note) Select with the parameter "#2059 zerbas" whether to use the mechanical basic position or electrical basic position as the absolute position basic point for the machine end stopper method.

3.9.2 Starting up the Absolute Position Detection System

The zero point initialization should be carried out before the absolute position detection system is started up. The coordinate system is established and operation is enabled by zero point initialization.
In this section, only the outline is introduced. (Refer to the Instruction Manual for details.)
Refer to the chapter "III Parameters" for the parameter details.

Operation when absolute position is not established

If the zero point has not been initialized even once or if the absolute position is lost, the following alarm and non-initialized axis will be output. The coordinate system is unstable in this point, so the limitations given in following table will be applied to each mode. Initialize the zero point and establish the coordinate system. Refer to the Instruction Manual for details.

Alarm: Z70 (Absolute position data error)
          Z71 (Absolute position encoder failure)

Operation in each mode

Operation mode	Absolute position detection method	
	Dogless-type	**Dog-type**
Memory/MDI	Movement command invalid **(Note 1)** (Including G28)	Movement command invalid **(Note 1)** (G28 is valid)
JOG feed	Valid	Valid
Rapid traverse	Valid	Valid
Handle	Valid	Valid
Step	Valid	Valid
Zero point return	Starting not possible **(Note 2)**	Starting possible

(Note 1) The program error (P430) will occur.
(Note 2) If the axis before the absolute position establish is started, the error "M01 OPERATION ERROR 0024" will occur.
(This mode is valid for an axis for which the absolute position has been established.)

Selecting the zero point initialization method

Select the zero point initialization method with the following parameter.
  #2049 type   1: Dogless type Machine end stopper method
              2: Dogless type Marked point alignment method
              3: Dog type
              4: Dogless type Marked point alignment method II

Dogless-type zero point initialization

The zero point is initialized using the ABS POSITION SET screen and JOG or handle.
The operation methods differ according to the zero point initialization method. Refer to the Instruction Manual for details.

(1) Machine end stopper method
   The machine end stopper method includes the manual initialization and automatic initialization methods.

   (a) Manual initialization
      With this method, the axis is pushed against the machine end stopper using handle or JOG.

   (b) Automatic initialization
      With this method, the axis is pushed against the machine end stopper, and can be used when the "INIT-SET" mode is selected. This method has the following features compared to the manual initialization method.
      ・The axis is pushed with the same conditions (feedrate, distance) each time, so inconsistencies in the zero point position can be reduced.
      ・Part of the operations is automated to simplify the zero point initialization.

(2) Marked point alignment method
   With this method, the axis is aligned to the machine's basic point (marked point) using handle or JOG. The first grid point where the axis reaches upon retraction in the opposite direction after alignment to the marked point is regarded as the basic point.

(3) Marked point alignment method II
   With this method, the axis is aligned to the machine's basic point (marked point) using handle or JOG. The machine's basic position (marked point) is regarded as the basic point.

Dog-type zero point initialization

By executing dog-type reference position return with the manual reference position return mode or automatic reference position return command (G28), the zero point will be initialized.

3.10 Auxiliary Axis Operation

Auxiliary axis absolute position initial setting and test run are carried out on the auxiliary axis test screen.
In this section, only the outline is introduced. Refer to the Instruction Manual and "MR-J2-CT Specifications and Instruction Manual (BNP-B3944)" for details.
Also, refer to "13. Auxiliary Axis Parameter" in "III Parameter" for details on the auxiliary axis parameters.

3.10.1 Preparations

Before the screen is switched to auxiliary axis test screen, prepare the following things.

(1) Parameter settings
    Set the following parameters.

No.	Name		Setting details
50102	**Cont2**	Control parameter 2	bit7 = 1 (Absolute position detection) Turn the NC power ON again after this parameter is set. **(Note)** The alarm "Z70 Abs data error" occurs after the power ON again.
50120	**ABS Type**	Absolute position detection parameter	bit1/bit2 : Select the absolute position detection method.

bit1/bit2 : Select the absolute position detection method.

Method	bit2	bit1	Details
Dog-type method	**(Note)**	1	This decides the reference position by the near point dog.
Mechanical end stopper method	0	0	This decides the basic point by pushing an axis to machine end etc. when the torque (current) limit is set.
Marked point alignment method	1	0	This decides the basic point by aligning an axis to machine origin point.

(Note) When bit1 is "1", dog-type method is selected regardless of bit2 setting.

bit3 : Select the electrical basic position direction at marked point alignment method.

Direction	bit3
Electrical basic position direction +	0
Electrical basic position direction -	1

(2) Release servo OFF/interlock for auxiliary axis.
(3) Turn J2CT operation adjustment mode valid signal (R9998/bit0) ON.

3.10.2 Absolute Position Initial Setting

The coordinate system is established and operation is enabled when the absolute position is initially set.
Carry this out when absolute position is not established.
Refer to the Instruction Manual for detailed operations.

3.10.3 Test Operation

Disconnect the auxiliary axis control from PLC and startup in a forward/reverse run by menu operation to carry out a test operation.
Refer to the Instruction Manual for detailed operations.

3.10.4 PLC device

Devices that are used for auxiliary axis operation adjustment and control are as follows.
Refer to "MR-J2-CT Specifications and Instruction Manual (BNP-B3944)" for details.

(1) Operation adjustment mode

Device No.		Abbrev.	Signal name
	bit		
R9998	bit0		J2CT Operation adjustment mode valid (Common for all axes)
R9948	bit0		J2CT 1st axis in operation adjustment mode
	bit1		J2CT 2nd axis in operation adjustment mode
	bit2		J2CT 3rd axis in operation adjustment mode
	bit3		J2CT 4th axis in operation adjustment mode

(2) Auxiliary axis control command

Signal name	J2CT Control command 4	J2CT Control command 3	J2CT Control command 2	J2CT Control command 1	J2CT Control command L	J2CT Control command H
Abbrev.	CTCM4	CTCM3	CTCM2	CTCM1	CTCML	CTCMH
J2CT 1st axis	R9950	R9951	R9952	R9953	R9954	R9955
J2CT 2nd axis	R9956	R9957	R9958	R9959	R9960	R9961
J2CT 3rd axis	R9962	R9963	R9964	R9965	R9966	R9967
J2CT 4th axis	R9968	R9969	R9970	R9971	R9972	R9973

(a) CTCM1 (J2CT Control command 1)

bit		Details
0	*SVF	Servo OFF
1	QEMG	PLC emergency stop
2	*PRT1	Data protect
3	MRST	MC reset
4	*IT+	Interlock +
5	*IT-	Interlock -
6	RDF	Ready OFF
7	H	Handle mode
8	AUT	Automatic operation mode
9	MAN	Manual operation mode
A	J	Jog mode
B	ZRN	Reference position mode
C		
D	AZS	Zero point initialization mode
E	ZST	Basic position set
F	S	Incremental mode

(b) CTCM2 (J2CT Control command 2)

bit		Details
0	ST	Operation start
1	DIR	Rotation direction
2	STS	Arbitrary point feed command valid
3	PUS	Stopper positioning command valid
4	MP1	Incremental feed magnification 1
5	MP2	Incremental feed magnification 2
6	PR1	Operation parameter selection1
7	PR2	Operation parameter selection 2
8		
9		
A		
B		
C		
D		
E		
F		

(c) CTCM3 (J2CT Control command 3)

	bit	Details
0	ST1	Station selection 1
1	ST2	Station selection 2
2	ST4	Station selection 4
3	ST8	Station selection 8
4	ST16	Station selection 16
5	ST32	Station selection 32
6	ST64	Station selection 64
7	ST128	Station selection 128
8	ST256	Station selection 256
9		
A		
B		
C		
D		
E		
F		

(b) CTCM4 (J2CT Control command 4)

	bit	Details
0	OVR1	Speed override 1
1	OVR2	Speed override 2
2	OVR4	Speed override 4
3	OVR8	Speed override 8
4	OVR16	Speed override 16
5	OVR32	Speed override 32
6	OVR64	Speed override 64
7	OVR	Speed override valid
8		
9		
A		
B		
C		
D		
E		
F		

(e) CTCML, CTCMH (J2CT Control command L, control command H)

CTCML	Command position during arbitrary point feed command valid (32bit)
CTCMH	

(3) Auxiliary axis status

Signal name	J2CT Status 4	J2CT Status 3	J2CT Status 2	J2CT Status 1	Machine position
Abbrev.	CTST4	CTST3	CTST2	CTST1	
J2CT 1st axis	R9900	R9901	R9902	R9903	R9904, R9905
J2CT 2nd axis	R9906	R9907	R9908	R9909	R9910, R9911
J2CT 3rd axis	R9912	R9913	R9914	R9915	R9916, R9917
J2CT 4th axis	R9918	R9919	R9920	R9921	R9922, R9923

(a) CTST1 (J2CT Status 1)

bit		Details
0	RDY	Servo ready
1	INP	In-position
2	SMZ	Smoothing zero
3	AX1	Axis selection output
4	MVP	In axis movement +
5	MVN	In axis movement -
6	TLQ	In torque limit
7	ADJ	Adjusting machine
8	ZP	Reference position reached
9	RST	In reset
A	HO	In handle mode
B	MA	Controller preparation complete
C	SA	Servo preparation complete
D	JSTA	Automatic set position reached
E	JST	Set position reached
F	NEAR	Near set position

(b) CTST2 (J2CT Status 2)

bit		Details
0	AUTO	In automatic operation mode
1	MANO	In manual operation mode
2	JO	In jog mode
3	ARNN	In reference position return
4	ZRNO	In reference position return mode
5	DOG	Near-point dog
6	AZSO	In zero point initialization mode
7	SO	In incremental mode
8	AL1	Alarm 1
9	AL2	Alarm 2
A	AL4	Alarm 4
B	BAT	Battery voltage drop
C	ABS	Absolute position power shutoff movement over
D	ZSN	Absolute position loss
E	ZSF	Initial setting completed
F	ZSE	Initial setting error completed

(c) CTST3 (Status 3)

	bit	Details
0	STO1	Station position 1
1	STO2	Station position 2
2	STO4	Station position 4
3	STO8	Station position 8
4	STO16	Station position 16
5	STO32	Station position 32
6	STO64	Station position 64
7	STO128	Station position 128
8	STO256	Station position 256
9		
A		
B		
C		
D		
E		
F		

(d) CTST4 (J2CT Status 4)

	bit	Details
0	PSW1	Position switch 1
1	PSW2	Position switch 2
2	PSW3	Position switch 3
3	PSW4	Position switch 4
4	PSW5	Position switch 5
5	PSW6	Position switch 6
6	PSW7	Position switch 7
7	PSW8	Position switch 8
8	PMV	In positioning operation
9	PFN	Positioning complete
A	PSI	In stopper
B		
C		
D		
E		
F		

3.10.5 Notes

(1) Do not turn "Auto operation "start" command signal (ST) " ON during Ope. test mode.
(2) NC does not retain auxiliary axis parameters. Parameters are retained at the auxiliary axis side.
(3) Auxiliary axis emergency stop has to be commanded by PLC interface.
(4) NC axis handle movement is invalid during auxiliary axis handle mode.
(5) If the screen shifts other screen, the auxiliary axis mode (Ope. test mode, Absolute posn set) is held.
　　Thus, the axis does not stop even if the axis is rotating.

3.11 Data Sampling

NC data sampling function allows a sampling of NC internal data (speed output from NC to drive unit, feedback data from drive unit, etc.) so that the data is output as text data.

Item	Specifications
Sampling cycle	700 Series 1.7ms x setting value 70 Series (type A) 1.7ms x setting value 70 Series (type B) 3.5ms x setting value
Number of sampled axes	700 Series Servo axis : 1 to 16 axes Spindle : 1 to 4 axes 70 Series Servo axis : 1 to 7 axes Spindle : 1 to 3 axes
Number of sampled channels	1 to 8 points
Sampling data size	700 Series Maximum 1,310,720 points 70 Series Maximum 655,360 points (Note 1) This is the entire data size. The data size per channel will decrease when the number of sampled channels increases. (Note 2) If the open DRAM memory is insufficient, the maximum data size will decrease.

● Parameter output is not executed for the data set with this function.
● The state returns to "Sampling stop" when the power is turned ON.

Refer to the "diagnosis data collection setting screen" section in the Instruction Manual for detailed operations.

3.12 Data backup

With this function, system data (program, parameter, R register, etc.), ladder (user PLC program), APLC data can be backed up/restored.
Refer to the "all backup screen" section in the Instruction Manual for detailed operations.

3.13 M70 SETUP INSTALLER

Install the following data with M70 SETUP INSTALLER.

(1) Language data
(2) Custom data
  • Custom screen
  • PLC alarm guidance
(3) Custom startup screen

Use CF card to carry out the installation.

3.13.1 Compatible Data and CF Card Folder Configuration

(1) Compatible data with M70 SETUP INSTALLER

Type	Data	Details	Remarks
Language data	lang0_xxx.bin	Language data (for FROM)	Language identification string is shown instead of xxx. (ex. jpn: Japanese, fra: french)
	lang1_xxx.bin	Language data (for expansion FROM)	
Custom data	Custom screen module	Interpreter data and object data	
	config.ini	A setting file to register custom screen.	
	customdef.ini	A setting file to register custom screen for the menus and function buttons on the default screen.	
	customload.txt	A setting file to register name and load order of the object data.	
	PLC alarm guidance data	HTML files and JPEG files to be displayed in the PLC alarm guidance.	
Custom startup screen	startupscreen.bmp	A bitmap file to be displayed on the initial screen when power is turned ON.	Color: 256 Colors (8 bit) Size: 640 * 440

(2) CF card folder configuration
   Compatible data with M70 SETUP INSTALLER is stored in CF card with the folder configuration as follows.

```
CF Card ──────── Lang (language data folder)
        │
        │         ├───── A0 (folder labeled by version)
        │         │
        │         │              ├───── lang0_jpn.bin (Japanese language data for FROM)
        │         │              │
        │         │              ├───── lang1_jpn.bin (Japanese language data for expansion FROM)
        │         │                        :
        │         │                        :
        │         ├───── A1 (folder labeled by version)
        │
        │
        ├───── custom (custom data folder)
        │         │
        │         ├───── PLCAlarm (PLC alarm guidance folder)
        │         │         │
        │         │         ├───── PLCAlarm_0001_jpn.htm (PLC alarm guidance data)
        │         │                   :
        │         │                   :
        │         ├───── Custom screen modules
        │         │
        │         ├───── Setting files
        │
        │
        ├───── startupscreen.bmp (bitmap data for custom startup screen)
        │
        │
        └───── Installer (installer folder)
                  │
                  └───── installer.o (installer)
```

3.13.2 Operation Method

Starting up M70 SETUP INSTALLER

(1) Insert the CF card for M70 SETUP INSTALLER into the front panel CF.

(2) Turn the power ON while pressing the menu ◁.

Startup screen appears. A bleep sounds after a while, and then the mode selection screen for M70 SETUP INSTALLER appears.
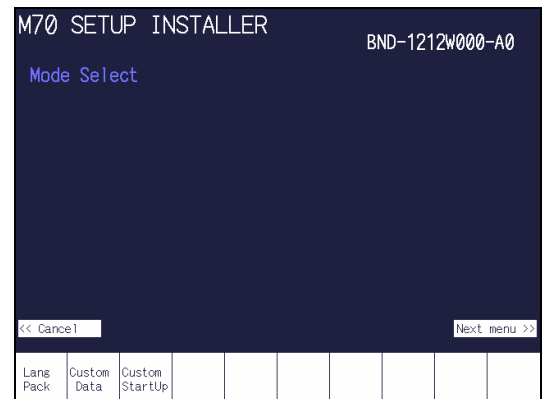
(Note) Keep pressing the menu ◁ until a bleep sounds.

Installing language data

(1) | Press the menu key [Lang Pack] on the mode selection screen.

➡ Language data installation screen appears. The language selection menu is displayed.

```
M70 SETUP INSTALLER
                              BND-1212W000-A0
Language Pack Install

Installed Language      1st   Japanese
                        2nd

Now Selected Language   1st
                        2nd

                   * English is the default selection.

<< Cancel                               Next menu >>

Japan  German  French  Italian Spanish Chinese Korean        Clear  Install
                                        tradit
```
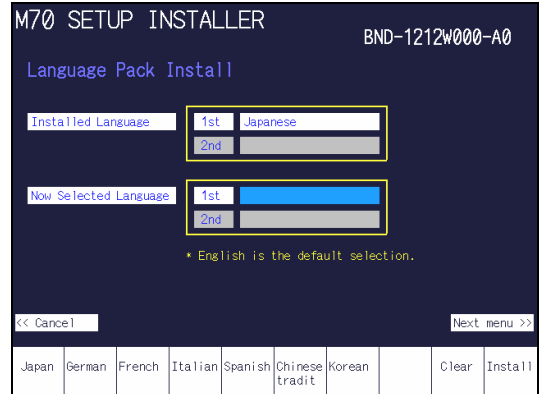
The language currently installed is shown in the "Installed Language" field.

• The next language selection menu is displayed by pressing ▷ menu (Next menu >>).

(2) | Select the language to install with the menu key.

➡ The language selected is shown in the "Now Selected Language" field.

```
M70 SETUP INSTALLER
                              BND-1212W000-A0
Language Pack Install

Installed Language      1st   Japanese
                        2nd

Now Selected Language   1st   Chinese-traditional
                        2nd

                   * English is the default selection.

<< Cancel                               Next menu >>

Japan  German  French  Italian Spanish Chinese Korean        Clear  Install
                                        tradit
```
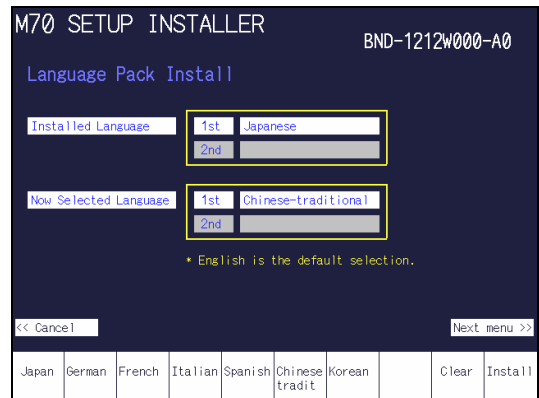
• To change the language already selected, press the menu key [Clear] and select again.
• The 2nd language can be selected when the expansion FROM is provided. (Cursor moves to the "2nd" field after the 1st language has been selected.)

(3) | Press the menu key [Install].

➡ A confirmation message appears.

```
Do you wish to install?
<< Cancel                               Next menu >>

Yes    No
```

(4) | Press the menu key [Yes].

➡ A message appears after the installation has completed.

```
Installation completed
<< Cancel                               Next menu >>

Yes    No
```

• Pressing the menu key [No] returns to the language selection menu.
• Do not turn the power OFF during the installation of language data.

(Note) Pressing the menu ◁ (<< Cancel) returns to the mode selection screen.

Installing custom data

(1) Press the menu key [Custom Data] on the mode selection screen.

Custom data installation screen appears.
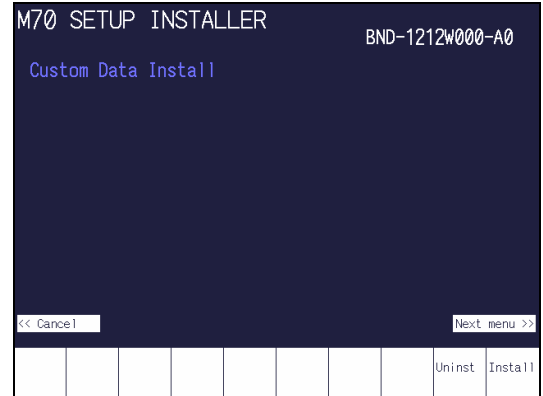
➡️

```
M70 SETUP INSTALLER
                              BND-1212W000-A0
Custom Data Install




<< Cancel                          Next menu >>
                                   Uninst  Install
```

(2) Press the menu key [Install].   ➡️   A confirmation message appears.

```
Do you wish to install?
<< Cancel                          Next menu >>
Yes    No
```

(3) Press the menu key [Yes].   ➡️   A message appears after the installation has completed.

```
Installation completed
<< Cancel                          Next menu >>
Yes    No
```
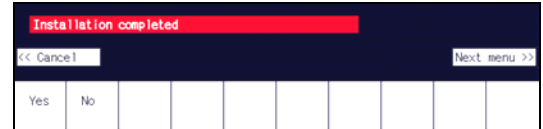
• Pressing the menu key [No] returns to the first menu.

• Do not turn the power OFF during the installation of custom data.

Uninstalling custom data

(1) Press the menu key [Uninst] on the custom data installation screen.   ➡️   A confirmation message appears.
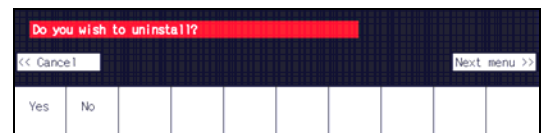
```
Do you wish to uninstall?
<< Cancel                          Next menu >>
Yes    No
```

(2) Press the menu key [Yes].   ➡️   A message appears after the installation has completed.

```
Uninstallation completed
<< Cancel                          Next menu >>
Yes    No
```
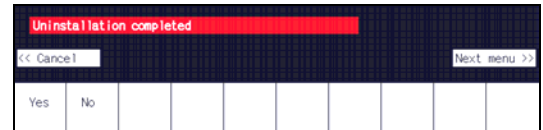
• Pressing the menu key [No] returns to the first menu.

• Do not turn the power OFF during the uninstallation of custom data.

(Note) Pressing the menu ◁ (<< Cancel) returns to the mode selection screen.

Installing custom startup screen

(1) Press the menu key [Custom Startup] on the initial screen of M70 SETUP INSTALLER. ➡ Custom Startup Screen Install screen appears.
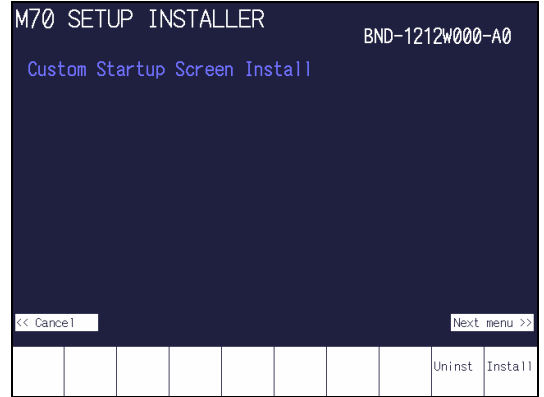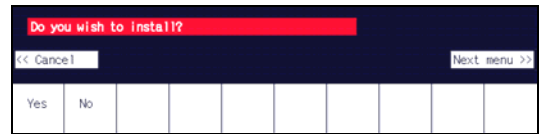
```
M70 SETUP INSTALLER              BND-1212W000-A0

  Custom Startup Screen Install




<< Cancel                                Next menu >>

                                        Uninst  Install
```

(2) Press the menu key [Install]. ➡ A confirmation message appears.

```
Do you wish to install?
<< Cancel                                Next menu >>
 Yes    No
```

(3) Press the menu key [Yes]. ➡ A message appears after the installation has completed.

```
Installation completed
<< Cancel                                Next menu >>
 Yes    No
```

• Pressing the menu key [No] returns to the first menu.

• Do not turn the power OFF during the installation of custom startup screen.

Uninstalling custom startup screen

(1) | Press the menu key [Uninst] on the Custom Startup Screen Install screen. | ➡ A confirmation message appears.
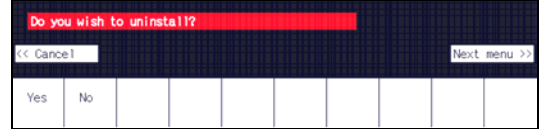
Do you wish to uninstall?
<< Cancel   Next menu >>
Yes | No

(2) | Press the menu key [Yes]. | ➡ A message appears after the installation has completed.

Uninstallation completed
<< Cancel   Next menu >>
Yes | No
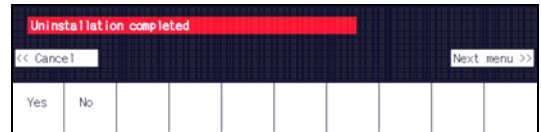
• Pressing the menu key [No] returns to the first menu.

• Do not turn the power OFF during the uninstallation of custom startup screen.

(Note) Pressing the menu ◁ (<< Cancel) returns to the mode selection screen.

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3.13.3 List of Error Messages

Message	Details
The 1st language is not selected.	The first language has not been selected at the installation of language pack. Specify the first language again.
The same language is selected.	The same language has been selected as both first and second language at the installation of language pack. Specify the language again.
The selected language does not exist.(1st)	The language data, selected as the 1st language at the installation of language pack, does not exist . Ensure that the language data has been stored in the CF card, and that the version of the data is appropriate.
The selected language does not exist.(2nd)	The language data, selected as the 2nd language at the installation of language pack, does not exist. Ensure that the language data has been stored in the CF card, and that the version of the data is appropriate.
The custom data does not exist.	The "custom" folder does not exist in the CF card. Check the stored data in the CF card.
The file startupscreen.bmp" does not exist."	The "startupscreen.bmp" file does not exist in the CF card. Check the stored data in the CF card.

4. 700 Series H/W Replacement Methods

4.1 Durable Parts

4.1.1 Control unit battery

All data, such as the parameters and machining programs that need to be backed up when the power is turned OFF, are saved by a lithium battery installed in the control unit's battery holder.

Battery	Q6BAT BKO-C10811H03 (SANYO CR17335SE-R with Mitsubishi specifications)
Battery cumulative data holding time	45,000 hours (At room temperature. The life will be shorter if the temperature is high.))
Battery life	Approx. 5 years (from date of battery manufacture)

(Note) Replace the battery when the alarm "Z52 Battery drop 0001" appears on the NC screen.
The internal data could be damaged if the alarm "Z52 Battery drop 0003" appears.

[Replacement procedures]
Always replace the battery with the control unit (machine) power turned OFF.
Complete the replacement within 30 minutes after turning the power OFF. (If the battery is not connected within 30 minutes, the data being backed up might be destroyed.)

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door, and confirm that the control unit LED, 7-segment display, etc., are all OFF.
(3) Open the front cover of the control unit. Pull the right side of the front cover toward front.
(4) Pull the connector connected to the battery out from the BAT connector.
(5) Remove the battery from the battery holder.
(6) Fit the new battery into the battery holder.
(7) Insert the connector connected to the new battery into the BAT connector. Pay attention to the connector orientation, being careful not to insert backwards.
(8) Close the front cover of the control unit. At this time, confirm that the cover is closed by listening for the "click" sound when the latch catches.
(9) Close the door of the electric cabinet.

Front cover

BAT connector

Battery holder

Connector connected to the battery

Battery

[Precautions for handling battery]
    (1) Always replace the battery with the same type.
    (2) Do not disassemble the battery.
    (3) Do not place the battery in flames or water.
    (4) Do not pressurize and deform the battery.
    (5) This is a primary battery so do not charge it.
    (6) Dispose of the spent battery as industrial waste.

⚠ **CAUTION**

  ❗ If the battery low warning is issued, save the machining programs, tool data and parameters in an input/output device, and then replace the battery. When the battery alarm is issued, the machining programs, tool data and parameters may be destroyed. Reload the data after replacing the battery.

  ⚠ Do not short circuit, charge, overheat, incinerate or disassemble the battery.

  ⚠ Dispose the spent battery according to the local laws.

4.1.2 Cooling fan for control unit

Type : 109P0412H731
Life : 60,000 hours (When the rotary speed decreased 30% less than the initial values)
Cooling fan (for control unit) life is estimated on the assumption that it is used under 60°C environment. Keep in mind that the value above is not a guaranteed value.

[Replacement procedures]
Always replace the cooling fan with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Remove the fan cover on the top center of the control unit. (Remove the fan cover by pushing up the front tab.)
(4) Pull out the cooling fan from the control unit cooling fan housing.
(5) Pull the connector connected to the cooling fan out from the control unit PCB.
(6) Replace the cooling fan with the new one. Insert the connector connected to the new cooling fan into the control unit PCB.
(7) Put the cooling fan into the control section cooling fan housing. (Be sure the label side is on the top.)
(8) Arrange the cooling fan wiring neatly in the control unit cooling fan housing.
(9) Install the fan cover. (First install the back tabs in the control unit. Then install the front tabs in the control unit.)
(10) Confirm that all the cables are correctly connected and close the electric cabinet door.

Front tab

Fan cover   Cooling fan

Back
tab   Control unit
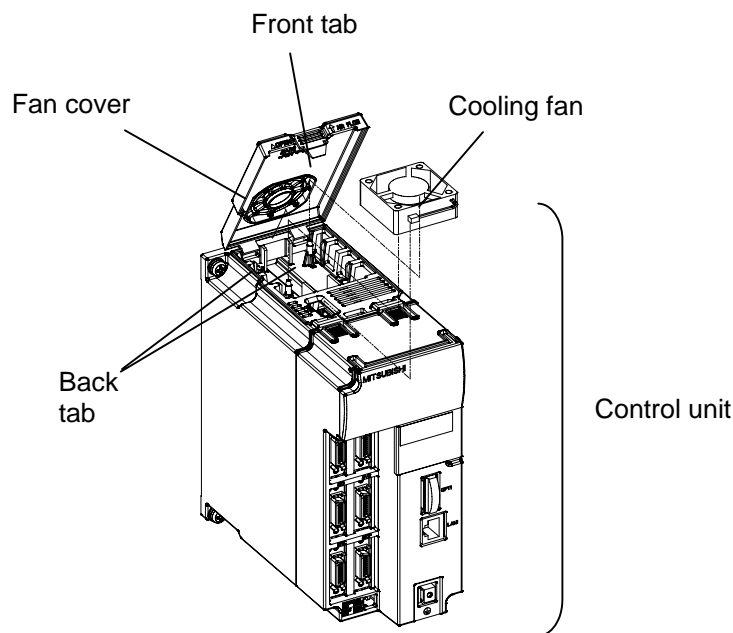
⚠ **CAUTION**

⚠ Do not replace the control unit while the power is ON.

⚠ Collect and dispose of the spent cooling fan according to the local laws.

4.1.3 Cooling fan for display unit (XP terminal)

Type : MMF-06D24DS-RP3
Life : 50,000 hours (When the rotary speed decreased 20% less than the initial values)
        Cooling fan (for display unit) life is estimated on the assumption that it is used under 60°C
        environment. Keep in mind that the value above is not a guaranteed value.

[Replacement procedures]
Always replace the cooling fan for display unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Remove the fan cover of cooling fan housing (2 parts) that is installed to PCB on back of display unit.
    (Remove the fan cover by pushing up the front tab.)
(4) Pull out the cooling fan from the control unit cooling fan housing.
(5) Pull the connector connected to the cooling fan out from the control unit PCB.
(6) Replace the cooling fan with the new one. Insert the connector connected to the new cooling fan into
    the control unit PCB.
(7) Put the cooling fan into the control section cooling fan housing. (Be sure the label side is on the top.)
(8) Arrange the cooling fan wiring neatly in the control unit cooling fan housing.
(9) Install the fan cover.
(10) Confirm that all the cables are correctly connected and close the electric cabinet door.

Tab
Fan cover
Cooling fan
Cooling fan housing
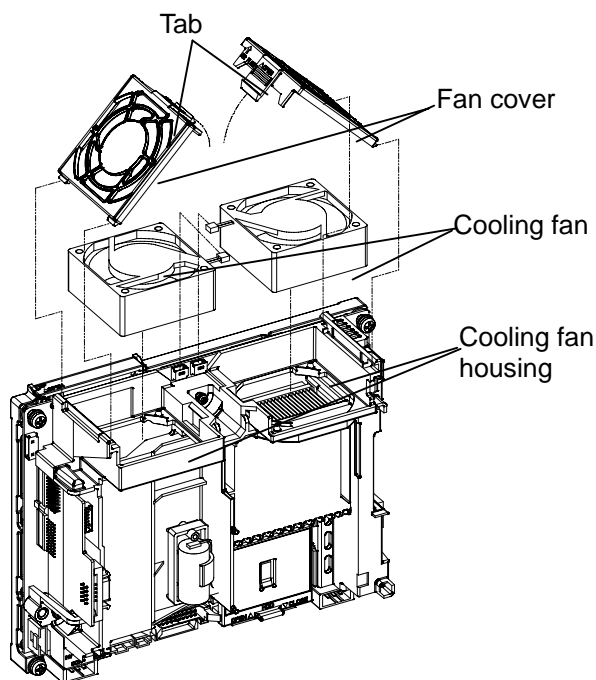
⚠ **CAUTION**

⚠ Do not replace the control unit while the power is ON.

⚠ Collect and dispose of the spent cooling fan according to the local laws.

4.1.4 Backlight

● 8.4-type
LCD panel	NL6448BC26-01 (NEC)
Inverter	65PWB31 (NEC)
Backlight for replacement	84LHS01 (NEC)
Backlight life	30,000 hours (Duration of time until luminance drops to 50% of the initial value.)

● 10.4-type
LCD panel	NL6448BC33-53, NL6448BC33-54 (NEC)
Inverter	104PW161 (NEC)
Backlight for replacement	104LHS35 (NEC)
Backlight life	50,000 hours (ambient temperature 25°C) (Duration of time until luminance drops to 50% of the initial value.)

Backlight life is estimated on the assumption that it is used under 25°C environment. Keep in mind that the value above is not a guaranteed value.

[Replacement procedures]
Always replace the backlight for LCD panel with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Pull the connector connected to the backlight out from the backlight power supply PCB. (For 8.4 inch, one each for top and bottom; for 10.4 inch, one for top.)
(4) Disconnect the menu key connector.
(5) Remove the escutcheon fixing screws (at 4 places) and take the escutcheon off.
(6) Pull out the backlight installed on the left side of the LCD panel. (The backlights have locking claws on the front. Hold these claws down while pulling the backlight out.)
(7) Insert the new backlight into the upper and lower sections at the left end of the LCD panel. (Press in until the locking claws click.)
(8) Mount the escutcheon with 2 fixing screws (1 each for the upper and lower sections of the left end).
(9) Connect the backlight connection connector to the backlight power supply PCB.
(10) Confirm that all the cables are correctly connected and close the electric cabinet door.
(11) Connect the menu key connector.

[Precautions for using LCD panel]
(1) Depending on the ambient temperature, response time, brightness and color may differ.
(2) Depending on the display contents, nonuniformity of brightness, flickers and streaks may be observed on LCD display.
(3) Because cold cathod-tube is used for LCD display, optical characteristics (nonuniformity of brightness and display) change according to the operation time. (Especially in low temperature.)
(4) Screen display color may be differed depending on the angle to view it.

⚠ **CAUTION**

⚠ Do not replace the backlight while the power is ON.

⚠ Dispose the replaced backlight according to the local laws.

⚠ Do not touch the backlight while the power is ON. Failure to observe this could result in electric shocks due to high voltage.

⚠ Do not touch the backlight while the LCD panel is in use. Failure to observe this could result in burns.

⚠ Do not apply impact or pressure on the LCD panel or backlight. Failure to observe this could result in breakage as they are made of glass.

[8.4-type display unit]

Escutcheon

Menu key connector

LCD panel

Backlight

Escutcheon

Menu key connector

[10.4-type display unit]

Control unit fittings

Escutcheon

Menu key connector

Backlight

LCD panel

Escutcheon

Menu key connector
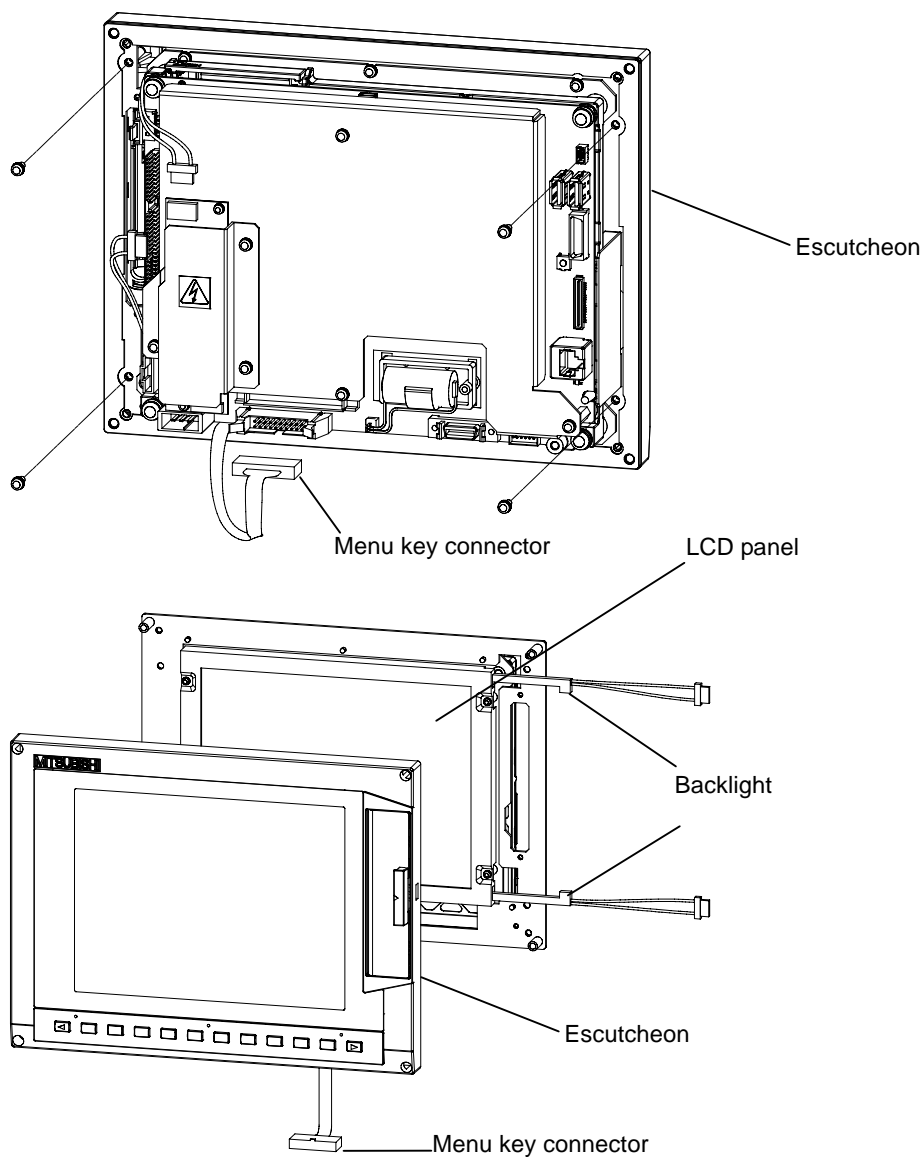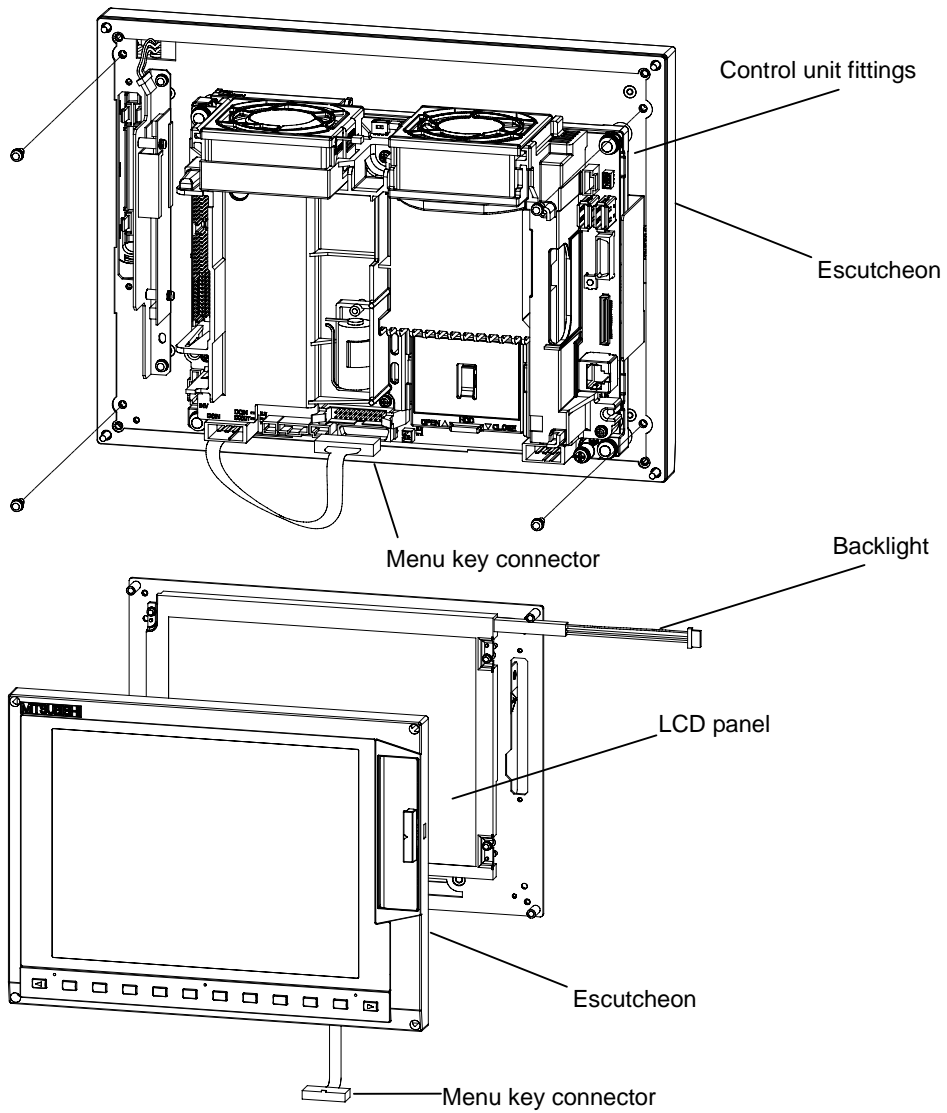
4.2 Unit

4.2.1 Control Unit

[Replacement procedures]
Always replace the control unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the control unit.
(4) Remove the screws fixing the control unit, and remove the control unit from the control unit installation fitting. (Loosen the two lower fixing screws first, and then remove one upper fixing screw while supporting the control unit with a hand. Then lift the control unit upward and take it off. The two lower fixing screws do not need to be removed.)
(5) Replace with a new control unit, and fix the control unit onto control unit installation fitting with the fixing screws.
(6) Connect all the cables back to the control unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

Fixing screws (3)

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the control unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

(Note) Wire the control unit optical cable as shown below.

Control unit

Optical communication cable
(section without reinforced sheath):
Bending radius: 25mm or more

Optical communication cable
(section with reinforced sheath):
Bending radius: 50mm or more

Recommended clamp material
    CKN-13SP
    KITAGAWA INDUSTRIES

4.2.2 Display Unit

[Replacement procedures]
Always replace the display unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the display unit.
(4) Remove the screws fixing the display unit (at 4 places) and take the display unit off.
(5) Replace with a new display unit, and fix the display unit with the fixing screws.
(6) Connect all the cables connected to the display unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

Fixing screws (4)

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the display unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

4.2.3 Keyboard unit

[Replacement procedures]
Always replace the keyboard unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the keyboard unit.
(4) Remove the screws fixing the keyboard unit and take the keyboard unit off.
(5) Replace with a new keyboard unit, and fix the keyboard unit with the fixing screws.
(6) Connect all the cables connected to the keyboard unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

⚠ CAUTION

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the keyboard unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

[8.4-type Keyboard unit]

Fixing screws (4)

[10.4-type Keyboard unit]

Fixing screws (4)

4.2.4 DX Unit

[Replacement procedures]
Always replace the DX unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the DX unit.
(4) Remove the screws fixing the DX unit and take the DX unit off.
(5) Replace with a new DX unit, and fix the DX unit onto the control unit with the fixing screws.
   (Fix so that the DX unit connector slot is placed at the lower part.)
(6) Connect all the cables connected to the DX unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

Fixing screws (4)
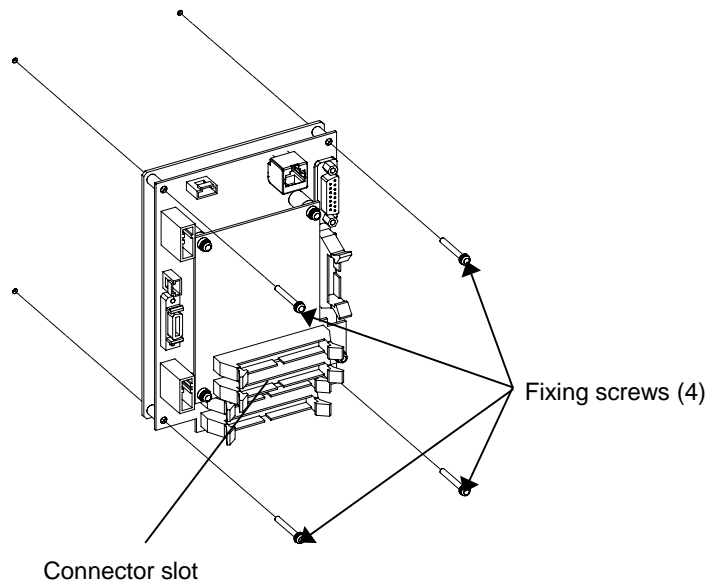
Connector slot

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the DX unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

4.2.5 Hard Disk Unit

Hard disk unit life: 5 years or 20,000 hours of power ON, whichever comes first.

[Replacement procedures]
Always replace the hard disk unit with the control unit (machine) power turned OFF.

   (1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
   (2) Open the electric cabinet door.
   (3) Disconnect all F140 cables connected to the hard disk in the hard disk unit.
      (Always disconnect F140 cables holding the front and back of the hard disk securely with fingers.)
   (4) Remove the screws fixing the hard disk unit (2 at upper part, 1 at lower part) and take the hard disk unit off.
   (5) Replace with a new hard disk unit, and fix the hard disk unit with the fixing screws.
   (6) Connect F140 cables to the hard disk in the hard disk unit.
      (Always connect F140 cables in the correct connector direction fixing the bottom of the hard disk with fingers.)
   (7) Confirm that all the cables are correctly connected and close the electric cabinet door.

Fixing screws (2)
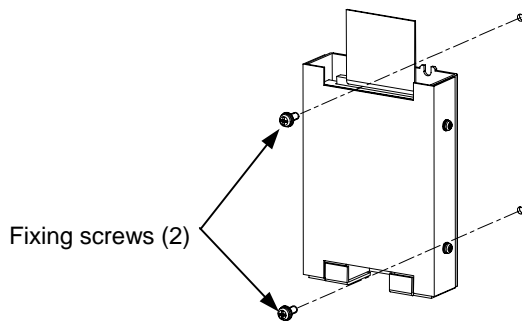
(Note) When mounting the hard disk unit, face the cable lead-out side directly straight up, and mount within ±15°.
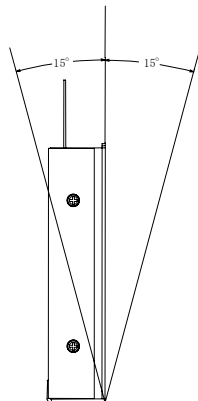
15°　15°

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the hard disk unit while the power is ON.

⚠ Dispose of the replaced hard disk unit according to the local laws.

⚠ Hard disk unit is a precision device, so do not drop or apply strong impacts on it.

4.3 Compact Flash

4.3.1 Control Unit Compact Flash

[Replacement procedures]
Always replace the compact flash with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door, and confirm that the control unit LED, 7-segment display, etc., are all OFF.
(3) Open the front cover of the control unit.
(4) Press the eject lever twice to eject the compact flash.
(5) Insert the new compact flash. (The surface is faced on the observers' right.)
(6) Close the front cover of the control unit. At this time, confirm that the cover is closed by listening for the "click" sound when the latch catches.
(7) Close the electric cabinet door.
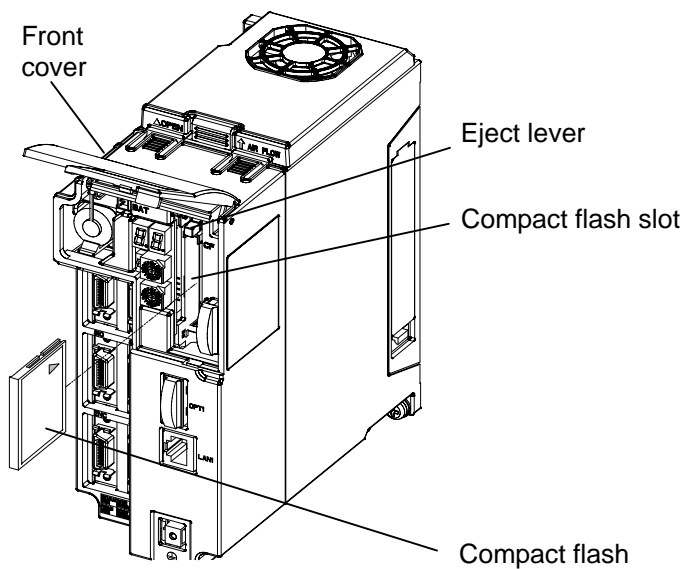
(Note 1) There may be a compatibility problem with commercially available compact flash memory, resulting in mulfunction.

4.4 IC card

4.4.1 Front IC Card

[Card insertion procedures]
    (1) Open the card slot door located on the display unit right end.
    (2) Insert the IC card. (The surface is faced on the observers' right.)

[Card ejecting procedures]
    (1) Open the card slot door located on the display unit right end.
    (2) Press the eject lever twice to eject the IC card.

Eject lever
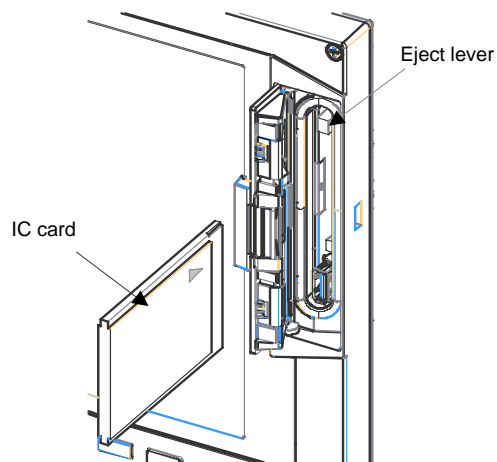
IC card

(Note 1) Do not eject an IC card during the data reading/writing.
(Note 2) There may be a compatibility problem between devices a commercially available IC card, so
        illegal operations may occur.

5. 70 Series H/W Replacement Methods

5.1 Durable Parts

5.1.1 Control unit battery

All data, such as the parameters and machining programs that need to be backed up when the power is turned OFF, are saved by a lithium battery installed in the control unit's battery holder.

Battery	Q6BAT BKO-C10811H03 (SANYO CR17335SE-R with Mitsubishi specifications)
Battery cumulative data holding time	45,000 hours (At room temperature. The life will be shorter if the temperature is high.))
Battery life	Approx. 5 years (from date of battery manufacture)

(Note) Replace the battery when the alarm "Z52 Battery drop 0001" appears on the NC screen.
The internal data could be damaged if the alarm "Z52 Battery drop 0003" appears.

[Replacement procedures]
Always replace the battery with the control unit (machine) power turned OFF.
Complete the replacement within 30 minutes after turning the power OFF. (If the battery is not connected within 30 minutes, the data being backed up might be destroyed.)

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Confirm that the control unit LED, 7-segment display, etc., are all OFF.
(3) Open the battery cover of the control unit. Pull the right side of the battery cover toward front.
(4) Pull the connector connected to the battery out from the BAT connector.
(5) Remove the battery from the battery holder.
(6) Fit the new battery into the battery holder.
(7) Insert the connector connected to the new battery into the BAT connector. Pay attention to the connector orientation, being careful not to insert backwards.
(8) Close the front cover of the control unit. At this time, confirm that the cover is closed by listening for the "click" sound when the latch catches.

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[Precautions for handling battery]
> (1) Always replace the battery with the same type.
> (2) Do not disassemble the battery.
> (3) Do not place the battery in flames or water.
> (4) Do not pressurize and deform the battery.
> (5) This is a primary battery so do not charge it.
> (6) Dispose of the spent battery as industrial waste.

⚠ **CAUTION**

> ❗ If the battery low warning is issued, save the machining programs, tool data and parameters in an input/output device, and then replace the battery. When the battery alarm is issued, the machining programs, tool data and parameters may be destroyed. Reload the data after replacing the battery.
>
> ⚠ Do not short circuit, charge, overheat, incinerate or disassemble the battery.
>
> ⚠ Dispose the spent battery according to the local laws.

5.1.2 Backlight

● 8.4-type
Inverter   65PWB31
Backlight for replacement   84LHS01
Backlight life   50,000 hours (Duration of time until luminance drops to 50% of the initial value.)

● 10.4-type
Inverter   104PW161
Backlight for replacement   104LHS35
Backlight life   50,000 hours (ambient temperature 25°C) (Duration of time until luminance drops to 50% of the initial value.)

Backlight life is estimated on the assumption that it is used under 25°C environment. Keep in mind that the value above is not a guaranteed value.
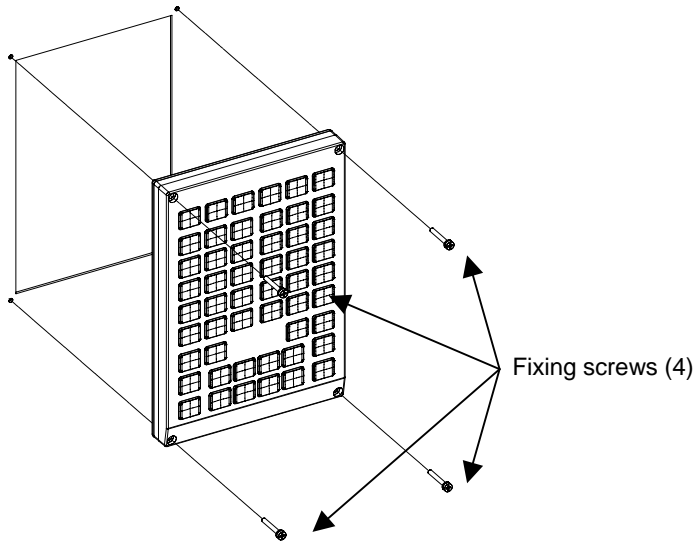
[Replacement procedures]
Always replace the backlight for LCD panel with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Pull the connector connected to the backlight out from the backlight inverter (one for top).
(3) Disconnect the MENU connector.
(4) Remove the escutcheon fixing screws (at 4 places) and take the escutcheon off.
(5) Pull out the backlight installed on the left side of the LCD panel. (The backlights have locking claws on the front. Hold these claws down while pulling the backlight out.)
(6) Insert the new backlight into the upper and lower sections at the left end of the LCD panel. (Press in until the locking claws click.)
(7) Mount the escutcheon with 4 fixing screws (1 each for 4 sections).
(8) Connect the backlight connection connector to the backlight inverter.
(9) Confirm that all the cables are correctly connected and close the electric cabinet door.
(10) Connect the MENU connector.

[Precautions for using LCD panel]
(1) Depending on the ambient temperature, response time, brightness and color may differ.
(2) Depending on the display contents, nonuniformity of brightness, flickers and streaks may be observed on LCD display.
(3) Because cold cathod-tube is used for LCD display, optical characteristics (nonuniformity of brightness and display) change according to the operation time. (Especially in low temperature.)
(4) Screen display color may be differed depending on the angle to view it.

⚠ **CAUTION**

⚠ Do not replace the backlight while the power is ON.

⚠ Dispose the replaced backlight according to the local laws.

⚠ Do not touch the backlight while the power is ON. Failure to observe this could result in electric shocks due to high voltage.

⚠ Do not touch the backlight while the LCD panel is in use. Failure to observe this could result in burns.

⚠ Do not apply impact or pressure on the LCD panel or backlight. Failure to observe this could result in breakage as they are made of glass.

[8.4-type/10.4-type display unit]

Backlight connector

MENU connector

Backlight inverter

Backlight
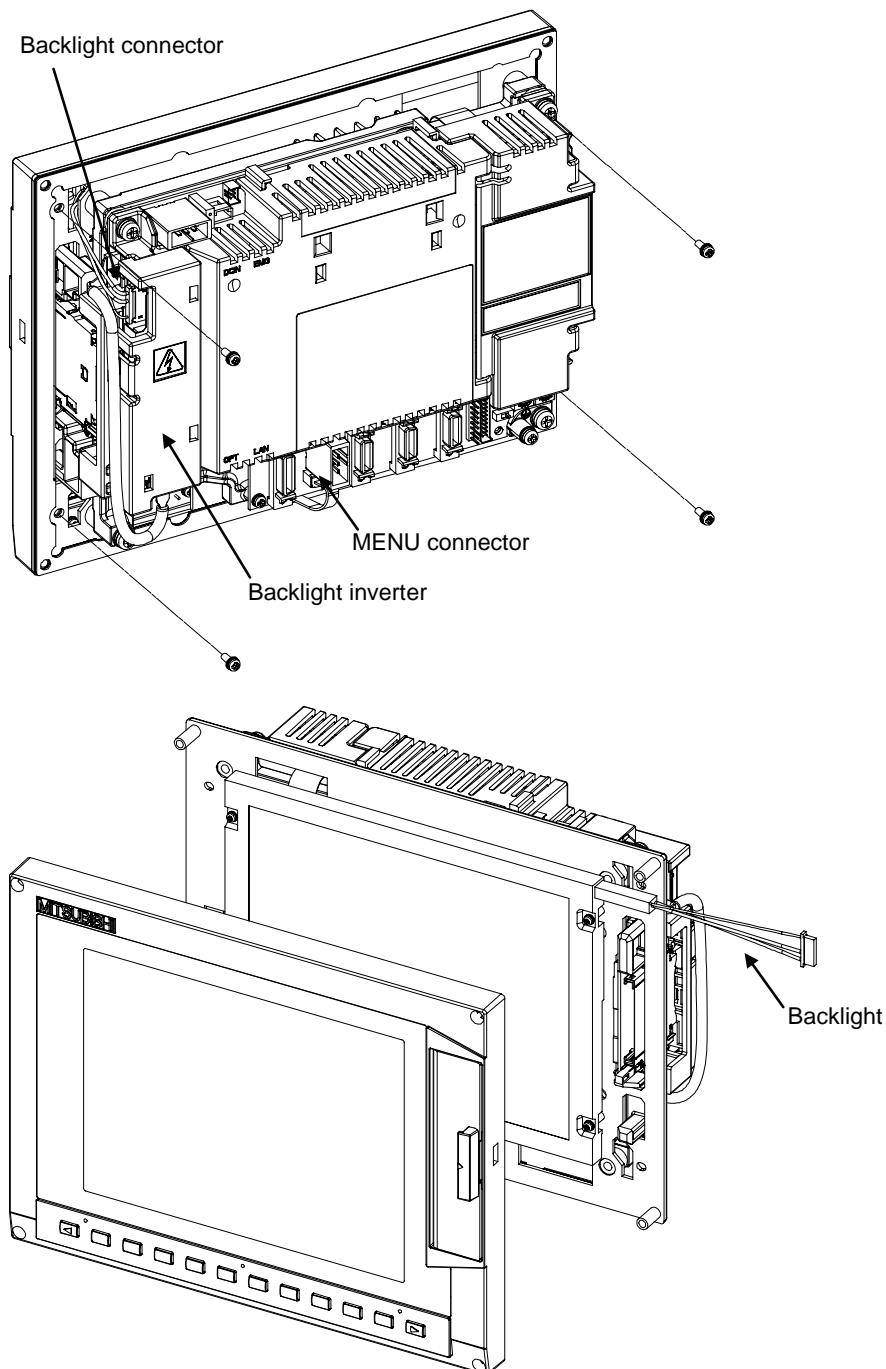
5.2 Unit

5.2.1 Control Unit

[Replacement procedures]
Always replace the control unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Disconnect all the external cables connected to the control unit.
(3) Remove all the internal cables connected to the control unit. (MENU/INV/LCD connector)
   (Note) Open the battery cover to remove LCD connector.
(4) Remove the screws fixing the control unit, and remove the control unit from the control unit installation fitting. (Loosen the two lower fixing screws first, and then remove one upper fixing screw while supporting the control unit with a hand. Then lift the control unit upward and take it off. The two lower fixing screws do not need to be removed.)
(5) Replace with a new control unit, and fix the control unit onto control unit installation fitting with the fixing screws.
(6) Connect all the cables back to the control unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the control unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

(Note) Wire the control unit optical cable as shown below.

Control unit

Recommended clamp material
CKN-13SP
KITAGAWA INDUSTRIES

Optical communication cable
(section without reinforced sheath):
Bending radius: 30mm or more

5.2.2 Display Unit

[Replacement procedures]
Always replace the display unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the display unit.
(4) Remove the screws fixing the display unit (at 4 places) and take the display unit off.
(5) Replace with a new display unit, and fix the display unit with the fixing screws.
(6) Connect all the cables connected to the display unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

Fixing screws (4)

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the display unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

5.2.3 Keyboard unit

[Replacement procedures]
Always replace the keyboard unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the keyboard unit.
(4) Remove the screws fixing the keyboard unit and take the keyboard unit off.
(5) Replace with a new keyboard unit, and fix the keyboard unit with the fixing screws.
(6) Connect all the cables connected to the keyboard unit. (Connect the cables to the designated connectors.)
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the keyboard unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

[8.4-type Keyboard unit]

Fixing screws (4)

[10.4-type Keyboard unit]

Fixing screws (4)

5.2.4 DX Unit

[Replacement procedures]
Always replace the DX unit with the control unit (machine) power turned OFF.

(1) Check that the machine power is turned OFF. (If the power is not OFF, turn it OFF.)
(2) Open the electric cabinet door.
(3) Disconnect all the cables connected to the DX unit.
(4) Remove the screws fixing the DX unit and take the DX unit off.
(5) Replace with a new DX unit, and fix the DX unit onto the control unit with the fixing screws.
(Fix so that the NCKB connector slot is placed at the lower part.)
(6) Connect all the cables connected to the DX unit. (Connect the cables to the designated connectors.)
NCKB cable can be easily inserted by fitting the Δ1st pin position with the connector.
(7) Confirm that all the cables are correctly connected and close the electric cabinet door.
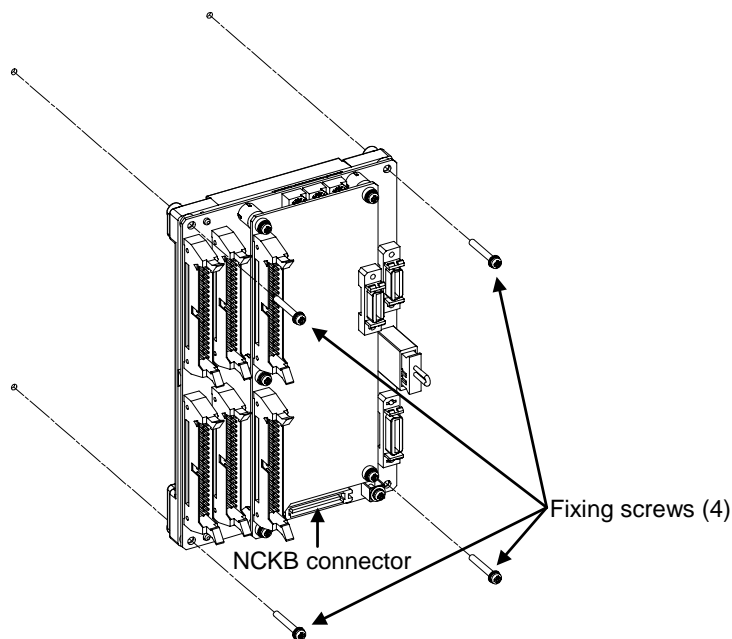
Fixing screws (4)

NCKB connector

⚠ **CAUTION**

⚠ Incorrect connections may damage the devices, so connect the cables to the specified connectors.

⚠ Do not replace the DX unit while the power is ON.

⚠ Do not connect or disconnect the connection cables between each unit while the power is ON.

5.3 Compact Flash

5.3.1 Front Compact Flash

[Card insertion procedures]
   (1) Open the card slot door located on the display unit right end.
   (2) Insert the compact flash. (The surface is faced on the observers' right.)

[Card ejecting procedures]
   (1) Open the card slot door located on the display unit right end.
   (2) Press the eject lever twice to eject the compact flash.

Compact flash

Eject lever
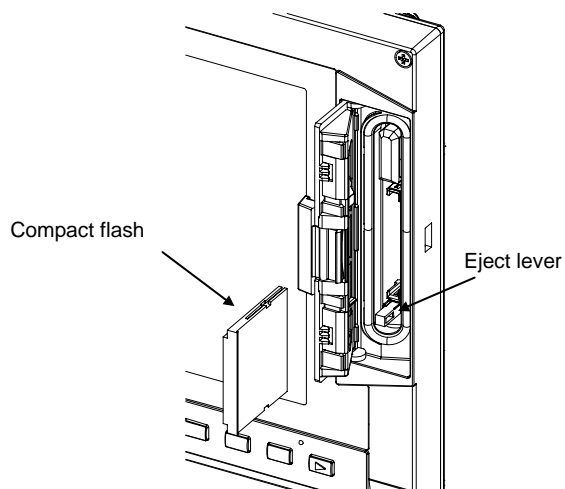
(Note 1) Do not eject a compact flash during the data reading/writing.
(Note 2) There may be a compatibility problem with non-recommended compact flashes, which may lead illegal operations.

6. Cable

If the cable is replaced without turning the power OFF, the normal unit or peripheral devices could be damaged, and risks could be imposed.
Disconnect each cable with the following procedures.

(a) For the following type of connector, press the tabs with a thumb and forefinger in the direction of the arrow, and pull the connector off.
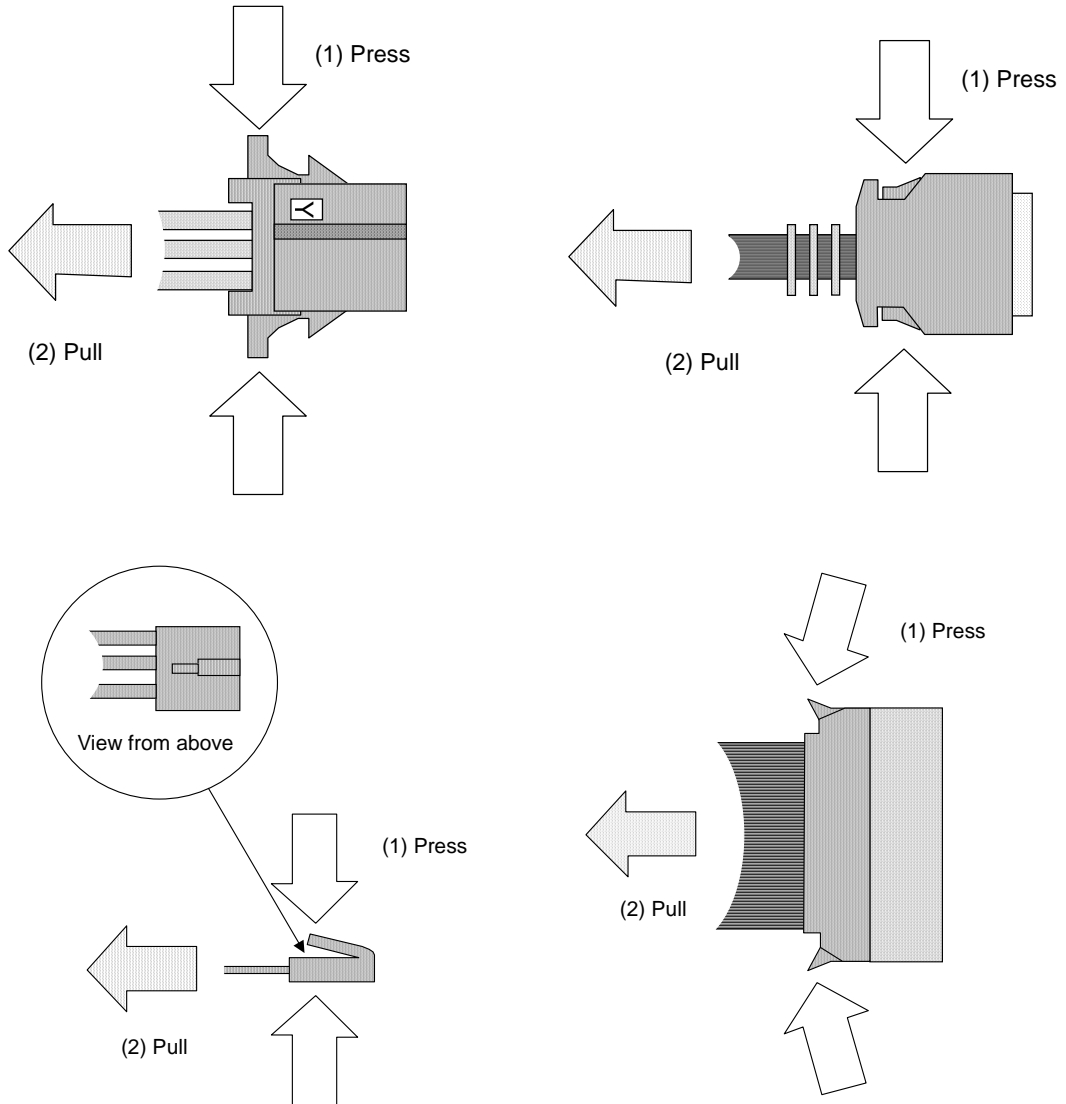
⚠ **CAUTION**

⊘ Do not connect or disconnect the connection cables between each unit while the power is ON.
⊘ Do not pull the cables when connecting/disconnecting it.

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(b) For a flat cable type connector with latches, open the latches in the directions of the arrows, and pull the connector off.

(1) Open

(2) Pull
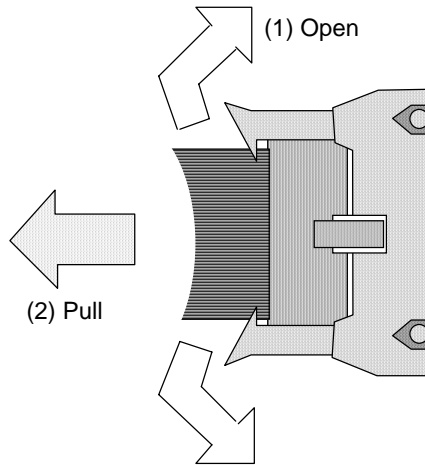
(c) For a flat cable type connector without latches, hold the connector with a thumb and forefinger, and pull the connector off.

(1) Hold with thumb and forefinger.

(2) Pull
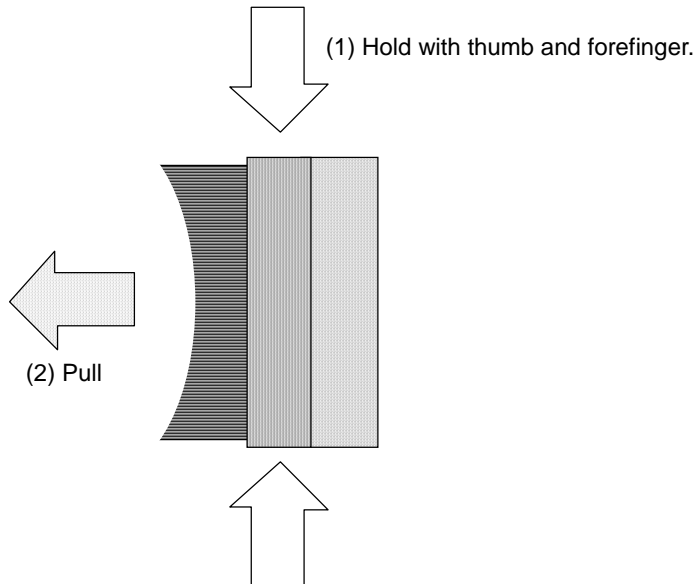
(d) For the screw fixed type connector, loosen the two fixing screws, and pull the connector off.
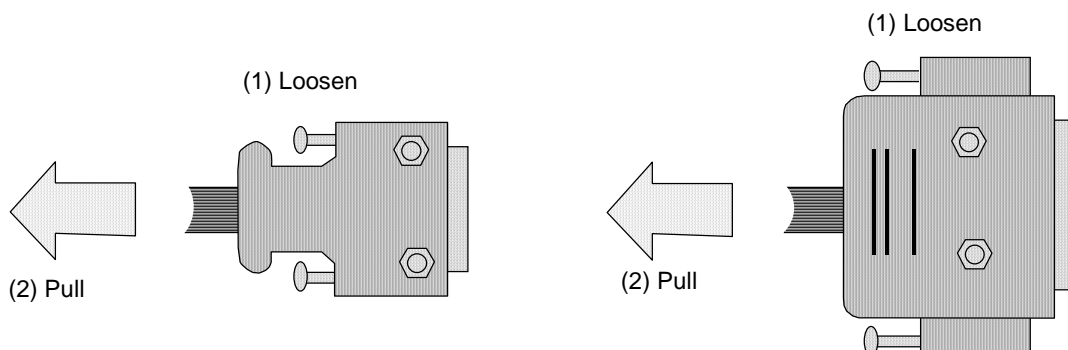
(1) Loosen

(1) Loosen

(2) Pull

(2) Pull

⚠ **CAUTION**

🚫 Do not connect or disconnect the connection cables between each unit while the power is ON.
🚫 Do not pull the cables when connecting/disconnecting it.

(e) For the optical cable connector, pull off while holding down the lock button.

(1) Press

(2) Pull
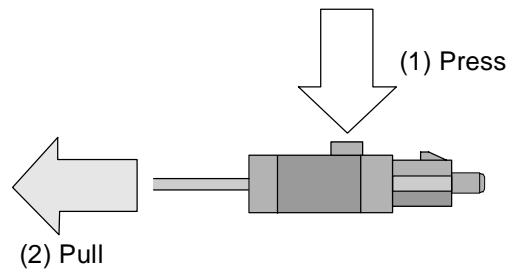
(f) For the Ethernet connector, pull off while holding down the locked latch.
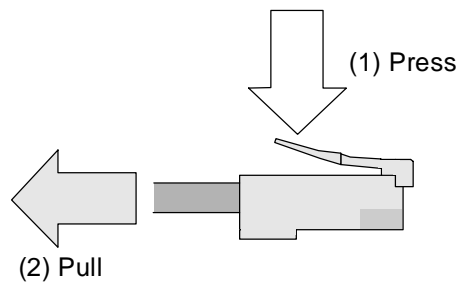
(1) Press

(2) Pull

⚠ **CAUTION**

🚫 Do not connect or disconnect the connection cables between each unit while the power is ON.
🚫 Do not pull the cables when connecting/disconnecting it.

II Explanation of Alarms

1. List of Alarms

1.1 Operation Alarms

(The bold characters are the messages displayed on the screen.)

```
M△△   Message   OOOO
                    └──────── Error No.
              └─────────────── Message
      └───────────────────────  Class
```
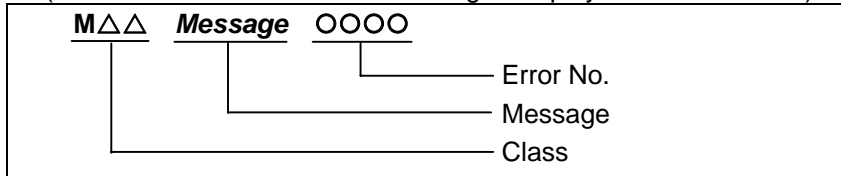
(1) Class: M01   Operation error

Alarms occurring due to incorrect operation by the operator during NC operation and those by machine trouble are displayed.

Error No.	Details	Remedy
0001	**Dog overrun** When returning to the reference position, the near-point detection limit switch did not stop over the dog, but overran the dog.	• Increase the length of the near-point dog. • Reduce the reference position return speed.
0002	**Some ax does not pass Z phase** One of the axes did not pass the Z-phase during the initial reference position return after the power was turned ON.	• Move the detector one rotation or more in the opposite direction of the reference position, and repeat reference position return.
0003	**R-pnt direction illegal** When manually returning to the reference position, the return direction differs from the axis movement direction selected with the AXIS SELECTION key.	• The selection of the AXIS SELECTION key's +/- direction is incorrect. The error is canceled by feeding the axis in the correct direction.
0004	**External interlock axis exists** The external interlock function has activated (the input signal is "OFF") and one of the axes has entered the interlock state.	• As the interlock function has activated, release it before resuming operation. • Check the sequence on the machine side. • Check for broken wires in the interlock signal line.
0005	**Internal interlock axis exists** The internal interlock state has been entered. The absolute position detector axis has been removed. A command for the manual/automatic simultaneous valid axis was issued from the automatic mode. The manual speed command was issued while the tool length measurement 1 signal is ON.	• The servo OFF function is valid, so release it first. • An axis that can be removed has been issued, so perform the correct operations. • The command is issued in the same direction as the direction where manual skip turned ON, so perform the correct operations. • During the manual/automatic simultaneous mode, the axis commanded in the automatic mode became the manual operation axis. Turn OFF the manual/automatic valid signal for the commanded axis. • Turn ON the power again, and perform absolute position initialization. • Turn OFF the tool length measurement 1 signal to start the program by the manual speed command.
0006	**H/W stroke end axis exists** The stroke end function has activated (the input signal is "OFF") and one of the axes is in the stroke end status.	• Move the machine manually. • Check for broken wires in the stroke end signal wire. • Check for trouble in the limit switch.

Error No.	Details	Remedy
0007	**S/W stroke end axis exists** The stored stroke limit I, II, IIB or IB function has activated.	• Move it manually. • If the stored stroke limit in the parameter is incorrectly set, correct it.
0008	**Chuck/tailstock stroke end ax** The chuck/tail-stock barrier function turned ON, and an axis entered the stroke end state.	• Reset the alarm with reset, and move the machine in the reverse direction.
0009	**Ref point return No. invalid** Return to the No. 2 reference position was performed before return to the No. 1 reference position was completed.	• Execute No. 1 reference position return.
0019	**Sensor signal illegal ON** The sensor signal was already ON when the tool measurement mode (TLM) signal was validated. The sensor signal turned ON when there was no axis movement after the tool measurement mode (TLM) signal was validated. The sensor signal turned ON at a position within 100μm from the final entry start position.	• Turn the tool measurement mode signal input OFF, and move the axis in a safe direction. • The operation alarm will turn OFF even when the sensor signal is turned OFF. **(Note)** When the tool measurement mode signal input is turned OFF, the axis can be moved in either direction. Pay attention to the movement direction.
0020	**Ref point retract invalid** Return to the reference position was performed before the coordinates had not been established.	• Execute reference position return
0021	**Tool ofs invld after R-pnt** Reference position return was performed during tool retract return, and therefore the tool compensation amount became invalid after reference position return was completed.	• The error is cleared if the operation mode is changed to other than reference position return before the axis performs reference position return. • The error is cleared when reference position return is completed. • The error is cleared if reset 1 is input or the emergency stop button is pushed.
0024	**R-pnt ret invld at abs pos alm** A zero point return signal was input during an absolute position detection alarm.	• Reset the absolute position detection alarm, and then perform zero point return.
0025	**R-pnt ret invld at zero pt ini** A zero point return signal was input during zero point initialization of the absolute position detection system.	• Complete zero point initialization, and then perform zero point return.
0030	**Now skip on** The skip signal remains input when the skip return operation changed to the measurement operation.	• Increase the skip return amount.
0031	**No skip** Even though 1st skip was to the correct position, the 2nd skip could not be found.	• Check whether the measurement target has moved.
0050	**Chopping axis R-pnt incomplete** The chopping axis has not completed zero point return before entering the chopping mode. All axes interlock will be applied.	• Reset or turn the chopping signal OFF, and then carry out zero point return.

Error No.	Details	Remedy
0051	**Synchronous error excessive** The synchronization error of the master and slave axes exceeded the allowable value under synchronous control. A deviation exceeding the synchronization error limit value was found with the synchronization deviation detection.	• Select the correction mode and move one of the axes in the direction in which the errors are reduced. • Increase the allowable value or reset it to 0 (check disabled). • When using simple C-axis synchronous control, set the contents of the R435 register to 0. • Check the parameter (#2024 synerr).
0053	**No spindle select signal** Synchronous tapping command was issued when the spindle select signals (SWS) for all spindles were OFF in the multiple-spindle control II.	• Turn ON the spindle select signal (SWS) responding to the tapping spindle before performing the synchronous tapping command.
0054	**No spindle serial connection** Synchronous tapping command was issued when the spindle that the spindle select signal (SWS) was ON was not serially connected in the multiple-spindle control II.	• Make sure the spindle select signal (SWS) for the responding spindle is ON. • When issuing a command, consider the machine construction.
0055	**Spindle fwd/rvs run para err** Asynchronous tapping command was issued when M code of the spindle frd/rvs run command set by the parameter "#3028 sprcmm" was one of the followings in the multiple-spindle control II. • One of M0, M1, M2, M30, M98, M99, M198 • M code No. that commands macro interrupt signal valid/invalid	• Change the value of the parameter #3028 sprcmm.
0056	**Tap pitch/thread number error** The command of the pitch/thread number is not correct in the synchronous tapping command of the multiple-spindle control II. The pitch is too small for the spindle rotation speed. Thread number is too large for the spindle rotation speed.	• Check the pitch/thread number and rotation speed of the tapping spindle.
0060	**Handle ratio too large** Handle ratio is too large for the rapid traverse rate (or external deceleration speed when external deceleration is valid).	• Set a smaller ratio.
0065	**R-pos offset value illegal** At the start of reference position initial setting, setting of reference position offset value (#2034 rfpofs) is other than 0.	• Set the reference position offset value (#2034 rfpofs) to 0, then turn the power ON again to perform reference position initial setting.
0066	**R-pos scan distance exceeded** Reference position could not be established within the maximum scan distance.	• Check the scale to see if it has dirt or damage. • Check if the servo drive unit supports this function.

Error No.	Details	Remedy
0101	**No operation mode**	• Check for a broken wire in the input mode signal wire. • Check for trouble in the mode selector switch. • Check the sequence program.
0102	**Cutting override zero** The "cutting feed override" switch on the machine operation panel is set to zero. The override was set to "0" during a single block stop.	• Set the "cutting feed override" switch to a value other than zero to clear the error. • When the "cutting feed override" switch is set to a value other than zero, check for a short circuit in the signal wire. • Check the sequence program.
0103	**External feed rate zero** "The manual feed speed" switch on the machine operation panel is set to zero when the machine is in the jog mode or automatic dry run mode. The "Manual feedrate B speed" is set to zero during the jog mode when manual feedrate B is valid. The "each axis manual feedrate B speed" is set to zero during the jog mode when each axis manual feedrate B is valid.	• Set "the manual feed speed" switch to a value other than zero to release the error. • If "the manual feed speed" switch is set to a value other than zero, check for a short circuit in the signal wire. • Check the sequence program.
0104	**F 1-digit feed rate zero** The F1-digit feedrate is set to zero when the F1-digit feed command is being executed.	• Set the F1-digit feedrate on the setup parameter screen.
0105	**Spindle stop** The spindle stopped during the synchronous feed command.	• Rotate the spindle. • If the workpiece is not being cut, start dry run. • Check for a broken wire in the spindle encoder cable. • Check the connections for the spindle encoder connectors. • Check the spindle encoder pulse. • Reconsider the program. (Command, address)
0106	**Handle feed ax No. illegal** An axis not found in the specifications was designated for handle feed or the handle feed axis was not selected.	• Check for broken wires in the handle feed axis selection signal wire. • Check the sequence program. • Check the No. of axes listed in the specifications.
0107	**Spindle rotation speed over** The spindle rotation speed exceeded the axis clamp speed during the thread cutting command.	• Lower the commanded spindle rotation speed.
0108	**Fixed pnt mode feed ax illegal** An axis not found in the specifications was designated for the fixed point mode feed or the fixed point mode feedrate is illegal.	• Check for broken wires in the fixed mode feed axis selection signal wire and fixed point mode feedrate wire. • Check the fixed point mode feed specifications.
0109	**Block start interlock** An interlock signal that locks the start of the block has been input.	• Check the sequence program.
0110	**Cutting block start interlock** An interlock signal that locks the start of the cutting block has been input.	• Check the sequence program.

Error No.	Details	Remedy
0111	**Restart switch ON** The restart switch was turned ON before the restart search was completed, and the manual mode was selected.	• Search the block to be restarted. • Turn OFF the restart switch.
0112	**Program check mode** The automatic start button was pressed during program check or in program check mode.	• Press the reset button to cancel the program check mode.
0113	**Auto start in buffer correct** The automatic start button was pressed during buffer correction.	• Press the automatic start button after buffer correction is completed.
0115	**In reset process** The automatic start button was pressed during resetting or tape rewinding.	• When rewinding the tape, wait for the winding to end, or press the reset button to stop the winding, and then press the automatic start button. • During resetting, wait for resetting to end, and then press the automatic start button.
0117	**Playback not possible** The playback switch was turned ON during editing.	• During editing, cancel the function by pressing the input or previous screen key, and then turn ON the playback switch.
0118	**Turn stop in normal line cntrl** The turning angle at the block joint exceeded the limit during normal line control. Normal line control type I The normal line control axis turning speed (#1523 C_feed) has not been set. Normal line control type II When turning in the inside of the arc, the parameter "#8041 C-rot. R" setting value is larger than the arc radius.	• Check the program. • Set the normal line control axis turning speed. (Parameter "#1523 C_feed") • Set the C axis turning diameter smaller than the arc radius, or check the setting value of the C axis turning diameter. (Parameter "#8041 C rot. R")
0119	**Reverse run impossible** Any of the following conditions are occurring. a) There is no block to run backward b) Eight blocks without a travel command continued	• a) Release with forward run. • b) Release with reset.
0120	**In synchronous correction mode** The synchronous correction mode switch was pressed in a non-handle mode.	• Select the handle or manual feed mode. • Turn OFF the correction mode switch.
0121	**No synchronous control option** The synchronous control system (register R2589) was set with no synchronous control option.	• Set 0 in register R2589.
0123	**Computer link B not possible** The cycle start was attempted before resetting was completed. An attempt was made to perform computer link B operation at the second part system and following in a multi-part system.	• Perform the cycle start after resetting is completed. • Set 0 in "#8109 HOST LINK", and then set 1 again before performing the cycle start. • The computer link B operation cannot be performed at the second part system and following in a multi-part system.
0124	**X/Z axes simultaneous prohibit** The basic axis corresponding to the inclined axis was started simultaneously in the manual mode while the inclined axis control was valid.	• Turn the inclined axis and basic axis start OFF for both axes. (This also applied for manual/automatic simultaneous start.) • Invalidate the basic axis compensation, or command one axis at a time.

Error No.	Details	Remedy
0125	**Rapid override zero** The "rapid traverse override" switch on the machine operation panel is set to zero.	• Set the "rapid traverse override" switch to a value other than zero to clear the error. • When the "rapid traverse override" switch is set to a value other than zero, check for a short circuit in the signal wire. • Check the sequence program.
0126	**Program restart machine lock** Machine lock was applied on the return axis while manually returning to the restart position.	• Release the machine lock before resuming operations.
0127	**Rot axis parameter error** The orthogonal coordinate axis name does not exist. The rotary axis name does not exist. The orthogonal coordinate axis name is duplicated. The number of axes that were selected to change tool length compensation along the tool axis amount exceeds the maximum number of axes. The orthogonal coordinate axis name is that of the rotary axis name.	• Review the rotational axis configuration parameters.
0128	**Restart pos return incomplete** Automatic return was performed with an axis whose return to the restart position was not complete.	• Perform restart position return manually. • Validate the parameter "automatic return by program restart" (#1302 AutoRP), then execute automatic start.
0150	**Chopping override zero** The override became "0" while performing the chopping operation.	• Check the chopping override (R2530). • Check the rapid traverse override (R2502).
0151	**Command axis chopping axis** A chopping axis movement command was issued from the program during the chopping mode. (This alarm will not occur when the movement amount is commanded as 0.) (All axes interlock state will be applied.)	• Reset, or turn OFF the chopping signal. When the chopping signal is turned OFF, the axis will return to the reference position, and then the program movement command will be executed.
0153	**Bottom dead center pos. zero** The bottom dead center position is set to the same position as the upper dead center position.	• Correctly set the bottom dead center position.
0154	**Chopping disable for handle ax** Chopping was started when the chopping axis was selected as the handle axis.	• Select an axis other than the chopping axis as the handle axis, or start chopping after changing the mode to another mode.
0160	**No speed set out of soft limit** Returned from the outside of the soft limit range for the axis with no maximum speed set for the outside of the soft limit range.	• Set the maximum speed for the outside of the soft limit range. (Parameter "#2021 out_f") • Change the soft limit range. (Parameter "#2013 OT-" "#2014 OT+")

Error No.	Details	Remedy
0166	**Aux axis changeover error** One of the following attempts was made on an axis that is switchable between NC axis and auxiliary axis. • A command was issued to an auxiliary axis from machining program. • When there were more than one NC axis having a same name, a command was issued to those axes from machining program. • NC axis control select signal was turned OFF while the NC axis was in motion. • NC axis control select signal was turned ON while the auxiliary axis was in motion.	• If you wish to issue a command to the axis from machining program, turn ON the NC axis control select signal so as to set the axis as an NC axis. • When more than one axis have a same name, let only one of the axes work as an NC axis. • Do not change NC axis control select signal while the axis is in motion.
0170	**Ill. op during T tip control** An attempt was made to perform an incorrect operation during tool tip center control.	• Change to the previous operation mode and reboot.
1005	**G114.n command illegal** An attempt was made to execute G114.n during execution of G114.n. G51.2 was commanded when the G51.2 spindle-spindle polygon machining mode was already entered with a separate part system.	• Cancel with G113. • Issue the spindle synchronous cancel signal (Y18B8: SPSYC). • Cancel with G50.2. • Cancel with the spindle-spindle polygon cancel signal (YCD1).
1007	**Spindle in-use by synchro tap** The spindle is being used in synchronized tapping.	• Cancel synchronized tapping.
1026	**SP-C ax ctrl runs independntly** C axis mode command was issued for polygon machining spindle. C axis mode command was issued for synchronized tapping spindle. Polygon command was issued for synchronized tapping spindle. Spindle is being used as spindle/C axis.	• Cancel the C axis command. • Cancel the polygon machining command. • Cancel the C axis with servo OFF.
1030	**Synchronization mismatch** Different M codes were commanded in the two part systems as the synchronization M codes. Synchronization with the "!" code was commanded in another part system during M code synchronization. Synchronization with the M code was commanded in another part system during synchronization with the "!" code.	• Correct the program so that the M codes match. • Correct the program so that the same synchronization codes are commanded.
1031	**Multiple C axes select invalid** The C axis selection signal was changed when multiple C axes could not be selected. An axis that cannot be controlled as the multiple C axes selection was selected.	• Check and correct the parameters and program.

Error No.	Details	Remedy
1032	**Tap retract Sp select illegal** Tap return was executed when a different spindle was selected. Cutting feed will wait until synchronization is completed.	• Select the spindle for which tap cycle was halted before the tap return signal was turned ON.
1033	**Sp-Sp polygon cut interlock** Cutting feed will wait until synchronization is completed.	• Wait for synchronization to end.
1034	**Mixed sync ctrl prmtr illegal** Mixed synchronization control exceeding the number of control axes was attempted. Mixed synchronization control with duplicated axis addresses was attempted.	• Check the parameter settings for mixed synchronization control.
1035	**Mixed sync ctrl disable modal** Mixed synchronization was commanded for a part system in which mixed synchronization control is disabled as shown below. 　• During nose R compensation mode 　• During pole coordinate interpolation mode 　• During cylindrical interpolation mode 　• During balance cut mode 　• During fixed cycle machining mode 　• During facing turret mirror image	• Check the program.
1036	**Synchro ctrl setting disable** The synchronous control operation method selection (R2589 register) was set when the mode was not the C axis mode. The synchronous control operation method selection (R2589 register) was set in the zero point not set state. Mirror image disable state 　The external mirror image or parameter mirror image was commanded during facing turret mirror image.	• Set the R2589 register to 0. • Check the program and parameters.
1037	**Synchro start/cancel disable** Synchronous control was started or canceled when synchronous control could not be started or canceled.	• Check the program and parameters.
1038	**Move cmnd invld to synchro ax** A movement command was issued to a synchronous axis in synchronous control.	• Check the program.
1106	**Sp synchro phase calc illegal** The spindle synchronization phase alignment command was issued while the spindle synchronization phase calculation request signal was ON.	• Check the program. • Check the sequence program.

(2) Class: M90   Message: Parameter set mode

M90 Messages output when the setup parameter lock function is enabled are displayed.

Error No.	Details	Remedy
-	Setup parameter lock released The setup parameter lock is released. Automatic start is disabled when setup parameters can be set.	Refer to the manual issued by the machine tool builder.

1.2 Stop Codes

These codes indicate a status that caused the controller to stop for some reason.

(The bold characters are the messages displayed on the screen.)

```
T△△   Message   ○○○○
                      └──── Error No.
               └──────────── Message
        └──────────────────── Class
```
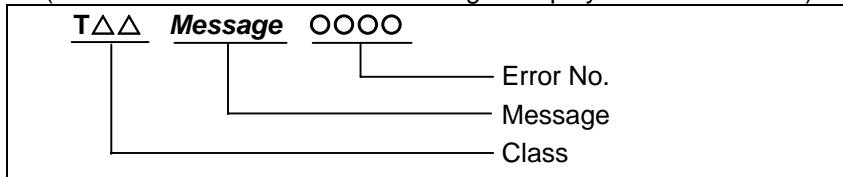
(1) Class: T01 Cycle start prohibit

This indicates the state where automatic operation cannot be started when attempting to start it from the stop state.

Error No.	Details	Remedy
0101	**Axis in motion** Automatic start is not possible as one of the axes is moving.	• Try automatic start again after all axes have stopped.
0102	**NC not ready** Automatic start is not possible as the NC is not ready.	• Another alarm has occurred. Check the details and remedy.
0103	**Reset signal ON** Automatic start is not possible as the reset signal has been input.	• Turn OFF the reset input signal. • Check that the reset switch is not ON constantly due to trouble. • Check the sequence program.
0104	**Auto operation pause signal ON** The FEED HOLD switch on the machine operation panel is ON (valid).	• Check the FEED HOLD switch. • The feed hold switch is the B contact. • Check for broken wires in the feed hold signal wire. • Check the sequence program.
0105	**H/W stroke end axis exists** Automatic start is not possible as one of the axes is at the stroke end.	• If one of the axis' ends is at the stroke end, move the axis manually. • Check for broken wire in the stroke end signal wire. • Check for trouble in the stroke end limit switch.
0106	**S/W stroke end axis exists** Automatic start is not possible as one of the axes is at the stored stroke limit.	• Move the axis manually. • If an axis is not at the end, check the parameter details.
0107	**No operation mode** The operation mode has not been selected.	• Select the automatic operation mode. • Check for broken wires in the automatic operation mode (memory, tape, MDI) signal wire.
0108	**Operation mode duplicated** Two or more automatic operation modes are selected.	• Check for a short circuit in the mode selection signal wire (memory, tape, MDI). • Check for trouble in the switch. • Check the sequence program.
0109	**Operation mode changed** The automatic operation mode changed to another automatic operation mode.	• Return to the original automatic operation mode, and start automatic start.

Error No.	Details	Remedy
0110	**Tape search execution** Automatic start is not possible as tape search is being executed.	• Begin automatic start after the tape search is completed.
0112	**Restart pos. return incomplete** Automatic start is not possible as the axis has not been returned to the restart position.	• Manually return to the restart position. • Turn the automatic restart valid parameter ON, and then execute automatic start.
0113	**CNC overheat** Automatic start is not possible because a thermal alarm (Z53 CNC overheat) has occurred.	• The NC controller temperature has exceeded the specified temperature. • Take appropriate measures to cool the unit.
0115	**Cycle st. prohibit(Host comm.)** Automatic start cannot be executed as the NC is communicating with the host computer.	• Execute automatic start after the communication with the host computer is completed.
0116	**Cycle st prohibit(Battery alm)** Automatic start cannot be executed because the voltage of the battery inserted in the NC control unit has dropped.	• Replace the battery of the NC control unit. • Contact the service center.
0117	**R-pnt offset value not set** As the reference position offset value has not been set, automatic operation cannot be used.	• Perform the initial reference position setting, then set the reference position offset value (#2034 rfpofs).
0138	**In absolute position alarm** A start signal was input during an absolute position detection alarm.	• Reset the absolute position detection alarm, and then input the start signal.
0139	**In abs posn initial setting** A start signal was input while initializing the absolute position detector's zero point.	• Complete zero point initialization before inputting the start signal.
0180	**Cycle start prohibit** Automatic start is disabled in servo auto turning valid.	• Set "0" to "#1164 ATS" when the servo auto turning is not executed.
0190	**Cycle start prohibit** Automatic start is disabled because setup parameters can be set.	• Refer to the manual issued by the machine tool builder.
0191	**Cycle start prohibit** Automatic start was caused during file deletion or writing.	• Cause automatic start after file deletion or writing is completed.
0193	**Cycle st. prohibit (Term exp'd)** Automatic start is disabled because the valid term has been expired.	• Enter the decryption code and turn the power ON again.

(2) Class: T02   Feed hold

The feed hold state been entered due to a condition in the automatic operation.

Error No.	Details	Remedy
0201	**H/W stroke end axis exists** An axis is at the stroke end.	• Manually move the axis away from the stroke end limit switch. • The machining program must be corrected.
0202	**S/W stroke end axis exists** An axis is at the stored stroke limit.	• Manually move the axis. • The machining program must be corrected.
0203	**Reset signal ON** The reset signal has been input.	• The program execution position has returned to the start of the program. Execute automatic operation from the start of the machining program.
0204	**Auto operation pause signal ON** The FEED HOLD switch is ON.	• Resume automatic operation by pressing the "CYCLE START" switch.
0205	**Operation mode changed** The operation mode changed to another mode during automatic operation.	• Return to the original automatic operation mode, and resume automatic operation by pressing the "CYCLE START" switch.
0206	**Acc/dec time cnst too large** The acceleration and deceleration time constants are too large. (This problem occurs at the same time as system alarm Z59.)	• Increase the set value of the parameter "#1206 G1bF". • Decrease the set value of the parameter "#1207 G1btL". • Lower the cutting speed.
0215	**Abs posn detect alarm occurred** An absolute position detection alarm occurred.	• Reset the absolute position detection alarm.
0220	**Aux axis changeover error** A movement command was issued to an auxiliary axis.	• When NC axis control selection signal is ON, automatic operation can be resumed by pressing the "CYCLE START" switch.

(3) Class: T03   Block stop

This indicates that automatic operation stopped after executing one block of the program.

Error No.	Details	Remedy
0301	**Single block stop signal ON** The SINGLE BLOCK switch on the machine operation panel is ON. The single block or machine lock switch changed.	• Automatic operation can be resumed by turning the CYCLE START switch ON.
0302	**Block stop cmnd in user macro** The block stop command was issued in the user macro program.	• Automatic operation can be resumed by turning the CYCLE START switch ON.
0303	**Operation mode changed** The automatic mode changed to another automatic mode.	• Return to the original automatic operation mode, and resume automatic operation by turning the CYCLE START switch ON.
0304	**MDI completed** The last block of MDI was completed.	• Set MDI again, and turn the CYCLE START switch ON to resume MDI operation.
0305	**Block start interlock** The interlock signal that locks the block start is entered.	• Check the sequence program.
0306	**Cutting blck start interlock** The interlock signal that locks the block cutting start is entered.	• Check the sequence program.
0310	**Inclined Z offset change** Whether to validate the offset of the inclined Z-axis switched during program operation.	• Automatic operation can be restarted by turning ON the CYCLE START switch.
0330	**Aux axis changeover error** NC axis control selection signal was OFF while traveling NC axis.	• When NC axis control selection signal is ON, automatic operation can be resumed by pressing the "CYCLE START" switch.

(4) Class: T04   Collation stop

This indicates that collation stop was applied during automatic operation.

Error No.	Details	Remedy
0401	**Collation stop** Collation stop occurred.	• Automatic operation can be restarted with automatic start.

(5) Class: T10   Fin wait

This indicates the operation state when an alarm did not occur during automatic operation, and nothing seems to have happened.

Error No.	Details
0□□□	The error number is displayed while each of the completion wait modes listed in the table below is ON. It disappears when the mode is canceled.

Alarm No.	Unclamp signal wait (Note 2)	In dwell execution
0		
1		×
8	×	
9	×	×

Alarm No.	Door open (Note 1)	Waiting for spindle position to be looped
0		
1		×
8	×	
9	×	×

Alarm No.	Waiting for spindle orientation to complete	Waiting for cutting speed deceleration	Waiting for rapid traverse deceleration	Waiting for MSTB completion
0				
1				×
2			×	
3			×	×
4		×		
5		×		×
6		×	×	
7		×	×	×
8	×			
9	×			×
A	×		×	
B	×		×	×
C	×	×		
D	×	×		×
E	×	×	×	
F	×	×	×	×

(Note 1) This mode is enabled by the door interlock function.
(Note 2) The system is waiting for the index table indexing unclamp signal to turn ON or OFF

1.3 Servo/Spindle Alarms

This section describes alarms occurred by the errors in the servo system such as the drive unit, motor and encoder, etc. The alarm message, alarm No. and axis name will display on the alarm message screen. The axis where the alarm occurred and the alarm No. will also display on the servo monitor screen and the spindle monitor screen respectively. If several alarms have occurred, up to two errors per axis will display on the servo monitor screen and the spindle monitor screen respectively.

(Note 1) The alarm class and alarm reset method combinations are preset.

Alarm class	Reset method	Resetting methods
S01	PR	After removing the cause of the alarm, reset the alarm by turning the NC power ON again.
S02	PR	After correcting the parameter, reset the alarm by turning ON the NC power again.
S03	NR	After removing the cause of the alarm, reset the alarm by inputting the NC RESET key.
S04	AR	After removing the cause of the alarm, reset the alarm by turning the drive unit power ON again.
S51	-	This is cleared if a correct value is set.
S52	-	-

(Note 2) The resetting method may change according to the alarm class.
For example, even if "S03 SERVO ALARM: NR" is displayed, it may be necessary to turn the NC power ON again.

```
SOO    Message    :  xx    ΔΔΔΔ    □
                                    │         ┌ Servo   : Axis name
                                    └ Axis name ┤
                                              └ Spindle : "S1","S2","S3","S4"
                                    Alarm No. (Parameter No.)
                                    Reset method
                                    Message
                                    Alarm class
```
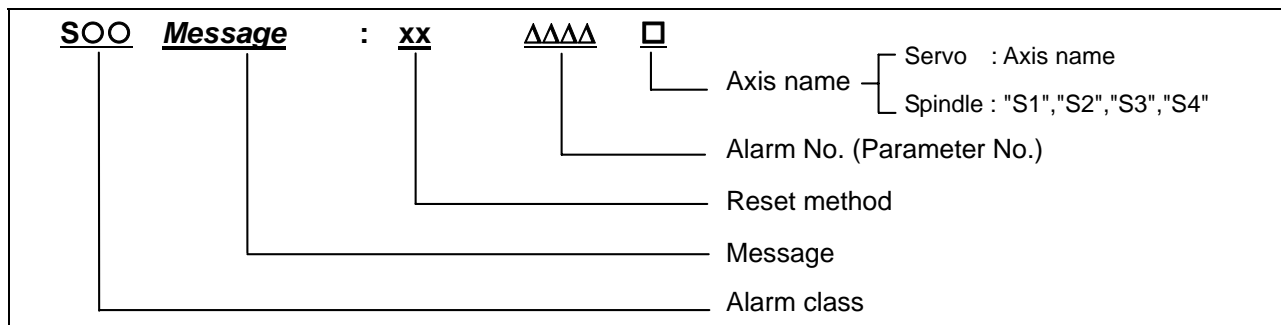
(1) Class: S01/S03/S04   Servo alarm

(a) Servo drive unit alarm

No.	Message	Details	Reset method	Stop method
0010	Insufficient voltage	A drop of bus voltage was detected in main circuit.	PR	Dynamic stop
0011	Axis selection error	The axis selection rotary switch has been incorrectly set.	AR	Initial error
0012	Memory error 1	A hardware error was detected during the power ON self-check.	AR	Initial error
0013	Software processing error 1	An error was detected for the software execution state.	PR	Dynamic stop
0016	Init mag pole pos detect err	The initial magnetic pole position, detected in the initial magnetic pole position detection control, is not reliable. In the DC excitation function, this error will be detected when the servo ON has been set before the magnetic pole shift amount is set while the absolute position detector is used.	PR	Dynamic stop
0017	A/D converter error	A current feedback error was detected.	PR	Dynamic stop
0018	Motor side dtc: Init commu err	An error was detected in the initial communication with the motor side detector.	PR	Initial error
001A	Machine side dtc: Init comu er	An error was detected in the initial communication with the machine side detector.	PR	Initial error
001B	Machine side dtc: Error 1	An error was detected by the detector connected to the machine side. The error details are different according to the connected detector. Refer to "Detector alarm".		Dynamic stop
001C	Machine side dtc: Error 2			
001D	Machine side dtc: Error 3			
001E	Machine side dtc: Error 4			
001F	Machine side dtc: Commu error	An error was detected in the communication with the machine side detector.	PR	Dynamic stop
0021	Machine side dtc: No signal	An error was detected in the ABZ-phase in the full closed loop control system.	PR	Dynamic stop
0024	Grounding	The motor power cable is in contact with FG (Frame Ground).	PR	Dynamic stop
0025	Absolute position data lost	The absolute position was lost in the detector.	AR	Initial error
0026	Unused axis error	A power module error was detected on the axis set to Free.	PR	Dynamic stop
0027	Machine side dtc: Error 5	An error was detected by the detector connected to the machine side. The error details are different according to the connected detector. Refer to "Detector alarm".		Dynamic stop
0028	Machine side dtc: Error 6			
0029	Machine side dtc: Error 7			
002A	Machine side dtc: Error 8			
002B	Motor side dtc: Error 1	An error was detected by the detector connected to the motor side. The error details are different according to the connected detector. Refer to "Detector alarm".		Dynamic stop
002C	Motor side dtc: Error 2			
002D	Motor side dtc: Error 3			
002E	Motor side dtc: Error 4			
002F	Motor side dtc: Commu error	An error was detected in the communication with the motor side detector.	PR	Dynamic stop
0030	Over regeneration	Over-regeneration level exceeded 100%. The regenerative resistor is overloaded.	PR	Dynamic stop
0031	Overspeed	The motor speed exceeded the allowable speed.	PR	Deceleration stop enabled
0032	Power module overcurrent	The power module detected the overcurrent.	PR	Dynamic stop
0033	Overvoltage	The bus voltage in main circuit exceeded the allowable value.	PR	Dynamic stop
0034	NC-DRV commu: CRC error	An error was detected in the data received from the NC.	PR	Deceleration stop enabled

No.	Message	Details	Reset method	Stop method
0035	NC command error	The travel command data received from the NC was excessive.	PR	Deceleration stop enabled
0036	NC-DRV commu: Commu error	The communication with the NC was interrupted.	PR	Deceleration stop enabled
0037	Initial parameter error	An incorrect set value was detected among the parameters send from the NC at the power ON.	PR	Initial error
0038	NC-DRV commu: Protocol error 1	An error was detected in the communication frames received from the NC.	PR	Deceleration stop enabled
0039	NC-DRV commu: Protocol error 2	An error was detected in the axis data received from the NC.	PR	Deceleration stop enabled
003A	Overcurrent	Excessive motor drive current was detected.	PR	Dynamic stop
003B	Power module overheat	The power module detected an overheat.	PR	Dynamic stop
003C	Regeneration circuit error	An error was detected in the regenerative transistor or in the regenerative resistor.	PR	Dynamic stop
003D	Pw sply volt err acc/dec	A motor control error, due to an input voltage failure, was detected.	PR	Dynamic stop
003E	Magnet pole pos detect err	The magnetic pole position, detected in the magnetic pole position detection control, is not reliable.	AR	Dynamic stop
0041	Feedback error 3	Either a missed feedback pulse in the motor side detector or an error in the Z-phase was detected in the full closed loop system.	PR	Dynamic stop
0042	Feedback error 1	Either a missed feedback pulse in the detector used for the position detection or an error in the Z-phase was detected.	PR	Dynamic stop
0043	Feedback error 2	An excessive difference in feedback was detected between the machine side detector and the motor side detector.	PR	Dynamic stop
0045	Fan stop	An overheat of the power module was detected during the cooling fan stopping.	PR	Dynamic stop
0046	Motor overheat	Either the motor or the motor side detector detected an overheat.	NR	Deceleration stop enabled
0048	Motor side dtc: Error 5	An error was detected by the detector connected to the motor side. The error details are different according to the connected detector. Refer to "Detector alarm".		Dynamic stop
0049	Motor side dtc: Error 6			
004A	Motor side dtc: Error 7			
004B	Motor side dtc: Error 8			
004F	Instantaneous power interrupt	The control power supply has been shut down for 50ms or more.	NR	Deceleration stop enabled
0050	Overload 1	Excessive load current was detected.	NR	Deceleration stop enabled
0051	Overload 2	Excessive load current was detected.	NR	Deceleration stop enabled
0052	Excessive error 1	A position tracking error was detected. (during servo ON)	NR	Deceleration stop enabled
0053	Excessive error 2	A position tracking error was detected. (during servo OFF)	NR	Dynamic stop
0054	Excessive error 3	The anomalous motor current was detected at the detection of Excessive error 1.	NR	Dynamic stop
0058	Collision detection 1: G0	A disturbance torque exceeded the tolerable disturbance torque in rapid traverse modal (G0). The tolerable disturbance torque is decided by SV060:TLMT.	NR	Maximum capacity deceleration stop
0059	Collision detection 1: G1	A disturbance torque exceeded the tolerable disturbance torque in the cutting feed modal (G1). The tolerable disturbance torque is decided by SV060:TLMT and SV035:SSF4/clG1(bitC, bitD and bitE).	NR	Maximum capacity deceleration stop
005A	Collision detection 2	A current command with the maximum capacity current value was detected.	NR	Maximum capacity deceleration stop
005B	Sfty obsrvation: Cmd spd err	A commanded speed exceeding the safe speed was detected in speed monitoring mode.	PR	Deceleration stop enabled

No.	Message	Details	Reset method	Stop method
005D	Sfty obsrvation: Door stat err	The door state signal input in the NC does not coincide with the door state signal input in the drive unit. Otherwise, door open state was detected in normal mode.	PR	Deceleration stop enabled
005E	Sfty obsrvation: FB speed err	A motor speed exceeding the safe speed was detected in the speed monitoring mode.	PR	Deceleration stop enabled
005F	External contactor error	A contact of the external contactor is welding.	NR	Deceleration stop enabled
0060 ~ 0077	Power supply alarm	The power supply unit detected an error. The error details are different according to the connected power supply unit. Refer to "Power supply alarm".		Dynamic stop
0080	Motor side dtc: cable err	A difference of type was detected between the motor side detector and the cable connected to the detector. Otherwise, the cable type for the motor side detector was not successfully achieved.	AR	Initial error
0081	Machine side dtc: cable err	A difference of type was detected between the machine side detector and the cable connected to the detector. Otherwise, the cable type for the machine side detector was not successfully achieved.	AR	Initial error
0087	Drive unit communication error	The communication frame between drivers was aborted.	PR	Dynamic stop
0088	Watchdog	The drive unit does not operate correctly.	AR	Dynamic stop
008A	Drivers commu data error 1	The communication data 1 between drivers exceeded the tolerable value in the communication between drivers.	PR	Dynamic stop
008B	Drivers commu data error 2	The communication data 2 between drivers exceeded the tolerable value in the communication between drivers.	PR	Dynamic stop

(Note1) Definitions of terms in the table are as follows.
　　　　Motor side detector: Detector connected to CN2　　　Machine side detector: Detector connected to CN3
(Note2) Resetting methods
　　　　NR: Reset with the NC RESET button. This alarm can also be reset with the PR and AR resetting conditions.
　　　　PR: Reset by turning the NC power ON again. This alarm can also be reset with the AR resetting conditions.
　　　　　　When the control axis is removed, this alarm can be reset with the NC RESET button. (Excluding alarms 32 and 37.)
　　　　AR: Reset by turning the servo drive unit power ON again.

