

MELSERVO

Servo Amplifiers and Motors

Instruction Manual

MR-MG30

Profibus/DP Option Unit

● Safety Instructions ●

(Always read these instructions before using the equipment.)

Do not attempt to install, operate, maintain or inspect this apparatus until you have read through this Instruction Manual, Servo amplifier Instruction Manual, Servo motor Instruction Manual and appended documents carefully and can use the equipment correctly. Do not use this apparatus you have a full knowledge of the equipment, safety information and instructions.

In this Instruction Manual, the safety instruction levels are classified into "WARNING" and "CAUTION".



Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.




Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight injury to personnel or may cause physical damage.


Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

What must not be done and what must be done are indicated by the following diagrammatic symbols:



: Indicates what must not be done. For example, "No Fire" is indicated by .



: Indicates what must be done. For example, grounding is indicated by .

In this Instruction Manual, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT".

After reading this installation guide, always keep it accessible to the operator.

1. To prevent electric shock, note the following:

 **WARNING**

- Before wiring or inspection, switch power off. Then, confirm the voltage is safe with voltage tester. If work is done with power on, you may get an electric shock.
- Connect the MR-MG30 to ground.
- Any person who is involved in wiring and inspection should be fully competent to do the work.
- Do not attempt to wire the MR-MG30 until they have been installed. Otherwise, you may get an electric shock.
- Do not work by the wet hand, you may get an electric shock.
- The cables should not be damaged, stressed, loaded, or pinched. Otherwise, you may get an electric shock.
- During power-on or during operation, do not touch the inside from the gap of the front cover. You may get an electric shock.

2. To prevent injury, note the follow

 **CAUTION**

- Only the voltage specified in the Instruction Manual should be applied to each terminal, Otherwise, a burst, damage, etc. may occur.
- Connect the terminals correctly to prevent a burst, damage, etc.
- Ensure that polarity (+, -) is correct. Otherwise, a burst, damage, etc. may occur.

3. Additional instructions

The following instructions should also be fully noted. Incorrect handling may cause a fault, injury, electric shock, etc.

(1) Transportation and installation

⚠ CAUTION

- Stacking in excess of the specified number of products is not allowed.
- Install the servo amplifier in a load-bearing place in accordance with the Instruction Manual.
- Do not climb or stand on servo equipment. Do not put heavy objects on equipment.
- The servo amplifier and servo motor must be installed in the specified direction.
- Leave specified clearances between the MR-MG30 and control enclosure walls or other equipment.
- The MR-MG30 which has been damaged or has any parts missing.
- The MR-MG30 has an opening. Provide an adequate protection to prevent screws, metal pieces and other conductive matter or oil and other combustible matter from entering the MR-MG30.
- Do not drop or strike MR-MG30. Isolate from all impact loads.
- When you keep or use it, please fulfill the following environmental conditions.

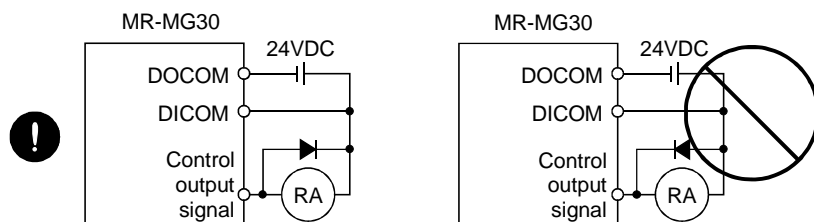
Environment		Conditions	
Ambient temperature	During operation	[°C]	0 to +55 (non-freezing)
		[°F]	32 to 131 (non-freezing)
	In storage	[°C]	-20 to +65 (non-freezing)
		[°F]	-4 to 149 (non-freezing)
Ambient humidity	In operation	90%RH or less (non-condensing)	
	In storage	90%RH or less (non-condensing)	
Ambience		Indoors (no direct sunlight) Free from corrosive gas, flammable gas, oil mist, dust and dirt	
Altitude		Max. 1000m (3280 ft) above sea level	
Vibration	[m/s ² (ft/s ²)]	5.9 (19.4) or less	

- When the equipment has been stored for an extended period of time, consult Mitsubishi.

(2) Wiring

⚠ CAUTION

- The surge absorbing diode installed on the DC output signal relay of the servo amplifier must be wired in the specified direction. Otherwise, the emergency stop (EMG) and other protective circuits may not operate. (The diagrams show the case of the sink interface.)



(3) Test run adjustment

CAUTION

- Before operation, check the parameter settings. Improper settings may cause some machines to perform unexpected operation.
- The parameter settings must not be changed excessively. Operation will be insatiable.

(4) Usage

CAUTION

- Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately.
- Any person who is involved in disassembly and repair should be fully competent to do the work.
- Do not modify the equipment.
- Use the servo amplifier with the specified MR-MG30.

(5) Corrective actions

CAUTION

- When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation.
- When power is restored after an instantaneous power failure, keep away from the machine because the machine may be restarted suddenly (design the machine so that it is secured against hazard if restarted).

(6) General instruction

- To illustrate details, the equipment in the diagrams of this Specifications and Instruction Manual may have been drawn without covers and safety guards. When the equipment is operated, the covers and safety guards must be installed as specified. Operation must be performed in accordance with this Specifications and Instruction Manual.

● About processing of waste ●

When you discard servo amplifier, a battery (primary battery), and other option articles, please follow the law of each country (area).



FOR MAXIMUM SAFETY

- This product is not designed or manufactured to be used in equipment or systems in situations that can affect or endanger human life.
- When considering this product for operation in special applications such as machinery or systems used in passenger transportation, medical, aerospace, atomic power, electric power, or submarine repeating applications, please contact your nearest Mitsubishi sales representative.
- Although this product was manufactured under conditions of strict quality control, you are strongly advised to install safety devices to forestall serious accidents when it is used in facilities where a breakdown in the product is likely to cause a serious accident.



EEP-ROM life

The number of write times to the EEP-ROM, which stores parameter settings, etc., is limited to 100,000. If the total number of the following operations exceeds 100,000, the servo amplifier and/or converter unit may fail when the EEP-ROM reaches the end of its useful life.

- Write to the EEP-ROM due to parameter setting changes
- Home position setting in the absolute position detection system

<About the Manuals>

If it is the first time for you to use the MR-MG30, the Servo Amplifier Instruction Manual and Servo Motor Instruction Manual are required in addition to this Option Unit Instruction Manual. Always purchase them and use the servo safely.

Relevant manuals

● MELSERVO-J2-Super Series

Manual name	Manual No.
MR-J2S-□B Servo Amplifier Instruction Manual	SH(NA)030007
MELSERVO Servo Motor Instruction Manual	SH(NA)3181

● MELSERVO-J2M Series

Manual name	Manual No.
SSCNET Compatible Servo Amplifier Instruction Manual	SH(NA)030012
MELSERVO Servo Motor Instruction Manual	SH(NA)3181

CONTENTS

1. FUNCTIONS AND CONFIGURATION	1- 1 to 1- 8
1.1 Outline	1- 1
1.2 System configuration	1- 1
1.3 MR-MG30 standard specifications	1- 3
1.4 Combination with servo amplifiers.....	1- 5
1.5 Parts identification	1- 5
1.6 INSTALLATION.....	1- 6
1.6.1 Installation direction and clearances	1- 6
1.6.2 Keep out foreign materials	1- 7
2. PROFIBUS COMMUNICATION FUNCTION	2- 1 to 2-24
2.1 Communication specifications	2- 1
2.2 PROFIBUS communication cable	2- 1
2.3 Setting the node address	2- 2
2.4 Details indicated with LED display.....	2- 3
2.4.1 Module status LED	2- 3
2.4.2 Network status LED	2- 3
2.5 PROFIBUS profile	2- 4
2.5.1 PROFIBUS device data	2- 4
2.5.2 Slave user parameters	2- 7
2.5.3 PROFIBUS profile	2- 8
2.6 Details of buffer memory.....	2-10
2.6.1 Details of PKW	2-10
2.6.2 Details of PZD	2-11
2.7 Parameter definitions	2-14
2.7.1 Outline of PNU.....	2-14
2.7.2 PROFIBUS PNU	2-15
2.7.3 Parameters	2-19
2.8 Initialization sequence.....	2-21
2.9 Normal control	2-23
2.9.1 Data communication timing.....	2-23
2.9.2 Read request.....	2-24
2.9.3 Write request	2-24
3. SIGNALS AND WIRING	3- 1 to 3-18
3.1 Connection Example	3- 1
3.2 I/O signals.....	3- 4
3.2.1 Connectors and Signal Layouts.....	3- 4
3.2.2 Explanation of power supply system signals.....	3- 5
3.2.3 Signal (device) explanation.....	3- 6
3.3 Detailed description of signals (devices)	3-11
3.3.1 Operation start (ST_□) ▪ Temporary stop (TSTP_□)	3-11
3.3.2 Movement finish ▪ Rough match ▪ In position	3-12

3.4 Interfaces.....	3-14
3.4.1 Sink I/O interface.....	3-14
3.4.2 Source I/O interfaces	3-15
3.5 Operation Timing.....	3-16
3.5.1 Power ON to initialization sequence.....	3-16
3.5.2 Trouble occurrence	3-16
3.5.3 Power supply shutoff.....	3-17

4. OPERATION	4- 1 to 4-26
---------------------	---------------------

4.1 Automatic operation mode (Direct specification)	4- 1
4.2 Manual operation mode (JOG operation).....	4- 4
4.3 Home position return mode	4- 6
4.3.1 Outline of home position return.....	4- 6
4.3.2 Dog type home position return.....	4- 8
4.3.3 Count type home position return.....	4-10
4.3.4 Data setting type home position return.....	4-12
4.3.5 Home position ignorance (servo-on position defined as home position)	4-13
4.3.6 Dog type rear end reference home position return	4-14
4.3.7 Count type front end reference home position return	4-16
4.3.8 Dog cradle type home position return.....	4-18
4.3.9 Home position return automatic return function	4-20
4.4 Automatic positioning function to the home position.....	4-21
4.5 Interrupt Positioning Operation Mode.....	4-22
4.6 Application Functions.....	4-24
4.6.1 Operation stop.....	4-24
4.6.2 Temporary stop	4-25
4.6.3 Speed change	4-26

5. PARAMETERS	5- 1 to 5-22
----------------------	---------------------

5.1 Common parameter	5- 1
5.1.1 Parameter list	5- 1
5.1.2 Parameter detail list.....	5- 3
5.2 Positioning parameter	5- 9
5.2.1 Parameter list	5- 9
5.2.2 Parameter detail list.....	5-11
5.2.3 Detailed explanation.....	5-17
5.3 Servo Parameter List	5-20

6. TROUBLESHOOTING	6- 1 to 6- 6
---------------------------	---------------------

6.1 Outline	6- 1
6.2 Operation at Error Occurrence	6- 1
6.3 SSCNET Communication Errors	6- 2
6.4 PROFIBUS Communication Errors	6- 2
6.5 Option Unit Alarms.....	6- 3
6.6 Operation Alarms	6- 5

7. OUTER DIMENSION DRAWING	7- 1 to 7- 2
-----------------------------------	---------------------

1. FUNCTIONS AND CONFIGURATION

1. FUNCTIONS AND CONFIGURATION

1.1 Outline

These specifications explain the PROFIBUS-DP communication option unit MR-MG30.

When the PROFIBUS-DP communication option unit MR-MG30 is combined with an SSCNETII compatible servo amplifier, the position data, command speed and acceleration/deceleration time constants can be set in real time and positioning operation can be executed via the PROFIBUS communication.

Up to six SSCNETII compatible servo amplifier axes can be controlled with one communication option unit.

1.2 System configuration

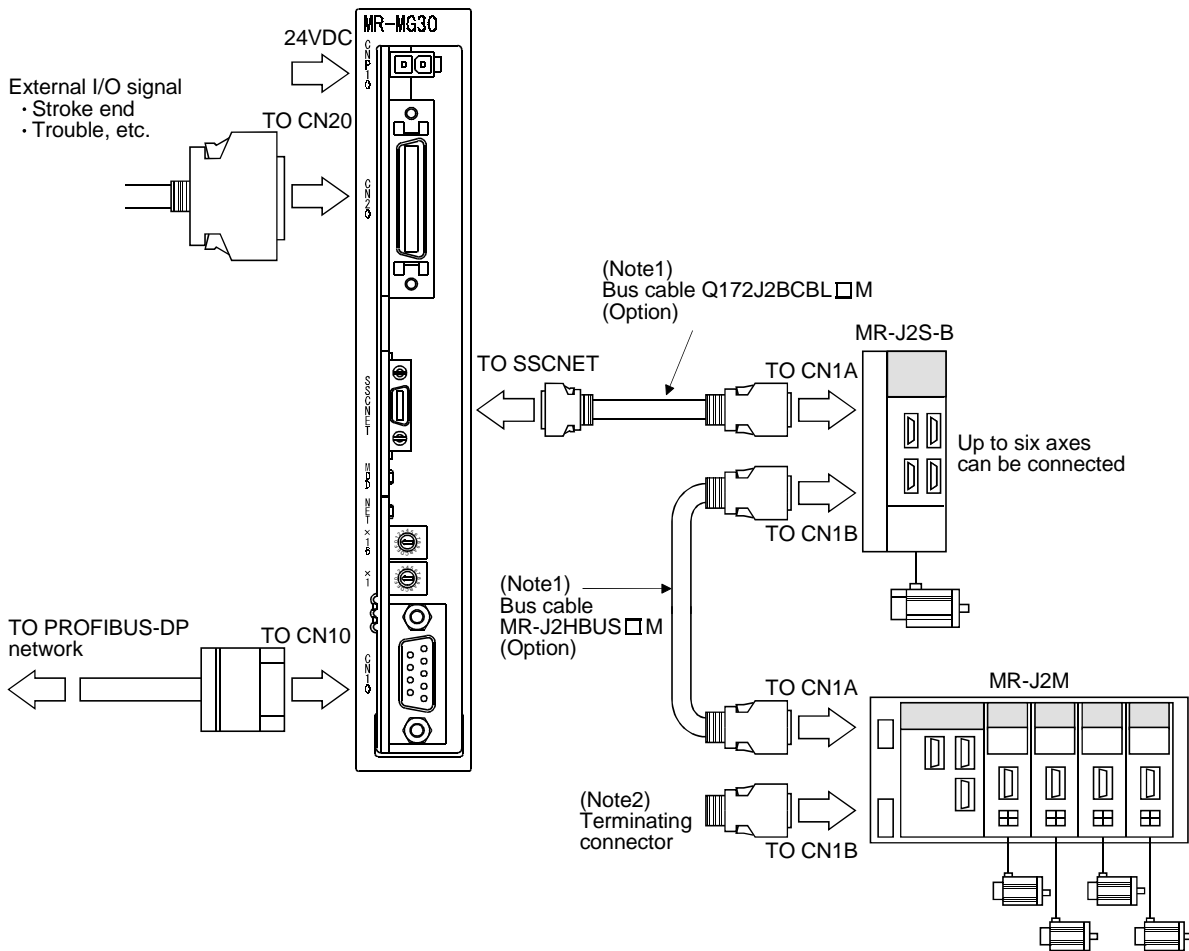
This section describes the operation to be performed using the MR-MG30.

The positioning control data for operation consists of the following data.

Name	Setting range	Unit
Position data	-999999 to 999999	× 0.001 [mm] × 0.01 [mm] × 0.1 [mm] × 1 [mm]
Servo motor speed	0 to max. speed	[r/min]
Acceleration time constant	0 to 20000	[ms]
Deceleration time constant	0 to 20000	[ms]
Auxiliary function	0 · 1 (Refer to Section 4.1)	0: Absolute position command 1: Incremental value command

1. FUNCTIONS AND CONFIGURATION

Positioning control using PROFIBUS communication is possible. In addition, the parameters can be changed, set and monitored, etc. Signals such as the stroke end and proximity dog can be input directly to the MR-MG30. One MR-MG30 can control a maximum of six axes of servo amplifiers.



Note1. □ in the model name includes a symbol that indicates the cable length.

Symbol	Cable length [m]
05	0.5
1	1
5	5

2. The last axis of the servo amplifier requires a terminating connector. The last axis indicates the most downstream servo amplifier physically connected. It does not indicate the last number among the set axis numbers.

1. FUNCTIONS AND CONFIGURATION

1.3 MR-MG30 standard specifications

(1) Option unit specification list

Item			Description	
Model			MR-MPB06	
Power supply	Voltage		24VDC	
	Permissible voltage fluctuation		24VDC±10%	
	Power supply capacity		10W	
Interfaces power supply			24VDC±10% 500mA or more	
Interfaces	command		PROFIBUS-DP V0	
	Servo amplifier		SSCNET II	
Structure			Self-cooled, open (IP00)	
Environment	Ambient temperature	During operation	[°C]	0 to +55 (non-freezing)
			[°F]	32 to +131 (non-freezing)
		In storage	[°C]	-20 to +65 (non-freezing)
			[°F]	-4 to +149 (non-freezing)
	Ambient humidity	During operation		90%RH or less (non-condensing)
		In storage		
	Ambient			Indoors (no direct sunlight) Free from corrosive gas, flammable gas, oil mist, dust and dirt
	Altitude			Max. 1000m (3280ft) above sea level
	Vibration			5.9 [m/s ²] or less
				19.4 [ft/s ²] or less
Mass [kg] ([lb])			0.5 (1.10)	

1. FUNCTIONS AND CONFIGURATION

(2) Motion specification list

Item		Description	
Operation mode	Automatic mode (direct designation)	<ul style="list-style-type: none"> ▪ Positioning using PROFIBUS communication data Position command : Set with PROFIBUS communication One-point feed length setting range: ± 1 [μm] to ± 999.999 [μm] Speed command : Set with PROFIBUS communication The acceleration/deceleration time constant is also set with PROFIBUS communication The S-pattern acceleration/deceleration time constant is set with the positioning parameter No. 52 Command method : Absolute value command (signed), incremental value command (signed) 	
	Interrupt positioning operation mode	<ul style="list-style-type: none"> ▪ Positioning using PROFIBUS communication data Position command : Set with PROFIBUS communication One-point feed length setting range: ± 1 [μm] to ± 999.999 [μm] Speed command : Set with PROFIBUS communication The acceleration/deceleration time constant is also set with PROFIBUS communication The S-pattern acceleration/deceleration time constant is set with the positioning parameter No. 52 After interrupt is input, the axis moves by the commanded position amount, and then stops. 	
	Manual operation mode	Jog	Jog operation is performed in accordance with the parameter-set speed command by contact input or through PROFIBUS communication function.
	Home position return mode	Dog type	Home position return is made starting with Z-phase pulse after passage of proximity dog. Home position address may be set. Home position shift distance may be set. Home position return direction may be selected. Automatic at-dog home position return return/automatic stroke return function
		Count type	Home position return is made by counting encoder pulses after contact with proximity dog. Home position address may be set. Home position shift value may be set. Home position return direction may be set. Automatic at-dog home position return return/automatic stroke return function
		Data setting type	Home position return is made without dog. Home position may be set at any position by manual operation, etc. Home position address may be set.
		Home position ignorance (Servo-on position as home position)	Position where servo-on (SON) is switched on is defined as home position. Home position address may be set.
		Dog type rear end reference	Home position return is made with respect to the rear end of a proximity dog. Home position address may be set. Home position shift value may be set. Home position return direction may be set. Automatic at-dog home position return return/automatic stroke return function
		Count type front end reference	Home position return is made with respect to the front end of a proximity dog. Home position address may be set. Home position shift value may be set. Home position return direction may be set. Automatic at-dog home position return return/automatic stroke return function
		Dog cradle type	Home position return is made with respect to the front end of a proximity dog by the first Z-phase pulse. Home position address may be set. Home position shift value may be set. Home position return direction may be set. Automatic at-dog home position return return/automatic stroke return function
Automatic positioning to home position		High-speed automatic return to a defined home position.	
Other functions		<ul style="list-style-type: none"> Absolute position detection, backlash function Overtravel prevention using external limit switch Software stroke limit Speed change 	

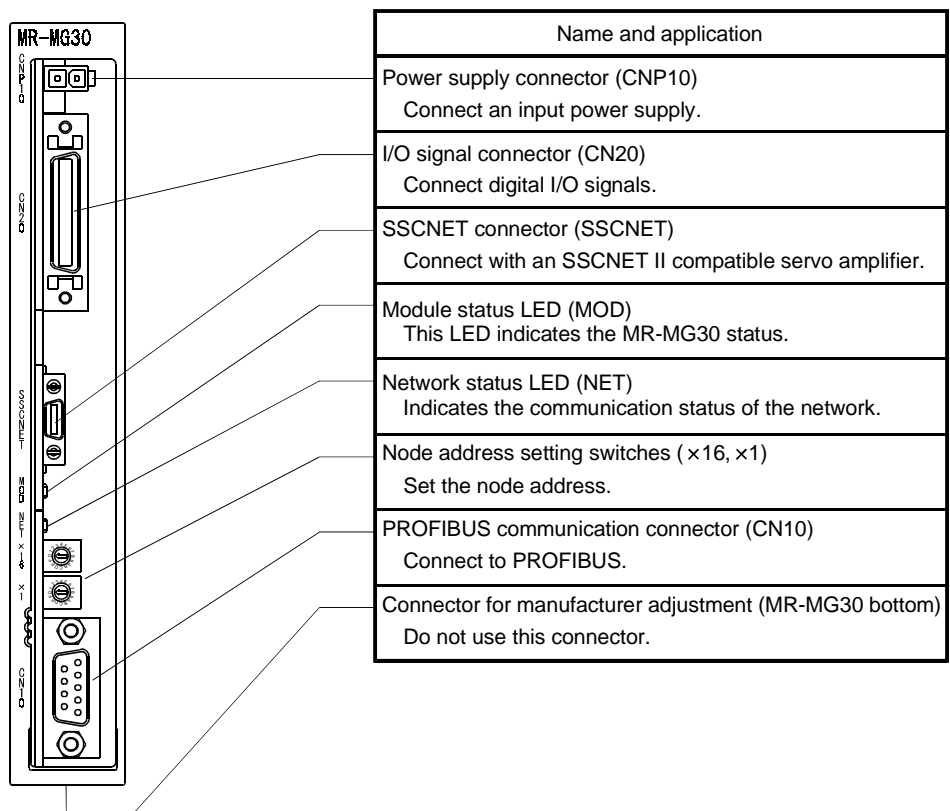
1. FUNCTIONS AND CONFIGURATION

1.4 Combination with servo amplifiers

The MR-MG30 is used in combination with the following servo amplifiers. One MR-MG30 can control a maximum of six axes of servo amplifiers.

Series name	Model name	Description
MR-J2 Super series	MR-J2S-□B MR-J2S-□B1 MR-J2S-□B4	For the servo amplifier capacities and applicable servo motor capacities, refer to the Servo Amplifier Instruction Manuals and Servo Motor Instruction Manuals.
MR-J2M series	MR-J2M-P8B MR-J2M-□DU MR-J2M-BU□	

1.5 Parts identification



1. FUNCTIONS AND CONFIGURATION

1.6 INSTALLATION

CAUTION

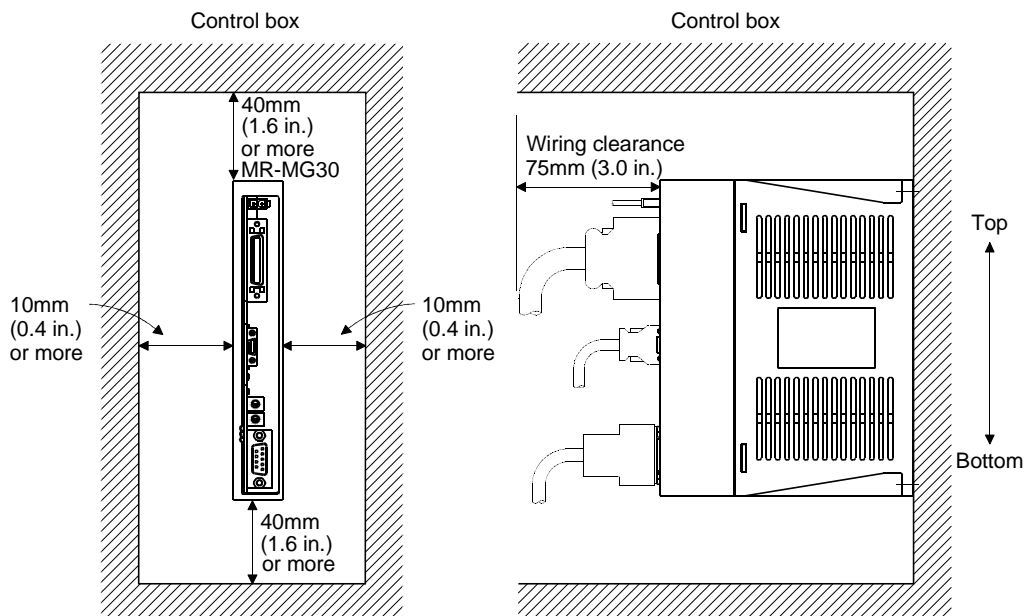
- Install the equipment in accordance with this Instruction Manual.
- Do not get on or put heavy load on the equipment to prevent injury.
- Use the equipment within the specified environmental condition range.
- The MR-MG30 has an opening. Provide an adequate protection to prevent screws, metal pieces and other conductive matter or oil and other combustible matter from entering the MR-MG30.
- Do not subject the MR-MG30 to drop impact or shock loads as they are precision equipment.
- Do not install or operate a faulty MR-MG30.
- When the product has been stored for an extended period of time, consult Mitsubishi.

1.6.1 Installation direction and clearances

CAUTION

- The equipment must be installed in the specified direction. Otherwise, a fault may occur.
- Leave specified clearances between the MR-MG30 and control box inside walls or other equipment.

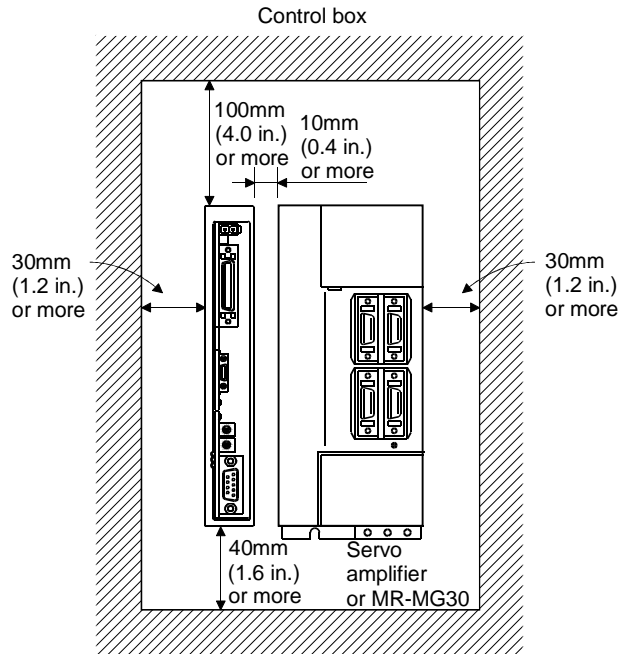
(1) Installation of one servo amplifier



1. FUNCTIONS AND CONFIGURATION

(2) Installation of two or more servo amplifiers

Leave a large clearance between the top of the MR-MG30 and the internal surface of the control box, and install a fan to prevent the internal temperature of the control box from exceeding the environmental conditions.



1.6.2 Keep out foreign materials

- (1) When installing the unit in a control box, prevent drill chips and wire fragments from entering the MR-MG30.
- (2) Prevent oil, water, metallic dust, etc. from entering the MR-MG30 through openings in the control box or a fan installed on the ceiling.
- (3) When installing the control box in a place where there are much toxic gas, dirt and dust, conduct an air purge (force clean air into the control box from outside to make the internal pressure higher than the external pressure) to prevent such materials from entering the control box.

MEMO

2. PROFIBUS COMMUNICATION FUNCTION

2. PROFIBUS COMMUNICATION FUNCTION

2.1 Communication specifications

Item		Specifications					
Communication profile		PROFIBUS-DP (slave) V0					
Transmission specifications	Electrical standard and characteristics	RS-485 compatible					
	Medium	Shielded twisted copper wire cable type A					
	Transmission encoding method	NRZ					
	Transmission speed/maximum transmission distance (Note 1)	Communication speed	9.6, 19.2, 93.75 Kbps	187.5 Kbps	500 Kbps	1.5 Mbps	3, 6, 12 Mbps
		Total extension distance	1200 m	1000 m	400 m	200 m	100 m
	Node address	0 to 125 (Note 2)					
	Number of connected nodes (number of repeaters)	32 (0), 62 (1), 92 (2), 126 (3)					

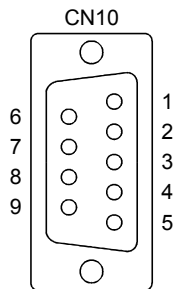
Note 1. Use type A cable.

2. Depending on the master, node addresses 0, 1, 124 and 125 may not be usable.

2.2 PROFIBUS communication cable

A 9-pin Dsub male connector and type A cable should be used for the network communication cable.

(1) Connector pin layout



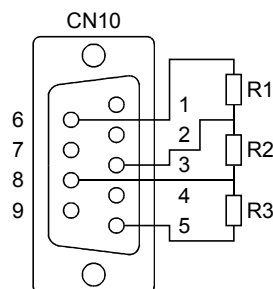
Pin No.	Signal name	Application
1	SHIELD	Shield
2	N/C	Not connected
3	RxD TxD-P	Send/receive + data
4	RTS (Note 1)	Control signal
5	DGND (Note 2)	Data ground
6	VP (Note 2)	Voltage supplied to terminator -P (P5V)
7	N/C	Not connected
8	RxD/TxD-N	Send/receive - data
9	N/C	Not connected

Note 1. This may not be required depending on the master.

2. This signal is used when there is a terminator.

(2) Terminator

The following type of terminating treatment is required for nodes at both ends of the network.



R1 = 390Ω±2% 1/4W
R2 = 220Ω±2% 1/4W
R3 = 390Ω±2% 1/4W

2. PROFIBUS COMMUNICATION FUNCTION

2.3 Setting the node address

POINT	<ul style="list-style-type: none"> Set the node address before powering on the MR-MG30. While power is on, any changes made to the node address are invalid.
-------	---

Set the node address with the rotary switches ($\times 16$, $\times 1$) on the front of the option unit MR-MG30. The station number can be set as a decimal in the range of 0 to 125. The station No. is set to 0 as the default.

(1) Precautions for setting

- (a) Do not set the node address between 126 and 255.
- (b) Depending on the master, node addresses 0, 1, 124 and 125 may not be usable.
- (c) A node address duplicated with another device on the network cannot be set.
(Correct communication will not be possible if the node addresses are duplicated.)

(2) Setting method

POINT	<ul style="list-style-type: none"> Set each node address setting switch in the switch number position without fail. If it is set between the number positions, normal data communication cannot be made.
	<p>Good example Bad example</p>

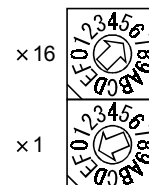
$\times 16$ setting value \rightarrow (Node address/16) quotient

$\times 1$ setting value \rightarrow (Node address/16) remainder

Example) For node address 111

$\rightarrow 111/16 = 6 \dots 15$

$\rightarrow \times 16$ setting value = 6H, $\times 1$ setting value = FH



2. PROFIBUS COMMUNICATION FUNCTION

2.4 Details indicated with LED display

2.4.1 Module status LED

LED status	Details
OFF	Power is not supplied to the option unit
Green solid	Option unit is running normally
Red flicker	An alarm or warning is occurring due to an error in one of the connected servo amplifiers
Red solid	An option unit alarm or warning is occurring

2.4.2 Network status LED

LED status	Details
OFF	Communication stopped or in first phase of initialisation
Green flicker (0.5 sec. cycle)	In second phase or third phase of initialization
Green solid	Exchanging data during normal control

2. PROFIBUS COMMUNICATION FUNCTION

2.5 PROFIBUS profile

2.5.1 PROFIBUS device data

This is a GSD file for recognizing the features and function of the MR-MG30 PROFIBUS-DP device. The GSD file is available from Mitsubishi. Contact your Mitsubishi sales office for more information. (This file can also be created by the user.)

Use a Text Editor to edit this file. Refer to the PROFIBUS-DP Configuration Software instruction Manual for details on installing the file.

<MG3008D2. GSD>

Parameter	Value	(Note 1) Details
#Profibus_DP		File header
GSD_Revision	1	GSD file ID version
Vendor_Name	"Mitsubishi Electric"	Maker name (Note 2)
Model_Name	"MR-MG30"	Product name
Revision	"Revision 1.00"	Product version
Ident_Number	08D2H	Device number obtained from Profibus Nutzer Organization
Protocol_Ident	0	Fixed to 0 for PROFIBUS-DP
Station_Type	0	Fixed to 0 for DP slave
FMS_Supp	0	FMS (field bus message specifications) are not supported
Hardware_Release	"Series A"	Hardware version
Software_Release	"Revision 1.00"	Software version
9.6_supp	1	Communication speed 9600bps supported
19.2_supp	1	Communication speed 19.2Kbps supported
93.75_supp	1	Communication speed 93.75Kbps supported
187.5_supp	1	Communication speed 187.5Kbps supported
500_supp	1	Communication speed 500Kbps supported
1.5M_supp	1	Communication speed 1.5Mbps supported
3.0M_supp	1	Communication speed 3.0Mbps supported
6.0M_supp	1	Communication speed 6.0Mbps supported
12.0M_supp	1	Communication speed 12.0Mbps supported
MaxTsd_9.6	60	Maximum time 60 bit times for communication speed 9600bps
MaxTsd_19.2	60	Maximum time 60 bit times for communication speed 19.2Kbps
MaxTsd_93.75	60	Maximum time 60 bit times for communication speed 93.75Kbps
MaxTsd_187.5	60	Maximum time 60 bit times for communication speed 187.5Kbps
MaxTsd_500	100	Maximum time 100 bit times for communication speed 500Kbps
MaxTsd_1.5M	150	Maximum time 150 bit times for communication speed 1.5Mbps
MaxTsd_3.0M	250	Maximum time 250 bit times for communication speed 3.0Mbps
MaxTsd_6.0M	450	Maximum time 450 bit times for communication speed 6.0Mbps
MaxTsd_12.0M	800	Maximum time 800 bit times for communication speed 12.0Mbps
Redundancy	0	Redundancy is not supported
Repeater_Ctr_Sig	2	Mounted as TTL level via RTS signal from module
24V_Pins	0	24V power for connecting maintenance device is not used
Freeze_Mode_supp	1	Freeze mode is supported
Sync_Mode_Supp	1	Synchronization mode is supported
Auto_Baud_supp	1	Automatic baud rate detection is supported
Set_Slave_Add_supp	0	Slave address setting is not supported
Min_Slave_Intervall	1	The time between the two polling cycles is 100µs
Modular_Station	1	Designate the module device
Max_Module	1	Maximum number of modules: 1
Max_Input_Len	168	Maximum input data: 168Byte
Max_Output_Len	168	Maximum output data: 168Byte

2. PROFIBUS COMMUNICATION FUNCTION

Parameter	Value	(Note 1) Details
Max_Data_Len	336	Maximum input/output data: 336Byte
Fail_Safe	0	Fail safe is not supported
Max_Diag_data_Len	6	6 bytes are secured as diagnosis data (external diagnosis not provided)
Slave_Family	1	Function class (main family) defines Drives
PrmText	1	Text selection 1 registered
Text(0)	"No byte swapping"	"No byte swapping" when Bit0=0
Text(1)	"Byte swapping"	"Byte swapping" when Bit0=1
EndPrmText		
PrmText	2	Text selection 2 registration
Text(0)	"Not Connected"	0 indicates "Not Connected"
Text(1)	"MR-J2S/MR-J2M"	1 indicates "MR-J2S/MR-J2M"
EndPrmText		
ExtUserPrmData	1 "Byte swapping"	Register byte swap selection 1 with text base
Bit(0) 0 0-1		Bit0=default 0 Range 0 to 1
Prm_Text_Ref	1	Use text selection 1
EndExtUserPrmData		
ExtUserPrmData	2 "1st axis servo series selection"	1st axis servo amplifier series selection 2 registration on text basis
Unsigned8 0 0-1		Unsigned8 = default 0, range 0 to 1
Prm_Text_Ref	2	Use text selection 2
EndExtUserPrmData		
ExtUserPrmData	3 "2nd axis servo series selection"	2nd axis servo amplifier series selection 3 registration on text basis
Unsigned8 0 0-1		Unsigned8 = default 0, range 0 to 1
Prm_Text_Ref	2	Use text selection 2
EndExtUserPrmData		
ExtUserPrmData	4 "3rd axis servo series selection"	3rd axis servo amplifier series selection 4 registration on text basis
Unsigned8 0 0-1		Unsigned8 = default 0, range 0 to 1
Prm_Text_Ref	2	Use text selection 2
EndExtUserPrmData		
ExtUserPrmData	5 "4th axis servo series selection"	4th axis servo amplifier series selection 5 registration on text basis
Unsigned8 0 0-1		Unsigned8 = default 0, range 0 to 1
Prm_Text_Ref	2	Use text selection 2
EndExtUserPrmData		
ExtUserPrmData	6 "5th axis servo series selection"	5th axis servo amplifier series selection 6 registration on text basis
Unsigned8 0 0-1		Unsigned8 = default 0, range 0 to 1
Prm_Text_Ref	2	Use text selection 2
EndExtUserPrmData		
ExtUserPrmData	7 "2nd axis servo series selection"	6th axis servo amplifier series selection 7 registration on text basis
Unsigned8 0 0-1		Unsigned8 = default 0, range 0 to 1
Prm_Text_Ref	2	Use text selection 2
EndExtUserPrmData		
Max_User_Prm_Data_Len	2	User parameter 8-byte acquisition
Ext_User_Prm_Data_Const(0)	01H	Default value for 1st byte of user parameter
Ext_User_Prm_Data_Const(1)	00H	Default value for 2nd byte of user parameter
Ext_User_Prm_Data_Const(2)	00H	Default value for 3rd byte of user parameter
Ext_User_Prm_Data_Const(3)	00H	Default value for 4th byte of user parameter
Ext_User_Prm_Data_Const(4)	00H	Default value for 5th byte of user parameter
Ext_User_Prm_Data_Const(5)	00H	Default value for 6th byte of user parameter

2. PROFIBUS COMMUNICATION FUNCTION

Parameter	Value	(Note 1) Details
Ext_User_Prm_Data_Const(6)	00H	Default value for 7th byte of user parameter
Ext_User_Prm_Data_Const(7)	00H	Default value for 8th byte of user parameter
Ext_User_Prm_data_Ref(1)	1	Use byte swap selection 1 with text base for 2nd byte of user parameter
Ext_User_Prm_Data_Ref(2)	2	Use byte swap selection 2 with text base for 3rd byte of user parameter
Ext_User_Prm_Data_Ref(3)	3	Use byte swap selection 3 with text base for 4th byte of user parameter
Ext_User_Prm_Data_Ref(4)	4	Use byte swap selection 4 with text base for 5th byte of user parameter
Ext_User_Prm_Data_Ref(5)	5	Use byte swap selection 5 with text base for 6th byte of user parameter
Ext_User_Prm_Data_Ref(6)	6	Use byte swap selection 6 with text base for 7th byte of user parameter
Ext_User_Prm_Data_Ref(7)	7	Use byte swap selection 7 with text base for 8th byte of user parameter
Module	"1 axis system" F3H, F9H	1 axis system selection
EndModule		
Module	"2 axes system" F3H, F9H, F3H, F9H	2 axes system selection
EndModule		
Module	"3 axes system" F3H, F9H, F3H, F9H, F3H, F9H	3 axes system selection
EndModule		
Module	"4 axes system" F3H, F9H, F3H, F9H, F3H, F9H, F3H, F9H	4 axes system selection
EndModule		
Module	"5 axes system" F3H, F9H, F3H, F9H, F3H, F9H, F3H, F9H, F3H, F9H	5 axes system selection
EndModule		
Module	"6 axes system" F3H, F9H, F3H, F9H, F3H, F9H, F3H, F9H, F3H, F9H, F3H, F9H	6 axes system selection
EndModule		

Note 1. The contents are not included in the actual ASCII file.