Separate table : Detector alarm　(Servo drive unit)

Alarm number when the detector is connected to the motor side		2B	2C	2D	2E	48	49	4A	4B
Alarm number when the detector is connected to the machine side		1B	1C	1D	1E	27	28	29	2A
OSA17 OSE104, OSE105 OSA104, OSA105 OSA405, OSA166	MITSUBISHI	Memory alarm	LED alarm	Data alarm	-	-	-	-	-
OSA18		CPU alarm	-	Data alarm	-	-	-	-	-
MDS-B-HR		Memory error	-	Data error	-	Scale not connected	-	-	-
AT343, AT543	Mitutoyo	Initialization error	EEPROM error	Photoelectric type, static capacity type data mismatch	ROM/RAM error	CPU error	Photoelectric type overspeed	Static capacity type error	Photoelectric type error
LC191M, LC491M RCN723, RCN223 APE391M	HEIDENHAIN	Initialization error	EEPROM error	Relative/ absolute position data mismatch	ROM/RAM error	CPU error	Overspeed	Absolute position data error	Relative position data error
Futaba absolute position scale	Futaba	-	-	-	-	-	-	Waveform error	Overspeed Absolute position is lost
MP scale, MPI scale	Mitsubishi Heavy Industries	Installation accuracy fault	-	Detection position deviance	Scale breaking	Absolute value detection fault	-	Gain fault	Phase fault
MJ831	SONY	-	-	-	-	-	-	-	Detector alarm

(Note1) Definitions of terms in the table are as follows.
　　　　Motor side detector: Detector connected to CN2　　　Machine side detector: Detector connected to CN3
(Note2) A driver processes all reset types of alarms as "PR". However, "AR" will be applied according to the detector.

(b) Spindle drive unit alarm

No.	Message	Details	Reset method	Stop method
0010	Insufficient voltage	A drop of bus voltage was detected in main circuit.	PR	Coast to a stop
0011	Axis selection error	The axis selection rotary switch has been incorrectly set.	AR	Initial error
0012	Memory error 1	A hardware error was detected during the power ON self-check.	AR	Initial error
0013	Software processing error 1	An error was detected for the software execution state.	PR	Coast to a stop
0016	Init mag pole pos detect err	The magnetic pole position, detected in the initial magnetic pole position detection control, is not reliable.	PR	Coast to a stop
0017	A/D converter error	A current feedback error was detected.	PR	Coast to a stop
0018	Motor side dtc: Init commu err	An error was detected in the initial communication with the motor side detector.	PR	Initial error
0019	Detector commu err in syn cont	An error was detected in the communication with the extended connection detector.	PR	Coast to a stop
001A	Machine side dtc: Init comu er	An error was detected in the initial communication with the machine side detector.	PR	Initial error
001B	Machine side dtc: Error 1	An error was detected by the detector connected to the machine side. The error details are different according to the connected detector. Refer to "Detector alarm".		Coast to a stop
001C	Machine side dtc: Error 2			
001D	Machine side dtc: Error 3			
001E	Machine side dtc: Error 4			
001F	Machine side dtc: Commu error	An error was detected in the communication with the machine side detector.	PR	Coast to a stop
0020	Motor side dtc: No signal	The cable type of the motor side detector does not coincide with the detector type set with the parameter.	PR	Initial error
0021	Machine side dtc: No signal Excessive speed error	The cable type of the machine side detector does not coincide with the detector type set with the parameter.	PR	Initial error
		An error was detected in the ABZ-phase in the full closed loop control system.	PR	Coast to a stop
0023	Grounding	An excessive speed tracking error was detected (during servo ON).	NR	Coast to a stop
0024	Machine side dtc: No signal	A grounding of the motor power cable or motor was detected.	AR	Coast to a stop
0026	Unused axis error	A power module error was detected on the axis set to Free.	PR	Coast to a stop
0027	Machine side dtc: Error 5	An error was detected by the detector connected to the machine side. The error details are different according to the connected detector. Refer to "Detector alarm".		Coast to a stop
0028	Machine side dtc: Error 6			
0029	Machine side dtc: Error 7			
002A	Machine side dtc: Error 8			
002B	Motor side dtc: Error 1	An error was detected by the detector connected to the motor side. The error details are different according to the connected detector. Refer to "Detector alarm".		Coast to a stop
002C	Motor side dtc: Error 2			
002D	Motor side dtc: Error 3			
002E	Motor side dtc: Error 4			
002F	Motor side dtc: Commu error	An error was detected in the communication with the motor side detector.	PR	Coast to a stop
0030	Over regeneration	Over-regeneration level exceeded 100%. The regenerative resistor is overloaded.	PR	Coast to a stop
0031	Overspeed	The motor speed exceeded the allowable speed.	PR	Deceleration stop enabled
0032	Power module overcurrent	The power module detected the overcurrent.	PR	Coast to a stop
0033	Overvoltage	The bus voltage in main circuit exceeded the allowable value.	PR	Coast to a stop
0034	NC-DRV commu: CRC error	An error was detected in the data received from the NC.	PR	Deceleration stop enabled
0035	NC command error	An error was detected in the travel command data received from the NC.	PR	Deceleration stop enabled
0036	NC-DRV commu: Commu error	The communication with the NC was interrupted.	PR	Deceleration stop enabled
0037	Initial parameter error	An incorrect set value was detected among the parameters send from the NC at the power ON.	PR	Initial error

No.	Message	Details	Reset method	Stop method
0038	NC-DRV commu: Protocol error 1	An error was detected in the communication frames received from the NC.	PR	Deceleration stop enabled
0039	NC-DRV commu: Protocol error 2	An error was detected in the axis data received from the NC.	PR	Deceleration stop enabled
003A	Overcurrent	Excessive motor drive current was detected.	PR	Coast to a stop
003B	Power module overheat	The power module detected an overheat.	PR	Coast to a stop
003C	Regeneration circuit error	An error was detected in the regenerative transistor or in the regenerative resistor.	PR	Coast to a stop
003E	Magnet pole pos detect err	The magnetic pole position, detected in the magnetic pole position detection control, is not reliable.	AR	Coast to a stop
0041	Feedback error 3	An error was detected in the feedback of the motor side detector.	PR	Coast to a stop
0042	Feedback error 1	An error was detected in the feedback of the machine side detector.	PR	Coast to a stop
0043	Feedback error 2	An excessive difference in feedback was detected between the motor side detector and the machine side detector.	PR	Coast to a stop
0045	Fan stop	A cooling fan in the drive unit stopped.	PR	Coast to a stop
0046	Motor overheat	Either the motor or the motor side detector detected an overheat.	NR	Deceleration stop enabled
0048	Motor side dtc: Error 5	An error was detected by the detector connected to the motor side. The error details are different according to the connected detector. Refer to "Detector alarm".		Coast to a stop
0049	Motor side dtc: Error 6			
004A	Motor side dtc: Error 7			
004B	Motor side dtc: Error 8			
004C	Current err mag pole estim	Current detection failed at the pulse-applied magnetic pole estimation by IPM spindle motor.	NR	Coast to a stop
004E	NC command mode error	An error was detected in the spindle control mode send from the NC.	NR	Deceleration stop enabled
004F	Instantaneous power interrupt	The control power supply has been shut down for 50ms or more.	NR	Deceleration stop enabled
0050	Overload 1	Excessive load current was detected.	NR	Deceleration stop enabled
0051	Overload 2	Excessive load current was detected.	NR	Deceleration stop enabled
0052	Excessive error 1	A position tracking error was detected. (during servo ON)	NR	Deceleration stop enabled
0054	Excessive error 3	The anomalous motor current was detected at the detection of Excessive error 1.	NR	Coast to a stop
005B	Sfty obsrvation: Cmd spd err	A commanded speed exceeding the safe speed was detected in speed monitoring mode.	PR	Deceleration stop enabled
005D	Sfty obsrvation: Door stat err	The door state signal input in the NC does not coincide with the door state signal input in the drive unit. Otherwise, door open state was detected in normal mode.	PR	Deceleration stop enabled
005E	Sfty obsrvation: FB speed err	A motor speed exceeding the safe speed was detected in the speed monitoring mode.	PR	Deceleration stop enabled
005F	External contactor error	A contact of the external contactor is welding.	NR	Deceleration stop enabled
0060 ~ 0077	Power supply alarm	The power supply unit detected an error. The error details are different according to the connected power supply unit. Refer to "Power supply alarm".		Coast to a stop
0080	Motor side dtc: cable err	The connected cable type does not coincide with the motor side detector type.	PR	Initial error
0081	Machine side dtc: cable err	The connected cable type does not coincide with the machine side detector type.	PR	Initial error
0087	Drive unit communication error	The communication frame between drivers was aborted.	PR	Coast to a stop
0088	Watchdog	The drive unit does not operate correctly.	AR	Coast to a stop
008A	Drivers commu data error 1	The communication data 1 between drivers exceeded the tolerable value in the communication between drivers.	PR	Coast to a stop
008B	Drivers commu data error 2	The communication data 2 between drivers exceeded the tolerable value in the communication between drivers.	PR	Coast to a stop

(Note) Resetting methods
    NR: Reset with the NC RESET button. This alarm can also be reset with the PR and AR resetting conditions.
    PR: Reset by turning the NC power ON again. This alarm can also be reset with the AR resetting conditions.
        When the control axis is removed, this alarm can be reset with the NC RESET button. (Excluding alarms 32 and 37.)
    AR: Reset by turning the servo drive unit power ON again.

Separate table : Detector alarm (Spindle drive unit)

Alarm number when the detector is connected to the motor side		2B	2C	2D	2E	48	49	4A	4B
Alarm number when the detector is connected to the machine side		1B	1C	1D	1E	27	28	29	2A
TS5690 TS5691	MITSUBISHI	Memory error	Waveform error	-	-	-	Overspeed	-	Relative position data error
MDS-B-HR		Initialization error	-	Data error	-	Connection error	-	-	-
OSA18		CPU error	-	Data error	-	-	-	-	-
ERM280 + APE391M	HEIDENHAIN	Initialization error	EEPROM error	-	-	CPU error	Overspeed	-	Relative position data error
MPCI scale	Mitsubishi Heavy Industries	Installation accuracy fault	-	Detection position deviance	Scale breaking	-	-	Gain fault	Phase fault

(Note) A driver processes all reset types of alarms as "PR". However, "AR" will be applied according to the detector.

(c) Power supply alarm

No.	LED display	Message	Details	Reset method
0061		Pw sply: Pwr module overcurnt	Overcurrent protection function in the power module has started its operation.	PR
0062		Pw sply: Frequency error	The input power supply frequency increased above the specification range.	PR
0067		Pw sply: Phase interruption	An open-phase condition was detected in input power supply circuit.	PR
0068		Pw sply: Watchdog	The system does not operate correctly.	AR
0069		Pw sply: Grounding	The motor power cable is in contact with FG (Frame Ground).	PR
006A		Pw sply: Ext contactor weld	A contact of the external contactor is welding.	PR
006B		Pw sply: Rush relay welding	A resistor relay for rush short circuit fails to be OFF.	PR
006C		Pw sply: Main circuit error	An error was detected in charging operation of the main circuit capacitor.	PR
006E		Pw sply: Memory error/AD error	An error was detected in the internal memory or A/D converter.	AR
006F		Power supply error	No power supply is connected to the drive unit, or a communication error was detected.	AR
0070		Pw sply: Ext emergency stp err	A mismatch of the external emergency stop input and NC emergency stop input continued for 30 seconds.	PR
0071		Pw sply: Instant pwr interrupt	The power was momentarily interrupted.	NR
0072		Pw sply: Fan stop	A cooling fan built in the power supply unit stopped, and overheat occurred in the power module.	PR
0073		Pw sply: Over regeneration	Over-regeneration detection level became over 100%. The regenerative resistor is overloaded. This alarm cannot be reset for 15 min from the occurrence to protect the regeneration resistor. Leave the drive system energized for more than 15 min, then turn the power ON to reset the alarm.	NR
0075		Pw sply: Overvoltage	L+ and L- bus voltage in main circuit exceeded the allowable value. As the voltage between L+ and L- is high immediately after this alarm, another alarm may occur if this alarm is reset in a short time. Wait more than 5 min before resetting so that the voltage drops.	NR
0076		Pw sply: Ext EMG stop set err	The rotary switch setting of external emergency stop is not correct, or a wrong external emergency stop signal is input.	AR
0077		Pw sply: Power module overheat	Thermal protection function in the power module has started its operation.	PR

(Note 1) If a power supply alarm (60 to 77) occurs, all servos will stop with the dynamic brakes, and all spindles will coast to a stop.
(Note 2) "b", "C" and "d" displayed on the power supply unit's LED as a solid light (not flickering) do not indicate an alarm.

(2) Class: S02   Message: Initial parameter error

An error was found in the parameters transmitted from the controller to the drive unit when the power was turned ON.
Remove the cause of the alarm, and then reset the alarm by turning the controller power OFF once.

Alarm No.	Details	Remedy
2201 to 2264	The servo parameter setting data is illegal. The alarm No. is the No. of the servo parameter where the error occurred.	Check the descriptions for the appropriate servo parameters and correct them.
2301	The number of constants to be used in the following functions is too large: • Electronic gears • Position loop gain • Speed feedback conversion	Check that all the related parameters are specified correctly. sv001:PC1, sv002:PC2, sv003:PGN1 sv018:PIT, sv019:RNG1, sv020:RNG2
2302	When high-speed serial incremental detector (OSE104, OSE105) is connected, parameters for absolute position are set to ON. Set the parameters for absolute position detection to OFF. To detect an absolute position, replace the incremental specification detector with an absolute position detector.	Check that all the related parameters are specified correctly. sv017:SPEC, sv025:MTYP
2303	No servo option is found. The closed loop (including the ball screw-end detector) or dual feedback control is an optional function.	Check that all the related parameters are specified correctly. sv025:MTYP/pen sv017:SPEC/dfbx
2304	No servo option is found. The SHG control is an optional function.	Check that all the related parameters are specified correctly. sv057:SHGC sv058:SHGCsp
2305	No servo option is found. The adaptive filtering is an optional function.	Check that all the related parameters are specified correctly. sv027:SSF1/aflt
13001 to 13256	Parameter error The spindle parameter setting data is illegal. The alarm No. is the No. of the spindle parameter where the error occurred.	Check the descriptions for the appropriate spindle parameters and correct them. Refer to Alarm No.37 in Spindle Drive Maintenance Manual.

(3) Class: S51   Message: Parameter error

This warning is displayed if a parameter outside the tolerance range is set.
Illegal settings will be ignored.
This alarm will be reset when a correct value is set.

Alarm No.	Details	Remedy
2201 to 2264	Servo parameter setting data is illegal. The alarm No. is the No. of the servo parameter where the warning occurred.	Check the descriptions for the appropriate servo parameters and correct them.
13001 to 13256	Spindle parameter setting data is illegal. The alarm No. is the No. of the spindle parameter where the warning occurred.	Check the descriptions for the appropriate spindle parameters and correct them. Refer to Spindle Drive Maintenance Manual.

(4) Class: S52 Servo warning

When a warning occurs, a warning No. will appear on the NC monitor screen and with the LEDs on the front of the drive unit. Check the warning No., and remove the cause of the warning by following this list.

(a) Servo drive unit warning

No.	Message	Details	Reset method	Stop method
0096	Scale feedback error	An excessive difference in feedback amount was detected between the motor side detector and the MPI scale in MPI scale absolute position detection system.	*	-
0097	Scale offset error	An error was detected in the offset data that is read at the NC power-ON in MPI scale absolute position detection system.	PR	-
009E	Absolute position detector: Revolution counter error	An error was detected in the revolution counter data of the absolute position detector. The accuracy of absolute position is not guaranteed.	*	-
009F	Battery voltage drop	The battery voltage to be supplied to the absolute position detector is dropping.	*	-
00A6	Fan stop warning	A cooling fan in the drive unit stopped.	*	-
00E0	Overregeneration warning	Over-regeneration detection level exceeded 80%.	*	-
00E1	Overload warning	A level of 80% of the Overload 1 alarm state was detected.	*	-
00E4	Set parameter warning	An incorrect set value was detected among the parameters send from the NC in the normal operation.	*	-
00E6	Control axis detachment warning	A control axis is being detached. (State display)	*	-
00E7	In NC emergency stop state	In NC emergency stop. (State display)	*	Deceleration stop enabled
00E8 ~ 00EF	Power supply warning	The power supply unit detected a warning. The error details are different according to the connected power supply unit. Refer to "Power supply warning".	*	- *EA : Deceleration stop enabled

(Note1) Definitions of terms in the table are as follows.
    Motor side detector: Detector connected to CN2   Machine side detector: Detector connected to CN3
(Note 2) Resetting methods
    *: Automatically reset once the cause of the warning is removed.
    NR: Reset with the NC RESET button. This warning can also be reset with the PR and AR resetting conditions.
    PR: Reset by turning the NC power ON again. This warning can also be reset with the AR resetting conditions.
        When the control axis is removed, this warning can be reset with the NC RESET button. (Excluding warning 93.)
    AR: Reset by turning the servo drive unit power ON again.
(Note 3) Servo and spindle motor do not stop when the warning occurs.
(Note 4) When an emergency stop is input, servo and spindle motor decelerate to a stop.
    (When SV048, SV055 or SV056 is set for servo and when SP055 or SP056 is set for spindle.)

(b) Spindle drive unit warning

No.	Message	Details	Reset method	Stop method
00A6	Fan stop warning	A cooling fan in the drive unit stopped.	*	-
00E0	Overregeneration warning	Over-regeneration detection level exceeded 80%.	*	-
00E1	Overload warning	A level of 80% of the Overload 1 alarm state was detected.	*	-
00E4	Set parameter warning	A parameter was set to the value over the setting range.	*	-
00E6	Control axis detachment warning	A control axis is being detached. (State display)	*	-
00E7	In NC emergency stop state	In NC emergency stop. (State display)	*	Deceleration stop enabled
00E8 ~ 00EF	Power supply warning	The power supply unit detected a warning. The error details are different according to the connected power supply unit. Refer to "Power supply warning".	*	-

(Note 1) Resetting methods
    *: Automatically reset once the cause of the warning is removed.
    NR: Reset with the NC RESET button. This warning can also be reset with the PR and AR resetting conditions.
    PR: Reset by turning the NC power ON again. This warning can also be reset with the AR resetting conditions.
        When the control axis is removed, this warning can be reset with the NC RESET button. (Excluding warning 93.)
    AR: Reset by turning the servo drive unit power ON again.
(Note 2) Servo and spindle motor do not stop when the warning occurs.
(Note 3) When an emergency stop is input, servo and spindle motor decelerate to a stop.
    (When SV048, SV055 or SV056 is set for servo and when SP055 or SP056 is set for spindle.)

(c) Power supply warning

No.	LED display	Message	Details	Reset method
00E9	P	Instantaneous power interruption warning	The power was momentarily interrupted.	NR
00EA	q	In external emergency stop state	External emergency stop signal was input.	*
00EB	r	Power supply: Over regeneration warning	Over-regeneration detection level exceeded 80%.	*
00EE	u	Pw sply: Fan stop warning	A cooling fan built in the power supply unit stopped.	*

(Note 1) Resetting methods

　　　*: Automatically reset once the cause of the warning is removed.

　　　NR: Reset with the NC RESET button. This warning can also be reset with the PR and AR resetting conditions.

　　　PR: Reset by turning the NC power ON again. This warning can also be reset with the AR resetting conditions.

　　　　When the control axis is removed, this warning can be reset with the NC RESET button. (Excluding warning 93.)

　　　AR: Reset by turning the servo drive unit power ON again.

(Note 2) Servo and spindle motor do not stop when the warning occurs.

1.4 MCP Alarm

An error has occurred in the drive unit and other interfaces. (The bold characters are the messages displayed on the screen.)

```
Y△△   Message   OOOO   OOOO
                             └── Alarm No.
                         ──────── Error No.
                     ──────────── Message
        ──────────────────────── Class
```
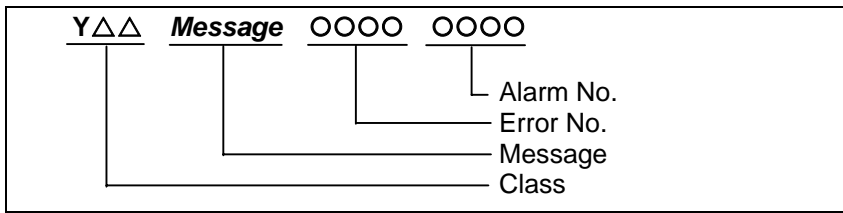
(1) Class: Y02 System alarm

An error occurred in the data transmitted between the MCP and drive unit after the power was turned ON.

Error No.	Details		Remedy
0050	**System alm: Process time over**		The software or hardware may be damaged. Contact the service center.
0051	**Alarm No.**		A communication error has occurred between the controller and drive unit.
	0000	**SV commu er: CRC error 1** (10 times/910.2 ms)	• Take measures against noise.
	0001	**SV commu er: CRC error 2** (2 continuous times)	• Check that the communication cable connector between the controller and drive unit and one between the drive units are tight.
	0002	**SV commu er: Recv timing err** (2 continuous times)	• Check whether the communication cable between the controller and drive unit and one between the drive units are disconnected.
	xy03	**SV commu er: Data ID error** (2 continuous times) x: Channel No. (0 to) y: Drive unit rotary switch No. (0 to)	• A drive unit may be faulty. Take a note of the 7-segment LED contents of each drive unit and report to the Service Center.
	xy04	**SV commu er: Recv frame No.** (2 continuous times) x: Channel No. (0 to) y: Number of reception frame -1 (0 to)	• Update the drive unit software version.
	x005	**SV commu er: Commu error** (No error classification) x: Channel No. (0 to)	
	x006	**SV commu er: Connect error** x: Channel No. (0 to)	
	xy20	**SV commu er: Init commu error** The drive unit could not shift to the initial communication run time and stopped. x: Channel No. (0 to) y: Drive unit rotary switch No. (0 to)	
	xy30	**SV commu er: Node detect error** No response from drive unit to the request from NC when setting network configuration. x: Channel No. (0 to) y: Station No. (0 to)	
	xy31	**SV commu er: Commu not support** Drive unit's software version doesn't support the communication mode that the controller requires. x: Channel No. (0 to) y: Station No. (0 to)	

(Note) When two or more "Y02 System alarms" occur at the same time, only the alarm which occurs first is displayed.

(2) Class: Y03   Message: Drive unit unequipped

The drive unit is not correctly connected.

Error No.	Details	Remedy
Alphabet (axis name)	Servo axis drive unit not mounted	Check the drive unit mounting state. • Check the end of the cable wiring. • Check the cable for broken wires. • Check the connector insertion. • The drive unit input power is not being input. • The drive unit axis No. switch is illegal.
1 to 4	PLC axis drive unit not mounted	
S	No.1 spindle axis drive unit not mounted	
T	No.2 spindle axis drive unit not mounted	
M	No.3 spindle axis drive unit not mounted	
N	No.4 spindle axis drive unit not mounted	

(3) Class : Y05   Message: Initial parameter error

Details	Remedy
There is a problem in the value set for the number of axes or the number of part systems.	Check the value set for the corresponding parameters. #1001 SYS_ON #1002 axisno #1039 spinno, etc.
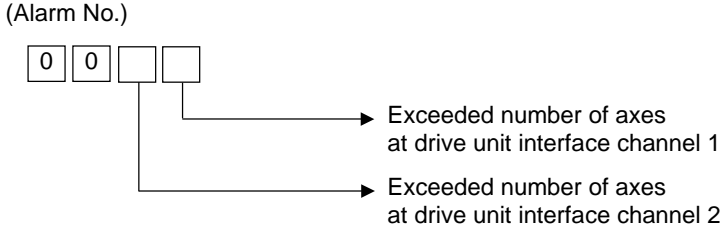
(4) Class: Y06   Message: mcp_no setting error

There are differences in the MCP and axis parameters when the NC power is turned ON.

Error No.	Details	Remedy
0001	There is a skipped number in the channels.	Check the values set for the following parameters. #1021 mcp_no #3031 smcp_no
0002	The random layout setting is duplicated.	
0003	The drive unit fixed setting "0000" and random layout setting "∗∗∗∗" are both set.	
0004	The spindle/C axis "#1021 mcp_no" and "#3031 smcp_no" are not set to the same values.	
0005	A random layout is set for the "#1154 pdoor" =1 two-part system.	
0006	The channel No. parameter is not within the setting range.	

(5) Class: Y07   Message: Too many axes connected

The number of connected axes exceeds the number allowed in the system.

```
(Alarm No.)

 ┌─┐┌─┐┌─┐┌─┐
 │0││0││ ││ │
 └─┘└─┘└─┘└─┘
            │              ──────▶ Exceeded number of axes
            │                      at drive unit interface channel 1
            │
            └──────────────▶ Exceeded number of axes
                             at drive unit interface channel 2
```

Alarm No.	Details	Remedy
0000 to 00FF	The number of axes connected to each channel exceeds the maximum number of connectable axes. The exceeded number of axes per channel is displayed as alarm No. This alarm occurs when the drive unit is connected only with the 2nd channel without connecting with the 1st channel.	Remove connected axes from the channel whose alarm No. is other than 0 for the number displayed as the alarm No. Keep the number of connected axes to or less than the maximum that can be connected.

(Note 1) The number of axes is limited per each drive unit interface channel.

(Note 2) Maximum number of axes that can be connected differs depending on whether or not an expansion unit is available or the setting of "#11012 16 axes for 1ch". The maximum number of connectable axes is as shown below.

Extension unit	#11012 16 axes for 1ch	Maximum number of axes to be connected (Per 1 channel)
Yes	0/1	8 axes
No	0	
	1	16 axes

(Note 3) If this alarm occurs, the alarm "Y03 Message: Drive unit unequipped" will not occur.

(Note 4) This alarm is displayed taking precedence over the alarm "Y08 Too many drive units connected" and "Y09 Too many axisno connected".

(6) Class: Y08   Message: Too many drive units connected

The number of connected drive units exceeds the number allowed in the system.

```
(Alarm No.)

 0   0  □ □
            │
            └──────────────► Exceeded number of drive units
                             at drive unit interface channel 1

            └──────────────► Exceeded number of drive units
                             at drive unit interface channel 2
```

Alarm No.	Details	Remedy
0000 to 00FF	The number of drive units connected to each channel exceeds 8. The exceeded number of drive units per channel is displayed as alarm No.	Remove drive units from the channel whose alarm No. is other than 0 for the number displayed as the alarm No. Keep the number of connected drive units to 8 or less.

(Note 1) The drive unit is not counted when all the axes connected to it are invalid.

(Note 2) If this alarm occurs, the alarm "Y03 Message: Drive unit unequipped" will not occur.

(Note 3) The alarm "Y07 Too many axes connected" and "Y09 Too many axisno connected" are displayed taking precedence over this alarm.

(7) Class: Y09   Message: Too many axisno connected

The connected axes No. (drive unit's rotary switch No.) is bigger than the No. allowed in the system.

```
(Alarm No.)

 0   0  □  □

                           ─► "1" when the axis No. at drive unit interface channel 1
                              is too big

                           ─► "1" when the axis No. at drive unit interface channel 2
                              is too big
```

Alarm No.	Details	Remedy
0000 to 0011	The No. of the axis (drive unit's rotary switch No.) connected to each channel is bigger than the No. allowed.	For the channel whose alarm No. is 1, keep the axis No. (drive unit's rotary switch No.) not bigger than the No. allowed.

(Note 1) The axis No. is limited per each drive unit interface channel.

(Note 2) The biggest allowed connected axis No. differs depending on whether or not an expansion unit is available or the setting of "#11012 16 axes for 1ch". The biggest connectable axis No. is as shown below.

Extension unit	#11012 16 axes for 1ch	Highest allowed connected axis No. (Per 1 channel)
Yes	0/1	0 to 7
No	0	
	1	0 to F

(Note 3) If this alarm occurs, the alarm "Y03 Message: Drive unit unequipped" will not occur.

(Note 4) This alarm is displayed taking precedence over the alarm "Y08 Too many drive units connected".

(Note 5) The alarm "Y07 Too many axes connected" is displayed taking precedence over this alarm.

(8) Class: Y12   Message: No commu. with axis drv unit

Details	Remedy
Even though the high-speed synchronous tapping option is valid, drive unit that doesn't support the option is connected.	Replace it with a drive unit that supports the option.

(9) Class: Y13   Message: No commu. with sp drv unit

Details	Remedy
Even though the high-speed synchronous tapping option is valid, drive unit that doesn't support the option is connected.	Replace it with a drive unit that supports the option.

(10) Class: Y14   Message: Comm btwn drives not ready

Details	Remedy
Communication of drive units failed to be ready within a specified time.	• Connection of drive units may be wrong. • Check if any of drive units is broken.

(11) Class: Y20   Safety observation alarm

When this alarm is output, emergency stop mode is applied.
Refer to "remedy" of each alarm as to how to cancel the alarm.

Error No.	Alarm No.	Details	Remedy
0001	Axis name	**Parameter compare error** The speed monitoring parameter in the NC and the parameter transmitted to the drive unit are not matched. The name of the axis with an error is displayed.	The NC or the servo drive unit may be damaged. Contact the service center.
0002	Axis name	**Sfty obsrvation: Cmd spd err** The speed exceeding the speed set with the parameter was commanded during the speed monitoring mode. The name of the axis with an error is displayed.	Check the speed monitoring parameter and the user PLC. Restart the NC.
0003	Axis name	**Sfty obsrvation: FB pos err** The commanded position transmitted to the servo drive unit from NC and the feedback position to be received from the servo drive unit are totally different during the speed monitoring mode. The name of the axis with an error is displayed.	The NC or the servo drive unit may be damaged. Contact the service center.
0004	Axis name	**Sfty obsrvation: FB speed err** Actual rotation speed of the motor is exceeding the speed set with speed monitoring parameter during the speed monitoring mode. The name of the axis with an error is displayed.	Check the speed observation parameter and the user PLC. Restart the NC.
0005	Door No.	**Door signal: Input mismatch** Door state signals on the NC side and the drive side do not match. It may be caused by the followings: • Cable disconnection • Damaged door switch • Damaged NC or servo drive unit	Check the cable. Check the door switch. Restart the NC.
0006	Door No.	**No spd obsv mode in door open** The door open state was detected when the speed monitoring mode was invalid. The causes may be same as the ones for 0005 (Door signal: Input mismatch). Also the user PLC may not be correct.	Check the user PLC. Restart the NC.

Error No.	Alarm No.	Details	Remedy
0007	Axis name	**Speed obsv: Para incompatible** Two speed monitoring parameters are not matched at the rising edge of the speed monitoring mode signal. The name of the axis with an error is displayed.	Change the relevant parameters so that the two speed monitoring parameters match. Restart the NC.
0008	Contactor No.	**Contactor welding detected** Contactor welding was detected.	Make sure that contactor's auxiliary b contact signal is output correctly to the device set on "#1380 MC_dp1" and "#1381 MC_dp2". If welding, replace the contactor. Restart the NC.
0009	-	**No spec: Safety observation** The servo parameter and the spindle parameter of the speed monitor are set for a system with no safety observation option.	Turn OFF the servo parameter SV113/bitF, the spindle parameter SP229/bitF and the spindle type servo parameter SV113/bitF. Then, restart the NC.
0010	-	**SDIO connector input volt err** 24VDC power is not supplied to SDIO connector correctly. (SDIO 4A pin supply voltage was dropped to 16V or less, or 1ms or more instant power interrupt was detected.) In this case, "Pw sply:Inst pw interpt(DC24V)" alarm occurs because the contactor control output signal cannot be controlled. This state remains until restarting the NC even if the cause of the alarm has been removed.	Check the wiring. Supply 24VDC power to the SDIO connector. Restart the NC.

(12) Class: y21   Safety observation warning

The warning will be cancelled when the cause of the warning is removed.
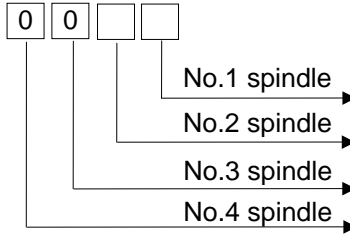
Error No.	Alarm No.	Details	Remedy
0001	Axis name	**Speed obsv signal: Speed over** The speed exceeds the safety speed limit when the speed monitoring mode signal is ON. The name of the axis with an error is displayed.	When decelerated, the warning will be removed, and the speed monitor will be started.

(13) Class: Y51 Parameter error

An error occurred in a parameter that causes an alarm while the control axis was operating.

Error No.	Details	Remedy
0001	**Parameter G0tL illegal** The time constant has not been set or the setting exceeded the setting range.	• Check "#2004 G0tL".
0002	**Parameter G1tL illegal** The time constant has not been set or the setting exceeded the setting range.	• Check "#2007 G1tL".
0003	**Parameter G0t1 illegal** The time constant has not been set or the setting exceeded the setting range.	• Check "#2005 G0t1".
0004	**Parameter G1t1 illegal** The time constant has not been set or the setting exceeded the setting range.	• Check "#2008 G1t1".
0009	**Parameter grid space illegal**	• Check "#2029 grspc".
0012	**Parameter stapt1-4 illegal** The time constant has not been set or the setting exceeded the setting range.	• Check spindle parameters" #3017 stapt1" to "#3020 stapt4".
0015	**Parameter skip_tL illegal** The time constant has not been set or the setting exceeded the setting range.	• Check "#2102 skip_tL".
0016	**Parameter skip_t1 illegal** The time constant has not been set or the setting exceeded the setting range.	• Check "#2103 skip_t1".
0017	**Parameter G0bdcc illegal** "#1205 G0bdcc" for the 2nd part system is set to acceleration/deceleration before G0 interpolation.	• Check "#1205 G0bdcc".
0018	**OMR-II parameter error** The OMR-II related parameter settings are incorrect. In this case, the OMR-II is disabled.	• Check the related parameter settings.
0019	**PLC indexing stroke length err** When the linear axis equal indexing is validated for the PLC indexing axis, "#12804 aux_tleng" has not been set. Otherwise, it is out of the setting range.	• Check "#12804 aux_tleng".
0020	**No hi-accu acc/dec t-const ext** Option to extend the high-accuracy acceleration/deceleration time constant is unavailable.	• Set "#1207 G1btL" to the value with which high-accuracy time constant extension specification is unavailable.
0101	**Values of PC1/PC2 too large** The PC1 and PC2 settings used for the rotary axis are too large.	• Check "#2201 PC1" and "#2202 PC2".

(14) Class: Y90   Message: No spindle signal

(Alarm No.)

| 0 | 0 | | |

No.1 spindle →
No.2 spindle →
No.3 spindle →
No.4 spindle →

Alarm No.	Z open phase	B open phase	A open phase
1			✕
2		✕	
3		✕	✕
4	✕		
5	✕		✕
6	✕	✕	
7	✕	✕	✕

Alarm No.	Details	Remedy
0001 to 0007	There is an error in the spindle encoder signal. The data transmission to the drive unit is stopped when this error occurs.	• Check the spindle encoder's feedback cable and the encoder.

1.5 System Alarms

(The bold characters are the messages displayed on the screen.)

Z31 *DataServer error* ○○○○

└──── Warning No.
───── Message

Warning No.	Explanation
0001	**Socket open error(socket)**
0002	**Socket bind error(bind)**
0003	**Connection wait queue error(listen)**
0004	**Connection request error(accept)**
0005	**Data recv error(socket error)**
0006	**Data recv error(data error)**
0007	**Data send error(socket error)**
0008	**Data send error(data error)**
000A	**Socket close error(close)**

(Note) If warning No. 0001, 0002, 0003, or 000A is displayed, set the parameters, then turn power OFF and turn it ON again.

(The bold characters are the messages displayed on the screen.)

Message	Details	Remedy
Z40 **Format** **mismatch**	This appears when the parameter MemVal is formatted at 0, and MemVal is set to 1.	• Either return the MemVal setting, or format and restart.

Z51
E2PROM error
00xx
	<Type>
	  Z51 E2PROM error 0011: Read error
	  Z51 E2PROM error 0012: Write error
		• If the same alarm is output by the same operation, the cause is an H/W fault. Contact the Service Center.

Z52
Battery fault
000x
	The voltage of the battery inserted in the NC control unit has dropped. (The battery used to save the internal data.)
	  0001: Battery warning
	  0002: Battery detecting circuit error
	  0003: Battery alarm
	(Note 1)
		• Replace the battery of the NC control unit.
		• Check for disconnection of the battery cable.
		• After treating the battery, check the machining program.

Z53 **CNC overheat**	The controller or operation board temperature has risen above the designated value. **(Note 2)**	• Cooling measures are required. • Turn OFF the controller power, or lower the temperature with a cooler, etc.
Z55 **RIO** **communication** **stop**	This occurs when an error occurs in the communication between the controller and remote I/O unit. • Cable breakage • Remote I/O unit fault • Power supply to remote I/O unit fault **(Note 3)**	• Check and replace the cables. • Replace the remote I/O unit. • Check the power supply. (existence of supply, voltage)
Z57 **System warning**	The program memory capacity setting value cannot be formatted. The expansion cassette (HR437) is not mounted after formatting. An expansion cassette different from the expansion cassette (HR437) mounted during formatting is mounted.	Check the state of the following items. • Program memory capacity • Status of expansion cassette (HR437) mounting • APLC open option
Z58 **ROM write not** **completed**	The machine tool builder macro program was not written to the FROM after being registered, edited, copied, condensed, merged, the number changed, or deleted.	• Write the machine tool builder macro program to the FROM. • If the operations, such as editing, done while the NC power was OFF can be invalidated, the program does not need to be written to the FROM.
Z59 **Acc/dec time** **cnst too large**	Acceleration and deceleration time constants are too large. (This alarm is output at the same time as "T02 Acc/dec time cnst too large 0206.")	• Increase the value specified as the "#1206 G1bF" parameter. • Decrease the value specified as the "#1207 G1btL" parameter. • Lower the feedrate.
Z60 **Fieldbus** **communi-** **cation error**	Communication error has occurred on the Fieldbus communication using HN571/HN573/HN575.	• Refer to (Note 4) for details.
Z64 **Valid term soon** **to be expired** **xx**	The valid term will be expired in less than a week. Remaining valid term is xx more days.	• Obtain a decryption code by making a payment. Enter the decryption code.
Z65 **Valid term has** **been expired**	No decryption code was input before the valid term was expired.	• Obtain a decryption code by making a payment. Enter the decryption code.

Message	Details	Remedy
Z67 **CC-Link** **communication** **error**	A communication error occurred during CC-Link communication using CC-Link unit.	• Refer to "List of Messages" in CC-Link (Master/Slave) Specification manual (BNP-C3039-214).
Z68 **CC-Link** **unconnected**	The cable connected between CC-Link unit and each device is disconnected or broken.	• Connect the cable. • Check whether or not the cable is broken.

⚠ **CAUTION**

❗ If the battery low warning is issued, save the machining programs, tool data and parameters in an input/output device, and then replace the battery. When the battery alarm is issued, the machining programs, tool data and parameters may be destroyed. Reload the data after replacing the battery.

⚠ Do not replace the battery while the power is ON.

⚠ Do not short circuit, charge, heat, incinerate or disassemble the battery.

⚠ Dispose of the spent battery following local laws.

(Note 1) The display of Z52 battery fault 0001 can be removed by resetting. However, the warning state will not be cancelled until the battery is replaced.

(Note 2) Temperature warning

If the alarm is displayed when an overheat alarm is detected, the overheat signal will be output simultaneously. If the machine is in automatic operation, the operation will be continued, but restarting will not be possible after resetting or stopping with M02/M30. (Starting will be possible after block stop or feed hold.) The alarm will be reset and the overheat signal will turn OFF when the temperature drops below the specified temperature.

Z53 CNC overheat	000x ↑ 0001 : The temperature in the controller is high. 0002 : The temperature around the communication terminal (setting and display unit) is high. 0003 : The temperature in the controller and around the communication terminal (setting and display unit) is high.

The ambient temperature must be lowered immediately when a "Z53 CNC overheat" alarm occurs, but if machining must be continued, the alarm can be invalidated by turning the following parameter OFF.

```
                              7 6 5 4 3 2 1 0
  PLC parameter bit selection #6449   □□□□□□□□


                                 Communication terminal
                                 (setting and display unit) ⌠ 0: Detection invalid
                                 Controller                 ⌡ 1: Detection valid
```
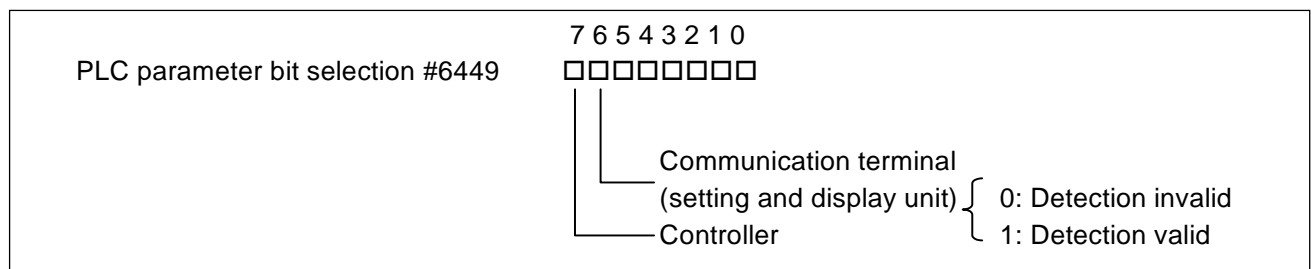
(Note 3) RIO communication interrupt

If communication between the control unit and remote I/O unit fails, the alarm and remote I/O unit number are displayed.

Z55 RIO communication stop

Board connection remote I/O communication interrupted station

Remote I/O 3rd part system communication interrupted station

Remote I/O 1st part system communication interrupted station

Remote I/O 2nd part system communication interrupted station
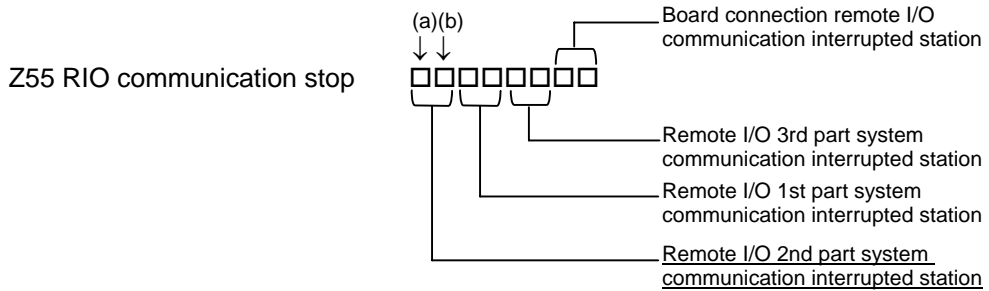
(a) and (b) above indicate the following matters.

Alarm number	RIO (seventh station)	RIO (sixth station)	RIO (fifth station)	RIO (fourth station)
0				
1				✕
2			✕	
3			✕	✕
4		✕		
5		✕		✕
6		✕	✕	
7		✕	✕	✕
8	✕			
9	✕			✕
A	✕		✕	
B	✕		✕	✕
C	✕	✕		
D	✕	✕		✕
E	✕	✕	✕	
F	✕	✕	✕	✕

Alarm number	RIO (third station)	RIO (second station)	RIO (first station)	RIO (0th station)
0				
1				✕
2			✕	
3			✕	✕
4		✕		
5		✕		✕
6		✕	✕	
7		✕	✕	✕
8	✕			
9	✕			✕
A	✕		✕	
B	✕		✕	✕
C	✕	✕		
D	✕	✕		✕
E	✕	✕	✕	
F	✕	✕	✕	✕

This also applies for the remote I/O 1st part system communication interrupted station, remote I/O 3rd part system communication interrupted station and board connection remote I/O communication interrupted station.

(Note 4)

Z60 Fieldbus communication error **n1 n2 n3 n4**

Classification No.

Message

Class. No.	Details
n1	Shows state of the master channel (shown in hexadecimal number)
	00: Offline — In initializing
	40: Stop — Cutting I/O communication
	80: Clear — Resetting output data of each slave by sending 0 data.
	C0: In operation — In I/O communication
n2	Shows error state (shown in hexadecimal number) Bit 7 6 5 4 3 2 1 0 <table><tr><th>BIT</th><th>Details</th></tr><tr><td>0</td><td>Control error: Parameter error</td></tr><tr><td>1</td><td>Auto clear error: Communication with all the slave channels was cut because a communication with one slave channel had an error.</td></tr><tr><td>2</td><td>Non exchange error: Slave channel with communication error is found</td></tr><tr><td>3</td><td>Fatal error: The communication cannot be continued because sever network failure exists.</td></tr><tr><td>4</td><td>Event error: Short-circuit was found on the network.</td></tr><tr><td>5</td><td>Not ready: CNC communication is not ready.</td></tr><tr><td>6</td><td>Time out error: Time out was detected in communication with each channel.</td></tr><tr><td>7</td><td>Not used</td></tr></table>
n3	Shows error No. (shown in hexadecimal number) Refer to "(a) Error in master channel" and "(b) Error in slave channel" for details.
n4	Shows slave No. where communication error has occurred. (shown in hexadecimal number) "FF" means an error in master channel.

(a) Error in master channel (when remote address with an error is FF (hexadecimal number))

Value in n3	Details	Remedy
0	No error	Operating normally
32	No USR_INTF-task	Damage in **HN571**. Replace **HN571**.
33	No global data field	
34	No FDL-task	
35	No PLC-task	
37	Master parameter incorrect	
39	Slave parameter incorrect	
3C	Data offset exceeding allowable set value received	Check the configuration setting.
3D	Slave data send range overlap	
3E	Slave data receive range overlap	
3F	Not set data hand shake	Damage in **HN571**. Replace **HN571**.
40	RAM range exceeded	
41	Slave parameter data set illegal	
CA	No segment	
D4	Data base read illegal	Download the configuration data again.
D5	Operating system illegal	Damage in **HN571**. Replace **HN571**.
DC	Watch dog error	
DD	Hand shake mode No data communication by 0	
DE	Master auto clear mode	When setting auto clear mode, the auto clear mode was performed because one slave was not able to connect in run time.

(b) Error in slave channel (when remote address with an error is other than FF (hexadecimal number))

Value in n4	Details	Remedy
2	Station overflow reported	Check the configuration of slave channel in which error has occurred. Check if there is any short-circuit in wire to bus.
3	Station stopped responding to master command	
9	No slave required responding data	
11	No station respond	
12	No master to logical token ring	
15	Illegal parameter requested	

1.6 Absolute Position Detection System Alarms

(The bold characters are the messages displayed on the screen.)

```
Z△△  Message  OOOO  □□□□
                              Axis name
                              Error No.
                              Message
                              Class
```
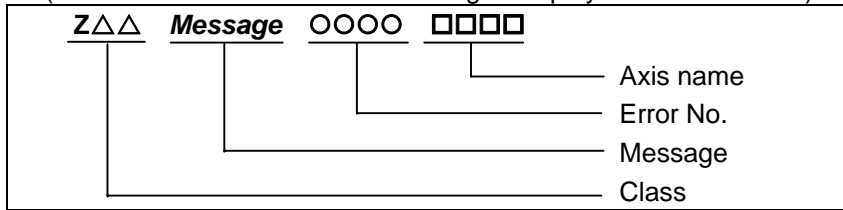
(1) Class: Z70   Abs data error

This error is displayed if the absolute position data is lost in the absolute position detection system.

Error No.	Details	Remedy	Zero point initialization	Alarm reset when power is turned OFF	Servo alarm No.
0001	**Abs posn base set incomplete** Zero point initialization is incomplete. Otherwise, the spindle was removed.	Complete zero point initialization.	Required	-	-
0002	**Absolute position lost** The absolute position reference point data saved in the NC has been destroyed.	Input the parameters. If the reference point data cannot be restored, perform zero point initialization.	(Required)	-	-
0003	**Abs posn param changed** The parameters used to detect the absolute position have been changed. #1003 iunit #2201 PC1 #1016 iout #2202 PC2 #1017 rot #2218 PIT #1018 ccw #2219 RNG1 #1040 M_inch #2220 RNG2 #2049 type #2225 MTYP	Correctly set the parameters. Turn the power on again, and perform zero point initialization.	Required	-	-
0004	**Abs posn initial set illegal** The zero point initialization point is not at the grid position.	Reperform zero point initialization.	Required	-	-
0005	**Abs posn param restored** Restoration was possible with parameter input in the above No.0002 state.	Turn the power on again, and operation will be possible.	Not required	-	-
0080	**Abs posn data lost** The absolute value data was lost, because the multi-rotation counter data in the detector was incorrect, etc.	Replace the detector and complete zero point initialization.	Required	-	(9E) etc.

Error No.	Details	Remedy	Zero point initialization	Alarm reset when power is turned OFF	Servo alarm No.
0101	**Abs posn error(servo alm 25)** The power was turned ON again after the servo alarm No. 25 displayed.	Reperform zero point initialization.	Required	-	(25)
0106	**Abs posn error(servo alm E3)** The power was turned ON again after the servo alarm No. E3 displayed.	Reperform zero point initialization.	Required	-	(E3)

(Note) To release alarm "Z70 Abs data error", enter the parameter data output when establishing the absolute position and turn ON the power again. For the rotary axis, however, the alarm cannot be released by entering the parameter data.

(2) Class: Z71   Abs encoder failure

This alarm is displayed if an error is found in the detector for the absolute position detection system.

Error No.	Details	Remedy	Zero point initialization	Alarm reset when power is turned OFF	Servo alarm No.
0001	**AbsEncoder:Backup voltage drop** The backup voltage in the absolute position detector dropped.	Replace the battery, check the cable connections, and check the detector. Turn the power ON again, and perform zero point initialization.	Required	- (Z70-0101 displays after power is turned ON again.)	25
0003	**AbsEncoder: Commu error** Communication with the absolute position detector was not possible.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	91
0004	**AbsEncoder: Abs data changed** The absolute position data fluctuated when establishing the absolute position.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	93
0005	**AbsEncoder: Serial data error** An error was found in the serial data from the absolute position detector.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	92
0006	**AbsEncoder: Abs/inc posn diffr** Servo alarm E3 Absolute position counter warning	Operation is possible until the power is turned off.	(Required) When power is turned ON again.	Reset (Z70-0106 displays after power is turned ON again.)	E3
0007	**AbsEncoder: Initial commu err** Initial communication with the absolute position detector was not possible.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	18

(3) Class: Z72   Message: Position check error

This alarm is displayed if an error is detected when comparing the detector's absolute position and controller coordinate values in the absolute position system.

(4) Class: Z73   Message: Absolute position data warning

This warning is displayed for the absolute position detection system.

Alarm No.	Details	Remedy

0001	Battery for abs data fault
	   Servo alarm 9F
	   Low battery voltage
		If the battery voltage is low or the cable is damaged, there is no need to initialize the absolute position.

(Note) When this alarm occurs, do not turn OFF the drive unit power to protect the absolute position data. Replace the battery while the drive unit power is ON.

1.7 Distance-coded Reference Scale Errors

(The bold characters are the messages displayed on the screen.)

Z△△ ***Message*** ○○○○ □□□□

—— Axis name

—— Error No.

—— Message

—— Alarm class
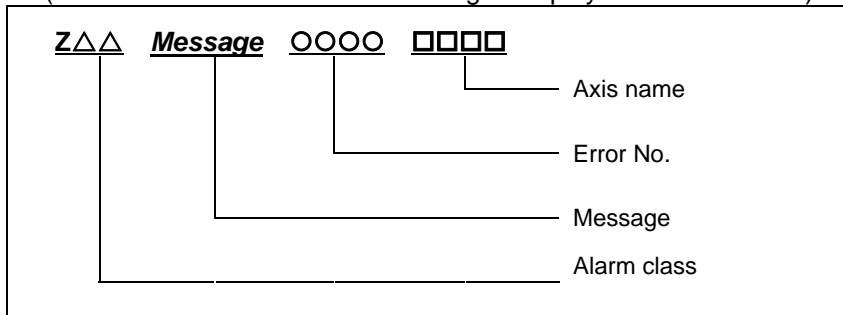
(1) Class: Z80 Distance-coded ref scale err

Error No.	Details	Remedy
0001	**Basic position lost** The basic point data memorized by the NC is broken.	• Input the parameter. If the basic point data cannot be recovered, perform the initial reference position setting.
0002	**Basic position restore** The basic point data is recovered by parameter input.	• Operation can be started after turning the power ON.
0003	**No spec: Distance-coded scale** Even if the distance-coded reference scale is not included in the specification, it is set to be available.	• Check the specification. • If you do not use this function, set the detector type in servo parameters correctly.

(2) Class: Z81 Synchronous control

Error No.	Details	Remedy
0001	**R-pos adjustment data lost** Reference position adjustment value data in the NC is damaged.	• Input the parameter. If the data cannot be recovered by the parameter, establish the reference position again.
0002	**R-pos adjustment data restored** After the error 0001, by inputting the parameter, the data was recovered.	• After the reference position establishment, you can continue the operation.

1.8 Messages during Emergency Stop

(The bold characters are the messages displayed on the screen.)

EMG   Emergency stop   ▢▢▢▢

└──────Error items

Error Item	Details	Remedy
PLC	The user PLC has entered the emergency stop state during the sequence process.	• Investigate and remove the cause of the user PLC emergency stop.
EXIN	The emergency stop input signal for machine operation board or handy terminal is significant (open).	• Cancel the emergency stop input signal. • Check the wiring to see if any wiring is broken.
SRV	An alarm occurred in the servo system causing an emergency stop.	• Investigate and remove the cause of the servo alarm.
STOP	The user PLC (ladder sequence) is not running.	• Check if the rotary switch CS2 on the top of the controller front panel is set to 1. • Check if the PLC edit file save screen (onboard function) [4RUN/SP] (run/stop) switch is turned ON.
SPIN	Spindle drive unit not mounted The spindle drive unit is not mounted.	• Cancel the causes of the other emergency stop. • Check emergency stop signal input in the spindle drive unit.
PC_H	High-speed PC processing abnormal	• Check the sequence program. (To stop monitoring the high-speed PC processing temporarily, set 1 in "#1219 aux03/bit1". Disable the monitoring function only as a temporary measure.)
PARA	Setting of the door open II fixed device is illegal. The dog signal random assignment parameter setting is illegal.	• Specify the "#1155 DOOR_m" and "#1156 DOOR_s" parameters correctly. (When the door open II fixed device is not used, set "#1155 DOOR_m" and "#1156 DOOR_s" to "100".) • Correctly set the "#2073 zrn_dog", "#2074 H/W_OT+", "#2075 H/W_OT-" and "#1226 aux10/bit5" parameters.

Error No.	Details	Remedy
LINK	If the FROM/TO instruction is not executed within 500 ms, an emergency stop occurs.	• Try to execute the FROM or TO instruction one or more times every 500 ms. * Measure the time in which no interrupt request is issued from MELSEC and store the result in the R register. R10190: Current time-out counter R10191: Counter for maximum time-out after power-on R10192: Counter for maximum time-out after system start-up (backed up)
	MELSEC is held in error and reset states.	• Check the MELSEC states.
	The contents of MELSEC-specific code area in buffer memory have been destroyed.	• Check the MELSEC states.
	PLC serial link communication has stopped. **(Note)** When "WAIT" is entered for the PLC serial link, only the preparation sequence has been established before the communication stops. Therefore, it is supposed that the basic specification parameters related to serial link parameters #1902 and #1903 are incorrect or the #1909 set-time is too short.	• Check that HR571 card wiring and external sequencer transmission are normal. • Check the diagnostic screen for link communication errors. • Check whether the basic specification parameters related to serial link parameters are specified correctly.
WAIT	The preparation sequence is not sent from the master station. Otherwise, the contents of the received preparation sequence are inconsistent with those of the parameters, so that the usual sequence cannot be started. **(Note)** When "LINK" is also entered for the PLC serial link, refer to "Note" in the section, "LINK".	• Check that the HR571 card rotary switch and wiring and the external sequencer transmission are normal. • Check the diagnostic screen for link communication errors.
XTEN	The HR571 card operates abnormally or the rotary switch is set incorrectly.	• Check the HR571 card rotary switch and replace the HR571 card if required.
LAD	The user PLC (ladder sequence) has an illegal code.	• Check the user PLC (ladder sequence) to see if it uses illegal device numbers or constants.
CVIN	The external emergency stop function for power supply is valid. So, the emergency stop input signal for power supply is significant (open).	• Cancel the emergency stop input signal. • Check the wiring to see if any wiring is broken.
MCT	An emergency stop occurs because the contactor shutoff test is executing.	• Automatically cancel the emergency stop after the contactor shutoff is confirmed. • When the contactor shutoff cannot be confirmed within 5 seconds after contactor shutoff test signal (Y742) is input, "Y20 Contactor welding detected" alarm will occur, and the emergency stop status remains. • Turn the power ON again after confirming "contactor's auxiliary b contact" signal is correctly output to the device that is set with "#1330 MC_dp1" and "#1331 MC_dp2".

1.9 Auxiliary Axis Alarms

Refer to "1.3 Servo/spindle alarms" for details of the alarm class and alarm clear class combination.

(The bold characters are the messages displayed on the screen.)

```
S○○   Message   △△△△   □□□□
                                    Axis No. 1 to 4
                                    Alarm information
                                    (Follows MR-J2-CT alarm information)
                                    Message
                                    Alarm class
```
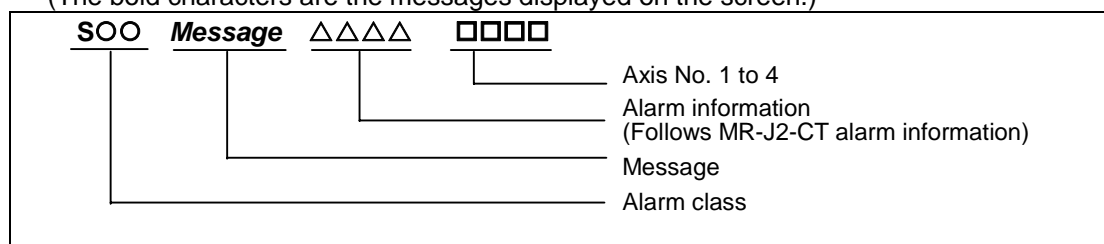
(1) Class: S01   Aux ax servo alarm

Alarm information	Details	Remedy
0011	**Aux ax PCB err (Drive circuit)** An error occurred in the drive unit's internal PCB.	• Replace servo drive unit.
0013	**Aux ax S/W processing error** An error occurred in the drive unit's internal reference clock.	• Replace servo drive unit.
0016	**Aux ax motor/detector type err**	
	Motor type error.	• Use a correct drive unit and motor combination.
	Detector initial communication error.	• Connect correctly. • Replace the motor. • Replace or repair cable.
	Detector CPU error.	• Replace the motor (detector).
0017	**Aux ax PCB error(A/D err)** An error occurred in the drive unit's internal A/D converter.	• Replace servo drive unit.
0025	**Aux ax absolute posn lost** An error occurred in the detector's internal absolute position data.	• Turn the power ON for 2 to 3 minutes while the alarm is occurring, and then turn the power ON again. • Replace the battery, and initialize the absolute position again.
0034	**Aux ax CRC error** An error occurred in the communication with the NC.	• Take countermeasures against noise.
0036	**Aux ax communication timeout** Communication with the NC was cut off.	• Connect correctly. • Turn the NC power ON. • Replace the drive unit or NC.
0037	**Aux ax parameter error** The parameter setting value is incorrect.	• Set the parameter correctly.
0038	**Aux ax frame error** An error occurred in the communication with the NC.	• Take countermeasures against noise.
0039	**Aux ax commu INFO error** Undefined data was transferred from the NC.	• Change the NC software version to a compatible version.

(2) Class: S02   Aux ax servo alarm

Alarm information	Details	Remedy
0011	**Aux ax PCB err (Drive circuit)** An error occurred in the drive unit's internal PCB.	• Replace servo drive unit.
0013	**Aux ax S/W processing error** An error occurred in the drive unit's internal reference clock.	• Replace servo drive unit.
0015	**Aux ax EEROM error** A write error occurred to the EEROM in the drive unit.	• Replace servo drive unit.
0017	**Aux ax PCB error(A/D err)** An error occurred in the drive unit's internal A/D converter.	• Replace servo drive unit.
0018	**Aux ax PCB error(LSI err)** An error occurred in the drive unit's internal LSI.	• Replace servo drive unit.
0020	**Aux ax detector error** An error occurred in the communication between the servo drive unit and detector.	• Connect correctly. • Replace or repair cable.
0024	**Aux ax ground fault detection** A ground fault of the output was detected when the power was turned ON.	• Repair the ground fault section. • Replace the cable or motor.

(3) Class: S03   Aux ax servo alarm

Alarm information	Details	Remedy
0010	**Aux ax under voltage** The power voltage is 160V or less.	• Review the power supply. • Replace the servo drive unit.
0030	**Aux ax regeneration error**	
	The tolerable regeneration power of the internal regenerative resistor or external regenerative option was exceeded.	• Set the parameter #50002 correctly. • Connect correctly. • Lower the positioning frequency. • Change the regenerative option to a larger capacity. • Lower the load. • Review the power supply.
	Regenerative transistor error	• Replace the servo drive unit.
0031	**Aux ax overspeed** The motor's rotation speed exceeded the tolerable momentary speed.	• Increase the acceleration/ deceleration time constant. • Review the gear ratio. • Replace the detector.
0032	**Aux ax overcurrent** A current exceeding the servo drive unit's tolerable current flowed.	• Repair the wiring. • Replace the servo drive unit. • Take countermeasures against noise.

Alarm information	Details	Remedy
0033	**Aux ax overvoltage** The voltage of the converter in the servo drive unit was 400V or more.	• Wire correctly. • Replace the servo drive unit. • For the internal regenerative resistor, replace the drive unit. • For the external regenerative option, replace the regenerative option.
0046	**Aux ax motor overheating** An operation state causing the motor to overheat continued.	• Reduce the motor load. • Review the operation pattern.
0050	**Aux ax overload 1** The servo drive unit or servomotor overload protection function activated.	• Reduce the motor load. • Review the operation pattern. • Change to a motor or drive unit with large output. • Change the setting of the automatic tuning response characteristics. • Correct the connection. • Replace the servomotor.
0051	**Aux ax overload 2** The max. output current flowed for several seconds due to a machine collision or overload.	• Review the operation pattern. • Change the setting of the automatic tuning response characteristics. • Correct the connection. • Replace the servomotor.
0052	**Aux ax excessive error** A position deflection exceeding the excessive error detection setting value occurred.	• Increase the acceleration/deceleration time constant. • Increase the torque limit value. • Review the power facility capacity. • Review the operation pattern. • Replace the servomotor. • Connect correctly. • Repair or replace the cable.

(4) Class: S52   Message: Aux ax servo warning

Alarm information	Details	Remedy
0092	**Aux ax battery voltage drop** The absolute position detection battery voltage dropped.	• Mount a battery. • Replace the battery and initialize the absolute position.
00E0	**Aux ax overregeneration warning** The regeneration power may have exceeded the tolerable range of the built-in regenerative resistor or external regenerative option.	• Lower the positioning frequency. • Change the regenerative option to a larger one. • Lower the load.
00E1	**Aux ax overload warning** The overload alarm 1 could occur.	• Refer to the items for S03 0050.
00E3	**Aux ax abs position counter warning** There is an error in the absolute position detector internal data.	• Take countermeasures against noise. • Replace the servomotor.
00E9	**Aux ax main circuit OFF warning** The servo ON signal was input while the main circuit power was OFF. The contactor operation is faulty.	• Turn ON the main circuit power.

(5) Class: Z70   Message: Aux ax abs position error

Alarm information	Details	Remedy
0001	**Aux ax abs posn base set incomplete** The zero point (reference point) has not been initialized in the absolute position system.	• Initialize the zero point (reference point).
0002	**Aux ax absolute position lost** The absolute position coordinate data in the drive unit has been lost.	• Initialize the zero point (reference point).
0003	**Aux ax abs posn param changed** The absolute position system related parameters have been changed or lost.	• Correctly set the parameters and then initialize the zero point (reference point).

(6) Class: Z71   Message: Aux ax drop voltage

Alarm information	Details	Remedy
0001	**Aux ax abs encoder: back up voltage drop** The data in the detector has been lost. Battery voltage drop. Detector cable wire breakage or looseness.	• Check the battery and detector cable and then initialize the zero point (reference point).

(7) Class: Z73   Message: Aux ax system warning

Alarm information	Details	Remedy
0001	**Aux ax battery for abs data fault** Battery voltage drop. Detector cable wire breakage or looseness.	• Check the battery and detector cable. The zero point does not need to be initialized.
0003	**Aux ax absolute position counter warning** An error occurred in the detector's absolute position counter.	• Replace the detector.

(8) Class: M00   Aux ax operation error

Alarm information	Details	Remedy
0001	**Aux ax dog overrun** When executing dog-type reference position, the zero point return speed is too fast or the dog length is too short.	• Lower the zero point return speed or increase the dog length.
0003	**Aux ax R-pnt direction illegal** When executing reference position return, the axis was moved in the opposite of the designated direction.	• Move the axis in the correct direction.
0004	**Aux ax external interlock** The axis interlock function is valid.	• Cancel the interlock signal
0005	**Aux ax internal interlock** An interlock was established by the servo OFF function.	• Cancel the servo OFF.
0007	**Aux ax soft limit** The soft limit was reached.	• Check the soft limit setting and machine position
0024	**Aux ax R ret invld at abs alm** Reference position return was executed during an absolute position alarm.	• Initialize the absolute position reference point and then fix the absolute position coordinates.
0025	**Aux ax R ret invld at ini** Reference position return was executed while initializing the absolute position.	• Initialize the absolute position reference point and then fix the absolute position coordinates.

(9)   Class: M01   Aux ax operation error

Alarm information	Details	Remedy
0101	**Aux ax no operation mode** The operation mode is not designated, or the operation mode was changed during axis movement.	• Correctly designate the operation mode.
0103	**Aux ax feedrate 0** The operation parameter's feedrate setting is zero. The operation parameter feedrate setting is zero. Or, the override is valid, and the override value is zero.	• Set a value other than zero in the feedrate setting or override value.
0160	**Aux ax sta No. illegal** A station No. exceeding the No. of indexed divisions was designated.	• Correctly designate the station No.
0161	**Aux ax R-pnt ret incomplete** Automatic/manual operation was started before reference position return was executed with the incremental system.	• Execute the reference position return.
0162	**Aux abs position initializing** The start signal was input while initializing the absolute position reference point.	• Complete the absolute position reference point initialization.
0163	**Aux ax abs position error** The start signal was input during an absolute position alarm.	• Initialize the absolute position reference point and then fix the absolute position coordinates.
0164	**Aux ax arbitrary positioning** The manual operation mode was started during the random positioning mode.	• Turn the random positioning mode OFF before switching to the manual operation mode.
0165	**Aux uneven index sta No. ilgl** The commanded station No. was higher than 9 or the number of indexing stations during uneven indexing.	• Check the commanded station No. and the parameter "#50100 station" setting.

(10) Class: Y02   Auxiliary axis MCP alarms

An error occurred during data transfer between the MCP and auxiliary axis drive unit after turning on the power.

Error No.		Details	Remedy
0050		**Aux ax sys alm: Proc time over**	The software or hardware may be damaged. Contact the service center.
0051	0000	**Aux ax commu er:CRC error 1** (10 times/910.2ms)	A communication error has occurred between the controller and drive unit. • Take measures against noise. • Check that the communication cable connector between the controller and drive unit and one between the drive unit are tight. • Check whether the communication cable between the controller and drive unit and one between the drive units are disconnected. • A driving drive unit may be faulty. Take a note of the 7-segment LED contents of each driving drive unit and report to the Service Center.
	0001	**Aux ax commu er:CRC error 2** (2 continuous times)	
	0002	**Aux ax commu er:Recv timing** (2 continuous times)	
	xx03	**Aux ax commu er:Data ID** (2 continuous times) xx: Axis No.	
	xx04	**Aux ax commu er:Recv frame no.** (2 continuous times) xx: Axis No.	

(11) Class: Y03   Message: Aux ax drive unit unequipped

The drive unit is not properly connected.

Error No.	Details	Remedy
Axis No. 1 to 4	bit correspondence (bit 0: 1st axis, bit 1: 2nd axis, bit 2: 3rd axis, bit 3: 4th axis)	Check the auxiliary axis drive unit mounting state. • Check the end of the cable wiring. • Check the cable for broken wires. • Check the connector insertion. The auxiliary axis drive unit input power is not being input. The auxiliary axis drive unit axis No. switch is illegal.

1.10 Computer Link Errors

(The bold characters are the messages displayed on the screen.)

```
L△△   Message   O
   │       │     └──────── Error No.
   │       │
   │       └────────────── Message
   │
   └────────────────────── Alarm class
```
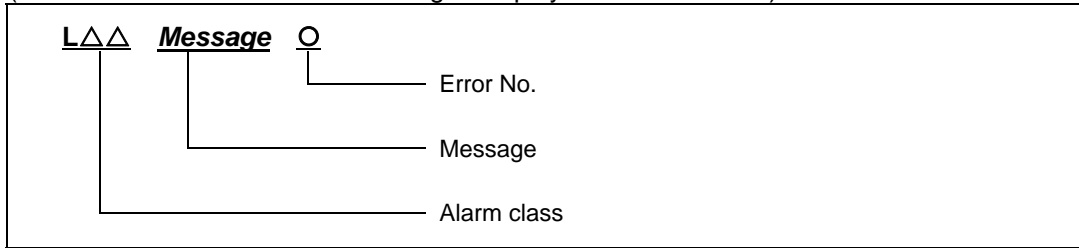
(1) Class: L01 Computer link error

Error No.	Details	Remedy
-2	**Serial port being used** Serial port has already being opened or cannot be used.	• Check whether the same port being used by Anshin-net, etc. • Recheck the parameters for tape operation port.
-4	**Timeout error** Communication ends with timeout ⎧CNC has a 248-byte receive buffer. The time during which CNC receives 248 bytes exceeds the "TIME-OUT" value set in the I/O device parameter.⎫	• Set a greater timeout value in the input/output device parameter. • Recheck the HOST software as to whether or not the HOST transmits data in response to DC1 from CNC (data request). • Check whether or not start code of computer link parameter is set to 0.
-10	**Host ER signal OFF** HOST ER (CNC DR) signal is not turned ON.	• Check whether or not the cable is disconnected from the connector. • Check whether or not the cable is broken. • Check whether or not the HOST power is turned ON.
-15	**Parity H error** Communication ends with parity H.	• Recheck the HOST software as to whether or not the data to be transmitted to CNC is ISO code.
-16	**Parity V error** Communication ends with parity V.	• Recheck the data to be transmitted to CNC.
-17	**Overrun error** Although CNC transmits DC3 (request to stop data transfer) to the HOST, it receives data of 10 bytes or more from the HOST, thus terminates communication. When CNC is transmitting data to the HOST, it receives data of 10 bytes or more from the HOST.	• Recheck the software as to whether or not the HOST stops transmitting data within 10 bytes after receiving DC3. • Recheck the HOST software as to whether or not the HOST transmits data such as a command or header to CNC during receiving a work program.

1.11 User PLC Alarms

(The bold characters are the messages displayed on the screen.)

U△△ *Message* ○○○○ ○○○○

— Sub-status 2
— Sub-status 1
— Message
— Alarm class

Message	Sub-status		Details	Remedy
	1	**2**		
U01 **No user** **PLC**	-	-	PLC program is not input. (Note) Emergency stop (EMG) will be applied.	Download the PLC program of the format selected with the PLC environment selection parameters (bit selection #51/bit 4).
U10 **Illegal PLC**	**0x0010**	-	**PLC scan time error** The scan time is 1 second or longer.	Edit the PLC program size to a smaller size.
	0x0040	-	**PLC program operation mode illegal** PLC program different from the designated mode was downloaded. (Note) Emergency stop (EMG) will be applied.	Download the PLC program having the same format as when the power was reset or turned ON.
	0x0080	-	**GPPW ladder code error** (Note) Emergency stop (EMG) will be applied.	Download the correct GPPW format PLC program.
	0x008x	-	**PLC4B ladder code error** An illegal circuit was found in the PLC4B ladder. bit1: PC medium-speed circuit illegal bit2: PC high-speed circuit illegal (Note) Emergency stop (EMG) will be applied.	Download the correct PLC4B format PLC program.
	0x0400	**Number of ladder steps**	**Software illegal interrupt** The PLC program process stopped abnormally due to an illegal software command code. (Note) Emergency stop (EMG) will be applied.	Turn the power ON again. If the error is not reset, download the correct PLC program.

Message	Sub-status		Details	Remedy
	1	**2**		
U10 Illegal PLC	0x800x	**Number of PLC program steps**	**Software exception** The PLC program process stopped abnormally due to a bus error, etc.	
			bit 0: BIN command operation error bit 1: BCD command operation error	Refer to the methods for using the BCD and BIN function commands.
			bit6: CALL/CALLS/RET command error bit7: IRET command execution error (Note) Emergency stop (EMG) is applied for bit 6/7.	Turn the power ON again. If the error is not reset, download the correct PLC program.
U50 PLC stopped			The PLC program is stopped.	Start the PLC program.
U55 PLC stopped / is not saved			The PLC program is stopped and not written into ROM.	Write the PLC program into ROM.
U60 Ladder is not saved			The PLC program is not written into ROM.	Write the PLC program into ROM.

(Note) The number of PLC program steps displayed on the screen may not match the actual number of error occurrence steps because of the PLC program timing. Use this as a guideline of the occurrence place.

1.12 Network Service Errors

Message	Details	Remedy
N001 **Modem initial error**	• There is an error in the modem connection when the power is turned ON.	• Check the connection between the NC and modem, connection port and modem power.
N002 **Redial over**	• The dial transmission failed more than the designated No. of redial times.	• Wait a while, and then transmit again.
N003 **TEL unconnect**	• The phone line is not connected.	• Check the modem's phone line connection.
N004 **Net communication error**	• An error other than the above errors occurred during communication.	• Note down the circumstances under which this error occurred, and contact the Service Center.
N005 **Invalid net communication**	• The modem connection port is being used for another function such as input/output. • The modem connection port settings are incorrect.	• Quit using the modem connection port with the other function, and then turn the power ON again. • Check the modem connection port settings.
N006 **Received result of diagnosis**	• The diagnosis data file has been received	• Erase the message.
N007 **Send data size over**	• A file larger than Anshin-net server capacity (64Kbyte) has been transmitted during machining data sharing.	• Reduce the size of machining program file so that it won't exceed the capacity of Anshin-net server.
N008 **No file on server**	• When machining data sharing function is being executed, file reception fails, as the file does not exist on Anshin-net server.	• Before receiving file, confirm that a machining program file exists on Anshin-net server.
N009 **Password error**	• File reception fails due to wrong password when machining data sharing is being executed.	• Input the password again.
N010 **Customer number error**	• Data reception fails due to wrong customer number when machining data sharing is being executed.	• Input the customer number again.
N011 **Storage capacity over**	• As the size of file to be received is bigger than free space on the NC side, file reception fails during machining data sharing.	• Ensure sufficient free space on the NC side.
N012 **File deletion error**	• A file on Anshin-net server cannot be deleted when machining data sharing is being executed.	• Check if the file exists on Anshin-net server. • Note down the circumstances under which this error occurred, and contact the Service Center.

2. Operation Messages

The following messages display on each screen.

2.1 Search-related Operation Messages

Message	Details
Searching	• The operation search is being executed.
Search completed	• The operation search was completed correctly.
Verifying	• The program is being verified.
Verifying stopped	• The program verification stopped.
Search error	• Could not find the designated ONB number. Review the ONB number or machining program settings. • The operation search could not be completed correctly. • When the parameter (#9005) of the tape mode port was set out of the range or when the port was not connected, an operation search of NC serial was performed. • The T code list search failed. Review the program name. • Could not find the machining program in HD or IC card. • Check the parameters for HD operation or IC card operation. • Tape search was executed during the HOST LINK communication.
Setting error	• The directory name exceeded the display range. A directory path for which the entire directory cannot be displayed cannot be designated in the directory name area. • The search is not possible because ONB number is not designated.
Restart search is completed	• The restart search was completed.
Executing restart search	• The restart search is being executed.
Execute operation search	• The program is not searched. Execute the operation search.
Can't cancel verify stop	• The compare stop cannot be canceled because the operation is not in a compare stop.
Executing top search	• The top search is being executed correctly.
Top search completed	• The top search was completed correctly.
Top search not completed	• The restart search (type 2) was executed without the top search.
Can't input data	• Data input was attempted during M, S, T, B history display.
Input some of ONB	• Awaiting ONB number input
Verifying stop posn already registered	• The verify stop position has already been registered.
No searched program	• The program has not been searched.
Program restarting	• The program is being restarted.
Program error	• The restart search was executed in the program with an error.
N/B block not found	• The restart search was executed, designating N or B No. not exist.
Restart search interrupted by reset	• Reset was executed during the restart search.
No. of repetitions exceeded	• The restart search was executed, designating the number of repetitions exceeding the number set in the program.
Program not found	• The restart search was executed, designating a program No. not exist.

2.2 Graphic Display-related Operation Messages

Message	Details
Searching	• The check search is being executed.
Search error	• Could not find the designated ONB number. Review the ONB number or machining program settings. • The check search could not be completed correctly. • When the parameter (#9005) of the tape mode port was set out of the range or when the port was not connected, an operation search of NC serial was performed.
Executing automatic operation	• An attempt was made to perform operations such as parameter, tool compensation amount data and coordinate system offset settings during auto operation. (Input/output also possible during auto operation) • The machining program and MDI data that the operator is attempting to edit cannot be edited during auto operation. • It is not possible to be executed a check search or check start-up during auto operation. • An attempt was made to set the verify stop position during auto operation.

Setting error	• The directory name exceeded the display range.
	  A directory path for which the entire directory cannot be displayed cannot be designated in the directory name area.
	• The check search is not possible because ONB number is not designated.
	• A non-existent axis name or setting that does not exist in the format was made when making the display mode settings.
	  Set using an existing axis name.
	• Incorrect tool No. was specified at the execution of tool clear.

Execute operation search	• The program is not searched. Execute the operation search.
Checking	• The program check is being executed.
Check stopped	• The program check is being stopped.
Work form is illegal	• A workpiece is not drawn correctly because the two or more workpiece widths are set to "0".
Push [Check reset] menu	• An error occurred in the graphic check. Press the [Check reset] menu key to reset the error.
Executing trace	• The trace mode is valid.
Program check completed	• The trace in the program check completed with an M02/M30 code.
Reset complete	• The program check was reset.
Tool interfere with work	• The tool contacted the workpiece when performing rapid traverse (G0) movement with the interference check enabled.
Program checking	• The program check is being executed.
Executing reset operation	• The program check is being reset.
Executing trace(tip posn)	• The tip position trace mode is valid.
Executing BG simulation	• The back ground simulation is being executed.
Draw library inside error (n)	• Contact the service center.

Message	Details
Program check not possible	• Graphic check was attempted during the Computer link B operation.
Execute check search	• The program check is disabled. Execute the check search.
Solid check disabled (memory shortage)	• The 3D program check is disabled due to the memory shortage. Separate the programs and execute the check drawing again. Press the menu [Work init] once before performing the check drawing again.

2.3 Variable (Common variables, local variables) - related Operation Messages

Message	Details
Erase? (Y/N)	• Message to confirm the line erase. [Y] or [INPUT] : Variables are deleted. [N] : Variables are not deleted.

2.4 PLC Switch-related Operation Messages

Message	Details
Set up parameter ?(Y/N)	• Message to confirm the parameter setup. [Y] or [INPUT] : It will be possible to make settings. [N] : It will not be possible to make settings.

2.5 Compensation-related (Tool compensation, coordinate system offset) Operation Messages

Message	Details
Erase? (Y/N)	• Message to confirm the erasing. [Y] or [INPUT] : Erase the data. [N] : Do not erase the data.
Clear all axes? (Y/N)	• Message to confirm the all axes clear. [Y] or [INPUT] : Clear the data for all axes. [N] : Do not clear the data.
Cannot return to origin	• Operations other than line paste, paste and data input cannot be undone. • It is the initial state. Cannot undo. • The last operation was performed in another part system. Cannot undo the operation.
Clear all? (Y/N)	• Message to confirm the clearing the all data. [Y] or [INPUT] : Clear all data. [N] : Do not clear the data.
Input P number	• The coordinate system [Coord G54.1 P] menu was pressed. • The expansion workpiece coordinate system P No. was input.
Data clear complete	• Clearing of the collection data is complete.
Execute the collection data clear?	• Determines whether to clear the collection data. Press [Y] or [INPUT] to clear the data.

2.6 Data Input/Output-related Operation Messages

Message	Details
Overwrite this file?(Y/N)	• Message to confirm the overwriting. 　[Y] or [INPUT] : Overwrite the file. 　[N]　　　　　 : Do not overwrite the file.
Over run error	• The buffer overran or overflowed.
Memory over	• The program cannot be written, because the memory capacity will be exceeded.
Edit lock B	• It is not possible to change machining program B (8000 to 8999: user standard subprogram) or machining program C (9000 to 9999: machine tool builder custom program) as edit lock B is enabled.
Edit lock C	• It is not possible to change machining program C (9000 to 9999: machine tool builder custom program) as edit lock C is enabled.
Can't make directory on this device	• Creation of a directory was attempted for a device that cannot have a directory.
Designated file does not exist	• The file specified in device A, and B does not exist. • The applicable file does not exist in the specified directory.
The file name is a directory	• A directory was designated for the file transfer. A directory cannot be transferred.
Change complete	• The data conversion completed correctly.
Changing	• The data is being converted.
Erase complete	• The file has been erased.
Erase ended. Some file not erased	• The file erasing completed, but there are some files that could not be erased.
Verify error	• An error occurred when performing a file verification.
Compare error. Compare next file?(Y/N)	• Message to confirm the comparison 　[Y] or [INPUT] : Compare the next file. 　[N]　　　　　 : Do not compare the next file.
Compare complete	• The data comparison completed.
Verifying	• The data is being compared.
The file already exists	• The input file name already exists. • The file name after renaming already exists.
Can't erase designated file	• Erasing was attempted of a file that cannot be erased.
Can't rename designated file	• An attempt was made to change the name of a file that cannot be renamed.
Can't condense designated file	• Condensing of a file that cannot be condensed was attempted.
Designated file is locked	• Changing was attempted of a locked file.
Can't open file for dev A	• Could not find the file for device A. 　Or, the file is in a state in which it cannot be accessed.
Can't open file for dev B	• Could not find the file for device B. 　Or, the file is in a state in which it cannot be accessed.
Can't read file for dev A	• Could not read in the file for device A. 　Recheck the connection status for device A or the input/output parameter setting.
Can't read file for dev B	• Could not read in the file for device B. 　Recheck the connection status for device B or the input/output parameter setting.

Message	Details
Can't close file for dev A	• Contact the service center
Can't close file for dev B	• Contact the service center.
Can't write file for dev A	• Could not write in the file for device B. Recheck the connection status for device A or the input/output parameter setting.
Can't write file for dev B	• Could not write in the file for device B. Recheck the connection status for device B or the input/output parameter setting.
Can't seek file for dev A	• Contact the service center.
Can't seek file for dev B	• Contact the service center.
File name not designated for dev A	• A file name was not designated for device A.
File name not designated for dev B	• A file name was not designated for device B.
Can't open directory for dev A	• Could not find a directory corresponding to device A.
Can't open directory for dev B	• Could not find a directory corresponding to device B.
Different devices designated in A and B	• The same device must be designated for devices A and B, but differing devices were designated.
Timeout error	• A timeout error occurred when communicating with the external device.
Checking	• Cannot be executed during a check
Make directory complete	• Creation of the directory has been completed.
Dir create Complete	• Creation of the directory has been completed.
Can't make directory	• An error occurred while creating the directory.
The directory is not empty	• A file was found in the directory. Erase the file in the directory.
Directory pass is illegal	• The designated directory path name is illegal. Input a correct directory path name.
Data protect	• Setting, erasing, parameter setting, etc., of the various data is prohibited, because the data protect key is validated.
Transfer complete	• The data transfer completed correctly.
Transferring	• The data is being transferred.
Parity H error	• A parity H error was detected.
Parity V error	• A parity V error was detected.
File entry over	• The No. of registration files designated in the specifications was exceeded, so the file could not be registered.
Program No. not found in the file	• There is no program number in the selected file.
Executing format	• The formatting is being executed.
Format complete	• The formatting completed.
Format error	• The formatting failed.
Framing error	• An error occurred between the NC and the external device.
Variable conversion error	• An error occurred during the M2 macro conversion, and the conversion failed.

Message	Details
Merge complete	• The data merge completed.
Merge execution	• The data merge is being executed.
Memory alloc error	• Securing of the communication data range failed.
Rename complete	• The rename has been completed.
OK? (Y/N)	• Message to confirm the operation. [Y] or [INPUT] : Execute the operation [N] : Cancel the operation.
I/O not ready	• An error occurred between the NC and the external device.
I/O parameter error	• The external device settings and input/output parameters do not match.
I/O port busy	• Input/output was not possible as the I/O port is busy.
FD write protect	• The FD is write-protected. Release the write protection.
PLC running	• An attempt was made to input a user PLC during PLC RUN. • Stop the PLC on the maintenance screen.
FD not ready	• An attempt was made to perform an FD operation search with no FD. • An attempt was made to display the FD list with no FD.
MemoryCard not ready	• An attempt was made to perform operations with no memory card.
DS not ready	• An attempt was made to perform operations with no data server.
Can't write in READ-ONLY file	• Contact the service center.
Condense complete	• Condensing has been completed.
A directory does not exist	• The specified directory does not exist.
Setting complete normally	• Decryption code setting file of the credit system was set normally.

2.7 Parameter-related Operation Messages

Message	Details
Designate copy end posn	• The copy start position was specified using the cursor. Continue and specify the copy end position using the cursor.
Copy start posn and end posn reversed	• When the copy range was designated, a position before the start position was designated as the end position.
Columns of copy start and end different	• A different column (axis or part system) was specified for the copy start/end position at the screen with the arrangement configuration for each axis and part system.
Copy range is inadequate	• Could not find the parameter No. for the copy start position. • A value larger than the last parameter No. was designated as the copy end position parameter No. Check the designated copy range.
Setting error	• The port is already being used. • The parameter HOST LINK was turned ON during the Anshin-net communication.
Setting error: column n	• The nth column setting data is inappropriate when multiple axes were set at the same time (/ division). (Settings have been made up to the (n-1)th column.)
Password is illegal	• The password designated for displaying the Machine Parameter screen is illegal.
Input the password	• The menu key for first displaying the Machine Parameter screen was pressed after the power was turned ON.
Paste error	• An attempt was made to paste in a different parameter from the copy parameter.

Paste? (Y/N)	• Message to confirm the operation when pasting.
	  [Y] or [INPUT]: Paste the data at the current cursor position.
	  [N] : Do not paste the data.

Data protect	• Setting, erasing, parameter settings, etc., of the various data is prohibit, because the data protect key is validated.
Executing automatic operation	• An attempt was made to make parameter settings during auto operation.
Can't select	• The password designated for displaying the machine parameters has not been input. • Display of the machine parameters was attempted on the [Param No.] menu, but the password has not been input. Press the [Machine param] menu, and input the password for displaying the machine parameters.
No odd number for R register start No.	• An odd number cannot be used for R register start No. Use an even number.

2.8 Measurement-related (Workpiece, rotation) Operation Messages

Message	Details
TLM switch OFF	• Measurement, retrieving of the skip position, writing the coordinates data etc. was attempted when the TLM switch was OFF.
Can't take-in skip posn	• Could not retrieve the skip position. Check the following: **< When measuring the workpiece >** 1. Is the name of the axis to be measured designated in the basic axis (I, J, K)? 2. Is the axis that executed the axis movement a measurement axis? **< When measuring the rotation >** 1. Is the name of the axis to be measured designated in the coordinate rotation plane (horizontal axis, vertical axis)? 2. Is the axis that executed the axis movement a measurement axis?
Can't write coordinates data	• Could not obtain the measured axis No. • The measured angle was illegal. • Could not write into the coordinate system offset. Measure again. • The work coordinate offset data was attempted to set when the measurement counter does not have the necessary values. • The work coordinate offset date was attempted to set in the slave axis.
Sensor take in not possible	• Could not retrieve the position measured with the touch sensor. Measure again.
Can't measure	• Measurement failed.
Sensor signal was illegally turned on	• The sensor signal was already ON when the tool measurement mode (TLM) signal was validated. • The sensor signal turned ON when there was no axis movement after the tool measurement mode (TLM) signal was validated. • The sensor signal turned ON at a position within 100μm from the final entry start position. • Move the axis in a safe direction after turning the sensor signal OFF or turning the tool measurement mode signal OFF.
Can't write compensation data	• The cursor position and the cell for writing the compensation amount (length dimension, radius dimension) do not match. Match the cursor position with the cell for writing the compensation amount.
Offset No. not found	• During manual tool length measurement, the sensor was turned ON designating tool compensation No. not exist. • During manual tool length measurement, the measurement method was switched to manual tool length measurement 2 designating tool compensation No. not exist. • Correctly set the R register of compensation No.
TLM axis is illegal	• During 2 or more axes movement, the tool length measurement was executed by turning the sensor ON. Keep the tool away from the sensor and execute the measurement by one axis.
TLM axis not returned to ref. position	• The tool length measurement was executed by tuning the sensor ON for the axis in which dog-type reference point return has not been executed. Carry out reference point return for the measurement axis.
Can't write rotation parameter	• The measured result cannot be set in the process parameter.

Message	Details
Can't calculate center & angle for rot	• Three points necessary for calculation are not retrieved. • Center shift amount or censor radius was failed to retrieve. • Calculation of the center and the angle was failed.
Input 0 to coord center & angle for rot	• The center and the angle are not "0". Set "0" in the parameter "#8623 Coord rot centr (H)", "#8624 Coord rot centr (V)" and "#8627 Coord rot angle".
Can't calculate	• Hole center cannot be determined.
Meas axis not returned to ref. position	• The workpiece measurement was executed when dog-type reference point return has not been executed. Carry out reference point return for the measurement axis.

2.9 Tool (Tool registration, tool life) -related Operation Messages

Message	Details
Designated group already exists	• An already existing group No. was designated when changing the group No. (Tool life screen (grp)) • An already existing group No. was designated when newly creating the group. (Tool life screen (grp list)) Designate a group No. that does not already exist.
Designated group does not exist	• Erasing was attempted on the Tool life screen (grp list) of a group that does not exist.
Can't register group	• The group registration process on the Tool life screen (grp list) failed.
Can't delete group	• The group deletion process on the Tool life screen (grp list) failed.
Erase? (Y/N)	• Message to confirm the erasing. [Y] or [INPUT] : Erase the data [N] : Do not erase the data.
Delete all groups? (Y/N)	• Message to confirm the erasing of all groups. [Y] or [INPUT] : Erase all groups [N] : Do not erase all groups.
Can't delete all groups	• All groups' deletion cannot be executed because data protection key (KEY 1) is validated or automatic operation mode is validated, etc. during all groups' deletion. All groups' deletion cannot be executed because nothing has been registered to group, also.
Pot number not exist	• The set pot number does not exist. Check the pot number.
Create new file? (Y/N)	• Message to confirm the operation when newly creating data, files, etc. [Y] or [INPUT] : Newly create. [N] : Cancel the operation.
Input the tool number	• Waiting tool number input.
Clear not possible	• The clear range is incorrect.
Spindle/stndby tool display not possible	• The spindle standby cannot be displayed due to the user PLC setting. Contact the machine tool builder.
Format tool life data? (Y/N)	• Determines whether to format the tool life management data. When [Y] is input, the formatting is executed.
Tool life format complete	• The tool life management data formatting completed.
Exists in spindle/standby. Set? (Y/N)	• An attempt was made to set the same No. as the tool No. for spindle/standby.
Exists in magazine 1. Set? (Y/N)	• An attempt was made to set the same No. as the tool No. that has been registered to the valid magazine.
Exists in magazine 2. Set? (Y/N)	• An attempt was made to set the same No. as the tool No. that has been registered to the valid magazine.
Exists in magazine 3. Set? (Y/N)	• An attempt was made to set the same No. as the tool No. that has been registered to the valid magazine.
Exists in magazine 4. Set? (Y/N)	• An attempt was made to set the same No. as the tool No. that has been registered to the valid magazine.
Exists in magazine 5. Set? (Y/N)	• An attempt was made to set the same No. as the tool No. that has been registered to the valid magazine.

2.10 Editing-related Operation Messages

Message	Details
Buffer correct not possible	• Buffer correction cannot be performed for this program. • Buffer correction was attempted during the BTR operation.
Can't write into file	• Could not write the data to the memory with the buffer correction. Contact the service center.

Overwrite this file?(Y/N)	• Message to confirm when registering MDI
	  [Y] or [INPUT] : Overwrite the file.
	  [N] : Do not overwrite the file.

Memory over	• The program cannot be written, because the memory capacity will be exceeded.
Designated character string not found	• Could not find the search results and character string in the program.

Save current file ?(Y/N)	• Message to confirm the saving.
	  [Y] : Save the changes to the current file.
	  [N] : Do not save the changes to the current file.

A file does not exist	• An attempt was made to select and edit a non-existent file.
Executing	• Following menu's process is executing now: "Line paste", "Line clear", "Undo", "String search", "String replace", "Miss warning", or "Next miss".
Designated file does not exist	• An attempt was made to select and erase a non-existent file.
Erase complete	• The data erasing completed.
Can't erase designated file	• The selected file cannot currently be erased.
Designated file does not exist	• A file that does not exist was designated when file editing.
Designated file already exists	• When creating a new file, a file name was designated that already exists.

Replace? (Y/N)	• Message to confirm the character string replacement.
	  [Y] or [INPUT] : Replace the character string.
	  [N] : Do not replace the character string.

File access error	• Contact the Service Center.
File open error	• The designated file is already open.
Editing	• A program is being edited on the screen. Save the program to write it into the memory.
Program entry over	• The program could not be registered in the memory when attempted, because the No. of registrations designated in the specifications would be exceeded.
Block char nos over	• The character number limitation in one block was exceeded.
Paste error	• Pasting was attempted within the copy range of the same file.
Copy range is inadequate	• The copy range designation is inadequate. Check whether the designated range exists. • The range was designated exceeding 100 lines during mass editing.
Area designation is inadequate	• The area designation is inadequate. Check whether the designated area exists.
Designated line is out of program range	• Designation was attempted of a line No. larger than the No. of lines in the entire program.

Message	Details
MDI no setting	• Editing of the MDI was started, but the MDI setting was incomplete.
Abs/Inc mode is illegal	• During playback editing: G90 was set when control parameter "Playback G90" was OFF. G91 was set when control parameter "Playback G90" was ON.
MDI search complete	• The MDI search completed.
Can't search in MDI mode	• The restart search was attempted during MDI mode. • Execute the restart search after switching other than MDI mode.
MDI Set ended	• MDI setting cannot be executed.
MDI Setting error	• MDI setting was completed.
MDI search error	• Could not execute the MDI search.
MDI entry complete	• MDI entry has been completed.
Can't edit except in MDI mode	• "#1144 mdlkof" (MDI setting lock) is "0" and therefore it is not possible to edit the MDI program in a mode other than MDI mode.
Input miss was detected	• An input miss was detected.
Input miss was not detected	• A search was performed for an input miss, however, none was found.
Can't edit a file except in NC memory	• Editing cannot be performed at the edit window for programs other than those in the NC memory.
Save it	• The cursor was tried to move beyond the editable range during mass-editing. Save, then operate again.
Save not possible	• A special file (history file etc.) that cannot be saved was edited and an attempt was made to save it. Perform an operation to quit editing. • Failed saving due to file size over, etc. during mass-editing. • Setting of "#1166 fixpro" was illegal. Use the settings for a regular program. • MDI cannot be entered due to MDI editing mode. Press INPUT key and finish editing.
Save left side file? (Y/N)	• Message to confirm whether saving the left side file of the multi-program display type [Y]: Save the change [N]: Do not save the change
Save right side file? (Y/N)	• Message to confirm whether saving the right side file of the multi-program display type [Y]: Save the change [N]: Do not save the change
Can't edit because of size over	• The program cannot be written, because the memory capacity will be exceeded. • If the memory capacity of the transfer designation device is exceeded during the automatic backup, increase the available memory of the device.
Can't edit the searched file	• The serial file cannot be edited.
DS not ready	• Operation was attempted when a DS was not inserted. • Creating or opening a program was attempted when a DS was not inserted.
FD not ready	• The FD operation search was attempted when an FD was not inserted. • The FD list display was attempted when an FD was not inserted. • Creating or opening a program was attempted when an FD was not inserted.

Message	Details
MemoryCard not ready	• Operation was attempted when a memory card was not inserted.
This cannot be specified	• Invalid special characters (/E, etc.) were set.
Loading	• Loading file.
Saving	• Saving file.
Can't execute playback edit	• The playback editing cannot be executed because the right side area is mass-editing mode. • Playback editing was attempted while program file to be edited is not designated. Display a program file in the right side area.
Program display lock C	• The program display or search cannot be executed. Review the parameter "#1121 pglk_c" (program display lock).

2.11 Diagnosis-related Operation Messages

Message	Details
Erase? (Y/N)	• Message to confirm alarm history clear operation [Y] or [INPUT] : Erase the data [N]　　　　　: Do not erase the data.
Can't write data	• The data cannot be written.
Device is illegal	• The designated device is inadequate.
Modal output not possible	• The modal output process failed.
Modal clear not possible	• The modal cancel process failed.
Continue display not possible	• Continuous display is not possible because data is not set at the cursor position.
One-shot output not possible	• The one-shot output process failed.
Setting data not found	• The data has not been set.
Select a menu	• A device No. was set without selecting a menu operation. Press any operation menu and input the device No. with a menu highlighted.

2.12 Maintenance-related Operation Messages

Message	Details
Password is illegal	• The input password is incorrect.
Input password	• The [Password] menu key was pressed, and the password input mode was entered. Input a password.
Now making back-up	• Currently backing up system data and the user PLC program to a specified device.
Backupping	• The SRAM data is being backed up on the HD.
Backup complete	• Backup of the SRAM data on the HD has been completed. • Back up of system data and user PLC program to a specified device has been completed.
Backup error	• An error occurred while backing up the SRAM data on the HD.
Select directory to backup	• Select area by moving cursor, using ↑ and ↓ keys. Press the "INPUT" key to confirm.
Select directory to restore	• Select file by moving cursor, using ↑ and ↓ keys. Press the "INPUT" key to confirm.
Executing format	• The formatting is being executed correctly.
Format complete	• The formatting completed correctly.
Format error	• The NC memory formatting failed. Contact the nearest service center.

Quit HMI ?(Y/N)	• Message to confirm the HMI quitting
	  [Y] or [INPUT] : Quit the HMI.
	  [N] : Do not quit the HMI.

Format NC memory?(Y/N)	• Message to confirm the NC memory formatting
	  [Y] or [INPUT] : Start formatting the NC memory.
	  [N] : Do not format the NC memory.

Execute SRAM backup ?(Y/N)	• Message to confirm the SRAM back up
	  [Y] or [INPUT] : The SRAM data is backed up to the HD.
	  [N] : The SRAM data is not backed up to the HD.

PLC running. Does it stop? (Y/N)	• Message to confirm the PLC STOP
	  [Y] or [INPUT] : Backup the SRAM data on the HD.
	  [N] : Do not backup the SRAM data on the HD.

Restoring	• The system data and user PLC program are now being restored to the NC from a specified device.
Restore complete	• Restoration of system data and user PLC program to the NC from a specified device has been completed.

Auto adjust error	• The H/W status cannot be read properly, and therefore it is not possible to perform auto adjustments.
	  Check the remote I/O unit.
	  Perform manual adjustments.
	• The unit is defective. Replace the unit.

Change Ope. test mode	• Operation of the Operation test screen was attempted when the operation adjustment mode was not selected.
Test mode sig valid signal is now OFF	• The operation adjustment mode cannot be selected because the operation adjustment mode valid signal (R9998/bit0) is 0.

Message	Details
Auto adjust complete	• Analog output adjustment completed normally.
Auto adjust execution	• Performing analog output adjustment normally.

Execute? (Y/N)	• Message to confirm the operation
	  [Y] or [INPUT] : The currently selected operation is performed.
	  [N] : The currently selected operation is not performed.

Unit not equipped	• The machine is not equipped with an analog output unit.
A serial number is inaccurate	• The system data to be restored and the serial number in the NC do not match, and therefore it is not possible to restore. • Check to ensure that the serial number in the NC has been set and that the system data to be restored matches.
Operating aux axis	• It is not possible to set parameter and input/output data during auxiliary axis operation. • It is not possible to change the display axis during auxiliary axis operation.

2.13 Data Sampling-related Operation Messages

Message	Details
Executing sampling	• The waveform data is being sampled.
Input the axis name	• This appears when the data type is selected in the Ch1 or Ch2 data setting area. Input the name of the axis to be sampled.
Input axis name/signal No./bit	• This appears when the data type is selected in the Ch1 or Ch2 data setting area. Set the sampling conditions common for Ch1 and Ch2.
Input device name/device No.	• Input device name/device No.
Input file/sub-ID/item/data	• This appears when an NC file is selected in the Ch1 or Ch2 data setting area.
Change the area	• Change the area.
Sampling conditions are illegal	• The data cannot be sampled as the setting conditions are illegal. Review the data, vertical scale, sampling rate and horizontal scale on the Condition setting screen.
Can't start sampling	• "#1224 aux08/bit0" is "0" and sampling start-up cannot be performed.
The collection invalid	• The parameters are set to prevent data being collected. Check the parameters.
The collection begin?	• Determines whether to start data collection. Press [Y] or [INPUT] to start data collection.
The collection stop?	• Determines whether to stop data collection. Press [Y] or [INPUT] to stop data collection.
The collection is being executed	• An attempt was made to start data collection while data collection was being performed.
The collection is stopping	• An attempt was made to stop data collection while data collection was stopped.
The collection invalid	• The data collection is set invalid in the parameter. Check the parameter.
Scroll execution	• The waveform display is being scrolled.
Refresh execution	• The waveform is being refreshed.

2.14 Absolute Position Detection-related Operation Messages

Message	Details
Setting absolute position set	• Setting from the screen was attempted of absolute position detection data when the "Absolute Position Set" was not ON. Press the menu key [Absolute Position Set] to turn it ON.
Not the abs position detection system	• An absolute position detection system has not been selected for the currently selected axis. The machine parameter (Axis specification parameter "#2049 type") must be set.
Axis name inappropriate	• The set axis name is inappropriate. Check the axis name.
Not passed on grid	• The absolute position basic point was set without passing the grid after the power ON in the dogless-type absolute position detection. Return one grid back and repeat the procedure.
Can't start	• Settings of "#0 absolute posn set", "#2 Z-point" and "#2055 pushf" are not adequate. • "AbsEncoder: Serial data error" alarm (Z71 0005) has occurred. Check the parameter and the alarm.
Illegal direction	• JOG starting direction is illegal in the machine end stopper method of the dogless-type absolute position detection.

2.15 System Setup-related Operation Messages

Message	Details
Initial parameter creating	• The initial parameter is being created.
Initial parameter transferring	• The initial parameter is being transferred.
Spindle initial parameter transferring	• The spindle initial parameter is being transferred.
Can't write data	• The data cannot be written. • Setting of the initial parameter failed. • Contact the service center.
Param set ended. Format NC memory? (Y/N)	• After completing the parameter setting, it determines whether executing the file format or not. Enter [Y] or [INPUT] to execute the file format.
Write sample ladder? (Y/N)	• It determines whether executing writing the sample PLC program or not. Enter [Y] or [INPUT] to start writing the sample PLC program.
Sample ladder not found	• The file to set the sample PLC program is lost. Contact the service center.

2.16 Automatic Backup-related Operation Messages

Message	Details
Auto backup disabled (Device illegal)	• Set a correct value in the device No. of the automatic backup device.
Auto backup disabled (No DS)	• When turning ON the power next time, insert DS.
Auto backup disabled (No memory card)	• When turning ON the power next time, insert the memory card.
Auto backup proceeding	• Wait for the automatic backup to complete.
Auto backup completed	• The automatic back up is completed.
Memory over	• The memory capacity of the transfer designation device was exceeded during the automatic backup. Increase the available memory of the transfer designation device.
File access error	• A file access error occurred during the automatic backup. Contact the service center.
Can't make directory	• The storage destination directory of the automatic backup data described in the custom definition file does not exist. Create the directory of the storage destination.
Write protect	• The memory card is write-protected. Release the write protection.

2.17 Alarm History-related Operation Messages

Message	Details
The collection begin? (Y/N)	• Determines whether to start alarm history. Press [Y] or [INPUT] to start alarm history.
The collection stop? (Y/N)	• Determines whether to stop alarm history. Press [Y] or [INPUT] to stop alarm history.
The collection is being executed	• An attempt was made to start alarm history while alarm history was being performed.
The collection is stopping	• An attempt was made to stop alarm history while alarm history was being stopped.
Execute the collection data clear?(Y/N)	• Determines whether to clear alarm history. Press [Y] or [INPUT] to clear alarm history.
Data clear complete	• The alarm history cleared was completed.
The collection begin	• The alarm history was started.
The collection stop	• The alarm history was stopped.

2.18 Anshin-net-related Operation Messages

(1) Messages related to all Anshin-net screens

Message		Details
(None)	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Communication has not been started. • A call is being placed with automatic alarm notification or one-touch call, and a call is being received from the NC service.

(2) Messages related to automatic alarm notification

Message		Details
dialing	**Do not turn the power OFF until the automatic alarm notification ends.**	• A call is being placed with automatic alarm notification. • Communication starts when an alarm occurs, but the line is not connected yet in this state. • This state is also entered when standing by for transmission. • Communication has been started with emergency stop by the servo, spindle or PLC alarm, or by the establishment of the conditions set in the parameters.
Waiting for dialing	**Do not turn the power OFF until the automatic alarm notification ends.**	• Redialing since the NC service is using the line for other communication.
Verifying the user registration	**Do not turn the power OFF until the automatic alarm notification ends.**	• User authentication is being executed by the NC service side.
Connecting	**Do not turn the power OFF until the automatic alarm notification ends.**	• The line is connected with automatic alarm notification.
Receiving	**Do not turn the power OFF until the automatic alarm notification ends.**	• The diagnosis data is being received with automatic alarm notification.
Sending	**Do not turn the power OFF until the automatic alarm notification ends.**	• The diagnosis data is being sent with automatic alarm notification.
Transmission completed	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Automatic alarm notification has ended, and the line has been disconnected.
Reception completed	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Automatic alarm notification has ended, and the line has been disconnected. • This is displayed when at least one file has been received.
(Status of communication with NC service)	**Connecting with NC service.** **Wait for communication to end.**	• In connection standby state since line is being used by Anshin-net.

(3) Messages related to automatic alarm notification

Message		Details
Operator notice effective	**If automatic operation stops while operator notification is valid, the designated telephone number will be contacted.**	• Operator notification is valid. • If machining ends normally or abnormally in this state, communication with operator notification will start.
Dialing	**Do not turn the power OFF until the operator notification ends.**	• Data is being transmitted with operator notification. • Communication will start when machining ends normally or abnormally, but the line is not connected yet in this state. • This state is also entered when standing by for transmission.
Waiting for dialing	**Do not turn the power OFF until the operator notification ends.**	• Redialing since the NC service is using the line for other communication.
Verifying the user registration	**Do not turn the power OFF until the operator notification ends.**	• User authentication is being executed by the NC service side.
Connecting	**Do not turn the power OFF until the operator notification ends.**	• The line is connected with operator notification.
Receiving	**Do not turn the power OFF until the operator notification ends.**	• The diagnosis data is being received with operator notification.
Sending	**Do not turn the power OFF until the operator notification ends.**	• The diagnosis data is being sent with operator notification.
Transmission completed	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Operator notification has ended, and the line has been disconnected.
Reception completed	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Operator notification has ended, and the line has been disconnected. • This is displayed when at least one file has been received.
(Status of communication with NC service)	**Connecting with NC service.** **Wait for communication to end.**	• In connection standby state since line is being used by Anshin-net.

(4) Messages related to automatic alarm notification

Message		Details
Carry out one-touch call? (Y/N)	Press "Y" to make a one-touch call and "N" to cancel. If the line is being in use, a connection with NC service will be established as soon as the line becomes idle.	• A connection with NC service has not been established. • The system is confirming whether to actually make a one-touch call. • This is displayed when the Call menu is pressed. Press Y or INPUT to execute one-touch call.

Message		Details
Dialing	Do not turn the power OFF until the one-touch call ends.	• Data is being transmitted with one-touch call. • Communication will start when one-touch call is executed, but the line is not connected yet in this state. • This state is also entered when standing by for transmission.
Waiting for dialing	Do not turn the power OFF until the one-touch call ends.	• Redialing since the NC service is using the line for other communication.
Verifying the user registration	Do not turn the power OFF until the one-touch call ends.	• User authentication is being executed by the NC service side.
Connecting	Do not turn the power OFF until the one-touch call ends.	• The line is connected with one-touch call.
Receiving	Do not turn the power OFF until the one-touch call ends.	• The diagnosis data is being received with one-touch call.
Sending	Do not turn the power OFF until the one-touch call ends.	• The diagnosis data is being sent with one-touch call.
Transmission completed	Press one-touch call to call the NC service. Do not turn the power OFF during the one-touch call.	• Communication with one-touch call has ended, and the line has been disconnected.
Reception completed	Press one-touch call to call the NC service. Do not turn the power OFF during the one-touch call.	• Communication with one-touch call has ended, and the line has been disconnected. • This is displayed when at least one file has been received.
(Status of communication with NC service)	Connecting with NC service. Wait for communication to end.	• In connection standby state since line is being used by Anshin-net.

(5) Messages related to transmission request from NC service

Message		Details
Verifying the distination	**Connecting with NC service.** **Wait for communication to end.**	• User authentication is being executed by the NC system side.
Connecting	**Connecting with NC service.** **Wait for communication to end.**	• The line is connected upon transmission request from NC service.
Receiving	**Connecting with NC service.** **Wait for communication to end.**	• Data is being received upon transmission request from NC service.
Sending	**Connecting with NC service.** **Wait for communication to end.**	• Data is being sent upon transmission request from NC service.
Transmission completed	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Transmission request from NC service has been completed, and the line has been disconnected.
Reception completed	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• Transmission request from NC service has been completed, and the line has been disconnected. • This is displayed when at least one file or message has been received.

(6) Messages related to number 1 to 3 menu operations

Message		Details
(None)	**Press one-touch call to call the NC service.** **Do not turn the power OFF during the one-touch call.**	• The selected telephone No. will be set as the telephone No. to be notified to the NC service. • Hereafter, the telephone No. set with one-touch call or operator notification will be notified to the NC service.

(7) Messages related to arbitrary number setting

Message		Details
(None)	**Input the telephone No. to be notified.**	• The input telephone No. will be set as the telephone No. to be notified to the NC service. • Hereafter, the telephone No. set with one-touch call or operator notification will be notified to the NC service.

(8) Messages related to sharing of machining data

Message	Details
Transmit by the set password?(Y/N)	• The line is not connected with NC service. • The system is confirming whether to transfer machining data. Press "Y" or "INPUT" to transfer machining data, "N" to cancel.
OK? (Y/N)	• The line is not connected with NC service. • The system is confirming whether to erase machining data. Press "Y" or "INPUT" to erase machining data, "N" to cancel.
dialing	• A call is being placed. • "Transmit by the set password?(Y/N)" or "OK? (Y/N)" is shown. Pressing "Y" or "INPUT" starts the communication. The line is not connected yet in this state.
Connecting	• The line is connected for sharing of machining data.
Transmitting	• The machining data is being transmitted.
Transmission completed	• Machining data transmission has ended, and the line has been disconnected.
Receiving	• The machining data is being received.
Reception completed	• Machining data reception has ended, and the line has been disconnected.
Erase complete	• Machining data erasing has ended, and the line has been disconnected.
Waiting for dialing	• In dialing standby state since the line is being used.
Input the password	• The password, which is required for the transmission/reception of machining data, has not been set. Input the password set on the Anshin-net parameter 1 screen.
Input the user number	• The user number, which is required for the transmission/reception of machining data, has not been set. Input the user number set on the Anshin-net parameter 1 screen.

2.19 Messages Related to Machine Tool Builder Network System

(1) Messages related to all Machine Tool Builder Network System (MTB net) Screens.

Message		Details
(None)	**Press the [Send] menu when you transmit the diagnosis data to MTB. Don't turn OFF the power supply while transmitting.**	• Communication has not been started.

Message	Details
Network service is connected	• The settings of the MTB net parameter 1,2 cannot be changed since the system is communicating with Call Center or machine tool builder. Set again after the communication has ended.

(2) Messages related to transmission of diagnosis data

Message		Details
Transmit diagnosis data? (Y/N)	**Press Y (transmit the diagnosis data) or N (cancel). You'll connect with MTB when it gets available if line used.**	• The system is confirming the transmission of diagnosis data.
dialing	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The diagnosis data is being transmitted. • The line is not connected yet in this state.
Verifying the user registration	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The system is waiting for an authentication response from remote diagnosis tool kit.
Waiting for the reply	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The line has been disconnected once, and the system is waiting for a connection with the machine tool builder.
Verifying the destination	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The line has been connected corresponding to the received call from the machine tool builder. The system is confirming the destination of connection.
Connecting	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The system is connected or connecting with machine tool builder.
Transmitting	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The diagnosis data is actually being transmitted.
Transmission completed	**Press Y (transmit the diagnosis data) or N (cancel). You'll connect with MTB when it gets available if line used.**	• The transmission of diagnosis data has ended, and the line has been disconnected.

Message		Details
Waiting for dialing	**Don't turn OFF a power supply until diagnosis data transmission ends.**	• The machine tool builder is using the line for other communication.
(Status of communication with NC service)	**Connecting with NC service. Please wait until the communication ends.**	• In connection standby state since line is being used by Anshin-net.
(Status of communication with machine manufacturer)	**Connecting with MTB. Please wait until the communication ends.**	• In connection standby state since line is being used by the machine tool builder.

(3) Messages related to reception of the diagnosis results

Message		Details
Verifying the destination	**Connecting with MTB. Please wait until the communication ends.**	• The line has been connected corresponding to the received call from the machine tool builder. The system is confirming the destination of connection.
Connecting	**Connecting with MTB. Please wait until the communication ends.**	• The system is connected or connecting with machine tool builder.
Receiving	**Connecting with MTB. Please wait until the communication ends.**	• The diagnosis results are actually being received.
Reception completed	**Press the [Send] menu when you transmit the diagnosis data to MTB. Don't turn OFF the power supply while transmitting.**	• Reception of the diagnosis results has ended, and the line has been disconnected.

(4) Messages related to reception of messages

Message		Details
Verifying the destination	**Connecting with MTB. Please wait until the communication ends.**	• The line has been connected corresponding to the received call from the machine tool builder. The system is confirming the destination of connection.
Connecting	**Connecting with MTB. Please wait until the communication ends.**	• The system is connected or connecting with machine tool builder.
Reception completed	**Press the [Send] menu when you transmit the diagnosis data to MTB. Don't turn OFF the power supply while transmitting.**	• Reception of the message has ended, and the line has been disconnected.

2.20 Other Operation Messages

Message	Details
Executing automatic operation	• Cannot be performed during automatic operation. Perform the operation again after automatic operation has been completed.
Setting error	• The setting data is inadequate. (Alphabetic characters were set where only numeric characters can be set, etc.) • The data has not been set. • There is no specification.
Data range error	• The input data exceeded the range. Set the value again within the range.
Data protect	• Setting, erasing, parameter setting, etc., of the various data is prohibited, because the data protect key is validated. Reconsider the data protect key setting.
Write protect	• Attempted to create a new program file in the write-protected device • Opened the program file of the write-protected device • Attempted to save the program file of the write-protected device • Attempted to correct the buffer for the write-protected file. • Attempted to edit or correct the buffer for the read-only program file.
Edit lock B	• It is not possible to change machining program B (8000 to 8999: user standard subprogram) or machining program C (9000 to 9999: machine tool builder custom program) as edit lock B is enabled.
Edit lock C	• It is not possible to change machining program C (9000 to 9999: machine tool builder custom program) as edit lock C is enabled.
Origin set not possible	• The operation is in a state in which origin set is not possible. Check the parameter "#1123 origin (Origin set prohibited)" setting. • Check that the axis has stopped. • Check that idling (post-reset status) is currently being performed.
Can't command manual value	• The manual numerical value protect is valid and therefore it is not possible to perform a manual numerical value command.
Getting T code list	• T code list is being retrieved.
T code list complete	• Retrieving T code list is completed.
Load meter display not possible	• The load meter cannot be displayed. Contact the machine tool builder.
Pallet running	• Each setting was executed during pallet running.
APC executing	• Each setting was executed during automatic pallet changer executing.

3. Program Error

(The bold characters are the message displayed in the screen.)
These alarms occur during automatic operation, and the causes of these alarms are mainly program errors which occur, for instance, when mistakes have been made in the preparation of the machining programs or when programs which conform to the specification have not been prepared.

Error No.	Details	Remedy
P 10	**No. of simultaneous axes over** The number of axis addresses commanded in the same block exceeds the specifications.	• Divide the alarm block command into two. • Check the specifications.
P 11	**Illegal axis address** The axis address commanded by the program and the axis address set by the parameter do not match.	• Revise the axis names in the program.
P 20	**Division error** An axis command which cannot be divided by the command unit has been issued.	• Check the program.
P 29	**Not accept command** The normal line control command (G40.1, G41.1, G42.1) has been issued during the modal in which the normal line control is not acceptable.	• Check the program.
P 30	**Parity H error** The number of holes per character on the paper tape is even for EIA code and odd for ISO code.	• Check the paper tape. • Check the tape puncher and tape reader.
P 31	**Parity V error** The number of characters per block on the paper tape is odd.	• Make the number of characters per block on the paper tape even. • Set the parameter parity V selection OFF.
P 32	**Illegal address** An address not listed in the specifications has been used.	• Check and revise the program address. • Check and correct the parameters values. • Check the specifications.
P 33	**Format error** The command format in the program is not correct.	• Check the program.
P 34	**Illegal G code** A G code not listed in the specifications has been used. An illegal G code was commanded during the coordinate rotation command (G68).	• Check and correct the G code address in the program.
	G51.2 or G50.2 was commanded when the rotary tool axis No. (#1501 polyax) was set to "0". G51.2 or G50.2 was commanded when the tool axis was set to the linear axis (#1017 rot "0").	• Check the parameter setting values.
P 35	**Setting value range over** The setting range for the addresses has been exceeded.	• Check the program.
P 36	**Program end error** "EOR" has been read during tape and memory mode.	• Enter the M02 and M30 command at the end of the program. • Enter the M99 command at the end of the subprogram.

Error No.	Details	Remedy
P 37	**O, N number zero** A zero has been specified for program and sequence Nos.	• The program Nos. are designated across a range from 1 to 99999999. • The sequence Nos. are designated across a range from 1 to 99999.
P 38	**No spec: Add. Op block skip** "/n" has been issued even though there are no optional block skip addition specifications.	• Check the specifications.
P 39	**No specifications** • A non-specified G code was specified. • The selected operation mode is not used.	• Check the specifications.
P 40	**Pre-read block error** When tool radius compensation is executed, there is an error in the pre-read block and so the interference check is disabled.	• Reconsider the program.
P 48	**Restart pos return incomplete** Movement command was executed before executing the block that is restart-searched.	• Carry out program restart again. Movement command cannot be executed before executing the block that is restart-searched.
P 49	**Invalid restart search** • Restart search was attempted for the 3-dimensional circular interpolation. • Restart search was attempted during the cylindrical interpolation, polar coordinate interpolation, and tool tip center control.	• Reconsider the program. • Reconsider the restart search position.
P 50	**No spec: Inch/Metric change** Inch/Metric changeover (G20/G21) command was issued even though there is no inch/metric conversion specification.	• Check the specifications.
P 60	**Compensation length over** The commanded movement distance is excessive. (Over 2^{31})	• Reconsider the axis address command.
P 61	**No spec: Unidirectional posit.** Unidirectional positioning (G60) was commanded even though there is no unidirectional positioning specification.	• Check the specifications.
P 62	**No F command** • No feed rate command has been issued. • There is no F command in the cylindrical interpolation or polar coordinate interpolation immediately after the G95 mode is commanded.	• The default movement modal command at power ON is G01. This causes the machine to move without a G01 command if a movement command is issued in the program, and an alarm results. Use an F command to specify the feed rate. • Specify F with a thread lead command.
P 63	**No spec: High-speed machining** High-speed machining cancel (G5P0) was commanded even though there is no high-speed machining mode specification.	• Check the specifications.
P 65	**No spec: High speed mode 3**	• Check the high-speed mode III specifications.

Error No.	Details	Remedy
P 70	**Arc end point deviation large** • There is an error in the arc start and end points as well as in the arc center. • The difference of the involute curve through the start point and the end point is large. • When arc was commanded, one of the two axes configuring the arc plane was a scaling valid axis.	• Check the numerical values of the addresses that specify the start and end points, arc center as well as the radius in the program. • Check the "+" and "-" directions of the address numerical values. • Check the scaling valid axis.
P 71	**Arc center error** • The arc center is not sought during R-specified circular interpolation. • The curvature center of the involute curve cannot be obtained.	• Check the numerical values of the addresses in the program. • Check whether the start point or end point is on the inner side of the base circle for involute interpolation. When carrying out tool radius compensation, check that the start point and end point after compensation are not on the inner side of the base circle for involute interpolation. • Check whether the start point and end point are at an even distance from the center of the base circle for involute interpolation.
P 72	**No spec: Herical cutting** A helical command has been issued though it is not included in the specifications.	• Check the helical specifications. • An Axis 3 command was issued by the circular interpolation command. If there is no helical specification, the linear axis is moved to the next block.
P 73	**No spec: Spiral cutting** A spiral command was issued despite the fact that such a command does not exist in the specifications.	• The G02.1 and G03.1 commands are issued for circular interpolation. • Check the spiral specifications.
P 74	**Can't calculate 3DIM arc** The end block was not specified during 3-dimension circular interpolation supplementary modal, and therefore it is not possible to calculate the 3-dimension circular interpolation. Furthermore, it not possible to calculate the 3-dimension circular interpolation due to an interruption during 3-dimension circular interpolation supplementary modal.	• Reconsider the program.
P 75	**3DIM arc illegal** An unusable G code was issued during 3-dimension circular interpolation modal. Or, a 3-dimension circular interpolation command was issued during a modal for which a 3-dimension circular interpolation command cannot be issued.	• Reconsider the program.
P 76	**No spec: 3DIM arc interpolat** G02.4/G03.4 was commanded even though there is no 3-dimension circular interpolation specification.	• Check the specifications.
P 80	**No spec: Hypoth ax interpolat** Hypothetical axis interpolation (G07) was commanded even though there is no hypothetical axis interpolation specification.	• Check the specifications.

Error No.	Details	Remedy
P 90	**No spec: Thread cutting** A thread cutting command was issued even though there is no thread cutting command specification.	• Check the specifications.
P 91	**No spec: Var lead threading** Variable lead thread cutting (G34) was commanded even though there is no variable lead thread cutting specification.	• Check the specifications.
P 93	**Illegal pitch vaule** The thread lead (thread pitch) when performing the thread cutting command is incorrect.	• Set the correct thread lead command for the thread cutting command.
P100	**No spec: Cylindric interpolat** A cylindrical interpolation command was issued even though there is no cylindrical interpolation specification.	• Check the specifications.
P110	**Plane select during figure rot** Plane selection (G17/G18/G19) was commanded during figure rotation.	• Check the machining program.
P111	**Plane selected while coord rot** Plane selection commands (G17, G18, G19) were issued during a coordinate rotation command (G68).	• After command G68, always issue a plane selection command following a G69 (coordinate rotation cancel) command.
P112	**Plane selected while R compen** • Plane selection commands (G17, G18, G19) were issued while tool radius compensation (G41, G42) and nose R compensation (G41, G42, G46) commands were being issued. • Plane selection commands were issued after completing nose R compensation commands when there are no further axis movement commands after G40, and compensation has not been cancelled.	• Issue plane selection commands after completing (axis movement commands issued after G40 cancel command) tool radius compensation and nose R compensation commands.
P113	**Illegal plane select** The circular command axis differs from the selected plane.	• Issue a circular command after correct plane selection.
P120	**No spec: Feed per rotation** Feed per rotation (G95) was commanded even though there is no feed per rotation specification.	• Check the specifications.
P121	**F0 command during arc modal** F0 (F 1-digit feed) was commanded during the arc modal (G02/G03).	• Check the machining program.
P122	**No spec: Auto corner override** An auto corner override command (G62) was issued even though there is no auto corner override specification.	• Check the specifications. • Delete the G62 command from the program.
P123	**No spec: High-accuracy control** High-accuracy control command was issued even though there is no high-accuracy control specification	• Check the specifications.

Error No.	Details	Remedy
P124	**No spec: Inverse time feed** There is no inverse time option.	• Check the specifications.
P125	**G93 mode error** • A G code command that cannot be issued was issued during G93 mode. • G93 command was issued during a modal for which inverse time feed cannot be performed.	• Reconsider the program.
P126	**Invalid cmnd in high-accuracy** An illegal command was issued during the high-accuracy control mode. • A G code group 13 command was issued during the high-accuracy control mode. • Milling, cylindrical interpolation or pole coordinate interpolation was commanded during the high-accuracy control mode.	• Reconsider the program.
P127	**No spec: SSS Control** The SSS control valid parameter was set to ON although there is no SSS control specification.	• Check the specifications. If there is no SSS control specification, set the parameter #8090 SSS ON to 0.
P130	**2nd M function code illegal** The 2nd miscellaneous function address commanded in the program differs from the address set in the parameters. miscellaneous function.	• Check and correct the 2nd miscellaneous function address in the program.
P131	**No spec: Cnst surface ctrl G96** A constant surface speed control command (G96) was issued even though there is no specification.	• Check the specifications. • Change the constant surface speed control command (G96) to a rotation speed command (G97).
P132	**Spindle rotation speed S=0** No spindle rotation speed command has been issued.	• Reconsider the program.
P133	**Illegal P-No. G96** An invalid constant surface speed control axis has been specified.	• Reconsider the parameter specified for the constant surface speed control axis.
P140	**No spec: Pos compen cmd** The position compensation command (G45 to G48) specifications are not available.	• Check the specifications.
P141	**Pos compen during rotation** Position compensation was commanded during the figure rotation or coordinate rotation command.	• Reconsider the program.
P142	**Pos compen invalid arc** A position compensation invalid arc command was commanded.	• Reconsider the program.

Error No.	Details	Remedy
P150	**No spec: Nose R compensation** • Even though there were no tool radius compensation specifications, tool radius compensation commands (G41 and G42) were issued. • Even though there were no nose R compensation specifications, nose R compensation commands (G41, G42, and G46) were issued.	• Check the specifications.
P151	**Radius compen during arc mode** A compensation command (G40, G41, G42, G43, G44, G46) has been issued in the arc modal (G02, G03).	• Issue the linear command (G01) or rapid traverse command (G00) in the compensation command block or cancel block. (Set the modal to linear interpolation.)
P152	**No intersection** In interference block processing during execution of a tool radius compensation (G41 or G42) or nose R compensation (G41, G42, or G46) command, the intersection point after one block is skipped cannot be determined.	• Reconsider the program.
P153	**Compensation interference** An interference error has arisen while the tool radius compensation command (G41, G42) or nose R compensation command (G41, G42, G46) was being executed.	• Reconsider the program.
P154	**No spec: 3D compensation** A three-dimensional compensation command was issued even though there are no three-dimensional compensation specifications.	• Check the specifications.
P155	**Fixed cyc exec during compen** A fixed cycle command has been issued in the radius compensation mode.	• The radius compensation mode is established when a fixed cycle command is executed and so the radius compensation cancel command (G40) should be issued.
P156	**R compen direction not defined** At the start of G46 nose R compensation, the compensation direction is undefined if this shift vector is used.	• Change the vector to that with which the compensation direction is defined. • Exchange with a tool having a different tip point No.
P157	**R compen direction changed** During G46 nose R compensation, the compensation direction is inverted.	• Change the G command to that which allows inversion of the compensation direction (G00, G28, G30, G33, or G53). • Exchange with a tool having a different tip point No. • Turn ON the "#8106 G46 NO REV-ERR" parameter.
P158	**Illegal tip point** During G46 nose R compensation, the tip point is illegal (other than 1 to 8).	• Change the tip point No. to a legal one.

Error No.	Details	Remedy
P170	**No offset number** The compensation No. (DOO, TOO, HOO) command was not given when the radius compensation (G41, G42, G43, G46) command was issued. Alternatively, the compensation No. is larger than the number of sets in the specifications.	• Add the compensation No. command to the compensation command block. • Check the number of compensation No. sets a correct it to a compensation No. command within the permitted number of tool compensation sets.
P171	**No spec:Comp input by prog G10** Compensation data input by program (G10) was commanded even though there is no specification of compensation data input by program.	• Check the specifications.
P172	**G10 L number error** (G10 L-No. error) The L address command is not correct when the G10 command is issued.	• Check the address L-No. of the G10 command and correct the No.
P173	**G10 P number error** (G10 compensation error) When the G10 command is issued, a compensation No. outside the permitted number of sets in the specifications has been commanded for the compensation No. command.	• First check the number of compensation sets and then set the address P designation to within the permitted number of sets.
P174	**No spec:Comp input by prog G11** Compensation data input by program cancel (G11) was commanded even though there is no specification of compensation data input by program.	• Check the specifications.
P177	**Tool life count active** Registration of tool life management data with G10 was attempted when the used data count valid signal was ON.	• The tool life management data cannot be registered when counting the used data. Turn the used data count valid signal OFF.
P178	**Tool life data entry over** The number of registration groups, total number of registered tools or the number of registrations per group exceeded the specifications range.	• Review the number of registrations.
P179	**Illegal group No.** • When registering the tool life management data with G10, the group No. was commanded in duplicate. • A group No. that was not registered was designated during the T□□□□99 command. • An M code command must be issued as a single command but coexists in the same block as that of another M code command. • The M code commands set in the same group exist in the same block.	• The group No. cannot be commanded in duplicate. When registering the group data, register it in group units. • Correct to the correct group No.
P180	**No spec: Drilling cycle** A fixed cycle command was issued though there are not fixed cycle (G72 - G89) specifications.	• Check the specifications. • Correct the program.

Error No.	Details	Remedy
P181	**No spindle command (Tap cycle)** The spindle rotation speed command has not been issued when the fixed cycle for drilling command is given. "S*****" type S command does not exist in the same block with the synchronous tapping cycle.	• Issue the spindle rotation speed command (S) when the fixed cycle for drilling command G84, G74 (G84, G88) is given. • Enter "S*****" type S command.
P182	**Synchronous tap error** • Connection to the main spindle unit was not established. • The synchronous tapping was attempted with the spindle not serially connected under the multiple-spindle control I.	• Check connection to the main spindle. • Check that the main spindle encoder exists. • Set 1 to the parameter #3024 (sout).
P183	**No pitch/thread number** The pitch or thread number command has not been issued in the tap cycle of a fixed cycle for drilling command.	• Specify the pitch data and the number of threads by F or E command.
P184	**Pitch/thread number error** • The pitch or the number of threads per inch is illegal in the tap cycle of the fixed cycle for drilling command. • The pitch is too small for the spindle rotation speed. • The thread number is too large for the spindle rotation speed.	• Check the pitch or the number of threads per inch.
P185	**No spec: Sync tapping cycle** Synchronous tapping cycle (G84/G74) was commanded even though there is no synchronous tapping cycle specification.	• Check the specifications.
P186	**Illegal S cmnd in synchro tap** S command was issued during synchronous tapping modal.	· Cancel the synchronous tapping before issuing the S command.
P190	**No spec: Turning cycle** A lathe cutting cycle command was input although the lathe cutting cycle was undefined in the specification.	• Check the specification. • Delete the lathe cutting cycle command.
P191	**Taper length error** In the lathe cutting cycle, the specified length of taper section is illegal.	• The radius set value in the lathe cycle command must be smaller than the axis shift amount.
P192	**Chamfering error** Chamfering in the thread cutting cycle is illegal.	• Set a chamfering amount not exceeding the cycle.
P200	**No spec: MRC cycle** The compound type fixed cycle for turning machining I (G70 to G73) was commanded when the compound type fixed cycle for turning machining I specifications were not provided.	• Check the specification.

Error No.	Details	Remedy
P201	**Program error (MRC)** • When called with a compound type fixed cycle for turning machining I command, the subprogram contained at least one of the following commands: • Reference position return command (G27, G28, G29, G30) • Thread cutting (G33, G34) • Fixed cycle skip-function (G31, G31.n) • The first move block of the finish shape program in compound type fixed cycle for turning machining I contains an arc command.	• Delete the following G codes from this subprogram that is called with the compound type fixed cycle for turning machining I commands (G70 to G73): G27, G28, G29, G30, G31, G33, G34, and fixed cycle G codes. • Remove G2 and G3 from the first move block of the finish shape program in compound type fixed cycle for turning machining I.
P202	Block over (MRC) The number of blocks in the shape program of the compound type fixed cycle for turning machining I is over 50 or 200 (this differs according to the model).	• Specify 50 or a less value. The number of blocks in the shape program called by the compound type fixed cycle for turning machining I commands (G70 to G73) must be decreased below 50 or 200 (this differs according to the model).
P203	**D cmnd figure error (MRC)** The compound type fixed cycle for turning machining I (G70 to G73) shape program could not cut the work normally because it defined an abnormal shape.	• Check the compound type fixed cycle for turning machining I (G70 to G73) shape program.
P204	**E cmnd fixed cycle error** A command value of the compound type fixed cycle for turning machining (G70 to G76) is illegal.	• Check the compound type fixed cycle for turning machining (G70 to G76) command value.
P210	**No spec: Pattern cycle** A compound type fixed cycle for turning machining II (G74 to G76) command was input although it was undefined in the specification.	• Check the specification.
P220	**No spec: Special fixed cycle** No special fixed cycle specifications are available.	• Check the specifications.
P221	**No. of special fixed holes = 0** A 0 has been specified for the number of holes in special fixed cycle mode.	• Reconsider the program.
P222	**G36 angle error** A G36 command specifies 0 for angle intervals.	• Reconsider the program.
P223	**G12/G13 radius error** The radius value specified with a G12 or G13 command is below the compensation amount.	• Reconsider the program.
P224	**No spec: Circular (G12/G13)** There are no circular cutting specifications.	• Check the specifications.

Error No.	Details	Remedy
P230	**Subprogram nesting over** • A subprogram has been called 8 or more times in succession from the subprogram. • The program in the data server contains the M198 command. • The program in the IC card has been called more than once (the program in the IC card can be called only once at a time).	• Check the number of subprogram calls and correct the program so that it does not exceed 8 times.
P231	**No sequence No.** At subprogram call time, the sequence No. set at return from the subprogram or specified by GOTO, was not set.	• Specify the sequence Nos. in the call block of the subprogram.
P232	**No program No.** • The machining program has not been found when the machining program is called. • The file name of the program registered in IC card is not corresponding to O No.	• Enter the machining program. • Check the subprogram storage destination parameters. • Ensure that the external device (including IC card) that contains the file is mounted.
P235	**Program editing** Operation was attempted for the file under program editing.	• Execute the program again after completion of program editing.
P240	**Program editing** Operation was attempted for the file under program editing.	• Check the specifications.
P241	**No variable No.** The variable No. commanded is out of the range specified in the specifications.	• Check the specifications. • Check the program variable No.
P242	**= not defined at vrble set** The "=" sign has not been commanded when a variable is defined.	• Designate the "=" sign in the variable definition of the program.
P243	**Can't use variables** An invalid variable has been specified in the left or right side of an operation expression.	• Correct the program.
P244	**Invalid set date or time** Date or time was set earlier than current date or time in the system variables (#3011, #3012) when the credit system was valid.	• Date or time cannot be changed. • Reconsider the program.
P250	**No spec: Figure rotation** Figure rotation (M98 I_J_P_H_L_) was commanded even though there is no figure rotation specification.	• Check the specifications.
P251	**Figure rotation overlapped** Figure rotation command was issued during figure rotation.	• Check the machining program.
P252	**Coord rotate in fig. rotation** A coordinate rotation related command (G68, G69) was issued during figure rotation.	• Reconsider the program.
P260	**No spec: Coordinates rotation** Even though there were no coordinate rotation specifications, a coordinate rotation command was issued.	• Check the specifications.

Error No.	Details	Remedy
P270	**No spec: User macro** A macro specification was commanded though there are no such command specifications.	• Check the specifications.
P271	**No spec: Macro interrupt** A macro interruption command has been issued though it is not included in the specifications.	• Check the specifications.
P272	**NC and macro texts in a block** A statement and a macro statement exist together in the same block.	• Reconsider the program and place the executable statement and macro statement in separate blocks.
P273	**Macro call nesting over** The number of macro call nests exceeded the specifications.	• Reconsider the program and correct it so that the macro calls do not exceed the limit imposed by the specification.
P275	**Macro argument over** The number of macro call argument type II sets has exceeded the limit.	• Reconsider the program.
P276	**Illegal G67 command** A G67 command was issued though it was not during the G66 command modal.	• Reconsider the program. • The G67 command is the call cancel command and so the G66 command must be designated first before it is issued.
P277	**Macro alarm message** An alarm command has been issued in #3000.	• Refer to the operator messages on the DIAG screen. • Refer to the instruction manual issued by the machine tool builder.
P280	**Brackets [ ] nesting over** The number of parentheses "[" or "]" which can be commanded in a single block has exceeded five.	• Reconsider the program and correct it so the number of "[" or "]" is five or less.
P281	**Brackets [ ] not paired** The number of "[" and "]" parentheses commanded in a single block does not match.	• Reconsider the program and correct it so that "[" and "]" parentheses are paired up properly.
P282	**Calculation impossible** The arithmetic formula is incorrect.	• Reconsider the program and correct the formula.
P283	**Divided by zero** The denominator of the division is zero.	• Reconsider the program and correct it so that the denominator for division in the formula is not zero.
P290	**IF sentence error** There is an error in the IF conditional GOTO□ statement.	• Reconsider the program.
P291	**WHILE sentence error** There is an error in the WHILE conditional DO□-END□ statement.	• Reconsider the program.
P292	**SETVN sentence error** There is an error in the SETVN□ statement when the variable name setting was made.	• Reconsider the program. • The number of characters in the variable name of the SETVN statement must be 7 or less.
P293	**DO-END nesting over** The number of DO-END nesting levels in WHILE conditional DO□-END□ statement has exceeded 27.	• Reconsider the program and correct it so that the nesting levels of the DO - END statement does not exceed 27.

Error No.	Details	Remedy
P294	**DO and END not paired** The DO's and END's are not paired off properly.	• Reconsider the program and correct it so that the DO's and END's are paired off properly.
P295	**WHILE/GOTO in tape** There is a WHILE or GOTO statement on the tape during tape operation.	• During tape operation, a program which includes a WHILE or GOTO statement cannot be executed and so the memory operation mode is established instead.
P296	**No address (macro)** A required address has not been specified in the user macro.	• Review the program.
P297	**Address-A error** The user macro does not use address A as a variable.	• Review the program.
P298	**G200-G202 cmnd in tape** User macro G200, G201, or G202 was specified during tape or MDI mode.	• Review the program.
P300	**Variable name illegal** The variable names have not been commanded properly.	• Reconsider the variable names in the program and correct them.
P301	**Variable name duplicated** The name of the variable has been duplicated.	• Correct the program so that the name is not duplicated.
P310	**Not use GMSTB macro code** G, M, S, T, or B macro code was called during fixed cycle.	• Review the program. • Review the parameter.
P350	**No spec: Scaling command** The scaling command (G50, G51) was issued when the scaling specifications were not available.	• Check the specifications.
P360	**No spec: Program mirror** A mirror image (G50.1 or G51.1) command has been issued though the programmable mirror image specifications are not provided.	• Check the specifications.
P370	**No spec: Facing t-post MR** The facing turret mirror image specifications are not provided.	• Check the specifications.
P371	**Facing t-post MR illegal** Mirror image for facing tool posts was commanded to an axis for which external mirror image or parameter mirror image is valid. Mirror image for facing tool posts validating mirror image for a rotary axis was commanded.	• Check the program. • Check the parameters.
P380	**No spec: Corner R/C** The corner R/C was issued when the corner R/C specifications were not available.	• Check the specifications. • Remove the corner chamfering/corner rounding command from the program.

Error No.	Details	Remedy
P381	**No spec: Arc R/C** Corner chamfering II /corner rounding II was specified in the arc interpolation block although corner chamfering/corner rounding II is unsupported.	• Check the specifications.
P382	**No corner movement** The block next to corner chamfering/corner rounding is not a movement command.	• Replace the block succeeding the corner chamfering/corner rounding command by G01 command.
P383	**Corner movement short** In the corner chamfering/corner rounding command, the movement distance was shorter than the value in the corner chamfering/corner rounding command.	• Make the corner chamfering/corner rounding less than the movement distance since this distance is shorter than the corner chamfering/corner rounding.
P384	**Corner next movement short** When the corner chamfering/corner rounding command was input, the movement distance in the following block was shorter than the length of the corner chamfering/corner rounding.	• Make the corner chamfering/corner rounding less than the movement distance since this distance in the following block is shorter than the corner chamfering/corner rounding.
P385	**Corner during G00/G33** A block with corner chamfering/corner rounding was given during G00 or G33 modal.	• Recheck the program.
P390	**No spec: Geometric** A geometric command was issued though there are no geometric specifications.	• Check the specifications.
P391	**No spec: Geometric arc** There are no geometric IB specifications.	• Check the specifications.
P392	**Angle < 1 degree (GEOMT)** The angular difference between the geometric line and line is 1° or less.	• Correct the geometric angle.
P393	**Inc value in 2nd block (GEOMT)** The second geometric block was specified by an incremental value.	• Specify this block by an absolute value.
P394	**No linear move command (GEOMT)** The second geometric block contains no linear command.	• Specify the G01 command.
P395	**Illegal address (GEOMT)** The geometric format is invalid.	• Recheck the program.
P396	**Plane selected in GEOMT ctrl** A plane switching command was executed during geometric command processing.	• Execute the plane switching command before geometric command processing.
P397	**Arc error (GEOMT)** In geometric IB, the circular arc end point does not contact or cross the next block start point.	• Recheck the geometric circular arc command and the preceding and following commands.
P398	**No spec: Geometric1B** Although the geometric IB specifications are not included, a geometric command is given.	• Check the specifications.

Error No.	Details	Remedy

P411	**Illegal modal G111**
	• G111 was issued during milling mode.
	• G111 was issued during nose R compensation mode.
	• G111 was issued during constant surface speed.
	• G111 was issued during mixed synchronization control.
	• G111 was issued during fixed cycle.
	• G111 was issued during polar coordinate interpolation.
	• G111 was issued during cylindrical interpolation mode.
		• Before commanding G111, cancel the following commands.
		  • Milling mode
		  • Nose R compensation
		  • Constant surface speed
		  • Mixed synchronization control
		  • Fixed cycle
		  • Polar coordinate interpolation
		  • Cylindrical interpolation

P412	**P412 No spec: Axis name switch** Axis name switch (G111) was issued even though there is no axis name switch (G111) specification.	• Check the specifications.
P420	**No spec: Para input by program** Parameter input by program (G10) was commanded even though there is no specification of parameter input by program.	• Check the specifications.
P421	**Parameter input error** • The specified parameter No. or set data is illegal. • An illegal G command address was input in parameter input mode. • A parameter input command was input during fixed cycle modal or nose R compensation. • G10L50, G10L70, G11 were not commanded in independent blocks.	• Check the program.
P430	**R-pnt return incomplete** • A command was issued to move an axis, which has not returned to the reference position, away from that reference position. • A command was issued to an axis removal axis.	• Execute reference position return manually. • The command was issued to an axis for which axis removal is validated so invalidate axis removal.
P431	**No spec: 2,3,4th R-point ret** A command for second, third or fourth reference position return was issued though there are no such command specifications.	• Check the specifications.
P432	**No spec: Start position return** Start position return (G29) was commanded even though there is no start position return specification.	• Check the specifications.
P433	**No spec: R-position check** Reference position check (G27) was commanded even though there is no reference position check specification.	• Check the specifications.

Error No.	Details	Remedy
P434	**Compare error** One of the axes did not return to the reference position when the reference position check command (G27) was executed.	• Check the program.
P435	**G27 and M commands in a block** An M command was issued simultaneously in the G27 command block.	• An M code command cannot be issued in a G27 command block and so the G27 command and M code command must be placed in separate blocks.
P436	**G29 and M commands in a block** An M command was issued simultaneously in the G29 command block.	• An M code command cannot be issued in a G29 command block and so the G29 command and M code command must be placed in separate blocks.
P438	**G52 invalid during G54.1** A local coordinate system command was issued during execution of the G54.1 command.	• Review the program.
P450	**No spec: Chuck barrier** The chuck barrier on command (G22) was specified although the chuck barrier was undefined in the specification.	• Check the specification.
P451	**No spec: Stroke chk bef travel** Stroke check before travel (G22/G23) was commanded even though there is no stroke check before travel specification.	• Check the specification.
P452	**Limit before travel exists** An illegal command such as the start or end point of the traveling axis is inside the prohibited area or the axis passes through the prohibited area, was detected when Stroke check before travel (G22) was ON.	• Review the coordinate values of the axis address commanded in the program.
P460	**Tape I/O error** An error has arisen in the tape reader or, alternatively, in the printer during macro printing.	• Check the power and cable of the connected devices. • Check the I/O device parameters.
P461	**File I/O error** A file of the machining program cannot be read. IC card has not been inserted.	• In memory mode, the programs stored in memory may have been destroyed. Output all of the programs and tool data once and format them. • Ensure that the external device (including an IC card, etc) that contains the file is mounted. • Check the parameters for HD operation or IC card operation.
P462	**Computer link commu error** A communication error occurred during the BTR operation.	• "L01 Computer link error" is displayed simultaneously, so remedy the problem according to the error No.
P480	**No spec: Milling** • Milling was commanded when the milling specifications were not provided. • Polar coordinate interpolation was commanded when the polar coordinate interpolation specifications were not provided.	• Check the specification.

Error No.	Details	Remedy
P481	**Illegal G code (mill)** • An illegal G code was used during the milling mode. • An illegal G code was used during cylindrical interpolation or polar coordinate interpolation. • The G07.1 command was issued during the tool radius compensation.	• Check the program.
P482	**Illegal axis (mill)** • A rotary axis was commanded during the milling mode. • Milling was executed even though an illegal value was set for the milling axis No. • Cylindrical interpolation or polar coordinate interpolation was commanded during mirror image. • Cylindrical interpolation or polar coordinate interpolation was commanded before the tool compensation was completed after the T command. • G07.1 was commanded when cylindrical interpolation was not possible (there is no rotary axis, or external mirror image is ON). • An axis other than a cylindrical coordinate system axis was commanded during cylindrical interpolation.	• Check the machining program, parameters and PLC I/F signal.
P484	**R-pnt ret incomplete (mill)** • Movement was commanded to an axis that had not completed reference position return during the milling mode. • Movement was commanded to an axis that had not completed reference position return during cylindrical interpolation or polar coordinate interpolation.	• Carry out manual reference position return.

Error No.	Details	Remedy
P485	**Illegal modal (mill)** • The milling mode was turned ON during nose R compensation or constant surface speed control. • A T command was issued during the milling mode. • The mode was switched from milling to cutting during tool compensation. • Cylindrical interpolation or polar coordinate interpolation was commanded during the constant surface speed control mode (G96). • The command unacceptable in the cylindrical interpolation was issued. • A T command was issued during the cylindrical interpolation or polar coordinate interpolation mode. • A movement command was issued when the plane was not selected just before or after the G07.1 command. • A plane selection command was issued during the polar coordinate interpolation mode. • Cylindrical interpolation or polar coordinate interpolation was commanded during tool radius compensation. • The G16 plane in which the radius value of a cylinder is 0 was specified. • A cylindrical interpolation or polar coordinate interpolation command was issued during coordinate rotation by program (G68).	• Check the program. • Before issuing G12.1, issue G40 or G97. • Before issuing G12.1, issue a T command. • Before issuing G13.1, issue G40. • Specify the radius value of a cylinder other than 0, or specify the X axis's current value other than 0 before issuing G12.1/G16.
P486	**Milling error** • The milling command was issued during the mirror image (when parameter or external input is turned ON). • Polar coordinate interpolation, cylindrical interpolation or milling interpolation was commanded during mirror image for facing tool posts. • The start command of the cylindrical interpolation or polar coordinate interpolation was issued during the normal line control.	• Check the program.
P511	**Synchronization M code error** • Two or more synchronization M codes were commanded in the same block. • The synchronization M code and "!" code were commanded in the same block. • Synchronization with the M code was commanded in 3rd part system or more. (Synchronization with the M code is valid only in 1st part system or 2nd part system.)	• Check the program.
P550	**No spec: G06.2(NURBS)** There is no NURBS interpolation option.	• Check the specifications.

Error No.	Details	Remedy
P551	**G06.2 knot error** The knot (k) command value is smaller than the value for the previous block.	• Reconsider the program. • Specify the knot by monotone increment.
P552	**Start point of 1st G06.2 err** The block end point immediately before the G06.2 command and the G06.2 first block command value do not match.	• Match the G06.2 first block coordinate command value with the previous block end point.
P554	**Invld manual interrupt in G6.2** Manual interruption using a block was performed while in G06.2 mode.	• Perform for blocks other than G06.2 mode when manually interrupting.
P555	**Invalid restart during G06.2** Restart was attempted from the block in G06.2 mode.	• Restart from the block other than in G06.2 mode.
P600	**No spec: Auto TLM** An automatic tool length measurement command (G37) was execute though there are no such command specifications.	• Check the specifications.
P601	**No spec: Skip** A skip command (G31) was issued though there are no such command specifications.	• Check the specifications.
P602	**No spec: Multi skip** A multiple skip command (G31.1, G31.2 or G31.3) was issued though there are no such command specifications.	• Check the specifications.
P603	**Skip speed 0** The skip speed is 0.	• Specify the skip speed.
P604	**TLM illegal axis** No axis or more than one axis was specified in the automatic tool length measurement block.	• Specify only one axis.
P605	**T & TLM command in a block** The T code is in the same block as the automatic tool length measurement block.	• Specify this T code before the block.
P606	**T cmnd not found before TLM** The T code was not yet specified in automatic tool length measurement.	• Specify this T code before the block.
P607	**TLM illegal signal** Before the area specified by the D command or decelerating area parameter d, the measurement position arrival signal went ON. The signal remains OFF to the end.	• Check the program.
P608	**Skip during radius compen** A skip command was specified during radius compensation processing.	• Specify a radius compensation cancel (G40) command or remove the skip command.
P610	**Illegal parameter** • The parameter setting is not correct. • G114.1 was commanded when the spindle synchronization with PLC I/F command was selected. • G113 was commanded when the spindle-spindle polygon machining option was OFF and the spindle synchronization with PLC I/F command was selected.	• Check whether "#1549 Iv0vR1" to "#1553 Iv0vR5" are set in descending order (in order of large values). • Check whether "#1554 Iv0rd2" to "#1557 Iv0rd5" are set in descending order. • Check and correct "#1514 expLinax" and "#1515 expRotax". • Check the program. • Check the parameter.

Error No.	Details	Remedy
P611	**No spec: Exponential function** Specification for exponential interpolation is not available.	• Check the specification.
P612	**Exponential function error** A movement command for exponential interpolation was issued during mirror image for facing tool posts.	• Check the program.
P700	**Illegal command value** Spindle synchronization was commanded to a spindle that is not connected serially.	• Check the program. • Check the parameter.
P900	**No spec: Normal line control** A normal line control command (G40.1, G41.1, G42.1) was issued when the normal line control specifications were not provided.	• Check the specifications.
P901	**Normal line control axis G92** A coordinate system preset command (G92) was issued to a normal line control axis during normal line control.	• Check the program.
P902	**Normal line control axis error** • The normal line control axis was set to a linear axis. • The normal line control axis was set to the linear type rotary axis II axis. • The normal line control axis has not been set. • The normal line control axis was the same as the plane selection axis.	• Correct the normal line control axis.
P903	**Plane chg in Normal line ctrl** The plane selection command (G17, G18, G19) was issued during normal line control.	• Delete the plane selection command (G17, G18, G19) from the program for normal line control.
P920	**No spec: 3D coord conv** There is no specification for 3-dimensional coordinate conversion.	• Check the specifications.
P921	**Illegal G code at 3D coord** A G code command that cannot be performed was made during 3-dimensional coordinate conversion modal.	• Refer to "Mitsubishi CNC 700/70 Series Programming Instruction Manual (Machining Center Series)" for further details of usable G commands. • When the basic specification parameter "#1229 set01/bit3" is ON, turn the parameter OFF or specify the constant surface speed control cancel (G97).
P922	**Illegal mode at 3D coord** A 3-dimensional coordinate conversion command was issued during a modal for which 3-dimensional coordinate conversion cannot be performed.	• Refer to "Mitsubishi CNC 700/70 Series Programming Instruction Manual (Machining Center Series)" for further details of usable G commands.
P923	**Illegal addr in 3D coord blk** A G code for which G68 to combination could not be performed was specified for the same block.	• Refer to "Mitsubishi CNC 700/70 Series Programming Instruction Manual (Machining Center Series)" for further details of usable G commands.

Error No.	Details	Remedy
P930	**No spec: Tool axis compen** A tool length compensation along the tool axis command was issued even though there is no tool length compensation along the tool axis specification.	• Check the specifications.
P931	**Executing tool axis compen** A G code that cannot be commanded exists during tool length compensation along the tool axis.	• Reconsider the program.
P932	**Rot axis parameter error** There is a mistake in the linear axis name and rotary axis name in the rotary axis configuration parameters.	• Set the correct value and reboot.
P940	**No spec: Tool tip control** There is no tool tip center control specification.	• Check the specifications.
P941	**Invalid T tip control command** A tool tip center control command was issued during a modal for which a tool tip center control command cannot be issued.	• Reconsider the program.
P942	**Invalid cmnd during T tip ctrl** A G code that cannot be commanded was issued during tool tip center control.	• Reconsider the program.
P943	**Tool posture command illegal** In the case of tool tip center control type 1, if the signs at the tool-side rotary axis or table base-side rotary axis start and finish points differ, a tool base-side rotary axis or table workpiece-side rotary axis rotation exists for the same block, and does not pass a singular point. In the case of tool tip center control type 2, the posture vector command is incorrect.	• Reconsider the program.
P990	**PREPRO error** Combining commands that required pre-reading (nose R offset, corner chamfering/corner rounding, geometric I, geometric IB, and compound type fixed cycle for turning machining) resulted in eight or more pre-read blocks.	• Reduce the number of commands that require pre-reading or delete such commands.

4. Troubleshooting

4.1 Drive System Troubleshooting

4.1.1 Troubleshooting at Power ON

If the NC system does not start up correctly and a system error occurs when the NC power is turned ON, the drive unit may not have been started up properly. Check the LED display on the drive unit, and take measures according to this section.

LED display	Symptom	Cause of occurrence	Investigation method	Remedy
AA	Initial communication with the CNC was not completed correctly.	The drive unit axis No. setting is incorrect.	Is there any other drive unit that has the same axis No. set?	Set correctly.
		The CNC setting is incorrect.	Is the No. of CNC controlled axes correct?	Set correctly.
		Communication with CNC is incorrect.	Is the connector (CN1A, CN1B) connected?	Connect correctly.
			Is the cable broken?	Replace the cable.
Ab	Initial communication with the CNC was not carried out.	The axis is not used, the setting is for use inhibiting.	Is the DIP switch set correctly?	Set correctly.
		Communication with CNC is incorrect.	Is the connector (CN1A, CN1B) connected?	Connect correctly.
			Is the cable broken?	Replace the cable.
12	An error was detected in the unit's memory and IC during the self-diagnosis at power ON.	The CPU peripheral circuit is abnormal.	Check the repeatability.	Replace the unit.
			Check whether there is any abnormality with the unit's surrounding environment, etc.	Improve the surrounding environment.

The drive unit has started up normally if the following type of emergency stop (E7) is displayed on the display unit's LED display.

F1	E7	F2	E7	Not lit
F+axis No.	Emergency stop	F+axis No.	Emergency stop	
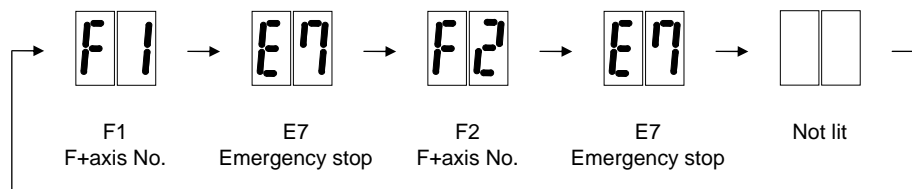
Normal drive unit LED display at NC power ON (for 1st axis)

4.1.2 Troubleshooting for each alarm No.

Alarm No. 10	Insufficient voltage Insufficient bus voltage was detected in main circuit.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the timing when the alarm occurs.	The moment of READY ON	Check the investigation item No. 2.	○	○
		During operation	Review the power supply capacity.		
2	Did the external contactor turn ON at the READY ON?	The external contactor did not turn ON.	Check the investigation item No. 3.	○	○
		The external contactor turned ON, but the alarm occurred immediately.	Check the investigation item No. 4.		
3	Check the wiring of contactor excitation circuit.	The wiring is correct.	Replace the contactor.	○	○
		The wiring is not correct.	Rewire.		
4	Check the input voltage of the drive unit. (Voltage between L1 and L2, L2 and L3, L1 and L3)	The input voltage is normal.	Replace the drive unit.	○	○
		The input voltage is abnormal.	Review the power supply capacity.		

Alarm No. 11	Axis selection error Setting of the axis No. selection switch is incorrect.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the setting of the axis selection switch (rotary switch) on the top of the unit.	The same axis No. is set for the L and M axes.	Correctly set the axis No. 0 = No. 1 axis, 1 = No. 2 axis, ...	○	○
		The value is duplicated with other axis.	Correctly set the axis No. 0 = No. 1 axis, 1 = No. 2 axis, ...		
		No abnormality is found in particular.	Replace the drive unit.		

Alarm No. 12	Memory error 1 A CPU error or an internal memory error was detected during the power ON self-check.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the servo or spindle software version was changed recently.	The version was changed.	There is a possibility that the spindle software was downloaded into servo, or the servo software was downloaded into spindle. Download servo/spindle software again.	○	○
		The version was not changed.	Check the investigation item No. 2.		
2	Check the repeatability.	The error is always repeated.	Replace the drive unit.	○	○
		The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 3.		
3	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 13	Software processing error 1 Software processing has not finished within the specified time.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the servo or spindle software version was changed recently.	The version was changed.	Change software version back to the original.	○	○
		The version was not changed.	Check the investigation item No. 2.		
2	Check the repeatability.	The error is always repeated.	Replace the drive unit.	○	○
		The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 3.		
3	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 16	Magnetic pole position detection error An error was detected in the magnetic pole detection for controlling the motor.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the parameters.	The parameters specified with the adjustment are not set.	Replace the drive unit.		○
		Correct parameters are set.	Check the investigation item No. 2.		
2	Check the repeatability.	The error is always repeated.	Replace the drive unit.		○
		The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 3.		
3	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.			○

Alarm No. 17	A/D converter error An error was detected in the A/D converter for detecting current FB.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the repeatability.	The error is always repeated.	Replace the drive unit.	○	○
		The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 2.		
2	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 18	Motor side detector: Initial communication error Initial communication with the motor side detector failed.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the servo parameter (SV025.ent) setting value. OSE104: 0, OSA104: 1 Are all others set to 2? (Excluding slave axis for synchronous control)	The value is not set correctly.	Correctly set SV025.		○
		The value is set correctly.	Check the investigation item No. 2.		
2	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	○	○
		The connector is not disconnected.	Check the investigation item No. 3.		
3	Turn the power OFF, and check the detector cable connection with a tester.	The connection is faulty.	Replace the detector cable.	○	○
		The connection is normal.	Check the investigation item No. 4.		
4	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	○	○
		The alarm is on the detector side.	Check the investigation item No. 5.		
5	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 1A	Machine side detector: Initial communication error Initial communication with the linear scale or the ball screw side detector failed.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the servo parameter (SV025.pen) setting value. Are the serial communication type detector parameters set for the pulse type detector?	The value is not set correctly.	Correctly set SV025.	O	
		The value is set correctly.	Check the investigation item No. 2.		
2	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	O	
		The connector is not disconnected.	Check the investigation item No. 3.		
3	Turn the power OFF, and check the detector cable connection with a tester.	The connection is faulty.	Replace the detector cable.	O	
		The connection is normal.	Check the investigation item No. 4.		
4	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	O	
		The alarm is on the detector side.	Check the investigation item No. 5.		
5	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		O	

Alarm No. 1B	Machine side detector: Error 1 The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the servo axis has moved and the spindle has rotated when an alarm occurred.	The axis has operated.	Check the investigation item No. 3.	O	O
		The axis has not operated.	Check the investigation item No. 2.		
2	Check whether the operation at low speed is normal.	The operation is normal.	Check the investigation item No. 3.	O	O
		The operation is not normal.	Check the cautions at power ON. • Wiring check • Parameter check		
3	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	O	O
		The connector is not disconnected.	Check the investigation item No. 4.		
4	Turn the power OFF, and check the detector cable connection with a tester.	The connection is faulty.	Replace the detector cable.	O	O
		The connection is normal.	Check the investigation item No. 5.		
5	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	O	O
		The alarm is on the detector side.	Check the investigation item No. 6.		
6	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		O	O

Alarm No. 1C	Machine side detector: Error 2 The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			O	

Alarm No. 1D	Machine side detector: Error 3 The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			O	

Alarm No. 1E	Machine side detector: Error 4 The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			O	

Alarm No. 1F	Machine side detector: Communication error An error was detected in communication data with the linear scale or the ball screw side detector. Or the communication was interrupted.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	○	
		The connector is not disconnected.	Check the investigation item No. 2.		
2	Is the detector cable wired in the same conduit as the motor's power cable, or are the two cables laid in parallel near each other?	The cables are wired near each other. (Noise is entering from the power cable.)	Improve the cable wiring.	○	
		The wires are sufficiently separated.	Check the investigation item No. 3.		
3	Is the motor FG wire connected only to the drive unit which drives it? (Is the motor grounded to one point?)	The motor FG wire is grounded on the motor side.	Ground the motor to one point, connecting the wires together on the drive unit side.	○	
		The motor is grounded to one point.	Check the investigation item No. 4.		
4	Turn the power OFF, and check the detector cable connection with a tester. (Is the cable shielded?)	The connection is faulty.	Replace the detector cable.	○	
		The connection is normal.	Check the investigation item No. 5.		
5	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	○	
		The alarm is on the detector side.	Check the investigation item No. 6.		
6	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	

Alarm No. 21	Machine side detector: No signal When an excessive error alarm occurred, no signal from the machine side detector was detected.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the servo parameter (SV025. pen) setting value. Are the pulse type detector parameters set for a serial communication type detector?	The value is not set correctly.	Correctly set SV025.	○	
		The value is set correctly.	Check the investigation item No. 3.		
2	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	○	
		The connector is not disconnected.	Check the investigation item No. 4.		
3	Turn the power OFF, and check the detector cable connection with a tester.	The connection is faulty.	Replace the detector cable.	○	
		The connection is normal.	Check the investigation item No. 5.		
4	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	○	
		The alarm is on the detector side.	Check the investigation item No. 6.		
5	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	

Alarm No. 23	**Excessive speed error** A difference between the speed command and speed feedback was continuously exceeding 50 r/min for longer than the setting time.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Check the U, V and W wiring between the spindle drive unit and spindle motor.	The wires are not correctly connected.	Correctly connect.		○
		The wires are correctly connected.	Check the investigation item No. 2.		
2	Check the spindle parameter (SP017, SP018, SP019, SP020, SP117 and SP129 or later) setting value.	The correct values are not set.	Correctly set.		○
		The correct values are set.	Check the investigation item No. 3.		
3	Measure the acceleration/ deceleration time up to the point where the spindle speed reaches its maximum. If the alarm occurs when forward run is changed to reverse run, measure the acceleration/ deceleration time from the forward run's maximum speed to reverse run's maximum speed.	12sec or more.	Increase the spindle acceleration/deceleration time constant setting value.		○
		Less than 12sec.	Check the investigation item No. 4.		
4	Check the load amount when the alarm occurred during cutting.	Load amount is 120% or more.	Reduce the load.		○
		Load amount is less than 120%.	Check the investigation item No. 5.		
5	Check the fluctuation of the input voltage into the power supply unit.	Voltage drop during acceleration does not satisfy the motor voltage.	Review the power supply capacity.		○
		Voltage drop during acceleration satisfies the motor voltage.	Check the investigation item No.6.		
6	Check the capacity of the drive unit.	The capacity does not satisfy the motor output.	Increase the capacity.		○
		The capacity satisfies the motor output.	Replace the unit.		

Alarm No. 24	**Grounding** The motor power cable is in contact with FG (Frame Ground).				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Measure the insulation across the power cables (U,V,W) for connected motors and the ground. (Carry out a megger test.)	Less than 100kΩ.	The motor or power cable may be ground faulted.	○	○
		100kΩ or more.	Check the investigation item No. 2.		
2	Has oil come in contact with the motor or power cable?	Oil has come in contact.	Take measures so that oil does not come in contact. Check the motor's cannon connector and the inside of the terminal box, and clean as necessary.	○	○
		Oil has not come in contact.	Check the investigation item No. 3.		
3	Measure the insulation again.	Less than 1MΩ.	Replace the motor or cable.	○	○
		1MΩ or more.	Check the investigation item No. 2.		
4	Measure the resistance across the U, V, W phase terminals of the servo/spindle drive unit and the ground. (Do not measure the insulation as the unit could be damaged.)	Less than 100kΩ.	Replace the drive unit.	○	○
		100kΩ or more.	Replace the power supply unit.		

Alarm No. 25	**Absolute position data lost** The absolute position was lost, as the backup battery voltage dropped in the absolute position detector.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Is warning 9F occurring at the same time?	The warning is occurring.	Check the investigation item No. 2.	○	
		The warning is not occurring.	Check the investigation item No. 3.		
2	Measure the battery voltage with a tester.	Less than 3V.	Replace the battery, and establish the zero point.	○	
		3V or more.	Check the NC bus cable connection.		
3	Did alarm No.18 occur when the power was turned ON the last time?	Alarm No.18 occurred.	Turn the drive unit control power ON again, and establish the zero point.	○	
		Alarm No.18 did not occur.	Check the investigation item No. 4.		
4	Was the detector cable or battery cable left disconnected from the unit for a long time?	The unit was left disconnected for a long time. Guide at delivery : 20 hours or more After 5 years : 10 hours or more	Turn the drive unit control power ON again, and establish the zero point.	○	
		The cables were not left disconnected.	Check the investigation item No. 5.		
5	Check the detector cable or battery cable connection with a tester.	The connection is faulty.	Replace the cable.	○	
		The connection is normal.	Replace the drive unit.		

Alarm No. 26	**Unused axis error** A power module error occurred in the axis whose axis No. selection switch was set to "F"(free axis).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the repeatability.	The error is always repeated.	Replace the drive unit.	○	○
		The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 2.		
2	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 27	**Machine side detector: Error 5** The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	

Alarm No. 28	**Machine side detector: Error 6** The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	

Alarm No. 29	**Machine side detector: Error 7** The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	

Alarm No. 2A	**Machine side detector: Error 8** The machine side detector detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	

Alarm No. 2B	**Motor side detector: Error 1** The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 2C	**Motor side detector: Error 2** The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 2D	**Motor side detector: Error 3** The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 2E	**Motor side detector: Error 4** The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 2F	**Motor side detector: Communication error** An error was detected in communication data with the motor side detector or with the linear scale of a linear servo system. Or the communication was interrupted.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	○	○
		The connector is not disconnected.	Check the investigation item No. 2.		
2	Is the detector cable wired in the same conduit as the motor's power cable, or are the two cables laid in parallel near each other?	The cables are wired near each other. (Noise is entering from the power cable.)	Improve the cable wiring.	○	○
		The wires are sufficiently separated.	Check the investigation item No. 3.		
3	Is the motor FG wire connected only to the drive unit which drives it? (Is the motor grounded to one point?)	The motor FG wire is grounded on the motor side.	Ground the motor to one point, connecting the wires together on the drive unit side.	○	○
		The motor is grounded to one point.	Check the investigation item No. 4.		
4	Turn the power OFF, and check the detector cable connection with a tester. (Is the cable shielded?)	The connection is faulty.	Replace the detector cable.	○	○
		The connection is normal.	Check the investigation item No. 5.		
5	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	○	○
		The alarm is on the detector side.	Check the investigation item No. 6.		
6	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 30	Over-regeneration The over-regeneration level exceeded 100%. The regenerative resistor is in the overload state.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check again if the regenerative capacity exceeds the regenerative resistor tolerable capacity.	The regenerative capacity exceeds the regenerative resistor tolerable capacity.	Add the option regenerative resistor or replace it.	○	○
		The regenerative resistor selection is appropriate.	Check the investigation item No. 2.		
2	Check if the parameter is set incorrectly, and check the values of sv036 and sp032.	The parameters are set incorrectly.	Change the parameters.	○	○
		The parameters are correct.	Check the investigation item No. 3.		
3	Is an external regenerative resistor used?	An external regenerative resistor is used.	To the investigation item No. 5.	○	
		A built-in regenerative resistor is used.	To the investigation item No. 4.		
4	Is the short wire connected between P and D terminal? Are there any problems with the connection condition?	The wire is not connected.	Connect the wire.	○	
		The connector is disconnected. The connector has a contact fault.	Reconnect the connector. Replace the connector.		
		The connection is correct.	To the investigation item No. 6.		
5	Is the connection of the regenerative resistor or regeneration resistor cable correct?	The connection is incorrect.	Rewire.	○	○
		The connection is correct.	To the investigation item No. 6.		
6	Is the regeneration resistor or the regeneration resistor cable broken? Disconnect the regenerative resistor terminal and check the resistance value with a tester.	The regeneration resistor is broken. Or the resistance value is large.	Replace the regenerative resistor	○	○
		The regeneration resistor cable is broken.	Replace the cable.		
		The resistance value is normal.	To the investigation item No. 7.		
7	Check if the power supply voltage is too high.	The power supply voltage exceeded 253V.	Review the power supply.	○	○
		The power supply voltage is normal.	Replace the drive unit.		

Alarm No. 31	Overspeed The motor was detected to rotate at a speed exceeding the allowable speed. (In the case of linear motor, it was detected to move at a speed exceeding the allowable speed.)				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check if the unit in which the alarm was detected is servo or spindle.	The alarm was detected in servo.	Check the investigation item No. 2.	○	○
		The alarm was detected in spindle.	Check the investigation item No. 3.		
2	Check the servo parameters SV001 (PC1), SV002 (PC2), SV018 (PIT) and SV025 (MTYP) settings.	The settings are incorrect.	Correctly set.	○	
		Correctly set.	Check the investigation item No. 5.		
3	Check the spindle parameter SP017 (TSP) setting.	The setting is incorrect. The alarm is detected at 115% of SP017.	Correctly set.		○
		Correctly set.	Check the investigation item No. 4.		
4	Check the PLG output waveform.	There is a problem.	Adjust the PLG output waveform.	○	○
		Normal.	Check the investigation item No. 5.		
5	Check whether the speed waveform is overshooting.	The waveform is overshooting.	Increase the acceleration/ deceleration time constant.	○	○
		The waveform is not overshooting.	Check if there is any abnormality in the unit's ambient environment. (Ex.: Ambient temperature, noise, grounding)		
			Check the investigation item No. 6.		
6	Check the repeatability.	The alarm occurs when the motor is stopped.	Replace the detector or detector cable.	○	○
		The alarm occurs at all time.	Check the investigation item No. 7.		

Alarm No. 32	**Power module overcurrent** Overcurrent protection function in the power module has started its operation.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Disconnect the power cable (U, V, W) from the unit's terminal block and motor, and check whether a short-circuit between the power cable or whether conduction at both end of wiring occurs with a tester.	Short-circuited or not conducted.	Replace the power cables (U, V, W).		
		There is no problem.	Check the investigation item No. 2.	○	○
2	Check the motor insulation with a (megger) tester under the condition of the investigation item No. 1. (between motor power and ground earth)	Less than 1MΩ. (Grounding)	Replace the motor.		
		1MΩ or more. (Normal)	Check the investigation item No. 3.	○	○
3	Check the parameter setting values. • Refer to the adjustment procedure.	The value is not set correctly.	Correctly set.		
		The value is set correctly.	Check the investigation item No. 4.	○	○
4	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.		
		The connector is not disconnected.	Check the investigation item No. 5.	○	○
5	Turn the power OFF, and check the detector cable connection with a tester.	Connection is faulty.	Replace the detector cable.		
		Connection is normal.	Check the investigation item No. 6.	○	○
6	Check the repeatability.	The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 8.		
		The error is always repeated.	Check the investigation item No. 7.	○	○
7	Replace with another unit, and check whether the fault is on the drive unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.		
		The alarm is on the detector side.	Replace the detector.	○	○
8	Check for any abnormalities in the unit's ambient environment. (Ex.: Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 33	**Overvoltage** The main circuit bus voltage exceeded the tolerable value.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Is an external regenerative resistor used?	An external regenerative resistor is used.	To the investigation item No. 3.		
		A built-in regenerative resistor is used.	To the investigation item No. 2.	○	
2	Is the short wire connected between P and D terminal? Are there any problems with the connection condition?	The wire is not connected.	Connect the wire.		
		The connector is disconnected. The connector has a contact fault.	Reconnect the connector. Replace the connector.	○	
		The connection is correct.	To the investigation item No. 6.		
3	Is the combination of the used regenerative resistor and drive unit appropriate?	The combination is incorrect.	Replace the correct regenerative resistor.		
		The combination is normal.	To the investigation item No. 4.	○	○
4	Is the connection of the regenerative resistor or regeneration resistor cable correct?	The connection is incorrect.	Rewire.		
		The connection is correct.	To the investigation item No. 5.	○	○
5	Is the regeneration resistor or the regeneration resistor cable broken? Disconnect the regenerative resistor terminal and check the resistance value with a tester.	The regeneration resistor is broken. Or the resistance value is large.	Replace the regenerative resistor.		
		The regeneration resistor cable is broken.	Replace the cable.	○	○
		The resistance value is normal.	To the investigation item No. 6.		
6	The acceleration/deceleration time constant is too short. At acceleration/deceleration, has the speed overshoot reached to the current limit?	Reached to the current limit The speed overshoot is applied.	Increase the acceleration/ deceleration time constant.		
		The connection is normal.	Replace the drive unit.	○	○

Alarm No. 34	NC-DRV communication: CRC error An error was detected in the data received from the CNC.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Manually shake the connection connectors between NC and drive unit, battery unit and drive unit, or among multiple drive units to check if they are disconnected. Also, check if an excessive force is not applied on them.	The connector is disconnected (or loose).	Correctly install.	○	○
		The connector is not disconnected.	Check the investigation item No. 2.		
2	Turn the power OFF, and check the connection of the communication cables indicated in item 1 with a tester. Or, replace with a correct cable.	The connection is faulty.	Replace the communication cable.	○	○
		The connection is normal.	Check the investigation item No. 3.		
3	Check whether the NC or drive unit software version was changed recently.	The version was changed.	Change software version back to the original.	○	○
		The version was not changed.	Check the investigation item No. 4.		
4	Replace with another drive unit, and check whether the fault is on the NC side or drive unit side.	The alarm is on the drive unit side.	Replace the drive unit.	○	○
		The alarm is on the unit connections.	Check the investigation item No. 5.		
5	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 35	NC command error The travel command data that was received from the CNC was excessive.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "34" items.			○	○

Alarm No. 36	NC-DRV communication: Communication error The communication with the CNC was interrupted.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "34" items.			○	○

Alarm No. 37	Initial parameter error An incorrect parameter was detected among the parameters received from the CNC at the power ON.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check if the unit in which the alarm was detected is servo or spindle.	The alarm was detected in servo.	Check the investigation item No. 2.	○	○
		The alarm was detected in spindle.	Check the investigation item No. 3.		
2	An error parameter No. is displayed on the NC diagnosis screen. Check the servo parameter with the parameter adjustment procedure.	Wrong parameters were set. SV001 to SV005	Correct the parameter. Set the value within the designated setting range.	○	
		-1 The electronic gears are overflowing.	Check SV001, SV002 and SV018.		
		-2 The absolute position detection parameter is valid when OSE104 and OSE105 are connected. (Absolute position control cannot be used.)	In order to use the absolute position control function, an absolute position option is required.		
		Correct parameters were set.	Check the investigation item No. 4.		
3	An error parameter No. is displayed on the NC diagnosis screen. Check the servo parameter with the parameter adjustment procedure.	SP001 to SP384	Set the value within the designated setting range.		○
4	Check the alarm No. "34" items.			○	○

Alarm No. 38	**NC-DRV communication: Protocol error 1** An error was detected in the communication frames received from the CNC.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "34" items.			○	○

Alarm No. 39	**NC-DRV communication: Protocol error 2** An error was detected in the axis information data received from the CNC.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "34" items.			○	○

Alarm No. 3A	**Overcurrent** Excessive current was detected in the motor drive current.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether vibration is occurring.	Vibration is occurring.	• Set a filter. • Lower the speed loop gain (SV005/SP005).	○	○
		There is no vibration.	Check the investigation item No. 2.		
2	The speed loop gain setting is larger than the standard value. Servo: SV005 / Spindle: SP005	The setting is too large.	Set an appropriate value.	○	○
		The setting is approximately the same as the standard value.	Check the investigation item No. 3.		
3	Check the current loop gain. Servo: SV009,SV010,SV011,SV012 Spindle: SP081,SP082,SP083,SP084	The setting is incorrect.	Set the standard value.	○	○
		The standard value is set.	Check the investigation item No. 4.		
4	Disconnect the power cable (U,V,W) from the terminal block and the cannon plug from the motor. Check the insulation with a tester.	The power cable is short-circuited.	Replace the motor power cable.	○	○
		There is no problem.	Check the investigation item No. 5.		
5	Check the insulation between the motor power cable and FG.	There is a ground fault at the power cable.	Replace the motor power cable.	○	○
		There is no problem.	Check the investigation item No. 6.		
6	Connect the cannon plug, and check the insulation between the power cable and FG.	There is a ground fault in the motor.	Replace the motor. (With the absolute position system, the zero point must be established.)	○	○
		There is no problem.	Check the investigation item No. 7.		
7	Check if there is any abnormality in the motor's ambient environment. (Ex. Ambient temperature, cutting water)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 3B	**Power module overheat** Thermal protection function in the power module has started its operation.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check that the fan is rotating correctly.	Large amounts of cutting oil or cutting chips, etc., are adhered, or the rotation is slow.	Clean or replace the fan.	○	○
		The fan is rotating properly.	Check the investigation item No. 2.		
2	Check whether the heat dissipating fins are dirty.	Cutting oil or cutting chips, etc., are adhered, and the fins are clogged.	Clean the fins.	○	○
		The fins are normal.	Check the investigation item No. 3.		
3	Measure the drive unit's ambient temperature.	55°C or more.	Improve the ventilation and cooling for the power distribution panel.	○	○
		Less than 55°C.	Check the investigation item No. 4.		
4	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 3C	Regeneration circuit error An error was detected in the regenerative transistor or in the regenerative resistor.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Is an external regenerative resistor used?	An external regenerative resistor is used.	To the investigation item No. 3.	○	
		A built-in regenerative resistor is used.	To the investigation item No. 2.		
2	Is the short wire connected between P and D terminal? Are there any problems with the connection condition?	The wire is not connected.	Connect the wire.	○	
		The connector is disconnected. The connector has a contact fault.	Reconnect the connector. Replace the connector.		
		The connection is correct.	Replace the drive unit.		
3	Is the connection of the regenerative resistor or regeneration resistor cable correct?	The connection is incorrect.	Rewire.	○	○
		The connection is correct.	To the investigation item No. 4.		
4	Is the regeneration resistor or the regeneration resistor cable broken? Disconnect the regenerative resistor terminal and check the resistance value with a tester.	The regeneration resistor is broken. Or the resistance value is large.	Replace the regenerative resistor.	○	○
		The regeneration resistor cable is broken.	Replace the cable.		
		The resistance value is normal.	Replace the drive unit.		

Alarm No. 42	Feedback error 1 An error was detected in the feedback signals of the position detector in a servo system, or in PLG's feedback signals in a spindle system.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check SP019 and SP020.	Parameter is set incorrectly.	Correctly set.		○
		Parameter is set correctly.	Check the investigation item No. 2.		
2	Check the alarm No. "2C" items.				○

Alarm No. 43	**Feedback error 2** Excessive difference was detected in position data between the motor side detector and the machine side detector in a servo system. In a spindle system, an error was detected in the encoder feedback signals.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	○	
		The connector is not disconnected.	Check the investigation item No. 2.		
2	Is the detector cable wired in the same conduit as the motor's power cable, or are the two cables laid in parallel near each other?	The cables are wired near each other. (Noise is entering from the power cable.)	Improve the cable wiring.	○	
		The wires are sufficiently separated.	Check the investigation item No. 3.		
3	Is the motor FG wire connected only to the drive unit which drives it? (Is the motor grounded to one point?)	The motor FG wire is grounded on the motor side.	Ground the motor to one point, connecting the wires together on the drive unit side.	○	
		The motor is grounded to one point.	Check the investigation item No. 4.		
4	Turn the power OFF, and check the detector cable connection with a tester. (Is the cable shielded?)	The connection is faulty.	Replace the detector cable.	○	
		The connection is normal.	Check the investigation item No. 5.		
5	Replace with another unit, and check whether the fault is on the unit side or detector side.	The alarm is on the drive unit side.	Replace the drive unit.	○	
		The alarm is on the detector side.	Check the investigation item No. 6.		
6	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	
7	Check SP019 and SP020.	Parameter is set incorrectly.	Correctly set.	○	
		Parameter is set correctly.	Check the investigation item No. 8.		
8	Check the alarm No. "1B" items.			○	

Alarm No. 45	**Fan stop** A cooling fan built in the drive unit stopped, and overheat occurred in the power module.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Turn the unit power ON again, and confirm the rotation of the fan. Note) Assure more than 10 seconds for the time from when the power is turned OFF till when it is turned ON. For the fan used for the drive unit, assuring more than 10 seconds for the time from when the power is turned OFF till when it is turned ON is required.	The fan is rotating, and an alarm did not occur again.	Continue to use. The power may be turned ON without assuring more than 10 seconds for the time from when the power is turned OFF till when it is turned ON. Leave for more than 10 seconds, and turn the power ON again.	○	○
		The fan did not rotate. Or, an alarm occurred again.	Check the investigation item No. 2.		
2	Check if the connector connected to a fan is disconnected.	The connector is disconnected.	Correctly connect the connector.	○	○
		The connector is not disconnected.	Check the investigation item No. 3.		
3	Check if oil or cutting chips are adhered to the fan.	Oil or cutting chips are adhered.	Improve the use environment and replace the drive unit.	○	○
		Oil or cutting chips are not adhered. The cable may be broken.	Replace the drive unit.		

Alarm No. 46	Motor overheat Thermal protection function of the motor or in the detector, has started its operation.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the repeatability.	The alarm occurs before operation.	Check the investigation item No. 2.		
		The alarm occurs occasionally after operation is started.	Check the investigation item No. 5.	○	○
2	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly install.	○	○
		The connector is not disconnected.	Check the investigation item No. 3.		
3	Turn the power OFF, and check the detector cable connection with a tester. (Is the cable shielded?)	The connection is faulty.	Replace the cable.	○	○
		The connection is normal.	Check the investigation item No. 4.		
4	When using MDS-B-HR, check if the motor is validated even if a motor thermal is not provided?	SV034/bit2 = 0	Set SP034/bit2 to 1.	○	
		SV034/bit2 = 1	Check the investigation item No. 5.		
5	Check the overload % (servo) or load meter (spindle).	The load is large.	Servo : Check the investigation item No. 6. Spindle : Check the investigation item No. 8.	○	○
		The load is not large.	Check the investigation item No. 9.		
6	Is the unbalance torque high?	The constant load torque (friction + unbalance) is 60% or more.	Select the motor so that the constant load torque is 60% or less.	○	
		The constant load torque is less than 60%.	Check the investigation item No. 7.		
7	Was the overload alarm (50) forcibly reset by turning the drive unit power OFF?	The alarm was forcibly reset.	Do not turn the drive unit's power OFF when an overload alarm occurs. (The NC power can be turned OFF.)	○	○
		The alarm was not forcibly reset.	Check the investigation item No. 9.		
8	Check the parameter settings.	The parameter is not set correctly.	Correctly set.		○
		The parameter is set correctly.	Check the investigation item No. 9.		
9	Measure the motor temperature when the alarm occurs.	The motor is hot.	Check the investigation item No. 10.	○	○
		The motor is not hot.	Check the investigation item No. 12.		
10	When using a motor with fan, check whether the fan is stopped, or it is clogged with dust, etc.	The motor fan was stopped.	Check the investigation item No. 11.	○	○
		The motor fan wind flow is poor.	Clean the fan.		
11	Check the fan wiring.	There is no problem.	Check the investigation item No. 12.	○	○
		The cable is broken.	Replace the cable.		
		The cable is not broken.	Replace the fan.		
12	Replace the drive unit or motor with another drive unit or motor, and check whether the fault is on the drive unit side or motor side	The alarm is on the drive unit side.	Replace the drive unit.	○	○
		The alarm is on the motor side.	Replace the motor.		
13	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

Alarm No. 48	Motor side detector: Error 5 The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 49	Motor side detector: Error 6 The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	

Alarm No. 4A	**Motor side detector: Error 7** The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 4B	**Motor side detector: Error 8** The motor side detector (linear scale in the case of linear motor) detected an error. As details defer from detector to detector, refer to the separate table (1).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the alarm No. "1B" items.			○	○

Alarm No. 4E	**NC command mode error** The mode outside the specification was input in spindle control mode selection.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the wiring and setting environment. 1) Correctly grounded? 2) Any noise generating devices around the unit? 3) Are the speed/position detector cables correctly shielded?	1) The grounding is incomplete.	Correctly ground.		○
		2) The alarm occurs easily when a specific device operates.	Use noise measures on the device described on the left.		
		3) The cable is not correctly shielded.	Correctly shield the cable.		
		No abnormality is found in particular.	Replace the drive unit.		

Alarm No. 50	**Overload 1** Overload detection level became over 100%. The motor or the drive unit is overloaded.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the overload parameters. Servo : SV021, SV022 Spindle : SP063, SP064	The standard values (below) are not set. Servo : SV021 = 60, SV022 = 150 Spindle : SV063 = 60, SP064 = 110	Set the standard values.	○	○
		The standard values are set.	Investigate item 2.		
2	Check the overload % (servo) or load meter (spindle).	The load is large.	Servo : Investigate item 3. Spindle : Investigate item 7.	○	○
		The load is not large.	Investigate item 9.		
3	Check whether machine resonance is occurring.	Resonance is occurring.	Adjust the parameters. • Set the notch filter. • Lower VGN1 (SV005).	○	
		Resonance is not occurring.	Investigate item 4.		
4	Check whether the shaft sways when the motor is stopped. (Hunting)	The motor is hunting.	Adjust the parameters. • Increase VGN1 (SV005). • Lower VIA (SV008).	○	
		The motor is not hunting.	Investigate item 5.		
5	Check the brake operation. • Check the brake relay. • Check the connector (CN20) connection.	The motor brakes are not released.	Correct the faulty section.	○	
		The motor brake operation is normal.	Investigate item 6.		
6	Check the load current with the NC Servo Monitor, and investigate the machine load.	The cutting load is large.	Lower the cutting load.	○	
		There is interference with the positioning pin.	When using the positioning pin, turn the servo OFF when stopped.		
		An excessive force is applied from the machine.	Check whether the ball screw is bent, or whether there is a fault in the guide.		
		The machine load is not large.	Investigate item 8.		
7	Check the PLG output waveform.	There is a problem.	Adjust the PLG output waveform.		○
		Normal	Investigate item 8.		
8	Confirm the motor capacity selection again.	The motor performance is insufficient.	Lower the acceleration/deceleration rate or cutting load.	○	○
		The motor performance is sufficient.	Investigate item 9.		
9	Try replacing the drive unit.	Improved.	Replace the drive unit.	○	○
		Not improved.	Replace the motor.		

(Note) NR and PR resetting are not possible when the overload level is 50% or more. Do not forcibly reset (AR) by turning the unit power OFF. If AR resetting is used at 50% or higher, the level is set to 80% when the power is turned ON next. (Servo)

Alarm No. 51	**Overload 2** Current command of more than 95% of the unit's max. current was being continuously given for longer than 1 second in a servo system. In a spindle system, current command of more than 95% of the motor's max. current was being continuously given for longer than 1 second.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Did the alarm occur immediately after READY ON?	The alarm occurred after ready ON before operation starts.	Investigate item 2.	○	
		The alarm occurred after normal operation.	Investigate item 5.		
2	Check that the PN voltage is supplied to the drive unit. • Is the CHARGE lamp ON?	The voltage is not supplied.	Correctly supply the PN voltage.	○	
		Approx. 300V is correctly supplied.	Investigate item 3.		
3	Check the motor power cable (U, V, W phases). • The power cable is not connected. • Is the cable connected to the motor for another axis?	The connections are incorrect.	Connect correctly.	○	
		The connections are correct.	Investigate item 4.		
4	Check the detector cable connection. • Is the cable connected to the motor for another axis?	The connections are incorrect.	Connect correctly.	○	
		The connections are correct.	Investigate item 5.		
5	Check whether the machine has collided.	The machine has collided.	Check the machining program and soft limit settings.	○	
		The machine has not collided.	Investigate item 6.		
6	Check whether the current value on the NC Servo Monitor screen is saturated during acceleration/deceleration.	The current is saturated during acceleration/deceleration.	Increase the acceleration/deceleration time constant.	○	
		The current value during acceleration/deceleration is appropriate.	Investigate item 7.		
7	Check the detector FB.	The FB signal is abnormal.	Replace the detector. (With the absolute position system, the zero point must be established.)	○	
		The FB signal is normal.	Replace the drive unit.		
8	Check the load meter value.	The load is large.	Lower the load.		○
		The load is not large.	Investigate item 9.		
9	Check the PLG output waveform.	There is a problem.	Adjust the PLG output waveform.		○
		Normal	Replace the drive unit.		

Alarm No. 52	**Excessive error 1** A difference between the actual and theoretical motor positions during servo ON exceeded the setting value.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the excessive error detection width. SV023 (Servo) SP102 (Orientation control) SP154, SP155 (C-axis control) SP177/bitD, SP186 (Spindle synchronous control) SP193/bitD, SP218 (Synchronous tap)	The excessive error detection width is too small. Servo standard value: $SV023 = \dfrac{RAPID}{60 \times PGN1} \div 2$ For the spindle, a value larger than the droop amount: Droop amount = $\dfrac{\text{Spindle rotation speed} \times \text{No. of pulses}}{60 \times \text{position loop gain}}$	Set appropriate values.	○	○
		Appropriate values are set.	Investigate item 2.		
2	Check the position detector polarity. SV017/bit4 (Servo) SP097/bit5 (Orientation control) SP129/bit5 (C-axis control) SP177/bit5 (Spindle synchronous control) SP193/bit5 (Synchronous tap control)	The polarity is reversed.	Correctly set the parameters.	○	○
		Normal.	Investigate item 3.		
3	Check the alarm No. "51" items.			○	○

Alarm No. 53	Excessive error 2 A difference between the actual and theoretical motor positions during servo OFF exceeded the setting value.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the follow-up function while the NC is in the servo OFF state.	The axis detachment function (NC parameter) is invalid. (Note) For the axis detachment function, refer to the NC manual.	Check the investigation item No. 2.	○	
		The axis detachment function (NC parameter) is valid. (Note) For the axis detachment function, refer to the NC manual.	Check the investigation item No. 3.		
2	Check whether the axis has moved during servo OFF, and check the motor brake operation.	The axis has moved.	Adjust the brakes, etc. so that the axis does not move.	○	
		The axis has not moved.	Check the investigation item No. 3.		
3	Check the excessive error detection width. SV026 (Servo)	The excessive error detection width is too small. $$SV026 = \frac{RAPID}{60 \times PGN1} \div 2$$	Set an appropriate value.	○	
		An appropriate value is set.	Check for problems on the NC side, such as the position FB follow-up control.		

Alarm No. 54	Excessive error 3 When an excessive error 1 occurred, detection of the motor current failed.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check that the PN voltage is supplied to the drive unit. • Is the CHARGE lamp ON?	The voltage is not supplied.	Correctly supply the PN voltage.	○	
		Approx. 300V is correctly supplied.	Investigate item 2.		
2	Check the motor power cable (U, V, W phases). • The power cable is not connected. • Is the cable connected to the motor for another axis?	The connections are incorrect.	Connect correctly.	○	
		The connections are correct.	Replace the drive unit.		

Supplement (servo)

Depending on the ideal machine position in respect to the command position, the actual machine position could enter the actual shaded section shown below, which is separated more than the distance set in OD1.
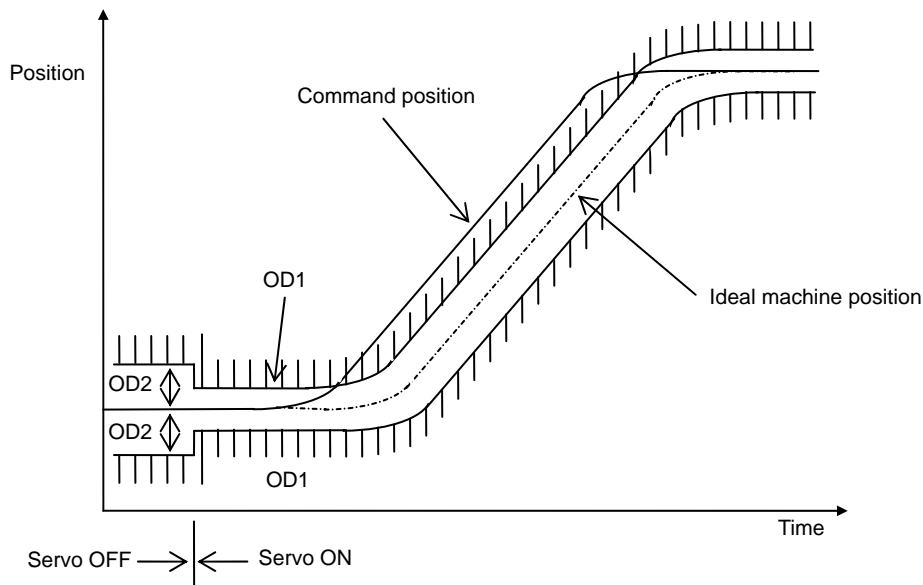
Alarm No. 58	**Collision detection 1: G0** When collision detection function was valid, the disturbance torque in rapid traverse (G0) exceeded the collision detection level.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the machine has collided.	The machine has collided.	Check the machining program and soft limit settings.	○	
		The machine has not collided.	Increase the detection level (SV060). (The detection level should be set as 1.5-times the maximum torque or more.)		

Alarm No. 59	**Collision detection 1: G1** When collision detection function was valid, the disturbance torque in cutting feed (G1) exceeded the collision detection level.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the machine has collided.	The machine has collided.	Check the machining program and soft limit settings.	○	
		The machine has not collided.	Increase the detection level (SV035. clG1). (Set the detection level larger than the maximum cutting load.)		

Alarm No. 5A	**Collision detection 2** When collision detection function was valid, the command torque reached the max. motor torque.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the machine has collided.	The machine has collided.	Check the machining program and soft limit settings.	○	
		The machine has not collided.	Check the investigation item No. 2.		
2	Check whether the current value on the NC Servo Monitor screen is saturated during acceleration/deceleration.	The current is saturated during acceleration/deceleration.	Check the investigation item No. 3.	○	
		The current value during acceleration/deceleration is appropriate.	Investigate the cause of the load fluctuation.		
3	Can the acceleration/deceleration time constant be changed?	The constant can be changed.	Increase the acceleration/deceleration time constant.	○	
		The constant cannot be changed.	Set to ignore collision detection method 2.		

Alarm No. 5B	**Safety observation: Commanded speed error** In safety monitoring mode, the commanded speed was detected to exceed the safe speed.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the commanded speed on the NC side.	The commanded speed and safe speed limit value are the same.	Reduce the commanded speed on the NC side or increase the safe speed limit value.	○	○
		The commanded speed is slower than the safe speed.	Replace the drive unit.		

Alarm No. 5D	**Safety observation: Door state error** In safety monitoring mode, the door state signal from the NC and the same signal from the drive unit don't match. Otherwise, door open state was detected in normal mode.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the DI input timing.	Both NC side and drive unit side input timings match one another within 500ms.	Review the DI input sequence. Check if the cable for the DI input signal is broken.	○	○
		NC side and drive unit side inputs do not match one another within 500ms.	Investigate the wiring and connection environment.		

Alarm No. 5E	Safety observation: Feedback speed error In safety monitoring mode, the motor speed was detected to exceed the safe speed.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check the DI input timing.	The feedback speed and safe speed limit value are the same.	Reduce the commanded speed on the NC side or increase the safe speed limit value.	○	○
		The feedback speed is slower than the safe speed.	Replace the drive unit.		
2	Check the wiring and setting environment. 1) Correctly grounded? 2) Any noise generating devices around the unit? 3) Are the speed/position detector cables correctly shielded?	1) The grounding is incomplete.	Correctly ground.	○	○
		2) The alarm occurs easily when a specific device operates.	Use noise measures on the device described on the left.		
		3) The cable is not correctly shielded.	Correctly shield the cable.		
		No abnormality is found in particular.	Replace the drive unit.		

Alarm No. 5F	External contactor error A contact of the external contactor is welding.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the contactor's contact has melted.	The contactor has melted.	Replace the contactor.	○	○
		The contactor has not melted.	Check the investigation item No. 2.		
2	Check whether the axis where an alarm occurred was a contactor control axis.	The alarm occurred at the axis where the contactor control is not executed.	Set the parameter correctly.	○	○
		The alarm occurred at the axis where the contactor control is executed.	Replace the drive unit.		

Alarm No. 61	Power supply: Power module overcurrent Overcurrent protection function in the power module has started its operation.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the state of the operation when the alarm occurs, and check the repeatability.	The alarm occurs each time immediately after 200VAC is supplied or after READY is turned ON.	Replace the unit.	○
		The alarm occurs frequently during READY ON.	Check the investigation item No. 3.	
		The alarm occurs after continuous operation for a long time. The unit is hot.	Check the investigation item No. 2.	
2	Check the load state of all motors, and the starting/stopping frequency.	The total load of all motors exceeds the rated capacity of the power supply unit.	Lower the motor load and operation frequency.	○
		The total does not exceed the capacity.	Check the investigation item No. 3.	
3	Check the power capacity.	The power capacity is insufficient.	Increase the power capacity.	○
		The specified power capacity is secured.	Check the investigation item No. 4.	
4	Measure the voltage across wires. • Is the voltage 170V or more even when the motor is accelerating?	The voltage drops to 170V or less occasionally.	Increase the power capacity.	○
		The difference of the voltage across wires is 10V or more.	Improve the power phase balance.	
		The difference of the voltage across wires is less than 10V.	Check the investigation item No. 5.	
5	Measure the power voltage with a synchroscope, and check whether there is any distortion. • Are there any other devices causing the power distortion?	The power voltage is distorted.	Improve the source of the distortion. Install an AC reactor.	○
		The power voltage waveform is not abnormal.	Check the investigation item No. 6.	
6	Check if there is any abnormality in the unit's ambient environment. (Ex. Noise, grounding, etc.)	Take remedies according to the causes of the abnormality in the ambient environment.		○

Alarm No. 62	Power supply: Frequency error The input power supply frequency increased above the specification range.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the state of the operation when the alarm occurs, and check the repeatability.	The alarm occurs each time immediately after the power is turned ON. Or, the alarm occurs occasionally regardless of the operation state.	Check the investigation item No. 2.	○
		The alarm occurs only while the motor is accelerating/decelerating.	Check the investigation item No. 3.	
2	Measure the power voltage waveform during normal operation.	The frequency is deviated from 50Hz±3% or 60Hz±3%.	Review the power facilities.	○
		The voltage waveform dips at some sections.	Improve the source of the distortion. Install an AC reactor.	
		There is no problem.	Check the investigation item No. 4.	
3	Measure the power voltage when the motor is accelerating/decelerating.	The frequency greatly fluctuates during acceleration/deceleration.	Review the power facilities.	○
		The voltage waveform during deceleration dips in some sections.	Improve the source of the distortion. Install an AC reactor.	
		There is no problem.	Check the investigation item No. 4.	
4	Check if there is any abnormality in the unit's ambient environment. (Ex. Noise, grounding, etc.)	Take remedies according to the causes of the abnormality in the ambient environment.		○

Alarm No. 67	Power supply: Phase interruption An open-phase condition was detected in input power supply circuit.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the voltage for each input phase.	There are phases with no voltage.	Correct the power supply.	○
		There is no problem.	Check the investigation item No. 2.	
2	Check the alarm No. "71" items.			○

Alarm No. 68	Power supply: Watchdog The system does not operate correctly.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the repeatability.	The alarm occurs each time READY is turned ON.	Replace the unit.	○
		The alarm occurs occasionally.	Check the investigation item No. 2.	
2	Check if there is any abnormality in the unit's ambient environment. (Ex. Noise, grounding, etc.)	Take remedies according to the causes of the abnormality in the ambient environment.		○
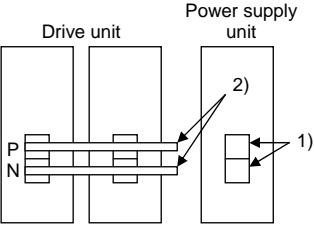
Alarm No. 69	Power supply: Grounding The motor power cable is in contact with FG (Frame Ground).				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Measure the insulation across the power cables (U,V,W) for all motors and the ground. (Carry out a megger test.)	Less than 100kΩ. (Grounding)	The motor or power cable may be ground faulted.	○	○
		100kΩ or more. (Normal)	Check the investigation item No. 2.		
2	Has oil come in contact with the motor or power cable?	Oil has come in contact.	Take measures so that oil does not come in contact. Check the motor's cannon connector and the inside of the terminal box, and clean as necessary.	○	○
		Oil has not come in contact.	Check the investigation item No. 3.		
3	Measure the insulation again.	Less than 1MΩ. (Grounding)	Replace the motor or cable.	○	○
		1MΩ or more. (Normal)	Check the investigation item No. 2.		
4	Measure the resistance across the U, V, W phase terminals of the servo/spindle drive unit and the ground. (Do not measure the insulation as the unit could be damaged.)	Less than 100kΩ.	Replace the drive unit.	○	○
		100kΩ or more.	Replace the power supply unit.		
5	Check whether there is any axis in which alarm has occurred.	There is an axis in which alarm has occurred.	Check the alarm No. "24" items.	○	○
		There is no axis in which alarm has occurred.	Check the investigation item No. 2.		

Alarm No. 6A	Power supply: External contactor welding A contact of the external contactor is welding.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check whether any alarm has occurred on the drive unit side.	An alarm has occurred.	Remove the cause of the alarm on the drive side, and check the investigation item No. 2.	○
		An alarm has not occurred.	Check the investigation item No. 2.	
2	Check whether the contactor's contact has melted.	The contactor has melted.	Replace the contactor.	○
		The contactor has not melted.	Check the investigation item No. 3.	
3	Check that the contactor excitation wiring is correctly connected from the power supply unit's MC1 terminal.	The connection is correct.	Correctly connect.	○
		The connection is incorrect.	Replace the power supply unit.	

Alarm No. 6B	Power supply: Rush relay welding A resistor relay for rush short circuit fails to be OFF.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check whether any alarm has occurred on the drive unit side.	An alarm has occurred.	Remove the cause of the alarm on the drive side, and then carry out the investigation details 2.	○
		An alarm has not occurred.	Check the investigation item No. 2.	
2	Check the repeatability.	The alarm occurs each time READY is turned ON.	Replace the unit.	○
		The alarm occurs occasionally.	Check the investigation item No. 3.	
3	Check if there is any abnormality in the unit's ambient environment. (Ex. Noise, grounding, etc.)	Take remedies according to the causes of the abnormality in the ambient environment.		○

Alarm No. 6C	**Power supply: Main circuit error** An error was detected in charging operation of the main circuit capacitor.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the CHARGE lamp state when the alarm occurs.	The CHARGE lamp remains ON for some time.	Replace the power supply unit.	
		The lamp turns ON instantly, but when the alarm occurs and the contactor turns OFF, the lamp turns OFF immediately.	Check the investigation item No. 2.	○
		The lamp never turns ON.	Check the investigation item No. 2. Then replace the unit.	
2	Disconnect the power supply unit's PN terminal block wiring, and measure the resistance value at 1) and 2) shown below.	1) The power supply unit side is abnormal.	Replace the power supply unit.	
		2) The drive unit side is abnormal.	Disconnect the PN wiring, and then check the drive unit side.	
		1) and 2) are both normal.	Replace the power supply unit.	○

Drive unit / Power supply unit

Tester measurement point	Polarity +	Polarity -	Normal	Abnormal
1)	P	N	Several 100Ω	Short-circuit/∞Ω
	N	P	∞Ω	Several 100Ω
2)	P	N	Several 100Ω	Short-circuit/∞Ω
	N	P	∞Ω	Several 100Ω

Alarm No. 6E	**Power supply: Memory error/AD error** An error was detected in the internal memory or A/D converter.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the repeatability.	The alarm occurs each time READY is turned ON.	Replace the unit.	○
		The alarm occurs occasionally.	Check the investigation item No. 2.	
2	Check if there is any abnormality in the unit's ambient environment. (Ex. Noise, grounding, etc.)	Take remedies according to the causes of the abnormality in the ambient environment.		○

Alarm No. 6F	**Power supply error** No power supply is connected to the drive unit, or a communication error was detected.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the LED display on the power supply unit.	"F" is flickering.	An A/D converter error has occurred. Check the alarm No. "6E" items.	
		Another alarm code is flickering.	Check items of each alarm No.	
		"0" is displayed.	Check the investigation item No. 2.	
		"F" is displayed.	Check the investigation item No. 2.	○
		"8" is displayed.	Check the alarm No. "68" items.	
		"b", "C", "d" is displayed.	Check the investigation item No. 3.	
		Something else is displayed.	Check the alarm No. "68" items.	
2	Check the rotary switch setting.	0 or 4 is set.	Check the investigation item No. 3.	○
		A value other than the above is set.	Correctly set the rotary switch.	
3	Check the communication cable (CN4) connected with the drive unit.	There is a problem with the wiring or shield.	Replace the cable.	○
		There is no problem.	Replace the unit.	

(Note) Alarm 6F is detected at the same time other power supply alarms occur.

Alarm No. 70	Power supply: External emergency stop error A mismatch of the external emergency stop input and CNC emergency stop input continued for 30 seconds.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the connection between external emergency stop and NC emergency stop.	Not wired.	Correctly wire the external emergency stop and NC emergency stop.	○
2	Check if there is any abnormality in the unit's ambient environment.	No abnormality is found in particular.	Replace the drive unit.	
		The grounding is incomplete.	Take remedies according to the causes of the abnormality. Additionally ground and review.	○

Alarm No. 71	Power supply: Instantaneous power interruption The power was momentarily interrupted.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Investigate the sequence to check whether the contactor has been turned OFF with an emergency stop button, etc.	The contactor has been turned OFF externally.	Review the machine sequence. When turning the contactor OFF with external means, such as an emergency stop button, this alarm can be avoided by inputting NC emergency stop at the same time.	○
		The contactor has not been turned OFF.	Check the investigation item No. 2.	
2	Check the repeatability.	The alarm occurs each time READY is turned ON.	Check the investigation item No. 3.	
		The alarm occurs at a certain operation.	Check the investigation item No. 1. If there is no problem, check the investigation item No. 3.	○
		The alarm occurs occasionally during operation.	Check the investigation item No. 4.	
3	Check whether the power input wire and contactor are correctly wired.	The wiring is incorrect.	Correctly connect.	○
		There is no problem.	Check the investigation item No. 4.	
4	Check the power voltage waveform with a synchroscope.	An instantaneous power failure or voltage drop occurs frequently.	Correct the power facility.	○
		There is no problem.	Replace the unit.	

Alarm No. 72	Power supply: Fan stop A cooling fan built in the power supply unit stopped, and overheat occurred in the power module.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Turn the unit power ON again, and confirm the rotation of the fan. Note) Assure more than 10 seconds for the time from when the power is turned OFF till when it is turned ON. For the fan used for the drive unit, assuring more than 10 seconds for the time from when the power is turned OFF till when it is turned ON is required.	The fan is rotating, and an alarm did not occur again.	Continue to use. The power may be turned ON without assuring more than 10 seconds for the time from when the power is turned OFF till when it is turned ON. Leave for more than 10 seconds, and turn the power ON again.	○
		The fan did not rotate. Or, an alarm occurred again.	Check the investigation item No. 2.	
1	Check if the connector connected to a fan is disconnected.	The connector is disconnected.	Correctly connect the connector.	○
		The connector is not disconnected.	Check the investigation item No. 3.	
2	Check if oil or cutting chips are adhered to the fan.	Oil or cutting chips are adhered.	Improve the use environment and replace the drive unit.	○
		Oil or cutting chips are not adhered. The cable may be broken.	Replace the drive unit.	

Alarm No. 73		Power supply: Over regeneration			
		Over-regeneration detection level became over 100%. The regenerative resistor is overloaded. This alarm cannot be reset for 15 min from the occurrence. Leave the drive system energized for more than 15 min, then turn the power ON to reset the alarm.			
		Investigation details	Investigation results	Remedies	CV
1		Check the alarm occurrence state and regenerative load displayed on the NC Monitor screen while changing the operation mode.	The regenerative load value increases when the power is turned ON and the motor is not rotated.	Check whether the state is affected by power fluctuation, grounding or noise. If there is no problem, replace the unit.	○
			The regenerative load value increases each time the motor decelerates, and the alarm occurs.	A-CR : Check the investigation item No. 2. C1-CV : Check the investigation item No. 4.	
			The regenerative load value increases each time the motor decelerates, but the alarm does not occur when the operation mode is eased.	A-CR : Check the investigation item No. 2. C1-CV : Ease the operation mode.	
2		Check whether the parameter (regenerative resistor type) of the drive unit controlling the power supply unit is correct.	The setting is incorrect.	Correctly set. (Check the alarm No. "6D" items.)	○
			The setting is correct.	Check the investigation item No. 3.	
3		Check the regenerative resistor's state. • Is oil adhered? • Measure the resistance value.	The regenerative resistor is abnormal.	Replace the regenerative resistor.	○
			There is no problem.	Check the investigation item No. 4.	
4		Check the alarm No. "75" items.			○

Alarm No. 75		Power supply: Overvoltage			
		L+ and L- bus voltage in main circuit exceeded the allowable value. As the voltage between L+ and L- is high immediately after this alarm, another alarm may occur if this alarm is reset in a short time. Wait more than 5 min before resetting so that the voltage drops.			
		Investigation details	Investigation results	Remedies	CV
1		Check the repeatability.	The alarm occurs each time the motor decelerates.	Check the investigation item No. 3.	○
			The alarm occurs occasionally.	Check the investigation item No. 2.	
2		Check the power supply's alarm history.	Auxiliary regeneration frequency over (E8) occurs just before the over-voltage occurs.	Limit the occurrence of the excessive instantaneous regeneration by not decelerating multiple axes at the same time.	○
			Others.	Check the investigation item No. 3.	
3		Check the power capacity.	The power capacity is insufficient.	Increase the power capacity.	○
			The specified power capacity is secured.	Check the investigation item No. 4.	
4		Measure the voltage across wires. • Is the voltage 170V or more even when the motor is accelerating?	The voltage drops to 170V or less occasionally.	Increase the power capacity.	○
			The difference of the voltage across wires is 10V or more.	Improve the power phase balance.	
			The difference of the voltage across wires is less than 10V.	Check the investigation item No. 5.	
5		Measure the power voltage with a synchroscope, and check whether there is any distortion. • Are there any other devices causing the power distortion?	The power voltage is distorted.	Improve the source of the distortion. Install an AC reactor.	○
			The power voltage waveform is not abnormal.	Check the investigation item No. 6.	
6		Check if there is any abnormality in the unit's ambient environment. (Ex. Noise, grounding, etc.)	Take remedies according to the causes of the abnormality in the ambient environment.		○

Alarm No. 76	Power supply: External emergency stop setting error The rotary switch setting of external emergency stop is not correct, or a wrong external emergency stop signal is input.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Check the rotary switch setting.	When using external emergency stop, rotary switch is not set to "4".	Set the rotary switch to "4".	○
2	Check if there is any abnormality in the unit's ambient environment.	No abnormality is found in particular.	Replace the drive unit.	
		The grounding is incomplete.	Take remedies according to the causes of the abnormality. Additionally ground and review.	○

Alarm No. 77	Power supply: Power module overheat Thermal protection function in the power module has started its operation.			
	Investigation details	**Investigation results**	**Remedies**	**CV**
1	Confirm that the fan is properly rotating.	Large amounts of cutting oil or cutting chips, etc., are adhered, or the rotation is slow.	Clean or replace the fan.	○
		The fan is properly rotating.	Check the investigation item No. 2.	
2	Check whether the heat dissipating fins are dirty.	Cutting oil or cutting chips, etc., are adhered, and the fins are clogged.	Clean the fins.	○
		The fins are normal.	Check the investigation item No. 3.	
3	Measure the power supply unit's ambient temperature.	55°C or more	Improve the ventilation and cooling for the power distribution panel.	○
		Less than 55°C.	Check the investigation item No. 4.	
4	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○

Alarm No. 88	Watchdog The system does not operate correctly.				
	Investigation details	**Investigation results**	**Remedies**	**SV**	**SP**
1	Check whether the servo or spindle software version was changed recently.	The version was changed.	Change software version back to the original.	○	○
		The version was not changed.	Check the investigation item No. 2.		
2	Check the repeatability.	The error is always repeated.	Replace the drive unit.	○	○
		The state returns to normal once, but occurs sometimes thereafter.	Check the investigation item No. 3.		
3	Check if there is any abnormality in the unit's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		○	○

4.1.3 Troubleshooting for each warning No.

Warning No. 9E	**Absolute position detector: Revolution counter error** An error was detected in the revolution counter of the absolute position detector. The absolute position data cannot be compensated.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Check if there is any abnormality in the detector's ambient environment. (Ex. Ambient temperature, noise, grounding)	Take remedies according to the causes of the abnormality in the ambient environment.		O	
2	Check the repeatability.	Occurs frequently.	Replace the detector.	O	O
		Is not repeated.	Check the investigation item No. 1.		