2. If the maximum number of characters for the Vendor-name of the master in used is 10, set as "Mitsubishi"

2. PROFIBUS COMMUNICATION FUNCTION

2.5.2 Slave user parameters

Address	Function
0H	For maker settings. (Setting value is fixed to "1".)
1H	Select byte swap function (byte reversal function). 0: Byte swap invalid 1: Byte swap valid
2H	Axis 1 servo amplifier series selection Select the servo amplifier series to be connected to Axis 1. 0: Not connected 1: MR-J2S-B/MR-J2M-P8B
3H	Axis 2 servo amplifier series selection Select the servo amplifier series to be connected to Axis 2. 0: Not connected 1: MR-J2S-B/MR-J2M-P8B
4H	Axis 3 servo amplifier series selection Select the servo amplifier series to be connected to Axis 3. 0: Not connected 1: MR-J2S-B/MR-J2M-P8B
5H	Axis 4 servo amplifier series selection Select the servo amplifier series to be connected to Axis 4. 0: Not connected 1: MR-J2S-B/MR-J2M-P8B
6H	Axis 5 servo amplifier series selection Select the servo amplifier series to be connected to Axis 5. 0: Not connected 1: MR-J2S-B/MR-J2M-P8B
7H	Axis 6 servo amplifier series selection Select the servo amplifier series to be connected to Axis 6. 0: Not connected 1: MR-J2S-B/MR-J2M-P8B

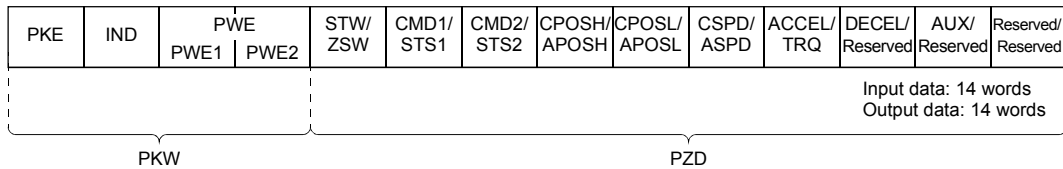
2. PROFIBUS COMMUNICATION FUNCTION

2.5.3 PROFIBUS profile

The option unit runs as the "PROFIBUS-DP master's slave".

The PROFIBUS profile (data buffers) is compatible with "PPO type 5". The module type can be changed with the slave module settings. Refer to the instruction manual provided with the network master's configuration software for details.

<PPO type5>



(1) ID definition

ID		(Note) Details	
PKW	PKE	AK	Task or response
		SPM	Task execution request or task execution completed
		PNU	Parameter No.
	IND	Sub-Index	Sub-index (array No.)
		Reserved	Area reserved for expansion
	PWE	PWE1	High-order (16 to 31 bit) For 16-bit data: Set to 0 as this is not used For 32-bit data: Set high-order 16 bits of parameter value
PWE2		Low-order (0 to 15 bit): Parameter value	
PZD	STW/ZSW		STW : Control word (command request) ZSW : Status word (command response)
	CMD1/STS1		CMD1 : Control command 1 (command request) STS1 : Driver status 1 (command response)
	CMD2/STS2		CMD2 : Control command 2 (command request) STS2 : Driver status 2 (command response)
	CPOSH/APOSH		CPOSH : Position data high-order 16 bits (command request) APOSH : Actual current position high-order 16 bits (command response)
	CPOSL/APOSL		CPOSL : Position data low-order 16 bits (command request) APOSL : Actual current position low-order 16 bits (command response)
	CSPD/ASPD		CSPD : Command speed (command request) ASPD : Motor speed (command response)
	ACCEL/TRQ		ACCEL : Acceleration time constant (command request) TRQ : Instantaneous torque (command response)
	DECEL		DECEL : Deceleration time constant (command request)
	AUX		AUX : Auxiliary function (command request)
	Reserved		Area reserved for expansion

Note. Command request: Message from master to slave

Command response: Message from slave to master

2. PROFIBUS COMMUNICATION FUNCTION

(2) Buffer memory map

The buffer memory map when using all six axes with the slave user parameters is as follows.

Memory offset	Details
00H to 1BH	Command request/command response area for axis 1 14 words
1CH to 37H	Command request/command response area for axis 2 14 words
38H to 53H	Command request/command response area for axis 3 14 words
54H to 6FH	Command request/command response area for axis 4 14 words
70H to 8BH	Command request/command response area for axis 5 14 words
8CH to A7H	Command request/command response area for axis 6 14 words

If there are any unconnected axes, the buffer memory up to the final connected axis, counting from axis 1, is secured. The following buffer memory is reduced. The buffer memory for the unconnected axes up to the final connected axis becomes an open area.

Example 1) When axes 2 and 5 are not connected

Memory offset	Details
00H to 1BH	Command request/command response area for axis 1 14 words
1CH to 37H	Open area
38H to 53H	Command request/command response area for axis 3 14 words
54H to 6FH	Command request/command response area for axis 4 14 words
70H to 8BH	Open
8CH to A7H	Command request/command response area for axis 6 14 words

Example 2) When axes 2, and 4 to 6 are not connected

Memory offset	Details
00H to 1BH	Command request/command response area for axis 1 14 words
1CH to 37H	Open area
38H to 53H	Command request/command response area for axis 3 14 words

2. PROFIBUS COMMUNICATION FUNCTION

2.6 Details of buffer memory

POINT
<ul style="list-style-type: none"> ▪ In this section, ON indicates that the corresponding bit is "1" and OFF indicates that the corresponding bit is "0".

2.6.1 Details of PKW

Name		Bit	Definition																	
PKW	PKE	PNU	0 to 10 Parameter number (Set target parameter with IND + PNU.)																	
		SPM	11 <ul style="list-style-type: none"> ▪ Command request (Task execution request) The task set with PKW is executed at the rising edge of SPM. ▪ Command response (Task execution completed) This turns ON when the task execution is completed. 																	
		AK	12 to 15 <ul style="list-style-type: none"> ▪ Command request <ul style="list-style-type: none"> 0 : No task 1 : Request parameter value (read request) 2 : Change parameter value (word) (RAM) (write request) (Note 1) 3 to 5 : Not supported 6 : Request parameter value (array) (read request) 7 : Change parameter value (array word) (RAM) (write request) (Note 1) 8 to 11: Not supported 12 : Change parameter value (array word) (EEPROM) (write request) (Note 2) 13 : Not supported 14 : Change parameter value (word) (EEPROM) (write request) (Note 2) 15 : Not supported ▪ Command response <ul style="list-style-type: none"> 0 : No response 1 : Send parameter value (word) 2 : Send parameter value (double word) 3 : Not supported 4 : Send parameter value (array word) 5 : Send parameter value (array double word) 6 : Not supported 7 : Command execution error (Store error No. in PWE) 8 to 15: Not supported <p>Note 1. The parameter value is written into the RAM. This value is cleared when the power is turned OFF. 2. The parameter value is written into the EEPROM. The value is stored in the EEPROM, and is saved even when the power is turned OFF.</p>																	
	IND		0 to 7 Area reserved for expansion (Set to 0)																	
			8 to 15 Sub-Index Designate the array No. for the command request AK = 6, 7, 12.																	
	PWE	PWE1	0 to 15 Parameter read value or write value high-order 16 bits For 16-bit data : Set to 0 as this is not used For 32-bit data : Set high-order 16 bits of parameter value																	
		PWE2	0 to 15 Parameter read value or write value low-order 16 bits The PWE details are as follows when the command response AK is 7.																	
				<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Error details</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Invalid PNU</td> </tr> <tr> <td>1</td> <td>Parameter value cannot be changed</td> </tr> <tr> <td>2</td> <td>Setting value not within range</td> </tr> <tr> <td>3</td> <td>Invalid sub-index</td> </tr> <tr> <td>4</td> <td>No array found</td> </tr> <tr> <td>11</td> <td>No parameter change rights (mode error)</td> </tr> <tr> <td>18</td> <td>Other error</td> </tr> </tbody> </table>	Error details		0	Invalid PNU	1	Parameter value cannot be changed	2	Setting value not within range	3	Invalid sub-index	4	No array found	11	No parameter change rights (mode error)	18	Other error
	Error details																			
	0	Invalid PNU																		
1	Parameter value cannot be changed																			
2	Setting value not within range																			
3	Invalid sub-index																			
4	No array found																			
11	No parameter change rights (mode error)																			
18	Other error																			

2. PROFIBUS COMMUNICATION FUNCTION

2.6.2 Details of PZD

(1) Command request

		Name	Bit	Definition																																		
PZD	STW		0 to 6	For manufacturer setting (Set to 1)																																		
		RST	7	0 → 1: This cancels the servo alarm/option unit alarm.																																		
			8 to 12	For manufacturer setting (Set to 0)																																		
		PIF	13	Parameter initial transmission complete This turns ON when the initial parameter transmission from the master unit is completed. When PIF turns ON, the MR-MG30 starts the initialization process with the servo amplifier.																																		
		ORST	14	The operation alarm is reset when ORST is turned ON.																																		
		SON	15	When SON turns ON, the power to the connected servo amplifier's base circuit is turned ON. When SON turns OFF, the base is cut off, and the servomotor coasts.																																		
CMD1	ST	Operation start	0	When ST turns ON, the operation designated with the operation mode starts.																																		
	DIR	Start direction	1	In the JOG operation mode, the axis moves in the address decrement direction when DIR is ON, and in the address increment direction when DIR is OFF.																																		
	STP	Operation stop	2	When STP turns ON, the current operation decelerates to a stop. The operation does not resume even if STP turns OFF.																																		
	MD0	Operation mode selection 0	3	Select the operation mode with a 3-bit binary value. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>MD2</th> <th>MD1</th> <th>MD0</th> <th>Selected operation mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>Manual operation</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>High-speed home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>Automatic operation (direct designation)</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>Interrupt positioning operation</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td rowspan="3">For manufacturer setting (Don't change this value by any means.)</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	MD2	MD1	MD0	Selected operation mode	0	0	0	Manual operation	0	0	1	Home position return	0	1	0	High-speed home position return	0	1	1	Automatic operation (direct designation)	1	0	0	Interrupt positioning operation	1	0	1	For manufacturer setting (Don't change this value by any means.)	1	1	0	1	1	1
	MD2	MD1	MD0	Selected operation mode																																		
	0	0	0	Manual operation																																		
	0	0	1	Home position return																																		
	0	1	0	High-speed home position return																																		
	0	1	1	Automatic operation (direct designation)																																		
	1	0	0	Interrupt positioning operation																																		
	1	0	1	For manufacturer setting (Don't change this value by any means.)																																		
	1	1	0																																			
	1	1	1																																			
	MD1	Operation mode selection 1	4																																			
	MD2	Operation mode selection 2	5																																			
			6	For manufacturer setting (Set to 0)																																		
TSTP	Temporary stop	7	If TSTP turns ON during automatic operation or interrupt positioning, the operation temporarily stops. Operation resumes when TSTP is turned OFF. Even if ST turns ON during temporary stop, it is ignored. If the operation mode is changed during temporary stop, the remaining movement distance is cleared. The remaining movement distance is cleared if STP is turned ON during temporary stop. TSTP is ignored during home position return and JOG operation.																																			
SCHG	Speed change	8	When SCHG turns ON, the speed changes to that set with the command request and command speed. This is invalid during the home position return mode.																																			
			9	For manufacturer setting (Set to 0)																																		
TL	Torque limit selection	10	OFF : The torque is limited to the motor's maximum torque. ON : The torque is limited to the value set with servo parameters No. 10 and 11.																																			
			11	For manufacturer setting (Set to 0)																																		
ITP	Interrupt positioning input	12	If ITP turns ON during the interrupt positioning mode, the axis moves by the movement amount set in the command request and target position, and then stops.																																			
LSP	Forward rotation stroke end	13	Operation in the CCW direction is not possible when LSP is turned OFF. Operation will take place in the CW direction. Turn LSP ON to enable CCW operation.																																			
LSN	Reverse rotation stroke end	14	Operation in the CW direction is not possible when LSN is turned OFF. Operation will take place in the CCW direction. Turn LSN ON to enable CW operation.																																			
DOG	Proximity dog	15	The proximity dog is detected when DOG is turned ON. The dog detection polarity can be changed with the parameters. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Positioning parameter No. 15</th> <th>Proximity dog detection polarity</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>DOG is OFF</td> </tr> <tr> <td>1</td> <td>DOG is ON</td> </tr> </tbody> </table>	Positioning parameter No. 15	Proximity dog detection polarity	0	DOG is OFF	1	DOG is ON																													
Positioning parameter No. 15	Proximity dog detection polarity																																					
0	DOG is OFF																																					
1	DOG is ON																																					
CMD2			0 to 15	For manufacturer setting (Set to 0)																																		

Note 1. Input of function devices assigned to the external DI with common parameters No. 21 to 44 is invalid during the STW, CMD1 or CMD2 function device.

2. Automatic can be turned ON internally when positioning parameters No. 46 to 48 are set.

2. PROFIBUS COMMUNICATION FUNCTION

Name		Bit	Definition
PZD	CPOSH	Position data High-order 16 bits	0 to 15 Set the movement amount The incremental value command or absolute value command can be selected with the auxiliary function.
	CPOS�	Position data Low-order 16 bits	
	CSPD	Servo motor speed	0 to 15 Set the command rotation speed for the servomotor during positioning. Set a value less than the instantaneous tolerable rotation speed of the applicable servomotor.
	ACCEL	Acceleration time constant	0 to 15 Set the acceleration time constant. Set the time to reach the applicable servomotor's rated rotation speed.
	DECEL	Deceleration time constant	0 to 15 Set the deceleration time constant. Set the time to reach the applicable servomotor's rated rotation speed.
	AUX	Auxiliary function	0 to 15 Set the auxiliary function. 0 : Absolute value command 1 : Incremental value command
		0 to 15	For manufacturer setting (Set to 0)

(2) Command response

Name		Bit	Definition
PZD	ZSW		0 to 2 For manufacturer setting (1 is returned)
		Fault	3 1: Servo alarm or option unit alarm occurred
			4 to 5 For manufacturer setting (1 is returned)
		Power ON prohibited	6 0 is always returned
		WNG	7 1: Servo warning occurred
			8 For manufacturer setting (0 is returned)
		Control request	9 1 is always returned
		INP	10 This turns ON when the droop pulses are less than the in-position range set with servo parameter No. 20. This turns OFF during base OFF.
		ZP	11 This turns ON when home position return is completed. When using the absolute position system, this turns ON when the servo amplifier is in the servo ON state. However, this turns OFF in the following cases: 1) When SON is OFF 2) When EMG-SG is open 3) When EM1-SG is open 4) When alarm occurs 5) When home position return has not been completed after purchasing the product 6) When home position return has not been completed after absolute position lost (AL.25) or absolute position counter warning (AL.E3) occurs 7) When home position return has not been completed after changing the electronic gears 8) When home position return has not been completed after validating the absolute position system 9) When the rotation direction selection has been changed 10) When the home position address has been changed 11) During home position return
		SONS	12 This turns ON when the servo turns ON and operation is possible.
		RDONS	13 This turns ON when initialization of the servo amplifier is completed.
		OALM	14 OALM turns ON when an operation alarm occurs.
	15 For manufacturer setting (0 is returned)		

2. PROFIBUS COMMUNICATION FUNCTION

		Name		Bit	Definition																																		
PZD	STS1	MEND	Movement finish	0	This turns ON when in-position (INP) is ON and the remaining command distance is "0".																																		
		CPO	Rough match	1	This turns ON when the remaining command distance is less than the rough match output range set with the parameters. This is not output when the servo amplifier is in the servo OFF state.																																		
				2	For manufacturer setting (0 is returned)																																		
		MD0	Operation mode selection output 0	3	The currently selected operation mode is output. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>MD2</th> <th>MD1</th> <th>MD0</th> <th>Output operation mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>Manual operation</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>High-speed home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>Automatic operation (direct designation)</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>Interrupt positioning operation</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td rowspan="3">For manufacturer setting</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	MD2	MD1	MD0	Output operation mode	0	0	0	Manual operation	0	0	1	Home position return	0	1	0	High-speed home position return	0	1	1	Automatic operation (direct designation)	1	0	0	Interrupt positioning operation	1	0	1	For manufacturer setting	1	1	0	1	1	1
		MD2	MD1	MD0		Output operation mode																																	
		0	0	0		Manual operation																																	
		0	0	1		Home position return																																	
		0	1	0		High-speed home position return																																	
		0	1	1		Automatic operation (direct designation)																																	
		1	0	0		Interrupt positioning operation																																	
		1	0	1		For manufacturer setting																																	
		1	1	0																																			
		1	1	1																																			
	MD1	Operation mode selection output 1	4																																				
	MD2	Operation mode selection output 2	5																																				
			6	Not used (0 is returned)																																			
	PUS	Temporary stop	7	PUS turns ON when operation is stopped with TSTP ON. PUS turns OFF when TSTP turns OFF and operation is resumed.																																			
	SCF	Speed change finished	8	SCF turns ON when the speed has been correctly changed.																																			
	SCE	Speed change illegal	9	SCE turns ON when the speed has not been changed correctly.																																			
	TLC	Limiting torque	10	This turns ON when the generated torque reaches the set torque limit value.																																			
		11	Reserved (0 is returned)																																				
POT	Position range output	12	POT turns ON when the actual current position is within the range set with the parameters. This turns OFF when home position return is incomplete, or when the base is OFF.																																				
		13 to 15	For manufacturer setting (0 is returned)																																				
STS2		0 to 15	For manufacturer setting (0 is returned)																																				
	APOSH	Current position High-order 16 bits	0 to 15	The current position, using the machine home position as "0", is indicated.																																			
	APOSH	Current position Low-order 16 bits	0 to 15																																				
	ASPD	Servo motor speed	0 to 15	The servomotor speed is indicated.																																			
	TRQ	Instantaneous torque	0 to 15	The currently generated torque value is sent in real-time, using the rated torque as 100%.																																			
			0 to 15	For manufacturer setting (0 is returned)																																			

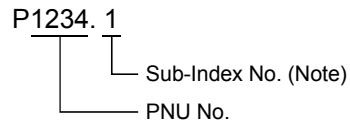
2. PROFIBUS COMMUNICATION FUNCTION

2.7 Parameter definitions

2.7.1 Outline of PNU

The parameters can be set from the network using PNU. The data used by the network is indicated as PNU(P) to identify them from the common parameters, positioning parameters and servo parameters.

(1) Details of PNU data



Note. If the data type is an array data, the Sub-Index No. is included in PNU.

(2) PNU data type

Name	Abbrev.	Range
Unsigned16	Us16	0 to $2^{16} - 1$ (no array)
Integer16	Int16	-2^{15} to $2^{15} - 1$ (no array)
Unsigned32	Us32	0 to $2^{32} - 1$ (no array)
Integer32	Int32	-2^{31} to $2^{31} - 1$ (no array)
Array Unsigned16	AUs16	0 to $2^{16} - 1$ (array type)
Array Integer16	AInt16	-2^{15} to $2^{15} - 1$ (array type)
Array Unsigned32	AUs32	0 to $2^{32} - 1$ (array type)
Array Integer32	AInt32	-2^{31} to $2^{31} - 1$ (array type)

2. PROFIBUS COMMUNICATION FUNCTION

2.7.2 PROFIBUS PNU

(1) Real-time monitoring

The following items can be monitored from the master.

PNU	Item	Details	Data type	Unit
P1.1	Current position	The current position, using the machine home position as "0", is indicated.	AInt32	× 10 ^{STM} [μm] (Note)
P1.3	Command position	The set command position is indicated.	AInt32	
P1.5	Command remaining distance	The remaining distance to the set command position is indicated.	AInt32	
P1.14	Droop pulses	The deflection counter's droop pulses are indicated.	AInt32	[pulse]
P1.17	Regenerative load ratio	The regenerative power in respect to the tolerable regenerative power is indicated as a percentage.	AInt16	[%]
P1.18	Effective load ratio	The continuous effective load torque is indicated. The effective value for the past 15 seconds is indicated using the rated torque as 100%.	AInt16	[%]
P1.19	Peak load ratio	The peak torque is indicated. The peak torque for the past 15 seconds is indicated using the rated torque as 100%.	AInt16	[%]
P1.20	Instantaneous torque	The instantaneous torque is indicated. The real-time value of the occurring torque is indicated using the rated torque as 100%.	AInt16	[%]
P1.21	ABS counter	When using the absolute position detection system, movement amount from the home position is indicated as the absolute position detector's multi-rotation counter value. This is nonspecific when using the incremental system.	AInt16	[rev]
P1.22	Motor speed	The servomotor speed is indicated.	AInt32	0.1 [r/min]
P1.24	Bus voltage	The servo amplifier's main circuit converter (across P-N) voltage is indicated.	AInt16	[V]
P1.28	Within one-revolution position	The position within one revolution of the servomotor detector is indicated with the detector's pulse unit.	AInt32	[pulse]
P1.30	Load inertia ratio	The estimated servomotor axis conversion load moment of inertia ratio value for the servomotor's moment of inertia is indicated.	AInt16	0.1 [times]

Note. The magnification can be read with P3.2.

2. PROFIBUS COMMUNICATION FUNCTION

(2) Parameter initialization

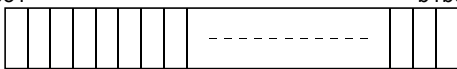
The parameters can be initialized from the master.

PNU	Item	Details of data	Data type
P2.1	Common parameter (No. 00 to 59) initialisation (Note)	1EA5H	AUs16
P2.2	Positioning parameter (No. 00 to 79) initialisation (Note)	1EA5H	AUs16
P2.3	Servo parameter (No. 01 to 39) initialisation (Note)	1EA5H	AUs16
P2.8	Option unit alarm history clear (Note)	1EA5H	AUs16

Note. The parameters are initialized when the option unit's power is turned OFF and ON.

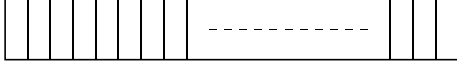
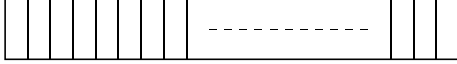
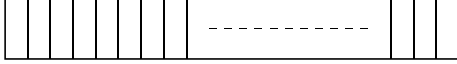
(3) Read data

Various data can be read from the master.

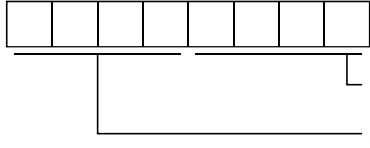
PNU	Item	Details of data	Data type																																																																								
P3.2	Movement amount magnification read	The feed length magnification set with the positioning parameter No. 05 is read. 3: ×1000 magnification 2: ×100 magnification 1: ×10 magnification 0: ×1 magnification	AUs16																																																																								
P3.3	Option unit alarm (warning) read	The currently occurring option unit alarm No. is read. Example) "0010" is read when AL10 is occurring.	AUs16																																																																								
P3.4	Servo alarm (warning) read	The currently occurring servo alarm No. is read. Example) "0033" is read when AL33 is occurring.	AUs16																																																																								
P3.5	Operation alarm read	The currently occurring operation alarm No. is read. Example) "0020" is read when AL20 is occurring.	AUs16																																																																								
P3.6	Input status read 0	The input signal's OFF/ON (0 or 1) information is read. When the external signals are validated with the common parameters No. 21 to 44, the external DI information is read. Refer to section 3.2.3 for the meanings of the abbreviations. <div style="text-align: center;"> b31-----b1b0  </div> <table border="1" style="margin: 10px auto; width: 80%; text-align: center;"> <thead> <tr> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> <td>8</td> <td></td> <td>16</td> <td>ST</td> <td>24</td> <td>SCHG</td> </tr> <tr> <td>1</td> <td></td> <td>9</td> <td></td> <td>17</td> <td>DIR</td> <td>25</td> <td></td> </tr> <tr> <td>2</td> <td></td> <td>10</td> <td></td> <td>18</td> <td>STP</td> <td>26</td> <td>TL</td> </tr> <tr> <td>3</td> <td></td> <td>11</td> <td></td> <td>19</td> <td>MD0</td> <td>27</td> <td>(Note)</td> </tr> <tr> <td>4</td> <td></td> <td>12</td> <td></td> <td>20</td> <td>MD1</td> <td>28</td> <td>ITP</td> </tr> <tr> <td>5</td> <td></td> <td>13</td> <td></td> <td>21</td> <td>MD2</td> <td>29</td> <td>LSP</td> </tr> <tr> <td>6</td> <td></td> <td>14</td> <td>ORST</td> <td>22</td> <td></td> <td>30</td> <td>LSN</td> </tr> <tr> <td>7</td> <td>RST</td> <td>15</td> <td>SON</td> <td>23</td> <td>TSTP</td> <td>31</td> <td>DOG</td> </tr> </tbody> </table>	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	0		8		16	ST	24	SCHG	1		9		17	DIR	25		2		10		18	STP	26	TL	3		11		19	MD0	27	(Note)	4		12		20	MD1	28	ITP	5		13		21	MD2	29	LSP	6		14	ORST	22		30	LSN	7	RST	15	SON	23	TSTP	31	DOG	AUs32
bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.																																																																				
0		8		16	ST	24	SCHG																																																																				
1		9		17	DIR	25																																																																					
2		10		18	STP	26	TL																																																																				
3		11		19	MD0	27	(Note)																																																																				
4		12		20	MD1	28	ITP																																																																				
5		13		21	MD2	29	LSP																																																																				
6		14	ORST	22		30	LSN																																																																				
7	RST	15	SON	23	TSTP	31	DOG																																																																				

Note. For manufacturer setting.

2. PROFIBUS COMMUNICATION FUNCTION

PNU	Item	Details of data	Data type																																																																								
P3.7	Input status read 1	<p>The input signal's OFF/ON (0 or 1) information is read. When the external signals are validated with the common parameters No. 21 to 44, the external DI information is read. Refer to section 3.2.3 for the meanings of the abbreviations.</p> <p>b31-----b1b0</p>  <table border="1" data-bbox="604 542 1273 853"> <thead> <tr> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> </tr> </thead> <tbody> <tr><td>0</td><td>(Note)</td><td>8</td><td>(Note)</td><td>16</td><td></td><td>24</td><td></td></tr> <tr><td>1</td><td>(Note)</td><td>9</td><td>(Note)</td><td>17</td><td></td><td>25</td><td></td></tr> <tr><td>2</td><td>(Note)</td><td>10</td><td></td><td>18</td><td></td><td>26</td><td></td></tr> <tr><td>3</td><td>(Note)</td><td>11</td><td></td><td>19</td><td></td><td>27</td><td></td></tr> <tr><td>4</td><td>(Note)</td><td>12</td><td>(Note)</td><td>20</td><td></td><td>28</td><td></td></tr> <tr><td>5</td><td>(Note)</td><td>13</td><td></td><td>21</td><td></td><td>29</td><td></td></tr> <tr><td>6</td><td>(Note)</td><td>14</td><td></td><td>22</td><td></td><td>30</td><td></td></tr> <tr><td>7</td><td>(Note)</td><td>15</td><td></td><td>23</td><td></td><td>31</td><td></td></tr> </tbody> </table> <p>Note. For manufacturer setting.</p>	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	0	(Note)	8	(Note)	16		24		1	(Note)	9	(Note)	17		25		2	(Note)	10		18		26		3	(Note)	11		19		27		4	(Note)	12	(Note)	20		28		5	(Note)	13		21		29		6	(Note)	14		22		30		7	(Note)	15		23		31		AUs32
bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.																																																																				
0	(Note)	8	(Note)	16		24																																																																					
1	(Note)	9	(Note)	17		25																																																																					
2	(Note)	10		18		26																																																																					
3	(Note)	11		19		27																																																																					
4	(Note)	12	(Note)	20		28																																																																					
5	(Note)	13		21		29																																																																					
6	(Note)	14		22		30																																																																					
7	(Note)	15		23		31																																																																					
P3.8	Output status read 0	<p>The output signal OFF/ON (0 or 1) information is read. Refer to section 3.2.3 for the meanings of the abbreviations.</p> <p>b31-----b1b0</p>  <table border="1" data-bbox="604 1097 1273 1408"> <thead> <tr> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td>8</td><td></td><td>16</td><td>MEND</td><td>24</td><td>SCF</td></tr> <tr><td>1</td><td></td><td>9</td><td></td><td>17</td><td>CPO</td><td>25</td><td>SCE</td></tr> <tr><td>2</td><td></td><td>10</td><td>INP</td><td>18</td><td></td><td>26</td><td>TLC</td></tr> <tr><td>3</td><td>ALM</td><td>11</td><td>ZP</td><td>19</td><td>MDO0</td><td>27</td><td>(Note)</td></tr> <tr><td>4</td><td></td><td>12</td><td>SON</td><td>20</td><td>MDO1</td><td>28</td><td>POT</td></tr> <tr><td>5</td><td></td><td>13</td><td>PDONS</td><td>21</td><td>MDO2</td><td>29</td><td>(Note)</td></tr> <tr><td>6</td><td></td><td>14</td><td>OALM</td><td>22</td><td></td><td>30</td><td></td></tr> <tr><td>7</td><td>WNG</td><td>15</td><td></td><td>23</td><td>PUS</td><td>31</td><td></td></tr> </tbody> </table> <p>Note. For manufacturer setting.</p>	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	0		8		16	MEND	24	SCF	1		9		17	CPO	25	SCE	2		10	INP	18		26	TLC	3	ALM	11	ZP	19	MDO0	27	(Note)	4		12	SON	20	MDO1	28	POT	5		13	PDONS	21	MDO2	29	(Note)	6		14	OALM	22		30		7	WNG	15		23	PUS	31		AUs32
bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.																																																																				
0		8		16	MEND	24	SCF																																																																				
1		9		17	CPO	25	SCE																																																																				
2		10	INP	18		26	TLC																																																																				
3	ALM	11	ZP	19	MDO0	27	(Note)																																																																				
4		12	SON	20	MDO1	28	POT																																																																				
5		13	PDONS	21	MDO2	29	(Note)																																																																				
6		14	OALM	22		30																																																																					
7	WNG	15		23	PUS	31																																																																					
P3.9	Output status read 1	<p>The output signal OFF/ON (0 or 1) information is read. Refer to section 3.2.3 for the meanings of the abbreviations.</p> <p>b31-----b1b0</p>  <table border="1" data-bbox="604 1653 1273 1964"> <thead> <tr> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> <th>bit</th> <th>Abbrev.</th> </tr> </thead> <tbody> <tr><td>0</td><td>(Note)</td><td>8</td><td></td><td>16</td><td></td><td>24</td><td></td></tr> <tr><td>1</td><td>(Note)</td><td>9</td><td></td><td>17</td><td></td><td>25</td><td></td></tr> <tr><td>2</td><td>(Note)</td><td>10</td><td></td><td>18</td><td></td><td>26</td><td></td></tr> <tr><td>3</td><td>(Note)</td><td>11</td><td></td><td>19</td><td></td><td>27</td><td></td></tr> <tr><td>4</td><td>(Note)</td><td>12</td><td>(Note)</td><td>20</td><td></td><td>28</td><td></td></tr> <tr><td>5</td><td>(Note)</td><td>13</td><td></td><td>21</td><td></td><td>29</td><td></td></tr> <tr><td>6</td><td>(Note)</td><td>14</td><td></td><td>22</td><td></td><td>30</td><td></td></tr> <tr><td>7</td><td>(Note)</td><td>15</td><td></td><td>23</td><td></td><td>31</td><td></td></tr> </tbody> </table> <p>Note. For manufacturer setting.</p>	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	0	(Note)	8		16		24		1	(Note)	9		17		25		2	(Note)	10		18		26		3	(Note)	11		19		27		4	(Note)	12	(Note)	20		28		5	(Note)	13		21		29		6	(Note)	14		22		30		7	(Note)	15		23		31		AUs32
bit	Abbrev.	bit	Abbrev.	bit	Abbrev.	bit	Abbrev.																																																																				
0	(Note)	8		16		24																																																																					
1	(Note)	9		17		25																																																																					
2	(Note)	10		18		26																																																																					
3	(Note)	11		19		27																																																																					
4	(Note)	12	(Note)	20		28																																																																					
5	(Note)	13		21		29																																																																					
6	(Note)	14		22		30																																																																					
7	(Note)	15		23		31																																																																					

2. PROFIBUS COMMUNICATION FUNCTION

PNU	Item	Details of data	Data type
P3.10	Power ON time read	The power ON time, counted from the shipment of the option unit, is read. Response unit [hours]	AUs16
P3.11	No. of power ON times read	The number of times the power was turned ON, counted from the shipment of the option unit, is read. Response unit [times]	AUs16
P3.12	Home position within one revolution position read	The cycle counter value for the absolute value home position is read. Response unit [pulse]	AUs32
P3.13	Home position multi-rotation data read	The multi-rotation counter value for the absolute value home position is read. Response unit [rev]	AUs16
P3.14	Error parameter No. read	The PNU No. and Sub-Index No. with an error is read.  "0001" is always read.	AUs32
P3.15	Amplifier type read	0: No connected servo amplifier 1: MR-J2SB/MR-J2M	AUs16

(4) PPO read

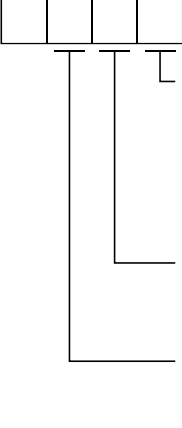
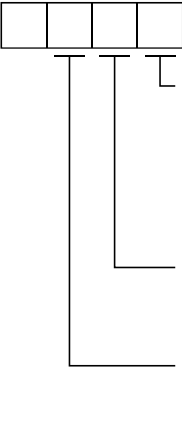
The node address, details of the past six errors, and the usable PNU numbers can be read.

PNU	Item	Details of data	Data type
P918	Node address read	The set node addresses are read.	Us16
P947.1 to P947.8	Servo alarm history No. 1 read	P947.1 : Alarm No. P947.2 to P947.8 : All 0	AUs16
P947.9 to P947.16	Servo alarm history No. 2 read	P947.9 : Alarm No. P947.10 to P947.16 : All 0	AUs16
P947.17 to P947.24	Servo alarm history No. 3 read	P947.17 : Alarm No. P947.18 to P947.24 : All 0	AUs16
P947.25 to P947.32	Servo alarm history No. 4 read	P947.25 : Alarm No. P947.26 to P947.32 : All 0	AUs16
P947.33 to P947.40	Servo alarm history No. 5 read	P947.33 : Alarm No. P947.34 to P947.40 : All 0	AUs16
P947.41 to P947.48	Servo alarm history No. 6 read	P947.41 : Alarm No. P947.42 to P947.48 : All 0	AUs16
P980.1 to P980.116 P981.1 to P980.116 P982.1 to P980.116 P983.1 to P980.116 P984.1 to P980.116 P985.1 to P980.116 P986.1 to P980.116 P987.1 to P980.116 P988.1 to P980.116 P989.1 to P980.116	PNU list read	The usable PNU numbers are sorted and read out.	AUs16

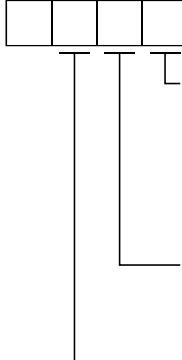
2. PROFIBUS COMMUNICATION FUNCTION

2.7.3 Parameters

The parameters can be read and set from the network by using PNU. Refer to Chapter 5 for parameter details.

PNU	Sub-Index	Item	Details of data	Data type
P1000 to P1059	1	Common parameter No. 0 to 59 read/set	The values set for the common parameters No. 00 to 59 are indicated. (PNU-1000) corresponds to the parameter No.	AUs16
	2	Common parameter No. 0 to 59 data type read	<p>The data type of the common parameter No. 0 to 59 setting values is read.</p>  <p>Decimal point position 0 : No decimal point 1 : Last digit (no decimal point) 2 : 2nd digit after decimal point 3 : 3rd digit after decimal point 4 : 4th digit after decimal point</p> <p>Data type 0 : Use as hexadecimal 1 : Must be converted to decimal</p> <p>Parameter write type 0 : Valid after writing 1 : Valid when power is turned ON after writing</p> <p>(PNU-1000) corresponds to the parameter No.</p>	AUs16
P1200 to P1279	1	Positioning parameter No.0 to 79	The values set for the positioning parameters No. 0 to 79 are indicated. (PNU-1200) corresponds to the parameter No.	AUs16
	2	Positioning parameter No. 0 to 79 data type read	<p>The data type of the positioning parameter No. 0 to 79 setting values is read.</p>  <p>Decimal point position 0 : No decimal point 1 : Last digit (no decimal point) 2 : 2nd digit after decimal point 3 : 3rd digit after decimal point 4 : 4th digit after decimal point</p> <p>Data type 0 : Use as hexadecimal 1 : Must be converted to decimal</p> <p>Parameter write type 0 : Valid after writing 1 : Valid when power is turned ON after writing</p> <p>(PNU-1200) corresponds to the parameter No.</p>	AUs16

2. PROFIBUS COMMUNICATION FUNCTION

PNU	Sub-Index	Item	Details of data	Data type
P1401 to P1439	1	Servo parameter No. 1 to 39	The values set for the servo parameters No. 1 to 39 are indicated. (PNU-1400) corresponds to the parameter No.	AUs16
	2	Servo parameter No. 1 to 39 data type read	<p>The data type of the servo parameter No. 1 to 39 setting values is read.</p>  <p> Decimal point position 0 : No decimal point 1 : Last digit (no decimal point) 2 : 2nd digit after decimal point 3 : 3rd digit after decimal point 4 : 4th digit after decimal point </p> <p> Data type 0 : Use as hexadecimal 1 : Must be converted to decimal </p> <p> Parameter write type 0 : Valid after writing 1 : Valid when power is turned ON after writing </p> <p>(PNU-1400) corresponds to the parameter No.</p>	AUs16

2. PROFIBUS COMMUNICATION FUNCTION

2.8 Initialization sequence

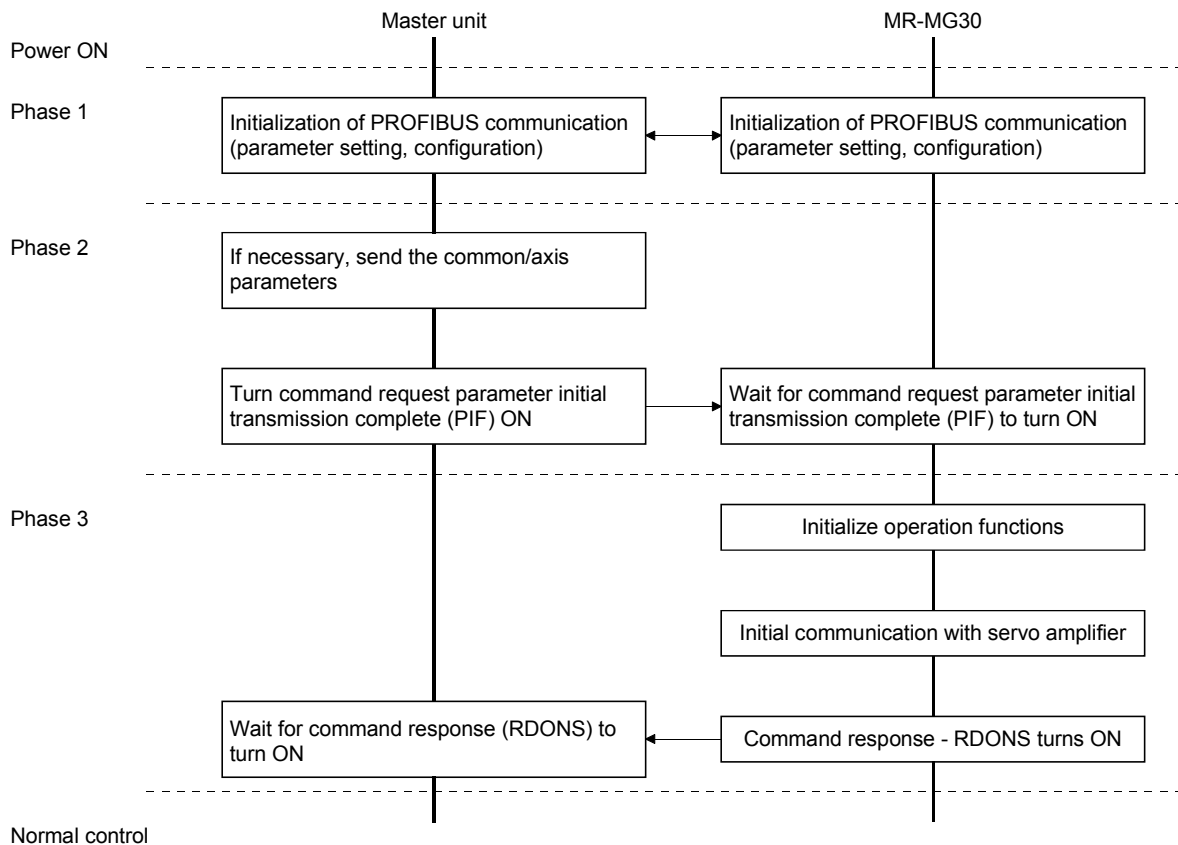
After the MR-MG30 power is turned ON, the following initialization process, including setting of the parameters, is carried out before actual operation is started.

Phase 1: Initialization of PROFIBUS communication (parameter setting, configuration)

Phase 2: Initialization of parameter settings

Phase 3: Initialization between MR-MG30 and servo amplifier

<Outline flow>



2. PROFIBUS COMMUNICATION FUNCTION

(1) Phase 1 (Initialization of PROFIBUS communication)

This phase is carried out commonly for all axes.

Following the PROFIBUS specifications, the master unit sends the servo amplifier series connected to each axis, the send/receive data size, etc. to the MR-MG30 using parameter statements, configuration statements, etc.

The number of servo amplifier axes controlled with the MR-MG30 is determined according to the size of the send/receive data.

The phase shifts to phase 2 when the data exchange enabled state (Data_Exch) is reached.

(2) Phase 2 (Initialization of parameter settings)

This phase is carried out commonly for all axes.

When phase 1 is finished, the master unit uses the PKW data to send the common parameters and axis parameters (positioning parameters and servo parameters) to the MR-MG30 as necessary.

When the parameters have been sent, the master unit turns the command request - parameter initial transmission complete (PIF) ON. After the PIF for the number of axes set in phase 1 are received, the MR-MG30 shifts to phase 3.

Even if the parameter is validated when the power is turned ON/OFF, common parameters/axis parameters (positioning parameters) sent to the MR-MG30 with this phase are valid even without turning the power OFF and ON. Note that the axis parameters (servo parameters) follow the specifications for each servo amplifier.

(3) Phase 3 (Initialization between MR-MG30 and servo amplifier)

When phase 2 is finished, the MR-MG30 carries out the initialization process corresponding to the parameters received in phase 2. After that, initial communication for the servo amplifiers, corresponding to the number of axes set in phase 1 starts.

The initial communication with the servo amplifier is carried out with each servo amplifier. The axes in the servo amplifier, for which initial communication has been turned completed, send the command response - servo amplifier control READY (RDONS) ON to the master unit. The master unit shifts to normal control after receiving RDONS.

2. PROFIBUS COMMUNICATION FUNCTION

2.9 Normal control

2.9.1 Data communication timing

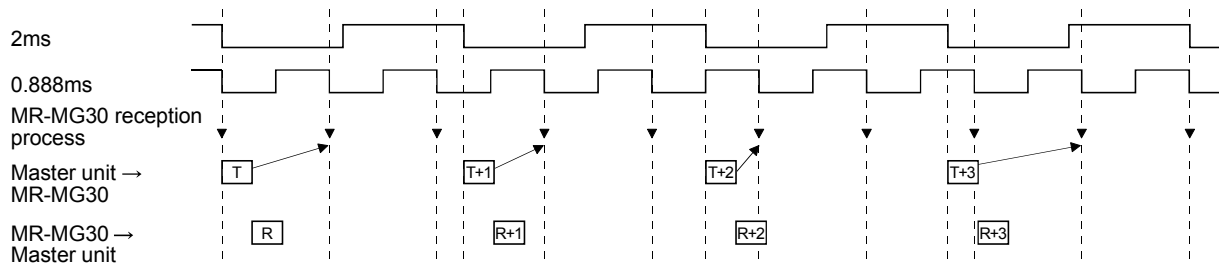
The MR-MG30 retrieves the data received from the master unit and updates the sent data at a 0.888msec cycle.

There is no problem if the actual communication cycle between the master unit and MR-MG30 is long (Item (1)). However, if the communication cycle between the master unit and MR-MG30 is faster (Item (2)), the data from the master unit may overflow from the MR-MG30.

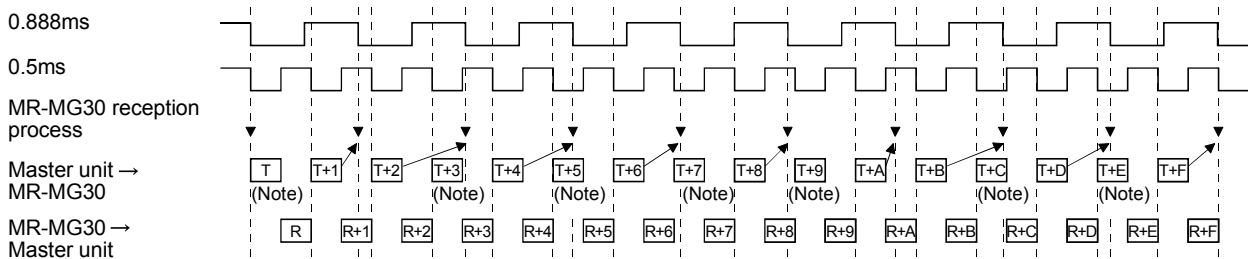
Thus, a cycle to update the data received after the MR-MG30 send/receive process cycle must be set in the master unit separately from the communication cycle. (Item (3))

In the actual control, complete a handshake with the data from the MR-MG30 and update the data if necessary. (Refer to section 2.9.2, 2.9.3)

(1) Communication cycle between master unit - MR-MG30: 2msec Master unit data update cycle 2msec

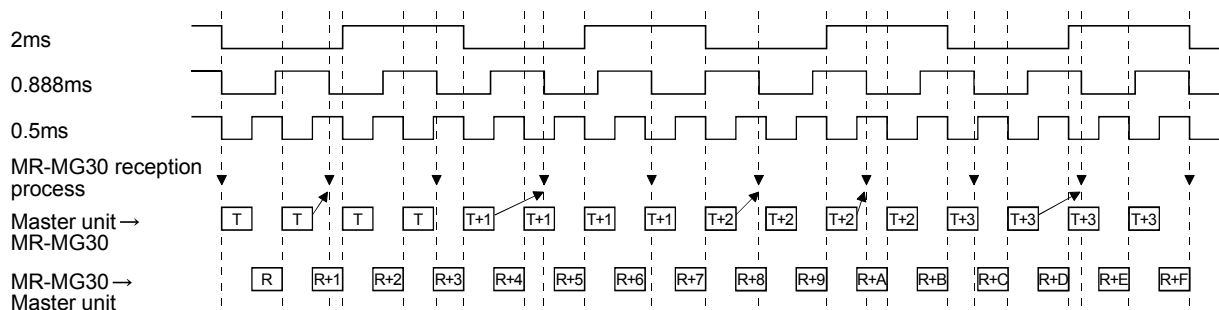


(2) Communication cycle between master unit - MR-MG30: 0.5msec Master unit data update cycle 0.5msec



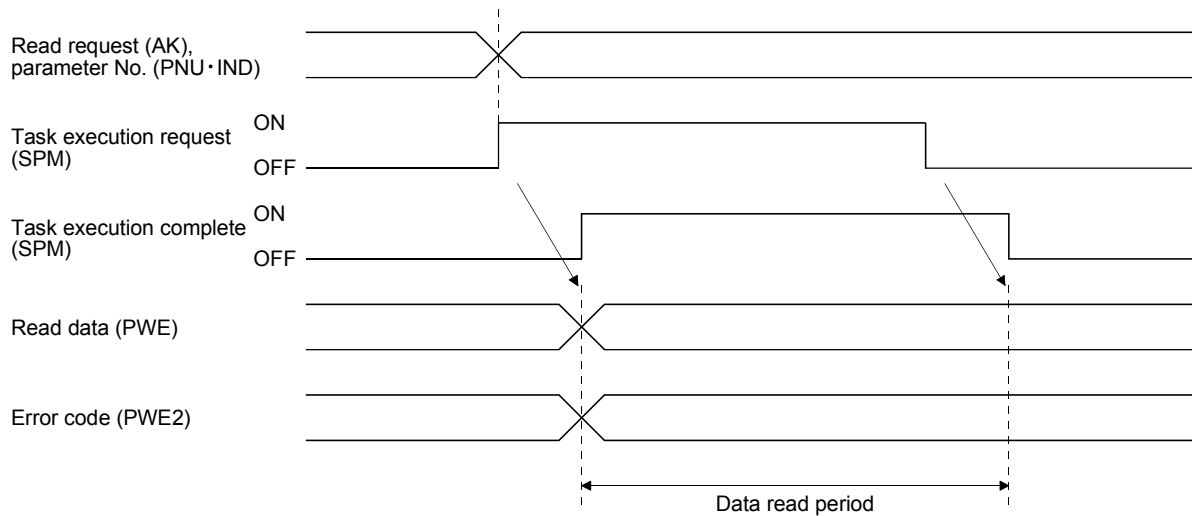
Note. Overflowing data

(3) Communication cycle between master unit - MR-MG30: 0.5msec Master unit data update cycle 2msec



2. PROFIBUS COMMUNICATION FUNCTION

2.9.2 Read request



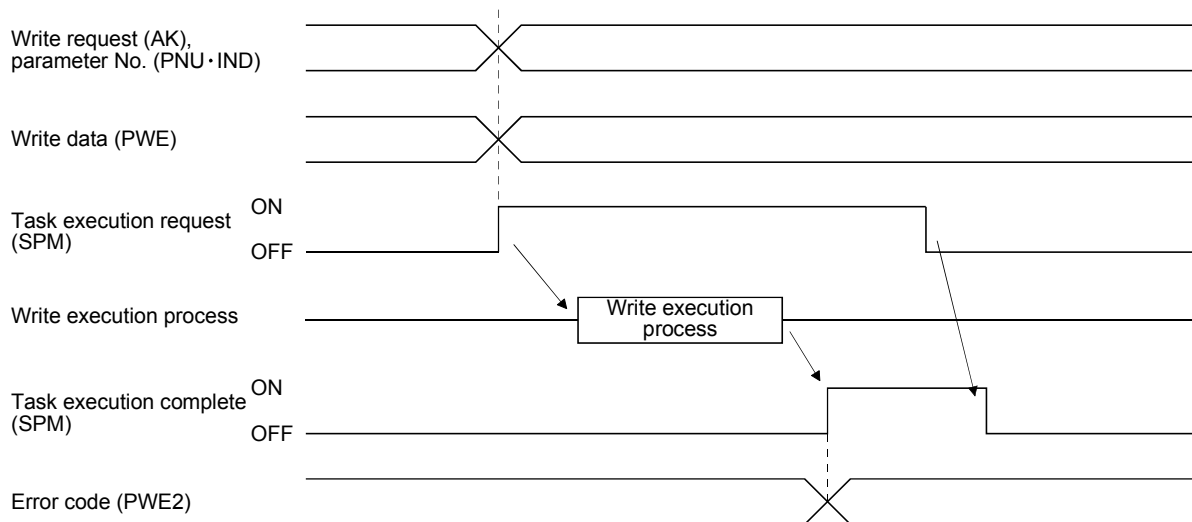
Set the read request (AK) and parameter No. (PNU · IND), and turn the task execution request (SPM) ON. When the task execution request turns ON, the data corresponding to the set read request and parameter No. is set in PWE.

The task execution complete signal (SPM) turns ON simultaneously at this time. Read out the read data set in the PWE while task execution complete is ON.

If an error occurs in respect to the read request, the error code is set in PWE2.

Turn the task execution request (SPM) OFF after the task execution complete (SPM) turns ON and reading of the data is completed.

2.9.3 Write request



Set the write request (AK), parameter No. (PNU · IND) and write data (PWE), and turn the task execution request (SPM) ON. When the task execution request turns ON, the data set in the write data (PWE) is written. When writing is completed, the task execution complete signal (SPM) turns ON.

If an error occurs in respect to the write request, the error code is set in PWE2.

Turn the task execution request (SPM) OFF after the task execution complete (SPM) turns ON.

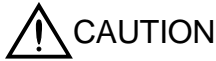
3. SIGNALS AND WIRING

3. SIGNALS AND WIRING



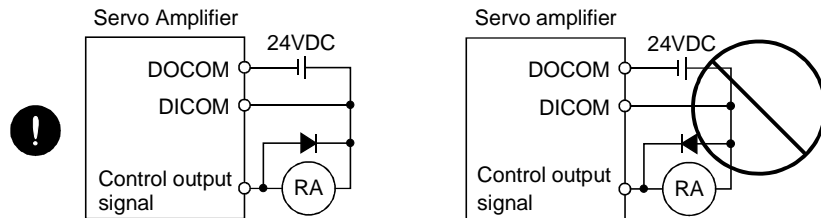
WARNING

- Any person who is involved in wiring should be fully competent to do the work.
- The cables should not be damaged, stressed excessively, loaded heavily, or pinched. Otherwise, you may get an electric shock.



CAUTION

- Wire the equipment correctly and securely. Otherwise, the servo motor may misoperate, resulting in injury.
- Connect cables to correct terminals to prevent a burst, fault, etc.
- Ensure that polarity (+, -) is correct. Otherwise, a burst, damage, etc. may occur.
- The surge absorbing diode installed to the DC relay designed for control output should be fitted in the specified direction. Otherwise, the signal is not output due to a fault, disabling the emergency stop (EMG) and other protective circuits. (The figure shows the case of the sink interface.)



- Use a noise filter, etc. to minimize the influence of electromagnetic interference, which may be given to electronic equipment used near the servo amplifier.
- Do not install a power capacitor, surge suppressor or radio noise filter (FR-BIF option) with the power line of the servo motor.
- When using the regenerative brake resistor, switch power off with the alarm signal. Otherwise, a transistor fault or the like may overheat the regenerative brake resistor, causing a fire.
- Do not modify the equipment.

3.1 Connection Example



CAUTION

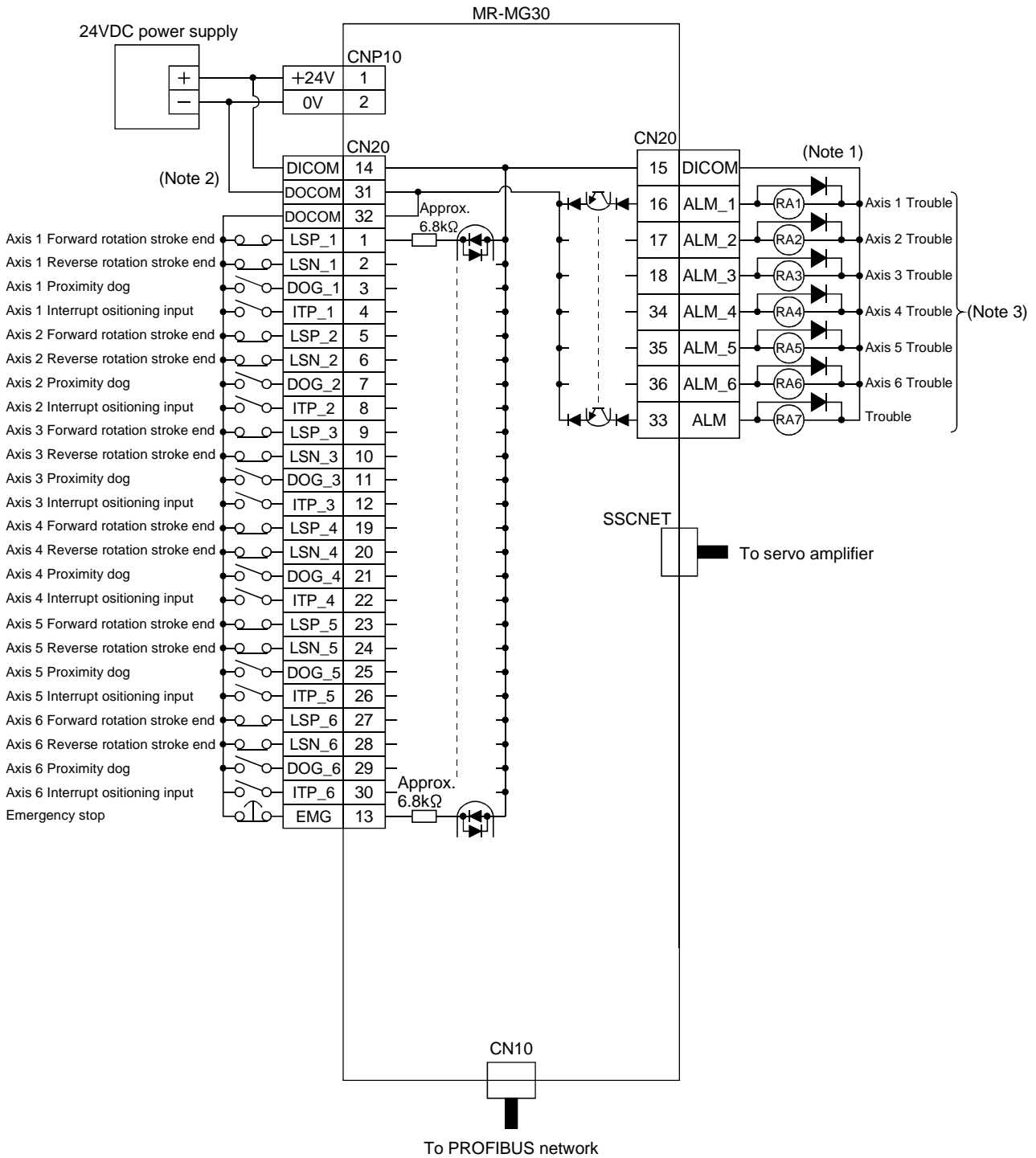
- The emergency stop switch (normally closed contact) must be installed.

POINT

- When starting operation, always turn on emergency stop (EMG) and Forward/Reverse rotation stroke end (LSP/LSN/LSP_□/LSN_□). (Normally closed contacts)
- The pins with the same signal name are connected in the MR-MG30.

3. SIGNALS AND WIRING

(1) Sink I/O interface



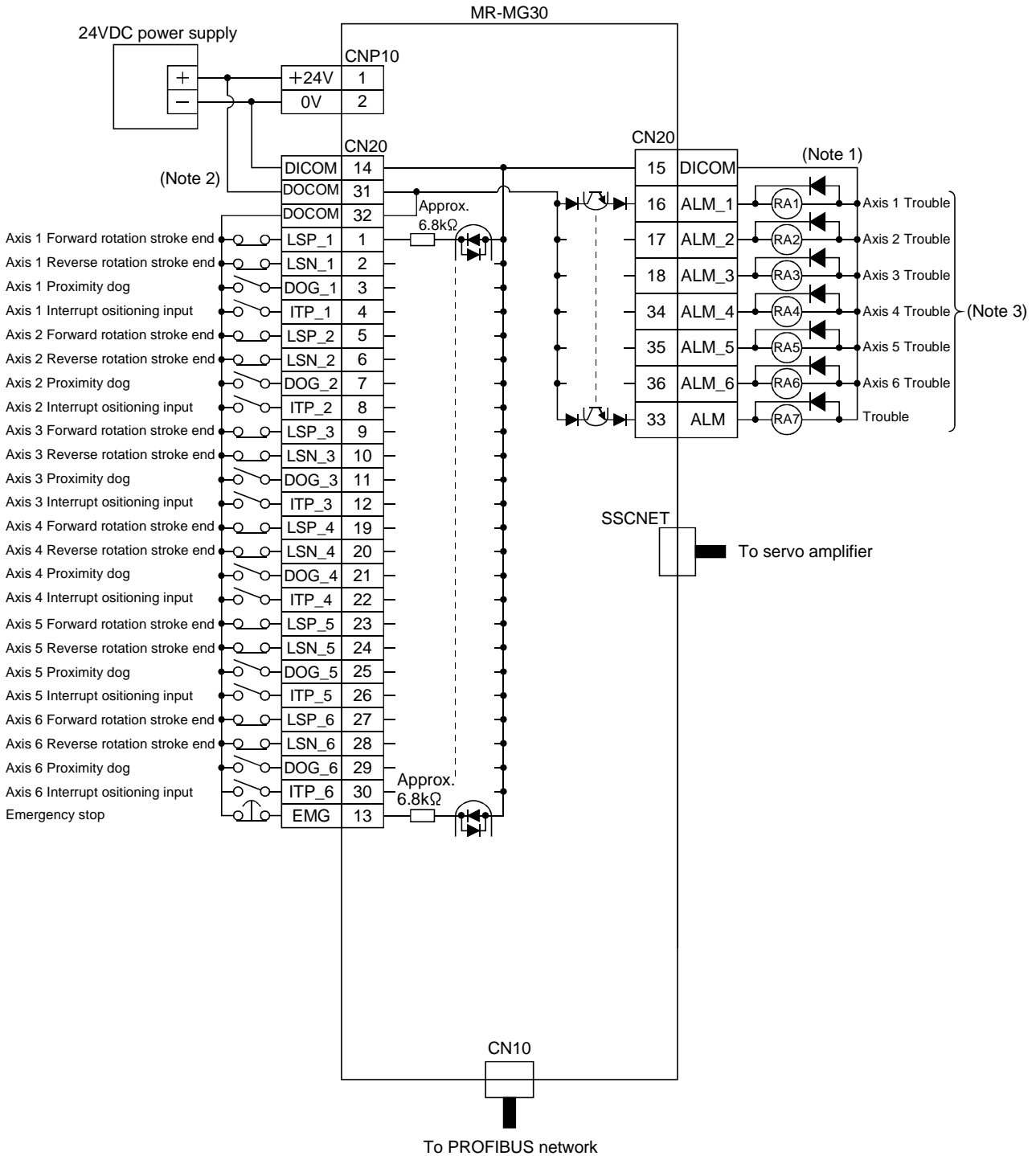
Note 1. Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will be faulty and will not output signals, disabling the emergency stop (EMG) and other protective circuits.

2. Supply $24\text{VDC} \pm 10\%$ 500mA current for interfaces from the outside. 500mA is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points. Refer to Section 3.4 that gives the current value necessary for the interface.

3. Trouble (ALM/ALM_□) turns on in normal alarm-free condition.

3. SIGNALS AND WIRING

(2) Source I/O interface



Note 1. Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will be faulty and will not output signals, disabling the emergency stop (EMG) and other protective circuits.

2. Supply 24VDC±10% 500mA current for interfaces from the outside. 500mA is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points. Refer to Section 3.4 that gives the current value necessary for the interface.

3. Trouble (ALM/ALM_□) turns on in normal alarm-free condition.

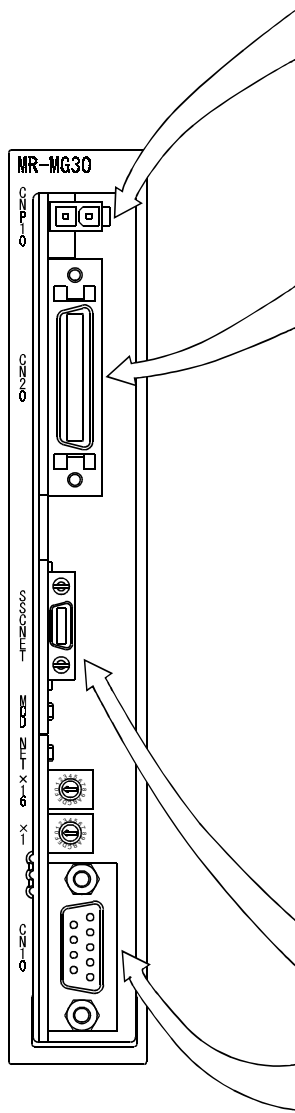
3. SIGNALS AND WIRING

3.2 I/O signals

3.2.1 Connectors and Signal Layouts

POINT
<ul style="list-style-type: none"> The pin configurations of the connectors are as viewed from the cable connector wiring section. Refer to section 2.2 for CN1 signal assignment.

The connectors and bus cable for connection are not supplied. Prepare them on the customer side.



- CNP10 (Power supply connector)

Signal layout

1	2
+24V	0V

Connector for connection

Product name	Model name	Manufacturer
Connector	5557-02R-210	Molex
Case	5556-PBTL	

- CN20 (I/O signal connector)

Signal layout

(Note)			
35	ALM_6	17	ALM_3
ALM_5	34	ALM_2	16
33	ALM_4	15	ALM_1
ALM	32	DICOM	14
31	DOCOM	13	DICOM
DOCOM	30	EMG	12
29	ITP_6	11	ITP_3
DOG_6	28	DOG_3	10
27	LSN_6	9	LSN_3
LSP_6	26	LSP_3	8
25	ITP_5	7	ITP_2
DOG_5	24	DOG_2	6
23	LSN_5	5	LSN_2
LSP_5	22	LSP_2	4
21	ITP_4	3	ITP_1
DOG_4	20	DOG_1	2
19	LSN_4	1	LSN_1
LSP_4		LSP_1	

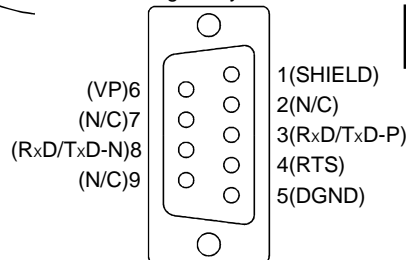
Connector for connection(36pin)

Product name	Model name	Manufacturer
Connector	10136-3000VE	3M
Case	10336-52F0-008	

Note. The pins enclosed by the thick line are in the default signal layout. The devices of these pins can be changed by setting the common parameter Nos. 21 to 44.

- SSCNET (SSCNET II connector)
Bus cable Q172J2BCBL□M
- CN10 (PROFIBUS connector)

Signal layout



Connector for connection (D-sub 9-pin male)

Product name	Model name	Manufacturer
Connector + case	17JE-23090-02-D8A	DDK

3. SIGNALS AND WIRING

3.2.2 Explanation of power supply system signals

(1) Interface power supply

(a) In the case of sink interface

Signal name	Abbreviation	Connector pin No.	Function/application explanation
Digital I/F power supply input	DICOM	CN20-14 CN20-15	Input 24VDC (500mA or more) for input interface. The pins are connected internally. Connect + of the 24VDC external power supply. 24DC \pm 10%
Digital I/F common	DOCOM	CN20-31 CN20-32	Common terminals for the input signals such as EMG. The pins are connected internally.

(b) In the case of source interface

Signal name	Abbreviation	Connector pin No.	Function/application explanation
Digital I/F common	DICOM	CN20-14 CN20-15	Common terminals for the input signals such as EMG. The pins are connected internally.
Digital I/F power supply input	DOCOM	CN20-31 CN20-32	Input 24VDC (500mA or more) for input interface. The pins are connected internally. Connect + of the 24VDC external power supply. 24DC \pm 10%

(2) Control circuit power supply

Signal name	Abbreviation	Connector pin No.	Function/application explanation
Control circuit power supply	+24	CNP10-1	Control circuit power supply input terminals. Supply 24VDC. Connect the positive side to +24V, and the negative side to 0V. 24VDC \pm 10%
	0V	CNP10-2	

3. SIGNALS AND WIRING

3.2.3 Signal (device) explanation

(1) I/O devices

The devices indicated here can be assigned to any pins of the connector CN20 in the common parameter setting for use as I/O signals.

(a) Changeable pins

For the I/O interfaces (symbols in I/O division column in the table), refer to Section 3.4.

Pin type	Connector pin No.	I/O category	Default device
Input	CN20-1	DI-1	Axis 1 Forward rotation stroke end (LSP_1)
	CN20-2		Axis 1 Reverse rotation stroke end (LSN_1)
	CN20-3		Axis 1 Proximity dog (DOG_1)
	CN20-4		Axis 1 Interrupt ositioning input (ITP_1)
	CN20-5		Axis 2 Forward rotation stroke end (LSP_2)
	CN20-6		Axis 2 Reverse rotation stroke end (LSN_2)
	CN20-7		Axis 2 Proximity dog (DOG_2)
	CN20-8		Axis 2 Interrupt ositioning input (ITP_2)
	CN20-9		Axis 3 Forward rotation stroke end (LSP_3)
	CN20-10		Axis 3 Reverse rotation stroke end (LSN_3)
	CN20-11		Axis 3 Proximity dog (DOG_3)
	CN20-12		Axis 3 Interrupt ositioning input (ITP_3)
	CN20-19		Axis 4 Forward rotation stroke end (LSP_4)
	CN20-20		Axis 4 Reverse rotation stroke end (LSN_4)
	CN20-21		Axis 4 Proximity dog (DOG_4)
	CN20-22		Axis 4 Interrupt ositioning input (ITP_4)
	CN20-23		Axis 5 Forward rotation stroke end (LSP_5)
	CN20-24		Axis 5 Reverse rotation stroke end (LSN_5)
	CN20-25		Axis 5 Proximity dog (DOG_5)
	CN20-26		Axis 5 Interrupt ositioning input (ITP_5)
CN20-27	Axis 6 Forward rotation stroke end (LSP_6)		
CN20-28	Axis 6 Reverse rotation stroke end (LSN_6)		
CN20-29	Axis 6 Proximity dog (DOG_6)		
CN20-30	Axis 6 Interrupt ositioning input (ITP_6)		
Output	CN20-16	DO-1	Axis 1 Trouble (ALM_1)
	CN20-17		Axis 2 Trouble (ALM_2)
	CN20-18		Axis 3 Trouble (ALM_3)
	CN20-34		Axis 4 Trouble (ALM_4)
	CN20-35		Axis 5 Trouble (ALM_5)
	CN20-36		Axis 6 Trouble (ALM_6)

3. SIGNALS AND WIRING

(b) Input devices

The assignment of the devices to the connector CN20 can be changed by the common parameters No. 21 to 44. The input devices assigned to the pins cannot be used for PROFIBUS communication.

□ of the signal abbreviation in the table indicates the axis number. For example, the signal abbreviation of the servo-on signal of Axis 3 is SON_3.

Device name	Abbreviation	Function/application explanation																																					
No assigned function		No function is assigned.																																					
Alarm reset	RES_□	Turn RES_□ on for more than 50ms to reset the alarm. Some servo alarms and option unit alarms cannot be deactivated by the reset (RES_□). Refer to Chapter 6 and the troubleshooting chapter of the corresponding Servo Amplifier Instruction Manual. Turning RES_□ on in an alarm-free status shuts off the base circuit.																																					
Operation alarm reset	ORST_□	When ORST_□ is turned ON, the current operation alarm is reset.																																					
Servo-on	SON_□	Turn SON_□ on to power on the base circuit and make the servo amplifier ready to operate (servo-on). Turn it off to shut off the base circuit and coast the servo motor (servo off). Set "8 □ □ □" in positioning parameter No. 46 to switch this signal on (keep terminals connected) automatically in the servo amplifier.																																					
Operation start	ST_□	When ST_□ is turned ON, the operation specified for Operation mode selection (MD0_□/MD1_□/ MD2_□) is started.																																					
Start direction	DIR_□	When DIR_□ is turned OFF in the JOG operation mode, the axis moves in the address increasing direction, and when DIR_□ is turned ON, the axis moves in the address decreasing direction.																																					
Operation stop	STP_□	When STP_□ is turned ON during operation, the current operation is decelerated to a stop. Operation is not resumed if STP_□ is turned OFF again.																																					
Operation mode selection 0	MD0_□	Select the operation mode from among the 3-bit binary values.																																					
Operation mode selection 1	MD1_□																																						
Operation mode selection 2	MD2_□																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Selected operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>Manual operation</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>High-speed home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>Automatic operation (direct specification)</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>Interrupt positioning operation</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td rowspan="3">For manufacturer setting Do not change this value by any means.</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>			(Note) Device			Selected operation mode	MD2_□	MD1_□	MD0_□	0	0	0	Manual operation	0	0	1	Home position return	0	1	0	High-speed home position return	0	1	1	Automatic operation (direct specification)	1	0	0	Interrupt positioning operation	1	0	1	For manufacturer setting Do not change this value by any means.	1	1	0	1	1	1
(Note) Device			Selected operation mode																																				
MD2_□	MD1_□	MD0_□																																					
0	0	0	Manual operation																																				
0	0	1	Home position return																																				
0	1	0	High-speed home position return																																				
0	1	1	Automatic operation (direct specification)																																				
1	0	0	Interrupt positioning operation																																				
1	0	1	For manufacturer setting Do not change this value by any means.																																				
1	1	0																																					
1	1	1																																					
Note. 0: OFF 1: ON																																							
Temporary stop	TSTP_□	Turn TSTP_□ ON during automatic operation to make a temporary stop. Turn TSTP_□ OFF STP-SG again to make a restart. Shorting the forward operation start (ST_□) during a temporary stop is ignored. Switching from automatic mode to manual mode during a temporary stop clears the remaining moving distance. During home position return and jog operation, the temporary stop/restart input is ignored. Refer to Section 3.3.1.																																					
Speed change	SCHG_□	When SCHG_□ is turned ON, the current speed is changed to the speed set to the command request/command speed. Invalid in the home position return mode.																																					
Torque limit selection	TL_□	OFF: The servo motor torque is generated to the maximum. ON: The servo motor torque is limited to the servo parameter No. 10/11 setting.																																					
Interrupt positioning input	ITP_□	When ITP_□ is turned ON in the interrupt positioning operation mode, the axis stops after moving the distance set to the command request/target position.																																					