Warning No. 9F	**Battery voltage drop** The battery voltage that is supplied to the absolute position detector dropped. The absolute position data is retained.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Measure the battery (MDS-A-BT) voltage.	Less than 3V.	Replace the battery unit.	O	
		3V or more.	Check the investigation item No. 2.		
2	Check whether the NC bus cable is disconnected.	The cable is disconnected.	Correctly connect.	O	
		The cable is not disconnected.	Check the investigation item No. 3.		
3	Check whether the battery wire in the detector cable is broken.	The cable is broken.	Replace the cable.	O	
		The cable is not broken.	Check the investigation item No. 4.		
4	Replace the drive unit.	Improved.	Replace the drive unit.		
		Not improved.	Replace the detector. (With the absolute position system, the zero point must be established.)	O	

(Note) When warning 9F occurs, do not turn the drive unit power OFF to ensure that the absolute position data is held. Replace the battery with the drive unit power ON.

Warning No. A6	**Fan stop warning** A cooling fan built in the drive unit stopped.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Check the alarm No. "45" items.			O	O

Warning No. E1	**Overload warning** Overload detection level exceeded 80%.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Check if the motor is hot.	Motor is hot.	Check the alarm No. "50" items.		O
		Motor is not hot.	Check the investigation item No. 2.		
2	Check if an error occurs when executing acceleration/deceleration operation.	Error is not found in operation. Thus, operation is possible.	Ease the operation patter, if possible. If no alarm occurs, operation can be continued as it is.		O
		Error is found in operation.	Check the investigation item 3 or later of Alarm No. 50.		
3	Check the alarm No. "50" items.			O	O

Warning No. E4	**Set parameter warning** An incorrect parameter was detected among the parameters received from the CNC.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Check the error parameter No.	SV001 to SV256 SP001 to SP256	Set the value within the designated setting range.	O	O
2	Check the spindle control input 4/bit 0 to 2.	Selected other than 000, 001, 010 and 100 when the alarm occurred.	Correctly select.		O

Warning No. E6	**Control axis detachment warning** Control axis detachment was commanded.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	The status in which removal of the control axis was commanded from the NC is indicated.			O	

Warning No. E7	**In NC emergency stop state** Emergency stop was input from the CNC.				
	Investigation details	**Investigation results**	**Remedies**	SV	SP
1	Check if the emergency stop is applied on the NC side.	The emergency stop is applied.	Check the investigation item No. 2.	○	○
		The emergency stop is cancelled.	Check the investigation item No. 3.		
2	Cancel the emergency stop.	Normally starts up.	Normal.	○	○
		"E7" remains displayed.	Check the investigation item No. 3.		
3	Check whether an alarm is occurring in another drive unit.	An alarm is occurring in another drive unit.	Reset the alarm in the other drive unit.	○	○
		An alarm is not occurring.	Check the investigation item No. 4.		
4	Turn the power of NC and 200VAC (400V) ON again			○	○

Warning No. E9	**Instantaneous power interruption warning** The power was momentarily interrupted.			
	Investigation details	**Investigation results**	**Remedies**	CV
1	Check the alarm No. "71" items.			○

Warning No. EA	**In external emergency stop state** External emergency stop signal was input.			
	Investigation details	**Investigation results**	**Remedies**	CV
1	Check whether the specifications allow use of the external emergency stop.	Use is not allowed.	Invalidate the external emergency stop.	○
		Use is allowed.	Check the investigation item No. 2.	
2	Measure the input voltage of the CN23 connector. (While emergency stop is cancelled.)	24V is input.	Replace the power supply unit.	○
		24V is not input.	Check whether the external emergency stop cable is broken, or check the external contact operation.	

Warning No. EB	**Power supply: Over regeneration warning** Over-regeneration detection level exceeded 80%.			
	Investigation details	**Investigation results**	**Remedies**	CV
1	Check the alarm No. "73" items.			○

Warning No. EE	**Power supply: Fan stop warning** A cooling fan built in the power supply unit stopped.			
	Investigation details	**Investigation results**	**Remedies**	CV
1	Check the alarm No. "72" items.			○

4.1.4 Parameter numbers during initial parameter error

If an initial parameter error (alarm 37) occurs, the alarm and the No. of the parameter set exceeding the setting range will appear on the NC Diagnosis screen as shown below.

S02 Initial parameter error ○○○○ □

○○○○ : Error parameter No.
□ : Axis name

If an error No. larger than the servo parameter No. is displayed for the servo drive unit (MDS-D/DH-V1/V2), the alarm is occurring for several related parameters. Refer to the following table, and correctly set the parameters.

Error parameter No.	Details	Related parameters
2301	The following settings are overflowing. • Electronic gears • Position loop gain • Speed feedback	SV001, SV002 SV003, SV018 SV019, SV020 SV049
2302	The absolute position parameter is valid when OSE104 and OSE105 are connected.	SV017, SV025

4.1.5 Troubleshooting the spindle system when there is no alarm or warning

If an abnormality is observed in the spindle system but no alarm or warning has occurred, refer to the following table and check the state.

[1] The rotation speed command and actual rotation speed do not match.

	Investigation item	Investigation results	Remedies
1	Check the speed command.	The speed command is not input correctly.	Input the correct speed command.
		The speed command is correct.	Check the investigation item No. 2.
2	Check whether there is slipping between the motor and spindle. (When connected with a belt or clutch.)	There is slipping.	Repair the machine side.
		No particular problems found.	Check the investigation item No. 3.
3	Check the spindle parameters (SP026, SP129 and following).	The correct values are not set.	Set the correct values.
		The correct values are set.	Replace the spindle drive unit.

[2] The starting time is long or has increased in length.

	Investigation item	Investigation results	Remedies
1	Check whether the friction torque has increased.	The friction torque has increased.	Repair the machine side.
		No particular problems found.	Check the investigation item No. 2.
2	Manually rotate the motor bearings and check the movement.	The bearings do not rotate smoothly.	Replace the spindle motor.
		The bearings rotate smoothly.	Check the investigation item No. 3.
3	Check whether the torque limit signal has been input.	The signal has been input.	Do not input this signal.
		The signal is not input.	Replace the drive unit.

[3] The motor stops during cutting.

	Investigation item	Investigation results	Remedies
1	Check the load rate during cutting.	The load meter sways over 120% during cutting.	Reduce the load.
		No particular problems found.	Check the investigation item No. 2.
2	Carry out the same investigations and remedies as section (4).		

[4] The vibration and noise (gear noise), etc., are large.

	Investigation item	Investigation results	Remedies
1	Check the machine's dynamic balance. (Coast from the maximum speed.)	The same noise is heard during coasting.	Repair the machine side.
		No particular problems found.	Check the investigation item No. 2.
2	Check whether there is a resonance point in the machine. (Coast from the maximum speed.)	Vibration and noise increase at a set rotation speed during coasting.	Repair the machine side.
		No particular problems found.	Check the investigation item No. 3.
3	Check the machine's backlash.	The backlash is great.	Repair the machine side.
		No particular problems found.	Check the investigation item No. 4.
4	Check the spindle parameter settings. (SP005:VGN1, SP006:VIA1, SP007:VIL1, SP008:VGN2, SP009:VIA2, SP010:VIL2, SP014:PY1)	The vibration and noise levels will increase when the setting value is set to approx. half.	Change the setting value. Note that the impact response will drop.
		The symptoms do not change even if the above value is set.	Return the setting values to the original values. Check the investigation item No. 5.
5	Jiggle the detector connectors (drive unit side and detector side) and check if they are disconnected.	The connector is disconnected (or loose).	Correctly connect the connector.
		The connector is not disconnected (or loose).	Check the investigation item No. 6.
6	Turn the power OFF, and check the connection of the speed detector cable with a tester.	The connection is faulty or disconnected.	Replace the detector cable. Correct the connection.
		The connection is normal.	Replace the drive unit.

[5] The spindle coasts during deceleration.

	Investigation item	Investigation results	Remedies
1	Check whether there is slipping between the motor and spindle. (When connected with a belt or clutch.)	There is slipping.	Repair the machine side.
		No particular problems found.	Replace the drive unit.

[6] The rotation does not stabilize.

	Investigation item	Investigation results	Remedies
1	Check the spindle parameter SP005 (SP008) settings.	The rotation stabilizes when the settings values are both set to approx. double.	Change the setting value. Note that the gear noise may increase.
		The symptoms do not change even when the above value is set.	Return the setting values to the original values. Check the investigation item No. 2.
2	Manually shake the speed detector connectors (spindle drive unit side and speed detector side) to check if they are disconnected.	The connector is disconnected (or loose).	Correctly connect the connector.
		The connector is not disconnected (or loose).	Check the investigation item No. 3.
3	Turn the power OFF, and check the connection of the speed detector cable with a tester. (Especially check the shield wiring.)	The connection is faulty or disconnected.	Replace the detector cable. Correct the connection.
		The connection is normal.	Check the investigation item No. 4.
4	Investigate the wiring and installation environment. 1) Is the ground correctly connected? 2) Are there any noise-generating devices near the drive unit?	1) The grounding is incomplete.	Correctly ground.
		2) The alarm occurs easily when a specific device operates.	Use noise measures on the device described on the left.
		No particular problems found.	Replace the spindle drive unit.

[7] The speed does not rise above a set level.

	Investigation item	Investigation results	Remedies
1	Check the speed command. Check whether the override input is input from the machine operation panel.	The speed command is not input correctly.	Input the correct speed command.
		The speed command is input correctly.	Check the investigation item No. 2.
2	Check whether the load has suddenly become heavier.	The load has become heavier.	Repair the machine side.
		No particular problems found.	Check the investigation item No. 3.
3	Manually rotate the motor bearings and check the movement.	The bearings do not rotate smoothly.	Replace the spindle motor.
		The bearings rotate smoothly.	Check the investigation item No. 4.
4	Manually shake the speed detector connectors (spindle drive unit side and speed detector side) to check if they are disconnected.	The connector is disconnected (or loose).	Correctly connect the connector.
		The connector is not disconnected (or loose).	Check the investigation item No. 5.
5	Turn the power OFF, and check the connection of the speed detector cable with a tester. (Especially check the shield wiring.)	The connection is faulty or disconnected.	Replace the detector cable. Correct the connection.
		The waveform is normal.	Replace the spindle drive unit.

III Explanation of Parameters

1. Outline

1.1 Screen Transition Chart

The menus for screens related to maintenance appear when the function key Mainte is pressed.
The parameter menu appears when the menu key Param is pressed.

Process parameters	Control parameters	Axis parameters	Operation parameters	Barrier data
I/O parameters	Ethernet parameters	Computer link parameters	Subprogram storage destination parameters	

User parameters

Machine parameters

Base system parameters	Base axis specification parameters	Base common parameters	Axis specifications parameters	Zero point return parameters
Absolute position parameters	Servo parameters	Spindle specification parameters	Spindle parameters	
Rotary axis configuration parameters	PLC timer	PLC integrated timer	PLC counter	PLC constants
Selecting the PLC bit	Error compensation parameters	Error data	Macro list	Position switches
Auxiliary axis parameters	Open param 1	Open param 2		

(Note) There are user parameter dedicated menus in the screens related to setup. The menu configuration differs slightly from the above configuration. Refer to the Instruction Manual for details.

1.2 Unit

(1) Input setting unit and number of decimal digits

The number of digits in the decimal section of the parameters related to length is determined by the input setting unit.
The input setting unit is set with parameter "#1003 iunit".

Input setting unit	No. of digits in decimal section	Example of setting range
B	3	0 to 999.999 (mm)
C	4	0 to 999.9999 (mm)
D	5	0 to 999.99999 (mm)
E	6	0 to 999.999999 (mm)

The setting ranges indicated in this manual use the input setting unit "B".

2. User Parameters

2.1 Process Parameters

<WRK COUNT> (No. of workpieces machined)

【#8001】 WRK COUNT M

Set the M code for counting the number of the workpiece repeated machining.
The number of the M-codes set by this parameter is counted.
The No. will not be counted when set to "0".

---Setting range---
0 to 99

【#8002】 WRK COUNT

Set the initial value of the number of workpiece machining. The number of current workpiece machining is displayed.

---Setting range---
0 to 999999

【#8003】 WRK COUNT LIMIT

Set the maximum number of workpiece machining.
A signal will be output to PLC when the number of machining times is counted to this limit.

---Setting range---
0 to 999999

<AUTO TLM> (Automatic tool length measurement)

【#8004】 SPEED

Set the feedrate during automatic tool length measurement.

---Setting range---
1 to 1000000 (mm/min)

【#8005】 ZONE r

Set the distance between the measurement point and deceleration start point.

---Setting range---
0 to 99999.999 (mm)

【#8006】 ZONE d

Set the tolerable range of the measurement point.
An alarm will occur when the sensor signal turns ON before the range, set by this parameter, has not been reached from the measurement point, or when the signal does not turn ON after the range is passed.

---Setting range---
0 to 99999.999 (mm)

<AUTO CORNER OVR.> (Automatic corner override)

【#8007】　OVERRIDE

Set the override value for automatic corner override.

---Setting range---
0 to 100 (%)

【#8008】　MAX ANGLE

Set the maximum corner opening angle where deceleration should start automatically.
When the angle is larger than this value, deceleration will not start.

---Setting range---
0 to 180 (°)

【#8009】　DSC. ZONE

Set the position where deceleration starts at the corner.
Designate at which length point before the corner deceleration should start.

---Setting range---
0 to 99999.999 (mm)

<T-TIP OFFSET> (Wear data input)

【#8010】　ABS. MAX.　　　　for L system only

Set the maximum value when inputting the tool wear compensation amount.
A value exceeding this setting value cannot be set.
Absolute value of the input value is set.
(If a negative value is input, it is treated and set as a positive value.)
If "0" is input, this parameter will be disabled.

---Setting range---
0 to 99.999 (mm)
(Input setting increment applies)

【#8011】　INC. MAX.　　　　for L system only

Set the maximum value for when inputting the tool wear compensation amount in the incremental mode.
A value exceeding this setting value cannot be set.
Absolute value of the input value is set.
(If a negative value is input, it is treated and set as a positive value.)
If "0" is input, this parameter will be disabled.

---Setting range---
0 to 99.999 (mm)
(Input setting increment applies)

<FIXED C.> (Fixed cycle)

【#8012】 **G73 n** **for M system only**

    Set the return amount for G73 (step cycle).

    ---Setting range---
    0 to 99999.999 (mm)

【#8013】 **G83 n**

    Set the return amount for G83 (deep hole drilling cycle).

    ---Setting range---
    0 to 99999.999 (mm)

【#8014】 **CDZ-VALE** **for L system only**

    Set the screw cut up amount for G76 and G78 (thread cutting cycle).

    ---Setting range---
    0 to 127 (0.1 lead)

【#8015】 **CDZ-ANGLE** **for L system only**

    Set the screw cut up angle for G76 and G78 (thread cutting cycle).

    ---Setting range---
    0 to 89 (°)

【#8016】 **G71 MINIMUM** **for L system only**

    Set the minimum value of the last cutting amount by the rough cutting cycle (G71, G72).
    The cutting amount of the last cutting will be the remainder. When the remainder is smaller than this parameter setting, the last cycle will not be executed.

    ---Setting range---
    0 to 999.999 (mm)

【#8017】 **G71 DELTA-D** **for L system only**

    Set the change amount of the rough cutting cycle.
    The rough cutting cycle (G71, G72) cutting amount repeats d+Δd, d, d-Δd using the value (d) commanded with D as a reference. Set the change amount Δd.

    ---Setting range---
    0 to 999.999 (mm)

【#8018】 **G84/G74 n** **for M system only**

    Not used. Set to "0".

<PRECISION> (High-accuracy control)

【#8019】 R COMP

Set a compensation coefficient for reducing a control error in the reduction of a corner roundness and arch radius.
The larger the setup value, the smaller the theoretical error will be. However, since the speed at the corner will go down, the cycle time will be extended.
        Coefficient = 100 - setting value
(Note) This is valid when "#8021 COMP CHANGE" is set to "0".

---Setting range---
0 to 99 (%)

Theor R decrease

The value calculated with the following data is displayed for the theoretical radius reduction error amount ΔR (mm).
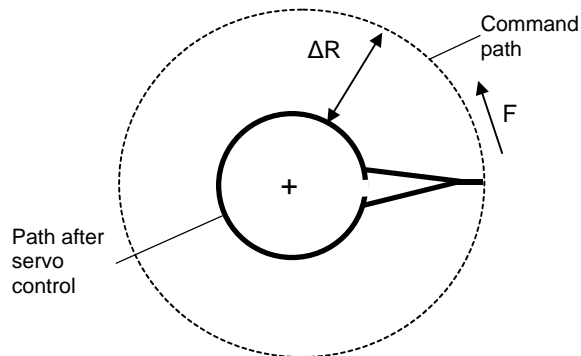
Theoretical radius reduction amount at arc center

【#8020】 DCC. angle

Set up the minimum value of an angle (external angle) that should be assumed to be a corner.
When an inter-block angle (external angle) in high-accuracy mode is larger than the set value, it will be determined as a corner and the speed will go down to sharpen the edge.
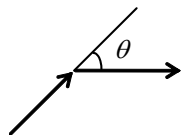
If the set value is smaller than θ, the speed goes down to optimize the corner.

(Note) If "0" is set, it will be handled as 5 degrees.

---Setting range---
0 to 89 (degrees)
0: The angle will be 5°.

【#8021】 COMP_CHANGE

Select whether to share or separate the compensation coefficient at the corner/curve during the high-accuracy control mode.
0: Share ("#8019 R COMP" is applied.)
1: Separate
・ Corner : #8022 CORNER COMP
・ Curve : #8023 CURVE COMP
(Note) Set "1" when using SSS control.

【#8022】 CORNER COMP

> Set the compensation coefficient to further reduce or increase the roundness at the corner during the high-accuracy control mode.
> > Coefficient = 100 - setting value
>
> (Note) This is valid when "#8021 COMP CHANGE" is set to "1".
>
> **---Setting range---**
> -1000 to 99 (%)

【#8023】 CURVE COMP

> Set the compensation coefficient to further reduce or increase the radius reduction amount at the curve (arc, involute, spline) during the high-accuracy control mode.
> > Coefficient = 100 - setting value
>
> (Note) This is valid when "#8021 COMP CHANGE" is set to "1".
> For theoretical radius reduction error amount, refer to "Theor R decrease" in "#8019 R COMP"
>
> **---Setting range---**
> -1000 to 99 (%)

<SPILINE> (High-accuracy spline)

【#8025】 SPLINE ON   for M system only

> Select whether to enable the spline function.
> 0: Disable
> 1: Enable
>
> Spline interpolation is valid during G61.2 modal, regardless of this setting.

【#8026】 CANCEL ANG.   for M system only

> Set the angle where the spline interpolation is temporarily canceled.
> When the angle made by blocks exceeds this parameter setting value, spline interpolation will be canceled temporarily. In consideration of the pick feed, set a value a little smaller than the pick feed angle.
>
> **---Setting range---**
> 0 to 180 (°)
> 0: 180 (°)

【#8027】 Toler-1   for M system only

> Set the maximum chord error (tolerance) in a block that includes an inflection point. Set the tolerance applicable when the applicable block is developed to fine segments by CAM. (normally about 10 μm)
> When "0.000" is set, the applicable block will be linear.
>
> **---Setting range---**
> 0.000 to 100.000 (mm)

【#8028】 Toler-2   for M system only

> Set the maximum chord error (tolerance) in a block that includes no inflection point. Set the tolerance applicable when the applicable block is developed to fine segments by CAM. (normally about 10 μm)
> When "0.000" is set, the applicable block will be linear.
>
> **---Setting range---**
> 0.000 to 100.000 (mm)

【#8029】 FairingL   for M system only

> Set the length of the block subject to fairing.
> (Enabled when "#8033 Fairing ON" is set to "1".)
>
> **---Setting range---**
> 0 to 100.000 (mm)

【#8030】 **MINUTE LENGS   for M system only**

Set the fine-segment length where the spline interpolation is temporarily canceled.
When the length of one block exceeds this parameter setting value, spline interpolation is canceled temporarily and linear interpolation is performed. Set a value a little smaller than one block length of the program.
If "-1" is set, spline interpolation will be performed regardless of block length.

---Setting range---
-1 to 127 (mm)
0: 1 (mm)

<Fairing>

【#8033】 **Fairing ON   for M system only**

Select whether to use the fairing function.
0: Not use
1: Use
Fairing function is enabled during G61.2 modal, regardless of this setting.

【#8034】 **AccClamp ON   for M system only**

Select the method for clamping the cutting speed.
0: Clamp with parameter "#2002 clamp" or the corner deceleration function.
1: Clamp the cutting speed with acceleration judgment.
(Enabled when "#8033 Fairing ON" is set to "1".)

【#8036】 **CordecJudge   for M system only**

Select the condition to decide a corner.
0: A corner is decided from the angle of the neighboring block.
1: A corner is decided from the angle of the neighboring block, excluding minute blocks.
(Enabled when "#8033 Fairing ON" is set to "1".)

【#8037】 **CorJudgeL   for M system only**

Set the length of the block to be excluded when deciding a corner.
(Enabled when "#8036 CordecJudge" is set to "1".)

---Setting range---
0 to 99999.999 (mm)

<C-MODAL> (C axis normal line)

【#8041】 **C-rot.R**

Set the length from the center of the normal line control axis to the tool tip. This is used to calculate the turning speed at the block joint.
This is enabled during the normal line control type II.

---Setting range---
0.000 to 99999.999 (mm)

【#8042】 **C-ins.R**

Set the radius of the arc to be automatically inserted into the corner during normal line control.
This is enabled during the normal line control type I.

---Setting range---
0.000 to 99999.999 (mm)

【#8043】 **Tool HDL FD OFS**

Set the length from the tool holder to the tool tip.

---Setting range---
0.000 to 99999.999 (mm)

【#8044】 UNIT*10

Set the command increment scale.
The scale will be "1" when "0" is set.

---**Setting range**---
0 to 10000 (fold)
0: One fold

<FIXED C.> (Fixed cycle)

【#8051】 G71 THICK

Set the amount of cut-in by the rough cutting cycle (G71, G72)

---**Setting range**---
0 to 99999.999 (mm)

【#8052】 G71 PULL UP

Set the amount of pull-up when returning to the cutting start point for the rough cutting cycle (G71. G72).

---**Setting range**---
0 to 99999.999 (mm)

【#8053】 G73 U

Set the X-axis cutting margin of the forming rough cutting cycle (G73).

---**Setting range**---
-99999.999 to 99999.999 (mm)

【#8054】 G73 W

Set the Z-axis cutting margin of the forming rough cutting cycle (G73).

---**Setting range**---
-99999.999 to 99999.999 (mm)

【#8055】 G73 R

Set how many times cutting will be performed in the forming rough cutting cycle (G73).

---**Setting range**---
0 to 99999 (times)

【#8056】 G74 RETRACT

Set the amount of retract (amount of cut-up) of the cutting-off cycle (G74, G75).

---**Setting range**---
0 to 999.999 (mm)

【#8057】 G76 LAST-D

Set the amount of final cut-in by the compound type thread cutting (G76).

---**Setting range**---
0 to 999.999 (mm)

【#8058】 G76 TIMES

Set how many times the amount of final cut-in cycle (G76 finish margin) will be divided in the compound type thread cutting (G76).

---**Setting range**---
0 to 99 (times)

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【#8059】　G76 ANGLE

Set the angle (thread angle) of the tool nose in the compound type thread cutting (G76).

---Setting range---
0 to 99 (°)

<3-dimensional tool radius compensation>

【#8071】　3-D CMP　　　for M system only

Set the value of the denominator constants for 3-dimensional tool radius compensation.
Set the value of "p" in the following formula.
Vx = i x r/p, Vy = j x r/p, Vz = k x r/p
Vx, Vy, Vz : X, Y, and Z axes or vectors of horizontal axes
i, j, k : Program command value
r : Offset
$p = \sqrt{(i^2 + j^2 + k^2)}$ when the set value is "0".

---Setting range---
0 to 99999.999

<Scaling>

【#8072】　SCALING P　　　for M system only

Set the scale factor for reduction or magnification in the machining program specified by G50 or G51 command.
This parameter will be valid when the program specifies no scale factor.

---Setting range---
-99.999999 to 99.999999

<Spiral interpolation>

【#8075】　SpiralEndErr　　　for M system only

Set the tolerable error range (absolute value) when the end point position, commanded by the spiral or conical interpolation command with the command format type 2, differs from the end point position obtained from the speed and increment/decrement amount.

---Setting range---
0 to 99999.999 (mm)

【#8078】　Screen Saver Timer

Set the period of time before turn-OFF of the display unit backlight.
When "0" is set, the backlight is not turned OFF.

---Setting range---
0 to 60 (min)
0: The backlight is not turned OFF

<Deep hole drilling cycle>

【#8083】　G83S modeM　　　for M system only

Set the M command code for changing to the small diameter deep hole drilling cycle mode.

---Setting range---
1 to 99999999

【#8084】　G83S Clearance　for M system only

Set the clearance amount for the small diameter deep hole drilling cycle (G83).

---Setting range---
0 to 999.999 (mm)

【#8085】　G83S Forward F　for M system only

Set the feedrate from the R point to the cutting start position in the small diameter deep hole drilling cycle (G83).

---Setting range---
0 to 99999 (mm/min)

【#8086】　G83S Back F　　for M system only

Set the speed for returning from the hole bottom during the small diameter deep hole drilling cycle (G83).

---Setting range---
0 to 99999 (mm/min)

<SSS control>

【#8090】　SSS ON　　　　for M system only

Set whether to enable the SSS control with G05 P10000.
0: Disable
1: Enable

【#8091】　StdLength　　　for M system only

Set the maximum value of the range for recognizing the shape.
To eliminate the effect of steps or errors, etc., set a large value. To enable sufficient deceleration, set a small value.
If "0.000" is set, the standard value (1.000mm) will be applied.

---Setting range---
0 to 100.000 (mm)

【#8092】　ClampCoeff　　for M system only

Set the clamp speed at the curved section configured of fine segments.
Coefficient = √setting value

---Setting range---
1 to 100

【#8093】　StepLeng　　　for M system only

Set the width of the step at which the speed is not to be decelerated. (Approximately the same as the CAM path difference [Tolerance].)
If "0" is set, the standard value (5μm) will be applied.
If a minus value is set, the speed will decelerate at all minute steps.

---Setting range---
-1.000 to 0.100 (mm)

【#8094】　DccWaitAdd　　for M system only

Set the time to wait for deceleration when the speed FB does not drop to the clamp speed.

---Setting range---
0 to 100 (ms)

<Coord rotation>

【#8621】 Coord rot plane (H)

Set the plane (horizontal axis) for coordinate rotation control.
Usually, set the name of the 1st axis.
When not set, "X" axis will be set.

---Setting range---
Axis name

【#8622】 Coord rot plane (V)

Set the plane (vertical axis) for coordinate rotation control.
Usually, set the name of the 2nd axis.
When not set, "Y" axis will be set.

---Setting range---
Axis name

【#8623】 Coord rot centr (H)

Set the center coordinates (horizontal axis) for coordinate rotation control.

---Setting range---
-999999.999 to 999999.999 (mm)

【#8624】 Coord rot centr (V)

Set the center coordinates (vertical axis) for coordinate rotation control.

---Setting range---
-999999.999 to 999999.999 (mm)

【#8625】 Coord rot vctr (H)

Set the vector components (horizontal axis) for coordinate rotation control.
When this parameter is set, the coordinate rotation control angle (#8627) will be automatically calculated.

---Setting range---
-999999.999 to 999999.999 (mm)

【#8626】 Coord rot vctr (V)

Set the vector components (vertical axis) for coordinate rotation control.
When this parameter is set, the coordinate rotation control angle (#8627) will be automatically calculated.

---Setting range---
-999999.999 to 999999.999 (mm)

【#8627】 Coord rot angle

Set the rotation angle for coordinate rotation control.
When this parameter is set, the coordinate rotation vector (#8625, #8626) will be "0".

---Setting range---
-360.000 to 360.000 (°)

<TLM>

【#8701】 **Tool length**

Set the length to the touch tool tip.

---Setting range---
±99999.999 (mm)

【#8702】 **Tool Dia**

Set the diameter of the sphere at the touch tool tip.

---Setting range---
±99999.999 (mm)

【#8703】 **OFFSET X**

This sets the deviation amount (X direction) from the touch tool center to the spindle center.

---Setting range---
±99999.999 (mm)

【#8704】 **OFFSET Y**

Set the deviation amount (Y direction) from the touch tool center to the spindle center.

---Setting range---
±99999.999 (mm)

【#8705】 **RETURN**

Set the one-time return distance for contacting again.

---Setting range---
0 to 99999.999 (mm)

【#8706】 **FEED**

Set the feedrate when contacting again.

---Setting range---
1 to 60000 (mm/min)

【#8707】 **Skip past amout (H)**

Set the difference (horizontal axis direction) between the skip read value and actual skip position.

---Setting range---
±99999.999 (mm)

【#8708】 **Skip past amout (V)**

Set the difference (vertical axis direction) between the skip read value and actual skip position.

---Setting range---
±99999.999 (mm)

【#8709】 **EXT work sign rvs**

Select when using the external workpiece coordinate system with Z shift.
Select whether to reverse the sign.
0: External workpiece offset (Z shift) without sign reversal
1: External workpiece offset (Z shift) with sign reversal

【#8710】 **EXT work ofs invld**

Set whether to enable external workpiece offset subtraction when setting the workpiece coordinate offset.
0: Not subtract the external workpiece offset. (Conventional specification)
1: Subtract the external workpiece offset.

【#8711】　**TLM L meas axis**

Set the tool length measurement axis.
Set the "#1022 axname2" axis name.

---**Setting range**---
Axis name
(Note) If the axis name is illegal or not set, the 3rd axis name will be set as default.

【#8712】　**TLM D meas axis**

Set the tool diameter measurement axis.
Set the "#1022 axname2" axis name.

---**Setting range**---
Axis name
(Note) If the axis name is illegal or not set, the 1st axis name will be set as default.

【#19001】　**Syn.tap(,S)cancel**

0: Retain the spindle speed (,S) in synchronous tap return
1: Cancel the spindle speed (,S) in synchronous tap return with G80

【#19002】　**Zero-point mark**

Select the position for displaying the zero point mark in the graphic trace and 2D check.
0: Machine coordinates zero point (same as conventional method)
1: Workpiece coordinate zero point

【#19003】　**PRG coord rot type**

Select the start point of the initial travel command after G68 command.
0: Calculate the end position using the current position on the local coordinate system before rotating, without rotating the start point in accordance with the coordinates rotation.
1: Calculate the end position, assuming that the start point rotates in accordance with the coordinates rotation.

\<Surface speed control\>

【#19425】　**ManualB Std R1**

Set a radius used as standard for the rotary axis speed.
When the setting value of #19425 is larger than that of "#19427 ManualB Std R2", #19425 setting will be used as surface speed control standard radius 2: #19427 setting will be used as surface speed control standard radius 1.

---Setting range---
0 to 99999.999 (mm)

【#19426】　**ManualB Std F1**

This sets the rotary axis speed for surface speed control standard radius 1 (ManualB Std R1).
When the setting value of #19426 is larger than that of "#19428 ManualB Std F2", #19426 setting will be used as surface speed control standard speed 2: #19427 setting will be used as surface speed control standard speed 1.

---Setting range---
1 to 1000000 (°/min)

【#19427】　**ManualB Std R2**

Set a radius used as standard for the rotary axis speed.
When the same value is set as "#19425 ManualB Std R1", the surface speed control standard speed 1 (ManualB Std F1) will be selected as the rotary axis speed if the radius is less than that value. The surface speed control standard speed 2 (ManualB Std F2) is selected if larger than the set value.

---Setting range---
0 to 99999.999 (mm)

【#19428】　**ManualB Std F2**

Set the rotary axis speed for surface speed control standard radius 2 (ManualB Std R2).

---Setting range---
1 to 1000000 (°/min)

2.2 Control Parameters

【#8101】　MACRO SINGLE

Select how to control the blocks where the user macro command continues.
0: Do not stop while macro blocks continue.
1: Stop every block during signal block operation.

【#8102】　COLL. ALM OFF

Select the interference (bite) control to the workpiece from the tool diameter during tool radius compensation and nose R compensation.
0: An alarm will be output and operation stops when an interference is judged.
1: Changes the path to avoid interference.

【#8103】　COLL. CHK OFF

Select the interference (bite) control to the workpiece from the tool diameter during tool radius compensation and nose R compensation.
0: Performs interference check.
1: Does not perform interference check.

【#8105】　EDIT LOCK B

Select the edit lock for program Nos. 8000 to 9999 in the memory.
0: Enable the editing.
1: Prohibit the editing of above programs.

When "1" is set, the file cannot be opened.

【#8106】　G46 NO REV-ERR　　　　for L system only

Select the control for the compensation direction reversal in G46 (nose R compensation).
0: An alarm will be output and operation will stop when the compensation direction is reversed (G41 -> G42' G42 -> G41).
1: An alarm won't occur when the compensation direction is reversed, and the current compensation direction will be maintained.

【#8107】　R COMPENSATION

Select whether to move to the inside because of a delay in servo response to a command during arc cutting mode.
0: Move to the inside, making the arc smaller than the command value.
1: Compensate the movement to the inside.

【#8108】　R COMP Select

Select the arc radius error compensation target.
0: Perform compensation over all axes.
1: Perform compensation axis by axis.

(Note) This parameter is effective only when "#8107 R COMPENSATION" is "1".

【#8109】　HOST LINK

Select whether to enable computer link B instead of the RS-232C port.
0: Disable (Enable normal RS-232C communication.)
1: Enable (Disable normal RS-232C communication.)

【#8110】　**G71/G72 POCKET**

Select whether to enable the pocket machining when there is a dimple (pocket) in the rough cutting cycle (G71, G72) finishing program.
0: OFF
1: ON

【#8111】　**Milling Radius**

Select the diameter and radius of the linear axis for milling (cylindrical/pole coordinate) interpolation.
0: All axes radius command
1: Each axis setting (follows "#1019 dia")
(Note) This parameter is valid only in the milling (cylindrical/polar coordinate) interpolation mode.

【#8112】　**DECIMAL PNT-P**

Select whether to enable the decimal point command for G04 address P.
0: Disable
1: Enable

【#8113】　**Milling Init G16**

Set which plane to execute for milling machining after the power is turned ON or reset.

#8113	#8114	Plane
0	0	G17 plane
0	1	G19 plane
1	0	G16 plane
1	1	

0: Not G16 plane
1: G16 plane
(Note) This parameter is valid for the G code system 2 or 3 ("#1037 cmdtyp"="3" or "4").

【#8114】　**Milling Init G19**

Set which plane to execute for milling machining after the power is turned ON or reset.

#8113	#8114	Plane
0	0	G17 plane
0	1	G19 plane
1	0	G16 plane
1	1	

0: Not G19 plane
1: G19 plane

(Note) This parameter is valid for the G code system 2 or 3 ("#1037 cmdtyp"="3" or "4").

【#8116】　**Coord rot para invd**

Select whether to enable the coordinate rotation by the parameters.
0: Enable
1: Disable

【#8117】　**OFS Diam DESIGN**

Select tool radius or tool diameter compensation amount to be specified.
0: Tool radius compensation amount
1: Tool diameter compensation amount

【#8119】　**Comp. unit switch**

Select the setting unit of compensation amount that has no decimal point.
0: 1mm (or 1inch) unit
1: The minimum command unit (follows "#1003 iunit")

【#8121】 Screen Capture

Select whether to enable the screen capture function.
0: Disable
1: Enable

(Note1) By setting this parameter to "1", and by keeping pushing the [SHIFT] key, screen capture will be executed.
(Note2) This parameter is valid only with M70 Series.

【#8122】 Keep G43 MDL M-REF

Select whether to keep the tool length offset by high speed manual reference position return during tool length offset.
0: Will not be kept (Cancel)
1: Kept

【#8124】 Mirr img at reset

Select the operation type of the mirror image by parameter setting and the mirror image by external input.
0: The current mirror image is canceled, and new mirror image will start with the machine position at reset as the mirror center.
1: The mirror center is kept to continue the mirror image.

【#8145】 Validate F1 digit

Select whether to execute the F command with a 1-digit code command or with a direct numerical command.
0: Direct numerical command (command feedrate during feed per minute or rotation)
1: 1-digit code command (with the feedrate specified by the parameters "#1185 spd_F1" to "#1189 F5")

【#8154(PR)】

Not used. Set to "0".

【#8155】 Sub-pro interrupt

Select the method for the user macro interrupt.
0: The user macro interrupt of macro type
1: The user macro interrupt of sub-program type

【#8156】 Fine thread cut E

Select the address E type when cutting an inch screw.
0: Specify the number of threads per inch for inch screw cutting.
1: Specify the precision lead for inch screw cutting.

【#8157】 **Radius comp type B (M system) / Nose R comp type B (L system)**

For M system

Select the method of the arithmetic processing for the intersection point when the start-up or cancel commands are operated during radius compensation.

0: The processing does not handle the start-up or cancel command block: handle the offset vector in the direction vertical to that of the command instead.

1: The processing is executed for the intersection point between the command block and the next block.

For L system

Select the method of the arithmetic processing for the intersection point when the start-up or cancel commands are operated during nose R or radius compensation.

0: The processing does not handle the start-up or cancel command block: handle the offset vector in the direction vertical to that of the command instead.

1: The processing is executed for the intersection point between the command block and the next block.

【#8158】 **Init const sur spd**

Select the initial state after power-ON.

0: Constant surface speed control cancel mode.

1: Constant surface speed control mode.

【#8159】 **Synchronous tap**

Select whether to use the floating tap chuck in G74 and G84 tap cycles.

0: With a floating tapping chuck

1: Without a floating tapping chuck

【#8160】 **Start point alarm**

Select an operation when the operation start point cannot be found while moving to the next block of G117.

0: The auxiliary function is enabled after the block for the movement has finished.

1: The program error (P33) occurs.

2.3 Axis Parameters

【#8201】 AX. RELEASE

Select the function to remove the control axis from the control target.
0: Control as normal.
1: Remove from control target.

【#8202】 OT-CHECK OFF

Select whether to enable the stored stroke limit II function set in #8204 and #8205.
0: Enable
1: Disable

【#8203】 OT-CHECK-CANCEL

When the simple absolute position method ("#2049 type" is "9") is selected, the stored stroke limits I, II (or IIB) and IB can be disabled until the first reference position return is executed after the power is turned ON.
0: Enable (according to #8202)
1: Temporarily cancel
(Note) "#8203 OT-CHECK-CANCEL" affects all the stored stroke limits.

【#8204】 OT-CHECK-N

Set the coordinates of the (-) direction in the movable range of the stored stroke limit II or the lower limit coordinates of the prohibited range of stored stroke limit IIB.
If the sign and value are the same as #8205, the stored stroke limit II (or IIB) will be invalid.
If the stored stroke limit IIB function is selected, the prohibited range will be between two points even when #8204 and #8205 are set in reverse.
When II is selected, the entire range will be prohibited if #8204 and #8205 are set in reverse.

---Setting range---
±99999.999 (mm)

【#8205】 OT-CHECK-P

Set the coordinates of the (+) direction in the movable range of the stored stroke limit II or the upper limit coordinates of the prohibited range of stored stroke limit IIB.

---Setting range---
±99999.999 (mm)

【#8206】 TOOL CHG. P

Set the coordinates of the tool change position for G30. n (tool change position return).
Set with coordinates in the basic machine coordinate system.

---Setting range---
±99999.999 (mm)

【#8207】 G76/87 IGNR   for M system only

Select whether to enable the shift operation at G76 (fine boring) and G87 (back boring).
0: Enable
1: Disable

【#8208】 G76/87 (-)   for M system only

Select the shift direction at G76 and G87.
0: Shift to (+) direction
1: Shift to (-) direction

【#8209】 G60 SHIFT   for M system only

Set the last positioning direction and distance for a G60 (unidirectional positioning) command.

---Setting range---
±99999.999 (mm)

【#8210】 OT INSIDE

Select whether the stored stoke limit function set by #8204 and #8205 prevents the machine from moving to the inside or outside of the specified range.
0: Inhibits outside area (Select stored stroke limit II.)
1: Inhibits inside area (Select stored stroke limit II B.)

【#8211】 MIRR. IMAGE

Select whether to enable the parameter mirror image function.
0: Disable
1: Enable

【#8213(PR)】 Rotation axis type

Select the rotation type (short-cut valid/invalid) or linear type (workpiece coordinate linear type/all coordinate linear type).
This parameter is enabled only when "#1017 rot" is set to "1". (Note)
0: Short-cut invalid
1: Short-cut valid
2: Workpiece coordinate linear type
3: All coordinate linear type

(Note) The movement method is as follows by the specified rotation axis type.

Setting value	0	1	2	3
Workpiece coordinate value	Display range: 0° to 359.999°		Display range: 0° to ±99999.999°	
Machine coordinate value/relative position	Display range: 0° to 359.999°			Display range: 0° to ±99999.999°
ABS command	The incremental amount from the end point to the current position is divided by 360, and the axis moves by the remainder amount according to the sign.	Moves with a short-cut to the end point.	In the same manner as the normal linear axis, moves according to the sign by the amount obtained by subtracting the current position from the end point.	
INC command	Moves in the direction of the commanded sign by the commanded incremental amount starting at the current position.			
Reference position return	The movement to the middle point applies to the ABS command or the INC command.			
	Returns with movement within 360 degrees from the middle point to reference position.			Moves and returns in the reference position direction for the difference from the current position to the reference position.

【#8215】 TLM standard length

Set the TLM standard length.
TLM standard length is the distance from a tool replacement point (reference position) to the measurement basic point (surface) which is used to measure the tool length.

---Setting range---
-99999.999 to 99999.999 (mm)

【#8216】　Type in G28 return

Select the performance after establishing the reference position in reference position return command.
0: Moves to the reference position.
1: Won't move to the reference position.

【#8217】　Check start point

Set a drawing start position in graphic check of each axis.

---Setting range---
-99999.999 to 99999.999 (mm)

2.4 Operation Parameters

【#8901】 Counter type 1

Set the type of counter displayed at the upper left of the AUTO/MDI display on the Monitor screen.
1: Current position
 2: Work coordinate position
 3: Machine position
 4: Program position
 8: Remain command
 9: Manual interrupt amount
10: Next command
11: Restart position
12: Remain distance
16: Tip work coordinate position
18: Tool axis movement
19: Tip machine position
20: Relative position

---Setting range---
0 to 255

【#8902】 Counter type 2

Set the type of counter displayed at the lower left of the AUTO/MDI display on the Monitor screen.
1: Current position
 2: Work coordinate position
 3: Machine position
 4: Program position
 8: Remain command
 9: Manual interrupt amount
10: Next command
11: Restart position
12: Remain distance
16: Tip work coordinate position
18: Tool axis movement
19: Tip machine position
20: Relative position

---Setting range---
0 to 255

【#8903】 Counter type 3

Set the type of counter displayed at the upper right of the AUTO/MDI display on the Monitor screen.
1: Current position
 2: Work coordinate position
 3: Machine position
 4: Program position
 8: Remain command
 9: Manual interrupt amount
10: Next command
11: Restart position
12: Remain distance
16: Tip work coordinate position
18: Tool axis movement
19: Tip machine position
20: Relative position

---Setting range---
0 to 255

【#8904】　Counter type 4

Set the type of counter displayed at the lower right of the AUTO/MDI display on the Monitor screen.
1: Current position
 2: Work coordinate position
 3: Machine position
 4: Program position
 8: Remain command
 9: Manual interrupt amount
10: Next command
11: Restart position
12: Remain distance
16: Tip work coordinate position
18: Tool axis movement
19: Tip machine position
20: Relative position

---Setting range---
0 to 255

【#8905】　Counter type 5

Set the type of counter displayed at the left of the Manual display on the Monitor screen.
1: Current position
 2: Work coordinate position
 3: Machine position
 4: Program position
 8: Remain command
 9: Manual interrupt amount
10: Next command
11: Restart position
12: Remain distance
16: Tip work coordinate position
18: Tool axis movement
19: Tip machine position
20: Relative position

---Setting range---
0 to 255

【#8906】　Counter type 6

Set the type of counter displayed at the right of the Manual display on the Monitor screen.
1: Current position
 2: Work coordinate position
 3: Machine position
 4: Program position
 8: Remain command
 9: Manual interrupt amount
10: Next command
11: Restart position
12: Remain distance
16: Tip work coordinate position
18: Tool axis movement
19: Tip machine position
20: Relative position

---Setting range---
0 to 255

【#8910】　Edit undo

Set whether to enable the Undo function during program edit on the Monitor screen or Edit screen.
0: Disable
1: Enable

【#8914】 **Auto Top search**

Select the operation method for restart search type 2.
0: It is necessary to set the top search position arbitrarily.
1: The restart search is executed from O No. that is designated as head.

【#8915】 **Auto backup day 1**

When the NC power is ON after the designated date was passed over, the automatic backup is executed.
When "-1" is set to "Auto backup day 1", the automatic backup is executed every turning NC power ON.
When "0" is set to all on "Auto backup day 1" to "4", the automatic backup is not executed. It is possible to specify the designated date up to 4 days for a month.

---Setting range---
-1 to 31
("-1" can be set for "Auto backup day 1" only.)

【#8916】 **Auto backup day 2**

When the NC power is ON after the designated date was passed over, the automatic backup is executed.
When "-1" is set to "Auto backup day 1", the automatic backup is executed every turning NC power ON.
When "0" is set to all on "Auto backup day 1" to "4", the automatic backup is not executed. It is possible to specify the designated date up to 4 days for a month.

---Setting range---
-1 to 31
("-1" can be set for "Auto backup day 1" only.)

【#8917】 **Auto backup day 3**

When the NC power is ON after the designated date was passed over, the automatic backup is executed.
When "-1" is set to "Auto backup day 1", the automatic backup is executed every turning NC power ON.
When "0" is set to all on "Auto backup day 1" to "4", the automatic backup is not executed. It is possible to specify the designated date up to 4 days for a month.

---Setting range---
-1 to 31
("-1" can be set for "Auto backup day 1" only.)

【#8918】 **Auto backup day 4**

When the NC power is ON after the designated date was passed over, the automatic backup is executed.
When "-1" is set to "Auto backup day 1", the automatic backup is executed every turning NC power ON.
When "0" is set to all on "Auto backup day 1" to "4", the automatic backup is not executed. It is possible to specify the designated date up to 4 days for a month.

---Setting range---
-1 to 31
("-1" can be set for "Auto backup day 1" only.)

【#8919】 **Auto backup device**

Select the automatic backup target device.
*The setting range differs according to the model.

---Setting range---
[M700 Series]
0: DS
1: HD
2: Memory card

[M70 Series]
0: Memory card

【#8920】 **3D tool ofs select**

Select the method to calculate the drawing position when drawing a solid.
With 3D drawing, the drawing position (tool tip position) is calculated with the method designated with this parameter, and the image is drawn.
0: Machine position ± tool shape setting window data
1: Machine position ± tool compensation amount
2: Machine position ± tool shape setting window data
3: Machine position ± tool shape setting window data

【#8921】 **Mass Edit select**

Select the editing mode for the machining programs saved in HD, FD, and memory card.
When the program size is 1.0MB (When "#8910 Edit Undo" is invalid, 2.0MB) or more, mass-editing will be applied.
0: Regular editing mode
1: Mass-editing mode

【#8922】 **T-reg-dup check**

Set whether to enable the duplication check in registering tools to magazine pots, and in setting tool Nos. for spindle/standby.
0: Duplication check valid for all valid magazines
1: Duplication check invalid
2: Duplication check valid only for the selected magazine

【#8923(PR)】 **Hide Edit-IO menu**

Set whether to enable the edit-in/out menu.
When disabled, the edit-input/output menu won't appear.
However, the maintenance-in/out menu is always enabled regardless of this parameter setting.
0: Enable
1: Disable

【#8924】 **MEAS. CONFIRM MSG**

Select whether to display a confirming message when attempting to write compensation data for tool measurement, or coordinate system data for workpiece measurement.
0: Not display a confirming message
1: Display a confirming message

【#8925】 **SP on 1st part sys**

Set a spindle No. to be displayed on the 1st part system window when 2-part system simultaneous display is valid.
High-order: Select an upper side spindle No.
Low-order: Select a lower side spindle No.
(Note 1) When "00" is set, spindles will be displayed in a default order (the 1st spindle on the upper side, the 2nd spindle on the lower side)
(Note 2) If you designate a bigger number than the setting of "#1039 spinno", or either the high-order or low-order setting is "0", the 1st spindle will be displayed.

---Setting range---
High-order: 0 to 6
Low-order: 0 to 6

【#8926】   SP on 2nd part sys

Set a spindle No. to be displayed on the 2nd part system window when 2-part system simultaneous display is valid.
High-order: Select an upper side spindle No.
Low-order: Select a lower side spindle No.
(Note 1) When "00" is set, spindles will be displayed in a default order (the 1st spindle on the upper side, the 2nd spindle on the lower side)
(Note 2) If you designate a bigger number than the setting of "#1039 spinno", or either the high-order or low-order setting is "0", the 1st spindle will be displayed.

---Setting range---
High-order: 0 to 6
Low-order: 0 to 6

【#8927】   SP on 3rd part sys

Set a spindle No. to be displayed on the 3rd part system window when 2-part system simultaneous display is valid.
High-order: Select an upper side spindle No.
Low-order: Select a lower side spindle No.
(Note 1) When "00" is set, spindles will be displayed in a default order (the 1st spindle on the upper side, the 2nd spindle on the lower side)
(Note 2) If you designate a bigger number than the setting of "#1039 spinno", or either the high-order or low-order setting is "0", the 1st spindle will be displayed.

---Setting range---
High-order: 0 to 6
Low-order: 0 to 6

【#8928】   SP on 4th part sys

Set a spindle No. to be displayed on the 4th part system window when 2-part system simultaneous display is valid.
High-order: Select an upper side spindle No.
Low-order: Select a lower side spindle No.
(Note 1) When "00" is set, spindles will be displayed in a default order (the 1st spindle on the upper side, the 2nd spindle on the lower side)
(Note 2) If you designate a bigger number than the setting of "#1039 spinno", or either the high-order or low-order setting is "0", the 1st spindle will be displayed.

---Setting range---
High-order: 0 to 6
Low-order: 0 to 6

2.5 Barrier Data (For L system only)

【#8300】 P0

Set the reference X-coordinates of the chuck and the tail stock barrier.
Set the center coordinate (radius value) of workpiece by the basic machine coordinate system.

---Setting range---
±99999.999 (mm)

【#8301】 P1

Set the area of the chuck and tail stock barrier.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8302】 P2

Set the area of the chuck and tail stock barrier.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8303】 P3

Set the area of the chuck and tail stock barrier.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8304】 P4

Set the area of the chuck and tail stock barrier.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8305】 P5

Set the area of the chuck and tail stock barrier.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8306】 P6

Set the area of the chuck and tail stock barrier.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8310】 Barrier ON

Select whether to enable the chuck and tailstock barrier.
0: Disable (Setting from special display unit will be enabled)
1: Enable

【#8311】 P7

Set the area of the left spindle section.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8312】 P8

Set the area of the left spindle section.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8313】 P9

Set the area of the right spindle section.
X axis: Set the coordinate from the workpiece center (P0). (radius value)
Z axis: Set the coordinates in the basic machine coordinate system.

---Setting range---
±99999.999 (mm)

【#8314】 P10

Set the area of the right spindle section.
Set the coordinate from the center of workpiece (P0) for X-axis. (radius value)
Set the coordinate value by basic machine coordinate system for Z-axis.

---Setting range---
±99999.999 (mm)

【#8315】 Barrier Type (L)

Select the shape of the left chuck and tailstock barrier.
0: No area
1: Chuck
2: Tailstock

【#8316】 Barrier Type (R)

Select the shape of the right chuck and tailstock barrier.
0: No area
1: Chuck
2: Tailstock

【#8317】 ELIV. AX. Name

Set the name of the delivery axis when the right chuck and tailstock barrier is movable.
When using the multi-part system method and the delivery axis is an axis in the other part system, designate the axis including the part system as 1A, 1B or 2A, 2B. If the part system is not designated as A and B, the set part system will be used.

---Setting range---
A/B/.. (axis name)
1A/1B/..
2A/2B/.. (with part system designated)
0: Cancel

【#8318】 Stock Angle (L)

Set the angle for the left tailstock end section.
The angle will be interpreted as 90° if there is no setting (when "0" is set).

---Setting range---
0 to 180 (°)
0: 90° (default)

【#8319】　**Stock Angle (R)**

Set the angle for the right tailstock end section.
The angle will be interpreted as 90° if there is no setting (when "0" is set).

---Setting range---
0 to 180 (°)
0: 90° (default)

2.6 I/O Parameters

There are basically two types of input/output parameters which must be set when inputting, outputting or referring to data, or when performing tape operation.

9001 to 9018 parameters:
Set which channel to connect which device to for each I/O application.

9101 to 9528 parameters:
Set the transmission speed, etc., for each input/output device.
Up to five types of input/output device parameters can be set in device 0 to 4.

【#9001】　DATA IN PORT No.

Select the port for inputting the data such as machine program and parameters.
1: ch1
2: ch2

【#9002】　DATA IN DEV. No.

Select the device No. for inputting the data.
(The device Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9003】　DATA OUT PORT No.

Select the port for outputting the data such as machine program and parameters.
1: ch1
2: ch2

【#9004】　DATA OUT DEV. No.

Select the device No. for outputting the data.
(The device Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9005】　TAPE MODE PORT No.

Select the input port for running with the tape mode.
1: ch1
2: ch2

【#9006】　TAPE MODE DEV. No.

Select the device No. to be run with the tape mode.
(The device Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9007】　MACRO PRINT PORT No.

Select the output port used for the user macro DPRINT command.
1: ch1
2: ch2

【#9008】　MACRO PRINT DEV. No.

Select the device No. used for the DPRINT command.
(The device Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9009】 PLC IN/OUT PORT No.

Select the port for inputting/outputting various data with PLC.
1: ch1
2: ch2

【#9010】 PLC IN/OUT DEV. No.

Select the device No. used for the PLC input/output.
(The device Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9011】 REMOTE PRG IN PORT No.

Select the port for inputting remote programs.
1: ch1
2: ch2

【#9012】 REMOTE PRG IN DEV. No.

Select the device No. used to input remote programs.
The device Nos. correspond to the input/output device parameters.

---Setting range---
0 to 4

【#9013】 EXT UNIT PORT No.

Select the port for communication with an external unit.
1: ch1
2: ch2

【#9014】 EXT UNIT DEV. No.

Select the unit No. used for communication with an external unit
(The unit Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9017】 HANDY TERMINAL PORT No.

Select the port for communication with a handy terminal.
1: ch1
2: ch2

【#9018】 HANDY TERMINAL DEV. No.

Select the device No. used for communication with a handy terminal.
(The device Nos. correspond to the input/output device parameters.)

---Setting range---
0 to 4

【#9051】 Data I/O port

Select whether to use display side serial port or NC side serial port for data input/output function.
0: Display side serial port
1: Display side serial port
2: NC side serial port

(Note) The setting range differs according to the model.

【#9052】 Tape mode port

Select whether to use display side serial port or NC side serial port for tape mode.
0: NC side serial port
1: Display side serial port
2: NC side serial port

(Note) The setting range differs according to the model.

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【#9101】　**DEV0 DEVICE NAME**

Set the device name corresponding to the device No.
Set a simple name for quick identification.

---Setting range---
Use alphabet characters, numerals and symbols to set a name within 3 characters.

【#9102】　**DEV0 BAUD RATE**

Select the serial communication speed.
0: 19200 (bps)
1: 9600
2: 4800
3: 2400
4: 1200
5: 600
6: 300
7: 110

【#9103】　**DEV0 STOP BIT**

Select the stop bit length used in the start-stop system.
Refer to "#9104 DEV0 PARITY CHECK". At the output of data, the number of characters is always adjusted for the parity check.
1: 1 (bit)
2: 1.5
3: 2

【#9104】　**DEV0 PARITY CHECK**

Select whether to add the parity check bit to the data.
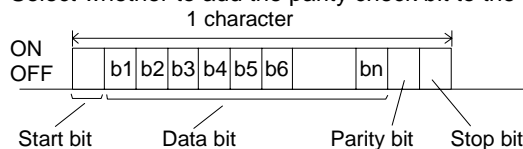
Set this parameter in accordance with the I/O device specifications.
0: Not add a parity bit in I/O mode
1: Add a parity bit in I/O mode

【#9105】　**DEV0 EVEN PARITY**

Select odd or even when parity is added to the data. This parameter is ignored when no parity is added.

0: Odd parity
1: Even parity

【#9106】　**DEV0 CHR. LENGTH**

Set the length of the data bit.
Refer to "#9104 DEV0 PARITY CHECK".
0: 5 (bit)
1: 6
2: 7 (NC connection not supported)
3: 8

【#9107】　**DEV0 TERMINATR TYP**

Select the code to terminate data reading.
0, 3: EOR
1, 2: EOB or EOR

【#9108】 **DEV0 HAND SHAKE**

Select the transmission control method.
No handshaking will be used when a value except 1 to 3 is set.
1: RTS/CTS method
2: No handshaking
3: DC code method

【#9109】 **DEV0 DC CODE PRTY**

Select the DC code type when the DC code method is selected.
0: Not add parity to DC code (DC3 = 13H)
1: Add parity to DC code (DC3 = 93H)

【#9111】 **DEV0 DC2/4 OUTPUT**

Select the DC code handling when outputting data to the output device.

---Setting range---
DC2 / DC4
0: None / None
1: Yes / None
2: None / Yes
3: Yes / Yes

【#9112】 **DEV0 CR OUTPUT**

Select whether to add the (CR) code just before the EOB (L/F) code during output.
0: Not add
1: Add

【#9113】 **DEV0 EIA OUTPUT**

Select ISO or EIA code for data output.
In data input mode, the ISO and EIA codes are identified automatically.
0: ISO code output
1: EIA code output

【#9114】 **DEV0 FEED CHR.**

Set the length of the tape feed to be output at the start and end of the data during tape output.

---Setting range---
0 to 999 (characters)

【#9115】 **DEV0 PARITY V**

Select whether to perform the parity check for the number of characters in a block at the input of
data.
At the output of data, the number of characters is always adjusted to for the parity check.
0: Not perform parity V check
1: Perform parity V check

【#9116】 **DEV0 TIME-OUT (sec)**

Set the time out time to detect an interruption in communication.
Time out check will not be executed when set to "0".

---Setting range---
0 to 30 (s)

【#9117】 **DEV0 DR OFF**

Select whether to enable the DR data check in data I/O mode.
0: Enable
1: Disable

【#9118】 DEV0 DATA ASCII

Select the code of the output data.
0: ISO/EIA code
(Depends on whether #9113, #9213, #9313, #9413 or #9513 EIA output parameter is set up.)
1: ASCII code

【#9119】 DEV0 INPUT TYPE

Select the mode for input (verification).
0: Standard input (Data from the very first EOB is handled as significant information.)
1: EOBs following the first EOB of the input data are skipped until data other than EOB is input

【#9121】 DEV0 EIA CODE [

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "
[".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9122】 DEV0 EIA CODE]

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"] ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9123】 DEV0 EIA CODE #

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"#".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9124】 DEV0 EIA CODE *

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"*".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9125】 DEV0 EIA CODE =

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"=".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9126】 DEV0 EIA CODE :

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
" : ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

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【#9127】 **DEV0 EIA CODE $**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "$".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9128】 **DEV0 EIA CODE !**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "!".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

---Setting range---
0 to FF (hexadecimal)

【#9201】 **DEV1 DEVICE NAME**

Set the device name corresponding to the device No.
Set a simple name for quick identification.

<Setting range>
Use alphabet characters, numerals and symbols to set a name within 3 characters.

【#9202】 **DEV1 BAUD RATE**

Select the serial communication speed.
0: 19200 (bps)
1: 9600
2: 4800
3: 2400
4: 1200
5: 600
6: 300
7: 110

【#9203】 **DEV1 STOP BIT**

Select the stop bit length used in the start-stop system.
Refer to "#9204 DEV1 PARITY CHECK". At the output of data, the number of characters is always adjusted to for the parity check.
<Setting range>
1: 1 (bit)
2: 1.5
3: 2

【#9204】 **DEV1 PARITY CHECK**

Select whether to add a parity check bit to the data.
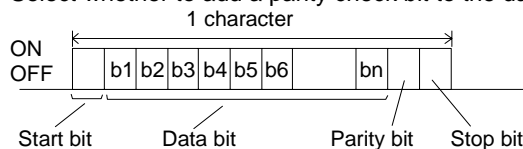
Set this parameter in accordance with the I/O device specifications.
0: Not add a parity bit in I/O mode
1: Add a parity bit in I/O mode

【#9205】 **DEV1 EVEN PARITY**

Select whether even or odd parity will be used when parity is used. This parameter is ignored when no parity is added.
0: Odd parity
1: Even parity

【#9206】   **DEV1 CHR. LENGTH**

Select the length of the data bit.
Refer to "#9204 DEV1 PARITY CHECK".
<Setting range>
0: 5 (bit)
1: 6
2: 7 (NC connection not supported)
3: 8

【#9207】   **DEV1 TERMINATR TYP**

Select the code to terminate data reading.
0,3: EOR
1,2: EOB or EOR

【#9208】   **DEV1 HAND SHAKE**

Select the transmission control method.
No handshaking will be used when a value except 1 to 3 is set.
1: RTS/CTS method
2: No handshaking
3: DC code method

【#9209】   **DEV1 DC CODE PRTY**

Select the DC code type when the DC code method is selected.
0: Not add parity to DC code (DC3 = 13H)
1: Add parity to DC code (DC3 = 93H)

【#9211】   **DEV1 DC2/4 OUTPUT**

Select the DC code handling when outputting data to the output device.

<Setting range>
DC2 / DC4
0: None / None
1: Yes / None
2: None / Yes
3: Yes / Yes

【#9212】   **DEV1 CR OUTPUT**

Select whether to add the (CR) code just before the EOB (L/F) code during output.
0: Not add
1: Add

【#9213】   **DEV1 EIA OUTPUT**

Select ISO or EIA code for data output.
In data input mode, the ISO and EIA codes are identified automatically.
0: ISO code output
1: EIA code output

【#9214】   **DEV1 FEED CHR.**

Set the length of the tape feed to be output at the start and end of the data during tape output.

<Setting range>
0 to 999 (characters)

【#9215】   **DEV1 PARITY V**

Select whether to perform the parity check for the number of characters in a block at the input of data.
At the output of data, the number of characters is always adjusted to for the parity check.
0: Not perform parity V check
1: Perform parity V check

【#9216】 DEV1 TIME-OUT (sec)

Set the time out time to detect an interruption in communication.
Time out check will not be executed when set to "0".

<Setting range>
0 to 30 (s)

【#9217】 DEV1 DR OFF

Select whether to enable the DR data check in data I/O mode.
0: Enable
1: Disable

【#9218】 DEV1 DATA ASCII

Select the code of the output data.
0: ISO/EIA code
(Depends on whether #9113, #9213, #9313, #9413 or #9513 EIA output parameter is set up.)
1: ASCII code

【#9219】 DEV1 INPUT TYPE

Select the mode for input (verification).
0: Standard input (Data from the very first EOB is handled as significant information.)
1: EOBs following the first EOB of the input data are skipped until data other than EOB is input

【#9221】 DEV1 EIA CODE [

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "
[".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9222】 DEV1 EIA CODE]

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"] ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9223】 DEV1 EIA CODE #

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"#".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified. .

<Setting range>
0 to FF (hexadecimal)

【#9224】 DEV1 EIA CODE ∗

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"∗".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

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【#9225】 **DEV1 EIA CODE =**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "=".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9226】 **DEV1 EIA CODE :**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code " : ".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9227】 **DEV1 EIA CODE $**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "$".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9228】 **DEV1 EIA CODE !**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "!".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9301】 **DEV2 DEVICE NAME**

Set the device name corresponding to the device No.
Set a simple name for quick identification.

<Setting range>
Use alphabet characters, numerals and symbols to set a name within 3 characters.

【#9302】 **DEV2 BAUD RATE**

Select the serial communication speed.
0: 19200 (bps)
1: 9600
2: 4800
3: 2400
4: 1200
5: 600
6: 300
7: 110

【#9303】 **DEV2 STOP BIT**

Select the stop bit length used in the start-stop system.
Refer to "#9304 DEV2 PARITY CHECK". At the output of data, the number of characters is always adjusted to for the parity check.
1: 1 (bit)
2: 1.5
3: 2

【#9304】 **DEV2 PARITY CHECK**

Select whether to add a parity check bit to the data.
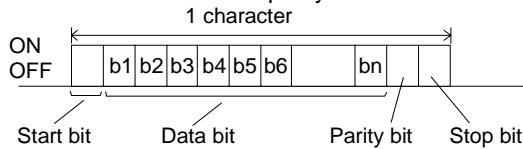
Set this parameter in accordance with the I/O device specifications.
0: Not add a parity bit in I/O mode
1: Add a parity bit in I/O mode

【#9305】 **DEV2 EVEN PARITY**

Select whether even or odd parity will be used when parity is used. This parameter is ignored when no parity is added.
0: Odd parity
1: Even parity

【#9306】 **DEV2 CHR. LENGTH**

Select the length of the data bit.
Refer to "#9304 DEV2 PARITY CHECK".
0: 5 (bit)
1: 6
2: 7 (NC connection not supported)
3: 8

【#9307】 **DEV2 TERMINATR TYP**

Select the code to terminate data reading.
0, 3: EOR
1, 2: EOB or EOR

【#9308】 **DEV2 HAND SHAKE**

Select the transmission control method.
No handshaking will be used when a value except 1 to 3 is set.
1: RTS/CTS method
2: No handshaking
3: DC code method

【#9309】 **DEV2 DC CODE PRTY**

Select the DC code type when the DC code method is selected.
0: Not add parity to DC code (DC3 = 13H)
1: Add parity to DC code (DC3 = 93H)

【#9311】 **DEV2 DC2/4 OUTPUT**

Select the DC code handling when outputting data to the output device.

<Setting range>
DC2 / DC4
0: None / None
1: Yes / None
2: None / Yes
3: Yes / Yes

【#9312】 **DEV2 CR OUTPUT**

Select whether to add the (CR) code just before the EOB (L/F) code during output.
0: Not add
1: Add

【#9313】 **DEV2 EIA OUTPUT**

Select ISO or EIA code for data output.
In data input mode, the ISO and EIA codes are identified automatically.
0: ISO code output
1: EIA code output

【#9314】 **DEV2 FEED CHR.**

Set the length of the tape feed to be output at the start and end of the data during tape output.

<Setting range>
0 to 999 (characters)

【#9315】 **DEV2 PARITY V**

Select whether to perform the parity check for the number of characters in a block at the input of data.
At the output of data, the number of characters is always adjusted to for the parity check.
0: Not perform parity V check
1: Perform parity V check

【#9316】 **DEV2 TIME-OUT (sec)**

Set the time out time to detect an interruption in communication.
Time out check will not be executed when set to "0".

<Setting range>
0 to 30 (s)

【#9317】 **DEV2 DR OFF**

Select whether to enable the DR data check in data I/O mode.
0: Enable
1: Disable

【#9318】 **DEV2 DATA ASCII**

Select the code of the output data.
0: ISO/EIA code
(Depends on whether #9113, #9213, #9313, #9413 or #9513 EIA output parameter is set up.)
1: ASCII code

【#9319】 **DEV2 INPUT TYPE**

Select the mode for input (verification).
0: Standard input (Data from the very first EOB is handled as significant information.)
1: EOBs following the first EOB of the input data are skipped until data other than EOB is input

【#9321】 **DEV2 EIA CODE [**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "
[".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9322】 **DEV2 EIA CODE]**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"] ".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9323】 **DEV2 EIA CODE #**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"#".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9324】 **DEV2 EIA CODE ∗**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "∗".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9325】 **DEV2 EIA CODE =**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "=".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9326】 **DEV2 EIA CODE :**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code " : ".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9327】 **DEV2 EIA CODE $**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "$".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9328】 **DEV2 EIA CODE !**

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "!".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9401】 **DEV3 DEVICE NAME**

Set the device name corresponding to the device No.
Set a simple name for quick identification.

<Setting range>
Use alphabet characters, numerals and symbols to set a name within 3 characters.

【#9402】 **DEV3 BAUD RATE**

Select the serial communication speed.
0: 19200 (bps)
1: 9600
2: 4800
3: 2400
4: 1200
5: 600
6: 300
7: 110

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【#9403】 **DEV3 STOP BIT**

Select the stop bit length used in the start-stop system.
Refer to "#9404 DEV3 PARITY CHECK". At the output of data, the number of characters is always adjusted to for the parity check.
1: 1 (bit)
2: 1.5
3: 2

【#9404】 **DEV3 PARITY CHECK**

Select whether to add a parity check bit to the data.
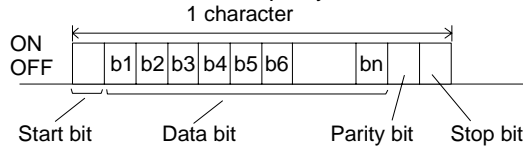
Set this parameter in accordance with the I/O device specifications.
0: Not add a parity bit in I/O mode
1: Add a parity bit in I/O mode

【#9405】 **DEV3 EVEN PARITY**

Select whether even or odd parity will be used when parity is used. This parameter is ignored when no parity is added.
0: Odd parity
1: Even parity

【#9406】 **DEV3 CHR. LENGTH**

Select the length of the data bit.
Refer to "#9404 DEV3 PARITY CHECK".
0: 5 (bit)
1: 6
2: 7 (NC connection not supported)
3: 8

【#9407】 **DEV3 TERMINATR TYP**

Select the code to terminate data reading.
0, 3: EOR
1, 2: EOB or EOR

【#9408】 **DEV3 HAND SHAKE**

Select the transmission control method.
No handshaking will be used when a value except 1 to 3 is set.
1: RTS/CTS method
2: No handshaking
3: DC code method

【#9409】 **DEV3 DC CODE PRTY**

Select the DC code type when the DC code method is selected.
0: Not add parity to DC code (DC3 = 13H)
1: Add parity to DC code (DC3 = 93H)

【#9411】 **DEV3 DC2/4 OUTPUT**

Select the DC code handling when outputting data to the output device.

<Setting range>
DC2 / DC4
0: None / None
1: Yes / None
2: None / Yes
3: Yes / Yes

【#9412】 DEV3 CR OUTPUT

Select whether to add the (CR) code just before the EOB (L/F) code during output.
0: Not add
1: Add

【#9413】 DEV3 EIA OUTPUT

Select ISO or EIA code for data output.
In data input mode, the ISO and EIA codes are identified automatically.
0: ISO code output
1: EIA code output

【#9414】 DEV3 FEED CHR.

Set the length of the tape feed to be output at the start and end of the data during tape output.

<Setting range>
0 to 999 (characters)

【#9415】 DEV3 PARITY V

Select whether to perform the parity check for the number of characters in a block at the input of data.
At the output of data, the number of characters is always adjusted to for the parity check.
0: Not perform parity V check
1: Perform parity V check

【#9416】 DEV3 TIME-OUT (sec)

Set the time out time to detect an interruption in communication.
Time out check will not be executed when set to "0".

<Setting range>
0 to 30 (s)

【#9417】 DEV3 DR OFF

Select whether to enable the DR data check in data I/O mode.
0: Enable
1: Disable

【#9418】 DEV3 DATA ASCII

Select the code of the output data.
0: ISO/EIA code
(Depends on whether #9113, #9213, #9313, #9413 or #9513 EIA output parameter is set up.)
1: ASCII code

【#9419】 DEV3 INPUT TYPE

Select the mode for input (verification).
0: Standard input (Data from the very first EOB is handled as significant information.)
1: EOBs following the first EOB of the input data are skipped until data other than EOB is input.

【#9421】 DEV3 EIA CODE [

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "[".
When output with EIA code, data can be output using the alternate code in which the special ISO code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9422】 DEV3 EIA CODE]

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"] ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9423】 DEV3 EIA CODE #

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"#".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9424】 DEV3 EIA CODE ∗

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"*".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9425】 DEV3 EIA CODE =

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"=".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9426】 DEV3 EIA CODE :

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
" : ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9427】 DEV3 EIA CODE $

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"$".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9428】 DEV3 EIA CODE !

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"!".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9501】 **DEV4 DEVICE NAME**

Set the device name corresponding to the device No.
Set a simple name for quick identification.

<Setting range>
Use alphabet characters, numerals and symbols to set a name within 3 characters.

【#9502】 **DEV4 BAUD RATE**

Select the serial communication speed.
0: 19200 (bps)
1: 9600
2: 4800
3: 2400
4: 1200
5: 600
6: 300
7: 110

【#9503】 **DEV4 STOP BIT**

Select the stop bit length used in the start-stop system.
Refer to "#9504 DEV4 PARITY CHECK". At the output of data, the number of characters is always adjusted to for the parity check.
1: 1 (bit)
2: 1.5
3: 2

【#9504】 **DEV4 PARITY CHECK**

Select whether to add a parity check bit to the data.
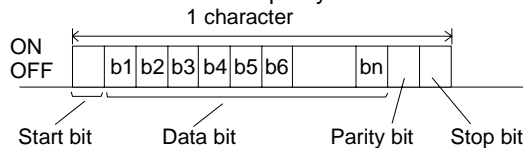
Set this parameter in accordance with the I/O device specifications.
0: Not add a parity bit in I/O mode
1: Add a parity bit in I/O mode

【#9505】 **DEV4 EVEN PARITY**

Select whether even or odd parity will be used when parity is used. This parameter is ignored when no parity is added.
0: Odd parity
1: Even parity

【#9506】 **DEV4 CHR. LENGTH**

Select the length of the data bit.
Refer to "#9504 DEV4 PARITY CHECK".
0: 5 (bit)
1: 6
2: 7 (NC connection not supported)
3: 8

【#9507】 **DEV4 TERMINATR TYP**

Select the code to terminate data reading.
0. 3: EOR
1, 2: EOB or EOR

【#9508】 **DEV4 HAND SHAKE**

Select the transmission control method.
No handshaking will be used when a value except 1 to 3 is set.
1: RTS/CTS method
2: No handshaking
3: DC code method

【#9509】 **DEV4 DC CODE PRTY**

Select the DC code type when the DC code method is selected.
0: Not add parity to DC code (DC3 = 13H)
1: Add parity to DC code (DC3 = 93H)

【#9511】 **DEV4 DC2/4 OUTPUT**

Select the DC code handling when outputting data to the output device.

<Setting range>
DC2 / DC4
0: None / None
1: Yes / None
2: None / Yes
3: Yes / Yes

【#9512】 **DEV4 CR OUTPUT**

Select whether to add the (CR) code just before the EOB (L/F) code during output.
0: Not add
1: Add

【#9513】 **DEV4 EIA OUTPUT**

Select ISO or EIA code for data output.
In data input mode, the ISO and EIA codes are identified automatically.
0: ISO code output
1: EIA code output

【#9514】 **DEV4 FEED CHR.**

Set the length of the tape feed to be output at the start and end of the data during tape output.

<Setting range>
0 to 999 (characters)

【#9515】 **DEV4 PARITY V**

Select whether to perform the parity check for the number of characters in a block at the input of data.
At the output of data, the number of characters is always adjusted to for the parity check.
0: Not perform parity V check
1: Perform parity V check

【#9516】 **DEV4 TIME-OUT (sec)**

Set the time out time to detect an interruption in communication.
Time out check will not be executed when set to "0".

<Setting range>
0 to 30 (s)

【#9517】 **DEV4 DR OFF**

Select whether to enable the DR data check in data I/O mode.
0: Enable
1: Disable

【#9518】 **DEV4 DATA ASCII**

Select the code of the output data.
0: ISO/EIA code
(Depends on whether #9113, #9213, #9313, #9413 or #9513 EIA output parameter is set up.)
1: ASCII code

【#9519】 **DEV4 INPUT TYPE**

Select the mode for input (verification).
0: Standard input (Data from the very first EOB is handled as significant information.)
1: EOBs following the first EOB of the input data are skipped until data other than EOB is input.

【#9521】 DEV4 EIA CODE [

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code "
[".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9522】 DEV4 EIA CODE]

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"] ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9523】 DEV4 EIA CODE #

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"#".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9524】 DEV4 EIA CODE ∗

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"∗".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9525】 DEV4 EIA CODE =

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"=".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9526】 DEV4 EIA CODE :

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
" : ".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9527】 DEV4 EIA CODE $

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"$".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

【#9528】   DEV4 EIA CODE !

Set the code in hexadecimal, which does not duplicate the existing EIA codes, for the special code
"!".
When output with EIA code, data can be output using the alternate code in which the special ISO
code, not included in EIA, is specified.

<Setting range>
0 to FF (hexadecimal)

2.7 Ethernet Parameters

Set the parameters related to Ethernet input/output.
After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

9701 to 9706 parameters:
When several TCP/IP drivers are installed and the IP address is set manually ("#9701 IP address automatic setting" is set to 0), the same setting will be made for all parameters.

9711 to 9781 parameters:
Set the server information required for using the Ethernet function.
Server information for up to four units can be set.

【#9701(PR)】　　IP addr auto set

The IP address is automatically assigned from the server.
0: Manual setting
1: Automatic setting

(Note) When the automatic setting is selected, "#11005 PC IP address, PC Subnet, PC Gateway" will be invalid.

【#9706】　　Host No.

Select the No. of the host to be used from host 1 to host 4.

---Setting range---
1 to 4 : Host No.

【#9711】　　Host1 host name

Set the host computer name.
This parameter allows the NC to easily recognize the host computer on the network. Set the host computer's name (name registered in C:¥windows¥hosts) or the IP address.
---Setting example---
For host name: mspc160
For IP address: 150.40.0.111
(Note) Set the host computer's TCP/IP address if communication is not carried out correctly.

---Setting range---
15 characters (alphanumeric) or less

【#9712】　　Host1 user name

Set the user name when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9713】　　Host1 password

Set the password when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9714】　　Host1 directory

Set the directory name of the host computer.
The directory released to the client (NC unit) with the host computer's server is handled as root directory by the NC unit.

---Setting range---
31 characters (alphanumeric) or less

【#9715】 **Host1 host type**

Select the type of the host computer.
0: UNIX/PC automatic judgment
1: UNIX
2: PC (DOS)
(Note) When "0" is set, the settings for the following parameters will be invalid.
• #9716 Wrd pos: name
• #9717 Wrd pos: size
• #9718 Wrd pos: Dir
• #9719 Wrd pos: cmnt
• #9720 Wrd num: cmnt

【#9716】 **Host 1 Wrd pos: name**

Set the file name display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9717】 **Host 1 Wrd pos: size**

Set the size display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9718】 **Host 1 Wrd pos: Dir**

Set the <DIR> display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9719】 **Host 1 Wrd pos: cmnt**

Set the comment (date, time, etc.) display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9720】 **Host 1 Wrd num: cmnt**

Set the number of words to be displayed as a comment.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9721】 **Host 1 no total siz**

Set whether to display the total number of characters registered in the machining programs of host1 when displaying the file list.
If there are many files in the directory to be referred to, the list can be updated quickly by setting "1".
0: Display
1: Not display

【#9731】 **Host2 host name**

Set the host computer name.
This parameter allows the NC to easily recognize the host computer on the network. Set the host computer's name (name registered in C:¥windows¥hosts) or the IP address.
---Setting example---
For host name: mspc160
For IP address: 150.40.0.111
(Note) Set the host computer's TCP/IP address if communication is not carried out correctly.

---Setting range---
15 characters (alphanumeric) or less

【#9732】 **Host2 user name**

Set the user name when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9733】 **Host2 password**

Set the password when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9734】 **Host2 directory**

Set the directory name of the host computer.
The directory released to the client (NC unit) with the host computer's server is handled as the root directory by the NC unit.

---Setting range---
31 characters (alphanumeric) or less

【#9735】 **Host2 host type**

Select the type of the host computer.
0: UNIX/PC automatic judgment
1: UNIX
2: PC (DOS)
(Note) When "0" is set, the settings for the following parameters will be invalid.
• #9736 Wrd pos: name
• #9737 Wrd pos: size
• #9738 Wrd pos: Dir
• #9739 Wrd pos: cmnt
• #9740 Wrd num: cmnt

【#9736】 **Host 2 Wrd pos: name**

Set the file name display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9737】 **Host 2 Wrd pos: size**

Set the size display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9738】 **Host 2 Wrd pos: Dir**

Set the <DIR> display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9739】 **Host 2 Wrd pos: cmnt**

Set the comment (date, time, etc.) display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9740】 **Host 2 Wrd num: cmnt**

Set the number of words to be displayed as a comment.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9741】 **Host 2 no total siz**

Set whether to display the total number of characters registered in the machining programs of host1 when displaying the file list.
If there are many files in the directory to be referred to, the list can be updated quickly by setting "1".

---Setting range---
0: Display
1: Not display

【#9751】 **Host3 host name**

Set the host computer name.
This parameter allows the NC to easily recognize the host computer on the network. Set the host computer's name (name registered in C:¥windows¥hosts) or the IP address.
---Setting example---
For host name: mspc160
For IP address: 150.40.0.111
(Note) Set the host computer's TCP/IP address if communication is not carried out correctly.

---Setting range---
15 characters (alphanumeric) or less

【#9752】 **Host3 user name**

Set the user name when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9753】 **Host3 password**

Set the password when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9754】 **Host3 directory**

Set the directory name of the host computer.
The directory released to the client (NC unit) with the host computer's server is handled as the root directory by the NC unit.

---Setting range---
31 characters (alphanumeric) or less

【#9755】 **Host3 host type**

Select the type of the host computer.
0: UNIX/PC automatic judgment
1: UNIX
2: PC (DOS)
(Note) When "0" is set, the settings for the following parameters will be invalid.
• #9756 Wrd pos: name
• #9757 Wrd pos: size
• #9758 Wrd pos: Dir
• #9759 Wrd pos: cmnt
• #9760 Wrd num: cmnt

【#9756】 **Host 3 Wrd pos: name**

Set the file name display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9757】 **Host 3 Wrd pos: size**

Set the size display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9758】 **Host 3 Wrd pos: Dir**

Set the <DIR> display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9759】 **Host 3 Wrd pos: cmnt**

Set the comment (date, time, etc.) display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9760】 **Host 3 Wrd num: cmnt**

Set the number of words to be displayed as a comment.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9761】 **Host 3 no total siz**

Set whether to display the total number of characters registered in the machining programs of host1 when displaying the file list.
If there are many files in the directory to be referred to, the list can be updated quickly by setting "1".

---Setting range---
0: Display
1: Not display

【#9771】 **Host4 host name**

Set the host computer name.
This parameter allows the NC to easily recognize the host computer on the network. Set the host computer's name (name registered in C:¥windows¥hosts) or the IP address.
---Setting example---
For host name: mspc160
For IP address: 150.40.0.111
(Note) Set the host computer's TCP/IP address if communication is not carried out correctly.

---Setting range---
15 characters (alphanumeric) or less

【#9772】 **Host4 user name**

Set the user name when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9773】 **Host4 password**

Set the password when logging into the host computer.

---Setting range---
15 characters (alphanumeric) or less

【#9774】 **Host4 directory**

Set the directory name of the host computer.
The directory released to the client (NC unit) with the host computer's server is handled as the root directory by the NC unit.

---Setting range---
31 characters (alphanumeric) or less

【#9775】 **Host4 host type**

Select the type of the host computer.
0: UNIX/PC automatic judgment
1: UNIX
2: PC (DOS)
(Note) When "0" is set, the settings for the following parameters will be invalid.
• #9776 Wrd pos: name
• #9777 Wrd pos: size
• #9778 Wrd pos: Dir
• #9779 Wrd pos: cmnt
• #9780 Wrd num: cmnt

【#9776】 **Host 4 Wrd pos: name**

Set the file name display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9777】 **Host 4 Wrd pos: size**

Set the size display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---Setting range---
0 to 100
0: Default value

【#9778】 **Host 4 Wrd pos: Dir**

Set the <DIR> display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---**Setting range**---
0 to 100
0: Default value

【#9779】 **Host 4 Wrd pos: cmnt**

Set the comment (date, time, etc.) display position (nth word from left) of the list displayed when the ftp command "dir" is executed.
(Note) One word designates a character string divided by one or more spaces.

---**Setting range**---
0 to 100
0: Default value

【#9780】 **Host 4 Wrd num: cmnt**

Set the number of words to be displayed as a comment.
(Note) One word designates a character string divided by one or more spaces.

---**Setting range**---
0 to 100
0: Default value

【#9781】 **Host 4 no total siz**

Set whether to display the total number of characters registered in the machining programs of host1 when displaying the file list.
If there are many files in the directory to be referred to, the list can be updated quickly by setting "1".

---**Setting range**---
0: Display
1: Not display

2.8 Computer Link Parameters

【#9601】 **BAUD RATE**

Select the rate at which data is transferred.

---Setting range---
0: 19200 (bps)
1: 9600
2: 4800
3: 2400
4: 1200
5: 600
6: 300
7: 110
8: 38400

【#9602】 **Stop Bit**

Select the stop bit length used in the start-stop system.
Refer to "#9603 PARITY EFFECTIVE". At the output of data, the number of characters is always adjusted to for the parity check.
1: 1 (bit)
2: 1.5
3: 2

【#9603】 **PARITY EFFECTIVE**

Select whether to add the parity bit to the data.
The parameter is set when using a parity bit separately from the data bit.
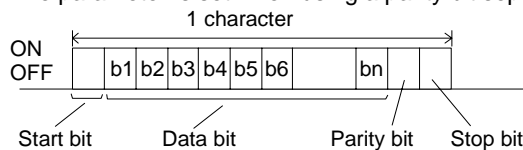
Set this parameter according to the specifications of input/output device.
0: Not add a parity bit at the input/output
1: Add a parity bit at the input/output

【#9604】 **EVEN PARITY**

Select odd or even when parity is added to the data. This parameter is ignored when no parity is added.

0: Odd parity
1: Even parity

【#9605】 **CHR. LENGTH**

Select the length of the data bit.
Refer to "#9603 PARITY EFFECTIVE".
0: 5 (bit)
1: 6
2: 7 (NC connection not supported)
3: 8

【#9606】 **HAND SHAKE**

Select the transmission control method.
"3" (DC code method) should be set for computer link B.
0: No control
1: RTS/CTS method
2: No handshaking
3: DC code method

【#9607】 TIME-OUT SET

Set the time-out time at which an interruption of data transfer during data input/output should be detected.
"0" means infinite time-out.

---Setting range---
0 to 999 (1/10s)

【#9608】 DATA CODE

Set the code to be used for the data description.
Refer to "#9603 PARITY EFFECTIVE".
0: ASCII code
1: ISO code

【#9609】 LINK PARAM. 1

bit1: DC1 output after NAK or SYN
Select whether to output the DC1 code after the NAK or SYN code is output.
0: Not output the DC1 code.
1: Output the DC1 code.

bit7: Enable/disable resetting
Select whether to enable the resetting in the computer link.
0: Enable
1: Disable

【#9610】 LINK PARAM. 2

Bit 2: Specify the control code parity (even parity for the control code).
Select whether to add an even parity to the control code, in accordance with the I/O device specifications.
0: Not add a parity bit to the control code
1: Add a parity bit to the control code

Bit 3: Parity V
Select whether to enable checking of parity V in one block at the input of the data.
0: Disable
1: Enable

【#9611】 Link PARAM. 3

Not used. Set to "0".

【#9612】 Link PARAM. 4

Not used. Set to "0".

【#9613】 Link PARAM. 5

Not used. Set to "0".

【#9614】 START CODE

Select the code used to command the first transfer of file data.
This parameter is used for a specific user. Normally set "0".
0: DC1 (11H)
1: BEL (07H)

【#9615】 **CTRL. CODE OUT**

bit 0: NAK output
Select whether to send the NAK code to the host if a communication error occurs in computer link B.
0: Not output the NAK code
1: Output the NAK code.

bit 1: SYN output
Select whether to send the SYN code to the host if NC resetting or an emergency stop occurs in computer link B.
0: Not output the SYN code.
1: Output the SYN code.

bit 3: DC3 output
Select whether to send the DC3 code to the host when the communication ends in computer link B.
0: Not output the DC3 code.
1: Output the DC3 code.

【#9616】 **CTRL. INTERVAL**
Not used. Set to "0".

【#9617】 **WAIT TIME**
Not used. Set to "0".

【#9618】 **PACKET LENGTH**
Not used. Set to "0".

【#9619】 **BUFFER SIZE**
Not used. Set to "0".

【#9620】 **START SIZE**
Not used. Set to "0".

【#9621】 **DC1 OUT SIZE**
Not used. Set to "0".

【#9622】 **POLLING TIMER**
Not used. Set to "0".

【#9623】 **TRANS. WAIT TMR**
Not used. Set to "0".

【#9624】 **RETRY COUNTER**
Not used. Set to "0".

2.9 Subprogram Storage Destination Parameters

【#8880】　Subpro stor D0: dev

Select the storage destination (device) for the subprogram.
When D0 is designated at a subprogram call, the subprogram to be called will be searched from the device selected with this parameter.

(Example)
The following will be searched:
M98 P (program No.), D0
　Device: "#8880 Subpro stor D0: dev" device
　Directory: "#8881 Subpro stor D0: dir" directory

(Note 1) When the called subprogram is not found in the selected storage destination, a program error will occur.
(Note 2) When D0 to D4 is not designated at a subprogram call, the subprogram will be searched from the memory.

---Setting range---
Device name

Setting value	Display name
M	Memory
G	HD
F	FD
R	Memory card
D	Data server
E	Ethernet

【#8881】　Subpro stor D0: dir

Select the storage destination (directory) for the subprogram.
When D0 is designated at a subprogram call, the subprogram to be called will be searched from the directory selected with this parameter.
Refer to "#8880 Subpro stor D0: dev".

---Setting range---
Directory 48 characters

【#8882】　Subpro stor D1: dev

Select the storage destination (device) for the subprogram.
When D1 is designated at a subprogram call, the subprogram to be called will be searched from the device selected with this parameter.

(Example)
The following will be searched:
M98 P (program No.), D1
　Device: "#8882 Subpro stor D1: dev" device
　Directory: "#8883 Subpro stor D1: dir" directory

(Note 1) When the called subprogram is not found in the selected storage destination, a program error will occur.
(Note 2) When D0 to D4 is not designated at a subprogram call, the subprogram will be searched from the memory.

---Setting range---

Setting value	Display name
M	Memory
G	HD
F	FD
R	Memory card
D	Data server
E	Ethernet

【#8883】　Subpro stor D1: dir

Select the storage destination (directory) for the subprogram.
When D1 is designated at a subprogram call, the subprogram to be called will be searched from the directory selected with this parameter.
Refer to "#8882 Subpro stor D1: dev".

---Setting range---
Directory 48 characters

【#8884】　Subpro stor D2: dev

Select the storage destination (device) for the subprogram.
When D2 is designated at a subprogram call, the subprogram to be called will be searched from the device selected with this parameter.

(Example)
The following will be searched:
M98 P (program No.), D2
　Device: "#8884 Subpro stor D2: dev" device
　Directory: "#8885 Subpro stor D2: dir" directory

(Note 1) When the called subprogram is not found in the selected storage destination, a program error will occur.
(Note 2) When D0 to D4 is not designated at a subprogram call, the subprogram will be searched from the memory.

---Setting range---

Setting value	Display name
M	Memory
G	HD
F	FD
R	Memory card
D	Data server
E	Ethernet

【#8885】　Subpro stor D2: dir

Select the storage destination (directory) for the subprogram.
When D2 is designated at a subprogram call, the subprogram to be called will be searched from the directory selected with this parameter.
Refer to "#8884 Subpro stor D2: dev".

---Setting range---
Directory 48 characters

【#8886】　Subpro stor D3: dev

Select the storage destination (device) for the subprogram.
When D3 is designated at a subprogram call, the subprogram to be called will be searched from the
device selected with this parameter.

(Example)
The following will be searched:
M98 P (program No.), D3
　Device: "#8886 Subpro stor D3: dev" device
　Directory: "#8887 Subpro stor D3: dir" directory

(Note 1) When the called subprogram is not found in the selected storage destination, a program
error will occur.
(Note 2) When D0 to D4 is not designated at a subprogram call, the subprogram will be searched
from the memory.

---Setting range---

Setting value	Display name
M	Memory
G	HD
F	FD
R	Memory card
D	Data server
E	Ethernet

【#8887】　Subpro stor D3: dir

Select the storage destination (directory) for the subprogram.
When D3 is designated at a subprogram call, the subprogram to be called will be searched from the
directory selected with this parameter.
Refer to "#8886 Subpro stor D3: dev".

---Setting range---
Directory 48 characters

【#8888】　Subpro stor D4: dev

Select the storage destination (device) for the subprogram.
When D4 is designated at a subprogram call, the subprogram to be called will be searched from the
device selected with this parameter.

(Example)
The following will be searched:
M98 P (program No.), D4
　Device: "#8888 Subpro stor D4: dev" device
　Directory: "#8889 Subpro stor D4: dir" directory

(Note 1) When the called subprogram is not found in the selected storage destination, a program
error will occur.
(Note 2) When D0 to D4 is not designated at a subprogram call, the subprogram will be searched
from the memory.

---Setting range---
Device name

Setting value	Display name
M	Memory
G	HD
F	FD
R	Memory card
D	Data server
E	Ethernet

【#8889】   Subpro stor D4: dir

Select the storage destination (directory) for the subprogram.
When D4 is designated at a subprogram calling, the subprogram to be called will be searched from
the directory selected with this parameter.
Refer to "#8888 Subpro stor D4: dev".

---Setting range---
Directory 48 characters

2.10 Anshin-net Parameter 1

【#10801】 Notice tel num 1

Set the call-back telephone No. used for one-touch call and operator notification.
Begin with the No. from an area code for domestic call.
Begin with a communication company No. for international call.
Hyphens "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10802】 Comment 1

Set a comment, such as a party's name, for the notification party telephone No.1.

---Setting range---
Within 20 alphanumerical characters (excluding spaces)

【#10803】 Notice tel num 2

Set the call-back telephone No. used for one-touch call and operator notification.
Begin with the No. from an area code for domestic call.
Begin with a communication company No. for international call.
Hyphens "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10804】 Comment 2

Set a comment, such as a party's name, for the notification party telephone No.2.

---Setting range---
Within 20 alphanumerical characters (excluding spaces)

【#10805】 Notice tel num 3

Set the call-back telephone No. used for one-touch call and operator notification.
Begin with the No. from an area code for domestic call.
Begin with a communication company No. for international call.
Hyphens "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10806】 Comment 3

Set a comment, such as a party's name, for the notification party telephone No.3.

---Setting range---
Within 20 alphanumerical characters (excluding spaces)

【#10807】 Password

Set the password for sharing of machining data.

---Setting range---
4 characters (one-byte alphanumeric characters, without space)

【#10808】 Customer number

Set the user No. for sharing of machining data.

---Setting range---
Within 8 characters (one-byte alphanumeric characters, without space)

【#10812】 Anshin-net valid

Select whether to enable the Anshin-net function.
0: Disable
1: Enable

2.11 Machine Tool Builder Network System (MTB-net) Parameter 1

【#10813】　 **MTBnet enable**

Select whether to enable the machine tool builder network system.
0: Disable
1: Enable
Standard setting: 0
(Note) Values other than "0" and "1" are invalid.

3. **Setting the Machine Parameters**

A password must be set before the machine parameters can be set.

Machine parameter password setting method

(1) | Press the function key Mainte. → The menu for the maintenance related screen will appear.

(2) | Press the menu Param. → The parameter menu will appear.

(3) | Press the machine parameter selection menu.
(Example) Menu Basesys param → A message prompting input of the password will appear.
If the password has been input once after the power was turned ON, the cursor will appear at the Machine Parameter screen.

(4) | Set the password and press the INPUT key.
MPARA INPUT → The cursor will appear at the Machine Parameter screen, and the machine parameters can be set.

(Note 1) Refer to the section "4. Base Specification Parameters" and following for details on the machine parameters.
(Note 2) Always turn the power OFF after setting the machine parameters.

4. Base Specifications Parameters

Base specification parameter is the generic term for the following three parameters.
In this Manual, the parameters are explained in order of number.

Base system parameters	Base axis specification parameters	Base common parameters
#1001-#1006, #1025-#1037 #1073-#1076, #1085-#1086 #1109-#1111, #1151 #1169-#1216, #1501-#1574 #1590-#1593, #12001-#12012	#1010-#1024, #1061-#1072 #1493-#1494	#1038-#1059, #1077-#1084 #1087-#1108, #1112-#1149 #1153-#1168, #1217-#1343 #1361, #1901-#1911 #1925-#1935, #11001-#11021 #11028-#11029

After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

【#1001(PR)】　SYS_ON　System validation setup

Select the existence of PLC axes and part systems.

---Setting range---
0: Not exist
1: Exist

【#1002(PR)】　axisno　Number of axes

Set the number of control axes and PLC axes.
A total of 16 axes can be set.
Control axis: 0 to 8
PLC axis: 0 to 2
When set to "0", the number of control axes in the part system will be "0". Do not set the number of control axes of the first part system to "0".

(Note) The setting range differs according to the model.

【#1003(PR)】　iunit　Input setup unit

Select the input setting value for each part system and the PLC axis.
Increments in parameters will follow this selection.
　B : 1 μm
　C : 0.1 μm
　D : 0.01 μm (10nm)
　E : 0.001 μm (1nm)

【#1004(PR)】　ctrl_unit　Control unit

Select the control increment for each part system and PLC axis.
Select the increment for the NC internal position data, communication data between the NC and drive unit, and the servo travel data. Increments for some parameters, such as the pitch error and backlash, will follow this selection.
　B : 1 μm
　C : 0.1 μm
　D : 0.01 μm (10nm)
　E : 0.001 μm (1nm)

【#1005(PR)】　plcunit　PLC unit

Select the PLC interface setting and display increment.
The PLC interface setting and display increment will follow this specification. Note that the PLC axis will follow "#1003 iunit".
　B : 1 μm
　C : 0.1 μm
　D : 0.01 μm (10nm)
　E : 0.001 μm (1nm)

4. Base Specifications Parameters

【#1006(PR)】　mcmpunit　Machine error compensa-tion unit

Select the machine error compensation setting and display increment.
The parameters related to machine error compensation (backlash, pitch error compensation, etc.)
and PLC interface (external machine coordinate system compensation) will follow this selection.
  B : 1 µm
  C : 0.1 µm
  D : 0.01 µm (10nm)
  E : 0.001 µm (1nm)

【#1007(PR)】　System type select　System type select

Select the NC system type.
  0: Machining center system (M system)
  1: Lathe system (L system)

(Note 1) If the setting value is out of range, M system will be selected.
(Note 2) This parameter is exclusively for 70 series. 700 series doesn't support this parameter.

【#1010(PR)】　srvunit　Output unit (servo)

Select the output increment to servo. The standard value is "E".
  B : 1 µm
  C : 0.1 µm
  D : 0.01 µm (10nm)
  E : 0.001 µm (1nm)

【#1013(PR)】　axname　Axis name

Set each axis's name with an alphabetic character.
Use the characters X, Y, Z, U, V, W, A, B or C.

(Note 1) Do not set the same name twice in one part system.
The same name which is used in another part system can be set.
(Note 2) The PLC name does not need to be set. (The axis name is displayed as 1 and 2.)

---Setting range---
X, Y, Z, U, V, W, A, B, C

【#1014(PR)】　incax　Increment command axis name

Set the axis name when commanding an incremental value for the axis travel amount.
Available alphabets are the same as in "#1013 axname".

(Note 1) Set an alphabet that is different from that of "#1013 axname".
(Note 2) Setting is not required if absolute/incremental specification with axis names is not
performed ("#1076 AbsInc" = "0").

---Setting range---
X, Y, Z, U, V, W, A, B, C

【#1015(PR)】　cunit　Program command unit
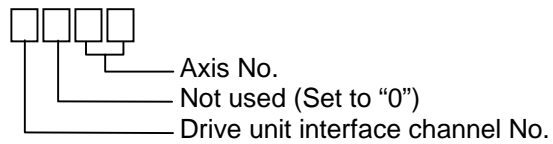
Set the minimum increment of program travel command.
cunit Travel amount for travel command 1
      0: Follow "#1003 iunit"
      1: 0.0001 mm (0.1µm)
     10: 0.001 mm (1µm)
    100: 0.01 mm (10µm)
   1000: 0.1 mm (100µm)
  10000: 1.0 mm

If there is a decimal point in travel command, the decimal point position will be handled as 1mm
regardless of this setting.

4. Base Specifications Parameters

【#1017(PR)】 rot   Rotational axis

Select whether the axis is a rotary axis or linear axis.
When rotary axis is set, the axis will be controlled with the rotary axis's coordinate system. Set the rotary axis type with "#8213 Rotation axis type".
   0: Linear axis
   1: Rotary axis

【#1018(PR)】 ccw   Motor CCW

Select the direction of the motor rotation to the command direction.
   0: Clockwise (looking from motor shaft) with the forward rotation command
   1: Counterclockwise (looking from motor shaft) with the forward rotation command

【#1019(PR)】 dia   Diameter specification axis

Select the command method of program travel amount.
When the travel amount is commanded with the diameter dimensions, the travel distance will be 5mm when the command is 10mm of travel distance.
The travel amount per pulse will also be halved during manual pulse feed.
If diameter is selected, tool length, the wear compensation amount, and the workpiece coordinate offset will be displayed in diameter value. Other parameters concerning length will always be displayed in radius value.
   0: Command with travel amount
   1: Command with diameter dimension

【#1020(PR)】 sp_ax   Spindle Interpolation

Select "1" when using the spindle for the contour control of NC axis (C-axis).
   0: Servo axis is used for contour control.
   1: Spindle is used for contour control.

【#1021(PR)】 mcp_no   Drive unit I/F channel No. (servo)

Using a 4-digit number, set the drive unit interface channel No. and which axis in that channel is to be used when connecting a servo drive unit.

Axis No.
Not used (Set to "0")
Drive unit interface channel No.

【#1022(PR)】 axname2   2nd axis name

Set the name of the axis displayed on the screen with two characters. (X1, Z2, etc.)
Always use an alphabetic character (A to Z) for the first character.

   ---Setting range---
   A to Z and 1 to 9 (Two digits)
   (Setting will be cleared when "0" is set)

【#1023(PR)】 crsadr   Command address during cross machining

Set the axis name for issuing a command to this axis during cross machining control.

   ---Setting range---
   A to Z
   (Setting will be cleared when "0" is set)

【#1024(PR)】 crsinc   Incremental command address during cross machining

Set the axis name for issuing an incremental command to this axis during cross machining control.

   ---Setting range---
   A to Z
   (Setting will be cleared when "0" is set)

4. Base Specifications Parameters

【#1025】 I_plane Initial plane selection

Select the plane to be selected when the power is turned ON or reset.
- 0: X-Y plane (G17 command state)
- 1: X-Y plane (G17 command state)
- 2: Z-X plane (G18 command state)
- 3: Y-Z plane (G19 command state)

【#1026】 base_I Base axis I

Set the names of the basic axes that compose the plane.

Set the axis name set in "#1013 axname".

If all three items ("base_I", "base_J" and "base_K") do not need to be set, such as for 2-axis specifications, input "0", and the parameter will be blank.

Normally, when X, Y and Z are specified respectively for base_I,_J,_K, the following relation will be established:

G17: X-Y
G18: Z-X
G19: Y-Z

Specify the desired axis name to set an axis address other than above.

---Setting range---

Axis names such as X, Y or Z

【#1027】 base_J Base axis J

Set the names of the basic axes that compose the plane.

Set the axis name set in "#1013 axname".

If all three items ("base_I", "base_J" and "base_K") do not need to be set, such as for 2-axis specifications, input "0", and the parameter will be blank.

Normally, when X, Y and Z are specified respectively for base_I,_J,_K, the following relation will be established:

G17: X-Y
G18: Z-X
G19: Y-Z

Specify the desired axis name to set an axis address other than above.

---Setting range---

Axis names such as X, Y or Z

【#1028】 base_K Base axis K

Set the names of the basic axes that compose the plane.

Set the axis name set in "#1013 axname".

If all three items ("base_I", "base_J" and "base_K") do not need to be set, such as for 2-axis specifications, input "0", and the parameter will be blank.

Normally, when X, Y and Z are specified respectively for base_I,_J,_K, the following relation will be established:

G17: X-Y
G18: Z-X
G19: Y-Z

Specify the desired axis name to set an axis address other than above.

---Setting range---

Axis names such as X, Y or Z

【#1029】 aux_I Flat axis I

Set the axis name when there is an axis parallel to "#1026 base_I".

---Setting range---

Axis names such as X, Y or Z

【#1030】 aux_J Flat axis J

Set the axis name when there is an axis parallel to "#1027 base_J".

---Setting range---

Axis names such as X, Y or Z

【#1031】 **aux_K   Flat axis K**

Set the axis name when there is an axis parallel to "#1028 base_K".

---Setting range---
Axis names such as X, Y or Z

【#1037(PR)】   **cmdtyp   Command type**

Set the G code list and compensation type for programs.

cmdtyp	G code list	Compensation type
1	List 1 (for M)	Type A (one compensation amount for one compensation No.)
2	List 1 (for M)	Type B (shape and wear compensation amounts for one compensation No.)
3	List 2 (for L)	Type C (shape and wear compensation amounts for one compensation No.)
4	List 3 (for L)	Ditto
5	List 4 (for special L)	Ditto
6	List 5 (for special L)	Ditto
7	List 6 (for special L)	Ditto
8	List 7 (for special L)	Ditto
9	List 8 (for M) M2 format type A	Type A (one compensation amount for one compensation No.)
10	List 8 (for M) M2 format type B	Type B (shape and wear amounts for one compensation No.)

There are some items in the specifications that can be used or cannot be used according to the value set in this parameter.
The file structure may also change depending on the compensation data type.

【#1038】   **plcsel   Ladder selection**

Not used. Set to "0".

【#1039(PR)】   **spinno   Number of spindles**

Select the number of spindles.
   0: No spindle
   1 to 6: One to Six spindles

(Note) The setting range differs according to the model.

【#1040(PR)】   **M_inch   Constant input (inch)**

Select the unit system for setting and display regarding machine parameter and PLC interface's position, length and speed.
   0: Metric system
   1: Inch system

【**#1041(PR)**】 **I_inch   Initial state (inch)**

Select the unit system for the program travel amount when the power is turned ON or reset and for position display.
　0: Metric system
　1: Inch system

(Note) Selection of inch and metric unit
When the setting value of "#1041 I_inch" is changed, the unit of length is changed after reset. The following parameters concerning length, however, are not changed automatically. Change the setting values of following parameters according to the new unit system.

Tool compensation amount (Tool length compensation amount, tool wear compensation amount and tool tip compensation amount)			
Workpiece coordinate offset			
Machining parameter	#8004 SPEED	#8027 Toler-1	#8056 G74 RETRACT
	#8005 ZONE r	#8028 Toler-2	#8057 G76 LAST-D
	#8006 ZONE d	#8029 FairingL	#8075 SpiralEndErr
	#8009 DSC. ZONE	#8030 MINUTE LENGS	#8084 G83S Clearance
	#8010 ABS. MAX.	#8037 CorJudgeL	
	#8011 INC. MAX.	#8041 C-rot. R	#8085 G83S Forward F
	#8012 G73n	#8042 C-ins. R	#8086 G83S Back F
	#8013 G83n	#8051 G71 THICK	
	#8016 G71 MINIMUM	#8052 G71 PULL UP	
	#8017 G71 DELTA-D	#8053 G73 U	
	#8018 G84/G74n	#8054 G73 W	
Axis parameter	#8204 OT-CHECK-N		
	#8205 OT-CHECK-P		
	#8206 TOOL CHG.P		
	#8209 G60 Shift		
Barrier data	#8300-#8306, #8311-#8314		
Base specifications parameter	#1084 RadErr		

"#8004 SPEED" is 10 inches/min. unit for the inch system.

【**#1042(PR)**】 **pcinch   PLC axis command (inch)**

Select the unit system for the commands to the PLC axis.
　0: Metric system
　1: Inch system

4. Base Specifications Parameters

【#1043】　lang　Select language displayed

Select the display language.

0: English (Standard)
1: Japanese (Standard)
11: German (Option)
12: French (Option)
13: Italian (Option)
14: Spanish (Option)
15: Traditional Chinese (Option)
16: Korean (Option)
17: Portuguese (Option)
18: Dutch (Option)
19: Swedish (Option)
20: Hungarian (Option)
21: Polish (Option)
22: Simplified Chinese (Option)
23: Russian (Option)
24: Turkish (Option)
25: Czech (Option)

(Note) A language which can be displayed is different according to each series.

【#1044(PR)】　auxno　MR-J2-CT Connections

Set the number of MR-J2-CTs connected.

(Note) The number of MR-J2-CTs possible to connect and setting range are different according to the model.
Check the specifications of each series.

【#1045(PR)】　nskno　Megatorgue motor connections

Set the number of NSK megatorque motors connected. When a value other than "0" is set, 2nd miscellaneous function data will be output as signed binary data.

---Setting range---
0 to 16

【#1051(PR)】　MemTol　Tool compensation memory common for part systems

0: Tool compensation memory separate for part systems
1: Tool compensation memory common for part systems

【#1052(PR)】　MemVal　No. of common variables shared in part system designation

0: Common variables common for part systems (number fixed)
 #100 - : Per part system
 #500 - : Common for part systems
1: Common variables common for part systems (number designation)
 #100 - : Designate with V1comN
 #500 - : Designate with V0comN

(Note) When this parameter is changed, the file system will be changed after the power is turned ON.
So always execute format.
The new format will be enabled after turning the power ON again.

---Setting order---
(1) MemVal changeover -> (2) Turn power ON again -> (3) Format ->(4) Turn power ON again

【#1061(PR)】　intabs　Manual ABS updating

Select whether to update the absolute position data during automatic handle interrupt.
This parameter is enabled only when "#1145 I_abs" is set to "1".
0: Do not update (coordinate system shifted the amount of the interruption)
1: Update (same coordinates as when interrupt did not occur will be applied)

【#1062】 T_cmp Tool compensation function

Select whether the tool length compensation and wear compensation are enabled during T command execution.

Setting value	Tool length compensation	Wear compensation
0	Enable	Enable
1	Enable	Disable
2	Disable	Enable
3	Disable	Disable

【#1063】 mandog Manual dog-type

Select the manual reference position return method for the second return (after the coordinate system is established) and later.
The initial reference position return after the power ON is performed with dog-type return, and the coordinate system will be established.
(This setting is not required when the absolute position detection is used.)
    0: High speed return
    1: Dog-type

【#1064(PR)】 svof Error correction

Select whether to correct the error when the servo is OFF.
    0: Not correct the error
    1: Correct the error

【#1068(PR)】 slavno Slave axis number

Set the axis number of the slave axis in synchronous control.
The axis number is an NC number excluding the spindle and PLC axis.
Two or more slave axes cannot be set for one master axis.
This parameter cannot be set for a slave axis.
When using the multi-part system, the relation of the master axis and slave axis cannot extend over part systems.
    0: No slave axis
    1 to 16:   First to sixteenth axis

【#1069】 no_dsp Axis with no counter display

Select whether to display the axis counter or not.
This setting is enabled on the counter display screen (relative position counter, etc.).
    0: Display
    1: Not display

【#1070】 axoff Axis removal

Select whether to enable or disable axis removal control.
    0: Disable
    1: Enable

【#1072】 chop_ax Chopping axis

Select the chopping axis.
    0: Non-chopping axis
    1: Chopping axis

【#1073】 I_Absm Initial absolute setting

Select the mode (absolute or incremental) at turning ON the power or reset.
    0: Incremental setting
    1: Absolute setting

4. Base Specifications Parameters

【#1074】 I_Sync　Initial synchronous feed

Select the feedrate mode at turning ON the power or reset.
  0: Asynchronous feed (feed per minute)
  1: Synchronous feed (feed per revolution)

【#1075】 I_G00　Initial G00

Select the linear command mode at turning ON the power or reset.
  0: Linear interpolation (G01 command state)
  1: Positioning (G00 command state)

【#1076】 AbsInc　ABS/INC address　　for L system only

Select the command method for the absolute and incremental commands.
  0: Use G command for the absolute and incremental commands.
  1: Use axis name for the absolute and incremental commands.
(The axis name in "#1013 axname" will be the absolute command, "#1014 incax" will be the incremental command.)
When "1" is selected, using two axis names, one each for the absolute and incremental commands, allows to issue the absolute and incremental commands appropriately to an axis.

【#1077】 radius　Incremental command for diameter specification axis

Select whether the incremental command of the diameter specification axis ("#1019 dia" is set to "1") uses the diameter value or radius value.
  0: Diameter value
  1: Radius value

【#1078】 Decpt2　Decimal point type 2

Select the increment of position commands that do not have a decimal point.
  0: Minimum input command unit (follows "#1015 cunit")
  1: 1mm (or 1inch) unit (For the dwell time, 1s unit is used.)

【#1079】 F1digt　Validate F1 digit

Select the F command method.
  0: Direct numerical command (command feedrate during feed per minute or rotation)
  1: 1-digit code command (feedrate set with "#1185 spd_F1" – "#1189 F5")

【#1080】 Dril_Z (For M system only)　Specify boring axis

Select a fixed cycle hole drilling axis.
  0: Use an axis vertical to the selected plane as hole drilling axis.
  1: Use the Z axis as the hole drilling axis regardless of the selected plane.

【#1081】 Gmac_P　Give priority to G code parameter

Select the G code priority relationship during the macro call with G command.
  0: Priority is on G code used in the system
  1: Priority is on registered G code for call

【#1082】 Geomet　Geometric

Select the type of geometric to use.
  0: Not use
  1: Use only geometric I
  2: Use geometric I and IB

With geometric, specific address codes are used for exclusive meanings. Thus, if A or C is used for the axis name or 2nd miscellaneous command code, the A used for the axis name may function as the geometric's angle designation. Pay special attention to axis names, etc., when using this function.

4. Base Specifications Parameters

【#1084】 RadErr Arc error

Set the tolerable error range when the end point deviates from the center coordinate in the circular command.

---Setting range---
0 to 1.000 (mm)

【#1085】 G00Drn G00 dry run

Select whether to apply dry run (feed at manual setting speed instead of command feedrate) to the G00 command.
0: Not apply to G00. (move at rapid traverse rate)
1: Apply to G00. (move at manual setting speed)

【#1086】 G0Intp G00 non-interpolation

Select the G00 travel path type.
0: Move linearly toward the end point. (interpolation type)
1: Move to the end point of each axis at the rapid traverse feedrate for each axis. (non-interpolation)

(Note) If this parameter is set to "1", neither of the following functions will be available: rapid traverse constant inclination acceleration/deceleration and rapid traverse constant inclination multi-step acceleration/deceleration.

【#1087】 G96_G0 Constant surface speed control by rapid traverse feed command

Select how to handle the surface speed for the G00 command when using the constant surface speed control function.
  0: Calculate the surface speed constantly even during G00 movement
  1: Calculate the surface speed at the block end point in the G00 command

【#1088】 G30SL Disable G30 soft limit

Select how to handle the soft limit during G30 (2nd reference position return).
  0: Enable
  1: Disable

【#1091】 Mpoint Ignore middle point

Select how to handle the middle point during G28 and G30 reference position return.
  0: Pass the middle point designated in the program and move to the reference position.
  1: Ignore the middle point designated in the program and move straight to the reference position.

【#1092】 Tchg _A Replace tools for additional axis

Select the movement of the additional axis at the tool change position return command.
  0: The additional axis will not move
  1: After the standard axis returns, the additional axis will also return to the tool change position

【#1093】 Wmvfin Synchronization between part systems method

Slect the timing of synchronization between part systems when using the multi-part system.
When the travel command is found in the synchronization command (!, M) block:
  0: Synchronize before executing travel command
  1: Synchronize after executing travel command

【#1094】 TI_SBK Select life count for single block   for L system only

Select whether to count the data units to be used for single block operation when using the tool life management II function (L system).
  0: Not count
  1: Count

【#1095】 T0tfof TF output

Select how to handle TF for T00 command.
  0: TF will be output
  1: TF wont be output

4. Base Specifications Parameters

【#1096(PR)】 T_Ltyp   Tool life management type   **for L system only**

Select the tool life management type.
  1: Life management I
  In this type, how long and how many times the program commanded tool is used are accumulated
  to monitor the usage state.
  2: Life management ll
  This method is the same as tool life management I, but with the spare tool selection function.
  A spare tool is selected from a group of tool commands commanded in the program.
  Tool compensation (tool length compensation and tool radius compensation) is carried out for the
  selected tool.

【#1097】 T1digt   Tool wear compensation number 1-digit command

Select the number of digits of the tool wear compensation No. in the T command.
  0: The 2 high-order digits are the tool No., and the 2 low-order digits are the wear compensation
  No.
  1: The 3 high-order digits are the tool No., and the 1 low-order digit is the wear compensation No.

This parameter will be fixed to "0" when tool life management II is selected.

【#1098】 Tlno.   Tool length offset number

Select the number of digits of the tool length compensation No. in the T command.
  0: The 2 or 3 high-order digits are the tool No.
  The 2 or 1 low-order digits are the tool length compensation and wear compensation Nos.
  1: The 2 or 3 high-order digits are the tool No. and tool length compensation Nos.
  The 2 or 1 low-order digits are the wear compensation No.

【#1099】 Treset   Cancel tool compensation amount

Select how to handle the tool compensation vector when resetting the system.
  0: Clear the tool length and wear compensation vectors when resetting
  1: Hold the tool length and wear compensation vectors when resetting

When the values are cleared, the compensation will not be applied, so the axis will be shifted by the
compensation amount in the next compensation operation.
When the values are kept, the compensation will be applied, so the axis will shift the differential
amount of the compensation amount in the next compensation operation.

【#1100】 Tmove   Tool compensation

Select when to perform tool length compensation and wear compensation.
  0: Compensate when T command is executed.
  1: Superimpose and compensate with the travel command in the block where the T command is
  located. If there is no travel command in the same block, compensation will be executed after the
  travel command is superimposed in the next travel command block.
  2: Compensate the wear amount when the T command is executed. Superimpose and
  compensate the tool length compensation amount with the travel command in the same block.   If
  there is no travel command in the same block, compensation will be executed after the travel
  command is superimposed in the next travel command block.

【#1101】 Tabsmv   Tool compensation method

Select the type of travel command when "#1100 Tmove" is set to "1" or "2".
  0: Compensate regardless of the travel command type
  1: Compensate only at the travel command in the absolute command

【#1102】 tlm   Manual tool length measuring system   **for L system only**

Select the measurement method for manual tool measurement I.
  0: Align tool with basic point
  1: Input measurement results

(Note) Interpreted as "0" when other than "0" or "1" is set.

【#1103】　T_life　Validate life management

Select whether to use the tool life management.
　0: Not use
　1: Use

【#1104】　T_Com2　Tool command method 2

Select how to handle the tool command in the program when "#1103 T_Life" is set to "1".
　0: Handle the command as group No.
　1: Handle the command as tool No.

【#1105】　T_Sel2　Tool selection method 2

Select the tool selection method when "#1103 T_Life" is set to "1".
　0: Select in order of registered No. from the tools used in the same group.
　1: Select the tool with the longest remaining life from the tools used or unused in the same group.

【#1106】　Tcount　Life management　　for L system only

Select the input method when address N is omitted in inputting the data (G10 L3 command) for tool life management function II.
　0: Time specified input
　1: Number of times specified input

【#1107】　Tllfsc　Split life management display screen　　　　　　　　　for L system only

Set the number of groups to be displayed on the tool life management II (L system) screen.
　0: Displayed group count 1, maximum number of registered tools: 16
　1: Displayed group count 2, maximum number of registered tools: 8
　2: Displayed group count 4, maximum number of registered tools: 4

【#1108】　TlrectM　Life management re-count M code　　　　　　　　　for L system only

Set the M code for tool life management II (L system) re-count.

---Setting range---
0 to 99

【#1109】　subs_M　Validate alternate M code

Select the user macro interrupt with the substitute M code.
　0: Disable alternate M code
　1: Enable alternate M code

【#1110】　M96_M　M96 alternate M code

Set an M code to replace M96 when "#1109 subs_M" is set to "1".

---Setting range---
3 to 97 (excluding 30)

【#1111】　M97_M　M97 alternate M code

Specify an M code to replace M97 when #1109 subs_M is set to 1.

---Setting range---
3 to 97 (excluding 30)

【#1112(PR)】　S_TRG　Validate status trigger method

Select the enable conditions for the user macro interrupt signal (UIT).
　0: Enable when interrupt signal (UIT) turns ON
　1: Enable when interrupt signal (UIT) is ON

【#1113(PR)】　INT_2　Validate interrupt method type 2

Select the performance after user macro interrupt signal (UIT) input.
　0: Execute interrupt program without waiting for block being executed to end
　1: Execute interrupt program after completing block being executed

4. Base Specifications Parameters

【#1114】　mcrint　Macro argument initialization

Select whether to clear statements other than specified arguments by macro call.
Also select whether to clear local variables by power-ON and resetting.
 0: Clear the non-specified arguments by macro call.
 1: Hold non-specified arguments by macro call
 2: Hold non-specified arguments by macro call, and clear local variables by power-ON and resetting

---

【#1115】　thwait　Waiting for thread cutting

Set the queue number during screw thread cutting when chamfering is disabled.

---Setting range---
0 to 99 (Approx. 4 ms)
Standard seting value: 4

【#1116】　G30SLM　Invalidate soft limit (manual operation)

Enable this function when disabling the soft limit check function at the second to fourth reference position return.
0: Enable soft limit function
1: Disable soft limit function

【#1117(PR)】　H_sens　Handle response switch

Select the handle response mode during handle feed.
0: Standard
1: High-speed

【#1118】　mirr_A　Select how to set up the length of tools on cutter tables (opposed tables)　　for L system only

Select one of the following two methods:
• Set the current length of tools on each facing turret.
• Set a value, assuming that the tools on each facing turret are in the same direction as that of those on the base turret.
 0: Current length of the tools on each facing turret
 1: Value, assuming that the tools on each facing turret are in the same direction as that of those on the base turret

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【#1119】　Tmiron　Select the mirror image of each facing turret with T command　　for L system only

Select whether to enable the mirror image of each facing turret with the T command.
 0: Disable
 1: Enable

【#1120(PR)】　TofVal　Change macro variable

Select whether to change the macro variable (tool offset) numbers for shape compensation and wear compensation.
 0: Not change (Conventional specification)
 1: Change the shape and wear compensation variable numbers each for X, Z, and R

【#1121】　edlk_c　Edit lock C

Select the edit lock for program Nos. 9000 to 9999 in memory.
0: Editing possible
1: Editing prohibited. The file cannot be opened.

(Note) If "#1122" is set to "1" or "2", "1" will be set in "#1121" when the power is turned ON.

【#1122(PR)】　pglk_c　Program display lock C

Select whether to prohibit the program display and search for program Nos. 9000 to 9999 in memory.
 0: Program display and search is possible
 1: Program display is impossible. Search is possible.
 2: Program display and search is impossible

(Note) If "#1122" is set to "1" or "2", "1" will be set in "#1121" when the power is turned ON.

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【#1123】 origin Origin set prohibit

Select whether to use the origin set function.
   0: Use
   1: Not use

【#1124】 ofsfix Fix tool compensation No.

Select how to handle the compensation No. when the input key is pressed on the tool compensation screen.
   0: Increment the compensation No. by 1 (Same as general parameters)
   1: # compensation No. does not change

When setting in sequence, "0" is handier. When changing and setting repeatedly while adjusting one compensation value, "1" is handier

【#1125】 real_f Actual feedrate display

Select the feedrate display on the monitor screen.
   0: Command speed
   1: Actual travel feedrate

【#1126】 PB_G90 Playback G90

Select the method to command the playback travel amount in the playback editing.
0: Incremental value
1: Absolute value

【#1127】 DPRINT DPRINT alignment

Select the alignment for printing out with the DPRINT function.
   0: No alignment, output s printed with left justification
   1: Align the minimum digit and output

【#1128】 RstVCI Clear variables by resetting

Select how to handle the common variables when resetting.
0: Common variables won't change after resetting.
1: The following common variables will be cleared by resetting:
#100 to #149 when 100 sets of variables are provided.
#100 to #199 when 200 sets or more of variables are provided.

【#1129】 PwrVCI Clear variables by power-ON

Select how to handle the common variables when the power is turned ON.
0: The common variables are in the same state as before turning the power OFF.
1: The following common variables will be cleared when the power is turned ON:
#100 to #149 when 100 sets of variables are provided.
#100 to #199 when 200 sets or more of variables are provided.

【#1130】 set_t Display selected tool number

Select the tool command value display on the POSITION screen.
0: Display T-modal value of program command
1: Display Tool No. sent from PLC

【#1132】 CRT

Not used. Set to "0".

【#1133】 ofsmem

Not used. Set to "0".

【#1134】 LCDneg

Not used. Set to "0".

4. Base Specifications Parameters

【#1135】　unt_nm　Unit name

Set the unit name.
Set with 4 or less characters consisting of both alphabets and numbers. If "0" is set, the unit name won't be displayed.

---Setting range---
4 or less characters consisting of both alphabets and numbers

---

【#1136】　optype

Not used. Set to "0".

【#1137】　Cntsel

Not used. Set to "0".

【#1138】　Pnosel

Not used. Set to "0".

【#1139】　edtype

Not used. Set to "0".

【#1140】　Mn100　M code number

Set the first number of M code that corresponds to the setup Nos. from 100 to 199.

---Setting range-
0 to 99999999

【#1141】　Mn200　M code number

Set the first number of M code that corresponds to the setup Nos. from 200 to 299.

---Setting range---
0 to 99999999

【#1142】　Mn300　M code number

Set the first number of M code that corresponds to the setup Nos. from 300 to 399.

---Setting range---
0 to 99999999

【#1143】　Mn400　M code number

Set the first number of M code that corresponds to the setup Nos. from 400 to 499.

---Setting range---
0 to 99999999

【#1144】　mdlkof　MDI setup lock

Select whether to enable MDI setting in non-MDI mode.
　0: Disable MDI setting
　1: Enable MDI setting

【#1145】　I_abs　Manual ABS parameter

Select how to handle the absolute position data during automatic handle interrupt.
　0: Absolute position data will be renewed if manual ABS switch is ON. If it is OFF, data won't be renewed.
　1: Follow the "intabs" state when "#1061 intabs" is enabled

【#1146】　Sclamp　Spindle rotation speed clamp function

Select how to handle the spindle rotation speed clamp function with the G92S command.
　0: G92S command is handled as a clamp command only in the G96 state (during constant surface speed control).
　G92S will be handled as normal S command in G97 state (constant surface speed OFF).
　1: The S command in the same block as G92 is constantly handled as a clamp command

【#1147】 smin_V Minimum spindle rotation speed clamp type

Specify the type of spindle min. rotation speed clamp value.
  0: Rotation speed setting
  1: Output voltage coefficient setting

Set "#3023 smini" according to this type setting.

【#1148】 I_G611 Initial high precision

Set the high accuracy control mode for the modal state when the power is turned ON.
  0: G64 (cutting mode) at power ON
  1: G61.1 (high-accuracy control mode) at power ON

【#1149】 cireft Arc deceleration speed change

Select whether to decelerate at the arc entrance or exit.
  0: Not decelerate
  1: Decelerate

【#1151】 rstint Reset initial

Select whether to initialize (power ON state) the modals by resetting.
  0: Not initialize modal state
  1: Initialize modal state

【#1153】 FixbDc Hole bottom deceleration check

Select whether to perform a deceleration check or in-position check at the hole bottom in a hole drilling cycle. This parameter is enabled only for a hole drilling cycle in which no dwell command can be issued at the hole bottom.
  0: Perform no deceleration check and in-position check
  1: Perform deceleration check
  2: Perform in-position check

【#1154(PR)】 pdoor

Not used. Set to "0".

【#1155】 DOOR_m

Not used. Set to "100".

---Setting range---
100

【#1156】 DOOR_s

Not used. Set to "100".

---Setting range---
100

【#1157】 F0atrn

Not used. Set to "0".

【#1158】 F0atno

Not used. Set to "0".

【#1163(PR)】 No rio RIO connection detection invalid

Select whether to enable or disable RIO connection detection.
  0: Enable
  1: Disable
If your I/O consists of only cards such as CC-LINK, setting this parameter to "1" will avoid the RIO communication cutoff alarm.

【#1164(PR)】　ATS　Automatic tuning function

Select whether to enable or disable the automatic tuning function.
　0: Disable
　1: Enable

【#1166】　fixpro　Fixed cycle editing

Select a type of program dealt on the edit/program list/data in/out screen, general program fixed cycle, or machine tool builder macro program.
　0: General programs can be edited, etc.
　1: Fixed cycles can be edited, etc.
　Password No.: The machine tool builder macro programs can be edited, etc.

---Setting range---
0 to 99999999

【#1167】　e2rom

Not used. Set to "0".

【#1168】　test　Simulation test

Select the test mode for the control unit.
In the test mode, test is performed with a hypothetical reference position return complete even though the real reference position return hasn't been completed. This is limited to test operation of the control unit itself, and must not be used when the machine is connected.
　0: Normal operation mode
　1: Test mode

【#1169】　part system name　Part system name

Set the name of each part system.
This must be set only when using multi-part system.
This name will be displayed on the screen only when the part systems must be identified.
Use a max. of four alphabetic characters or numerals.

---Setting range---
A max. of four alphabetic characters or numerals.

【#1170】　M2name　Second miscellaneous code

Set this address code when using the 2nd miscellaneous command. Set an address with A, B or C that is not used for "#1013 axname" or "#1014 incax".

---Setting range---
A, B, C

【#1171】　taprov　Tap return override

Set the tap return override value for the synchronous tapping.
When "0" is set, it will be regarded as 100%.

---Setting range---
1 to 100 (%)

【#1172】　tapovr　Tap return override

Set the override value when leaving the tap end point in the synchronous tapping cycle.
The setting range is 1 to 999, and the unit is %.
When a value less than 100 is set, it will be judged as 100%.

---Setting range---
1 to 999 (%)

【#1173】 dwlskp G04 skip condition

Set the skip signal for ending the G04 (dwell) command.

---Setting range---
PLC interface input signal

	Skip3	Skip2	Skip1
0 :	-	-	-
1 :	-	-	*
2 :	-	*	-
3 :	-	*	*
4 :	*	-	-
5 :	*	-	*
6 :	*	*	-
7 :	*	*	*

(* : Enable   - : Disable)

【#1174】 skip_F G31 skip speed

Set the feedrate when there is no F command in the program at G31 (skip) command.

---Setting range---
1 to 999999 (mm/min)

【#1175】 skip1 G31.1 skip condition

Designate the skip signal in multi-step skip G31.1.

---Setting range---
The setting method is same as "#1173".

【#1176】 skip1f G31.2 skip speed

Set the skip feedrate in multi-step skip G31.1.

---Setting range---
1 to 999999 (mm/min)

【#1177】 skip2 G31.2 skip condition

Set the skip signal in multi-step skip G31.2.

---Setting range---
The setting method is same as "#1173".

【#1178】 skip2f G31.2 skip speed

Set the skip signal in multi-step skip G31.2.

Set-ting	PLC interface input signal		
	Skip 3	Skip 2	Skip 1
0	-	-	-
1	-	-	○
2	-	○	-
3	-	○	○
4	○	-	-
5	○	-	○
6	○	○	-
7	○	○	○

○: Enable   -: Disable

【#1179】 skip3 G31.3 skip condition

Set the skip signal in multi-step skip G31.3

---Setting range---
The setting method is same as "#1173".

4. Base Specifications Parameters

【#1180】 skip3f　G31.3 skip speed

Set the skip signal in multi-step skip G31.3.

---Setting range---
1 to 999999 (mm/min)

【#1181】 G96_ax　Constant surface speed axis

Select the axis to be targeted for constant surface speed control.
0: Program setting will be disabled, and the axis will always be fixed to the 1st axis
1: 1st axis
2: 2nd axis
3: 3rd axis
:　　　　:
8: 8th axis

However, when set to other than "0", the priority will be on the program setting.

【#1182】 thr_F　Thread cutting speed

Set the screw cut up speed when not using chamfering in the thread cutting cycle.
　0: Cutting feed clamp feedrate
　1 to 60000 mm/min: Setting feedrate

---Setting range---
0 to 60000 (mm/min)

【#1183】 clmp_M　M code for clamp

Set the M code for C axis clamp in hole drilling cycle.

---Setting range---
0 to 99999999

【#1184】 clmp_D　Dwelling time after outputting M code for unclamp

Set the dwell time after outputting the M code for C axis unclamp in hole drilling cycle.

---Setting range---
0.000 to 99999.999 (s)

【#1185】 spd_F1　F1 digit feedrate F1

Set the feedrate for the F command in the F 1-digit command ("#1079 F1digit" is set to "1").
Feedrate when F1 is issued (mm/min)

---Setting range---
1 to 60000 (mm/min)

【#1186】 spd_F2　F1 digit feedrate F2

Set the feedrate for the F command in the F 1-digit command ("#1079 F1digit" is set to "1").
Feedrate when F2 is issued (mm/min)

---Setting range---
1 to 60000 (mm/min)

【#1187】 spd_F3　F1 digit feedrate F3

Set the feedrate for the F command in the F 1-digit command ("#1079 F1digit" is set to "1").
Feedrate when F3 is issued (mm/min)

---Setting range---
1 to 60000 (mm/min)

【#1188】 spd_F4　F1 digit feedrate F4

Set the feedrate for the F command in the F 1-digit command ("#1079 F1digit" is set to "1").
Feedrate when F4 is issued (mm/min)

---Setting range---
1 to 60000 (mm/min)

【#1189】　spd_F5　F1 digit feedrate F5

Set the feedrate for the F command in the F 1-digit command ("#1079 F1digit" is set to "1").
Feedrate when F5 is issued (mm/min)

---Setting range---
1 to 60000 (mm/min)

【#1190(PR)】　s_xcnt　Validate inclined axis control　　　　　　　　　　**for L system only**

Select whether to enable or disable inclined axis control.
   0: Disable inclined axis control
   1: Enable inclined axis control

【#1191(PR)】　s_angl　Inclination angle　　　　　　　　　　　　　　　**for L system only**

Set the inclination angle (θ).
(Note) When set to "0", the angle determined by three-side setting will be applied.

---Setting range---
± 80.000 (°)

【#1192(PR)】　s_zrmv　Compensation at reference position return　　　**for L system only**

Select whether to perform compensation for the base axis corresponding to the inclined axis at reference position return.
   0: Perform compensation
   1: Not perform compensation

【#1193】　inpos　Deceleration check method 1/ Validate in-position check

The definitions are changed with the setting of "#1306 InpsTyp Deceleration check specification type".
<When Deceleration check method 1 is selected>
Select the deceleration check method for G0.
   0: Command deceleration check
   1: In-position check
<When Deceleration check method 2 is selected>
Select the deceleration confirmation method for the positioning or cutting command.
   0: G0, G1+G9　　　Command deceleration check
   1: G0, G1+G9　　　In-position check

【#1194】　H_acdc　Time constant 0 for handle feed

Select the time constant for manual handle feed.
   0: Use time constant for G01
   1: Time constant 0 (step)

【#1195】　Mmac　Macro call for M command

Select whether to enable or disable M command macro call of user macro.
   0: Disable
   1: Enable

【#1196】　Smac　Macro call for S command

Select whether to enable or disable S command macro call of user macro.
   0: Disable
   1: Enable

【#1197】　Tmac　Macro call for T command

Select whether to enable or disable T command macro call of user macro.
   0: Disable
   1: Enable

【#1198】　M2mac　Macro call with 2nd miscellaneous code

Select whether to enable or disable 2nd miscellaneous command macro call of user macro.
   0: Disable
   1: Enable

【#1199】   Sselect   Select initial spindle control

Select the initial condition of spindle control after power is turned ON.
  0: 1st spindle control mode (G43.1)
  1: Selected spindle control mode (G44.1)
  2: All spindle simultaneously control mode (G47.1)

(Note) Spindle No. when G44.1 is commanded is selected with "#1534 SnG44.1".

【#1200(PR)】   G0_acc   Validate acceleration and deceleration with inclination angle constant G0

Select the acceleration and deceleration type when a rapid traverse command is issued.
  0: Acceleration and deceleration with constant time (conventional type)
  1: Acceleration and deceleration with a constant angle of inclination

(Note) When rapid traverse constant inclination multi-step acceleration/deceleration is valid, this parameter will be invalid.

【#1201(PR)】   G1_acc   Validate acceleration and deceleration with inclination constant G1

Select the acceleration and deceleration type when a linear interpolation command is issued.
  0: Acceleration and deceleration with constant time (conventional type)
  1: Acceleration and deceleration with a constant angle of inclination

---

【#1202】   mirofs   Distance between facing turrets   for L system only

Set the distance between tools (edges) (between facing turrets).

---Setting range---
0 to 99999.999 (mm)

【#1203】   TmirS1   Select turrets as facing turrets with T command   for L system only

Select the turrets, which correspond to the tool Nos. 1 to 32, as facing turrets for T code mirror image.

---Setting range---
0 to FFFFFFFF

【#1204】   TmirS2   Select turrets as facing turrets with T command   for L system only

Select the turrets, which correspond to the tool Nos. 33 to 64, as facing turrets for T code mirror image.

---Setting range---
0 to FFFFFFFF

【#1205】   G0bdcc   Acceleration and deceleration before G0 interpolation

  0: Post-interpolation acceleration/deceleration is applied to G00.
  1: Pre-interpolation acceleration/deceleration is applied to G00 even in the high accuracy control mode.
  2: Rapid traverse constant inclination multi-step acceleration/deceleration is enabled.

(Note) "1" cannot be set for the 2nd part system and the following.

【#1206】   G1bF   Maximum speed

Set a cutting feedrate when applying pre-interpolation acceleration/deceleration.
When high-accuracy control time constant expansion is valid, set the maximum of cutting feed clamp speed of each axis.

---Setting range---
1 to 999999 (mm/min)

【#1207】　G1btL　Time constant

Set a cutting feed time constant when applying pre-interpolation acceleration/deceleration.
When "0" is set, the time constant will be clamped at 1ms.
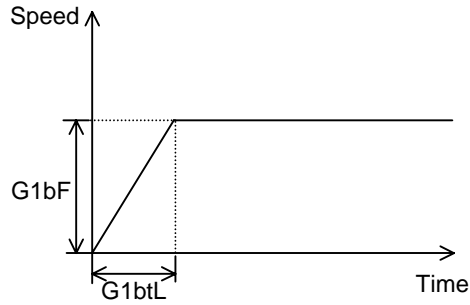
---Setting range---

Without high-accuracy control time constant expansion : 0 to 5000　(ms)
With high-accuracy control time constant expansion : 0 to 30000 (ms)

【#1208】　RCK　Arc radius error compensation factor

Set a coefficient for arc radius error compensation.
An arc radius error compensation amount can be increased or decreased between -60.0 and +20.0%.

---Setting range---

-60.0 to +20.0 (%)

【#1209】　cirdcc　Arc deceleration speed

Set the deceleration speed at the arc entrance or exit.

---Setting range---

1 to 999999 (mm/min)

【#1210】　RstGmd　Modal G code reset

Select whether to initialize G code group modals and H and D codes, which corresponds to bits as follows, when the system is reset.
　0: Initialize.
　1: Not initialize.

<Description of bits for M system>

1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10
0	0	0	0	0	0	*	*	0	0	0	0	*	*	*	*

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
0	*	0	*	*	0	*	0	*	*	*	*	0	*	*	*

bit 1F:　(Not used)

bit 1E:　(Not used)

bit 1D:　(Not used)

bit 1C:　(Not used)

bit 1B:　(Not used)

bit 1A:　(Not used)

bit 19: Spindle clamp rotation speed initialization

bit 18: H, D codes initialization

bit 17:　(Not used)

bit 16:　(Not used)

bit 15:　(Not used)

bit 14:　(Not used)

bit 13: Group 20 2nd spindle control modal initialization

bit 12: Group 19 G command mirror modal initialization

bit 11: Group 18 Polar coordinate command modal initialization

bit 10: Group 17 Constant surface speed control command modal initialization

bit F:　(Not used)

bit E: Group 15 Normal line control modal initialization

bit D:　(Not used)

bit C: Group 13 Cutting modal initialization

bit B: Group 12 Workpiece coordinate system modal initialization

bit A:　(Not used)

bit 9: Group 10 Fixed cycle return command modal initialization

bit 8:　(Not used)

bit 7: Group 8 Length compensation modal initialization

bit 6: Group 7 Radius compensation modal initialization

bit 5: Group 6 Inch/metric modal initialization

bit 4: Group 5 Feed G modal initialization

bit 3:　(Not used)

bit 2: Group 3 Absolute/incremental command modal initialization

bit 1: Group 2 Plane selection modal initialization

bit 0: Group 1 Move G modal initialization

The H code indicates the tool length offset number, and the D code indicates the tool radius compensation number.
When bit 18 is set to ON, the H and D codes and group 8 G modal are retained.
When bit 7 is set to ON, the H code and group 8 G modal are retained.

<Description of bits for M system>

1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10
0	0	0	0	0	0	*	0	0	0	0	*	*	0	*	*

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
0	0	0	*	*	0	*	0	0	*	*	*	*	*	*	*

bit 1F: (Not used)
bit 1E: (Not used)
bit 1D: (Not used)
bit 1C: (Not used)
bit 1B: (Not used)
bit 1A: (Not used)
bit 19: Spindle clamp rotation speed initialization
bit 18: (Not used)
bit 17: (Not used)
bit 16: (Not used)
bit 15: (Not used)
bit 14: Group 15 Facing turret mirror image initialization
bit 13: Group 20 2nd spindle control modal initialization
bit 12: (Not used)
bit 11: Group 18 Balance cut initialization
bit 10: Group 17 Constant surface speed control command modal initialization
bit F: (Not used)
bit E: (Not used)
bit D: (Not used)
bit C: Group 13 Cutting modal initialization
bit B: Group 12 Workpiece coordinate system modal initialization
bit A: (Not used)
bit 9: Group 10 Fixed cycle return command modal initialization
bit 8: (Not used)
bit 7: (Not used)
bit 6: Group 7 Nose R compensation modal initialization
bit 5: Group 6 Inch/metric modal initialization
bit 4: Group 5 Feed G modal initialization
bit 3: Group 4 Barrier check modal initialization
bit 2: Group 3 Absolute/incremental command modal initialization
bit 1: Group 2 Plane selection modal initialization
bit 0: Group 1 Move G modal initialization

【#1213(PR)】　　proaxy　Side 1 of inclination angle　　　　　　　　　　　　　for L system only

Set the length within the orthogonal coordinate of the inclined axis, a side of the triangle formed with the inclination angle.

---Setting range---
±9999.999

【#1214(PR)】　　macaxy　Side 2 of inclination angle　　　　　　　　　　　　　for L system only

Set the actual length of the base axis corresponding to the inclined axis, a side of the triangle formed with the inclination angle.

---Setting range---
±9999.999

【#1215(PR)】　　macaxx　Side 3 of inclination angle　　　　　　　　　　　　　for L system only

Set the actual length of the inclined axis, a side of the triangle formed with the inclination angle.

---Setting range---
±9999.999

【#1216】　　extdcc　External deceleration level

Set the upper limit value of the feedrate when the external deceleration signals are enabled.
This parameter is valid when "#1239 set11/bit6" is set to "0".

---Setting range---
1 to 999999 (mm/min)

4. Base Specifications Parameters

【#1217】 aux01

Not used. Set to "0".

【#1218】 aux02

bit3: Parameter input/output format

Select the parameter input/output format.
  0: Type I
  1: Type II (related to "#1218 aux02/bit5")

bit4: External workpiece coordinate offset tool number selection

Select the R register that contains the tool number used for automatic calculation when measuring the coordinate offset of an external workpiece.
  0: Follow the setting of "#1130 set_t".
  1: Use the tool number indicated by user PLC.

bit5: Parameter I/O II spindle specification address

Select the spindle specification address of parameter I/O type II.
  0: C
  1: T
This parameter is also applied to the spindle specification address for input and verification.
(Note) This parameter is valid only for parameter I/O type II (when "#1218 aux02/bit3" is set to "1").

bit6: Set No. valid when program input

Select which program No. is applied when inputting programs in "#1 MAIN PROGRAM" on Data I/O screen.
  0: The No. in the input data
  1: The No. set in the data setting area

bit7: Input by program overwrite

(1) Select the operation when the program to be input in "#1 MAIN PROGRAM" on Data I/O screen, has already been registered.
  0: An operation error (E65) occurs.
  1: Input by overwrite.
(2) Select the operation in the high-speed program server mode, when the name of the file to be transmitted with (IC -> host) transmission already exists in the host.
  0: Prohibit overwrite
  1: Enable overwrite

【#1219】 aux03

bit1: Stop high-speed PC monitoring function

Set "1" to disable the function that triggers the emergency stop when the PC high-speed processing time is extended.
Disable the monitoring function only as a temporary measure.

bit5: Dog-type intermediate point

Select whether to move to the intermediate point during automatic dog-type reference position return.
0: Not move.
1: Move.

bit7: Time constant setting changeover for soft acceleration/deceleration

Select the time constant for soft acceleration/deceleration.
0: Accelerating time is obtained with G0tL (G1tL).
1: Accelerating time is obtained with G0tL + G0t1 (G1tL + G1t1).

【#1220】 aux04   for L system only

bit 0: Tool life check timing selection

Select the criterion to judge the tool life end when the use count is incremented in tool life management II.
  0: Determine the tool life end when the incremented use count has exceeded the life count. (Default)
  (Use count > life count)
  1: Determine the tool life end when the incremented use count has reached the life count.
  (Use count ≥ life count)

【#1221】 aux05

Not used. Set to "0".

---

4. Base Specifications Parameters

【#1222】 aux06

bit4: Minimum cut-in amount selection

Select the minimum cut-in amount command value for the compound thread cutting cycle (G76 command).
  0: The minimum cut-in amount (Q) will be "0".
  1: The minimum cut-in amount (Q) will be set in the CNC internal data.

bit5: Fixed cycle for compound lathe command format check selection

Select the operation when the 1st block of the fixed cycle for compound lathe is omitted while the conventional format is selected ("#1265 ext01/bit0" is set to "0").
0: Program error (P33) will occur.
1: Parameter setting value will be used.

bit7: Reference position return deceleration check method

Select the deceleration check method to be used during automatic reference position return.
  0: In-position check
  1: Commanded deceleration check

【#1223】 aux07

bit1: Deceleration check method 2

Select the deceleration check method in G1+G9.
  0: Command deceleration check in G1+G9
  1: In-position check in G1+G9
The deceleration check is not performed for the commands except G1+G9.
When "#1306 InpsTyp deceleration check specification type" is set to "1" (Deceleration check specification type 2), this parameter will be invalid.

bit2: Synchronous tap R-point in-position check

Select whether to enable the synchronous tap I-point -> R-point in-position check.
  0: Disable
  1: Enable
(Note) This parameter is valid only when "1" (Enable in-position check) is set for "#1223 aux07/bit3 Synchronous tap in-position check improvement".

bit3: Synchronous tap in-position check improvement

Select whether to enable the synchronous tap in-position check improvement.
  0: Disable
  1: Enable
Related parameters:
#1223/bit2 Synchronous tap R-point in-position check
#1223/bit4 Synchronous tap hole bottom in-position check
#1223/bit5 Synchronous tap R-point in-position check 2

bit4: Synchronous tap hole bottom in-position check

Select whether to enable the synchronous tap hole bottom in-position check.
  0: Disable
  1: Enable
(Note) This parameter is valid only when "1" (Enable in-position check) is set for "#1223 aux07/bit3 Synchronous tap in-position check improvement".

bit5: Synchronous tap R-point in-position check 2

Select whether to enable the synchronous tap R-point in-position check.
  0: Disable
  1: Enable
(Note) This parameter is valid only when "1" (Enable in-position check) is set for "#1223 aux07/bit3 Synchronous tap in-position check improvement".

bit6: Cancel synchronous tap (, S) return

  0: Retain the spindle speed (, S) in synchronous tap return
  1: Cancel the spindle speed (, S) in synchronous tap return with G80

bit7: Synchronous tap method

Select the synchronous tapping method.
0: Synchronous tapping with multi-step acceleration/deceleration and rapid return
1: Conventional type synchronous tapping

4. Base Specifications Parameters

【#1224】　aux08

bit0: Sampling data output

Select whether to enable the sampling data output.
0: Disable
1: Enable

【#1225】　aux09

bit6: Enable/disable spindle rotation speed clamp 2

Select whether to enable the spindle rotation speed clamp by the G92 Q command for the spindle command rotation speed (R7000) set with the user ladder.
　0: Follow the setting of "aux09/bit7".
　1: Only G92 S is valid for R7000. G92 Q is invalid.
When this parameter is set to "1", setting of "aux09/bit7" is invalid.

bit7: Enable/disable spindle rotation speed clamp

Select whether to enable the spindle rotation speed clamp by the G92 S or Q command for the spindle command rotation speed (R7000) set with the user ladder.
0: Enable
1: Disable

【#1226】　aux10

bit0: Tool compensation data for external workpiece coordinate offset measurement

Select the tool compensation data to be used for external workpiece coordinate offset measurement.
　0: Tool length data and tool nose wear data
　1: Tool length data

bit1: Optional block skip type

Select whether to enable the optional block skip in the middle of a block.
　0: Enable only at the beginning of a block.
　1: Enable in the middle of a block, as well as at the beginning of the block.

bit2: Single block stop timing

Select the timing at which the single block signal is activated.
　0: When the signal goes ON while automatic operation is starting, the block will stop after finished.
　1: When the signal is ON at the end of the block, the block will stop.

bit3: C-axis reference position return type

Select the C-axis reference position return type.
　0: Basic position return is performed by the G28 reference position return command or by activating the manual reference position return. The basic point dog is used.
　1: When the first C-axis command is issued after the C-axis mode is entered in automatic mode, reference position return is performed before the execution of the block. The reference position return is also performed by the G28 reference position return command or by activating the manual reference position return. The Z phase of the encoder is used.

bit4: S command during constant surface speed

Select whether to output a strobe signal when the S command is issued in constant surface speed mode.
　0: Not output any strobe signal in constant surface speed mode.
　1: Output strobe signals in constant surface speed mode.

bit5: Arbitrary allocation of dog signal

Select whether to enable the arbitrary allocation parameter for the origin dog and H/W OT.
　0: Disable (Fixed device is used.)
　1: Enable (Device is specified by the parameter.)

bit7: Shorten JOG stop time

Select whether to shorten the JOG stop time.
　0: Not shorten (Conventional specification)
　1: Shorten

【#1227】 aux11

bit0: Select PLC signal or spindle feedrate attained

Set up this option when disabling the cutting start interlock by spindle feedrate attained.
- 0: Cutting start interlock by PLC signal
- 1: Cutting start interlock by spindle feedrate attained

bit1: Select H or D code

Set up this option to validate the data that is set up on the tool life management screen when issuing the H99 or D99 command.
- 0: The H and D codes validate the data that is set up on the management setup screen.
- 1: Validates the data that is set up on the management setup screen when issuing the H99 or D99 command.

bit2: Measures against tool setter chattering

Select a condition where a relieving operation completes after measurement with tools.
- 0: Sensor signals have stopped for 500 ms or longer.
- 1: 100 μ m or longer has passed after sensor signals stopped.

bit3: Absolute coordinate switching (nose R)

Select whether to display a nose position or coordinate value with the absolute coordinate counter.
- 0: Displays the nose position.
- 1: Displays the position specified by program command. Select a condition where a relieving operation completes after measurement with tools.

bit5: Spindle rotation speed clamp

Specify whether to clamp the rotation speed in constant surface speed mode when the spindle rotation clamp command is issued.
- 0: Clamps the rotation regardless of the constant surface speed mode.
- 1: Clamps the rotation only in constant surface speed mode.

bit7: Switch the range of tool life data to be input

Set up the range of tool life data to be input or compared.
- 0: Inputs or compares all of the data output.
- 1: Inputs or compares part of the data output
  1) Tool life management I data to be input or compared tool number (D), lifetime (E), life count (F), and auxiliary data (B).
  2) Tool life management II data to be input or compared Group number (G), method (M), life (E/F), tool number (D), and compensation number (H)

4. Base Specifications Parameters

【#1228】 aux12

bit1: Switch "offset and parameter" screen

Select to switch the "offset and parameter" screen to the parameter screen.
   0: Display the "offset and parameter" screen.
   1: Display the "parameter" screen.

bit2: Switch data protection in data transmission mode

Select the range of data protection in data transmission mode.
   0: Enable the protection for both send and receive data.
   1: Enable the protection for receive data only.

bit3: Nose R specification

Select the method to specify the nose R compensation.
   0: Specify the nose R compensation by shape number.
   1: Specify the nose R compensation by wear number.

bit4: Select operation error or stop code

Select operation error or stop code to provide for both block start and cutting start interlocks.
   0: Operation error
   1: Stop code

bit5: Select constant surface speed coordinates

Select the constant surface speed coordinate.
   0: Workpiece coordinate
   1: Absolute value coordinate

bit6: Switch relative values displayed

Select whether to preset the relative coordinates with workpiece coordinate preset (G92.1) or counter preset (G92).
   0: Preset the relative coordinates.
   1: Not preset the relative coordinates.

bit7: Protection with manual value command

Select whether to protect a manual value command.
   0: Not protect. (Conventional specification)
   1: Protect.

4. Base Specifications Parameters

【#1229】　set01

bit0: Subprogram interrupt
Select the type of the user macro interrupt.
0: Macro type user macro interrupt
1: Sub-program type user macro interrupt

bit1: Accurate thread cutting E
Select what the address E specifies in inch screw cutting.
0: Number of threads per inch
1: Precision lead

bit2: Radius compensation type B (for M system only)
Select the method of the arithmetic processing for the intersection point when the start-up or cancel command is operated during radius compensation.
0: The processing does not handle the start-up or cancel command block: handle the offset vector in the direction vertical to that of the command instead.
1: The processing is executed for the intersection point between the command block and the next block.

bit2: Nose R compensation type B (for L system only)
Select the method of the arithmetic processing for the intersection point when the start-up or cancel commands are operated during nose R or radius compensation.
0: The processing does not handle the start-up or cancel command block: handle the offset vector in the direction vertical to that of the command instead.
1: The processing is executed for the intersection point between the command block and the next block.

bit3: Initial constant surface speed
Select the initial state after the power-ON.
0: Constant surface speed control cancel mode
1: Constant surface speed control mode

bit4: Synchronous tap
Select whether to use the floating tap chuck in G74 and G84 tapping cycles.
0: With a floating tap chuck
1: Without a floating tap chuck

bit5: Start point alarm
Select the operation when the operation start point cannot be found while executing the next block of G117.
0: Enables the auxiliary function after the block has been executed.
1: Outputs the program error (P33).

bit6: Grid display selection
Select the grid display type on the servo monitor screen during the dog type reference position return.
0: Distance between dog OFF and basic point (including a grid mask amount)
1: A value given by reducing a grid mask amount from the distance between dog OFF and basic point

【#1230】　set02

bit7: Macro interface input/output for each part system
Select the specification of the macro interface input/output.
0: Shared by all part systems.
1: Used independently by the part systems.

【#1231】　set03

bit0: Graphic check compatibility parameter
Select whether to return the data to the pre-starting data after having checked a machining program that rewrites the common variables, workpiece offsets and tool offsets.
0: Return the data.
1: Not return the data.

bit4: Switch zero point mark display position
Select the position for displaying the basic point mark in the graphic trace and 2D check.
0: Machine coordinate basic point (same as conventional method)
1: Workpiece coordinate basic point

bit5: Switch graphic check counter display
Select the type of counter displayed on the Graphic Check screen.
0: Machine position counter
1: Workpiece coordinate position counter

【#1232】　set04

Not used. Set to "0".

【#1233】　set05

Not used. Set to "0".

【#1234】　set06

Not used. Set to "0".

【#1235】　set07

bit0: Helical interpolation speed 2
0: Select normal speed designation also for 3rd axis
1: Select arc plane element speed designation

bit2: Fixed type chopping compensation valid only at start
When the fixed type compensation value is selected, the method can be changed to the compensation value sequential update type after the first four cycles.
0: Disable the method changeover
1: Enable the method changeover

bit4: Selection condition of synchronous tapping gear step
Select the parameters that determine the gear step for synchronous tapping.
0: #3005 through #3008 (smax1 to 4) when "#1223 aux07/bit7" is "0".
   Or #3013 through #3016 (stap1 to 4) when "#1223 aux07/bit7" is "1".
1: Always #3013 through #3016 (stap1 to 4)

【#1236】　set08

bit0: Manual rotary axis feedrate unit
Select the unit of manual rotary axis feedrate.
0: Fixed to [°/min]
1: Same speed as before (When inch command, the speed is the command speed divided by 25.4.)

bit1: Spindle speed detection
Select the pulse input source of actual spindle rotation speed (R6506/R6507) when the spindle encoder serial connection is selected ("#3025 enc-on" is set to "2").
0: Serial input
1: Encoder input connector

bit2: Current limit droop cancel invalid
Select whether to cancel the position droop when the current limit changeover signal is canceled.
0: Cancel the droop.
1: Not cancel the droop.

bit3: Rotary axis command speed scale
Select to multiply the rotary axis command speed by 10 times.
0: Invalid
1: During initial inching, the rotary axis command speed is multiplied by 10. In other words, if "F100" is commanded, the speed will be the same as when 1000°/min is commanded.
The rotary axis speed display unit will be 10°/min.

【#1237(PR)】　set09

Not used. Set to "0".

【#1238(PR)】 set10

bit0: Switch G36 function

Select the function, the automatic tool length measurement or arc thread cutting (CCW), to be applied to G36 when the G code system 6 or 7 is selected.
    0: Automatic tool length measurement
    1: Arc thread cutting (CCW)

bit7: Switch operation alarm

Select whether to enable the NC alarm 5 (AL5) signal output.
    0: Disable NC alarm 5 (AL5)
    All operation alarms will be output to NC alarm 4 (AL4).
    All operation alarms will be recorded in the alarm history.
    1: Enable NC alarm 5 (AL5)
    The following operation alarms will be output to NC alarm 5 (AL5), not to NC alarm 4 (AL4).
    The operation alarms output to NC alarm 5 (AL5) will not be recorded in the alarm history.
    ・External interlock axis found
    ・ Cutting override zero
    ・ External feedrate zero
    ・ Block start interlock
    ・ Cutting block start interlock
    ・ Cutting interlock for spindle-spindle polygon (G51.2)

【#1239(PR)】 set11

bit0: Coil switching method

Select the coil switching method.
    0: Via PLC (Y189F).
    1: NC internal processing. (Y189F is invalid.)

bit1: Handle I/F selection

Select the handle connection destination.
    0: Use the handle connected to the encoder communication connector.
    1: Use the remote I/O unit as a priority.
    When HN391/HN392 is mounted, the handle connected to the operation panel I/O unit will be used regardless of this parameter setting.

bit3: Polygon machining mode at reset

Select whether to cancel the polygon machining mode when reset is applied.
    0: Not cancel.
    1: Cancel.

bit4: Invalidate G51.1 phase command

Select whether to enable the phase control with the spindle-spindle polygon function.
    0: Always enable. (When R is not commanded, it will be handled as R0.)
    1: Enable only at the R command.

bit5: Door interlock spindle speed clamp valid

Select whether to enable the spindle clamp speed changeover by the PLC signal.
    0: Disable
    1: Enable

【#1240(PR)】 set12

bit0: Handle input pulse

Select the handle input pulse.
    0: MITSUBISHI CNC standard handle pulse
    1: Handle 400 pulse

bit2: Zero point shift amount magnification

When "1" is set, the following magnification will be applied on the "#2027 G28sft Reference position shift distance", "#2057 Near zero point +" and "#2058 Near zero point -" settings.
    For 0.1μm: 10-fold
    For 0.01μm: 100-fold

bit4: Optical communication automatic channel detection invalid

Select whether to enable the optical communication automatic channel detection.
    0: Enable
    1: Disable

4. Base Specifications Parameters

【#1265(PR)】   ext01

bit0: Command format 1

Select the command format for the fixed cycle for compound lathe.
   0: Conventional format
   1: MITSUBISHI CNC special format (1 block command method)

bit1: Command format 2

Select the command format for the lathe fixed cycle.
   0: Conventional format
   1: MITSUBISHI CNC special format

bit2: Command format 3

Select the command format for the hole drilling fixed cycle.
   0: Conventional format
   1: MITSUBISHI CNC special format

【#1266(PR)】   ext02

Not used. Set to "0".

【#1267(PR)】   ext03

bit0: G code type

Select the high-speed high-accuracy G code type.
   0: Conventional format (G61.1)
   1: MITSUBISHI special format (G08P1)

【#1268(PR)】   ext04

Not used. Set to "0".

【#1269(PR)】   ext05

Not used. Set to "0".

【#1270(PR)】   ext06

bit6: Switch continuous thread cutting Z phase wait operation

Select when to start the 2nd block thread cutting when there is a command with no movement (MST command, etc.) between the thread cutting blocks.
   0: Wait for the spindle's single rotation synchronization signal before starting the movement.
   1: Start movement without waiting for the spindle's single rotation synchronization signal.

bit7: Handle C axis coordinate during cylindrical interpolation

Specify whether to keep the rotary axis coordinate as before the cylindrical interpolation start command is issued during the cylindrical interpolation.
   0: Not keep
   1: Keep

【#1271(PR)】　ext07

bit0: Mirror image operation

Select the type of mirror image operation.

0: Type 1

・ The program mirror image, external mirror image, and parameter mirror image are exclusive to each other.

・ An increment command moves the image to the position indicated by the travel amount with the sign inverted.

1: Type 2

・ Mirror image operation is enabled when the program mirror image (G51.1) command is issued or when the external signal or parameter is ON.

・ An increment command moves the image to the position determined by applying the mirror image to the absolute program coordinates.

bit1: Address specifying fixed cycle repetition count (for M system only)

Select the address that specifies the fixed cycle repetition count.

0: Address L only (Default)

1: Addresses K and L

If addresses K and L are specified simultaneously, the data at address K will be used for operation.

bit2: F-command unit

Select the unit to be used when a thread cutting lead command does not contain decimal point.

0: Type 1 (conventional specifications)

F1 -> 1 mm/rev, 1 inch/rev

1: Type 2

F1 -> 0.01 mm/rev, 0.0001 inch/rev

bit3: G-code group for unidirectional positioning (for M system only)

Select the G-code group for unidirectional positioning.

0: Unmodal G code (group 00)

1: Modal G code (group 01)

Related parameter: "#8209 G60 Shift" (Set the last positioning direction and distance for each axis applicable when the unidirectional positioning command is issued.)

bit4: Operation by independent G40 command

Select whether the radius compensation vector is canceled by the independent G40 command.

0: Type 1 (conventional specification) (Default)

The radius compensation vector will be canceled by the independent G40 command.

1: Type 2

The radius compensation vector won't be canceled by the independent G40 command: it will be canceled by the next travel command for the radius compensation plane.

bit5: Cut start position (for L system only)

Select the position from where cutting begins in a fixed cycle for compound lathe.

0: Conventional specification (Default)

The cut start position will be determined by the final shaping program.

1: Extended specification

The cut start position will be determined from the cycle start point.

bit6: Nose R compensation (for L system only)

Select whether to apply nose R compensation for shapes in a rough cutting cycle.

0: Conventional specification (Default)

The shape after nose R compensation in the final shaping program will be used as rough cutting shape (when the nose R compensation for the final shaping program).

1: Extended specifications

The shape without nose R compensation in the final shaping program will be used as rough cutting shape.

bit7: Cut amount (for L system only)

Select the operation to be performed when the program-specified cut amount exceeds the cut amount of the final shaping program.

0: Conventional specification (Default)

A program error will occur when the program-specified cut amount exceeds the cut amount of the final shaping program.

1: Extended specification

Rough cutting will be performed by one cut when the program-specified cut amount exceeds the cut amount of the final shaping program.

【#1272(PR)】 ext08

bit0: Switch pocket machining operation

Select the pocket machining specification.
0: Conventional specification
Pocket machining will be selected with the H designation.
The pull direction when pocket machining is ON will be the Z direction.
1: Extended specification
Pocket machining will start only when both X and Z axes are specified in the first travel block after the finished shape start block.
The pull direction when pocket machining is ON will be the X direction.

bit1: M function synchronous tap cycle

Specify whether to enable the M function synchronous tapping cycle.
0: Disable
1: Enable

bit2: Spiral/conical interpolation command format 2

Select the command format for spiral and conical interpolation.
0: Type 1 (conventional specification)
1: Type 2 (with the number of spiral rotation L designation and the increment designation)

bit3: Switch macro call function

Select whether to shift the argument to the subprogram if nests are overlapped when per block call (G66.1) is commanded.
0: Shift
1: Not shift (Conventional specification)

bit4: Tap cycle selection

Select the tapping cycle.
0: Pecking tapping cycle
1: Deep hole tapping cycle

bit5: Deep hole tap cycle override selection

Select whether to enable override on the pulling operation during synchronized tapping with the deep hole tapping cycle.
0: Disable
1: Enable

bit6: Switch corner chamfering/ corner R command format

Select the command format of the corner chamfering/corner R.
0: Command format I (conventional format)
Issue a command with comma (,C and ,R).
1: Command format II
In addition to command format I, addresses without comma can be used to command.
I/K or C can be used for corner chamfering, while R can be used for corner R.

bit7: Return position after macro interrupt in fixed cycle selection

Select the destination to return to after a macro interrupt in the fixed cycle.
0: Return to the block in the fixed cycle.
1: Return to the block next to the fixed cycle.

【#1273(PR)】　ext09

bit0: Switch ASIN calculation results range
Select the ASIN calculation results range.
　0: -90° to 90°
　1: 90° to 270°

bit1: Switch system variable unit
Select the unit for the system variable #3002 (time during automatic start).
　0: 1 ms unit
　1: 1 hour unit

bit2: Switch G71, G72, G73 cutting direction judgment
Select the cutting direction when the longitudinal rough cutting cycle (G71), face rough cutting cycle (G72) or closed loop cutting cycle (G73) is commanded.
　0: Conventional specification
Determined according to the finished shape program.
　1: Extended specification
Determined according to the finishing allowance and cutting allowance commanded in the program.

bit3: Facing turret mirror image coordinate value type
Select how to show the workpiece coordinate values of the axis for which the facing turret mirror image is valid.
　0: Movements in the workpiece coordinate system are in the same direction as those in the workpiece machine coordinate system.
　1: Movements in the workpiece coordinate system are in the opposite direction to those in the workpiece machine coordinate system.

bit4: Facing turret mirror image valid axis selection
Select the axis for which the facing turret mirror image is valid.
　0: Fixed to 1st axis.
　1: Determined according to the plane selected when the facing turret mirror image is commanded.

【#1274(PR)】　ext10

bit7: Word range check
Select whether to check that the operation expression of the word data in the program is enclosed in brackets ([ ]) when the machine program is executed.
This check is also applied to the 08000 to 09999 and the machine tool builder macro program.
　0: Check
　1: Not check

【#1275(PR)】　ext11
Not used. Set to "0".

【#1276(PR)】　ext12
Not used. Set to "0".

【#1277(PR)】   ext13

bit0: Tool life management II count type 2

Select how and when the mount or use count will be incremented in tool life management II. The condition to output "tool group life over (TGLO)" signal will be changed accordingly.

0: Type 1 (Default)

Counts up when the spindle tool is used for cutting.

TGLO signal will be output when the last tool in selected group is judged as expired.

1: Type 2

Counts up by one for a tool used or mounted in a program at the time of resetting.

TGLO signal will be output when any of tool groups has reached its lifetime limit.

bit1: Tool life management II life prediction

Select whether to enable tool life prediction function in tool life management II.

0: Disable

1: Enable

bit2: Tool life management II life end signal timing

Select the timing at which tool life prediction signal is output in tool life management II.

0: Output only when the ["life value" - "used value"] matches the remaining life. ("life value" - "used value" = "remaining life")

1: Output when the ["life value" - "used value"] is less than the remaining life. ("life value" - "used value" ≤ "remaining life")

bit3: Tool life management II life end signal tool

Select the tool for which the tool life prediction signal is output in tool life management II.

0: Output the signal tool by tool.

1: Output the signal at the last tool in the group.

bit4: Tool life management II count changeover (For M system only)

Select the tool life count method and its timing.

0: Conforms to "ext13/bit0" setting.

1: When "ext13/bit0" is set to "0":

Counts up by one for a tool used or mounted in a program at the time of resetting.

When "ext13/bit0" is set to "1":

Follow the setting of "Method (Mthd)" on Tool life screen.

The output condition of "tool group life over" signal conforms to "ext13/bit0".

【#1278(PR)】   ext14

bit0: Program restart method selection

Select the program restart type.

0: Restart type A

1: Restart type B

【#1279(PR)】   ext15

bit0: Part system synchronization method

Select the part system synchronization method.

0: If one part system is not in the automatic operation, the synchronization command will be ignored and the next block will be executed.

1: Operate according to the "waiting ignore" signal.

If the "waiting ignore" signal is set to "1", the synchronization command will be ignored. When set to "0", synchronization will be applied.

bit1: Interrupt amount during machine lock

Select when to cancel the interruption amount during machine lock.

0: When resetting

1: During manual reference position return (not when resetting)

bit2: Selection of cutting start interlock target block

Select whether to enable the cutting start interlock for successive cutting blocks.

0: Enable

1: Disable

【#1280(PR)】　ext16

bit0: I/F per axis during cross machining control

Select how to handle the following PLC interface for axes interchanged with cross machining control.

・ Mirror image
・ Manual/automatic interlock
・ Manual/automatic machine lock

　0: Follows axis configuration before cross machining control.
　1: Follows axis configuration after cross machining control.

(Example) The device No. of automatic interlock (+) for X1 will be as follows when the cross machining is executed with the 1st axis (X1) in the 1st part system and 1st axis (X2) in the 2nd part system.

When "0" is set: Y820 (interface for 1st axis in 1st part system)

When "1" is set: Y828 (interface for 1st axis in 2nd part system)

(Note) If the number of axes in the part system changes with cross machining, the interface of the target axis may change when this parameter is set to "1".

(Example) When 1st part system's C axis is moved to 2nd part system with a 1st part system (X, Z, C, Y) and 2nd part system (X, Z) configuration:

When "1" is set: Y82A, Y7CA, Y8AA and later will be the interface for the C axis moved to the 2nd part system. Y7C2, Y822, Y8A2 and later will be the interface of the Y axis in the 1st part system, because the axes following the removed C axis (third place) are shifted up.

bit1: Cross machining control cancel with reset

Select whether to cancel the cross machining control when reset is applied.

　0: Cancel.
　1: Not cancel.

bit2: Interchange coordinate position display

Select whether to display interchanged (or moved) coordinate positions in the cross machining control.

This setting will be applied when the axes are moved, as well as when the axes are interchanged.

　0: Display interchanged (or moved) coordinate positions.
　1: Display coordinate positions without being interchanged (nor moved).

(Example) When 1st part system's C axis is moved to 2nd part system with a 1st part system (X, Z, C, Y) and 2nd part system (X, Z) configuration:

1st part system: X, Z and Y coordinate positions are displayed.

2nd part system: X, Z and C coordinate positions are displayed.

bit3: Reset operation for synchronization/super-imposition control

Select whether to cancel synchronization/superimposition control when reset is applied.

　0: Cancel.
　1: Not cancel.

【#1281(PR)】　ext17

bit0: Zero point return operation changeover parameter

(Zero point setting operation)

The "Operation error 1036" will occur regardless of this parameter, and regardless of manual or automatic operation.

(High-speed zero point return)

0: \<During manual operation\>

The master axis and slave axis will simultaneously start zero point return. Even if one of the axes reaches the zero point, the other axis will continue to move until it reaches the zero point. Thus, if the difference of the master axis and slave axis feedback position before zero point return is larger than the tolerable synchronization error amount, the error "Operation error 0051" will occur during zero point return.

0: \<During automatic operation\>

The master axis and slave axis will simultaneously start zero point return. When the master axis reaches the zero point, the slave axis will stop. Thus, the positional relation of the master axis and slave axis established before zero point return is maintained.

1: \<During manual operation\> \<During automatic operation\>

The master axis and slave axis will simultaneously start zero point return. When the master axis reaches the zero point, the slave axis will stop. Thus, the positional relation of the master axis and slave axis established before zero point return is maintained.

bit3: Synchronous control Operation setting

Select whether to automatically align the positioning of slave axis with that of master axis when the axis subject to synchronous control is changed from servo OFF to servo ON.

0: Not align.

1: Align.

Bit5: High-speed synchronous tapping valid

Select whether to enable high-speed synchronous tapping.

0: Disable

1: Enable

【#1282(PR)】　ext18

Not used. Set to "0".

【#1283(PR)】　ext19

Not used. Set to "0".

【#1284(PR)】　ext20

Not used. Set to "0".

【#1285(PR)】　ext21

bit0: Multi-part system program generation and operation

Select whether to use Multi-part system program management.

0: Not use

1: Use

(Note) When this parameter is changed, the power must be turned OFF and ON, and the system formatted. When "1" is not set to two or more "#1001 SYS_ON" [1] to [4], this parameter will not be valid even if this parameter is set to "1".

bit1: Changeover of method to select operation program

Select how to search a program to operate.

0: Select a program in the selected part system with operation search.

1: Select a common part system program with operation search. (A common part system program No. will be selected.)

4. Base Specifications Parameters

【#1286(PR)】 ext22

bit0: Program input/output method selection

Select the program input/output method.

 0: Only the programs in the selected part system are input/output.

 1: The designated programs are output for all part systems.

bit2: O No. for program input No.

Select the operation when the same program No. is input during data input.

 0: The O No. is handled as a character string data.

 1: The O No. is handled as a program No. Whether to overwrite the program or cause an error is decided by "#1218 bit7 Input by program overwrite".

bit3: No O No. at machining program input

Select whether to enable the machining program input even if there is no program No. (O No.).

The program No. is fixed to 01 in this case.

 0: Disable

 1: Enable

【#1287(PR)】 ext23

bit4: Relative coordinate display

(M system)

 0: Display the actual position including tool length offset.

 1: Display the machining position in terms of a program command excluding tool length offset.

(L system)

 0: Display the actual position including tool shape compensation.

 1: Display the machining position in terms of a program command excluding tool shape compensation.

bit5: Relative coordinate display

(M system)

 0: Display the actual position including tool radius compensation.

 1: Display the machining position in terms of a program command excluding tool radius compensation.

(L system)

 0: Display the actual position including nose R compensation.

 1: Display the machining position in terms of a program command excluding nose R compensation.

【#1288(PR)】 ext24

bit0: MDI program clear

Select whether to clear the MDI programs when MDI operation ends, the power is turned ON again, reset is input, or emergency stop is canceled.

 0: Not clear.

 1: Clear (save only % programs).

【#1289(PR)】 ext25

bit0: Tool radius compensation switch corner judgment method (Nose R compensation)

Select the criterion to execute the outer rounding at the small corner in tool radius compensation.

(L system)

 0: The corner angle is 0°; linear-linear; G02-G03/G03-G02; the radius is the same. (Conventional method)

 1: The corner angle is 1° or smaller; linear-linear; G02-G03/G03-G02; the radius is almost the same. (Method for rounding minute corner angle)

(M system)

 0: The corner angle is 1° or smaller; linear-linear; G02-G03/G03-G02. (Conventional method)

 1: The corner angle is 1° or smaller; linear-linear; G02-G03/G03-G02; the radius is almost the same. (Method for rounding minute corner angle)

【#1290(PR)】 ext26

Not used. Set to "0".

【#1291(PR)】 ext27

Not used. Set to "0".

4. Base Specifications Parameters

【#1292(PR)】 ext28

Not used. Set to "0".

【#1293(PR)】 ext29

Not used. Set to "0".

【#1294(PR)】 ext30

Not used. Set to "0".

【#1295(PR)】 ext31

Not used. Set to "0".

【#1296(PR)】 ext32

Not used. Set to "0".

【#1297(PR)】 ext33

Not used. Set to "0".

【#1298(PR)】 ext34

Not used. Set to "0".

【#1299(PR)】 ext35

Not used. Set to "0".

【#1300(PR)】 ext36

bit0: Multiple spindle control II

Select multiple spindle control I or II.
   0: Multiple spindle control I (L system only)
   1: Multiple spindle control II (select from ladder)

bit7: Spindle synchronization command method

Select the spindle synchronization command method.
   0: Spindle synchronization with PLC I/F
   1: Spindle synchronization with machining program

【#1301】 nrfchk Near reference position check method

Select the method to judge the "near reference position".
   0: Conventional method
   1: Command machine position is used.
   2: Feedback position is used.

【#1302】 AutoRP Automatic return by program restart

Select the method to move to the restart position when restarting the program.
   0: Move the system manually to the restart position and then restart the program.
   1: The system automatically moves to the restart position at the first activation after the program restarts.

【#1303(PR)】 V1comN No. of #100 address part system common variables

Set the number of common variables, common for part systems, starting from address #100.
This is valid only when "#1052 MemVal" is set to "1".

---Setting range---
0 to 100

【#1304(PR)】 V0comN No. of #500 address part system common variables

Set the number of common variables, common for part systems, starting from address #500.
This is valid only when "#1052 MemVal" is set to "1".

---Setting range---
0 to 500

【#1306】　InpsTyp　Deceleration check specification type

Select the parameter specification type for the G0 or G1 deceleration check.
0: Deceleration check specification type 1
G0 is specified with "#1193 inpos", and G1+G9 with "#1223 aux07/bit1".
1: Deceleration check specification type 2
G0 or G1+G9 is specified with "#1193 inpos".

【#1309(PR)】　GType　Switch command format

Select which is used to command the reverse tap.
　0: G84.1/G88.1
　1: D command with the value changed to negative

【#1310】　WtMmin　Minimum value for synchronization M code

Set the minimum value for the M code. When "0" is set, the synchronization M code will be invalid.

---Setting range---
0, 100 to 99999999

【#1311】　WtMmax　Maximum value for synchronization M code

Set the maximum value for the M code. When "0" is set, the synchronization M code will be invalid.

---Setting range---
0, 100 to 99999999

【#1312】　T_base　Tool life management standard number

Set the standard No. for the tool life management.
When the value specified by the T code command exceeds the set value in this parameter, the set value will be subtracted from the command value, which will be used as tool group No. for tool life management.
When the value specified by the T code command is equal to or less than the set value, the T code will be handled as a normal T code and not subjected to tool life management.
When "0" is set in this parameter, the T code command will always specify a group No. (Valid for M-system tool life management II.)

---Setting range---
0 to 9999

【#1313】　TapDw1　Synchronous tap hole bottom wait time

Set the hole bottom wait time for synchronous tapping.
When P address is specified, the greater value will be used as the hole bottom wait time. When an in-position check is performed at the hole bottom, the wait time will be provided after the completion of the in-position check.
(Note) This parameter is valid only when "1" is set in "#1223 aux07/bit3" (synchronous tap in-position check improvement) and "#1223 aux07/bit4" (synchronous tap hole bottom in-position check).

---Setting range---
0 to 999 (ms)

【#1314】　TapInp　Synchronous tap in-position check width (tap axis)

Set the hole bottom in-position check width for synchronous tapping.
(Note) This parameter is valid only when "1" is set in "#1223 aux07/bit3" (synchronous tap in-position check improvement) and "#1223 aux07/bit4" (synchronous tap hole bottom in-position check).

---Setting range---
0.000 to 99.999

【#1316(PR)】 CrossCom Reference of common variables common for part systems

Select whether to use the common variables from #100100 to #800199.
   0: Not use
   1: Use
This parameter is valid only when the number of variable sets is set to 600 or more.
When this parameter is set to "1", variables from #100100 to #100110 will not be available as the system variables for PLC data read function, and the setting of "#1052 MemVal" will be invalid.

【#1324(PR)】 Chop_R Chopping compensation value fixing method

Set the head No. of the R register used as the compensation amount save area during fixed compensation amount method.
When the first number is an odd number, the operation message "Setting error" appears.
When the value overlaps with the chopping control data area, the operation message "Setting error" appears.

---Setting range---
8300 to 9782
(Only the even number)
(Within backup area)

【#1326】 PLC Const Ext. Number PLC constant extension number

Set the number of PLC constant extension points.

---Setting range---
0 to 750

【#1327】 3D ATC type Tool change method specification

Select the tool change method for determining the tool to draw solids.
With 3D drawing, the tool will be changed by the method designated with this parameter, and then the image will be drawn.
   0: With one standby tool
   1: With two standby tools
   2: With no standby tool

【#1328】 TLM type Tool measurement standard positions election

Select the tool measurement method.
   0: Use the machine position at TLM switch ON as 0.
   1: Use the machine basic point as standard.

【#1329】 Emgcnt Emergency stop contactor shut-off time

Set the time taken for the drive section's main power to be shut-off when the confirmation of all the axes' stop failed after the emergency stop state.
The contactor shut-off signal is output as soon as all the axes are confirmed stopped if the confirmation is done prior to the set time.
When there is no safety observation option or "0" is set, the shut-off time will be 30(s).

---Setting range---
0 to 60 (s)

【#1330(PR)】 MC_dp1 Contactor weld detection device 1

When safety observation is executed, set the I/O device to input the contactor's auxiliary b contact signal used for the contactor weld detection.
If "0" is set, weld detection will not be executed.

---Setting range---
000 to 02FF (HEX)

【#1331(PR)】 MC_dp2 Contactor weld detection device 2

When safety observation is executed, set the I/O device to input the contactor's auxiliary B contact signal used for the contactor weld detection.
If "0" is set, weld detection will not be executed.

---Setting range---
000 to 02FF (HEX)

【#1332(PR)】　F-bus init delay　Fieldbus communication error invalid time

Tuning the power ON, start the communication, and then set the time where Fieldbus communication error is not detected. Set this in 0.1 second increment.

---Setting range---
0 to 255 (0.1s)
Standard: 0

【#1333】　LMC restrain　Lost motion compensation restraint in handle mode

Select whether to restrain the lost motion compensation in handle mode.
　0: Restrain
　1: Not restrain

【#1334】　DI/DO refresh cycl　DI/DO refresh cycle

Select the DI/DO refresh cycle.
　0: Standard mode
　1: High-speed mode 1
　2: High-speed mode 2

(Note 1) This parameter is valid for M700 and M70 (typeA) series. "Standard mode" is applied to M70 (typeB) regardless of this parameter.
(Note 2) The speed may not be high if number of ladder steps is excessive.
(Note 3) If high-speed mode is selected, the fine segment processing performance may degrade.

【#1335】　man_smg　Manual feed acceleration/deceleration selection

Select the acceleration/deceleration mode in jog feed, incremental feed and manual reference position return (when rapid traverse signal OFF).
　0: Acceleration/Deceleration for rapid traverse
　1: Acceleration/Deceleration for cutting feed

【#1336(PR)】　#400_Valtype　#400 address variable type

Select whether the #400-level variables are used as machine tool builder macro variables or as common variables.
　0: #400 to #449 are not available; #450 to #499 are used as machine tool builder macro variables.
　1: #400 to #499 are used as common variables

(Note) 700 sets of common variables are required for using #400 to #499 as common variables. If this parameter is set to "1" while the number of common variables is not set to 700, this parameter setting will be regarded as "0".

【#1338(PR)】　rev data save trg　Trigger switching to save arbitrary reverse run data

Select the condition to start/stop saving reverse run data.
　0: Start when the reverse run control mode signal is turned ON. Stop when turned OFF.
　1: Start when the reverse run control mode signal is ON and macro interrupt is valid (M96/ION).
Stop when the reverse run control mode signal is OFF or macro interruption is finished (M97/IOF) (compatible with M500M).

【#1361(PR)】　aux_acc　Auxiliary axis acceleration/deceleration type

Select the acceleration/deceleration type of auxiliary axis in PLC axis indexing.
　0: Acceleration/deceleration with constant time
　1: Acceleration/deceleration with a constant angle of inclination

【#1493(PR)】　ref_syn　Synchronization at zero point initialization

　0: Master axis and slave axis determine their zero points individually.
　1: The zero points of both master and slave axes are determined by initializing the master axis's zero point.
The slave axis moves in perfect synchronization with the master axis.
Set this to "1" for speed/current command synchronization control.

4. Base Specifications Parameters

【#1494(PR)】 dsp_ax_change   Axis order of counter display

Set this in order to change the axis order of counter display.
The axes will be displayed in ascending order of the setting values "1" to "8".
However, axis whose setting is "0" will be displayed after axes whose settings are between "1" and "8" are displayed.

(Note 1) When the same value is set for more than one axis, axis that is displayed on the left side on the parameter screen will be first displayed.
(Note 2) When both of mixed synchronization control (option) and interchange coordinate position display ("1280 ext16/bit2" OFF) are valid, and when there are two or more valid part systems, this parameter will be ignored.

---Setting range---
1 to 8: Axes are displayed in ascending order.
Other than 1 to 8: Axes are displayed after the display of the axes with setting value "1" to "8".

【#1501】 polyax   Rotational tool axis number   for L system only

Set the number of the rotational tool axis used for polygon machining (G51.2). Set "0" when not using polygon machining (spindle-servo axis), or when using spindle-spindle polygon machining. A value exceeding the base specification parameter "#1002 axisno" cannot be specified.
This parameter is valid when the G code system is 6 or 7 (7 or 8 is set in base specification parameter "#1037 cmdtyp").

【#1502】 G0Ipfg   G1 -> G0 deceleration check

Select whether to perform a deceleration check when the travel direction is changed from G1 to G0.
  0: Not perform
  1: Perform

【#1503】 G1Ipfg   G1 -> G1 deceleration check

Select whether to perform a deceleration check when the travel direction is changed from G1 to G1.
  0: Not perform
  1: Perform

【#1505】 ckref2   Second reference position return check

Select whether the check is carried out at the specified position in manual second reference position return mode upon completion of spindle orientation or at second reference position return interlock signal.
  0: Upon completion of spindle orientation
  1: At second reference position return interlock signal

【#1506】 F1_FM   Upper limit of F1 digit feedrate

Set the maximum value up to which the F 1-digit feedrate can be changed.

---Setting range---
0 to 60000 (mm/min)

【#1507】 F1_K   F1 digit feedrate change constant

Set the constant that determines the speed change rate per manual handle graduation in F 1-digit feedrate change mode.

---Setting range---
0 to 32767

【#1510】 DOOR_H   Shorten door interlock II axis stop time

Select whether to shorten the time during which the axis is stopped when the door is opened.
0 : Use the conventional axis stop time.
1 : Shorten the axis stop time.
(Note) When the door interlock II signal is input via a ladder, the conventional axis stop time will be used.

【#1511】 **DOORPm Signal input device 1 for door interlock II: for each part system**

Set the fixed device number (X??) for door interlock II signal input for each part system.
A device number from X01 to XFF can be specified.
Device number "000" is invalid.
Set device number "100" when using no fixed device number for door interlock II signal input.
Related parameter: "#1154 pdoor (Door interlock II for each part system) "

---Setting range---
000 to 2FF
(hexadecimal)

【#1512】 **DOORPs Signal input device 2 for door interlock II: for each part system**

Set the fixed device number (X??) for door interlock II signal input for each part system.
(Set the same value as that of #1155.)
Related parameter: "#1154 pdoor (Door interlock II for each part system)"

---Setting range---
000 to 2FF
(hexadecimal)

【#1513】 **stapM M code for synchronous tap selection**

Set the M code for the synchronous tapping selection.
Select the synchronous tapping mode using the miscellaneous function code of the value set in this parameter. The M function command can be issued immediately before the tap command or in the same block. This function is valid only when "1" is set in "#1272 ext08/bit1 (Enable/disable M-function synchronous tap cycle)".
(Note) Do not use M00, 01 02, 30, 98, and 99.

---Setting range---
0 to 99999999

【#1514】 **expLinax Exponential function interpolation linear axis**

Set the axis name for the linear axis used in exponential function interpolation.

---Setting range---
A to Z

【#1515】 **expRotax Exponential function interpolation rotary axis**

Set the axis name for the rotary axis used in exponential function interpolation.

---Setting range---
A to Z

【#1516】 **mill_ax Milling axis name**

Set the name of the rotary axis used in milling interpolation. Only one rotary axis can be set.
When there is no E command in issuing the G12.1 command, this parameter will be followed.

---Setting range---
A to Z

【#1517】 **mill_C Milling interpolation hypothetical axis name**

Select the hypothetical axis command name for milling interpolation.
When there is no D command in issuing the milling interpolation command, this parameter will be followed.
    0: Y axis command
    1: Command rotary axis name.

【#1518】 **polm Spindle-spindle polygon Workpiece spindle No.**

Set the workpiece axis No. used in spindle-spindle polygon machining.
(Note) The 1st spindle will be selected when "0" is set.

【#1519】 pols   Spindle-spindle polygonTool spndle No.

Set the number of the rotaty tool spindle used in spindle-spindle polygon machining.
(Note) The 2nd spindle will be selected when "0" is set.

【#1520(PR)】   Tchg34   Additional axis tool compensation operation

Select axis to carry out the additional axis' tool compensation function.
0: 3rd axis.
1: 4th axis.

【#1521】 C_min   Minimum turning angle

Set the minimum turning angle of the normal line control axis at the block joint during normal line control.

---Setting range---
0.000 to 360.000 (°)
(Input setting increment applies)

【#1522(PR)】   C_axis   Normal line control axis

Set the number of the axis for normal line control.
Set a rotary axis No.
0: Normal line control disabled
1 to 8: Axis No. (number of control axes)

【#1523】 C_feed   Normal line control axis turning speed

Set the turning speed of the normal line control axis at the block joint during normal line control.
Set a value that does not exceed the normal line control axis' clamp speed ("#2002 clamp").
This is valid with normal line control type I.

---Setting range---
0 to 1000000
(°/min)

【#1524】 C_type   Normal line control type

Select the normal line control type.
0: Normal line control type I
1: Normal line control type II

【#1533】 millPax   Pole coordinate linear axis name

Set the linear axis name used for pole coordinate interpolation.

---Setting range---
Axis name such as X, Y or Z

【#1534】 SnG44.1   Spindle No. for G44.1 command

Set the selected spindle No. for the G44.1 command.
The setting range differs according to the model.
If a spindle that does not exist is set, the 2nd spindle will be used. Note that if there is only one spindle, the 1st spindle will be used.
0: 2nd spindle
1: 1st spindle
2: 2nd spindle
3: 3rd spindle
4: 4th spindle

【#1535】 C_leng   Minimum turning movement amount

Set the minimum turning movement amount of the normal line control axis at the block joint during normal line control.

---Setting range---
0.000 to 99999.999 (mm)
(Input setting increment applies)

4. Base Specifications Parameters

【#1537】 crsax[1]　Cross machining control axis

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1538】 crsax[2]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1539】 crsax[3]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1540】 crsax[4]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1541】 crsax[5]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1542】 crsax[6]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1543】　crsax[7]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1544】　crsax[8]

Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis to be interchanged with the axis in the part system where the mixed synchronization control (cross machining control) request signal is input, or the name of the axis to be shifted to that part system.

---Setting range---
Two digits between A to Z and 1 to 9
(Setting will be cleared when "0" is set)

【#1561】　3Dcdc　Switch workpiece coordinate display during 3D coordinate conversion

Select the workpiece coordinate display during 3D coordinate conversion.
　　0: Workpiece coordinate system
　　1: G68 program coordinate system
(Note) The special display unit's absolute coordinates also follow this parameter setting.

【#1562】　3Dremc　Switch remaining command display during 3D coordinate conversion

Select the remaining command display during 3D coordinate conversion.
　　0: Workpiece coordinate system
　　1: G68 program coordinate system

【#1563】　3Dcdrc　Switch coordinate reading during 3D coordinate conversion

Select the coordinate system of the workpiece/skip coordinate read value in the 3D coordinate conversion modal.
　　0: G68 program coordinate system
　　1: Workpiece (local) coordinate system

【#1564】　3Dspd　Hole drilling speed during 3D coordinate conversion

Select the rapid traverse rate for the hole drilling cycle during 3D coordinate conversion.
　　0: The cutting feed clamp speed is used.
　　Other than 0: The set speed is used.
Note that if the rapid traverse rate is exceeded, the speed will be clamped at the rapid traverse rate.

【#1565】　helgear　Helical machining base axis

Set the base axis for helix angle calculation in helical machining. When no setting, Z axis will be used.

---Setting range---
Axis name such as X, Y, Z, U, V, W, A, B, and C

【#1566】　3DSelctDrillaxMode　Switch drill axis's mode from rapid traverse during 3D coordinate conversion

Select the rapid traverse mode in non-drilling blocks among a drilling cycle to the cutting feed mode during 3-dimensional coordinate conversion.
　　0: Rapid traverse mode. The speed follows the setting of "#2001 rapid".
　　1: Cutting feed mode. The speed follows the setting of "#1564 3Dspd".

【#1568】　SfiltG1　G01 soft acceleration/deceleration filter

Set the filter time constant for smoothly changing the acceleration rate for the cutting feed acceleration/deceleration in pre-interpolation acceleration/deceleration.

---Setting range---
0 to 200 (ms)

【#1569】 SfiltG0   G00 soft acceleration/deceleration filter

Set the filter time constant for smoothly changing the acceleration rate for the rapid traverse acceleration/deceleration in pre-interpolation acceleration/deceleration.

---Setting range---
0 to 200 (ms)

【#1570】 Sfilt2   Soft acceleration/deceleration filter 2

Set the filter time constant for smoothly changing the acceleration rate in pre-interpolation acceleration/deceleration.
This will be invalid when "0" or "1" is set.

---Setting range---
0 to 26 (ms)

【#1571】 SSSdis   SSS control adjustment coefficient fixed value selection

Fix the shape recognition range for SSS control.

【#1572】 Cirorp   Arc command overlap

This eliminates speed fluctuations at the joint of the arc and straight line and arc and arc.
Set as a bit unit.
  0: Do not overlap the arc command blocks
  1: Overlap the arc command blocks

bit0 : Arc command during high-speed high-accuracy control II
bit1 : Arc command during high-speed machining mode II
bit2 : Arc command during high-accuracy control (G61.1)
bit3 : Arc command during cutting mode (G64)

The line command block and arc command block won't be overlapped during G61.2 modal regardless of this setting.

(Note) This parameter is invalid during SSS control.

【#1573】 Ret1   Return type 1

Select the axis to be moved later after tool return.
This is referred to with the movement path (transit point #1 -> interrupt point).
Up to eight axes can be specified by expressing one axis with one bit.

bit0 : Transit point #1 1st axis
bit1 : Transit point #1 2nd axis
bit2 : Transit point #1 3rd axis
bit3 : Transit point #1 4th axis
bit4 : Transit point #1 5th axis
bit5 : Transit point #1 6th axis
bit6 : Transit point #1 7th axis
bit7 : Transit point #1 8th axis

---Setting range---
00000000 to 11111111 (Binary)

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【#1574】　Ret2　Return type 2

Select the axis to be moved later after tool return.
This is referred to with the movement path (return start point -> transit point #2).
Up to eight axes can be specified by expressing one axis with one bit.

bit0 : Transit point #2 1st axis
bit1 : Transit point #2 2nd axis
bit2 : Transit point #2 3rd axis
bit3 : Transit point #2 4th axis
bit4 : Transit point #2 5th axis
bit5 : Transit point #2 6th axis
bit6 : Transit point #2 7th axis
bit7 : Transit point #2 8th axis

---Setting range---
00000000 to 11111111 (Binary)

【#1590】　Animate ax direct　Machine status animated display axis ± direction

<bit0>
0: 1st axis + direction is set to the right direction.
1: 1st axis + direction is set to the left direction.

<bit1>
0: 2nd axis + direction is set to the rear direction.
1: 2nd axis + direction is set to the front direction.

<bit2>
0: 3rd axis + direction is set to the top direction.
1: 3rd axis + direction is set to the bottom direction.

【#1591】　Animate ax-1　Machine status animated display axis name (1st axis)

Set the name of the 1st axis displayed with the machine status animation. When the axis name is not specified, the current 1st axis name ("#1013 axname") will be used.

---Setting range---
Axis name such as X, Y, Z

【#1592】　Animate ax-2　Machine status animated display axis name (2nd axis)

Set the name of the 2nd axis displayed with the machine status animation. When the axis name is not specified, the current 2nd axis name ("#1013 axname") will be used.

---Setting range---
Axis name such as X, Y, Z

【#1593】　Animate ax-3　Machine status animated display axis name (3rd axis)

Set the name of the 3rd axis displayed with the machine status animation. When the axis name is not specified, the current 3rd axis name ("#1013 axname") will be used.

---Setting range---
Axis name such as X, Y, Z

【#1901(PR)】　station addr

Not used. Set to "0".

【#1902(PR)】　Din size

Not used. Set to "0".

【#1903(PR)】　Dout size

Not used. Set to "0".

【#1904(PR)】　data length

Not used. Set to "0".

4. Base Specifications Parameters

【#1905(PR)】 **baud rate**
> Not used. Set to "0".

【#1906(PR)】 **stop bit**
> Not used. Set to "0".

【#1907(PR)】 **parity check**
> Not used. Set to "0".

【#1908(PR)】 **even parity**
> Not used. Set to "0".

【#1909(PR)】 **Tout (ini)**
> Not used. Set to "0".

【#1910(PR)】 **Tout (run)**
> Not used. Set to "0".

【#1911(PR)】 **clock select**
> Not used. Set to "0".

【#1925】 **EtherNet   Start of service**
> Start or stop the Ethernet communication function.
> 0: Stop
> 1: Start

【#1926(PR)】 **Grobal IP address   IP address**
> Set the main CPU's IP address.
> Set the NC IP address seen from an external source.

【#1927(PR)】 **Global Subnet mask   Subnet mask**
> Set the subnet mask for the IP address.

【#1928(PR)】 **Global Gateway address   Gateway**
> Set the IP address for the gateway.

【#1929】 **Port number   Port No.**
> Set the port No. for the service function.
>
> **---Setting range---**
> 1 to 9999
> (Set 2000 when not connected to the Ethernet.)

【#1930(PR)】 **Host address   Host address**
> Set the host's IP address.

【#1931(PR)】 **Host number   Host No.**
> Set the host's port No.
>
> **---Setting range---**
> 1 to 9999

【#1934(PR)】 **Local IP address**
> Set the HMI side CPU's IP address.

【#1935(PR)】 **Local Subnet mask**
> Set the HMI side CPU's subnet mask.

【#11001(PR)】 APC type APC screen display type selection

Set the type of screen displayed with the pallet program registration screen.
0: Standard pallet registration screen
1: Pallet 4-page registration screen

【#11002(PR)】 Valid pallet num Number of pallets setting

Set the number of pallets validated on the pallet program registration screen.

---Setting range---
2 to 12 (Interpreted as 2 when 0 is set.)

【#11003(PR)】 APLC valid APLC valid

Temporarily disable APLC.
Normally set "1".
0: Disable
1: Enable

【#11004(PR)】 PLCauto-run enable PLC automatic startup valid

Select starting condition of the built-in PLC.
0: Start PLC after NC screen startup
1: Start PLC at NC startup
(Note) When standard NC screen is not used, set "1".

【#11005(PR)】 PC IP address IP address setting

Set the IP address for the display unit or PC in which machining programs are stored.
Set the IP address for the display unit on which the automatic power OFF will be executed.
(Note) When "0.0.0.0" is input, "192.168.100.2" is automatically set.

*This parameter is used only for 700 Series.

PC subnet
Set the subnet mask for the display unit or PC in which machining programs are stored.

PC Gateway
Set the gateway for the display unit or PC in which machining programs are stored.

【#11006】 PC Port number Port No. setting

Set the port No. for the display unit or PC in which machining programs are stored.
(Note 1) When "0" is input, "55555" is automatically set.
(Note 2) When changing the parameter, set the same value in "PD_Control_Port" in the PC side environment setting file.

---Setting range---
0 to 65535

【#11007】 PC Timeout Communication timeout time setting

Set the NC side communication timeout time.
(Note 1) When "0" is input, "30" is automatically set.
(Note 2) When the value greater than "300" is set, a setting error occurs.
(Note 3) When changing the parameter, set the same value in "PD_Time_out" in the PC side environment setting file.

---Setting range---
0 to 300 (s)

【#11009(PR)】 M2 label O M2 label O

Select the program number label when using the M2 format.
0: Label L
1: Label O

4. Base Specifications Parameters

【#11010(PR)】　Software keyboard　Software keyboard

Select with touch panel whether to use software keyboard.
- 0: Do not use
- 1: Use
- 2: Use (Note)

(Note) Software keyboard automatically appears on a specific screen. (for M70 Series only).

【#11011】　Handy TERM. PW.　Handy terminal password

Set the password used for the handy terminal customized downloading.
Blank (when "0" is set) and "0000" are regarded as no password.
Not the password of a new customizing file but the password of the customizing file downloaded to the last handy terminal is set.
Set blank or "0000" when initially downloading.

---Setting range---
0000 to 9999

【#11012(PR)】　16 axes for 1ch　Connecting 16 axes for 1ch

Select the maximum number of axes (sum of the NC axis, spindle, and PLC axis) connected to the drive unit interface (channel 1) when not using the extension unit (FCU7-EX891+HN552)
- 0: Up to 8 axes can be connected to channel 1.
- 1: Up to 16 axes can be connected to channel 1.

Note that "OMR-DD function" cannot be used. This parameter is disabled when the extension unit is connected. It is possible to connect only up to eight axes or less per channel.

【#11013】　3D_MChk　Invalidate 3D machine interference check

Select whether to enable the 3D machine interference check function.
- 0: Enable
- 1: Disable

【#11014】　Chk_len1　1st-step interference check distance

Set the 1st-step check distance when in 3D machine interference check mode.

---Setting range---
0.000 to 99999.999(mm)

【#11015】　Chk_len2　2nd-step interference check distance

Set the 2nd-step check distance when in 3D machine interference check mode.

---Setting range---
0.000 to 99999.999(mm)

【#11016】　Expand_Rate　Shape expansion rate

Set the model shape expansion rate to be used for 3D machine interference check. This parameter is used for expanding a model shape to be used for 3D machine interference check. The interference check is performed using a shape expanded by the amount of [Check length (mm) x Shape expansion rate (%)].

---Setting range---
0 to 300(%)

【#11017】　T-ofs set at run　Tool compensation amount setting during automatic operation valid

Select whether to enable the tool compensation amount setting during automatic operation and operation pause.
- 0: Disable
- 1: Enable

【#11018】　M password hold

Select whether to enable the "Machine user" password holding.
When this is set to "1", the "Machine user" password will be held.
- 0: Enable
- 1: Disable

4. Base Specifications Parameters

【#11019】　2-system display　2-part system simultaneous display

Select whether to validate 2-part system simultaneous display on operation screen.
0: Display one part system on operation screen
1: Display two part systems simultaneously on operation screen

(Note 1) Unless you set "1" in two or more of "#1001 SYS_ON [1] to [4]", two-part system simultaneous display will fail regardless of this parameter.

【#11021】　PLC mesg disp type　Format of PLC alarm and operator message

Select the format of PLC alarms and operator messages to be displayed on the bottom right of the screen.
0: Display up to the first 40 characters.
1: If text is longer than 40 characters, divide it into two and display separately.　(Classification No. is displayed together)

【#11028】　Tolerance Arc Cent　Tolerable correction value of arc center error

Set the tolerable correction value for the calculated coordinate value error of R-specified circular center.
When a difference between "a line between the start and end points" and "commanded radius x 2" is the tolerance or smaller, the error is corrected so that the middle of a line between the start and end points will be the arc center.
When [Setting value < 0] : 0 (Not correct)
When [Setting value = 0] : 2 x minimum setting increment
When [Setting value > 0] : Setting value

---Setting range---
-1 to 0.100(mm)

【#11029】　Arc to G1 no Cent　Change command from arc to linear when no arc center designation

Select the operation when arc center or radius designation is omitted from arc command.
0: Program error
1: Change into linear command

【#12001】　ManualB RectanA xH　Manual feed rate B constant surface control intersecting part system axis name (horizontal)

Set the part system axis name ("#1013 axname") for the two axes that intersect with the rotary axis direction. When one of the two axes is blank, a constant speed will be applied without using constant surface speed control.

---Setting range---
Axis addresses such as X, Y, Z, U, V, W, A, B, and C

【#12002】　ManualB RectanA xV　Manual feed rate B constant surface control intersecting part system axis name (vertical)

Set the part system axis name ("#1013 axname") for the two axes that intersect with the rotary axis direction. When one of the two axes is blank, a constant speed will be applied without using constant surface speed control.

---Setting range---
Axis addresses such as X, Y, Z, U, V, W, A, B, and C

【#12003】　ManualB RotCent erH　Manual feed rate B constant surface control rotation center machine position (horizontal)

Set the machine coordinate position (horizontal axis) at the center of the rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

4. Base Specifications Parameters

【**#12004**】 **ManualB RotCent erV   Manual feed rate B constant surface control rotation center machine position (vertical)**

Set the machine coordinate position (vertical axis) at the center of the rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【**#12005(PR)**】 **Mfig   Number of M**

Set the number of M that can be specified within the same block.

---Setting range---
1 to 4

【**#12006(PR)**】 **Mbin   M binary**

Data type   Output data
0   BCD
1   Unsigned binary
-1   Singed binary
For unsigned binary:
   The absolute value "1" is output for "-1".
For singed binary:
   "-1" is output as "0xFFFFFFFF".

---Setting range---
Data type
(-1,0,1)

【**#12007(PR)**】 **Sfig   Number of S**

Set the number of spindles.

(Note 1) The setting range differs according to the model.
(Note 2) Sfig is set in the range of 1 to 4. However, the number of outputs by Sfig cannot be controlled. Thus, only one S command is output regardless of the Sfig setting value.

---Setting range---
1 to 6

【**#12008(PR)**】 **Sbin   S binary**

Data type   Output data
0   BCD
1   Unsigned binary
-1   Singed binary
For unsigned binary:
   The absolute value "1" is output for "-1".
For singed binary:
   "-1" is output as "0xFFFFFFFF".

(Note 1) Sbin can be set with "-1", "0" and "1", but the S command cannot be BCD output.
   If BCD (0) is selected for Sbin, it will be handled as a singed binary (-1).

---Setting range---
Data type
(-1,0,1)

【**#12009(PR)**】 **Tfig   Number of T**

Set the number of T that can be specified within the same block.

---Setting range---
1 to 4

4. Base Specifications Parameters

【#12010(PR)】　Tbin　T binary

     Data type   Output data
     0   BCD
     1   Unsigned binary
     -1   Singed binary
     For unsigned binary:
       The absolute value "1" is output for "-1".
     For singed binary:
       "-1" is output as "0xFFFFFFFF".

    ---Setting range---
     Data type
     (-1,0,1)

【#12011(PR)】　Bfig　Number of B

     Set the number of T that can be specified within the same block.

    ---Setting range---
     1 to 4

【#12012(PR)】　Bbin　B binary

     Data type   Output data
     0   BCD
     1   Unsigned binary
     -1   Singed binary
     For unsigned binary:
       The absolute value "1" is output for "-1".
     For singed binary:
       "-1" is output as "0xFFFFFFFF".

    ---Setting range---
     Data type
     (-1,0,1)

5. Axis Specifications Parameters

5.1 Axis Specifications Parameters

After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

【#2001】　rapid　Rapid traverse rate

Set the rapid traverse feedrate for each axis.
(Note) The maximum value to be set depends on the machine specifications.

---Setting range---
1 to 1000000 (mm/min)

【#2002】　clamp　Cutting feedrate for clamp function

Set the maximum cutting feedrate for each axis.
Even if the feedrate in G01 exceeds this value, the clamp will be applied at this feedrate.

---Setting range---
1 to 1000000 (mm/min)

【#2003(PR)】　**smgst　Acceleration and deceleration modes**

Set acceleration and deceleration control modes.

bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
						OT3	OT2	OT1	C3		C1	L	R3		R1	LR
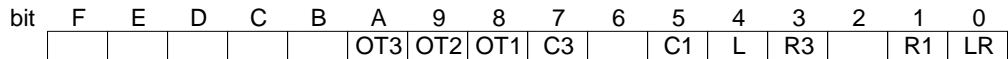
(Note) Set "0" in null bits (excluding bit2 and bit6 when the soft acceleration/deceleration is selected.)

<Combination of acceleration/deceleration patterns and bit patterns>

	Rapid traverse	R3(bit3)	-(bit2)	R1(bit1)	LR(bit0)
	Cutting feed	C3(bit7)	-(bit6)	C1(bit5)	LC(bit4)
Acceleration /deceleration types	Step	0	0	0	0
	Linear acceleration /deceleration	0	0	0	1
	Primary delay	0	0	1	0
	Exponential acceleration and linear deceleration	1	0	0	0
	Soft acceleration /deceleration	1	1	1	1

(Note) R1 > R3 when both R1 and R3 contain 1.

<Stroke end stop types>

Type	OT2	OT3
Linear deceleration	0	0
Position loop step stop	1	0
Speed loop step stop	0	1
Position loop step stop	1	1

2×G0t1 (OT1=1,OT2=OT3=0)
G0t1 (OT1=OT2=OT3=0)
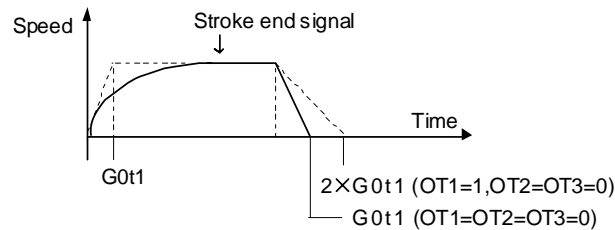
(Note) OT1 is valid under the following conditions (valid for dog type zero point return):
- Stop type: Linear deceleration
- Acceleration/Deceleration mode: Exponential acceleration and Linear deceleration

---Setting range---
0/1

【#2004】　**G0tL　G0 time constant (linear)**

Set a linear control time constant for rapid traverse acceleration and deceleration.
The time constant will be enabled when LR (rapid traverse feed with linear acceleration/deceleration) or F (soft acceleration/deceleration) is selected in "#2003 smgst Acceleration and deceleration modes".
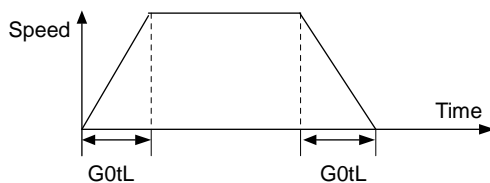
---Setting range---
1 to 4000 (ms)

【#2005】 G0t1 G0 time constant(primary delay) / Second-step time constant for soft acceleration/deceleration

Set a primary-delay time constant for rapid traverse acceleration and deceleration.
The time constant will be enabled when R1 (rapid traverse feed with primary delay) or R3 (exponential acceleration and linear deceleration) is selected in "#2003 smgst Acceleration and deceleration modes".

When the soft acceleration/deceleration is selected, the second-step time constant will be used.

<Rapid traverse feed with primary delay>

<Rapid traverse feed with exponential acceleration and linear deceleration>
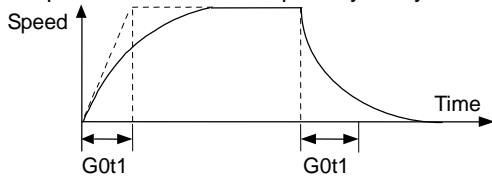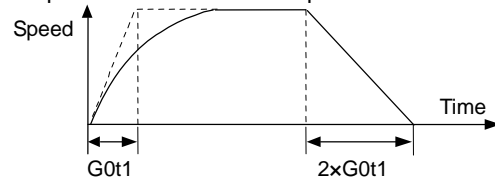
---Soft acceleration/deceleration>
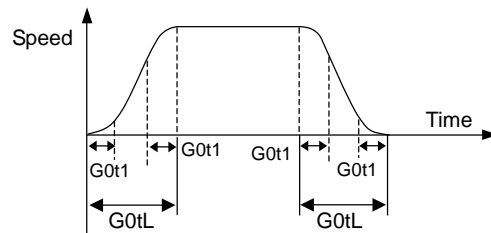
---Setting range---
1 to 5000 (ms)

【#2006】 G0t2

Not used. Set to "0".

【#2007】 G1tL G1 time constant (linear)

Set a linear control time constant for cutting acceleration and deceleration.
The time constant will be enabled when LC (cutting feed with linear acceleration/deceleration) or F (soft acceleration/deceleration) is selected in "#2003 smgst Acceleration or deceleration modes".
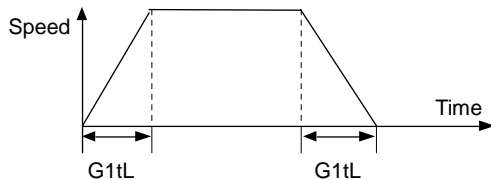
---Setting range---
1 to 4000 (ms)

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【#2008】 **G1t1** **G1 time constant (primary delay)/Second-step time constant for soft acceleration/deceleration**

Set the primary delay time constant for cutting acceleration and deceleration.
The time constant will be enabled when C1 (cutting feed with the primary delay) or C3 (cutting feed with exponential acceleration and linear deceleration) is selected in "#2003 smgst acceleration/deceleration modes".

When the soft acceleration or deceleration is selected, the second-step time constant will be used.

<Cutting feed with primary delay>

<Cutting feed with exponential acceleration and linear deceleration>
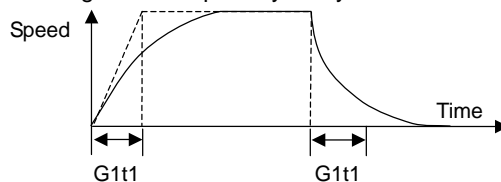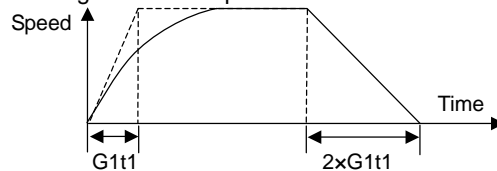
---Soft acceleration/deceleration>
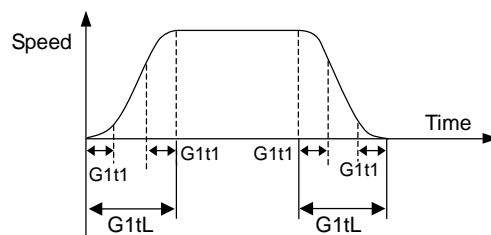
---Setting range---
1 to 5000 (ms)

【#2009】 **G1t2**

Not used. Set to "0".

【#2010】 **fwd_g** **Feed forward gain**

Set a feed forward gain for pre-interpolation acceleration/deceleration.
The larger the set value, the smaller the theoretical control error will be. However, if a machine vibration occurs, set the smaller value.

---Setting range---
0 to 200 (%)

【#2011】 **G0back** **G0 backlash**

Set up the backlash compensation amount when the direction is reversed with the movement command in rapid traverse feed mode or in manual mode.

---Setting range---
-9999999 to 9999999

【#2012】 G1back   G1 backlash

Set up the backlash compensation amount when the direction is reversed with the movement command in cutting mode.