3. SIGNALS AND WIRING

Device name	Abbreviation	Function/application explanation																								
Forward rotation stroke end	LSP_□	<p>To start operation, turn LSP_□/LSN_□ on. Turn it off to bring the motor to a sudden stop and make it servo-locked.</p> <p>Set "1" in positioning parameter No. 53 to make a slow stop.</p> <table border="1"> <thead> <tr> <th colspan="2">(Note) Input signals</th> <th colspan="2">Operation</th> </tr> <tr> <th>LSP_□</th> <th>LSN_□</th> <th>CCW direction</th> <th>CW direction</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>○</td> <td>○</td> </tr> <tr> <td>0</td> <td>1</td> <td></td> <td>○</td> </tr> <tr> <td>1</td> <td>0</td> <td>○</td> <td></td> </tr> <tr> <td>0</td> <td>0</td> <td></td> <td></td> </tr> </tbody> </table>	(Note) Input signals		Operation		LSP_□	LSN_□	CCW direction	CW direction	1	1	○	○	0	1		○	1	0	○		0	0		
(Note) Input signals		Operation																								
LSP_□	LSN_□	CCW direction	CW direction																							
1	1	○	○																							
0	1		○																							
1	0	○																								
0	0																									
Reverse rotation stroke end	LSN_□	<p>Note. 0: off 1: on</p> <p>LSP_□/LSN_□ can be internally changed to Automatic ON (Always ON) by the positioning parameter NO. 47 setting.</p>																								
Proximity dog	DOG_□	<p>When DOG_□ turn off, the proximity dog signal is detected. The polarity of dog detection input can be changed with the parameter.</p> <table border="1"> <thead> <tr> <th>Positioning parameter No.15</th> <th>Polarity of proximity dog detection input</th> </tr> </thead> <tbody> <tr> <td>0 (initial value)</td> <td>DOG_□ turn off.</td> </tr> <tr> <td>1</td> <td>DOG_□ turn on.</td> </tr> </tbody> </table>	Positioning parameter No.15	Polarity of proximity dog detection input	0 (initial value)	DOG_□ turn off.	1	DOG_□ turn on.																		
Positioning parameter No.15	Polarity of proximity dog detection input																									
0 (initial value)	DOG_□ turn off.																									
1	DOG_□ turn on.																									

(c) Output devices

The assignment of the devices to the connector CN20 can be changed by the common parameters No. 45 to 50. The output devices assigned to the pins can also be used for PROFIBUS communication.

□ of the signal abbreviation in the table indicates the axis number. For example, the signal abbreviation of the trouble signal of Axis 3 is ALM_3.

Device name	Abbreviation	Function/application explanation
No assigned function		No function is assigned.
Trouble	ALM_□	<p>ALM_□ turns off when power is switched off or the protective circuit is activated to shut off the base circuit.</p> <p>Without alarm occurring, ALM_□ turns on within 1.5s after power-on.</p>
Warning	WNG_□	When warning has occurred, WNG_□ turns on. When there is no warning, WNG_□ turns off within 1.5s after power-on.
In position	INP_□	<p>INP_□ turns on when the number of droop pulses is in the preset in-position range. The in-position range can be changed using servo parameter No. 20.</p> <p>When the in position range is increased, this signal may be always ON at low speed rotation.</p> <p>INP_□ turns on when servo on turns on. It turns OFF during base shutoff.</p>

3. SIGNALS AND WIRING

Device name	Abbreviation	Function/application explanation																																					
Home position return completion	ZP_□	ZP_□ turns ON at completion of a home position return. In an absolute position system, ZP_□ turns ON when operation is ready to start, but turns OFF in any of the following cases. 1) Servo-on (SON_□) is turned OFF. 2) Forced stop (EMG_□) is turned OFF. 3) Servo amplifier forced stop (EM1) is turned OFF. 4) Alarm occurs. 5) Home position return has not been made after product purchase. 6) Home position return has not been made after occurrence of Absolute position erase (AL.25) or Absolute position counter warning (AL.E3). 7) Home position return has not been made after electronic gear change. 8) Home position return has not been made after the absolute position system was changed from invalid to valid. 9) When the rotation direction selection has been changed 10) When the home position address has been changed 11) During home position return When any of 1) to 11) has not occurred and a home position return is already completed at least once, Home position return completion (ZP_□) turns to the same output status as Ready (RD_□).																																					
Ready	RD_□	RD_□ turns on when the servo is switched on and the servo amplifier is ready to operate.																																					
Operation alarm	OALM_□	When an operation alarm occurs, OALM_□ turns ON.																																					
Movement finish	MEND_□	MEND_□ turns ON when In position (INP_□) turns ON and the command remaining distance is "0". (Refer to section 3.3.2) MEND_□ turns ON at servo-on.																																					
Control mode selection	CPO_□	CPO_□ turns ON when the command remaining distance becomes less than the rough match output range set in the parameter. The control mode selection range can be changed by the positioning parameter No. 40. CPO_□ turns ON at servo-on. It is always ON during a home position return or manual operation.																																					
Operation mode selection 0	MDO0_□	The currently selected operation mode is output.																																					
Operation mode selection 1	MDO1_□	<table border="1"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MDO2_□</th> <th>MDO1_□</th> <th>MDO0_□</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>Manual operation</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>High-speed home position return</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>Automatic operation (direct specification)</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td rowspan="3">Interrupt positioning operation For manufacturer setting</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> </tbody> </table> <p>Note. 0: off 1: on</p>	(Note) Device			Operation mode	MDO2_□	MDO1_□	MDO0_□	0	0	0	Manual operation	0	0	1	Home position return	0	1	0	High-speed home position return	0	1	1	Automatic operation (direct specification)	1	0	0	Interrupt positioning operation For manufacturer setting	1	0	1	1	1	0	1	1	1	
(Note) Device			Operation mode																																				
MDO2_□	MDO1_□			MDO0_□																																			
0	0		0	Manual operation																																			
0	0	1	Home position return																																				
0	1	0	High-speed home position return																																				
0	1	1	Automatic operation (direct specification)																																				
1	0	0	Interrupt positioning operation For manufacturer setting																																				
1	0	1																																					
1	1	0																																					
1	1	1																																					
Operation mode selection 2	MDO2_□																																						
Temporary stop	PUS_□	PUS_□ turns ON when deceleration for a stop is started by Temporary stop (TSTP_□). When TSTP_□ is turned OFF to resume operation, PUS_□ turns OFF.																																					
Speed change finished	SCF_□	SCF_□ turns ON when a speed change is normally completed.																																					
Speed change illegal	SCE_□	SCE_□ turns ON when a speed change is not normally completed.																																					
Limiting torque	TLC_□	TLC_□ turns ON when the generated torque reaches the preset torque. It turns OFF when Servo-on (SON) turns OFF.																																					
Position range	POT_□	Position range (POT_□) turns ON when the current position is within the range set in the positioning parameter No. 42 to 45. If the current position is within the set range, the signal turns OFF at incompletion of a home position return or during base shutoff (during servo off, alarm occurrence or alarm reset).																																					

3. SIGNALS AND WIRING

(2) Input signal

Signal name	Abbreviation	Connector pin No.	Function/application explanation	(Note) I/O category
Emergency stop	EMG	CN20-13	Turn EMG on to bring the motor to an emergency stop state, in which the servo is switched off and the dynamic brake is operated. Turn EMG off in the emergency stop state to reset that state.	DI-1

Note. Refer to Section 3.4 for the interface.

(3) Output signal

Signal name	Abbreviation	Connector pin No.	Function/application explanation	(Note) I/O category
Trouble	ALM	CN20-33	ALM turns off when power is switched off or the protective circuit is activated to shut off the base circuit. Without alarm occurring, ALM turns on within 1.5s after power-on.	DO-1

Note. Refer to Section 3.4 for the interface.

(4) SSCNET

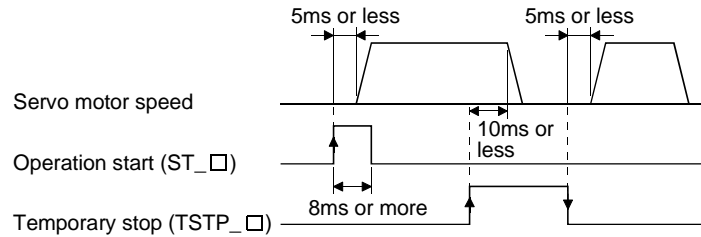
Connector	Name	Function/application explanation
SSCNET	Bus cable connector	Connect the connector to the servo amplifier. Use the Q172J2BCBL□M as the connection cable.

3. SIGNALS AND WIRING

3.3 Detailed description of signals (devices)

3.3.1 Operation start (ST_□) • Temporary stop (TSTP_□)

- (1) Operation start (ST_□) should make the sequence which can be used after the main circuit has been established. These signals are invalid if it is switched on before the main circuit is established. Normally, it is interlocked with the ready (RD_□).
- (2) A start in the servo amplifier is made when the operation start (ST_□) changes from OFF to ON. The delay time of the servo amplifier's internal processing is max. 5ms. The delay time of other signals is max. 10ms.



- (3) The ON time of the operation start (ST_□) and temporary stop (TSTP_□) signal should be 8ms or longer to prevent a malfunction.
- (4) During operation, the operation start (ST_□) is not accepted. The next operation should always be started after the rough match (CPO_□) is output with the rough match output range set to 0 or after the movement finish (MEND_□) is output.

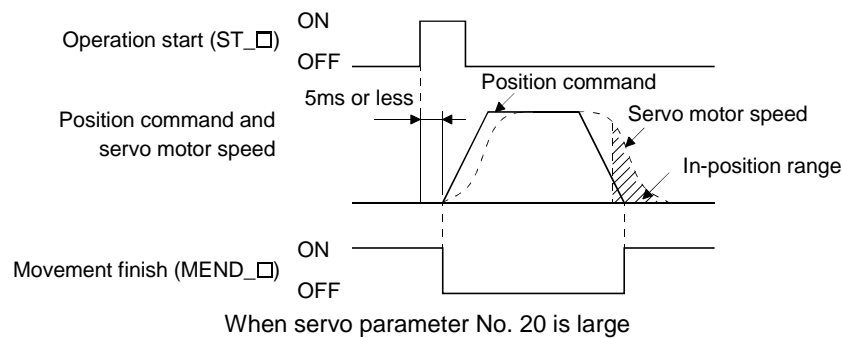
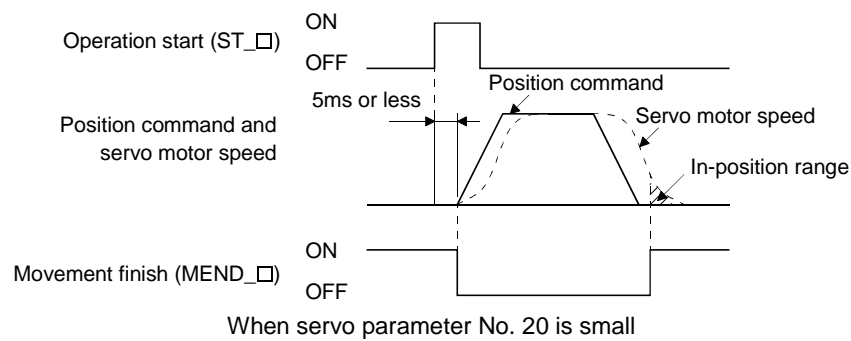
3. SIGNALS AND WIRING

3.3.2 Movement finish • Rough match • In position

POINT
<ul style="list-style-type: none"> If servo-on occurs after a stop made by servo-off, alarm occurrence or emergency stop (EMG) ON during automatic operation, Movement finish (MEND_□), Rough match (CPO_□) and In position (INP_□) turn on. To make a start again, confirm the point table No. being specified, and turn on Operation start (ST_□).

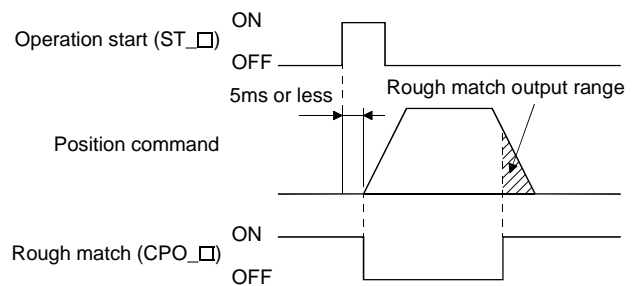
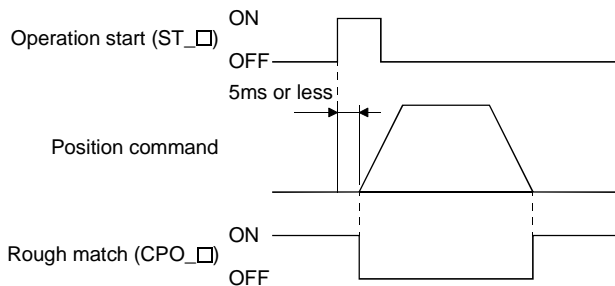
(1) Movement finish

The following timing charts show the output timing relationships between the position command generated in the servo amplifier and the movement finished (MEND_□). This timing can be changed using servo parameter No. 20 (in-position range). MEND_□ turns ON in the servo-on status.



(2) Rough match

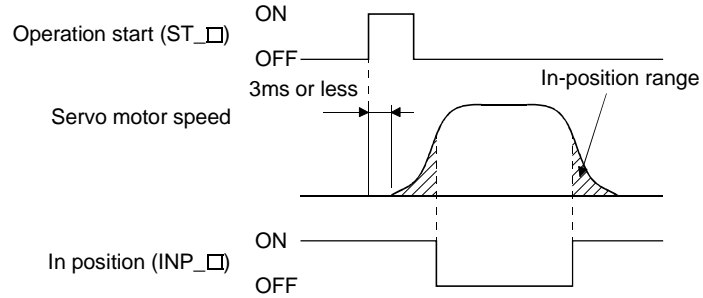
The following timing charts show the relationships between the signal and the position command generated in the servo amplifier. This timing can be changed using positioning parameter No. 40 (rough match output range). CPO_□ turns ON in the servo-on status.



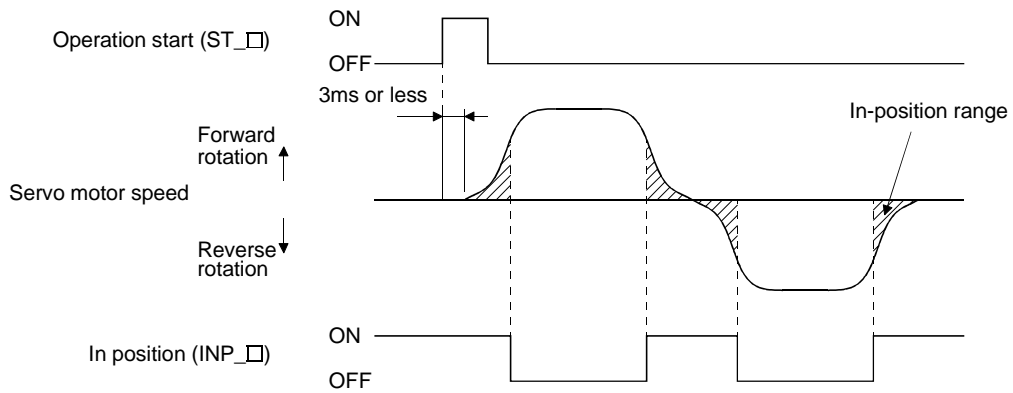
3. SIGNALS AND WIRING

(3) In position

The following timing chart shows the relationship between the signal and the feedback pulse of the servo motor. This timing can be changed using servo parameter No. 20 (in-position range). INP_□ turns ON in the servo-on status.



When positioning operation is performed once



When servo motor reverses rotation direction during automatic continuous operation

3. SIGNALS AND WIRING

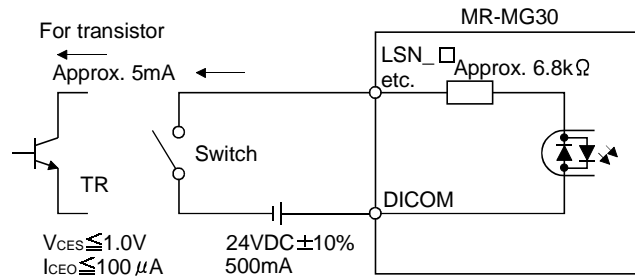
3.4 Interfaces

This section provides the details of the I/O signal interfaces (refer to the I/O division in the table) given in Section 3.2. Refer to this section and make connection with the external equipment.

3.4.1 Sink I/O interface

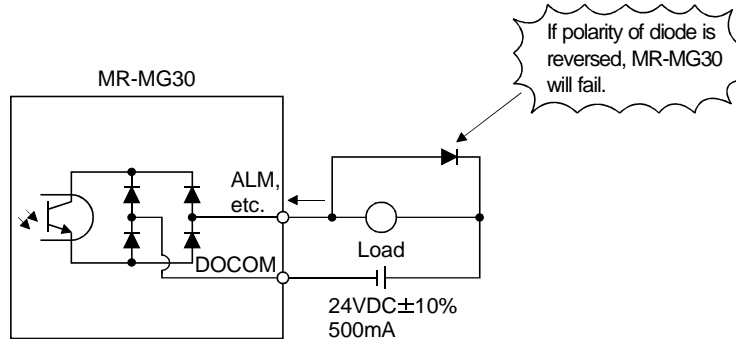
(1) Digital input interface DI-1

Give a signal with a relay or open collector transistor.



(2) Digital output interface DO-1

A lamp, relay or photocoupler can be driven. Install a diode (D) for an inductive load, or install an inrush current suppressing resistor (R) for a lamp load. (Permissible current: 40mA or less, inrush current: 100mA or less) A maximum of 2.6V voltage drop occurs in the servo amplifier.

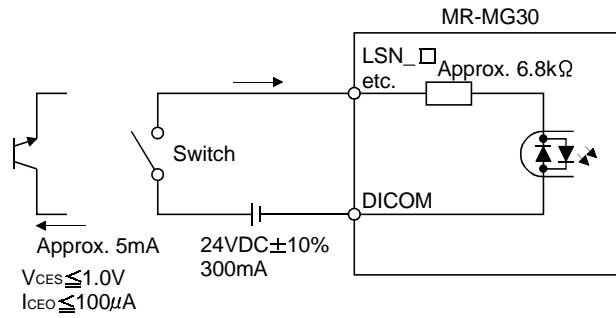


3. SIGNALS AND WIRING

3.4.2 Source I/O interfaces

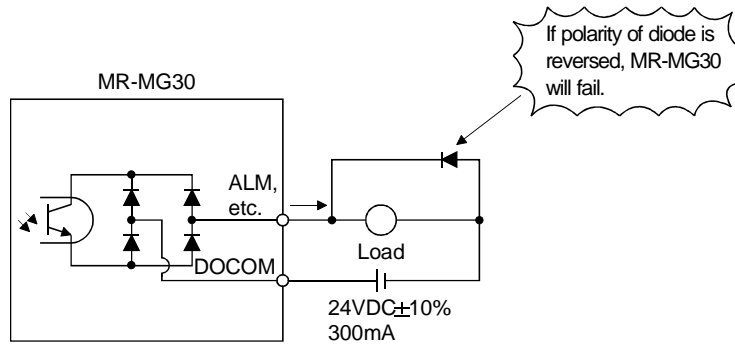
In MR-MG30, source type I/O interfaces can be used. In this case, all DI-1 input signals and DO-1 output signals are of source type. Perform wiring according to the following interfaces.

(1) Digital input interface DI-1



(2) Digital output interface DO-1

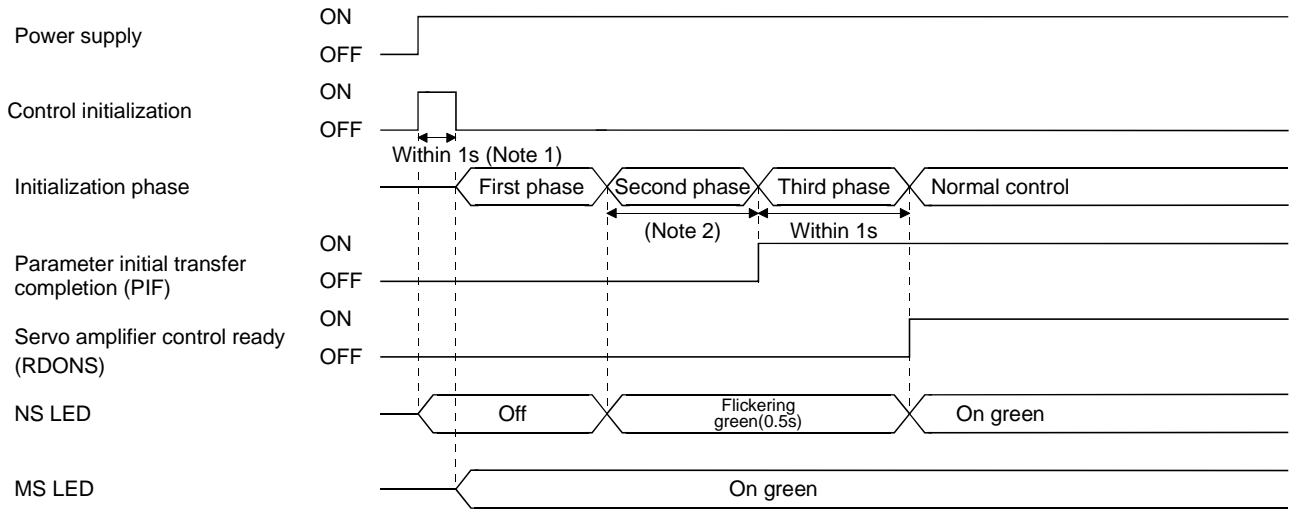
A maximum of 2.6V voltage drop occurs in the servo amplifier.



3. SIGNALS AND WIRING

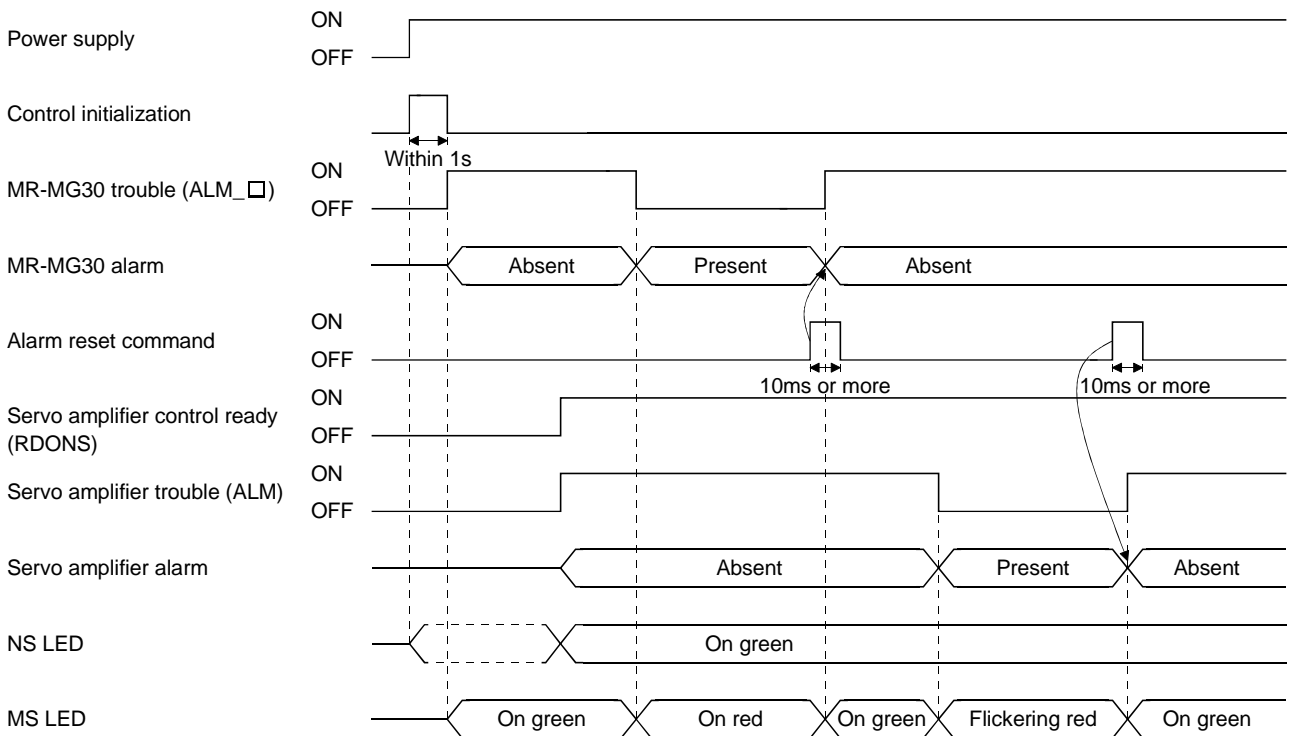
3.5 Operation Timing

3.5.1 Power ON to initialization sequence



- Note 1. Longer than 1s when parameter clear was executed at previous power ON.
 2. Changes greatly depending on the number of transferred parameters.

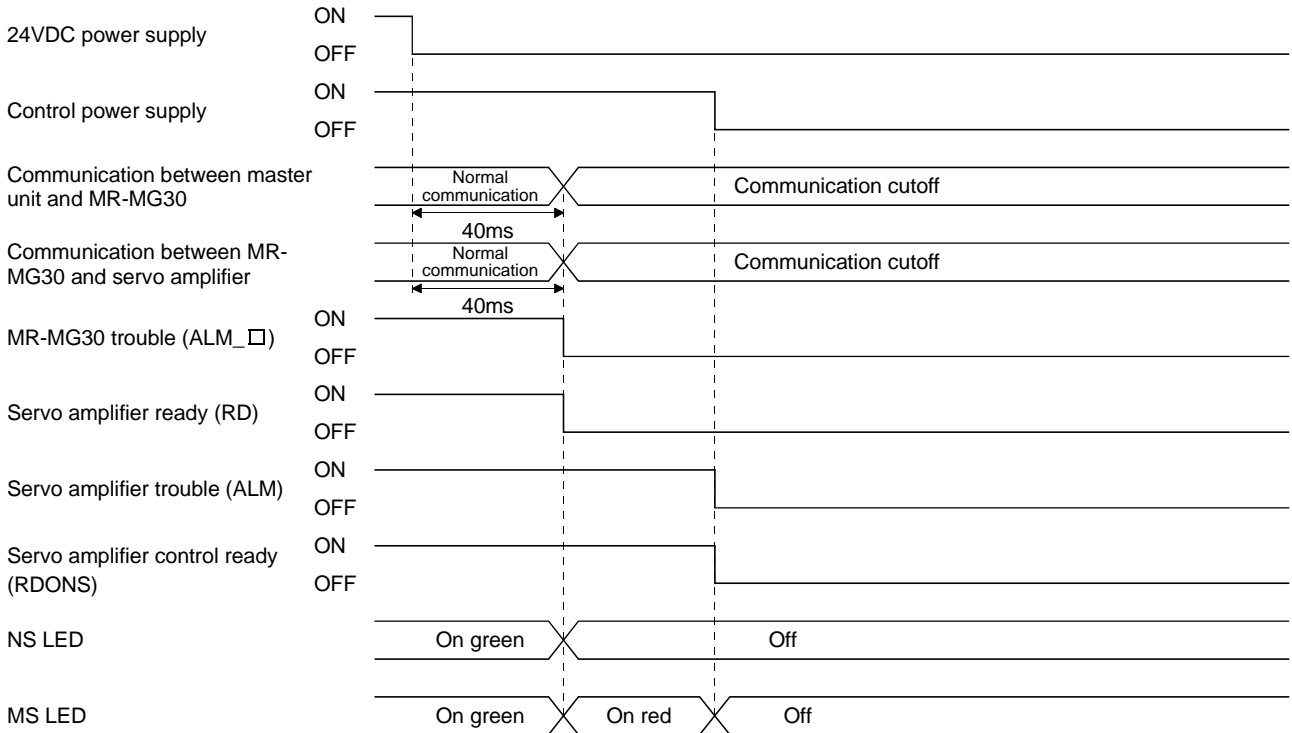
3.5.2 Trouble occurrence



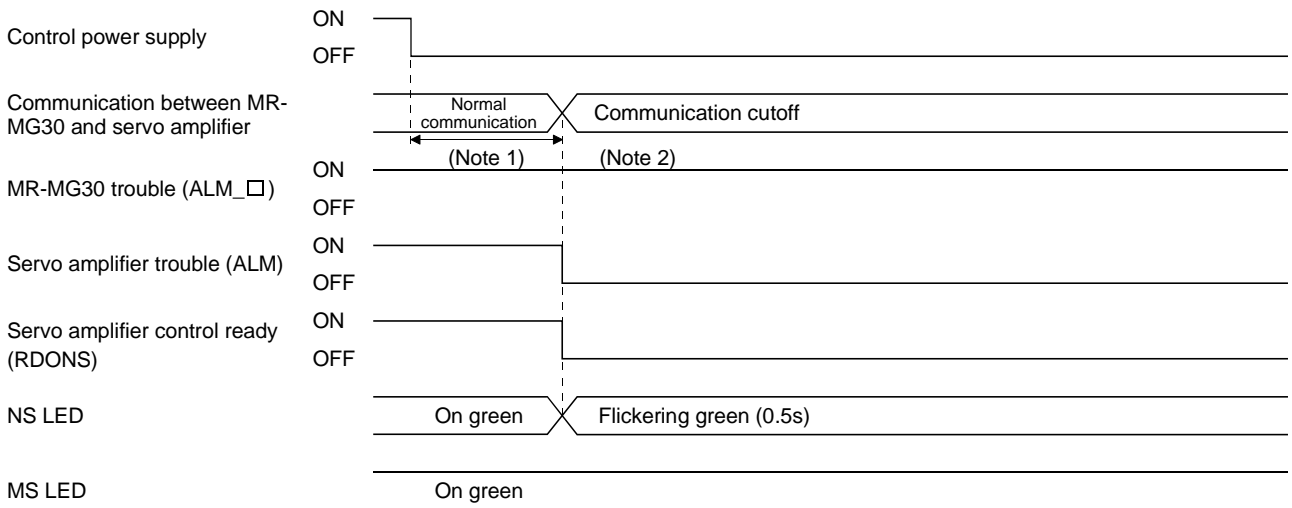
3. SIGNALS AND WIRING

3.5.3 Power supply shutoff

(1) MR-MG30 power supply OFF



(2) Servo amplifier control circuit power OFF

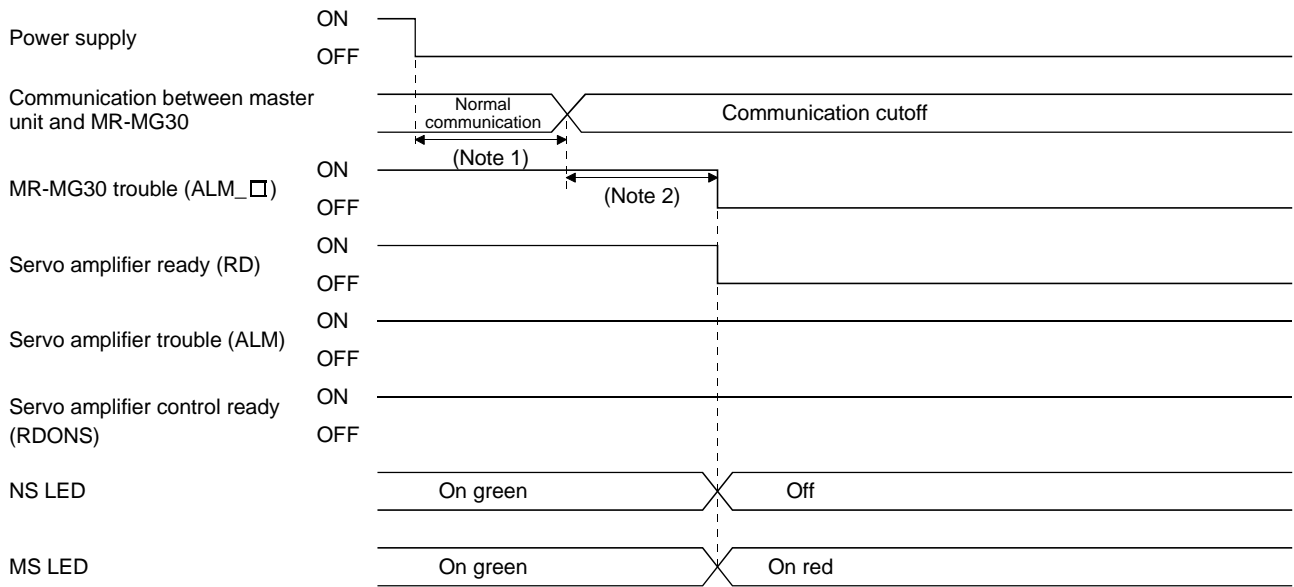


Note 1. Changes depending on the servo amplifier.

2. After communication is cut off, communication cut off by SSCNET cable breakage is also represented in a similar timing chart.

3. SIGNALS AND WIRING

(3) Master unit power supply OFF



Note 1. Changes depending on the master unit.

2. Depends on the WD timer setting from the master unit.

3. After communication is cut off, PROFIBUS cable breakage is also represented in a similar timing chart.

4. OPERATION

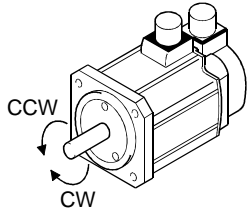
4. OPERATION

4.1 Automatic operation mode (Direct specification)

Using the command request, directly specify the data necessary for positioning to execute positioning operation.

(1) Setting

The devices/parameters/command requests necessary for the automatic operation mode are indicated below.

Item	Device/parameter/command request	Description															
(Note) Automatic operation mode (direct specification) selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the automatic operation mode (direct specification). <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td>Automatic operation mode (direct specification)</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	1	1	Automatic operation mode (direct specification)				
	(Note) Device			Operation mode													
	MD2_□		MD1_□		MD0_□												
0	1	1	Automatic operation mode (direct specification)														
Operation mode selection 1 (MD1_□)																	
Operation mode selection 2 (MD2_□)	Note: 0: OFF 1: ON																
Servo motor rotation direction selection	Positioning parameter No. 4	Using this parameter, select the rotation direction for the address increasing direction of the servo motor. 0: CCW (address increase) 1: CW (address increase) 															
Command pulse unit selection	Positioning parameter No. 5	Using this parameter, set the feed length multiplication (STM) of the position data. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Set value</th> <th>Feed length multiplication</th> <th>Command unit [μm]</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Position data × 1 time</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Position data × 10 times</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Position data × 100 times</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Position data × 1000 times</td> <td style="text-align: center;">1000</td> </tr> </tbody> </table>	Set value	Feed length multiplication	Command unit [μm]	0	Position data × 1 time	1	1	Position data × 10 times	10	2	Position data × 100 times	100	3	Position data × 1000 times	1000
Set value	Feed length multiplication	Command unit [μm]															
0	Position data × 1 time	1															
1	Position data × 10 times	10															
2	Position data × 100 times	100															
3	Position data × 1000 times	1000															

Note. Use the input signal or command request for setting.

4. OPERATION

Item		Device/parameter /command request		Description					
(Note 2) Positioning data	Position data	PZD	CPOSH (For upper 16 bits)	Set the moving distance. Set the upper 16 bits of the moving distance to CPOSH and the lower 16 bits to CPOSL.					
			CPOSL (For lower 16 bits)	Setting range: -999999 to 999999 Setting unit: $\times 10^{\text{STM}} \mu\text{m}$					
	Speed		CSPD	Set the servo motor speed for execution of positioning. The set value should be equal to or less than the instantaneously permissible speed of the used servo motor. Setting range: 0 to instantaneously permissible speed 4 Setting unit: r/min					
	Acceleration time constant		ACCEL	Set the acceleration time constant for execution of positioning. The set value is the time from when the used servo motor is at 0r/min until it reaches the rated speed. Setting range: 0 to 20000 Setting unit: ms					
	Deceleration time constant		DECEL	Set the deceleration time constant for execution of positioning. The set value is the time from when the used servo motor is at the rated speed until it reaches 0r/min. Setting range: 0 to 20000 Setting unit: ms					
Auxiliary function		AUX	Set the auxiliary function. Select the command system for the set position data. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Set value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Absolute value command system The position data is the position from the home position.</td> </tr> <tr> <td>1</td> <td>Incremental value command system The position data is the moving distance from the current position.</td> </tr> </tbody> </table>	Set value	Description	0	Absolute value command system The position data is the position from the home position.	1	Incremental value command system The position data is the moving distance from the current position.
Set value	Description								
0	Absolute value command system The position data is the position from the home position.								
1	Incremental value command system The position data is the moving distance from the current position.								

Note 1. Use the input signal or command request for setting.

2. Use the command request for setting.

(2) Operation procedure

(a) Automatic operation mode (direct specification) selection

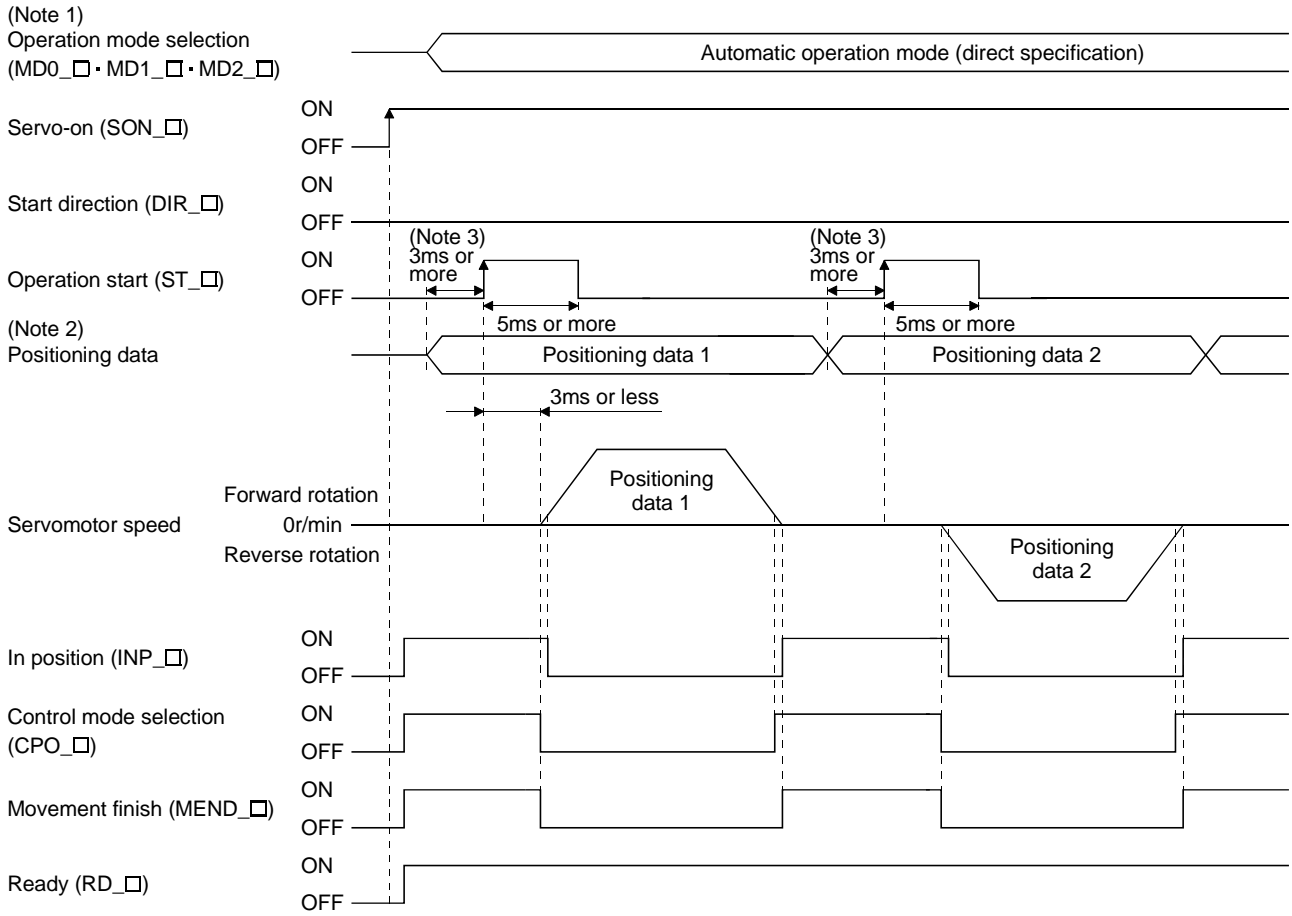
Using Operation mode selection (MD0_□/MD1_□/MD2_□), select the automatic operation mode (direct specification).

(b) Operation start

When Operation start (ST_□) is turned ON, positioning operation is executed on the leading edge of ST_□ according to the position data, speed, acceleration time constant, deceleration time constant and auxiliary function data.

4. OPERATION

(3) Timing chart



Note 1. MD0_□: ON, MD1_□: ON, MD2_□: OFF

2. Position data, speed, acceleration time constant, deceleration time constant, auxiliary function

3. Detection of the external I/O signal is delayed by the input signal filter setting time of the common parameter No. 20. Also, make a sequence that will change the positioning data earlier by the time in which the variations of signal changes by the output signal sequence from the controller and by the hardware are taken into consideration.

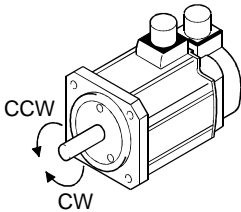
4. OPERATION

4.2 Manual operation mode (JOG operation)

For machine adjustment, home position matching, etc., jog operation may be used to make a motion to any position.

(1) Setting

The devices/parameters/command requests necessary for the manual operation mode are indicated below.

Item	Device/parameter/command request	Description											
(Note) Manual operation mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the manual operation mode (JOG). <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td>Manual operation mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	0	Manual operation mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	0	Manual operation mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Servo motor rotation direction selection	Positioning parameter No. 4	Using this parameter, select the rotation direction for the address increasing direction of the servo motor. 0: CCW (address increase) 1: CW (address increase) 											
JOG speed	Positioning parameter No. 10	Set the servo motor speed for JOG operation.											
JOG acceleration time constant	Positioning parameter No. 11	Set the acceleration time constant for JOG operation.											
JOG deceleration time constant	Positioning parameter No. 12	Set the deceleration time constant for JOG operation.											

Note. Use the input signal or command request for setting.

(2) Procedure

(a) Parameter setting

Set the JOG speed, acceleration time constant and deceleration time constant in the positioning parameters No. 10, 11 and 12. The positioning parameters No. 52 for the S-pattern acceleration/ deceleration time constant is valid.

(b) Manual operation mode selection

Using Operation mode selection (MD0_□/MD1_□/MD2_□), select the manual operation mode.

(c) Moving direction selection

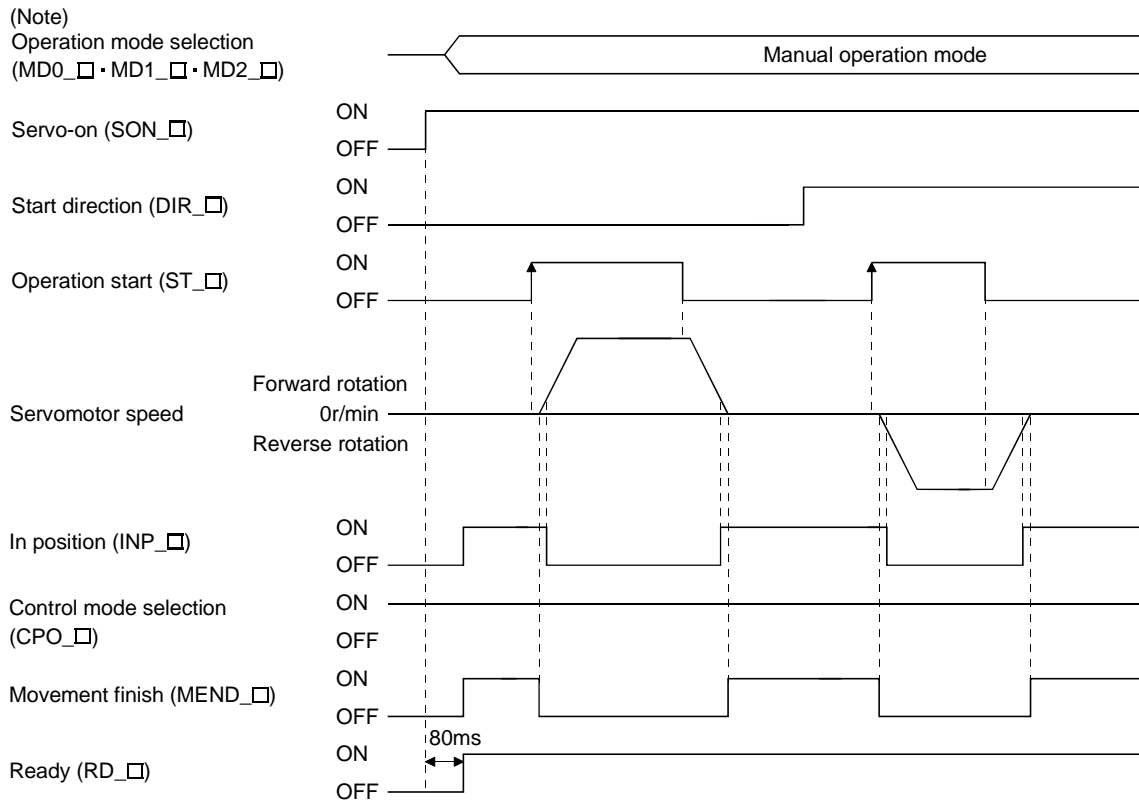
Specify the axis moving direction using Start direction (DIR_□). The axis moves in the address increasing direction when DIR_□ is OFF, and moves in the address decreasing direction when DIR_□ is ON.

(d) Operation start

Turn ON Operation start (ST_□).

4. OPERATION

(3) Timing chart



Note. MD0_□: OFF, MD1_□: OFF, MD2_□: OFF

4. OPERATION

4.3 Home position return mode

4.3.1 Outline of home position return

Home position return is performed to match the command coordinates with the machine coordinates. In the incremental system, home position return is required every time input power is switched on. In the absolute position detection system, once home position return is done at the time of installation, the current position is retained if power is switched off. Hence, home position return is not required when power is switched on again. This servo amplifier has the home position return methods given in this section. Choose the most appropriate method for your machine structure and application.

This servo amplifier has the home position return automatic return function which executes home position return by making an automatic return to a proper position if the machine has stopped beyond or at the proximity dog. Manual motion by jog operation or the like is not required.

(1) Home position return types

Choose the optimum home position return according to the machine type, etc.

Type	Home position return method	Features
Dog type home position return	With deceleration started at the front end of a proximity dog, the position where the first Z-phase signal is given past the rear end of the dog or a motion has been made over the home position shift distance starting from the Z-phase signal is defined as a home position.(Note)	<ul style="list-style-type: none"> • General home position return method using a proximity dog. • Repeatability of home position return is excellent. • The machine is less burdened. • Used when the width of the proximity dog can be set greater than the deceleration distance of the servo motor.
Count type home position return	With deceleration started at the front end of a proximity dog, the position where the first Z-phase signal is given after advancement over the preset moving distance after the proximity dog or a motion has been made over the home position shift distance starting from the Z-phase signal is defined as a home position.	<ul style="list-style-type: none"> • Home position return method using a proximity dog. • Used when it is desired to minimize the length of the proximity dog.
Data setting type home position return	The position reached after any automatic motion is defined as a home position.	<ul style="list-style-type: none"> • No proximity dog required.
Home position ignorance (Servo-on position as home position)	The position where servo is switched on is defined as a home position.	
Dog type rear end reference	The position where the axis, which had started decelerating at the front end of a proximity dog, has moved the after-proximity dog moving distance and home position shift distance after it passed the rear end is defined as a home position.	<ul style="list-style-type: none"> • The Z-phase signal is not needed.
Count type front end reference	The position where the axis, which had started decelerating at the front end of a proximity dog, has moved the after-proximity dog moving distance and home position shift distance is defined as a home position.	<ul style="list-style-type: none"> • The Z-phase signal is not needed.
Dog cradle type	The position where the first Z-phase signal is issued after detection of the proximity dog front end is defined as a home position.	

Note: The Z-phase signal is a signal recognized in the servo amplifier once per servo motor revolution and cannot be used as an output signal.

4. OPERATION

(2) Procedure

(a) Parameter setting

The following indicates the parameters necessary for a home position return. The parameters to be used change depending on the home position return methods. For details, refer to the section of the corresponding home position return (Section 4.3.2 and later).

Positioning parameter No.	Item
13	Home position return type
14	Home position return direction
15	Proximity dog input polarity
16	Home position return speed
17	Creep speed
18	Home position return acceleration time constant
19	Home position return deceleration time constant
20	Home position shift distance
21/22	Home position address
23	Moving distance after proximity dog

(b) Home position return mode selection

Using Operation mode selection (MD0_□/MD1_□/MD2_□), select the home position return mode.

(c) Home position return start

When Operation start (ST_□) is turned ON, a home position return is executed according to the positioning parameter No. 12, 13, 14 setting. At this time, Start direction (DIR_□) is invalid.

(3) Instructions

(a) Before starting home position return, always make sure that the limit switch operates.

(b) Confirm the home position return direction. Incorrect setting will cause the machine to run reversely.

(c) Confirm the proximity dog input polarity. Otherwise, misoperation can occur.

4. OPERATION

4.3.2 Dog type home position return

A home position return method using a proximity dog. With deceleration started at the front end of the proximity dog, the position where the first Z-phase signal is given past the rear end of the dog or a motion has been made over the home position shift distance starting from the Z-phase signal is defined as a home position.

(1) Devices/parameters

Set the input device and parameters as indicated below.

Item	Device/parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>Home position return mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Dog type home position return selection	Positioning parameter No. 13	Select "0": Dog type home position return.											
Home position return direction selection	Positioning parameter No. 14	Select the home position return direction. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Address increasing direction</td> </tr> <tr> <td style="text-align: center;">1 (Initial value)</td> <td>Address decreasing direction</td> </tr> </tbody> </table>	Set value	Home position return direction	0	Address increasing direction	1 (Initial value)	Address decreasing direction					
Set value	Home position return direction												
0	Address increasing direction												
1 (Initial value)	Address decreasing direction												
Dog input polarity	Positioning parameter No. 15	Select the polarity at which the proximity dog input signal is detected. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 (Initial value)</td> <td>Open circuit (OFF) turns the dog signal ON.</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Closed circuit (ON) turns the dog signal ON.</td> </tr> </tbody> </table>	Set value	Home position return direction	0 (Initial value)	Open circuit (OFF) turns the dog signal ON.	1	Closed circuit (ON) turns the dog signal ON.					
Set value	Home position return direction												
0 (Initial value)	Open circuit (OFF) turns the dog signal ON.												
1	Closed circuit (ON) turns the dog signal ON.												
Home position return speed	Positioning parameter No. 16	Set the speed until the dog is detected.											
Creep speed	Positioning parameter No. 17	Set the speed after the dog is detected.											
Home position return acceleration time constant	Positioning parameter No. 18	Set the acceleration time constant for a home position return.											
Home position return deceleration time constant	Positioning parameter No. 19	Set the deceleration time constant for a home position return.											
Home position shift amount	Positioning parameter No. 20	Make this setting when moving the home position from the first Z phase signal after the axis has passed the proximity dog rear end.											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											

(2) Length of proximity dog

To ensure that the Z-phase signal of the servo motor is generated during detection of the proximity dog (DOG_□), the proximity dog should have the length which satisfies formulas (4.2) and (4.3):

$$L_1 \geq \frac{V}{60} \cdot \frac{td}{2} \dots \dots \dots (4.2)$$

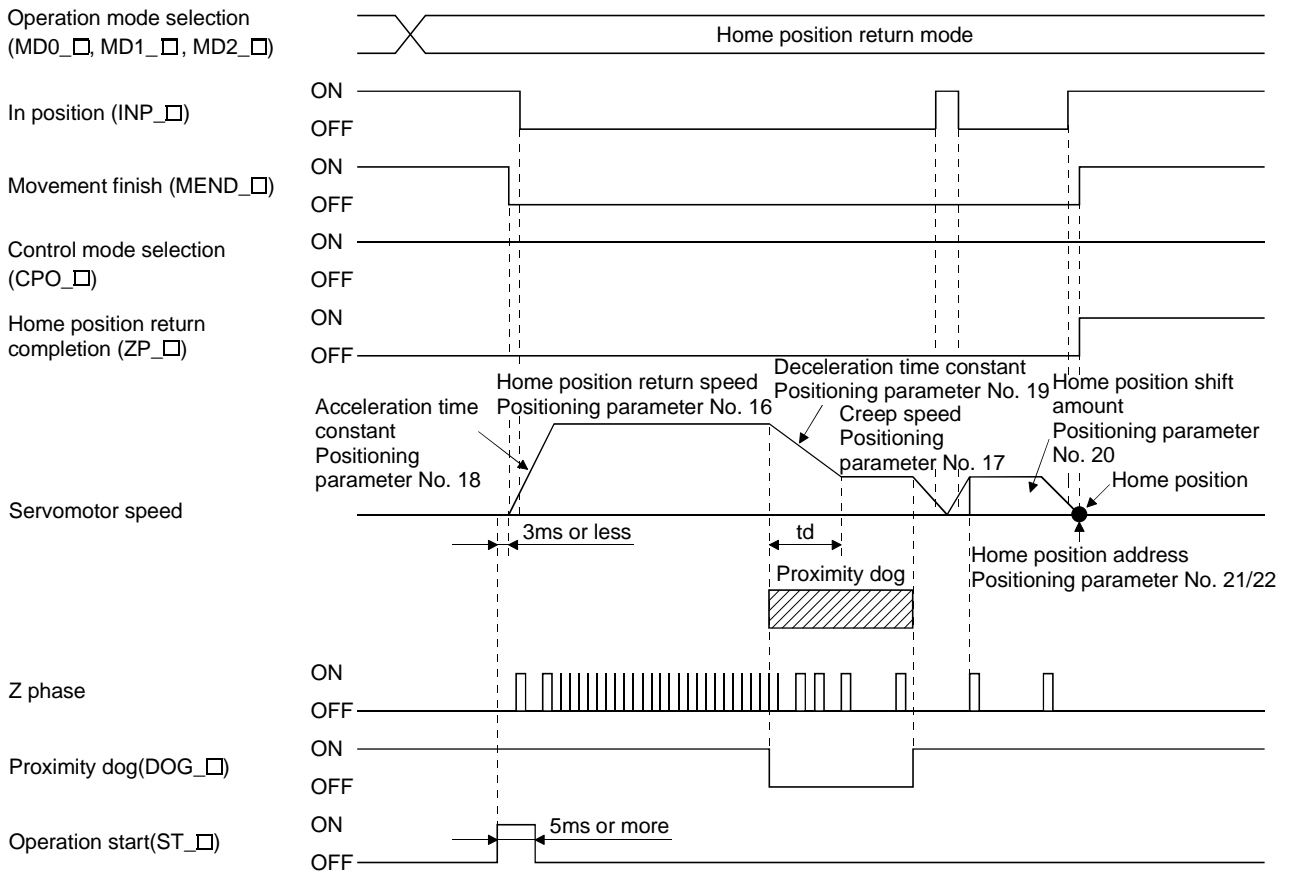
L_1 : Proximity dog length [mm]
 V : Home position return speed [mm/min]
 td : Deceleration time [s]

$$L_2 \geq 2 \cdot \Delta S \dots \dots \dots (4.3)$$

L_2 : Proximity dog length [mm]
 ΔS : Moving distance per servo motor revolution [mm]

4. OPERATION

(3) Timing chart

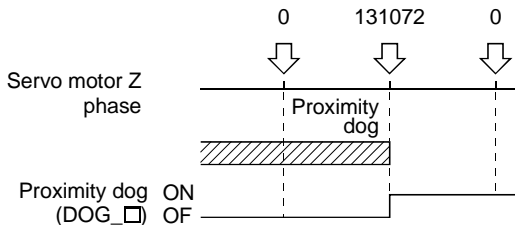


The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

(4) Adjustment

In dog type home position return, adjust to ensure that the Z-phase signal is generated during dog detection. Locate the rear end of the proximity dog (DOG) at approximately the center of two consecutive Z-phase signals.

The position where the Z phase signal is can be checked by PROFIBUS real-time monitor P1.28 (position within one revolution).



4. OPERATION

4.3.3 Count type home position return

In count type home position return, a motion is made over the distance set in positioning parameter No.23 (moving distance after proximity dog) after detection of the proximity dog front end. The position where the first Z-phase signal is given after that is defined as a home position. Hence, if the proximity dog (DOG_□) is 10ms or longer, there is no restriction on the dog length. This home position return method is used when the required proximity dog length cannot be reserved to use dog type home position return or when the proximity dog (DOG_□) is entered electrically from a controller or the like.

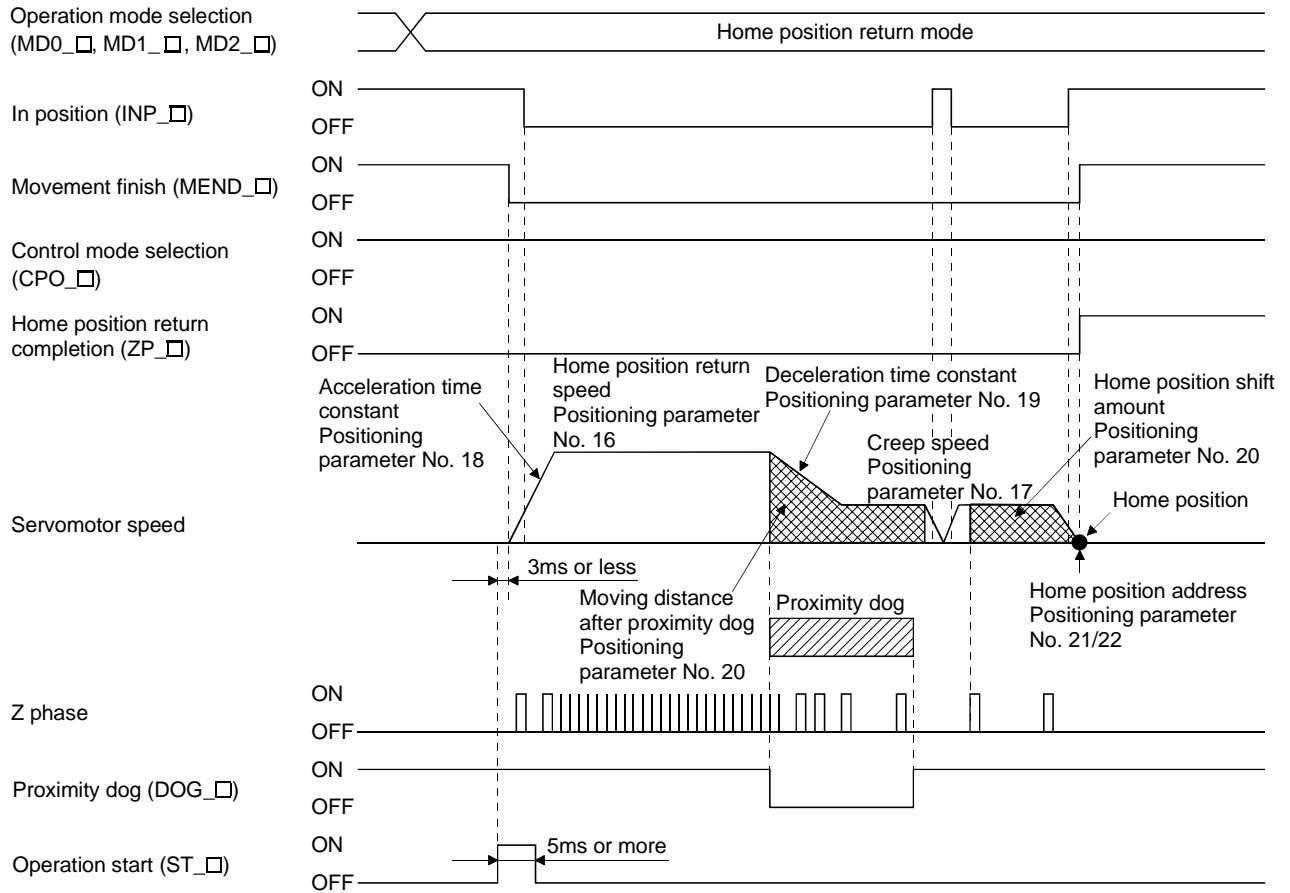
(1) Devices/parameters

Set the input device and parameters as indicated below.

Item	Device/parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>Home position return mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Count type home position return selection	Positioning parameter No. 13	Select "1": Count type home position return.											
Home position return direction selection	Positioning parameter No. 14	Select the home position return direction. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Address increasing direction</td> </tr> <tr> <td style="text-align: center;">1 (Initial value)</td> <td>Address decreasing direction</td> </tr> </tbody> </table>	Set value	Home position return direction	0	Address increasing direction	1 (Initial value)	Address decreasing direction					
Set value	Home position return direction												
0	Address increasing direction												
1 (Initial value)	Address decreasing direction												
Dog input polarity	Positioning parameter No. 15	Select the polarity at which the proximity dog input signal is detected. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 (Initial value)</td> <td>Open circuit (OFF) turns the dog signal ON.</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Closed circuit (ON) turns the dog signal ON.</td> </tr> </tbody> </table>	Set value	Home position return direction	0 (Initial value)	Open circuit (OFF) turns the dog signal ON.	1	Closed circuit (ON) turns the dog signal ON.					
Set value	Home position return direction												
0 (Initial value)	Open circuit (OFF) turns the dog signal ON.												
1	Closed circuit (ON) turns the dog signal ON.												
Home position return speed	Positioning parameter No. 16	Set the speed until the dog is detected.											
Creep speed	Positioning parameter No. 17	Set the speed after the dog is detected.											
Home position return acceleration time constant	Positioning parameter No. 18	Set the acceleration time constant for a home position return.											
Home position return deceleration time constant	Positioning parameter No. 19	Set the deceleration time constant for a home position return.											
Home position shift amount	Positioning parameter No. 20	Make this setting when moving the home position from the first Z phase signal after the axis has passed the proximity dog rear end.											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											
Moving distance after proximity dog	Positioning parameter No. 23	Set the moving distance after the axis has passed the proximity dog front end.											

4. OPERATION

(2) Timing chart



The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

4. OPERATION

4.3.4 Data setting type home position return

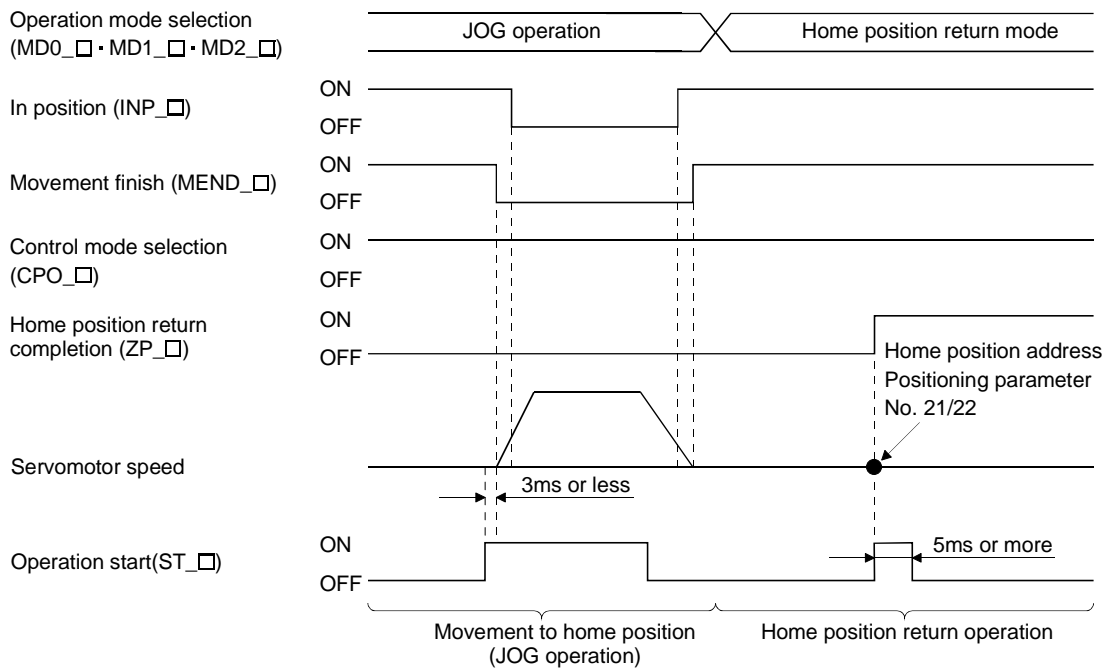
Data setting type home position return is used when it is desired to determine any position as a home position. JOG operation, manual pulse generator operation or like can be used for movement.

(1) Parameters

Set the parameters as described below.

Item	Parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">Home position return mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Data setting type home position return selection	Positioning parameter No. 13	Select "2": Data setting type home position return.											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											

(2) Timing chart



The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

4. OPERATION

4.3.5 Home position ignorance (servo-on position defined as home position)

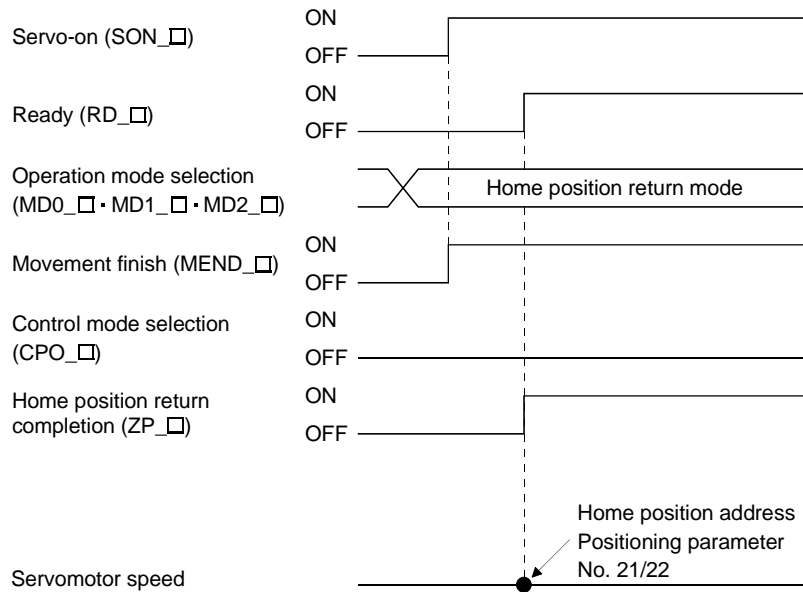
The position where servo is switched on is defined as a home position.

(1) Devices/parameters

Set the input device and parameters as indicated below.

Item	Device/parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Home position return mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Home position disregard (servo-on home position) selection	Positioning parameter No. 13	Select "4": Home position disregard (servo-on home position).											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											

(2) Timing chart



The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

4. OPERATION

4.3.6 Dog type rear end reference home position return

POINT	<ul style="list-style-type: none"> This home position return method depends on the timing of reading Proximity dog (DOG_□) that has detected the rear end of a proximity dog. Hence, if a home position return is made at the creep speed of 100r/min, an error of ± 200 pulses will occur in the home position. The error of the home position is larger as the creep speed is higher.
-------	---

The position where the axis, which had started decelerating at the front end of a proximity dog, has moved the after-proximity dog moving distance and home position shift distance after it passed the rear end is defined as a home position. A home position return that does not depend on the Z-phase signal can be made.

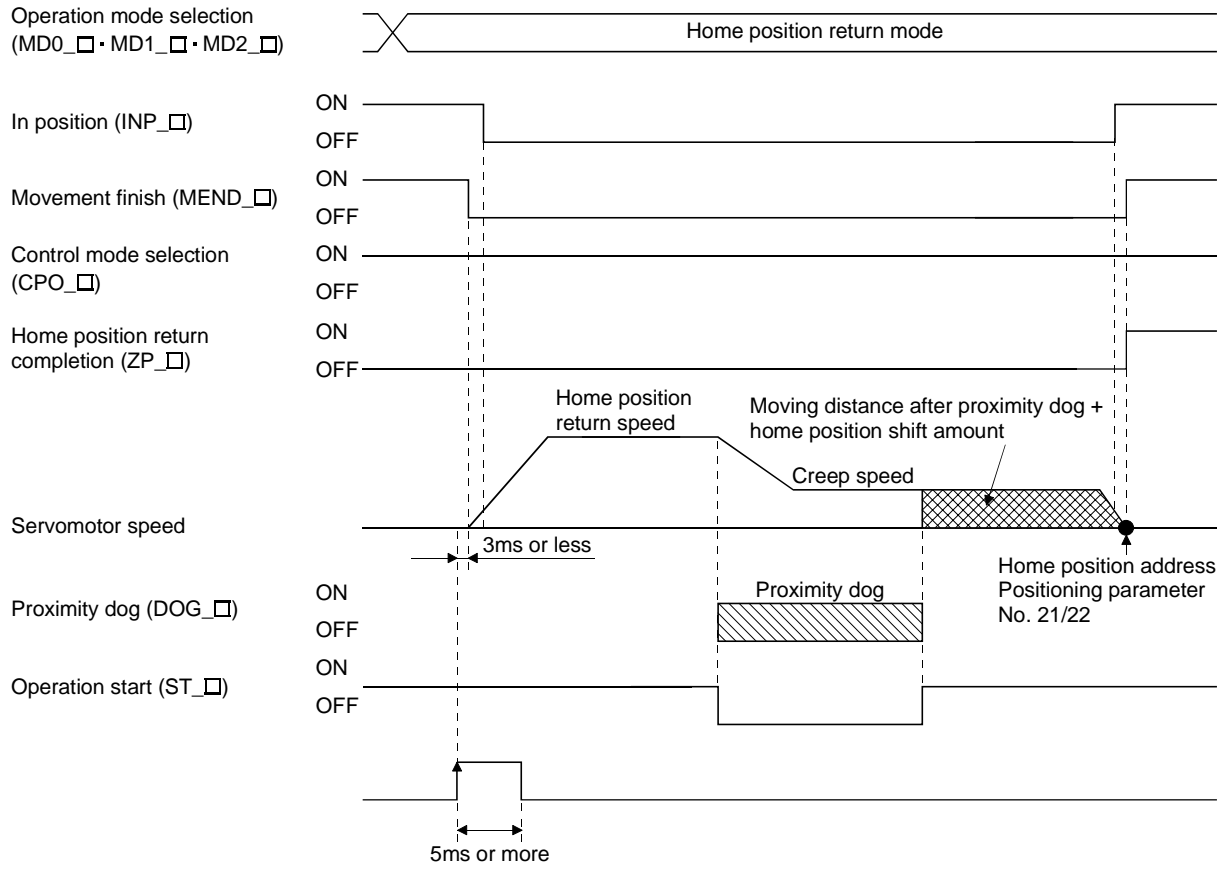
(1) Devices/parameters

Set the input device and parameters as indicated below.

Item	Device/parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin: 5px auto;"> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>Home position return mode</td> </tr> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Dog type rear end reference home position return selection	Positioning parameter No. 13	Select "5": Dog type rear end reference home position return.											
Home position return direction selection	Positioning parameter No. 14	Select the home position return direction. <table border="1" style="margin: 5px auto;"> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> <tr> <td style="text-align: center;">0</td> <td>Address increasing direction</td> </tr> <tr> <td style="text-align: center;">1 (Initial value)</td> <td>Address decreasing direction</td> </tr> </table>	Set value	Home position return direction	0	Address increasing direction	1 (Initial value)	Address decreasing direction					
Set value	Home position return direction												
0	Address increasing direction												
1 (Initial value)	Address decreasing direction												
Dog input polarity	Positioning parameter No. 15	Select the polarity at which the proximity dog input signal is detected. <table border="1" style="margin: 5px auto;"> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> <tr> <td style="text-align: center;">0 (Initial value)</td> <td>Open circuit (OFF) turns the dog signal ON.</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Closed circuit (ON) turns the dog signal ON.</td> </tr> </table>	Set value	Home position return direction	0 (Initial value)	Open circuit (OFF) turns the dog signal ON.	1	Closed circuit (ON) turns the dog signal ON.					
Set value	Home position return direction												
0 (Initial value)	Open circuit (OFF) turns the dog signal ON.												
1	Closed circuit (ON) turns the dog signal ON.												
Home position return speed	Positioning parameter No. 16	Set the speed until the dog is detected.											
Creep speed	Positioning parameter No. 17	Set the speed after the dog is detected.											
Home position return acceleration time constant	Positioning parameter No. 18	Set the acceleration time constant for a home position return.											
Home position return deceleration time constant	Positioning parameter No. 19	Set the deceleration time constant for a home position return.											
Home position shift amount	Positioning parameter No. 20	Make this setting when moving the home position from the first Z phase signal after the axis has passed the proximity dog rear end.											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											

4. OPERATION

(2) Timing chart



The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

4. OPERATION

4.3.7 Count type front end reference home position return

POINT	<ul style="list-style-type: none"> This home position return method depends on the timing of reading Proximity dog (DOG_□) that has detected the front end of a proximity dog. Hence, if a home position return is made at the home position return speed of 100r/min, an error of ±200 pulses will occur in the home position. The error of the home position is larger as the home position return speed is higher.
-------	--

The position where the axis, which had started decelerating at the front end of a proximity dog, has moved the after-proximity dog moving distance and home position shift distance is defined as a home position. A home position return that does not depend on the Z-phase signal can be made. The home position may change if the creep speed varies.

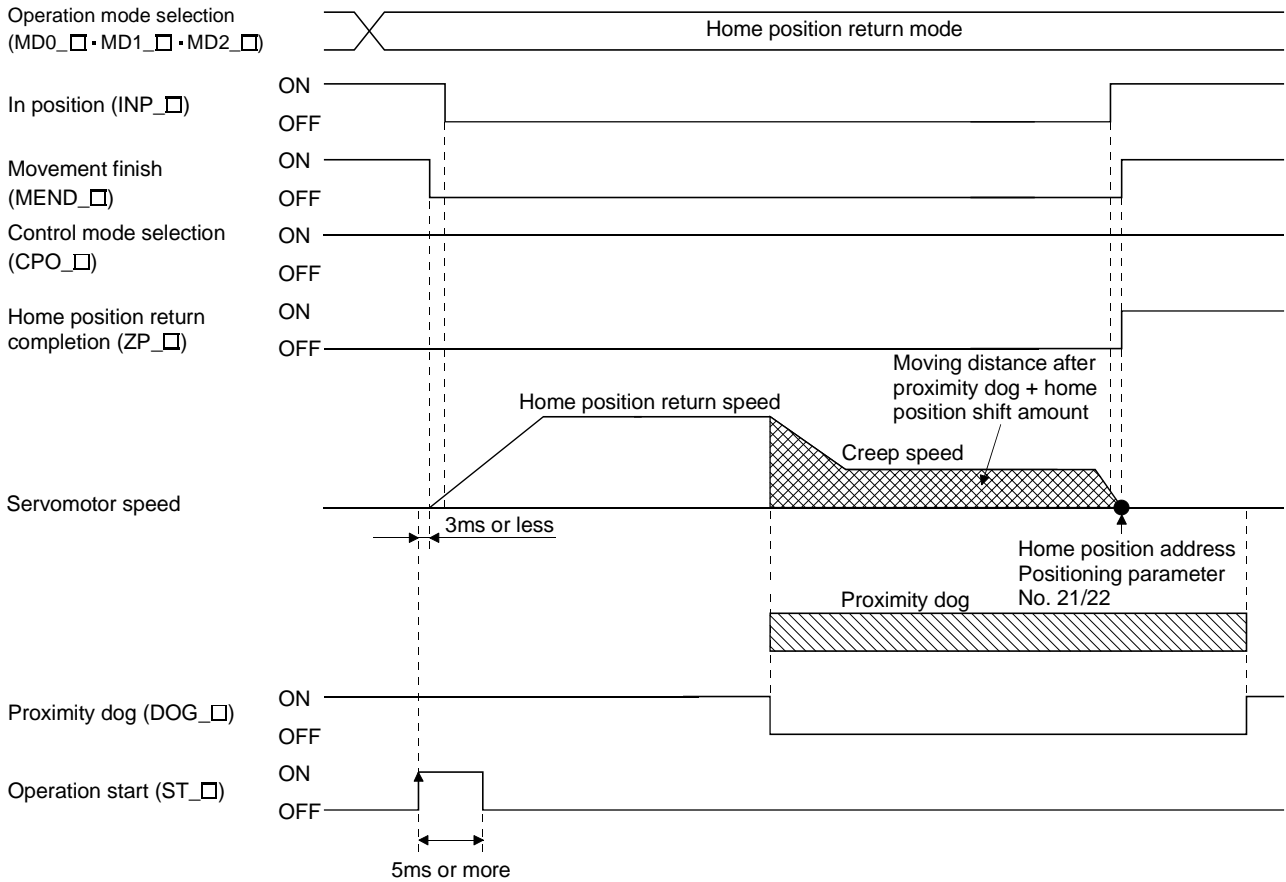
(1) Devices/parameters

Set the input device and parameters as indicated below.