---Setting range---
-9999999 to 9999999

【#2013】 OT -   Soft limit I –

Set a soft limit area with reference to the zero point of the basic machine coordinate.
Set the coordinate in the negative direction for the movable area of stored stroke limit 1. The coordinate in the positive direction is set in "#2014 OT+".
To narrow the available range in actual use, use the parameters "#8204 OT-" and "#8205 OT+".
When the same value (other than "0") is set in this parameter and "#2014 OT+", this function will be disabled.
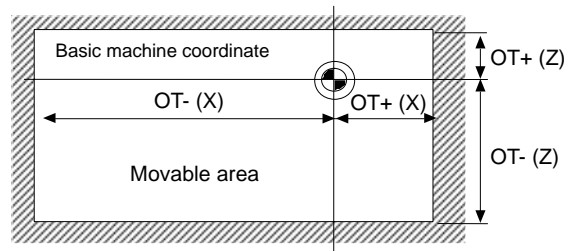
---Setting range---
±99999.999 (mm)

【#2014】 OT +   Soft limit I +

Set a soft limit area with reference to the zero point of the basic machine coordinate.
Set the coordinate in the positive direction for the movable area of stored stroke limit 1. The coordinate in the negative direction is set in "#2013 OT-".
To narrow the available range in actual use, use the parameters "#8204 OT-" and"#8205 OT+".
When the same value (other than "0") is set in this parameter and "#2013 OT-", this function will be disabled.
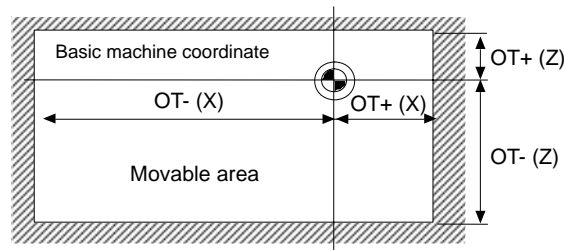
---Setting range---
±99999.999 (mm)

【#2015】 t1m1-   Negative direction sensor of tool setter

Set a sensor position in the negative direction when using the tool setter.

---Setting range---
±99999.999 (mm)

【#2016】 t1m1+   Positive direction sensor of tool setter or TLM standard length

Set the sensor position in the positive direction when using the tool setter.
When the TLM is used, set the distance from a tool change point (reference position) to the measurement basic point (surface) in order to measure the tool length.

---Setting range---
±99999.999 (mm)

【#2017】　tap_g　Axis servo gain

Set the position loop gain for special operations (synchronized tapping, interpolation with spindle C axis, etc.).
Set the value in 0.25 increments.
The standard setting value is "10".

---Setting range---
0.25 to 200.00 (rad/s)

【#2018(PR)】　no_srv　Operation with no servo control

Select when performing test operation without connecting the drive unit and motor.
　0: Normal operation
　1: Test operation
When "1" is set, the operation will be possible even if drive units and motor are not connected, because the drive system alarm will be ignored.
This parameter is used for test operation during start up: Do not use during normal operation.
If "1" is set during normal operation, errors will not be detected even if they occur.

【#2019】　revnum　Return steps

Set the steps required for reference position return for each axis.
　0: Not execute reference position return.
　1 to max. number of NC axes: Steps required for reference position return

---Setting range---
0 to max. number of NC axes

【#2020】　o_chkp　Spindle orientation completion check during second reference position return

Set the distance from the second reference position to the position for checking that the spindle orientation has completed during second reference position return.
When the set value is "0", the above check will be omitted.

---Setting range---
0 to 99999.999 (mm)

【#2021】　out_f　Maximum speed outside soft limit range

Set the maximum speed outside the soft limit range.

---Setting range---
0 to 1000000 (mm/min)

【#2022】　G30SLX　Validate soft limit (automatic and manual)

Select whether to disable a soft limit check during the second to the fourth reference position return in both automatic and manual operation modes.
　0: Enable
　1: Disable

【#2023】　ozfmin　Set up ATC speed lower limit

Set the minimum speed outside the soft limit range during the second to the fourth reference position return.

---Setting range---
0 to 1000000 (mm/min)

【#2024】　synerr　Allowable error

Set the maximum synchronization error, allowable at the synchronization error check, for the master axis.
When "0" is set, the error check will not be carried out.

---Setting range---
0 to 99999.999 (mm)

5.2 Zero Point Return Parameters

After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

【#2025】　**G28rap　G28 rapid traverse rate**

Set a rapid traverse rate for the dog type reference position return command.
This is not used for the distance-coded reference position detection.

---Setting range---
1 to 1000000 (mm/min)

【#2026】　**G28crp　G28 approach speed**

Set the approach speed to the reference position.

(Note) The G28 approach speed unit is (10°/min) only when using the Z-phase type encoder (#1226 aux10/bit3=1) for the spindle/C-axis reference position return type. The same unit is used for both the micrometric and sub-micrometric specifications.

---Setting range---
1 to 60000 (mm/min)

【#2027】　**G28sft　Reference position shift distance**

Set the distance from the electrical zero-point detection position to the reference position.
This is not used for the distance-coded reference position detection.

(Note) When "#1240 set12/bit2" is ON, a magnification (C: 10-fold, D: 100-fold and E: 1000-fold) corresponding to the input setting unit ("#1003 iunit") will be applied to the setting value.

---Setting range---
0.000 to 99.999 (mm)

【#2028】　**grmask　Grip mask amount**

Set the distance where the grid point will be ignored when near-point dog OFF signals are close to that grid point during reference position return.

Near-point dog

Grid mask setup distance
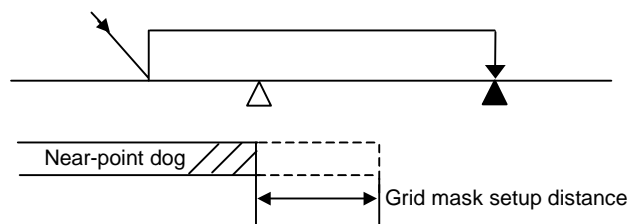
The grid mask is valid for one grid.
This is not used for the distance-coded reference position detection.

---Setting range---
0.000 to 99.999 (mm)

【#2029】　**grspc　Grid interval**

Set a detector grid interval.
Generally, set the value equal to the ball screw pitch. However, if the detector grid interval is not equal to the screw pitch when measured with a linear scale, set the detector grid interval.

To reduce the grid interval, use its divisors.
This is not used for the distance-coded reference position detection.

---Setting range---
0.000 to 999.999 (mm)

【#2030(PR)】 **dir (-)   Reference position direction (-)**

Select which side of the near-point dog the reference position is established.
   0: Positive direction
   1: Negative direction

Directions in which reference position is established as viewed from the near-point dog
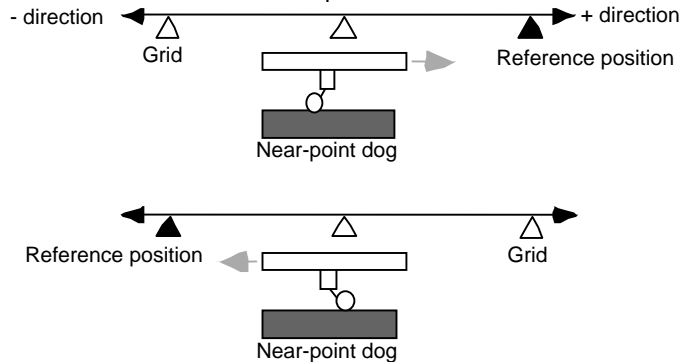
【#2031】 **noref   Axis without reference position**

Select whether the reference position is provided for the axis.
   0: Reference position is provided. (Normal controlled axis)
   1: No reference position is provided.
When "1" is set, reference position return is not required before automatic operation starts.

【#2032】 **nochk   Whether reference position return is completed not checked**

Select whether to check the reference position return completion.
   0: Check the reference position return completion.
   1: Not check the reference position return completion.
When "1" is set, the absolute and incremental commands can be executed even if dog type (or Z phase pulse system) reference position return is not completed.
Note that this setting is available for a rotary axis only.

【#2033】 **zp_no   Z phase pulse system reference position return spindle encoder No.**

Set the spindle encoder No. to be used when the reference position return is performed with the Z phase pulse of the spindle encoder.
   0: Dog type
   1 to 6: Spindle No.
*The setting range differs according to the model.

---Setting range---
0 to 6

【#2034】 **rfpofs   Distance-coded reference position detection offset**

Set the offset value from the position for the initial reference position setting to the machine's actual basic point in reference position return in the distance-coded reference position detection.
Input the value of the machine value counter that is displayed immediately after the reference position is established.
When the power is turned ON and this parameter is set to "0", the manual reference position return is regarded as initial reference position setting.
If this parameter is set to "0", automatic operation won't be available.

---Setting range---
-99999.999 to 99999.999 (mm)

【#2035】　srchmax　Distance-coded reference position detection scan distance

Set the maximum distance for scanning the reference marks when the reference position is not established in the distance-coded reference position detection.
For the scan distance, set the distance that fully covers the number of reference marks as you wish to detect.
(Example) When adding about 10% of additional coverage:
Scan distance = Base reference mark interval [mm] * 2 * 1.1

---Setting range---
0.000 to 99999.999 (mm)

【#2036】　slv_adjust　Reference position adjustment value

Set the distance from the first grid point after leaving the near point dog on the slave axis to the position where the reference position is actually established in dog-type reference position return in synchronous control. (Reference position shift amount is not included.)
The adjustment value will be automatically set in the slave axis's parameter according to the reference position adjustment complete signal from PLC.
Fine adjustment is also available from the parameter screen.
In the distance-coded reference position detection, the reference position adjustment value will be invalid.
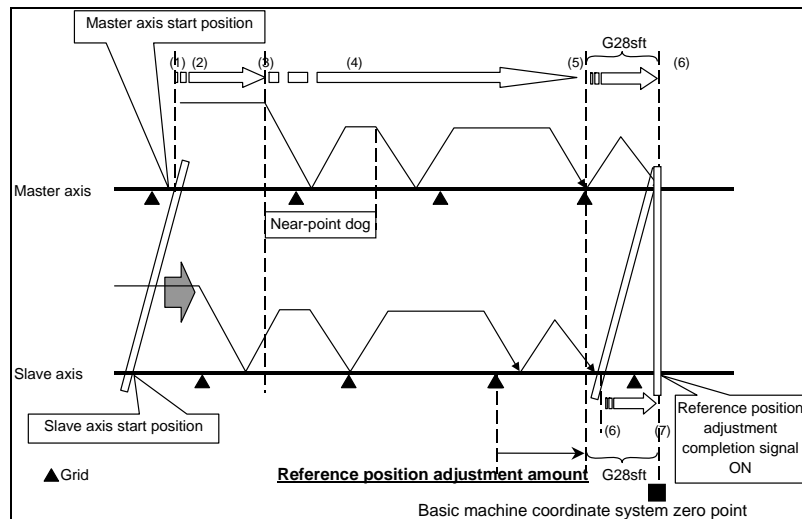
(Note 1) This parameter is enabled when the synchronization at zero point initialization ("#1493 ref_syn" = "1" of the master axis) is applied.
(Note 2) This parameter can be set when one of the following settings is applied.
● Relative position detection ("#2049 type" = "0")
● Dog-type absolute position detection ("#2049 type" = "3")
● Simple absolute position ("#2049 type" = "9")
(Note 3) Set "0" when using the speed/current command synchronization control.
(Note 4) A setting unit of this parameter is [mm]. It is not influenced by the content of the following parameters setting.
● "#1003 iunit"
● "#1004 ctrl_unit"
● "#1005 plcunit"
● "#1040 M_inch"
● "#1041 I_inch"
● "#1240 set12/bit2" (Zero point shift amount magnification)
(Note 5) The number of the significant digits after decimal point follows "#1004 ctrl_unit"
(Note 6) A change of this parameter requires reference position return. When the automatic operation starts without reference position return, an alarm will occur.

---Setting range---
0 to 99999.999999 (mm)

【#2037】　G53ofs　Reference position #1

Set the position of the first reference position from the zero point of the basic machine coordinate.
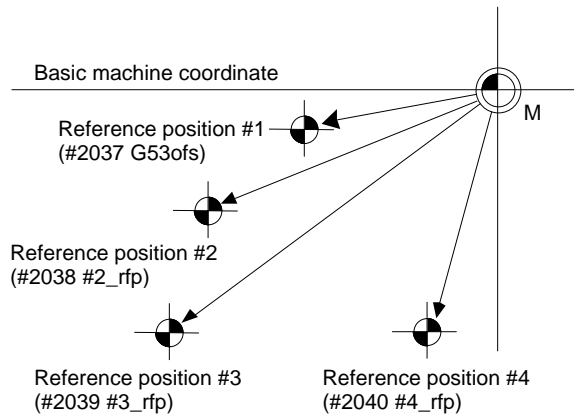
---Setting range---
±999999.999 (mm)

【#2038】　#2_rfp　Reference position #2

Set the position of the second reference position from the zero point of the basic machine coordinate.

---Setting range---
±999999.999 (mm)

【#2037】　G53ofs　Reference position #1
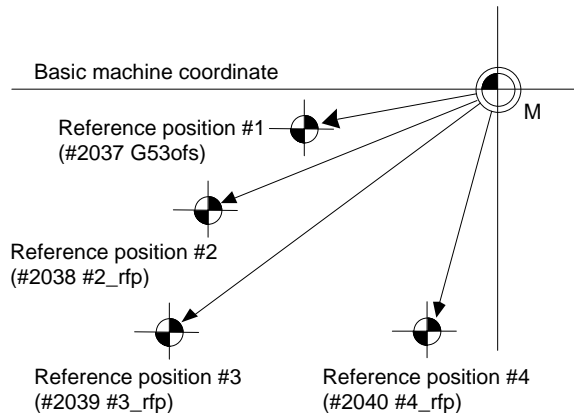
【#2039】 #3_rfp Reference position #3

Set the position of the third reference position from the zero point of the basic machine coordinate.

Basic machine coordinate

Reference position #1
(#2037 G53ofs)

Reference position #2
(#2038 #2_rfp)

Reference position #3
(#2039 #3_rfp)

Reference position #4
(#2040 #4_rfp)

M
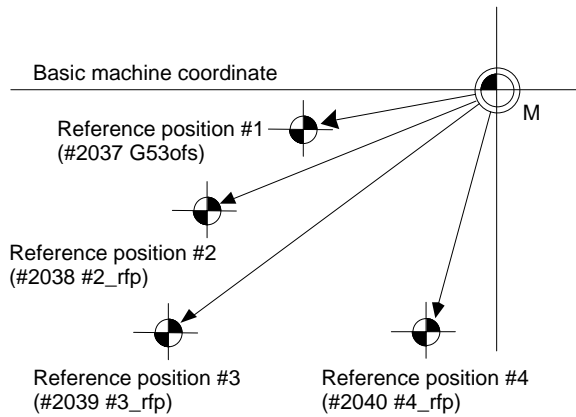
---Setting range---
±999999.999 (mm)

【#2040】 #4_rfp Reference position #4

Set the position of the fourth reference position from the zero point of the basic machine coordinate.

Basic machine coordinate

Reference position #1
(#2037 G53ofs)

Reference position #2
(#2038 #2_rfp)

Reference position #3
(#2039 #3_rfp)

Reference position #4
(#2040 #4_rfp)

M

---Setting range---
±999999.999 (mm)

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5.3 Absolute Position Parameters

After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

【#2049(PR)】　type　Absolute position detection method

Select the absolute position zero point alignment method.
　0: Not absolute position detection
　1: Stopper method (push against mechanical stopper)
　2: Marked point alignment method (align to alignment point)
　3: Dog-type (align with dog and near point detection switch)
　4: Marked point alignment method II (Align to alignment mark. Grid return won't be performed after marked point alignment)
　9: Simple absolute position (Not absolute position detection, but the position when the power is turned off is registered.)

【#2050】　absdir　Basic point of Z direction

Select the direction of the grid point immediately before the machine basic position (basic point of detector) in the marked point alignment.
　0: Positive direction
　1: Negative direction

【#2051】　check　Check

Set the tolerable range of travel distance (deviation distance) while the power is turned OFF.
If the difference of the positions when the power is turned OFF and when turned ON again is larger than this value, an alarm will be output.
Set "0" to omit the check.

---Setting range---
0 to 99999.999 (mm)

【#2054】　clpush　Current limit (%)

Set the current limit value during the stopper operation in the dogless-type absolute position detection.
The setting value is the ratio of the current limit value to the rated current value.

---Setting range---
0 to 100 (%)

【#2055】　pushf　Push speed

Set the feedrate for the automatic initial setting during stopper method.

---Setting range---
1 to 999 (mm/min)

【#2056】　aproch　Approach

Set the approach distance of the stopper when deciding the absolute position basic point with the stopper method.
After using stopper once, the tool returns with this distance, and then use stopper again.

---Setting range---
0 to 999.999 (mm)

【#2057】　nrefp　Near zero point +

Set the positive direction width where the near reference position signal is output.
When set to "0", the width will be equivalent to the grid width setting.

(Note) When "#1240 set12/bit2" is ON, a magnification (C: 10-fold, D: 100-fold, E:1000-fold) corresponding to the input setting increment ("#1003 iunit") will be applied to the setting value.

---Setting range---
0 to 999.999 (mm)
(Input setting increment applied)

【#2058】　nrefn　Near zero point -

Set the negative direction width where the near reference position signal is output.
When set to "0", the width will be equivalent to the grid width setting.

(Note) When "#1240 set12/bit2" is ON, a magnification (C: 10-fold, D: 100-fold, E:1000-fold) corresponding to the input setting increment ("#1003 iunit") will be applied to the setting value.

---Setting range---
0 to 999.999 (mm)
(Input setting increment applied)

【#2059】　zerbas　Select zero point parameter and basic point

Select which is to be the zero point coordinate position during absolute position initial setting.
　0: Position where the axis was stopped.
　1: Grid point just before stopper.

5.4 Axis Specifications Parameters 2

After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

【#2061】 OT_1B-　Soft limit IB-

Set the coordinate of the lower limit of the area where the stored stroke limit IB is inhibited.
Set a value from zero point in the basic machine coordinate system.
If the same value (non-zero) with the same sign as that of "#2062 OT_IB+" is set, the stored stroke limit IB function will be disabled.

---Setting range---
±99999.999 (mm)

【#2062】 OT_1B+　Soft limit IB+

Set the coordinate of the upper limit of the area where the stored stroke limit IB is inhibited.
Set a value from zero point in the basic machine coordinate system.

---Setting range---
±99999.999 (mm)

【#2063】 OT_1B type　Soft limit IB type

Select the type that applies the settings of "#2062 OT_IB+" and "#2061 OT_IB-" in stored stroke limit I.
　　0: Soft limit IB
　　1: The settings are invalid
　　2: Soft limit IC
　　3: Soft limit is checked for the inclined axis control axis with the program coordinate system.
(Note) This is valid only for inclined axis' base axis and inclined axis.

【#2068】 G0fwdg　G00 feed forward gain

Set a feed forward gain for G00 pre-interpolation acceleration/deceleration.
The larger the setting value, the shorter the positioning time during in-position checking.
If a machine vibration occurs, set the smaller value.

---Setting range---
0 to 200 (%)

【#2069】 Rcoeff　Axis arc radius error correction coefficient

Set the percentage to increase or decrease the arc radius error correction amount for each axis.

---Setting range---
-100.0 to +100.0 (%)

【#2070(PR)】 div_RT　Rotational axis division count

Set the number of divisions of one turn of the rotary axis under control.
(Example) When "36" is set, one turn is supposed to be 36.000.
(Note 1) When "0" is set, the normal rotary axis (360.000 degrees for one turn) is assumed.
(Note 2) If this parameter is changed when the absolute position detection specification is used, absolute position data will be lost. Initialization must be performed again.

---Setting range---
0 to 999

【#2071】　s_axis　Inclined axis selection   **For L system only**

Select whether the axis is to be under the inclined-axis control or to be the base axis corresponding to the inclined axis.
　　0: Not to be under the inclined-axis control
　　1: Inclined axis
　　2: Base axis corresponding to inclined axis

(Note) Each of "1" and "2" values must be set for only one axis. If either value is set for two or more axes, inclined-axis control does not work.

【#2072】　rslimt　Restart limit

Set the most minus (-) side position where restart search is possible.
If the machine is positioned on the more minus (-) side than the set value in T-command restart mode, restart search in type 3 will be disabled.

---Setting range---
±9999.999 (mm)

【#2073】　zrn_dog　Origin dog Random assignment device

Under the standard specifications, the origin dog signal is assigned to a fixed device. Set the input device in this parameter when it is desired to assign the origin dog signal to a position other than the fixed device.

(Note 1) This parameter is valid when "1" is set in "#1226 aux10/bit5".
(Note 2) When this parameter is valid, do not set the existing device number. If the existing device number is set, an emergency stop will occur. However, no device number check will be performed for an axis to which the "near-point dog ignored" signal is input.

---Setting range---
0000 to 02FF (HEX)

【#2074】　H/W_OT+　H/W OT+ Random assignment device

Under the standard specifications, the OT (+) signal is assigned to a fixed device. Set the input device in this parameter when it is desired to assign the OT (+) g signal to a position other than the fixed device.

(Note 1) This parameter is valid when "1" is set in "#1226 aux10/bit5".
(Note 2) When this parameter is valid, do not set the existing device number. If the existing device number is set, an emergency stop will occur. However, no device number check will be performed for an axis to which the "OT ignored" signal is input.

---Setting range---
0000 to 02FF (HEX)

【#2075】　H/W_OT-　H/W OT- Random assignment device

Under the standard specifications, the OT (-) signal is assigned to a fixed device. Set the input device in this parameter when it is desired to assign the OT (-) signal to a position other than the fixed device.

(Note 1) This parameter is valid when "1" is set in "#1226 aux10/bit5".
(Note 2) When this parameter is valid, do not set the existing device number. If the existing device number is set, an emergency stop will occur. However, no device number check will be performed for an axis to which the "OT ignored" signal is input.

---Setting range---
0000 to 02FF (HEX)

【#2076】　index_x　Index table indexing axis

Select whether the axis is a normal axis or an index table indexing axis.
　0: Normal axis
　1: Index table indexing axis

(Note) This parameter is valid only for the NC axis. The parameter is invalid if set for the PLC axis.

【#2077】　G0inps　G0 in-position width

Set the in-position width for G0.
Between SV024 and this parameter, the parameter with a larger value will be applied.
When "0" is set, this parameter will be invalid: only SV024 will be available.

---Setting range---
0.000 to 99.999 (mm)

【#2078】　G1inps　G1 in-position width

Set the in-position width for G1.
Between SV024 and this parameter, the parameter with a larger value will be applied.
When "0" is set, this parameter will be invalid: only SV024 will be available.

---Setting range---
0.000 to 99.999 (mm)

【#2079(PR)】　chcomp　Chopping compensation coefficient

Set the coefficient to be applied to the compensation amount for the insufficient amount caused by
servo delay during chopping.

---Setting range---
0 to 10 (standard value: 8)

【#2080】　chwid　Bottom dead center position width

Set the tolerance between the commanded stroke and actual stroke.
Compensation will be applied during chopping so that the result of [command width - maximum
stroke of top or bottom dead point/ 2] will be within this tolerance.

---Setting range---
0 to 10.000 (mm)

【#2081】　chclsp　Maximum chopping speed

Set the clamp speed in chopping operation.
When "0" is set, the clamp speed will be determined by "#2002 clamp".

---Setting range---
0 to 60000 (mm/min)

【#2082】　a_rstax　Restart position return order

Set the No. for each axis in order from the 1st automatically returning axis to the restart position.
When "0" is set, the axis will not return.
Note that when "0" is set for all axes, all of the axes will return simultaneously.

---Setting range---
0 to 8

【#2084】　G60_ax　Unidirectional positioning operation selection

Select how to operate the unidirectional positioning when the positioning command (G00) is issued.
　0: Carry out unidirectional positioning according to the command and modal.
　1: Carry out unidirectional positioning regardless of the command and modal.
Set "1" for the axis to carry out the unidirectional positioning at every positioning command, regardless of whether the unidirectional positioning command and modal are issued.

<Related parameters>
"#8209 G60 SHIFT" and "#2076 index_x"

【#2087】　syncnt　Synchronization/super-imposition control setting for each axis

Set the polarity of synchronous axis with respect to basic axis to the bit corresponding to each axis.
　0: Polarity with respect to basic axis is positive
　1: Polarity with respect to basic axis is negative

---Setting range---
0 to FF (hexadecimal)

【#2088】　bsax_sy　Reference axis for synchronous control

Set the basic axis for synchronous control with the 2nd axis name (axname2).
A numerical character cannot be set as the 1st character.

---Setting range---
Axis name

【#2089】　bsax_pl　Reference axis for superimposition control

Set the basic axis for superimposition control with the 2nd axis name (axname2).
A numerical character cannot be set as the 1st character.

---Setting range---
Axis name

【#2090】　plrapid　Rapid traverse rate for super-imposition control

Set the rapid traverse rate for superimposition control.
(Equivalent to "#2001 rapid Rapid traverse rate".)

---Setting range---
1 to 1000000 (mm/min)

【#2091】　plclamp　Cutting feed clamp speed for super-imposition control

Set the cutting feed clamp speed for superimposition control.
(Equivalent to "#2002 clamp Cutting feed clamp speed".)

---Setting range---
1 to 1000000 (mm/min)

【#2092】　plG0tL　G0 time constant for superimposition control (linear)

Set the G0 time constant (linear) for superimposition control.
(Equivalent to "#2004 G0tL G0 time constant (linear)".)

---Setting range---
1 to 4000 (ms)

【#2093】　plG0t1　G0 time constant for superimposition control (primary delay)

Set the G0 time constant (primary delay) for superimposition control.
(Equivalent to "#2005 G0t1 G0 time constant (primary delay".)

---Setting range---
1 to 5000 (ms)

【#2094】 pIG1tL   G1 time constant for superimposition control (linear)

Set the G1 time constant (linear) for superimposition control.
(Equivalent to "#2007 G1tL G1 time constant (linear)".)

---Setting range---
1 to 4000 (ms)

【#2095】 pIG1t1   G1 time constant for superimposition control (primary delay)

Set the G1 time constant (primary delay) for superimposition control.
(Equivalent to "#2008 G1t1 G1 time constant (primary delay)".)

---Setting range---
1 to 5000 (ms)

【#2096】 crncsp   Minimum corner deceleration speed

Set the minimum clamp speed for corner deceleration in the high-accuracy control mode. Normally set "0".
(Note) This parameter is invalid during SSS control.

---Setting range---
0 to 1000000 (mm/min)

【#2097】 tlml2-   Sub side tool setter - direction sensor

Set the sensor position (on sub side) in the (-) direction when using the tool setter on the sub spindle side.

---Setting range---
±99999.999 (mm)

【#2098】 tlml2+   Sub side tool setter + direction sensor

Set the sensor position (on sub side) in (+) direction when using the tool setter on the sub spindle side.

---Setting range---
±99999.999 (mm)

【#2102】 skip_tL   Skip time constant linear

Set a linear control time constant for variable speed skip acceleration and deceleration.
The time constant will be enabled when LC (cutting feed with linear acceleration and deceleration) or "F" (soft acceleration/deceleration) is selected in "#2003 smgst Acceleration and deceleration modes".

---Setting range---
1 to 4000 (ms)

【#2103】 skip_t1   Skip time constant primary delay / Second-step time constant for soft acceleration/deceleration

Set a primary-delay time constant for variable speed skip acceleration and deceleration.
The time constant will be enabled when C1 (cutting feed with primary delay) or C3 (exponential acceleration and linear deceleration) is selected in "#2003 smgst Acceleration and deceleration modes".
When the soft acceleration/deceleration is selected, the second-step time constant will be used.

---Setting range---
1 to 5000 (ms)

【#2106】 Index unit   Indexing unit

Set the indexing unit to which the rotary axis can be positioned.

---Setting range---
0 to 360 (°)

【#2109】 **Rapid (H-precision)   Rapid traverse rate for high-accuracy control mode**

Set the rapid traverse rate for each axis in the high-accuracy control mode. "#2001 rapid" will be used when "0" is set.

---Setting range---
0 to 1000000 (mm/min)

【#2110】 **Clamp (H-precision)   Cutting feed clamp speed for high-accuracy control mode**

Set the cutting feed maximum speed for each axis in the high-accuracy control mode. "#2002 clamp" will be used when "0" is set.

---Setting range---
0 to 1000000 (mm/min)

【#2111】 **Blf valid   Quadrant protrusion compensation valid**

Set whether to enable the quadrant protrusion compensation.
   0: Disable
   1: Enable
If either of "#2112 Blf motor inertia", "#2115 Blf motor stl trq" or "#2113 Blf visc friction" is set to "0", quadrant protrusion compensation will not work even if this parameter is set to "1".

【#2112】 **Blf motor inertia   Motor inertia**

Set the motor inertia for quadrant protrusion compensation.
Refer to the servo manual and input the value appropriate for the motor.

---Setting range---
1 to 32000 (10^{-6}kgm^2)

【#2113】 **Blf visc friction   Viscous friction**

Set the viscous friction for quadrant protrusion compensation.
After setting the other parameters to the appropriate values, monitor the machine end and gradually adjust the value.
If this parameter setting is small, a recess will form on the inner side of the circle, and if large, a protrusion will form on the outer side of the circle. When the value is appropriate, a spike-shaped quadrant protrusion will form based on normal step-shaped backlash.

---Setting range---
1 to 32767 (1/16 Nm/(rad/s))

【#2114】 **Blf fwdg   Compensation FF gain**

Set the feed forward gain for quadrant protrusion compensation.
After setting the other parameters to the appropriate values, monitor the machine end and gradually adjust the value.
If this parameter setting is small, a large quadrant protrusion will form, and if large, a recess will form on the inner side of the circle.

---Setting range---
0 to 1000 (%)

【#2115】 **Blf motor stl trq   Motor stall torque**

Set the motor rated current for quadrant protrusion compensation.
Refer to the servo manual and input the value appropriate for the motor.

---Setting range---
1 to 16000 (1/256 Nm)

【#2118(PR) 】 SscDrSel Speed monitor Door selection

Select which door group of the speed monitoring the spindle belongs to.
0000: Door 1 group.
0001: Door 1 group.
0002: Door 2 group.
0003: Door 1 and 2 group.
The speed monitoring will not be executed when "#2313 SV113 SSF8/BitF" is OFF regardless of this parameter.
The selected door group must be set when setting the synchronous control.
The spindle/C axis control enables the door selection in "#3071 SscDrSelSp" for the corresponding spindle.

【#2121】 vbacklash valid Variable backlash valid/continuous

Select whether the variable backlash is to be invalid/valid/continuous.
0: Invalid
1: Valid
2: Continuous
("#2011 G0back" and "#2012 G1back" will not work when valid or continuous status is selected.)

【#2122】 G0vback+ Variable G0 backlash +

Set the compensation amount for the range of each position during rapid traverse.
(+: B1, =: B2, -: B3 on the compensation amount table)

---Setting range---
-99999999 to 99999999 (Interpolation unit)

【#2123】 G0vback= Variable G0 backlash =

Set the compensation amount for the range of each position during rapid traverse.
(+: B1, =: B2, -: B3 on the compensation amount table)

---Setting range---
-99999999 to 99999999 (Interpolation unit)

【#2124】 G0vback- Variable G0 backlash -

Set the compensation amount for the range of each position during rapid traverse.
(+: B1, =: B2, -: B3 on the compensation amount table)

---Setting range---
-99999999 to 99999999 (Interpolation unit)

【#2125】 G1vback+ Variable G1 backlash +

Set the compensation amount for the range of each position during cutting feed.
(+: A1, =: A2, -: A3 on the compensation amount table)

---Setting range---
-99999999 to 99999999(Interpolation unit)

【#2126】 G1vback= Variable G1 backlash =

Set the compensation amount for the range of each position during cutting feed.
(+: A1, =: A2, -: A3 on the compensation amount table)

---Setting range---
-99999999 to 99999999 (Interpolation unit)

【#2127】 G1vback- Variable G1 backlash -

Set the compensation amount for the range of each position during cutting feed.
(+: A1, =: A2, -: A3 on the compensation amount table)

---Setting range---
-99999999 to 99999999 (Interpolation unit)

【#2128】 G1vback feed1 G1 variable backlash compensation amount changeover speed 1

Set the speed range during cutting feed.
(The speed less than 1 is the low speed, and the speed exceeding 2 is the high speed.)
Note that the speed range is identified in the order of low, high and medium speed. Consider whether the set value should be larger or smaller than other values.

---Setting range---
0 to 480000 (mm/min)

【#2129】 G1vback feed2 G1 variable backlash compensation amount changeover speed 2

Set the range of the speed during cutting feed.
(The speed less than 1 is the low speed, and the speed exceeding 2 is the high speed.)
Note that the speed range is identified in the order of low, high and medium speed. Consider whether the set value should be larger or smaller than other values.

---Setting range---
0 to 480000 (mm/min)

【#2130】 G1vback dist1 G1 variable backlash compensation amount changeover distance 1

Set the range of the distance during cutting feed.
(The distance less than 1 is the small distance, and the distance exceeding 2 is the large distance.)
Note that the distance range is identified in the order of small, large and medium. Consider whether the set value should be larger or smaller than other values.

---Setting range---
0 to 999999.999999 (mm)

【#2131】 G1vback dist2 G1 variable backlash compensation amount changeover distance 2

Set the range of the distance during cutting feed.
(The distance less than 1 is the small distance, and the distance exceeding 2 is the large distance.)
Note that the distance range is identified in the order of small, large and medium. Consider whether the set value should be larger or smaller than other values.

---Setting range---
0 to 999999.999999 (mm)

【#2132】 vback pos1 Variable backlash compensation amount changeover end point position 1

Set the range of the center of the end point position.
(The range less than position 1 is the - range, and the range exceeding position 2 is the + range.)
The end point position range is determined in the order of -, + , and center. Consider whether the set value should be larger or smaller than other values.
(Note 1) If continuous variable backlash is set with "#2121 vbacklash valid", position 1 will be set as the position - point and position 2 will be set as the position + point.
(Note 2) When the size relation of the compensation amount changeover speed and distance 1 and 2 is not appropriate while the variable backlash compensation is valid, the followings will be applied: If the backlash speed and distance are smaller than the compensation amount changeover speed and distance 1, both the speed and distance will be small; if larger than the compensation amount changeover speed and distance 2, both the speed and distance will be large.

---Setting range---
-999999.999999 to 999999.999999 (mm)

【#2133】 **vback pos2** **Variable backlash compensation amount changeover end point position 2**

Set the range of the center of the end point position.
(The range less than position 1 is the - range, and the range exceeding position 2 is the + range.)
The end point position range is determined in the order of -, + , and center. Consider whether the set value should be larger or smaller than other values.
(Note 1) If continuous variable backlash is set with "#2121 vbacklash valid", position 1 will be set as the position - point and position 2 will be set as the position + point.
(Note 2) When the size relation of the compensation amount changeover speed and distance 1 and 2 is not appropriate while the variable backlash compensation is valid, the followings will be applied:
If the backlash speed and distance are smaller than the compensation amount changeover speed and distance 1, both the speed and distance will be small; if larger than the compensation amount changeover speed and distance 2, both the speed and distance will be large.

---Setting range---
-999999.999999 to 999999.999999 (mm)

【#2134】 **vback arc K** **Variable backlash arc compensation coefficient**

Set the arc compensation coefficient.

---Setting range---
0 to 300 (%)

【#2135】 **vback feed refpt** **Variable backlash reference position selection (speed)**

Select the speed range to be used as the reference position.
  0: Low speed
  1: Medium speed
  2: High speed

【#2136】 **vback pos refpt** **Variable backlash reference position selection (end point position)**

Select the end point range to be used as the reference position.
  0: Position + range
  1: Position center range
  2: Position - range

【#2137】 **vback dir refpt** **Variable backlash reference position selection (entry direction)**

Select the entry direction to be used as the reference position.
  0: Entry direction +
  1: Entry direction -

【#2138】 **vback pos center** **Continuous variable backlash position center point**

Set the position center point. (This is used only when continuous variable backlash is set with "#2121 vbacklash valid".) Set a value between "#2132 vback pos1" and "#2133 vbackpos2" for the position center point.
(Note 1) When the size relation of the compensation amount changeover speed and distance 1 and 2 is not appropriate while the variable backlash compensation is valid, the followings will be applied:
If the backlash speed and distance are smaller than the compensation amount changeover speed and distance 1, both the speed and distance will be small; if larger than the compensation amount changeover speed and distance 2, both the speed and distance will be large.

---Setting range---
-999999.999999 to 999999.999999 (mm)

【#2139】 **omrff_off** **OMR-FF invalid**

Select whether to enable or temporarily disable the OMR-FF control when OMR-FF is valid.
  0: Enable
  1: Temporarily disable
When "1" is selected while OMR-FF is valid, OMR-FF can be temporarily disabled and conventional feed forward control can be applied instead.

【#2140(PR)】　Ssc Svof Filter　Speed monitor Error detection time during servo OFF

Set the error detection time of command speed monitoring and feedback speed monitoring during servo OFF.

An alarm will occur if the time, for which the speed has been exceeding the safe speed or safe rotation speed, exceeds the error detection time set in this parameter.

If "0" is set, it will be handled as 200 (ms).

---Setting range---
0 to 9999 (ms)

【#2141】　chtL　Chopping first-step time constant for soft acceleration and deceleration

Set the first-step time constant for the chopping axis when soft acceleration/deceleration is applied.

Note that, however, there may be cases where actual time constant is shorter than the set time constant, because the time constant is automatically calculated according to the feedrate so that the acceleration rate during acceleration/deceleration (clamp speed/chopping time constant) will be constant.

When "0" is set, "#2007 G1tL" will be valid.
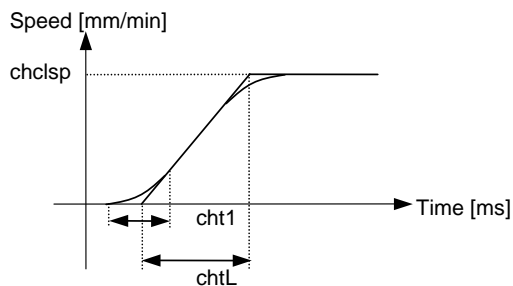
---Setting range---
0 to 4000 (ms)

【#2142】　cht1　Chopping second-step time constant for soft acceleration and deceleration

Set the second-step time constant for the chopping axis when soft acceleration/deceleration is applied.

Note that, however, there may be cases where actual time constant is shorter than the set time constant, because the time constant is automatically calculated so that the ratio between first-step and second-step time constant will be constant.

When "0" is set, "#2008 G1t1" will be valid.

---Setting range---
0 to 4000 (ms)

【#2146】　Blf_L1　Reference distance for position-dependent increasing-type backlash compensation 1

Set the distance for specifying the compensation change rate in position-dependent increasing-type backlash compensation.
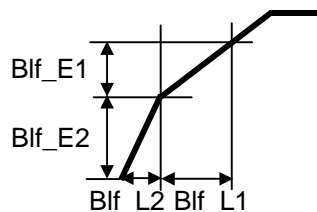
When "#2146 Blf_E1" is set to "0", the position-dependent increasing-type backlash compensation function will be disabled.

---Setting range---
0 to 99999.999 (mm)

【#2147】 Blf_L2   Reference distance for position-dependent increasing-type backlash compensation 2

Set the distance for specifying the compensation change rate in position-dependent increasing-type backlash compensation.

Blf_E1

Blf_E2

Blf_L2 Blf_L1
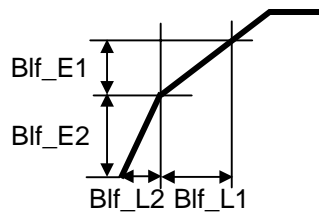
When "#2146 Blf_E1" is set to "0", the position-dependent increasing-type backlash compensation function will be disabled.

---Setting range---
0 to 99999.999 (mm)

【#2148】 Blf_E1   Reference amount of position-dependent increasing-type backlash compensation 1

Set the compensation amount for specifying the compensation change rate in position-dependent increasing-type backlash compensation.

Blf_E1

Blf_E2

Blf_L2 Blf_L1
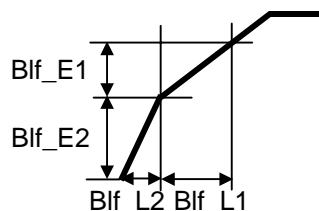
When "#2146 Blf_E1" is set to "0", the position-dependent increasing-type backlash compensation function will be disabled.

---Setting range---
0 to 9999999 (Machine error compensation unit)

【#2149】 Blf_E2   Reference amount of position-dependent increasing-type backlash compensation 2

Set the compensation amount for specifying the compensation change rate in position-dependent increasing-type backlash compensation.

Blf_E1

Blf_E2

Blf_L2 Blf_L1
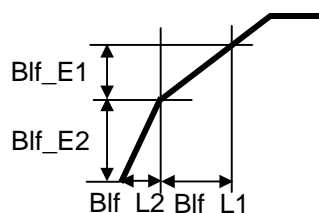
When "#2146 Blf_E1" is set to "0", the position-dependent increasing-type backlash compensation function will be disabled.

---Setting range---
0 to 9999999 (Machine error compensation unit)

【#2150】 Rot_len   Farthest distance from rotary axis center

Set the farthest distance of the rotating part from the rotation center. When "0" is set, this distance will conform to the rotary axis' specification speed.

---Setting range---
0.000 to 99999.999(mm)

【#2151】 rated_spd Rated speed

Set the maximum speed which can be driven with the motor's maximum torque.

(Note 1) This parameter's setting value must be smaller than "#2001 rapid Rapid traverse". If bigger, constant inclination acceleration/deceleration will be applied.
(Note 2) If rapid traverse constant inclination multi-step acceleration/deceleration is valid, and also if this parameter is set to "0", constant inclination acceleration/deceleration will be applied.
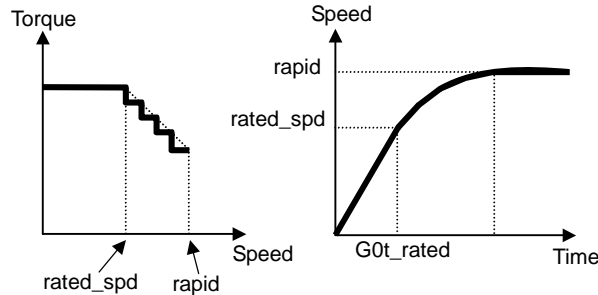
---Setting range---
0 to 1000000(mm/min)

【#2152】 acc_rate Acceleration rate in proportion to the maximum acceleration rate

Set the rate in proportion to the maximum acceleration rate in rapid traverse.

(Note) If this parameter is set to "0" or "100", constant inclination acceleration/deceleration will be applied.

$$acc\_rate = \frac{a_{min}}{a_{max}} \times 100$$
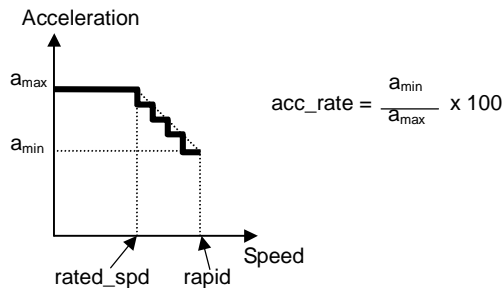
---Setting range---
0 to 100(%)

【#2153】 G0t_rated G0 time constant up to rated speed (multi-step acceleration/deceleration)

Set the acceleration rate up to the rated speed of rapid traverse constant inclination multi-step acceleration/deceleration.

*If this parameter is set to "0", constant inclination acceleration/deceleration will be applied.

---Setting range---
0 to 4000(ms)
(G0t_rapid) G0 time constant up to rapid traverse speed (multi-step acceleration/deceleration)
Set the acceleration time until the rapid traverse speed of rapid traverse constant inclination multi-step acceleration/deceleration is applied.
(Note) Set the acceleration time when a pertinent axis is operated independently.

【#2155】 hob_fwd_g Feed forward gain for hobbing machining

Set the feed forward gain when controlling as workpiece axis of tool spindle synchronization II (hobbing).

---Setting range---
0 to 200 (%)

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6. Servo Parameters

6.1 Details for servo parameters

For parameters marked with a (PR) in the table, turn the NC power OFF after setting. After the power is turned ON again, the parameter is validated.

> ⚠️ **CAUTION**
>
> ⚠️ In the explanation on bits, set all bits not used, including blank bits, to "0".

【#2201(PR)】 **SV001 PC1 Motor side gear ratio**

Set the gear ratio in the motor side when there is the gear between the servomotor's shaft and machine (ball screw, etc.).
For the rotary axis, set the total deceleration (acceleration) ratio.
Even if the gear ratio is within the setting range, the electronic gears may overflow and an initial parameter error (servo alarm 37) may occur.

---Setting range---
1 - 32767

【#2202(PR)】 **SV002 PC2 Machine side gear ratio**

Set the gear ratio in the motor side when there is the gear between the servomotor's shaft and machine (ball screw, etc.).
For the rotary axis, set the total deceleration (acceleration) ratio.
Even if the gear ratio is within the setting range, the electronic gears may overflow and an initial parameter error (servo alarm 37) may occur.

---Setting range---
1 - 32767

【#2203】 **SV003 PGN1 Position loop gain 1**

Set the position loop gain. The standard setting is "33".
The higher the setting value is, the more accurately the command can be followed, and the shorter the settling time in positioning gets, however, note that a bigger shock will be applied to the machine during acceleration/deceleration.
When using the SHG control, also set SV004 (PGN2) and SV057 (SHGC).

---Setting range---
1 - 200 (rad/s)

【#2204】 **SV004 PGN2 Position loop gain 2**

When using the SHG control, set this parameter with SV003 (PGN1) and SV057 (SHGC).
When not using the SHG control, set to "0".

---Setting range---
0 - 999 (rad/s)

【#2205】 **SV005 VGN1 Speed loop gain 1**

Set the speed loop gain.
The higher the setting value is, the more accurate the control will be; however, vibration tends to occur.
When vibration occurs, adjust by lowering by 20 - 30%.
The value should be determined to be 70 - 80% of the value at which the vibration stops.

---Setting range---
1 - 9999

【#2206】　　SV006　VGN2　Speed loop gain 2

Set the speed loop gain at the motor limitation speed with "SV029 (VCS) Speed at the change of speed loop gain".
Use this to suppress noise at high speed during rapid traverse, etc. Then, the speed loop gain decreases at faster speed than the setting value of "SV029 (VCS) Speed at the change of speed loop gain".
When not using, set to "0".
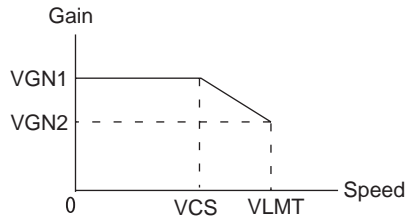
---Setting range---
-1000 - 9999

【#2207】　　SV007　VIL　Speed loop delay compensation

Set this parameter when the limit cycle occurs in the full-closed loop, or overshooting occurs in positioning.
Select the method of the speed loop delay compensation with the parameter "#2207 SV027(SSF1)/Bit1,0(vcnt)".
When setting this parameter, make sure to set the torque offset "SV032 (TOF)".

---Setting range---
0 - 32767

【#2208】　　SV008　VIA　Speed loop lead compensation

Set the gain of the speed loop integral control.
Standard setting: 1364
Standard setting in the SHG control: 1900
Adjust the value by increasing/decreasing this by about 100 at a time.
Raise this value to improve contour tracking accuracy in high-speed cutting. Lower this value when the position droop does not stabilize (10 - 20Hz).

---Setting range---
1 - 9999

【#2209】　　SV009　IQA　Current loop q axis lead compensation

Set the fixed value of each motor.
Set the standard value for each motor described in the standard parameter list.

---Setting range---
1 - 20480

【#2210】　　SV010　IDA　Current loop d axis lead compensation

Set the fixed value of each motor.
Set the standard value for each motor described in the standard parameter list.

---Setting range---
1 - 20480

【#2211】　　SV011　IQG　Current loop q axis gain

Set the fixed value of each motor.
Set the standard value for each motor described in the standard parameter list.

---Setting range---
1 - 8192

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【#2212】 SV012 IDG Current loop d axis gain

Set the fixed value of each motor.
Set the standard value for each motor described in the standard parameter list.

---Setting range---
1 - 8192

【#2213】 SV013 ILMT Current limit value

Set the current (torque) limit value in a normal operation.
This is a limit value in both forward run and reverse run directions.
When the standard setting value "800" is set, the maximum torque will be determined by the specification of the motor.
Set this parameter as a proportion (%) to the stall torque.

---Setting range---
0 - 999

【#2214】 SV014 ILMTsp Current limit value in special control

Set the current (torque) limit value in a special operation (absolute position initial setting, stopper control, etc).
This is a limit value in both forward run and reverse run directions.
Set to "800" when not using.
Set this parameter as a proportion (%) to the stall torque.

---Setting range---
0 - 999

【#2215】 SV015 FFC Acceleration rate feed forward gain

When a relative error in the synchronous control is large, set this parameter to the axis that is delaying. The standard setting value is "0". The standard setting in the SHG control is "100".
To adjust a relative error in acceleration/deceleration, increase the value by 50 - 100 at a time.

---Setting range---
0 - 999 (%)

【#2216】 SV016 LMC1 Lost motion compensation 1

Set this parameter when the protrusion (that occurs due to the non-sensitive band by friction, torsion, backlash, etc.) at quadrant change is too large.
This compensates the torque at quadrant change (when an axis feed direction is reversed) by the proportion (%) to the stall torque.
Select whether to enable the lost motion compensation and the compensation method with the parameter "#2227 SV027 (SSF1)/ Bit9, 8".

---Setting range---
-1 - 200
Note that the range will be "-1 - 20000" when SV082/bit2 is "1".

【#2217(PR)】   SV017   SPEC1   Servo specification selection 1

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
              │  │  │  │ 0  0  0  0     0  0        │        │  0
                                                           │  │  │  │  dfbx
                                                           │  │  │  seqh
                                                           │  │  vfb
                                                           │  fdir
                                                           abs
                                                        spm
```
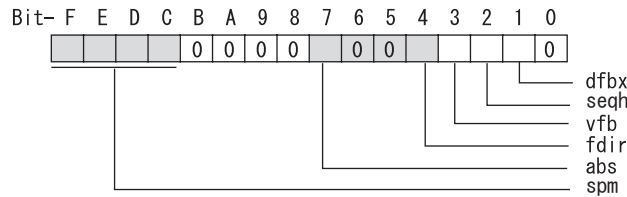
Bit-0

Not used. Set to "0".

Bit-1   **dfbx**   **Dual feedback control**

0: Stop   1: Start

Bit-2   **seqh**   **sequence**

0: Normal   1: High-speed

Bit-3   **vfb**   **Speed feedback filter**

0: Stop   1: Start (2250Hz)

Bit-4   **fdir**   **Position feedback**

0: Forward polarity   1: Reverse polarity

Bit-5, 6

Not used. Set to "0".

Bit-7   **abs**   **Position control**

0: Incremental   1: Absolute position control

Bit-8 - B

Not used. Set to "0".

Bit-F - C   **spm**   **Motor series selection**

0000: HF, HP motor (200V specifications)   0010: HF-H, HP-H motor (400V specifications)

【#2218(PR)】   SV018   PIT   Ball screw pitch

Set the ball screw pitch. Set to "360" for the rotary axis.

---Setting range---
1 - 32767 (mm/rev)

【#2219(PR)】   SV019   RNG1   Position detector resolution

For the semi-closed loop control
   Set the same value as SV020 (RNG2).

For the full-closed loop control
   Set the number of pulses per ball screw pitch.
   OSA18 (Hxn-A48) (260,000 p/rev) ----------- SV019 = 260
   OSA105 (Hxn-A51) (1,000,000 p/rev) ------- SV019 = 1000
   OSA166 (Hxn-A74) (16,000,000 p/rev) ----- SV019 = 16000
   MDS-B-HR (Analog cycle/512 division) ----- SV019 = Set them with SV117 (RNG1ex).
For the setting value when using a linear scale, etc., refer to the section related to the detector setting in the drive unit instruction manual

---

【#2220(PR)】   SV020   RNG2   Speed detector resolution

Set the number of pulses per revolution of the motor side detector.
Detector model name   SV020 setting
   OSA18 (Hxn-A48) (260,000 p/rev) ----------- SV019 = 260
   OSA105 (Hxn-A51) (1,000,000 p/rev) ------- SV019 = 1000
   OSA166 (Hxn-A74) (16,000,000 p/rev) ----- SV019 = 16000

---Setting range---
0 - 32767 (kp/rev)

【#2221】　SV021　OLT　Overload detection time constant

Normally set this parameter to "60".

---Setting range---
1 - 999 (s)

【#2222】　SV022　OLL　Overload detection level

Set the current detection level of "Overload 1" (Alarm 50) as a percentage in respect to the stall current.
Normally set this parameter to "150". (For machine tool builder adjustment.)

---Setting range---
110 - 500 (Stall current %)

【#2223】　SV023　OD1　Excessive error detection width during servo ON

Set the excessive error detection width in servo ON.
<Standard setting value>
OD1=OD2= (Rapid traverse rate [mm/min]) / (60×PGN1) / 2 [mm]
If this parameter is set to "0", the excessive error detection will not be performed.

---Setting range---
0 - 32767 (mm)

【#2224】　SV024　INP　In-position detection width

Set the in-position detection width.
Set the positioning accuracy required for the machine.
The lower the setting is, the higher the positioning accuracy will be. However, the cycle time (settling time) becomes longer. The standard setting value is "50".

---Setting range---
0 - 32767 (μm)

【#2225(PR)】　　SV025　MTYP　Motor/Detector type

Set the position detector type, speed detector type and motor type.
The setting value is a four-digit hex (HEX).

```
HEX-    4     3     2     1
      ┌─────┬─────┬─────┬─────┐
      │░░░░░│     │░░░░░│     │
      └─────┴─────┴─────┴─────┘
                          └──── mtyp
                    └────────── ent
              └──────────────── pen
```
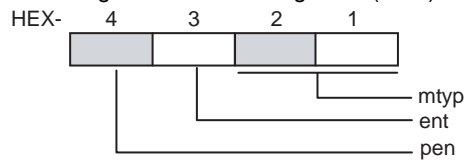
HEX-1, 2	mtyp	Motor type

Set the motor type. Set this according to SV017/bitC-F.

For SV017/bitC-F(spm)=0 (200V standard motor series)

HF75xxx-yyy	:	HEX2, 1 = 01h		HP54xxx-yyy	:	HEX2, 1 = 11h
HF105xxx-yyy	:	HEX2, 1 = 02h		HP104xxx-yyy	:	HEX2, 1 = 12h
HF54xxx-yyy	:	HEX2, 1 = 03h		HP154xxx-yyy	:	HEX2, 1 = 13h
HF104xxx-yyy	:	HEX2, 1 = 04h		HP224xxx-yyy	:	HEX2, 1 = 1Bh
HF154xxx-yyy	:	HEX2, 1 = 05h		HP204xxx-yyy	:	HEX2, 1 = 14h
HF204xxx-yyy	:	HEX2, 1 = 07h		HP354xxx-yyy	:	HEX2, 1 = 15h
HF354xxx-yyy	:	HEX2, 1 = 08h		HP454xxx-yyy	:	HEX2, 1 = 16h
HF453xxx-yyy	:	HEX2, 1 = 09h		HP704xxx-yyy	:	HEX2, 1 = 17h
HF703xxx-yyy	:	HEX2, 1 = 0Ah		HP903xxx-yyy	:	HEX2, 1 = 18h
HF903xxx-yyy	:	HEX2, 1 = 0Bh		HP1103xxx-yyy	:	HEX2, 1 = 19h

For SV017/bitC-F(spm)=2 (400V standard motor series)

HF-H75xxx-yyy	:	HEX2, 1 = 01h		HP-H 54xxx-yyy	:	HEX2, 1 = 11h
HF-H 105xxx-yyy	:	HEX2, 1 = 02h		HP-H 104xxx-yyy	:	HEX2, 1 = 12h
HF-H 54xxx-yyy	:	HEX2, 1 = 03h		HP-H 154xxx-yyy	:	HEX2, 1 = 13h
HF-H 104xxx-yyy	:	HEX2, 1 = 04h		HP-H 224xxx-yyy	:	HEX2, 1 = 1Bh
HF-H 154xxx-yyy	:	HEX2, 1 = 05h		HP-H 204xxx-yyy	:	HEX2, 1 = 14h
HF-H 204xxx-yyy	:	HEX2, 1 = 07h		HP-H 354xxx-yyy	:	HEX2, 1 = 15h
HF-H 354xxx-yyy	:	HEX2, 1 = 08h		HP-H 454xxx-yyy	:	HEX2, 1 = 16h
HF-H 453xxx-yyy	:	HEX2, 1 = 09h		HP-H 704xxx-yyy	:	HEX2, 1 = 17h
HF-H 703xxx-yyy	:	HEX2, 1 = 0Ah		HP-H 903xxx-yyy	:	HEX2, 1 = 18h
HF-H 903xxx-yyy	:	HEX2, 1 = 0Bh		HP-H 1103xxx-yyy	:	HEX2, 1 = 19h

(xxx: Code of brake, shaft shape, etc.,　yyy: Detector code)

HEX-3	ent	Speed detector

OSA18(HFaaaxxx-A48): HEX3=2
OSA105(HFaaaxxx-A51): HEX3=2
OSA166(HFaaaxxx-A74): HEX3=2

HEX-4	pen	Position detector

For semi-closed loop
OSA18(HFaaaxxx-A48): HEX4=2
OSA105(HFaaaxxx-A51): HEX4=2
OSA166(HFaaaxxx-A74): HEX4=2
For full-closed loop
OSA105-ET2, OSA166-ET2: HEX4 = 6h　　　MDS-B-HR: HEX4 = Ah

【#2226】　　SV026　OD2　Excessive error detection width during servo OFF

Set the excessive error detection width when servo OFF.
For the standard setting, refer to the explanation of SV023 (OD1).
When "0" is set, the excessive error detection will not be performed.

---Setting range---
0 - 32767 (mm)

【#2227】 **SV027 SSF1 Servo function selection 1**

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     0     0  0              0  0        0  0
                                               └── vcnt
                                           ──── vfct
                                    ──────────── lmc
                                 ─────────────── ovs
                     ──────────────────────────── zrn2
```
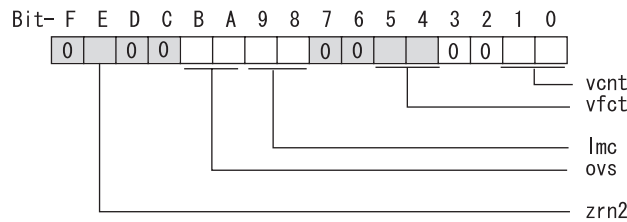
Bit-1,0	**vcnt**	**Speed loop delay compensation execution changeover**

00: Disable   01: Changeover type 1   10: Changeover type 2   11: Setting prohibited

Bit-3,2		

Not used. Set to "0".

Bit-5,4	**vfct**	**Jitter compensation pulse number**

00: Disable   01: 1 pulse   10: 2 pulses   11: 3 pulses

Bit-7,6		

Not used. Set to "0".

Bit-9,8	**lmc**	**Lost motion compensation type selection**

00: Compensation stop   01: Setting prohibited   10: Type 2   11: Setting prohibited
(Set the compensation amount in SV016 and SV041.)
(Note) When "SV082/lmc3" is set to "1", the lost motion compensation type 3 will be selected.

Bit-B,A	**ovs**	**Overshoot compensation type selection**

00: Compensation stop   01: Setting prohibited   10: Setting prohibited   11: Type 3
(Set the compensation amount in SV031 and SV042.)

Bit-C		

Not used. Set to "0".

Bit-D		

Not used. Set to "0".

Bit-E	**zrn2**	

Set to "1". (Fixed)

Bit-F		

Not used. Set to "0".

【#2228】 **SV028**

Not used. Set to "0".

【#2229】 **SV029 VCS Speed at the change of speed loop gain**

If the noise is bothersome at high speed during rapid traverse, etc, this noise can be reduced by lowering the speed loop gain at high speed.
Set the speed at which the speed loop gain changes, and use this together with SV006 (VGN2). (Refer to SV006.)
When not using, set to "0".

---Setting range---
0 - 9999 (r/min)

【#2230】 **SV030 IVC Voltage non-sensitive band compensation**

When 100% is set, the voltage equivalent to the logical non-energized time will be compensated.
When "0" is set, 100% compensation will be performed.
If adjustment is necessary, adjust the value by 10% at a time from 100%.
If the value is too large, vibration or vibration noise may be generated.

---Setting range---
0 - 255 (%)

【#2231】　SV031　OVS1　Overshooting compensation 1

Set the compensation amount of the motor torque during positioning.
This is enabled only when the overshooting compensation SV027 (SSF1/ovs) is selected.

---Setting range---
-1 - 100 (Stall current %)
Note that the range will be "-1 - 10000" (Stall current 0.01%) when"SV082/bit2" is "1",

【#2232】　SV032　TOF　Torque offset 1

Set the unbalance torque of vertical axis and inclined axis.
When the vertical axis pull up function is enabled, the pull up compensation direction is determined
by this parameter's sign. When set to "0", the vertical axis pull up will not be executed.

---Setting range---
-100 - 100 (Stall current %)

【#2233】　SV033　SSF2　Servo function selection 2

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
              0  0  0  0  0                          0
                                                        nfd1
                                                        nf3
                                                        nfd2
                                                        rps
                                                        zup
                                                        lmc2a
```
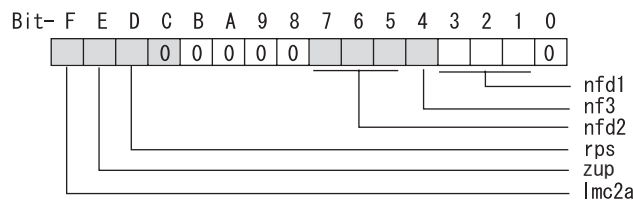
Bit-0

Not used. Set to "0".

Bit-1,2,3　　　nfd1　　　Depth of Notch filter 1

Set the filter depth of Notch filter 1.
Bit3,2,1=000: -∞　　　　Bit3,2,1=001: -18.1[dB]
Bit3,2,1=010: -12.0[dB]　Bit3,2,1=011: -8.5[dB]
Bit3,2,1=100: -6.0[dB]　Bit3,2,1=101: -4.1[dB]
Bit3,2,1=110: -2.5[dB]　Bit3,2,1=111: -1.2[dB]
Set the adaptive frequency of Notch filter 1 in "#2238 SV0038　FHz1".

Bit-4　　　　　nf3　　　　Notch filter 3

0: Stop　　　1: Start (1125Hz)

Bit-5,6,7　　　nfd2　　　Depth of Notch filter 2

Set the filter depth of Notch filter 2.
Bit7,6,5=000: -∞　　　　Bit7,6,5=001: -18.1[dB]
Bit7,6,5=010: -12.0[dB]　Bit7,6,5=011: -8.5[dB]
Bit7,6,5=100: -6.0[dB]　Bit7,6,5=101: -4.1[dB]
Bit7,6,5=110: -2.5[dB]　Bit7,6,5=111: -1.2[dB]
Set the adaptive frequency of Notch filter 2 in "#2246 SV0046　FHz2".

Bit-8,9,A,B,C

Not used. Set to "0".

Bit-D　　　　　rps　　　　Safety observation safety speed setting increment

0: mm/min　　　1: 100mm/min

Bit-E　　　　　zup　　　　Vertical axis pull up function

0: Stop　　　1: Enable

Bit-F　　　　　lmc2a　　　Lost motion compensation 2 timing

0: Normal　　　1: Change

【#2234】　SV034　SSF3　Servo function selection 3

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     │  │  │  │  │0 │0 │0 │0 │0 │0 │0 │0 │0 │0 │0 │0 │
     │  └──┴──┘                                      ────── ovsn
```
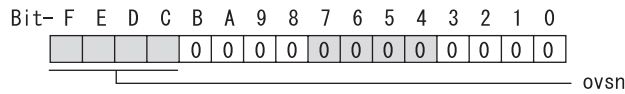
Bit-0 - B

Not used. Set to "0".

Bit-C,D,E,F   ovsn   Overshooting compensation type 3 non-sensitive ban

Set the non-sensitive band of the model position droop in increments of 2μm.
When using feed forward control, set the non-sensitive band for the model position droop and
ignore the model overshooting.
Bit-F,E,D,C=0000: 0μm　　　Bit-F,E,D,C=0001: 2μm　　　Bit-F,E,D,C=0010: 4μm

【#2235】　SV035　SSF4　Servo function selection 4

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     │0 │0 │0 │0 │0 │0 │0 │  │0 │0 │0 │0 │0 │0 │0 │
                              ────────── ckab
     └──────────────────────── clt
```
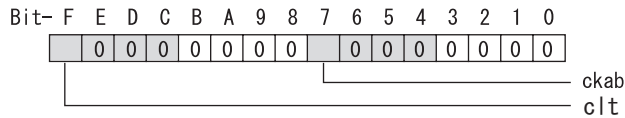
Bit-0 - 6

Not used. Set to "0".

Bit-7   ckab   No signal detection 2

0: Disable　　　1: Enable

Bit-8 - E

Not used. Set to "0".

Bit-F   clt   Inertia ratio display

0: Setting for normal use
1: Display the total inertia ratio estimated at acceleration/deceleration at the inertia ratio on the
servo monitor screen

【#2236(PR)】　　SV036　PTYP　Power supply type/ Regenerative resistor type

Power supply type
When connecting a power supply unit, set a code for each power supply unit.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
     │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
     └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                              └──────── ptyp
                                     └───────────────── rtyp
                          └────────────────────────────  amp
```

Bit-0 - 7	**ptyp**	**External emergency stop setting**

When the emergency stop input signal of the power supply unit is "disabled"

Power supply unit is not connected	: 0000h
MDS-D-CV-37 / MDS-DH-CV-37	: 0004h
MDS-D-CV-75 / MDS-DH-CV-75	: 0008h
MDS-D-CV-110 / MDS-DH-CV-110	: 0011h
MDS-D-CV-185 / MDS-DH-CV-185	: 0019h
MDS-D-CV-300 / MDS-DH-CV-300	: 0030h
MDS-D-CV-370 / MDS-DH-CV-370	: 0037h
MDS-D-CV-450 / MDS-DH-CV-450	: 0045h
MDS-D-CV-550	: 0055h
MDS-DH-CV-750	: 0075h

When the emergency stop input signal of the power supply unit is "enabled"

Power supply unit is not connected	: 0000h
MDS-D-CV-37 / MDS-DH-CV-37	: 0044h
MDS-D-CV-75 / MDS-DH-CV-75	: 0048h
MDS-D-CV-110 / MDS-DH-CV-110	: 0051h
MDS-D-CV-185 / MDS-DH-CV-185	: 0059h
MDS-D-CV-300 / MDS-DH-CV-300	: 0070h
MDS-D-CV-370 / MDS-DH-CV-370	: 0077h
MDS-D-CV-450 / MDS-DH-CV-450	: 0085h
MDS-D-CV-550	: 0095h
MDS-DH-CV-750	: 00B5h

Bit-8 - B	**rtyp**

Not used. Set to "0".

Bit-C - F	**amp**

Not used. Set to "0".

Regenerative resistor type
Set the regenerative resistor type.
(Note) These bits are used only in MDS-D-SVJ3/SPJ3 series.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
     │  │  │  │  │  │  │  │  │  │  │  │  │ 0│ 0│ 0│ 0│
     └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                     └────────────────── emgx
                              └───────────────────────── rtyp
                       └──────────────────────────────── amp
```

Bit-0 - 3	

Not used. Set to "0".

Bit-4 - 7	**emgx**	**External emergency stop function**

Set the external emergency stop function. (Do not set a value other than specified.)
0: Disable　　4: Enable

Bit-8 - B	**rtyp**

Bit-C - F	**amp**

For "amp = 1"
"rtyp" setting value
　0: Resistor built-in drive unit
　1: Setting prohibited
　2: MR-RB032
　3: MR-RB12 or GZG200W39OHMK
　4: MR-RB32 or GZG200W120OHMK 3 units connected in parallel
　5: MR-RB30 or GZG200W39OHMK 3 units connected in parallel

6: MR-RB50 or GZG300W39OHMK 3 units connected in parallel
7: MR-RB31 or GZG200W20OHMK 3 units connected in parallel
8: MR-RB51 or GZG300W20OHMK 3 units connected in parallel
9 - F: Setting prohibited

For "amp = 2"
"rtyp" setting value
  0 - 3: Setting prohibited
  4: FCUA-RB22
  5: FCUA-RB37
  6: FCUA-RB55
  7, 8: Setting prohibited
  9: R-UNIT2
  A - C: Setting prohibited
  D: FCUA-RB75/2 2 units
  E, F: Setting prohibited

【#2237】 SV037 JL Load inertia scale

Set "the motor inertia + motor axis conversion load inertia" in respect to the motor inertia.
$SV037(JL) = (Jm+Jl / Jm) \times 100$
Jm : Motor inertia
Jl : Motor axis conversion load inertia

For linear motor, set the gross mass of the moving sections in kg unit.

---Setting range---
0 - 5000 (%)
(For linear motor, the unit is "kg".)

【#2238】 SV038 FHz1 Notch filter frequency 1

Set the vibration frequency to suppress when machine vibration occurs. (Enabled at 80 or more)
When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【#2239】 SV039 LMCD Lost motion compensation timing

Set this parameter when the lost motion compensation timing does not match.
Adjust by increasing the value by 10 at a time.

---Setting range---
0 - 2000 (ms)

【#2240】 SV040 LMCT Lost motion compensation non-sensitive band

Set the non-sensitive band of the lost motion compensation in the feed forward control.
When "0" is set, the actual value to be set is 2μm. Adjust by increasing by 1μm at a time.

---Setting range---
0 - 255 (μm)

【#2241】 SV041 LMC2 Lost motion compensation 2

Set this parameter as well as SV016 (LMC1) only when you wish to vary the lost motion compensation amount depending on the command directions.
Normally set this parameter to "0".

---Setting range---
-1 - 200 (Stall current %)
Note that when SV082/bit2 is "1", -1 - 20000 (Stall current 0.01%)

【#2242】 SV042 OVS2 Overshooting compensation 2

Set this parameter as well as SV031 (OVS1) only when you wish to vary the overshooting compensation amount depending on the command directions.
Normally set this parameter to "0".

---**Setting range**---
-1 - 100 (Stall current %)
Note that the range will be "-1 - 10000" (Stall current 0.01%) when SV082/bit2 is "1".

【#2243】 SV043 OBS1 Disturbance observer filter frequency

Set the disturbance observer filter band.
Normally set this parameter to "100".
To use the disturbance observer, also set SV037 (JL) and SV044 (OBS2).
When not using, set to "0".

---**Setting range**---
0 - 1000 (rad/s)

【#2244】 SV044 OBS2 Disturbance observer gain

Set the disturbance observer gain. The standard setting is "100 - 300".
To use the disturbance observer, also set SV037 (JL) and SV043 (OBS1).
When not using, set to "0".

---**Setting range**---
0 - 500 (%)

【#2245】 SV045

Not used. Set to "0".

【#2246】 SV046 FHz2 Notch filter frequency 2

Set the vibration frequency to suppress when machine vibration occurs. (Enabled at 80 or more.)
When not using, set to "0".

---**Setting range**---
0 - 2250 (Hz)

【#2247】 SV047 EC Inductive voltage compensation gain

Set the inductive voltage compensation gain. Normally set this parameter to "100".
If the current FB peak exceeds the current command peak, lower the gain.

---**Setting range**---
0 - 200 (%)

【#2248】 SV048 EMGrt Vertical axis drop prevention time

Input a length of time to prevent the vertical axis from dropping by delaying READY OFF until the brake works when the emergency stop occurs.
Increase the setting by 100ms at a time and set the value where the axis does not drop.
When using a motor with a break of HF(-H) Series or HP(-H) Series, set to "200ms" as a standard.

---**Setting range**---
0 - 20000 (ms)

【#2249】 SV049 PGN1sp Position loop gain 1 in spindle synchronous control

Set the position loop gain during spindle synchronization control (synchronous tapping and synchronization control with spindle C-axis).
Set the same value as the value of the position loop gain for spindle synchronous tapping control.
When performing the SHG control, set this parameter with SV050 (PGN2sp) and SV058 (SHGCsp).

---**Setting range**---
1 - 200 (rad/s)

【#2250】 SV050 PGN2sp Position loop gain 2 in spindle synchronous control

When using SHG control during spindle synchronous control (synchronous tapping and synchronization control with spindle C-axis), set this parameter with SV049 (PGN1sp) and SV058 (SHGCsp).
When not performing the SHG control, set to "0".

---Setting range---
0 - 999 (rad/s)

【#2251】 SV051 DFBT Dual feed back control time constant

Set the control time constant in dual feed back.
When "0" is set, the actual value to be set is 1ms.
The higher the time constant is, the closer it gets to the semi-closed control, so the limit of the position loop gain will be raised.

---Setting range---
0 - 9999 (ms)

【#2252】 SV052 DFBN Dual feedback control non-sensitive band

Set the non-sensitive band in the dual feedback control.
Normally set this parameter to "0".

---Setting range---
0 - 9999 (μm)

【#2253】 SV053 OD3 Excessive error detection width in special control

Set the excessive error detection width when servo ON in a special control (initial absolute position setting, stopper control, etc.).
When "0" is set, excessive error detection won't be performed when servo ON during a special control.

---Setting range---
0 - 32767 (mm)

【#2254】 SV054 ORE Overrun detection width in closed loop control

Set the overrun detection width in the full-closed loop control.
When the gap between the motor side detector and the linear scale (machine side detector) exceeds the value set by this parameter, it will be judged to be overrun and "Alarm 43" will be detected.
When "-1" is set, the alarm detection will not be performed.
When "0" is set, overrun will be detected with a 2mm width.

---Setting range---
-1 - 32767 (mm)

【#2255】 SV055 EMGx Max. gate off delay time after emergency stop

Set a length of time from the point when the emergency stop is input to the point when READY OFF is compulsorily executed.
Set the maximum value "+ 100ms" of the SV056 setting value of the servo drive unit which the power supply unit and the main circuit are connected with.
In preventing the vertical axis from dropping, the gate off will be delayed for the length of time set by SV048 even if SV055's value is smaller than that of SV048.

---Setting range---
0 - 20000 (ms)

【#2256】 SV056 EMGt Deceleration time constant at emergency stop

Set the time constant used for the deceleration control at emergency stop.
Set the value of 0.9-fold rapid traverse acceleration/deceleration time constant used in the acceleration/deceleration. This is because the friction torque will act as a deceleration torque when the motor decelerates, which enables the machine to stop quickly.
When preventing an impact at the acceleration/deceleration from being given to the machine, set the same value as the rapid traverse acceleration/deceleration time constant.

---Setting range---
0 - 20000 (ms)

【#2257】 SV057 SHGC SHG control gain

When performing the SHG control, set this parameter with S003 (PGN1) and SV004 (PGN2).
When not performing the SHG control, set to "0".

---Setting range---
0 - 1200 (rad/s)

【#2258】 SV058 SHGCsp SHG control gain in spindle synchronous control

When using SHG control during spindle synchronization control (synchronous tapping and synchronous control with spindle C-axis), set this parameter with SV049 (PGN1sp) and SV050 (PGN2sp).
When not performing the SHG control, set to "0".

---Setting range---
0 - 1200 (rad/s)

【#2259】 SV059

Not used. Set to "0".

【#2260】 SV060

Not used. Set to "0".

【#2261】 SV061 DA1NO D/A output channel 1 data No.

Input the data number you wish to output to D/A output channel.
When using the 2-axis drive unit, set "-1" for the axis on the side to which the data will not be output.

---Setting range---
-1 - 127

【#2262】 SV062 DA2NO D/A output channel 2 data No.

Input the data number you wish to output to D/A output channel.
When using the 2-axis drive unit, set "-1" for the axis on the side to which the data will not be output.

---Setting range---
-1 - 127

【#2263】 SV063 DA1MPY D/A output channel 1 output scale

Set the output scale in increment of 1/100.
When "0" is set, the magnification is the same as when "100" is set.

---Setting range---
-32768 - 32767 (1/100-fold)

【#2264】 SV064 DA2MPY D/A output channel 2 output scale

Set the output scale with a 1/100 increment.
When "0" is set, the magnification is the same as when "100" is set.

---Setting range---
-32768 - 32767 (1/100-fold)

【#2265】 SV065 TLC Machine side compensation spring constant

Set the machine side compensation spring constant.
For semi-closed loop control, the machine side compensation amount can be approximated with the following expression.
Compensation amount = Command speed $F(mm/min)^2 \times SV065$ / (Radius R(mm) $\times 10^9$)   (μm)
When not using, set to "0".

---Setting range---
-32768 - 32767

【#2266 - 2280】 SV066 - SV080

These parameters are set automatically by the NC system.

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【#2281(PR)】　　SV081

　　　　　　　　Not used. Set - "0".

【#2282】　　SV082　SSF5　Servo function selection 5

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
                        0  0  0  0  0  0  0
                                                        lmct
                                                     lmc3
                                                  ccu
                                               dos3
                                            dis
```
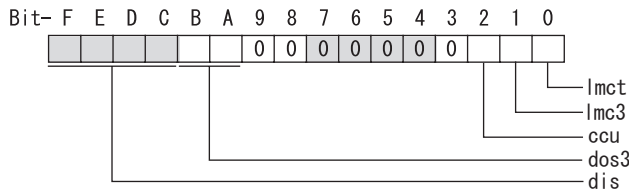
Bit-F,E,D,C　　dis　　　Digital signal input selection
　　　0000(000xh): No signal　　　0001(100xh): Safety observation function door state signal

Bit-B - A　　　　dos3　　　　　Digital signal output selection 3
　　　00: Not used　　　10: Contactor control signal output

Bit-9 - 3
　　　Not used. Set to "0".

Bit-2　　　ccu　　Lost motion overshoot compensation　compensation amount setting increment
　　　0: Stall rated current %　　　1: Stall rated current 0.01%

Bit-1　　　　　　　lmc3　　　　　Lost motion compensation type3
　　　0: Stop　　　1: Start

Bit-0　　　lmct　　Lost motion compensation 3 adjustment time measurement enabled
　　　0: Setting for normal use　　　1: Adjustment time measurement enabled

【#2283】　　SV083　SSF6　Servo function selection 6

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     0  0  0  0  0  0  0  0           0           0
                                                  nfd4
                                            nfd5
```
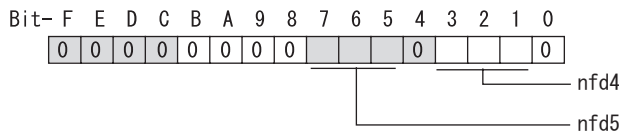
Bit-0
　　　Not used. Set to "0".

Bit-1,2,3　　　　nfd4　　　　Depth of Notch filter 4
　　　Set the filter depth of Notch filter 4.
　　　Bit 3,2,1=000: -∞　　　　Bit 3,2,1=001: -18.1[dB]
　　　Bit 3,2,1=010: -12.0[dB]　Bit 3,2,1=011: -8.5[dB]
　　　Bit 3,2,1=100: -6.0[dB]　Bit 3,2,1=101: -4.1[dB]
　　　Bit 3,2,1=110: -2.5[dB]　Bit 3,2,1=111: -1.2[dB]
　　　Set the adaptive frequency of Notch filter 4 in "#2287 SV0087　FHz4".

Bit-4
　　　Not used. Set to "0".

Bit-5,6,7　　　　nfd5　　　　Depth of Notch filter 5
　　　Set the filter depth of Notch filter 5.
　　　Bit 7,6,5=000: -∞　　　　　Bit 7,6,5=001: -18.1[dB]
　　　Bit 7,6,5=010: -12.0[dB]　　Bit 7,6,5=011: -8.5[dB]
　　　Bit 7,6,5=100: -6.0[dB]　　Bit 7,6,5=101: -4.1[dB]
　　　Bit 7,6,5=110: -2.5[dB]　　Bit 7,6,5=111: -1.2[dB]
　　　Set the adaptive frequency of Notch filter 5 in "#2288 SV0088　FHz5".

Bit-8 - F
　　　Not used. Set to "0".

【#2284】 **SV084 SSF7 Servo function selection 7**

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F E D C B A 9 8 7 6 5 4 3 2 1 0
     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
                                   └─ irms
```

Bit-0	**irms**	**Motor current display**

    0: Normal motor current display   1: Effective motor current display

【#2285】 **SV085 LMCk Lost motion compensation 3 spring constant**

Set the machine system's spring constant when using lost motion compensation type 3.
When not using, set to "0".

---Setting range---
0 - 32767 (0.01%/μm)

【#2286】 **SV086 LMCc Lost motion compensation 3 viscous coefficient**

Set the machine system's viscous coefficient when using lost motion compensation type 3.
When not using, set to "0".

---Setting range---
0 - 32767 (0.01%/μm)

【#2287】 **SV087 FHz4 Notch filter frequency 4**

Set the vibration frequency to suppress when machine vibration occurs. (Enabled at 80 or more)
When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【#2288】 **SV088 FHz5 Notch filter frequency 5**

Set the vibration frequency to suppress when machine vibration occurs. (Enabled at 80 or more)
When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【#2289】 **SV089 TQMAX Kq Torque maximizing control Kp**

Normally set this parameter to "0".

---Setting range---
0 - 32767 (0.01%/μm)

【#2290】 **SV090 TQMAX Kd Torque maximizing control Kd**

Normally set this parameter to "0".

---Setting range---
0 - 32767 (0.01%/•s/mm)

【#2291 - 2293】 **SV091 - SV093**

Not used. Set to "0".

【#2294】 **SV094 MPV Magnetic pole position error detection speed**

In the magnetic polar position detection function, the command motor speed and motor speed at the position command stop are monitored.
The command motor speed level and motor speed level at the position command stop are set with "r/min" increment.
When the command motor speed level is set to "0", the magnetic polar position error is detected at 10r/min. Set to "10" as a standard setting applied when the magnetic polar position error detection function is enabled. This will detect the magnetic polar position error when the motor speed is "100r/min".
When not using, set to "0".

Ten-thousands digit, Thousands digit ----------- Command motor speed level (10r/min)
Hundreds digit, Tens digit, Ones digit ----------- Motor speed level (10r/min)

---Setting range---
0 - 31999

【#2295】 **SV095 ZUPD Vertical axis pull up distance**

Set this parameter to adjust the pull up distance when the vertical axis pull up function is enabled.
For a rotary motor, 8/1000 of a rotation at the motor end is internally set as the pull up distance, when the pull up function is enabled and this parameter is set to "0".

---Setting range---
0 - 2000 (μ m)

【#2296 - 2312】 **SV096 - SV112**

Not used. Set to "0".

【#2313】 **SV113 SSF8 Servo function selection 8**

Select the servo specifications.
A function is assigned to each bit.
Set this parameter by converting to hexadecimal.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     [0][0][0][0][0][0][0][0][0][0][0][0][0][0][0][0]
     |_____ ssc
```
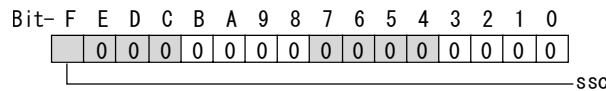
Bit-0 - E
Not used. Set to "0".

Bit-F   ssc   Safety observation function
0: Stop   1: Start

【#2314】 **SV114 SSF9 Servo function selection 9**

Not used. Set to "0".

【#2315】 **SV115 SSF10 Servo function selection 10**

Not used. Set to "0".

【#2316】 **SV116 SSF11 Servo function selection 11**

Not used. Set to "0".

【#2317(PR)】 **SV117 RNG1ex Expansion position detector resolution**

Set this parameter when using a special position detector.
Normally set this parameter to "0".
Refer to the section related to the detector setting in the drive unit instruction manual.

【#2318(PR)】　**SV118　RNG2ex　Expansion speed detector resolution**

Set the number of pulses per revolution of the motor side detector.
OSA18 ------ SV118 = 0
OSA105 ---- SV118 = 0
OSA166 ---- SV118 = 0

---Setting range---
0 - 32767 (x 2^{16}p/rev)

【#2319 - 2437】　**SV119 - SV237**

Not used. Set to "0".

【#2438】　**SV238　SSCFEED　Safety observation Safety speed**

Set the machine's safety speed for the safety observation function.
Set this parameter within the following setting ranges.
For linear axis: 2000mm/min or less
For rotary axis: 18000°/min (50r/min) or less
When not using, set to "0".

---Setting range---
0 - 18000 (mm/min) or (°/min)

【#2439】　**SV239　SSCRPM　Safety observation Safety motor speed**

Set the motor's safety speed for the safety observation function.
When not using, set to "0".

---Setting range---
0 - 32767 (r/min)

【#2440 - 2456】　**SV240 - SV256**

Not used. Set to "0".

6.2 List of standard parameters for each servomotor

The standard parameters for each motor are given below.
The standard parameters are set to drive the isolated motor. When setting the parameters with the actual machine, set the parameters according to the machine specifications and detector being used, etc.

(a) 200V Standard motor HF Series

Motor		HF75	HF105	HF54	HF104	HF154	HF204	HF354	HF453	HF703	HF903
Drive unit MDS-D-V1-		20	20	40	40	80	80	160	160	160W	320
SV001	PC1	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	100	100	100	100	100	100	100	100	100	100
SV006	VGN2	0	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	20480	10240	20480	10240	10240	8192	8192	6144	6144	4096
SV010	IDA	20480	10240	20480	10240	10240	8192	8192	6144	6144	4096
SV011	IQG	768	512	3072	1280	1536	2048	2048	2048	2048	1536
SV012	IDG	768	512	3072	1280	1536	2048	2048	2048	2048	1536
SV013	ILMT	800	800	800	800	800	800	800	800	800	800
SV014	ILMTsp	800	800	800	800	800	800	800	800	800	800
SV015	FFC	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	xx01	xx02	xx03	xx04	xx05	xx07	xx08	xx09	xx0A	xx0B
SV026	OD2	6	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0

Motor		HF75	HF105	HF54	HF104	HF154	HF204	HF354	HF453	HF703	HF903
Drive unit MDS-D-V1-		20	20	40	40	80	80	160	160	160W	320
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0	0
SV047	EC1	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0	0
SV066 ⋮ SV256		0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0

Note that a value other than "0" may be automatically set by the NC system for the system setting parameters.

(b) 200V Standard motor HP Series

Motor		HP54	HP104	HP154	HP204	HP354	HP454	HP704	HP903	HP1103
Drive unit MDS-D-V1-		40	40	80	80	160	160	160W	320	320W
SV001	PC1	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0
SV005	VGN1	100	100	100	100	100	100	100	100	100
SV006	VGN2	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	8192	4096	6144	3072	4096	3072	3072	2048	2048
SV010	IDA	8192	4096	6144	3072	4096	3072	3072	2048	2048
SV011	IQG	1280	768	1536	1024	1280	1024	1024	1280	1280
SV012	IDG	1280	768	1536	1024	1280	1024	1024	1280	1280
SV013	ILMT	800	800	800	800	800	800	800	800	800
SV014	ILMTsp	800	800	800	800	800	800	800	800	800
SV015	FFC	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50
SV025	MTYP	xx11	xx12	xx13	xx14	xx15	xx16	xx17	xx18	xx19
SV026	OD2	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0

Motor		HP54	HP104	HP154	HP204	HP354	HP454	HP704	HP903	HP1103
Drive unit MDS-D-V1-		40	40	80	80	160	160	160W	320	320W
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0
SV047	EC1	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0
SV066 : SV256		0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0

Note that a value other than "0" may be automatically set by the NC system for the system setting parameters.

(c) 400V Standard motor HF-H Series

Motor		HF-H75	HF-H105	HF-H54	HF-H104	HF-H154	HF-H204	HF-H354	HF-H453	HF-H703	HF-H903
Drive unit MDS-DH-V1-		10	10	20	20	40	40	80	80	80W	160
SV001	PC1	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	100	100	100	100	100	100	100	100	100	100
SV006	VGN2	0	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	20480	10240	20480	10240	15360	8192	8192	6144	6144	6144
SV010	IDA	20480	10240	20480	10240	15360	8192	8192	6144	6144	6144
SV011	IQG	768	512	3072	1280	2048	2048	2048	2048	2048	2048
SV012	IDG	768	512	3072	1280	2048	2048	2048	2048	2048	2048
SV013	ILMT	800	800	800	800	800	800	800	800	800	800
SV014	ILMTsp	800	800	800	800	800	800	800	800	800	800
SV015	FFC	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
SV018	PIT	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	xx01	xx02	xx03	xx04	xx05	xx07	xx08	xx09	xx0A	xx0B
SV026	OD2	6	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0

Motor		HF-H75	HF-H105	HF-H54	HF-H104	HF-H154	HF-H204	HF-H354	HF-H453	HF-H703	HF-H903
Drive unit MDS-DH-V1-		10	10	20	20	40	40	80	80	80W	160
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0	0
SV047	EC1	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0	0
SV066 ⋮ SV256		0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0	0 ⋮ 0

Note that a value other than "0" may be automatically set by the NC system for the system setting parameters.

(d) 400V Standard motor HP-H Series

Motor		HP-H54	HP-H104	HP-H154	HP-H204	HP-H354	HP-H454	HP-H704	HP-H903	HP-H1103
Drive unit MDS-DH-V1-		20	20	40	40	80	80	80W	160	160W
SV001	PC1	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0
SV005	VGN1	100	100	100	100	100	100	100	100	100
SV006	VGN2	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	8192	4096	6144	3072	4096	3072	3072	2048	2048
SV010	IDA	8192	4096	6144	3072	4096	3072	3072	2048	2048
SV011	IQG	1280	768	1536	1024	1280	1024	1024	1280	1280
SV012	IDG	1280	768	1536	1024	1280	1024	1024	1280	1280
SV013	ILMT	800	800	800	800	800	800	800	800	800
SV014	ILMTsp	800	800	800	800	800	800	800	800	800
SV015	FFC	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0
SV017	SPEC	2000	2000	2000	2000	2000	2000	2000	2000	2000
SV018	PIT	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50
SV025	MTYP	xx11	xx12	xx13	xx14	xx15	xx16	xx17	xx18	xx19
SV026	OD2	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0

Motor		HP-H54	HP-H104	HP-H154	HP-H204	HP-H354	HP-H454	HP-H704	HP-H903	HP-H1103
Drive unit MDS-DH-V1-		20	20	40	40	80	80	80W	160	160W
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0
SV047	EC1	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0
SV066 : SV256		0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0	0 : 0

Note that a value other than "0" may be automatically set by the NC system for the system setting parameters.

6.3 Supplement

6.3.1 D/A Output No.

6.3.1.1 MDS-D/DH Series

(1) D/A output specifications

Item	Explanation
No. of channels	2ch
Output cycle	0.8ms (min. value)
Output precision	12bit
Output voltage range	0V to 2.5V (zero) to +5V
Output magnification setting	-32768% to +32767% (1% scale)
Output pin (CN9 connector)	MO1 = Pin 9 MO2 = Pin 19 GND = Pins 1, 11
Others	The D/A output for the 2-axis unit (MDS-D/DH-V2) is also 2ch. When using the 2-axis unit, set -1 for the output data (SV061, 62) of the axis that is not to be measured.

CN9 connector

Pin	Name	Pin	Name
1	LG	11	LG
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9	MO1	19	MO2
10		20	

(2) Setting the output data

Input the No. of the data to be output to each D/A output channel.

#	No.	Abbrev.	Parameter name
2261	SV061	DA1NO	D/A output channel 1 data No.
2262	SV062	DA2NO	D/A output channel 2 data No.

<Standard output>

No.	Output data	Standard output unit	
		Linear axis	**Rotary axis**
-1	D/A output not selected	For 2-axis drive unit (MDS-D/DH-V2). Set the parameters to another axis in the drive unit that is not D/A output.	
0	Commanded rotation speed	1000(r/min)/V	
1	Motor rotation speed	1000(r/min)/V	
2	Torque command	Motor stall rated ratio 100%/V	
3	Torque feedback	Motor stall rated ratio 100%/V	
8	Machine vibration frequency	500Hz/V	
30	Collision detection estimated torque	Motor stall rated ratio 100%	
31	Collision detection disturbance estimated torque	Motor stall rated ratio 100%	
32[Note]	Estimated load inertia ratio or moving sections gross weight	100% or 100kg	
35	Disturbance observer estimated disturbance torque	Motor stall rated ratio 100%	
50	Position droop	1µm/V	1/1000° /V
51	Position command	1µm/V	1/1000° /V
52	Position feedback	1µm/V	1/1000° /V
53	Position F⧸T	1µm/s/V	1/1000° /s/V
54	Deviation from ideal position (considering servo tracking delay)	1µm/V	1/1000° /V
60	Position droop	1mm/V	1° /V
61	Position command	1mm/V	1° /V
62	Position feedback	1mm/V	1° /V
63	Position F⧸T	1mm/s/V	1° /s/V
64	Deviation from ideal position (considering servo tracking delay)	1mm/V	1° /V
70	Position droop	1m/V	1000° /V
71	Position command	1m/V	1000° /V
72	Position feedback	1m/V	1000° /V
73	Position F⧸T	1m/s/V	1000° /s/V
74	Deviation from ideal position (considering servo tracking delay)	1m/V	1000° /V
126	Saw tooth wave	0V to 5V	
127	2.5V test data	2.5V	

(Note) The estimated load inertia ratio (unit: 100%) is applied for the rotary motor, and the moving sections gross weight (unit: 100kg) for the linear motor.

<Servo control signal>

Servo control input (NC to V1/V2)

No.	Details	
16384	Servo control input 1-0	READY ON command
16385	Servo control input 1-1	Servo ON command
16388	Servo control input 1-4	Position loop gain changeover command
16390	Servo control input 1-6	Excessive error detection width changeover command
16391	Servo control input 1-7	Alarm reset command
16392	Servo control input 1-8	Current limit selection command
16409	Servo control input 2-9	Speed monitor command valid
16410	Servo control input 2-A	In door closed (controller)
16411	Servo control input 2-B	In door closed (all drive units)
16416	Servo control input 3-0	Control axis detachment command

Servo control output (V1/V2 to NC)

No.	Details	
16480	Servo control output 1-0	In READY ON
16481	Servo control output 1-1	In servo ON
16484	Servo control output 1-4	In position loop gain changeover
16486	Servo control output 1-6	In excessive error detection width changeover
16487	Servo control output 1-7	In alarm
16488	Servo control output 1-8	In current limit selection
16492	Servo control output 1-C	In in-position
16493	Servo control output 1-D	In current limit
16494	Servo control output 1-E	In absolute position data loss
16495	Servo control output 1-F	In warning
16496	Servo control output 2-0	Z phase passed
16499	Servo control output 2-3	In zero speed
16503	Servo control output 2-7	In external emergency stop
16505	Servo control output 2-9	In speed monitor
16506	Servo control output 2-A	In door closed (controller)
16507	Servo control output 2-B	In door closed (self drive unit)
16512	Servo control output 3-0	In control axis detachment

6.3.1.2 MDS-D-SVJ3 Series

(1) D/A output specifications

Item	Explanation
No. of channels	2ch
Output cycle	0.8ms (min. value)
Output precision	10bit
Output voltage	0V to 2.5V (zero) to +5V
Output magnification setting	-32768% to +32767% (1% scale)
Output pin (CN9 connector)	MO1 = Pin 4 MO2 = Pin 14 GND = Pins 1, 11

CN9 connector

Pin	Name	Pin	Name
1	LG	11	LG
2		12	
3		13	
4	MO1	14	MO2
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

(2) Setting the output data

Input the No. of the data to be output to each D/A output channel.

#	No.	Abbrev.	Parameter name
2261	SV061	DA1NO	D/A output channel 1 data No.
2262	SV062	DA2NO	D/A output channel 2 data No.

<Standard output>

No.	Output data	Standard output unit	
		Linear axis	**Rotary axis**
0	Commanded rotation speed	1000(r/min)/V	
1	Motor rotation speed	1000(r/min)/V	
2	Torque command	Motor stall rated ratio 100%/V	
3	Torque feedback	Motor stall rated ratio 100%/V	
8	Machine vibration frequency	500Hz/V	
30	Collision detection estimated torque	Motor stall rated ratio 100%	
31	Collision detection disturbance estimated torque	Motor stall rated ratio 100%	
32[Note]	Estimated load inertia ratio or moving sections gross weight	100% or 100kg	
35	Disturbance observer estimated disturbance torque	Motor stall rated ratio 100%	
50	Position droop	1μm/V	1/1000° /V
51	Position command	1μm/V	1/1000° /V
52	Position feedback	1μm/V	1/1000° /V
53	Position F⊿T	1μm/s/V	1/1000° /s/V
54	Deviation from ideal position (considering servo tracking delay)	1μm/V	1/1000° /V
60	Position droop	1mm/V	1° /V
61	Position command	1mm/V	1° /V
62	Position feedback	1mm/V	1° /V
63	Position F⊿T	1mm/s/V	1° /s/V
64	Deviation from ideal position (considering servo tracking delay)	1mm/V	1° /V
70	Position droop	1m/V	1000° /V
71	Position command	1m/V	1000° /V
72	Position feedback	1m/V	1000° /V
73	Position F⊿T	1m/s/V	1000° /s/V
74	Deviation from ideal position (considering servo tracking delay)	1m/V	1000° /V
126	Saw tooth wave	0V to 5V	
127	2.5V test data	2.5V	

(Note) The estimated load inertia ratio (unit: 100%) is applied for the rotary motor, and the moving sections gross weight (unit: 100kg) for the linear motor.

<Servo control signal>

Servo control input (NC to SVJ3)

No.		Details
16384	Servo control input 1-0	READY ON command
16385	Servo control input 1-1	Servo ON command
16388	Servo control input 1-4	Position loop gain changeover command
16390	Servo control input 1-6	Excessive error detection width changeover command
16391	Servo control input 1-7	Alarm reset command
16392	Servo control input 1-8	Current limit selection command
16409	Servo control input 2-9	Speed monitor command valid
16410	Servo control input 2-A	In door closed (controller)
16411	Servo control input 2-B	In door closed (all drive units)
16416	Servo control input 3-0	Control axis detachment command

Servo control output (SVJ3 to NC)

No.		Details
16480	Servo control output 1-0	In READY ON
16481	Servo control output 1-1	In servo ON
16484	Servo control output 1-4	In position loop gain changeover
16486	Servo control output 1-6	In excessive error detection width changeover
16487	Servo control output 1-7	In alarm
16488	Servo control output 1-8	In current limit selection
16492	Servo control output 1-C	In in-position
16493	Servo control output 1-D	In current limit
16494	Servo control output 1-E	In absolute position data loss
16495	Servo control output 1-F	In warning
16496	Servo control output 2-0	Z phase passed
16499	Servo control output 2-3	In zero speed
16503	Servo control output 2-7	In external emergency stop
16505	Servo control output 2-9	In speed monitor
16506	Servo control output 2-A	In door closed (controller)
16507	Servo control output 2-B	In door closed (self drive unit)
16512	Servo control output 3-0	In control axis detachment

6.3.2 Electronic Gears

The servo drive unit has internal electronic gears. The command value from the NC is converted into a detector resolution unit to carry out position control. The electronic gears are single gear ratios calculated from multiple parameters as shown below. However, each value (ELG1, ELG2) must be less than 32767.
If the value overflows, the initial parameter error (alarm 37) or error parameter No.2301 will be output.
If an alarm occurs, the mechanical specifications and electrical specifications must be revised so that the electronic gears are within the specifications range.

(1) For semi-closed loop control

Reduced fraction of $\dfrac{ELG1}{ELG2}$ $=$ $\dfrac{PC2 \times RNG1}{PC1 \times PIT \times IUNIT}$ (reduced fraction)

$\quad$ IUNIT = 2/NC (μm) command unit
$\qquad$ 1μm : IUNIT = 2,　0.1μm : IUNIT = 20

When the above is calculated, the following conditions must be satisfied.
$\quad$ ELG1 $\leq$ 32767
$\quad$ ELG2 $\leq$ 32767

(2) For full-closed loop control

Reduced fraction of $\dfrac{PGNX}{PGNY}$ $=$ $\dfrac{PC2 \times RNG2 \times PGN1}{PC1 \times RNG1 \times 30}$ (reduced fraction)

When the above is calculated, the following conditions must be satisfied.
$\quad$ PGNX $\leq$ 32767
$\quad$ PGNY $\leq$ 32767

And,

Reduced fraction of $\dfrac{PGNXsp}{PGNYsp}$ $=$ $\dfrac{PC2 \times RNG2 \times PGN1sp}{PC1 \times RNG1 \times 30}$ (reduced fraction)

When the above is calculated, the following conditions must be satisfied.
$\quad$ PGNXsp $\leq$ 32767
$\quad$ PGNYsp $\leq$ 32767

6.3.3 Lost Motion Compensation

When the motor is to rotate in the clockwise direction (looking from the load side) at the command for the + direction, the command direction is CW. Conversely, when the motor is to rotate in the counterclockwise direction, the command direction is CCW.

This rotation direction can be set with the CNC machine parameters. Note that the meaning of the ± will differ for some servo parameters according to this motor rotation direction. The servo parameters affected by CW/CCW are shown below.

SV016 (LMC1), SV041 (LMC2)　　　　　(When different values are set for SV016 and SV041)

<Example> If the lost motion compensation amount is to be changed according to the direction, the compensation amount at the quadrant changeover point of each arc where the lost motion compensation is applied will be as shown below according to the command polarity.

	CW	CCW
A	X: SV041	X: SV016
B	Y: SV016	Y: SV041
C	X: SV016	X: SV041
D	Y: SV041	Y: SV016

+Y

D : The Y axis command direction changes from the + to - direction.

A : The X axis command direction changes from the + to - direction.

-X

+X

C : The X axis command direction changes from the - to + direction.

-Y

B : The Y axis command direction changes from the - to + direction.
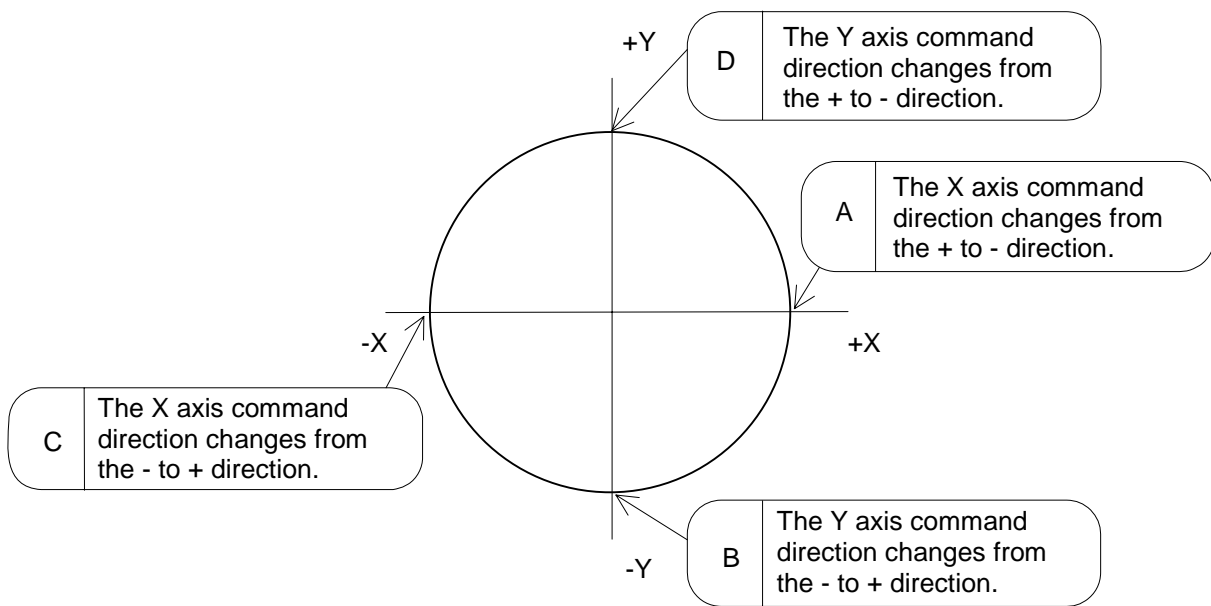
(Note) The setting value for the parameter is "0" or "-1", the compensation amount is determined as shown below.

Setting value for SV016	Setting value for SV041	Compensation amount in + direction	Compensation amount in - direction
0	0	No compensation	No compensation
n	0	n	n
0	m	m	m
n	m	n	m
n	-1	n	No compensation
-1	m	No compensation	m

7. Spindle Parameters

7.1 Spindle Base Specifications Parameters

For parameters indicated with a (PR) in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

【#3001】   slimt 1   Limit rotation speed (Gear: 00)

Set the spindle speed for maximum motor speed with gear 00.
(Set the spindle speed for the S analog output 10V.)

---Setting range---
0 - 99999 (r/min)

【#3002】   slimt 2   Limit rotation speed (Gear: 01)

Set the spindle speed for maximum motor speed with gear 01.
(Set the spindle speed for the S analog output 10V.)

---Setting range---
0 - 99999 (r/min)

【#3003】   slimt 3   Limit rotation speed (Gear: 10)

Set the spindle speed for maximum motor speed with gear 10.
(Set the spindle speed for the S analog output 10V.)

---Setting range---
0 - 99999 (r/min)

【#3004】   slimt 4   Limit rotation speed (Gear: 11)

Set the spindle speed for maximum motor speed with gear 11.
(Set the spindle speed for the S analog output 10V.)

---Setting range---
0 - 99999 (r/min)

【#3005】   smax 1   Maximum rotation speed (Gear: 00)

Set the maximum spindle speed with gear 00.
Set this as slimt $\geq$ smax.
By comparing the S command value and the values of gear 1 - 4, a spindle gear shift command will be output automatically.

---Setting range---
0 - 99999 (r/min)

【#3006】   smax 2   Maximum rotation speed (Gear: 01)

Set the maximum spindle speed with gear 01.
Set this as slimt $\geq$ smax.
By comparing the S command value and the values of gear 1 - 4, a spindle gear shift command will be output automatically.

---Setting range---
0 - 99999 (r/min)

【#3007】   smax 3   Maximum rotation speed (Gear: 10)

Set the maximum spindle speed with gear 10.
Set this as slimt $\geq$ smax.
By comparing the S command value and the values of gear 1 - 4, a spindle gear shift command will be output automatically.

---Setting range---
0 - 99999 (r/min)

【#3008】   **smax 4   Maximum rotation speed (Gear: 11)**

Set the maximum spindle speed with gear 11.
Set this as slimt ≥ smax.
By comparing the S command value and the values of gear 1 - 4, a spindle gear shift command will
be output automatically.

---Setting range---
0 - 99999 (r/min)

【#3009】   **ssift 1   Shift rotation speed (Gear: 00)**

Set the spindle speed for gear shifting with gear 00.
(Note) Setting too large value may cause a gear nick when changing gears.

---Setting range---
0 - 32767 (r/min)

【#3010】   **ssift 2   Shift rotation speed (Gear: 01)**

Set the spindle speed for gear shifting with gear 01.
(Note) Setting too large value may cause a gear nick when changing gears.

---Setting range---
0 - 32767 (r/min)

【#3011】   **ssift 3   Shift rotation speed (Gear: 10)**

Set the spindle speed for gear shifting with gear 10.
(Note) Setting too large value may cause a gear nick when changing gears.

---Setting range---
0 - 32767 (r/min)

【#3012】   **ssift 4   Shift rotation speed (Gear: 11)**

Set the spindle speed for gear shifting with gear 11.
(Note) Setting too large value may cause a gear nick when changing gears.

---Setting range---
0 - 32767 (r/min)

【#3013】   **stap 1   Tap rotation speed (Gear: 00)**

Set the maximum spindle speed during tapping cycle with gear 00.

---Setting range---
0 - 99999 (r/min)

【#3014】   **stap 2   Tap rotation speed (Gear: 01)**

Set the maximum spindle speed during tapping cycle with gear 01.

---Setting range---
0 - 99999 (r/min)

【#3015】   **stap 3   Tap rotation speed (Gear: 10)**

Set the maximum spindle speed during tapping cycle with gear 10.

---Setting range---
0 - 99999 (r/min)

【#3016】 **stap 4 Tap rotation speed (Gear: 11)**

Set the maximum spindle speed during tapping cycle with gear 11.

---Setting range---
0 - 99999 (r/min)

【#3017】 **stapt 1 Tap time constant (Gear: 00)**

Set the time constant for constant inclination synchronous tapping cycle with gear 00 (linear acceleration/deceleration pattern).

---Setting range---
1 - 5000 (ms)

【#3018】 **stapt 2 Tap time constant (Gear: 01)**

Set the time constant for constant inclination synchronous tapping cycle with gear 01 (linear acceleration/deceleration pattern).

---Setting range---
1 - 5000 (ms)

【#3019】 **stapt 3 Tap time constant (Gear: 10)**

Set the time constant for constant inclination synchronous tapping cycle with gear 10 (linear acceleration/deceleration pattern).

---Setting range---
1 - 5000 (ms)

【#3020】 **stapt 4 Tap time constant (Gear: 11)**

Set the time constant for constant inclination synchronous tapping cycle with gear 11 (linear acceleration/deceleration pattern).

---Setting range---
1 - 5000 (ms)

<Relation of spindle limit rotation speed and spindle maximum rotation speed>

The spindle rotation speed which can be attained at the spindle motor's maximum rotation speed is set for the limit rotation speed (slimt). This value is obtained by multiplying the gear ratio on the spindle motor maximum rotation speed (SP017). Set the maximum rotation speed (smax) when the rotation speed is to be limited according to the machine specifications, such as the spindle gear specifications. Up to four value can be set for gear changeover.
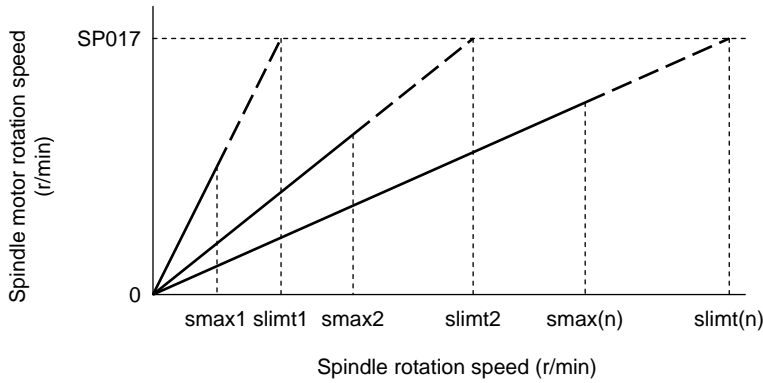
<Relation of tap time constant and actual acceleration/deceleration time constant>
(For constant inclination synchronous tap cycle)

Set the acceleration time up to the tap rotation speed (stap) in the tap time constant (stapt). Acceleration/deceleration is carried out at the same inclination for all speed commands. Up to four values can be set for gear changeover.
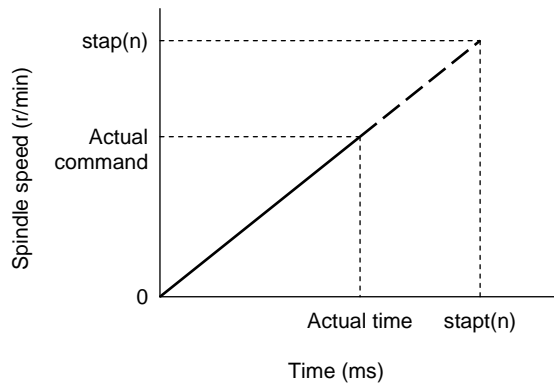
【#3021】 sori   Orientation rotation speed

Set the spindle orientation speed.
Set the speed for when the spindle rotates at the constant speed.

---Setting range---
0 - 32767 (r/min)

【#3022】 sgear   Encoder gear ratio

Set the gear ratio of the spindle to the detector.
Setting value 0 ---> Detector : Spindle = 1:1
Setting value 1 ---> Detector : Spindle = 1:2
Setting value 2 ---> Detector : Spindle = 1:4
Setting value 3 ---> Detector : Spindle = 1:8

---Setting range---
0 - 8

【#3023】 smini   Minimum rotation speed

Set the minimum spindle speed.
If an S command below this setting is issued, the spindle will rotate at the minimum speed set by this parameter.

---Setting range---
0 - 32767 (r/min)

【#3024(PR)】 sout   Spindle connection

Select the type of interface with a spindle drive unit.
0: No connection with a spindle
1: Dedicated network, dedicated optical communication
2 - 5: S-analog

---Setting range---
0 - 5

【#3025(PR)】 enc-on   Spindle encoder

Set the connection condition of a spindle's detector.
Setting 0 ---> Not connected
Setting 1 ---> Connected (Spindle detector connection check function is enabled.)
Setting 2 ---> Serially connected

---Setting range---
0 - 2

【#3026】 cs_ori   Selection of winding in orientation mode

0: Perform orientation using the coil selected when the orientation command is issued.
1: Use the coil L whenever the orientation command is issued.

【#3027】 cs_syn   Selection of winding in spindle synchronous mode

0: Select the coil H or L based on the actual spindle motor speed (calculated from commanded speed) when spindle synchronization starts. (Coil switch is not performed during spindle synchronous tapping control. This control is carried out using the coil selected at start.)
If the actual spindle motor speed is less than the setting of SP020, the coil L is selected. But if the actual speed exceeds the setting of SP020, the coil H is selected.
1: Use the coil H whenever the spindle synchronization command is issued.

【#3028】 sprcmm   Tap cycle spindle forward run/reverse run M command

Set the M codes for the spindle forward run/reverse run commands.
High-order 3 digits: Set the M code for spindle forward run command.
Low-order 3 digits: Set the M code for spindle reverse run command.
When "0" is set, the M code for spindle forward run command is handled as "3" and the M code for spindle reverse run command as "4".

---Setting range---
0 - 999999

【#3029】 tapsel Asynchro-nous tap gear selection

Select whether to use the tapping speed or maximum speed for the gear that is selected when an asynchronous tapping command is issued.
　0: Tapping speed
　1: Maximum speed
This parameter is enabled only when the M-function synchronous tapping cycle enable parameter "#1272 ext08/bit1" is ON.

【#3030】

Not used. Set to "0".

【#3031(PR)】 smcp_no Drive unit I/F channel No. (spindle)

Set the interface channel No. of CNC control unit to which the spindle is connected and the axis No. within each channel.
Set this parameter in 4-digit (hexadecimal) format.

HEX- 4 3 2 1
Number of axes
Interface channel No.

Rotary switch settings
Axis No.= 1 2 3
Channel No.=1
Channel No.=2
CNC control unit
Spindle drive unit
Axis No.= 1 2 n
Channel No.=m
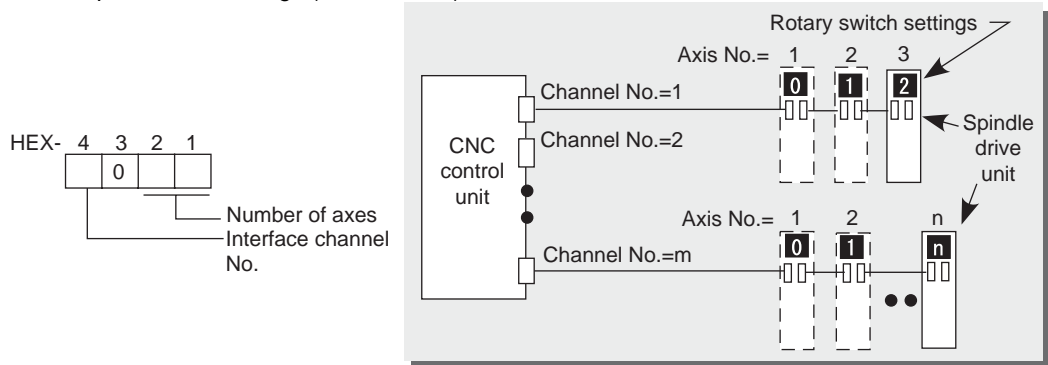
HEX-4 　　: Drive unit interface channel No.
HEX-3 　　: Not used. Set to "0".
HEX-2, 1 : Axis No.
For a spindle to be connected to CNC via analog interface, set to "0000".

---Setting range---
1001 - 1010, 2001 - 2010

【#3032】

Not used. Set to "0".

【#3035(PR)】 spunit Output unit

Select the data unit for communication with the spindle drive unit.
This selection is applied to the data communicated between the NC and spindle drive unit as well as the spindle movement data. Note, however, that this parameter is enabled only for the MDS-D Series spindle drive unit.
Spindle/C axis depends on this parameter setting and the C axis output unit (servo) is ignored.
When MDS-D Series is used, follow the setting of "#1003 ctrl_unit".
　B: 1μm
　C: 0.1μm
　D: 10nm
　E: 1nm

【#3037】 taps21 Synchronous tap switching spindle speed 2 (Gear: 00)

Set the spindle speed at which the 2nd step acceleration/deceleration time constant is to be switched with gear 00.

---Setting range---
0 - 99999 (r/min)

【#3038】　taps22　Synchronous tap switching spindle speed 2 (Gear: 01)

Set the spindle speed at which the 2nd step acceleration/deceleration time constant is to be switched with gear 01.

---Setting range---
0 - 99999 (r/min)

【#3039】　taps23　Synchronous tap switching spindle speed 2 (Gear: 10)

Set the spindle speed at which the 2nd step acceleration/deceleration time constant is to be switched with gear 10.

---Setting range---
0 - 99999 (r/min)

【#3040】　taps24　Synchronous tap switching spindle speed 2 (Gear: 11)

Set the spindle speed at which the 2nd step acceleration/deceleration time constant is to be switched with gear 11.

---Setting range---
0 - 99999 (r/min)

【#3041】　tapt21　Synchronous tap switching time constant 2 (Gear: 00)

Set the time constant to reach synchronous tapping switching spindle speed 2 (taps21- 24) with gear 00.

---Setting range---
1 - 5000 (ms)

【#3042】　tapt22　Synchronous tap switching time constant 2 (Gear: 01)

Set the time constant to reach synchronous tapping switching spindle rotation speed 2 (taps21 - 24) with gear 01.

---Setting range---
1 - 5000 (ms)

【#3043】　tapt23　Synchronous tap switching time constant 2 (Gear: 10)

Set the time constant to reach synchronous tapping switching spindle rotation speed 2 (taps21 - 24) with gear 10.

---Setting range---
1 - 5000 (ms)

【#3044】　tapt24　Synchronous tap switching time constant 2 (Gear: 11)

Set the time constant to reach synchronous tapping switching spindle rotation speed 2 (taps21 - 24) with gear 11.

---Setting range---
1 - 5000 (ms)

【#3045】　tapt31　Synchronous tap switching time constant 3 (Gear: 00)

Set the time constant to reach the maximum speed (smax1 - 4) with gear 00.

---Setting range---
1 - 5000 (ms)

【#3046】　tapt32　Synchronous tap switching time constant 3 (Gear: 01)

Set the time constant to reach the maximum speed (smax1 - 4) with gear 01.

---Setting range---
1 - 5000 (ms)

【#3047】 **tapt33 Synchronous tap switching time constant 3 (Gear: 10)**

Set the time constant to reach the maximum speed (smax1 - 4) with gear 10.

---Setting range---
1 - 5000 (ms)

【#3048】 **tapt34 Synchronous tap switching time constant 3 (Gear: 11)**

Set the time constant to reach the maximum speed (smax1 - 4) with gear 11.

---Setting range---
1 - 5000 (ms)

【#3049】 **spt Spindle synchronization acceleration/deceleration time constant**

Set the acceleration/deceleration time constant for when the commanded spindle synchronization speed changes under spindle synchronization control.

---Setting range---
0 - 9999 (ms)

【#3050】 **sprlv Spindle synchronization rotation speed attainment level**

Set the level of difference between the commanded synchronization spindle speeds and actual speeds of both the basic and synchronous spindles during spindle synchronization, below which the spindle speed synchronization complete signal will go ON.

---Setting range---
0 - 4095 (pulse) (1 pulse = 0.088°)

【#3051】 **spplv Spindle phase synchroniza-tion attainment level**

Set the level of phase difference between the basic and synchronous spindles during spindle synchronization, below which the spindle phase synchronization complete signal will go ON.

---Setting range---
0 - 4095 (pulse) (1 pulse = 0.088°)

【#3052】 **spplr Spindle motor spindle relative polarity**

Set the spindle motor and spindle's relative polarity.
  0: Positive polarity
Spindle CW rotation at motor CW rotation
  1: Negative polarity
Spindle CCW rotation at motor CW rotation

---Setting range---
0000/0001 (HEX)

【#3053】 **sppst Spindle encoder Z -phase position**

Set the deviation amount from the spindle's basic point to the spindle detector's Z phase.
Obtain the deviation amount, considering a clockwise direction as positive when viewed from the spindle's front side.

---Setting range---
0 - 359999 (1/1000°)

【#3054】 **sptc1 Spindle synchronization multi-step acceleration/deceleration changeover speed 1**

Set the spindle speed for changing the 1st step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3055】 **sptc2 Spindle synchronization multi-step acceleration/deceleration changeover speed 2**

Set the spindle speed for changing the 2nd step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3056】 **sptc3** **Spindle synchronization multi-step acceleration/deceleration changeover speed 3**

Set the spindle speed for changing the 3rd step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3057】 **sptc4** **Spindle synchronization multi-step acceleration/deceleration changeover speed 4**

Set the spindle speed for changing the 4th step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3058】 **sptc5** **Spindle synchronization multi-step acceleration/deceleration changeover speed 5**

Set the spindle speed for changing the 5th step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3059】 **sptc6** **Spindle synchronization multi-step acceleration/deceleration changeover speed 6**

Set the spindle speed for changing the 6th step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3060】 **sptc7** **Spindle synchronization multi-step acceleration/deceleration changeover speed 7**

Set the spindle speed for changing the 7th step's acceleration/deceleration time constant.

---Setting range---
0 - 99999 (r/min)

【#3061】 **spdiv1** **Magnification for time constant changeover speed 1**

Set the acceleration/deceleration time constant from the spindle synchronization multi-step acceleration/deceleration changeover speed 1 (sptc1) to the spindle synchronization multi-step acceleration/deceleration changeover speed 2 (sptc2). Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---Setting range---
0 - 127

【#3062】 **spdiv2** **Magnification for time constant changeover speed 2**

Set the acceleration/deceleration time constant from the spindle synchronization multi-step acceleration/deceleration changeover speed 2 (sptc2) to the spindle synchronization multi-step acceleration/deceleration changeover speed 3 (sptc3). Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---Setting range---
0 - 127

【#3063】 **spdiv3** **Magnification for time constant changeover speed 3**

Set the acceleration/deceleration time constant from the spindle synchronization multi-step acceleration/deceleration changeover speed 3 (sptc3) to the spindle synchronization multi-step acceleration/deceleration changeover speed 4 (sptc4). Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---Setting range---
0 - 127

【#3064】 **spdiv4** **Magnification for time constant changeover speed 4**

Set the acceleration/deceleration time constant from the spindle synchronization multi-step acceleration/deceleration changeover speed 4 (sptc4) to the spindle synchronization multi-step acceleration/deceleration changeover speed 5 (sptc5). Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---Setting range---
0 - 127

【#3065】 spdiv5 Magnification for time constant changeover speed 5

Set the acceleration/deceleration time constant from the spindle synchronization multi-step acceleration/deceleration changeover speed 5 (sptc5) to the spindle synchronization multi-step acceleration/deceleration changeover speed 6 (sptc6). Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---**Setting range**---
0 - 127

【#3066】 spdiv6 Magnification for time constant changeover speed 6

Set the acceleration/deceleration time constant from the spindle synchronization multi-step acceleration/deceleration changeover speed 6 (sptc6) to the spindle synchronization multi-step acceleration/deceleration changeover speed 7 (sptc7). Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---**Setting range**---
0 - 127

【#3067】 spdiv7 Magnification for time constant changeover speed 7

Set the acceleration/deceleration time constant for the spindle synchronization multi-step acceleration/deceleration changeover speed 7 (sptc7) and higher. Set this as a magnification in relation to the spindle synchronization acceleration/deceleration time constant (spt).

---**Setting range**---
0 - 127

【#3068】 symtm1 Phase synchronization start confirmation time

Set the time to confirm that synchronization is attained before phase synchronization control is started.
When "0" is set, the time will be 0.5 seconds. When "100" or less is set, the time will be 100ms.

---**Setting range**---
0 - 9999 (ms)

【#3069】 symtm2 Phase synchronization end confirmation time

Set a period of waiting time for phase synchronization control's completion as a time in which the speed stays within the attainment range.
When "0" is set, the time will be 0.5 seconds. When "100" or less is set, the time will be 100ms.

---**Setting range**---
0 - 9999 (ms)

【#3070】 syprt Phase synchronization speed

Set the amount of speed fluctuation of synchronous spindle during phase synchronization control. Set this as a proportion to commanded speed.
When "0" is set, the amount will be 100%.

---**Setting range**---
0 - 100 (%)

【#3071(PR)】 SscDrSelSp Speed monitor Door selection

Select which door group of the speed monitoring a spindle belongs to.
0000: Belong to the door 1 group.
0001: Belong to the door 1 group.
0002: Belong to the door 2 group.
0003: Belong to the door 1 and 2 groups.
(Note) Speed monitoring is not executed when SP229:SFNC9/bitF is "OFF".

---**Setting range**---
0000 - 0003 (HEX)

【#3072(PR)】　Ssc Svof Filter Sp　Speed monitor Error detection time during servo OFF

Set the error detection time for when an error of command speed monitoring or feedback speed monitoring is detected during servo OFF.
The alarm will occur if actual speed exceeds safe speed or safe rotation speed for a period of time longer than this setting.
When "0" is set, the detection time will be 200 (ms).

---Setting range---
0 - 9999 (ms)

【#3101】　sp_t 1　Time constant for spindle rotation with S command (Gear: 00)

Set the acceleration/deceleration time constant for spindle rotation using the S command (spindle control mode = speed operation mode) with gear 00 (Linear acceleration/deceleration pattern).

---Setting range---
0 - 30000 (ms)

【#3102】　sp_t 2　Time constant for spindle rotation with S command (Gear: 01)

Set the acceleration/deceleration time constant for spindle rotation using the S command (spindle control mode = speed operation mode) with gear 01 (Linear acceleration/deceleration pattern).

---Setting range---
0 - 30000 (ms)

【#3103】　sp_t 3　Time constant for spindle rotation with S command (Gear: 10)

Set the acceleration/deceleration time constant for spindle rotation using the S command (spindle control mode = speed operation mode) with gear 10 (Linear acceleration/deceleration pattern).

---Setting range---
0 - 30000 (ms)

【#3104】　sp_t 4　Time constant for spindle rotation with S command (Gear: 11)

Set the acceleration/deceleration time constant for spindle rotation using the S command (spindle control mode = speed operation mode) with gear11 (Linear acceleration/deceleration pattern).

---Setting range---
0 - 30000 (ms)

【#3105】　sut　Speed reach range

Set the speed deviation rate with respect to the commanded speed, at which the speed reach signal will be output.

---Setting range---
0 - 100 (%)

【#3106】　**zrn_typ　Zero point return specifications**

Select the zero point return specification.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
         0  0  0                       0
```