Item	Device/parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>Home position return mode</td> </tr> </tbody> </table> Note. 0: OFF 1: ON	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)													
Count type dog front end reference home position return selection	Positioning parameter No. 13	Select "6": Count type dog front end reference home position return.											
Home position return direction selection	Positioning parameter No. 14	Select the home position return direction. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Address increasing direction</td> </tr> <tr> <td style="text-align: center;">1 (Initial value)</td> <td>Address decreasing direction</td> </tr> </tbody> </table>	Set value	Home position return direction	0	Address increasing direction	1 (Initial value)	Address decreasing direction					
Set value	Home position return direction												
0	Address increasing direction												
1 (Initial value)	Address decreasing direction												
Dog input polarity	Positioning parameter No. 15	Select the polarity at which the proximity dog input signal is detected. <table border="1" style="margin: 5px auto;"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 (Initial value)</td> <td>Open circuit (OFF) turns the dog signal ON.</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Closed circuit (ON) turns the dog signal ON.</td> </tr> </tbody> </table>	Set value	Home position return direction	0 (Initial value)	Open circuit (OFF) turns the dog signal ON.	1	Closed circuit (ON) turns the dog signal ON.					
Set value	Home position return direction												
0 (Initial value)	Open circuit (OFF) turns the dog signal ON.												
1	Closed circuit (ON) turns the dog signal ON.												
Home position return speed	Positioning parameter No. 16	Set the speed until the dog is detected.											
Creep speed	Positioning parameter No. 17	Set the speed after the dog is detected.											
Home position return acceleration time constant	Positioning parameter No. 18	Set the acceleration time constant for a home position return.											
Home position return deceleration time constant	Positioning parameter No. 19	Set the deceleration time constant for a home position return.											
Home position shift amount	Positioning parameter No. 20	Make this setting when moving the home position from the first Z phase signal after the axis has passed the proximity dog rear end.											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											
Moving distance after proximity dog	Positioning parameter No. 23	Set the moving distance after the axis has passed the proximity dog front end.											

4. OPERATION

(2) Timing chart



The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

4. OPERATION

4.3.8 Dog cradle type home position return

The position where the first Z-phase signal is issued after detection of the proximity dog front end can be defined as a home position.

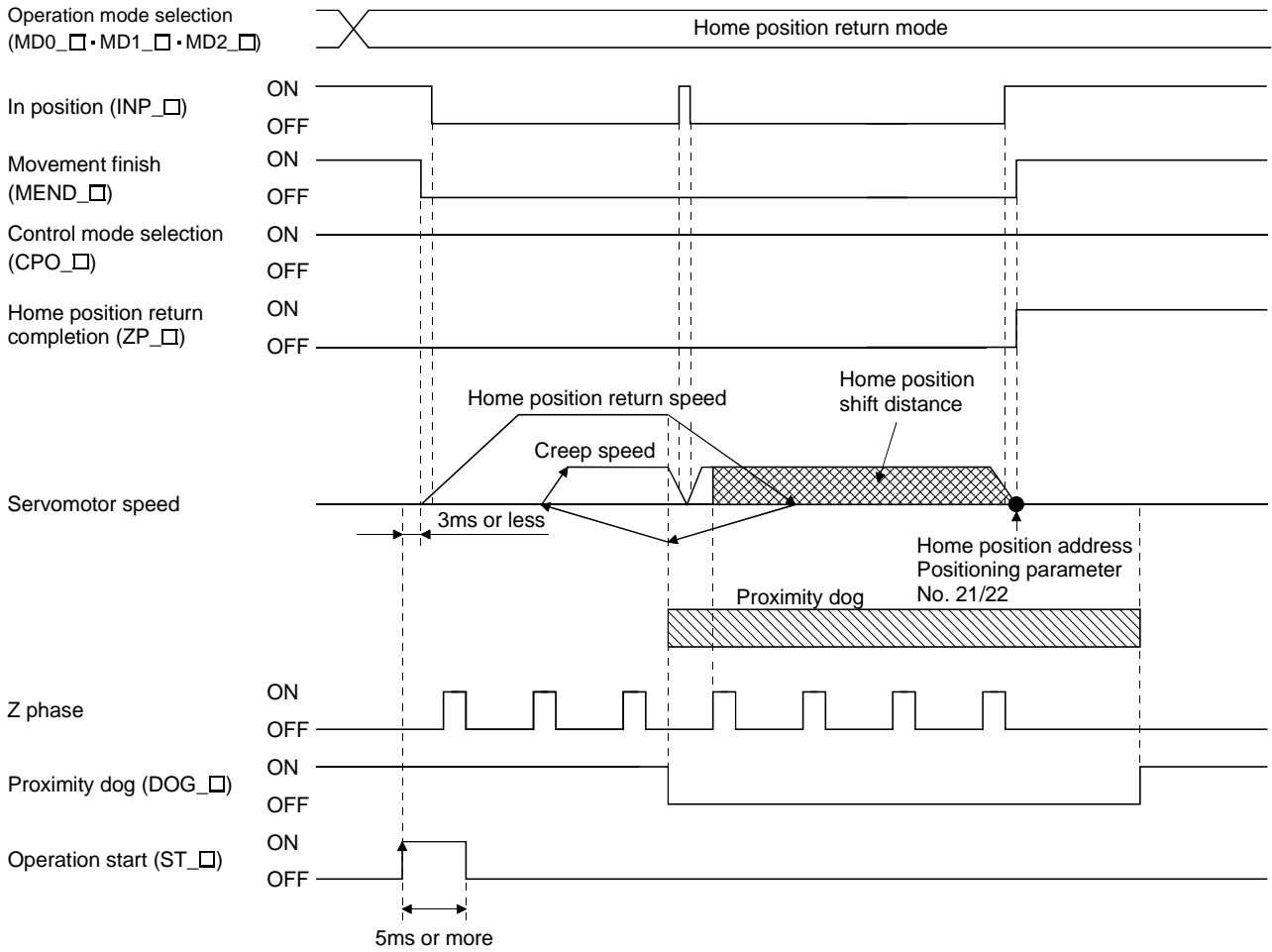
(1) Devices/parameters

Set the input device and parameters as indicated below.

Item	Device/parameter	Description											
Home position return mode selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Home position return mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	0	1	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	0	1	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)													
Dog cradle type home position return selection	Positioning parameter No. 13	Select "7": Dog cradle type home position return.											
Home position return direction selection	Positioning parameter No. 14	Select the home position return direction. <table border="1"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Address increasing direction</td> </tr> <tr> <td>1 (Initial value)</td> <td>Address decreasing direction</td> </tr> </tbody> </table>	Set value	Home position return direction	0	Address increasing direction	1 (Initial value)	Address decreasing direction					
Set value	Home position return direction												
0	Address increasing direction												
1 (Initial value)	Address decreasing direction												
Dog input polarity	Positioning parameter No. 15	Select the polarity at which the proximity dog input signal is detected. <table border="1"> <thead> <tr> <th>Set value</th> <th>Home position return direction</th> </tr> </thead> <tbody> <tr> <td>0 (Initial value)</td> <td>Open circuit (OFF) turns the dog signal ON.</td> </tr> <tr> <td>1</td> <td>Closed circuit (ON) turns the dog signal ON.</td> </tr> </tbody> </table>	Set value	Home position return direction	0 (Initial value)	Open circuit (OFF) turns the dog signal ON.	1	Closed circuit (ON) turns the dog signal ON.					
Set value	Home position return direction												
0 (Initial value)	Open circuit (OFF) turns the dog signal ON.												
1	Closed circuit (ON) turns the dog signal ON.												
Home position return speed	Positioning parameter No. 16	Set the speed until the dog is detected.											
Creep speed	Positioning parameter No. 17	Set the speed after the dog is detected.											
Home position return acceleration time constant	Positioning parameter No. 18	Set the acceleration time constant for a home position return.											
Home position return deceleration time constant	Positioning parameter No. 19	Set the deceleration time constant for a home position return.											
Home position shift amount	Positioning parameter No. 20	Make this setting when moving the home position from the first Z phase signal after the axis has passed the proximity dog rear end.											
Home position address	Positioning parameter No. 21/22	Set the current position at completion of a home position return.											

4. OPERATION

(2) Timing chart



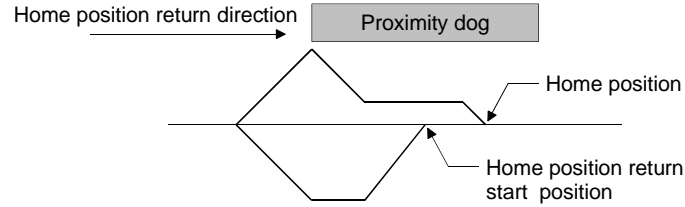
The common parameter No.21/22 (home position return position data) setting value is the positioning address after the home position return is completed.

4. OPERATION

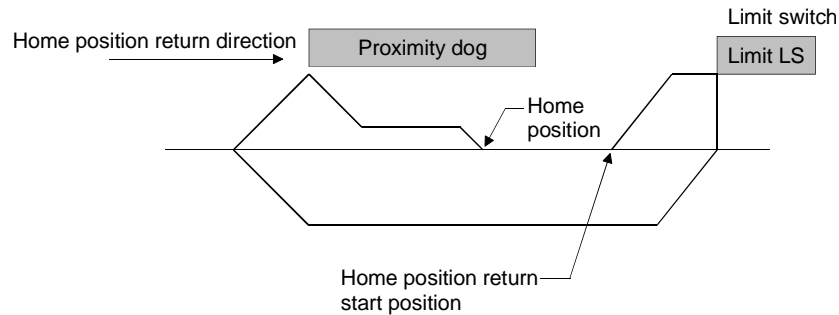
4.3.9 Home position return automatic return function

If the current position is at or beyond the proximity dog in dog or count type home position return, you need not make a start after making a return by jog operation or the like.

When the current position is at the proximity dog, an automatic return is made before home position return.



At a start, a motion is made in the home position return direction and an automatic return is made on detection of the limit switch. The motion stops past the front end of the proximity dog, and home position return is resumed at that position. If the proximity dog cannot be detected, the motion stops on detection of the opposite limit switch and AL. 90 occurs.



Software limit cannot be used with these functions.

4. OPERATION

4.4 Automatic positioning function to the home position

POINT	<ul style="list-style-type: none"> You cannot perform automatic positioning from outside the position data setting range to the home position. In this case, make a home position return again using a manual home position return.
--------------	--

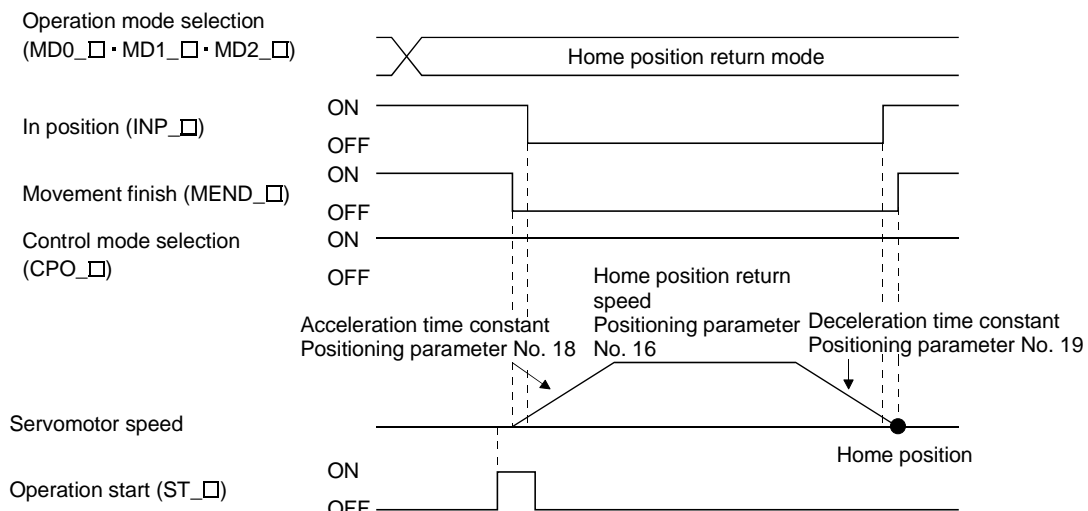
If this function is used when returning to the home position again after performing a manual home position return after a power-on and deciding the home position, automatic positioning can be carried out to the home position at high speed. In an absolute position system, manual home position return is not required after power-on.

Please perform a manual home position return beforehand after a power-on.

Set the input signals and parameter as follows:

Item	Device/parameter	Description											
Automatic home positioning selection	Operation mode selection 0 (MD0_□)	Set the devices as shown below to select the home position return mode. <table border="1" style="margin-left: 20px;"> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td>Home position return mode</td> </tr> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	0	1	0	Home position return mode
	(Note) Device			Operation mode									
	MD2_□		MD1_□		MD0_□								
0	1	0	Home position return mode										
Operation mode selection 1 (MD1_□)													
Operation mode selection 2 (MD2_□)	Note. 0: OFF 1: ON												
Home position return speed	Positioning parameter No. 16	Set the speed until the dog is detected.											
Home position return acceleration time constant	Positioning parameter No. 18	Set the acceleration time constant for a home position return.											
Home position return deceleration time constant	Positioning parameter No. 19	Set the deceleration time constant for a home position return.											

Use the positioning parameter No. 16 to set the home position return speed of the automatic home positioning function. Use the positioning parameter No. 18 and 19 to set the acceleration time constant and deceleration time constant. Turn ON Reverse rotation start (ST_□) to start an automatic high-speed return.



4. OPERATION

4.5 Interrupt Positioning Operation Mode

POINT
<ul style="list-style-type: none"> When interrupt positioning is executed in the interrupt positioning operation mode, a stopping position differs depending on the servo motor speed at which Interrupt positioning input (ITP_□) turns ON.

The interrupt positioning operation mode is a function that stops the axis after it has advanced the distance in the position data set to the command request from the position where Interrupt positioning input (ITP_□) turned ON. The position data is handled as an incremental value command, regardless of the auxiliary function setting.

(1) Setting

Item		Device/parameter/command request		Description															
Automatic operation mode (direct specification) selection		Operation mode selection 0 (MD0_□)		Set the devices as shown below to select the interrupt positioning operation mode. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">(Note) Device</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD2_□</th> <th>MD1_□</th> <th>MD0_□</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td>Interrupt positioning operation mode</td> </tr> </tbody> </table>	(Note) Device			Operation mode	MD2_□	MD1_□	MD0_□	1	0	0	Interrupt positioning operation mode				
	(Note) Device				Operation mode														
	MD2_□	MD1_□	MD0_□																
1	0	0	Interrupt positioning operation mode																
		Operation mode selection 1 (MD1_□)																	
		Operation mode selection 2 (MD2_□)																	
Command pulse unit selection		Positioning parameter No. 5		Using this parameter, set the feed length multiplication (STM) of the position data. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Set value</th> <th>Feed length multiplication</th> <th>Command unit</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Position data × 1 time</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Position data × 10 times</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Position data × 100 times</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Position data × 1000 times</td> <td style="text-align: center;">1000</td> </tr> </tbody> </table>	Set value	Feed length multiplication	Command unit	0	Position data × 1 time	1	1	Position data × 10 times	10	2	Position data × 100 times	100	3	Position data × 1000 times	1000
Set value	Feed length multiplication	Command unit																	
0	Position data × 1 time	1																	
1	Position data × 10 times	10																	
2	Position data × 100 times	100																	
3	Position data × 1000 times	1000																	
(Note) Positioning data	Position data	PZD	CPOSH (For upper 16 bits)	Set the moving distance. Set the upper 16 bits of the moving distance to CPOSH and the lower 16 bits to CPOSL. Setting range: -999999 to 999999 Setting unit: $\times 10^{\text{STM}} \mu\text{m}$															
			CPOSL (For lower 16 bits)																
	Speed		CSPD	Set the servo motor speed for execution of positioning. The set value should be equal to or less than the instantaneously permissible speed of the used servo motor. Setting range: 0 to instantaneously permissible speed Setting unit: r/min															
	Acceleration time constant		ACCEL	Set the acceleration time constant for execution of positioning. The set value is the time from when the used servo motor is at 0r/min until it reaches the rated speed. Setting range: 0 to 20000 Setting unit: ms															
	Deceleration time constant		DECEL	Set the deceleration time constant for execution of positioning. The set value is the time from when the used servo motor is at the rated speed until it reaches 0r/min. Setting range: 0 to 20000 Setting unit: ms															
Auxiliary function			AUX	The auxiliary function is invalid. The position data is handled as an incremental value command, regardless of the setting.															

Note. Use the command request for setting.

4. OPERATION

(2) Operation procedure

(a) Interrupt positioning operation mode selection

Using Operation mode selection (MD0_□/MD1_□/MD2_□), select the interrupt positioning operation mode.

(b) Operation start

When Operation start (ST_□) is turned ON, positioning operation is executed on the leading edge of ST_□ according to the speed, acceleration time constant, deceleration time constant and auxiliary function data. The rotation direction is determined by the sign of the position data set to the command request data. At this time Start direction (DIR_□) is invalid.

Position data: Positive → Address increasing direction

Position data: Negative → Address decreasing direction

(c) Interrupt positioning execution

When Interrupt positioning input (ITP_□) is turned ON, the axis stops after moving the distance in the set position data of the command request data on the leading edge of ST_□.

(3) Timing chart

(Note 1)

Operation mode selection
(MD0_□ · MD1_□ · MD2_□)

Servo-on (SON_□)

Operation start (ST_□)

Interrupt ositioning input (ITP_□)

(Note 2)

Positioning data

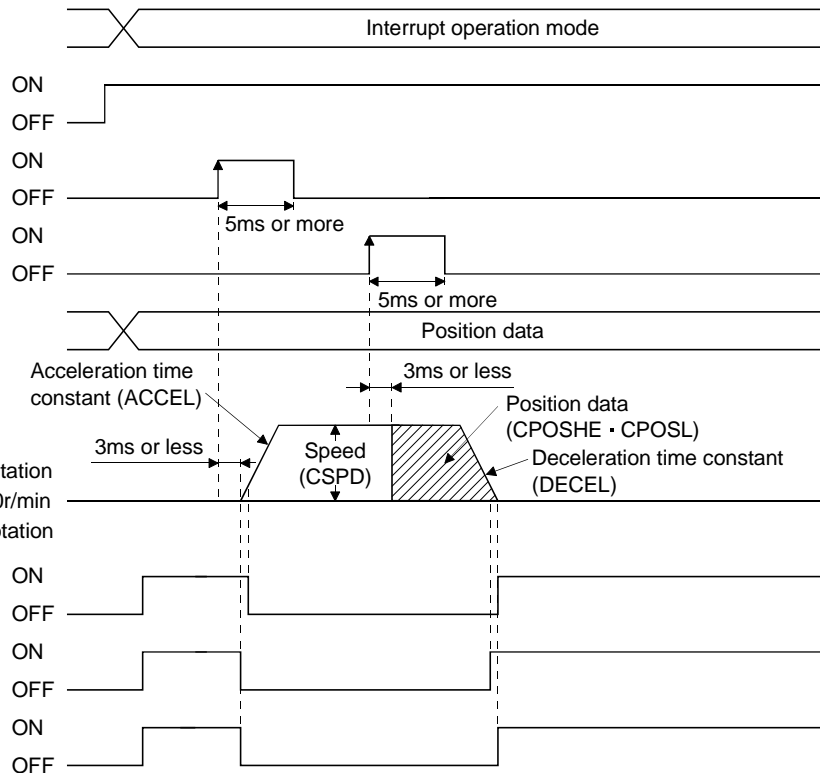
Acceleration time constant (ACCEL)

Servo motor speed
Forward rotation
0r/min
Reverse rotation

In position (INP_□)

Control mode selection
(CPO_□)

Movement finish (MEND_□)



Note 1. MD0_□: 0, MD1_□: 1, MD2_□: 2

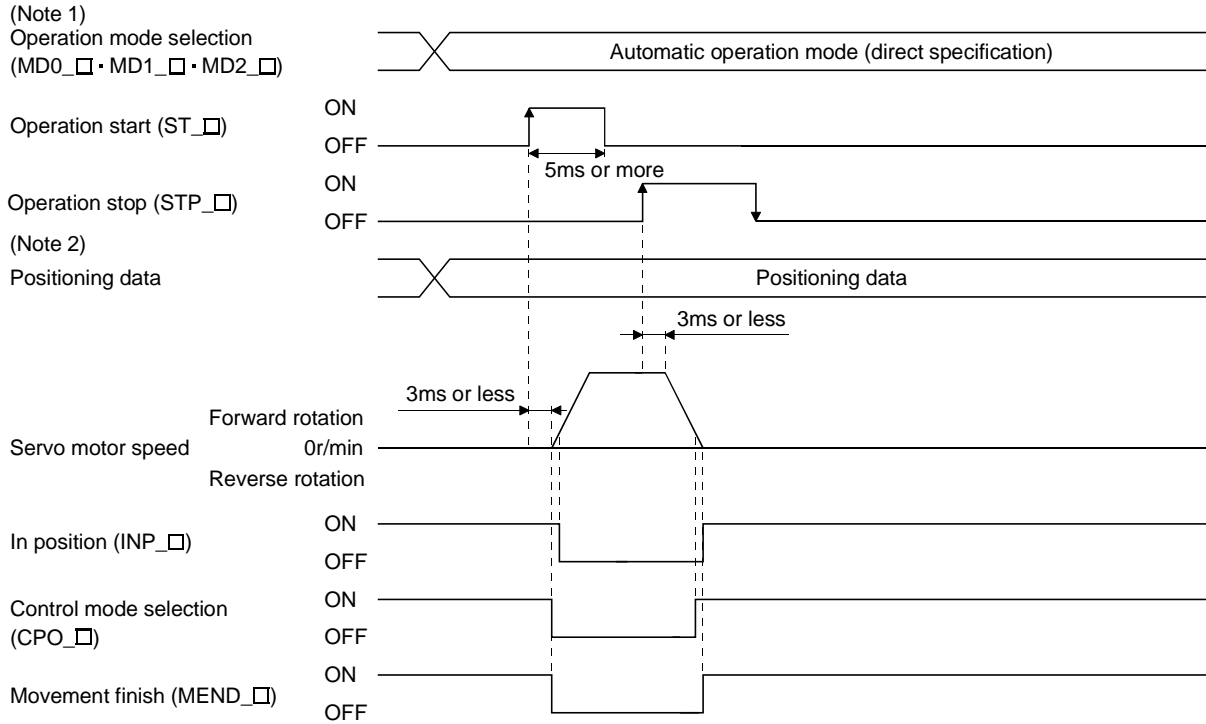
2. Position data, speed, acceleration time constant, deceleration time constant

4. OPERATION

4.6 Application Functions

4.6.1 Operation stop

When Operation stop (STP_□) is turned ON during operation in the automatic operation mode, the axis stops at the currently set deceleration time constant. If Operation stop (STP_□) is then turned OFF, operation is not resumed. When S-pattern acceleration/deceleration is specified, the S-pattern time constant is always valid.



Note 1. MD0_□: ON, MD1_□: OFF, MD2_□: OFF

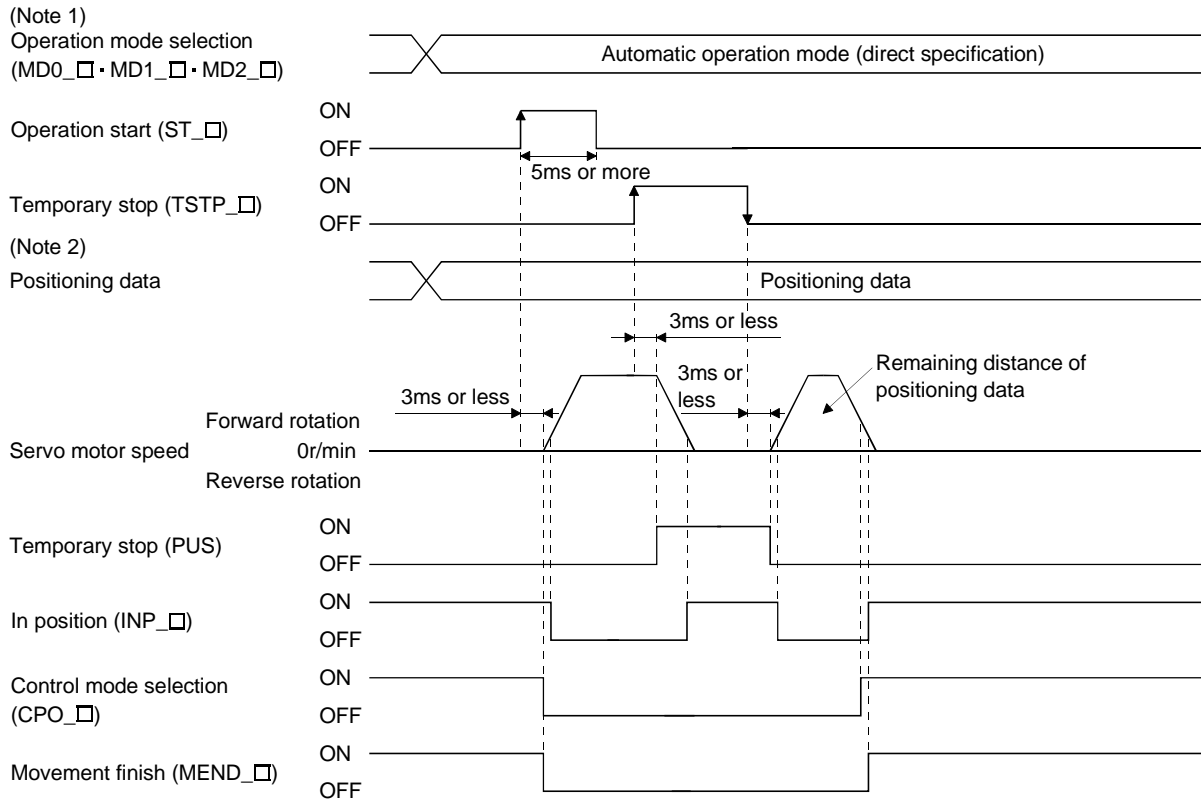
2. Position data, speed, acceleration time constant, deceleration time constant, auxiliary function

4. OPERATION

4.6.2 Temporary stop

Temporary stop (TSTP_□) is a device that becomes valid in the automatic operation mode. It cannot be used in the other operation modes.

When Temporary stop (TSTP_□) is turned ON during operation in the automatic operation mode, the axis stops at the currently set deceleration time constant. When Temporary stop (TSTP_□) is then turned OFF, the operation is resumed for the remaining distance. However, when Operation start (ST_□) has been turned ON during a temporary stop, operation cannot be resumed if Temporary stop (TSTP_□) is turned OFF. When S-pattern acceleration/deceleration is specified, the S-pattern time constant is always valid.



Note 1. MD0_□: ON, MD1_□: OFF, MD2_□: OFF

2. Position data, speed, acceleration time constant, deceleration time constant, auxiliary function

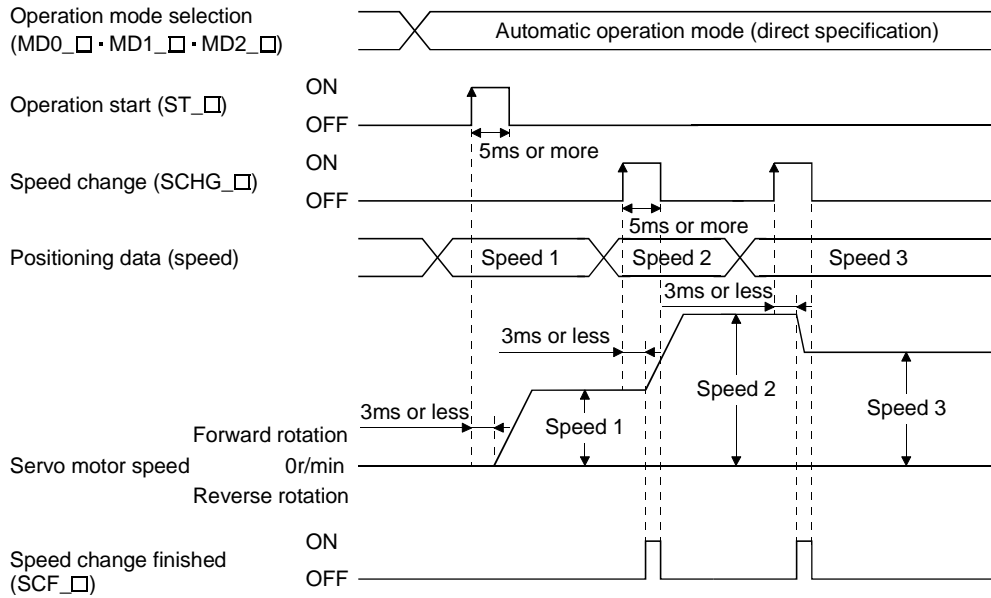
4. OPERATION

4.6.3 Speed change

Speed change (SCHG_□) cannot be used in the home position return mode.

When Speed change (SCHG_□) is turned ON during operation, the speed is changed according to the positioning data (speed, acceleration time constant, deceleration time constant) applicable when Speed change (SCHG_□) is turned ON.

Speed change (SCHG_□) is invalid during deceleration.



5. PARAMETERS

5. PARAMETERS



CAUTION

- Never adjust or change the parameter values extremely as it will make operation instable.

POINT

- This chapter does not provide the detailed explanation of the servo parameters. Refer to the Instruction Manual of the used servo amplifier.

The following parameter types are necessary to control the servo amplifier using the MR-MG30.

Parameter Group		Description	PNU No.
Common parameter		Used to make setting common to the axes. For PROFIBUS communication, setting can be made from any connected axis.	1000 to 1059
Axis parameter	Positioning parameter	Make setting for each axis according to the machine specifications and positioning specifications.	1200 to 1279
	Servo parameter	Make setting for each axis according to the specifications of the connected servo amplifier. For the parameter setting method, etc., refer to the corresponding Servo Amplifier Instruction Manual.	1401 to 1439

5.1 Common parameter

POINT

- The parameters marked * before their symbols are made valid by switching power off once and then switching it on again after parameter setting.

5.1.1 Parameter list

Category	No.	PNU No.	Abbreviation	Name	Initial Value	Unit
Basic parameter	0	0000		For manufacturer setting	0	
	1	1001	SV1	Axis 1 servo amplifier series selection	0	
	2	1002	SV2	Axis 2 servo amplifier series selection	0	
	3	1003	SV3	Axis 3 servo amplifier series selection	0	
	4	1004	SV4	Axis 4 servo amplifier series selection	0	
	5	1005	SV5	Axis 5 servo amplifier series selection	0	
	6	1006	SV6	Axis 6 servo amplifier series selection	0	
	7	1007		For manufacturer setting	0	
	8	1008		For manufacturer setting	0	
	9	1009		For manufacturer setting	0	
	10	1010		For manufacturer setting	0	
	11	1011		For manufacturer setting	0	
	12	1012		For manufacturer setting	0	
	13	1013		For manufacturer setting	0	
	14	1014		For manufacturer setting	0	
	15	1015		For manufacturer setting	0	
16	1016	*ALMC	Alarm history clear	0000h		

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name	Initial Value	Unit	
Basic parameter	17	1017		For manufacturer setting	0		
	18	1018		For manufacturer setting	0		
	19	1019	*BLK	Parameter block	0000h		
Extension parameter	20	1020	*DIF	Input signal filter	0000h		
	21	1021	*DI1	Input signal selection 1 (CN20-pin1)	101Dh		
	22	1022	*DI2	Input signal selection 2 (CN20-pin2)	101Eh		
	23	1023	*DI3	Input signal selection 3 (CN20-pin3)	101Fh		
	24	1024	*DI4	Input signal selection 4 (CN20-pin4)	101Ch		
	25	1025	*DI5	Input signal selection 5 (CN20-pin5)	201Dh		
	26	1026	*DI6	Input signal selection 6 (CN20-pin6)	201Eh		
	27	1027	*DI7	Input signal selection 7 (CN20-pin7)	201Fh		
	28	1028	*DI8	Input signal selection 8 (CN20-pin8)	201Ch		
	29	1029	*DI9	Input signal selection 9 (CN20-pin9)	301Dh		
	30	1030	*DI10	Input signal selection 10 (CN20-pin10)	301Eh		
	31	1031	*DI11	Input signal selection 11 (CN20-pin11)	301Fh		
	32	1032	*DI12	Input signal selection 12 (CN20-pin12)	301Ch		
	33	1033	*DI13	Input signal selection 13 (CN20-pin19)	401Dh		
	34	1034	*DI14	Input signal selection 14 (CN20-pin20)	401Eh		
	35	1035	*DI15	Input signal selection 15 (CN20-pin21)	401Fh		
	36	1036	*DI16	Input signal selection 16 (CN20-pin22)	401Ch		
	37	1037	*DI17	Input signal selection 17 (CN20-pin23)	501Dh		
	38	1038	*DI18	Input signal selection 18 (CN20-pin24)	501Eh		
	39	1039	*DI19	Input signal selection 19 (CN20-pin25)	501Fh		
	40	1040	*DI20	Input signal selection 20 (CN20-pin26)	501Ch		
	41	1041	*DI21	Input signal selection 21 (CN20-pin27)	601Dh		
	42	1042	*DI22	Input signal selection 22 (CN20-pin28)	601Eh		
	43	1043	*DI23	Input signal selection 23 (CN20-pin29)	601Fh		
	44	1044	*DI24	Input signal selection 24 (CN20-pin30)	601Ch		
	45	1045	*DO1	Output signal selection 1 (CN20-pin16)	1003h		
	46	1046	*DO2	Output signal selection 2 (CN20-pin17)	2003h		
	47	1047	*DO3	Output signal selection 3 (CN20-pin18)	3003h		
	48	1048	*DO4	Output signal selection 4 (CN20-pin34)	4003h		
	49	1049	*DO5	Output signal selection 5 (CN20-pin35)	5003h		
	50	1050	*DO6	Output signal selection 6 (CN20-pin36)	6003h		
		51	1051		For manufacturer setting	0	
		52	1052		For manufacturer setting	0	
		53	1053		For manufacturer setting	0	
		54	1054		For manufacturer setting	0	
	55	1055		For manufacturer setting	0		
	56	1056		For manufacturer setting	0		
	57	1057		For manufacturer setting	0		

5. PARAMETERS

5.1.2 Parameter detail list

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range																											
Basic parameter	0	1000		For manufacturer setting	0																													
	1	1001		Do not change this value by any means.	0																													
	2	1002			0																													
	3	1003			0																													
	4	1004			0																													
	5	1005			0																													
	6	1006			0																													
	7	1007			0																													
	8	1008			0																													
	9	1009			0																													
	10	1010			0																													
	11	1011			0																													
	12	1012			0																													
	13	1013			0																													
	14	1014			0																													
	15	1015			0																													
	16	1016	*ALMC	<p>Alarm history clear Used to clear the alarm history</p> <table border="1" style="margin-left: 20px;"> <tr> <td style="width: 20px; text-align: center;">0</td> <td style="width: 20px; text-align: center;">0</td> <td style="width: 20px; text-align: center;"> </td> <td style="width: 20px; text-align: center;">0</td> </tr> </table> <p style="margin-left: 40px;">└─ Alarm history clear 0: Invalid 1: Valid</p> <p>When alarm history clear is made valid, the alarm history is cleared at next power-on. After the alarm history is cleared, the setting is automatically made invalid (reset to 0).</p>	0	0		0	0000h		Refer to the Name and Function field.																							
	0	0		0																														
	17	1017		For manufacturer setting	0																													
18	1018		Do not change this value by any means.	0																														
19	1019	*BLK	<p>Parameter block</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Set value</th> <th>Operation for set value</th> <th>Operation via PROFIBUS communication</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">0000</td> <td style="text-align: center;">Reference</td> <td>Basic parameters (0 to 19)</td> </tr> <tr> <td style="text-align: center;">Write</td> <td>Extension parameters (20 to 59)</td> </tr> <tr> <td rowspan="2" style="text-align: center;">000A</td> <td style="text-align: center;">Reference</td> <td>Basic parameters (0 to 19)</td> </tr> <tr> <td style="text-align: center;">Write</td> <td>Extension parameters (20 to 59)</td> </tr> <tr> <td rowspan="2" style="text-align: center;">000C</td> <td style="text-align: center;">Reference</td> <td>Basic parameters (0 to 19)</td> </tr> <tr> <td style="text-align: center;">Write</td> <td>Extension parameters (20 to 59)</td> </tr> <tr> <td rowspan="2" style="text-align: center;">100B</td> <td style="text-align: center;">Reference</td> <td>Basic parameters (0 to 19)</td> </tr> <tr> <td style="text-align: center;">Write</td> <td>Extension parameters (20 to 59)</td> </tr> <tr> <td rowspan="2" style="text-align: center;">100C</td> <td style="text-align: center;">Reference</td> <td>Basic parameters (0 to 19)</td> </tr> <tr> <td style="text-align: center;">Write</td> <td>Extension parameters (20 to 59)</td> </tr> </tbody> </table>	Set value	Operation for set value	Operation via PROFIBUS communication	0000	Reference	Basic parameters (0 to 19)	Write	Extension parameters (20 to 59)	000A	Reference	Basic parameters (0 to 19)	Write	Extension parameters (20 to 59)	000C	Reference	Basic parameters (0 to 19)	Write	Extension parameters (20 to 59)	100B	Reference	Basic parameters (0 to 19)	Write	Extension parameters (20 to 59)	100C	Reference	Basic parameters (0 to 19)	Write	Extension parameters (20 to 59)	0000h		Refer to the Name and Function field.
Set value	Operation for set value	Operation via PROFIBUS communication																																
0000	Reference	Basic parameters (0 to 19)																																
	Write	Extension parameters (20 to 59)																																
000A	Reference	Basic parameters (0 to 19)																																
	Write	Extension parameters (20 to 59)																																
000C	Reference	Basic parameters (0 to 19)																																
	Write	Extension parameters (20 to 59)																																
100B	Reference	Basic parameters (0 to 19)																																
	Write	Extension parameters (20 to 59)																																
100C	Reference	Basic parameters (0 to 19)																																
	Write	Extension parameters (20 to 59)																																

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range																																																																																																			
Extension parameter	20	1020	*DIF	Input signal filter Used to select the input signal filter. <div style="border: 1px solid black; display: inline-block; padding: 2px;">0 0 0</div> Input signal filter If external input signal causes chattering due to noise, etc., input filter is used to suppress it. 1: 0.888[ms] 2: 1.777[ms] 3: 2.666[ms] 4: 3.555[ms]	0004h		Refer to the Name and Function field.																																																																																																			
	21	1021	*DI1	Input signal selection 1 (CN20-pin1) Used to select the functions of the CN20-pin1. <div style="border: 1px solid black; display: inline-block; padding: 2px;">0</div> DI function assignment (Refer to following table) Axis No. selection 0 : No function 1 to 6: Axis No. selection F : All axis input	101Dh		Refer to the Name and Function field.																																																																																																			
				<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Set value</th> <th>Input function</th> <th>Set value</th> <th>Input function</th> </tr> </thead> <tbody> <tr><td>00</td><td>No function assigned</td><td>18</td><td>Speed change</td></tr> <tr><td>01</td><td>No function assigned</td><td>19</td><td>No function assigned</td></tr> <tr><td>02</td><td>No function assigned</td><td>1A</td><td>Torque limit selection</td></tr> <tr><td>03</td><td>No function assigned</td><td>1B</td><td>For manufacturer setting (Note)</td></tr> <tr><td>04</td><td>No function assigned</td><td>1C</td><td>No function assigned</td></tr> <tr><td>05</td><td>No function assigned</td><td>1D</td><td>Forward rotation stroke end</td></tr> <tr><td>06</td><td>No function assigned</td><td>1E</td><td>Reverse rotation stroke end</td></tr> <tr><td>07</td><td>Alarm reset</td><td>1F</td><td>Proximity dog</td></tr> <tr><td>08</td><td>No function assigned</td><td>20</td><td>For manufacturer setting (Note)</td></tr> <tr><td>09</td><td>No function assigned</td><td>21</td><td>For manufacturer setting (Note)</td></tr> <tr><td>0A</td><td>No function assigned</td><td>22</td><td>For manufacturer setting (Note)</td></tr> <tr><td>0B</td><td>No function assigned</td><td>23</td><td>For manufacturer setting (Note)</td></tr> <tr><td>0C</td><td>No function assigned</td><td>24</td><td>For manufacturer setting (Note)</td></tr> <tr><td>0D</td><td>No function assigned</td><td>25</td><td>For manufacturer setting (Note)</td></tr> <tr><td>0E</td><td>Operation alarm reset</td><td>26</td><td>For manufacturer setting (Note)</td></tr> <tr><td>0F</td><td>Servo-on</td><td>27</td><td>For manufacturer setting (Note)</td></tr> <tr><td>10</td><td>Operation start</td><td>28</td><td>For manufacturer setting (Note)</td></tr> <tr><td>11</td><td>Start direction</td><td>29</td><td>For manufacturer setting (Note)</td></tr> <tr><td>12</td><td>Operation stop</td><td>2A</td><td>No function assigned</td></tr> <tr><td>13</td><td>Operation mode selection 0</td><td>2B</td><td>No function assigned</td></tr> <tr><td>14</td><td>Operation mode selection 1</td><td>2C</td><td>For manufacturer setting (Note)</td></tr> <tr><td>15</td><td>Operation mode selection 2</td><td>2D</td><td>No function assigned</td></tr> <tr><td>16</td><td>No function assigned</td><td>2E</td><td>No function assigned</td></tr> <tr><td>17</td><td>Temporary stop</td><td>2F</td><td>No function assigned</td></tr> </tbody> </table> <p>Note. Never set this value since it is for manufacturer setting.</p>	Set value	Input function	Set value	Input function	00	No function assigned	18	Speed change	01	No function assigned	19	No function assigned	02	No function assigned	1A	Torque limit selection	03	No function assigned	1B	For manufacturer setting (Note)	04	No function assigned	1C	No function assigned	05	No function assigned	1D	Forward rotation stroke end	06	No function assigned	1E	Reverse rotation stroke end	07	Alarm reset	1F	Proximity dog	08	No function assigned	20	For manufacturer setting (Note)	09	No function assigned	21	For manufacturer setting (Note)	0A	No function assigned	22	For manufacturer setting (Note)	0B	No function assigned	23	For manufacturer setting (Note)	0C	No function assigned	24	For manufacturer setting (Note)	0D	No function assigned	25	For manufacturer setting (Note)	0E	Operation alarm reset	26	For manufacturer setting (Note)	0F	Servo-on	27	For manufacturer setting (Note)	10	Operation start	28	For manufacturer setting (Note)	11	Start direction	29	For manufacturer setting (Note)	12	Operation stop	2A	No function assigned	13	Operation mode selection 0	2B	No function assigned	14	Operation mode selection 1	2C	For manufacturer setting (Note)	15	Operation mode selection 2	2D	No function assigned	16	No function assigned	2E	No function assigned	17	Temporary stop	2F	No function assigned		
Set value	Input function	Set value	Input function																																																																																																							
00	No function assigned	18	Speed change																																																																																																							
01	No function assigned	19	No function assigned																																																																																																							
02	No function assigned	1A	Torque limit selection																																																																																																							
03	No function assigned	1B	For manufacturer setting (Note)																																																																																																							
04	No function assigned	1C	No function assigned																																																																																																							
05	No function assigned	1D	Forward rotation stroke end																																																																																																							
06	No function assigned	1E	Reverse rotation stroke end																																																																																																							
07	Alarm reset	1F	Proximity dog																																																																																																							
08	No function assigned	20	For manufacturer setting (Note)																																																																																																							
09	No function assigned	21	For manufacturer setting (Note)																																																																																																							
0A	No function assigned	22	For manufacturer setting (Note)																																																																																																							
0B	No function assigned	23	For manufacturer setting (Note)																																																																																																							
0C	No function assigned	24	For manufacturer setting (Note)																																																																																																							
0D	No function assigned	25	For manufacturer setting (Note)																																																																																																							
0E	Operation alarm reset	26	For manufacturer setting (Note)																																																																																																							
0F	Servo-on	27	For manufacturer setting (Note)																																																																																																							
10	Operation start	28	For manufacturer setting (Note)																																																																																																							
11	Start direction	29	For manufacturer setting (Note)																																																																																																							
12	Operation stop	2A	No function assigned																																																																																																							
13	Operation mode selection 0	2B	No function assigned																																																																																																							
14	Operation mode selection 1	2C	For manufacturer setting (Note)																																																																																																							
15	Operation mode selection 2	2D	No function assigned																																																																																																							
16	No function assigned	2E	No function assigned																																																																																																							
17	Temporary stop	2F	No function assigned																																																																																																							
	22	1022	*DI2	Input signal selection 2 (CN20-pin2) Set the function of the CN20-2 pin. The setting method is the same as that of the common parameter No. 21.	101Eh		Refer to the Name and Function field.																																																																																																			

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter	23	1023	*DI3	Input signal selection 3 (CN20-pin3) Set the function of the CN20-3 pin. The setting method is the same as that of the common parameter No. 21.	101Fh		Refer to the Name and Function field.
	24	1024	*DI4	Input signal selection 4 (CN20-pin4) Set the function of the CN20-4 pin. The setting method is the same as that of the common parameter No. 21.	101Ch		Refer to the Name and Function field.
	25	1025	*DI5	Input signal selection 5 (CN20-pin5) Set the function of the CN20-5 pin. The setting method is the same as that of the common parameter No. 21.	201Dh		Refer to the Name and Function field.
	26	1026	*DI6	Input signal selection 6 (CN20-pin6) Set the function of the CN20-6 pin. The setting method is the same as that of the common parameter No. 21.	201Eh		Refer to the Name and Function field.
	27	1027	*DI7	Input signal selection 7 (CN20-pin7) Set the function of the CN20-7 pin. The setting method is the same as that of the common parameter No. 21.	201Fh		Refer to the Name and Function field.
	28	1028	*DI8	Input signal selection 8 (CN20-pin8) Set the function of the CN20-8 pin. The setting method is the same as that of the common parameter No. 21.	201Ch		Refer to the Name and Function field.
	29	1029	*DI9	Input signal selection 9 (CN20-pin9) Set the function of the CN20-9 pin. The setting method is the same as that of the common parameter No. 21.	301Dh		Refer to the Name and Function field.
	30	1030	*DI10	Input signal selection 10 (CN20-pin10) Set the function of the CN20-10 pin. The setting method is the same as that of the common parameter No. 21.	301Eh		Refer to the Name and Function field.
	31	1031	*DI11	Input signal selection 11 (CN20-pin11) Set the function of the CN20-11 pin. The setting method is the same as that of the common parameter No. 21.	301Fh		Refer to the Name and Function field.
	32	1032	*DI12	Input signal selection 12 (CN20-pin12) Set the function of the CN20-12 pin. The setting method is the same as that of the common parameter No. 21.	301Ch		Refer to the Name and Function field.

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter	33	1033	*DI13	Input signal selection 13 (CN20-pin19) Set the function of the CN20-19 pin. The setting method is the same as that of the common parameter No. 21.	401Dh		Refer to the Name and Function field.
	34	1034	*DI14	Input signal selection 14 (CN20-pin20) Set the function of the CN20-20 pin. The setting method is the same as that of the common parameter No. 21.	401Eh		Refer to the Name and Function field.
	35	1035	*DI15	Input signal selection 15 (CN20-pin21) Set the function of the CN20-21 pin. The setting method is the same as that of the common parameter No. 21.	401Fh		Refer to the Name and Function field.
	36	1036	*DI16	Input signal selection 16 (CN20-pin22) Set the function of the CN20-22 pin. The setting method is the same as that of the common parameter No. 21.	401Ch		Refer to the Name and Function field.
	37	1037	*DI17	Input signal selection 17 (CN20-pin23) Set the function of the CN20-23 pin. The setting method is the same as that of the common parameter No. 21.	501Dh		Refer to the Name and Function field.
	38	1038	*DI18	Input signal selection 18 (CN20-pin24) Set the function of the CN20-24 pin. The setting method is the same as that of the common parameter No. 21.	501Eh		Refer to the Name and Function field.
	39	1039	*DI19	Input signal selection 19 (CN20-pin25) Set the function of the CN20-25 pin. The setting method is the same as that of the common parameter No. 21.	501Fh		Refer to the Name and Function field.
	40	1040	*DI20	Input signal selection 20 (CN20-pin26) Set the function of the CN20-26 pin. The setting method is the same as that of the common parameter No. 21.	501Ch		Refer to the Name and Function field.
	41	1041	*DI21	Input signal selection 21 (CN20-pin27) Set the function of the CN20-27 pin. The setting method is the same as that of the common parameter No. 21.	601Dh		Refer to the Name and Function field.
	42	1042	*DI22	Input signal selection 22 (CN20-pin28) Set the function of the CN20-28 pin. The setting method is the same as that of the common parameter No. 21.	601Eh		Refer to the Name and Function field.

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range																																																																																																							
Extension parameter	43	1043	*DI23	Input signal selection 23 (CN20-pin29) Set the function of the CN20-29 pin. The setting method is the same as that of the common parameter No. 21.	601Fh		Refer to the Name and Function field.																																																																																																							
	44	1044	*DI24	Input signal selection 24 (CN20-pin30) Set the function of the CN20-30 pin. The setting method is the same as that of the common parameter No. 21.	601Ch		Refer to the Name and Function field.																																																																																																							
	45	1045	*DO1	Output signal selection 1 (CN20-pin16) Set the function of the CN20-16 pin. <div style="display: flex; align-items: center;"> <table border="1" style="border-collapse: collapse; margin-right: 10px;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">0</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> <div> <p>DO0 function assignment (Refer to following table)</p> <p>Axis No. selection 0 : No function 1 to 6: Axis No. E : All axis AND output F : All axis OR output</p> </div> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>Set value</th> <th>Output function</th> <th>Set value</th> <th>Output function</th> </tr> </thead> <tbody> <tr><td>0</td><td>No function assigned</td><td>18</td><td>Speed change finished</td></tr> <tr><td>1</td><td>No function assigned</td><td>19</td><td>Speed</td></tr> <tr><td>2</td><td>No function assigned</td><td>1A</td><td>Torque limit selection</td></tr> <tr><td>3</td><td>Trouble</td><td>1B</td><td>For manufacturer setting (Note)</td></tr> <tr><td>4</td><td>No function assigned</td><td>1C</td><td>Interrupt ositioning input</td></tr> <tr><td>5</td><td>No function assigned</td><td>1D</td><td>Forward rotation stroke end</td></tr> <tr><td>6</td><td>No function assigned</td><td>1E</td><td>Reverse rotation stroke end</td></tr> <tr><td>7</td><td>Warning output</td><td>1F</td><td>Proximity dog</td></tr> <tr><td>8</td><td>No function assigned</td><td>20</td><td>For manufacturer setting (Note)</td></tr> <tr><td>9</td><td>No function assigned</td><td>21</td><td>For manufacturer setting (Note)</td></tr> <tr><td>A</td><td>Positioning completion</td><td>22</td><td>For manufacturer setting (Note)</td></tr> <tr><td>B</td><td>Home position return completion</td><td>23</td><td>For manufacturer setting (Note)</td></tr> <tr><td>C</td><td>Ready</td><td>24</td><td>For manufacturer setting (Note)</td></tr> <tr><td>D</td><td>No function assigned</td><td>25</td><td>For manufacturer setting (Note)</td></tr> <tr><td>E</td><td>Operation alarm</td><td>26</td><td>For manufacturer setting (Note)</td></tr> <tr><td>F</td><td>No function assigned</td><td>27</td><td>For manufacturer setting (Note)</td></tr> <tr><td>10</td><td>Movement finish</td><td>28</td><td>No function assigned</td></tr> <tr><td>11</td><td>Control mode selection</td><td>29</td><td>No function assigned</td></tr> <tr><td>12</td><td>No function assigned</td><td>2A</td><td>No function assigned</td></tr> <tr><td>13</td><td>Operation mode selection output 0</td><td>2B</td><td>No function assigned</td></tr> <tr><td>14</td><td>Operation mode selection output 1</td><td>2C</td><td>For manufacturer setting (Note)</td></tr> <tr><td>15</td><td>Operation mode selection output 2</td><td>2D</td><td>No function assigned</td></tr> <tr><td>16</td><td>No function assigned</td><td>2E</td><td>No function assigned</td></tr> <tr><td>17</td><td>Temporary stop</td><td>2F</td><td>No function assigned</td></tr> </tbody> </table>		0			Set value	Output function	Set value	Output function	0	No function assigned	18	Speed change finished	1	No function assigned	19	Speed	2	No function assigned	1A	Torque limit selection	3	Trouble	1B	For manufacturer setting (Note)	4	No function assigned	1C	Interrupt ositioning input	5	No function assigned	1D	Forward rotation stroke end	6	No function assigned	1E	Reverse rotation stroke end	7	Warning output	1F	Proximity dog	8	No function assigned	20	For manufacturer setting (Note)	9	No function assigned	21	For manufacturer setting (Note)	A	Positioning completion	22	For manufacturer setting (Note)	B	Home position return completion	23	For manufacturer setting (Note)	C	Ready	24	For manufacturer setting (Note)	D	No function assigned	25	For manufacturer setting (Note)	E	Operation alarm	26	For manufacturer setting (Note)	F	No function assigned	27	For manufacturer setting (Note)	10	Movement finish	28	No function assigned	11	Control mode selection	29	No function assigned	12	No function assigned	2A	No function assigned	13	Operation mode selection output 0	2B	No function assigned	14	Operation mode selection output 1	2C	For manufacturer setting (Note)	15	Operation mode selection output 2	2D	No function assigned	16	No function assigned	2E	No function assigned	17	Temporary stop	2F	No function assigned	1003h	
	0																																																																																																													
Set value	Output function	Set value	Output function																																																																																																											
0	No function assigned	18	Speed change finished																																																																																																											
1	No function assigned	19	Speed																																																																																																											
2	No function assigned	1A	Torque limit selection																																																																																																											
3	Trouble	1B	For manufacturer setting (Note)																																																																																																											
4	No function assigned	1C	Interrupt ositioning input																																																																																																											
5	No function assigned	1D	Forward rotation stroke end																																																																																																											
6	No function assigned	1E	Reverse rotation stroke end																																																																																																											
7	Warning output	1F	Proximity dog																																																																																																											
8	No function assigned	20	For manufacturer setting (Note)																																																																																																											
9	No function assigned	21	For manufacturer setting (Note)																																																																																																											
A	Positioning completion	22	For manufacturer setting (Note)																																																																																																											
B	Home position return completion	23	For manufacturer setting (Note)																																																																																																											
C	Ready	24	For manufacturer setting (Note)																																																																																																											
D	No function assigned	25	For manufacturer setting (Note)																																																																																																											
E	Operation alarm	26	For manufacturer setting (Note)																																																																																																											
F	No function assigned	27	For manufacturer setting (Note)																																																																																																											
10	Movement finish	28	No function assigned																																																																																																											
11	Control mode selection	29	No function assigned																																																																																																											
12	No function assigned	2A	No function assigned																																																																																																											
13	Operation mode selection output 0	2B	No function assigned																																																																																																											
14	Operation mode selection output 1	2C	For manufacturer setting (Note)																																																																																																											
15	Operation mode selection output 2	2D	No function assigned																																																																																																											
16	No function assigned	2E	No function assigned																																																																																																											
17	Temporary stop	2F	No function assigned																																																																																																											

Note. Never set this value since it is for manufacturer setting.

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter	46	1046	*DO2	Output signal selection 2 (CN20-pin17) Set the function of the CN20-17 pin. The setting method is the same as that of the common parameter No. 45.	2003h		Refer to the Name and Function field.
	47	1047	*DO3	Output signal selection 3 (CN20-pin18) Set the function of the CN20-18 pin. The setting method is the same as that of the common parameter No. 45.	3003h		Refer to the Name and Function field.
	48	1048	*DO4	Output signal selection 4 (CN20-pin34) Set the function of the CN20-34 pin. The setting method is the same as that of the common parameter No. 45.	4003h		Refer to the Name and Function field.
	49	1049	*DO5	Output signal selection 5 (CN20-pin35) Set the function of the CN20-35 pin. The setting method is the same as that of the common parameter No. 45.	5003h		Refer to the Name and Function field.
	50	1050	*DO6	Output signal selection 6 (CN20-pin36) Set the function of the CN20-36 pin. The setting method is the same as that of the common parameter No. 45.	6003h		Refer to the Name and Function field.
	51	1051		For manufacturer setting	0		
	52	1052		Do not change this value by any means.	0		
	53	1053			0		
	54	1054			0		
	55	1055			0		
	56	1056			0		
	57	1057			0		

5. PARAMETERS

5.2 Positioning parameter

POINT

- The parameters marked * before their symbols are made valid by switching power off once and then switching it on again after parameter setting.

5.2.1 Parameter list

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit
Basic parameter	0	1200	*CMX	Electronic gear numerator	1	
	1	1201		For manufacturer setting	0	
	2	1202	*CDV	Electronic gear denominator	1	
	3	1203		For manufacturer setting	0	
	4	1204	*DIR	Rotation direction selection	0	
	5	1205	*STM	Feed length magnification	0	
	6	1206		For manufacturer setting	0	
	7	1207		For manufacturer setting	0	
	8	1208		For manufacturer setting	0	
	9	1209	*BLK	Parameter block	0	
Extension parameter 1	10	1210	JOG	JOG speed	100	r/min
	11	1211	JOGA	JOG acceleration time constant	100	ms
	12	1212	JOGD	JOG deceleration time constant	100	ms
	13	1213	*ZTY	Home position return type	0	
	14	1214	*ZDIR	Home position return direction	1	
	15	1215	*DPOL	Proximity dog input polarity	0	
	16	1216	ZRF	Home position return speed	500	r/min
	17	1217	CRF	Creep speed	10	r/min
	18	1218	ZTCA	Home position return acceleration time constant	100	ms
	19	1219	ZTCD	Home position return deceleration time constant	100	ms
	20	1220	ZST	Home position shift distance	0	μm
	21	1221	*ZPSL	Home position address low	0	×10 ^{STM} μm
	22	1222	*ZPSH	Home position address high	0	
	23	1223	DCT	Moving distance after proximity dog	1000	×10 ^{STM} μm
	24	1224		For manufacturer setting	100	
	25	1225		For manufacturer setting	15	
	26	1226	ORP	Home position return function selection	0	
	27	1227		For manufacturer setting	0	
	28	1228		For manufacturer setting	0	
	29	1229		For manufacturer setting	0	
	30	1230		For manufacturer setting	0	
	31	1231		For manufacturer setting	0	
	32	1232		For manufacturer setting	0	
	33	1233		For manufacturer setting	0	
	34	1234		For manufacturer setting	0	
	35	1235		For manufacturer setting	0	
	36	1236		For manufacturer setting	0	
	37	1237		For manufacturer setting	0	
	38	1238		For manufacturer setting	0	
	39	1239		For manufacturer setting	0	

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit
Extension parameter 2	40	1240	CRP	Rough match output range	0	$\times 10^{\text{STM}} \mu\text{m}$
	41	1241	MOFT	Movement complete minimum OFF time	10	ms
	42	1242	*LPP1	Position range output address + low	0	$\times 10^{\text{STM}} \mu\text{m}$
	43	1243	*LPP2	Position range output address + high	0	
	44	1244	*LNP1	Position range output address - low	0	$\times 10^{\text{STM}} \mu\text{m}$
	45	1245	*LNP2	Position range output address - high	0	
	46	1246	*DI1	Input signal automatic ON selection 1	0000h	
	47	1247	*DI2	Input signal automatic ON selection 2	0000h	
	48	1248		For manufacturer setting	0000h	
	49	1249	*D01	Output signal selection 1	0000h	
	50	1250		For manufacturer setting	0	
	51	1251		For manufacturer setting	0	
	52	1252	*STC	S-pattern acceleration/deceleration time constant	0	ms
	53	1253	*LSTP	Stop at stroke end detection selection	0	
	54	1254	*SSTP	Stop at software limit detection selection	0	
	55	1255	*PSTP	Stop at PROFIBUS communication disconnection selection	0	
	56	1256	QCD	Sudden stop deceleration time constant	10	ms
	57	1257	*BKC	Backlash compensation	0	pulse
	58	1258	*LMP1	Software limit address + low	0	$\times 10^{\text{STM}} \mu\text{m}$
	59	1259	*LMP2	Software limit address + high	0	
	60	1260	*LMN1	Software limit address - low	0	$\times 10^{\text{STM}} \mu\text{m}$
	61	1261	*LMN2	Software limit address - high	0	
	62	1262		For manufacturer setting	0	
	63	1263		For manufacturer setting	0000h	
	64	1264		For manufacturer setting	0	
	65	1265		For manufacturer setting	0	
	66	1266		For manufacturer setting	0	
	67	1267		For manufacturer setting	0	
	68	1268		For manufacturer setting	0	
	69	1269		For manufacturer setting	0	
70	1270		For manufacturer setting	0		
71	1271		For manufacturer setting	0		
72	1272		For manufacturer setting	0		
73	1273		For manufacturer setting	0		
74	1274		For manufacturer setting	0		
75	1275		For manufacturer setting	0		
76	1276		For manufacturer setting	0		
77	1277		For manufacturer setting	0		
78	1278		For manufacturer setting	0		
79	1279		For manufacturer setting	0		

5. PARAMETERS

5.2.2 Parameter detail list

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range																																						
Basic parameter	0	1200	*CMX	Electronic gear numerator Set the value of electronic gear numerator. Setting "0" sets the number of encoder pulses internally. (Refer to Section 5.2.3, (1))	1		0 to 65535																																						
	1	1201		For manufacturer setting Do not change this value by any means.	0																																								
	2	1202	*CDV	Electronic gear denominator Set the value of electronic gear denominator. (Refer to Section 5.2.3, (1))	1		1 to 65535																																						
	3	1203		For manufacturer setting Do not change this value by any means.	0																																								
	4	1204	*DIR	Rotation direction selection Select the rotation direction of the servo motor in the address increasing direction. 0: CCW (address increase) 1: CW (address increase)	0		Refer to the Name and Function field.																																						
	5	1205	*STM	Feed length magnification Used to select the feed length multiplication factor. 0: 1 times 1: 10 times 2: 100 times 3: 1000 times	0		Refer to the Name and Function field.																																						
	6	1206		For manufacturer setting	0																																								
	7	1207		Do not change this value by any means.	0																																								
	8	1208			0																																								
	9	1209	*BLK	Parameter block <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Set value</th> <th>Operation for set value</th> <th>Operation via PROFIBUS communication</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0000</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> <tr> <td rowspan="2">000A</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> <tr> <td rowspan="2">000C</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> <tr> <td rowspan="2">000E</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> <tr> <td rowspan="2">100B</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> <tr> <td rowspan="2">100C</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> <tr> <td rowspan="2">100E</td> <td>Reference</td> <td>Basic parameters (0 to 9)</td> </tr> <tr> <td>Write</td> <td>Extension parameters (10 to 79)</td> </tr> </tbody> </table>	Set value	Operation for set value	Operation via PROFIBUS communication	0000	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	000A	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	000C	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	000E	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	100B	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	100C	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	100E	Reference	Basic parameters (0 to 9)	Write	Extension parameters (10 to 79)	0		Refer to the Name and Function field.
Set value	Operation for set value	Operation via PROFIBUS communication																																											
0000	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											
000A	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											
000C	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											
000E	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											
100B	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											
100C	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											
100E	Reference	Basic parameters (0 to 9)																																											
	Write	Extension parameters (10 to 79)																																											

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter 1	10	1210	JOG	JOG speed Used to set the jog speed command.	100	r/min	0 to Permissible speed
	11	1211	JOGA	JOG acceleration time constant Set the acceleration time constant for JOG operation.	100	ms	0 to 20000
	12	1212	JOGD	JOG deceleration time constant Set the deceleration time constant for JOG operation.	100	ms	0 to 20000
	13	1213	*ZTY	Home position return type Select the home position setting method. 0: Dog type 1: Count type 2: Data setting type 3: Stopper type 4: Home position ignorance (Servo-on position as home position) 5: Dog type rear end reference 6: Count type front end reference 7: Dog cradle type	0		0 to 7
	14	1214	*ZDIR	Home position return direction Select the home position return direction. 0: Address increment direction 1: Address decrement direction	1		0 • 1
	15	1215	*DPOL	Proximity dog input polarity Select the polarity at which the proximity dog input signal is detected. 0: Dog signal turns ON for open circuit. 1: Dog signal turns ON for closed circuit.	0		0 • 1
	16	1216	ZRF	Home position return speed Used to set the servo motor speed for home position return. (Refer to Section 5.4)	500	r/min	0 to Permissible speed
	17	1217	CRF	Creep speed Used to set the creep speed after proximity dog detection. (Refer to Section 5.4)	10	r/min	0 to Permissible speed
	18	1218	ZTCA	Home position return acceleration time constant Set the acceleration time constant for a home position return.	100	ms	0 to 20000
	19	1219	ZTCD	Home position return deceleration time constant Set the deceleration time constant for a home position return.	100	ms	0 to 20000
	20	1220	ZST	Home position shift distance Used to set the shift distance starting at the Z-phase pulse detection position inside the encoder.	0	μm	0 to 65535
	21	1221	*ZPSH	Home position address low Set the address for when home position return is completed. Parameter No. 22 is the first three digits. Set the same sign for No. 21 and No. 22. A parameter error will occur if different signs are set.	0	× 10 ^{STM} μm	-999999 to 999999
	22	1222	*ZPSL	Home position address high	0		

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter 1	23	1223	DCT	Moving distance after proximity dog Used to set the moving distance after proximity dog in count type home position return. (Refer to Section 5.4.3)	1000	$\times 10^{\text{STM}}$ μm	0 to 65535
	24	1224		For manufacturer setting	100		
	25	1225		Do not change this value by any means.	15		
	26	1226	ORP	Home position return function selection Disables the function that inhibits home position return operation. 0: Invalid 1: Valid	0		0000h . 0001h
	27	1227		For manufacturer setting	0		
	28	1228		Do not change this value by any means.	0		
	29	1229			0		
	30	1230			0		
	31	1231			0		
	32	1232			0		
	33	1233			0		
	34	1234			0		
	35	1235			0		
	36	1236			0		
	37	1237			0		
	38	1238			0		
39	1239			0			
Extension parameter 2	40	1240	CRP	Rough match output range Used to set the command remaining distance range where the rough match (CPO_□) is output. (Refer to Section 5.2.3 (4).)	0	$\times 10^{\text{STM}}$ μm	0 to 65535
	41	1241	MOFT	Movement complete minimum OFF time Set the time during which the movement completion output is OFF, regardless of the output condition, after the start signal has turned ON at the time of positioning operation.	10	ms	0 to 1000
	42	1242	*LPP1	Position range output address + low Used to set the address increment side position range output address. Set the same sign to positioning parameters No.42 and 43. Setting of different signs will result in a parameter error. In parameters No. 42 to 45, set the range where position range (POT_□) turns on. Set address: □□□□□□ Upper 3 Lower 3 digits digits └───┬───┘ └───┬───┘ Positioning parameter No. 42 Positioning parameter No. 43	0	$\times 10^{\text{STM}}$ μm	-999999 to 999999
	43	1243	*LPP2	Position range output address + high	0		
	44	1244	*LNP1	Position range output address - low Used to set the address decrement side position range output address. Set the same sign to positioning parameters No.44 and 45. Setting of different signs will result in a parameter error. Set address: □□□□□□ Upper 3 Lower 3 digits digits └───┬───┘ └───┬───┘ Positioning parameter No. 44 Positioning parameter No. 45	0	$\times 10^{\text{STM}}$ μm	-999999 to 999999
	45	1245	*LNP2	Position range output address - high	0		

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range																																								
Extension parameter 2	46	1246	*DI1	Input signal automatic ON selection 1 Select the function device signals that will turn ON automatically. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Signal name</th> <th colspan="2">Initial value</th> </tr> <tr> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td>Servo-on</td> <td>0</td> </tr> </tbody> </table> BIN 0: Used in PROFIBUS or as external input signal BIN 1: Automatic ON	Signal name	Initial value		BIN	HEX		0	0		0		0	Servo-on	0	0000h		Refer to the Name and Function field.																										
	Signal name	Initial value																																													
BIN		HEX																																													
	0	0																																													
	0																																														
	0																																														
Servo-on	0																																														
47	1247	*DI2	Input signal automatic ON selection 2 Select the function device signals that will turn ON automatically. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Signal name</th> <th colspan="2">Initial value</th> </tr> <tr> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td>Operation mode selection 1</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td>Operation mode selection 2</td> <td>0</td> </tr> <tr> <td>Operation mode selection 3</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td>Torque limit selection</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td>0</td> </tr> <tr> <td>Forward rotation stroke</td> <td>0</td> </tr> <tr> <td>Reverse rotation stroke</td> <td>0</td> </tr> </tbody> </table> BIN 0: Used in PROFIBUS or as external input signal BIN 1: Automatic ON	Signal name	Initial value		BIN	HEX		0	0		0		0	Operation mode selection 1	0		0	0	Operation mode selection 2	0	Operation mode selection 3	0		0		0	0		0	Torque limit selection	0		0		0	0		0	Forward rotation stroke	0	Reverse rotation stroke	0	0000h		Refer to the Name and Function field.
Signal name	Initial value																																														
	BIN	HEX																																													
	0	0																																													
	0																																														
	0																																														
Operation mode selection 1	0																																														
	0	0																																													
Operation mode selection 2	0																																														
Operation mode selection 3	0																																														
	0																																														
	0	0																																													
	0																																														
Torque limit selection	0																																														
	0																																														
	0	0																																													
	0																																														
Forward rotation stroke	0																																														
Reverse rotation stroke	0																																														

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter 2	48	1248		For manufacturer setting Do not change this value by any means.	0000h		
	49	1249	*D01	Output signal selection 1 <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;">0</div> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;">0</div> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;"> </div> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;"> </div> </div> <p style="margin-left: 20px;">Select whether to or the MR-MG30 fault to the fault output. 0: or disabled 1: or enabled</p> <p style="margin-left: 20px;">Select whether to or the MR-MG30 warning to the warning output. 0: or disabled 1: or enabled</p>	0000h		Refer to the Name and Function field.
	50	1250		For manufacturer setting	0		
	51	1251		Do not change this value by any means.	0		
	52	1252	*STC	S-pattern acceleration/deceleration time constant Set when inserting S-pattern time constant into the acceleration/deceleration time constant of the point table. (Refer to Section 5.2.3, (2)) This time constant is invalid for home position return.	0	ms	0 to 100
	53	1253	*LSTP	Stop at stroke end detection selection Select the stop processing to be performed when the stroke end signal turns OFF. (Refer to Section 5.2.3 (3).) 0: Sudden stop (Stop according to the positioning parameter No. 56 (Sudden stop deceleration time constant)) 1: Slow stop (Deceleration to stop according to the deceleration time constant)	0		0 · 1
	54	1254	*SSTP	Stop at software limit detection selection Select the stop processing to be performed when the software limit is detected. 0: Sudden stop (Stop according to the positioning parameter No. 56 (Sudden stop deceleration time constant)) 1: Slow stop (Deceleration to stop according to the deceleration time constant)	0		0 · 1
	55	1255	*PSTP	Stop at PROFIBUS communication disconnection selection Select the stop processing to be performed when the PROFIBUS communication stops dead. 0: Stop due to alarm (Stop by dynamic brake) 1: Deceleration to stop 2: Not stopped	0		0 to 2
	56	1256	QCD	Sudden stop deceleration time constant Set the deceleration time constant for a sudden stop to be made when the LSP/LSN signal turns OFF or when the software limit is detected.	10	ms	0 to 20000
	57	1257	*BKC	Backlash compensation Used to set the backlash compensation made when the command direction is reversed. This function compensates for the number of backlash pulses in the opposite direction to the home position return direction. In the absolute position detection system, this function compensates for the backlash pulse count in the direction opposite to the operating direction at power-on.	0	pulse	0 to 1000

5. PARAMETERS

Category	No.	PNU No.	Abbreviation	Name and Function	Initial Value	Unit	Setting Range
Extension parameter 2	58	1258	*LMP1	Software limit address + high Used to set the address increment side software stroke limit. The software limit is made invalid if this value is the same as in "software limit -". (Refer to Section 5.2.3, (5)) Set the same sign to positioning parameters No.58 and 59. Setting of different signs will result in a parameter error. Set address: $\square\square\square\square\square$ Upper 3 Lower 3 digits digits └───┬───┘ Positioning parameter No. 58 Positioning parameter No. 59	0	$\times 10^{\text{STM}}$ μm	999999 to 999999
	59	1259	*LMP2	Software limit address + low	0		
	60	1260	*LMN1	Software limit address - high Used to set the address decrement side software stroke limit. The software limit is made invalid if this value is the same as in "software limit -". (Refer to Section 5.2.3, (5)) Set the same sign to positioning parameters No.60 and 61. Setting of different signs will result in a parameter error. Set address: $\square\square\square\square\square$ Upper 3 Lower 3 digits digits └───┬───┘ Positioning parameter No. 60 Positioning parameter No. 61	0	$\times 10^{\text{STM}}$ μm	-999999 to 999999
	61	1261	*LMN2	Software limit address - low	0		
	62	1262		For manufacturer setting	0		
	63	1263		Do not change this value by any means.	0000h		
	64	1264			0		
	65	1265			0		
	66	1266			0		
	67	1267			0		
	68	1268			0		
	69	1269			0		
	70	1270			0		
	71	1271			0		
	72	1272			0		
	73	1273			0		
	74	1274			0		
	75	1275			0		
	76	1276			0		
77	1277			0			
78	1278			0			
79	1279			0			

5. PARAMETERS

5.2.3 Detailed explanation

(1) Electronic gear



CAUTION

• False setting will result in unexpected fast rotation, causing injury.

POINT

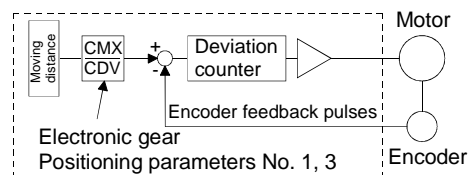
- A guideline for the electronic gear setting range changes depending on the encoder resolution. If a value is set outside the range, noise may be produced during acceleration/deceleration or operation may not be performed at the preset speed or acceleration/deceleration time constant.

Encoder resolution	Recommended setting range
131072	1/10 to 100
8192	1/20 to 20

- After setting the positioning parameter No.1, 3 value, switch power off, then on to make that setting valid.

Use the electronic gear (positioning parameters No.1, 3) to make adjustment so that the servo amplifier setting matches the moving distance of the machine. Also, by changing the electronic gear value, the machine can be moved at any multiplication ratio to the moving distance on the servo amplifier.

$$\frac{\text{CMX}}{\text{CDV}} = \frac{\text{Positioning parameters No. 1}}{\text{Positioning parameters No. 3}}$$



The following examples are used to explain how to calculate the electronic gear value:

POINT

- The following specification symbols are needed for electronic gear calculation:
 - Pb : Ballscrew lead [mm(in.)]
 - n : Reduction ratio
 - Pt : Servo motor resolution [pulse/rev]
 - ΔS : Travel per servo motor revolution [mm/rev]

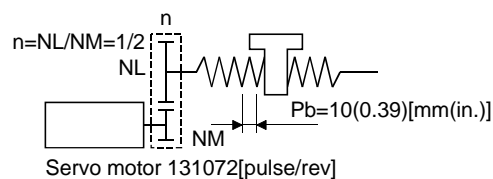
(a) Ballscrew setting example

Machine specifications

Ballscrew lead: Pb = 10 (0.39) [mm(in.)]

Reduction ratio: n = 1/2

Servo motor resolution: Pt = 131072 [pulse/rev]



$$\frac{\text{CMX}}{\text{CDV}} = \frac{P_t}{\Delta S} = \frac{P_t}{n \cdot p_b \cdot 1000} = \frac{131072}{1/2 \cdot 10 \cdot 1000} = \frac{131072}{5000} = \frac{32768}{1250}$$

Hence, set 32768 to CMX and 1250 to CDV.