- Z phase detection direction
- Orientation direction
- Designate zero point return/deceleration stop in synchronous tapping
- Synchronous tapping zero point return direction
- Synchronous tapping command polarity
- Designate zero point return/deceleration stop of spindle/C axis
- Spindle/C axis zero point return direction
- Interpolation mode selection in orientation
- Spindle zero point detection with contactless switch

Bit-F	**Spindle zero point detection with contactless switch**
0: Normal	1: Enable spindle zero point detection using proximity switch
Bit-E	**Interpolation mode selection in orientation**
0: Interpolation mode (Use the interpolation mode gain "SP002 PGN".)	
1: Non-interpolation mode (Use the non-interpolation mode gain "SP001 PGV")	
Select this when vibration occurs since the gain is too high during the orientation.	
Bit-D,C,B	
Not used. Set to "0".	
Bit-A,9	**Spindle/C axis zero point return direction**
00: Short-cut　01: Forward run　10: Reverse run	
Bit-8	**Designate zero point return/deceleration stop of spindle/C axis**
0: Zero point return　1: Deceleration stop	
Bit-7	**Synchronous tapping command polarity**
0: Forward direction　　　1: Reverse direction	
Bit-6,5	**Synchronous tapping zero point return direction**
00: Short-cut　01: Forward run　10: Reverse run	
Bit-4	**Designate zero point return/deceleration stop in synchronous tapping**
0: Zero point return　　　1: Deceleration stop	
Bit-3	
Not used. Set to "0".	
Bit-2,1	**Orientation direction**
00: Short-cut　01: Forward run　10: Reverse run	
Bit-0	**Z phase detection direction**
0: Forward direction　　　1: Reverse direction	

【#3107】　**ori_spd　Orientation command speed**

Set the spindle speed during orientation command.

---Setting range---
1 - 99999 (r/min)

【#3108】　**ori_sft　In-position shift amount for orientation**

Set the orientation stop position.
The clockwise direction when viewed from the load side is considered as minus (-).

---Setting range---
-35999 - 35999 (0.01°)

【**#3109**】　**zdetspd　Z phase detection speed**

When "#3106/bitF = 0" (Normal), set the spindle speed at initial Z phase detection.
When "#3106/bitF = 1" (Spindle zero point proximity switch detection enabled), set the spindle speed at initial spindle zero point proximity switch detection.
(Note) When spindle zero point proximity switch detection is enabled, the rotation direction of the orientation/zero point return (synchronous tapping, spindle/C axis) will follow Z phase detection direction. And the speed will follow Z phase detection speed.

---Setting range---
1 - 99999 (r/min)

【**#3110**】　**tap_spd　Synchronous tapping zero point return speed**

Set the synchronous tapping zero point return speed.

---Setting range---
1 - 99999 (r/min)

【**#3111**】　**tap_sft　Synchronous tapping zero point return shift amount**

Set the synchronous tapping zero point return shift amount.

---Setting range---
0.00 - 35999 (0.01°)

【**#3112**】　**cax_spd　Spindle C axis zero point return speed**

Set the spindle C axis zero point return speed.

---Setting range---
1 - 99999 (r/min)

【**#3113**】　**cax_sft　Spindle C axis zero point return shift amount**

Set the spindle C axis zero point return shift amount

---Setting range---
0.00 - 359999 (0.001°)

【**#3114**】　**cax_para_chg　Spindle/C axis parameter switch**

Select whether to switch detector's parameters between spindle control and C axis control during spindle/C axis control.
0: Not switch
1: Switch

---Setting range---
0/1 (Standard: 0)

【**#3115**】　**sp2_t1　Time constant in orientation/position loop reference position return (Gear: 00)**

Set the acceleration/deceleration time constant to reach the spindle's limit speed (slimt) when spindle rotates in orientation/position loop zero point return method (C axis, tapping) using gear 00 (Linear acceleration/deceleration pattern).
(Note) Set a value that is bigger than the values set by "#3101 sp_t1 - #3104 sp_t4".

---Setting range---
0 - 30000 (ms)

【**#3116**】　**sp2_t2　Time constant in orientation/position loop reference position return (Gear: 01)**

Set the acceleration/deceleration time constant to reach the spindle's limit speed (slimt), when spindle rotates in the orientation/position loop zero point return method (C axis, tapping) using gear 01 (Linear acceleration/deceleration pattern).
(Note) Set a value that is bigger than the values set by "#3101 sp_t1 - #3104 sp_t4".

---Setting range---
0 - 30000 (ms)

【#3117】　sp2_t3　Time constant in orientation/position loop reference position return (Gear: 10)

Set the acceleration/deceleration time constant to reach the spindle's limit speed (slimt), when spindle rotates in the orientation/position loop zero point return method (C axis, tapping) using gear 10 (Linear acceleration/deceleration pattern).
(Note) Set a value that is bigger than the values set by "#3101 sp_t1 - #3104 sp_t4".

---Setting range---
0 - 30000 (ms)

【#3118】　sp2_t4　Time constant in orientation/position loop reference position return (Gear: 11)

Set the acceleration/deceleration time constant to reach the spindle's limit speed (slimt), when spindle rotates in the orientation/position loop zero point return method (C axis, tapping) using gear 11 (Linear acceleration/deceleration pattern).
(Note) Set a value that is bigger than the values set by "#3101 sp_t1 - #3104 sp_t4".

---Setting range---
0 - 30000 (ms)

【#3120】　staptr　Time constant reduction rate in high-speed synchronous tapping

When performing high-speed synchronous tapping, set the reduction rate ofthe time constant compared to the time constant in normal synchronous tapping. (Setting "0"or "100" will be regarded as reduction rate zero, so the time constant won't be reduced.)
E.g.) When set to "10", time constant in high-speed synchronous tapping will be 90% of that in normal synchronous tapping.

---Setting range---
0 to 100(%)

【#3121】　tret　Turret indexing

Select the validity of turret indexing.

---Setting range---
0: Invalid
1: Valid

【#3122】　GRC　Turret side gear ratio

Set the number of teeth on the turret side when the gear selection command (control input 4/bit6, 5) is set to 00. Set a value of GRC so that the ratio of GRC to the spindle side gear ratio (#13057 SP057) will be 1:N (an integer).
If this parameter is set to "0", it will be regarded as "1".

---Setting range---
0 - 32767

【#3123】　tret_spd　Turret indexing speed

Set the turret end indexing speed when in turret indexing.
When this parameter is set to 0, the value of Orientation command speed (#3107 ori_spd) will be used for the turret indexing speed.

---Setting range---
0 - 32767(r/min)

【#3124】　tret_t　Turret indexing time constant

Set the acceleration/deceleration time constant to reach Limit rotation speed (#3001 slimt) at gear 00 when in turret indexing (linear acceleration/deceleration pattern).   Set this parameter to a larger value than #3115 sp2_t1 at gear 00.

---Setting range---
0 - 30000 (ms)

【#3125】　tret_inpos　Turret indexing in-position width

Set the position error range in which the index positioning complete signal is output when in turret indexing. When this parameter is set to 0, the value of In-position width (#13024 SP024) will be used for this width.

---Setting range---
0 - 32767(1°/1000)

【#3126】 **tret_fin_off   Index positioning complete signal OFF time**

Set the time to forcedly turn OFF the index positioning complete signal since the indexing start signal turns ON. If this period of time has not passed yet, the index positioning complete signal will not turn ON even at the completion of index positioning.

---Setting range---
0 - 10000 (ms)

【#3127】 **SPECSP   Spindle specification**

bit0: Select the gear chanveover method.
(0: Gear change type 1, 1: Gear change type 2)

---Setting range---
0x0000 to 0xffff(hexadecimal)

【#3128】 **ori_spec   Orientation specification**

bit0: Orientation imposition advance output (0: Invalid, 1: Valid)

---Setting range---
0x0000 to 0xffff(hexadecimal)

【#3129】 **cax_spec   Spindle/C axis specification**

Not used. Set to "0".

【#3130】 **syn_spec   Spindle synchronization specification**

bit0: Tool spindle synchronization II (hobbing) automatic compensation
     selection
       1: Compensate hobbing axis delay (advance) with workpiece axis.
       0: No compensation.

---Setting range---
0/1

【#3131】 **tap_spec   Synchronous tapping specification**

Not used. Set to "0".

【#3132】 **ori_inp2   2nd in-position width for orientation**

Use this when detecting a different in-position from the normal in-position detection, such as advancing the inposition signal. When using, set a bigger value than the valud of the spindle parameter SP024.

---Setting range---
0 to 32767 (1deg/1000)

【#3133】 **spherr   Hobbing axis delay (advance) allowable angle**

Set the allowable angle between the commanded position and actual position of hobbing axis when it is in tool spindle synchronization II (hobbing) mode (X18AE ON), and also when hobbing axis and workpiece axis are synchronizing (X18A9 ON).

---Setting range---
0 to 32767 (1deg/1000)

【#3134】 **sphtc   Primary delay time constant for hobbing axis automatic compensation**

Set the primary delay time constant of hobbing axis automatic compensation primary delay filter control in tool spindle synchronization II (hobbing). When set to 0, primary delay filter control is invalid.

---Setting range---
0 to 32767 (ms)

【#3135】　sfwd_g　Feed forward gain for hobbing axis

Set the feed forward gain for the hobbing axis in tool spindle
synchronization II (hobbing) mode.

---Setting range---
0 to 200 (%)

【#3137】　stap_ax_off　High-speed synchronous tapping disabled axis

Set the high-speed synchronous tapping disabled axis.
bit0 to bit16: High-speed synchronous tapping disabled axis
0: Enabled
1: Disabled

If communication between drive units is disabled for a certain axis, set the axis's bits of all the
spindles as disabled.
If communication between drive units is disabled for a certain spindle, set all the bits of the spindle
as disabled (0xFFFF).
(Note) Each bit (bit0 -) corresponds to the order of the axis name parameter (#1013 axname)
setting.

7.2 Spindle Parameters

Parameters indicated as (PR) in the table will be validated when the NC power is turned OFF and ON after setting.
The spindle parameter setting and display methods differ according to the NC being used. Refer to the instruction manuals for the NC and each spindle.

⚠️**CAUTION**

⚠️ In the explanation on bits, set all bits not used, including blank bits, to "0".

【#13001】 **SP001 PGV   Position loop gain Non-interpolation mode**

Set the position loop gain for "Non-interpolation" control mode. The standard setting is "33".
When the setting value increases, the tracking ability to commands will be higher and the settling time during positioning can be shorter. However, the impact applied on the machine during acceleration/deceleration will increase.
The position loop gain will be selected according to the control mode selection command set with control input 4/bit 2, 1, 0.

Control input 4   bit2, 1, 0 = 000: Non-interpolation
                    bit 2, 1, 0 = 001: Spindle synchronization
                    bit 2, 1, 0 = 010: Interpolation
                    bit 2, 1, 0 = 100: Interpolation

(Note) Control mode is commanded from NC.
When carrying out SHG control, set SP035 (SFNC3)/bitC (shgn) or SP036 (SFNC4)/bit4 (shgs) to "1".

---Setting range---
1 - 200 (1/s)

【#13002】 **SP002 PGN   Position loop gain interpolation mode**

Set the position loop gain for "Interpolation" control mode. The standard setting is "33".
When the setting value increases, the tracking ability to commands will be higher and the settling time during positioning can be shorter. However, the impact applied on the machine during acceleration/deceleration will increase.
The position loop gain will be selected according to the control mode selection command set with control input 4/bit 2, 1, 0.

Control input 4   bit2, 1, 0 = 000: Non-interpolation
                    bit 2, 1, 0 = 001: Spindle synchronization
                    bit 2, 1, 0 = 010: Interpolation
                    bit 2, 1, 0 = 100: Interpolation

(Note) Control mode is commanded from NC.
When carrying out SHG control, set SP035 (SFNC3)/bitC (shgn) or SP036 (SFNC4)/bit4 (shgs) to "1".

---Setting range---
1 - 200 (1/s)

【#13003】 **SP003 PGS Position loop gain spindle synchronization**

Set the position loop gain for "Spindle synchronization" control mode. The standard setting is "33". When the setting value increases, the tracking ability to commands will be higher and the settling time during positioning can be shorter. However, the impact applied on the machine during acceleration/deceleration will increase.
The position loop gain can be selected according to the control mode selection command set with control input 4/bit 2, 1, 0.

Control input 4   bit2, 1, 0 = 000: Non-interpolation
                     bit 2, 1, 0 = 001: Spindle synchronization
                     bit 2, 1, 0 = 010: Interpolation
                     bit 2, 1, 0 = 100: Interpolation

(Note) Control mode is commanded from NC.
When carrying out SHG control, set SP035 (SFNC3)/bitC (shgn) or SP036 (SFNC4)/bit4 (shgs) to "1".

---Setting range---
1 - 200 (1/s)

【#13004】 **SP004**

Not used. Set to "0".

【#13005】 **SP005 VGN1 Speed loop gain 1**

Set the speed loop gain.
Set this according to the load inertia size.
The higher the setting value is, the more accurate the control will be. However, vibration tends to occur.
If vibration occurs, adjust by lowering by 20 - 30%.
The value should be determined to be 70 to 80% of the value at which the vibration stops.

---Setting range---
1 - 9999

【#13006】 **SP006 VIA1 Speed loop lead compensation 1**

Set the speed loop integral control gain.
The standard setting is "1900". Adjust the value by increasing/decreasing by about 100 at a time.
Raise this value to improve contour tracking accuracy in high-speed cutting. Lower this value when the position droop does not stabilize (10 - 20Hz).

---Setting range---
1 - 9999

【#13007】 **SP007 VIL1 Speed loop delay compensation 1**

Set this parameter when the limit cycle occurs in the full-closed loop, or overshooting occurs in positioning.
Select the control method with SP033 (SFNC1)/bit1, 0 (vcnt).
Normally, use "Changeover type 2".
When setting this parameter, make sure to set the torque offset "SP050 (TOF)".
When not using, set to "0".

---Setting range---
0 - 32767

【#13008】 **SP008 VGN2 Speed loop gain 2**

Normally, SP005 (VGN1), SP006 (VIA1) and SP007 (VIL1) are used.
By setting SP035 (SFNC3)/bit1 (vgin), SP035 (SFNC3)/bit9 (vgn) or SP036 (SFNC4)/bit1 (vgs) to "1", Gain 2 can be used according to the application.
Gain 2 can also be used by setting "Speed gain set 2 changeover request (control input 5/bitC)" to "1".
Refer to SP005 (VGN1), SP006 (VIA1) and SP007 (VIL1) for the procedures.

---Setting range---
1 - 9999

【#13009】 SP009 VIA2　Speed loop lead compensation 2

Normally, SP005 (VGN1), SP006 (VIA1) and SP007 (VIL1) are used.
By setting SP035 (SFNC3)/bit1 (vgin), SP035 (SFNC3)/bit9 (vgn) or SP036 (SFNC4)/bit1 (vgs) to "1", Gain 2 can be used according to the application.
Gain 2 can also be used by setting "Speed gain set 2 changeover request (control input 5/bitC)" to "1".
Refer to SP005 (VGN1), SP006 (VIA1) and SP007 (VIL1) for the procedures.

---Setting range---
1 - 9999

【#13010】 SP010 VIL2　Speed loop delay compensation 2

Normally, SP005 (VGN1), SP006 (VIA1) and SP007 (VIL1) are used.
By setting SP035 (SFNC3)/bit1 (vgin), SP035 (SFNC3)/bit9 (vgn) or SP036 (SFNC4)/bit1 (vgs) to "1", Gain 2 can be used according to the application.
Gain 2 can also be used by setting "Speed gain set 2 changeover request (control input 5/bitC)" to "1".
Refer to SP005 (VGN1), SP006 (VIA1) and SP007 (VIL1) for the procedures.

---Setting range---
0 - 32767

【#13011-13013】 SP011 - SP013

Not used. Set to "0".

【#13014】 SP014 PY1　Minimum excitation rate 1

Set the minimum value for the variable excitation rate. The standard setting is "50".
Set to "0" when using an IPM spindle motor.
If the gear noise, etc., is large, select a small value. However, a larger setting value is more effective for impact response.
(Note) When setting a value "50 or more", check if there is no gear noise, motor excitation noise, vibration during low-speed rotation or vibration when the servo is locked during orientation stop, etc.When setting a value "less than 50", check if there is no problem with the impact load response or rigidity during servo lock.

---Setting range---
0 - 100 (%)

【#13015】 SP015 PY2　Minimum excitation rate 2

Normally, SP014 (PY1) is used.
Excitation rate 2 can be used according to the application by setting SP035 (SFNC3)/bit2 (pyin), SP035 (SFNC3)/bitA (pyn) or SP036 (SFNC4)/bit2 (psy) to "1".
Excitation rate 2 can also be used by setting "Minimum excitation rate 2 changeover request (control input 5/bitB)" to "1". Refer to SP014 (PY1) for the procedures.
Set to "0" when using an IPM spindle motor.

---Setting range---
0 - 100 (%)

【#13016】 SP016 DDT　Phase alignment deceleration rate

Set the single-rotation position alignment deceleration rate for orientation stopping, phase alignment during rotation and changing from non-interpolation to spindle synchronization mode during rotation.
If the load inertia is large, decrease the setting.
When the setting value increases, the orientation in-position and single-rotation position alignment will end earlier, but the impact applied on the machine will increase.
To change the deceleration rate only during rotation command (command F∆T≠0), set this parameter together with SP070 (KDDT).

---Setting range---
1 - 32767 (0.1 (r/mn)/ms)

【#13017(PR)】 **SP017 SPEC1　Spindle specifications 1**

Select the spindle specifications.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
     │  │  │  │  │ 0│ 0│ 0│ 0│ 0│ 0│ 0│  │  │  │ 0│  │
     └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                              └─ fdir2
                                           └──── seqh
                                        └─────── vfb
                                     └────────── fdir
         └──────────────────────────────────── smp
```
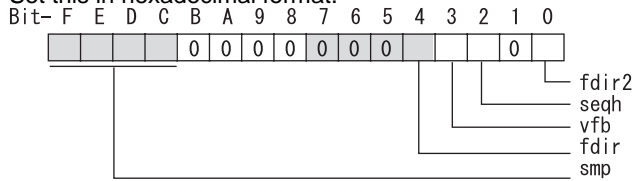
Bit-F,E,D,C	spm	Motor series selection

0000(0xxxh): 200V specification IM spindle motor　0001(1xxxh): 200V specification IPM spindle motor
0010(2xxxh): 400V specification IM spindle motor　0011(3xxxh): 400V specification IPM spindle motor

Bit-5 - B		

Not used. Set to "0".

Bit-4	fdir	Position feedback

0: Forward polarity　　　1: Reverse polarity

Bit-3	vfb	Speed feedback filter

0: Disable　　　　　　1: Enable (2250Hz)

Bit-2	seqh	High-speed READY ON sequence

0: Disable　　　　　　1: Enable

Bit-1		

Not used. Set to "0".

Bit-0	fdir2	Speed feedback polarity

0: Forward polarity　　　1: Reverse polarity

【#13018(PR)】 **SP018 SPEC2　Spindle specifications 2**

Select the spindle specifications.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
    ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
    │ 0│ 0│ 0│ 0│ 0│ 0│ 0│  │ 0│ 0│  │ 0│ 0│ 0│  │ 0│
    └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                              └─ oplp
                                       └──────── mkch
                              └───────────────── spsu
```
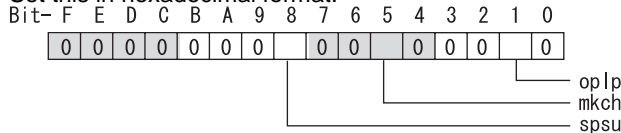
Bit-F - 9		

Not used. Set to "0".

Bit-8	spsu	Speed setting unit

0: rev/min　　　1: x4r/min

Bit-7,6		

Not used. Set to "0".

Bit-5	mkch	Coil switch function

0: Disable　　　1: Enable

Bit-4,3,2		

Not used. Set to "0".

Bit-1	oplp	Open loop

0: Disable　　　1: Enable

Bit-0		

Not used. Set to "0".

【#13019(PR)】 **SP019 RNG1　Position detector resolution**

Set the same value as SP020 (RNG2).
(Refer to the explanation for SP020.)

---Setting range---
0 - 32767 (kp/rev)

III - 201

【#13020(PR)】　**SP020 RNG2　Speed detector resolution**

Set the number of pulses per revolution of the motor side detector.

Detector TS5691 (128 teeth): SP020 = 2000
TS5691 (180 teeth): SP020 = 2880
TS5691 (256 teeth): SP020 = 4000
TS5691 (384 teeth): SP020 = 6000
TS5691 (512 teeth): SP020 = 8000
TS5690 (64 teeth): SP020 = 2000
TS5690 (128 teeth): SP020 = 4000
TS5690 (256 teeth): SP020 = 8000

【#13021(PR)】　**SP021 OLT　Overload detection time constant**

Set the detection time constant of the overload 1 (Alarm 50).
Set to "60" as a standard.
Set "300" when using an IPM spindle motor.

---Setting range---
1 - 15300 (s)

【#13022】　**SP022 OLL　Overload detection level**

Set the current detection level of "Overload 1" (Alarm 50) as a percentage in respect to the motor short-time rated output current.
Set to "120" as a standard.
Set to "100" when using an IPM spindle motor.

---Setting range---
1 - 200 (Short-time rated %)

【#13023】　**SP023 OD1　Excessive error detection width (interpolation mode, spindle synchronization)**

Set the excessive error detection width for the interpolation mode and spindle synchronization.
Set to "120" as a standard.
If this parameter is set to "0", excessive error detection won't be performed.

---Setting range---
0 - 32767 (°)

【#13024】　**SP024 INP　In-position width**

Set the in-position detection width.
Set the positioning accuracy required for the machine.
The lower the setting is, the higher the positioning accuracy will be. However, the cycle time (settling time) will be longer. The standard setting is "875".

---Setting range---
0 - 32767 (1°/1000)

【#13025】　**SP025 INP2　2nd in-position width**

Use this when detecting an in-position different from normal in-position width, such as advancing the in-position signal. The procedure is the same as SP024 (INP). The standard setting is "875".

---Setting range---
0 - 32767 (°/1000)

【#13026(PR)】　**SP026 TSP　Maximum motor speed**

Set the maximum motor speed. If the actual motor speed exceeds the set maximum speed, an overspeed alarm will occur.

---Setting range---
1 - 32767 (r/min)

【#13027】 **SP027 ZSP   Motor zero speed**

Set the motor speed for detecting zero speed. If the actual motor speed drops below the set speed, the zero speed detection will go ON. The standard setting is "50".

---Setting range---
1 - 1000 (r/min)

【#13028】 **SP028 SDTS   Speed detection set value**

Set the motor speed for detecting the speed. If the actual motor speed drops below the set value, the speed detection will go ON. The standard setting is 10% of the maximum motor speed.

---Setting range---
10 - 32767 (r/min)

【#13029】 **SP029 SDTR   Speed detection reset width**

Set the hysteresis width in which the speed detection changes from ON to OFF. If the setting value is small, the speed detection will chatter easily. The standard setting is "30".

---Setting range---
10 - 1000 (r/min)

【#13030】 **SP030**

Not used. Set to "0".

【#13031(PR)】 **SP031 MTYP   Motor type**

Set the position detector type, speed detector type and motor type.
Set to "2200" (fixed value).

【#13032(PR)】   SP032 PTYP   Power supply type/ Regenerative resistor type

Power supply type
When connecting a power supply unit, set a code for each power supply unit.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
     │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
     └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                          └──────────── ptyp
                          └────────────────────────── rtyp
              └──────────────────────────────────── amp
```

Bit-0 - 7	ptyp	External emergency stop setting

When the emergency stop input signal of the power supply unit is "disabled"
  Power supply unit is not connected   : 0000h
  MDS-D-CV-37   / MDS-DH-CV-37   : 0004h
  MDS-D-CV-75   / MDS-DH-CV-75   : 0008h
  MDS-D-CV-110 / MDS-DH-CV-110 : 0011h
  MDS-D-CV-185 / MDS-DH-CV-185 : 0019h
  MDS-D-CV-300 / MDS-DH-CV-300 : 0030h
  MDS-D-CV-370 / MDS-DH-CV-370 : 0037h
  MDS-D-CV-450 / MDS-DH-CV-450 : 0045h
  MDS-D-CV-550   : 0055h
             MDS-DH-CV-750   : 0075h
When the emergency stop input signal of the power supply unit is "enabled"
  Power supply unit is not connected   : 0000h
  MDS-D-CV-37   / MDS-DH-CV-37   : 0044h
  MDS-D-CV-75   / MDS-DH-CV-75   : 0048h
  MDS-D-CV-110 / MDS-DH-CV-110 : 0051h
  MDS-D-CV-185 / MDS-DH-CV-185 : 0059h
  MDS-D-CV-300 / MDS-DH-CV-300 : 0070h
  MDS-D-CV-370 / MDS-DH-CV-370 : 0077h
  MDS-D-CV-450 / MDS-DH-CV-450 : 0085h
  MDS-D-CV-550   : 0095h
             MDS-DH-CV-750   : 00B5h

Bit-8 - B	rtyp	

Not used. Set to "0".

Bit-C - F	amp	

Not used. Set to "0".

Regenerative resistor type
Set the regenerative resistor type.
(Note) These bits are used only in MDS-D-SVJ3/SPJ3 series.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
     │  │  │  │  │  │  │  │  │  │  │  │  │ 0│ 0│ 0│ 0│
     └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                       └────────────── emgx
                          └────────────────────────── rtyp
              └──────────────────────────────────── amp
```

Bit-0 - 3		

Not used. Set to "0".

Bit-4 - 7	emgx	External emergency stop function

Set the external emergency stop function. (Do not set a value other than specified.)
0: Disable   4: Enable

Bit-8 - B	rtyp	
Bit-C - F	**amp**	

For "amp = 1"
"rtyp" setting value
  0: Resistor built-in drive unit
  1: Setting prohibited
  2: MR-RB032
  3: MR-RB12 or GZG200W39OHMK
  4: MR-RB32 or GZG200W120OHMK 3 units connected in parallel
  5: MR-RB30 or GZG200W39OHMK 3 units connected in parallel
  6: MR-RB50 or GZG300W39OHMK 3 units connected in parallel

7: MR-RB31 or GZG200W20OHMK 3 units connected in parallel
8: MR-RB51 or GZG300W20OHMK 3 units connected in parallel
9 - F: Setting prohibited

For "amp = 2"
"rtyp" setting value
0 - 3: Setting prohibited
4: FCUA-RB22
5: FCUA-RB37
6: FCUA-RB55
7, 8: Setting prohibited
9: R-UNIT2
A - C: Setting prohibited
D: FCUA-RB75/2   2 units
E, F: Setting prohibited

【#13033】   SP033 SFNC1   Spindle function 1

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.
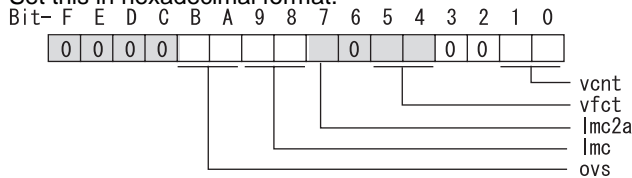
Bit-F - C

Not used. Set to "0".

Bit-B,A   **ovs**   **Overshoot compensation**

00: Compensation stop   01: Setting prohibited   10: Setting prohibited   11: Compensation type 3

(Note) Set the compensation amount in SP043(OVS1) and SP042(OVS2).

Bit-9,8   **lmc**   **Lost motion compensation**

00: Compensation stop   01: Setting prohibited   10: Compensation type 2   11: Setting prohibited

(Note) Set the compensation amount in SP048(LMC1) and SP041(LMC2).
When "SP227/lmc3" is set to "1", the lost motion compensation type 3 will be selected regardless of this setting.

Bit-7   **lmc2a**   **Lost motion compensation 2 timing**

0: Normal timing   1: Timing changed

Bit-6

Not used. Set to "0".

Bit-5,4   **vfct**   **Jitter compensation**

00: Disable   01: 1 pulse   10: 2 pulse   11: 3 pulse

Bit-3,2

Not used. Set to "0".

Bit-1,0   **vcnt**   **Delay compensation changeover**

00: Disable   01: Changeover type 1   10: Changeover type 2   11: Changeover type 2

【#13034】　　**SP034 SFNC2　Spindle function 2**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
     ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
     │  │  │  │ 0│  │  │  │  │  │  │  │  │  │  │  │  │
     └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
                                            └── zck
                                         └───── nfd1
                                      └──────── nfd3
                               └─────────────── nfd2
                         └───────────────────── pwm
               └─────────────────────────────── nfd4
         └───────────────────────────────────── nfd5
```
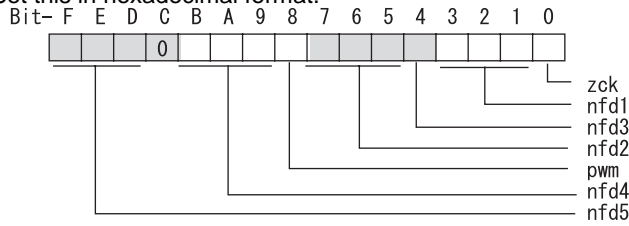
Bit-F,E,D	**nfd5**	**Depth of Notch filter 5**

Set the filter depth of Notch filter 5.
　Bit F,E,D=000: -∞　　　　　　Bit F,E,D=001: -18[dB]
　Bit F,E,D=010: -12[dB]　　　　Bit F,E,D=011: -9[dB]
　Bit F,E,D=100: -6[dB]　　　　 Bit F,E,D=101: -4[dB]
　Bit F,E,D=110: -3[dB]　　　　 Bit F,E,D=111: -1 [dB]

Bit-C

Not used. Set to "0".

Bit-B,A,9	**nfd4**	**Depth of Notch filter 4**

Set the filter depth of Notch filter 4.
　Bit B,A,9=000: -∞　　　　　　Bit B,A,9=001: -18[dB]
　Bit B,A,9=010: -12[dB]　　　　Bit B,A,9=011: -9[dB]
　Bit B,A,9=100: -6[dB]　　　　 Bit B,A,9=101: -4[dB]
　Bit B,A,9=110: -3[dB]　　　　 Bit B,A,9=111: -1 [dB]

Bit-8	**pwm**	**Current control**

　0: Standard current control　　　1: High frequency current control

Bit-7,6,5	**nfd2**	**Depth of Notch filter 2**

Set the filter depth of Notch filter 2.
　Bit 7,6,5=000: -∞　　　　　　Bit 7,6,5=001: -18[dB]
　Bit 7,6,5=010: -12[dB]　　　　Bit 7,6,5=011: -9[dB]
　Bit 7,6,5=100: -6[dB]　　　　 Bit 7,6,5=101: -4[dB]
　Bit 7,6,5=110: -3[dB]　　　　 Bit 7,6,5=111: -1 [dB]

Bit-4	**nfd3**	**Notch filter 3(1125Hz)**

　0: Stop　　　　1: Start

Bit-3,2,1	**nfd1**	**Depth of Notch filter 1**

Set the filter depth of Notch filter 1.
　Bit 3,2,1=000: -∞　　　　　　Bit 3,2,1=001: -18[dB]
　Bit 3,2,1=010: -12[dB]　　　　Bit 3,2,1=011: -9[dB]
　Bit 3,2,1=100: -6[dB]　　　　 Bit 3,2,1=101: -4[dB]
　Bit 3,2,1=110: -3[dB]　　　　 Bit 3,2,1=111: -1 [dB]

Bit-0	**zck**	**Z phase check (ALM42)**

　0: Enable　　　1: Disable

【#13035(PR)】   **SP035 SFNC3   Spindle function 3**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F E D C B A 9 8 7 6 5 4 3 2 1 0
      0 0 0   0     0   0 0 0 0     0
                                    vgin
                                  pyin
                                nopc
                              vgn
                            pyn
                          shgn
```
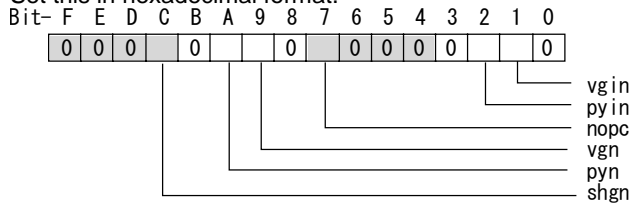
bit-F - D

Not used. Set to "0".

bit-C   shgn   SHG control

0: Stop   1: Start

bit-B

Not used. Set to "0".

bit-A   pyn   Excitation rate selection

0: Select Excitation rate 1   1: Select Excitation rate 2

bit-9   vgn   Speed loop gain set selection

0: Select Set 1   1: Select Set 2

bit-8

Not used. Set to "0".

bit-7   nopc   Phase alignment

0: Start   1: Stop

bit-6 - 3

Not used. Set to "0".

bit-2   pyin   Excitation rate selection

0: Select Excitation rate 1   1: Select Excitation rate 2

bit-1   vgin   Speed loop gain set selection

0: Select Set 1   1: Select Set 2

bit-0

Not used. Set to "0".

【#13036(PR)】   **SP036 SFNC4   Spindle function 4**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F E D C B A 9 8 7 6 5 4 3 2 1 0
      0 0 0 0 0 0 0 0   0 0   0     0
                                    vgs
                                  pys
                                shgs
                              mksl
```
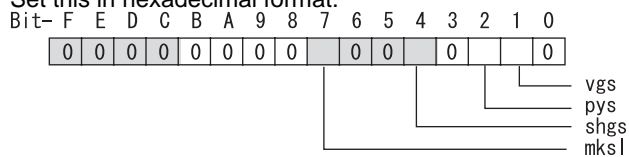
bit-F - 8

Not used. Set to "0".

bit-7   mksl   Spindle coil selection

0: Select the coil commanded during synchronization   1: Select high-speed coil

bit-6,5

Not used. Set to "0".

bit-4   shgs   SHG control

0: Stop   1: Start

bit-3

Not used. Set to "0".

bit-2   pys   Excitation rate selection

0: Select Excitation rate 1   1: Select Excitation rate 2

bit-1   vgs   Speed loop gain set selection

0: Select Gain set 1   1: Select Gain set 2

bit-0

Not used. Set to "0".

【#13037】   **SP037 JL   Load inertia scale**

Set "the motor inertia + motor axis conversion load inertia" in respect to the motor inertia.
SP037(JL) = (Jm+Jl / Jm) × 100
Jm : Motor inertia
Jl : Motor axis conversion load inertia

---Setting range---
0 - 5000 (%)

【#13038】   **SP038 FHz1   Notch filter frequency 1**

Set the vibration frequency to suppress when machine vibration occurs.
(Enabled at 50 or more)   When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【#13039】   **SP039 LMCD   Lost motion compensation timing**

Set this parameter when the lost motion compensation timing doest not match.
Adjust by increasing the value by 10 at a time.

---Setting range---
0 - 2000 (ms)

【#13040】   **SP040 LMCT   Lost motion compensation non-sensitive band**

Set the non-sensitive band of the lost motion compensation in the feed forward control.
When "0" is set, the actual value to be set is 2°/1000. Adjust by increasing by 1°/1000 at a time.

---Setting range---
–32768 - 32767 (1°/1000)

【#13041】   **SP041 LMC2   Lost motion compensation 2**

Set this parameter as well as SP048 (LMC1) only when you wish to vary the lost motion
compensation amount depending on the command directions.
Normally set to "0".

---Setting range---
-1 - 200 (Short-time rated %)
Note that the range will be" -1 - 20000" (Short-time rated 0.01%) when SP227/bit2 is "1".

【#13042】   **SP042 OVS2   Overshooting compensation 2**

Set this parameter as well as SP043 (OVS1) only when you wish to vary the overshooting
compensation amount depending on the command directions.
Normally set to "0".

---Setting range---
-1 - 100 (Short-time rated %)
Note that the range will be "-1 - 10000" (Short-time rated 0.01%) when SP227/bit2 is "1".

【#13043】　**SP043 OVS1　Overshooting compensation 1**

Set this parameter when overshooting occurs during positioning. This compensates the motor torque during positioning.
This is enabled only when the overshooting compensation SP033 (SFNC1/ovs) is selected.

Type 3: When "SP033 (SFNC1)/bitB, A (ovs) = 11"
Set the compensation amount based on the motor short-time rated current.
Increase in increments of 1%, and find the value where overshooting does not occur.

Other than Type 3: When "SP033 (SFNC1)/bitB, A (ovs) $\neq$ 11"
Overshooting compensation (Type 3) is not executed.

When you wish to vary compensation amount depending on the direction
When SP042 (OVS2) is "0", compensate with the value of SP043 (OVS1) in both of the + and - directions.
If you wish to change the compensation amount depending on the command direction, set this parameter as well as SP042 (OVS2).
(SP043: + direction, SV042: - direction. However, the directions may be opposite depending on other settings.)

When "-1" is set, the compensation won't be performed in the direction of the command.

---Setting range---
-1 - 100 (Short-time rated %)
Note that the range will be "-1 - 10000" (Short-time rated 0.01%) when SP227/bit2 is "1".

【#13044】　**SP044 OBS2　Disturbance observer gain**

Set the disturbance observer gain. The standard setting is "100".
To use the disturbance observer, also set SP037 (JL) and SP045 (OBS1).
When not using, set to "0".

---Setting range---
0 - 500 (%)

【#13045】　**SP045 OBS1　Disturbance observer filter frequency**

Set the disturbance observer filter band.
Normally set to "100".
To use the disturbance observer, also set SP037 (JL) and SP044 (OBS2). When not using, set to "0".

---Setting range---
0 - 1000 (rad/s)

【#13046】　**SP046 FHz2　Notch filter frequency 2**

Set the vibration frequency to suppress when machine vibration occurs.
(Enabled at 50 or more) When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【#13047】　**SP047 EC　Inductive voltage compensation gain**

Set the inductive voltage compensation gain. Normally set to "100".
If the current FB peak exceeds the current command peak, lower the gain.

---Setting range---
0 - 200 (%)

【#13048】　SP048 LMC1　Lost motion compensation 1

Set this parameter when the protrusion (that occurs due to the non-sensitive band by friction, torsion, backlash, etc) at quadrant change is too large.
This compensates the torque at quadrant change.
This is enabled only when the lost motion compensation SP033 (SFNC1/lmc) is selected.

Type 2: When "SP033 (SFNC1)/bit9, 8 (lmc) = 10"
Set the compensation amount based on the motor short-time rated current.
The standard setting is double the friction torque. The compensation amount will be 0 when "0" is set.

Other than type 2: When "SP033 (SFNC1)/bit9, 8 (lmc) ≠ 10"
Lost motion compensation (Type 2) is not executed.

When you wish to vary compensation amount depending on the direction
When SP041 (LMC2) is "0", compensate with the value of SP048 (LMC1) in both of the + and - directions.
If you wish to change the compensation amount depending on the command direction, set this parameter as well as SP041 (LMC2).
(SP048: + direction, SP041: - direction. However, the directions may be opposite depending on other settings.)
When "-1" is set, the compensation won't be performed in the direction of the command.

---Setting range---
-1 - 200 (Short-time rated %)
Note that the range will be "-1 - 20000" (Short-time rated 0.01%) when SP227/bit2 is "1".

【#13049】　SP049 FFC　Acceleration rate feed forward gain

When a relative error during synchronization control is too large, set this parameter to the axis that is delaying.
The standard setting value is "0". The standard setting for the SHG control is "100".
To adjust a relative error in acceleration/deceleration, increase the value by 50 - 100 at a time.

---Setting range---
0 - 999 (%)

【#13050】　SP050 TOF　Torque offset

Set the unbalance torque.

---Setting range---
-100 - 100 (Short-time rated %)

【#13051】　SP051

Not used. Set to "0".

【#13052】　SP052

Not used. Set to "0".

【#13053】　SP053 ODS　Excessive error detection width (non-interpola-tion mode)

Set the excessive error detection width for the non-interpolation mode.
Standard setting value: ODS = Maximum motor speed [r/min]×60/PGV/2

If this parameter is set to "0", excessive error detection won't be performed.

---Setting range---
0 - 32767 (°)

【#13054】　SP054

Not used. Set to "0".

【#13055】 SP055 EMGx   Max. gate off delay time after emergency stop

Set a period of time from the point when the emergency stop is input to the point when READY OFF is compulsorily executed.
Normally, set the same value as the absolute value of SP056.
When "0" is set, READY OFF is compulsorily executed after "7000ms".

---**Setting range**---
0 - 20000 (ms)

【#13056】 SP056 EMGt   Deceleration time constant at emergency stop

Set the time constant used for deceleration control during emergency stop. Set the time to stop from the maximum motor speed (TSP).
When "0" is set, the deceleration control is executed with "7000ms".

---**Setting range**---
-20000 - 20000 (ms)

【#13057(PR)】 SP057 GRA1   Spindle side gear ratio 1

Set the number of teeth on the spindle side when the gear selection command (control input 4/bit6, 5) is set to "00".

---**Setting range**---
1 - 32767

【#13058(PR)】 SP058 GRA2   Spindle side gear ratio 2

Set the number of teeth on the spindle side when the gear selection command (control input 4/bit6, 5) is set to "01".

---**Setting range**---
1 - 32767

【#13059(PR)】 SP059 GRA3   Spindle side gear ratio 3

Set the number of teeth on the spindle side when the gear selection command (control input 4/bit6, 5) is set to "10".

---**Setting range**---
1 - 32767

【#13060(PR)】 SP060 GRA4   Spindle side gear ratio 4

Set the number of teeth on the spindle side when the gear selection command (control input 4/bit6, 5) is set to "11".

---**Setting range**---
1 - 32767

【#13061(PR)】 SP061 GRB1   Motor side gear ratio 1

Set the number of teeth on the motor side when the gear selection command (control input 4/bit6, 5) is set to "00".

---**Setting range**---
1 - 32767

【#13062(PR)】 SP062 GRB2   Motor side gear ratio 2

Set the number of teeth on the motor side when the gear selection command (control input 4/bit6, 5) is set to "01".

---**Setting range**---
1 - 32767

【#13063(PR)】 　SP063 GRB3 　Motor side gear ratio 3

Set the number of teeth on the motor side when the gear selection command (control input 4/bit6, 5) is set to "10".

---Setting range---
1 - 32767

【#13064(PR)】 　SP064 GRB4 　Motor side gear ratio 4

Set the number of teeth on the motor side when the gear selection command (control input 4/bit6, 5) is set to "11".

---Setting range---
1 - 32767

【#13065】 　SP065 TLM1 　Torque limit 1

Set the torque limit value when the torque limit (control input 1/bitA, 9, 8) is set to "001".

---Setting range---
0 - 999 (Short-time rated %)

【#13066】 　SP066 TLM2 　Torque limit 2

Set the torque limit value when the torque limit (control input 1/bitA, 9, 8) is set to "010".

---Setting range---
0 - 999 (Short-time rated %)

【#13067】 　SP067 TLM3 　Torque limit 3

Set the torque limit value when the torque limit (control input 1/bitA, 9, 8) is set to "011".

---Setting range---
0 - 999 (Short-time rated %)

【#13068】 　SP068 TLM4 　Torque limit 4

Set the torque limit value when the torque limit (control input 1/bitA, 9, 8) is set to "100".

---Setting range---
0 - 999 (Short-time rated %)

【#13069】 　SP069 PCMP 　Phase alignment completion width

Set the single-rotation position alignment completion width for phase alignment and changing from non-interpolation to spindle synchronization mode during rotation.
Set the rotation error that is required for machine.
When the setting value decreases, the rotation error will also decrease, but the cycle time (settling time) will increase. The standard setting is "875".

---Setting range---
0 - 32767 (1°/1000)

【#13070】 　SP070 KDDT 　Phase alignment deceleration rate scale

Set the scale for SP016 (DDT) when you wish to change the deceleration rate only during rotation command (command $F \otimes T \neq 0$).
When the setting value increases, the single-rotation position alignment will be completed earlier, but the impact applied on the machine will also increase. Set to "0" when not using this function.

---Setting range---
0 - 255 (1/16-fold)

【#13071】 **SP071 DIQM   Variable current limit during deceleration, lower limit value**

Set this parameter to adjust the deceleration time by changing the current limit value during deceleration according to the motor speed.
As shown below, set the lower limit rate of the current limit in SP071 (DIQM), and use this together with SP072 (DIQN).
When DIQM is set to 100%, the current limit value for deceleration (TMRL) set in the motor constants will be applied.
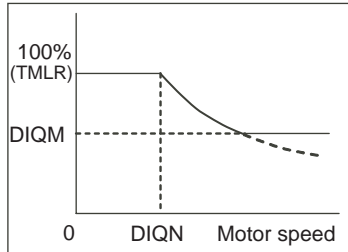
---Setting range---
0 - 999 (%)

【#13072】 **SP072 DIQN   Variable current limit during deceleration, break point speed**

Set this parameter to adjust the deceleration time by changing the current limit value during deceleration according to the motor speed.
As shown below, set the lower limit rate of the current limit in SP071 (DIQM), and use this together with SP072 (DIQN).
When DIQM is set to 100%, the current limit value for deceleration (TMRL) set in the motor constants will be applied.
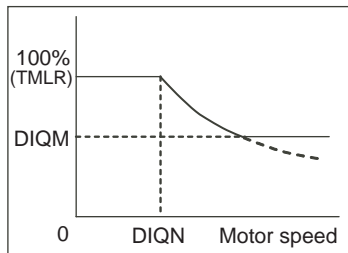
---Setting range---
1 - 32767 (r/min)

【#13073】 **SP073 VGVN   Variable speed gain target value**

If noise is bothersome during high-speed rotation, this noise can be reduced by lowering the speed loop gain at high speeds.
As shown below, set the speed loop gain rate for the overspeed detection speed in SP073 (VGVN), and use this together with SP074 (VGVS).
Set to "0" when not using this function.
The overspeed detection speed (VLMT) is 115% of the maximum motor speed (TSP).
This function can be used when either VGN1 or VGN2 is selected.

(VLMT=Max. speed × 1.15)

---Setting range---
0 - 100 (%)

III - 213
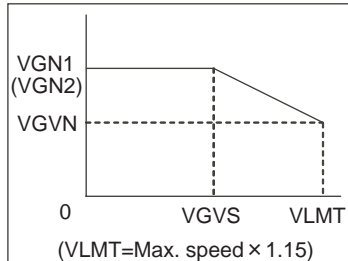
【#13074】 SP074 VGVS Variable speed gain change start speed

If noise is bothersome during high-speed rotation, this noise can be reduced by lowering the speed loop gain at high speeds.
As shown below, set the speed loop gain rate for the overspeed detection speed in SP073 (VGVN), and use this together with SP074 (VGVS).
Set to "0" when not using this function.
The overspeed detection speed (VLMT) is 115% of the maximum motor speed (TSP).
This function can be used when either VGN1 or VGN2 is selected.

VGN1
(VGN2)

VGVN

0　　　　　VGVS　　　　VLMT

(VLMT=Max. speed × 1.15)
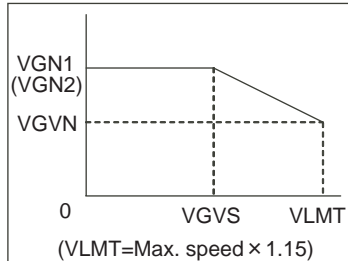
---Setting range---
0 - 32767 (r/min)

【#13075】 SP075 DWSH Slip compensation scale during regeneration High-speed coil

Set the slip frequency scale for deceleration.
Normally, set this to "0".

---Setting range---
0 - 255 (1/16-fold)

【#13076】 SP076 DWSL Slip compensation scale during regeneration Low-speed coil

Set the slip frequency scale at deceleration when using the low-speed coil.
Normally, set this to "0".

---Setting range---
0 - 255 (1/16-fold)

【#13077】 SP077 IQA Q axis current advance compensation

Set the current loop gain.
When using coil switch function, set the current loop gain for when the high-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 20480

【#13078】 SP078 IDA D axis current advance compensation

Set the current loop gain.
When using coil switch function, set the current loop gain for when the high-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 20480

【#13079】 SP079 IQG Q axis current gain

Set the current loop gain.
When using coil switch function, set the current loop gain for when the high-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 8192

【#13080】   SP080 IDG   D axis current gain

Set the current loop gain.
When using coil switch function, set the current loop gain for when the high-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 8192

【#13081】   SP081 IQAL   Q axis current advance compensation Low-speed coil

When using coil switch function, set the current loop gain for when the low-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 20480

【#13082】   SP082 IDAL   D axis current advance compensation Low-speed coil

When using coil switch function, set the current loop gain for when the low-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 20480

【#13083】   SP083 IQGL   Q axis current gain Low-speed coil

When using coil switch function, set the current loop gain for when the low-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 8192

【#13084】   SP084 IDGL   D axis current gain Low-speed coil

When using coil switch function, set the current loop gain for when the low-speed coil is selected.
The setting value is determined by the motor's electrical characteristics, so the value is fixed by the motor used.
Set the value given in the spindle parameter list.

---Setting range---
1 - 8192

【#13085】   SP085

Not used. Set to "0".

【#13086】   SP086

Not used. Set to "0".

【#13087】   SP087 FHz4   Notch filter frequency 4

Set the vibration frequency to suppress if machine vibration occurs (Enabled at 50 or more).
When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【#13088】   SP088 FHz5   Notch filter frequency 5

Set the vibration frequency to suppress if machine vibration occurs (Enabled at 50 or more).
When not using, set to "0".

---Setting range---
0 - 2250 (Hz)

【**#13089 - 13112**】　**SP089 - SP112**

Not used. Set to "0".

【**#13113**】　**SP113 OPLP　Current command value for open loop**

Set the current command value for when open loop control is enabled.
When "0" is set, the state will be the same as when "50" is set.
Set to "0" when not using this function.
Open loop control is enabled when SP018 (SPEC2)/bit1 (oplp) is set to "1".

---Setting range---
0 - 999 (Short-time rated %)

【**#13114**】　**SP114 MKT　Coil changeover gate cutoff timer**

Set the time to cut off the gate when turning the coil switch contactor OFF and ON.
Set a value longer than the coil switch contactor's OFF/ON time.
The standard setting is "150".

---Setting range---
0 - 3500 (ms)

【**#13115**】　**SP115 MKT2　Coil changeover current limit timer**

Set the time to limit the current immediately after the coil switch contactor ON/OFF is completed and
the gate is turned ON. The standard setting is "25".

---Setting range---
0 - 3500 (ms)

【**#13116**】　**SP116 MKIL　Coil changeover current limit value**

Set the time to limit the current immediately after the coil switch contactor ON/OFF is completed and
the gate is turned ON.
The standard setting is "120".

---Setting range---
0 - 999 (Short-time rated %)

【**#13117**】　**SP117 SETM　Excessive speed deviation timer**

Set the time to detect the speed excessive error alarm.
Set the time required for the machine.
The standard setting is "12".

---Setting range---
0 - 60 (s)

【**#13118 - 13120**】　**SP118 - SP120**

Not used. Set to "0".

【**#13121**】　**SP121 MP Kpp　Magnetic pole detection position loop gain**

Set the position loop gain for the magnetic polar detection loop.
This is used for the initial magnetic polar detection when the IPM spindle motor is turned ON.
Set to "0" when using an IM spindle motor.

---Setting range---
0 - 32767

【**#13122**】　**SP122 MP Kvp　Magnetic pole detection speed loop gain**

Set the speed loop gain for the magnetic polar detection loop.
This is used for the initial magnetic polar detection when the IPM spindle motor is turned ON.
Set to "0" when using an IM spindle motor.

---Setting range---
0 - 32767

【#13123】 SP123 MP Kvi   Magnetic pole detection speed loop advance compensation

Set the speed loop advance compensation for the magnetic polar detection loop.
This is used for the initial magnetic polar detection when the IPM spindle motor is turned ON.
Set to "0" when using an IM spindle motor.

---**Setting range**---
0 - 32767

【#13124】 SP124 ILMTsp   Magnetic pole detection current limit value

Set the current limit value for the magnetic polar detection loop.
This is used for the initial magnetic polar detection when the IPM spindle motor is turned ON.
Set to "0" when using an IM spindle motor.

---**Setting range**---
0 - 999 (Short-time rated %)

【#13125】 SP125 DA1NO   D/A output channel 1 data No.

Set the data No. you wish to output to D/A output channel.

---**Setting range**---
-1 - 3, 50, 60 or 127

【#13126】 SP126 DA2NO   D/A output channel 2 data No.

Set the data No. you wish to output to D/A output channel.

---**Setting range**---
-1 - 3, 50, 60 or 127

【#13127】 SP127 DA1MPY   D/A output channel 1 output scale

Set the output scale in increments of 1/100.
When "0" is set, the scale will be the same as when "100" is set.

---**Setting range**---
-32768 - 32767 (1/100-fold)

【#13128】 SP128 DA2MPY   D/A output channel 2 output scale

Set the output scale in increments of 1/100.
When "0" is set, the scale will be the same as when "100" is set.

---**Setting range**---
-32768 - 32767 (1/100-fold)

【#13129(PR) - 13160(PR)】   SP129 - SP160

Set the unique constants for the spindle motor. (High-speed coil)
The setting value is determined by the motor's mechanical and electrical characteristics and specifications, so normally set the value given in the spindle parameter list.

【#13161(PR)-13192(PR)】   SP161 - SP192

Set the unique constants for the spindle motor (Low-speed coil).
The setting value is determined by the motor's mechanical and electrical characteristics and specifications, so normally set the value given in the spindle parameter list.

【#13193 - 13224】   SP193 - SP224

Not used. Set to "0".

【#13225】 **SP225 SFNC5   Spindle function 5**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
           | 0| 0| 0| 0| 0| 0|  | 0| 0| 0| 0| 0|
                                 |_____ ddir
           |_____ ovsn
```
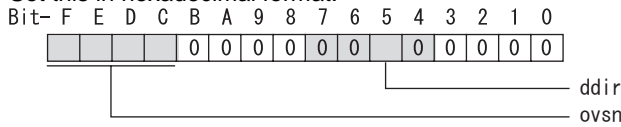
Bit-F,E,D,C ovsn Overshooting compensation type 3 non-sensitive band

Set the non-sensitive band for overshooting compensation type 3 in increments of 2°/1000.
When using feed forward control, set the non-sensitive band for the model position droop and ignore the model overshooting. Set to "2°/1000" as a standard.

Bit-B - 6

Not used. Set to "0".

Bit-5   ddir   Proximity switch signal enable edge

0: Falling edge   1: Rising edge

Bit-4 - 0

Not used. Set to "0".

【#13226】 **SP226**

Not used. Set to "0".

【#13227】 **SP227 SFNC7   Servo function 7**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
           | 0| 0| 0| 0| 0| 0| 0| 0| 0| 0|  | 0| 0|
                                             |_____ ccu
           |_____ dis
```
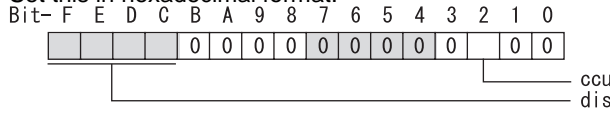
Bit-F,E,D,C   dis   Digital signal input selection

0: No signal   1: Safety observation function door state signal   4: Proximity switch signal detection

Bit-B - 3

Not used. Set to "0".

Bit-2 ccu Lost motion/overshoot compensation   compensation amount setting unit

0: Short-time rated %   1: Short-time rated 0.01%

Bit-1,0

Not used. Set to "0".

【#13228】 **SP228 SFNC8   Spindle function 8**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
   | 0| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0|  |
                                                   |__ irms
```
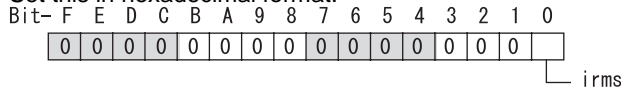
Bit-F - 1

Not used. Set to "0".

Bit-0   irms   Meter display

0: Display normal load meter   1: Display effective motor current

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【#13229】 **SP229 SFNC9　Spindle function 9**

Select the spindle functions.
Functions are allocated to each bit.
Set this in hexadecimal format.

```
Bit- F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0
        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
                                                    ─── rps
                                                    ─── ssc
```
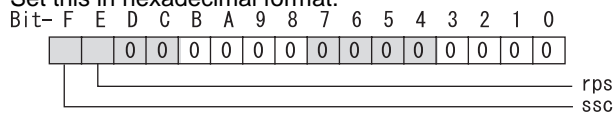
Bit-F　　　　　　**ssc**　　　　**Safety observation function**
0: Stop　　　1: Start

Bit-E
Not used. Set to "0".

Bit-D　　　　　　**rps**　　　　**Safety observation speed setting unit**
0: °/min　　　1: 100°/min

Bit-C - 0
Not used. Set to "0".

【#13230】 **SP230**

Not used. Set to "0".

【#13231】 **SP231**

Not used. Set to "0".

【#13232】 **SP232**

Not used. Set to "0".

【#13233】 **SP233 IVC　Voltage non-sensitive band compensation**

When "100%" is set, the voltage equivalent to the logical non-energized time will be compensated.
When "0" is set, 100% compensation will be performed.
Adjust in increments of 10% from the default value 100%.
If the value is too large, vibration or vibration noise may be generated.

---Setting range---
0 - 255 (%)

【#13234-13236】 **SP234 - SP236**

Not used. Set to "0".

【#13237(PR)】 **SP237 TCF　Torque command filter**

Set the filter for the torque command. Set to "0" when not using this function.
The standard value is "500" when using the motor side detector TS5690 or TS5691.

---Setting range---
0 - 4500 (Hz)

【#13238】 **SP238 SSCFEED　Safety observation safety speed**

Set to "0" when not using this function.

---Setting range---
0 - 18000 (°/min)

【#13239】 **SP239 SSCRPM　Safety observation safety motor speed**

Set the motor's safety speed for the safety observation function.
Set to "0" when not using this function.

---Setting range---
0 - 32767 (r/min)

【#13240(PR)】 **SP240**

Not used. Set to "0".

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【#13241(PR) - 13256(PR)】   SP241 - SP256

This is automatically set by the NC system.

7.3 Supplement

7.3.1 D/A Output Numbers

7.3.1.1 MDS-D/DH Series

(1) D/A output specifications

Item	Explanation
No. of channels	2ch
Output cycle	0.8ms (min. value)
Output precision	12bit
Output voltage range	0V to 2.5V (zero) to +5V
Output magnification setting	±32768
Output pin (CN9 connector)	MO1 = Pin 9 MO2 = Pin 19 LG = Pin 1, 11

CN9 connector
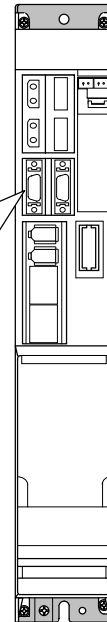
Pin	Name	Pin	Name
1	LG	11	LG
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9	MO1	19	MO2
10		20	

(2) Setting the output data

Input the No. of the data to be output to each D/A output channel.

#	No.	Abbrev.	Parameter name
13125	SP125	DA1NO	D/A output channel 1 data No.
13126	SP126	DA2NO	D/A output channel 2 data No.

<Standard output>

No.	Output data	Output unit for standard setting
-1	D/A output stop	-
0	Commanded motor rotation speed	1000(r/min)/V
1	Motor rotation speed	1000(r/min)/V
2	Torque current command	Short time rated ratio 100%/V
3	Torque current feedback	Short time rated ratio 100%/V
35	Disturbance observer estimated disturbance torque	Short time rated torque current value ratio 100%/V
50	Position droop	1/1000°/V
51	Position command	1/1000° /V
52	Position feedback	1/1000° /V
53	Position F⊿T	1/1000° /s/V
54	Deviation from ideal position (considering spindle tracking delay)	1/1000° /V
60	Position droop	1°/V
61	Position command	1° /V
62	Position feedback	1° /V
63	Position F⊿T	1° /s/V
64	Deviation from ideal position (considering spindle tracking delay)	1° /V
70	Position droop	1000° /V
71	Position command	1000° /V
72	Position feedback	1000° /V
73	Position F⊿T	1000° /s/V
74	Deviation from ideal position (considering spindle tracking delay)	1000° /V
126	Saw tooth wave	0V to 5V
127	2.5V test data output	2.5V

<Spindle control signal>

Spindle control input (NC to SP)

No.	Details	
16384	Spindle control input 1-0	READY ON command
16385	Spindle control input 1-1	Servo ON command
16391	Spindle control input 1-7	Alarm reset command
16392	Spindle control input 1-8	Torque limit 1 selection command
16393	Spindle control input 1-9	Torque limit 2 selection command
16394	Spindle control input 1-A	Torque limit 3 selection command
16409	Spindle control input 2-9	Speed monitor command valid
16410	Spindle control input 2-A	In door closed (controller)
16411	Spindle control input 2-B	In door closed (all drive units)
16432	Spindle control input 4-0	Spindle control mode selection command 1
16433	Spindle control input 4-1	Spindle control mode selection command 2
16434	Spindle control input 4-2	Spindle control mode selection command 3
16436	Spindle control input 4-4	Gear changeover command
16437	Spindle control input 4-5	Gear selection command 1
16438	Spindle control input 4-6	Gear selection command 2

Spindle control output (SP to NC)

No.	Details	
16480	Spindle control output 1-0	In ready ON
16481	Spindle control output 1-1	In servo ON
16487	Spindle control output 1-7	In alarm
16488	Spindle control output 1-8	In torque limit 1 selection
16489	Spindle control output 1-9	In torque limit 2 selection
16490	Spindle control output 1-A	In torque limit 3 selection
16492	Spindle control output 1-C	In in-position
16495	Spindle control output 1-F	In warning
16496	Spindle control output 2-0	Z phase passed
16499	Spindle control output 2-3	In zero speed
16503	Spindle control output 2-7	In external emergency stop
16505	Spindle control output 2-9	In speed monitor
16506	Spindle control output 2-A	In door closed (controller)
16507	Spindle control output 2-B	In door closed (self drive unit)
16528	Spindle control output 4-0	In spindle control mode selection 1
16529	Spindle control output 4-1	In spindle control mode selection 2
16530	Spindle control output 4-2	In spindle control mode selection 3
16532	Spindle control output 4-4	In gear changeover command
16533	Spindle control output 4-5	In gear selection 1
16534	Spindle control output 4-6	In gear selection 2

Spindle control input (NC to SP)

No.	Details	
16445	Spindle control input 4-D	L coil selection command
16458	Spindle control input 5-A	Phase synchronization suppression command
16459	Spindle control input 5-B	Minimum excitation rate 2 changeover request
16460	Spindle control input 5-C	Speed gain set 2 changeover request
16461	Spindle control input 5-D	Zero point re-detection request
16462	Spindle control input 5-E	Spindle holding force up

Spindle control output (SP to NC)

No.	Details	
16541	Spindle control output 4-D	In L coil selection
16545	Spindle control output 5-1	Speed detection
16550	Spindle control output 5-6	In coil changeover
16554	Spindle control output 5-A	In phase synchronization suppression
16555	Spindle control output 5-B	In minimum excitation rate 2 selection
16556	Spindle control output 5-C	In speed gain set 2 selection
16557	Spindle control output 5-D	Zero point re-detection complete
16558	Spindle control output 5-E	Spindle holding force up completed
16559	Spindle control output 5-F	In 2nd in-position

7.3.1.2 MDS-D-SPJ3 Series

(1) D/A output specifications

Item	Explanation
No. of channels	2ch
Output cycle	0.8ms (min. value)
Output precision	10bit
Output voltage range	0V to 2.5V (zero) to +5V
Output magnification setting	±32768
Output pin (CN9 connector)	MO1 = Pin 4 MO2 = Pin 14 GND = Pins 1, 11

CN9 connector

Pin	Name	Pin	Name
1	LG	11	LG
2		12	
3		13	
4	MO1	14	MO2
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

(2) Setting the output data

Input the No. of the data to be output to each D/A output channel.

#	No.	Abbrev.	Parameter name
13125	SP125	DA1NO	D/A output channel 1 data No.
13126	SP126	DA2NO	D/A output channel 2 data No.

<Standard output>

No.	Output data	Output unit for standard setting
0	Commanded motor rotation speed	1000(r/min)/V
1	Motor rotation speed	1000(r/min)/V
2	Torque current command	Short time rated ratio 100%/V
3	Torque current feedback	Short time rated ratio 100%/V
35	Disturbance observer estimated disturbance torque	Short time rated torque current value ratio 100%/V
50	Position droop	1/1000°/V
51	Position command	1/1000° /V
52	Position feedback	1/1000° /V
53	Position F⊿T	1/1000° /s/V
54	Deviation from ideal position (considering spindle tracking delay)	1/1000° /V
60	Position droop	1°/V
61	Position command	1° /V
62	Position feedback	1° /V
63	Position F⊿T	1° /s/V
64	Deviation from ideal position (considering spindle tracking delay)	1° /V
70	Position droop	1000° /V
71	Position command	1000° /V
72	Position feedback	1000° /V
73	Position F⊿T	1000° /s/V
74	Deviation from ideal position (considering spindle tracking delay)	1000° /V
126	Saw tooth wave	0V to 5V
127	2.5V test data output	2.5V

<Spindle control signal>

Spindle control input (NC to SP)				Spindle control output (SP to NC)		

No.	Details			No.	Details	
16384	Spindle control input 1-0	READY ON command		16480	Spindle control output 1-0	In ready ON
16385	Spindle control input 1-1	Servo ON command		16481	Spindle control output 1-1	In servo ON
16391	Spindle control input 1-7	Alarm reset command		16487	Spindle control output 1-7	In alarm
16392	Spindle control input 1-8	Torque limit 1 selection command		16488	Spindle control output 1-8	In torque limit 1 selection
16393	Spindle control input 1-9	Torque limit 2 selection command		16489	Spindle control output 1-9	In torque limit 2 selection
16394	Spindle control input 1-A	Torque limit 3 selection command		16490	Spindle control output 1-A	In torque limit 3 selection
				16492	Spindle control output 1-C	In in-position
				16495	Spindle control output 1-F	In warning
				16496	Spindle control output 2-0	Z phase passed
				16499	Spindle control output 2-3	In zero speed
				16503	Spindle control output 2-7	In external emergency stop
16409	Spindle control input 2-9	Speed monitor command valid		16505	Spindle control output 2-9	In speed monitor
16410	Spindle control input 2-A	In door closed (controller)		16506	Spindle control output 2-A	In door closed (controller)
16411	Spindle control input 2-B	In door closed (all drive units)		16507	Spindle control output 2-B	In door closed (self drive unit)
16432	Spindle control input 4-0	Spindle control mode selection command 1		16528	Spindle control output 4-0	In spindle control mode selection 1
16433	Spindle control input 4-1	Spindle control mode selection command 2		16529	Spindle control output 4-1	In spindle control mode selection 2
16434	Spindle control input 4-2	Spindle control mode selection command 3		16530	Spindle control output 4-2	In spindle control mode selection 3
16436	Spindle control input 4-4	Gear changeover command		16532	Spindle control output 4-4	In gear changeover command
16437	Spindle control input 4-5	Gear selection command 1		16533	Spindle control output 4-5	In gear selection 1
16438	Spindle control input 4-6	Gear selection command 2		16534	Spindle control output 4-6	In gear selection 2

Spindle control input (NC to SP)

No.	Details	
16445	Spindle control input 4-D	L coil selection command
16458	Spindle control input 5-A	Phase synchronization suppression command
16459	Spindle control input 5-B	Minimum excitation rate 2 changeover request
16460	Spindle control input 5-C	Speed gain set 2 changeover request
16461	Spindle control input 5-D	Zero point re-detection request
16462	Spindle control input 5-E	Spindle holding force up

Spindle control output (SP to NC)

No.	Details	
16541	Spindle control output 4-D	In L coil selection
16545	Spindle control output 5-1	Speed detection
16550	Spindle control output 5-6	In coil changeover
16554	Spindle control output 5-A	In phase synchronization suppression
16555	Spindle control output 5-B	In minimum excitation rate 2 selection
16556	Spindle control output 5-C	In speed gain set 2 selection
16557	Spindle control output 5-D	Zero point re-detection complete
16558	Spindle control output 5-E	In spindle holding force up
16559	Spindle control output 5-F	In 2nd in-position

8. Rotary Axis Configuration Parameters

Parameters indicated as (PR) in the table will be validated when the NC power is turned OFF and ON after setting.

【#7900(PR)】 **RCDAX_I   Orthogonal coordinate horizontal axis name**

Set the name of the horizontal axis in the orthogonal coordinate system.

---Setting range---
A,B,C,U,V,W,X,Y,Z

【#7901(PR)】 **RCDAX_J   Orthogonal coordinate vertical axis name**

Set the name of the vertical axis in the orthogonal coordinate system.

---Setting range---
A,B,C,U,V,W,X,Y,Z

【#7902(PR)】 **RCDAX_K   Orthogonal coordinate height axis name**

Set the name of the height axis in the orthogonal coordinate system.

---Setting range---
A,B,C,U,V,W,X,Y,Z

【#7903】 **G92_CRD   Origin zero set coordinate selection**

Select the coordinate to preset when issuing an origin zero command (G92X_Y_Z_;).
0: Tool center coordinate
1: Holder center coordinate

【#7904】 **NO_TIP   Tool handle feed function selection**

Select whether to enable the tool handle feed.
0: Enable (tool handle feed)
1: Disable (standard)

【#7905】 **NO_ABS   Selection of tool axis travel amount display at manual ABS switch ON/OFF**

Select how to update the display of tool axis travel amount.
0: Update at ABS switch OFF
1: Update at every ON and OFF of ABS switch

【#7906】 **PASSTYP   Singular point passage type**

Select the movement after passing a singular point.
0: Type 1
A/B axis rotation angle will be in the same sign direction as that when the tool center point control started.
1: Type 2
C axis rotation amount on the singular point will be smaller.

【#7907】 **CHK_ANG   Near singular judgment angle**

Set the angle for judging a position near the singular point.

---Setting range---
0.000 to 5.000 (°)

【#7908】 **SLCT_PRG_COORD   Programming coordinate system selection**

Select the coordinate system for the programming coordinate.
0: Table coordinate system
1: Workpiece coordinate system (coordinate system that rotates together with workpiece)

【#7909】 **IJK_VEC_MR   Posture vector mirror image selection**

Select whether to enable the mirror image on the posture vector (IJK) when Type 2 is selected in "#7906 PASSTYP".
0: Disable
1: Enable

8. Rotary Axis Configuration Parameters

【#7910】 SLCT_INT_MODE　Interpolation method selection

Select the interpolation method.
- 0: Joint interpolation method
- 1: Single axis rotation interpolation method

【#7911】 SLCT_STANDARD_POS　Rotary axis basic position selection

Select the basic position of the rotary axis.
- 0: Workpiece coordinate zero point
- 1: The position when the tool center point is commanded.

(Note) Even if the position is changed, it is not changed during tool center point control. It is changed when next tool center point control will be commanded.

【#7913】 MCHN_SPEED_CTRL　Machine speed fluctuation suppression

Select whether to suppress the machine speed fluctuation due to rotary axis movement.
- 0: Suppress
- 1: Do not suppress

【#7920(PR)】 SLCT_T1　Rotary axis selection

Select in which axis direction to rotate the tool rotating type base-side rotary axis.
If the tool axis is inclined, use the second digit to set the axis direction in which the tool axis is inclined.
- 0: Invalid
- 1: I axis rotation
- 2: J axis rotation
- 3: K axis rotation

(Note) 0 to 99 can be set from the screen, but if an invalid value is set, the operation error "M01 0127 Rot axis parameter error" will occur when the power supply is turned ON.

---Setting range---
0 to 3
12, 13, 21, 23, 31, 32

【#7921(PR)】 TIANGT1　Inclination angle

Set the inclination angle if the tool-rotation type base-side rotary axis is inclined. Set the angle regarding CCW direction of the inclined plane as plus direction.

---Setting range---
-359.999 to 359.999 (°)
(Follow as "#1003 iunit Input setup unit".)

【#7922(PR)】 ROTAXT1　Rotary axis name

Set the name of the tool rotating type base-side rotary axis.
Set "0" when the axis has the mechanical axis specifications. (The setting is, however, invalid in the tool center point control.)

---Setting range---
0, A, B, C, U, V, W, X, Y, Z

【#7923】 DIR_T1　Rotation direction

Select the rotation direction of the tool rotating type base-side rotary axis.
- 0: CW
- 1: CCW

【#7924】 COFST1H　Horizontal axis rotation center offset

Set the distance in the horizontal axis direction between the rotation centers of the tool-side rotary axis and the base-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

8. Rotary Axis Configuration Parameters

【#7925】 COFST1V   Vertical axis rotation center offset

Set the distance in the vertical axis direction between the rotation centers of the tool-side rotary axis and the base-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7926】 COFST1T   Height axis rotation center offset

Set the distance in the height axis direction between the rotation centers of the tool-side rotary axis and the base-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7927】 CERRT1H   Horizontal axis rotation center error compensation amount

Set the error compensation amount in the horizontal axis direction of the tool rotating type base-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7928】 CERRT1V   Vertical axis rotation center error compensation amount

Set the error compensation amount in the vertical axis direction of the tool rotating type base-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7930(PR)】 SLCT_T2   Rotary axis center

Select in which axis direction to rotate the tool rotating type tool-side rotary axis.
If the tool axis is inclined, use the second digit to set the axis direction in which the tool axis is inclined.
  0: Invalid
  1: I axis rotation
  2: J axis rotation
  3: K axis rotation
(Note) 0 to 99 can be set from the screen, but if an invalid value is set, the operation error "M01 0127 Rot axis parameter error" will occur when the power supply is turned ON.

---Setting range---
0 to 3
12, 13, 21, 23, 31, 32

【#7931(PR)】 TIANGT2   Inclination angle

Set the inclination angle if the tool-rotation type tool-side rotary axis is inclined. Set the angle regarding CCW direction of the inclined plane as plus direction.

---Setting range---
-359.999 to 359.999 (°)
(Follow as "#1003 iunit Input setup unit".)

【#7932(PR)】 ROTAXT2   Rotary axis name

Set the name of the tool rotating type tool-side rotary axis.
Set "0" when the axis has the mechanical axis specifications. (The setting is, however, invalid in the tool center point control.)

---Setting range---
0, A, B, C, U, V, W, X, Y, Z

【#7933】 DIR_T2   Rotation direction

Set the rotation direction of the tool rotating type tool-side rotary axis.
  0: CW
  1: CCW

8. Rotary Axis Configuration Parameters

【#7934】 COFST2H　Horizontal axis rotation center offset

Set the distance in the horizontal axis direction between the spindle holder center and the rotation center of the tool-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7935】 COFST2V　Vertical axis rotation center offset

Set the distance in the vertical axis direction between the spindle holder center and the rotation center of the tool-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7936】 COFST2T　Height axis rotation center offset

Set the distance in the height axis direction between the spindle holder center and the rotation center of the tool-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7937】 CERRT2H　Horizontal axis rotation center error compensation amount

Set the error compensation amount in the horizontal axis direction of the tool rotating type tool-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7938】 CERRT2V　Vertical axis rotation center error compensation amount

Set the error compensation amount in the vertical axis direction of the tool rotating type tool-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7940(PR)】 SLCT_W1　Rotary axis selection

Select in which axis direction to rotate the table rotating type base-side rotary axis.
If the tool axis is inclined, use the second digit to set the axis direction in which the tool axis is inclined.
　0: Invalid
　1: I axis rotation
　2: J axis rotation
　3: K axis rotation
　(Note) 0 to 99 can be set from the screen, but if an invalid value is set, the operation error "M01 0127 Rot axis parameter error" will occur when the power supply is turned ON.

---Setting range---
0 to 3
12, 13, 21, 23, 31, 32

【#7941(PR)】 TIANGW1　Inclination angle

Set the inclination angle if the table-rotation type base-side rotary axis is inclined. Set the angle regarding CCW direction of the inclined plane as plus direction.

---Setting range---
-359.999 to 359.999 (°)
(Follow as "#1003 iunit Input setup unit".)

【#7942(PR)】 ROTAXW1 Rotary axis name

Set the name of the table rotating type base-side rotary axis.
Set "0" when the axis has the mechanical axis specifications. (The setting is, however, invalid in the tool center point control.)

---Setting range---
0, A, B, C, U, V, W, X, Y, Z

【#7943】 DIR_W1 Rotation direction

Set the rotation direction for the table rotating type base-side rotary axis.
0: CW
1: CCW

【#7944】 COFSW1H Horizontal axis rotation center offset

When all axes are at the machine basic point, set the distance in the horizontal axis direction from the machine basic point to the rotation center of the base-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7945】 COFSW1V Vertical axis rotation center offset

When all axes are at the machine basic point, set the distance in the vertical axis direction from the machine basic point to the rotation center of the base-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7946】 COFSW1T Height axis rotation center offset

When all axes are at the machine basic point, set the distance in the height axis direction from the machine basic point to the rotation center of the base-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7947】 CERRW1H Horizontal axis rotation center error compensation amount

Set the error compensation amount in the horizontal axis direction of the table rotating type base-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7948】 CERRW1V Vertical axis rotation center error compensation amount

Set the error compensation amount in the vertical axis direction of the table rotating type base-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7950(PR)】 SLCT_W2 Rotary axis selection

Set in which direction to rotate the table rotating type workpiece-side rotary axis.
If the tool axis is inclined, use the second digit to set the axis direction in which the tool axis is inclined.
0: Invalid
1: I axis rotation
2: J axis rotation
3: K axis rotation
(Note) 0 to 99 can be set from the screen, but if an invalid value is set, the operation error "M01 0127 Rot axis parameter error" will occur when the power supply is turned ON.

---Setting range---
0 to 3
12, 13, 21, 23, 31, 32

8. Rotary Axis Configuration Parameters

【#7951(PR)】   TIANGW2   Inclination angle

Set the inclination angle if the table rotatiing type workpiece-side rotary axis is inclined. Set the angle regarding CCW direction of the inclined plane as minus direction.

---Setting range---
-359.999 to 359.999 (°)
(Follow as "#1003 iunit Input setup unit".)

【#7952(PR)】   ROTAXW2   Rotary axis name

Set the name of the table rotating type workpiece-side rotary axis.
Set "0" when the axis has the mechanical axis specifications. (The setting is, however, invalid in the tool center point control.)

---Setting range---
0, A, B, C, U, V, W, X, Y, Z

【#7953】   DIR_W2   Rotation direction

Set the rotation direction for the table rotating type workpiece-side rotary axis.
　0: CW
　1: CCW

【#7954】   COFSW2H   Horizontal axis rotation center offset

When all axes are at the machine basic point, set the distance in the horizontal axis direction between rotation centers of the base-side rotary axis and the workpiece-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7955】   COFSW2V   Vertical axis rotation center offset

When all axes are at the machine basic point, set the distance in the vertical axis direction between rotation centers of the base-side rotary axis and the workpiece-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7956】   COFSW2T   Height axis rotation center offset

When all axes are at the machine basic point, set the distance in the height axis direction between rotation centers of the base-side rotary axis and the workpiece-side rotary axis.

---Setting range---
-99999.999 to 99999.999 (mm)

【#7957】   CERRW2H   Horizontal axis rotation center error compensation amount

Set the error compensation amount in the horizontal axis direction of the table rotating type workpiece-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

【#7958】   CERRW2V   Vertical axis rotation center error compensation amount

Set the error compensation amount in the vertical axis direction of the table rotating type workpiece-side rotary axis rotation center.

---Setting range---
-99999.999 to 99999.999 (mm)
(Follow as "#1006 mcmpunit Machine error compensation unit".)

9. Machine Error Compensation

9.1 Function Outline

Machine error compensation includes two independent functions: memorized pitch error compensation and memorized relative position compensation.

(1) Memorized pitch error compensation

According to the specified parameters, this method compensates an axis feed error caused by a ball screw pitch error, etc.

With the reference position defined as the base, set the compensation amount in the division points obtained by equally dividing the machine coordinates. (See Fig. 1. 1)

The compensation amount can be set by either the absolute or incremental system.

Select the desired method with the #4000:Pinc. Machine position is compensated between division points n and n+1 as much as compensation amount between them by linear approximation.
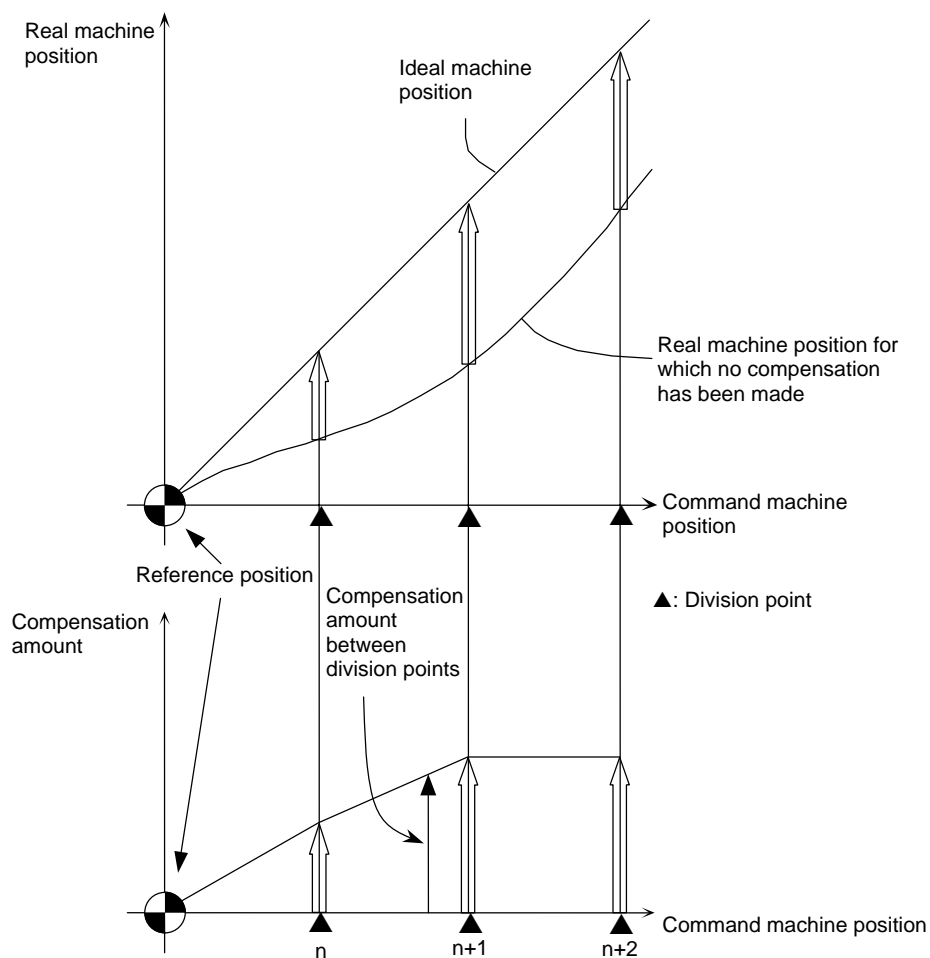

Fig. 1.1　Relationship between the compensation amount and machine position

(2) Memorized relative position compensation

This method, according to the parameters specified in advance, compensates the relative position error between two orthogonal axes caused by deflection of the moving stand.

For this, as shown in Fig. 1. 2, specify the compensation amount in the compensation axis direction in the division points obtained by equally dividing the machine coordinates of the base axis.

The base axis is one of the two orthogonal axes to which relative position compensation applies. This axis is used as the criterion for relative-error measurement. The compensation axis is the coordinate axis that is orthogonal to the base axis. The compensation is actually made for this coordinate axis.

The section between division points n and n+1 is compensated smoothly by linear approximation.
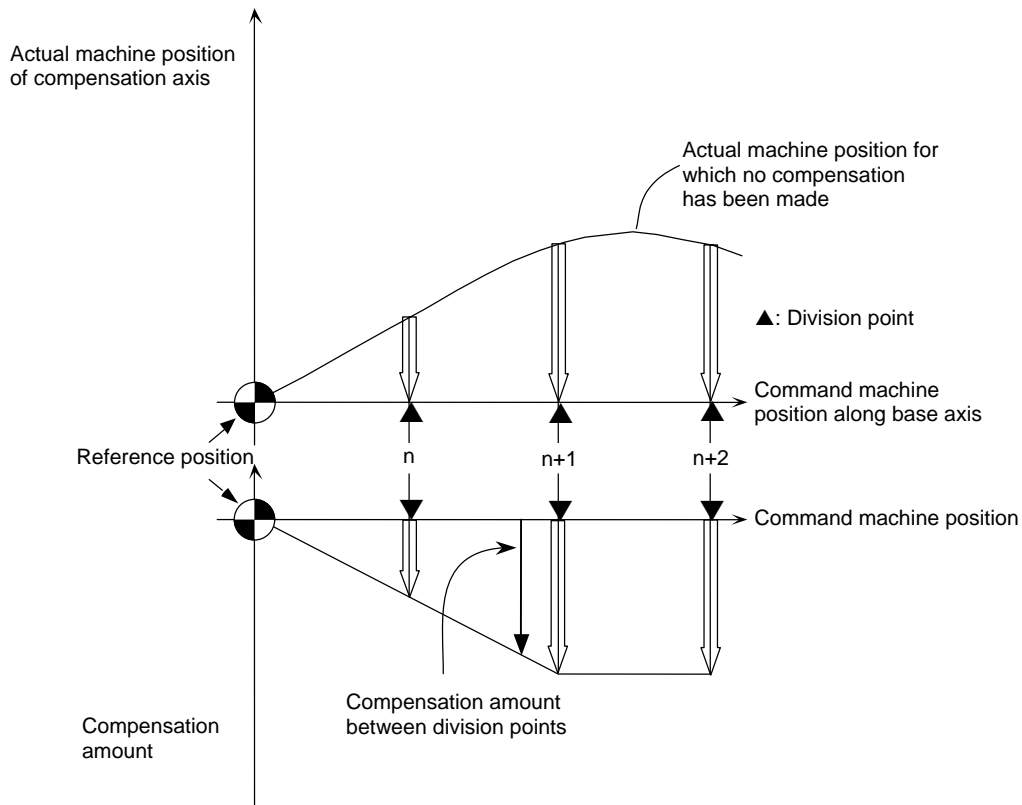

Fig. 1.2   Relationship between the compensation amount and machine position

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【#4000(PR)】   Pinc   Machine error compensation increment method

Select the method to set the machine error compensation data.

---Setting range---
0: Absolute amount method
1: Incremental amount method

<1st axis>

【#4001】 **cmpax   Basic axis**

Set a name of the basic axis for machine error compensation.
(1) For pitch error compensation, set the name of the axis to be compensated.
(2) For relative position compensation, set the name of the axis to be the basic axis.
Set "system No. + axis name" when using the multi-part system.
(Example) Z axis for 2nd part system: 2Z

---Setting range---
Axis name such as X, Y, Z, U, V, W, A, B, or C

【#4002】 **drcax   Compensation axis**

Set a name of the compensation axis for machine error compensation.
(1) For pitch error compensation, set the same axis name as in "#4001 cmpax".
(2) For relative position compensation, set the name of the axis to be actually compensated.
Set "system No. + axis name" when using the multi-part system.
(Example) Z axis for 2nd part system: 2Z

---Setting range---
Axis name such as X, Y, Z, U, V, W, A, B, or C

【#4003】 **rdvno   Division point number at reference position**

Set the compensation data No. corresponding to the reference position. As the reference position is actually the base position, there is no compensation No. Therefore set the number that is decremented by 1.

---Setting range---
4101 to 5124

【#4004】 **mdvno   Division point number at the most negative side**

Set the compensation data No. at the farthest end on the negative side.

---Setting range---
4101 to 5124

【#4005】 **pdvno   Division point number at the most positive side**

Set the compensation data No. at the farthest end on the positive side.

---Setting range---
4101 to 5124

【#4006】 **sc   Compensation scale factor**

Set the scale factor for the compensation amount.

---Setting range---
0 to 99

【#4007】 **spcdv   Division interval**

Set the interval to divide the basic axis.
Each compensation data will be the compensation amount for each of these intervals.

---Setting range---
1 to 9999999 (control unit applied)

2nd axis	3rd axis	4th axis	5th axis	6th axis	7th axis	8th axis	9th axis	10th axis	
4011	4021	4031	4041	4051	4061	4071	4081	4091	Set the parameters corresponding to the 1st axis' parameters 4001 to 4007 for each axis. A maximum of 6 axes can be controlled, but as the relative position is compensated, settings for 10 axes can be made.
4012	4022	4032	4042	4052	4062	4072	4082	4092	
4013	4023	4033	4043	4053	4063	4073	4083	4093	
4014	4024	4034	4044	4054	4064	4074	4084	4094	
4015	4025	4035	4045	4055	4065	4075	4085	4095	
4016	4026	4036	4046	4056	4066	4076	4086	4096	
4017	4027	4037	4047	4057	4067	4077	4087	4097	

#	Item		Details	Setting range
4101 • • • 5124			Set the compensation amount for each axis.	-32768 to 32767 The actual compensa-tion amount will be the value obtained by multiplying the setting value with the compensation scale.

9.2 Setting Compensation Data

Compensation data can be set according to either absolute or incremental system.
"#4000:Pinc"   0: Absolute system
                1: Incremental system

(1) Absolute system

Feed from the reference position to each division point is executed as shown in Fig. 2.1. The following is obtained at this time. Set it as the compensation amount.

(Specified position - Real machine position) × 2 (Unit of output)

For example, assume that the feed from the reference position to the +100mm position is executed. Also, assume that the real machine position is 99.990mm. In this case, the following value is defined as the compensation amount used at the +100mm position:

(100000 - 99990) × 2 = 20 pulses

The resultant value is defined as the compensation amount. Assume that the real machine position resulting when feed to the -100mm position is executed, is -99.990mm. In this case, the following value is defined as the compensation amount used at the -100mm position:
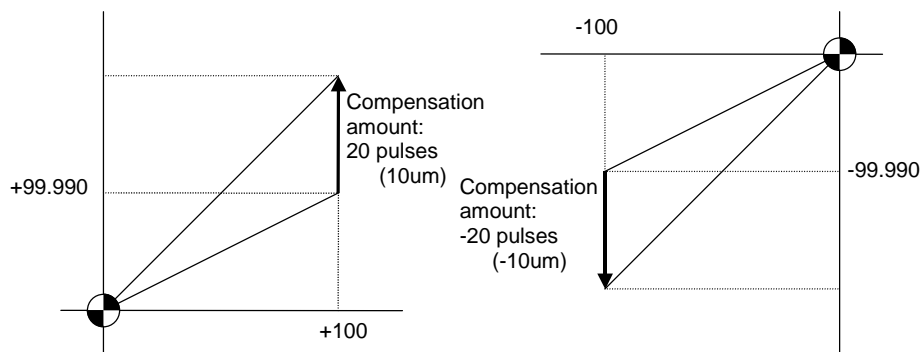
(-100000 - (-99990)) × 2 = -20 pulses

Fig. 2.1

(2) Incremental system

Fig. 2.2 contains a machine position that is placed in the positive direction with respect to the reference position. Assume that feed from division n-1 to n (division interval) is executed. In this case, the following value is defined as the compensation amount:

(Division interval - Actual movement distance) × 2 (Unit of output)

(3) Fig. 2.3 contains a machine position that is placed in the negative direction with respect to the reference position. Assume that feed from division point n+1 to n by the division interval is executed. In this case, the following value is defined as the compensation amount:

   (Division interval + Actual movement distance) × 2 (Unit of output)
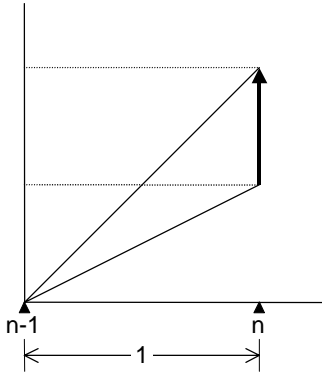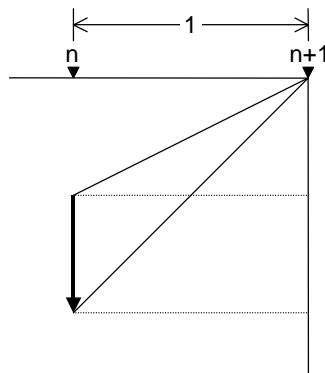
n: Division point compensation number
1: Division interval

Fig. 2.2   **Fig. 2.3**

Unit   : Unit of output
Range : -128 to 127

(Note) The unit of output is used as the unit of setting. The actual unit of compensation pulses depends on the compensation scale factor.

9.3 Example in Using a Linear Axis as the Base Axis

(1) When "mdvno" or "pdvno" exists at both ends of "rdvno":
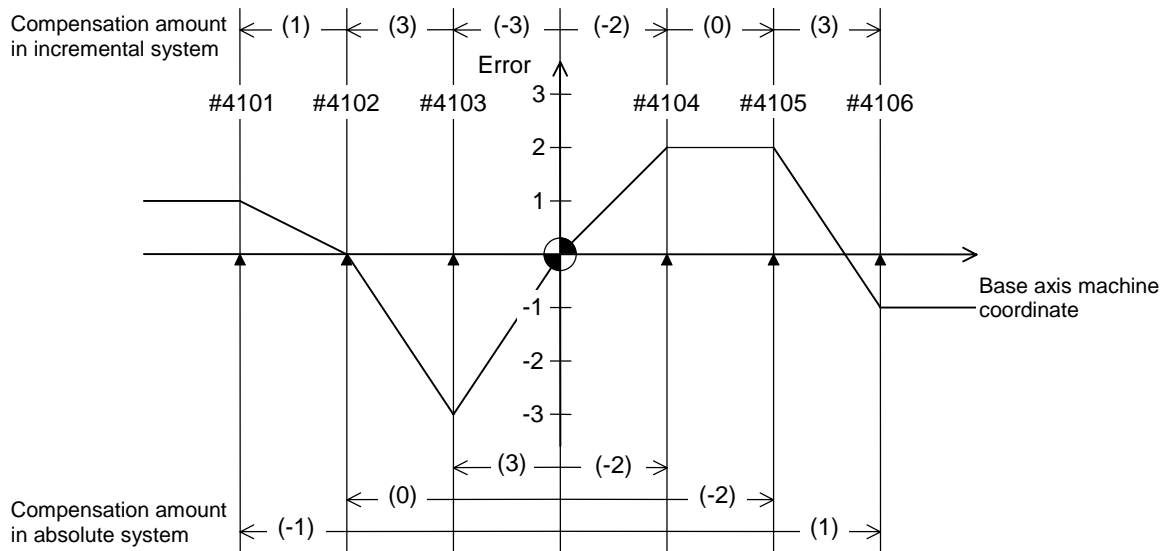
Division point number		#4101	#4102	#4103	#4104	#4105	#4106
Specified machine position		-300.000	-200.000	-100.000	100.000	200.000	300.000
Real machine position		-299.999	-200.000	-100.003	100.002	200.002	299.999
Compensa-tion amount	Incremental	2	6	-6	-4	0	6
	Absolute	-2	0	6	-4	-4	2

rdvno	4103
mdvno	4101
pdvno	4106

If the setting range ("mdvno" to "pdvno") is exceeded, the compensation will be based on compensation amount at "mdvno" or "pdvno".

(2) When the range compensated is only the positive range:
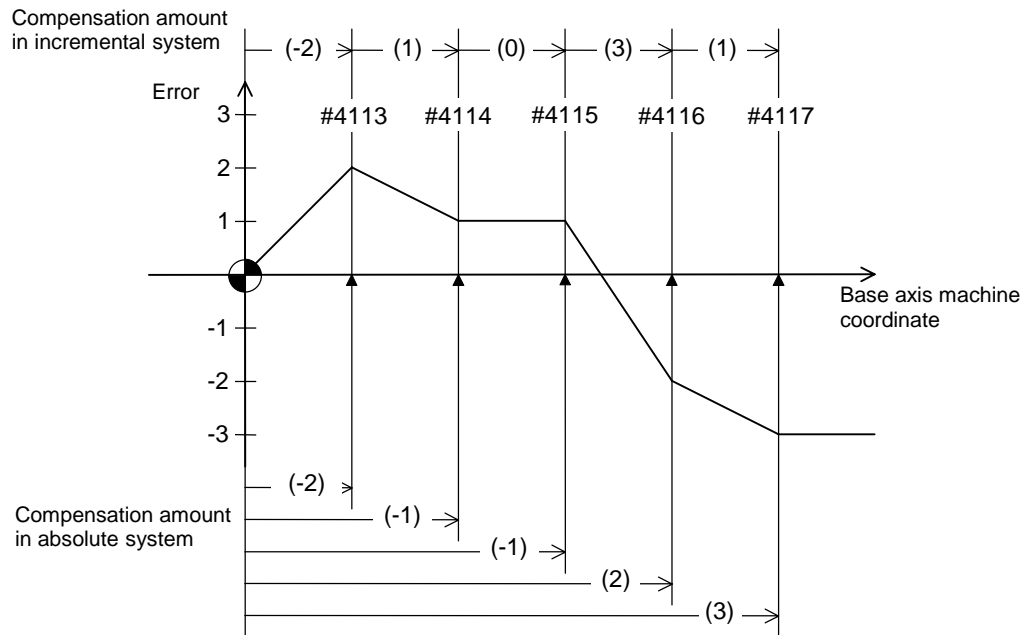
Division point number		#4113	#4114	#4115	#4116	#4117
Compensation amount	Incremental	-4	2	0	6	2
	Absolute	-4	-2	-2	4	6

rdvno	4112
mdvno	4113
pdvno	4117

If the machine position exceeds "pdvno", the compensation will be based on the compensation amount at "pdvno". If the machine position is negative in this case, no compensation will be executed.

(3) When the range compensated is only the negative range:

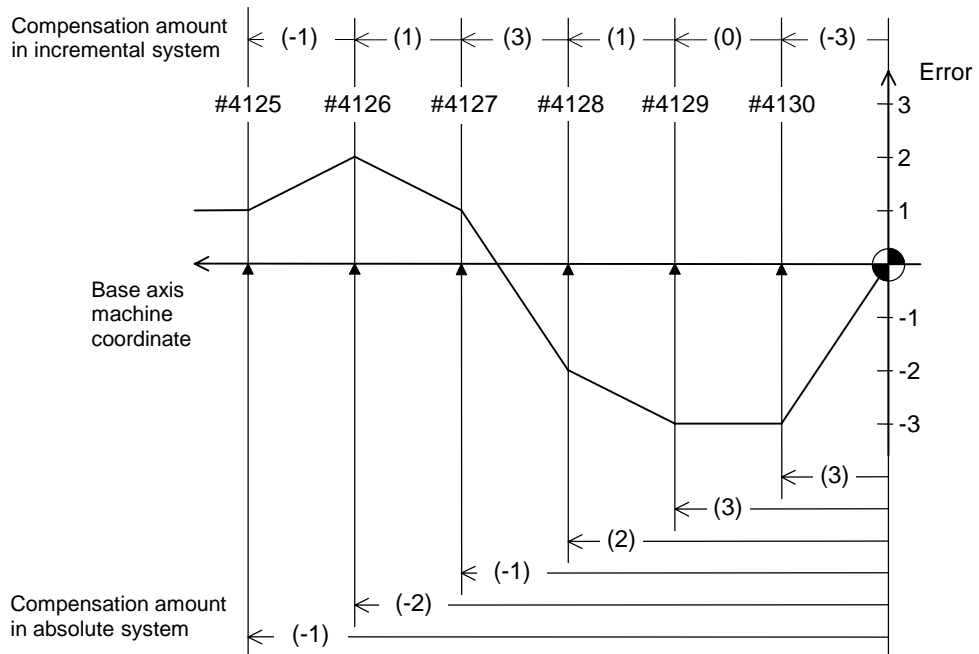| Division point number		#4125	#4126	#4127	#4128	#4129	#4130
Compensa-tion amount	Incremental	-2	2	6	2	0	-6
	Absolute	-2	-4	-2	4	6	6

rdvno	4130
mdvno	4125
pdvno	4130

If the machine position exceeds "mdvno", the compensation will be based on compensation amount at "mdvno".

(4) When compensation is executed in a range that contains no reference position:
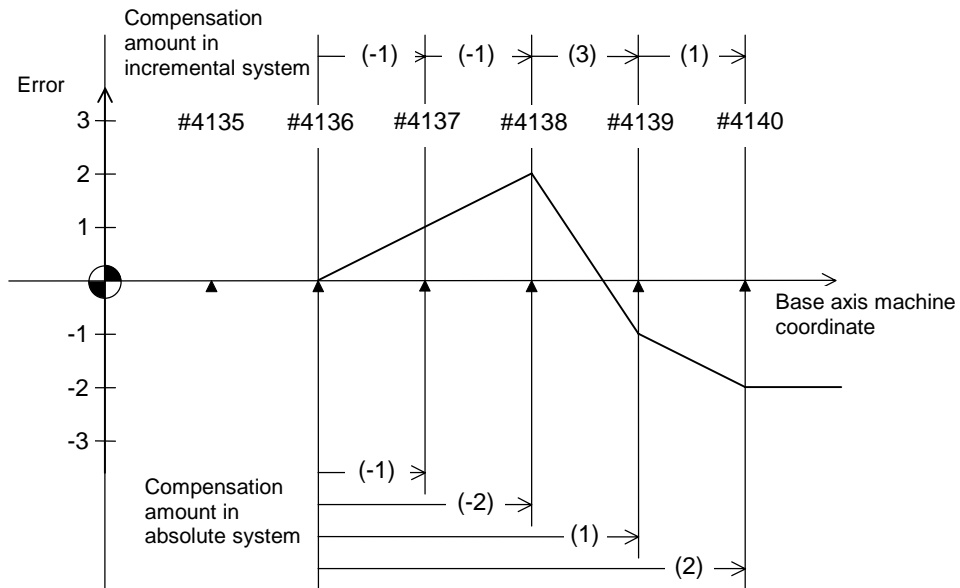
Division point number		#4135	#4136	#4137	#4138	#4139	#4140		rdvno	4134
Compensa-tion amount	Incremental			-2	-2	6	2		mdvno	4136
	Absolute			-2	-4	2	4		pdvno	4140

In this case, the compensation is executed in the range from "mdvno" to "pdvno". This setting rule applies also when the compensation is executed in a range which contains negative machine positions and no reference position.

9.4 Example in Using a Rotary Axis as the Base Axis
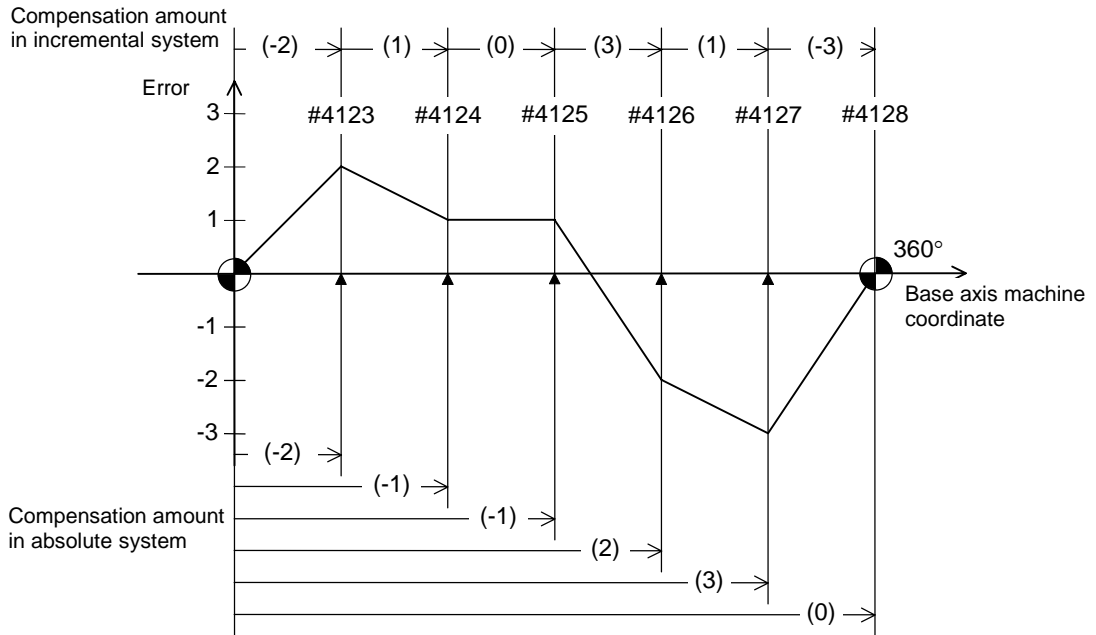
Division point number		#4123	#4124	#4125	#4126	#4127	#4128
Compensa-tion amount	Incremental	-4	2	0	6	2	-6
	Absolute	-4	-2	-2	4	6	0

rdvno	4122
mdvno	4123
pdvno	4128

In this case, the sum of the compensation amounts set according to the incremental system is always "0".
For the absolute system, the compensation amount at the terminal point (360 degrees) is always "0".

10. PLC Constants

10.1 PLC Timer

#	PLC device	Item	Details	Setting range
16000 : : : : : 16703	T0 : : : : : T703	PLC timer <10ms/100ms>	Set the time for the timer used in the PLC program (ladder). The 10ms timer and 100ms timer are identified by the command used. **(Note)** This setting value is valid when parameter "#6449 bit0" in the following "[BIT SELECT]" is set to "0".	0 to 32767 (×10ms or ×100ms)

(Note 1) Setting the timer setting value from the setting and display unit
The timer T setting value can be set with the following two methods.
- Method to validate the setting value (Kn) programmed with the sequence program (fixed timer)
- Method to validate the setting value set from the setting and display unit (variable timer)

(Note 2) The fixed timer and variable timer range can be set with the bit selection parameters (#6454/bit0 to bit3).

No. of points	Range	Bit selection parameter (#6454)				Fixed timer/ variable timer
		bit3	bit2	bit1	bit0	
0	None	0	0	0	0	All fixed timers
100	#16000 to #16099	0	0	0	1	Variable timers in range on left
200	#16000 to #16199	0	0	1	0	
300	#16000 to #16299	0	0	1	1	
400	#16000 to #16399	0	1	0	0	
500	#16000 to #16499	0	1	0	1	
600	#16000 to #16599	0	1	1	0	
All points	#16000 to #16703	0	1	1	1	All variable timers

10.2 PLC Integrated Timer

#	PLC device	Item	Details	Setting range
17000 : : 17063	ST0 : : ST63	PLC integrated timer <100ms INC.>	Set the time for the integrated timer used with the PLC program (ladder). **(Note)** This setting value is valid when parameter "#6449 bit0" in the following "[BIT SELECT]" is set to "0".	0 to 32767 (×100ms)

(Note 1) Setting the timer setting value from the setting and display unit
The timer T setting value can be set with the following two methods.
- Method to validate the setting value (Kn) programmed with the sequence program (fixed integrated timer)
- Method to validate the setting value set from the setting and display unit (variable integrated timer)

(Note 2) The fixed integrated timer and variable integrated timer range can be set with the bit selection parameters (#6454/bit5 to bit7).

No. of points	Range	Bit selection parameter (#6453)			Fixed integrated timer/ variable integrated timer
		bit7	bit6	bit5	
0	None	0	0	0	All fixed integrated timers
20	#17000 to #17019	0	0	1	Variable integrated timers in range on left
40	#17000 to #17039	0	1	0	
All points	#17000 to #17063	0	1	1	All variable integrated timers

10.3 PLC Counter

#	PLC device	Item	Details	Setting range
17200 : : : 17455	C000 : : : C255	Counter	Set the time for the counter used with the PLC program (ladder). **(Note)** This setting value is valid when parameter "#6449 bit1" in the following "[BIT SELECT]" is set to "0".	0 to 32767

(Note 1) Setting the counter setting value from the setting and display unit
The counter C setting value can be set with the following two methods.
- Method to validate the setting value (Kn) programmed with the sequence program (fixed counter)
- Method to validate the setting value set from the setting and display unit (variable counter)

(Note 2) The fixed counter and variable counter range can be set with the bit selection parameters (#6454/bit4 to bit7).

No. of points	Range	Bit selection parameter (#6454)				Fixed counter/ variable counter
		bit7	bit6	bit5	bit4	
0	None	0	0	0	0	All fixed counters
40	#17200 to #17239	0	0	0	1	
80	#17200 to #17279	0	0	1	0	
120	#17200 to #17319	0	0	1	1	Variable counter in range on left
160	#17200 to #17359	0	1	0	0	
200	#17200 to #17399	0	1	0	1	
240	#17200 to #17439	0	1	1	0	
All points	#17200 to #17455	0	1	1	1	All variable counters

10.4 PLC Constants

#	PLC device	Item	Details	Setting range
18001 : : : : 18150	R7500,7501 : : : : R7798,7799	PLC constant	Set the value to be set in the data type R register used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again.	-99999999 to 99999999

10.5 Selecting the PLC Bit

#	PLC device	Item	Details	Setting range
6401 6402 : : : : : : : : 6495 6496	R7800-Low R7800-High : : : : : : : : R7847-Low R7847-High	Bit selection	This is the bit type parameter used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again. Some of the parameters following #6449 may be fixed according to the usage purpose. Refer to the PLC Program Development On-board Instruction Manual.	0: OFF 1: ON
6497 6498 : : : : 6595 6596	R7848-Low R7848-High : : : : R7897-Low R7897-High	Bit selection expansion	This is the bit type parameter (expansion) used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again.	0: OFF 1: ON

Table: "Contents of bit selection parameters #6449 to #6496"

	Symbol name	7	6	5	4	3	2	1	0
0	#6449 R7824 L	Control unit temperature alarm ON	-	-	-	Counter C retention	Integrating timer ST retention	PLC counter program ON	PLC timer program ON
1	#6450 R7824 H	-	-	-	-	-	Operator message ON	1: R type / 0: F type	Alarm message ON
2	#6451 R7825 L	-	-	Serial GPP communication ON	-	-	-	Simple mode ON	-
3	#6452 R7825 H	-	-	-	Serial handy terminal communication ON	-	-	-	-
4	#6453 R7826 L	PLC integrated timer Number of variable integrated timer points setting			-	-	Message language selection code		
5	#6454 R7826 H	Counter C number of variable/fixed points setting				Timer T number of variable/fixed points setting			
6	#6455 R7827 L	-	-	-	-	-	-	-	-
7	#6456 R7827 H	-	-	-	-	-	-	-	-
8	#6457 R7828 L	High-speed input specification 1							
9	#6458 R7828 H	High-speed input specification 2							
A	#6459 R7829 L	High-speed input specification 3							
B	#6460 R7829 H	High-speed input specification spare							
C	#6461 R7830 L	High-speed output specification 1							
D	#6462 R7830 H	High-speed output specification 2							
E	#6463 R7831 L	High-speed output specification 3							
F	#6464 R7831 H	High-speed output specification spare							

	Symbol name	7	6	5	4	3	2	1	0
0	#6465 R7832 L								
1	#6466 R7832 H			High-speed input specification spare					
2	#6467 R7833 L								
3	#6468 R7833 H								
4	#6469 R7834 L	-	-	-	-	-	-	-	-
5	#6470 R7834 H	-	-	-	-	-	-	-	-
6	#6471 R7835 L	-	-	-	-	-	-	-	-
7	#6472 R7835 H	-	-	-	-	-	-	-	-
8	#6473 R7836 L								
9	#6474 R7836 H			High-speed output specification spare					
A	#6475 R7837 L								
B	#6476 R7837 H								
C	#6477 R7838 L	-	-	-	-	-	-	-	-
D	#6478 R7838 H	-	-	-	-	-	-	-	-
E	#6479 R7839 L	-	-	-	-	-	-	-	-
F	#6480 R7839 H	-	-	-	-	-	-	-	-

(Note 1) Be sure to set the bits indicated - and blanks to 0.

(Note 2) Parameters #6481 to #6496 are reserved for debugging by Mitsubishi.

11. Macro List

#	Item	Details	Setting range (unit)
7001 to 7091	M [01] to M [10]	**\<Code\>** Set the M code used for calling out the macro with the M command. This is valid when "#1195 Mmac" is set to 1.	1 to 9999
7002 to 7092		**\<Type\>** Set the macro call out type. <table><tr><td>0</td><td>M98 PΔΔΔΔ; and equivalent value call</td></tr><tr><td>1</td><td>G65 PΔΔΔΔ; and equivalent value call</td></tr><tr><td>2</td><td>G66 PΔΔΔΔ; and equivalent value call</td></tr><tr><td>3</td><td>G66.1 PΔΔΔΔ; and equivalent value call</td></tr><tr><td>others</td><td>M98 PΔΔΔΔ; and equivalent value call</td></tr></table>	0 to 3
7003 to 7093		**\<Program No.\>** Set the No. of the program to be called out.	Program name or file name (up to 32 characters)
	M2mac	Set the type and program No. for when calling out the macro with the 2nd miscellaneous command. The macro will be called out with the "#1170 M2name" address command when "#1198 M2mac" is set to 1.	
7102		**\<Type\>** Same as the M call macro.	0 to 3
7103		**\<Program No.\>** Same as the M call macro.	Program name or file name (up to 32 characters)
7201 to 7291	G [01] to G [10]	**\<Code\>** Set the G code to be used when calling the macro with a G command. Do not set a G code used in the system.	1 to 255
7202 to 7292		**\<Type\>** Same as the M call Marco.	0 to 3
7203 to 7293		**\<Program No.\>** Same as the M call Marco.	Program name or file name (up to 32 characters)
	Smac	Set the type and program No. for when calling the macro with an S command. This is valid when "#1196 Smac" is set to 1.	
7302		**\<Type\>** Same as the M call Marco.	0 to 3
7303		**\<Program No.\>** Same as the M call Marco.	Program name or file name (up to 32 characters)
	Tmac	Set the type and program No. for when calling the macro with a T command. This is valid when "#1197 Tmac" is set to 1.	
7312		**\<Type\>** Same as the M call macro.	0 to 3
7313		**\<Program No.\>** Same as the M call macro.	Program name or file name (up to 32 characters)

#	Item		Details	Setting range
7401	ASCII [01]	Valid	The ASCII code macro parameters (#7402 to 7405) are validated. 　　0: Invalid 　　1: Valid	0/1
7402		Code	Set the ASCII code used to call macros with the ASCII code.	L system: 　A, B, D, F, H, I, J, K, 　M, Q, R, S, T M system: 　A, B, F, H, I, K, M, Q, 　R, S, T
7403		Type	Set the macro call type. 　　0: M98, 1: G65, 2: G66, 3: G66.1	0 to 3
7404		Program No.	Set the program No. called with macro call.	0 to 99999999
7405		Variable	When the call type is "0", set the variable No. set after the ASCII code.	100 to 149
7411	ASCII [02]	Valid	The ASCII code macro parameters (#7412 to 7415) are validated. 　　0: Invalid 　　1: Valid	0/1
7412		Code	Set the ASCII code used to call macros with the ASCII code.	L system: 　A, B, D, F, H, I, J, K, 　M, Q, R, S, T M system: 　A, B, F, H, I, K, M, Q, 　R, S, T
7413		Type	Set the macro call type. 　　0: M98, 1: G65, 2: G66, 3: G66.1	0 to 3
7414		Program No.	Set the program No. called with macro call.	0 to 99999999
7415		Variable	When the call type is "0", set the variable No. set after the ASCII code.	100 to 149

12. Position Switch

The position switch (PSW) is used as an alternate switch for the dog switch provided on an axis of the machine. The position switch uses parameters by which the names of axes and their corresponding coordinates indicating imaginary dog positions are defined in advance. When the machine reaches the imaginary dog position, a signal is output to the PLC interface. The position switch thus works as an imaginary dog switch.

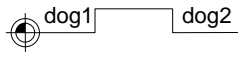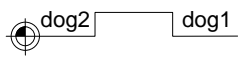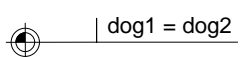| #		Item	Details	Setting range (unit)
7500	Pcheck	High-speed switching of position switch	Specify whether to perform position switch area checking at high speeds. 0: Do not perform position switch area checking at high speed (do it the same as before). 1: Perform position switch area checking at high speed.	0/1
75□1	<axis>	Axis name	Specify the name of the axis for which a position switch is provided.	X, Y, Z, U, V, W, A, B, or C axis address
75□2	<dog1>	Imaginary dog position 1	When the machine enters the range between imaginary dog positions 1 and 2, a signal is output to the PLC.	-99999.999 to 99999.999 (mm)
75□3	<dog2>	Imaginary dog position 2	1st part system device : X1D00 2nd part system device : X1D20	
75□4	<check>	Selection of area check method	When position switch area checking at high speed is selected, specify the mode of area checking, i.e., whether to use the command type machine position or detector feedback position, for each position switch point. 0: Use the command type machine position as the machine position for position switch area checking. 1: Use the detector feedback position as the machine position for position switch area checking. **(Note)** This parameter is valid only when 1 set in "#7500 Pcheck. "	0/1

Position switch Nos. of PSW1 to PSW24 and signal devices

	<axis>	<dog1>	<dog2>	<check>	Part system 1 device	Part system 2 device
PSW1	#7501	#7502	#7503	#7504	X1D00	X1D20
PSW2	#7511	#7512	#7513	#7514	X1D01	X1D21
PSW3	#7521	#7522	#7523	#7524	X1D02	X1D22
PSW4	#7531	#7532	#7533	#7534	X1D03	X1D23
:	:	:	:	:	:	:
PSW24	#7731	#7732	#7733	#7734	X1D17	X1D37

Instead of the dog switch provided on the machine axis, the coordinates indicating imaginary dog positions (dog1 and dog2) on the coordinate axis of the axis name preset with axis are set with the position switches (PSW1 - PSW24). When the machine reaches the position, the signal is output to the device corresponding to the PLC interface.
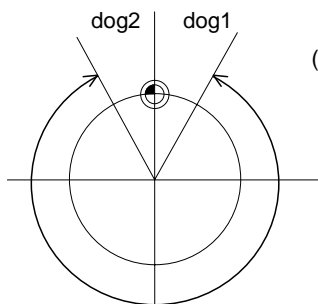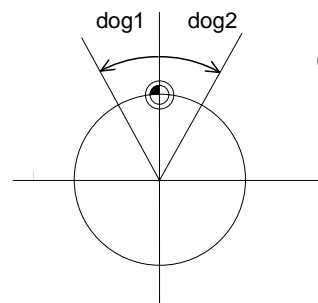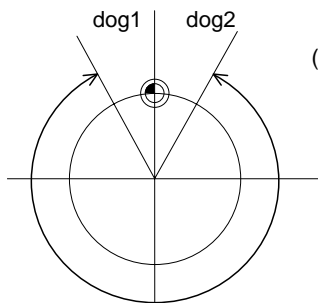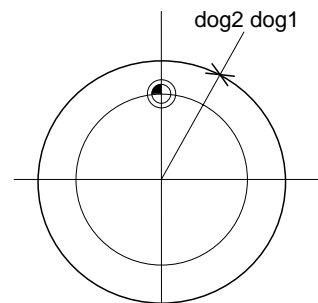
Example of settings of dog1 and dog2 and operation

Setting of dog1 and dog2	dog1, dog2 position	Operation
dog1 < dog2	dog1 ⌐‾⌐ dog2	A signal is output between dog1 and dog2.
dog1 > dog2	dog2 ⌐‾⌐ dog1	A signal is output between dog2 and dog1.
dog1 = dog2	| dog1 = dog2	If dog1 equals dog2, the dog1 position triggers a signal.

Basic machine coordinate system zero point
Imaginary dog
PSW width
dog1
dog2
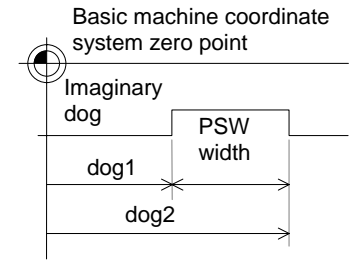
Rotary axis

Setting of dog1 and dog2	dog1, dog2 position	Description
dog1 < dog2	(Example) dog1 = 30.000 dog2 = 330.000	A signal is output between dog1 and dog2.
	(Example) dog1 = -30.000 dog2 = 30.000	A signal is also output when dog1 is negative.
dog1 > dog2	(Example) dog1 = 330.000 dog2 = 30.000	A signal is output between dog2 and dog1.
|dog1 - dog2| ≥ 360	(Example) dog1 = 30.000 dog2 = 390.000	A signal is kept output when the difference between dog1 and dog2 exceeds 360 degrees.

12.1 Canceling the Position Switch

To cancel the position switch, enter the number (#75 1) of the position switch to be canceled in # ( ) of the setting field, enter a slash "/" in DATA ( ), then press the INPUT key. This deletes the axis name for the specified position switch, thus invalidating the position switch.

The data specified for <dog1> and <dog2> are still stored in memory. To validate the position switch again, therefore, it is enough to specify the axis name only.

13. Auxiliary Axis Parameter

Turn the NC power OFF after setting parameters indicated with a (PR) in the table. The setting will be validated after the power is turned ON again.

【#50001(PR)】　MSR　Motor series

Set the motor series. When set to the default value ("0000"), the system will automatically judge the series.

---Setting range---
0000 to FFFF (hexadecimal)

【#50002(PR)】　RTY　Regeneration option type

Set the regenerative resistor type.
　Default value: 0000
　0000: Drive unit standard built-in resistor (10CT has no built-in resistor)
　0100: Setting prohibited
　0200: MR-RB032 (30W)
　0300: MR-RB12 (100W)
　0400: MR-RB32 (300W)
　0500: MR-RB30 (300W)
　0600: MR-RB50 (500W)
　0700 to 0F00: Setting prohibited

Do not set values that are not written here.

【#50003(PR)】　PC1　Motor side gear ratio (machine rotation ratio)

Set the number of gear teeth on the motor side and the number of gear teeth on the machine side as an integer reduced to its lowest terms.
Set the total gear ratio if there are multiple gear levels.
For rotary axes, set the motor rotation speed per machine rotation.
Default value: 1

---Setting range---
1 to 32767

【#50004(PR)】　PC2　Machine side gear ratio (motor rotation ratio)

Set the number of gear teeth on the motor side and the number of gear teeth on the machine side as an integer reduced to its lowest terms.
Set the total gear ratio if there are multiple gear levels.
For rotary axes, set the motor rotation speed per machine rotation.
Default value: 1

---Setting range---
1 to 32767

【#50005(PR)】　PIT　Feed pitch

Set the feed pitch.
Set "360" (default value) for rotary axes.
Set the feed lead for linear axes.

---Setting range---
1 to 32767(° or mm)

【#50006】　INP　In-position detection width

Set the position droop for the in-position detection.
In-position will be detected when the position droop reaches the setting value or less.
Default value: 50

---Setting range---
1 to 32767 (1/1000° or μm)

III - 256

【#50007】　ATU　Auto-tuning

Set the adjustment of the auto-tuning.
Default value: 0102

　　***1: Low response (low-rigidity loads, loads which easily vibrate)
　　***2: Standard setting value
　　***3:
　　***4:
　　***5: High response (high-rigidity loads, loads which do not easily vibrate)

　　**0*: Standard friction amount
　　**1*: Large friction amount (set the position loop gain slightly lower)

　　*0**: Only auto-tuning PG2, VG2, VIC, and GD2
　　*1**: Only auto-tuning PG1, PG2, VG1, VG2, VIC, and GD2 (total gain). (Standard setting)
　　*2**: No auto-tuning

Do not set values that are not explained here.

【#50008】　PG1　Position loop gain 1

Set the position loop gain of the model loop. This parameter determines the trackability to a position command.
Default value: 70

---Setting range---
4 to 1000 (1/s)

【#50009】

Not used. Set to "0".

【#50010】　EMGt　Deceleration control time constant

Set the deceleration time from the clamp speed (Aspeed1). Set the same value as the acceleration/deceleration time constant used for the normal rapid traverse.
Default value: 500

---Setting range---
0 to 32768 (ms)

【#50011】

Not used. Set to "0".

【#50012】

Not used. Set to "0".

【#50013】　MBR　Vertical axis drop prevention time

Set the time to delay the servo OFF during servo OFF command. Increase the setting by 100ms at a time and set the minimum value where the axis does not drop.
Default value: 100

---Setting range---
0 to 1000 (ms)

【#50014】 NCH Notch filter No.

Set the frequency of the machine resonance suppression filter.
0: Not used
1: 1125 (Hz)
2: 563
3: 375
4: 282
5: 225
6: 188
7: 161

【#50015】

Not used. Set to "0".

【#50016】 JIT Jitter compensation

Set the number of pulses that ignore the jitter compensation.
0: The function is not used.
1 to 3: 1 to 3 pulses ignore.

【#50017】

Not used. Set to "0".

【#50018】

Not used. Set to "0".

【#50019】 PG2 Position loop gain 2

Set the position loop gain of the actual loop.
Determine the position responsiveness to external disturbance.
Default value: 25

---Setting range---
1 to 500 (1/s)

【#50020】 VG1 Speed loop gain 1

Set the speed loop gain of the model loop.
This parameter determines the tracking ability to a speed command.
Default value: 1200

---Setting range---
20 to 5000 (1/s)

【#50021】 VG2 Speed loop gain 2

Set the speed loop gain of the actual loop.
This parameter determines the speed responsiveness to external disturbance.
Default value: 600

---Setting range---
20 to 8000 (1/s)

【#50022】 VIC Speed integral compensation

Set the characteristics of the speed low-frequency region.
Default value: 20

---Setting range---
1 to 1000 (ms)

【#50023】 VDC Speed differential compensation

Set the speed differential compensation to reduce overshoot.
When the default value "1000" is set, the normal PI control will start.
Adjust the overshoot amount by lowering in increments of 20.

---Setting range---
0 to 1000

【#50024】 DG2 Load inertia ratio

Set the ratio of load inertia to motor inertia.
Default value: 2.0

---Setting range---
0.0 to 50.0 (fold)

【#50025】

Not used. Set to "0".

【#50030(PR)】 MTY Motor type

Set the motor type. When set to the default value ("0000"), the system will automatically judge the type.

---Setting range---
0000 to FFFF (hexadecimal)

【#50050】 MD1 D/A output channel 1 data No.

Set the Nos. of the data to output on D/A output channel 1.
  Default value: 0000
  0000: Speed feedback (with sign)   Maximum speed = 8V
  0001: Current feedback (with sign)   Maximum current (torque) = 8V
  0002: Speed feedback (without sign)   Maximum speed = 8V
  0003: Current feedback (without sign)   Maximum current (torque) = 8V
  0004: Current command   Maximum current (torque) = 8V
  0005: Command FΔT   100000 [degrees/min] = 10V
  0006: Position droop 1 (1/1)   2048 [pulse] = 10V
  0007: Position droop 2 (1/4)   8192 [pulse] = 10V
  0008: Position droop 3 (1/16)   32768 [pulse] = 10V
  0009: Position droop 4 (1/32)   65536 [pulse] = 10V
  000A: Position droop 5 (1/64)   131072 [pulse] = 10V

【#50051】 MO1 D/A output channel 1 output offset

Set this parameter when the zero level of D/A output channel 1 is not equal to zero.

---Setting range---
-999 to 999 (mV)

【#50052】

Not used. Set to "0".

【#50053】 MD2 D/A output channel 2 data No.

Set the Nos. of the data to output on D/A output channel 2.
Descriptions are the same as in "#50050 MD1".
Default value: 0000

---Setting range---
0000 to FFFF (hexadecimal)

【#50054】 MO2 D/A output channel 2 output offset

Set this parameter when the zero level of D/A output channel 2 is not equal to zero.
Default value: 0

---Setting range---
-999 to 999 (mV)

【#50055】

Not used. Set to "0".

【#50100(PR)】 station Number of indexing stations

Set the number of stations.
For linear axes, this value is expressed by: number of divisions = number of stations - 1.
Default value: 2

---Setting range---
2 to 360

【#50101(PR)】 Cont1 Control parameter 1

The bits that are not explained here must be set to the default value.

bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Default value	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

bit1:
　　0: High-speed zero point return after the establishment of zero point
　　1: Dog-type return for each reference position return

bit8:
　　0: Reference position return direction (+)
　　1: Reference position return direction (-)

bit9:
　　0: Rotation direction determined by operation control signal (DIR)
　　1: Rotation direction in the shortcut direction

bitA
　　0: Machine basic position becomes the basic point.
　　1: Electrical basic position becomes the basic point.

bitD
　　0: Creation of coordinate zero point is valid.
　　1: Zero point is established at power supply ON position.

bitE
　　0: Rotation direction in operation control signal (DIR) or in the shortcut direction
　　1: Rotation direction in the arbitrary position command sign direction

bitF
　　0: Stopper direction is in the positioning direction.
　　1: Stopper direction is in the sign direction of the stopper amount.

13. Auxiliary Axis Parameter

【#50102(PR)】　Cont2　Control parameter 2

The bits that are not explained here must be set to the default value.

bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Default value	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0

bit1:
0: Error not corrected at servo OFF
1: Error corrected at servo OFF

bit2:
0: Linear axis
1: Rotary axis

bit3:
0: Station assignment direction CW
1: Station assignment direction CCW

bit4:
0: Uniform assignment
1: Non-uniform assignment

bit5:
0: DO channel standard assignment
1: DO channel reverse assignment

bit6:
0: 2-wire detector communication
1: 4-wire detector communication

bit7:
0: Incremental detection
1: Absolute position detection

【#50103(PR)】　EmgCont　Emergency stop control

The bits that are not explained here must be set to the default value.

bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Default value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

bit0:
0: Enable external emergency stop
1: Disable external emergency stop

bit1:
0: Dynamic brake stop at emergency stop
1: Deceleration control stop at emergency stop

bit2:
0: Enable NC bus emergency stop input
1: Disable NC bus emergency stop input

bit3:
0: Enable NC bus emergency stop output
1: Disable NC bus emergency stop output

【#50104(PR)】　tleng　Linear axis stroke length

Set the travel stroke length for linear axis.
The set value for this parameter will be ignored when non-uniform assignments are set or random positions are commanded.
Default value: 100.000

---Setting range---
0.001 to 99999.999 (mm)

【#50110】 ZRNspeed　Reference position return speed

Set the clamp value of the feedrate when a reference position return is carried out.
The feedrate applies the manual operation speed in the parameter group selected at the time, which is clamped by this parameter set value.
　Default value: 1000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50111】 ZRNcreep　Reference position return creep speed

Set the approach speed to the reference position after dog detection during a reference position return.
　Default value: 200

---Setting range---
1 to 65535 (°/min or mm/min)

【#50112】 grid mask　Grid mask

Set the amount that the dog is artificially extended. Normally set the half amount of the grid spacing.
　Default value: 0

---Setting range---
0 to 65536 (1/1000° or μm)

【#50113(PR)】 grspc　Grid spacing

Select the number of divisions in the grid spacing that is the conventional motor rotation travel amount.
The setting values "1", "2", "3" and "4" divide into 2, 4, 8 and 16 divisions respectively.
　Default value: 0

---Setting range---
0 to 4 ("1 / (n-th power of 2)" divisions)

【#50114】 ZRNshift　Reference position shift amount

Set the shift amount in a dog-type reference position return from the electrical basic position, which is determined on the grid, to the reference position.
　Default value: 0.000

---Setting range---
0 to 65536 (1/1000° or μm)

【#50115】 ST. ofset　Station offset

Set the distance (offset) from the reference position to station 1.
Default value: 0

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50116(PR)】 ABS base　Absolute position zero point

Set the travel distance in shifting the machine coordinate basic point from the standard point during absolute position initializing.
Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50117】 Limit(+) Soft limit (+)

Set the upper limit for commands in the plus direction.
Commands in the plus direction beyond this set value are not possible.
If the machine is in a position exceeding the setting value, commands in the minus direction will be possible.
If "#50117 Limit(+)" and "#50118 Limit(-)" are set to the same value, the soft limit function will not operate.
Default value: 1.000

---Setting range---
-99999.999 to 99999.999 (mm)

【#50118】 Limit(-) Soft limit (-)

Set the lower limit for commands in the minus direction.
Commands in the minus direction beyond this set value are not possible.
If the machine is in a position exceeding the setting value, commands in the plus direction will be possible.
Default value: 1.000

---Setting range---
-99999.999 to 99999.999 (mm)

【#50120】 ABS Type Absolute position detection parameter

The bits that are not explained here must be set to the default value.

bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Default value	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

bit1:
0: Dogless-type method initializing
1: Dog-type method initializing

bit2:
0: Machine end stopper method initializing
1: Marked point alignment method initializing

bit3:
0: Electrical basic position direction (+)
1: Electrical basic position direction (–)

【#50123(PR)】 ABS check Absolute position power OFF tolerable movement value

Set the tolerable amount of travel for a machine that travels during power OFF in an absolute position detection system. The "Absolute position power OFF movement exceeded (ABS)" signal will turn ON if the machine travels more than this setting value during power OFF.
The travel amount will not be checked when this parameter is set to "0.000".
Default value: 0.000

---Setting range---
0.000 to 99999.999 (° or mm)

【#50130】 backlash Backlash compensa-tion amount

Set the backlash compensation amount.
Default value: 0

---Setting range---
0 to 9999 (1/1000° or µm)

【#50132】

Not used. Set to "0".

【#50133】

Not used. Set to "0".

【#50134】

Not used. Set to "0".

【#50135】

Not used. Set to "0".

【#50150】 **Aspeed1   Operation parameter group 1 Automatic operation speed**

Set the feedrate during automatic operation when operation parameter group 1 is selected.
This parameter is regarded as the clamp value for the automatic operation speeds and manual operation speeds of all operation groups.
A speed exceeding Aspeed1 cannot be commanded, even if it is set in a parameter.
Default value: 5000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50151】 **Mspeed1   Operation parameter group 1 Manual operation speed**

Set the feedrate during manual operation or JOG operation when operation parameter group 1 is selected.
　Default value: 2000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50152】 **time1.1   Operation parameter group 1 Acceleration/deceleration time constant 1**

Set the linear acceleration/deceleration time for "Operation parameter group 1 automatic operation speed" (clamp speed) when operation parameter group 1 is selected.
When operating at a lower speed than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above.
When this is set with "Acceleration/deceleration time constant 2", S-pattern acceleration/deceleration will be carried out. In this case, this parameter determines the acceleration/deceleration time of the linear part.
　Default value: 100

---Setting range---
1 to 9999 (ms)

【#50153】 **time1.2   Operation parameter group 1 Acceleration/deceleration time constant 2**

Set this parameter when carrying out S-pattern acceleration/deceleration. Set the total time of the non-linear parts in the S-pattern acceleration/deceleration. When "1" is set, linear acceleration/deceleration will be carried out.
In the handle feed operation mode, this setting value is regarded as time constant for the linear acceleration/deceleration.
　Default value: 1

---Setting range---
1 to 999 (ms)

【#50154】　TL1　Operation parameter group 1 Torque limit value

Set the motor output torque limit value when operation parameter group 1 is selected.

At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required.

In the stopper positioning operation mode, this will be regarded as torque limit value when positioning to the stopper starting coordinates.

Default value: 500

---Setting range---

1 to 500 (%)

【#50155】　OD1　Operation parameter group 1 Excessive error detection width

Set the excessive error detection width when operation parameter group 1 is selected.

The excessive error alarm (S03 0052) will be detected when the position droop becomes larger than this setting value.

In the stopper positioning operation mode, this will be regarded as excessive error detection width when positioning to the stopper starting coordinates.

Default value: 100

---Setting range---

0 to 32767 (° or mm)

【#50156】　just1　Operation parameter group 1 Set position output width

Set the tolerable value at which "set position reached" (JST) or "automatic set position reached" (JSTA) signal is output when operation parameter group 1 is selected.

"Set position reached" (JST) indicates that the machine position is at any station.

During automatic operation, "automatic set position reached" (JSTA) is also output under the same condition.

These signals will turn OFF when the machine position moves away from the station over this value.

Default value: 0.500

---Setting range---

0.000 to 99999.999 (° or mm)

【#50157】　near1　Operation parameter group 1 Near set position output width

Set the tolerable value at which "near set position" (NEAR) signal is output when operation parameter group 1 is selected.

"Near set position" (NEAR) indicates that the machine position is near any station position.

This value is generally set wider than the set position output width.

During operations, this is related to the special commands when the station selection is set to "0".

Default value: 1.000

---Setting range---

0.000 to 99999.999 (° or mm)

【#50158】　Aspeed2　Operation parameter group 2 Automatic operation speed

Set the feedrate during automatic operation when operation parameter group 2 is selected.

Default value: 5000

---Setting range---

1 to 100000 (°/min or mm/min)

【#50159】　Mspeed2　Operation parameter group 2 Manual operation speed

Set the feedrate during manual operation or JOG operation when operation parameter group 2 is selected.

Default value: 2000

---Setting range---

1 to 100000 (°/min or mm/min)

13. Auxiliary Axis Parameter

【#50160】 time2.1　Operation parameter group 2 Acceleration/deceleration time constant 1

Set the linear acceleration/deceleration time for "Operation parameter group 1 automatic operation speed" (clamp speed) when operation parameter group 2 is selected.
When operating at a lower speed than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above.
When this is set with "Acceleration/deceleration time constant 2", S-pattern acceleration/deceleration will be carried out. In this case, this parameter determines the acceleration/deceleration time of the linear part.
　Default value: 100

---Setting range---
1 to 9999 (ms)

【#50161】 time2.2　Operation parameter group 2 Acceleration/deceleration time constant 2

Set this parameter when carrying out S-pattern acceleration/deceleration. Set the total time of the non-linear parts in the S-pattern acceleration/deceleration. When "1" is set, linear acceleration/deceleration will be carried out.
In the handle feed operation mode, this setting value is regarded as time constant for the linear acceleration/deceleration.
　Default value: 1

---Setting range---
1 to 999 (ms)

【#50162】 TL2　Operation parameter group 2 Torque limit value

Set the motor output torque limit value when operation parameter group 2 is selected. At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required.
In the stopper positioning operation mode, this will be regarded as torque limit value during the stopper operation.
　Default value: 500

---Setting range---
1 to 500 (%)

【#50163】 OD2　Operation parameter group 2 Excessive error detection width

Set the excessive error detection width when operation parameter group 2 is selected.
The excessive error alarm (S03 0052) will be detected when the position droop becomes larger than this setting value.
In the stopper positioning operation mode, this will be regarded as excessive error detection width during the stopper operation.
　Default value: 100

---Setting range---
0 to 32767 (° or mm)

【#50164】 just2　Operation parameter group 2 Set position output width

Set the tolerable value at which "set position reached" (JST) or "automatic set position reached" (JSTA) signal is output when operation parameter group 2 is selected.
"Set position reached" (JST) indicates that the machine position is at any station.
During automatic operation, "automatic set position reached" (JSTA) is also output under the same condition.
These signals will turn OFF when the machine position moves away from the station over this value.
　Default value: 0.500

---Setting range---
0.000 to 99999.999 (° or mm)

【#50165】　near2　Operation parameter group 2 Near set position output width

Set the tolerable value at which "near set position" (NEAR) signal is output when operation parameter group 2 is selected.
"Near set position" (NEAR) indicates that the machine position is near any station position.
This value is generally set wider than the set position output width.
During operations, this is related to the special commands when the station selection is set to "0".
　Default value: 1.000

---Setting range---
0.000 to 99999.999 (° or mm)

【#50166】　Aspeed3　Operation parameter group 3 Automatic operation speed

Set the feedrate during automatic operation when operation parameter group 3 is selected.
　Default value: 5000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50167】　Mspeed3　Operation parameter group 3 Manual operation speed

Set the feedrate during manual operation or JOG operation when operation parameter group 3 is selected.
　Default value: 2000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50168】　time3.1　Operation parameter group 3 Acceleration/deceleration time constant 1

Set the linear acceleration/deceleration time for "Operation parameter group 3 automatic operation speed" (clamp speed) when operation parameter group 1 is selected.
When operating at a lower speed than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above.
When this is set with "Acceleration/deceleration time constant 2", S-pattern acceleration/deceleration will be carried out. In this case, this parameter determines the acceleration/deceleration time of the linear part.
　Default value: 100

---Setting range---
1 to 9999 (ms)

【#50169】　time3.2　Operation parameter group 3 Acceleration/deceleration time constant 2

Set this parameter when carrying out S-pattern acceleration/deceleration. Set the total time of the non-linear parts in the S-pattern acceleration/deceleration. When "1" is set, linear acceleration/deceleration will be carried out.
In the handle feed operation mode, this setting value is regarded as time constant for the linear acceleration/deceleration.
　Default value: 1

---Setting range---
1 to 999 (ms)

【#50170】　TL3　Operation parameter group 3 Torque limit value

Set the motor output torque limit value when operation parameter group 3 is selected.
At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required.
In the stopper positioning operation mode, this will be regarded as pressing torque limit value after completion of the positioning.
　Default value: 500

---Setting range---
1 to 500 (%)

【#50171】 OD3　Operation parameter group 3　Excessive error detection width

Set the excessive error detection width when operation parameter group 3 is selected.
The excessive error alarm (S03 0052) will be detected when the position droop becomes larger than this setting value.
In the stopper positioning operation mode, this will be regarded as excessive error detection width during pressing after completion of the positioning.
　Default value: 100

---Setting range---
0 to 32767 (° or mm)

【#50172】 just3　Operation parameter group 3 Set position output width

Set the tolerable value at which "set position reached" (JST) or "automatic set position reached" (JSTA) signal is output when operation parameter group 3 is selected.
"Set position reached" (JST) indicates that the machine position is at any station.
During automatic operation, "automatic set position reached" (JSTA) is also output under the same condition.
These signals will turn OFF when the machine position moves away from the station over this value.
　Default value: 0.500

---Setting range---
0.000 to 99999.999 (° or mm)

【#50173】 near3　Operation parameter group 3 Near set position output width

Set the tolerable value at which "near set position" (NEAR) signal is output when operation parameter group 3 is selected.
"Near set position" (NEAR) indicates that the machine position is near any station position.
This value is generally set wider than the set position output width.
During operations, this is related to the special commands when the station selection is set to "0".
　Default value: 1.000

---Setting range---
0.000 to 99999.999 (° or mm)

【#50174】 Aspeed4　Operation parameter group 4 Automatic operation speed

Set the feedrate during automatic operation when operation parameter group 4 is selected.
　Default value: 5000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50175】 Mspeed4　Operation parameter group 4 Manual operation speed

Set the feedrate during manual operation or JOG operation when operation parameter group 4 is selected.
　Default value: 2000

---Setting range---
1 to 100000 (°/min or mm/min)

【#50176】 time4.1　Operation parameter group 4 Acceleration/deceleration time constant 1

Set the linear acceleration/deceleration time for "Operation parameter group 1 automatic operation speed" (clamp speed) when operation parameter group 4 is selected.
When operating at a lower speed than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above.
When this is set with "Acceleration/deceleration time constant 2", S-pattern acceleration/deceleration will be carried out. In this case, this parameter determines the acceleration/deceleration time of the linear part.
　Default value: 100

---Setting range---
1 to 9999 (ms)

【#50177】　time4.2　Operation parameter group 4 Acceleration/deceleration time constant 2

Set this parameter when carrying out S-pattern acceleration/deceleration. Set the total time of the non-linear parts in the S-pattern acceleration/deceleration. When "1" is set, linear acceleration/deceleration will be carried out.
In the handle feed operation mode, this setting value is regarded as time constant for the linear acceleration/deceleration.
　Default value: 1

---Setting range---
1 to 999 (ms)

【#50178】　TL4　Operation parameter group 4 Torque limit value

Set the motor output torque limit value when operation parameter group 4 is selected.
At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required.
In the stopper method initializing mode in absolute position detection system, this is regarded as torque limit value during stopper operation.
　Default value: 500

---Setting range---
1 to 500 (%)

【#50179】　OD4　Operation parameter group 4　Excessive error detection width

Set the excessive error detection width when operation parameter group 4 is selected. The excessive error alarm (S03 0052) will be detected when the position droop becomes larger than this setting value.
In the stopper method initializing mode in absolute position detection system, this is regarded as excessive error detection width during stopper operation.
　Default value: 100

---Setting range---
0 to 32767 (° or mm)

【#50180】　just4　Operation parameter group 4 Set position output width

Set the tolerable value at which "set position reached" (JST) or "automatic set position reached" (JSTA) signal is output when operation parameter group 4 is selected.
"Set position reached" (JST) indicates that the machine position is at any station.
During automatic operation, "automatic set position reached" (JSTA) is also output under the same condition.
These signals will turn OFF when the machine position moves away from the station over this value.
　Default value: 0.500

---Setting range---
0.000 to 99999.999 (° or mm)

【#50181】　near4　Operation parameter group 4 Near set position output width

Set the tolerable value at which "near set position" (NEAR) signal is output when operation parameter group 4 is selected.
"Near set position" (NEAR) indicates that the machine position is near any station position.
This value is generally set wider than the set position output width.
During operations, this is related to the special commands when the station selection is set to "0".
　Default value: 1.000

---Setting range---
0.000 to 99999.999 (° or mm)

【#50190】　stpos2　Station 2 coordinate

Set the station 2 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
　Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50191】 **stpos3   Station 3 coordinate**

Set the station 3 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50192】 **stpos4   Station 4 coordinate**

Set the station 4 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50193】 **stpos5   Station 5 coordinate**

Set the station 5 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50194】 **stpos6   Station 6 coordinate**

Set the station 6 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50195】 **stpos7   Station 7 coordinate**

Set the station 7 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50196】 **stpos8   Station 8 coordinate**

Set the station 8 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50197】 **stpos9   Station 9 coordinate**

Set the coordinate of each station when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).
   Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

13. Auxiliary Axis Parameter

【#50200】　PSWcheck　PSW detection method

Select the criterion for the output of position switches 1 to 8.
bit0 to 7 correspond to position switches 1 to 8.
   0: Judged by the machine position of the command system.
   1: Judged by the machine FB position (actual position).
The bits that are not written here must be set to "0".

【#50201】　PSW1 dog1　PSW1 area setting 1

Set "PSW1 area setting" 1 and 2 to specify the area where the position switch 1 will turn ON when
the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position
switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.
  Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50202】　PSW1 dog2　PSW1 area setting 2

Set "PSW1 area setting" 1 and 2 to specify the area where the position switch 1 will turn ON when
the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position
switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.
  Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50203】　PSW2 dog1　PSW2 area setting 1

Set "PSW2 area setting" 1 and 2 to specify the area where the position switch 2 will turn ON when
the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position
switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.
  Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50204】　PSW2 dog2　PSW2 area setting 2

Set "PSW2 area setting" 1 and 2 to specify the area where the position switch 2 will turn ON when
the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position
switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.
  Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50205】　PSW3 dog1　PSW3 area setting 1

Set "PSW3 area setting" 1 and 2 to specify the area where the position switch 3 will turn ON when
the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position
switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.
  Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50206】　**PSW3 dog2　PSW3 area setting 2**

Set "PSW3 area setting" 1 and 2 to specify the area where the position switch 3 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.
　Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50207】　**PSW4 dog1　PSW4 area setting 1**

Set "PSW4 area setting" 1 and 2 to specify the area where the position switch 4 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.
　Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50208】　**PSW4 dog2　PSW4 area setting 2**

Set "PSW4 area setting" 1 and 2 to specify the area where the position switch 4 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.
　Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50209】　**PSW5 dog1　PSW5 area setting 1**

Set "PSW5 area setting" 1 and 2 to specify the area where the position switch 5 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.
　Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50210】　**PSW5 dog2　PSW5 area setting 2**

Set "PSW5 area setting" 1 and 2 to specify the area where the position switch 5 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.
　Default value: 0.000

---Setting range---
-99999.999 to 99999.999 (° or mm)

【#50211】　**PSW6 dog1　PSW6 area setting 1**

Set "PSW6 area setting" 1 and 2 to specify the area where the position switch 6 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

　Default value: 0.000

　　---Setting range---

　-99999.999 to 99999.999 (° or mm)

【#50212】　**PSW6 dog2　PSW6 area setting 2**

Set "PSW6 area setting" 1 and 2 to specify the area where the position switch 6 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

　Default value: 0.000

　　---Setting range---

　-99999.999 to 99999.999 (° or mm)

【#50213】　**PSW7 dog1　PSW7 area setting 1**

Set "PSW7 area setting" 1 and 2 to specify the area where the position switch 7 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

　Default value: 0.000

　　---Setting range---

　-99999.999 to 99999.999 (° or mm)

【#50214】　**PSW7 dog2　PSW7 area setting 2**

Set "PSW7 area setting" 1 and 2 to specify the area where the position switch 7 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

　Default value: 0.000

　　---Setting range---

　-99999.999 to 99999.999 (° or mm)

【#50215】　**PSW8 dog1　PSW8 area setting 1**

Set "PSW8 area setting" 1 and 2 to specify the area where the position switch 8 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

　Default value: 0.000

　　---Setting range---

　-99999.999 to 99999.999 (° or mm)

【#50216】　PSW8 dog2　PSW8 area setting 2

Set "PSW8 area setting" 1 and 2 to specify the area where the position switch 8 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.
　Default value: 0.000

---**Setting range**---
-99999.999 to 99999.999 (° or mm)

【#50220】　push.1　Stopper amount

Set the command stroke of the stopper operation in the stopper positioning.
　Default value: 0.000

---**Setting range**---
0.000 to 359.999 (° or mm)

【#50221】　push.t1　Stopper standby time

Set the standby time from the stopper starting coordinate positioning to the stopper operation start in the stopper positioning.
　Default value: 0

---**Setting range**---
0 to 9999 (ms)

【#50222】　push.t2　Stopper torque release time

Set the time from the completion of the stopper operation to the changeover of the stopper torque in the stopper positioning.
　Default value: 0

---**Setting range**---
0 to 9999 (ms)

【#50223】　push.t3　Set position signal output delay time

Set the time from the completion of the stopper operation to the output of the "automatic set position reached" (JSTA), "set position reached" (JST) or "near set position" (NEAR) signal in the stopper positioning.
　Default setting: 0

---**Setting range**---
0 to 9999 (ms)

14. Open Parameter

【#29001】 Open param 1

Set LONG data.
#29001 to #29896 are used as parameter range where C language modules can be used arbitrarily.

---Setting range---
-

【#29901】 Open param 2

Set DOUBLE data.
#29901 to #29996 are used as parameter range where C language modules can be used arbitrarily.

---Setting range---
-

15. CC-Link Parameter

Be sure to stop the PLC ladder before changing the parameters.
When the parameter has been changed, PLC ladder scanning starts and parameters are updated to set no need to turn the power ON.
CC-Link parameters cannot be changed by G10 command.
   (Note) "Master station" and "Local/standby master station" next to the Details column shows whether these settings are required or not. "×" means to set "0".

15.1 CC-Link Parameter 1

"n" in the table represents the extenpansion slot No.(n=1 to 3).
Turn the NC power OFF after setting parameters indicated with a (PR) in the table. The setting will be validated after the power is turned ON again.

【#24001+40(n-1)(PR)】   SLn station No.   CC-Link station No.

Set the station No. of the CC-Link I/F unit.
"n" represents the expansion slot No.(n=1 to 3)
 -1: Invalid
  0: Master station
  1 to 64: Slave station

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
 -1 to 64

【#24002+40(n-1)(PR)】   SLn line-spd&Mode   CC-Link transmission rate and mode

Select the transmission rate and operation mode of the CC-Link I/F unit.
"n" represents the expansion slot No.(n=1 to 3)

Setting value	Transmission rate (bps)	Mode
0	156K	Online
1	625K	
2	2.5M	
3	5M	
4	10M	
5	156K	Circuit test
6	625K	
7	2.5M	
8	5M	
9	10M	
10	156K	Hardware test (Note) Perform hardware test after removing the CC-Link cable.
11	625K	
12	2.5M	
13	5M	
14	10M	

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
0 to 14

【#24003+40(n-1)(PR)】   SLn set fault sta   Setting of data link faulty station

Select whether to clear or hold the data input from the data link faulty station.
"n" represents the expansion slot No.(n=1 to 3)
    0: Clear
    1: Hold

(Note) Refer to "CC-Link System Master/Local Module User's Manual (SH(NA)-080394E-E)" for the details of the functions.

---Master station---
Set to "0" or "1".

---Local/standby master station---
Set to "0" or "1".

【#24004+40(n-1)】   SLn PLC stop set   Setting at PLC STOP

Set whether to refresh or compulsorily clear the slave stations at PLC STOP.
"n" represents the expansion slot No.(n=1 to 3)
  0: Refresh
  1: Compulsorily clear

(Note) Refer to "CC-Link System Master/Local Module User's Manual (SH(NA)-080394E-E)" for the details of the functions.

---Master station---
Set to "0" or "1".

---Local/standby master station---
Set to "0" or "1".

【#24005+40(n-1)(PR)】   SLn occ stations   Number of occupied stations

Set the number of occupied local and standby master stations.
"n" represents the expansion slot No.(n=1 to 3)

---Master station---
Set to "0".

---Local/standby master station---
Set to either of "1" to "4".

---Setting range---
0 to 4

【#24006+40(n-1)(PR)】   SLn extended cyc   Extended cyclic setting

Set the magnification for the extended cyclic operation of the local station whose type corresponds to Ver.2.
"n" represents the expansion slot No.(n=1 to 3)
Set "1" for the local station whose type corresponds to Ver.1.
This function is out of specifications when the protocol version is Ver.1. The setting for the local station is fixed to "1".

---Master station---
Set to "0".

---Local/standby master station---
Set to either of "1", "2", "4" or "8".

---Setting range---
0,1,2,4,8 (fold)

【#24007+40(n-1)】   SLn conn modules   Number of connected modules

Set the total number of remote stations, local stations, intelligent device stations, standby master station and reserved stations connected to the master station.
"n" represents the expansion slot No.(n=1 to 3)

---Master station---
Set to either of "1" to "64".

---Local/standby master station---
Set to "0".

---Setting range---
0 to 64 (modules)

【#24008+40(n-1)】　**SLn num of retries　Number of retries**

Set the number of retries for when a communication error occurs.
"n" represents the expansion slot No.(n=1 to 3)

---Master station---
Set to either of "1" or "7".

---Local/standby master station---
Set to "0".

---Setting range---
0 to 7 (times)

【#24009+40(n-1)】　**SLn auto ret mdls　Number of automatic return modules**

Set the total number of remote stations, local stations, intelligent device stations and standby master station that can be returned to system operation by a single link scan.
"n" represents the expansion slot No.(n=1 to 3)

(Note) Refer to "CC-Link System Master/Local Module User's Manual (SH(NA)-080394E-E)" for the details of the functions.

---Master station---
Set to either of "1" or "10".

---Local/standby master station---
Set to "0".

---Setting range---
0 to 10 (modules)

【#24010+40(n-1)(PR)】　**SLn STBY master st　Standby master station**

Set the station No. of the standby master station.
"n" represents the expansion slot No.(n=1 to 3)
Set "0" when no standby master station is provided.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set "0" (fixed) for the local station.
Set "1" (fixed) for the standby station.

---Setting range---
0 to 64

【#24011+40(n-1)】　**SLn ope at NC down　Operation at NC down**

Set the data link status for when the master station failure occurs.
"n" represents the expansion slot No.(n=1 to 3)
0: Fixed to stop

(Note) Refer to "CC-Link System Master/Local Module User's Manual (SH(NA)-080394E-E)" for the details of the functions.

---Master station---
Set to "0" (fixed).

---Local/standby master station---
Set to "0".

【#24012+40(n-1)】　**SLn scan mode　Scan mode**

Select whether to synchronize the link scan with one ladder scan.
"n" represents the expansion slot No.(n=1 to 3)
0: Fixed to synchronize

---Master station---
Set to "0" (fixed).

---Local/standby master station---
Set to "0".

【#24013+40(n-1)】　**SLn delay time　Delay time**

Set the delay time.
"n" represents the expansion slot No.(n=1 to 3)
0: (Fixed value)

---Master station---
Set to "0" (fixed).

---Local/standby master station---
Set to "0".

【#24014+40(n-1)】　**SLn RX dev name　Remote input (RX) refresh device name**

Set the refresh device name of the remote input (RX) to be automatically refreshed.
(Example) X
"n" represents the expansion slot No.(n=1 to 3)
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
0,X,M,L,B,D,W,R

【**#24015+40(n-1)**】 **SLn RX dev No.   Remote input (RX) refresh device No.**

Set the refresh device No. of the remote input (RX) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)

(Note 1) When setting parameters in ALL.PRM with using the parameter input/output function, input the
device No. of decimal digit.
(Example) When setting "X400" for the remote input (RX) refresh device No., input as follows;
    #24014+40(n-1): "X"
    #24015+40(n-1): "1024"
(Note 2) When the refresh device name has been set, the refresh device No. will be "0".
Confirm the refresh device No. after changing the refresh device name.

When specifying a bit device, set the address in increments of 16 points.
The operation will not be guaranteed unless the address is set in increments of 16 points.
(Example) 1000

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
 X: 0 to 5FF
 M: 0 to 10239
 L: 0 to 511
 B: 0 to 1FFF
 D: 0 to 2047
 W: 0 to 1FFF
 R: 8300 to 9799, 9800 to 9899

【**#24016+40(n-1)(PR)**】 **SLn RY dev name   Remote output (RY) refresh device name**

Set the refresh device name of the remote output (RY) to be automatically refreshed.
(Example) Y
"n" represents the expansion slot No.(n=1 to 3)
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
 0,Y,M,L,B,D,W,R

【#24017+40(n-1)】　　SLn RY dev No.　　Remote output (RY) refresh device No.

Set the refresh device No. of the remote output (RY) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)

(Note 1) When setting parameters in ALL.PRM with using the parameter input/output function, input the
device No. of decimal digit.
(Example) When setting "X400" for the remote input (RX) refresh device No., input as follows;
　　#24014+40(n-1): "X"
　　#24015+40(n-1): "1024"
(Note 2) When the refresh device name has been set, the refresh device No. will be "0".
Confirm the refresh device No. after changing the refresh device name.

When specifying a bit device, set the address in increments of 16 points.
The operation will not be guaranteed unless the address is set in increments of 16 points.
(Example) 1000

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
Y: 0 to 5FF
M: 0 to 10239
L: 0 to 511
B: 0 to 1FFF
D: 0 to 2047
W: 0 to 1FFF
R: 8300 to 9799, 9800 to 9899

【#24018+40(n-1)】　　SLn RWr dev name　　Remote register (RWr) refresh device name

Set the refresh device name of the remote register (RWr) to be automatically refreshed.
(Example) W
"n" represents the expansion slot No.(n=1 to 3)
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
0,M,L,B,D,W,R

【#24019+40(n-1)】   SLn RWr dev No.   Remote register (RWr) refresh device No.

Set the refresh device No. of the remote register (RWr) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)

(Note 1) When setting parameters in ALL.PRM with using the parameter input/output function, input the
device No. of decimal digit.
(Example) When setting "X400" for the remote input (RX) refresh device No., input as follows;
    #24014+40(n-1): "X"
    #24015+40(n-1): "1024"
(Note 2) When the refresh device name has been set, the refresh device No. will be "0".
Confirm the refresh device No. after changing the refresh device name.

When specifying a bit device, set the address in increments of 16 points.
The operation will not be guaranteed unless the address is set in increments of 16 points.
(Example) 1FF0

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
M: 0 to 10239
L: 0 to 511
B: 0 to 1FFF
D: 0 to 2047
W: 0 to 1FFF
R: 8300 to 9799, 9800 to 9899

【#24020+40(n-1)】   SLn RWw dev name   Remote register (RWw) refresh device name

Set the refresh device name of the remote register (RWw) to be automatically refreshed.
(Example) W
"n" represents the expansion slot No.(n=1 to 3)
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
0,M,L,B,D,W,R

【#24021+40(n-1)】   **SLn RWw dev No.   Remote register (RWw) refresh device No.**

Set the refresh device No. of the remote register (RWw) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)

(Note 1) When setting parameters in ALL.PRM with using the parameter input/output function, input the
device No. of decimal digit.
(Example) When setting "X400" for the remote input (RX) refresh device No., input as follows;
    #24014+40(n-1): "X"
    #24015+40(n-1): "1024"
(Note 2) When the refresh device name has been set, the refresh device No. will be "0".
Confirm the refresh device No. after changing the refresh device name.

When specifying a bit device, set the address in increments of 16 points.
The operation will not be guaranteed unless the address is set in increments of 16 points.
(Example) 1FF0

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
M: 0 to 10239
L: 0 to 511
B: 0 to 1FFF
D: 0 to 2047
W: 0 to 1FFF
R: 8300 to 9799, 9800 to 9899

【#24022+40(n-1)】   **SLn SB dev name   Special relay (SB) refresh device name**

Set the refresh device name of the special relay (SB) to be automatically refreshed.
(Example) SB
"n" represents the expansion slot No.(n=1 to 3)
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
0,M,L,B,D,W,R,SB

【#24023+40(n-1)】　**SLn SB dev No.　Special relay (SB) refresh device No.**

Set the refresh device No. of the special relay (SB) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)

(Note 1) When setting parameters in ALL.PRM with using the parameter input/output function, input the
device No. of decimal digit.
(Example) When setting "X400" for the remote input (RX) refresh device No., input as follows;
　　#24014+40(n-1): "X"
　　#24015+40(n-1): "1024"
(Note 2) When the refresh device name has been set, the refresh device No. will be "0".
Confirm the refresh device No. after changing the refresh device name.

When specifying a bit device, set the address in increments of 16 points.
The operation will not be guaranteed unless the address is set in increments of 16 points.
(Example) 1F0

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
M: 0 to 10239
L: 0 to 511
B: 0 to 1FFF
D: 0 to 2047
W: 0 to 1FFF
SB: 0 to 1FF
R: 8300 to 9799, 9800 to 9899

【#24024+40(n-1)】　**SLn SW dev name　Special relay (SW) refresh device name**

Set the refresh device name of the special relay (SW) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)
(Example) SW
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
0,M,L,B,D,W,R,SW

【**#24025+40(n-1)**】　　**SLn SW dev No.　Special relay (SW) refresh device No.**

Set the refresh device No. of the special relay (SW) to be automatically refreshed.
"n" represents the expansion slot No.(n=1 to 3)

(Note 1) When setting parameters in ALL.PRM with using the parameter input/output function, input the
device No. of decimal digit.
(Example) When setting "X400" for the remote input (RX) refresh device No., input as follows;
　　#24014+40(n-1): "X"
　　#24015+40(n-1): "1024"
(Note 2) When the refresh device name has been set, the refresh device No. will be "0".
Confirm the refresh device No. after changing the refresh device name.

When specifying a bit device, set the address in increments of 16 points.
(Example) 1F0

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set a value within the setting range.

---Setting range---
M: 0 to 10239
L: 0 to 511
B: 0 to 1FFF
D: 0 to 2047
W: 0 to 1FFF
SW: 0 to 1FF
R: 8300 to 9799, 9800 to 9899

【**#24026+40(n-1)(PR)**】　　**SLn Protocol Ver　Protocol version**

Select the CC-Link version mode that has been set to the slide switch SW1-2 on the CC-Link unit
(HN566/HN567).
"n" represents the expansion slot No.(n=1 to 3)
　0: Ver.2
　1: Ver.1
Ver.2 mode has been set to SW1-2 as default.

---Master station---
Set to "0" or "1".

---Local/standby master station---
Set to "0" or "1".

15.2 CC-Link Parameter 2

Use these parameters when NC is master station.
The ordinal number of the unit, assigned in ascending order of station No., is entered in "m" (m=1 to 64).
Parameters for each station are set in series in the order of units regardless of each station No.

(Example) When the 1st slave station occupies 4 stations, set the station No.5 to the parameters #24136 to
#24139 for the 2nd.

Turn the NC power OFF after setting parameters indicated with a (PR) in the table. The setting will be
validated after the power is turned ON again.

【#24121+15(m-1)】　CNm station type　Station type

Set the type of the connected remote station, local station, intelligent device station and standby
master station.
  0: No setting
  1: Ver.1 remote I/O station
  2: Ver.1 remote device station
  3: Ver.1 intelligent device station
  4: Ver.2 remote device station
  5: Ver.2 intelligent device station

"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)

---Master station---
Set to either of "0" to "5".

---Local/standby master station---
Set to "0".

【#24122+15(m-1)】　CNm extended cyc　Extended cyclic setting

Select the magnification for the extended cycling operation of the connected remote, local and
intelligent stations.
Set "1" when the protocol version is Ver.1.
Set "0" when no setting is required.
"m" means the m-th connected station in ascending order of station No. (m=1 to 64)

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set to "0".

---Setting range---
0,1,2,4,8 (times)

【#24123+15(m-1)】　CNm occ stations　Number of occupied stations

Set the number of the occupied stations by the connected remote, local and intelligent stations.
Set 1 for 8 points I/O and 16 points I/O.
Set "0" when no setting is required.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set to "0".

---Setting range---
0 to 4 (stations occupied)

【#24124+15(m-1)】 **CNm station No. Station No.**

Set the station No. of the connected remote, local and intelligent stations.
Set "0" when no setting is required.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set to "0".

---Setting range---
0 to 64

【#24125+15(m-1)】 **CNm remote sta pt Remote station points**

Select the number of points of the connected remote station.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)
The details of setting values differ with each protocol version and station type.

Protocol: Ver.2 (station type: Ver.1, remote I/O station)
  0: 0 point (reserved station)
  1: 8 points
  2: 8 points + 8 points reserved
  3: 16 points
  4: 32 points
•Setting 0 is valid only for the reserved station. When 0 is set for the other stations, the number of points will be 32.
• Set the value so that the total number of points of remote I/O stations connected in series will be multiple of 16.
(Example 1) 2 units of 8 points I/O: Set "1" for each
(Example 2) 3 units of 8 points I/O: Set "1" for the first and the second I/O, "2" for the third.

Protocol: Ver.2 (station type: Ver.1 except remote I/O station)
0: 0 point (reserved station)
1 to 4: Automatically calculated
• 0 point is valid only for the reserved station. When 0 is set for the other stations, the number of points will be automatically calculated.
• Unless 0 is set, the number of points will be automatically calculated with the number of occupied stations and the setting value of the extended cycling.

Protocol: Ver.1 (for all station types)
0 to 4: Automatically calculated
• 0 cannot be set even for the reserved station.
• Automatically calculated with the setting value of the number of occupied stations.

---Master station---
Set a value corresponding to the protocol version and the station type.

---Local/standby master station---
Set to "0".

【#24126+15(m-1)】 **CNm set rsvd sta Reserved station**

Set the reserved/error invalid station.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)
  0: No setting
  1: Reserved station
  2: Error invalid station

(Note) Refer to "CC-Link System Master/Local Module User's Manual (SH(NA)-080394E-E)" for the details of the functions.

---Master station---
Set either of "0" to "2".

---Local/standby master station---
Set to "0".

【#24131+15(m-1)】　**CNm send size　Send buffer size**

Set the allocation of the buffer memory size to the local station, standby master station and intelligent device station when in transient transmission.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)
Set "0" when no setting is required.

(Note) The total size of the send/receive buffers must be 4096 (words) or less.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set to "0".

---Setting range---
0, 64 to 4096 (words)

【#24132+15(m-1)】　**CNm receive size　Receive buffer size**

Set the allocation of the buffer memory size to the local station, standby master station and intelligent device station when in transient transmission.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)
Set "0" when no setting is required.

(Note) The total size of the send/receive buffers must be 4096 (words) or less.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set to "0".

---Setting range---
0, 64 to 4096 (words)

【#24133+15(m-1)】　**CNm auto bfr size　Automatic update buffer size**

Set the allocation of the buffer memory size to the local station, standby master station and intelligent device station when in transient transmission.
"m" means the m-th connected station in ascending order of station No. (m= 1 to 64)
Set "0" when no setting is required.

---Master station---
Set a value within the setting range.

---Local/standby master station---
Set to "0".

---Setting range---
0, 128 to 4096 (words)

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16. Anshin-net Parameter 2 / MTB-net Parameter 2

Although Anshin-net parameter 2 and MTB-net parameter 2 are set on the different screens, they share some items.
"Anshin-net parameter 2" and "MTB-net parameter 2" column shows whether the item is displayed on their screens.

Turn the NC power OFF after setting parameters indicated with a (PR) in the table. The setting will be validated after the power is turned ON again.

【#10901(PR)】　**Modem tel num**

Set the PHS modem's registered No. (telephone No.).
This is used for the authentication by the host.
A hyphen "-" can be used as a delimiting character.
This parameter is used as both Anshin-net parameter 2 and MTB-net parameter 2.

---Setting range---
Within 28 characters

【#10902(PR)】　**Num dispatch call**

Set a call No. to Call Center.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10903(PR)】　**Num arrival call 1**

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10904(PR)】　**Num arrival call 2**

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10905(PR)】　**Num arrival call 3**

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10906(PR)】   Num arrival call 4

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10907(PR)】   Num arrival call 5

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10908(PR)】   Num dispatch call

Set a call No. to a machine tool builder.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10909(PR)】   Num arrival call 1

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10910(PR)】   Num arrival call 2

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10911(PR)】   Num arrival call 3

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10912(PR)】　　**Num arrival call 4**

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10913(PR)】　　**Num arrival call 5**

Set the caller's No.: the other party's telephone No. that is used for INIT authentication.
Enter from the area code for domestic calls.
Enter from the communication company No. for international calls.
This is used to distinguish between received calls from Call Center and those from machine tool builder.
A hyphen "-" can be used as a delimiting character.

---Setting range---
Within 28 characters

【#10914】　　**Auto select anet**

Set whether to change to the Anshin-net screen when a call is automatically dispatched from the NC.
(Currently not used.)
　0: Not change
　1: Change

【#10915】　　**Num retry**

Set the number of times to retry when a control command transmission error occurs.
Standard setting: 3

---Setting range---
0 to 255

【#10916】　　**Command time out**

Set the timeout time for reception command standby.
Standard setting: 30 (s)

---Setting range---
0 to 65535 (s)

【#10917】　　**Frequ of redial**

Set the number of times to redial.
Standard setting: 3
This parameter is used as both Anshin-net parameter 2 and MTB-net parameter 2.

---Setting range---
0 to 255

【#10918】　　**Interval of redial**

Set the redial interval.
Standard setting: 100 (s)
This parameter is used as both Anshin-net parameter 2 and MTB-net parameter 2.

---Setting range---
0 to 65535 (s)

【#10919(PR)】　　**Modem connect port**

Select the modem connection port.
　1: Port 1
　2: Port 2
This parameter is used as both Anshin-net parameter 2 and MTB-net parameter 2.

16. Anshin-net Parameter 2 / MTB-net Parameter 2

【#10920】 Dial mode select

Select the dialing method.
  0: Fixed by modem (default)
  1: Dial with tone (push) method
  2: Dial with pulse (dial) method
This parameter is used as both Anshin-net parameter 2 and MTB-net parameter 2.

【#10921】 Call wait time

Set the call back waiting time.
Default value: 0
This parameter is used as both Anshin-net parameter 2 and MTB-net parameter 2.

---Setting range---
0 to 90 (s)

【#10922】 Machine Num

Set the machine's serial number as information for the machine tool builder to recognize the machine.
This parameter is supposed to be input by the machine tool builder (when shipping or when starting the machine tool builder network).
If this is set to blank, the system cannot connect with remote diagnosis tool kit.

---Setting range---
Within 15 characters (one-byte alphanumeric characters)

【#10951(PR)】 Condition kind 1

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note 1) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" when setting "0" for "Condition num".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 5 characters

16. Anshin-net Parameter 2 / MTB-net Parameter 2

【#10952(PR)】 Condition num 1

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10953(PR)】 Condition kind 2

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10954(PR)】 Condition num 2

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10955(PR)】　Condition kind 3

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10956(PR)】　Condition num 3

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 4 characters

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【**#10957(PR)**】 **Condition kind 4**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 5 characters

【**#10958(PR)**】 **Condition num 4**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10959(PR)】   Condition kind 5

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10960(PR)】   Condition num 5

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10961(PR)】　Condition kind 6

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10962(PR)】　Condition num 6

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10963(PR)】 **Condition kind 7**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10964(PR)】 **Condition num 7**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10965(PR)】   Condition kind 8

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10966(PR)】   Condition num 8

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 4 characters

【**#10967(PR)**】　**Condition kind 9**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note 1) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" when setting "0" for "Condition num".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 5 characters

【**#10968(PR)**】　**Condition num 9**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and "Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for the automatic notification of alarms.

---Setting range---
Within 4 characters

【#10969(PR)】 **Condition kind 10**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm type for alarm, device (register) name for PLC signal.

<Alarm>
Operation alarm (Mxx)
Stop code (Txx)
Servo alarm (Sxx)
Spindle servo alarm (Sxx)
System alarm (Zxx)
Absolute position detection alarm (Zxx)
Emergency stop (EMG)
Auxiliary axis servo alarm (Sxx)
Auxiliary axis absolute position detection alarm (Zxx)
Auxiliary axis OP error (Mxx)
Auxiliary axis MCP alarm (Yxx)
Computer link error (Lxx)
Operation error (Exx)
User PLC alarm (PLxx)

<Device (resister)>
1-bit data ... X,Y,U,W
16-bit data ... R

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 5 characters

【#10970(PR)】 **Condition num 10**

Set the condition (alarm or PLC signal) for the automatic notification of alarms.
Set the alarm No. for alarm, status value for PLC signal.

(Note) Set "0" to cancel (set blank for) any setting of #10951 to #10970, "Condition kind" 1 to 10 and
"Condition num" 1 to 10.
Input "00" to set "Condition num" to "0".
When either of "Condition kind" or "Condition num" is canceled, the condition will not be available for
the automatic notification of alarms.

---Setting range---
Within 4 characters

17. PLC Axis Indexing Parameters

After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

【#12800(PR)】　**chgauxno　Auxiliary axis number**

Set the axis No. to be controlled as auxiliary axis using auxiliary axis interface.

---Setting range---
0 to 16

【#12801(PR)】　**aux_station　Number of indexing stations**

Set the number of stations.
For linear axis, this value is expressed by: number of divisions = number of stations -1.

---Setting range---
2 to 360

【#12802(PR)】　**aux_Cont1　Control parameter 1**

The bits that are not explained here must be set to "0".

Bit3:
0: Automatic reach signal isn't interlocked with the start signal.
1: Automatic reach signal is interlocked with the start signal.

Bit4:
0: Automatic reach signal is turned ON again.
1: Automatic reach signal isn't turned ON again.

Bit5:
0: Station No. Output within fixed position.
1: Station No. Constantly output.

bit9:
0: Rotation direction determined by operation control signal (DIR)
1: Rotation direction in the shortcut direction

bitE:
0: Rotation direction in operation control signal (DIR) or in the shortcut direction
1: Rotation direction in the arbitrary position command sign direction

bitF:
0: Stopper direction is in the positioning direction.
1: Stopper direction is in the sign direction of the stopper amount.

【#12803(PR)】　**aux_Cont2　Control parameter 2**

The bits that are not explained here must be set to "0".

bit4:
0: Uniform index
1: Non-uniform index

【#12804(PR)】　**aux_tleng　Linear axis stroke length**

Set the movement stroke length for linear axes.
This parameter is meaningless at the non-uniform index or random position command.

---Setting range---
0.001 to 99999.999 (mm)

【#12805】　**aux_ST.offset　Station offset**

Set the distance (offset) from the reference position to station 1.

---Setting range---
-99999.999 to 99999.999 (° or mm)

17. PLC Axis Indexing Parameters

【#12810+10(n-1)】 aux_Aspeedn　Operation parameter group n Automatic operation speed

Set the feedrate during automatic operation when "operation parameter group n" is selected.
"#12810 aux_Aspeed1" is regarded as the clamp value for the automatic operation speeds and manual operation speeds of all operation groups.
A speed exceeding "aux_Aspeed1" cannot be commanded, even if it is set in a parameter.

---Setting range---
1 to 100000 (°/min or mm/min)

【#12811+10(n-1)】 aux_Mspeedn　Operation parameter group n Manual operation speed

Set the feedrate during manual operation or JOG operation when "operation parameter group n" is selected.

---Setting range---
1 to 100000 (/min or mm/min)

【#12812+10(n-1)】 aux_timen.1 Operation parameter group n Acceleration/deceleration time constant 1

Set the linear acceleration/deceleration time for "Operation parameter group 1 automatic operation speed" (clamp speed) when "operation parameter group n" is selected.
When this is set with "Acceleration/deceleration time constant 2", S-pattern acceleration/deceleration will be carried out. In this case, this parameter determines the acceleration/deceleration time of the linear part.
When operating at a speed less than the clamp speed, if "#1361 aux_acc" is set to "0",　the axis will accelerate/decelerate with the time constant set in this parameter. If "#1361 aux_acc" is set to "1", the axis will accelerate/decelerate at the constant inclination determined by this parameter and "aux_Aspeed1".

---Setting range---
1 to 4000 (ms)

【#12813+10(n-1)】 aux_timen.2　Operation parameter group n Acceleration/deceleration time constant 2

Set the total time of the non-linear parts in the S-pattern acceleration/deceleration. When "1" is set, linear acceleration/deceleration will be carried out.
In the handle feed operation mode, this setting value is regarded as time constant for the linear acceleration/deceleration.

---Setting range---
1 to 4000 (ms)

【#12814+10(n-1)】 aux_TLn　Operation parameter group n Torque limit value

Set the motor output torque limit value when "operation parameter group n" is selected.
At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required.
In the stopper positioning operation mode, this will be regarded as torque limit value when positioning to the stopper starting coordinates.

---Setting range---
1 to 500(%)

【#12815+10(n-1)】 aux_ODn　Operation parameter group n Excessive error detection width

Set the excessive error detection width when "operation parameter group n" is selected.
The excessive error alarm (S03 0052) will be detected when the position droop becomes larger than this setting value.
In the stopper positioning operation mode, this will be regarded as excessive error detection width when positioning to the stopper starting coordinates. .

---Setting range---
0 to 32767(　or mm)

17. PLC Axis Indexing Parameters

【#12816+10(n-1)】　aux_justn　Operation parameter group n Set position output width

Set the tolerable value at which "set position reached" (JST) or "automatic set position reached" (JSTA) signal is output when "operation parameter group n" is selected.

"Set position reached" (JST) indicates that the machine position is at any station.

During automatic operation, "automatic set position reached" (JSTA) is also output under the same condition.

These signals will turn OFF when the machine position moves away from the station over this value.

---Setting range---
0.000 to 99999.999(　or mm)

【#12817+10(n-1)】　aux_nearn　Operation parameter group n Near set position output width

Set the tolerable value at which "near set position" (NEAR) signal is output when "operation parameter group n" is selected.

"Near set position" (NEAR) indicates that the machine position is near any station position.

This value is generally set wider than the set position output width.

During operations, this is related to the special commands when the station selection is set to "0".

---Setting range---
0.000 to 99999.999(° or mm)

【#12818+10(n-1)(PR)】　aux_smgstn　Operation parameter group n Acceleration/Deceleration type

Select the acceleration/deceleration type when "operation parameter group n" is selected.

1: Linear acceleration/deceleration

F: S-pattern acceleration/deceleration

【#12850】　aux_stpos2　Station 2 coordinate

Set the station 2 coordinate value when non-uniform assignment is selected.

The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12851】　aux_stpos3　Station 3 coordinate

Set the station 3 coordinate value when non-uniform assignment is selected.

The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12852】　aux_stpos4　Station 4 coordinate

Set the station 4 coordinate value when non-uniform assignment is selected.

The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12853】　aux_stpos5　Station 5 coordinate

Set the station 5 coordinate value when non-uniform assignment is selected.

The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12854】　aux_stpos6　Station 6 coordinate

Set the station 6 coordinate value when non-uniform assignment is selected.

The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

17. PLC Axis Indexing Parameters

【#12855】 aux_stpos7   Station 7 coordinate

Set the station 7 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12856】 aux_stpos8   Station 8 coordinate

Set the station 8 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12857】 aux_stpos9   Station 9 coordinate

Set the coordinate of each station when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12858】 aux_stpos10   Station 10 coordinate

Set the station 10 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12859】 aux_stpos11   Station 11 coordinate

Set the station 11 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12860】 aux_stpos12   Station 12 coordinate

Set the station 12 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12861】 aux_stpos13   Station 13 coordinate

Set the station 13 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12862】 aux_stpos14   Station 14 coordinate

Set the station 14 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12863】 aux_stpos15   Station 15 coordinate

Set the station 15 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12864】 aux_stpos16 Station 16 coordinate

Set the station 16 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12865】 aux_stpos17 Station 17 coordinate

Set the station 17 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12866】 aux_stpos18 Station 18 coordinate

Set the station 18 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12867】 aux_stpos19 Station 19 coordinate

Set the station 19 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12868】 aux_stpos20 Station 20 coordinate

Set the station 20 coordinate value when non-uniform assignment is selected.
The station 1 coordinate value is fixed at "0.000" (machine coordinate zero point).

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12870】 aux_PSWcheck PSW detection method

Select the criterion for the output of position switches 1 to 15.
bit0 to E correspond to position switches 1 to 15.
    0: Judged by the machine position of the command system.
    1: Judged by the machine FB position (actual position).

(Note) The bits that are not explained here must be set to "0".

【#12871】 aux_PSW1dog1 PSW1 area setting 1

Set "PSW1 area setting" 1 and 2 to specify the area where the position switch 1 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12872】 aux_PSW1dog2 PSW1 area setting 2

Set "PSW1 area setting" 1 and 2 to specify the area where the position switch 1 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12873】 **aux_PSW2dog1   PSW2 area setting 1**

Set "PSW2 area setting" 1 and 2 to specify the area where the position switch 2 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12874】 **aux_PSW2dog2   PSW2 area setting 2**

Set "PSW2 area setting" 1 and 2 to specify the area where the position switch 2 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12875】 **aux_PSW3dog1   PSW3 area setting 1**

Set "PSW3 area setting" 1 and 2 to specify the area where the position switch 3 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12876】 **aux_PSW3dog2   PSW3 area setting 2**

Set "PSW3 area setting" 1 and 2 to specify the area where the position switch 3 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12877】 **aux_PSW4dog1   PSW4 area setting 1**

Set "PSW4 area setting" 1 and 2 to specify the area where the position switch 4 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12878】 **aux_PSW4dog2   PSW4 area setting 2**

Set "PSW4 area setting" 1 and 2 to specify the area where the position switch 4 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

17. PLC Axis Indexing Parameters

【#12879】 aux_PSW5dog1　PSW5 area setting 1

Set "PSW5 area setting" 1 and 2 to specify the area where the position switch 5 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12880】 aux_PSW5dog2　PSW5 area setting 2

Set "PSW5 area setting" 1 and 2 to specify the area where the position switch 5 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12881】 aux_PSW6dog1　PSW6 area setting 1

Set "PSW6 area setting" 1 and 2 to specify the area where the position switch 6 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12882】 aux_PSW6dog2　PSW6 area setting 2

Set "PSW6 area setting" 1 and 2 to specify the area where the position switch 6 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12883】 aux_PSW7dog1　PSW7 area setting 1

Set "PSW7 area setting" 1 and 2 to specify the area where the position switch 7 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12884】 aux_PSW7dog2　PSW7 area setting 2

Set "PSW7 area setting" 1 and 2 to specify the area where the position switch 7 will turn ON when the machine is positioned.

Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.

For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12885】 aux_PSW8dog1 PSW8 area setting 1

Set "PSW8 area setting" 1 and 2 to specify the area where the position switch 8 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12886】 aux_PSW8dog2 PSW8 area setting 2

Set "PSW8 area setting" 1 and 2 to specify the area where the position switch 8 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12887】 aux_PSW9dog1 PSW9 area setting 1

Set "PSW9 area setting" 1 and 2 to specify the area where the position switch 9 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12888】 aux_PSW9dog2 PSW9 area setting 2

Set "PSW9 area setting" 1 and 2 to specify the area where the position switch 9 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12889】 aux_PSW10dog1 PSW10 area setting 1

Set "PSW10 area setting" 1 and 2 to specify the area where the position switch 10 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12890】 aux_PSW10dog2 PSW10 area setting 2

Set "PSW10 area setting" 1 and 2 to specify the area where the position switch 10 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12891】　aux_PSW11dog1　PSW11 area setting 1

Set "PSW11 area setting" 1 and 2 to specify the area where the position switch 11 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12892】　aux_PSW11dog2　PSW11 area setting 2

Set "PSW11 area setting" 1 and 2 to specify the area where the position switch 11 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12893】　aux_PSW12dog1　PSW12 area setting 1

Set "PSW12 area setting" 1 and 2 to specify the area where the position switch 12 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12894】　aux_PSW12dog2　PSW12 area setting 2

Set "PSW12 area setting" 1 and 2 to specify the area where the position switch 12 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12895】　aux_PSW13dog1　PSW13 area setting 1

Set "PSW13 area setting" 1 and 2 to specify the area where the position switch 13 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12896】　aux_PSW13dog2　PSW13 area setting 2

Set "PSW13 area setting" 1 and 2 to specify the area where the position switch 13 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---**Setting range**---
-99999.999 to 99999.999(° or mm)

【#12897】 **aux_PSW14dog1　PSW14 area setting 1**

Set "PSW14 area setting" 1 and 2 to specify the area where the position switch 14 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12898】 **aux_PSW14dog2　PSW14 area setting 2**

Set "PSW14 area setting" 1 and 2 to specify the area where the position switch 14 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12899】 **aux_PSW15dog1　PSW15 area setting 1**

Set "PSW15 area setting" 1 and 2 to specify the area where the position switch 15 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12900】 **aux_PSW15dog2　PSW15 area setting 2**

Set "PSW15 area setting" 1 and 2 to specify the area where the position switch 15 will turn ON when the machine is positioned.
Whether the value of setting 1 is larger than setting 2 (or vice versa) does not affect the position switch operation.
For rotary axes, the output turns ON in the area excluding 0.000 degree.

---Setting range---
-99999.999 to 99999.999(° or mm)

【#12910】 **aux_push　Stopper amount**

Set the command stroke of the stopper operation in the stopper positioning.

---Setting range---
0.000 to 359.999(° or mm)

【#12911】 **aux_pusht1　Stopper standby time**

Set the standby time from the stopper starting coordinate positioning to the stopper operation start in the stopper positioning.

---Setting range---
0 to 9999(ms)

【#12912】 **aux_pusht2　Stopper torque release time**

Set the time from the completion of the stopper operation to the changeover of the stopper torque in the stopper positioning.

---Setting range---
0 to 9999(ms)

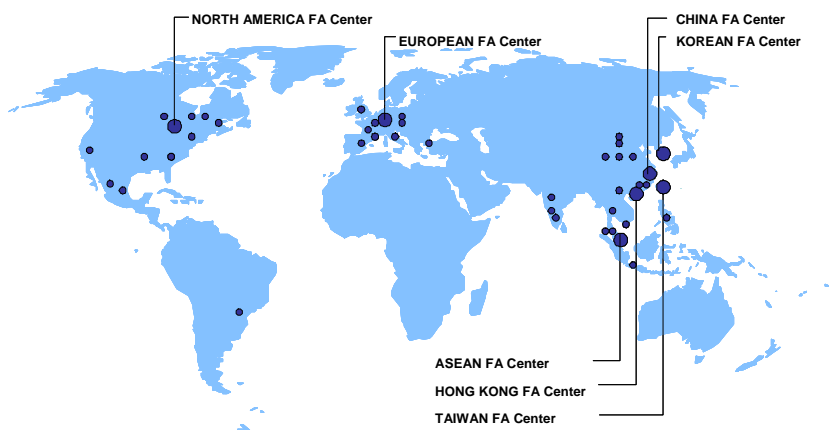【#12913】 aux_pusht3 **Set position signal output delay time**

Set the time from the completion of the stopper operation to the output of the "automatic set position reached" (JSTA), "set position reached" (JST) or "near set position" (NEAR) signal in the stopper positioning.

---Setting range---
0 to 9999(ms)

Revision History

Date of revision	Manual No.	Revision details
Sept. 2004	IB-1500124-A	First edition created.
June 2005	IB-1500124-C	• Contents were revised to correspond to Mitsubishi CNC 700 Series software version B1. • Mistakes were corrected.
Mar. 2006	IB-1500124-D	• Contents were revised to correspond to Mitsubishi CNC 700 Series software version C0. • Mistakes were corrected.
Sept. 2006	IB-1500124-E	• Contents were revised to correspond to Mitsubishi CNC 700 Series software version D0 and 70 Series software version A0. • Mistakes were corrected.
Sept. 2007	IB-1500124-F	• Contents were revised to correspond to Mitsubishi CNC 700/70 Series software version E1. • Mistakes were corrected.
Nov. 2007	IB-1500124-G	• Contents were revised to correspond to Mitsubishi CNC 700/70 Series software version E2. • Mistakes were corrected.

Global service network

NORTH AMERICA FA Center
EUROPEAN FA Center
CHINA FA Center
KOREAN FA Center
ASEAN FA Center
HONG KONG FA Center
TAIWAN FA Center

North America FA Center (MITSUBISHI ELECTRIC AUTOMATION INC.)
Illinois CNC Service Center
500 CORPORATE WOODS PARKWAY, VERNON HILLS, IL. 60061, U.S.A.
TEL: +1-847-478-2500 (Se   FAX: +1-847-478-2650 (Se
California CNC Service Center
5665 PLAZA DRIVE, CYPRESS, CA. 90630, U.S.A.
TEL: +1-714-220-4796   FAX: +1-714-229-3818
Georgia CNC Service Center
2810 PREMIERE PARKWAY 400, DULUTH, GA., 30097, U.S.A.
TEL: +1-678-258-4500   FAX: +1-678-258-4519
New Jersey CNC Service Center
200 COTTONTAIL LANE SOMERSET, NJ. 08873, U.S.A.
TEL: +1-732-560-4500   FAX: +1-732-560-4531
Michigan CNC Service Satellite
2545 38TH STREET, ALLEGAN, MI., 49010, U.S.A.
TEL: +1-847-478-2500   FAX: +1-269-673-4092
Ohio CNC Service Satellite
62 W. 500 S., ANDERSON, IN., 46013, U.S.A.
TEL: +1-847-478-2608   FAX: +1-847-478-2690
Texas CNC Service Satellite
1000, NOLEN DRIVE SUITE 200, GRAPEVINE, TX. 76051, U.S.A.
TEL: +1-817-251-7468   FAX: +1-817-416-1439
Canada CNC Service Center
4299 14TH AVENUE MARKHAM, ON. L3R OJ2, CANADA
TEL: +1-905-475-7728   FAX: +1-905-475-7935
Mexico CNC Service Center
MARIANO ESCOBEDO 69 TLALNEPANTLA, 54030 EDO. DE MEXICO
TEL: +52-55-9171-7662   FAX: +52-55-9171-7698
Monterrey CNC Service Satellite
ARGENTINA 3900, FRACC. LAS TORRES, MONTERREY, N.L., 64720, MEXICO
TEL: +52-81-8365-4171   FAX: +52-81-8365-4171
Brazil MITSUBISHI CNC Agent Service Center
 (AUTOMOTION IND. COM. IMP. E EXP. LTDA.)
ACESSO JOSE SARTORELLI, KM 2.1 18550-000 BOITUVA – SP, BRAZIL
TEL: +55-15-3363-9900   FAX: +55-15-3363-9911

European FA Center (MITSUBISHI ELECTRIC EUROPE B.V.)
Germany CNC Service Center
GOTHAER STRASSE 8, 40880 RATINGEN, GERMANY
TEL: +49-2102-486-0   FAX:+49-2102486-591
South Germany CNC Service Center
KURZE STRASSE. 40, 70794 FILDERSTADT-BONLANDEN, GERMANY
TEL: +49-711-3270-010   FAX: +49-711-3270-0141
France CNC Service Center
25, BOULEVARD DES BOUVETS, 92741 NANTERRE CEDEX FRANCE
TEL: +33-1-41-02-83-13   FAX: +33-1-49-01-07-25
Lyon CNC Service Satellite

U.K CNC Service Center
TRAVELLERS LANE, HATFIELD, HERTFORDSHIRE, AL10 8XB, U.K.
TEL: +44-1707-282-846   FAX:-44-1707-278-992
Italy CNC Service Center
VIALE COLLEONI 7   - PALAZZO SIRIO, CENTRO DIREZIONALE COLLEONI, 20041 AGRATE
BRIANZA -   (MI), ITALY
TEL: +39-039-60531-342   FAX: +39-039-6053-206
Spain CNC Service Satellite
CTRA. DE RUBI, 76-80 -APDO.420 08190 SAINT CUGAT DEL VALLES, BARCELONA SPAIN
TEL: +34-935-65-2236   FAX:
Turkey MITSUBISHI CNC Agent Service Center
 (GENEL TEKNIK SISTEMLER LTD. STI.)
DARULACEZE CAD. FAMAS IS MERKEZI A BLOCK NO.43 KAT2 80270 OKMEYDANI ISTANBUL,
TURKEY
TEL: +90-212-320-1640   FAX: +90-212-320-1649
Poland MITSUBISHI CNC Agent Service Center (MPL Technology Sp. z. o. o)
UL SLICZNA 34, 31-444 KRAKOW, POLAND
TEL: +48-12-632-28-85   FAX:
Wroclaw MITSUBISHI CNC Agent Service Satellite (MPL Technology Sp. z. o. o)
UL KOBIERZYCKA 23, 52-315 WROCLAW, POLAND
TEL: +48-71-333-77-53   FAX: +48-71-333-77-53
Czech MITSUBISHI CNC Agent Service Center
 (AUTOCONT CONTROL SYSTEM S.R.O.   )
NEMOCNICNI 12, 702 00 OSTRAVA 2 CZECH REPUBLIC
TEL: +420-596-152-426   FAX: +420-596-152-112

ASEAN FA Center (MITSUBISHI ELECTRIC ASIA PTE. LTD.)
Singapore CNC Service Center
307 ALEXANDRA ROAD #05-01/02 MITSUBISHI ELECTRIC BUILDING SINGAPORE   159943
TEL: +65-6473-2308   FAX: +65-6476-7439
Thailand MITSUBISHI CNC Agent Service Center (F. A. TECH CO., LTD)
898/19,20,21,22 S.V. CITY BUILDING OFFICE TOWER 1 FLOOR 12,14   RAMA III RD BANGPONGPANG,
YANNAWA, BANGKOK 10120. THAILAND
TEL: +66-2-682-6522   FAX: +66-2-682-6020
Malaysia MITSUBISHI CNC Agent Service Center
 (FLEXIBLE AUTOMATION SYSTEM SDN. BHD.)
60, JALAN USJ 10/1B 47620 UEP SUBANG JAYA SELANGOR DARUL EHSAN MALAYSIA
TEL: +60-3-5631-7605   FAX: +60-3-5631-7636
JOHOR MITSUBISHI CNC Agent Service Satellite
 (FLEXIBLE AUTOMATION SYSTEM SDN. BHD.)
NO. 16, JALAN SHAHBANDAR 1, TAMAN UNGKU TUN AMINAH, 81300 SKUDAI, JOHOR MALAYSIA
TEL: +60-7-557-8218   FAX: +60-7-557-3404
Indonesia MITSUBISHI CNC Agent Service Center
 (PT. AUTOTEKNINDO SUMBER MAKMUR)
WISMA NUSANTARA 14TH FLOOR JL. M.H. THAMRIN 59, JAKARTA 10350 INDONESIA
TEL: +62-21-3917-144   FAX: +62-21-3917-164
India MITSUBISHI CNC Agent Service Center (MESSUNG SALES & SERVICES PVT. LTD.)
B-36FF, PAVANA INDUSTRIAL PREMISES M.I.D.C., BHOASRI PUNE 411026, INDIA
TEL: +91-20-2711-9484   FAX: +91-20-2712-8115
BANGALORE MITSUBISHI CNC Agent Service Satellite
 (MESSUNG SALES & SERVICES PVT. LTD.)
S 615, 6TH FLOOR, MANIPAL CENTER, BANGALORE 560001, INDIA
TEL: +91-80-509-2119   FAX: +91-80-532-0480
Delhi MITSUBISHI CNC Agent Parts Center (MESSUNG SALES & SERVICES PVT. LTD.)
1197, SECTOR 15 PART-2, OFF DELHI-JAIPUR HIGHWAY BEHIND 32ND MILESTONE   GURGAON
122001, INDIA
TEL: +91-98-1024-8895   FAX:
Philippines MITSUBISHI CNC Agent Service Center
 (FLEXIBLE AUTOMATION SYSTEM CORPORATION)
UNIT No.411, ALABAMG CORPORATE CENTER KM 25. WEST SERVICE ROAD SOUTH SUPERHIGHWAY,
ALABAMG MUNTINLUPA METRO MANILA, PHILIPPINES 1771
TEL: +63-2-807-2416   FAX: +63-2-807-2417
Vietnam MITSUBISHI CNC Agent Service Center (SA GIANG TECHNO CO., LTD)
47-49 HOANG SA ST. DAKAO WARD, DIST.1 HO CHI MINH CITY, VIETNAM
TEL: +84-8-910-4763   FAX: +84-8-910-2593

China FA Center (MITSUBISHI ELECTRIC AUTOMATION (SHANGHAI) LTD.)
China CNC Service Center
2/F., BLOCK 5 BLDG.AUTOMATION INSTRUMENTATION PLAZA, 103 CAOBAO RD.   SHANGHAI 200233,
CHINA
TEL: +86-21-6120-0808   FAX:+86-21-6494-0178
Shenyang CNC Service Center
TEL: +86-24-2397-0184   FAX: +86-24-2397-0185
Beijing CNC Service Satellite
9/F, OFFICE TOWER1, HENDERSON CENTER, 18 JIANGUOMENNEI DAJIE,   DONGCHENG DISTRICT,
BEIJING 100005, CHINA
TEL: +86-10-6518-8830   FAX: +86-10-6518-8030
China MITSUBISHI CNC Agent Service Center
 (BEIJING JIAYOU HIGHTECH TECHNOLOGY DEVELOPMENT CO.)
RM 709, HIGH TECHNOLOGY BUILDING NO.229 NORTH SI HUAN ZHONG ROAD, HAIDIAN DISTRICT ,
BEIJING 100083, CHINA
TEL: +86-10-8288-3030   FAX: +86-10-6518-8030
Tianjin CNC Service Satellite
RM909, TAIHONG TOWER, NO220 SHIZILIN STREET, HEBEI DISTRICT, TIANJIN, CHINA 300143
TEL: -86-22-2653-9090   FAX: +86-22-2635-9050
Shenzhen CNC Service Satellite
RM02, UNIT A, 13/F, TIANAN NATIONAL TOWER, RENMING SOUTH ROAD, SHENZHEN, CHINA 518005
TEL: +86-755-2515-6691   FAX:+86-755-8218-4776
Changchun Service Satellite
TEL: +86-431-50214546   FAX: +86-431-5021690
Hong Kong CNC Service Center
UNIT A, 25/F RYODEN INDUSTRIAL CENTRE, 26-38 TA CHUEN PING STREET, KWAI CHUNG, NEW
TERRITORIES, HONG KONG
TEL: +852-2619-8588   FAX: +852-2784-1323

Taiwan FA Center (MITSUBISHI ELECTRIC TAIWAN CO., LTD.)
Taichung CNC Service Center
NO.8-1, GONG YEH 16TH RD., TAICHUNG INDUSTIAL PARK TAICHUNG CITY, TAIWAN R.O.C.
TEL: +886-4-2359-0688   FAX:+886-4-2359-0689
Taipei CNC Service Satellite
TEL: +886-4-2359-0688   FAX: +886-4-2359-0689
Tainan CNC Service Satellite
TEL: +886-4-2359-0688   FAX: +886-4-2359-0689

Korean FA Center (MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD.)
Korea CNC Service Center
1480-6, GAYANG-DONG, GANGSEO-GU SEOUL 157-200, KOREA
TEL: +82-2-3660-9631   FAX: +82-2-3664-8668

MITSUBISHI CNC

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : TOKYO BUILDING,2-7-3 MARUNOUCHI,CHIYODA-KU,TOKYO 100-8310,JAPAN

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