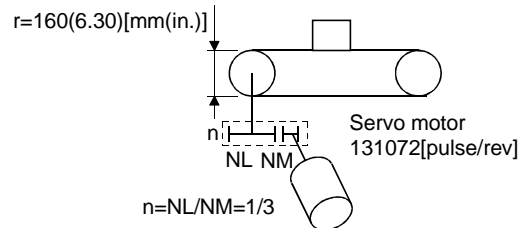
5. PARAMETERS

- (b) Conveyor setting example
Machine specifications

Pulley diameter: $r = 160 (6.30) [\text{mm}(\text{in.})]$

Reduction ratio: $n = 1/3$

Servo motor resolution: $P_t = 131072 [\text{pulse/rev}]$

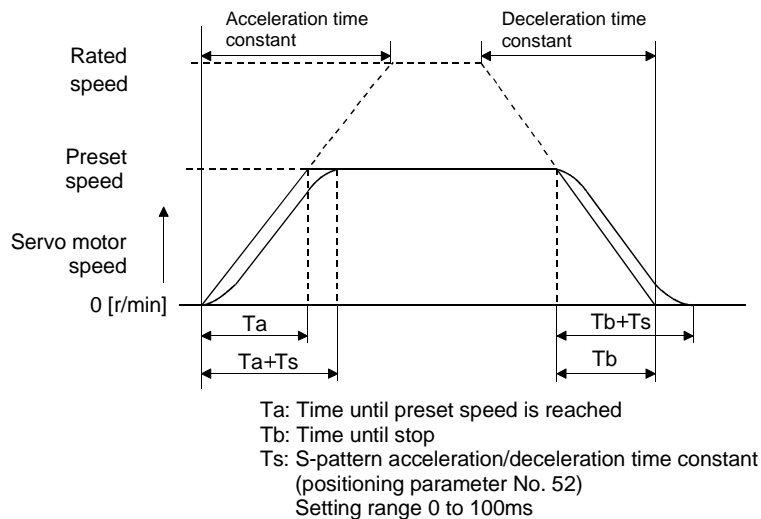


$$\frac{\text{CMX}}{\text{CDV}} = \frac{p_t}{\Delta S} = \frac{p_t}{n \cdot r \cdot \pi \cdot 1000} = \frac{131072}{1/3 \cdot 160 \cdot \pi \cdot 1000} = \frac{131072}{167551.61} \approx \frac{32768}{41888}$$

Reduce CMX and CDV to the setting range or less, and round off the first decimal place.
Hence, set 32768 to CMX and 41888 to CDV.

- (2) S-pattern acceleration/deceleration

In servo operation, linear acceleration/deceleration is usually made. By setting the S-pattern acceleration/deceleration time constant (positioning parameter No.52), a smooth start/stop can be made. When the S-pattern time constant is set, smooth positioning is executed as shown below. When the S-pattern acceleration/deceleration time constant is set, the time from when the positioning starts until the movement finish (MEND_□) is output will increase by the time equivalent to the S-pattern time constant setting.



- (3) Changing the stop pattern using a limit switch

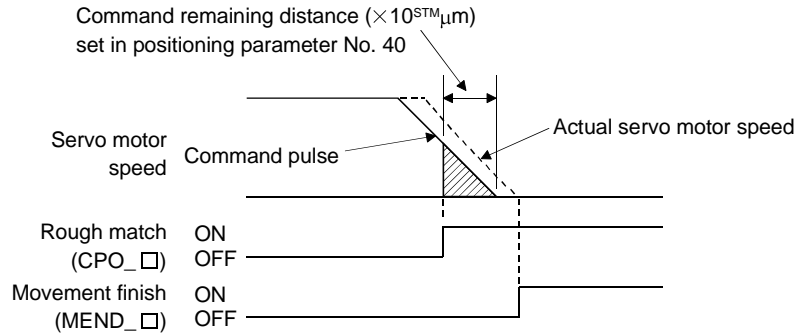
The servo amplifier is factory-set to make a sudden stop when the limit switch or software limit is made valid. When a sudden stop is not required, e.g. when there is an allowance from the limit switch installation position to the permissible moving range of the machine, a slow stop may be selected by changing the positioning parameter No.53 setting.

Positioning parameter No. 53 setting	Description
0 (initial value)	Droop pulses are reset to make a stop. (Sudden stop)
1	Droop pulses are drawn out to make a slow stop. (Slow stop)

5. PARAMETERS

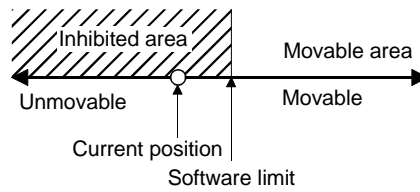
(4) Rough match output

Rough match (CPO_□) is output when the command remaining distance reaches the value set in positioning parameter No. 40 (rough match output range). The set remaining distance is 0 to 65535 [$\times 10^{\text{STM}} \mu\text{m}$].



(5) Software limit

A limit stop using a software limit is made as in stroke end operation. When a motion goes beyond the setting range, the motor is stopped and servo-locked. This function is made valid at power-on but made invalid during home position return. This function is made invalid when the software limit + setting is the same as the software limit - setting. A parameter error (AL. 37) will occur if the software limit + setting is less than the software limit - setting.



5. PARAMETERS

5.3 Servo Parameter List

POINT
<ul style="list-style-type: none"> The parameters marked * before their symbols are made valid by switching power off once and then switching it on again after parameter setting. The parameters are set when communication is established between the servo system controller and servo amplifier (indicated by b*). After that, power off the servo amplifier once and then power it on again.

Refer to the Instruction Manual of the corresponding servo amplifier for the parameter details.

(1) MR-J2S-□B

Classification	No.	Symbol	Name	Initial Value	Unit
Basic parameters	1	*AMS	Amplifier setting	0000	
	2	*REG	Regenerative brake resistor	0000	
	3		For manufacturer setting by servo system controller Automatically set from the servo system controller	0080	
	4			000	
	5			1	
	6	*FBP	Feedback pulse number	255	
	7	*POL	Rotation direction selection	0	
	8	ATU	Auto tuning	0001	
	9	RSP	Servo response	7kW or less: 0005 11kW or more: 0002	
	10	TLP	Forward rotation torque limit	300	%
	11	TLN	Reverse rotation torque limit	300	%
Adjustment parameters	12	GD2	Ratio of load inertia to servo motor inertia (load inertia ratio)	7.0	times
	13	PG1	Position control gain 1	7kW or less: 35 11kW or more: 19	rad/s
	14	VG1	Speed control gain 1	7kW or less: 177 11kW or more: 96	rad/s
	15	PG2	Position control gain 2	7kW or less: 35 11kW or more: 19	rad/s
	16	VG2	Speed control gain 2	7kW or less: 817 11kW or more: 455	rad/s
	17	VIC	Speed integral compensation	48	ms
	18	NCH	Machine resonance suppression filter 1 (Notch filter)	0000	
	19	FFC	Feed forward gain	0	%
	20	INP	In-position range	100	pulse
	21	MBR	Electromagnetic brake sequence output	0	ms
	22	MOD	Analog monitor output	0001	
	23	*OP1	Optional function 1	0000	
	24	*OP2	Optional function 2	0000	
25	LPF	Low-pass filter/adaptive vibration suppression control	0000		
26		For manufacturer setting	0		
Expansion parameters	27	MO1	Analog monitor 1 offset	0	mV
	28	MO2	Analog monitor 2 offset	0	mV
	29		For manufacturer setting	0001	
	30	ZSP	Zero speed	50	r/min
	31	ERZ	Error excessive alarm level	80	(Note) 0.025rev
	32	OP5	Optional function 5	0000	
	33	*OP6	Optional function 6	0000	
	34	VPI	PI-PID control switch-over position droop	0	pulse
	35		For manufacturer setting	0	
	36	VDC	Speed differential compensation	980	
	37		For manufacturer setting	0010	
	38	*ENR	Encoder output pulses	4000	pulse/rev
	39		For manufacturer setting	0	
	40	*BLK	Parameter blocks (Note 2)	0000	

Note. The setting unit of 0.025rev applies for the servo amplifier of software version B1 or later. For the amplifier of software version older than B1, the setting unit of 0.1rev is applied.

5. PARAMETERS

(2) MR-J2M-P8B

Classification	No.	Symbol	Name	Initial Value	Unit
Basic parameters	1		For manufacturer setting	0000	
	2			0000	
	3		For manufacturer setting by servo system controller Automatically set from the servo system controller	0080	
	4			0000	
	5			1	
	6			0	
	7	*POL		Rotation direction selection	0
	8	ATU	Auto tuning	0001	
	9	RSP	Servo response	0004	
	10	TLP	Forward rotation torque limit	300	%
	11	TLN	Reverse rotation torque limit	300	%
Adjustment parameters	12	GD2	Ratio of load inertia to servo motor inertia (load inertia ratio)	30	0.1 times
	13	PG1	Position control gain 1	145	rad/s
	14	VG1	Speed control gain 1	873	rad/s
	15	PG2	Position control gain 2	97	rad/s
	16	VG2	Speed control gain 2	1144	rad/s
	17	VIC	Speed integral compensation	20	ms
	18	NCH	Machine resonance suppression filter (Notch filter)	0	
	19	FFC	Feed forward gain	0	%
	20	INP	In-position range	100	pulse
	21	MBR	Electromagnetic brake sequence output	0	ms
	22		For manufacturer setting	0001	
	23	*OP1	Optional function 1	0000	
	24	*OP2	Optional function 2	0000	
	25			0000	
26			0000		
Expansion parameters	27		For manufacturer setting	0	mV
	28			0	mV
	29			0001	
	30	ZSP	Zero speed	50	r/min
	31	ERZ	Error excessive alarm level	80	0.1rev
	32	OP5	Optional function 5	0000	
	33		For manufacturer setting	0000	
	34	VPI	PI-PID control switch-over position droop	0	pulse
	35		For manufacturer setting	0	
	36	VDC	Speed differential compensation	980	
	37			0000	
	38		For manufacturer setting	0	
	39			0	
	40	*BLK	Parameter blocks (Note 2)	0000	

6. TROUBLESHOOTING

6. TROUBLESHOOTING

6.1 Outline

The MR-MG30 alarms and warnings are categorized into the following three types.

Name		Details
Option unit alarm		<p>These alarms and warnings are detected by the option unit.</p> <p>When an alarm occurs, all of the connected servo amplifiers stop in the base OFF state.</p> <p>The error codes can be read from the random connected axis using PROFIBUS communication.</p>
Axis alarms	Operation alarms	<p>These alarms are detected at the startup of operation and during operation in the automatic operation, manual operation, home position return, high-speed home position return and interrupt position control modes.</p> <p>Operation start (ST_□) is not accepted when an operation alarm is occurring.</p> <p>Turn operation alarm reset (ORST_□) ON and reset the operation alarm before turning operation start (ST_□) ON.</p>
	Servo alarm	<p>These alarms and warnings are detected by the connected servo amplifier.</p> <p>When an alarm or some warnings (AL-E6, E7, E9) are detected, the servo amplifier enters the servo OFF state and the operation stops.</p>

6.2 Operation at Error Occurrence

If any error occurs during operation, operation is performed as described in the following table.

Error section	Details	Operation	Explanation
Servo error	Servo operation	Stops	If a servo alarm or some warning (AL-E6, E7, E9) occurs, the servo motor connected to the servo amplifier, where the error has occurred, is stopped by the dynamic brake. Refer to the corresponding Servo Amplifier Instruction Manual, and remove the error cause.
	Data communication between servo amplifier and option unit	Continues	
	Data communication between option unit and PROFIBUS	Continues	
Option unit error (Refer to Section 6.5)	Servo operation	Stops	If an option unit alarm or some warning (AL-E7) occurs, the servo motors connected to all the servo amplifiers are stopped by the dynamic brakes. Refer to Section 6.5, and remove the error cause.
	Data communication between servo amplifier and option unit	Continues	
	Data communication between option unit and PROFIBUS	Continues	
SSCNET communication error (Refer to Section 6.3)	Servo operation	Stops	The SSCNET communication error is indicated by the alarm. When the alarm occurs, the servo motors connected to all the servo amplifiers are stopped by the dynamic brakes. Refer to Section 6.3 for alarm details.
	Data communication between servo amplifier and option unit	Stops	
	Data communication between option unit and PROFIBUS	Continues	
PROFIBUS communication error (Refer to Section 6.4)	Servo operation	Stops	The PROFIBUS communication error is indicated by the alarm. When the alarm occurs, the servo motor stops according to the positioning parameter No. 55 setting of the corresponding servo amplifier connected. Check the LED state (Section 6.4) and remove the cause, or check the PROFIBUS master station.
	Data communication between servo amplifier and option unit	Continues	
	Data communication between option unit and PROFIBUS	Stops	

6. TROUBLESHOOTING

6.3 SSCNET Communication Errors

The following table provides the factors and measures at occurrence of an SSCNET communication error.

Alarm code	Name	Details	Cause of occurrence	Remedy
AL34	CRC error	Bus cable communication error	1. The bus cable is disconnected.	Correctly connect.
			2. The bus cable is faulty.	Replace the cable.
			3. Noise entered the bus cable.	Provide measures against noise.
			4. The terminator is disconnected.	Connect the terminator.
			5. The axis No. setting was duplicated on the servo amplifier side.	Correctly set.
AL36	Transmission error	Bus cable or PCB error	1. The bus cable is disconnected.	Correctly connect.
			2. The bus cable is faulty.	Replace the cable.
			3. The PCB is faulty.	Replace the option unit.
			4. The terminator is disconnected.	Connect the terminator.

6.4 PROFIBUS Communication Errors

The following table provides the factors and measures at occurrence of a PROFIBUS communication error.

Alarm code	NS LED	Name	Details	Cause of occurrence	Remedy
AL8D	OFF	PROFIBUS communication error	Normal communication with master station not possible.	1. The communication cable is faulty.	Replace the cable.
				2. The communication cable is disconnected.	Correctly connect.
				3. The terminator is not connected correctly.	Correctly connect.

6. TROUBLESHOOTING

6.5 Option Unit Alarms

(1) Alarm/warning list

If any alarm/warning occurs, take the appropriate action according to (2) or (3) in this section.

After its cause has been removed, the alarm can be deactivated in either of the methods marked ○ in the Alarm Deactivation field.

	No.	LED Indication		Name	Alarm Deactivation	
		MOD	NET		Power OFF → ON	Alarm reset
Alarm	10	Lit red	Unchanged	Undervoltage	○	○
	12	Lit red	Unchanged	Memory error1 (RAM)	○	/
	13	Lit red	Unchanged	Clock error	○	/
	14	Lit red	Unchanged	Watchdog	○	/
	15	Lit red	Unchanged	Memory error2 (EEP-ROM)	○	/
	17	Lit red	Unchanged	Board error	○	/
	19	Lit red	Unchanged	Memory errorF (Flash-ROM)	○	/
	34	Lit red	Unchanged	CRC error	○	○
	36	Lit red	Unchanged	Transfer error	○	○
	37	Lit red	Unchanged	Parameter error	○	/
	8D	Lit red	Off	PROFIBUS communication error	○	○
Warning	E7	Lit red	Unchanged	Controller emergency stop warning	Automatically deactivated when occurrence factor is removed.	

(2) Remedies for alarms



CAUTION

▪ When any alarm has occurred, eliminate its cause, ensure safety, then reset the alarm, and restart operation. Otherwise, injury may occur.

When an alarm occurs, the dynamic brake is operated to stop the servomotor. At this time, the display indicates the alarm No.

Display	Name	Definition	Cause	Action
10	Undervoltage	Power supply voltage dropped.	1. Power supply voltage is low.	Review the power supply.
			2. There was an instantaneous control power failure of 30ms or longer.	
			3. Faulty parts in the servo amplifier	Change the MR-MG30.
Checking method Alarm (10) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.				
12	Memory error 1 (RAM)	RAM, memory fault	Faulty parts in the MR-MG30	Change the MR-MG30.
13	Clock error	Printed board fault		
14	Watchdog	CPU, parts fault		
		Checking method Alarm (any of 12, 13 or 14) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.		

6. TROUBLESHOOTING

Display	Name	Definition	Cause	Action
15	Memory error 2 (EEP-ROM)	EEP-ROM fault	1. Faulty parts in the MR-MG30 <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Checking method Alarm (15) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables. </div> 2. The number of write times to EEPROM exceeded 100,000.	Change the MR-MG30.
17	Board error 2	CPU/parts fault	Faulty parts in the MR-MG30	Change the MR-MG30.
19	Memory error 3 (Flash ROM)	ROM memory fault	<div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Checking method Alarm (17 or 19) occurs if power is switched on after disconnection of all cables but the control circuit power supply cable. </div>	
34	CRC error	Bus cable is faulty	1. Bus cable disconnected.	Connect correctly.
			2. Bus cable fault	Change the cable.
			3. Noise entered bus cable.	Take measures against noise.
			4. Termination connector disconnected.	Connect termination connector.
			5. The same No. exists in the servo amplifier side axis setting.	Set correctly.
36	Transfer error	Bus cable or printed board is faulty	1. Bus cable is disconnected.	Connect the connector of the bus cable.
			2. Bus cable fault.	Change the cable.
			3. Printed board is faulty.	Change the servo amplifier
37	Common parameter error	Common parameter setting is wrong.	1. MR-MG30 fault caused the parameter setting to be rewritten.	Change the MR-MG30.
			2. In the common parameters No. 21 to 44, the input signal assignment is overlapping.	Set common parameter No.21 to 44 correctly.
			3. The number of write times to EEPROM exceeded 100,000 due to parameter write, etc.	Change the MR-MG30.
8D	PROFIBUS communication error	Normal communication with the master station cannot be made.	1. The communication cable is faulty.	Change the cable.
			2. The communication cable is disconnected.	Connect it correctly.
			3. The terminating resistor is not connected correctly.	Connect it correctly.

(3) Remedies for warnings

If E7 occurs, the servo off status is established. Eliminate the cause of the warning according to this section.

Display	Name	Definition	Cause	Action
E7	Controller emergency stop warning	/	Emergency stop signal was entered into the servo system controller.	Ensure safety and deactivate emergency stop.

6. TROUBLESHOOTING

6.6 Operation Alarms

(1) Alarm/warning list

If any alarm/warning occurs, take the appropriate action according to (2) in this section.

After its cause has been removed, the alarm can be deactivated in either of the methods marked ○ in the Alarm Deactivation field.

No.	Name	Alarm Deactivation	
		Power OFF → ON	Alarm reset
20	Operation mode illegal	○	○
21	Position control data illegal	○	○
23	Mode changed during operation	○	○
37	Positioning parameter error	○	—
38	Servo parameter error	○	—
39	Connected model error	○	—
90	Home position return incomplete	○	○
98	Software limit reached	○	○
99	Stroke limit detected	○	○
B0	Servo amplifier powered off	○	○
E3	Absolute position counter	○	○

(2) Remedies for alarms



CAUTION

▪ When any alarm has occurred, eliminate its cause, ensure safety, then reset the alarm, and restart operation. Otherwise, injury may occur.

When an alarm occurs during operation, the servomotor decelerates to a stop. At this time, the display indicates the alarm No.

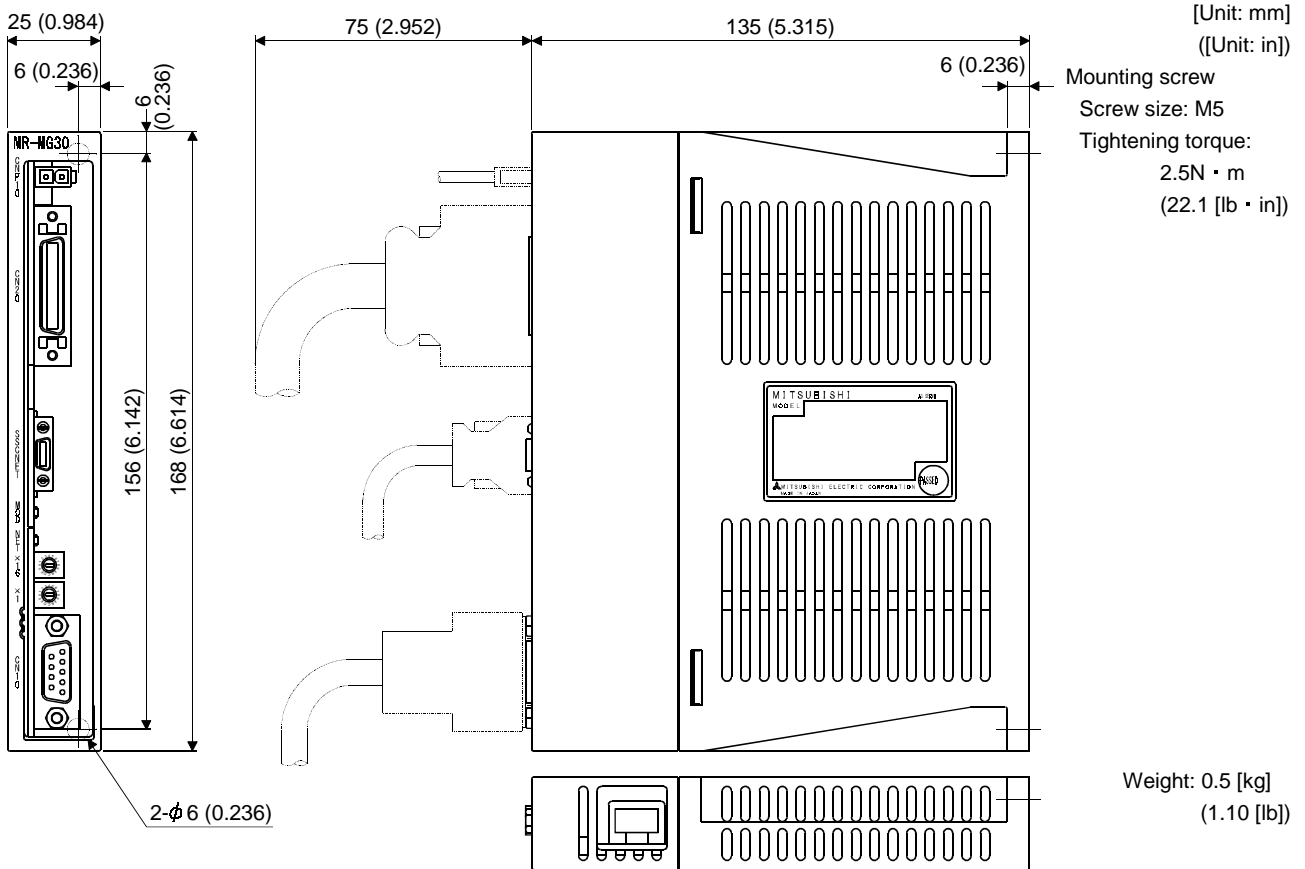
Display	Name	Definition	Cause	Action
20	Operation mode illegal	The operation mode selection (MD0_□ ▪ MD1_□ ▪ MD2_□) combination is illegal.	The MD0_□ ▪ MD1_□ ▪ MD2_□ combination is outside the setting range.	Set a correct combination.
21	Position control data illegal	Command request position control data setting value is incorrect.	A value exceeding the setting range was set for the command request position control data.	Set a correct value within the setting range.
23	Mode change during operation	Operation mode was changed during operation.	The operation mode was changed during operation.	Do not change the operation mode during operation.
37	Positioning parameter error	Positioning parameter setting value is incorrect.	1. The parameter setting value was rewritten due to an operation unit fault.	Replace the option unit.
			2. The electronic gear ratio setting exceeds the setting range.	Correctly set parameter No.0 and 2.
			3. An incorrect sign was set for the software limit + (parameter No. 58, 59). Similarly, an incorrect sign was set for the software limit - (parameter No. 60, 61).	Correctly set parameter No. 58 to 61.
			4. The software limit - (parameter No. 60, 61) setting value is larger than the software limit + (parameter No. 58, 59) setting value.	Correctly set parameter No. 58 to 61.
			5. An incorrect sign was set for the position range output address + (parameter No. 42, 43). Similarly, an incorrect sign was set for the position range output address - (parameter No. 44, 45).	Correctly set parameter No. 42 to 45.
			6. The position range output address - (parameter No. 44, 45) setting value is larger than the position range output address + (parameter No. 42, 43) setting value.	Correctly set parameter No. 42 to 45.
			7. The EEPROM write times exceeded 100,000 times for parameter writing, etc.	Replace the option unit.

6. TROUBLESHOOTING

Display	Name	Definition	Cause	Action
38	Servo parameter error	Servo parameter setting value is incorrect.	1. The parameter setting value was rewritten due to an option unit fault.	Replace the option unit.
			2. The EEPROM write times exceeded 100,000 times for parameter writing, etc.	Replace the option unit.
39	Connection model error	Servo amplifier series set in parameters differs from connected servo amplifier series.	1. The servo amplifier series set in the parameters differs from the connected servo amplifier series.	Correct set the common parameters No. 1 to 6.
			2. The axis setting on the servo amplifier side is incorrect.	Correctly set.
90	Home position return incomplete	For incremental system 1. Automatic operation was started before home position return was completed. 2. Home position return ended with an error.	1. Automatic operation was started before home position return was completed. 2. The axis could not be decelerated from the home position return speed to the creep speed. 3. Home position return was started from a position exceeding the dog, causing the limit switch to activate.	1. Complete home position return. 2. Review the home position return speed, creep speed and movement amount after near-point dog.
		For absolute position system 1. Automatic operation was started before home position was set. 2. Home position setting ended with an error.	1. Automatic operation was started before the home position was set. 2. The axis could not be decelerated from the home position setting speed to the creep speed. 3. Home position setting was started from a position exceeding the dog, causing the limit switch to activate.	1. Set the home position. 2. Review the home position setting speed, creep speed and movement amount after near-point dog.
98	Software limit reached	The software limit set with the parameters was reached.	1. The software limit was set within the actual movement range.	Correctly set parameter No. 58 to 61.
			2. Automatic operation of position data exceeding the software limit was started.	Correctly set the command request position data.
			3. The software limit was reached with JOG operation.	Operate within the software limit range.
99	Stroke limit detection	The limit switch (LSP_□ or LSN_□) for the commanded rotation direction is OFF.	The limit switch was validated.	Review the operation pattern so that LSP_□ and LSN_□ are ON.
B0	Servo amplifier power OFF	The servo amplifier is not in the controllable state.	1. Operation start (ST_□) was turned ON before the servo amplifier was initialized.	Wait for the servo amplifier initialization to end.
			2. Communication with the servo amplifier was cut off during normal operation.	Check whether the connection with the servo amplifier is disconnected.
E3	Absolute position counter warning	The absolute position detector pulse is incorrect.	1. Noise entered the detector.	Provide measures against noise.
			2. The detector is faulty.	Replace the servomotor.
			3. The movement amount from the home position exceeded a 32767 rotation or -37268 rotation in succession.	Make home position setting again.

7. OUTER DIMENSION DRAWING

7. OUTER DIMENSION DRAWING



REVISIONS

*The manual number is given on the bottom left of the back cover.

Print Data	*Manual Number	Revision
Jun., 2004	SH(NA)030047-A	First edition

HEADQUARTERS	EUROPEAN REPRESENTATIVES	EUROPEAN REPRESENTATIVES	EURASIAN REPRESENTATIVES
MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Straße 8 D-40880 Ratingen Phone: +49 (0)2102 486-0 Fax: +49 (0)2102 486-1120 e mail: megfamail@meg.mee.com	GEVA AUSTRIA Wiener Straße 89 AT-2500 Baden Phone: +43 (0) 2252 / 85 55 20 Fax: +43 (0) 2252 / 488 60 e mail: office@geva.at	Intehsis Srl MOLDOVA Cuza-Voda 36/1-81 MD-2061 Chisinau Phone: +373 (0) 2 / 562 263 Fax: +373 (0) 2 / 562 263 e mail: intehsis@mdl.net	Avtomatika Sever Ltd. RUSSIA Lva Tolstogo St. 7, Off. 311 RU-197376 St Petersburg Phone: +7 812 / 11 83 238 Fax: +7 812 / 11 83 239 e mail: as@avtsev.spb.ru
MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets F-92741 Nanterre Cedex Phone: +33 1 55 68 55 68 Fax: +33 1 55 68 56 85 e mail: factory.automation@fram.mee.com	TEHNIKON BELARUS Oktjabrskaya 16/5, Ap 704 BY-220030 Minsk Phone: +375 (0) 17 / 2104626 Fax: +375 (0) 17 / 2275830 e mail: tehnikon@belsonet.net	Beijer Electronics AS NORWAY Teglverksveien 1 NO-3002 Drammen Phone: +47 (0) 32 / 24 30 00 Fax: +47 (0) 32 / 84 85 77 e mail: info@beijer.no	CONSYS RUSSIA Promyshlennaya St. 42 RU-198099 St Petersburg Phone: +7 812 / 325 36 53 Fax: +7 812 / 325 36 53 e mail: consys@consys.spb.ru
MITSUBISHI ELECTRIC EUROPE B.V. Irish Branch Westgate Business Park, Ballymount IRL-Dublin 24 Phone: +353 (0) 1 / 419 88 00 Fax: +353 (0) 1 / 419 88 90 e mail: sales.info@meir.mee.com	Getronics b.v. BELGIUM Control Systems Pontbeeklaan 43 BE-1731 Asse-Zellik Phone: +32 (0) 2 / 4 67 17 51 Fax: +32 (0) 2 / 4 67 17 45 e mail: infoautomation@getronics.com	Getronics b.v. NETHERLANDS Control Systems Donauweg 2 B NL-1043 AJ Amsterdam Phone: +31 (0) 20 / 587 6700 Fax: +31 (0) 20 / 587 6839 e mail: info.gia@getronics.com	Electrotechnical Systems RUSSIA Siberia Partizanskaya St. 27, Office 306 RU-121355 Moscow Phone: +7 095 / 416-4321 Fax: +7 095 / 416-4321 e mail: info@eltechsystems.ru
MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Via Paracelso 12 I-20041 Agrate Brianza (MI) Phone: +39 (0)39 / 60 53 1 Fax: +39 (0)39 / 60 53 312 e mail: factory.automation@it.mee.com	TELECON CO. BULGARIA 4, A. Ljapchev Blvd. BG-1756 Sofia Phone: +359 (0) 2 / 97 44 05 8 Fax: +359 (0) 2 / 97 44 06 1 e mail: —	MPL Technology Sp. z o.o. POLAND ul. Sliczna 36 PL-31-444 Kraków Phone: +48 (0) 12 / 632 28 85 Fax: +48 (0) 12 / 632 47 82 e mail: krakow@mpl.pl	Electrotechnical Systems RUSSIA Siberia Shetinkina St. 33, Office 116 RU-630088 Novosibirsk Phone: +7 3832 / 22-03-05 Fax: +7 3832 / 22-03-05 e mail: info@eltechsystems.ru
MITSUBISHI ELECTRIC EUROPE B.V. Spanish Branch Carretera de Rubí 76-80 E-08190 Sant Cugat del Vallés (Barcelona) Phone: +34 9 3 / 565 3131 Fax: +34 9 3 / 589 2948 e mail: industrial@sp.mee.com	INEA CR d.o.o. CROATIA Losinjka 4 a HR-10000 Zagreb Phone: +385 (0) 1 / 36 940-01 Fax: +385 (0) 1 / 36 940-03 e mail: inea@inea.hr	Sirius Trading & Services srl ROMANIA Str. Biharia No. 67-77 RO-013981 Bucuresti 1 Phone: +40 (0) 21 / 201 1146 Fax: +40 (0) 21 / 201 1148 e mail: sirius@siriustrading.ro	ELEKTROSTYLE RUSSIA ul. Garschina 11 RU-140070 Moscow Oblast Phone: +7 095 / 514 9316 Fax: +7 095 / 514 9317 e mail: elo@elektrostyle.ru
MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane GB-Hatfield Herts. AL10 8 XB Phone: +44 (0)1707 / 27 61 00 Fax: +44 (0)1707 / 27 86 95 E-mail: automation@meuk.mee.com	AutoCont CZECH REPUBLIC Nemocnicni 12 CZ-70200 Ostrava 2 Phone: +420 59 / 615 21 11 Fax: +420 59 / 615 25 62 e mail: consys@autocont.cz	INEA SR d.o.o. SERBIA AND MONTENEGRO Karadjordjeva 12/260 SCG-113000 Smederevo Phone: +381 (0)26/ 617-163 Fax: +381 (0)26/ 617-163 e mail: inea_sr@verat.net	ELEKTROSTYLE RUSSIA Krasnij Prospekt 220-1 Office No. 312 RU-630049 Novosibirsk Phone: +7 3832 / 10 66 18 Fax: +7 3832 / 10 66 26 e mail: elo@elektrostyle.ru
MITSUBISHI ELECTRIC CORPORATION Office Tower "Z" 14 F 8-12,1 chome, Harumi Chuo-Ku Tokyo 104-6212 Phone: +81 3 6221 6060 Fax: +81 3 6221 6075	louis poulsen DENMARK Geminivej 32 DK-2670 Greve Phone: +45 (0) 70 / 10 15 35 Fax: +45 (0) 43 / 95 95 91 e mail: lpia@lpmail.com	INEA d.o.o. SLOVENIA Stegne 11 SI-1000 Ljubljana Phone: +386 (0) 1- 513 8100 Fax: +386 (0) 1- 513 8170 e mail: inea@inea.si	ICOS RUSSIA Ryazanskij Prospekt, 8a, Office 100 RU-109428 Moscow Phone: +7 095 / 232 0207 Fax: +7 095 / 232 0327 e mail: mail@icos.ru
MITSUBISHI ELECTRIC AUTOMATION 500 Corporate Woods Parkway Vernon Hills, IL 60061 Phone: +1 847 / 478 21 00 Fax: +1 847 / 478 22 83	UTU Elektrotehnika AS ESTONIA Pärnu mnt. 160i EE-11317 Tallinn Phone: +372 (0) 6 / 51 72 80 Fax: +372 (0) 6 / 51 72 88 e mail: utu@utu.ee	ARATRON AB SWEDEN Box 20087 S-16102 Bromma Phone: +46 (0) 8 / 40 41 600 Fax: +46 (0) 8 / 98 42 81 e mail: —	NPP Uralelektra RUSSIA ul. Sverdlova 11A RU-620027 Ekaterinburg Phone: +7 34 32 / 53 27 45 Fax: +7 34 32 / 53 27 45 e mail: elektra@etel.ru
MITSUBISHI ELECTRIC CORPORATION Office Tower "Z" 14 F 8-12,1 chome, Harumi Chuo-Ku Tokyo 104-6212 Phone: +81 3 6221 6060 Fax: +81 3 6221 6075	Beijer Electronics OY FINLAND Ansatie 6 A FIN-01740 Vantaa Phone: +358 (0) 9 / 886 77 500 Fax: +358 (0) 9 / 886 77 555 e mail: info@beijer.fi	ECONOTEC AG SWITZERLAND Postfach 282 CH-8309 Nürensdorf Phone: +41 (0) 1 / 838 48 11 Fax: +41 (0) 1 / 838 48 12 e mail: info@econotec.ch	STC Drive Technique RUSSIA Poslannikov per., 9, str.1 RU-107005 Moscow Phone: +7 095 / 786 21 00 Fax: +7 095 / 786 21 01 e mail: info@privod.ru
MITSUBISHI ELECTRIC AUTOMATION 500 Corporate Woods Parkway Vernon Hills, IL 60061 Phone: +1 847 / 478 21 00 Fax: +1 847 / 478 22 83	Provendör Oy FINLAND Teljänkatu 8 A 3 FIN-28130 Pori Phone: +358 (0) 2 / 522 3300 Fax: +358 (0) 2 / 522 3322 e mail: —	GTS TURKEY Darülaceze Cad. No. 43 Kat. 2 TR-80270 Okmeydani-Istanbul Phone: +90 (0) 212 / 320 1640 Fax: +90 (0) 212 / 320 1649 e mail: gts@turk.net	SHERF Motion Techn. Ltd ISRAEL Rehov Hamerkava 19 IL-58851 Holon Phone: +972 (0)3 / 559 54 62 Fax: +972 (0)3 / 556 01 82 e mail: —
MITSUBISHI ELECTRIC CORPORATION Office Tower "Z" 14 F 8-12,1 chome, Harumi Chuo-Ku Tokyo 104-6212 Phone: +81 3 6221 6060 Fax: +81 3 6221 6075	UTEKO A.B.E.E. GREECE 5, Mavrogenous Str. GR-18542 Piraeus Phone: +302 (0) 10 / 42 10 050 Fax: +302 (0) 10 / 42 12 033 e mail: —	CSC Automation Ltd. UKRAINE 15, M. Raskova St., Fl. 10, Off. 1010 U-02002 Kiev Phone: +380 (0) 44 / 238 83 16 Fax: +380 (0) 44 / 238 83 17 e mail: csc-a@csc-a.kiev.ua	MIDDLE EAST REPRESENTATIVE
MITSUBISHI ELECTRIC CORPORATION Office Tower "Z" 14 F 8-12,1 chome, Harumi Chuo-Ku Tokyo 104-6212 Phone: +81 3 6221 6060 Fax: +81 3 6221 6075	Meltrade Automatika Kft. HUNGARY 55, Harmat St. HU-1105 Budapest Phone: +36 (0) 1 / 2605 602 Fax: +36 (0) 1 / 2605 602 e mail: office@meltrade.hu	CSC Automation Ltd. UKRAINE 15, M. Raskova St., Fl. 10, Off. 1010 U-02002 Kiev Phone: +380 (0) 44 / 238 83 16 Fax: +380 (0) 44 / 238 83 17 e mail: csc-a@csc-a.kiev.ua	AFRICAN REPRESENTATIVE
MITSUBISHI ELECTRIC AUTOMATION 500 Corporate Woods Parkway Vernon Hills, IL 60061 Phone: +1 847 / 478 21 00 Fax: +1 847 / 478 22 83	SIA POWEL LATVIA Lienes iela 28 LV-1009 Riga Phone: +371 784 / 2280 Fax: +371 784 / 2281 e mail: utu@utu.lv	CBI Ltd SOUTH AFRICA Private Bag 2016 ZA-1600 Isando Phone: +27 (0)11 / 928 2000 Fax: +27 (0)11 / 392 2354 e mail: cbi@cbi.co.za	